

# **ORMOND BEACH WETLANDS RESTORATION PROJECT**

## **PRELIMINARY EVALUATION OF POTENTIAL WATER SOURCES**

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## **1 INTRODUCTION**

A key component of the Ormond Beach Wetlands Restoration Project (Project) is the identification of potential water sources for use in restoring the wetlands. A review and evaluation of available water quality data for existing and potential future water sources was conducted to determine the quality and suitability of available water sources for the Project. The objectives of this evaluation are to:

- Research, obtain, and assemble water quality data
- Analyze water quality data for suitability
- Evaluate the water quality of available water sources
- Identify data gaps for potential water sources
- Summarize methods, results, conclusions, and recommendations

### **1.1 METHODOLOGY**

Potential water sources identified were surface waters near or within the Study Area including both existing surface water from industrial drains, lagoons, marsh areas, and agriculture drainage channels, as well as proposed future water sources from the Brine Line and Groundwater Recovery Enhancement and Treatment (GREAT) Program. Water quality data for existing and projected water sources were researched, obtained, and assembled from various studies conducted within surface waters near or within the Study Area.

Water quality data were analyzed to determine the spatial distribution near or within the Study Area, the quantity and frequency of samples taken for each water source, constituents analyzed, and constituent concentration. The suitability was determined by the following.

- Distribution of sampling locations within the water source (i.e., spatial resolution)
- When samples were taken (i.e., data age)
- Frequency of samples taken (i.e., temporal resolution)
- Constituents analyzed (i.e., contaminant resolution)
- Constituent concentration compared to water quality criteria

The evaluation of the water quality data was conducted by comparing the data to applicable water quality standards established under California's Porter-Cologne Water Quality Control Act and the federal Clean Water Act. Both state and federal water quality standards are composed of two parts: 1) the designated beneficial uses and 2) the water quality objectives to protect these uses. The water quality objectives, as defined by the Porter-Cologne Act, are "the limits or levels of water quality constituents or characteristics which are established for the reasonable protection of beneficial uses of water or the prevention of nuisance within a specific area"

(SWRCB 2004). For this analysis, the water quality objectives will be based on the numeric limits and will be referred to as water quality criteria.

The existing designated beneficial uses of waters within the Ormond Beach Wetlands are water contact recreation (REC-1), non-contact water recreation (REC-2), estuarine habitat (EST), wildlife habitat (WILD), rare, threatened, or endangered species (RARE), and wetland habitat (WET) (LARWQCB 1994). Based on these beneficial uses, the applicable water quality criteria are those state and federal criteria established to protect human health and aquatic life. Human health criteria are based on exposure from organism consumption only. Water quality criteria have been established for priority toxic pollutants (e.g., metals and pesticides) and non-priority pollutants (e.g. temperature, ammonia, and pH). The applicable California water quality criteria are:

- California Toxics Rule (CTR) for enclosed bays and estuaries
- Water Quality Control Plan for Ocean Waters of California (Ocean Plan)
- Water Quality Control Plan for the Los Angeles Region (Basin Plan)

The U.S. Environmental Protection Agency (EPA) water quality criteria are based on the National Recommended Ambient Water Quality Criteria to protect:

- Human health and welfare
- Fresh water aquatic life protection
- Salt water aquatic life protection

The applicable water quality criteria are numeric limits based on either an instantaneous maximum or averages (e.g., 4 days, 1 hour, or 6 months). The water quality data reviewed for this study were composed of single instantaneous samples, which is not sufficient to determine exceedances of applicable water quality criteria based on averages. The comparison of water quality data to applicable water quality criteria was based on the rationale that if a constituent concentration from a single sample exceeded a criterion based on an average, there is a potential that the criterion could be exceeded if the constituent was sampled over a longer time period. Therefore, this evaluation consisted of a preliminary screening of water quality data to identify constituents exceeding water quality criteria based on the instantaneous sample concentration. Detailed comparisons of water quality data for each water source to state and federal water quality criteria are compiled in Appendix A.

## **2 WATER QUALITY OF EXISTING WATER SOURCES**

Surface water quality sampling locations within and near the Study Area are shown in Figure 1. Water quality data were available at the following locations.

- Hueneme Drain (Bubbling Springs Drain)
- J Street Drain
- East Hueneme Drain
- J Street Lagoon
- Oxnard Industrial Drain (OID)
- Salt marsh areas on the City of Oxnard/MWD Property
- Salt flat and marsh area northwest of the Ormond Beach Generating Station
- Drainage channel northwest of the Ormond Beach Generating Station
- Salt flat and marsh area southeast of the Ormond Beach Generating Station
- Oxnard Drainage Ditch #3
- Drainage channels bordering the Game Preserves

### **2.1 HUENEME DRAIN**

The Hueneme Drain, also known as Bubbling Springs Drain, discharges into J Street Lagoon at the northwest corner of the Study Area. Water quality data for Hueneme Drain consisted of one sample taken on August 1994 near the discharge point into J Street Lagoon (VCFCD 1996). General constituents analyzed were temperature, salinity, total dissolved solids (TDS), specific conductance (EC), nitrate, ammonium, phosphate, pH, biological oxygen demand (BOD), and oil and grease. Toxic constituents analyzed were chlorinated pesticides. Oil and grease and chlorinated pesticides were not detected. None of the other general constituents exceeded water quality criteria. No data were available for other priority toxic constituents (e.g., metals, VOCs, PAHs, or PCBs).

### **2.2 J STREET DRAIN**

Water quality data from the J Street Drain, which also discharges into J Street Lagoon, were available from two studies. Sampling locations were near the discharge point into J Street Lagoon and at the intersection of Hueneme Road.

Water quality data near the discharge point consisted of one sample taken in August 1994 (VCFCD 1996). Constituents analyzed were the same as those analyzed at the Hueneme Drain except BOD, oil and grease, and chlorinated pesticides were not analyzed. None of the general constituents analyzed exceeded water quality criteria. No data were available for any priority toxic constituents (e.g., metals, VOCs, PAHs, pesticides, or PCBs).

The City of Oxnard Technical Services Program Storm Drain Monitoring Program samples the J Street Drain at Hueneme Road (City of Oxnard 2004). Water quality data were composed of two samples analyzed for indicator bacteria in 2004 and weekly samples between June 2003 and September 2004 analyzed for temperature, conductivity, dissolved oxygen (DO), and pH. Both samples for indicator bacteria exceeded California REC-1 single sample standards for total and fecal coliform. For the weekly samples, exceedances of water quality criteria occurred for temperature, DO, and pH. Sixteen out of 52 samples exceeded the California Ocean Plan temperature criteria for marine life protection. Four out of 52 samples were below the most stringent EPA DO criteria for fresh water aquatic life. The pH levels varied from 7.54 to 10.89 with an average of 9.11, which exceeds both California and EPA pH criteria. Constituents exceeding water quality criteria were bacteria, temperature, DO, and pH. No data were available for any priority toxic constituents (e.g., metals, VOCs, PAHs, pesticides, or PCBs).

### **2.3 EAST HUENEME DRAIN**

The East Hueneme Drain is located adjacent to J Street Lagoon. Water quality data consisted of one sample taken at the Perkins Footbridge in August 1994 (VCFCD 1996). Constituents analyzed were the same as those analyzed for the Hueneme Drain. Oil and grease and chlorinated pesticides were not detected. None of the general constituents exceeded water quality criteria. No data were available for other priority toxic constituents (e.g., metals, VOCs, PAHs, or PCBs).

### **2.4 J STREET LAGOON**

Water quality data for the J Street Lagoon were available for two samples, one at the J Street Drain mouth and one at the OID mouth (VCFCD 1996). Constituents analyzed were the same as those analyzed for the Hueneme Drain. Oil and grease and chlorinated pesticides were not detected. None of the general constituents exceeded water quality criteria. No data were available for other priority toxic constituents (e.g., metals, VOCs, PAHs, or PCBs).

### **2.5 OXNARD INDUSTRIAL DRAIN**

Water quality data for various locations along the Oxnard Industrial Drain were available from three studies. Sample locations were near the discharge point into J Street Lagoon, within the City of Oxnard/MWD Property, at Hueneme Road, at Perkins Road, and at McWane Blvd.

Near the discharge point, one sample was taken in August 1994 (VCFCD 1996). Constituents analyzed were temperature, salinity, TDS, EC, nitrate, ammonium, phosphate, and pH. California Ocean Plan criteria for temperature and ammonia were exceeded.

Farther upstream within the City of Oxnard/MWD Property, one sample was taken (July 8, 2004) and analyzed for volatile organic compounds (VOCs), total metals, pesticides, polychlorinated biphenyls (PCBs), and radionuclides (SECOR 2004). Pesticides and PCBs

analyzed were not detected. Constituents that exceeded California or EPA criteria were arsenic, selenium, and zinc.

City of Oxnard Technical Services Program Storm Drain Monitoring Program monitors three locations along the OID. Water quality data were available for one sample at Hueneme Road, two samples at Perkins Road, and two samples at McWane Blvd (City of Oxnard 2004). The Hueneme Road sample taken on July 21, 2003 was analyzed for total and fecal coliform. Results were below water quality criteria. For the Perkins sampling location, two samples in June and September 2004 were analyzed for bacteria and weekly monitoring data between June 13, 2003 and September 3, 2004 were available for temperature, conductivity, DO, and pH. Bacteria results exceeded the total coliform criteria. One out of 52 samples was below the minimum EPA DO criteria for fresh water aquatic life. The pH levels varied from 7.74 to 9.16 with an average of 8.30 and occasionally exceed both California and EPA pH criteria. For the McWane Blvd sampling locations, the sampling frequency and constituents analyzed were the same as the Perkins sampling location. The June bacteria sample exceeded the fecal coliform criteria and the September bacteria sample exceeded the total coliform criteria. The pH levels varied from 7.39 to 9.25 with an average of 8.39 and occasionally exceeded both California and EPA pH criteria.

## **2.6 CITY OF OXNARD/MWD PROPERTY**

Water quality data within the City of Oxnard/MWD Property were available for two surface water samples taken July 8, 2004, one in a salt marsh area in the central portion of the property and the other in ponded water located at the southern property edge (SECOR 2004). Both samples were analyzed for VOCs, total metals, pesticides, and PCBs. No PCBs were detected. Water quality criteria were exceeded for arsenic, zinc, DDT, and gamma-BHC (Lidane). Data were not available for non-priority constituents (e.g., ammonia or pH).

## **2.7 NORTHWEST OF ORMOND BEACH GENERATING STATION**

Existing water sources from marsh areas and drainage channel are located near the Ormond Beach Generating Station (OBGS). To the northwest of OBGS, water sources include an artesian well, pickleweed marsh, salt flat pond, and a drainage channel. Water quality data are available for six samples (Jones & Stokes 1994). Two samples were taken in an artesian well, one in the pickleweed marsh, three within the salt flat pond, and two within the drainage channel. Constituents analyzed included TDS, EC, nitrate, total phosphorus, and pH. One sample from the artesian well, two samples from the salt flat pond, and both samples from the drainage channel exceeded California and/or EPA pH criteria. No data were available for priority toxic pollutants.

## **2.8 SOUTHEAST OF ORMOND BEACH GENERATING STATION**

To the southeast of the OBGS, existing water sources are a salt flat pond and pickleweed marsh. A total of seven samples were taken from the salt flat pond (Jones and Stokes 1994). One sample was analyzed for TDS, nitrate, total phosphorus, and pH and six samples were analyzed for EC and pH. Four samples were taken from the pickleweed

marsh, one sample was analyzed for TDS, nitrate, total phosphorus, and pH and three samples were analyzed for EC and pH. One sample of the ocean water was analyzed for EC and pH. Five out of seven salt flat pond samples exceeded the California and/or EPA pH criteria, as well as two of four pickleweed marsh samples. No data were available for priority toxic pollutants.

## **2.9 OXNARD DRAINAGE DITCH #3**

Water quality data from the Oxnard Drainage Ditch #3 west of Arnold Road were obtained from four data sources.

Two samples from Jones & Stokes (1994) were analyzed, with one sample analyzed for TDS, EC, nitrate, total phosphorus, and pH and one sample analyzed for just EC and pH. There were no exceedances for these constituents.

Three samples taken on June 8, 2000 (Wetland Research Associates 2000) were analyzed for salinity, VOCs, polynuclear aromatic hydrocarbons (PAHs), pesticides, chlorinated herbicide acids, and PCBs. VOCs, PAHs, chlorinated herbicide acids, and PCBs were not detected. For one sample, the only pesticide detected was DDT, which exceeded water quality criteria. No pesticides were detected in the other two samples.

Three samples were collected by the Navy (1994), two of these sample were taken on February 2, 1994 and the other taken on February 3, 1999. Constituents analyzed were dissolved metals, VOCs, PAHs, pesticides, and PCBs. There were no exceedances for VOCs, PAHs, and PCBs. There were exceedances of water quality criteria for the following metals: arsenic, chromium (total), copper, manganese, mercury (total), nickel, silver, and zinc.

The City of Oxnard Technical Services Program Storm Drain Monitoring Program has one monitoring station along the Oxnard Drainage Ditch #3 (City of Oxnard 2004). Bacteria data for total coliform, fecal coliform, and enterococcus were taken on June 24 and September 30, 2004. Both samples exceed the total coliform and enterococcus single sample standard. Weekly monitoring data between June 13, 2003 and September 3, 2004 were available for temperature, conductivity, DO, and pH. The DO levels of two out of 52 samples were below the minimum EPA criteria for fresh water aquatic life. The pH levels were occasionally just above the EPA pH criteria for salt water aquatic life.

## **2.10 DRAINAGE CHANNELS ADJACENT TO GAME PRESERVES**

Surface water samples have been taken from the drainage channels along the southwest Study Area boundary adjacent to the Ventura County and Point Mugu Game Preserves.

A total of 10 water quality samples between 1994 and 1999 have been taken from four sampling locations just south of the Ventura County Game Preserve. Surface water samples were analyzed for dissolved metals, VOCs, PAHs, pesticides, and PCBs (Navy 1994). There were no exceedances for VOCs, PAHs, and PCBs. Metals exceeding water quality criteria

were arsenic, chromium (total), copper, lead, manganese, and silver. Pesticides exceeding water quality criteria were delta-BHC, DDD, DDE, heptachlor, and heptachlor epoxide.

The surface water quality data for six sampling locations were taken adjacent to Point Mugu Game Preserve and were analyzed for dissolved metals, VOCs, PAHs, pesticides, and PCBs. There were no exceedances for VOCs, PAHs, and PCBs. Exceedance of water quality criteria occurred for the following metals: chromium, copper, manganese, mercury, nickel, selenium, silver, and zinc. Pesticides exceeding water quality criteria were DDD, DDE, DDT, and dieldrin.

### **3 WATER QUALITY OF FUTURE WATER SOURCES**

#### **3.1 PROPOSED BRINE LINE**

The brine line water quality data included projected values for the mean concentration, 90<sup>th</sup> percentile concentration values, and 90<sup>th</sup> percentile concentration and flows. Water quality constituents included general constituents, miscellaneous compounds, bacteria, metals, pesticides, volatile organic compounds (VOCs), and semi-volatile organic compounds. Constituents above water quality criteria included ammonia, chlorinated phenols, PAHs, and tributyltin. Metals above water quality criteria were arsenic, chromium (VI), copper, cyanide, lead, mercury, nickel, thallium, and zinc. Pesticides exceeding water quality criteria were aldrin, chlordane, DDT, dieldrin, endosulfan, endrin, heptachlor, PCBs, and toxaphene. Two VOCs, acrylonitrile and bromodichloromethane, and seven semi-VOCs exceeded water quality criteria for aquatic organism consumption.

#### **3.2 GREAT PROGRAM**

Another possible future water source is the Groundwater Recovery Enhancement and Treatment (GREAT) Program. This program includes a tertiary treatment facility for secondary wastewater effluent, advanced water treatment facility for tertiary effluent, and desalination facility. Data were not available for water sources to be generated from the GREAT Program. Therefore, the water from the GREAT Program was not evaluated for use as a water source in this study.

## 4 SUMMARY

### 4.1 DATA GAPS

**Spatial Resolution** – No water quality data were available for the drainage channels within the portions of the City of Oxnard/MWD property, Southland Sod Farm, Archie Bard Property, Ventura County Game Preserve, and Point Mugu Game Preserve. For water sources with available water quality data, the spatial distribution of the samples may not be adequate to fully characterize the J Street Lagoon and the water sources within the City of Oxnard/MWD Property.

**Data Age** – Water quality data were out dated for the Hueneme Drain, East Hueneme Drain, J Street Lagoon, discharge point of the OID, and the marsh areas located to the northwest and southeast of the OBGS.

**Temporal Resolution** – The frequency of water quality samples were not sufficient for a direct comparison to water quality criteria.

**Contaminant Resolution** – No water quality data for priority toxic pollutants were available for the Hueneme Drain, J Street Drain, East Hueneme Drain, J Street Lagoon, OID (discharge location), and the marsh areas to the northwest and southeast of the OBGS. No water quality data for non-priority pollutants were available for water sources within the City of Oxnard/MWD Property and drainage channels adjacent to game preserves

### 4.2 CONCLUSIONS

Existing water quality data were available within a small portion of the Study Area. From the available data, constituents that exceeded water quality criteria for each water source were identified and are summarized in Figure 2.

**Hueneme Drain** – Water quality data are out dated and no data are available for priority toxic pollutants, thus there are insufficient data to evaluate the suitability for use in the Project.

**J Street Drain** – Constituents exceeding water quality criteria are bacteria, temperature, dissolved oxygen, and pH. In addition, no data are available for priority toxic pollutants. Based on the available water quality data, water from the J Street Drain probably would not be suitable for the Project without prior treatment to remove constituents exceeding water quality criteria. Treatment methods could include treatment facilities, constructed treatment wetlands, or both.

**East Hueneme Drain** – Water quality data are out dated and no data are available for priority toxic pollutants, thus there are insufficient data to evaluate the suitability for use in the Project.

**J Street Lagoon** – Water quality data are out dated and no data are available for priority toxic pollutants, thus there are insufficient data to evaluate the suitability for use in the Project.

**Oxnard Industrial Drain** – Constituents that exceeded water quality criteria were temperature, ammonia, bacteria, pH, and metals. In addition, data were not available for some priority toxic constituents (e.g., VOCs, PAHs, pesticides, or PCBs). Based on the available water quality data, the OID may not be suitable as a water source for the Project without prior treatment to remove constituents exceeding water quality criteria. Treatment methods could include treatment facilities, constructed treatment wetlands, or both.

**City of Oxnard/MWD Property** – Water quality criteria were exceeded for arsenic, zinc, DDT, and gamma-BHC (Lidane). With only one sample from the salt marsh and one sample from the ponded water, the spatial distribution of the samples may not be adequate to fully characterize this water source. Based on the available water quality data, these water sources may not be suitable for the Project without prior treatment to remove constituents exceeding water quality criteria.

**Northwest and Southeast of the Ormond Beach Generating Station** – For constituents analyzed, pH levels exceeded water quality criteria. Water quality data for both areas are out dated and no data are available for priority toxic pollutants. Therefore, there are insufficient data to evaluate the suitability for use in the Project.

**Oxnard Drainage Ditch #3** – Constituents that exceeded water quality criteria were bacteria, DO, pH, metals, and DDT. Based on the available water quality data, water from the Oxnard Drainage Ditch #3 would probably not be suitable as a water source for the Project without prior treatment to remove constituents exceeding water quality criteria. Treatment methods could include treatment facilities, constructed treatment wetlands, or both.

**Drainage Channels Adjacent to Game Preserves** – Constituents that exceeded water quality criteria were metals and pesticides. Water from these drainage channels may not be suitable as a water source for the Project without prior treatment to remove constituents exceeding water quality criteria. Treatment methods could include treatment facilities, constructed treatment wetlands, or both.

**Proposed Brine Line** – Based on comparison of the projected water quality data to water quality criteria for aquatic life, the proposed brine line would probably not be suitable as a water source without prior treatment to remove constituents exceeding the water quality criteria. Treatment methods could include treatment facilities, constructed treatment wetlands, or both.

#### **4.3 RECOMMENDATIONS**

- Conduct water quality sampling program to characterize the water quality of drainage channels within the portions of the City of Oxnard/MWD property, Southland Sod Farm, Archie Bard Property, Ventura County Game Preserve, and Point Mugu Game Preserve.
- Update water quality data for the Hueneme Drain, J Street Drain, East Hueneme Drain, J Street Lagoon, discharge point of the OID, and the marsh areas located to the northwest and southeast of the OBGS.

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