# MEMORANDUM

TO: Andy Hauge, Robin Cort

FROM: Jeff Peters, Gary Halsey, Joyce Hunting, Dave Smith

DATE: July 31, 1995

RE: Santa Rosa Subregional Long-term Wastewater Project
Baylands (Reyes Soils) Screening Study

---

## SUMMARY

This report summarizes our recommendations regarding the feasibility/advisability of including Baylands (Reyes soils) as an irrigation component of the South County alternative project. An earlier memorandum, dated April 6, 1995, reports on the technical feasibility of the irrigation of Reyes soils, which prior to this time has been considered problematic. We conclude that irrigated hay crops and irrigated pasture can be established on Reyes Soils, but the soils are not suited to other cultivated crops such as alfalfa or vegetables because of extreme acidity and poor drainage conditions. The April 6 memorandum also addressed the potential economic benefits to the dairy industry from reduced purchases of supplemental feeds.

Our recommendation is that the Lakeville Baylands area should be included as a component of the South County alternative, which provides about 2,500 acres of suitable soils (**Figure 1**). The acreage in this area available for irrigation may fluctuate due to the possible identification of target tidal restoration areas by state agencies. The Schellville Baylands area, about 4,000 acres (**Figure 1**), should not be included as a project component at this time, and only included in the unlikely event it becomes apparent that additional South County irrigation acreage is needed

## PURPOSE

The BPU has directed that Baylands be included in the South County alternative based on their suitability for irrigation; however, potential environmental constraints must still be considered. Pursuant to Task 18 of amendment and work scope, we conducted a screening level analysis of the areas of Reyes soils in the Lakeville and Schellville areas to determine irrigation suitability and feasibility. The objective of the screening studies was to screen out any large areas of Reyes soils with obvious and significant environmental problems, such as high quality seasonal wetlands, endangered species habitat or other issues, and to provide a feasibility review of the remaining acreage.

Irrigation of Baylands Reyes soils along the Petaluma River and upper San Pablo Bay has, to this point, only been considered a tentative project component of the South County alternative. This is because

potentially significant environmental concerns may make irrigation problematic. If there are significant issues present, a thorough evaluation of this component could be costly.

## METHODOLOGY

A decision was made that it would be appropriate to undertake a preliminary or screening level evaluation of the feasibility of irrigating Baylands soils in two areas:

1) West of Lakeville Highway, along the Petaluma River; and,

2) North of Highway 37 in the lower Schellville area.

The Baylands south of Highway 37 were not included as they have higher potential for marsh restoration. The goal was to identify through reconnaissance methods, including air photo interpretation and literature review, between 4,000 and 5,000 acres of Baylands that do not appear to have significant environmental issues. The screening studies included a review of literature and discussions with personnel from select agencies. Among the issues that were evaluated were:

- jurisdictional wetlands
- special status species
- surface water quality
- groundwater quality
- other agency plans
- distance from project components

## FINDINGS

### Schellville Baylands Area

The Baylands area south of Schellville was examined first and found to have a number of biological characteristics which would need to be explored in depth in order for this area to be considered a legitimate and cost effective project component. Unlike the Lakeville area, the Schellville Baylands contains a number of functioning wetland slough channels which meander through the area. These contain habitat capable of supporting sensitive species; these habitat areas require more detailed study. Other portions of the Schellville project area contain seasonal wetlands which have not been converted to agricultural uses (not prior converted acreage).

In addition, the Vallejo Sanitary District has a long-standing project to add biosolids to soils in the Tubbs Island Area. This represents a potential agency issue regarding the liability and responsibility for damages should pollutant build-up occur in soils or groundwater from either biosolids or wastewater application. Joint responsibility for management may be difficult to achieve. Because of these concerns, and the

distance of the Schellville area from potential reservoir sites and other irrigation lands, it is recommended that this area not be included unless a significant need for additional irrigation acreage is identified.

## Lakeville Baylands Area

### *Wetland Issues*

Nearly all areas of Baylands soils along Lakeville Highway can be considered to be either prior converted wetlands or farmed wetlands (i.e., not under U.S. Army Corps jurisdiction), with a small area of wetland pastures. These designations are utilized by both the Army Corps for purposes of determining jurisdiction under Sec. 404 of the Clear Water Act, and the Natural Resource Conservation Service (formally the Soil Conservation Service) for evaluating farmer eligibility under USDA farm support programs. To avoid this issue, an element of the screening study was to identify areas of prior converted wetlands from functioning seasonal wetlands. Aerial photos from 1982, 1985, 1987, 1990 and 1992 were examined to determine the cropping, ponding, and wetland acreage for the Lakeville Highway Reyes soils. Sources of the photography included Western Air Corporation (WAC, Corvallis), Pacific Aerial Surveys (Oakland) and Soil Conservation Service (SCS) and Agricultural Stabilization and Conservation Services (ASCS, Petaluma field office). Based on the air photo review of the approximately 2,600 acres of Baylands, ponding, buildings, and wetlands accounted for approximately 75 acres. A 50-acre area was plowed in 1982 and a hay crop established, but has since been allowed to revert to seasonal wetland. All of the remaining acreage showed evidence of plowing or tilling in each set of photos. We identified about 2,500 acres that were either prior converted or farmed wetlands. These are defined as follows:

- **Prior Converted Wetlands**. Prior converted wetlands have had their hydrology altered either by cultivation practices that tend to level and fill in low areas, or by installation of drainage ditches to the extent that discontinuation of normal farming practices would not cause the land to revert to wetland vegetation. These wetlands were drained, dredged, filled, leveled or otherwise manipulated prior to December 23, 1985 and have been cropped regularly since. By definition, prior converted wetlands do not flood or pond in most years. Prior converted wetlands are not normally subject to Sec. 404 permitting requirements.[1] Although application of irrigation water to wetlands may not require a Sec. 404 permit, most would agree that it would be better not to irrigate extensive areas of functional high or medium quality seasonal wetlands as the irrigation would be subject to CEQA review and may require extensive mitigation.
- **Farmed Wetlands**. Farmed wetlands consist of cropped lands in which the hydrology has been altered only slightly, and where the discontinuation of farming would likely result in the natural restoration of wetlands vegetation. Conditions, however, would not be necessarily reminiscent of historic wetlands. These wetlands were drained, dredged, filled, leveled or otherwise manipulated before December 23, 1985, to make possible the production of an annually tilled crop to have produced at least one commodity crop during the five-year period prior to December

[1] This is somewhat controversial as several personnel in the Corps' San Francisco office do not consider dry-farmed planted oat-hay and, in particular, rye-grass-oat hay that is only occasionally planted, as agricultural commodities under Sec. 404. The Petaluma office of the NRCS does consider oat-hay to be an agricultural commodity for wetlands determinations under the Food Securities Act.

23, 1985. Production of a crop was not possible prior to manipulation. Flooding or ponding occur in farmed wetlands under natural hydrologic conditions in most years.

- **Wetland Pastures.** These areas are similar to the above. They are not cultivated and are used for non-commodity crops such as pasture and hay land. Wetland pastures typically fall under Corps jurisdiction and should be avoided.

Many areas of Reyes soils in oat-hay production appear to consist largely of prior converted wetlands with some low lying areas that regularly pond water during winter months. The smaller (and less wet) ponded areas are farmed and constitute farmed wetlands. The larger and wetter low lying areas are mainly not farmed and are skipped over in seeding and haying for practical reasons. These constitute seasonal wetlands where the oat-hay stubble is grazed, and in other fields which are not hayed but are grazed, these land areas constitute wetland pasture.

## Sensitive Species Issues

A large number of sensitive and protected species may inhabit seasonal and tidal marsh wetlands. Some of these may utilize adjacent farmlands, particularity levees and field borders, in order to escape occasional flooding. If these species are present, it is unclear whether introduction of irrigation to currently dry farmed areas would impact them (i.e. more intensive cultivation, piping systems, agrochemicals). Nonetheless, the presence of endangered species in Baylands areas would complicate the project planning and approval process. A buffer strip or setback along existing marsh areas could be included in project irrigation designs and provide sensitive species habitat to mitigate potential impacts associated with more intensive agriculture farming activities. Setbacks from 66 to 99 feet are presently included in the draft Irrigation Management Plan.

As part of the Baylands screening studies, a search of the California National Diversity Data Base Records (CNDDB) was made by the project study team. The CNDDB is a computer-assisted database comprised of known records of sensitive species occurrences and plant communities maintained by the California Department of Fish and Game. Although the data base catalog may be one to two years out of date, the CNDDB is a valuable and frequently used planning tool for screening studies such as this. The CNDDB records do not list any known occurrences of sensitive or protected species within the immediate Lakeville Baylands planning area. More detailed field studies will need to be completed prior to implementation of site-specific irrigation.

## Surface Water Quality Issues

There are a number of surface water quality issues associated with irrigation of Baylands areas. Irrigation could increase soil flushing of applied fertilizers and herbicides/pesticides. These substances, once flushed to adjoining drainage ditches, would subsequently be pumped and discharged to the Petaluma River. Acidic residues inherent in Reyes soils, such as sulfide compounds, could also be flushed in increased
quantities.

As part of the screening study, we evaluated acidity and salinity in a number of the agricultural ditches draining portions of the Lakeville Baylands through the use of field instruments. We found that in May nearly all of the ditches in the lower lying areas closer to the river were moderately acidic and saline. In contrast, the higher lying Baylands in transitional alluvial fan/flood plain areas closer to Lakeville Highway were almost neutral in pH and only slightly brackish. Our knowledge of Reyes soils from prior projects leads us to believe that water quality conditions would be expected to worsen over the summer months as surface runoff diminishes. The water would stagnate and become anoxic and more saline from evaporation.

A review of the water quality monitoring records from the Novato Sanitary District Baylands irrigation program for irrigated pasture, as well as from the Vallejo Sanitary District's Tubbs Island sludge farm land application program on dry-farmed oats, indicate prior and on-going acidic water quality problems in agricultural drainage ditches, along with occasional heavy metal problems. Sulfides may also be present in the ditch water, and present an existing aquatic toxicity problem.

It is our opinion the irrigation of dry farmed Baylands will not worsen water quality in drainage ditches discharging to the Petaluma River and San Pablo Bay. High inputs of agrochemicals likely will not be required for irrigated hay lands and irrigated pasture. Applications of phenoxy herbicides such as 2,4,D (a non-persistent herbicide) often are made early in the growth of dry-farmed oat-hay to control broad-leaf weeds, and one would expect this practice to continue for irrigated hay lands. Irrigated pasture would typically not use herbicides; grazing and mowing are used to control weeds.

A well conceived and implemented irrigation management plan could conceivably improve water quality conditions, particularity in the lower lying areas closer to the river. This could be accomplished by maintaining soils at a high moisture content to reduce sulfide oxidation, increased exchange of tidal waters in the ditches, or, in extreme cases, adding lime to the ditch waters. If well managed, only slight increases in the volume of ditch water pumped over the levees to the Petaluma River would be expected. Management of Reyes soils to increase/neutralize soil pH and surface and groundwater acidity may reduce native metals levels in the water bodies, as the solubility of most metals is extremely pH/redox sensitive.

## Groundwater Quality Issues

Baylands occur on reclaimed tidal marsh lands. These areas are characterized by deep deposits of silt and clayey sediments. Although groundwater is typically shallow (less than five feet), it is very saline and acidic, and considered non-potable. A second, deeper freshwater aquifer exists under many Baylands areas. Deeper wells penetrate to this aquifer in a number of areas around the north bay, and provide a source of domestic water to farms and ranches located on Baylands.

The potential of Baylands irrigation to impact the deep aquifer is remote due to the relatively good quality of project reclaimed wastewater, the thick deposits of impermeable sediments comprising the shallow saline aquifer, and the tendency of freshwater to perch on saline water and move slowly as a layer. It is unlikely additional field studies (groundwater monitoring wells) will be required if Baylands irrigation is included in the South County alternative.

### Biosolids Program Coordination

The City of Santa Rosa has developed a biosolids beneficial reuse program. An EIR was completed for this project and it began four years ago, with work still continuing. This program includes the agricultural land application of biosolids. Various properties along Lakeville Highway (Reyes soils) are currently receiving biosolids, and other properties are designated for future program expansion.

Biosolids are applied per the agronomic rate (nitrogen requirement) of the crop to be grown. Biosolids are currently applied only in the fall after the land has been disced, planted and prepared to receive the winter rains. If irrigation is available year-round, the amount of biosolids applied might need to be reduced to compensate for the nitrogen that would be applied through reclaimed water irrigation. Since the water generally contains only approximately one-third of the nitrogen requirement and there are many properties available to participate, the two programs can be easily coordinated.[2]

### Coordination with Sonoma Land Trust

A portion of the Baylands located northwest of the Lakeville Highway/Highway 37 intersection are owned by the Sonoma Land Trust. The lands are currently leased for the production of oat hay. We contacted Mr. Richard Charter, Director of the Trust, regarding his organization's plans for the property. According to Mr. Charter, the Land Trust is conducting a study of the potential for modifying agricultural drainage practices (pumping) in such a way that the lands can be utilized as seasonal wetland habitat during the winter months and still farmed the remainder of the year. Mr. Charter did not want to remove Land Trust property from possible consideration for irrigation.

## SMITH RANCH MITIGATION SITE

An approximately 100-acre ranch area adjacent to the Petaluma River (Smith Ranch) has been proposed for restoration and management as a seasonal wetlands as mitigation for a proposed development project across the river in Marin County (the Bahia project). This project is being reviewed by the City of Novato. The Smith Ranch wetlands mitigation project will also require approval from the Corps of Engineers, the U.S. Fish and Wildlife Service, and the California Department of Fish and Game. Should the Bahia project and mitigation plan for Smith Ranch be approved, then this 100-acre area will not be available for irrigation.

### U.S. Fish and Wildlife Concerns and the San Francisco Bay Estuary Plan

Diked Baylands along the Petaluma River could be restored to tidal action by breaching levees and allowing the natural recruitment of sediments to reestablish the marsh plain in these low lying (below 0 msl) areas. The San Francisco Bay Estuary Institute is in the planning stages of developing regional wetlands and habitat restoration plans for the north bay (San Pablo Bay) which will show, in general, the most desirable areas and the approximate types and mixes of habitats to meet various wildlife and endangered species management goals.

---

[2] The biosolids land application program currently has properties participating that are not already in the Reyes soils program.

Ruth Pratt of the U.S. Fish and Wildlife Service has informed the project team that the Service will oppose the Baylands component if it encompasses sites designated by the Estuary Institute plan as wetland restoration areas. We have discussed this issue with Mr. Josh Collins of the Estuary Institute. Mr. Collins has informed us that their planning efforts have not progressed to the point where they are prepared to make habitat enhancement designations on a map. He is unable, at this time, to indicate what lands the Institute may wish to recommend o restore. This poses a dilemma to our Baylands planning efforts. If the proposed Estuary Plan does eventually designate some or most of the Baylands for wetland restoration, then we will have wasted valuable time and expense in developing and evaluating the Baylands component of the project.

Our discussions with other resource agencies indicate that it is likely that they will want to encourage tidal restoration of some of the Baylands west of Lakeville Highway. The most obvious area is in the vicinity of Hog Island. This is considered a bottleneck in the wetland corridor along the Petaluma River since it is a stretch without significant riverside marsh. This may also be one of the easier areas to restore by moving the dike further east. In addition, there may be a perceived need to enhance some seasonal wetlands and establish high quality freshwater marsh and open freshwater bodies in this general area.

In addition to the Land Trust Property, there is a small (50 acre) area of non-farmed seasonal wetland within the Baylands site that could be a candidate for mitigation/management. An approximately 40-acre ponded freshwater wetland occurs below Lakeville Highway north of Hog Island and could be enhanced as mitigation for project freshwater impacts.

## Possible Planning Strategies

Nearly all of the diked Baylands in the Lakeville area can likely be considered prior-converted or farmed wetlands. They have been drained and farmed prior to 1985, and thus not likely subject to U.S. Army Corps of Engineers Sec. 404 provisions. However, detailed wetlands determination field work with wetlands boundary confirmation by the Corps has not been completed for the Lakeville Baylands.

Some resource agencies and interested parties may consider that irrigation of Baylands represents an adverse impact because infrastructure changes and higher agricultural land use would make conversion and restoration to tidal marsh much more difficult. These might be considered "lost opportunity impacts". Although the concept of this as an impact is somewhat abstract, there may be a requirement or request for some form of mitigation, possibly including seasonal wetland enhancement, freshwater wetlands creation, tidal marsh restoration, or some combination of all of these. Sites may be available as outlined above for mitigation.

Alternative approaches:

1. Anticipate a need to reserve some of the Baylands for wetland restoration and attempt to second guess which lands the resource agencies and institute might choose. For instance, we could leave out an area at or near Hog Island as a project component, as well as designate a seasonal wetland and ponded freshwater wetland for enhancement and protection.

2. Propose as a project component wetland restoration of the above area to defuse and obviate impacts. This may provide project credibility and good will, but will require a policy shift by the BPU.
3. Complete the environmental analysis and defer mitigation planning to a later phase/stage of the project. The total project impacts and overall mitigation requirements would be more fully understood at this time.

Inclusion of wetlands restoration as a project component is at odds with prior BPU direction, which is to consider at this time only those project elements essential to implementation of a wastewater project. Consequently, the Hog Island area is included in the recommended study area for now. The Hog Island area and the fresh water wetlands are shown on the map. **Figure 1** for informational purposes.

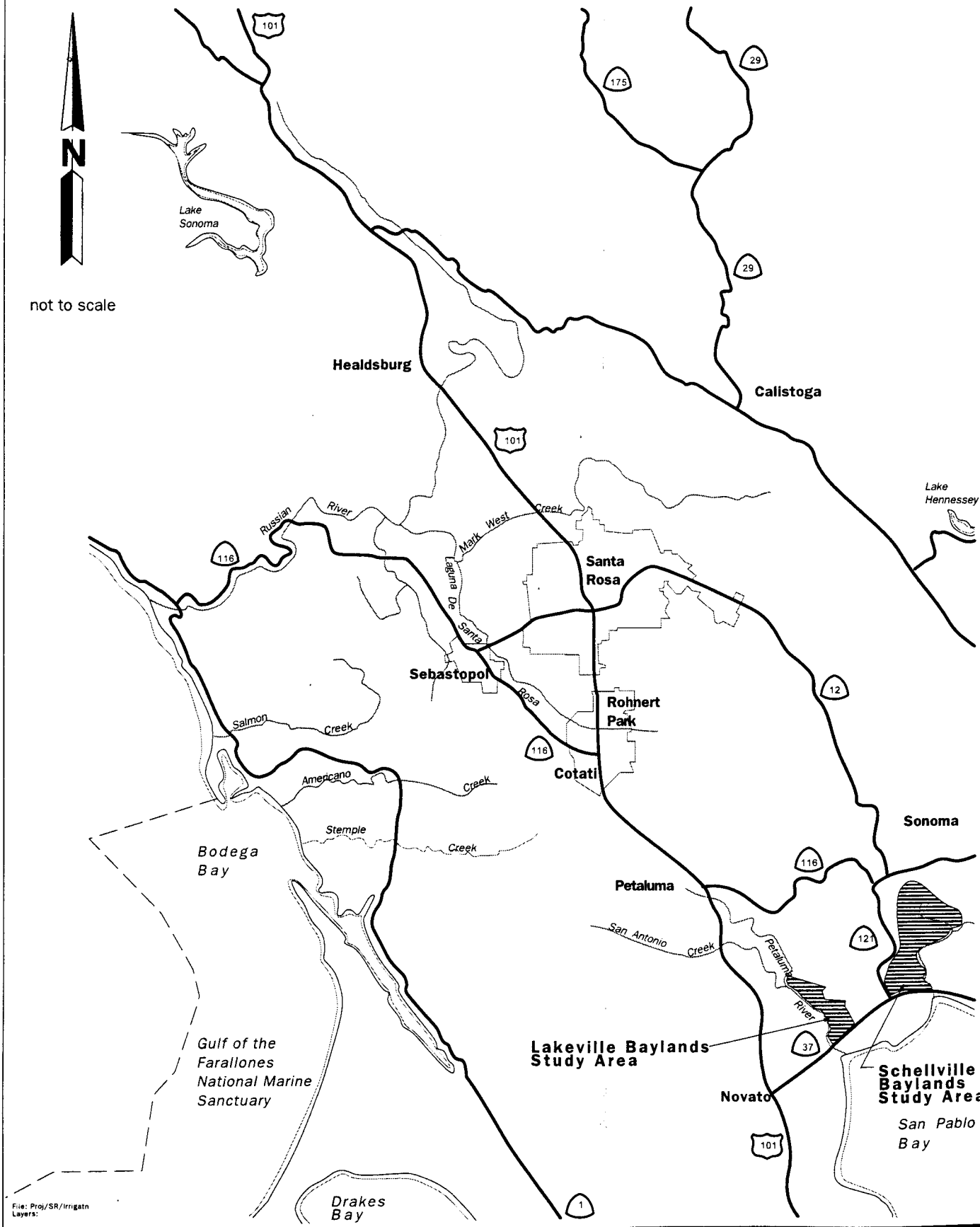
## CONCLUSIONS AND RECOMMENDATIONS

1. Drop Schellville Baylands area from further consideration as an irrigation component.
2. Include as a project component all of Lakeville Baylands.
3. Continue to coordinate planning with Sonoma Land Trust and the San Francisco Bay Estuary Institute to determine which lands they consider prime candidates for restoration. This dialogue should continue in order to show our willingness to address Agency concerns.
4. Defer mitigation planning until later in the EIR/EIS evaluation process, but give strong consideration at that time to the identified sites as possible mitigation opportunities, if needed.

5. If Lakeville Baylands is confirmed as a part of the South County component, soils, wetlands, water quality, and biological evaluations will need to be scheduled and proceed rapidly. These studies should not result in a budget increase.

We welcome the opportunity to discuss this further with you and the BPU. Considering our current EIR/EIS schedule, we recommend an expeditious response.

Ref: 93012mem.8

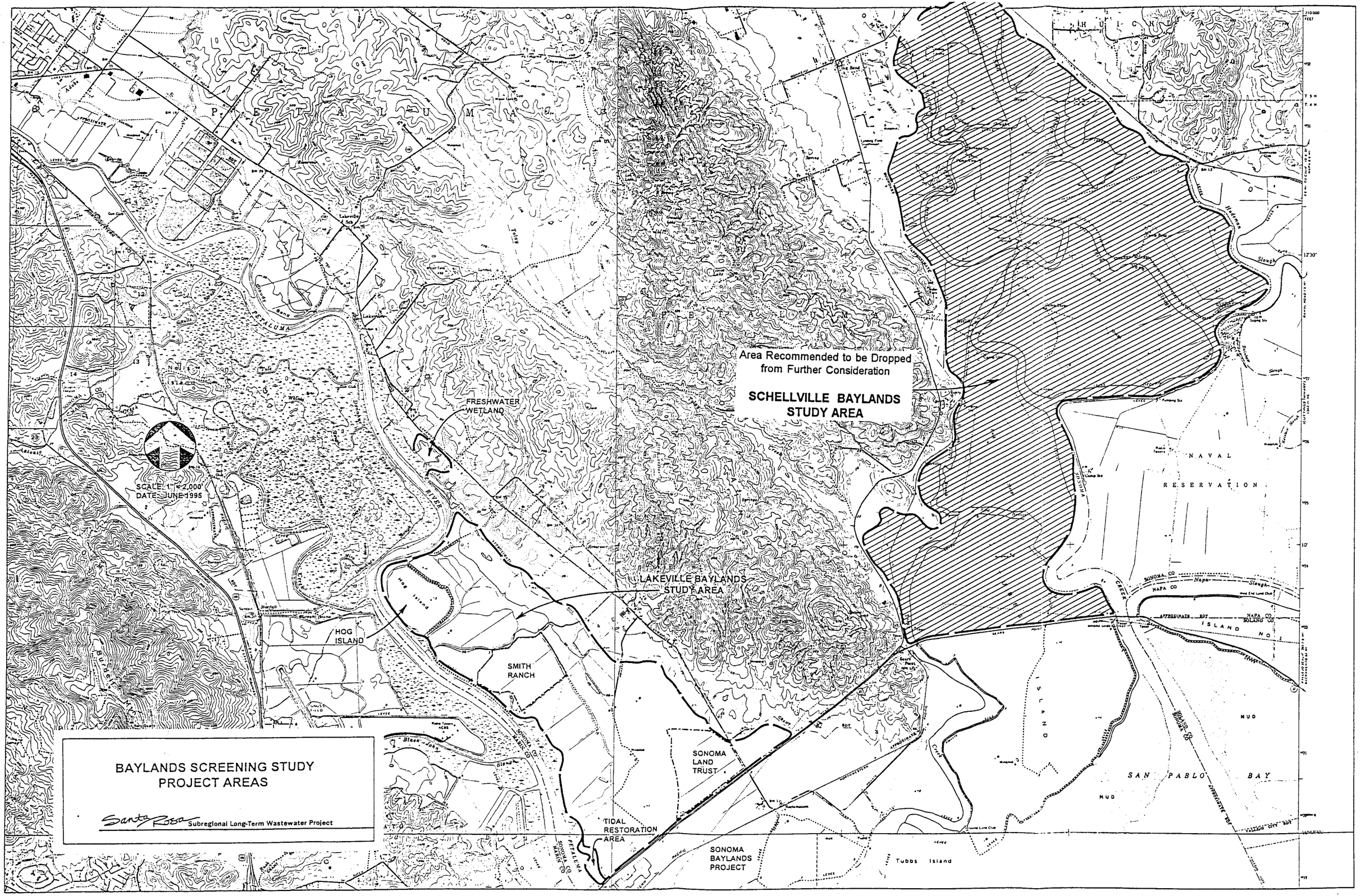



File: Proj/SR/Irrigatn
Layers:

Santa Rosa
Subregional Long-Term Wastewater Project

# BAYLANDS LOCATION MAP

August 8, 1996


Area Recommended to be Dropped from Further Consideration
SCHELLVILLE BAYLANDS STUDY AREA
LAKEVILLE BAYLANDS STUDY AREA
FRESHWATER WETLAND
HOG ISLAND
SMITH RANCH
SONOMA LAND TRUST
TIDAL RESTORATION AREA
SONOMA BAYLANDS PROJECT
NAVAL RESERVATION
SAN PABLO BAY
MUD
Tubbs Island
SCALE: 1" = 2,000'
DATE: JUNE 1995
BAYLANDS SCREENING STUDY
PROJECT AREAS
Santa Rosa Subregional Long-Term Wastewater Project