

Appendix A

Hydraulic Structure Data Collection



APPENDIX A

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A.1 Hydraulic Structure Data Collection Summary

Culvert modifications (e.g. widening and increasing flow capacity) have been previously discussed as a potential near-term and long-term adaptation action, depending on the ecological goals for the local area. As part of the general existing data collection effort for this study, ESA collected field survey data for culverts located beneath Highway 1 in the study area and existing hydraulic structure datasets from local technical groups. Figure A-1 show the locations of all known hydraulic structures around Elkhorn Slough. These are assumed to be the most recent and best available data. Culvert and hydraulic structure information were used to inform the DELFT-3D hydrodynamic modeling performed as part of this study. This document summarizes the data sources for hydraulic structure specifications.

A.1.1 Highway 1 Culvert Data Collection – November 2018

ESA performed a field reconnaissance and data collection for culverts located underneath Highway 1 for Reaches 1 through 4 in November 2018, at the beginning of the study. Culvert locations were transmitted to ESA by AMBAG and Caltrans. For each culvert, ESA measured the invert (bottom) elevation and diameter and noted the culvert material and condition. Table A-1 summarizes the culvert specifications.

TABLE A-1
HIGHWAY 1 CULVERT SPECIFICATIONS

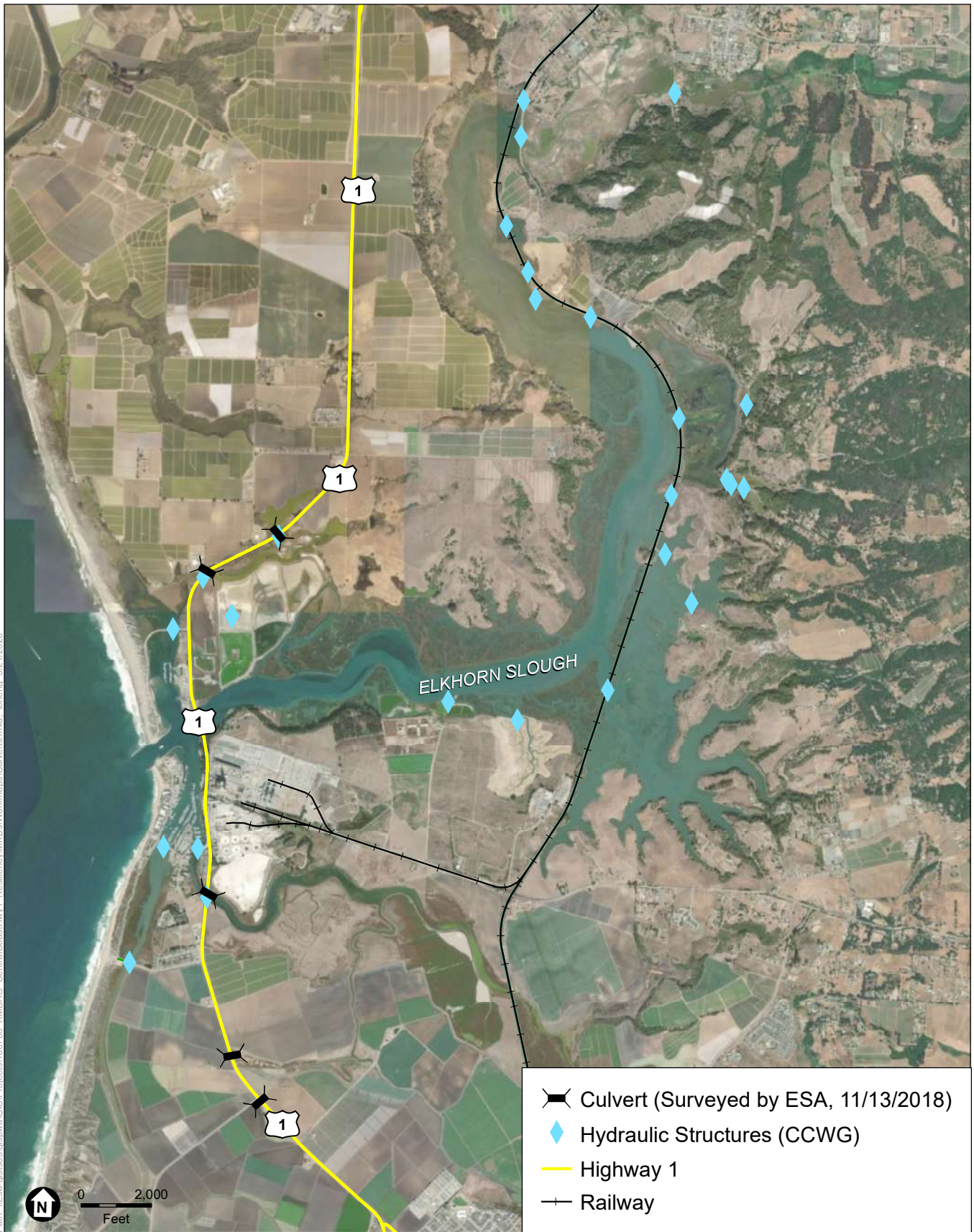
ID	Reach	Invert Elev. (ft, NAVD88)	Diameter (ft)	Material	Notes
R1-CULV-1	1	2.9	2	HDPE ^a	Culvert with concrete collar
R2-CULV-1	2	7.4	2	HDPE	Straight concrete wingwalls on both sides
R3-CULV-1	3	-1.6	6 (individual span)	Concrete	Dual box concrete culvert
R4-CULV-1	4	3.6	3	HDPE	-
R4-CULV-2	4	Unknown	1.5	HDPE	Culvert filled in. True invert of structure lower.

a. HDPE = High Density Polyethylene

In Reach 2, the culverts connecting flow from Lower to Upper Bennett Slough were crushed; little to no tidal influence reaches Upper Bennett Slough and Struve Pond, which matched previous and existing qualitative observations of those hydrologic systems. Figure A-2 shows the condition of culverts surveyed. All survey data were taken with respect to horizontal datum California State Plane (CASP) Zone 4 and North American Vertical Datum (NAVD88) and in English units.

A.1.2 Existing Data Collection

Central Coast Wetlands Group (CCWG) transmitted a record of known hydraulic structures located in and around the Slough and railway to ESA in April 2019, as part of existing data collection. These include culverts and flap gates initially installed underneath the railway embankment to provide inboard hydraulic control for agricultural purposes. ESA coordinated with CCWG and ESNERR over email and calls to verify the current condition of hydraulic structure and update the database, if different. An abbreviated version of the database is attached to the end of this appendix.



SOURCE: ESA (2018), CCWG (2019)

Central Coast Highway 1 Climate Resiliency Study
Figure A-1
 Hydraulic Structure Locations
 Surveyed by ESA on 11/13/2018



Reach 1 culvert located underneath vegetation)



Reach 2 culvert by Bennett Slough



Reach 3 dual concrete culverts



Reach 4 culvert (note structure is filled in)

SOURCE: ESA (2018)

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Figure A-2

Highway 1 Culvert Survey

Reaches 1-4