PRELIMINARY EVALUATION OF POTENTIAL WATER SOURCES

APPENDIX A – WATER QUALITY DATA

The water quality data for potential water sources were obtained and compared to water quality criteria for human health and aquatic life protection to evaluate the possibility of use as source water for the Ormond Beach Wetlands Restoration Project (Project).

The applicable water quality criteria are based on the designated beneficial uses. The existing and proposed Ormond Beach Wetlands designated beneficial uses 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). The applicable California water quality criteria are:

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

California criteria are based on protection of human health (aquatic consumption only) and for salt water aquatic life.

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

- Human health and welfare (aquatic organism consumption)
- Fresh water aquatic life protection
- Salt water aquatic life protection

Potential water sources include both existing surface water (i.e., drains, lagoons, and marsh areas), as well as possible future water sources from the Brine Line and Groundwater Recovery Enhancement and Treatment (GREAT) Program. Existing surface water were evaluated based on available water quality data. Water quality sampling locations are shown in Figure 1. Water quality data were available at the following locations:

- Hueneme Drain (Bubbling Springs Drain)
- East Hueneme Drain
- J Street Lagoon
- Oxnard Industrial Drain
- 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

The water quality data for each water source were compared to both state and federal water quality criteria (RWQCB 2003) and the results are summarized in the following tables. Each table lists the constituent analyzed, unit of measured constituent, and measured constituent for each sampling location, followed by the water quality criteria for that constituent. For easy comparison, constituents with no criteria are hatched with dots. Constituents with criteria dependent on site-specific factors (e.g., pH, hardness, and temperature) are shaded in gray indicating that exceedance of the criteria cannot be determined. Constituents that exceeded the water quality criteria are shaded in yellow with the exceeded criteria shown in red.

EXISTING WATER SOURCES

J STREET LAGOON

The Hueneme Drain (also known as Bubbling Springs Drain), J Street Drain, East Hueneme Drain, and Oxnard Industrial Drain (OID) all discharge into J Street Lagoon, as shown in Figure 2. Water samples taken in this area in August 1994 (labeled sampling locations 1 – 6) were analyzed for temperature, salinity, total dissolved solids (TDS), specific conductance (EC), nitrate, ammonium, phosphate, pH, biological oxygen demand (BOD), oil and grease, and chlorinated pesticides (VCFCD 1996). Samples 1, 3, and 5 were taken from the Hueneme Drain, J Street Drain, and East Hueneme Drain, respectively. Sample 2 was taken in the western end of J Street Lagoon and Sample 5 from the eastern end. The water quality data of Samples 1 – 5 were compared to California and EPA water quality criteria in Tables 1 and 2, respectively. Salinity levels indicate at the time of sampling, the lagoon was a fresh water environment with no tidal influence. The water quality meets California criteria, although the temperature criteria are based on site-specific factors. EPA water quality criteria for temperature, salinity, ammonia, phosphate, and pH are also dependent on site-specific factors to establish numeric criteria. The remaining constituents meet the EPA water quality criteria.

Additional data from the City of Oxnard Technical Services Program Storm Drain Monitoring Program were available for the J Street Drain at Hueneme Road (City of Oxnard 2004). Bacteria data from two samples taken on June 24 and September 30, 2004 included data for total coliform, E. coliform (fecal coliform), and enterococcus. California REC-1 single sample indicator bacteria standards are 10,000, 400, and 104 MPN/100 mL for total coliform, fecal coliform, and enterococcus, respectively. The single sample standards for total and fecal coliform were exceeded. Weekly monitoring data between June 13, 2003 and September 9, 2004 were available for temperature, conductivity, dissolved oxygen (DO), and pH. Temperature values ranged from 15.37 to 34.09 °C with an average value of 24.48 °C. Sixteen out of 52 samples exceeded the California Ocean Plan temperature criteria for marine life protection. Conductivity ranged from 1, 018 to 18,321 μS/cm with an average of 3,273 μS/cm. DO values have an average value of 13.02 mg/L with a range of 0.94 to 25.47 mg/L. 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. The average pH exceeds both California and EPA pH criteria.

OXNARD INDUSTRIAL DRAIN

For the OID, water quality data of two samples (Figure 2) compared to California and EPA water quality criteria are shown in Tables 3 and 4, respectively. One sample (Sample 6) was taken in August 1994 near the OID discharge point into J Street Lagoon (VCFCD 1996). For the downstream sample, the California water quality criterion for ammonia was exceeded, but not the EPA criteria. The California Ocean Plan temperature criterion was also exceeded. The second sample (Sample WS-1) was taken (July 8, 2004) further upstream within the City of Oxnard/MWD Property and analyzed for volatile organic compounds (VOCs), metals, pesticides, polychlorinated biphenyls (PCBs), and radionuclides (SECOR 2004). The sample exceeds the California criteria for zinc and exceeds the arsenic EPA ambient water quality criteria for human health and welfare one-in-a-million cancer risk for aquatic organism consumption. The selenium criteria continuous concentration (CCC) for fresh water is also exceeded. EPA criteria for cadmium, copper, lead, nickel, silver, and zinc are based on site-specific factors.

The City of Oxnard Technical Services Program Storm Drain Monitoring Program has two monitoring stations along the OID (City of Oxnard 2004). One sample at Hueneme Road taken on July 21, 2003 was analyzed for total and fecal coliform, which were below California REC-1 standards. Bacteria data for total coliform, fecal coliform, and enterococcus are available for two samples at Perkins Road and McWane Blvd taken on taken on June 24 and September 30, 2004. At Perkins Road, both total coliform samples exceed California criteria. At McWane Blvd, the June sample exceeds the California fecal coliform criteria and the September total coliform sample exceeds California criteria. Weekly monitoring data between June 13, 2003 and September 3, 2004 for the Perkins and McWane sampling locations were available for temperature, conductivity, DO, and pH. The temperature at Perkins Road ranged from 11.47 °C to 25.44 °C with an average of 19.65 °C. Conductivity ranged from 3,201 to 41,862 μS/cm with an average of 16,522 μS/cm. DO values ranged from 1.95 to 18.52 mg/L with an average of 8.90 mg/L. The minimum DO of 1.95 mg/L that occurred for one out of 52 samples was below the minimum EPA criteria for fresh water aquatic life. The pH levels varied from 7.74 to 9.16 with an average of 8.30. The pH levels occasionally exceed both California and EPA pH criteria. For McWane Blvd, the temperature ranged from 11.04 °C to 25.59 °C with an average of 20.05 °C. Conductivity ranged from 1,872 to 37,599 μS/cm with an average of 14,022μS/cm. DO values ranged from 3.62 to 17.7 mg/L with an average of 10.34. The pH levels varied from 7.39 to 9.25 with an average of 8.39. The pH levels occasionally exceed both California and EPA pH criteria.

CITY OF OXNARD/MWD PROPERTY

Two water quality sample locations (samples taken July 8, 2004) are within the City of Oxnard/MWD Property, one in a salt marsh area (sample WS-8) in the central portion of the property and the other in ponded water (sample WS-9) located at the southern property edge (Figure 2). Both samples were analyzed for VOCs, metals, pesticides, PCBs, and radionuclides. Tables 5 and 6 compare the water quality data to the California and EPA criteria, respectively. Both samples exceed California criteria for zinc, DDT, and gamma-BHC (Lindane). Zinc exceeds the California Ocean Plan 6-month median for marine aquatic life protection, but does not exceed the daily and instantaneous maximums. DDT levels were well above the human health criteria 30-day average for aquatic organism consumption. In addition, the DDT levels were above the continuous concentration for salt water aquatic life protection. Lindane levels were above all criteria for marine aquatic life protection. EPA DDT criteria for human health one-in-a-million cancer risk, fresh water

aquatic life protection, and salt water aquatic life protection were exceeded. Arsenic EPA human health one-in-a-million cancer risk criterion for organism consumption was also exceeded. EPA criteria for cadmium, copper, lead, nickel, silver, and zinc are based on site-specific factors.

NORTHWEST OF ORMOND BEACH GENERATING STATION

The Study Area includes the Ormond Beach Generating Station (OBGS). Surface water samples taken to the northwest of OBGS (Figure 3) have been summarized and analyzed by Jones & Stokes (1994). To the northwest of OBGS, water sources include an artesian well, pickleweed marsh, salt flat pond, and a drainage channel. Two samples were taken in an artesian well, one in the pickleweed marsh, and three within the salt flat pond. Constituents analyzed were total dissolved solids (TDS), specific conductance (EC), nitrate nitrogen, total phosphorus, and pH. These constituents are compared to California and EPA water quality criteria in Tables 7 and 8, respectively. One of the two samples (Sample W4E) from the artesian well and two out of three samples (Samples W5E and W13) from the salt flat pond exceed California and EPA pH criteria. One sample from the salt flat pond exceeds the EPA total dissolved solids criteria, although this criterion is for domestic water supplies. The same general constituents were also analyzed in two samples (Samples W6E and W15) within the drainage channel, as shown in Tables 9 and 10. Sample W6E exceeded the California pH criterion for marine aquatic life protection. Both samples exceeded the EPA pH criteria. One sample exceeded the EPA total dissolved solids criteria, although this criterion is for domestic water supplies. The EPA phosphorus criteria are based on site-specific factors.

SOUTHEAST OF ORMOND BEACH GENERATING STATION

Southeast of the OBGS is a salt flat pond and pickleweed marsh (Figure 3). Water quality data from these areas, in addition to one sample of the ocean water, were compared to California and EPA water quality criteria in Tables 11 and 12. A total of seven samples were taken from the salt flat pond; 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. The ocean water sample was analyzed for EC and pH. Four out of seven salt flat pond samples exceeded the California Ocean Plan pH criterion, as well as one of four pickleweed marsh samples. Five samples from the salt flat pond and two samples from the pickleweed marsh exceeded the EPA pH criteria. One salt flat pond sample and one pickleweed marsh sample exceeded the EPA TDS criterion, although this is applicable for domestic water supplies. The EPA phosphorus criteria are based on site-specific factors.

OXNARD DRAINAGE DITCH #3

Water quality data from eight sampling locations in the Oxnard Drainage Ditch #3 were obtained from three data sources. Two samples (Samples W1E and W1) from Jones & Stokes (1994) were analyzed for TDS, EC, nitrate, total phosphorus, and pH. Three samples (Samples 1-3) taken June 8, 2000 by Wetland Research Associates (2000) were analyzed for VOCs, polynuclear aromatic hydrocarbons (PAHs), pesticides, chlorinated herbicide acids, and PCBs. These constituents and dissolved metals were also analyzed in three samples collected by the Navy. Two of these sample (Samples SW11-12 and SW11-36) were taken on February 2, 1994 and the other (sample SW11-72) taken on February 3, 1999. The comparison of all eight samples to California and EPA water quality criteria are

shown in Tables 13 and 14, respectively. No exceedances occurred for general constituents based on two samples that were analyzed for general constituents. The EPA phosphorus and pH criteria are based on site-specific factors. Four samples were analyzed for VOCs and chlorinated herbicide acids with no exceedances. Six samples were analyzed for PAHs and PCBs with no exceedances. DDT was the only pesticide detected above water quality criteria from one out of the six samples tested. Three samples were tested for dissolved metals, which showed California water quality criteria exceedances for total chromium, copper, total mercury, nickel, silver, and zinc. EPA water quality criteria exceedances occurred for arsenic, copper, manganese, total mercury, nickel, and silver. EPA criteria for cadmium, copper, lead, nickel, silver, and zinc requires site-specific factors.

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. Temperature ranged from 9.01 °C to 25.42 °C with an average of 18.36 °C. Conductivity ranged from 903 to 13,217 μS/cm with an average of 4,617 μS/cm. DO values ranged from 2.51 to 24.32 mg/L with an average of 11.19 mg/L. The DO levels for two out of 52 samples fell below the minimum EPA criteria for fresh water aquatic life. The pH levels varied from 7.35 to 8.66 with an average of 8.15. The pH levels were occasionally above the EPA pH criteria for salt water aquatic life.

GAME PRESERVES

Surface water sampling locations along the southwest Study Area boundary adjacent to the Ventura County and Point Mugu Game Preserves are shown in Figure 4. Surface water samples were analyzed for dissolved metals, VOCs, PAHs, pesticides, and PCBs (Navy 1994). 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. The comparison of the water quality data to California and EPA water quality criteria are shown in Tables 15 and 16, respectively. Exceedances of both California and EPA water quality criteria occurred for metals and pesticides. Metals that exceeded the California water quality criteria were arsenic, chromium, copper, lead, and silver. Delta-BHC, DDD, DDE, Heptaclor, and heptachlor epoxide were the pesticides exceeding the California water quality criteria. EPA water quality criteria were exceeded for arsenic, copper, manganese, silver, DDD, DDE, heptachlor, and heptachlor epoxide.

The surface water quality data for sampling locations adjacent to Point Mugu Game Preserve are shown in Tables 17 and 18. The water quality is similar to the samples taken near the Ventura County Game Preserve, with exceedance for metals and pesticides. Metals that exceeded California water quality criteria were chromium, copper, mercury, nickel, silver, and zinc. Copper, manganese, and selenium were the metals above EPA water quality criteria. DDD, DDE, DDT, and dieldrin exceeded both California and EPA water quality criteria.

FUTURE WATER SOURCES

PROPOSED BRINE LINE

The brine line water quality data included projected values for the mean concentration, 90th percentile concentration values, and 90th percentile concentration and flows. Water quality constituents were divided into seven categories: general constituents, miscellaneous compounds, bacteria, metals, pesticides, volatile organic compounds (VOCs), and semi-volatile organic compounds.

The projected water quality of the brine line comparison to California and EPA water quality criteria are shown in Tables 19 and 20, respectively. Ammonia, chlorinated phenols, polycyclic aromatic hydrocarbons (PAHs), and tributyltin exceeded the California Ocean Plan criteria for marine aquatic life protection. Bacteria levels were below the water quality criteria. Metals above water quality criteria were chromium (VI), copper, cyanide, lead, mercury, nickel, 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. Comparison to the EPA National Recommended Ambient Water Quality Criteria showed similar exceedances of criteria. Sulfate and total dissolved solids (TDS) criteria were exceeded. PAHs and tributylin criteria were exceeded. Metals that exceeded standards were arsenic, copper, cyanide, and thallium. Pesticides exceeding water quality criteria were the same as the state criteria except for endrin. Acrylonitrile and four semi-VOCs exceeded the criteria.

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 are 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.

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