United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
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In Reply Refer To:
1-1-94-F-41

September 9, 1994

Lt. Colonel Michael J. Walsh
U.S. Army Corps of Engineers
Regulatory Branch (Attn: Bob Smith)
211 Main Street
San Francisco, California 94105-1905

Subject: Endangered Species Formal Consultation on the Proposed Levee Maintenance Activities and Dredging in the Sonoma Creek, Petaluma River, and San Antonio Creek Drainages, Marin and Sonoma Counties, California (PN 19989N46, PN 19990N54, and PN 19991N39)

Dear Lt. Colonel Walsh:

This responds to your request for formal consultation on issuance of a permit to the Southern Sonoma County Resource Conservation District (SSCRCD) to maintain levees through dredging of material from waterways in the Sonoma Creek, Petaluma River, and San Antonio Creek drainages in Marin and Sonoma Counties. Your request for formal consultation and conferencing, dated June 3, 1994, was received by the U.S. Fish and Wildlife Service (Service) on June 6, 1994.

This biological opinion addresses the effects of levee maintenance and dredging on the endangered California clapper rail (*Rallus longirostris obsoletus*), endangered salt marsh harvest mouse (*Reithrodontomys raviventris halicoetes*), and proposed threatened Sacramento splittail (*Pogonichthys macrolepidotus*).

This biological opinion is based on (1) U.S. Army Corps of Engineers (Corps) Public Notices 19989N46, 19990N54, and 19991N39, dated February 14, 1994; (2) information in Service files; and (3) additional communications between the Corps, the SSCRCD, and the Service.

Biological Opinion

It is our biological opinion that the proposed action is not likely to jeopardize the continued existence of the endangered California clapper rail, endangered salt marsh harvest mouse, or proposed threatened Sacramento splittail. Critical habitat for these species has not been designated or proposed; therefore, none will be adversely modified or destroyed.

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Description of the Proposed Action

Participating members of the SSCRCD propose to dredge material from the channels and/or wetlands adjacent to existing levees on their property to obtain material for levee maintenance. These levees lie adjacent to Sonoma Creek, Tolay Creek, the north and east branch of Tolay Creek, Napa Slough, Second Napa Slough, Third Napa Slough, Hudeman Slough, Steamboat Slough, Schell Slough, Railroad Slough, Rainbow Slough, and San Pablo Bay in the Sonoma Creek drainage; and San Antonio Creek, Petaluma River, and San Pablo Bay in the Petaluma River drainage.

Material would be dredged using a dragline from the water side of the levee and placed directly on top of the levee. The borrow areas are typically 25 feet out from the base of the levee and 15 feet wide, although the width varies. Borrow areas are excavated about 3 feet in depth.

In the Petaluma River drainage, most of the levees along the east bank of the river and some along San Antonio Creek support emergent vegetation 25 feet or less in width. Along these stretches, material for levee repair would be dredged directly from the river or creek bed. Along the remaining levees, material would be dredged from borrow areas in adjacent sloughs (Mud, Mud Hen, Black John, and Basalt Creek) with emergent tidal vegetation. According to the Public Notice (19989N46, 19991N39), the borrow areas along most of these levees are well defined, but for some, particularly along Black John Slough, the borrow areas are less visible because of regrowth of emergent vegetation.

In the Sonoma Creek drainage, many of the levees along Sonoma Creek above Second Napa Slough, along Lower Tolay Creek, and portions of remaining sloughs support emergent vegetation 25 feet or less in width. Material in these areas would be dredged directly out of the slough or creek bed. Along other levees, material would be dredged from borrow areas in adjacent marsh. According to the Public Notice (19990N54), the borrow areas along upper Tolay Creek, the north and east branches of Tolay Creek, the south side of Tubbs Island (San Pablo Bay), the south side of Steamboat Slough, upper Hudeman Slough, Second Napa Slough, and Napa Slough east of the Gonzales property, are less visible because of regrowth of emergent vegetation.

The permit application includes 242,000 linear feet of levee in the Sonoma Creek drainage and 83,500 linear feet (excludes Redwood Sanitary Landfill proper) in the Petaluma River drainage. The Corps Regional Permit for this activity, however, would authorize the dredging of up to 4 cubic yards of material per foot of levee, not to exceed 10,000 cubic yards per property owner per year (approximately 2,500 feet of levee/property owner/year). The Regional Permit would be in effect for 5 years.

Species Account/Environmental Baseline

California Clapper Rail

Please refer to U.S. Fish and Wildlife Service (1984) for biological information on the California clapper rail. Additional information is taken

from a previous biological opinion prepared by the Service, dated August 31, 1990, on Department of the Army permit application no. 15283E49, however, certain sections on the distribution, abundance, and status of the rail contained in that opinion are updated below to reflect current information.

Of the 193,800 acres of tidal marsh that bordered San Francisco Bay in 1850, about 30,100 acres currently remain (Dedrick, 1993). This represents an 84 percent reduction from historical conditions. In the north Bay alone, 59,000 acres of tidal marsh occurred historically. Only 13,670 acres or 23 percent remain today. A number of factors influencing remaining tidal marshes limit habitat values for clapper rails. In the north Bay as well as other portions of the Bay, habitat suitability of many marshes for clapper rails is limited or precluded by small size, fragmentation, and lack of tidal channel systems and other microhabitat features. Much of the tidal marsh habitat in the project area is comprised of narrow strips adjacent to levees. Although much is unsuitable for nesting, these narrow strips of marsh may also provide movement corridors for rails dispersing from existing nesting areas. In addition, marshes in the upstream portions of the Sonoma Creek drainage are comprised of primarily freshwater vegetation which is unsuitable for the clapper rail. In other portions of the Bay, marsh erosion and conversion to freshwater habitat are eliminating or limiting available habitat for clapper rails. These limitations render much of the remaining tidal marsh acreage in San Francisco Bay unsuitable or of low value for the species.

Throughout the Bay, the remaining California clapper rail population is besieged by a suite of mammalian and avian predators. At least twelve native and three non-native predator species are known to prey on various life stages of the rail in the south Bay (Albertson *et al.*, in prep.). Albertson *et al.* (in prep.) reported nest predation as high as 64 percent in some south Bay marshes. Red fox, Norway rats, and various raptors are the most common predators of clapper rails in the south Bay. These predators also may commonly prey on clapper rails in the north Bay. No studies, however, have been done in the north Bay on the effects of predators on clapper rails. Red fox, however, have been sighted at several locations in the north Bay in recent years.

Mercury accumulation in eggs is perhaps the most significant contaminant affecting clapper rails in San Francisco Bay, with the south Bay containing the highest mercury levels. Mercury is extremely embryo toxic and has a long biological half-life. The Service collected data from 1991 and 1992 on mercury concentrations in rail eggs in the southern portion of the estuary and found that the current accumulation of mercury in rail eggs occurs at potentially harmful levels. The percentage of non-viable eggs ranged from 25 to 38 percent (mean = 29 percent). No similar studies of contaminants and their effects on clapper rails have been done in the north Bay.

Gill (1979) estimated the total California clapper rail population in San Francisco Bay in the mid-1970's at 4,200 to 6,000 birds. Surveys conducted by the California Department of Fish and Game and the Service estimated that the clapper rail population approximated 1,500 birds in the mid-1980's (Harvey 1988). In 1988, the total San Francisco Bay clapper rail population was estimated to be 700 individuals with 200-300 rails in the north Bay and Suisun

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Marsh (Foerster 1989). The total rail population reached an estimated all-time historical low of about 500 birds in 1991 with the greatest recorded declines occurring in the south Bay (USFWS unpubl. data; E. Harding-Smith, pers. comm., 1993). In response to predator management, the south Bay rail population has since rebounded and is now estimated to be approximately 600 individuals (USFWS unpubl. data). A preliminary estimate of the north Bay and Suisun Marsh population is 195-422 pairs (Evens and Collins 1992).

In the Petaluma River drainage, Evens and Collins (1992) estimated 19 pairs of clapper rails. Clapper rails were found primarily at the mouth of Petaluma River, in Petaluma Marsh, and in nearby large blocks of tidal salt marsh habitat. In the Sonoma Creek drainage, Evens and Collins (1992) estimated 13 pairs of rails with Second Napa Slough, Hudeman Slough, and the mouth of Sonoma Creek being the primary locations of breeding pairs.

In a north Bay marsh, Evens and Page (1983) concluded that the clapper rail breeding season, including pair bonding and nest construction, may begin as early as February. Field observations in south Bay marshes suggest that pair formation also may occur in February in some areas (J. Takekawa, pers. comm., 1993). Similar observations have been made in Suisun Marsh (B. Grewell, pers. comm., 1993). The end of the breeding season is typically defined as the end of August, which corresponds with the time when eggs laid during renesting attempts have hatched and young are mobile. Young may fledge as late as mid-September (J. Takekawa, pers. comm., 1993).

Upland cover for escape during flood tides is essential for the species (Evens and Page 1983). In the project area, upland refugial cover is confined to the slopes of the levees.

Salt Marsh Harvest Mouse

Please refer to U.S. Fish and Wildlife Service (1984) for a summary of the status, distribution, and habitat requirements of the salt marsh harvest mouse. The information included in the Service's August 31, 1990, biological opinion on Department of Army permit application no. 15283E49 is still current and, therefore, thereby incorporated by reference.

Preferred habitat of the salt marsh harvest mouse in the project area is tidal salt marsh dominated by pickleweed. Salt marsh harvest mice share similar habitat with the California clapper rail, and therefore have experienced similar historic loss of habitat, particularly in the north Bay.

No comprehensive salt marsh harvest mouse surveys have been conducted in either the Petaluma River or Sonoma Creek drainage basins. The most recent trapping studies in the project area occurred in the late 1970's and early 1980's in preferred habitat in Sonoma Creek, Tolay Creek, at the mouth of Petaluma River, and just south of the Highway 101 bridge over Petaluma River. Mice are presumed to inhabit other similar habitat in the drainage basins.

also found in the diet. Predators include striped bass and other piscivores. Splittail are sometimes used as bait for striped bass. Although this occurs, it is not a common practice.

Splittail can tolerate salinities as high as 10-18 ppt (Moyle 1976, Moyle and Yoshiyama 1992). Splittail are found throughout the Delta, Suisun Bay and Suisun and Napa marshes. They migrate upstream from brackish areas to spawn in freshwater. Because they require flooded vegetation for spawning and rearing, splittail are frequently found in areas subject to flooding.

The 1983-1992 decline in splittail abundance is concurrent with hydrologic changes to the Sacramento-San Joaquin Estuary. These changes include increases in water diversions during the spawning period of January through July and dams that limit upstream migration. Diversions, entrainment due to CVP/SWP pumping, dams and reduced outflow, coupled with severe drought years, introduced aquatic species, and loss of wetlands and shallow-water habitat (California Department of Fish and Game 1992) appear to have reduced the species' capacity to reverse its decline.

The existing environmental baseline for the Sacramento splittail includes Central Valley Project (CVP) and State Water Project (SWP) operations modified by D-1485, the February 12, 1993, winter-run chinook salmon biological opinion, and the Service's February 4, 1994, delta smelt biological opinion.

The Sacramento splittail is adapted to living in rivers of the Central Valley where salinity varies spatially and temporally according to tidal cycles and the amount of freshwater inflow. Despite this tremendously variable environment, historical conditions probably offered relatively consistent spring flows that provided the Sacramento splittail with desired spawning and rearing grounds. Since the 1850's, however, the amount and extent of suitable habitat for the Sacramento splittail has declined dramatically. The advent in 1853, of hydraulic mining in the Sacramento and San Joaquin Rivers, led to increased siltation and alteration of the circulation patterns of the estuary (Nichols *et al.* 1986, Monroe and Kelly 1992). The reclamation of Merritt Island for agricultural purposes, in the same year, marked the beginning of the present-day cumulative loss of 94 percent of the Estuary's tidal marshes (Nichols *et al.* 1986, Monroe and Kelly 1992).

In addition to this degradation and loss of habitat, the Sacramento splittail has been increasingly subject to entrainment, upstream or reverse flows of waters in the Delta and San Joaquin River, and constriction of desired flooded vegetative habitat. These adverse conditions are primarily a result of the steadily increasing proportion of water diverted from the Delta by the Federal and State water projects (Monroe and Kelly 1992). Water delivery through the CVP began in 1940. The SWP began delivering water in 1968. However, the proportion of freshwater being diverted has increased since 1983, and has remained at extremely high levels ever since (Moyle *et al.* 1992). The high proportion of fresh water exported has exacerbated the already harsh environmental conditions experienced by the Sacramento splittail during the last six drought years.

Sacramento Splittail

Please refer to the proposed rule to list the Sacramento splittail as a threatened species (59 FR 862) for a more detailed account of the biology of the species. The Sacramento splittail (*Pogonichthys macrolepidotus*) is a large cyprinid that can reach greater than 12 inches in length (Moyle 1976). Adults are characterized by an elongated body, distinct nuchal hump, and a small blunt head with barbels usually present at the corners of the slightly subterminal mouth. This species can be distinguished from other minnows in the Central Valley of California by the enlarged dorsal lobe of the caudal fin. Splittail are dull, silvery-gold on the sides and olive-grey dorsally. During the spawning season, the pectoral, pelvic and caudal fins are tinged with an orange-red color. Males develop small white nuptial tubercles on the head.

Splittail are endemic to California's Central Valley where they were once widely distributed (Moyle 1976). Historically, splittail were found as far north as Redding on the Sacramento River and as far south as the site of Friant Dam on the San Joaquin River (Rutter 1908). Rutter (1908) also found splittail as far upstream as the Oroville Dam site on the Feather River and Folsom Dam site on the American River. Anglers in Sacramento reported catches of 50 or more splittail per day prior to damming of these rivers (Caywood 1974).

In recent times, dams and diversions have increasingly prevented upstream access to large rivers and the species is restricted to a small portion of its former range (Moyle and Yoshiyama 1992). Splittail enter the lower reaches of the Feather (Jones and Stokes 1993) and American Rivers (Charles Hanson, State Water Contractors, in litt., 1993) on occasion, but the species now largely is confined to the Delta, Suisun Bay, Suisun Marsh, and Napa Marsh.

Splittail are long lived, frequently reaching five to seven years of age. Females are highly fecund and each produces over 100,000 eggs. Populations fluctuate annually depending on spawning success. Spawning success is highly correlated with fresh water outflow and the availability of shallow-water habitat with submerged vegetation (Daniels and Moyle 1983). Splittail usually reach sexual maturity by the end of their second year. There is some variability in the reproductive period since older fish reproduce before younger individuals (Caywood 1974). Splittail migrate upstream to spawn, similar to delta and longfin smelt. The onset of spawning is associated with rising temperature and peaks from the months of March through May, although there are records of spawning from late January to early July (Wang 1986). Spawning occurs over flooded vegetation in tidal freshwater and euryhaline habitats of estuarine marshes and sloughs and slow-moving reaches of large rivers. Larvae remain in shallow, weedy areas close to spawning sites and move into deeper water as they mature (Wang 1986).

Splittail are benthic foragers that feed on opossum shrimp, although detrital material makes up a large percentage of their stomach contents (Daniels and Moyle 1983). Earthworms, clams, insect larvae, and other invertebrates are

There are over 1,800 screened and unscreened diversions within the delta; most of which adversely impact the Sacramento splittail. Entrainment caused by these diversions is likely the greatest source of mortality to Sacramento splittail. No fish screens can protect all Sacramento splittail from being entrained or impinged, and larval Sacramento splittail are particularly susceptible to entrainment, even with the best screening.

During the Sacramento splittail critical rearing interval from March 1 to May 31, adequate outflows of sufficient magnitude and duration are beneficial to provide the conditions necessary for spawning. For Sacramento splittail, these flows also provide transport away from the influence of the CVP/SWP pumps, and provides the necessary rearing habitat areas.

Effects of the Action

Disturbance to Clapper Rail Breeding Territories

Proposed levee maintenance activities could disrupt clapper rail breeding where territories lie adjacent to levees to be maintained. The degree of this disturbance likely would depend upon the proximity of individual rails and nests and the timing within the breeding season, and could result in increased competitive interactions, territory boundary shifts, or territory abandonment.

During a recent telemetry study of clapper rails in south San Francisco Bay, researchers observed an individual rail leaving an established territory in the Laumeister Marsh during the breeding season when apparently disturbed by a PG&E work crew in April 1992. The rail disturbed in Laumeister Marsh left a small, well-defined territory and subsequently moved throughout a large 37-acre area within the marsh and was unable to establish a new territory within the breeding period (USFWS, unpub. data). As a result of this territorial abandonment, the opportunity for successful reproduction during the breeding season was eliminated (J. Takekawa, pers. comm., 1993). Data from this telemetered rail suggest that increased human activity and associated noise within a rail's established territory can significantly alter the normal behavioral patterns of rails during the breeding season, possibly resulting in extensive movements, lack of reproductive success, or territory abandonment.

Levee maintenance activities conducted during the breeding season could cause rails to shift or abandon their territories. The ability of rails to reestablish new breeding territories could be severely hampered by limited habitat available in the vicinity to establish a new territory and the fact that rails tenaciously defend established breeding territories from intrusions by other rails. Furthermore, suitable tidal marsh habitat along remaining portions of the Sonoma Creek and Petaluma River drainages also is limited and disturbed rails could be forced to move considerable distances across marginal habitat in search of suitable unoccupied habitat. Such movement by a pair of rails from its established territory could significantly increase the risk of predation and mortality. Survival of displaced rails likely would be less than survival of rails that remain in established territories. In a telemetry study of light-footed clapper rails in southern California, Zembal and Massey (1988) found that three out of six telemetered rails that moved extensively were preyed upon within a relatively short period of time. By comparison,

seven other rails that remained sedentary within established territories were not preyed upon during the telemetry period. Loss of one female rail also would constitute the loss of potential progeny to the north Bay population into the future.

Loss of Marsh Habitat

In the Petaluma and Sonoma Creek drainages there are 14 and 16 property owners, respectively, potentially needing to do levee repair in any given year. Because the permit would restrict the amount of dredging per land owner per year to 10,000 cubic yards, a maximum of 140,000 cubic yards/year or 3.2 acres/year in the Petaluma River drainage and 160,000 cubic yards/year or 3.7 acres/year in the Sonoma Creek drainage could be dredged. According to calculations in the Public Notice, which are based on SSCRCD previous work from 1978 to 1990 under a separate permit and SSCRCD data, the total average borrow area dredged per year was estimated to be 210,000 square feet or 4.8 acres. The SSCRCD believes that only 1/3 to 1/2 of property owners that apply in any given year to repair levee segments actually do the work in that year.

Although the SSCRCD has applied for a five year permit which allows limited dredging by each property owner, this dredging activity is likely to continue into the future. Past levee maintenance activities have resulted in primarily permanent and some temporary loss of tidal salt marsh habitat as evidenced by the permanency of the majority of borrow ditches in both the Petaluma and Sonoma Creek drainages. This activity has resulted in a permanent and temporary loss of nesting habitat and cover for the clapper rail and habitat for the salt marsh harvest mouse.

The Service has calculated the acreage of tidal salt marsh habitat that has in the past or in the future will be affected by dredging operations in the Petaluma River drainage. The area affected was calculated by multiplying the linear feet of levees of each property in the application by a borrow area 15 feet in width. Subtracted from this calculation were levee areas not lying adjacent to salt marsh habitat and levee segments that have tidal marsh vegetation less than 25 feet wide adjacent to the levee. In these latter areas, it was assumed that the dredge reaches into the slough for material and does not disturb tidal marsh vegetation. For the purposes of this calculation, we also assumed that vegetation lying between the borrow area and the crest of the levee would not be impacted by the dredging operation. The total area of wetland impact was calculated to be 15 acres in the Petaluma River drainage and 56 acres in the Sonoma Creek drainage.

Excavation of borrow ditches, however, could benefit clapper rails and salt marsh harvest mice in several ways. Creation of borrow ditches might increase tidal circulation in the marsh where the ditches are connected to tidal sloughs. Increased tidal circulation in the marsh could increase overall marsh productivity, thereby indirectly benefiting the clapper rail and salt marsh harvest mouse. The number of ditches connected to tidal sloughs in the project area, however, has not been quantified and, therefore, the extent of this potential benefit to the rail and mouse is unknown. These borrow ditches also may provide travel lanes or foraging areas for clapper rails, although no studies have been done to estimate the extent of their use by clapper rails.

Where borrow ditches have revegetated, plant species diversity could increase marsh productivity by providing alternate nesting habitat.

Interruption of Access by Salt Marsh Harvest Mice to Refugial Habitat

Temporary and permanent creation of 15-foot wide borrow ditches between the levee slope and the tidal salt marsh interrupt access to high tide refugial habitat for the salt marsh harvest mouse. During high tide events at the locations of borrow ditches, salt marsh harvest mice would be forced to leave vegetative cover and cross a 15-foot wide expanse of water to reach upland cover on the levee slope. Exposure of salt marsh harvest mice to predation would be significantly increased.

Disturbance to Refugial Habitat for Clapper Rails

Noise associated with levee maintenance particularly if these activities occur during high tides could reduce availability of high tide refugial habitat that lies along the outboard levee face. The level of impact would be exacerbated if levee maintenance activities occur during a winter high tide series, which typically occurs from November through February each year. High tide series during these months also can be augmented substantially with changes in local weather patterns, including the presence of low pressure systems, heavy precipitation, and extraordinary tidal heights associated with storm surges (J. Takekawa, pers. comm., 1993). Although no studies have been done of the availability or extent use of refugial cover in the project area, it is likely that during high tide series, suitable refugial habitat becomes limited and any available vegetative cover becomes critical to the survival of clapper rails in the project area.

Rail mortality could occur if rails are displaced by levee maintenance activities during a high tide and are preyed upon while attempting to seek alternative refugial habitat along the levee or within the adjacent marsh. DeGroot (1927) noted that rails were extremely vulnerable to predation by raptors during high tide events when they were forced to seek refuge in exposed locations. Foerster *et al.* (1990) observed red foxes and raccoons foraging in one south Bay marsh during extreme winter high tides. Additional observations of red foxes foraging in south Bay marshes during high tides have been made by Refuge staff (E. Harding-Smith, pers. comm., 1993). Furthermore, of 7 rails lost to raptor predation during a telemetry study, all were lost during tidal cycles of 5.5 NGVD or higher (USFWS, unpub. data). Although lacking comparative data, Evens and Page (1986) suspected that avian predator success on black rails to be much lower during tidal events below winter high tides, and suggested initiation of a study on avian and possibly mammalian predatory behavior to determine if these predators keyed into high tide events and thus increased their foraging activities.

Loss of Subtidal Habitat

The dredging and/or excavation of bottom material from tidal sloughs or borrows for the purposes of providing material for levee maintenance has the potential to effect Sacramento splittail directly and indirectly. First, because Sacramento splittail are known to utilize flooded vegetation in

shallow slow moving sloughs and back water channel habitat for spawning, they, or the eggs they may have laid, may be directly taken as a result of the dredging and/or excavation of existing substrate if such activity disrupts or removes any existing emergent vegetation. The placement of dredged materials on the tops of levees could further effect emergent vegetation if measures, such as temporary fences or walls, are not constructed to prevent such material from falling back into the water. Eggs laid that are not directly taken by the dredging activities could remain unfertilized as adults are "chased" from the nesting sites by the proposed dredging activities. Eggs could also become covered with silt stirred up from the dredging operations and suffocated. Further, because the dredging activities will subsequently change the water depth and circulation in these areas, Sacramento splittail may be forced to seek alternative, less desirable, spawning sites.

Dredging operations resulting in the creation of standing pools that are not tidally influenced at low tide could result in the stranding of Sacramento splittail and other species. Stranding could make these species more susceptible to predation by predatory fish that are also stranded in the pool or piscivorous birds in and around the area. Therefore, any pools created during dredging must be provided with escape channels to allow free movement of any stranded species. These escape channels must also be accessible at low tides.

Summary

1) Disturbances from levee maintenance work during the breeding season from February through August creates the likelihood for rails to abandon up to an estimated 8 breeding territories within adjacent tidal marshes. The Service assumes this could result in the loss of reproductive success during the breeding season, and/or possible mortality of displaced individual birds. Any combination of the above would result in a net reduction in the long-term reproductive contribution to the population.

2) Long term levee maintenance work would result in the permanent and temporary loss of about 15 acres of tidal salt marsh in the Petaluma River Drainage and 56 acres of tidal salt marsh in the Sonoma Creek drainage which provides cover for both the salt marsh harvest mouse and clapper rail, and possibly nesting habitat for the clapper rail.

3) Levee maintenance work which creates permanent borrow ditches interrupts access for the salt marsh harvest mouse to the levee slope during high tide events, thereby increasing the risk of predation.

4) Levee maintenance work conducted during high tide events would reduce availability of high tide refugial habitat for clapper rails in the project area, thereby increasing the risk of predation.

5) Levee maintenance work conducted within areas of emergent vegetation may disrupt the normal behavioral patterns of Sacramento splittail including, but not limited to, breeding, feeding, and sheltering, and may also mobilize sediments containing contaminants.

Based on our analyses above, the increased probability of adverse effects to a low number of individuals, including progeny, and temporary loss of a small area of habitat from the proposed project, would not appreciably reduce the likelihood of survival and recovery of the endangered salt marsh harvest mouse and California clapper rail or the proposed Sacramento splittail in the wild.

Cumulative Effects

Cumulative effects are those impacts of future non-Federal actions affecting listed species that are reasonably certain to occur in the action area. Future Federal actions are subject to the consultation requirements under section 7 of the Act and, therefore, are not considered cumulative to the proposed action.

Cumulative effects on the clapper rail include ongoing habitat conversion from salt to brackish conditions by fresh water effluent from the San Jose/Santa Clara Water Pollution Control Plant. The San Francisco Bay Regional Water Quality Control Board routinely renews discharge permits that allow marsh conversion to continue. Although the most recent permit renewal contained a mitigation measure to replace about 275 acres of former salt marsh that has converted to largely unsuitable brackish marsh conditions, it has yet to be implemented. Other cumulative effects include chemical contamination from point and non-point discharges that may adversely affect survival rates and reproductive success.

One of the most serious cumulative effects on the salt marsh harvest mouse has been the degradation of diked wetlands, typically by the elimination of wetland vegetation through grazing, discing, grubbing, and plowing, and/or the elimination of appropriate hydrologic conditions by installing drains, ditches, and pumps. The extensive conversion of south Bay salt marshes to brackish and freshwater habitat also has appreciably reduced available tidal habitat for the species. Approval of urban developments without maintaining adequate upland habitat adjacent to wetlands also represents a major cumulative effect by likely increasing mortality rates and lowering harvest mouse carrying capacity in affected areas.

Cumulative effects on the Sacramento splittail include any continuing or future diversions of water that may entrain adult or larval fish or that may decrease outflows incrementally. Water diversions through intakes serving numerous small, private agricultural lands and duck clubs in the Delta, upstream of the Delta, and in Suisun Bay contribute to these cumulative effects. These diversions also include municipal and industrial uses, and provide cooling water for power plants. State or local levee maintenance and channel dredging activities also disturb spawning or rearing habitat. Sacramento splittail adults seek flooded vegetation in shallow, tidally-influenced sloughs and channel edges for spawning. To assure egg hatching and larval viability, spawning areas also must provide suitable water quality (i.e., low concentrations of pollutants) and substrates for egg attachment (e.g., submerged tree roots and branches and emergent vegetation). Suitable water quality must be provided by addressing point sources of contaminants so that maturation is not impaired by pollutant concentrations. Levee

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maintenance and channel dredging disturbs spawning and rearing habitat, and re-suspends contaminants into these waters.

Cumulative effects also include point and non-point source chemical contaminant discharges. These contaminants include selenium and numerous pesticides and herbicides associated with discharges related to agricultural and urban activities. Implicated as potential sources of mortality in Sacramento splittail, these contaminants may adversely affect splittail reproductive success and survival rates.

Cumulative effects, operating together with those of the proposed action, are not likely to appreciably reduce the likelihood of survival and recovery of the salt marsh harvest mouse, California clapper rail, or Sacramento splittail.

Incidental Take

Sections 4(d) and 9 of the Act, as amended, prohibit taking (i.e., to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct) of listed species of fish or wildlife without special exemption. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. Harass is defined as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Under the terms of 7(b)(4) and 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered a prohibited taking provided that such taking is in compliance with the terms and conditions of this incidental take statement. The measures described below are nondiscretionary, and must be undertaken by the agency so that they become binding conditions of any authorization granted to the applicant for the exemption under 7(o)(2) to apply.

The Federal agency has a continuing duty to regulate the activity that is covered by this incidental take statement. If the agency fails to require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the authorization, the protective coverage of 7(o)(2) may lapse.

For the California clapper rail, we anticipate that harassment and/or harm of up to 8 pairs of rails would result from the proposed action. Reduced availability of refugial habitat would subject rails to increased risk of predation. Territorial abandonment by rails could result in harassment and/or harm of individual rails and breeding failure. Levee maintenance activities over the long term would directly impact about 71 acres of rail cover and possibly nesting habitat.

The Service anticipates that an unquantifiable number of harvest mice may be killed during levee maintenance activities over the long term. This area of impact is estimated to be 71 acres in the two drainages combined. An additional unquantifiable number of harvest mice not directly impacted by

levee maintenance activities may be exposed to higher levels of predation because of the loss of continuous habitat adjacent to the levees. The harvest mouse population, however, is expected to rebound in those areas where the borrow ditches revegetate.

The Service anticipates that an unquantifiable number of Sacramento splittail may be taken as a result of the proposed maintenance activities. Project implementation would reduce the availability of approximately 13.5 acres of spawning and rearing habitat for Sacramento splittail. In this area contaminants would also be mobilized and could also adversely affect Sacramento splittail over an unknown period of time as these substances bio-accumulate.

The Service establishes the following reasonable and prudent measures to minimize the impact of incidental take. The measures described below are nondiscretionary, and must be implemented by the Department of the Army.

1) The potential for harassment, harm (including habitat modification), or mortality to California clapper rails shall be minimized.

2) Impacts to California clapper rail and salt marsh harvest mouse resulting from habitat modification shall be minimized.

3) Harm and harassment to Sacramento splittail resulting from the proposed dredging operations shall be minimized.

To be exempt from the prohibitions of Section 9 of the Act, the following terms and conditions, which implement the reasonable and prudent measures described above, must be complied with, and included as special conditions in any permit granted by the Department of the Army for this project.

The following terms and conditions implement reasonable and prudent measure #1:

(a) To avoid possible disruption of clapper rail breeding activities, levee maintenance work in the Petaluma River and Sonoma Creek drainages shall not occur during the period from February 1 through August 31 within any given year on the levee segments shown in the enclosed maps (cross-hatched areas) of the drainage basins. These areas are: in the Petaluma River drainage - 2,500 linear feet of levee (California Department of Fish and Game) adjacent to Black John Slough; and for the Sonoma Creek drainage - (1) 4,000 linear feet of levee (Kiser Brothers) that lies adjacent to Second Napa Slough; (2) 2,900 linear feet of levee and 800 linear feet of levee (J. Leveroni), both adjacent to Hudeman Slough; (3) 3,400 linear feet of levee (W. Haire) adjacent to Hudeman and Second Napa Sloughs; and (4) 8,000 linear feet of levee (N. Yanni) at the mouth of Sonoma Creek. All levee segments lie adjacent to established clapper rail breeding territories. Future surveying for rails in either drainage may result in expansion or contraction of seasonal restrictions to protect nesting rails. The Service shall provide the Corps with any revision to rail seasonal restrictions during annual review of work proposed under the permit.

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(b) Levee maintenance adjacent to the above clapper rail nesting areas shall not occur during high winter tide events to avoid disturbance of clapper rails using refugial habitat within these areas.

The following term and condition implements reasonable and prudent measure #2:

(a) The applicant shall prepare and implement a detailed tidal salt marsh habitat restoration plan which compensates for the permanent and temporary loss of 71 acres of salt march harvest mouse and clapper rail habitat associated with the proposed action. The enclosed maps identify several areas within the Petaluma River and Sonoma Creek drainages that could be suitable restoration sites (outlined areas). These are: in the Petaluma River drainage - (1) a 98-acre piece of agricultural land owned by the Redwood Sanitary landfill, (2) a 48-acre portion of agricultural land owned by A. Anolik on the Petaluma River, and (3) a 20-acre portion of agricultural land owned by M. Kullberg on the Petaluma River; and in the Sonoma Creek drainage - (1) a 16-acre piece of agricultural land owned by D. Reinecker, which was formerly the bed of the North Branch of Tolay Creek, and 62 acres of native vegetation upstream of the 16-acre parcel on Tolay Creek that could be enhanced; and (2) a 74-acre portion of agricultural land owned by G. Kiser near Wingo. The restoration plan shall be submitted to the Service and Corps for review and approval within one year of permit issuance and implemented within two years of permit issuance. The plan shall include habitat enhancement, monitoring for compliance and effectiveness, and management in perpetuity of the habitat for salt marsh harvest mouse and California clapper rail. Upon completion of appropriate salt marsh mitigation, no consultation for future regional permits will be required on the effects of the temporary and permanent loss of tidal salt marsh habitat on the salt marsh harvest mouse and California clapper rail provided there are no changes in the scope and extent of levee maintenance work which is currently proposed.

The following terms and conditions implement reasonable and prudent measure #3:

(a) To minimize take of Sacramento splittail, no dredging shall be conducted between January 1 and July 31. Because Sacramento splittail utilize the proposed areas for spawning and rearing during this time, habitat during this season must remain undisturbed.

(b) To minimize the impacts to the normal behavioral patterns of Sacramento splittail including, but not limited to, breeding, feeding, and sheltering, dredging shall occur away from the edge waters so that the shorelines are minimally disturbed. Dredging not shall disturb any emergent vegetation or create pools that are not tidally influenced at low tide. Furthermore, no dredged materials shall be placed on any existing emergent vegetation during levee repairs or fall into the water where emergent vegetation exists.

If, while maintaining levees in the project areas, the amount or extent of incidental take of the California clapper rail, salt marsh harvest mouse or Sacramento splittail, as described above, is exceeded, the causative action shall cease and consultation shall be reinitiated immediately.

The Service shall be notified within twenty-four (24) hours of the finding of any injured or dead California clapper rail or their eggs, or salt marsh harvest mouse, or any unanticipated damage to clapper rail or salt marsh harvest mouse habitat associated with levee maintenance. Notification must include the date, time, and precise location of the specimen/incident, and any other pertinent information. The Service contact person is Karen Miller (916/978-4866). Any dead or injured specimens shall be reposited with the Service's Division of Law Enforcement, 2800 Cottage Way, Sacramento, California 95825-1846 (916/978-4860).

This concludes formal consultation on the proposed work described above. Reinitiation of formal consultation is required if (1) the amount or extent of incidental take is exceeded, as previously described; (2) new information reveals effects of the actions that may affect listed species or critical habitat in a manner that was not considered in this opinion; (3) if the project is substantially modified in a manner that causes an effect to listed species that was not considered in this opinion; and/or (4) if a new species is listed or critical habitat is designated that may be affected by the action. If you have any questions regarding this opinion, please contact Karen Miller (mouse/rail) or Matt Vandenberg (splittail) of my staff at (916) 978-4866.

Sincerely,

Joel A Medlin

Joel A. Medlin
Field Supervisor

Enclosures

cc: RD (ARD-ES), FWS, Portland, OR
FS (ES), FWS, Wetlands Branch, Sacramento, CA
DHC, Washington, D.C.
CDFG, Region III, Yountville, CA
CDFG, Environmental Services, Sacramento, CA

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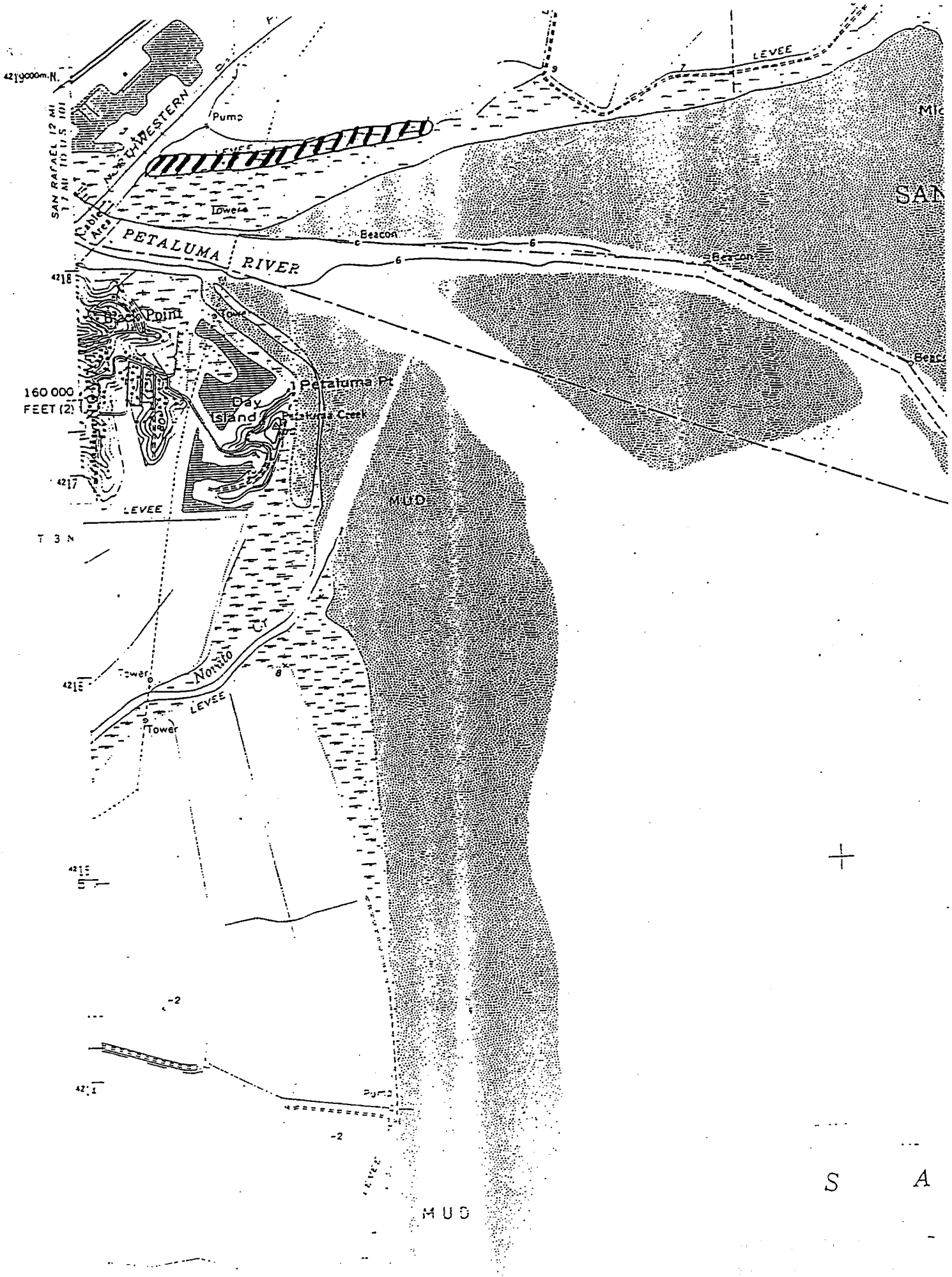
4219000m.N.
SAN RAFAEL 12 MI
17 MI TO U.S. 101
NORTHWESTERN
Pump
LEVEE
Towers
Cable Area
PETALUMA RIVER
Beacon
Beacon
4218
Black Point
Tower
160 000
FEET (2)
Petaluma Pt
Day Island
Petaluma Creek
4217
LEVEE
MUD
T 3 N
Novato
Tower
LEVEE
Tower
4216
4215
-2
4214
Pump
-2
LEVEE
MUD
LEVEE
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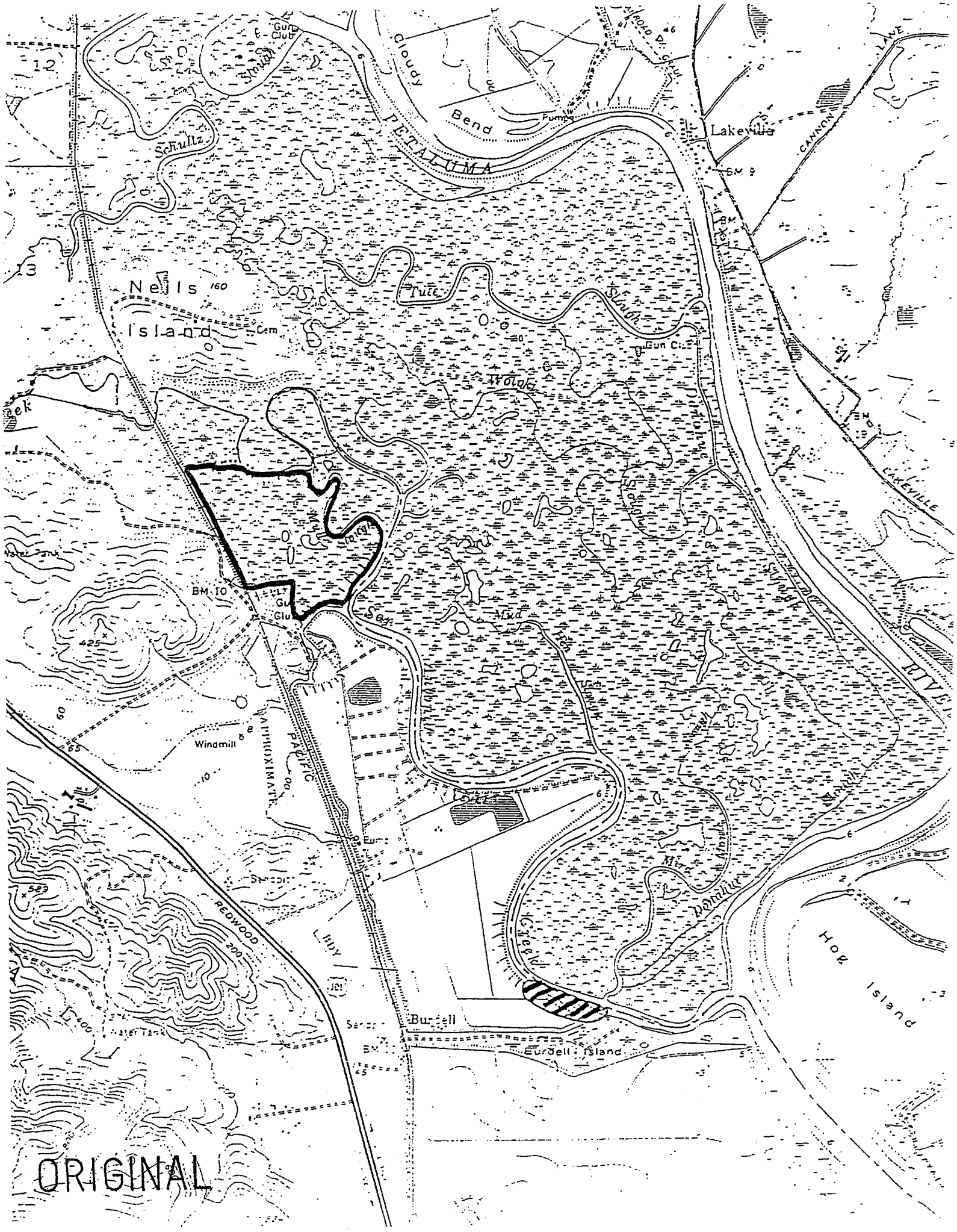
Gun Club
Slough
Cloudy
Bend
Pump
Lakeville
CANNON
LANE
PETALUMA
Schultz
Nells
Island
Cem
Tule
Slough
Gun Club
Wolok
LAKEVILLE
Water Tank
BM 10
Gun Club
Mud
Slough
RIVER
425
Windmill
APPROXIMATE
PACIFIC
Lovell
Sandpit
REDWOOD
Hog
Island
Burdell
Burdell Island
Water Tank

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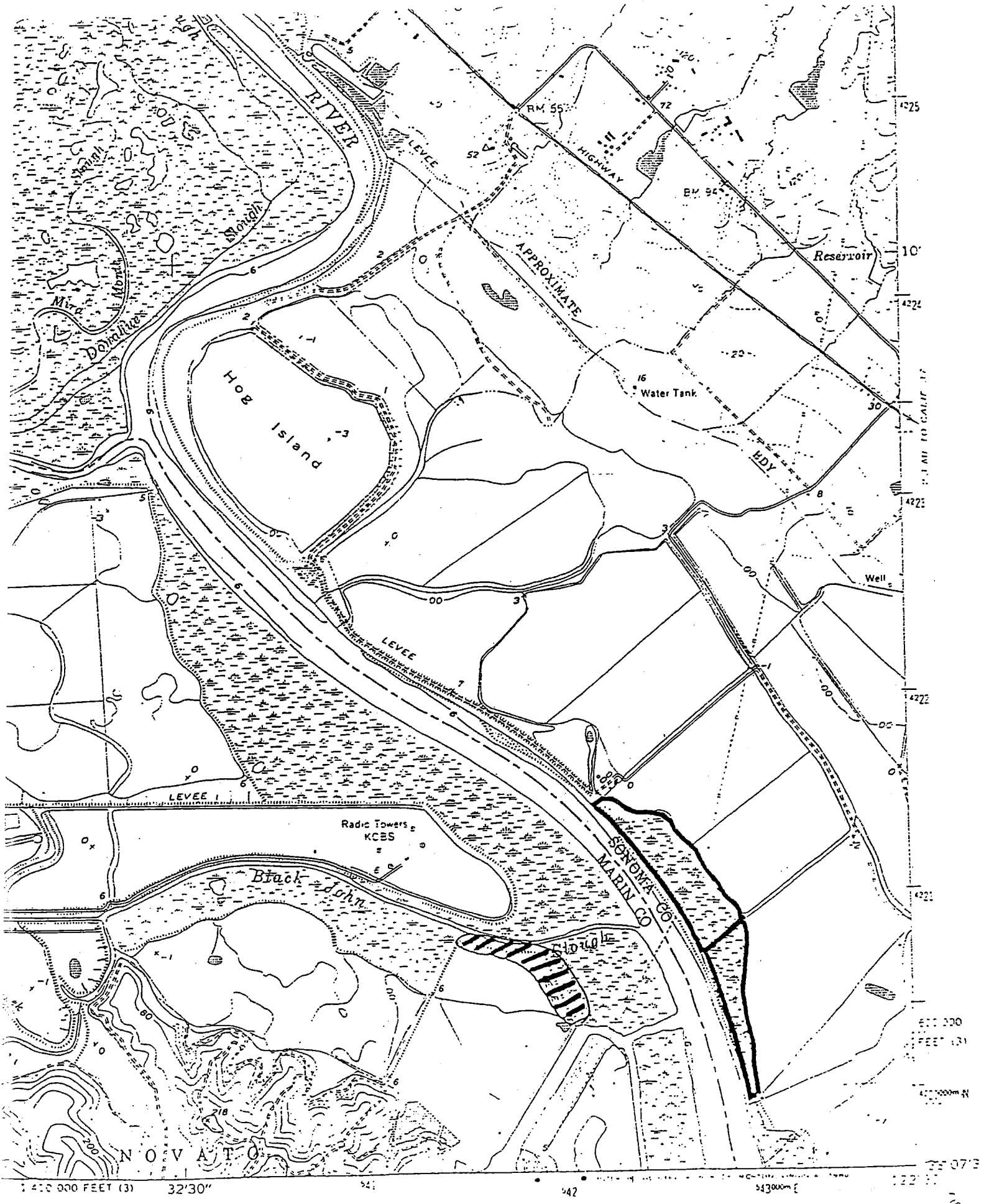
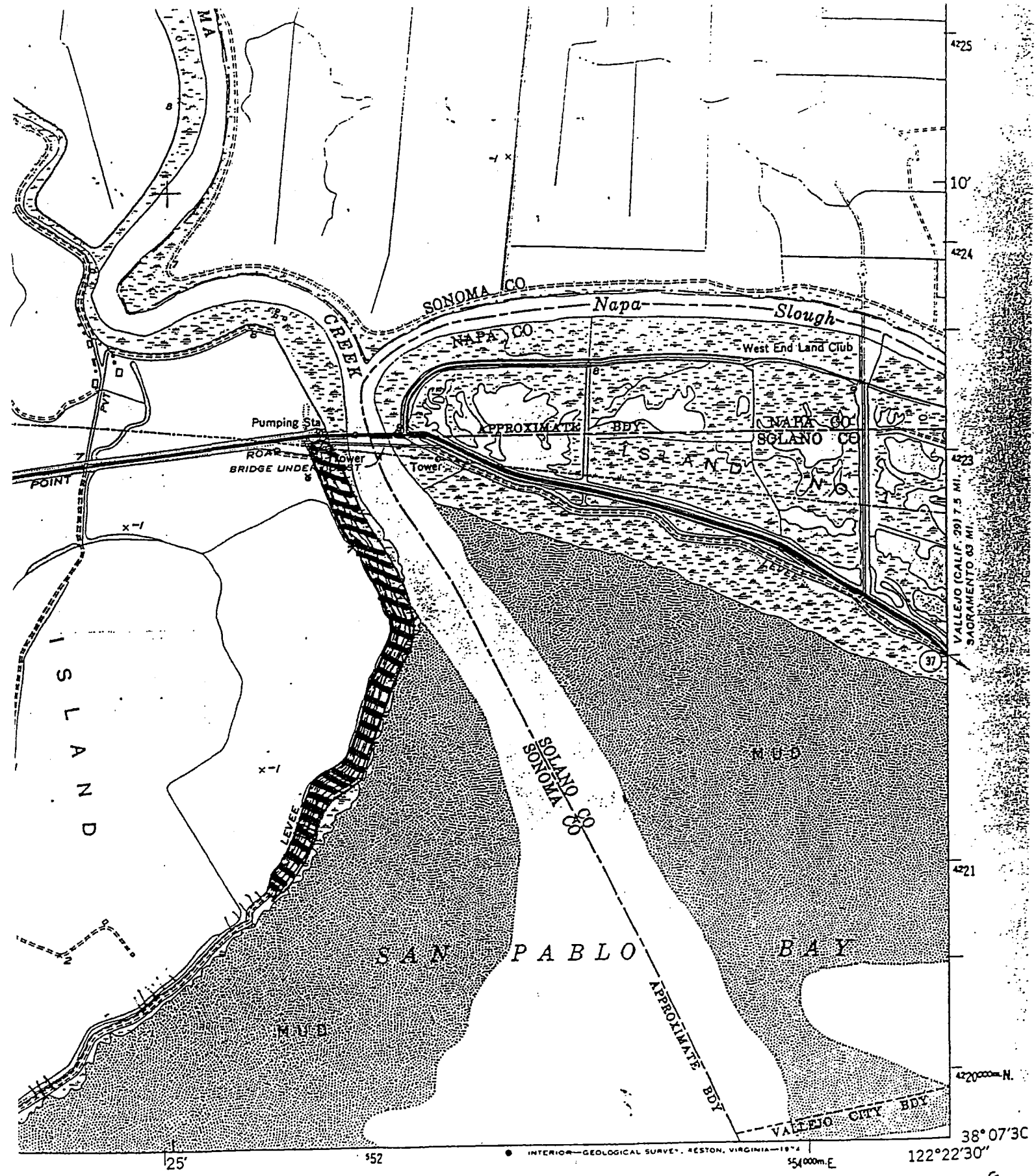

RIVER
LEVEE
HIGHWAY
BM 55
BM 96
APPROXIMATE
Reservoir
Water Tank
Hog Island
Mira Donalitee
Monah
HDY
Well
LEVEE
LEVEE
Radio Towers
KCBS
Black John
SONOMA CO
MARIN CO
NOVATO
1 410 000 FEET (3)
32'30"
942
943000m E
ROAD CLASSIFICATION



1 MILE

7000 FEET

METER

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ROAD CLASSIFICATION

Heavy-duty

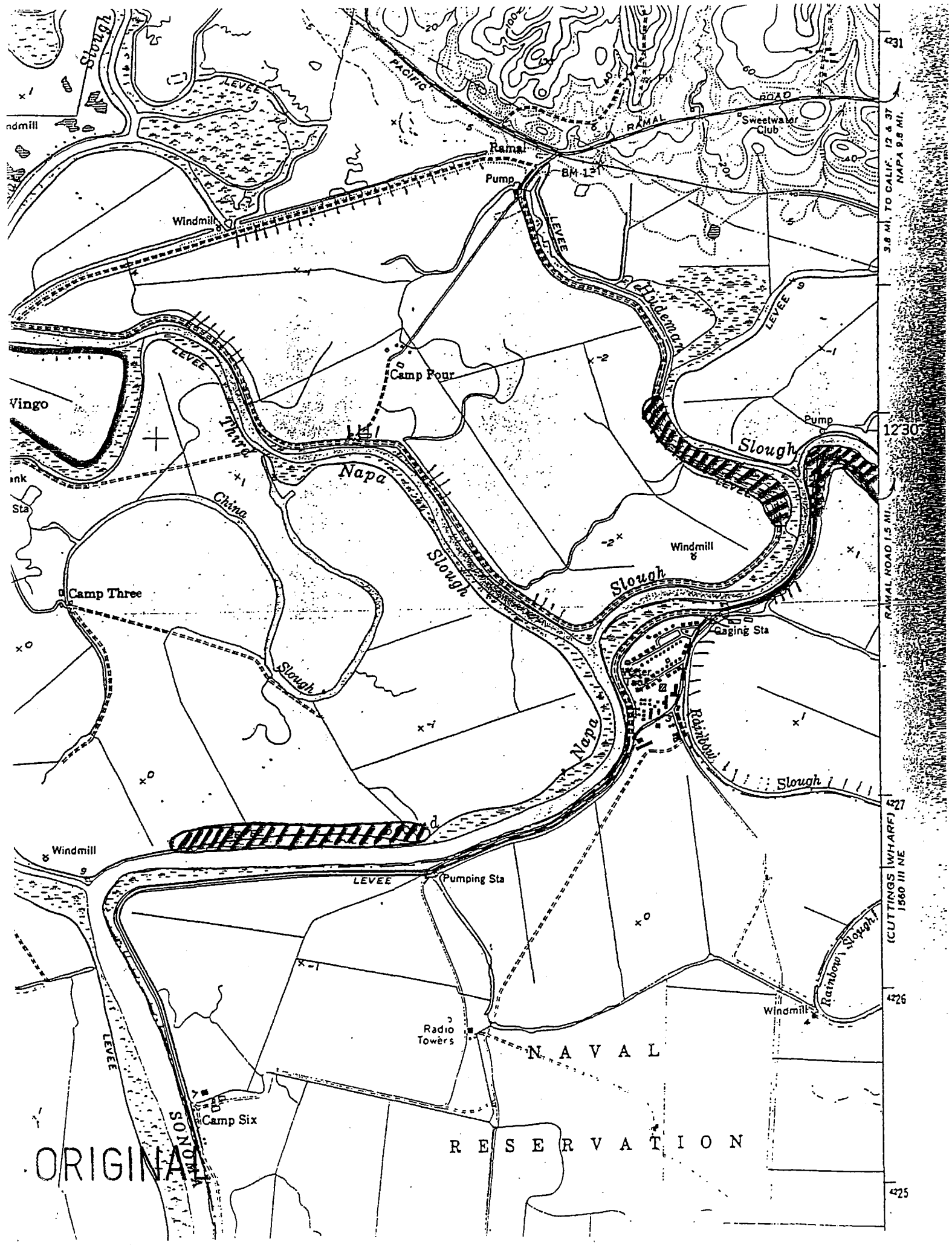
Medium-duty

Light-duty

Unimproved dirt

State Route


Sonoma Valley Club
Water Tanks
Wingo
LEVEE
APPROXIMATE
Gas Tank
Pumping Sta
PRIVATE
Third
Napa
China
Slough
Camp Three
Water Tank
McGill
BM 9
Camp One
Windmill
Quarry
Reservoir
Pumping Sta
North
Bush
Slough
Fairville
Branch
East
Branch
Camp Six
SONOMA
CREEK
TUBE
Windmill


Slough
LEVEE
PACIFIC
ROAD
RAMAL
Sweetwater Club
Ramal
Pump
BM 12
Windmill
LEVEE
Hudeman
LEVEE
Camp Four
Vingo
Third
Napa
China
Slough
Pump
Slough
LEVEE
Windmill
Slough
Camp Three
Gaging Sta
Slough
Napa
Rainbow
Slough
Windmill
LEVEE
Pumping Sta
Rainbow Slough
Windmill
Radio Towers
NAVAL
LEVEE
Camp Six
SONOMA
RESERVATION
3.8 MI. TO CALIF. 12 & 37
NAPA 9.8 MI.
RAMAL ROAD 1.5 MI.
(CUTTINGS WHARF)
1560 III NE
4231
1230
4227
4226
4225

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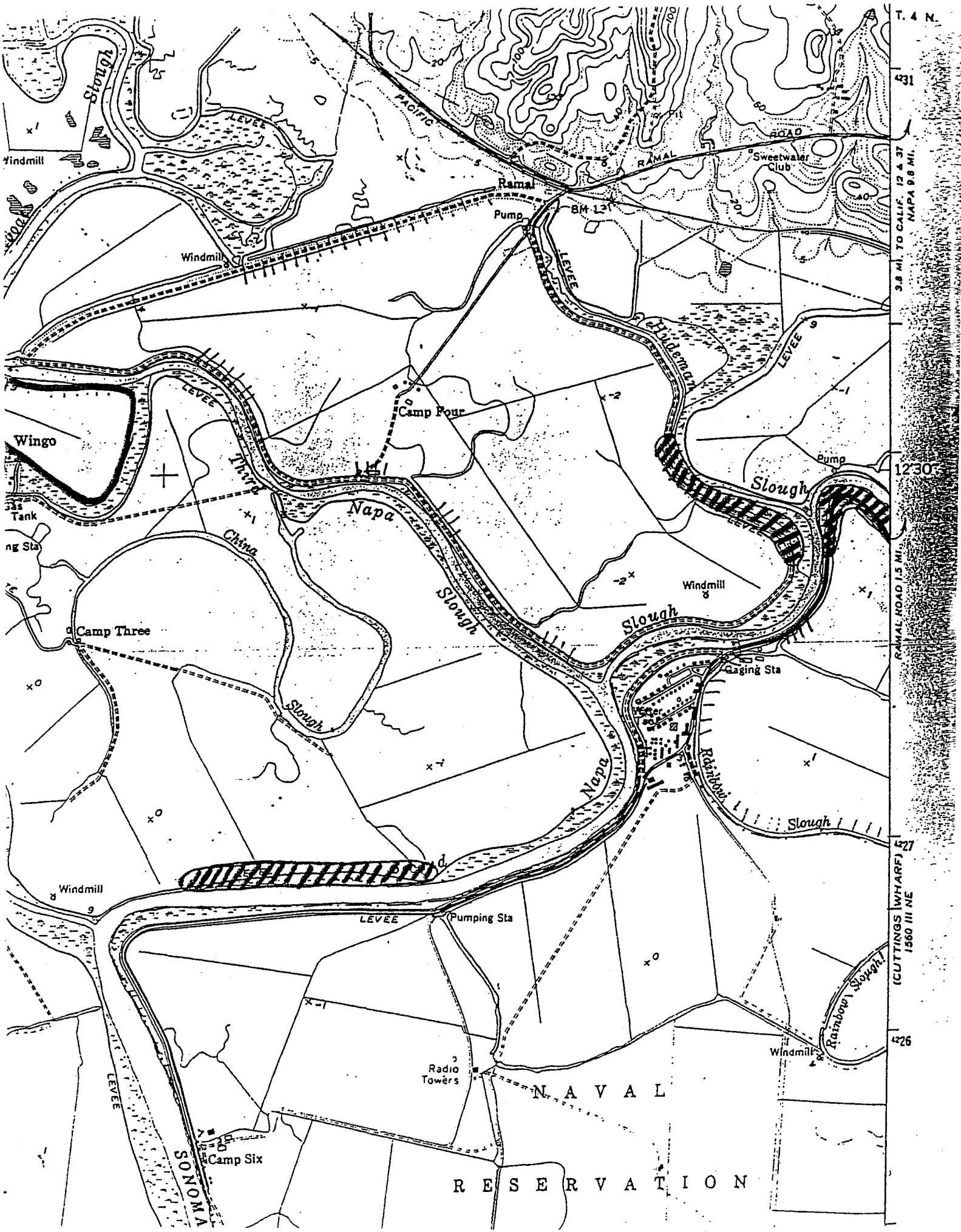
T. 4 N.
Slough
Windmill
LEVEE
PACIFIC
ROAD
RAMAL
Sweetwater Club
Ramal
Pump
BM 131
Windmill
LEVEE
Hudema
LEVEE
Camp Four
Wingo
LEVEE
Thirp
Napa
Slough
Pump
Slough
Gas Tank
China
Slough
Camp Three
Slough
Windmill
Slough
Gaging Sta
Water
Napa
Rainbow
Slough
Slough
Windmill
LEVEE
Pumping Sta
Rainbow Slough
Windmill
Radio Towers
NAVAL
LEVEE
Camp Six
SONOMA
RESERVATION
4231
3.8 MI. TO CALIF. 12 & 37
NAPA 9.8 MI.
12'30"
RAMAL ROAD 1.5 MI.
4227
(CUTTINGS WHARF)
1560 III NE
4226

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