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BALLONA WETLANDS/PLAYA VISTA DEVELOPMENT NON-INSECT INVERTEBRATE SURVEY FINAL REPORT

I. BASELINE INVESTIGATION

A. Introduction

Field surveys of the non-insect invertebrates of Ballona Wetlands were conducted quarterly. Preliminary field studies were conducted in April 1990. The site was surveyed in the summer, (June and July, 1990) in the fall, (October and November, 1990) in the winter, (February and March, 1991) and the final survey was in the spring (April, 1991). All four areas included in the proposed project were sampled and have been labeled Areas A, B, C, and D. The areas are defined and identified below in the Project Area section. All areas were visited with emphasis placed on areas slated (B and D) to undergo restoration, including the area of the proposed riparian corridor alignment and bluff base.

The purpose of this study is to identify the species composition and relative distribution of the wetland's non-insect invertebrates over a one year period. Although often inconspicuous and overlooked, invertebrates comprise the base of the ecosystem food web, and as such are essential to the maintenance and/or establishment of a healthy, diverse wetlands habitat. Therefore, this study will also assess the adverse and beneficial impacts of the proposed project on the non-insect invertebrate fauna of Ballona Wetlands.

B. Project Area

The proposed Playa Vista project site is an asymmetrical area located south of Marina del Rey and the Marina Freeway, west of the San Diego Freeway, north of Los Angeles International Airport, and east of the community of Playa del Rey.

The site is along the southern margin of the historic Ballona Creek floodplain. The southern border of the floodplain is the Westchester/Playa del Rey bluff system. This system of bluffs are approximately 300 feet in height. Cabora Road is located along and about one-third up the blufffs' face. The road was used

to establish approximately the irregular southern boundary of the project site.

For planning purposes, the site has been divided into four areas. These areas, labeled A, B, C, and D, are divided by the Ballona Flood Control Channel (Ballona Channel) on a easterly-westerly axis and by Lincoln Boulevard on northerly-southerly axis. Area A is located immediately adjacent to Marina del Rey and is within the County of Los Angeles. Area B, C, and D are in the City of Los Angeles. Area B is immediately south of Area A; Area C is immediately east of Area A and Area D is southeast of Area A. Table 1 provides the acreage associated with each area.

Table 1 : Acreage in each Area

AREA	ACREAGE
Area A	138.6
Area B	337.9
AreaC	66.3
Area D	462.0
TOTAL	1004.8

Area A

Area A is bounded by Marina del Rey to the north and west, the Ballona Channel to the south, and Lincoln Boulevard to the east. The topography of the site is largely the result of anthropogenic activities. The naturally occurring topography of the site was altered by the disposal of dredge material during the construction of the Ballona Flood Control Channel in the 1930's and Marina del Rey in the 1960's (Schreiber, 1981). Oil wells are located in the southwest corner, a parking lot is located along the northwest margin, and a drainage ditch is located along northeast margin. The drainage ditch is tidally influenced. The site is criss-crossed by off-road vehicle roads and pedestrian trails. A bike path/access road boarders the southern margin of the site. The path is on the northern levee of the Ballona Channel. The Channel is tidally influenced within the boundaries of the Playa Vista project area.

Area B

Area B is bounded by the Ballona Channel to the north, the community of Playa del Rey to the west, the Playa del Rey bluffs to the south and Lincoln

Boulevard to the east. It is the least disturbed on the four areas. The natural topography of the site is largely present.

Jefferson and Culver Boulevards cross the central portion of the area. A gas company staging area is located along the south central margin of the area at the base of the Playa del Rey Bluffs. Centinela Ditch is also located at the base of the Playa del Rey Bluffs. Jefferson Drain empties into the area southeast of the Jefferson/Culver Boulevards intersection. An access road borders the northern margin of the site. This road is the southern levee of the Ballona Channel.

This area contains the largest contiguous wetland. The main tidal channels into the wetlands have been cut-off from tidal flows by the installation of four tide-gated structures in the south levee of the Ballona Channel. Some salt water does enter the norhtwest corner of the wetlands through these flap gates. Tidal amplitude has been reduced by approximately 63% (Boland and Zedler, 1991). Salinity of the waters in the tidal channels near the tidegates is approximately that of seawater, 35 ppt (Boland and Zedler, 1991). Culverts under Culver Boulevard provide a hydrologic link between the wetlans to the north and south of this roadway. The salinity of the water in the channels south of Culver Boulevard varied throughout the year from close to seawater to freshwater (Stoltz, 1990, Boland and Zedler, 1991).

Area C

Area C is bounded by commercial/residential development to the north, Lincoln Boulevard to the west, the Ballona Channel to the south, and the Marina Freeway to the east. Like Area A, this areas current condition is largely the result of anthropogenic activities. The naturally occurring topography of the site was altered by the disposal of dredge material during the construction of the Ballona Flood Control Channel in the 1930's and Marina del Rey in the 1960's. The area is dissected by Culver Boulevard. The area north of Culver Boulevard is largely vacant. A small drainage ditch flows from the middle of the site to the northwest and into Area A. This ditch usually does not contain standing water. Baseball fields are located south of Culver Boulevard.

Area D

Area D is bounded by Lincoln Boulevard to the west , the Westchester Bluffs to the south, commercial/industrial parcels to the east, and Jefferson Boulevard

and the Ballona Channel to the north. It is the most developed of the four areas. It is the site of the offices and manufacturing facilities occupied by MacDonald Douglas and Hughes Aircraft Company. These facilities are located in the southeastern portion of the site. The southwestern portion of the site contains Centinela Ditch and a debris basin. Centinela Ditch is an intermittent freshwater stream carrying urban runoff. An abandoned airstrip is located in the central section of the site. Stockpiles of material are located along the northern margin. The Playa Vista site offices are located on the northwest portion of the parcel.

C. Methods and Materials

For the purposes of sampling invertebrates, Ballona Wetlands may be divided into four more-or-less distinct habitat types, each with a distinct fauna. Sampling methods varied depending upon the habitat and fauna being surveyed. Habitat types, the area of occurrence, and sampling methods are described below.

HABITATS

1) **Terrestrial** (with subdivisions for freshwater and saline-influenced systems); collection methods include hand sampling, sweep sampling, and soil excavation. Sampling was conducted along both uniform transect lines and subjectively where invertebrates were likely to be found. Terrestrial habitat occured on all four areas (A, B, C, and D).

2) **Freshwater** (including the riparian corridor); seine-netting, substrate sifting, dip-netting and hand collecting were employed in the sampling. Stations, collections and replications were done in conjunction with the freshwater fish survey conducted by Dr. David Soltz. Freshwater habitat occured in areas B and D primarily on the south side.

3) **Brackish water channels**; methods of collecting included seine-netting, substrate sifting, dip-netting and hand collecting. This sampling was also done in coordination with the fish survey. Brackish water habitat occured in area B on both sides of Culver Blvd.

4) **Marine** saline systems; included seine netting, otter trawling and bottom sampling. Sampling of the saline channels located on the north side of Culver Blvd. in area B was conducted using the same techniques as described above for the fresh and brackish water habitats.

Sampling periods occur four times during the year, encompassing all seasons and habitat changes. Each sampling session requires approximately one to two field days, with some differentiation of timing to adjust for differences in sampling techniques (ie. terrestrial vs marine) or work within optimal collecting circumstances (high tide vs low tide) for specific groups.

Live organisms were returned to the habitat that they were collected from, promptly after identification, with the exception of a few voucher specimens, and in the cases where immediate classification was not possible. Voucher specimens were preserved in 70% ethanol solution. For many species dead shells or carapaces were available and in those cases they were often collected in lieu of live organisms.

Species from each habitat are relatively distinct, with small percentages of overlap within ecotonal systems (ie. brackish water). The only other major habitat types on site are the sand systems, including the remnant dunes, and these are being sampled as part of the terrestrial insect survey. Very few non-arthropod invertebrates would be expected to occur there, except ubiquitous, introduced isopods.

D. Results

The results of the field surveys are listed in Table 2. Areas A, C, and most of D yielded almost no non-insect invertebrates. In the terrestial regions most abundant invertebrate observed was the introduced African land snail, *Otala lactea*. During the summer survey snails were active foliage predators on the pickleweed, *Salicornia*, wherever it occured, and in some instances it appeared to be entirely defoliating individual plants. The majority of the snails were estivating and not active, probably to avoid desiccation, during the fall collection period. By the end of March they were active and feeding again.

The freshwater stream located near the bluffs in Area D had been dry since approximately June 1990. The only invertebrate encountered in the streambed was the Louisiana swamp crayfish, *Procambarus clarki*, found living in a

discarded bottle.

Area B and the Ballona Channel appear to be the only regions on the property currently supporting any diversity of non-insect invertebrates. At least thirty species, representing four phyla, were found in area B during the summer and fall collections. With the exception of terrestrial snails, almost all of the non-insect invertebrates were found in the saline and brackish water channels leading to (or from) the tidal gates at Ballona Channel in area B. The most abundant organism found in the saline channels was the California horn snail, *Cerithidea californica*, with a population in the thousands. Other organisms that occured in some abundance included bent-nosed clam, *Macoma nasuta*, razor clam, *Tagelus subteres*, California paper snail, *Bulla gouldiana*, fiddler crab, *Uca crenulata*, striped shore crab, *Pachygrapsus crassipes*, and polychaete worms, such as *Capitella capitata* . Several brackish water and marine fish that were collected as part of the fish survey had leeches attached to them. Crayfish were also encountered commonly in the brackish and freshwater regions of the channels.

Several molluscs were collected and observed in the winter and spring 1991 surveys that were not found in the summer or fall 1990 surveys. Encrusting worm shells from the family Vermetidae were found on the shells of several larger molluscs, such as mussels and oysters. Several onyx slipper shells, *Crepidula onyx* , and a second species of jackknife or razor clam, *Tagelus californianus,* were observed in the 1991 samples but not noted in the 1990 ones. The California paper snail, *Bulla gouldiana,* were laying eggs in large numbers during the summer survey period but were not observed at all in the winter and spring samples.

E. Discussion

The majority of the organisms found occuring in Ballona Wetlands during the summer and fall surveys were common and fairly hearty species which are capable of persisting in degraded systems. Some species, such as the polychaete worm, *Capitella capitata*, are able to sucessfully invade habitats with high levels of disturbance. They are considered to be pollution indicators when they are found occuring in large populations in an ecosystem that is otherwise species poor (Grassle & Grassle, 1974).

It should be noted that the salinity of the channel water, especially on the south side of Culver Blvd. in area B, was greatly decreased in the fall sample. There was a large influx of freshwater, probably from the Jefferson storm drain, due to an unrelated project at least a mile upstream, beginning in mid October 1990. The water went from hypersaline conditions to hyposaline in what was probably a few days. (Please see Soltz, 1990 Fall report for exact figures). This estimate is based primarily on the fact that the overflow of water, which went out of the normal stream banks, was still on the surface and had not yet soaked into the soil, and thus appeared to be a recent event.

The composition of organisms that had colonized the saline water channels on the south side of Culver Blvd. in area B changed considerably after the freshwater influx. Clams, primarily the genus *Chione,* bubble snails, *Bulla gouldiana*, and the marine Annelids, all died or disappeared. Individual California horn snails, *Cerithidea californica,* were still surviving in October but had moved from the channel bottoms to the surface of the algal mats and appeared stressed. It was observed, in a brief visit to the site in December, that very few live horn snails were remaining on the south side of Culver Blvd. Previous studies have shown that almost no intertidal invertebrates would be able to survive freshwater conditions of two weeks or longer (Zedler & Magdych, 1984). It is reasonable to assume that recolonization of the channels could eventually occur if previous (or similar) salinity levels were restored and organism recruitment was possible from the north side of Culver Blvd.

An extensive study of the marine environment of Marina del Rey conducted by D. Soule and M. Oguri, for the Department of Beaches and Harbors, County of Los Angeles, was released February 1990. It is a comprehensive report, and probably the most complete information available to date on the invertebrate fauna of the Ballona Channel/Marina del Rey area. I highly recommend that this report be used as a primary resource base for the marine invertebrate fauna of Ballona Channel. It would not productive to extensively survey the area when such a recent and complete study is available.

The only non-insect invertebrate that is a candidate (category 2) for Federal listing as a rare or endangered species, that possibly occurs in the area is the California brackishwater snail, *Tryonia imitator*, and it has not be observed in the Ballona Wetlands. It should, however, continue to be surveyed for and taken into consideration during the proposed restoration.

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F. Conclusions

Based upon the surveys, my assessment is that general habitat quality appears to have degraded considerably since the Biota of the Ballona Region, Los Angeles County (Schreiber, 1981) was completed. Habitat quality is relatively poor, non-insect invertebrate diversity is low, and it may be currently unsuitable to maintain diverse populations of invertebrates necessary to serve as a broad food chain base. Introduced, non-native species, or a single species (such as California horn snail, *Cerithidea californica*), appear to be predominant in certain habitats, limiting the number of other organisms able to sustain themselves on these resources. Restoration of any level of tidal flow to the wetlands would increase the health and stablity of the habitat considerably. It is likely that a wide number of species would be able to recolonize with minimal human intervention. Some organisms that no longer occur in the area, but are beneficial to the balance of a dynamic and productive wetlands may have to be actively recruited to insure their presence.

Invertebrates tend to be inconspicious and frequently hidden, and consequently they are often overlooked in biological studies. They form the food base for numerous wetland vertebrates and are essential in a natural habitat. The invertebrate species composition and populations need to be closely monitored and managed during the restoration of Ballona Wetlands.

Table 2

NON-INSECT INVERTEBRATES OF BALLONA WETLANDS

SPECIES	AREA
PHYLUM MOLLUSCA	
CLASS PELECYPODA (BIVALVES)	
Speckled Scallop *Argopecten aequisulcatus*	B
California Chione *Chione californiensis*	B
Bent-nosed Clam *Macoma nasuta*	B
Bay Mussel *Mytilus edulis*	B

Pacific Oyster *Ostrea lurida*	B
Little-neck Clam *Protothaca staminea*	B
California Jacknife Clam *Tagelus californianus*	B
Razor Clam *Tagelus subteres*	B
Gaper Clam *Tresus nuttalli*	B

CLASS GASTROPODA (MARINE SNAILS)

California Assiminea *Assiminea california*	B
California Paper Bubble *Bulla gouldiana*	B
California Horn Snail *Cerithidea california*	B
California Cone Snail *Conus californicus*	B
Onyx Slipper Shell *Crepidula onyx*	B
Green Paper Bubble *Haminoea virescens*	B
Salt Marsh Snail *Melampus olivaceus*	B
Mud Nassa *Nassarius tegula*	B
Worm Shell Vermetidae	B

CLASS PULMONATA (LAND SNAILS)

African Land Snail (non-native) *Otata lactea*	A, B, C, D

PHYLUM ARTHOPODA

CLASS CRUSTACEA (CRUSTACEANS)

Acorn Barnacle *Balanus glandula*	B
Fiddler Crab *Uca crenulata*	B
Yellow Shore Crab *Hemigrapsus oregonensis*	B
Striped Shore Crab *Pachygrapsus crassipes*	B
Louisiana Swamp Crayfish *Procambarus clarki*	B, D
Pacific Coast Crayfish *Pacifastacus sp.*	B, D
Amphipod *Corophium sp.*	B
Unidentified Copepods	B
Unidentified Ostracods	B

PHYLUM ANNELIDA

CLASS POLYCHAETA (SEGMENTED WORMS)

Red-banded Bamboo Worm *Axiothella sp.*	B
Polychaete Worm *Capitella capitata*	B
Tube Worm *Hydroides norvegica*	B
Spionidae Worm *Polydora sp.*	B
Nereid Worm *misc. unidentified*	B

CLASS OLIGOCHAETA (EARTHWORMS & RELATIVES)

Misc Oligochaets *unidentified species*	B

CLASS HIRUDINEA (LEECHES)

Fish Leech *Family Piscicolidae*	B, D

PHYLUM NEMERTEA

Unidentified Nemertean Worm	B

Literature Cited

Boland, J.M. & J.B. Zedler. 1991. The Functioning of Ballona Wetland in Relation to Tidal Flushing, Part I--Before Tidal Restoration, January 1991. Project sponsored by the National Audubon Society.

Grassle, J. F. & J. P. Grassle. 1974. Opportunistic Life Histories and Genetic Systems in Marine Benethic Polychaetes. J. Mar. Res. 32(2):253-284.

Soltz, D. 1990. Preliminary Report on Fishes of Ballona Wetlands.

Schreiber, R. W., editor. 1981. Biota of the Ballona Region, Los Angeles County. Los Angeles Natural History Museum, CA.

Soule, D. F. & M. Oguri., editors. 1990. The Marine Environment of Marina Del Rey, October 1988 to September 1989. Studies of San Pedro Bay, California Part 20E. A report to the Department of Beaches and Harbors, County of Los Angeles.

Zedler, J. B. & W. P. Magdych. 1984. Review of Salinity and Predictions of Estuarine Responses to Lowered Salinity. State of California, Water Resources Control Board. Association of Governments, San Diego. pp 51.