

ATTACHMENT 37

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ENVIRONMENTAL MANAGEMENT

**EELGRASS DISTRIBUTION
CHULA VISTA WILDLIFE RESERVE
San Diego Bay, California**

MAY 1996

prepared for:

***Environmental Management Department
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M&A# 95-037-02
SDUPD PO#78258

June 15, 1996

**EELGRASS DISTRIBUTION
CHULA VISTA WILDLIFE RESERVE
MAY 1996**

Merkel & Associates, Inc.
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INTRODUCTION AND PURPOSE

Merkel & Associates, Inc. has been retained by the San Diego Unified Port District (SDUPD) to prepare a 1996 mapping and assessment of the status of eelgrass resources along the north dike of the Chula Vista Wildlife Reserve Island. Work has been conducted under SDUPD P.O. #78258.

The purpose of this report is to transmit information regarding the survey methods and results, as well as to provide a qualitative assessment of the current vigor of the eelgrass community bayward of the north dike in the Chula Vista Wildlife Reserve Island. This effort is a follow-up to investigations conducted in 1987 prior to an eelgrass transplant at the wildlife island as well as post-transplant reviews of the island's eelgrass resources as conducted in 1988 (Merkel 1988a and b), 1989 (Merkel 1990), 1992 (Merkel 1992), 1994 (MBC Applied Environmental Sciences 1994), and 1995 (Merkel & Associates 1995a).

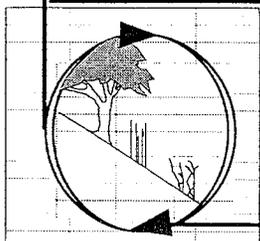
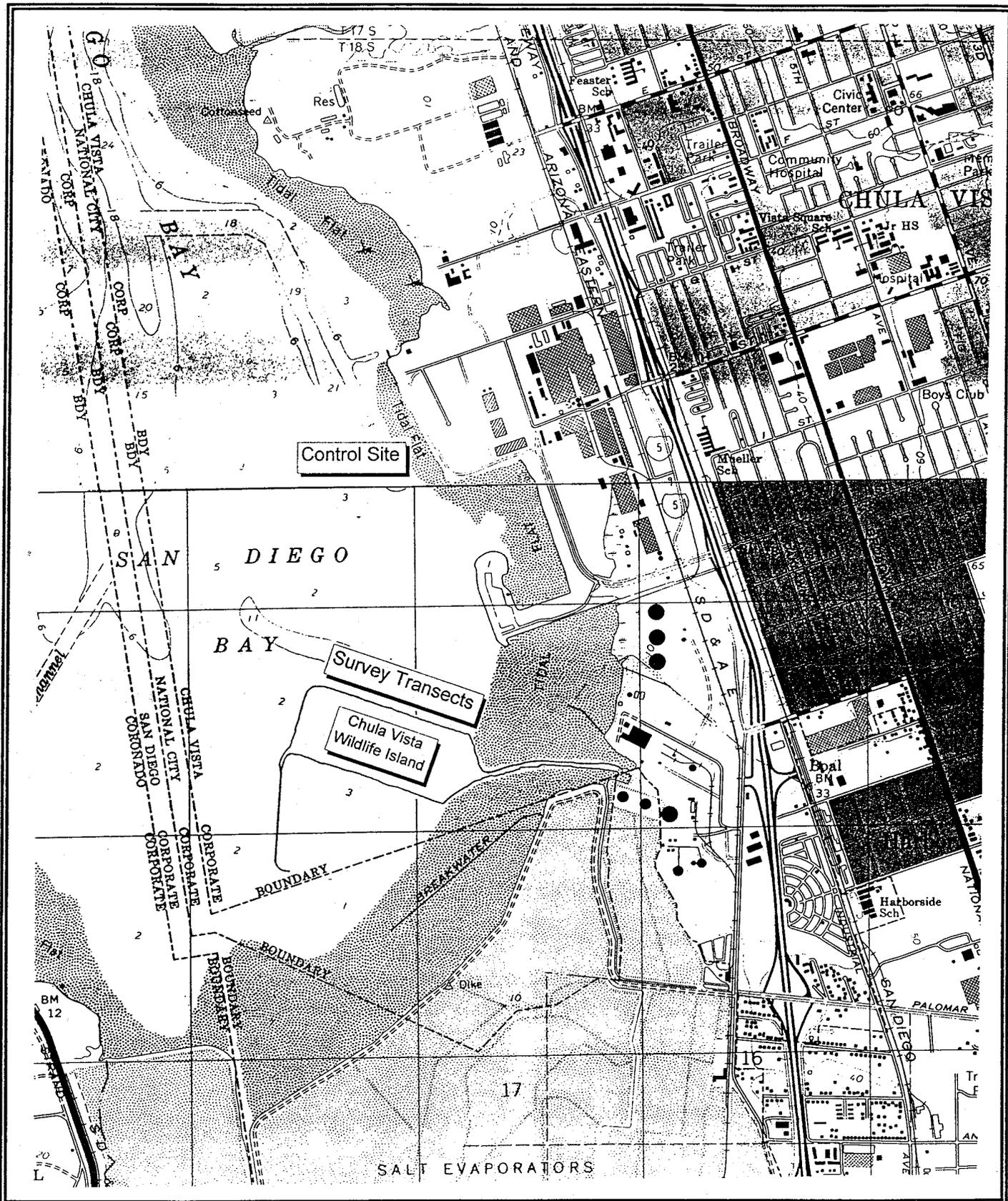
PROJECT STUDY AREA

The eelgrass study area extends along 2,400 linear feet of the north dike of the Chula Vista Wildlife Reserve and reaches approximately 360 ft. into the bay, terminating at the dredged San Diego Gas & Electric Company South Bay Power Plant cooling water intake channel, just south of the Chula Vista Marina (Figure 1). The study area occupies approximately 20.3 acres of south San Diego Bay.

The study area ranges in depth from +3 ft. MLLW (intertidal baseline) to approximately -4 ft. MLLW located along the upper edge of the steep slopes of the dredged South Bay Power Plant intake channel.

SURVEY METHODOLOGY

On May 31, 1996, an eelgrass survey was completed by Kevin J. Cull, Kyle L. Ince, Rachel Woodfield, and Chris Aeria of Merkel & Associates, Inc. This survey followed protocols established for the prior survey efforts and consisted of a survey along a 2,400 foot long baseline established adjacent to the berm on the shore of the north dike in a west-northwest to east-southeast direction. A total of 25 parallel transects spaced at 100-foot intervals were extended from the baseline into the bay as far as the intake channel edge. The first transect began at the western edge of the north dike. Transects were oriented approximately 25 degrees east of true north, perpendicular to the baseline. Eelgrass beds were measured bayward from the baseline using standard line-intercept transect methodology. Two divers utilizing a hand compass for orientation swam each transect line towing a fiberglass measuring tape. The starting and ending points of each eelgrass bed were recorded. Gaps exceeding three feet in width were also recorded as open bay bottom. Measurements were taken until the divers reached the SDG&E cooling water intake channel, approximately 360 feet from shore where the bottom dropped sharply to the bottom of the channel.



↑
Scale: 1" = 2,000'

Project Vicinity Map
Source: USGS 7.5' National City and Imperial Beach, CA Quadrangles

Figure
1

During the course of the survey, turion counts were conducted along every other transect within a 1/16 m² quadrat in order to determine the density of actively growing turions (upright shoots supporting numerous leaves in a single sheathed point of origin) within the eelgrass beds. The quadrat was placed at the approximate mid-point of each transect (12 locations) in the eelgrass to develop a mean density for the entire eelgrass bed.

Density and coverage measurements were also taken along three control transects located within an eelgrass bed located along the Chula Vista Bayside Park to the north of the Chula Vista Wildlife Island. This bed served as a control to compare it to conditions at the bed along the north dike. Transects were placed at 100 ft intervals and extended approximately 280 feet into the bay to the Chula Vista Marina navigational channel.

Utilizing the data collected in the field and adjusting for tidal differences eelgrass was mapped onto a topographic map of the Chula Vista Wildlife Reserve provided by the District with a scale of 1" = 100 feet.

SURVEY RESULTS

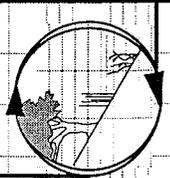
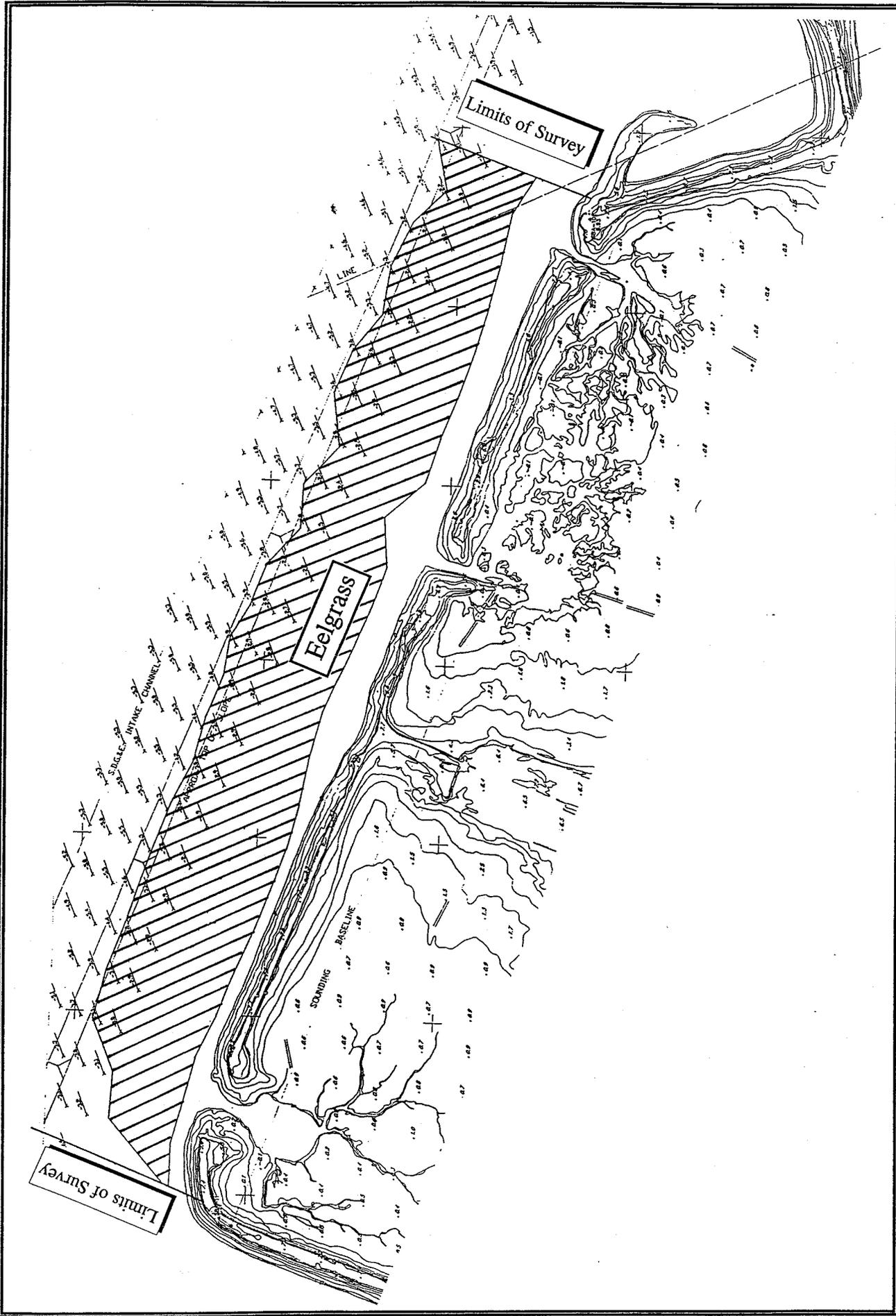
The survey revealed eelgrass extending from approximately -1.0 feet MLLW to as deep as -4.0 feet MLLW, the edge of the intake channel (Figure 2). The eelgrass found along the transects appeared to be in good health. Shoots observed during the survey were tall in stature and mostly free of epiphytic and sediment loading. With the exception of a few patches on the western portion of the survey site, the eelgrass occurred in a relatively contiguous bed along the north dike and stretched almost to, and in some cases to the edge of, the intake channel. Some matting of eelgrass, possibly due to sedimentation, was observed along the eastern portions of the shore-ward third of the main bed, an area subject to greater amounts of island erosion and in an area exhibiting high turbidity originating from the island as tides ebbed.

The mean shoot density within the eelgrass was determined to be 125.3 ± 65.4 turions/m² SD (n=12). The total area of eelgrass in the study area is approximately 12.7 acres (551,808 ft²). The May 1996 distribution of eelgrass at the wildlife island (Figure 2) is quite comparable to that observed in May 1995 (Figure 3) and even shares upper shore distribution characteristics with the bed as it existed in May 1994 (Figure 4).

DISCUSSION

The development of a sizable eelgrass meadow along the north dike of the Chula Vista Wildlife Island has been an interesting progression to observe. From a consistent lack of eelgrass up to the period of eelgrass transplant in the winter of 1987-1988 (Merkel 1990), to an explosive period of first year establishment ending in a near total demise of the bed over the winter of 1988-1989 (Merkel 1990), over a number of years, the eelgrass has come back with considerable vigor and is now believed to be at or near the maximum sustainable acreage for the north dike.

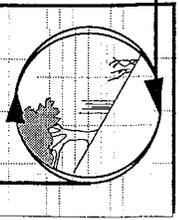
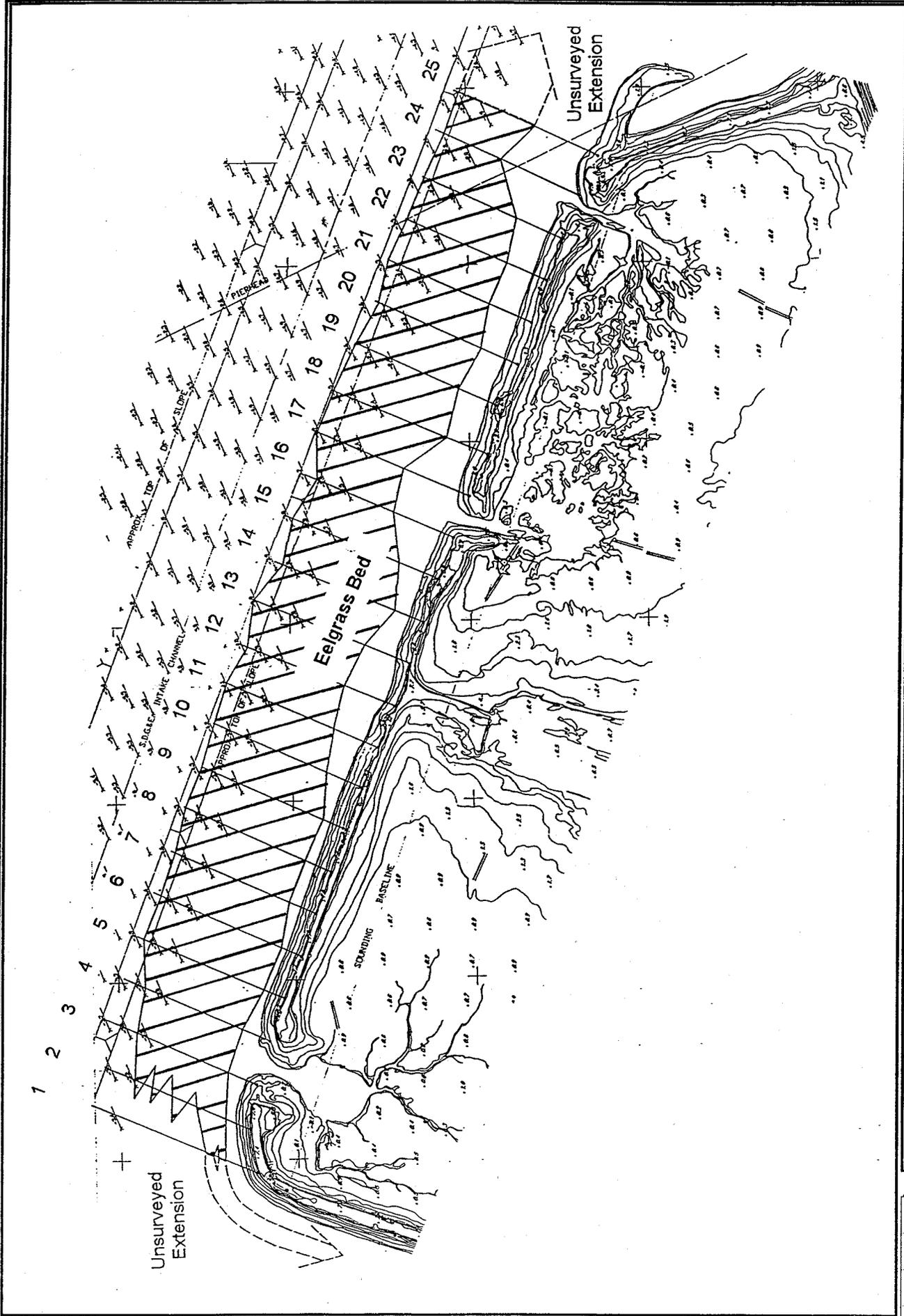
The current conditions have reflected a generally high degree of stability over the past two years. Prior to this period rapid growth appeared to be possible during the 1994 season (MBC 1994) with the 1992 season perhaps reflecting the earliest beginnings of this growth trend (Merkel 1992).



Scale: 1" = 300'

Eelgrass Distribution Along the North Dike of the Chula Vista Wildlife Island
 May 1996

Figure
 2

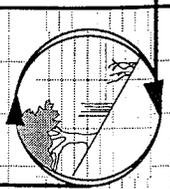
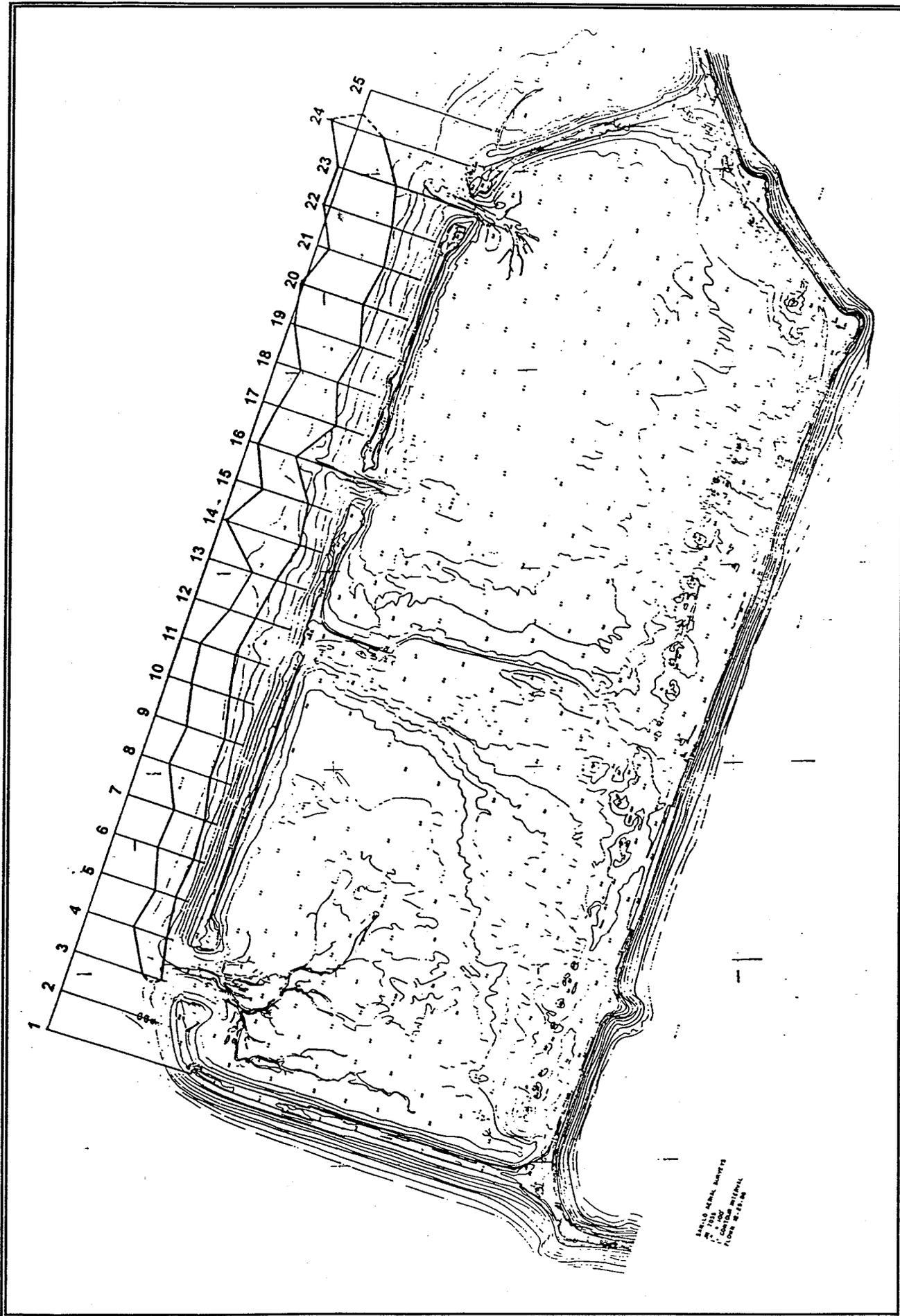


Scale: 1" = 300'

Eelgrass Distribution Along the North Dike of the Chula Vista Wildlife Island

May 1995

Figure 3



Scale: 1" = 340'

Eelgrass Distribution Along the North Dike of the Chula Vista Wildlife Island
 May 1994
 Source: MBC Applied Environmental Sciences (July 1994 Report)

Figure
 4

Based on a review of the area falling between the 0 foot MLLW elevation and the steep slopes adjacent to the South Bay Power Plant intake channel, factors believe to control the maximum possible distribution of eelgrass along the north dike of the Chula Vista Wildlife Reserve, only about 14.5 acres of eelgrass are believe possible within the study area under the current conditions. Future expansion bayward may be possible as the dredged channel slopes erode to a shallower grade.

The current eelgrass coverage reflects conditions of a tempered growth period, typical of what might be expected for a system achieving its maximum potential for expansion (Figure 5). The current conditions have declined only slightly from a May 1995 maximum of 13.01 acres (566,880 ft²) as illustrated in Figure 3 (Merkel & Associates 1995a), but remains substantially above the May 1994 coverage of 6.00 acres (261,297 ft²) as reported for the same study area (MBC 1994). On a percentage basis, the 0.3 acre (15,072 ft²) decline observe between 1995 and 1996, reflects a 2.4% net change while the 1994 to 1995 surveys revealed almost exactly a 100% increase.

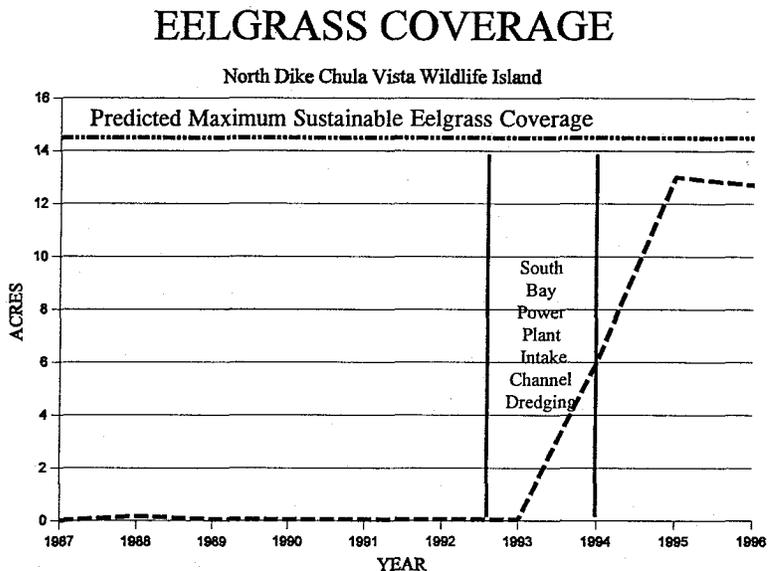


Figure 5. Eelgrass Expansion Trend Along the Northern Dike of the Chula Vista Wildlife Reserve Island From 1987 to 1996.

An eelgrass bed in this area was originally planted in 1988 as part of a mitigation project (Merkel 1988a). Although the transplanted bed was almost totally destroyed 12 months later by rapid sedimentation. Subsequent monitoring surveys have revealed remarkable eelgrass recovery well beyond the original transplant site. Eelgrass coverage recorded in the May 1994 survey (MBC 1994) totalled over 300 times greater coverage than the 850 ft² of eelgrass beds noted in a 1992 survey conducted by Pacific Southwest Biological Services (Merkel 1992). Eelgrass growth has also been considerable between the May 1994 and May 1995 surveys and has declined only slightly between 1995 and 1996. This loss has occurred mainly along the western-most portion of the eelgrass bed within the study area (compare Figure 2 and Figure 3).

The density of the eelgrass bed along the north dike is similar to densities in other areas of the south bay, and the control bed. This assessment is based upon both visual inspection and a comparison of turion densities measured at the north dike bed and the control bed. At 125.3 ± 65.38 turions/m² SD (n=12) the mean turion densities from this survey are slightly lower but statistically insignificant from the densities recorded for the May 1995 survey at 158.7 ± 48.8 turions/m² SD (n=25). Turion densities for the control site measured 230.0 ± 58.0 turions/m² and were not significantly different from those recorded for the May 1995 survey (240 turions/m²).

There is little to suggest the reason for such an explosive increase in eelgrass at the wildlife island during the recent three years. The only significant physical change which has occurred has been the dredging of the intake channel, completed in the early part of 1994. It has been theorized that these deep channels, and particularly those associated with navigation and the South Bay Power Plant allow for greater circulation and removal of silts suspended by afternoon wind-generated waves (Merkel & Associates 1995b). However, this hypothesis remains to be tested.

As indicated above, portions of the eelgrass bed appear to be suffering from sedimentation. The matted eelgrass could be affected by sediment being carried out with the outgoing tide from the middle drainage through the north dike. This channel drains a portion of the island's tidal flats back to the bay. The shoreward edge of the eelgrass bed has an alluvial fan shaped scalloping to it at each of the Wildlife Island tidal channel drainages. This is highly suggestive of either sedimentation or turbidity effects at work locally. During the 1996 survey a cloudy plume flowing bayward was observed at each tidal channel mouth as the tide was ebbing. The plume extended out to the intake channel and was consistent with the higher sediment loading and matting of eelgrass. While the slow definition of tidal drainages is expected to continue within the Wildlife Island and resultant interfaces at the eelgrass beds may be shaped by these geomorphic and hydrogeologic processes, the loss of eelgrass associated with these processes is not expected to ever amount to more than a few acres, barring substantial storm driven sediment expulsion from the inner basins.

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