Appendix A

Parcels in Goleta Slough Ecosystem - 2011

NOTE - This information from the SB County Assessor's records was gathered in 2011 and has not been updated. There are minor changes to the GSEMP boundary that are not reflected here (see Figure 2-4).

Consult the County's parcel look up page to confirm this information:

http://sbcassessor.com/assessor/AssessorParcelMap.aspx

APN	Property Address	Acreage	Land Use
065-230-007		10.85	IRRIGATED FARMS, MISC
065-230-012	620 S PATTERSON AVE	15.85	NURSERIES,GREENHOUSES
065-230-014	5300 SHORELINE DR	7.90	SINGLE FAMILY RESIDENCE
065-230-017	1105 MORE RANCH RD	2.85	SINGLE FAMILY RESIDENCE
065-250-011	S MORE RD	0.17	VACANT
065-250-025	5295 SHORELINE DR	32.27	TREE FARMS
065-250-044	1396 S ANDERSON LN	17.36	NURSERIES,GREENHOUSES
065-320-001		17.85	VACANT
065-320-002		33.20	VACANT
065-320-009		12.90	VACANT
065-320-011		0.89	PARKS
065-505-021		1.90	PARKS
065-525-001		2.19	PARKS
071-200-012		3.40	UTILITY,WATER COMPANY
071-200-013		2.00	UTILITY,WATER COMPANY
071-200-017	5905 SANDSPIT RD	21.50	PARKS
071-200-018		0.57	RIGHTS OF WAY,SEWER,LAND FILLS,ETC
071-200-019		4.75	MISCELLANEOUS
071-200-022		16.60	WASTE
071-200-023		33.10	MISCELLANEOUS
071-200-024	1 WILLIAM MOFFET PL	11.75	MISCELLANEOUS
071-200-025		18.35	MISCELLANEOUS
071-210-001	1171 S MORE RANCH RD	147.40	UTILITY,WATER COMPANY
071-152-001	650 S FAIRVIEW AVE	0.19	AUTO SALES, REPAIR, STORAGE, CAR WASH, ETC
071-152-004	5915 DALEY ST	0.19	SINGLE FAMILY RESIDENCE
071-152-005	5905 DALEY ST	0.09	SINGLE FAMILY RESIDENCE
071-152-007	5920 MATTHEWS ST	0.19	RESIDENTIAL INCOME, 2-4 UNITS
071-152-008	5940 MATTHEWS ST	0.19	AUTO SALES, REPAIR, STORAGE, CAR WASH, ETC
071-152-009	5960 MATTHEWS ST	0.19	AUTO SALES, REPAIR, STORAGE, CAR WASH, ETC
071-152-010	5974 MATTHEWS ST	0.10	VACANT
071-152-011	5982 MATTHEWS ST	0.10	SINGLE FAMILY RESIDENCE
071-152-012	654 S FAIRVIEW AVE	0.19	RETAIL STORES, SINGLE STORY
071-152-013	5901 DALEY ST	0.09	COMMERCIAL (MISC)
071-152-014	5910 MATTHEWS ST	0.09	WAREHOUSING
071-152-015	5945 DALEY ST	0.10	LIGHT MANUFACTURING
071-152-016	5955 DALEY ST	0.10	AUTO SALES, REPAIR, STORAGE, CAR WASH, ETC
071-152-019	5989 DALEY ST	0.10	AUTO SALES, REPAIR, STORAGE, CAR WASH, ETC

071-152-021	5965 DALEY ST	0.19	AUTO SALES, REPAIR, STORAGE, CAR WASH, ETC
071-153-002	5989 MATTHEWS ST	0.10	RESIDENTIAL INCOME, 2-4 UNITS
071-153-003	5975 MATTHEWS ST	0.10	COMMERCIAL (MISC)
071-153-004	5971 MATTHEWS ST	0.10	SINGLE FAMILY RESIDENCE
071-153-005	5955 MATTHEWS ST	0.10	SINGLE FAMILY RESIDENCE
071-153-006	5929 MATTHEWS ST	0.19	AUTO SALES, REPAIR, STORAGE, CAR WASH, ETC
071-153-007	5921 MATTHEWS ST	0.28	AUTO SALES, REPAIR, STORAGE, CAR WASH, ETC
071-153-008	5912 OLNEY ST	0.19	AUTO SALES, REPAIR, STORAGE, CAR WASH, ETC
071-153-009	5920 OLNEY ST	0.09	COMMERCIAL (MISC)
071-153-010	5930 OLNEY ST	0.14	INDUSTRIAL, MISC
071-153-011	5940 OLNEY ST UNIT 101	0.14	RESIDENTIAL INCOME, 2-4 UNITS
071-153-012	5950 OLNEY ST UNIT	0.10	AUTO SALES, REPAIR, STORAGE, CAR WASH, ETC
071-153-013	5960 OLNEY ST UNIT	0.10	OPEN STORAGE, BULK PLANT
071-153-017	664 S FAIRVIEW AVE	0.19	AUTO SALES, REPAIR, STORAGE, CAR WASH
071-153-018	690 S FAIRVIEW AVE	0.29	AUTO SALES, REPAIR, STORAGE, CAR WASH
071-154-001	710 S FAIRVIEW AVE	0.38	INDUSTRIAL, MISC
071-154-002	5927 OLNEY ST	0.19	OPEN STORAGE, BULK PLANT
071-154-003	5925 OLNEY ST	0.09	OPEN STORAGE, BULK PLANT
071-154-004	5917 OLNEY ST	0.19	OPEN STORAGE, BULK PLANT
071-154-005	5905 OLNEY ST	0.19	OPEN STORAGE, BULK PLANT
071-154-009		0.32	VACANT
071-154-010		0.11	VACANT
071-154-011		1.20	VACANT
071-160-001		2.30	VACANT
071-160-002		0.11	VACANT
071-160-003		0.22	COMMERCIAL (MISC)
071-160-004		2.00	COMMERCIAL (MISC)
071-160-005		0.11	VACANT
071-160-006		0.55	COMMERCIAL (MISC)
071-160-007		0.11	VACANT
071-160-008		0.11	VACANT
071-160-009		0.21	VACANT
071-160-010		0.32	COMMERCIAL (MISC)
071-160-011		0.33	VACANT
071-160-012		0.43	VACANT
071-160-013		0.32	VACANT
071-170-008	849 WARD DR	0.65	LIGHT MANUFACTURING
071-170-014	749 WARD DR	2.68	LIGHT MANUFACTURING
071-170-034	5787 THORNWOOD DR	1.20	OFFICE BUILDINGS, SINGLE STORY
071-170-037	5775 THORNWOOD DR	0.56	LIGHT MANUFACTURING
071-170-038	5785 THORNWOOD DR	0.56	LIGHT MANUFACTURING
071-170-057	5737 THORNWOOD DR	1.09	LIGHT MANUFACTURING
071-170-058	5725 THORNWOOD DR	0.68	PARKING LOTS
071-170-059	5715 THORNWOOD DR	0.66	LIGHT MANUFACTURING

071-170-060	801 S KELLOGG AVE	0.58	LIGHT MANUFACTURING
071-170-061	867 S KELLOGG AVE	0.56	LIGHT MANUFACTURING
071-170-062	873 S KELLOGG AVE	0.46	WAREHOUSING
071-170-063	879 S KELLOGG AVE	0.46	WAREHOUSING
071-170-064		0.45	INDUSTRIAL, MISC
071-170-077	839 WARD DR	1.34	LIGHT MANUFACTURING
071-170-078	859 WARD DR	4.26	LIGHT MANUFACTURING
071-170-082	601 PINE AVE UNIT A	2.52	LIGHT MANUFACTURING
071-170-083		1.61	INDUSTRIAL, MISC
071-181-012		2.40	VACANT
071-182-001	5995 PLACENCIA ST	0.07	SINGLE FAMILY RESIDENCE
071-182-002	5955 PLACENCIA ST	0.09	RESIDENTIAL INCOME, 2-4 UNITS
071-182-003	5959 PLACENCIA ST	0.10	RESIDENTIAL INCOME, 2-4 UNITS
071-182-004	5963 PLACENCIA ST	0.09	SINGLE FAMILY RESIDENCE
071-182-005	5965 PLACENCIA ST	0.09	SINGLE FAMILY RESIDENCE
071-182-006	5969 PLACENCIA ST	0.09	RESIDENTIAL INCOME, 2-4 UNITS
071-182-007	5971 PLACENCIA ST	0.09	MOBILE HOME PARKS
071-182-010	S FAIRVIEW AVE	0.10	OPEN STORAGE, BULK PLANT
071-182-011		0.19	OPEN STORAGE, BULK PLANT
071-182-012	5920 CORTA ST	0.09	RESIDENTIAL INCOME, 2-4 UNITS
071-182-013	5926 CORTA ST	0.09	RESIDENTIAL INCOME, 2-4 UNITS
071-182-014		0.09	INDUSTRIAL, MISC
071-182-015	5958 CORTA ST	0.09	WAREHOUSING
071-182-016	FAIRVIEW AVE	0.10	OPEN STORAGE, BULK PLANT
071-182-017	5939 PLACENCIA ST	0.19	AUTO SALES, REPAIR, STORAGE, CAR WASH
071-183-001	5919 CORTA ST	0.15	AUTO SALES, REPAIR, STORAGE, CAR WASH
071-183-003	5901 CORTA ST	0.10	LIGHT MANUFACTURING
071-183-004	1150 S FAIRVIEW AVE	0.13	SINGLE FAMILY RESIDENCE
071-183-005	1020 S FAIRVIEW AVE	0.11	WAREHOUSING
071-190-004	730 WARD DR	49.89	INDUSTRIAL, MISC
071-190-008		0.23	VACANT
071-190-009		0.23	WATER RIGHTS,PUMPS
071-190-028		1.37	RIGHTS OF WAY,SEWER,LAND FILLS,ETC
071-190-029	945 WARD DR	8.26	RIGHTS OF WAY,SEWER,LAND FILLS,ETC
071-190-030		1.16	RIGHTS OF WAY,SEWER,LAND FILLS,ETC
071-190-031	945 WARD DR	27.78	MOBILE HOME PARKS
071-190-036	905 S PATTERSON AVE	60.83	NURSERIES,GREENHOUSES
071-190-037		2.07	VACANT
071-190-038		0.24	VACANT
071-200-003	1126 FOWLER ST	9.10	PUBLIC BLDGS, FIREHOUSES, MUSEUMS, POST OFFICES,ETC
071-200-008		18.14	UTILITY,WATER COMPANY
071-200-009		7.28	PARKS
071-200-011		22.90	UTILITY,WATER COMPANY
073-060-046		0.29	INDUSTRIAL, MISC
073-060-050		2.37	MISCELLANEOUS
073-070-033	6464 HOLLISTER AVE	2.75	LIGHT MANUFACTURING
073-070-034	6470 HOLLISTER AVE	0.58	SERVICE STATIONS

073-070-035	6466 HOLLISTER AVE	4.64	RECREATION
073-070-043		1.28	RIVERS AND LAKES
073-070-044		1.18	RIVERS AND LAKES
073-070-045		1.55	RIVERS AND LAKES
073-070-046		3.47	RIVERS AND LAKES
073-080-028	6021 HOLLISTER AVE	0.70	HOTELS
073-080-029	6015 HOLLISTER AVE	0.23	SERVICE STATIONS
073-120-010	6850 EL COLEGIO RD	19.23	APARTMENTS, 5 OR MORE UNITS
073-120-014		90.62	CHURCHES, RECTORY
073-120-016		22.11	MISCELLANEOUS
073-120-020		2.73	VACANT
073-120-029		0.31	VACANT
073-120-059		0.45	VACANT
073-450-002		3.80	WASTE
073-450-003	SB ARPT/100 ADAMS	826.24	PUBLIC BLDGS, FIREHOUSES, MUSEUMS, POST OFFICES, ETC
073-470-089		0.21	VACANT
075-010-028	6795 EL COLEGIO RD	11.78	VACANT
073-500-CA2		0.00	
073-530-CA1		0.00	
073-550-CA1		0.00	
073-560-CA1		0.00	
073-570-CA1		0.00	
073-580-CA1		0.00	
073-590-CA1		0.00	
073-600-CA1		0.00	
065-320-007		34.72	VACANT
065-320-008		106.60	VACANT
065-320-004	VIEJA DR	35.50	VACANT
065-320-010		59.22	VACANT
065-540-047		2.92	PARKS
071-151-002	5940 DALEY ST	0.10	SINGLE FAMILY RESIDENCE
071-151-004	5920 DALEY ST	0.09	RESIDENTIAL INCOME, 2-4 UNITS
071-151-005	5910 DALEY ST	0.09	SINGLE FAMILY RESIDENCE
071-151-006	5902 DALEY ST	0.09	WAREHOUSING
071-151-007	5930 DALEY ST	0.10	WAREHOUSING
071-151-008	5924 DALEY ST	0.09	WAREHOUSING
071-151-009	5950 DALEY ST	0.10	OPEN STORAGE, BULK PLANT
071-151-011	630 S FAIRVIEW AVE	0.18	SINGLE FAMILY RESIDENCE
071-151-012	5960 DALEY ST	0.27	LIGHT MANUFACTURING
071-170-080		3.08	VACANT
073-120-015		12.30	MISCELLANEOUS
073-120-013	6750 EL COLEGIO RD	76.02	CHURCHES, RECTORY
073-470-027		0.41	VACANT
073-610-001	6769 HOLLISTER AVE	4.25	OFFICE BUILDINGS, MULTI-STORY
073-610-002	6775 HOLLISTER AVE	7.18	WAREHOUSING
073-610-003	6725 HOLLISTER AVE	2.94	WAREHOUSING
073-610-004	6755 HOLLISTER AVE	3.19	OFFICE BUILDINGS, MULTI-STORY
073-610-005		1.51	OFFICE BUILDINGS, SINGLE STORY

073-610-007	400 STORKE RD	19.99	PUBLIC BLDGS, FIREHOUSES, MUSEUMS, POST OFFICES,ETC
073-610-008		9.22	COMMERCIAL (MISC)
073-610-009		2.41	COMMERCIAL (MISC)
073-610-010		2.18	COMMERCIAL (MISC)
073-610-011		3.72	PARKING LOTS
073-610-012		2.32	OFFICE BUILDINGS, SINGLE STORY
073-610-013		2.36	HIGHWAYS AND STREETS
073-610-015		2.79	COMMERCIAL (MISC)
073-610-016		3.11	COMMERCIAL (MISC)
073-610-017		1.49	HIGHWAYS AND STREETS
073-610-018		18.77	COMMERCIAL (MISC)
073-610-019		23.79	LIGHT MANUFACTURING
071-190-018		0.46	VACANT
071-190-034	903 S KELLOGG AVE	4.29	OFFICE BUILDINGS, SINGLE STORY
071-190-035	907 S KELLOGG AVE	11.71	DRIVE-IN THEATRES
071-190-017		3.00	VACANT
071-170-053	5765 THORNWOOD DR	0.57	LIGHT MANUFACTURING
071-170-054	5755 THORNWOOD DR	0.57	LIGHT MANUFACTURING
071-170-076	5743 THORNWOOD DR	1.54	LIGHT MANUFACTURING
071-170-079	891 S KELLOGG AVE	15.07	VACANT
071-170-085	730 TECHNOLOGY DR	3.13	INDUSTRIAL, MISC
071-170-084	750 TECHNOLOGY DR	2.86	OFFICE BUILDINGS, MULTI-STORY
073-500-001	6857 SWEETWATER WY	0.08	CONDOS,COMMUNITY APT PROJS
073-500-002	6853 SWEETWATER WY	0.11	CONDOS,COMMUNITY APT PROJS
073-500-003	6849 SWEETWATER WY	0.08	CONDOS,COMMUNITY APT PROJS
073-500-004	6845 SWEETWATER WY	0.08	CONDOS,COMMUNITY APT PROJS
073-500-005	6841 SWEETWATER WY	0.08	CONDOS,COMMUNITY APT PROJS
073-500-006	6837 SWEETWATER WY	0.10	CONDOS,COMMUNITY APT PROJS
073-500-007	6831 SWEETWATER WY	0.07	CONDOS,COMMUNITY APT PROJS
073-500-008	6827 SWEETWATER WY	0.07	CONDOS,COMMUNITY APT PROJS
073-500-009	6821 SWEETWATER WY	0.11	CONDOS,COMMUNITY APT PROJS
073-500-010	6817 SWEETWATER WY	0.08	SINGLE FAMILY RESIDENCE
073-500-011	6813 SWEETWATER WY	0.09	CONDOS,COMMUNITY APT PROJS
073-500-012	6807 SWEETWATER WY	0.08	CONDOS,COMMUNITY APT PROJS
073-500-013	535 FIRESIDE LN	0.07	CONDOS,COMMUNITY APT PROJS
073-500-014	539 FIRESIDE LN	0.06	CONDOS,COMMUNITY APT PROJS
073-500-015	543 FIRESIDE LN	0.07	CONDOS,COMMUNITY APT PROJS
073-500-016	544 FIRESIDE LN	0.07	CONDOS,COMMUNITY APT PROJS
073-500-017	540 FIRESIDE LN	0.06	CONDOS,COMMUNITY APT PROJS
073-500-018	536 FIRESIDE LN	0.06	CONDOS,COMMUNITY APT PROJS
073-500-019	532 FIRESIDE LN	0.07	CONDOS,COMMUNITY APT PROJS
073-500-020	528 FIRESIDE LN	0.09	CONDOS,COMMUNITY APT PROJS
073-530-001	550 SPRINGBROOK CT	0.00	CONDOS,COMMUNITY APT PROJS
073-530-002	554 SPRINGBROOK CT	0.00	CONDOS,COMMUNITY APT PROJS
073-530-003	558 SPRINGBROOK CT	0.00	CONDOS,COMMUNITY APT PROJS
073-530-004	562 SPRINGBROOK CT	0.00	CONDOS,COMMUNITY APT PROJS
073-530-005	566 SPRINGBROOK CT	0.00	CONDOS,COMMUNITY APT PROJS
073-530-006	570 SPRINGBROOK CT	0.00	CONDOS,COMMUNITY APT PROJS

073-530-007	599 POPPYFIELD PL	0.00	CONDOS,COMMUNITY APT PROJS
073-530-008	595 POPPYFIELD PL	0.00	CONDOS,COMMUNITY APT PROJS
073-530-009	591 POPPYFIELD PL	0.00	CONDOS,COMMUNITY APT PROJS
073-530-010	587 POPPYFIELD PL	0.00	CONDOS,COMMUNITY APT PROJS
073-530-011	583 POPPYFIELD PL	0.00	CONDOS,COMMUNITY APT PROJS
073-530-012	581 POPPYFIELD PL	0.00	CONDOS,COMMUNITY APT PROJS
073-550-001	70 WS LN STE 101	0.00	CONDOS,COMMUNITY APT PROJS
073-550-002	70 WS LN STE 102	0.00	CONDOS,COMMUNITY APT PROJS
073-550-003	70 WS LN STE 103	0.00	CONDOS,COMMUNITY APT PROJS
073-550-004	70 WS LN STE 104	0.00	CONDOS,COMMUNITY APT PROJS
073-550-005	70 WS LN STE 105	0.00	CONDOS,COMMUNITY APT PROJS
073-550-010	50 WS LN STE 101	0.00	CONDOS,COMMUNITY APT PROJS
073-550-011	50 WS LN STE 102	0.00	CONDOS,COMMUNITY APT PROJS
073-550-012	50 WS LN STE 103	0.00	CONDOS,COMMUNITY APT PROJS
073-550-013	50 WS LN STE 104	0.00	CONDOS,COMMUNITY APT PROJS
073-550-018	40 WS LN STE 101	0.00	CONDOS,COMMUNITY APT PROJS
073-550-019	40 WS LN STE 102	0.00	CONDOS,COMMUNITY APT PROJS
073-550-020	40 WS LN STE 103	0.00	CONDOS,COMMUNITY APT PROJS
073-550-021	40 WS LN STE 104	0.00	CONDOS,COMMUNITY APT PROJS
073-550-024	45 WS LN STE 101	0.00	CONDOS,COMMUNITY APT PROJS
073-550-025	45 WS LN STE 102	0.00	CONDOS,COMMUNITY APT PROJS
073-550-026	45 WS LN STE 103	0.00	CONDOS,COMMUNITY APT PROJS
073-550-027	45 WS LN STE 104	0.00	CONDOS,COMMUNITY APT PROJS
073-550-032	55 WS LN STE 101	0.00	CONDOS,COMMUNITY APT PROJS
073-550-033	55 WS LN STE 102	0.00	CONDOS,COMMUNITY APT PROJS
073-550-034	55 WS LN STE 103	0.00	CONDOS,COMMUNITY APT PROJS
073-550-035	55 WS LN STE 104	0.00	CONDOS,COMMUNITY APT PROJS
073-560-001	75 WS LN STE 101	0.00	CONDOS,COMMUNITY APT PROJS
073-560-002	75 WS LN STE 102	0.00	CONDOS,COMMUNITY APT PROJS
073-560-003	75WS LN STE 103	0.00	CONDOS,COMMUNITY APT PROJS
073-560-004	75 WS LN STE 104	0.00	CONDOS,COMMUNITY APT PROJS
073-560-009	65 WS LN STE 101	0.00	CONDOS,COMMUNITY APT PROJS
073-560-010	65 WS LN STE 102	0.00	CONDOS,COMMUNITY APT PROJS
073-560-011	65 WS LN STE 103	0.00	CONDOS,COMMUNITY APT PROJS
073-560-012	65 WS LN STE 104	0.00	CONDOS,COMMUNITY APT PROJS
073-560-017	85 WS LN STE 101	0.00	CONDOS,COMMUNITY APT PROJS
073-560-018	85 WS LN STE 102	0.00	CONDOS,COMMUNITY APT PROJS
073-560-019	85 WS LN STE 103	0.00	CONDOS,COMMUNITY APT PROJS
073-560-020	85 WS LN STE 104	0.00	CONDOS,COMMUNITY APT PROJS
073-560-025	95WS LN STE 101	0.00	CONDOS,COMMUNITY APT PROJS
073-560-026	95 WS LN STE 102	0.00	CONDOS,COMMUNITY APT PROJS
073-560-027	95 WS LN STE 103	0.00	CONDOS,COMMUNITY APT PROJS
073-560-028	95 WS LN STE 104	0.00	CONDOS,COMMUNITY APT PROJS
073-570-001	86 WS LN STE 101	0.00	CONDOS,COMMUNITY APT PROJS
073-570-002	86 WS LN STE 102	0.00	CONDOS,COMMUNITY APT PROJS
073-570-003	86 WS LN STE 103	0.00	CONDOS,COMMUNITY APT PROJS
073-570-004	86 WS LN STE 104	0.00	CONDOS,COMMUNITY APT PROJS
073-570-009	84 WS LN STE 101	0.00	CONDOS,COMMUNITY APT PROJS
073-570-010	84 WS LN STE 102	0.00	CONDOS,COMMUNITY APT PROJS

073-570-011	84 WS LN STE 103	0.00	CONDOS,COMMUNITY APT PROJS
073-570-012	84 WS LN STE 104	0.00	CONDOS,COMMUNITY APT PROJS
073-570-017	80 WS LN STE 101	0.00	CONDOS,COMMUNITY APT PROJS
073-570-018	80 WS LN STE 102	0.00	CONDOS,COMMUNITY APT PROJS
073-570-019	80 WS LN STE 103	0.00	CONDOS,COMMUNITY APT PROJS
073-570-020	80WS LN STE 104	0.00	CONDOS,COMMUNITY APT PROJS
073-570-021	80 WS LN STE 105	0.00	CONDOS,COMMUNITY APT PROJS
073-570-022	80 WS LN STE 106	0.00	CONDOS,COMMUNITY APT PROJS
073-570-029	90 WS LN STE 101	0.00	CONDOS,COMMUNITY APT PROJS
073-570-030	90 WS LN STE 102	0.00	CONDOS,COMMUNITY APT PROJS
073-570-031	90 WS LN STE 103	0.00	CONDOS,COMMUNITY APT PROJS
073-570-032	90 WS LN STE 104	0.00	CONDOS,COMMUNITY APT PROJS
073-580-001	120 WS LN STE 101	0.00	CONDOS,COMMUNITY APT PROJS
073-580-002	120 WS LN STE 102	0.00	CONDOS,COMMUNITY APT PROJS
073-580-003	120 WS LN STE 103	0.00	CONDOS,COMMUNITY APT PROJS
073-580-004	120 WS LN STE 104	0.00	CONDOS,COMMUNITY APT PROJS
073-580-009	110WS LN STE 101	0.00	CONDOS,COMMUNITY APT PROJS
073-580-010	110 WS LN STE 102	0.00	CONDOS,COMMUNITY APT PROJS
073-580-011	110 WS LN STE 103	0.00	CONDOS,COMMUNITY APT PROJS
073-580-012	110 WS LN STE 104	0.00	CONDOS,COMMUNITY APT PROJS
073-580-013	110 WS LN STE 105	0.00	CONDOS,COMMUNITY APT PROJS
073-580-014	110 WS LN STE 106	0.00	CONDOS,COMMUNITY APT PROJS
073-580-015	110 WS LN STE 107	0.00	CONDOS,COMMUNITY APT PROJS
073-580-016	110 WS LN STE 108	0.00	CONDOS,COMMUNITY APT PROJS
073-580-025	115 WS LN STE 101	0.00	CONDOS,COMMUNITY APT PROJS
073-580-026	115 WS LN STE 102	0.00	CONDOS,COMMUNITY APT PROJS
073-580-027	115 WS LN STE 103	0.00	CONDOS,COMMUNITY APT PROJS
073-580-028	115 WS LN STE 104	0.00	CONDOS,COMMUNITY APT PROJS
073-580-029	115 WS LN STE 105	0.00	CONDOS,COMMUNITY APT PROJS
073-580-030	115 WS LN STE 106	0.00	CONDOS,COMMUNITY APT PROJS
073-580-037	125 WS LN STE 101	0.00	CONDOS,COMMUNITY APT PROJS
073-580-038	125 WS LN STE 102	0.00	CONDOS,COMMUNITY APT PROJS
073-580-039	125 WS LN STE 103	0.00	CONDOS,COMMUNITY APT PROJS
073-580-040	125 WS LN STE 104	0.00	CONDOS,COMMUNITY APT PROJS
073-590-001	155 WS LN STE 101	0.00	CONDOS,COMMUNITY APT PROJS
073-590-002	155 WS LN STE 102	0.00	CONDOS,COMMUNITY APT PROJS
073-590-003	155 WS LN STE 103	0.00	CONDOS,COMMUNITY APT PROJS
073-590-004	155 WS LN STE 104	0.00	CONDOS,COMMUNITY APT PROJS
073-590-009	150 WS LN STE 101	0.00	CONDOS,COMMUNITY APT PROJS
073-590-010	150 WS LN STE 102	0.00	CONDOS,COMMUNITY APT PROJS
073-590-011	150 WS LN STE 103	0.00	CONDOS,COMMUNITY APT PROJS
073-590-012	150 WS LN STE 104	0.00	CONDOS,COMMUNITY APT PROJS
073-590-017	130 WS LN STE 101	0.00	CONDOS,COMMUNITY APT PROJS
073-590-018	130 WS LN STE 102	0.00	CONDOS,COMMUNITY APT PROJS
073-590-019	130 WS LN STE 103	0.00	CONDOS,COMMUNITY APT PROJS
073-590-020	130 WS LN STE 104	0.00	CONDOS,COMMUNITY APT PROJS
073-590-025	140 WS LN STE 101	0.00	CONDOS,COMMUNITY APT PROJS
073-590-026	140 WS LN STE 102	0.00	CONDOS,COMMUNITY APT PROJS
073-590-027	140 WS LN STE 103	0.00	CONDOS,COMMUNITY APT PROJS

073-590-028	140 WS LN STE 104	0.00	CONDOS,COMMUNITY APT PROJS
073-590-029	140 WS LN STE 105	0.00	CONDOS,COMMUNITY APT PROJS
073-590-030	140 WS LN STE 106	0.00	CONDOS,COMMUNITY APT PROJS
073-590-031	140 WS LN STE 107	0.00	CONDOS,COMMUNITY APT PROJS
073-590-032	140 WS LN STE 108	0.00	CONDOS,COMMUNITY APT PROJS
073-590-041	160 WS LN STE 101	0.00	CONDOS,COMMUNITY APT PROJS
073-590-042	160 WS LN STE 102	0.00	CONDOS,COMMUNITY APT PROJS
073-590-043	160 WS LN STE 103	0.00	CONDOS,COMMUNITY APT PROJS
073-590-044	160 WS LN STE 104	0.00	CONDOS,COMMUNITY APT PROJS
073-600-001	180 WS LN STE 101	0.00	CONDOS,COMMUNITY APT PROJS
073-600-002	180 WS LN STE 102	0.00	CONDOS,COMMUNITY APT PROJS
073-600-003	180 WS LN STE 103	0.00	CONDOS,COMMUNITY APT PROJS
073-600-004	180 WS LN STE 104	0.00	CONDOS,COMMUNITY APT PROJS
073-600-009	170 WS LN STE 101	0.00	CONDOS,COMMUNITY APT PROJS
073-600-010	170 WS LN STE 102	0.00	CONDOS,COMMUNITY APT PROJS
073-600-011	170 WS LN STE 103	0.00	CONDOS,COMMUNITY APT PROJS
073-600-012	170 WS LN STE 104	0.00	CONDOS,COMMUNITY APT PROJS
073-600-013	170 WS LN STE 105	0.00	CONDOS,COMMUNITY APT PROJS
073-600-014	170 WS LN STE 106	0.00	CONDOS,COMMUNITY APT PROJS
073-600-021	165 WS LN STE 101	0.00	CONDOS,COMMUNITY APT PROJS
073-600-022	165 WS LN STE 102	0.00	CONDOS,COMMUNITY APT PROJS
073-600-023	165 WS LN STE 103	0.00	CONDOS,COMMUNITY APT PROJS
073-600-024	165 WS LN STE 104	0.00	CONDOS,COMMUNITY APT PROJS
073-600-029	175 WS LN STE 101	0.00	CONDOS,COMMUNITY APT PROJS
073-600-030	175 WS LN STE 102	0.00	CONDOS,COMMUNITY APT PROJS
073-600-031	175 WS LN STE 103	0.00	CONDOS,COMMUNITY APT PROJS
073-600-032	175 WS LN STE 104	0.00	CONDOS,COMMUNITY APT PROJS
073-550-006	70 WS LN STE 201	0.00	CONDOS,COMMUNITY APT PROJS
073-550-007	70 WS LN STE 202	0.00	CONDOS,COMMUNITY APT PROJS
073-550-008	70 WS LN STE 203	0.00	CONDOS,COMMUNITY APT PROJS
073-550-009	70 WS LN STE 204	0.00	CONDOS,COMMUNITY APT PROJS
073-550-014	50 WS LN STE 201	0.00	CONDOS,COMMUNITY APT PROJS
073-550-015	50 WS LN STE 202	0.00	CONDOS,COMMUNITY APT PROJS
073-550-016	50 WS LN STE 203	0.00	CONDOS,COMMUNITY APT PROJS
073-550-017	50 WS LN STE 204	0.00	CONDOS,COMMUNITY APT PROJS
073-550-022	40 WS LN STE 202	0.00	CONDOS,COMMUNITY APT PROJS
073-550-023	40 WS LN STE 203	0.00	CONDOS,COMMUNITY APT PROJS
073-550-028	45 WS LN STE 201	0.00	CONDOS,COMMUNITY APT PROJS
073-550-029	45 WS LN STE 202	0.00	CONDOS,COMMUNITY APT PROJS
073-550-030	45 WS LN STE 203	0.00	CONDOS,COMMUNITY APT PROJS
073-550-031	45 WS LN STE 204	0.00	CONDOS,COMMUNITY APT PROJS
073-550-036	55 WS LN STE 201	0.00	CONDOS,COMMUNITY APT PROJS
073-550-037	55 WS LN STE 202	0.00	CONDOS,COMMUNITY APT PROJS
073-550-038	55 WS LN STE 203	0.00	CONDOS,COMMUNITY APT PROJS
073-550-039	55 WS LN STE 204	0.00	CONDOS,COMMUNITY APT PROJS
073-560-005	75 WS LN STE 201	0.00	CONDOS,COMMUNITY APT PROJS
073-560-006	75 WS LN STE 202	0.00	CONDOS,COMMUNITY APT PROJS
073-560-007	75 WS LN STE 203	0.00	CONDOS,COMMUNITY APT PROJS
073-560-008	75 WS LN STE 204	0.00	CONDOS,COMMUNITY APT PROJS

073-560-013	65 WS LN STE 201	0.00	CONDOS,COMMUNITY APT PROJS
073-560-014	65 WS LN STE 202	0.00	CONDOS,COMMUNITY APT PROJS
073-560-015	65 WS LN STE 203	0.00	CONDOS,COMMUNITY APT PROJS
073-560-016	65 WS LN STE 204	0.00	CONDOS,COMMUNITY APT PROJS
073-560-021	85 WS LN STE 201	0.00	CONDOS,COMMUNITY APT PROJS
073-560-022	85 WS LN STE 202	0.00	CONDOS,COMMUNITY APT PROJS
073-560-023	85 WS LN STE 203	0.00	CONDOS,COMMUNITY APT PROJS
073-560-024	85 WS LN STE 204	0.00	CONDOS,COMMUNITY APT PROJS
073-560-029	95 WS LN STE 201	0.00	CONDOS,COMMUNITY APT PROJS
073-560-030	95 WS LN STE 202	0.00	CONDOS,COMMUNITY APT PROJS
073-560-031	95 WS LN STE 203	0.00	CONDOS,COMMUNITY APT PROJS
073-560-032	95 WS LN STE 204	0.00	CONDOS,COMMUNITY APT PROJS
073-570-005	86 WS LN STE 201	0.00	CONDOS,COMMUNITY APT PROJS
073-570-006	86 WS LN STE 202	0.00	CONDOS,COMMUNITY APT PROJS
073-570-007	86 WS LN STE 203	0.00	CONDOS,COMMUNITY APT PROJS
073-570-008	86 WS LN STE 204	0.00	CONDOS,COMMUNITY APT PROJS
073-570-013	84 WS LN STE 201	0.00	CONDOS,COMMUNITY APT PROJS
073-570-014	84 WS LN STE 202	0.00	CONDOS,COMMUNITY APT PROJS
073-570-015	84 WS LN STE 203	0.00	CONDOS,COMMUNITY APT PROJS
073-570-016	84 WS LN STE 204	0.00	CONDOS,COMMUNITY APT PROJS
073-570-023	80 WS LN STE 201	0.00	CONDOS,COMMUNITY APT PROJS
073-570-024	80 WS LN STE 202	0.00	CONDOS,COMMUNITY APT PROJS
073-570-025	80 WS LN STE 203	0.00	CONDOS,COMMUNITY APT PROJS
073-570-026	80 WS LN STE 204	0.00	CONDOS,COMMUNITY APT PROJS
073-570-027	80 WS LN STE 205	0.00	CONDOS,COMMUNITY APT PROJS
073-570-028	80 WS LN STE 206	0.00	CONDOS,COMMUNITY APT PROJS
073-570-033	90 WS LN STE 201	0.00	CONDOS,COMMUNITY APT PROJS
073-570-034	90 WS LN STE 202	0.00	CONDOS,COMMUNITY APT PROJS
073-570-035	90 WS LN STE 203	0.00	CONDOS,COMMUNITY APT PROJS
073-570-036	90 WS LN STE 204	0.00	CONDOS,COMMUNITY APT PROJS
073-580-005	120 WS LN STE 201	0.00	CONDOS,COMMUNITY APT PROJS
073-580-006	120 WS LN STE 202	0.00	CONDOS,COMMUNITY APT PROJS
073-580-007	120 WS LN STE 203	0.00	CONDOS,COMMUNITY APT PROJS
073-580-008	120 WS LN STE 204	0.00	CONDOS,COMMUNITY APT PROJS
073-580-017	110 WS LN STE 201	0.00	CONDOS,COMMUNITY APT PROJS
073-580-018	110 WS LN STE 202	0.00	CONDOS,COMMUNITY APT PROJS
073-580-019	110 WS LN STE 203	0.00	CONDOS,COMMUNITY APT PROJS
073-580-020	110 WS LN STE 204	0.00	CONDOS,COMMUNITY APT PROJS
073-580-021	110 WS LN STE 205	0.00	CONDOS,COMMUNITY APT PROJS
073-580-022	110 WS LN STE 206	0.00	CONDOS,COMMUNITY APT PROJS
073-580-023	110 WS LN STE 207	0.00	CONDOS,COMMUNITY APT PROJS
073-580-024	110 WS LN STE 208	0.00	CONDOS,COMMUNITY APT PROJS
073-580-031	115 WS LN STE 201	0.00	CONDOS,COMMUNITY APT PROJS
073-580-032	115 WS LN STE 202	0.00	CONDOS,COMMUNITY APT PROJS
073-580-033	115 WS LN STE 203	0.00	CONDOS,COMMUNITY APT PROJS
073-580-034	115 WS LN STE 204	0.00	CONDOS,COMMUNITY APT PROJS
073-580-035	115 WS LN STE 205	0.00	CONDOS,COMMUNITY APT PROJS
073-580-036	115 WS LN STE 206	0.00	CONDOS,COMMUNITY APT PROJS
073-580-041	125 WS LN STE 201	0.00	CONDOS,COMMUNITY APT PROJS

073-580-042	125 WS LN STE 202	0.00	CONDOS,COMMUNITY APT PROJS
073-580-043	125 WS LN STE 203	0.00	CONDOS,COMMUNITY APT PROJS
073-580-044	125 WS LN STE 204	0.00	CONDOS,COMMUNITY APT PROJS
073-590-005	155 WIS LN STE 201	0.00	CONDOS,COMMUNITY APT PROJS
073-590-006	155 WS LN STE 202	0.00	CONDOS,COMMUNITY APT PROJS
073-590-007	155 WS LN STE 203	0.00	CONDOS,COMMUNITY APT PROJS
073-590-008	155 WS LN STE 204	0.00	CONDOS,COMMUNITY APT PROJS
073-590-013	150 WS LN STE 201	0.00	CONDOS,COMMUNITY APT PROJS
073-590-014	150 WS LN STE 202	0.00	CONDOS,COMMUNITY APT PROJS
073-590-015	150 WS LN STE 203	0.00	CONDOS,COMMUNITY APT PROJS
073-590-016	150 WS LN STE 204	0.00	CONDOS,COMMUNITY APT PROJS
073-590-021	130 WS LN STE 203	0.00	CONDOS,COMMUNITY APT PROJS
073-590-022	130 WS LN STE 204	0.00	CONDOS,COMMUNITY APT PROJS
073-590-023	130 WS LN STE 201	0.00	CONDOS,COMMUNITY APT PROJS
073-590-024	130 WS LN STE 202	0.00	CONDOS,COMMUNITY APT PROJS
073-590-033	140 WS LN STE 201	0.00	CONDOS,COMMUNITY APT PROJS
073-590-034	140 WS LN STE 202	0.00	CONDOS,COMMUNITY APT PROJS
073-590-035	140 WS LN STE 20	0.00	CONDOS,COMMUNITY APT PROJS
073-590-036	140 WS LN STE 204	0.00	CONDOS,COMMUNITY APT PROJS
073-590-037	140 WS LN STE 205	0.00	CONDOS,COMMUNITY APT PROJS
073-590-038	140 WS LN STE 206	0.00	CONDOS,COMMUNITY APT PROJS
073-590-039	140 WS LN STE 207	0.00	CONDOS,COMMUNITY APT PROJS
073-590-040	140 WS LN STE 20	0.00	CONDOS,COMMUNITY APT PROJS
073-590-045	160 WS LN STE 201	0.00	CONDOS,COMMUNITY APT PROJS
073-590-046	160 WS LN STE 202	0.00	CONDOS,COMMUNITY APT PROJS
073-590-047	160 WS LN STE 203	0.00	CONDOS,COMMUNITY APT PROJS
073-590-048	160 WS LN STE 204	0.00	CONDOS,COMMUNITY APT PROJS
073-600-005	180 WS LN STE 201	0.00	CONDOS,COMMUNITY APT PROJS
073-600-006	180 WS LN STE 202	0.00	CONDOS,COMMUNITY APT PROJS
073-600-007	180 WS LN STE 203	0.00	CONDOS,COMMUNITY APT PROJS
073-600-008	180 WS LN STE 204	0.00	CONDOS,COMMUNITY APT PROJS
073-600-015	170 WS LN STE 201	0.00	CONDOS,COMMUNITY APT PROJS
073-600-016	170 WS LN STE 202	0.00	CONDOS,COMMUNITY APT PROJS
073-600-017	170 WS LN STE 203	0.00	CONDOS,COMMUNITY APT PROJS
073-600-018	170 WS LN STE 204	0.00	CONDOS,COMMUNITY APT PROJS
073-600-019	170 WS LN STE 205	0.00	CONDOS,COMMUNITY APT PROJS
073-600-020	170 WS LN STE 206	0.00	CONDOS,COMMUNITY APT PROJS
073-600-025	165 WS LN STE 201	0.00	CONDOS,COMMUNITY APT PROJS
073-600-026	165 WS LN STE 202	0.00	CONDOS,COMMUNITY APT PROJS
073-600-027	165 WS LN STE 203	0.00	CONDOS,COMMUNITY APT PROJS
073-600-028	165 WS LN STE 204	0.00	CONDOS,COMMUNITY APT PROJS
073-600-033	175 WS LN STE 201	0.00	CONDOS,COMMUNITY APT PROJS
073-600-034	175 WS LN STE 202	0.00	CONDOS,COMMUNITY APT PROJS
073-600-035	175 WS LN STE 203	0.00	CONDOS,COMMUNITY APT PROJS
073-600-036	175 WS LN STE 204	0.00	CONDOS,COMMUNITY APT PROJS
571-190-001	945 WARD DR 1	0.00	MOBILE HOMES
571-190-002	945 WARD DR 2	0.00	MOBILE HOMES
571-190-003	945 WARD DR 3	0.00	MOBILE HOMES
571-190-004	945 WARD DR 4	0.00	MOBILE HOMES

571-190-005	945 WARD DR 5	0.00	MOBILE HOMES
571-190-006	945 WARD DR 6	0.00	MOBILE HOMES
571-190-007	945 WARD DR 7	0.00	MOBILE HOMES
571-190-008	945 WARD DR 8	0.00	MOBILE HOMES
571-190-009	945 WARD DR 9	0.00	MOBILE HOMES
571-190-010	945 WARD DR 10	0.00	MOBILE HOMES
571-190-011	945 WARD DR 11	0.00	MOBILE HOMES
571-190-012	945 WARD DR 12	0.00	MOBILE HOMES
571-190-013	945 WARD DR 13	0.00	MOBILE HOMES
571-190-014	945 WARD DR 14	0.00	MOBILE HOMES
571-190-015	945 WARD DR 15	0.00	MOBILE HOMES
571-190-016	945 WARD DR 16	0.00	MOBILE HOMES
571-190-017	945 WARD DR 17	0.00	MOBILE HOMES
571-190-018	945 WARD DR 18	0.00	MOBILE HOMES
571-190-019	945 WARD DR 19	0.00	MOBILE HOMES
571-190-020	945 WARD DR 20	0.00	MOBILE HOMES
571-190-021	945 WARD DR 21	0.00	MOBILE HOMES
571-190-022	945 WARD DR 22	0.00	MOBILE HOMES
571-190-023	945 WARD DR 23	0.00	MOBILE HOMES
571-190-024	945 WARD DR 24	0.00	MOBILE HOMES
571-190-025	945 WARD DR 25	0.00	MOBILE HOMES
571-190-026	945 WARD DR 26	0.00	MOBILE HOMES
571-190-027	945 WARD DR 27	0.00	MOBILE HOMES
571-190-028	945 WARD DR 28	0.00	MOBILE HOMES
571-190-029	945 WARD DR 29	0.00	MOBILE HOMES
571-190-030	945 WARD DR 30	0.00	MOBILE HOMES
571-190-031	945 WARD DR 31	0.00	MOBILE HOMES
571-190-032	945 WARD DR 32	0.00	MOBILE HOMES
571-190-033	945 WARD DR 33	0.00	MOBILE HOMES
571-190-034	945 WARD DR 34	0.00	MOBILE HOMES
571-190-035	945 WARD DR 35	0.00	MOBILE HOMES
571-190-036	945 WARD DR 36	0.00	MOBILE HOMES
571-190-037	945 WARD DR 37	0.00	MOBILE HOMES
571-190-038	945 WARD DR 38	0.00	MOBILE HOMES
571-190-039	945 WARD DR 39	0.00	MOBILE HOMES
571-190-040	945 WARD DR 40	0.00	MOBILE HOMES
571-190-041	945 WARD DR 41	0.00	MOBILE HOMES
571-190-042	945 WARD DR 42	0.00	MOBILE HOMES
571-190-043	945 WARD DR 43	0.00	MOBILE HOMES
571-190-044	945 WARD DR 44	0.00	MOBILE HOMES
571-190-045	945 WARD DR 45	0.00	MOBILE HOMES
571-190-046	945 WARD DR 46	0.00	MOBILE HOMES
571-190-047	945 WARD DR 47	0.00	MOBILE HOMES
571-190-048	945 WARD DR 48	0.00	MOBILE HOMES
571-190-049	945 WARD DR 49	0.00	MOBILE HOMES
571-190-050	945 WARD DR 50	0.00	MOBILE HOMES
571-190-051	945 WARD DR 51	0.00	MOBILE HOMES
571-190-052	945 WARD DR 52	0.00	MOBILE HOMES
571-190-053	945 WARD DR 53	0.00	MOBILE HOMES

571-190-054	945 WARD DR 54	0.00	MOBILE HOMES
571-190-055	945 WARD DR 55	0.00	MOBILE HOMES
571-190-056	945 WARD DR 56	0.00	MOBILE HOMES
571-190-057	945 WARD DR 57	0.00	MOBILE HOMES
571-190-058	945 WARD DR 58	0.00	MOBILE HOMES
571-190-059	945 WARD DR 59	0.00	MOBILE HOMES
571-190-060	945 WARD DR 60	0.00	MOBILE HOMES
571-190-061	945 WARD DR 61	0.00	MOBILE HOMES
571-190-062	945 WARD DR 62	0.00	MOBILE HOMES
571-190-063	945 WARD DR 63	0.00	MOBILE HOMES
571-190-064	945 WARD DR 64	0.00	MOBILE HOMES
571-190-065	945 WARD DR 65	0.00	MOBILE HOMES
571-190-066	945 WARD DR 66	0.00	MOBILE HOMES
571-190-067	945 WARD DR 67	0.00	MOBILE HOMES
571-190-068	945 WARD DR 68	0.00	MOBILE HOMES
571-190-069	945 WARD DR 69	0.00	MOBILE HOMES
571-190-070	945 WARD DR 70	0.00	MOBILE HOMES
571-190-071	945 WARD DR 71	0.00	MOBILE HOMES
571-190-072	945 WARD DR 72	0.00	MOBILE HOMES
571-190-073	945 WARD DR 73	0.00	MOBILE HOMES
571-190-074	945 WARD DR 74	0.00	MOBILE HOMES
571-190-075	945 WARD DR 75	0.00	MOBILE HOMES
571-190-076	945 WARD DR 76	0.00	MOBILE HOMES
571-190-077	945 WARD DR 77	0.00	MOBILE HOMES
571-190-078	945 WARD DR 78	0.00	MOBILE HOMES
571-190-079	945 WARD DR 79	0.00	MOBILE HOMES
571-190-080	945 WARD DR 80	0.00	MOBILE HOMES
571-190-081	945 WARD DR 81	0.00	MOBILE HOMES
571-190-082	945 WARD DR 82	0.00	MOBILE HOMES
571-190-083	945 WARD DR 83	0.00	MOBILE HOMES
571-190-084	945 WARD DR 84	0.00	MOBILE HOMES
571-190-085	945 WARD DR 85	0.00	MOBILE HOMES
571-190-086	945 WARD DR 86	0.00	MOBILE HOMES
571-190-087	945 WARD DR 87	0.00	MOBILE HOMES
571-190-088	945 WARD DR 88	0.00	MOBILE HOMES
571-190-089	945 WARD DR 89	0.00	MOBILE HOMES
571-190-090	945 WARD DR 90	0.00	MOBILE HOMES
571-190-091	945 WARD DR 91	0.00	MOBILE HOMES
571-190-092	945 WARD DR 92	0.00	MOBILE HOMES
571-190-093	945 WARD DR 93	0.00	MOBILE HOMES
571-190-094	945 WARD DR 94	0.00	MOBILE HOMES
571-190-095	945 WARD DR 95	0.00	MOBILE HOMES
571-190-096	945 WARD DR 96	0.00	MOBILE HOMES
571-190-097	945 WARD DR 97	0.00	MOBILE HOMES
571-190-098	945 WARD DR 98	0.00	MOBILE HOMES
571-190-099	945 WARD DR 99	0.00	MOBILE HOMES
571-191-000	945 WARD DR 100	0.00	MOBILE HOMES
571-191-001	945 WARD DR 101	0.00	MOBILE HOMES
571-191-002	945 WARD DR 102	0.00	MOBILE HOMES

571-191-003	945 WARD DR 103	0.00	MOBILE HOMES
571-191-004	945 WARD DR 104	0.00	MOBILE HOMES
571-191-005	945 WARD DR 105	0.00	MOBILE HOMES
571-191-006	945 WARD DR 106	0.00	MOBILE HOMES
571-191-007	945 WARD DR 107	0.00	MOBILE HOMES
571-191-008	945 WARD DR 108	0.00	MOBILE HOMES
571-191-009	945 WARD DR 109	0.00	MOBILE HOMES
571-191-010	945 WARD DR 110	0.00	MOBILE HOMES
571-191-011	945 WARD DR 111	0.00	MOBILE HOMES
571-191-012	945 WARD DR 112	0.00	MOBILE HOMES
571-191-013	945 WARD DR 113	0.00	MOBILE HOMES
571-191-014	945 WARD DR 114	0.00	MOBILE HOMES
571-191-015	945 WARD DR 115	0.00	MOBILE HOMES
571-191-016	945 WARD DR 116	0.00	MOBILE HOMES
571-191-017	945 WARD DR 117	0.00	MOBILE HOMES
571-191-018	945 WARD DR 118	0.00	MOBILE HOMES
571-191-019	945 WARD DR 119	0.00	MOBILE HOMES
571-191-020	945 WARD DR 120	0.00	MOBILE HOMES
571-191-021	945 WARD DR 121	0.00	MOBILE HOMES
571-191-022	945 WARD DR 122	0.00	MOBILE HOMES
571-191-023	945 WARD DR 123	0.00	MOBILE HOMES
571-191-024	945 WARD DR 124	0.00	MOBILE HOMES
571-191-025	945 WARD DR 125	0.00	MOBILE HOMES
571-191-026	945 WARD DR 126	0.00	MOBILE HOMES
571-191-027	945 WARD DR 127	0.00	MOBILE HOMES
571-191-028	945 WARD DR 128	0.00	MOBILE HOMES
571-191-029	945 WARD DR 129	0.00	MOBILE HOMES
571-191-030	945 WARD DR 130	0.00	MOBILE HOMES
571-191-031	945 WARD DR 131	0.00	MOBILE HOMES
571-191-032	945 WARD DR 132	0.00	MOBILE HOMES
571-191-033	945 WARD DR 133	0.00	MOBILE HOMES
571-191-034	945 WARD DR 134	0.00	MOBILE HOMES
571-191-035	945 WARD DR 135	0.00	MOBILE HOMES
571-191-036	945 WARD DR 136	0.00	MOBILE HOMES
571-191-037	945 WARD DR 137	0.00	MOBILE HOMES
571-191-038	945 WARD DR 138	0.00	MOBILE HOMES
571-191-039	945 WARD DR 139	0.00	MOBILE HOMES
571-191-040	945 WARD DR 140	0.00	MOBILE HOMES
571-191-041	945 WARD DR 141	0.00	MOBILE HOMES
571-191-042	945 WARD DR 142	0.00	MOBILE HOMES
571-191-043	945 WARD DR 143	0.00	MOBILE HOMES
571-191-044	945 WARD DR 144	0.00	MOBILE HOMES
571-191-045	945 WARD DR 145	0.00	MOBILE HOMES
571-191-046	945 WARD DR 146	0.00	MOBILE HOMES
571-191-047	945 WARD DR 147	0.00	MOBILE HOMES
571-191-048	945 WARD DR 148	0.00	MOBILE HOMES
571-191-049	945 WARD DR 149	0.00	MOBILE HOMES
571-191-050	945 WARD DR 150	0.00	MOBILE HOMES
571-191-051	945 WARD DR 151	0.00	MOBILE HOMES

571-191-052	945 WARD DR 152	0.00	MOBILE HOMES
571-191-053	945 WARD DR 153	0.00	MOBILE HOMES
571-191-054	945 WARD DR 154	0.00	MOBILE HOMES
571-191-055	945 WARD DR 155	0.00	MOBILE HOMES
571-191-056	945 WARD DR 156	0.00	MOBILE HOMES
571-191-057	945 WARD DR 157	0.00	MOBILE HOMES
571-191-058	945 WARD DR 158	0.00	MOBILE HOMES
571-191-059	945 WARD DR 159	0.00	MOBILE HOMES
571-191-060	945 WARD DR 160	0.00	MOBILE HOMES
571-191-061	945 WARD DR 161	0.00	MOBILE HOMES
571-191-062	945 WARD DR 162	0.00	MOBILE HOMES
571-191-063	945 WARD DR 163	0.00	MOBILE HOMES
571-191-064	945 WARD DR 164	0.00	MOBILE HOMES
571-191-065	945 WARD DR 165	0.00	MOBILE HOMES
571-191-066	945 WARD DR 166	0.00	MOBILE HOMES
571-191-067	945 WARD DR 167	0.00	MOBILE HOMES
571-191-068	945 WARD DR 168	0.00	MOBILE HOMES
571-191-069	945 WARD DR 169	0.00	MOBILE HOMES
571-191-070	945 WARD DR 170	0.00	MOBILE HOMES
571-191-071	945 WARD DR 171	0.00	MOBILE HOMES
571-191-072	945 WARD DR 172	0.00	MOBILE HOMES
571-191-073	945 WARD DR 173	0.00	MOBILE HOMES
571-191-074	945 WARD DR 174	0.00	MOBILE HOMES
571-191-075	945 WARD DR 175	0.00	MOBILE HOMES
571-191-076	945 WARD DR 176	0.00	MOBILE HOMES
571-191-077	945 WARD DR 177	0.00	MOBILE HOMES
571-191-078	945 WARD DR 178	0.00	MOBILE HOMES
571-191-079	945 WARD DR 179	0.00	MOBILE HOMES
571-191-080	945 WARD DR 180	0.00	MOBILE HOMES
571-191-081	945 WARD DR 181	0.00	MOBILE HOMES
571-191-082	945 WARD DR 182	0.00	MOBILE HOMES
571-191-083	945 WARD DR 183	0.00	MOBILE HOMES
571-191-084	945 WARD DR 184	0.00	MOBILE HOMES
571-191-085	945 WARD DR 185	0.00	MOBILE HOMES
571-191-086	945 WARD DR 186	0.00	MOBILE HOMES
571-191-087	945 WARD DR 187	0.00	MOBILE HOMES
571-191-088	945 WARD DR 188	0.00	MOBILE HOMES
571-191-089	945 WARD DR 189	0.00	MOBILE HOMES
571-191-090	945 WARD DR 190	0.00	MOBILE HOMES
571-191-091	945 WARD DR 191	0.00	MOBILE HOMES
571-191-092	945 WARD DR 192	0.00	MOBILE HOMES
571-191-093	945 WARD DR 193	0.00	MOBILE HOMES
571-191-094	945 WARD DR 194	0.00	MOBILE HOMES
571-191-095	945 WARD DR 195	0.00	MOBILE HOMES
571-191-096	945 WARD DR 196	0.00	MOBILE HOMES
571-191-097	945 WARD DR 197	0.00	MOBILE HOMES
571-191-098	945 WARD DR 198	0.00	MOBILE HOMES
571-191-099	945 WARD DR 199	0.00	MOBILE HOMES
571-192-000	945 WARD DR 200	0.00	MOBILE HOMES

Appendix B - Restoration and Enhancement Projects
Through June 2012
See Figures 2-2-E and 2-2-W for locations

Project Name	Organization	Duration	Restoration or enhancement target	Target species for removal	Acres	Funding source	Comment
Airfield Safety Area Grading Mitigation	SB Airport	1997	None specific,with exception of creation of pocket wetlands along upland berms	iceplant, ruderal weeds	25.00	SB Airport (Mitigation for Airfield Safety Projects)	For more information, contact Andrew Bermond, Airport Planner
Airfield Safety Projects - Tecolotito & Carneros Creek Relocation/Restoration	SB Airport (restoration designed and implemented by URS Corporation)	2006-2007	Wetland and transitional wetland habitat	None specific	40.00	SB Airport (Mitigation for Airfield Safety Projects)	For more information, contact Andrew Bermond, Airport Planner
Airfield Storm Drain Restoration	SB Airport (restoration designed and imple-mented by URS Corp)	2005	Riparian and salt marsh	None specific	0.40	SB Airport	For more information, contact Andrew Bermond, Airport Planner
Area I Restoration	SB Airport (restoration designed and implemented by URS Corporation)	2005-2007	Seasonal freshwater wetlands, saltmarsh, uplands	Bermuda grass, Eucs, giant reed, mustard, myoporum, pampas grass	12.50	SB Airport (Mitigation for Airfield Safety Projects)	4.1 acres of upland 6.2 acres of new seasonal wetlands; enhancement of 2.2 acres of extg habitat. For more info, contact Andrew Bermond at Airport
Atascadero Creek Restoration Project: Gas Company site	Santa Barbara Urban Creeks Council; D Chirman Project Manager	April 1997-Dec 1998	Coastal salt marsh, coastal sage scrub, riparian	ruderal weeds	1.50	Southern CA Gas Company	Vegetation Enhancement Project In conjunction with Gas Co Pipeline Support development project. $14,885; volunteer project. 700 plants installed.

Project Name	Organization	Duration	Restoration or enhancement target	Target species for removal	Acres	Funding source	Comment
Basin E/F Tidal Restoration Project	SB Airport (restoration designed and implemented by URS Corporation)	2010-2011	Salt marsh restoration, with focus on habitat for Belding's savannah sparrow, tidewater goby, wandering skipper, pygmy blue butterfly, Southern tarplant, Coulter's goldfields, and saltmarsh aster	Ruderal weeds along upland berms (which were removed)	10.30	SB Airport (Mitigation for Airfield Safety Projects)	10.3 acre site, 9.3 of which is now tidally influenced pickleweed wetland
East Storke Wetland Restoration	UCSB (in conjunction with CCBER, Cheadle Center for Biodiversity and Ecological Restoration)	2003	Coast live oak	Ruderal weeds (all upland)	3.30	UCSB	Original project scope entailed removal of fill piles in area, which did not occur. Limited success of plantings. For more info, contact Lisa Stratton at CCBER.
Firestone Drainage Restoration	SB Airport (restoration designed and imple-mented by URS Corp.)	2005-2007	Riparian/ freshwater wetland project.	None specific	0.60	SB Airport	For more information, contact Andrew Bermond, Airport Planner
Flood Control - Pampas Grass Removal	SB County Flood Control	1994	Riparian/ oak woodland with plantings of sycamore and cottonwood trees.	Pampas grass on the Overeem property	0.72	SB Flood Control (mitigation for creek maintenance activiites along Lower Atascadero Creek)	Pampas grass removed as part of the enhancement of the property after it was purchased by SB County Flood Control. Part of the mitigation package for long-term maintenance on Lower Atascasdero Creek

Project Name	Organization	Duration	Restoration or enhancement target	Target species for removal	Acres	Funding source	Comment
Flood Control - Atascadero Creek & Instream Wetland	SB County Flood Control	1994-1999	Instream freshwater emergent wetland.	none specific	1.00	SB Flood Control (mitigation for long-term maintenance activities along Lower Atascadero Creek)	Total acreage of emergent wetland planting is approximately 1 acre. For more information, contact Maureen Spencer at SB County Flood Control.
Flood Control - Atascadero Creek & Nearby Wetlands	SB County Flood Control	1994-1999	Riparian and emergent freshwater wetland (in newly graded areas).	none specific	5.96	SB Flood Control (mitigation for long-term maintenance activities along Lower Atascadero Creek)	Includes restoration on 10.85 acre parcel purchased by SB County Flood Control in the 1990s. Restoration includes creation of 4.21 ac of emergent wetlands and 1.75 ac of willow/cottonwood riparian habitats. Graded wetland areas are in formerly upland areas dominated by ruderal weeds, south of Atascadero Creek.
Gas Co. Bridge Repair Mitigation Revegetation	Robert Hamilton Consulting Biologist; Darlene Chirman Biological Consulting	1997-2001	Saltgrass Distichlis spicata	Mustard, castor bean, posion hemloc, thistle	0.10	Southern CA Gas Company (mitigation for pipeline activities)	Mitigation for habitat disturbance from Gas. Co Pipeline Support Project. Add'l info available from So Cal Gas Co. 800+ plants installed.
Goleta Beach County Park	SB County Parks. Darlene Chirman Biological Consulting--Revegetation plan west slough margin	1998 (plan) - 2003 (instal-lation)	Slough margin plants, salt marsh to transitional, coastal sage scrub	Myoporum, ruderal weeds	0.40	Santa Barbara County Parks (likely grant supported)	Implementation by Enviroscaping under contract to Co. Parks. Prior restoration projects in same location were at east end of the park & slough margin (not included here). 700+ plants

Project Name	Organization	Duration	Restoration or enhancement target	Target species for removal	Acres	Funding source	Comment
Goleta Slough Habitat Enhancement Project (Map #4)	Santa Barbara Audubon Society	April 2000 - April 2002; 2003-2004	Riparian trees/vine, coastal salt marsh & tansitional plants	Pampas grass, castor bean, ruderal weeds, iceplant, Cape ivy	0.75	CREF (SB County--oil mitiation funds) also SPF funds*	Grant $15,500. Enhancement where Pampas grass removed: "The Pie", N. Jughandle, Atascadero Creek & bikeway, & coastal Bluffs/seep. Add'l funding: SPF est $7575; 1000+ plants installed
Goleta Slough Pampas Grass Control Project	Santa Barbara Audubon Society	April 1998-Sept 2000	Pampas grass removal (525 plants removed)	Pampas grass	12.00	Cal-IPPC (now Cal-IPC); Goleta Sanitary District	Demonstration PG removal & education. Budget: $54,175 over 3 years. Sites: Gas Co including "The Pie"; Atascadero Creek Bikeway, DFG parcel Supplemental Funding, sewer easement Atascadero Creek Bikesay, GSD
Goleta Slough Pampas Grass Control Project/ Patterson Ag Block	Santa Barbara Audubon Society; SB County Weed Management Area--Ag Commissioner's Office	2001-Dec 2004	Pampas grass removal (82 tons) and revegetate riparian species	Pampas grass	0.75	CDFAgriculture grants to WMA (SB1740); contracts to SBAS	Could have info from Ag Commissioner's Office. Also Rancho Goleta Mobile Home Park. Givens farm Ward Drive; "Diegaard Swamp". $17,463 CDFA; county match AgCom~ $10,000. SPF est $7575.
Growing Solutions	Growing Solutions	2007 - ongoing	Freshwater wetland and upland	Myoporum, giant reed	5.00	Growing Solutions; Southern California Wetlands Recovery Project	Project involves weed eradication and some areas of planting along Hollister Avenue and restoration of areas formerly part of the Growing Solutions nursery. For more information, contact Growing Solutions.
High Marsh Restoration & Slough Margin Enhancement	Santa Barbara Audubon Society	June 2000 - June 2003	High mash plants: Calif. saltbush (Atriplex californica) Matscale (A. watsonii) Parish's glasswort (Salicornia subter-minale) Sea lavender (Limonium californicum) Wooly sea-blite (Suaeda taxifolia)	Myoporum, iceplant, ruderal weeds	1.00	Coastal Resource Grant Program--AB1431; Garden Club of Santa Barbara; SPF funds*	County of SB served as granting partner; Garden Club of Santa Barbara puchased plants. 625+ plants installed. Budget of $45,000.

Project Name	Organization	Duration	Restoration or enhancement target	Target species for removal	Acres	Funding source	Comment
Mesa Road Tree Planting	UCSB (in conjunction with CCBER)	2007	Riparian and upland tree species	None specific	0.75	Partially funded as mitigation for the El Colegio tree removal	Partner project with Goleta Valley Beautiful. 40+ trees installed. For more information, contact Lisa Stratton at CCBER.
More Mesa Oak Woodland Restoration	SB Co Parks; contrac-tors Mark de la Garza, Darlene Chirman	March 2002-Oct 2002	Coast live oak; riparian & oak woodland species installed	Harding grass, vinca, thistles, fennel & non-native oaks	0.50	Grant to SB County Parks	More Mesa county parcel; oak woodland and streamside invasive weed control. 280 plants installed. Budget Was $5,640.
North Bluff Restoration - East	UCSB (in conjunction with CCBER)	1997	Coast live oak woodland and coastal sage scrub	None specific	1.00	UCSB	For more information, contact Lisa Stratton at CCBER.
Parking Lot Bioswale	UCSB (in conjunction with CCBER)	2004	Freshwater bioswale plantings	None specific	0.20	UCSB	5,000 linear feet of plantings to absorb parking lot runoff on UCSB's parking lot 38. For more information, contact Lisa Stratton at UCSB.
R-2 Wetland Restoration	SB Airport (restoration designed and implemented by URS Corporation)	2005-2007	Wetland and transitional wetland habitat	None specific	3.40	SB Airport (Mitigation for Airfield Safety Projects)	For more information, contact Andrew Bermond, Airport Planner
San Clemente Restoration	UCSB (in conjunction with Cheadle Center for Biodiversity and Ecological	2006	Freshwater wetland and transitional upland species	none specific	6.4	Mitigation/ condition for development of the San Clemente	Storm water management system and wetland restoration project; 2.2 acres of wetland restoration. Also entailed removal of surrounding fill dirt (stockpiled

Project Name	Organization	Duration	Restoration or enhancement target	Target species for removal	Acres	Funding source	Comment
Sempra Line 80 Revegetation Project (Map #8)	Sempra(Gas Co) DE Chirman Biological Consulting	Feb 2004-Dec 2006	Coastal marsh plants (e.g. saltgrass, Frankenia, Jaumea) and transitional species (e.g. quail bush, coast goldenbush)	Iceplant, ruderal weeds e.g. Italian thistle, wild radish, castor bean	0.15	Sempra Energy (Gas Co)	Mitigation for maintenance project on gas pipeline north of Goleta Beach (line 80). Over 900 plants installed. Budget Was $5,425.
Tecolotito Creek Berm Restoration	SB Airport (restoration designed and implemented by URS Corporation)	2005-2007	Wetland and transitional wetland habitat	None specific	15.10	SB Airport (Mitigation for Airfield Safety Projects)	For more information, contact Andrew Bermond, Airport Planner
Tidal Restoration Demonstration	SB Airport (restoration designed and implemented by URS Corporation)	2005	Pickleweed marsh (tidally influenced)	None specific	10.30	California Coastal Conservancy; SB Airport (Mitigation for Airfield Safety Projects)	Project was partially superceded by the Basin E/F Tidal Restoration Project (listed above), which re-graded the same area and expanded the tidally influenced wetland in these basins. For more information, contact Andrew Bermond, Airport Planner.
Verhelle Bridge Replacement Project	SB Airport (restoration designed and implemented by URS Corporation)	2006	Transitional wetland habitat/ riparian	None specific	0.50	SB Airport	For more information, contact Andrew Bermond, Airport Planner
West Goleta Slough - Phases I - III	California Fish & Game Property sponsored by Land Trust for Santa Barbara County	Planning 2005 on; construction 2009-2011	Transitional wetland habitat, upland, including grassland for benefit of Belding's savannah sparrow and Southern tar plant.	None specific	12.30	US Army Corps of Engineers; Federal Estuary Act Funds; Calif. Wildlife Conservation Board	Project involved remediation of areas of limited impacted soils, removing fill soils and abandoned military bunkers, and creation of 7 acres of new wetland areas. For more information, contact the Land Trust for Santa Barbara County. Budget Was $2.5M.

Project Name	Organization	Duration	Restoration or enhancement target	Target species for removal	Acres	Funding source	Comment
West Storke Wetland Restoration	UCSB (in conjunction with Cheadle Center for Biodiversity and Ecological Restoration)	2006	Upland and wetland	None specific	1.50	So. California Wetland Recovery Project	Restored 1.5 acres of 26-acre parcel. For more information, contact Lisa Stratton at CCBER.
TOTAL ACREAGE					**173.38**		

Compiled by Darlene Chirman and William Abbott, 2012

Appendix C
Policies from Relevant Jurisdictions
Updated February 2015 [where noted]

CONTENTS **Pg.**

CALIFORNIA COASTAL ACT (1973)

http://www.coastal.ca.gov/

30107.5 "Environmentally sensitive area" means any area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which could be easily disturbed or degraded by human activities and developments.

30212 (a) Public access from the nearest public roadway to the shoreline and along the coast shall be provided in new development projects except where: (1) it is inconsistent with public safety, military security needs, or the protection of fragile coastal resources, (2) adequate access exists nearby, or (3) agriculture would be adversely affected. Dedicated accessway shall not be required to be opened to public use until a public agency or private association agrees to accept responsibility for maintenance and liability of the accessway.

30230 Marine resources shall be maintained, enhanced, and where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long term commercial, recreational, scientific, and educational purposes.

30231 The biological productivity and the quality of coastal waters, creeks, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment, controlling runoff, preventing depletion of ground water supplies and substantial interference with surface water flow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural creeks.

30233 (a) The diking, filling, or dredging of open coastal waters, wetlands, estuaries, and lakes shall be permitted in accordance with other applicable provisions of this division, where there is no feasible less environmentally damaging alternative, and where feasible mitigation measures have been provided to minimize adverse environmental effects, and shall be limited to the following:

(1) New or expanded port, energy, and coastal-dependent industrial facilities, including commercial fishing facilities.
(2) Maintaining existing, or restoring previously dredged, depths in existing navigational channels, turning basins, vessel berthing and mooring areas, and boat launching ramps.
(3) In wetland areas only, entrance channels for new or expanded boating facilities; and in a degraded wetland, identified by the Department of Fish and Game pursuant to subdivision (b) or Section 30411, for boating facilities if, in conjunction with such boating facilities, a substantial portion of the degraded wetland is restored and maintained as a biologically productive wetland. The size of the wetland area used for boating facilities, including berthing space, turning basins, necessary navigation channels, and any necessary support facilities,

shall not exceed 25 percent of the degraded wetland.
(4) In open coastal waters, other than wetlands, including creeks, estuaries, and lakes, new or expanded boating facilities and the placement of structural pilings for public recreational piers that provide public access and recreational opportunities.
(5) Incidental public service purposes, including but not limited to, burying cables and pipes or inspection of piers and maintenance of existing intake and outfall lines.
(6) Mineral extraction, including sand for restoring beaches, except in environmentally sensitive areas.
(7) Restoration purposes.
(8) Nature study, aquaculture, or similar resource dependent activities.

(b) Dredging and spoils disposal shall be planned and carried out to avoid significant disruption to marine and wildlife habitats and water circulation. Dredge spoils suitable for replenishment should be transported for such purposes to appropriate beaches or into suitable long shore current systems.
(c) In addition to the other provisions of this section, diking, filling, or dredging in existing estuaries and wetlands shall maintain or enhance the functional capacity of the wetland or estuary….
(d) Erosion control and flood control facilities constructed on water courses can impede the movement of sediment and nutrients which would otherwise be carried by storm runoff into coastal waters. To facilitate the continued delivery of these sediments to the littoral zone, whenever feasible, the material removed from these facilities may be placed at appropriate points on the shoreline in accordance with other applicable provisions of this division, where feasible mitigation measures have been provided to minimize adverse environmental effects. Aspects that shall be considered before issuing a coastal development permit for such purposes are the method of placement, time of year of placement, and sensitivity of the placement area.

30236 Channelizations, dams, or other substantial alternations of rivers and creeks shall incorporate the best mitigation measures feasible, and be limited to:
(1) necessary water supply projects,
(2) flood control projects where no other method for protecting existing structures in the floodplain is feasible and where such protection is necessary for public safety or to protect existing development, or
(3) developments where the primary function is the improvement of fish and wildlife habitat.

30240 (a) Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on those resources shall be allowed within those areas.
(b) Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade those areas, and shall be compatible with the continuance of those habitat and recreation areas.

30251 The scenic and visual qualities of coastal areas shall be considered and protected as a resource of public importance. Permitted development shall be sited and designed to protect views to and along the ocean and scenic coastal areas, to minimize the alteration of natural land forms, to be visually compatible with the character of surrounding areas, and, where feasible, to restore and enhance visual quality in visually degraded areas. New development in highly scenic areas such as those designated in the California Coastline Preservation and Recreation Plan prepared by the Department of Parks and Recreation and by local government shall be subordinate to the character of its setting.

CITY OF GOLETA GENERAL PLAN/COASTAL LAND USE PLAN [Updated 2/15]

http://www.cityofgoleta.org/city-hall/planning-and-environmental-review/general-plan/view-general-plan/general-plan-coastal-land-use-plan-final-eir

LAND USE ELEMENT

LU 1.1: Land Use Plan Map and General Policies
Objective: To maintain a land use pattern that provides continuity with the past and present use and development of the city and locates the various uses in a manner that is consistent with the fundamental goals and principles of the plan.

LU 1.2: Residential Character - The Land Use Plan map shall ensure that Goleta's land use pattern remains predominately residential and open, with the majority of nonresidential development concentrated along the primary transportation corridor—east and west along Hollister Avenue and US-101. The intent of the Land Use Plan is to protect and preserve residential neighborhoods by preventing intrusion of nonresidential uses that would be detrimental to the preservation of the existing character of the neighborhoods.

LU 1.7: New Development and Protection of Environmental Resources. Approvals of all new development shall require adherence to high environmental standards and the preservation and protection of environmental resources, such as environmentally sensitive habitats, consistent with the standards set forth in the Conservation Element and the City's Zoning Code.

LU 1.8: New Development and Neighborhood Compatibility - Approvals of all new development shall require compatibility with the character of existing development in the immediate area, including size, bulk, scale, and height. New development shall not substantially impair or block important viewsheds and scenic vistas, as set forth in the Visual and Historical Resources Element.

LU 3.3: Community Commercial (C-C). [GP] The Community Commercial category is intended to allow relatively small commercial centers that provide convenience goods and services to serve the everyday needs of the surrounding residential neighborhoods while protecting the residential character of the area. Uses that may attract significant traffic volumes from outside the Goleta Valley are discouraged. Mixed-use, including residential, development at densities up to 12 units per acre may be permitted subject to approval of a conditional use permit in appropriate locations provided that it is compatible with adjacent uses, does not break up the continuity of commercial use at the sidewalk level, or is not within the airport approach zone as designated in the Safety Element. All community commercial development shall be designed to facilitate and promote pedestrian circulation in and to the area, as well as to link these areas to other activity centers. Noise levels and hours of operation may be regulated to avoid any potential conflict with adjacent residential uses. The size of any mixed-use developments shall be consistent with street and utility capacities. The Fairview Shopping Center and Calle Real Center are included in this designation.

LU 4.4: Service Industrial (I-S). [GP/CP] This designation is applied to properties within the airport flight path where airport operations limit the range and density of activities that may be allowed. Densities shall not exceed 25 persons per acre to conform to the Airport Land Use Plan and airport operations, as well as to maintain acceptable levels of service on roadways serving these areas. Uses may occur in a less-managed environment than in the Business Park category. Allowed uses include warehouses, storage, outdoor storage (including storage of vehicles and recreational vehicles), automotive sales and rentals, manufacturing, heavy commercial uses, and similar uses that may be compatible with airport operations. The processing or storage of flammable or hazardous materials shall be strictly controlled. Near the airport, heights of structures and landscaping shall be limited so as not to interfere with the airspace in the airport approach zone and clear zone.

LU 12.1: City of Goleta Planning Area. [GP] The City of Goleta Planning Area, shown on Figure 2-3, extends from the western sphere of influence (SOI) boundary of the City of Santa Barbara in the east to the westernmost boundary of the service area of the Goleta Water District at the El Capitan area to the west. The planning area is bounded by the Pacific Ocean on the south and Los Padres National Forest on the north. The planning area includes lands within Goleta; lands within the city of Santa Barbara, including the Santa Barbara Municipal Airport; lands within the UCSB campus subject to the jurisdiction of the University of California Board of Regents and the California Coastal Commission; and a wide array of lands in unincorporated Santa Barbara County, ranging from the densely developed community of Isla Vista to the scenic rural landscapes of the Gaviota Coast. The planning area also includes lands within the jurisdiction of a variety of special districts, including the Goleta Water District, the Goleta Sanitary District, the Goleta West Sanitary District, the Embarcadero Community Services District, the Isla Vista Recreation and Park District, the Santa Barbara County Fire Protection District, the Santa Barbara County Flood Control District, the Metropolitan Transit District, and others.

In addition to the specific guidelines or criteria set forth in subsequent sections of this policy, the following general guidelines shall apply to lands within the planning area that are outside the city boundary:

a. Land use changes and service delivery changes within the planning area shown in Figure 2-3 are likely to have impacts on Goleta and on its residents and businesses. Such changes could affect the ability of the City

to fully or effectively achieve the various objectives and purposes set forth in this plan. Consequently, the City has a strong interest in reviewing and commenting on all proposals for change in the Planning Area.

b. The City encourages the various entities with jurisdiction over lands within the Planning Area to refer all proposals for changes to the City for its review and comments. The changes of interest to the City include, but are not limited to, the following:
    1. Proposals for development of buildings or other structures.
    2. Proposals for subdivision of land, including lot line adjustments.
    3. Proposals for changes in zoning, including the map of zoning districts and text regulations applicable to the land.
    4. Proposed new plans or amendments to existing plans, including community or area plans, specific plans, the Long-Range Development Plan (LRDP) of UCSB, the Santa Barbara Airport Master Plan, resource-related plans, and other similar planning documents.
    5. Master plans and similar planning documents for services and facilities of special districts.
    6. Proposals for annexation of lands.
    7. Proposals for acquisition or disposition of real property.
    8. Proposals to extend or modify services and/or infrastructure facilities.
c. The City encourages that proposals related to the foregoing items be referred to the City at the earliest possible time so that the City's comments may have a role in helping shape the proposal prior to its being considered for final action in formal hearings or other proceedings.
d. The City encourages that the Lead Agencies pursuant to the California Environmental Quality Act (CEQA) for projects situated within the Planning Area include the City in their distributions of all CEQA notices for those projects, including, but not limited to, notices of preparation and notices of public scoping meetings.
e. The City shall notify all agencies and governmental entities having jurisdiction within the Planning Area of all City projects or actions that could potentially affect the agency or entity. This shall include notifications regarding the items set forth in section b. above and other notifications as may be requested by the agency or entity.
f. Additional rural lands should not be annexed to the Goleta Water District, Goleta Sanitary District, or the Goleta West Sanitary District.
g. Creation of new private service systems for sewer and water in rural areas north and west of Goleta shall be opposed.

LU 12.3: Santa Barbara Municipal Airport. [GP] Future changes at the Santa Barbara Municipal Airport, which is located on noncontiguous territory of the City of Santa Barbara situated at the center of Goleta, are of great interest and concern to the City of Goleta and Goleta's residents. Any future changes at the airport should take into account the following:

a. New facilities or changes to existing physical facilities, such as runways and passenger terminals, should not be approved unless the impacts of the projects on nearby areas within Goleta have been fully evaluated pursuant to CEQA, and any residual impacts following implementation of mitigations are determined to be minor or insignificant. Mitigation measures should be required that avoid or reduce impacts to the maximum extent practicable.
b. If noise impacts are anticipated to occur as a result of planned changes to airport operations or facilities, appropriate noise mitigation measures shall be considered, including adjustments of flight paths, authorized types of aircraft, and hours of operation, as well as acoustical insulation of affected residential units.
c. The Santa Barbara Municipal Airport is situated on lands that were historically a portion of the Goleta Slough and its associated streams and wetlands. Any new facilities or changes to existing physical facilities should avoid or minimize further fill or contamination of these sensitive coastal wetlands. Fill or alteration of existing wetlands or streams should be considered only in circumstances where there is no feasible alternative and should be the minimum necessary to accomplish the essential purpose.
d. The new passenger terminal project, and other future changes, should be designed to provide sufficient on-site parking for all airport users so that no parking impacts would occur on streets or parcels of land within Goleta neighborhoods. The passenger terminal project should incorporate design features to promote use of buses, vanpools, and other alternative forms of transportation by air passengers to reduce or avoid parking impacts and traffic impact on Goleta's streets and neighborhoods.
e. A Mitigation Agreement between the City of Santa Barbara and the City of Goleta should be developed and adopted to provide for monetary contributions by the City of Santa Barbara for its "fair share" of the costs of

any road improvements within Goleta needed to serve planned future airport projects. The agreement should also address mitigation of other types of impacts by airport projects that would occur within Goleta's territory.

f. Proposed changes in tenants or uses on airport property should be evaluated for impacts.
g. Appropriate mechanisms should be created in airport governance to provide for participation by representatives appointed or selected by the City of Goleta.

LU 6.2: Open Space/Passive Recreation. This use category is intended to identify and reserve areas with significant environmental values or resources, wildlife habitats, significant views, and other open space values. It may be used to designate both private and public open space areas. The category includes areas reserved for natural drainage courses that may be managed as part of the City's stormwater management program. The following criteria and standards shall apply to lands within this designation:

a. Open space lands are intended to maintain the land in a natural condition in order to protect and conserve sensitive habitats.
b. Resource management activities, including, but not limited to, habitat restorations, are permitted.
c. Minimal improvements to accommodate passive public use, such as trails, nature education, beach access, and public viewing areas, are permitted.
d. Except for existing facilities, active recreational uses involving structures or improvements to the land shall not be permitted.
e. Limited parking and public access improvements may be allowed provided that any adverse impacts are avoided or mitigated.

OPEN SPACE ELEMENT

3.2 GUIDING PRINCIPLES AND GOALS

1. Provide and maintain, in coordination with other agencies, a system of parks, open spaces, and recreation facilities that are accessible to and will meet the needs of present and future users of all age groups.
5. Preserve Goleta's existing open space areas, including its beaches and Pacific shoreline, sensitive habitat areas, and agricultural lands, and increase the amount of permanently protected open space as opportunities for acquisition arise.
6. Provide for convenient public access to Goleta's beach and shoreline areas and protect these areas for coastal-dependent and coastal-related recreation use.
7. Manage open space areas in a manner that provides for public access, passive and active recreational use, and enjoyment, consistent with protection of natural and scenic resource values.
8. Provide and maintain a system of trails that will connect major parks and open space areas with each other, neighborhoods, the regional trail system, and Los Padres National Forest.

Objective: To identify and protect prehistoric and historic cultural sites and resources from destruction or harmful alteration.

OS 6.11: Planned New Parks and Open Space. [GP] The locations of planned new public parks and open space are shown on Figure 3-2 and described in Table 3-1. Specific improvements will be implemented as conditions require and when funding is available. These planned new public parks and open space include:

a. Expansion of the Armitos Park. An approximately 4-acre neighborhood park located in the vicinity of Old San Jose Creek between Hollister Avenue and Armitos Avenue adjacent to the Armitos Park in Old Town.
b. A park in the southern portion of Old Town. A 4- to 5-acre active recreation community park, potentially including sports fields, located on or in the vicinity of the former drive-in theater in Old Town between the Santa Barbara Airport and SR-217.
c. Willow Springs Park. A 2- to 3-acre neighborhood park in the proposed Willow Springs Phase II project located south of US-101 and east of Los Carneros Road, on property totaling approximately 19 acres.
d. Village at Los Carneros Park. A 3- to 5-acre neighborhood park in the proposed Village at Los Carneros project located south of US-101 and west of Los Carneros Road, on property totaling approximately 18 acres. The park should include active recreation facilities, such as fields suitable for organized sports.
e. Cabrillo Business Park Open Space. An approximately 15-acre neighborhood open space located west of Santa Barbara Airport on an approximately 92-acre property bound by Hollister Avenue and Los Carneros Road.

Parks and open space in new developments shall be open to the general public and not limited to residents of individual development projects.

CONSERVATION ELEMENT

4.2 GUIDING PRINCIPLES AND GOALS

1. Protect, maintain, and enhance natural ecosystem processes and functions in Goleta and its environs in order to maintain their natural ecological diversity.
2. Preserve, restore, and enhance the physical and biological integrity of Goleta's creeks and natural drainages and their associated riparian and creekside habitats.
3. Protect, restore, and enhance coastal bluffs and dune areas.
4. Identify and protect wetlands, including vernal pools, as highly productive and complex ecosystems that provide special habitats for flora and fauna as well as for their role in cleansing surface waters and drainages.
5. Protect water quality and the biological diversity of Goleta Slough and Devereux Slough.
6. Protect and enhance other important aquatic and terrestrial habitats, including those associated with rare, threatened, or endangered species of plants or animals.
7. Protect, preserve, and enhance Goleta's Urban Forest.
9. Manage water resources at the watershed level cooperatively with other agencies to maintain high groundwater and surface water quality and to protect marine aquatic habitats.
10. Manage groundwater and surface water resources to promote water quality and quantity adequate to support natural ecosystem processes and functions.
12. Conserve soil resources as the foundation of resource production and minimize erosion and other soil-depleting processes.

ESHAs

CE 1.1: Definition of Environmentally Sensitive Habitat Areas. [GP/CP] ESHAs shall include, but are not limited to, any areas that through professional biological evaluation are determined to meet the following criteria:

a. Any area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and that could be easily disturbed or degraded by human activities and developments.
b. Any area that includes habitat for species and plant communities recognized as threatened or endangered by the state or federal governments; plant communities recognized by the State of California (in the Terrestrial Natural Communities Inventory) as restricted in distribution and very threatened; and those habitat types of limited distribution recognized to be of particular habitat value, including wetlands, riparian vegetation, eucalyptus groves associated with monarch butterfly roosts, oak woodlands, and savannas.
c. Any area that has been previously designated as an ESHA by the California Coastal Commission, the California Department of Fish and Game, City of Goleta, or other agency with jurisdiction over the designated area.

CE 1.2: Designation of Environmentally Sensitive Habitat Areas. ESHAs in Goleta are generally shown in Figure 4-1, and Table 4-2 provides examples of the ESHAs and some locations of each. The provisions of this policy shall apply to all designated ESHAs. ESHAs generally include but are not limited to the following:

a. Creek and riparian areas.
b. Wetlands, such as vernal pools.
c. Coastal dunes, lagoons or estuaries, and coastal bluffs/coastal bluff scrub.
d. Beach and shoreline habitats.
e. Marine habitats.
f. Coastal sage scrub and chaparral.
g. Native woodlands and savannahs, including oak woodlands.
h. Native grassland.
i. Monarch butterfly aggregation sites, including autumnal and winter roost sites, and related habitat areas.
j. Beach and dune areas that are nesting and foraging locations for the western snowy plover.
k. Nesting and roosting sites and related habitat areas for various species of raptors.
l. Other habitat areas for species of wildlife or plants designated as rare, threatened, or endangered under state or federal law.

m. Any other habitat areas that are rare or especially valuable from a local, regional, or statewide perspective.

CE 1.6: Protection of ESHAs. ESHAs shall be protected against significant disruption of habitat values, and only uses or development dependent on and compatible with maintaining such resources shall be allowed within ESHAs or their buffers. The following shall apply:

a. No development, except as otherwise allowed by this element, shall be allowed within ESHAs and/or buffers.
b. A setback or buffer separating all permitted development from an adjacent ESHA shall be required and shall have a minimum width as set forth in subsequent policies of this element. The purpose of such setbacks shall be to prevent any degradation of the ecological functions provided by the habitat area.
c. Public accessways and trails are considered resource-dependent uses and may be located within or adjacent to ESHAs. These uses shall be sited to avoid or minimize impacts on the resource to the maximum extent feasible. Measures— such as signage, placement of boardwalks, and limited fencing or other barriers—shall be implemented as necessary to protect ESHAs.
d. The following uses and development may be allowed in ESHAs or ESHA buffers only where there are no feasible, less environmentally damaging alternatives and will be subject to requirements for mitigation measures to avoid or lessen impacts to the maximum extent feasible:
    1) public road crossings,
    2) utility lines,
    3) resource restoration and enhancement projects,
    4) nature education,
    5) biological research, and
    6) Public Works projects as identified in the Capital Improvement Plan, only where there are no feasible, less environmentally damaging alternatives.
e. If the provisions herein would result in any legal parcel created prior to the date of this plan being made unusable in its entirety for any purpose allowed by the land use plan, exceptions to the foregoing may be made to allow a reasonable economic use of the parcel. Alternatively, the City may establish a program to allow transfer of development rights for such parcels to receiving parcels that have areas suitable for and are designated on the Land Use Plan map for the appropriate type of use and development.

CE 1.8: ESHA Buffers. Development adjacent to an ESHA shall minimize impacts to habitat values or sensitive species to the maximum extent feasible. Native vegetation shall be provided in buffer areas to serve as transitional habitat. All buffers shall be of a sufficient size to ensure the biological integrity and preservation of the ESHA they are designed to protect.

CE 1.10: Management of ESHAs. The following standards shall apply to the ongoing management of ESHAs:

a. The use of insecticides, herbicides, artificial fertilizers, or other toxic chemical substances that have the potential to degrade ESHAs shall be prohibited within and adjacent to such areas, except where necessary to protect or enhance the ESHA itself.
b. The use of insecticides, herbicides, or other toxic substances by City employees and contractors in construction and maintenance of City facilities and open space lands shall be minimized.
c. Mosquito abatement within or adjacent to ESHAs shall be limited to the implementation of the minimum measures necessary to protect human health Tecolote Creek Lagoon and shall be undertaken in a manner that minimizes adverse impacts to the ESHAs.
d. Weed abatement and brush-clearing activities for fire safety purposes shall be the minimum that is necessary to accomplish the intended purpose. Techniques shall be limited to mowing and other low-impact methods such as hand crews for brushing, tarping, and hot water/foam for weed control. Disking shall be prohibited.
e. Where there are feasible alternatives, existing sewer lines and other utilities that are located within an ESHA shall be taken out of service, abandoned in place, and replaced by facilities located outside the ESHA to avoid degradation of the ESHA resources, which could be caused by pipeline rupture or leakage and by routine maintenance practices such as clearing of vegetation.
f. Removal of nonnative invasive plant species within ESHAs may be allowed and encouraged, unless the nonnatives contribute to habitat values.
g. The following flood management activities may be allowed in creek and creek protection areas: desilting, obstruction clearance, minor vegetation removal, and similar flood management methods.

Policy CE 2: Protection of Creeks and Riparian Areas
Objective: Enhance, maintain, and restore the biological integrity of creek courses and their associated wetlands and riparian habitats as important natural features of Goleta's landscape.
CE 2.2: Streamside Protection Areas. A streamside protection area (SPA) is hereby established along both sides of the creeks identified in Figure 4-1. The purpose of the designation shall be to preserve the SPA in a natural state in order to protect the associated riparian habitats and ecosystems. The SPA shall include the creek channel, wetlands and/or riparian vegetation related to the creek hydrology, and an adjacent upland buffer area. The width of the SPA upland buffer shall be as follows:

a. The SPA upland buffer shall be 100 feet outward on both sides of the creek, measured from the top of the bank or the outer limit of wetlands and/or riparian vegetation, whichever is greater. The City may consider increasing or decreasing the width of the SPA upland buffer on a case-by-case basis at the time of environmental review. The City may allow portions of a SPA upland buffer to be less than 100 feet wide, but not less than 25 feet wide, based on a site specific assessment if (1) there is no feasible alternative siting for development that will avoid the SPA upland buffer; and (2) the project's impacts will not have significant adverse effects on streamside vegetation or the biotic quality of the stream.

CE 2.3: Allowable Uses and Activities in Streamside Protection Areas. The following compatible land uses and activities may be allowed in SPAs, subject to all other policies of this plan, including those requiring avoidance or mitigation of impacts:

a. Agricultural operations, provided they are compatible with preservation of riparian resources.
b. Fencing and other access barriers along property boundaries and along SPA boundaries.
c. Maintenance of existing roads, driveways, utilities, structures, and drainage improvements.
d. Construction of public road crossings and utilities, provided that there is no feasible, less environmentally damaging alternative.
e. Construction and maintenance of foot trails, bicycle paths, and similar low-impact facilities for public access.
f. Resource restoration or enhancement projects.
g. Nature education and research activities.
h. Low-impact interpretive and public access signage.
i. Other such Public Works projects as identified in the Capital Improvement Plan, only where there are no feasible, less environmentally damaging alternatives.

CE 2.5: Maintenance of Creeks as Natural Drainage Systems. Creek banks, creek channels, and assoc-iated riparian areas shall be maintained or restored to their natural condition wherever such conditions or opportun-ities exist. Creeks carry a significant amount of Goleta's stormwater flows. The following standards shall apply….

CE 2.6: Restoration of Degraded Creeks. Segments of several creeks in Goleta have been covered or channelized by concrete culverts, causing degradation of the creek ecosystem. Restoration activities for improving degraded creek resources shall include the following:

a. Channelized creek segments and culverts shall be evaluated and removed to restore natural channel bed and bank, where feasible.
b. Creek courses in public rights-of-way shall be uncovered as part of public works improvement projects.
c. Barriers that prevent migration of fish such as anadromous salmonids from reaching their critical habitat shall be removed or modified.
d. Restoration of native riparian vegetation and removal of exotic plant species shall be implemented, unless such plants provide critical habitat for monarch butterflies, raptors, or other protected animals.
e. Creek rehabilitation projects shall be designed to maintain or improve flow capacity, trap sediments and other pollutants that decrease water quality, minimize channel erosion, prevent new sources of pollutants from entering the creek, and enhance in-creek and riparian habitat.
f. The use of closed-pipe drainage systems for fish-bearing creeks shall be prohibited unless there is no feasible, less environmentally damaging alternative. When the use of culverts is necessary, the culverts shall be oversized and have gravel bottoms that maintain the channel's width and grade.

Policy CE 3: Protection of Wetlands
Objective: To preserve, protect, and enhance the functions and values of Goleta's wetlands.

CE 3.4: Protection of Wetlands in the Coastal Zone. The biological productivity andthe quality of wetlands shall be

protected and, where feasible, restored in accordance with the federal and state regulations and policies that apply to wetlands within the Coastal Zone. Only uses permitted by the regulating agencies shall be allowed within wetlands. The filling, diking, or dredging of open coastal waters, wetlands, estuaries, and lakes is prohibited unless it can be demonstrated that:

a. There is no feasible, environmentally less damaging alternative to wetland fill.
b. The extent of the fill is the least amount necessary to allow development of the permitted use.
c. Mitigation measures have been provided to minimize adverse environmental effects.
d. The purposes of the fill are limited to: incidental public services, such as burying cables or pipes; restoration of wetlands; and nature study, education, or similar resource-dependent activities. A wetland buffer of a sufficient size to ensure the biological integrity and preservation of the wetland shall be required. Generally the required buffer shall be 100 feet, but in no case shall wetland buffers be less than 50 feet. The buffer size should take into consideration the type and size of the development, the sensitivity of the wetland resources to detrimental edge effects of the development to the resources, natural features such as topography, the functions and values of the wetland, and the need for upland transitional habitat. A 100-foot minimum buffer area shall not be reduced when it serves the functions and values of slowing and absorbing flood waters for flood and erosion control, sediment filtration, water purification, and ground water recharge. The buffer area shall serve as transitional habitat with native vegetation and shall provide physical barriers to human intrusion.

CE 3.6: Mitigation of Wetland Fill. Where any dike or fill development is permitted in wetlands in accordance with the Coastal Act and the policies of this plan, at a minimum mitigation measures shall include creation or substantial restoration of wetlands of a similar type. Adverse impacts shall be mitigated at a ratio of 3:1 unless the project proponent provides evidence that the creation or restoration of a lesser area of wetlands will fully mitigate the adverse impacts of the fill. However, in no event shall the mitigation ratio be less than 2:1. All mitigation measures are subject to the requirements of CE 1.7.

CE 5.3 Protection of Costal Bluff Scrub, Coastal Sage Scrub, and Chaparral ESHA.
In addition to the provisions of Policy CE 1, the following standards shall apply….

Policy CE 7: Protection of Beach and Shoreline Habitats
Objective: To preserve and protect the biological integrity of Goleta's beaches, dunes, coastal bluffs and other shoreline resources.

Policy CE 8: Protection of Special-Status Species
Objective: To preserve and protect habitats for threatened, endangered, or other special-status species of plants and animals in order to maintain biodiversity.

CE 8.1: ESHA Designation. Requisite habitats for individual occurrences of special-status plants and animals, including candidate species for listing under the state and federal endangered species acts, California species of special concern, California Native Plant Society List 1B plants, and other species protected under provisions of the California Fish and Game Code shall be preserved and protected, and their occurrences, including habitat requirements, shall be designated as ESHAs. These habitats include, but are not limited to, the following:

a. Special-status plant species such as Santa Barbara honeysuckle (Lonicera subspicata var. subspicata), southern tarplant (Centromadia parryi ssp. australis) and black-flowered figwort (Scrophularia atrata).
b. Habitat capable of supporting special-status invertebrate species, such as the globose dune beetle (Coelus globosus), and roosting habitat for the monarch butterfly.
c. Aquatic habitat capable of supporting special-status fish species such as the steelhead trout (Oncorhynchus mykiss) and tidewater goby (Eucyclogobius newberryi).
d. Habitat capable of supporting special-status amphibians and reptiles such as the red-legged frog (Rana aurora draytonii) and western pond turtle (Clemmys marmorata pallida).
e. Nesting and roosting areas for various species of raptors such as Cooper's hawks (Accipiter cooperii), red-tailed hawks (Buteo jamaicensis), white-tailed kites (Elanus leucurus), and turkey vultures (Cathartes aura).
f. Nesting habitat for other special-status bird species such as western snowy plover, southwestern willow flycatcher (Empidonax traillii extimus), loggerhead shrike (Lanius ludovicianus), yellow warbler (Dendroica petechia), or tri-colored blackbird (Agelaius tricolor).
g. Nesting and foraging habitat for special-status mammals such as pallid bat (Antrozous pallidus), western red bat (Lasiurus blossevillii), Yuma myotis (Myotis yumanensis), and American badger (Taxidea taxus).

CE 8.2: Protection of Habitat Areas. All development shall be located, designed, constructed, and managed to avoid disturbance of adverse impacts to special-status species and their habitats, including spawning, nesting, rearing, roosting, foraging, and other elements of the required habitats.

Policy CE 10: Watershed Management and Water Quality

Objective: To prevent the degradation of the quality of groundwater basins and surface waters in and adjacent to Goleta.

CE 10.3: Incorporation of Best Management Practices for Stormwater Management. [GP/CP] New development shall be designed to minimize impacts to water quality from increased runoff volumes and discharges of pollutants from nonpoint sources to the maximum extent feasible, consistent with the City's Storm Water Management Plan or a subsequent Storm Water Management Plan approved by the City and the Central Coast Regional Water Quality Control Board. Post construction structural BMPs shall be designed to treat, infiltrate, or filter stormwater runoff in accordance with applicable standards as required by law. Examples of BMPs include, but are not limited to, the following:

a. Retention and detention basins.
b. Vegetated swales.
c. Infiltration galleries or injection wells.
d. Use of permeable paving materials.
e. Mechanical devices such as oil-water separators and filters.
f. Revegetation of graded or disturbed areas.
g. Other measures as identified in the City's adopted Storm Water Management Plan and other City-approved regulations.

CITY OF SANTA BARBARA COASTAL PLAN - AIRPORT & GOLETA SLOUGH (1982 & 2003)

http://www.santabarbaraca.gov/civicax/filebank/blobdload.aspx?BlobID=16924

Access - Policy A-1: Access within Goleta Slough is restricted to those conducting compatible research and educational projects.

Recreation - Policy B-1: Provide area(s) and facilities on the periphery of the wetland for the recreational and educational use of the Goleta Slough as funding permits.

Mosquito Abatement

Policy C-2: The City shall cooperate with [Vector Control] to see that mosquito abatement practices be limited to the minimum necessary to protect health and prevent damage to natural resources.

Policy C-7: Ongoing activities of special districts require City approval and Coastal Development Permit.

Action: Encourage Goleta Valley [Vector Control]'s use of biological methods of mosquito control.

Sedimentation - Policy C-5: Reduce the flow of sediment into the slough to the minimum compatible with marshland maintenance.

Action:

- Ensure that the ongoing sedimentation removal program of the Flood Control District at the Tecolotito and Carneros settlement basins just south of Hollister Avenue continues.

Support activities that would lead to improved upstream soil management and conservation.

Tidal Action - Policy C-6: Maintain tidal action to maintain optimum populations of marine organisms.

Actions:

- Determine where culverts should be installed or modified, and dikes and berms removed, based on their impact on marine organisms in the slough.
- Clear all channels and culverts in the tidal marsh area of materials that impede tidal circulation. Restore to working order tide gate and pump facilities.
- Have ongoing inspections and maintenance of culverts, tide gate, and pump facilities.

- Ensure that sandbar closure is reported to the Flood Control immediately to ensure sandbar removal is accomplished throughout the year.

Wetlands
Policy C-8: Only uses compatible with the protection and maintenance of wetland habitat and its open space character are allowed.

Policy C-9: Any development approved within or adjacent to the wetland areas shall be consistent with PRC Sections ... Within sensitive habitat areas, the approval of any restoration project ...shall occur only after Dept. of Fish and Game makes a finding under Section 30411 that the wetland is so severely degraded that major restoration which might include other uses not specifically permitted under Section 30233 is necessary and will have the primary effect of restoring the degraded area.

CITY OF SANTA BARBARA GENERAL PLAN UPDATE – April 2014 [New]

ENVIRONMENTAL RESOURCES ELEMENT (2011)

GOALS

- *Sustainable Resource Use.* Protect and use natural resources wisely to sustain their quantity and quality, minimize hazards to people and property, and meet present and future service, health and environmental needs.
- *Reduce Greenhouse Gases.* Reduce where practicable greenhouse gas emissions contributions to climate change, and to air pollution and related health risks.
- *Reduce Fossil Fuel Use.* Reduce fossil fuel use through increased efficiency and conservation, and by developing renewable energy sources.
- *Climate Change Adaptation.* If applicable, incorporate adaptation to climate change in proposals for new development, redevelopment and public infrastructure.

Climate Change Policies

ER1. **Climate Change.** As applicable, private development and public facilities and services may be required to incorporate measures to minimize contributions to climate change and to adapt to climate changes anticipated to occur within the life of each project.

Possible Implementation Actions to be Considered

ER1.1 Comprehensive Climate Change Action Plan. Prepare a comprehensive climate action plan, toward compliance with AB32, to address climate change concerns including reducing green-house gas emissions, green-house gas absorption, and adaptation to climate change. The climate action plan will include evaluation of community energy use (i.e., energy used by buildings and infrastructure); waste and recycling; water and wastewater systems; transportation; and community design. Include objectives and indicators to monitor greenhouse gas emissions, and natural phenomena related to climate change, such as oil seeps, sea-level rise, weather patterns, and wildlife behavior.

All elements of the General Plan will identify which specific policies contribute towards the reduction of green house gases. (Green house gases include carbon dioxide, methane, nitrous oxide, sulfur hexafluoride, hydrofluorocarbons and perfluorocarbons, among many others.)

ER1.2 Greenhouse Gas Emission (GHG). Require new development, redevelopment and substantial remodels to demonstrate how the project will support the City in attaining regional GHG vehicular emissions reduction targets. The Santa Barbara region has targets of zero net increase (from 2005 levels) in per capita GHG vehicular emissions in 2020 and 2035. These regional targets were adopted in 2010 by the Santa Barbara County Association of Governments (SBCAG) and the California Air Resources Board (CARB) pursuant to SB 375.

ER1.3 Urban Heat Island Effect. Improve carbon sequestration and reduce the urban heat island effect by:

a. Amending the Zoning Ordinance to establish standards that decrease impermeable surfaces and building areas relative to lot size;
b. Providing incentives such as expedited permitting for building projects that incorporate green roofs; and

c. Exploring possibilities for reducing standards for impermeable surfacing required by the Transportation Division and Fire Department.

ER2. **Emergency Response Strategies and Climate Change.** The City shall incorporate into its response strategies for emergency preparations, the potential effects of climate change, including from extreme weather, sea level rise, or epidemics, on humans, and the built and natural environments.

ER3. **Decrease City's Global Footprint.** In addition to promoting reduced unit size, building footprints and GHG emissions, and energy conservation, promote the use of more sustainable building and landscaping materials and methods.

Possible Implementation Action to be Considered

ER3.1 Locally-Harvested Renewable Materials. Establish additional green building incentives for the use of locally harvested, renewable building or manufacturing materials.

ER4. **Incorporation of Adaptation in Development.** New public and private development or substantial redevelopment or reuse projects shall estimate the useful life of proposed structures, and, in conjunction with available information about established hazard potential attributable to climate change, incorporate adaptation measures in the design, siting and location of the structures.

Possible Implementation Action to be Considered

ER4.1 Adaptation Guidelines. The City shall prepare adaptation guidelines for development projects, and to the extent of information available to the City, provide information about potential climate change hazards to developers. (See also Safety and Public Services Element policies, Hazard Avoidance.)

ER4.2 Sea Level Rise. Identify policy options, costs, and consequences for addressing sea level rise issues, including:

- Techniques to minimize wave energy and damage from storm surges, while minimizing disruption of coastal activities and habitats.
- Review of City public improvements and utilities for potential consequences of sea level rise, and consideration of means of adaptation such as measures to protect in place, raising facilities above projected flood heights, and managed retreat or relocation of facilities.
- Coordination with private property owners along the waterfront on techniques for structural adaptation and new design.

Biological Resources Policies

ER11. **Native and Other Trees and Landscaping**. Protect and maintain native and other urban trees, and landscaped spaces, and promote the use of native or Mediterranean drought-tolerant species in landscaping to save energy and water, incorporate habitat, and provide shade.

Possible Implementation Actions to be Considered

ER11.1 Tree Protection Ordinance. Update ordinance provisions to protect native oaks and other native or exotic trees. New development shall be sited and designed to preserve existing mature healthy native and non-native trees to the maximum extent feasible.

ER11.2 Oak Woodlands. Site new development outside of oak woodlands to the maximum extent feasible. Within and adjacent to oak woodlands:

a. Avoid removal of specimen oak trees;
b. Preserve and protect oak saplings and native understory vegetation within areas planned to remain in open space;
c. Provide landscaping compatible with the continuation and enhancement of the habitat area, consisting primarily of native species and excluding use of invasive non-native species;
d. Include conditions of approval for habitat restoration of degraded oak woodlands where such development creates direct or indirect impacts to the affected habitat;
e. Minimize or avoid installation of high water use landscaping (e.g., lawn) under the dripline of oak trees.

ER11.3 Urban Tree Protection and Enhancement. Create a City-wide enforcement and mitigation program for removal, severe pruning without a permit, or neglect, of protected trees (street trees, trees in front yards, and historic or otherwise designated trees).

ER12. **Wildlife, Coastal and Native Plant Habitat Protection and Enhancement**. Protect, maintain, and to the extent reasonably possible, expand the City's remaining diverse native plant and wildlife habitats, including ocean, wetland, coastal, creek, foothill, and urban-adapted habitats.

Possible Implementation Actions to be Considered

ER12.1 Designate Habitats. Map and designate important City upland habitats and wildlife corridors that merit long term protection, enhancement, and preservation for habitat and wildlife values. Include criteria and monitoring objectives such as largest areas of contiguous coastal sage scrub (generally five acres or greater), oak woodlands (generally one-half acre or greater), perennial grasslands (generally 0.25 acres or greater), annual grasslands (generally five acres or greater), and important wildlife movement corridors.

ER12.2 Multi-Use Plan for Coast and Native Habitat Restoration. Develop updated multi-use plans and monitoring guidelines for publicly owned beaches and other coastal areas to provide for both recreational uses and protection of coastal habitats and wildlife/native plant species. Incorporate as part of the Multi-Use Plan, a Waterfront habitat and wildlife management program that provides measures to improve the extent and quality of native coastal habitats within the City Waterfront, with the following goals:

a. Restoration and protection of remnant coastal sand dune habitat along the City Waterfront, including the removal of non-native and/or invasive plants.
b. Restoration and enhancement of the estuaries of Mission and Sycamore creeks and the Laguna Channel, including appropriate revegetation and removal and control of invasive species. Measures should be considered to improve these estuaries where feasible to maximize biological productivity and ecological function taking into consideration the dynamics of ocean waves and currents and ongoing movement of sand along the City coast.
c. A public access management plan that maintains public access to and along the shoreline, but channels the public to appropriate access locations as needed through sensitive habitat areas of the beach.

ER12.3 Coastal Bluff Habitat Restoration Program and Protection

a. Coastal Bluff Scrub Protection. Site and design new development or major remodels/expansions along the City coastal bluffs (including access, drainage, and landscape improvements) to:
   - minimize impacts to coastal bluff scrub habitat;
   - include provisions for habitat restoration of coastal bluff scrub habitats where development creates direct or indirect impacts to the affected habitat;
   - provide compatible landscaping within 10 feet of the edge of the bluff or on the bluff face, consisting of appropriate native coastal bluff scrub species.
b. Coastal Bluff Restoration. Establish a goal to restore 5.0 acres of coastal bluff habitat over the 20-year life of Plan Santa Barbara.
c. Restoration on Publicly Owned Lands. Work to increase the acreage of coastal bluff scrub through restoration projects on publicly-owned lands along Shoreline Park and the Douglas Family Preserve, and through providing education and assistance to private land owners to encourage the restoration of such habitats.

ER12.4 Native Species Habitat Planning. Protect and restore habitat areas for native flora and fauna, and wildlife corridors within the City, including for chaparral, oak woodland, and riparian areas. In particular, provide land use/design guidelines to:

a. Require buildings and other elements of the built environment, and landscaping to be designed to enhance the wildlife corridor network as habitat.
b. Ensure that the City and new development preserve existing trees within identified wildlife corridors, and promote planting new trees, and installing and maintaining appropriate native landscaping in new developments within or adjacent to important upland wildlife corridors and all streams. Ensure that efforts are made to minimize disturbance to understory vegetation, soils, and any aquatic habitats that are present below the trees in order to provide movement of species that utilize the habitat.
c. Ensure that new development and redevelopment projects will not result in a net reduction or loss in size and value of native riparian habitats.
d. Increase riparian habitat within the City and / or its sphere of influence by 20 acres or more, and 1 linear mile or more, over the 20 year life of Plan Santa Barbara. Priorities for restoration include perennial reaches of the major streams, reaches of creek on publicly-owned land, and degraded areas of the City's three major creeks.

ER12.5 Riparian Woodland Protection. Site new development outside of riparian woodlands to the extent feasible. Within and adjacent to riparian woodlands:

a. Avoid removal of mature native trees;
b. Preserve and protect native tree saplings and understory vegetation;
c. Provide landscaping within creek setback compatible with the continuation and enhancement of the habitat area, consisting primarily of appropriate native species and excluding use of invasive non-native species;
d. Include conditions of approval for habitat restoration of degraded oak woodlands where such development creates direct or indirect impacts to the affected habitat;
e. Include water quality protection and enhancement measures consistent with the adopted City Storm Water Management Plan.

ER13. **Trail Management**. Existing and future trails along creeks or in other natural settings shall be managed for both passive recreational use and as native species habitat and corridors.

ER14. **Integrated Pest Management Program**. To the extent allowable under state health and safety laws, establish ordinance provisions to apply integrated pest management requirements to development permits.

Hydrology, Water Quality and Flooding Policies

ER19. **Creek Resources and Water Quality**. Encourage development and infrastructure that is consistent with City policies and programs for comprehensive watershed planning, creeks restoration, water quality protection, open space enhancement, storm water management, and public creek and water awareness programs.

Possible Implementation Actions to be Considered

ER19.1 Comprehensive Creek Action Plan. Prepare a comprehensive long term action plan for protecting and enhancing creek water quality, riparian area, and steelhead use, and maintaining or enhancing flood management.

ER19.2 Master Drainage Plan. In coordination with watershed planning, develop a comprehensive drainage plan that identifies the existing system, policies and development standards to better address drainage and water quality issues, areas appropriate for drainage retention/detention, future capital improvements, and funding plan to finance the projects.

ER19.3 Pharmaceutical Waste Education and Collection**.** Continue coordination with the County of Santa Barbara and other agencies to establish and maintain an ongoing public education campaign and periodic drop-off collection days, focusing on proper disposal of pharmaceutical materials and other emergent contaminants of concern, to reduce the contaminants entering wastewater, storm drain, and solid waste systems.

ER19.4 Beach Water Quality Improvement. Consider actions for further improving water quality at East Beach, which could include: (1) a restoration plan for Lower Mission Creek/Laguna Channel, including the potential for a constructed wetland at the creek/ocean interface and/or (2) an ultraviolet treatment system to disinfect the flow within Laguna Creek during low flow periods (e.g., May-September) prior to entering the channel and discharging to the beach.

ER19.5 Watershed Action Plans**.** Continue work toward completion of Watershed Action Plans for Mission Creek, Sycamore Creek, Arroyo Burro Creek, and Laguna Watersheds.

ER20. **Storm Water Management Policies.** The City's Storm Water Management Program's policies, standards and other requirements for low impact development to reduce storm water run-off, volumes, rates, and water pollutants are hereby incorporated into the General Plan Environmental Resources Element.

Possible Implementation Actions to be Considered

ER20.1 Storm Water Guidelines. The City's Storm Water Management Guidelines provide information on implementation measures such as ground water recharge, pervious surfacing, bioswales, detention basins, and green roofs. Update measures for street sweeping, storm-drain stenciling, and public outreach for inclusion in conditions of approval or as mitigation measures. Encourage the conversion of excess street paving between sidewalks and streets to bioswales.

ER20.2 Wash-Down Policies. Prepare or update regulations to limit the practice of hosing down driveways, to conserve water and reduce pollutants carried through urban run-off and conserve water per State Water Resources Control Board regulatory guidelines for storm water management.

ER20.3 Floodplain Mapping Update. Update the Flood Insurance Maps (FIRM) floodplain boundaries for Special Flood Hazard Areas such as the Mission and Sycamore creek drainages and Area A near the Estero.

ER21. **Creek Setbacks, Protection, and Restoration**. Protection and restoration of creeks and their riparian corridors is a priority for improving biological values, water quality, open space and flood control in conjunction with adaptation planning for climate change.
Possible Implementation Actions to be Considered

ER21.1 Creek Setback Standards. Establish updated creek setback and restoration standards for new development and redevelopment along all creeks, and prepare or update guidelines for restoration, increase of pervious surfaces and appropriate land uses within designated creek side buffers.

a. Develop setback standards of greater than 25 feet from the top of bank for new structures and hard surfaces adjacent to creeks and wetlands.
b. At a given site, creek buffers should be adequate for protection from flood, erosion, and geologic hazards, and to provide habitat support.
c. In developing creek setback and restoration standards, consider applicable creek standards in surrounding jurisdictions and the Santa Barbara County Flood Control District general recommendation for new development setbacks of 50 feet from the top of bank of major creeks with natural creek banks, with a reduction up to 25 feet where "hard bank" protection is present.
d. For new development that is closer than 50 feet to the top of the bank of any major stream, creek bank stabilization shall be provided through planting of native trees and shrubs on creek banks and along the top of banks to minimize erosion and the potential for bank failure.
e. When the City determines that a structure must be constructed within proposed creek setbacks or where a project would be exposed to unusually high risk of bank erosion or collapse, non-intrusive bank stabilization methods such as bio-engineering techniques (e.g. revegetation, tree revetment, native material revetment, etc.) shall be used where feasible rather than hard bank solutions such as rip-rap or concrete.

ER21.2 Creekside Development Guidelines. Establish design guidelines for development and redevelopment near creeks, such as measures to orient development toward creeks, and better incorporate creeks as part of landscape and open space design. Utilize native riparian palettes for landscaping along creeks, and prohibit the use of non-native invasive plants. Encourage public creekside pedestrian paths where appropriate to increase connectivity and provide pocket parks and signage to improve public awareness and enjoyment of the City's creeks.

ER21.3 Creek Naturalization. Prohibit the placement of concrete or other impervious material into, or piping of, major creeks and primary tributaries except for water supply projects or flood control projects that are necessary for public safety, or to maintain or repair a structure that protects existing development. These protection measures shall only be used for water supply or flood control purposes where no other less environmentally damaging method is available and the project has been designed to minimize damage to creeks, wetlands, water quality, and riparian habitats. Whenever feasible, existing concrete lining shall be removed from creek channels, and reaches of drainages that have been previously under-grounded shall be "daylighted."

ER21.4 Surface Water Drainage Restoration. Set a goal to restore or daylight a total of at least .5 miles of surface water drainages over the life of Plan Santa Barbara. Priority areas for restoration include segments of Mission Creek consistent with sound flood control practices, the reach of Arroyo Hondo Creek through City College, the tributary to Arroyo Burro Creek west of Las Positas Road, and the segment of Arroyo Burro Creek adjacent to La Cumbre Plaza.

DRAFT EASTERN GOLETA VALLEY COMMUNITY PLAN (2011)

COMMUNITY DEVELOPMENT AND LAND USE

http://longrange.sbcountyplanning.org/planareas/goleta/gcp.php

OBJECTIVE LUA-EGV-1: Sustain and enhance agricultural land, operations, and characteristics in Eastern GV.

Policy LUA-EGV-1.1: The County shall maintain land use and development patterns that sustain and support agricultural land uses, agricultural operations, and distinctive urban and rural agricultural characteristics.

Policy LUA-EGV-1.3: Atascadero and Maria Ygnacio Creeks shall be maintained appropriately to serve as buffers between agricultural areas, recreational uses and adjacent commercial, industrial and residential uses.

WATERSHED, HYDROLOGY & FLOODING

[Note – No specific mention of Sea Level Rise]

GOAL #12. Water runoff is clean and not harmful to watershed and marine habitats.

OBJECTIVE HYD-EGV-1: Minimize pollution of streams, sloughs, drainage channels, groundwater basins, estuaries, the ocean and areas adjacent to such waters.

Policy HYD-EGV-1.1: Introduction of contaminated urban and agricultural runoff into all coastal waters, including sloughs, rivers, streams, coastal wetlands and intertidal areas, shall be eliminated or minimized.

Policy HYD-EGV-1.2: Untreated outfalls should avoid or be relocated out of Environmentally Sensitive Habitat and riparian areas.

OBJECTIVE HYD-EGV-2: Minimize potential flood hazards.

Policy HYD-EGV-2.1: Adequate setbacks from floodways and flood hazards shall be required.

Policy HYD-EGV-2.2: Setbacks of a minimum of 50 feet from top of bank but adjusted upward as needed to adequately protect life and property from potential flood hazards shall be required as determined by Flood Control.

Policy HYD-EGV-2.3: As part of its on-going maintenance operations, the Flood Control District shall minimize impacts to stream channels where feasible and consistent with sound flood control practices, and incorporate mitigation measures from the Flood Control Maintenance Program Environmental Impact Report (PEIR) to restore channels and stream backs. The District should incorporate and project costs for these efforts into County budget planning.

Discussion (p. 164): While about a third of Eastern Goleta Valley provides habitat for people in the built environment of the urban area, much of Eastern Goleta Valley provides habitat for local and migratory species, both plant and animal. Habitat areas generally exist on the periphery of the urban area, predominantly in the rural mountainous foothill areas and along the coast, but also through corridors connecting these peripheral areas. These habitats or wildlife corridors follow the riparian vegetation of the areas creeks, waterways, and wetlands; the watersheds provide the network between habitat areas. Non-contiguous habitat disrupts animal movement patterns, disables foraging viability, interrupts seed dispersal routes, and increases vulnerability of species to weed invasion or local hazards such as fire, flooding, disease, etc. Eastern Goleta Valley contains diverse inter-related habitats. Examples include the offshore marine environment, coastal strand, coastal dune, coastal estuaries, various kinds of scrub and woodland habitats, and freshwater streams. It is important to recognize the relationships between, as well as within, these communities when planning and regulating urban and agricultural development. As a valuable local resource, habitat protection and enhancement for the sake of Eastern Goleta Valley"s non- human residents is a key objective of this Plan.

The Conservation Element identifies a number of ecological systems for the Goleta Planning Area. This document further defines "Species and Ecological Communities of Particular Value". The County's LCP designates certain biotic communities as "Environmentally Sensitive Habitat" (ESH). ESH designated areas are afforded specific protections detailed in the County's land use planning policies, as set forth in the Comprehensive Plan and LCP. This Plan contains additional ESH overlay areas and associated habitat protections in the urban and mountainous areas of the Community (Figure 34), as well as protection for riparian corridors in the rural agricultural districts under the Riparian Corridor Overlay District. Additionally, Atascadero Creek is delineated as a “greenway" to emphasize the creek’s importance as a wildlife corridor from Goleta Slough to the San Marcos Foothills (Figure 35) and an opportunity for green infrastructure improvements consistent with Section III.

This community plan is designed to protect habitat and wildlife corridors from the impacts of development; that is, development under this Plan is restricted to infill of the existing urban area that is suitable for development.

Additionally, the urban area boundary prevents urban development in the rural area (see also, Section II.A). This approach avoids impacts to habitat areas in the foothills and prevents sprawling urbanization and leap-frog development patterns. Within the urban area, infill development is prioritized in the core of the community and away from coastal areas to protect coastal habitat resources. Additionally, the policy framework protects specific habitat types, including the environmentally sensitive habitat and riparian corridor habitat overlays, from the impacts of development on a case-by-case basis. Measures such as buffers, setbacks, green infrastructure, and resource replacement ratios provide protection of biological resources and habitats. Taken together, the objective for Eastern GV's natural environment is to preserve the existing resources and enhance these resources whenever possible.

Watershed Policies (p 171):

GOAL #13. The ecological and biological resources of local watersheds are preserved, balanced, and thriving, ridgeline to shore.

OBJECTIVE ECO-EGV-1: Preserve and enhance the watershed ecosystems of Eastern Goleta Valley.

Policy ECO-EGV-1.1: The County shall designate and provide protection to important or sensitive environmental resources and habitats in Eastern Goleta Valley.

Policy ECO-EGV-1.2: The County shall adhere to and incorporate the following priorities for the protection of ecological and biological resources:

- Preservation and/or enhancement of existing natural resources,
- Maintenance of habitat continuity and wildlife corridors,
- Establishment, enlargement, and restoration of ecological preserves and wildlife corridors,
- Long term protection of regional ecosystems,
- Protection and/or enhancement of critical habitats for endangered, threatened, and sensitive biota,
- Enhancement or restoration of degraded habitats, including active removal and management of invasive non-native species,
- Active management of preserves, open space and/or conservation easements,
- Active management of natural areas to diminish fire hazard while sustaining natural resources and values, such as habitat areas and hydrologic function, through management of fuel loads or other appropriate measures (see also, Section III.C: Public Safety), and
- Land use and development patterns that minimize or alleviate the impact to the natural environment and improve Eastern Goleta Valley's urban ecology.

BIOLOGICAL RESOURCES (P. 171)

OBJECTIVE ECO-EGV-2: Preserve and enhance the vitality of biological resources of Eastern Goleta Valley.

Policy ECO-EGV-2.1: Open space and conservation easements should be considered effective methods to preserve important biological resources and habitats.

Policy ECO-EGV-2.2: The use of native, drought-tolerant, and/or fire-resistant plants shall be strongly encouraged in landscaping and restoration projects, especially in parks, buffers adjacent to native habitats and in designated open space.

Policy ECO-EGV-2.3: Where sensitive plant species and sensitive animal species are found pursuant to the review of a discretionary project, the habitat in which the sensitive species is located shall be preserved to the maximum extent feasible. For the purposes of this policy, sensitive plant species are those species that appear on the County's list of locally rare, generally rare, or endangered plants, and the California Native Plant Society's Inventory of Endangered Vascular Plants of California. Sensitive animal species are defined as those animal species identified by the Department of Fish and Game, the U.S. Fish and Wildlife Service and/or are listed in Tate's The Audubon Blue List (birds).

Policy ECO-EGV-2.4: Where sites proposed for development contain sensitive or important habitats and areas to be

preserved over the long term, degradation of these habitats shall be avoided or minimized as a component of a project, including, but not limited to, one or more of the following conditions:

- Dedication of onsite open space easements covering habitat areas,
- Onsite habitat restoration programs utilizing appropriate native, drought-tolerant, and/or fire-resistant species,
- Monetary contributions toward habitat acquisition and management, and/or
- Offsite easement and/or restoration of comparable habitat/area when onsite preservation is infeasible.

Policy ECO-EGV-2.5: Restoration: In cases where adverse impacts to biological resources cannot be avoided after impacts have been minimized, restoration shall be required. A minimum replacement ratio of 2:1 shall be required to compensate for the destruction of native habitat areas or biological resources. The area or units to be restored, acquired, or dedicated for a permanent protective easement shall be twice the biological value of that which is destroyed. Restoration may also be required for parcels on which development is proposed and on which disturbance has previously occurred if the currently proposed development would exacerbate the existing impact. Where onsite restoration is infeasible or not beneficial with regard to long-term preservation of habitat, an offsite easement and/or restoration which provides adequate quality and quantity of habitat and within the same watershed shall be required.

Policy ECO-EGV-2.6: The County shall ensure the following requirements for any restoration efforts are considered and incorporated into the restoration plan:

- Restoration shall include the appropriate diversity and density of plants native to the locality,
- Restoration shall incorporate maintenance and monitoring measures to ensure that the remedial action is mitigating permanent remedy of the impact of development,
- When restoration is required, on-site rather than off-site restoration shall be preferred.

Habitat Policies (p. 173):

OBJECTIVE ECO-EGV-3: Preserve and enhance the ecological value and function of habitats of Eastern GV.

Policy ECO-EGV-3.1: Habitats that shall be preserved and enhanced include, but are not limited to:

- Creeks, streams, and waterways, and fish passage,
- Wetlands and vernal pools,
- Riparian vegetation,
- Wildlife corridors between habitat areas,
- Roosting, nesting, and foraging habitat for bird species, and
- Nesting and foraging habitat for subterranean species.

Policy ECO-EGV-3.2: Ecological communities and habitats shall not be fragmented into small non- viable pocket areas by development.

Policy ECO-EGV-3.3: In rural areas and where major wildlife corridors are present in urban areas, development shall not interrupt major wildlife travel corridors within Eastern Goleta Valley. Typical wildlife corridors are provided by drainage courses and similar undeveloped natural areas.

Policy ECO-EGV-3.4: Atascadero Creek Greenway: Atascadero Creek shall be considered as a „greenway" and wildlife corridor from its headwaters in the San Marcos Foothills to its outlet at Goleta Slough and Goleta Beach. The greenway is defined generally as a 100 ft buffer from the centerline of the creek, but may be adjusted where appropriate to include biological/hydrological resources consistent with this Plan. Within the buffer, the greenway shall conceptually and functionally protect and enhance the creek corridor"s habitat, hydrologic, and recreational value to the community, including, but not limited to, the installation of passive hiking trails, bike paths, wildlife passage pocket parks. (see also, Section III.D: Parks, Recreation, Trails, and Open Space). Protection, restoration, and enhancement of the greenway shall be encouraged for all development proposed within or adjacent to the greenway consistent with this Plan (Figure 35).

General Environmentally Sensitive Habitat (ESH) and Riparian Corridor (RC) Policies (p. 175):

The following policies, actions and development standards are intended to apply to environmentally sensitive habitat (ESH) areas or riparian corridors (RC), depicted generally on the County's approved ESH/RC maps.

OBJECTIVE ECO-EGV-5: Designate and provide protection for environmentally sensitive habitats and riparian corridors in the Planning Area.

Policy ECO-EGV-5.1: Environmentally Sensitive Habitat (ESH) areas and Riparian Corridors (RC) within Eastern Goleta Valley shall be protected and, where feasible and appropriate, enhanced.

Policy ECO-EGV-5.2: The following general criteria are utilized to determine which resources and habitats in Eastern Goleta Valley are identified as ESH. Significant habitat resources within urban, EDRN and Mountainous Areas that meet one or more of 1 of these criteria shall have coverage of the ESH overlay.

1. Unique, rare, or fragile communities which should be preserved to ensure their survival into perpetuity.
2. Habitats of rare and endangered species that are also protected by State and Federal laws.
3. Plant communities that are of significant interest because of extensions of ranges, or unusual hybrid, disjunctive, or relict species.
4. Specialized wildlife habitats which are vital to species survival, e.g., White-tailed Kite habitat, butterfly trees.
5. Outstanding representative natural communities that have values ranging from a particularly rich flora and fauna to an unusual diversity of species.
6. Areas which are important because of their high biological productivity and ecological function such as wetlands and vernal pools.
7. Areas which are structurally important in protecting watershed ecology and species, e.g., riparian corridors that protect stream banks from erosion and provide shade.

Policy ECO-EGV-5.3: To protect the viability of agricultural operations in the rural area consistent with the Comprehensive Plan and the Agricultural Element, the ESH Overlay shall not be applied to lands designated Agriculture in the rural area. Instead, riparian corridors in rural agricultural areas shall have coverage of the Riparian Corridor (RC) Overlay, which provides unique requirements for habitat areas located on land with rural agricultural land use designations.

Policy ECO-EGV-5.4: ESH and RC Habitat Types: The following specific biological resources and habitats in the urban, inner-rural, EDRN and Mountainous areas shall be considered environmentally sensitive and designated on the Goleta Valley Community Plan ESH/Riparian Corridor map (Figure 34) based on the criteria of Policy ECO-EGV-1.1 and shall be protected and preserved through provisions of the Environmentally Sensitive Habitat (ESH) and Riparian Corridor (RC) overlay

- Riparian woodland corridors,
- Monarch butterfly roosts,
- Sensitive native flora,
- Coastal sage scrub,
- Oak woodlands,
- Vernal pools,
- Native Grasslands,
- Wetlands,
- Raptor/Turkey Vulture Roosts,
- Critical wildlife habitat, and
- Wildlife Corridor

Policy ECO-EGV-5.5: Minimum Buffer Areas for ESH: The minimum buffer strip and setbacks from streams and creeks for development and activities within the ESH overlay that are regulated by the Co. Zoning Ordinances shall be as follows, except on parcels designated for agriculture in rural areas where Policy ECO-EGV-5.6 shall apply:

- ESH areas within the urban area and EDRNs: a minimum setback of 50 feet from either side of top-of-bank of creeks or existing edge of riparian vegetation, whichever is further, shall be indicated on all site plans. Plans shall minimize ground disturbance and vegetation removal;

- ESH areas within the Mountainous-GOL zone district: a minimum buffer of 200 feet from the edge of existing riparian vegetation. Grading and vegetation removal within these buffers shall be restricted while not precluding reasonable use of a parcel.

Unless otherwise noted the following Policies, Development Standards and Actions apply to all mapped Environmentally Sensitive Habitat and Riparian Corridor Areas, as well as the specified habitats.

OBJECTIVE ECO-EGV-6: Preserve and protect important local habitat types, including native woodlands, native grasslands, coastal sage scrub, monarch butterfly roosts, and riparian vegetation.

Policy ECO-EGV-6.1: Native woodlands, native grasslands, and coastal sage scrub shall be preserved and protected as viable and contiguous habitat areas.

Policy ECO-EGV-6.3: Riparian vegetation shall be protected and shall not be removed except where clearing is necessary for the maintenance of free flowing channel conditions, the removal of invasive exotic species, the provision of essential public services, or where protection would preclude the reasonable use of a parcel. Degraded areas shall be restored.

Policy ECO-EGV-6.4: Natural stream channels and conditions shall be maintained in an undisturbed state in order to protect banks from erosion, enhance wildlife passageways, and provide natural greenbelts.

Policy ECO-EGV-6.5: For wetland areas and surrounding habitats that have been damaged by pollution and artificial stream channelization, the County shall seek opportunities for restoration to their natural condition.

UCSB FINAL LONG RANGE DEVELOPMENT PLAN [Adopted 11/14]

http://lrdp.id.ucsb.edu/sites/default/files/sites/client057/www/streaming/USCB%202010%20LRDP.pdf

LRDP GOALS AND OBJECTIVES
The following goals and objectives apply to the UCSB campus and, with the other policies of the LRDP, comprise the overall vision for the University through 2025.

LRDP Goal
"Vision 2025" is the University of California at Santa Barbara's Long Range Development Plan (LRDP) that implements its Academic Plan and provides for facilities and housing to accommodate planned enrollment growth through the year 2025. The Academic Plan balances the instructional needs of students and the research mission that is critical to the campus' academic excellence.

UCSB is a world-class teaching and research university that attracts high quality faculty, staff and students. The University has a responsibility to absorb a reasonable proportion of the increasing enrollment in the University of California system as a whole. The overall goal of the LRDP is to plan and implement development consistent with the Coastal Act to facilitate an increase in enrollment from the current cap of 20,000 to 25,000 students; to house 100 percent of these additional students and the faculty and staff needed to serve them; and provide high quality academic space. The University's population goal is to increase student enrollment at a rate of about one percent per year over the planning horizon through 2025.

The LRDP also recognizes that the most highly valued physical asset of the campus is its magnificent natural setting and natural open spaces, and the ability of the public to readily access the coast in the vicinity of the University.

LRDP Objectives
The University's primary objective is to fulfill its educational mission to educate and house students, faculty and staff. At the same time, the University appreciates its location adjacent to the Pacific Ocean in the Coastal Zone and recognizes its responsibilities pursuant to the Coastal Act. The University wants to continue to restore and enhance

sensitive resources and increase the public's ability to access the coast from campus. The University's specific educational objectives, as implemented through physical development provided for within this LRDP, are:

- Increase graduate students from about 2,870 to 4,250 in order to meet the target of about 17 percent of total enrollment.
- Increase faculty from about 1,100 to 1,400. Staff is expected to increase by about 1,400 new positions to a total of about 5,000.
- Construct up to 1,874 additional faculty and staff units and an adequate number of units to accommodate 5,000 additional students on Storke, Main and West Campuses.
- Construct up to 3.6 million gross square feet (1.8 million net new assignable square feet) of academic and support uses not including parking garages and housing.
- Work towards providing housing for each added increment of new enrollment within four years.

LAND USE DEFINITIONS

OPEN SPACE

The conceptual build-out of the campus envisioned in the 2010 Long Range Development Plan (LRDP) provides an opportunity for the planned stewardship of the remaining Open Space areas that grace the campus. A few open space areas such as the Commencement Commons, UCEN lawn, and the Pearl Chase Garden have been designed for active use and for campus community celebrations and gatherings. The remaining campus Open Space lands, however, have been set aside in the 2010 LRDP for permanent protection from further development, with the exception of certain allowed uses listed below. The resources of these lands will be planned and managed for the benefit of the sensitive coastal resources including, but not limited to, wetlands, native grasslands, woodlands, nesting and roosting habitat areas, and rare species that also inhabit the remnant habitat provided by campus open spaces. The emphasis within these lands is the enhancement, restoration, and permanent conservation of a mosaic of sensitive habitat areas while still allowing for the provision of low-intensity public access and recreation, including trails and public parking for access to coastal and open space areas provided that such amenities are designed and managed in a manner that limits disturbance of the nearby habitat areas.

Allowed uses within the Open Space land use designation shall be limited to:

- Active recreation at Commencement Commons, UCen Lawn, and Pearl Chase Garden
- Drainage and water quality improvements
- Environmental interpretation/education displays
- Fences, signs, or other wildlife permeable, natural barriers to protect public safety, manage open space areas, and direct public access
- Habitat restoration and enhancement activities, including vegetation management consistent with Policy ESH-12
- Kiosks, information and educational signage
- Maintenance of existing roads, trails, and utilities
- Minimum necessary vegetation management for fire reduction/fuel modification for existing structures and fire reduction/fuel modification activities undertaken for new structures pursuant to Policy ESH-13
- New outdoor lighting limited to the minimum necessary to protect public safety where Class I bikeways are developed on the periphery of Open Space. Other new outdoor lighting within Open Space shall be prohibited unless authorized pursuant to an amendment to this LRDP.
- New underground utilities essential to authorized development where no other feasible location or method of service exists.
- North Campus visitor or interpretive center
- Restrooms to serve the public at key access points or routes
- Parking for the provision of public access to open space
- Passive public access and recreational facilities including public hiking/bicycle trails an benches and bicycle racks
- Replacement of existing culverts with bridged crossing of wetlands
- Uses and restriction explicitly applied to a given property pursuant to an open space and/or conservation easement or deed restriction in effect prior to the effective date of the 2010 LRDP
- West Campus road improvements as necessary to implement the transition of Slough Road from vehicular use to pedestrian, bicycle, and emergency vehicle use

- Temporary greenhouses, shade structures, tool sheds, and utility hookups (water) for restoration purposes

Where specifically noted below and subject to the noted limitations and other pertinent policies and provisions of the LRDP, the following legally authorized development within OS-designated lands that may become non-conforming as a result of the 2010 LRDP may be permanently retained and repaired or maintained:

- Existing student and/or community garden on Storke Campus east of Los Carneros Road and North of Lot 38 (including the associated greenhouse and garden-related structures), on Storke Campus adjacent to Storke Family Housing, and on West Campus adjacent to West Campus Apartments may each be retained in its 1990 development footprint; however, if any such areas or development are abandoned, they shall not be reconstructed except pursuant to an approved NOID;
- Cheadle Center for Biodiversity & Ecological Restoration (CCBER) office and greenhouses where located as of July 2014 may be retained; (as permitted in NOID 5-07).
- Academic and storage space for the Cheadle Center for Biodiversity and Ecological Restoration located adjacent to Harder Stadium.

LAND USE OVERLAYS

Land use overlays for environmentally sensitive habitats areas (ESHA) and the Coal Oil Point Reserve (COPR or Reserve) have been established to further restrict the types of land uses that may be allowed within ESHA or the COPR for the purpose of protecting natural resources. Where more than one overlay is applied in an area, the more restrictive standards of the overlay shall control development.

ENVIRONMENTALLY SENSITIVE HABITAT AREA OVERLAY

The Environmentally Sensitive Habitat Area (ESHA) Overlay is intended to protect environmentally sensitive areas by limiting allowed land uses within ESHA to only resource-dependent uses. The ESHA Overlay, as delineated on Figure D.2, shows the known environmentally sensitive habitat areas and serves as a planning tool to ensure that new development does not adversely impact those resources. Although considerable effort was undertaken to compile the ESHA Map (Figure D.2), the mapped ESHA cannot feasibly represent all ESHA, or the exact limits of the ESHA. Precise surveys must be undertaken to delineate the boundary of ESHA at the time of a proposed development. In addition, new areas of ESHA may be identified as specific surveys are conducted and more information is gathered, particularly during the development process. As a result, the ESHA Overlay requires periodic updates to reflect changes in knowledge, which must be processed as an amendment to this LRDP.

In addition to the Overlay, there are a number of LRDP policies that supplement and support the ESHA overlay and provide additional standards for the protection of ESHA. These policies are not limited to only ESHA identified in the ESHA Overlay. Any policy that refers to “ESHA” shall be applied to any area that meets the definition of an “environmentally sensitive habitat area” regardless of whether the ESHA is formally depicted on the ESHA Map.

Allowed uses within the ESHA Overlay shall be limited to:

- Fences, signs, or other wildlife permeable, natural barriers to protect public safety, manage open space areas, and direct public access
- Habitat creation, restoration and/or enhancement activities, including vegetation management for habitat restoration purposes consistent with Policy ESH-12
- Limited pedestrian or bicycle trails, boardwalks, footbridges or stairways for the enjoyment of the resource and where no other feasible location exists

RESERVE OVERLAY

The Coal Oil Point Reserve (COPR or Reserve) Overlay is intended to delineate the area of campus that is managed and preserved as part of the University of California’s Natural Reserve System, and serves the research, educational, public outreach, and stewardship functions established for the Reserve. The Reserve Overlay covers the entire 170 acres of the Coal Oil Point Reserve. Unlike conventional open spaces, the COPR functions as an outdoor classroom and laboratory for the long-term field study of wild land ecosystems, so public access must be managed within the Reserve in a manner consistent with the preservation of its natural resources. Areas of the Reserve that contain environmentally sensitive habitat are also designated with the ESHA Overlay to further restrict the land uses that may occur in those areas.

Allowed uses within the Reserve Overlay shall be limited to:

- Environmental interpretation/educational displays
- Fences, signs, or other wildlife permeable, natural barriers to protect public safety, manage open space areas, and direct public access
- Habitat creation, restoration and/or enhancement activities, including vegetation management for habitat restoration purposes consistent with Policy ESH-12
- Parking for Reserve personnel and volunteers
- Public coastal access, including public coastal access trails, parking, benches and bicycle racks
- Reserve Director's residence
- Reserve Field Station facilities such as workshops, storage sheds, offices, greenhouses and shade hut
- Weather stations, observation blinds, or other similar small structures to enhance the Reserve's objectives as a natural study area

DEVELOPMENT

The 2010 LRDP would transform the urban fabric of the campus with additional buildings among an orderly sequence of grand campus public spaces (Figure D.3*). These spaces provide the grid-like framework for siting campus buildings and connections to Isla Vista. Four main spaces are proposed for the Main Campus: Tower Mall and Storke Plaza, Pardall Mall, Campus Green and Quad, and Library Mall, all of which would open up views of the campus. Academic uses would still cluster around the central landmark of the Davidson Library, with the natural and physical sciences to the east and the arts and humanities to the west.

ACADEMIC & SUPPORT DEVELOPMENT

The LRDP proposes to create nearly 1.8 million assignable square feet (ASF) (3.6 million gross square feet [GSF]) of net new space needed by UC Santa Barbara, as well as allow for the replacement of buildings and facilities that are in poor repair, outdated, or need to be demolished to make room for new facilities. Over half of the projected development need (930,000 ASF) is for additional instructional and research facilities, including classrooms. Organized research that does not directly relate to specific instructional programs makes up about 300,000 ASF; library and institutional services require 120,000 ASF; academic and student support require 110,000 ASF; and public service requires 115,000 ASF (Table D.2).

NATURAL AREAS

Over half of the campus' 1,120 acres is naturalized open space, with a mixture of both exotic and native plants. Some of these areas, like Lagoon Island, provide areas for walking and sightseeing as well as important habitat value. Other areas, like the Coal Oil Point Reserve, have limited public access to protect fragile coastal ecosystems. Landscape plantings in natural areas would consist of locally native plants selected for compatibility with the habitat context and wildlife use of the area under consideration.

CAMPUS LAGOON ISLAND

The Campus Lagoon Island — actually a peninsula that extends north to the lagoon from the coast — is a relatively undisturbed landscape of native grasslands, trees, and shrubs that support a variety of wildlife and different types of plant communities. The island and adjacent Goleta Point would retain their natural characters since they are an integral part of the Main Campus' open space network. Each is accessible by paths along the coastal bluffs and beaches. Pedestrians would still be allowed access to designated pathways in most of these areas, and unobtrusive seating areas would be created. Bicyclists will not be permitted in either area.

EAST BLUFFS

The East Bluff area includes the mesa top, the bluff face, and the beach next to Lagoon Road. This area has a mixture of horticultural trees including Mexican Fan palms, and native and exotic plants that can be seen from pedestrian paths and a paved bicycle path. Other improvements include seating, safety fencing and a beach stairway north of Parking Lot 6. Dramatic views of the coast would be enhanced by slight grade changes to remove portions of the artificial earthen berm that obscures sight lines from sidewalks and Lagoon Road.

NORTH BLUFFS
The North Bluffs of the Main Campus mesa have been extensively replanted with oak and upland forest. A belvedere serves as an overlook to the Goleta Slough and the airport, and connects with a trail that winds along the bluffs between the Storke Campus and the east entrance to the campus.

WETLANDS
All areas of the campus have wetland areas, including small vernal pools on the North Campus, brackish marsh on Storke Campus, and large bodies of water like the Devereux Slough and the Campus Lagoon. These environmentally sensitive wetlands support a rich variety of plants and wildlife.

ENVIRONMENTALLY SENSITIVE HABITAT AREAS (ESHA)

The LRDP identifies many natural areas as environmentally sensitive habitat areas (ESHA) because they "contain plant or animal life which are either rare or especially valuable because of their special nature or role in an ecosystem and could be easily disturbed or degraded" (Coastal Act Sections 30107.5 and 30240). These areas are formally protected under the LRDP through policies that address appropriate development within and adjacent to ESHA, through an ESHA overlay which identifies the location of known sensitive habitat areas; and through the application of the Open Space land use designation (Figures D.1 and D.2). Some locations of ESHA on campus lands (such as within the Ocean Meadows site) have not been fully delineated but would be subject to full protection and restoration under UC Santa Barbara's stewardship. Other areas are included as open space in consideration of the significant visual resources afforded by the location or because the area is protected as a buffer for ESHA. These open spaces include the strips of land along the top of the ocean bluffs on the Main and West campuses, the banks of the Campus Lagoon, the areas bordering the Storke Campus Wetland, and the banks on the east side of the Devereux Slough. In other areas of the campus where environmentally sensitive locations exist without adjoining open space to serve as a buffer, the LRDP provides environmental protection through policies and standards that cover issues like building setbacks, run-off controls, fencing, and signs. Policies related to ESHA protection are listed in the next section.

The 2010 LRDP identifies ESHAs, including but not limited to, in the following areas:

- Portions of the Coal Oil Point Natural Reserve
- The Campus Lagoon island and Goleta Point
- Bluffs adjacent to Goleta Slough
- Ocean bluffs
- Beaches
- Storke Wetlands
- Seasonal and perennial wetlands, including vernal pools
- Riparian areas
- Streams and creeks
- Devereux Slough and its surrounding habitat areas
- Native purple needle grasslands
- Native creeping rye grasslands
- Coastal bluff scrub
- Venturan Coastal Sage
- Foredune and dune habitats
- Western Snowy Plover habitat
- Nesting and foraging habitat for rare raptor species such as the White-tailed Kite
- Monarch butterfly aggregation sites
- Other habitat supporting rare wildlife species and corridors
- Rare plant habitat (such as Santa Barbara Tarplant & Honeysuckle)

These areas include known or currently mapped ESHA on campus lands (Figure F.2*); unmapped or undiscovered areas could, however, meet ESHA definitions in the future. Non-native trees that provide Monarch roosts or contain raptor nests also often qualify as ESHA.

ECOLOGICAL RESTORATION

The University has restored large areas of the campus to more natural conditions, and this ecological restoration would continue over the LRDP's planning horizon. Proposed large-scale restoration projects include a nature park on the South Parcel, approved by the CCC in 2006. Additional restoration efforts would continue, especially in the Coal Oil Point Reserve, the North Campus Open Space and around the Campus Lagoon. The Greenbelt on the West and Storke campuses presents the multi-jurisdictional opportunity to improve its biological quality while increasing the Greenbelt's value as open space and a community educational resource. The gardens, greenhouses, and open spaces east of Los Carneros Road also provide important planting areas and a nursery for restoration activities. The LRDP includes policies that apply to restoration of habitat and open space and all such activities require approval through a Notice of Impending Development.

OPEN SPACE POLICIES

Policy OS-01: The Open Space designated on Figure D.1 shall establish the location and limits of Open Space (OS) areas subject to the OS policies set forth herein. The Open Space protection Policies OS-02 through Policy OS-10 shall apply to all designated open space areas with the exception of the open space areas at: Commencement Commons, UCEN lawn, and Pearl Chase Garden (Figure B.8).

Policy OS-02: The campus lands designated "Open Space" (OS) on the Land Use Map (Figure D.1) shall be set aside and permanently preserved and protected from development and disturbance for the primary purpose of providing spatially and ecologically connected areas and corridors in perpetuity. OS lands shall be managed to enhance, restore, preserve and expand wetlands, grasslands, raptor habitat, rare species habitat, and other significant habitat areas. Where supported by biological evaluation, minor adjustments may be feasible along the periphery of the Open Space-designated lands through a Commission-approved LRDP amendment. The intent of the edge adjustments shall be to refine the boundary of the 2010 LRDP land uses rather than accommodate additional land uses.

Policy OS-03: New development within OS lands shall be limited to the allowed land uses listed in Section D, Land Use for the Open Space land use designation. Consistent with the uses allowed within OS lands, future development within OS-designated lands may specifically include, but not be limited to, the following, subject to other pertinent policies and provisions of the LRDP, and shall require a NOID:

1. Public coastal access parking at Coal Oil Point, North Campus Open Space - Ocean Meadows, and West Campus Mesa, including ADA-compliant links where feasible from the parking area at Coal Oil Point to the section of the California Coastal Trail along West Campus Bluffs.
2. A visitor or interpretive center on the North Campus Open Space – Ocean Meadows site pursuant to Policy LU-19.
3. Road widening or other road improvements, including the required bridging crossing of the wetlands between West Campus Mesa and North Knoll that is necessary to accommodate an alternative vehicular access on West Campus and implement the Slough Road conversion pursuant to Policy TRANS-12.
4. The route from Parking Lot 38 to Los Carneros Road may be retained for bicycle and pedestrian use and necessary emergency vehicle access, provided that the connection through the open space is re-engineered to include a bridge or alternative crossing that retains a natural open connection to provide wetland connectivity consistent with Policy LU-28.

Policy OS-04: The University shall provide for the comprehensive planning, tracking, management, and monitoring of the OS-designated lands in accordance with the following:

1. To offset the increased intensity of development associated with the build-out of the 2010 LRDP, the University shall fully restore the North Campus Open Space – Ocean Meadows site. The University's responsibility to restore the site shall not preclude community involvement or community restoration projects on the site. Such restoration shall include habitat restoration, coastal access parking and trails, and potentially a visitor or interpretive center. The restoration shall be initiated prior to occupancy of the first campus housing project NOID approved subsequent to the 2010 LRDP and shall be fully installed by 2030, and monitored and maintained until successful. The restoration of the Ocean Meadows site shall begin prior to completion of the comprehensive LRDP Open Space Management Plan required in Policy OS-09 if the Plan is not complete prior to the required initiation period (prior to occupancy of the first housing project). In this interim period, the University shall submit individual restoration projects as a Notice of Impending Development.

2. Open Space, other than the North Campus Open Space – Ocean Meadows and areas already subject to restoration, shall remain available for habitat conservation and public access purposes. Restoration of the remaining available open space may be implemented as project-driven mitigation or as voluntary restoration projects as funding becomes available and in accordance with the priorities for restoration projects that are set forth in the OS Plan required pursuant to Policy OS-09. Prior to completion of the LRDP Open Space Management Plan, restoration projects may be implemented pursuant to individually approved NOIDs.
3. The University shall implement, in phases, the improvements identified in the University's portion of the Ellwood-Devereux Open Space regional planning effort consistent with the provisions of the LRDP. The improvements include maintenance of the Coastal and de Anza Trail formalization and development of a public coastal access trail system on North and West Campus consistent with Figure E.3, installation of designated public coastal access resources including parking, three beach access improvements, restrooms at Coal Oil Point, beach access improvement at "Jail House," South Parcel Nature Park Enhancement Area, and West Campus Bluffs Nature Park Enhancement Area.
4. The status of the cumulative restoration of the Open Space shall be tracked and annually reported to the Executive Director consistent with Policy OS-09. The tracking report shall include remaining restoration priorities and unmet funding requirements.
5. The University shall remediate and re-plant with appropriate native species eroded or compacted areas that have resulted from unauthorized trails within Open Space and shall prevent further trespass.

Policy OS-05: Existing underground public service utilities such as water, sewer, electricity or natural gas service lines located within OS-designated lands may be repaired and maintained as needed. Existing overhead utility lines shall be removed or undergrounded at the earliest feasible opportunity utilizing the least environmentally damaging methods.

Policy OS-06: Development undertaken on lands near OS-designated lands shall be sited and designed to minimize disturbance of Open Space including noise and light pollution as perceived by wildlife, to the maximum extent feasible consistent with the provision of public safety.

Policy OS-07: New outdoor lighting within Open Space shall be limited to the minimum necessary to protect public safety where Class I bikeways are developed on the periphery of Open Space. Where existing Class I bicycle paths are currently lit inconsistent with this requirement, such lighting may be maintained. Other new outdoor lighting within Open Space shall be prohibited unless authorized pursuant to an amendment to this LRDP.

Policy OS-08: Except for the purpose of habitat restoration and emergency vehicles responding to an emergency, motorized vehicles shall not be allowed on paths and trails located within OS-designated lands. New pedestrian or bicycle facilities within Open Space shall be located and designed in a manner to minimize potential impacts to environmentally sensitive habitat areas to the maximum extent feasible.

Policy OS-09: Within three years after certification of the 2010 LRDP Update, the University shall prepare and submit an LRDP Open Space Management Plan for certification as an LRDP amendment.

A. The Open Space Management Plan shall, at a minimum, include the following components:

1. The primary purpose of the Plan shall be to achieve the permanent preservation, restoration, enhancement expansion, and ecological connectivity of a mosaic of sensitive coastal habitats, including wetlands, grasslands, and habitat for rare plant and wildlife species within all campus lands designated Open Space. The Plan shall articulate a comprehensive vision for all campus open space and its transition, and connection, to adjacent non-University open space lands. The vision shall be represented by detailed site plans that implement a comprehensive program of habitat restoration and carefully designed and managed public access within Open Space. In addition, the Plan shall include project-level habitat restoration and coastal access plans for the North Campus Open Space-Ocean Meadows site with measurable milestones to implement the full restoration of the site by 2030. In addition to implementing the Open Spaces policies of the LRDP, the Plan shall reflect, and be consistent with, all other relevant policies and provisions of the LRDP.
2. The Plan shall include a Baseline Assessment of the types of habitat, habitat linkages and wildlife corridors within Open Space designated lands. The Plan shall identify and map ESHA on the North Campus Open Space – Ocean Meadows Site. The Plan shall include the evaluation of the existing level of disturbance or degradation of resources and the success of previous or on-going restoration projects within Open Space designated lands. The Plan shall incorporate the plans and provisions of previously approved restoration and public access

projects NOIDs/CDPs within OS-designated lands, including details such as planting palettes and locations, timing, success criteria, etc. The Baseline Assessment shall include a description of any existing vegetation management practices for fire reduction/fuel modification or habitat restoration purposes.

3. The Plan shall identify Restoration Goals and Opportunities for restoration and enhancement of the open space habitats, including but not limited to, the location of habitat types targeted for restoration and the level and types of restoration/enhancement such as eradication of invasive species, planting or re-establishment of native species, sediment removal, and measures to ensure long-term conservation of raptor habitat and to provide for the specific habitat conservation measures necessary to protect sensitive wildlife species such as the white-tailed kite and the western snowy plover. The Plan shall describe the criteria of success for the restoration goals and objectives. The Plan shall prioritize restoration projects and provide an anticipated/target time-line to incrementally implement the habitat restoration. The Restoration Goals and Opportunities shall evaluate the need and effectiveness of existing and proposed vegetation management practices for fire reduction/fuel modification or habitat restoration purposes.
4. The Plan shall require the full restoration of North Campus Open Space – Ocean Meadows pursuant to Policy OS-04 and shall identify other restoration opportunities within the Open Space that may be achieved through future NOIDs. The Plan shall include measurable milestones to implement the North Campus Open Space – Ocean Meadows restoration by 2030. The restoration projects identified for Ocean Meadows lands shall be ranked in accordance with the degree of ecological benefits provided by each project. The restoration identified within the approved Plan for other OS lands shall be similarly ranked. However, the restoration of Ocean Meadows lands shall be required as mitigation for the overall increase in density and intensity approved in the LRDP Update. Other restoration projects on OS lands may be undertaken as other funding sources become available but shall not substitute for the required restoration of Ocean Meadows by the University.
5. The Plan shall ensure that the tree masses serving as raptor habitat and/or monarch butterfly aggregations (e.g., near Storke Wetlands, West Campus, and the Ellwood Marine Terminal site) have a phased restoration that ensures there is no interim loss of available habitat, serving the same habitat function, when the existing tree masses reach senescence or for any reason, including habitat management objectives, must be removed. Tree species adequate to replace the function of the existing trees shall be planted in and around the existing tree masses with the intended purpose of reaching maturity as the older trees are lost. Locally native tree species such as the coastal live oak and sycamore that offer suitable nesting habitat upon maturation shall be preferentially planted in appropriate locations, in an effort to gradually convert the non-native woodlands to native woodlands, using acorns and cuttings collected within twenty miles of UCSB. However, other tree species that are native to other coastal California areas (such as Monterey cypress) may also be planted. Consideration shall also be given to including within the planting palette understory layers of locally native species, such as elderberry and willow and herbaceous species known to support native pollinators and other wildlife. Where existing trees are significantly pruned or removed within Open Space areas of campus, appropriate native tree species and understory plantings shall be immediately planted. Volunteer seedlings of non-native tree species may be removed to support the gradual conversion of existing woodlands to predominantly locally native tree species. Open space foraging areas located adjacent to or near nesting trees are of particular importance for the conservation of white-tailed kites, and shall be considered ESHA, and shall not be converted to other habitat types if the net area of similarly located white-tailed kite foraging habitat would be reduced.
6. The Plan shall include a full-sized map, prepared to scale, of all campus Open Space designated lands titled the Campus Habitat Restoration Map showing all restoration and/or enhancement project locations, including both voluntary and required as mitigation for impacts from approved projects. The map shall also show the location and limits of existing authorized development including transportation features and utilities, in relation to all habitat restoration or enhancement projects, including mitigation measures such as tree plantings previously required by the Commission or other regulatory agency. This map shall be updated after the approval of any NOID affecting OS-designated lands as described below.
7. Where existing habitat management plans or approved mitigation measures or implementation of special conditions imposed by the Commission have required or resulted in particular habitat establishment or conservation measures within OS-designated lands, these shall be reflected in the LRDP Open Space Management Plan and appended to the Plan for reference.
8. The Plan shall include the location and layout of essential bike paths and pedestrian trails.
9. The Plan shall include measures to restore and enhance disturbed areas used for unauthorized trails, roads and paths or other development within OS-designated lands that have not received past approval by the Commission.

10. The Plan shall include monitoring and adaptive management provisions sufficient to ensure that the restoration goals and success criteria are ultimately achieved. Individual restoration projects shall be monitored for a minimum of five consecutive years and until the restoration has been demonstrated to be a success.

11. To the extent feasible within the resources of the University, the development of the Plan shall be advised by university and invited scientists with expertise in the range of habitats and sensitive plant and wildlife species that occur within the campus Open Space lands, and the staff of the UCSB Cheadle Center for Biodiversity & Ecological Restoration (CCBER).

B. Open Space Monitoring, Reports, and Adaptive Management

1. The University shall track the Open Space Plan implementation, and status of each restoration project, to ensure that the restoration goals and success criteria are achieved.

2. The University shall submit an annual Open Space Tracking Report to the Executive Director of the Coastal Commission or its successor agency reporting on the status and success of the cumulative restoration of the Open Space. Where restoration goals are not being met, the University shall suggest additional measures to meet those goals.

3. At a minimum, the Campus Habitat Restoration Map shall be updated subsequent to the approval of a new NOID that includes habitat restoration or other NOID that affects OS-designated lands. The Campus Habitat Restoration Map shall additionally be included as part of the annual Open Space Tracking Report.

4. The panel of expert advisors and CCBER staff will be convened periodically, as funding allows, to review and oversee the restoration and enhancement activities undertaken pursuant to the approved Plan and will report their findings in writing to the Executive Director in alternate years commencing two years after Commission approval of the Plan. The panel will provide recommendations to update the Open Space Plan as necessary to address problems in implementation or otherwise adapt to new knowledge of habitat or open space planning.

Policy OS-10: Habitat of the western snowy plover, including resting, foraging, and nesting habitat, shall be preserved and protected from disturbance. Access to trails near plover habitat may be managed to protect plover populations during nesting season.

LAND RESOURCES POLICIES

General

Policy ESH-01 – Except for public access improvements and habitat restoration, south-facing ocean bluffs on campus lands shall remain in, or be restored to, natural conditions.

Policy ESH-02 – Pedestrians and bicyclists shall be encouraged to remain within designated trails, corridors and bike lanes. Signs shall be located and maintained as necessary to encourage appropriate use of pedestrian and bicycle routes. Barriers shall additionally be installed if necessary to protect sensitive resources from trespass as authorized pursuant to a Notice of Impending Development.

Policy ESH-03 – Trails shall be sited, designed, constructed, signed and maintained in a manner that limits disturbance of ESHA and open space to the maximum extent feasible. Where necessary and no alternative exists, limited use of ESHA buffer areas may be authorized for such trails provided the trail is aligned along the outermost area of the pertinent buffer and the intrusion of the trail route is minimized through design and landscaping features. Lighting shall be subject to Policy OS-07.

Policy ESH-04 – Transportation corridors for bicyclists shall be sited, designed,constructed,signed and maintained in a manner that encourages safe, multi-modal campus transportation and reduces motorized vehicle miles traveled while avoiding disturbance of open-space, ESHA, and ESHA buffers. Where a critical component of a proposed bicycle corridor would unavoidably encroach into an ESHA Buffer or Open Space, the extent of such encroachment shall be minimized to the maximum extent feasible and unavoidable residual impacts shall be fully mitigated.

Policy ESH-05 – Nature trails, intended for the passive enjoyment of the open space/ESHA resource, shall be restricted to pedestrian use and sited to afford the user an experience of the resource, provided that such trails are designed to protect the resource.

Policy ESH-06 – Operational noise levels shall not exceed state standards. The following operational noise sources are not subject to the maximum sound levels:

(a) Noise of safety signals, warning devices and emergency pressure relief valves; and

(b) Noise from moving sources such as tractors, automobiles, trucks, airplanes, etc.

For all special events where the proposed event or activity is expected to generate significant noise in close proximity to sensitive receptor locations, the campus shall impose limitations on the hours of the event or activity.

Policy ESH-07 – Construction noise levels shall not exceed state standards of 65dB(A) at property lines except at Coal Oil Point Reserve where the maximum allowable construction sound levels shall be more restrictive and shall not exceed 60 decibels on the A-weighted scale.

Policy ESH-08 – Orchards, vegetable, and other gardens should be incorporated into housing projects wherever practical, and existing legally-established gardens encouraged to continue. Where orchards and gardening plots are proposed, these features shall be incorporated into the campus housing project landscape plans.

Policy ESH-09 – Fencing and other types of barrier installations on campus shall be wildlife-safe and wildlife-permeable, except where such barriers are necessary to restrict unauthorized human entry, the restricted area has no habitat value, and the placement of the barrier does not have an adverse impact on wildlife. Development in or adjacent to environmentally sensitive habitat areas or open space shall be designed and constructed to ensure the safe movement by wildlife (such as through the clustering structures and the installation of bridged crossings of wetlands to replace culverts, etc.).

Policy ESH-10 – The University shall use mosquito control methods with the least effect upon non-target organisms and shall use environmentally sensitive pesticides (such as VectoBac®). Wetlands shall not be drained for this purpose, nor shall native wetland vegetation be removed, nor shall non-native larval predators be introduced.

Policy ESH-11 – The use of any noxious and/or invasive plant species listed as problematic, a 'noxious weed' and/or invasive by the California Native Plant Society, the California Exotic Pest Plant Council, the State of California or the U.S. Federal Government shall be prohibited in all campus landscaping.

Policy ESH-12 – Vegetation management activities may occur within Open Space and/or ESHA buffer areas, including mowing of native and non-native grasslands, when necessary to eradicate and control the spread of non-native species pursuant to a Commission-approved Habitat Restoration Plan. Surveys shall be conducted to identify ESHA as well as isolated patches of native grassland and any other individual sensitive plant species that may be present in the managed area. The vegetation management program shall ensure that measures are taken to avoid intrusion into ESHA, isolated patches of native grassland, and any other individual sensitive plant species that may be present. Vegetation management activities shall be the least intrusive and minimum necessary for restoration. The management of trees for any purpose, including restoration purposes, shall be subject to Policies ESH-28 and ESH-29 and Appendix 2, Tree Trimming and Removal Program.

Policy ESH-13 – New development shall be sited to ensure that vegetation management (including clearing, landscaping/irrigating, and thinning) associated with fire reduction/fuel modification activities (including mowing of grasslands) required by the Fire Department for long-term fire safety does not intrude within environmentally sensitive habitat areas (ESHA) or wetlands. Fire reduction/ fuel modification activities may occur within ESHA buffer or wetland buffer areas, provided that: (1) the fire reduction/fuel modification activities are the minimum necessary to meet fire department requirements, and (2) the fire reduction/fuel modification activities are implemented pursuant to a Commission-approved fire reduction/fuel modification plan that ensures the long-term protection of habitat values. Where fuel modification intrudes into the ESHA buffer, the impact shall be mitigated pursuant to Policy ESH -23.

Policy ESH-14 – Topsoil that is excavated, stored, or moved as part of an approved development shall be managed to preserve the viability of the mycorrhizae by being stockpiled no higher than 3 feet to protect the viability of the mycorrhizae. To the extent feasible, topsoil should be reused on site or for restoration.

Policy ESH-15 – The University shall replace and/or retrofit all outdoor lighting within ten (10) years following the date of effective certification of the 2010 LRDP to minimize the campus lighting footprint/envelope consistent with the following:

A. The University shall prepare a campus-wide Baseline Outdoor Lighting Assessment that:
- **1.** Provides an inventory, map, and detailed description of existing outdoor lighting;
- **2.** Identifies stand-alone (pole-mounted, bollards, etc.) light fixtures that do not comply with the design and efficiency standards set forth in Subparagraph C below; and
- **3.** Describes the lighting specifications used to measure compliance with the design and efficiency standards set forth in Subparagraph C below.

B. The University shall prepare and submit an Outdoor Lighting Replacement and Retrofit Program as an LRDP Amendment for Commission approval within 18 months after the updated LRDP is certified. The Program shall:
- **1.** Include the Baseline Assessment developed pursuant to Subparagraph A above;
- **2.** Provide a replacement/retrofit map that identifies the location of all non-compliant outdoor lights and describes whether each light shall be replaced or retrofitted;
- **3.** Identify a suite of target technologies and lighting specifications to meet the requirements of Subparagraph C. below.
- **4.** Prioritize the replacement and/or retrofit of the identified lights with the highest priority assigned to the non-compliant outdoor sports and recreation facility lighting and the second highest priority assigned to non-compliant outdoor lights of any kind in closest in proximity to ESHA, wetlands, or open space; when replacement/retrofit is implemented in conjunction with a NOID for a new development, the highest priority may, alternately, be assigned to the nearest non-compliant lighting proximate to the proposed development;
- **5.** Identify a proposed schedule to incrementally implement the replacement/retrofit in the order prioritized as part of each campus construction project to ensure full replacement/retrofit within ten years of the certification of the 2010 LRDP; this shall include measurable goals to be implemented with each NOID; and
- **6.** Be implemented as part of each campus development that includes an outdoor lighting component; additionally, the Program may be implemented through a series of separate projects as necessary to achieve full Program implementation in the given time-frame.

C. All outdoor lighting shall be designed to avoid, or minimize to the maximum extent feasible, all forms of light pollution, including light trespass, glare, and sky glow, and shall at a minimum incorporate the following:
- **1.** Best available visor technology to minimize light spill and direct/focalize lighting downward, toward the targeted area(s) only;
- **2.** The minimum standard (pole) height and height of the light mounting necessary to achieve the identified lighting design objective;
- **3.** The best available technology and a lighting spectrum designed to minimize lighting impacts on sensitive species and habitat; and
- **4.** Measures to minimize light trespass onto ESHA and open space areas.

D. As part of the routine maintenance and replacement of outdoor light fixtures and bulbs, including repair and maintenance of fixtures attached to buildings, the University shall use new materials that meet or exceed the standards set forth in Subparagraph C.

E. New or retrofitted lighting of outdoor sports facilities shall be limited to the Recreation-designated lands at Harder Stadium, the two approved tennis courts on Storke Campus, and within the Main Campus recreational complex as it exists as of the date of certification of the 2010 LRDP within the area delineated on the "Limits of Outdoor Sports Lighting Map" in Appendix 4. New outdoor lighting for sports purposes outside of the limits shown on the "Limits of Outdoor Sports Lighting Map" shall be prohibited. Existing night lighting of sports facilities elsewhere on campus shall be considered a non-conforming use/structure. New or retrofitted sports lighting shall require a Commission-approved Notice of Impending Development, which shall not be processed until the Commission certifies the Outdoor Lighting Replacement and Retrofit Program required pursuant to Subparagraph B above, and shall meet the standards set forth in Subparagraph C above and the following additional requirements:
- **1.** Shall not exceed the minimum level of power and brightness necessary for the proposed level of collegiate or intramural use; and
- **2.** Shall mitigate the impact of new lighting by retrofitting or removing existing sports lighting and other outdoor lighting sources consistent with the identified priorities in Subparagraph B above.

F. Development with an outdoor lighting component shall comply with the standards set forth in Subparagraph C of this policy. In addition, the NOID for each development with an outdoor lighting component shall implement a portion of the Outdoor Lighting Replacement and Retrofit Program consistent with the provisions of Subparagraph B above. Prior to the approval of the Outdoor Lighting Replacement and Retrofit Program, each NOID with an

outdoor lighting component shall include outdoor lighting retrofits/replacements in the nearest feasible location(s) to the proposed development. The NOID shall include a lighting plan and lighting specifications that identify the location of lights, the light fixture type, the light spectrum/bulb, the direction of light, and any special measures or treatments to control light spill for all on-site and off-site replaced/retrofitted outdoor lighting. The replacement schedule/map shall be updated and submitted in support of each NOID to track the progress of the Program implementation.

G. The University shall submit to the Executive Director of the Commission an annual report tracking the incremental progress of the Outdoor Lighting Replacement and Retrofit Program. The report shall indicate the location, type, and specifications for outdoor lighting replacements and retrofits that occurred in the previous year and priority areas for the subsequent year.

Policy ESH-16 – Night lighting shall be prohibited in environmentally sensitive habitat areas (ESHA) buffer and wetland buffer areas, except as required for public safety where an approved Notice of Impending Development specifically authorizes development within buffer areas pursuant to Policy ESH-22. In such cases the lighting shall be the minimum necessary to ensure public safety and shall be designed and implemented consistent with the lighting requirements of Policy ESH-15. Where lighting in a buffer area is proposed pursuant to this policy, the University shall submit a plan to screen nearby sensitive habitat from the effects of light pollution through landscaping with appropriate native plants or other measures.

Wetlands, ESHAs and Trees

Policy ESH-17 – Environmentally sensitive habitat areas (ESHA) on campus shall be protected and, where feasible, enhanced and restored. Only uses dependent on such resources shall be allowed within such areas. Where ESHA has been degraded through habitat fragmentation, colonization by invasive species, or other damage, such areas shall be restored.

Policy ESH-18 – Natural Open Space Areas and Environmentally Sensitive Habitat areas on campus shall be restored with native plant species of local genetic stock, appropriate to habitat type, such as riparian, wetland, and coastal sage scrub plant community.

Policy ESH-19 – Development adjacent to an ESHA shall be sited and designed to minimize impacts to habitat values and sensitive species to the maximum extent feasible. A native vegetation buffer shall be required between the development and the ESHA to serve as transitional habitat and provide distance and physical barriers to human intrusion. The buffer shall be of a sufficient size to ensure the biological integrity and preservation of the ESHA. The minimum buffer (setback) from an Environmentally Sensitive Habitat Area or freshwater wetland shall be 100 feet from the outermost edge of the ESHA or wetland, except as specifically authorized by the Commission in Policy ESH-33 and Policy ESH-31. The minimum buffer from brackish marsh shall be 200 feet from the upland edge of the brackish marsh, except as specifically authorized in Policy ESH-31. The minimum buffer from coastal salt-marsh shall be 300 feet from the upland edge of the salt-marsh, except as specifically authorized in Policy ESH-31 . The minimum buffer from eucalyptus raptor tree ESHA shall be 300 feet from the outer edge of the canopy, except as specifically authorized in Policy ESH-31.

The required buffer areas shall be measured from the following points:

- The upland edge of a wetland.
- The outer edge of the canopy of riparian vegetation, including additional area necessary to protect the root zones of trees.
- The outer edge of the plants that comprise a rare plant community ESHA. For annual species and perennial species that periodically lie dormant, the rare plant community ESHA shall be determined as the maximum convex polygon that connects the known current and historical locations of that species in order to capture the maximum habitat area, including dormant seed banks, bulbs, or rhizomes of rare plant species. The boundaries of rare plant communities shall include historic locations, within the past 20 years, of the subject habitat/species that are pertinent to the habitat under consideration.
- The outer edge of any habitat used by mobile or difficult to survey sensitive species (such as ground nesting habitat or rare insects, seasonal upland refuges of certain amphibians, etc.) within or adjacent to the lands under consideration based on the best available data.

- The top of bank for streams where riparian habitat is not present.
- The outer drip line of trees designated ESHA.

Policy ESH-20 – New development sited adjacent to ESHA buffers shall include provisions for the enhancement of the buffer with appropriate native vegetation pursuant to Policy ESH-32. Except for development that is otherwise consistent with the LRDP and approved pursuant to a NOID, existing development that is located within an ESHA buffer shall be removed and restored to an enhanced natural area at the time of redevelopment. A buffer enhancement plan shall be submitted as part of the NOID that authorizes the adjacent development. Where restoration of a non-ESHA area within a required buffer area is restored pursuant to an approved NOID, additional development setbacks shall not be required from the area of restoration.

Policy ESH-21 – Biological resources surveys shall be performed for all new development that is proposed where there is a potential for sensitive species, ESHA, or wetlands to be present; within or adjacent to ESHA (where the proposed development is within 200 feet of ESHA); within or adjacent (within 200 feet) to wetlands; within or adjacent (within 200 feet) to designated Open Space or other natural open space areas; or within 500 feet of trees suitable for nesting or roosting or significant foraging habitat is present. The results shall be presented in a biological report that shall include an analysis of the potential impacts of the proposed development on any identified habitat or species and recommendations for siting and design of the development to ensure protection of sensitive biological resources and habitat values.

Where established public agency "protocols" exist for the survey of a particular species or habitat, the preparing biologist shall undertake the survey and subsequent analysis in accordance with the requirements of the protocol and shall be trained and credentialed by the pertinent agency to undertake the subject protocol survey when such training and credentialing is available.

Policy ESH-22 – Buffer areas from environmentally sensitive habitat areas (ESHA) and wetlands shall be maintained in a natural condition, except for the following potential uses:

A. Habitat restoration;
B. Bio-swales or other bioengineered water quality features;
C. Discharge of clean water;
D. Erosion control measures (e.g., energy dissipaters before water is dispersed);
E. Public access trails;
F. Repair and maintenance of existing roads, trails, and utilities;
G. Minimal fire hazard reduction necessary to meet the Fire Code Defensible Space requirements for existing development; or
H. Flood control or sediment management activities.

The potential uses listed above shall only be undertaken within buffer areas where the University has demonstrated, as part of the Notice of Impending Development submittal, that:

1. No other less environmentally damaging alternative exists that would avoid the need to undertake the proposed development within a buffer area;
2. The intrusion of the development into the buffer is the minimum necessary; and
3. A qualified biologist has determined that:
- The development will not adversely impact habitat values and that the remaining buffer will be sufficient to protect the adjacent coastal resources; and
- The specific measures to be undertaken by the University to mitigate the impacts of the development are sufficient to enhance the protective features of the remaining buffer area (such as, but not limited to, removal of non-native species, plantings of locally native species, removal or replacement of nearby outdoor lighting contributing to light pollution).

Policy ESH-23 – Where there are unavoidable impacts to ESHA, a restoration plan shall be required to mitigate ESHA at 4:1 ratio (area restored to area impacted) for wetland, riparian, and open water or stream habitats and 3:1 for all other ESHA. Mitigation shall occur on site to the maximum extent feasible. Should restoration of impacted wetlands be feasible on the project site, restoration and enhancement of these habitats in place may be used to account for a

proportional amount of the required habitat mitigation. Where on site mitigation is not feasible, mitigation shall be provided at nearby off-site locations.

Policy ESH-24 – All wetland, riparian, ESHA, and buffer areas shall be maintained by the University through the CCBER or, in the event CCBER no longer is responsible for maintaining the campus areas, a successor entity responsible for such functions.

The University shall maintain records of all biological surveys and studies for use by other biologists and the public. The records shall include survey data to determine potential dormant seed and bulb banks in order to plan for conservation of dormant seed and bulb banks when sites with potential seed/bulb banks are developed.

Policy ESH-25 – The biological productivity and the quality of campus wetlands, including Storke Wetlands and Devereux Slough, shall be maintained and, where feasible, restored.

Policy ESH-26 – Motor vehicles and unleashed dogs shall be prohibited in wetlands. Motor vehicles (except for service and emergency vehicles) and unleashed dogs shall be prohibited on campus beaches. Dogs shall be leashed and kept on designated trails where such trails are routed through open space or environmentally sensitive habitat areas. Swimming shall be prohibited in the Campus Lagoon and Devereux Slough. Signs restricting such access and activities shall be posted.

Policy ESH-27 – Raptor habitat, including nesting trees, roosting trees, perching locations, and foraging habitat, shall be protected and preserved.

Policy ESH-28 –

A. The routine trimming and/or removal of trees on campus necessary to maintain campus landscaping or to address potential public safety concerns shall be exempt from the requirement to obtain a Notice of Impending Development (NOID), unless otherwise required pursuant to subparagraph B, below, and provided that the trimming and/or removal activities are carried out consistent with all provisions and protocols of the certified Campus Tree Trimming and Removal Program in Appendix 2, except that the following shall require a NOID:
   1. Trimming and/or removal of trees located within ESHA or on lands designated Open Space as covered in Policy ESH-29,
   2. The removal of any tree associated with new development, re-development, or renovation shall be evaluated separately through the NOID process as detailed in Subparagraph C, below;
   3. The removal of tree windrows, and
   4. Trimming and/or removal of egret, heron, or cormorant roosting trees proximate to the Lagoon.

B. All tree trimming and tree removal activities, including trimming or removal that is exempt from the requirement to obtain a Notice of Impending Development, shall be prohibited during the breeding and nesting season (February 15 to September 1) unless the University, in consultation with a qualified arborist, determines that:
   1. Immediate tree trimming or tree removal action by the University is required to protect life and property of the University from imminent danger, authorization is required where such activity would occur in ESHA or Open Space through an emergency permit,
   2. Trimming or removal of trees located outside of ESHA or Open Space areas during June 15 to September 1, provided where a qualified biologist has found that there are no active raptor nests or colonial birds roosts within 500 feet of the trees to be trimmed or removed, or
   3. Is part of a development or redevelopment approved pursuant to a Notice of Impending Development.

C. To preserve roosting habitat for bird species and monarch butterflies, tree(s) associated with new development, re-development, or renovation that are either native or have the potential to provide habitat for raptors or other sensitive species shall be preserved and protected to the greatest extent feasible. Where native, or otherwise biologically significant, trees are retained, new development shall be sited a minimum of five feet from the outer edge of that tree's canopy drip-line. The removal of such trees shall be evaluated pursuant to the Notice of Impending Development for the new development. Prior to the removal of any native and/or sensitive tree for development purposes, the University shall conduct biological studies to show whether the tree(s) provide nesting, roosting, or foraging habitat for raptors and sensitive bird species, aggregation or significant foraging sites for monarch butterflies, or habitat for other sensitive biological resources. The Commission may condition

the subject Notice of Impending Development to secure the seasonal timing restrictions and mitigation requirements otherwise set forth in the Campus Tree Trimming and Removal Program in Appendix 2.

Policy ESH-29 – Trees located within ESHA or designated Open Space shall not be trimmed or removed unless determined by a certified arborist to pose a substantial hazard to life or property and authorized pursuant to an emergency permit, or where the proposed removal is part of a Commission-approved habitat restoration plan, and shall require a Commission-approved Notice of Impending Development. All tree trimming and removal activities shall be consistent with the seasonal timing restrictions and mitigation requirements set forth in the Campus Tree Trimming and Removal Program in Appendix 2. The following Open Space areas shall be subject to the requirements for routine campus tree trimming and removal practices and shall not be considered as "Open Space" for the purposes of this policy: Commencement Green, UCEN lawn, and Pearl Chase Garden.

Policy ESH-30 – New development shall avoid all special-status plant species, including Southern tarplant, to the greatest extent feasible. This policy applies to isolated individual plants that do not meet the definition of ESHA. Special-status species that are ESHA shall be afforded full protection under the ESHA provisions of the LRDP. Where the individual(s) do not meet the definition of ESHA and cannot be feasibly avoided, then it may be relocated provided that the impact to individual species shall be fully mitigated.

Policy ESH-31 –

A. In light of the significant benefits of clustering LRDP development in specific locations on Main Campus, Storke Campus, and West Campus; of enhancing and restoring ESHA, ESHA buffers, and compensatory off-site ESHA/Wetland habitat restoration to provide valuable habitat connections in accordance with Policy OS-04; of minimizing vehicle miles traveled by locating housing, services, and campus facilities in areas easily accessible via walking, biking, or bus service; of providing a permanent open space connection from Goleta Slough, Storke Wetlands, and Devereux Slough to ensure long-term protection of habitat values; of restoring the habitats on the approximately 64-acre North Campus Open Space – Ocean Meadows site while providing coastal access pursuant to Policies OS-04 and LU-19; and of providing adequate housing stock to accommodate all future student, faculty, and staff, the University may construct development with an ESHA buffer or Wetland buffer width less than required in Policy ESH-19 consistent with the following:

1. In lieu of the 100-foot buffer from freshwater marsh and oak woodland ESHA, the Facilities Management project (see Policy LU-10) on Main Campus may be constructed with a minimum 50-foot buffer from the adjacent freshwater wetland and ESHA oak woodland habitat, and a 40-foot to 70-foot buffer on a portion of the southern boundary to accommodate an existing road where there is no potential for its relocation, as approximately delineated on Figure F.5.

2. In lieu of the 200-foot buffer from brackish marsh, the Central Stores project (see Policy LU-26) on Storke Campus may be constructed with a minimum 100-foot buffer from the adjacent brackish marsh, as approximately delineated on Figure F.5.

3. In lieu of the 300-foot buffer from eucalyptus raptor tree ESHA, the existing recreation footprint for Harder Stadium, Parking Lot 38 and Storke Field may be maintained on Storke Campus, as approximately delineated on Figure F.5. The minimum 200-foot buffer from Storke Wetlands brackish marsh shall not be reduced in these locations.

4. In lieu of the 300-foot buffer from coastal salt-marsh (Devereux Slough) and the 300 ft. buffer from eucalyptus raptor ESHA, the coastal salt-marsh buffer and raptor ESHA buffer may be integrated to coincide with a 100-foot buffer from the eucalyptus raptor tree ESHA in the location of the Devereux North Knoll project (see Policy LU-31) on West Campus, as approximately delineated on Figure F.5.

5. In lieu of the 300-foot buffer from the Devereux Slough South Finger coastal salt-marsh, the coastal salt-marsh and the 300 ft. buffer from eucalyptus raptor ESHA, the coastal salt-marsh buffer and raptor ESHA buffer may be integrated to coincide with a 100-foot buffer from the eucalyptus raptor tree ESHA in the location of the Devereux South Knoll (see Policy LU-30) on West Campus, as approximately delineated on Figure F-5. The 300-foot buffer from the edge of Devereux Slough, to the west of the South Knoll site, shall not be reduced, as reflected in Figure F.5.

6. In lieu of the 300-foot buffer from eucalyptus raptor tree ESHA, new development on West Campus Mesa may be constructed with a minimum 100-foot buffer from the from eucalyptus raptor tree ESHA, as approximately delineated on LRDP Figure F.5, provided that vehicular use of Slough Road is restricted as required in Policy TRANS-12 and the minimum 300-ft buffer from Devereux Slough is maintained.

7. Where no other feasible siting and design alternatives exist, West Campus roadway improvements and a new road alignment may intrude within ESHA buffers provided that the road is designed to be the minimum necessary to accommodate a two-lane road that meets Fire Department standards.

B. Buffers that are less than the required widths place sensitive resources at risk of significant degradation caused by the adjacent development. The University shall mitigate the adverse impacts of reduced buffers by providing mitigation for all ESHA and wetlands consistent with Policy ESH-22.

Policy ESH-32 – ESHA buffers and wetland buffers shall be planted with locally native species that are appropriate to protect and enhance the adjacent ESHA or wetland.

Policy ESH-33 – Buffers to existing wetland, riparian, and environmentally sensitive habitat areas on the North Parcel, including those identified in the 2006 North Parcel wetland delineation for the North Parcel/Ocean Walk Faculty Housing Development shall be provided in substantial accordance with the site plan for North Parcel/Ocean Walk development as follows: Buildings shall be required to be set as far back from wetland, riparian, and environmentally sensitive habitat areas as far as possible. Buffers from the wetland area located near the southwest corner of the North Parcel/Ocean Walk Site (within and near Devereux Creek), as delineated on the 2006 North Parcel Wetland Delineation, shall be a minimum of 100 feet. Buffers from the riparian area bordering Phelps Creek, as shown in the 2006 North Parcel Wetland Delineation, shall be a minimum of 50 feet from the edge of the riparian canopy. Buffers from all other existing wetlands and riparian areas (edge of canopy) shall be a minimum of 25 feet. Buffers to eucalyptus areas on site that support monarch butterflies shall be a minimum of 25 feet. Buffers to existing native grasslands on site shall be 10 feet, except for the limited amount of removal of grasslands allowed pursuant to this policy. The scattered, small patches of purple needlegrass on the north side of the North Parcel may be removed and reestablished on the South parcel at a mitigation ratio 3:1. No other portions of native grassland on the North Parcel/Ocean Walk shall be removed. The approximately 600 square feet of riparian scrub on the northeast side of the North parcel may be removed and reestablished at alternate locations on the North Parcel/Ocean Walk at a mitigation ratio of 3:1. No other portions of riparian habitat on the North Parcel/Ocean Walk site shall be removed.

Policy ESH-34 – The wetland and riparian areas within the faculty and student housing developments on North and West Campuses shall be interconnected with Natural Open Space Areas to the maximum extent feasible. Grading to connect the wetland areas within or near buffer areas shall be permitted; however, any such grading shall be limited to the dry season and approved by the University through the CCBER or, in the event CCBER no longer is responsible for maintaining campus wetland areas, a successor entity.

Main Campus

Policy ESH-35 – In order to protect the Campus Lagoon and Island, any new development adjacent to the lagoon shall:
(a) Landscape the perimeter of the development predominately with native shrubs and trees;
(b) Orient lighting to minimize light and glare to the Lagoon and tree-covered bluffs as outlined in Policy ESH-15; and
(c) Provide a minimum setback of 150 feet from the ocean bluff top.

Policy ESH-36 – Bicycle access to the Lagoon Island shall be prohibited. Signs prohibiting bicycles and signs directing pedestrian access to designated trails shall be posted pursuant to Policy ESH-02.

Policy ESH-37 – Except for public access improvements along the bluff top and habitat restoration, the Goleta Slough bluffs on campus lands and bluff tops that are designated as ESHA north of Mesa Road shall remain in, or be restored to, natural conditions. Should bluff failure occur adjacent to Mesa Road, the construction of retaining walls or other forms of remediation on the bluff face shall not be allowed. The native and non-native trees along the Goleta Slough Bluffs on campus shall be preserved and protected to the maximum extent feasible to retain habitat value for nesting birds.

Policy ESH-38 – In order to mitigate the loss of grassland habitat and open space associated with the construction of the Multipurpose Activity Center (MAC [Rec Cen Expansion]), 4.68 acres of land on the eastern side of East Storke Wetland north of Harder Stadium (Figure F.2) is permanently dedicated as ESHA. The 4.68 acre ESHA shall be permanently maintained and managed to ensure that it functions continuously as a restored

ESHA. The mitigation site shall preserve the existing mature trees, provide for additional plantings of locally native trees to enhance the long term viability of raptor habitat, and provide for native grassland restoration, wetland protection and restoration and enhancement where feasible.

Mitigation for construction of the MAC shall permanently ensure that dwarf lupine propagules are successfully established and shall be maintained north of the Recreation Center (Figure F.3).

Policy ESH-39 – Landscaping associated with the Multipurpose Activity Center (MAC) shall continue to be limited to locally native plants, with the exception of interior courtyards. The six mature oak trees located south and north of the MAC shall be replaced in kind if the trees die off or are otherwise removed as a result of disease.

Policy ESH-40 – Where landscaping aligns with ESHA buffer, wetland buffer, or Open Space on Main Campus, there shall be a 50-foot native landscaping transition zone. The native landscaping transition zone shall extend from the edge of the buffer / open space toward the developed campus area. The transition area is in addition to the buffer and is not intended to exclude structures or other development. Where previous Notices of Impending Development have required native landscaping, native landscaping shall continue to be required. Campus landscaping shall allow for turf areas to provide passive recreation and outdoor spaces, including but not limited to Commencement Commons, the UCEN lawn, and Pearl Chase Gardens. Campus landscaping shall also allow a diverse assemblage of plant species as part of the outdoor botanical classroom. Where Main Campus adjoins open space or ESHA buffer, trees and other plantings shall be selected to maximize benefits to wildlife species.

Storke Campus

Policy ESH-41 – Landscaping on Storke and West Campuses shall consist primarily of drought resistant plant species. In addition, where landscaping aligns with ESHA buffer, wetland buffer, or Open Space on Storke and West Campuses, there shall be a 50-foot native landscaping transition zone. The native landscaping transition zone shall extend from the edge of the buffer / open space toward the developed campus area. The transition area is in addition to the buffer and is not intended to exclude structures or other development. All new or replacement landscaping located in the 50 foot native landscaping transition zone planted around the approved development shall be limited to native plants. Where landscaping adjoins open space or ESHA buffer, trees and other plantings shall be selected to maximize benefits to wildlife species.

Policy ESH-42 – The University shall encourage and work with the Goleta West Sanitary District or other appropriate agencies to relocate the sewer line out of the Storke Wetland and restore the disturbed areas.

MARINE RESOURCES POLICIES

General

Policy MAR-01 - The University shall coordinate with and encourage action by the County of Santa Barbara, City of Santa Barbara, City of Goleta, and the Regional Water Quality Control Board to see that adjacent land uses are developed and operated in a manner that will sustain the biological productivity of campus marine resources.

Policy MAR-02 - The University shall work with the City of Santa Barbara and other interested parties to evaluate the benefits and feasibility of reestablishing tidal influx from Goleta Slough into the Storke Wetlands through the City of Santa Barbara's tidal gates. Where feasible and beneficial, restore the tidal connection.

Policy MAR-03 – Lagoon Berm Road may be maintained in the approved road prism consistent with typical repair and maintenance practices such as replenshing the fill and recompacting the fill slopes. Lagoon Berm Road shall not utilize rock revetments or seawalls to maintain the road prism. The road may be removed to adapt to rising sea level. Placement of sandbags or other temporary stability measures shall require a NOID or Emergency Permit.

Policy MAR-04 - Channelizations or other substantial alterations of streams shall be prohibited except for:
A. Necessary water supply projects where no feasible alternative exists;
B. Flood protection for existing development where there is no other feasible alternative; or
C. The improvement of fish and wildlife habitat.

Any channelization or stream alteration permitted for one of these three purposes shall minimize impacts to coastal resources, including the depletion of groundwater, and shall include maximum feasible mitigation measures to mitigate unavoidable impacts. Bioengineering alternatives shall be preferred for flood protection over "hard" solutions such as concrete or riprap channels.

WATER QUALITY (EROSION AND SEDIMENTATION) POLICIES

Policy WQ-01 - New development shall be sited, designed, and managed to prevent adverse impacts from stormwater or dry weather runoff to coastal waters and environmentally sensitive habitat areas. Sources of inflow to coastal wetlands shall be maintained so that the quality, volume and duration of flows do not diminish wetland hydrology.

Policy WQ-02 –
Proposed campus development shall be sited, designed, constructed, operated and managed in accordance with the water quality protection requirements set forth in this LRDP, including Appendix 3 , Water Quality Protection, which is hereby incorporated in full, by reference as part of this policy. Appendix 3 requires new development, which entails construction or other activities or land uses that have the potential to release pollutants into coastal waters, to submit a water quality protection plan (see Appendix 3 for Construction Pollution Prevention Plan, Post Develoment Runoff Plan, Water Quality and Hydrology Plan, as applicable) with the NOID. Appendix 3 provides implementation-level requirements to develop each type of water quality protection plan that may be necessary depending on the size and nature of the proposed development. Unless the Executive Director determines that future proposed changes to the contents of Appendix 3 are de minimis, such changes shall require an LRDP amendment. All revisions of Appendix 3 shall be timely published, including the date of the specific revision.

Development shall be sited and designed consistent with the following runoff control priorities, and implemented through the water quality protection plans in compliance with Appendix 3 (Water Quality Protection Program):

1. First, where drainage from campus lands may directly or indirectly flow into coastal waters, the first priority for the plans and designs of proposed campus development shall be the prevention of an increase in post-construction stormwater runoff volume or velocity compared with existing site conditions.
2. Second, where despite the inclusion of all feasible measures to achieve the first priority an increase in site runoff cannot be fully avoided, the project plans and designs shall include all feasible additional drainage management measures necessary to slow, capture, treat, infiltrate, and detain stormwater runoff on site to the maximum extent feasible, and in the manner that best protects coastal resources, including wetlands, environmentally sensitive habitat areas, and coastal waters.
3. Third, where despite the inclusion of all feasible measures to avoid offsite discharge of stormwater and dry weather runoff, the interconnected nature of existing and future campus development locations or site-specific physical conditions (such as the presence of relatively impervious clay soils) limit the effectiveness of on-site retention options, the University may allow runoff to be discharged, including as necessary piping of runoff under roadways or sidewalks, to a permitted offsite drainage management facility where the runoff is treated to remove pollutants and is retained and/or discharged in a non-erosive manner.

C. To maximize the protection of water quality, the University shall prioritize the use of earthen-based, bioengineered runoff treatment facilities such as bioswales or vegetated filter strips. Bioengineered runoff treatment facilities may incorporate energy dissipaters, sand filters, retention basins and engineered soils and substrates if warranted by site conditions. Drainage features may include vegetation as an intentional component of the design (such as swales planted with grass species) or in some cases a non-vegetated structure may support volunteer vegetation. In either case, regular management of the vegetation associated with the subject drainage feature, and/or of the feature itself (such as sediment removal), is necessary (1) to ensure the optimal performance of the structure, and (2) to limit the establishment or overgrowth of vegetation. Therefore, the University shall submit a detailed monitoring and low impact, non-chemical maintenance plan (relying on mowing, hand weeding, or confined short-term grazing) designed to prevent the overgrowth of vegetation in drainage management structures, and for periodic maintenance activities in addition to vegetation management, such as sediment removal and disposal. This maintenance plan shall include a schedule for proposed maintenance and a monitoring program to ensure that the required maintenance achieves the prescribed standard of vegetation control.

D. Where the University demonstrates that a permitted drainage facility that was created from dry land has been diligently managed and monitored in accordance with the requirements of the pertinent permit, the facility will not

be considered a "wetland" for the purpose of interpreting the LRDP when future maintenance, modification, or removal of the structure is proposed. As such, the Commission will not require compensatory mitigation for acreage affected by the proposed activity. However, measures will be required to limit or avoid impacts to coastal resources when such activities are proposed (such as setbacks from nearby habitat, seasonal restrictions on timing of work, relocation of sensitive species, etc.).

E. Site plans and designs for new development shall include source control measures which can be structural features or operational actions, to control pollutant sources, minimize runoff, and keep pollutants segregated from stormwater. Site plans and designs for new development shall concurrently emphasize runoff management, integrating existing site characteristics that affect runoff (such as topography, drainage, vegetation, soil conditions, and infiltration properties) with strategies that minimize post-project runoff, control pollutant sources, and where necessary remove pollutants. Site plans and designs shall be in compliance with the water quality protection plans required in Appendix 3, Water Quality Protection Program. The plans and designs for all drainage facilities proposed by the University on lands that may directly or indirectly drain to coastal waters shall be designed by a California-licensed professional in consultation with a qualified biologist, and shall include detailed information that supports the finding that the proposed development is sited, designed, constructed, operated, and maintained in the manner most protective of coastal resources including wetlands, environmentally sensitive habitat, and coastal waters. Sufficient evidence to demonstrate compliance of the proposed project with the requirements of Policy WQ-02 shall be submitted in support of the Notice of Impending Development and the NOID may be conditioned by the Commission to ensure that these requirements are met.

Policy WQ-03 - Stormwater and dry weather runoff management shall be addressed early in site design planning and alternatives analyses, taking into account existing site characteristics that affect runoff, (such as topography, drainage, vegetation, soil conditions, natural hydrologic features, and infiltration conditions) in designing strategies that minimize post-development changes in the runoff flow regime, control pollutant sources, and, where necessary, remove pollutants. The University shall, within a reasonable amount of time, develop a comprehensive surface water quality monitoring program for all discharges from campus. Properties and/or discharges with the highest levels of water pollution will be evaluated and water quality problems addressed, beginning with discharges deemed unhealthful or unsafe for human contact.

Policy WQ-04 - Campus site development is to be accomplished, whenever feasible, in a manner that will maximize percolation and infiltration of precipitation into the ground. The University shall site, design, construct and manage development to maintain or enhance where appropriate, on-site infiltration. Where inadequate infiltration would increase site runoff, development shall be scaled to ensure that on-site detention capacity (such as storage ponds or vaults) is increased sufficiently to avoid increased offsite discharge volume or velocity to the maximum extent feasible. Increased surface runoff shall not be conveyed over bluffs, including through sheet flow, open channels, or outfalls.

Policy WQ-05 - The University shall site, design, construct and manage development to preserve or enhance vegetation that provides water quality benefits such as transpiration, vegetative interception, pollutant uptake, shading of waterways, and erosion control. Native vegetation shall be prioritized for use in water-quality treatment facilities such as bioswales and vegetated filter strips. Removal of existing vegetation on campus shall be minimized and limited to a pre-approved area required for construction operations. The construction area shall be fenced to define project boundaries. When vegetation must be removed, the method shall be one that will minimize the erosive effects from the removal. Temporary mulching or other suitable interim stabilization measures shall be used to protect exposed areas during construction or other land disturbance activities.

Policy WQ-06 - The University shall design, construct and manage campus development to minimize the introduction of pollutants, including trash and sediment, into coastal waters. Pollutants shall not be allowed to enter coastal waters through drainage systems. Low Impact Development (LID) strategies shall be used to emphasize an integrated system of decentralized, small-scale control measures that minimize alteration of the site's natural hydrologic conditions through infiltration, evapotranspiration, filtration, detention, and retention of runoff close to its source. Traps and filters for roadway contaminants shall be provided as part of all drainage structures.

Policy WQ-07 -New development shall be designed to minimize the extent of new impervious surface area, especially directly-connected impervious surfaces, and where feasible to increase the area of pervious surfaces, to reduce runoff.

Policy WQ-08 - If implementing site design, source control, and LID strategies are not sufficient to minimize:

A. Pollutants in runoff from development and in turn protect coastal waters, use treatment control BMPs sized for the appropriate design storm to remove pollutants; and
B. Adverse post-development changes in runoff volume, flow rate, timing, and duration, use runoff controls sized for the appropriate design storm, to protect coastal waters, habitat, and property.

Policy WQ-09 - Minimize water quality impacts from construction by implementing best management practices, in compliance with Appendix 3, Water Quality Protection Program, including:
A. Construction shall be planned and managed to minimize impacts by such measures as limiting the project footprint, phasing grading activities to avoid rainy-season soil disturbance, implementing soil stabilization and pollution prevention measures, and preventing soil compaction unless required for structural support;
B. Whenever practical, land on the North and West Campus where there is a risk of erosion that may affect ESHAs, plan the project in increments of workable size which can be completed during a single construction season;
C. Erosion and sediment control measures are to be coordinated with the sequence of grading. Sediment basins, sediment traps, or similar sediment control measures shall be installed before extensive clearing and grading operations begin for campus development; and
D. Fill areas shall have suitable protection against erosion and shall not encroach on Devereux Slough, Storke Campus Wetlands, Campus Lagoon or any other natural watercourses or constructed channels on campus.

Policy WQ-10 - Grading operations that have the potential to deliver sediment to wetlands, environmentally sensitive habitat areas, or coastal waters shall be scheduled during the dry months of the year (May through October). The construction timeline may be extended into the rainy season for a specific, limited length of time, based on an inspection of the site, and a determination that conditions at the project site are suitable for. Continuation of work may be allowed if appropriate erosion and sedimentation control measures are in place and will be maintained during the activity. If grading occurs during the rainy season (November through April), sediment traps, barriers, covers or other methods shall be used to reduce erosion and sedimentation in compliance with Appendix 3, Water Quality Protection Program.

Policy WQ-11 - Excavated materials shall not be deposited or stored where the material can be washed away by storm water runoff. Topsoil removed from the surface in preparation for grading and construction is to be stored on or near the site, where the stockpile area(s) will not impact natural vegetation, and protected from erosion while grading operations are underway, provided that the topsoil is also managed consistent with Policy ESH-14. Appropriate measures shall be taken to protect the preserved topsoil from erosion and runoff through such measures as tarping, jute netting, silt fencing, and sandbagging soil. After completion of such grading, topsoil is to be restored to exposed cut and fill embankments of building pads so as to provide a suitable base for seeding and planting. These requirements shall be incorporated into applicable water quality protection plans (Construction Pollution Prevention Plan, Post-Development Runoff Plan, and/or Water Quality and Hydrology Plan as applicable) for processing during the NOID process as described in Appendix 3, Water Quality Protection Program.

Policy WQ-12 - Drainage facilities, BMPs, or other water quality design features required for new development shall be inspected, maintained, operated and managed in a manner that ensures that the intended water quality protection performance requirements are met for the life of the development. This shall be reflected in the applicable water quality protection plan in compliance with Appendix 3, Water Quality Protection Program.

Policy WQ-13 - Stormwater outfalls shall be sited, designed and managed to minimize the adverse impacts of discharging concentrated flows of stormwater or dry weather runoff into coastal waters, intertidal areas, beaches, bluffs, or stream banks.

Policy WQ-14 - Runoff from parking areas and from Mesa Road on the Main Campus shall be directed to drainage structures such as traps, filters and earth drainage swales with high pollutant-uptake native vegetation. The drainage structures shall be designed to reduce the introduction of roadway and parking lot contaminants into ESHAs and wetlands.

Policy WQ-15 - At Coal Oil Point, if percolation is determined through tests to be inadequate to prevent bluff top erosion, alternative methods to direct stormwater to eliminate the erosion hazard, shall be evaluated based on the water quality protection priorities outlined in the LRDP policies and Appendix 3, Water Quality Protection Program. The revisions to drainage shall require a Commission-approved water quality protection plan.

Policy WQ-16 - Siltation of the Campus Lagoon shall be minimized. Chemical wastes, sewage effluent or wastewaters shall be prohibited from entering the Lagoon. The quality of water entering the Lagoon shall be monitored and measures taken to remediate the source(s) contributing to the water quality threshold that was exceeded.

Policy WQ-17 - All sewage from campus development shall be disposed of in sanitary sewer lines or approved septic tank system subject to design and performance requirements of the Regional Water Quality Control Board.

FILL POLICIES

Policy FIL-1 - The diking, filling, or dredging of open coastal waters, wetlands, or estuaries may be allowed only where there is no feasible less environmentally damaging alternative and limited to only the following types of development: incidental public services; mineral extraction except in ESHA; restoration purposes; nature study, aquaculture, and similar resource dependent activities. Impacts associated with such development shall be fully mitigated.

Policy FIL-2 – Where restoration of Devereux Slough includes dredging, then sediment removal and spoils disposal activities shall be planned and carried out to avoid significant disruption to marine and wildlife habitats and water circulation.

Policy FIL-3 – If no other alternative exists, fill may be used to address potential 100-year flooding impacts consistent with federal law, with the exception of areas that are within or adjacent to tidally influenced areas and/or potentially subject to inundation due to sea level rise unless approved through an LRDP Amendment that allows this measure as adaptation strategy based on the Comprehensive Sea Level Rise Hazards Assessment in Policy SH-01.

CLIMATE CHANGE AND SHORELINE PROTECTION POLICIES

Policy SH-01 - Within five years of certification of the 2010 LRDP, the University shall prepare a Comprehensive Sea Level Rise Hazards Assessment for submittal to the Coastal Commission as an Amendment to the LRDP that addresses the anticipated impacts of sea level rise on the campus along the Goleta Slough and Pacific Ocean shoreline. The Plan shall be available prior to submitting a NOID for development or redevelopment that is located along the north boundary of the Storke Campus or at the Facilites Managment site. The Plan shall:

A. Identify the most vulnerable areas, structures, facilities, and resources; specifically areas with priority uses such as beaches, public access and recreation resources, ESHA and wetlands, wetland restoration areas, open space areas where future wetland or habitat migration would be possible, and existing and planned sites for critical infrastructure.

B. Include a detailed sea level rise vulnerability and risk assessment, either as an independent effort, or in conjunction with other assessments, such as the Goleta Slough multi-jurisdictional planning effort, that includes a specific analysis of the vulnerable areas and coastal resources in subsection “a” above. The vulnerability and risk assessment shall use best available science and multiple scenarios including best available scientific projections of expected sea level rise, such as by the Ocean Protection Council [e.g. 2013 OPC Guidance on Sea Level Rise], National Research Council, Intergovernmental Panel on Climate Change, and the West Coast Governors Alliance.

C. Based on the vulnerability analysis, identify campus areas that are potentially subject to the effects of sea level rise for the purpose of determining whether a detailed site-specific coastal hazards analysis will be required consistent with Policy SH-02 and Policy SH-04.

D. Recommend adaptation management strategies that would minimize risks to coastal resources and development due to hazards associated with sea level rise. Adaptation management strategies may include:

- Relocating existing development to safer locations
- Siting new development to avoid areas vulnerable to flooding, inundation, and erosion;
- Modifying land use designations and individual campus uses, and developing siting and design standards for new development, to avoid and minimize risks;
- Establishing conservation areas to allow wetland and habitat migration;
- Creating an adaptive public access plan that maximizes access to and along the shore as the effects of sea level rise are realized.

E. Analyze sea-level rise impacts at both the site-specific and regional scales. The Plan must evaluate how sea-level rise impacts from the littoral cell or watershed (such as expected changes in sediment supply, increases or reductions in stream flows, post-fire sediment pulses, etc.) could affect the campus. Additionally, the Plan must evaluate how options to adapt to sea-level rise could result in cumulative impacts to other areas in the littoral cell or watershed, and should recommend actions to minimize any impacts.

F. The Assessment shall identify the recommendations that will require processing through an LRDP Amendment to be effectuated.

Policy SH-02 - New development shall be sited to avoid potential flooding, inundation, and erosion hazards created or exacerbated by long-range SLR. New development that is potentially subject to the effects of sea level rise shall require a current (prepared within the past 2 years) coastal hazards assessment as described in Policy SH-04. Based on the coastal hazards assessment, new development and redevelopment shall be sited to avoid any hazards anticipated during the life of the structure and to avoid the need for bluff retaining or shoreline protection devices. Hazard avoidance efforts shall not result in impacts to coastal resources or encroachment into coastal habitats and shall not undermine broader ecosystem sustainability; for example, siting and design of new development must not only avoid sea-level rise hazards, but also ensure that the development does not have unintended adverse consequences that impact sensitive habitats or species in the area. The assessment must also consider the potential need for larger setbacks near ESHA and natural open spaces to allow for habitat sustainability and migration.

Policy SH-03 - After completing the Comprehensive Sea Level Rise Hazards Assessment required pursuant to Policy SH-01, the University shall continue to research and respond to the impacts of sea level rise on the campus along the Goleta Slough and Pacific Ocean shoreline. On-going efforts to respond to SLR-related hazards may include:

A. Continue to gather information on the effects of sea level rise on the shoreline, particularly the most vulnerable areas identified in the Comprehensive Sea Level Rise Hazards Analysis. Participate, as possible, in regional assessments of sea level rise vulnerability, risk and adaption planning efforts to ensure compatible treatment for sea level rise across jurisdictional boundaries;

B. Updating the Best Available Science, consistent with regional policy efforts, as new, peer-reviewed studies on sea level rise become available and as agencies such as the OPC or the CCC issue updates to their guidance reports; and

C. Amending the LRDP to add policies and provisions that address the impacts of sea level rise based on information gathered over time. Modifications to address SLR may include: relocating proposed development envelopes, changes to land use designations, relocating utilities, updates to the public access plan to ensure long-term protection of the function and connectivity of existing public access and recreation resources.

Policy SH-04 - A site-specific coastal hazards study shall be prepared by technical experts (e.g., geologic, geo-technical, hydrologic, and engineering professionals, as appropriate) in combination with planning professionals to address the potential hazards from erosion, flooding, wave attack, scour and other conditions created or exacerbated by SLR. The study shall use the best available science and consider multiple SLR scenarios including best available scientific projections of SLR such as by the Ocean Protection Council, National Research Council, Intergovernmental Panel on Climate Change, and the West Coast Governors Alliance. All input parameters for hazard analysis shall be clearly described in the analysis and, if judgment was used to choose between a range of values, the basis for the selection should be provided. The study shall identify the anticipated economic life of the structure(s), assess the ease of removal or adaptation, and recommend applicable adaptation management strategies, including siting and design measures, that eliminate or reduce hazards and that are consistent with all policies and provisions of the certified LRDP.

Policy SH-05 - The University will coordinate vulnerability assessments and adaptation planning with other regional jurisdictions that face common threats from sea-level rise, including the Goleta Slough management planning efforts, and will participate in regional studies of sea level rise vulnerability and adaptation, and in shoreline monitoring to identify sea level rise concerns.

Policy SH-06 - Shoreline structures, including revetments, seawalls, cliff retaining walls, or other such construction that alters natural shoreline processes shall be prohibited except where there is no less environmentally-damaging alternative for the protection of existing development or to serve coastal-dependent uses, or to protect public beaches in danger from erosion. Any such structures shall be sited to avoid sensitive resources and designed to minimize, to the maximum extent feasible, the alteration of natural land forms, and eliminate or mitigate adverse impacts on public

access and on local shoreline sand supply. Visual impacts shall be minimized through siting the structures as far inland as possible, using a narrow profile or small footprint structure if possible, inclusion of living shoreline or bioengineering techniques, and the use of appropriate colors and materials. Structures shall be removed at such time as the structure is no longer needed for its permitted purpose.

Policy SH-07 - No new permanent above-ground development shall be permitted on the dry sandy beach except for temporary recreational structures such as volleyball poles and nets.

Appendix D: CLIMATE CHANGE PROJECTIONS

1. General Climate Trends

Climate change is likely to result in increases in temperature with associated changes in precipitation, more extreme storm events, including rainfall intensity and droughts, as well as increases in sea level and other consequences. Southern California is projected to have:

- Warmer winters, earlier warming in the spring, and increased summer temperatures.
- Some evidence for a slightly drier future climate relative to today.

Table 1 summarizes likely trends in temperature, precipitation, runoff, and fire risk as projected by downscaled Global Climate Models for the Goleta Slough area. The two emissions scenarios presented (A2 and B1) were developed for the IPCC Special Report on Emissions Scenarios (Nakicenovic et al 2000) and represent different plausible global trajectories as follows:

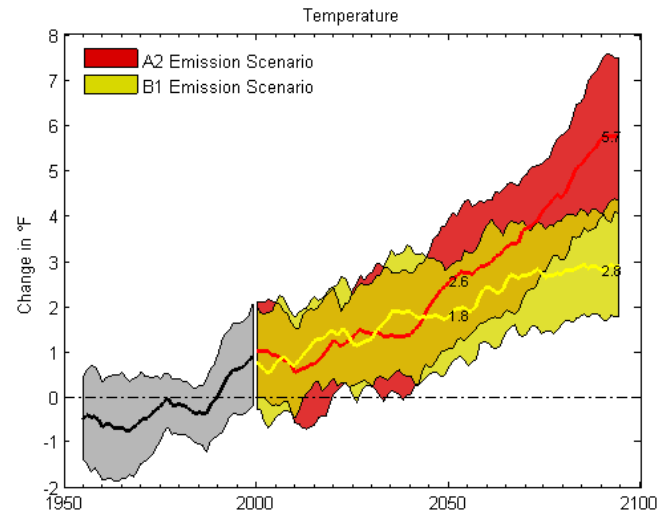
> HIGH EMISSIONS (Scenario A2). Medium-high emissions resulting from continuous population growth coupled with internationally uneven economic and technological growth. Under this scenario, emissions increase through the 21st century and by 2100 atmospheric carbon dioxide (CO2) levels are approximately three-times greater than pre-industrial levels.
>
> LOW EMISSIONS (Scenario B1). Lower emissions than A2 as a consequence of population peaking mid-century and declining thereafter, with improving economic conditions and technological advancements leading to more efficient utilization of resources. Under this scenario, emissions peak mid-century and then decline, leading to a net atmospheric CO2 concentration approximately double that of pre-industrial levels.

Temperatures are expected to rise for both scenarios, with a wide range of variability. The increase in temperature is projected to be fairly similar (+1.8 to 2.6°F) for both scenarios up to 2050, at which point the scenarios diverge, but both continue to increase. Precipitation is expected to increase until 2030 and then decrease, on average, but the change is relatively small and will likely be masked by the high variability of California rain events that already exists. Run-off, which is a derivative of precipitation, is projected to be highly variable, with an overall slight decrease. Fire risk is expected to decrease slightly over the next 100 years. Of the climate projections described in Table 1, temperature is the one best predicted by GCMs. The others are derivatives of temperature (or each other), which is partly why the uncertainty in precipitation and runoff is so great.

Table 1: Climate Change Projections for Goleta Slough

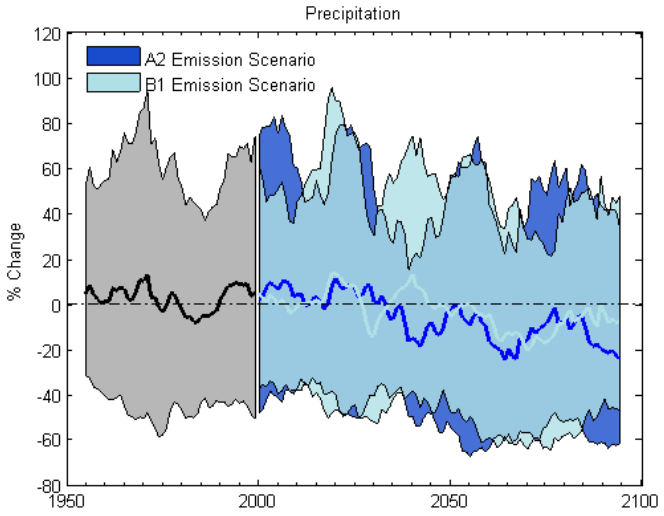
Temperature: Average temperature changes relative to the historic average from 1970-99. The heavy lines show average temperature change; the envelopes show the maximum and minimum projected change.

	2050	2100
B1	+1.8°F	+2.8°F
A2	+2.6°F	+5.7°F



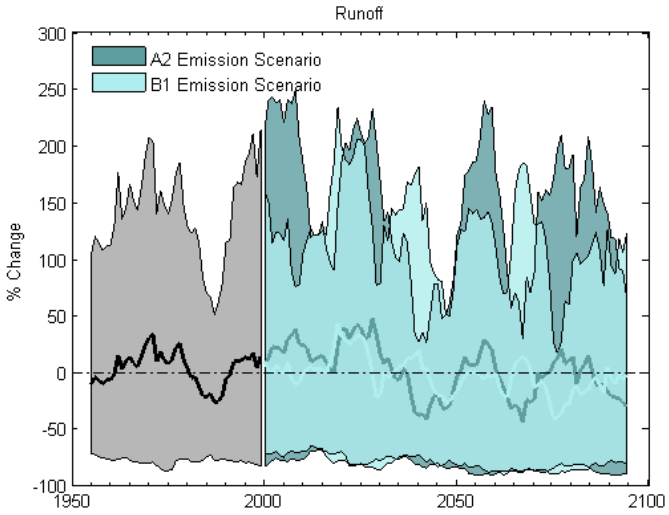
Precipitation: Average % change in precipitation relative to the historic average from 1970-99. The heavy lines show average precipitation changes the envelopes show the maximum and minimum projected change.

	2050	2100
B1	-5.2%	-7.4%
A2	-1.6%	-24.4%



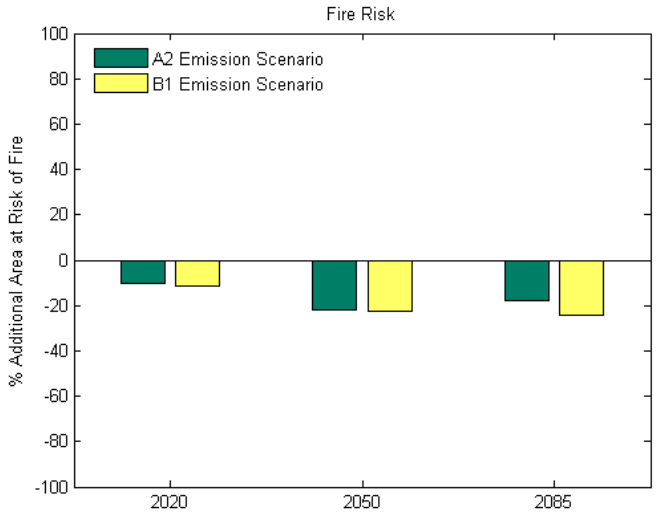
Runoff: Average % change in runoff relative to the historic average from 1970-99. The heavy lines show average precipitation changes the envelopes show the maximum and minimum projected change.

	2050	2100
B1	-16.1%	-1.8%
A2	-2.8%	-31.0%



Fire Risk: % change expected burned area, for 30 year averages ending in 2020, 2050, and 2085 compared to 2000.

	2020	2050	2100
B1	-12%	-23%	-24%
A2	-10.5 %	-22%	-18%



All data for the plots shown above was processed using downscaled climate data downloaded through the Cal-Adapt web portal[1] on 10/18/2012. The climate grids were downscaled using the bias-correction spatial-disaggregation (BCSD) methodology—a two-step approach of (1) calibrating (bias-correcting) the historic model data to observed meteorological data, and (2) increasing the resolution of the climate grids (in this case from 1-degree to 1/8-degree or ~12km by 12km resolution) using local topographic gradients.

For a given emissions scenario, the range in results for the temperature, precipitation and runoff plots represent the range in General Circulation Models (GCMs). The lines shown for these plots represent a 10-year moving average for the downscaled data from four GCMs[2] that were available through Cal-Adapt. More information on this data is presented in Cayan *et al* 2009.

The fire risk plot represents an average of three GCMs[3] for three 30-year average time windows for A2 and B1 emissions. Additional detail on the fire risk data is provided in Westerling *et al* 2008.

2. Historic Trends in Sea Level

The Local rates of sea level rise are a result of two components – a global rate of sea level rise and a local component controlled by local or regional processes, such as tectonics, subsidence and changes to local wind fields. The combination of these two components leads to a rate of relative sea level rise which includes changes in the both the sea and land elevations. If sea level rises and the shoreline rises or subsides, the relative rise in sea level could be lesser or greater than the global sea level rise. Vertical land movement can occur due to tectonics (earthquakes, regional subsidence or uplift), sediment compaction, isostatic readjustment and groundwater depletion (USACE, 2011). As rates of global sea level continue to increase with climate change, at some point, the rate of vertical land movement will become less significant in determining the impact of sea level rise.

[1] www.cal-adapt.org
[2] NCAR CCSM3, NCAR PCM1, CNRM CM3, GFDL CM2.1
[3] Same GCMs with the exception of NCAR CCSM3

The Santa Barbara tide gage has a 30-year long period of record and a mean historic local sea level rise trend of 4.9 inches with a 95% confidence interval of ± 7.2 inches per century (Table 2, NOAA 2009). This large uncertainty in the historic record can be attributed to the discontinuous gage record resulting from several harbor construction projects. The most recent sea level rise report by the NRC estimates local mean sea level trends for a number of stations along the west coast. Santa Monica was the station nearest to Santa Barbara and is estimated to have a local historic mean sea level trend of 5.6 inches per century (Table 2**Error! Reference source not found.**, NRC 2012).

ESA PWA evaluated several studies and observations of vertical land motion more specific to the Goleta Slough area (Table 2). The values from these studies and observations were inconsistent in direction, and ranged from 5.9 inches/century of subsidence (NRC, 2012) to 8 inches/century of uplift (Gill, 2011). The NRC, 2012 estimate assumes a subsidence of 5.9 inches/century for all of California south of Cape Mendocino due to deep tectonic movements. This is a rough estimate that doesn't take into account localized variations in vertical land motion due to shallow subsidence and local tectonic movement. No studies of localized subsidence in the Goleta Slough vicinity were readily available.

Table 2: Historic Local Sea Level Trends and Vertical Land Movement

Source	Location	Period of Record	Mean Sea Level Trend (Local) inches/century	Est. Vertical Land Movement inches/century
IPCC, 2007	Global	1961 - 2003	7.1	N/A
NOAA, 2009	Santa Barbara	1973 - 2006	4.9 ± 7.2	8.0 ± 2.5*
NOAA, 2009	Rincon Island	1962 - 1990	13.1 ± 6.5	
NRC, 2012 Table	Santa Monica	1933 - 2008	5.6	
NRC, 2012 Table	Los Angeles			- 5.9 ± 5.1
Kirby and Burbank, 2003 Figure 1	Santa Ynez Mtns near Goleta Slough			~ 7.9

Positive values indicate uplift. The NRC values from each table are reported for the regions nearest to Goleta Slough.
* Gill, 2011, derived from Santa Barbara tide gage data.

3. Future Projections and Guidance on Sea Level Rise

3.1. Background and Previous Studies

In March 2011, the OPC published a resolution recommending that state agencies incorporate the risks posed by sea level rise into project and program plans (OPC, 2011). The resolution was targeted towards state agencies and non-state entities implementing projects or programs funded by the state or on state property (OPC, 2011). The OPC (2011) provides the following guidance on which SLR projections to use:

- Assess vulnerabilities over a range of SLR projections, including analysis of the highest SLR values presented in the state guidance document;
- Avoid making decisions based on SLR projections that would result in high risk; and
- Coordinate and use the same SLR projections when working on the same project or program.

Table 3: OPC 2011 Global Sea Level Rise Projections Relative to Year 2000

Year		Average of Models	Range of Models
2030		7 in (18 cm)	5 – 8 in (13 to 21 cm)
2050		14 in (36 cm)	10 – 17 in (26 to 43 cm)
2100	Low	40 in (101 cm)	31 – 50 in (78 to 128 cm)
	Medium	47 in (121 cm)	37 – 60 in (95 to 152 cm)
	High	55 in (140 cm)	43 – 69 in (110 to 176 cm)

The State of California provided interim guidance via the OPC on SLR projections (see Table 3 and OPC 2011) and requested that the National Research Council (NRC) establish a committee to assess sea-level rise to inform the state efforts. The states of Washington and Oregon, the U.S. Army Corps of Engineers, the National Oceanic and Atmospheric Administration, and the U.S. Geological Survey subsequently joined California in sponsoring the NRC study to evaluate sea-level rise in the global oceans and along the coasts of California, Oregon, and Washington for 2030, 2050, and 2100 (NRC, 2012).

The National Research Council recently released their study results (NRC 2012). Figure 1 shows a comparison between the range in NRC global and regional sea level rise estimates. NRC's projected values for CA are somewhat lower than the Vermeer and Rahmstorf (2009) projections, which were used in developing the OPC 2011 interim guidance. For Los Angeles (the regional estimate nearest to Goleta), NRC 2012 predicts a regional sea level rise (which includes an allowance for vertical land motion) of 5 to 24 inches by 2050 and 17.4 to 65.5 inches by 2100 (Table 4)

Table 4: NRC 2012 Relative Regional Sea Level Rise Projections Relative to Year 2000

Year	Projection (A1B scenario)	Range (B1 and A1F1 scenario)
2030	5.8 in (14.7 cm)	1.7 to 11.8 in (4.6 to 30.0 cm)
2050	11.2 in (28.4 cm)	5 to 23.9 in (12.7 to 60.8 cm)
2100	36.7 in (93.1 cm)	17.4 to 65.5 in (44.2 to 166.5 cm)

Note: Projections are for Los Angeles and include a vertical subsidence of 1.5 ± 1.3 mm/year.

The US Army Corps of Engineers (USACE) issued circular EC 1165-2-212 in October 2011 which provides guidance for the incorporation of direct and indirect physical effects of projected future sea level rise (USACE, 2011). According to this guidance, planning studies and engineering designs should evaluate alternatives against a range of local sea level rise projections which are defined by "low", "intermediate" and "high" rates of local sea level rise.

As sea level rises, the likelihood that a particular land elevation will be exceeded will increase. The first impacts that will affect infrastructure will be from extreme events as shown in Figure 2. The figure shows that as mean sea level rises so will the elevation of events of a fixed recurrence. This means that for a fixed elevation the frequency of being inundated will increase over time. For infrastructure this will mean that operations will be affected more frequently well before the site is permanently inundated by mean sea level.

The aforementioned studies do not provide consensus on whether the severity of storms will change as a result of climate change. Therefore, for the Goleta Slough Ecosystem Management Plan, ESA PWA assumes that increases in sea level rise can be added to flood event statistics derived from historic storm conditions.

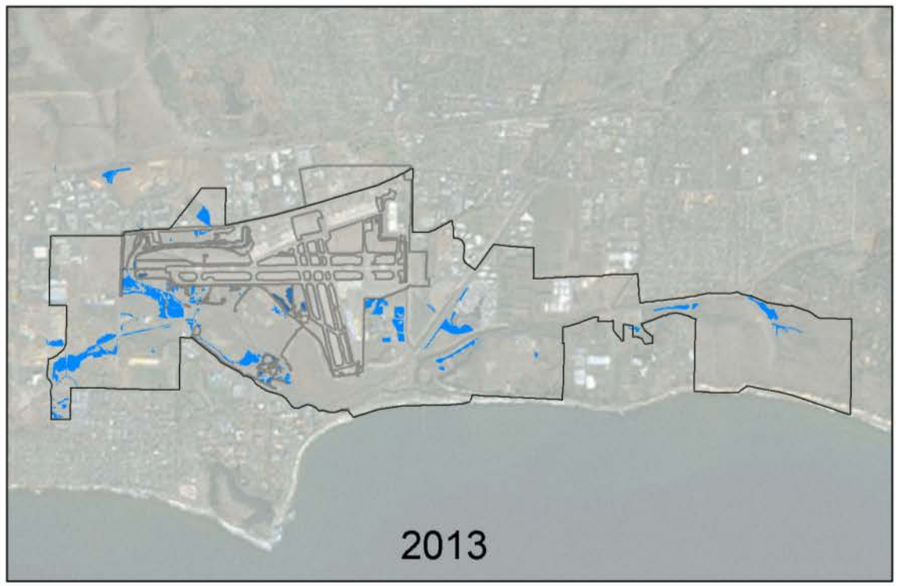
Appendix E – Habitat Vulnerability Summary Sheets

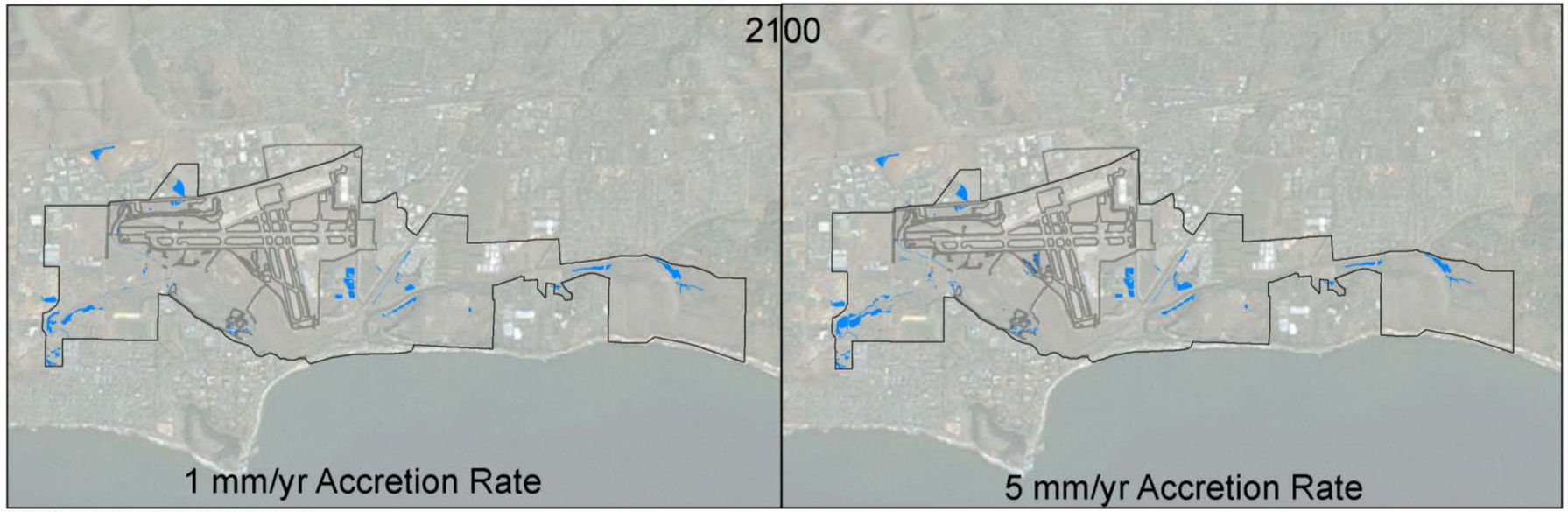
Table of Contents

Table SH-1. Freshwater Marsh / Willow Woodland Habitat Hazard Summary

Function	**Freshwater Marsh/Willow Woodland**
Location	Periodically inundated freshwater marsh habitats occur around the perimeter of Goleta Slough. Common species associated with these habitats include willow, bulrush, cattails and associated songbirds as well as herons, egrets and ducks.
Types of Hazard	Conversion of freshwater marsh habitats to salt marsh.
Exposure to Hazard	Existing freshwater marsh habitats primarily occur around the perimeter of Goleta Slough, particularly within managed pond areas to the south east of the airport as well as along the creek channels. Model results indicate substantial conversion of freshwater marsh habitats to salt marsh habitat with rising sea levels.
Sensitivity to Hazard	Increased sea levels would cause tidal expansion of sea water into areas currently influenced by freshwater. Freshwater plant species would be replaced by salt tolerant plant species. Animal and bird communities would shift in response to changing plant communities.
Vulnerability	• Conversion of habitat types from freshwater to saltwater wetland leads to loss of characteristic plants species. • Loss of freshwater plant species will lead to decline in population of animals dependent on those species.
Risk of Changes	Risk of loss of freshwater marsh habitat is directly linked to increasing sea levels and slough water levels. Low elevation freshwater wetlands in basins and along riparian corridors will be converted to saltwater wetlands due to increased elevation of saline tidal influence.

Figure SH-1. Freshwater Marsh 2100 SLAMM Results Without Tide Gate





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SOURCE: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

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Table SH-2. High Salt Marsh and Transitional Habitat Hazard Summary

Function	**High Salt Marsh and Transition Habitat**
Location	High tidal salt marsh and Transition Habitat is habitat with saline soils that is inundated less than 10% of the time. Under historic lagoon mouth management conditions at Goleta Slough, this habitat generally occurred at elevations ranging from 5.5 to 7.0 ft NAVD.
Types of Hazard	Conversion of existing habitat due to more frequent tidal and fluvial inundation. With modeled increases in sea level and water levels within Goleta Slough, tidal and transition habitats would migrate upslope, replacing existing uplands habitats, while being replaced by salt marsh.
Exposure to Hazard	Habitat evolution modeling for the Goleta Slough ecosystem predicts the conversion of existing upland (dry land) habitats into new transitional tidal habitat. More limited conversion of existing high marsh habitat to salt marsh is also predicted: • Most of the current tidal habitats within Goleta Slough are found in the basins south of airport runways. Transitional habitats frequented by Coulter's Goldfields are located immediately upslope of tidal habitats. • Existing transitional habitat areas are tidally connected to the slough channels and may be impacted by increases in slough water levels. • Regions with salty soils, found in around areas of former tidal exchange including some non-tidal wetlands at the Airport, DFW, and Storke wetlands, influence the distribution of plant species and may be indicators of historical habitat conditions. Under some of the modeled SLR scenarios, some of these areas will be hydrologically connected to tidal exchange in the future.
Sensitivity to Hazard	• Increased sea level and inundation times within Goleta Slough would lead to the conversion of existing transitional and high marsh habitat to tidal wetlands. • Transitional habitat may migrate upslope and across tidal barriers such as berms and levees, displacing existing upland habitat, however the availability of convertible upland habitats is limited by existing infrastructure.
Vulnerability	Conversion of habitat types may lead to the loss of characteristic and rare plant species associated with transitional and high marsh habitats, and loss of animals dependent on those plant species.
Risk of Changes	Risks associated with the conversion of habitats and associated losses are linked to rising water levels, increased inundation times and soil salinity. A more rapid increase in slough water levels increases the risk of habitat loss. Habitat evolution modeling predicts the potential expansion of Transitional and High Marsh habitat extents under future SLR conditions. The expansion of this habitat area may be limited by the management of existing uplands areas, including open space areas within the Airport and near the Storke Wetlands.

Table SH-3. Coulter's Goldfields Habitat Hazard Summary

Function	**Coulter's Goldfields** A rare annual plant (California Native Plant Society 1b.1) currently found in tidal high marsh and on salty soils in historically tidal areas of Goleta Slough.
Location	High Tidal Salt Marsh & Transition Habitats
Types of Hazard	Conversion of existing habitat due to more frequent tidal and fluvial inundation.
Exposure to Hazard	Habitat evolution modeling for the Goleta Slough ecosystem predicts the conversion of upland (dry land) habitat into transitional tidal habitat and the upslope migration of tidal high marsh habitat: • Most of the current tidal habitats within Goleta Slough are found in the basins south of airport runways. Transitional habitats frequented by Coulter's Goldfields are located in and immediately upslope of high salt marsh habitats. Currently the distribution is limited throughout Goleta Slough. • Existing transitional habitat areas are tidally connected to the slough channels and may be impacted by increases in slough water levels. • Regions with salty soils, found in around areas of former tidal exchange including some non-tidal wetlands at the Airport, DFW, and Storke wetlands, influence the distribution of plant species and may be indicators of historical habitat conditions. Under some of the modeled SLR scenarios, some of these areas will be hydrologically connected to tidal exchange in the future.
Sensitivity to Hazard	• A decrease in transitional/high marsh habitat area is expected to result in a reduction in the population of Coulter's Goldfields present at Goleta Slough. • Rapid migration of habitats (even with no net loss in habitat area) may lead to decline in species population due to limited colonization rate.
Vulnerability	• Increases in frequency of inundation Slough water levels decreases survivability of existing plants. • Rapid changes in soil salinity and inundation frequency may limit ability for species to migrate upslope with SLR. • Reduction in area of habitat may lead to significant decline in local Coulter's Goldfields population
Risk of Changes	Risk increases with greater habitat loss and more rapid upland migration of habitats. Habitat loss and conversion is linked to rising seas levels. A more rapid increase in slough water levels increases the risk of habitat loss. Model results indicate substantial movement in the boundaries between high marsh, transition and upland habitats in the absence of intervention measures.
Potential Adaptation Measures	• Control hydrology • Inlet management • Sediment management • Regrade topography • Revegetation • Easement on adjacent upland properties

Table SH-2. High Salt Marsh and Transitional Habitat Hazard Summary

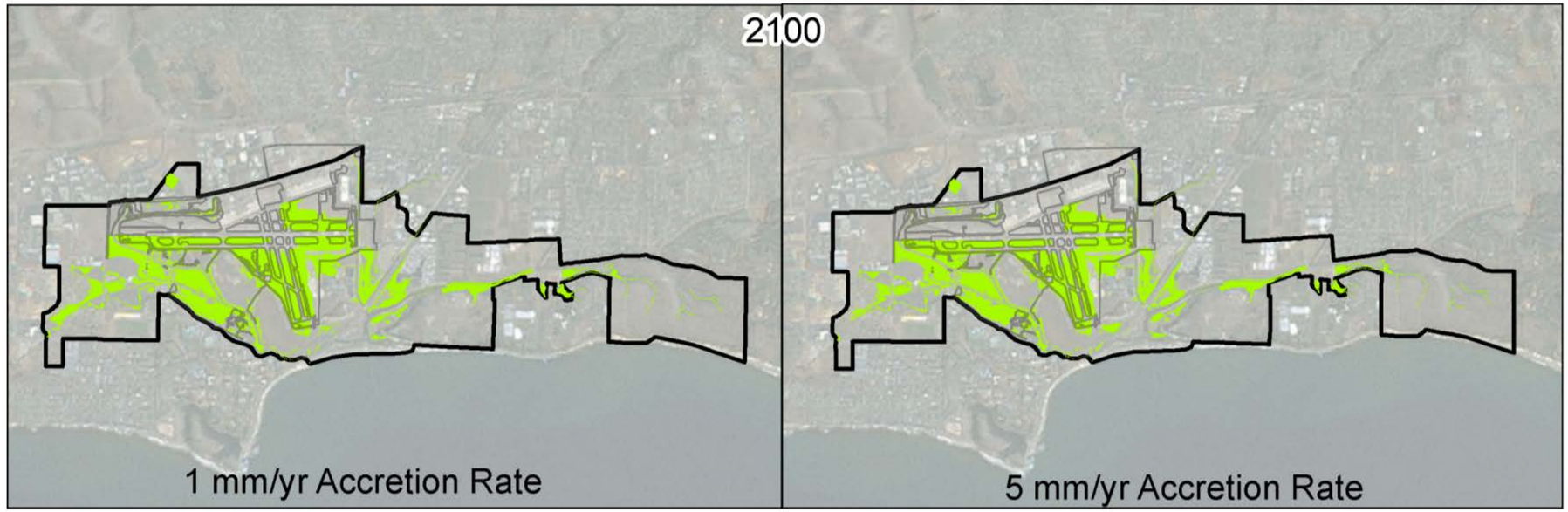

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Table SH-4. Salt Marsh Habitat Hazard Summary

Function	**Salt Marsh**
Location	Tidal salt marsh is a wetland habitat that is periodically inundated by saline water on rising tides. Tidal salt marsh habitats are characterized by a collection of plant species, such as pickleweed *(Salicornia virginica),* which are adapted to thrive in a frequently inundated, high salinity environment. Salt marsh species generally occur in areas that are tidally inundated 5% to 45% of the time. Under historic lagoon mouth management conditions at Goleta Slough, this habitat generally occurred at elevations ranging from 3.5 ft to 5.5 ft NAVD[1].
Types of Hazard	Conversion of existing habitat due to more frequent tidal and fluvial inundation. With modeled increases in sea level and water levels within Goleta Slough, salt marsh habitat would migrate upslope, replacing existing high marsh and transitional habitats, while being replaced by mudflats.
Exposure to Hazard	Habitat Evolution Modeling for the Goleta Slough ecosystem predicts the extensive conversion of salt marsh habitat into mudflat and the limited upslope migration of tidal high marsh habitat: • Large areas of Salt Marsh are found within the basins south of airport runways. • Limited pockets of salt marsh occur in areas adjacent to the Atascadero and San Jose Creek channels.
Sensitivity to Hazard	• Increased sea level and inundation times across within Goleta Slough would stress tidal marsh species such as pickleweed, eventually resulting in the conversion of existing salt marsh to mudflat and vegetated intertidal habitats. The conversion of salt marsh to mudflat due to rising sea levels may be slowed or in some cases prevented by accretive processes related to sediment accumulation. • Loss of bio-geochemical cycling functions associated with vegetated marsh (carbon sequestration, nutrient uptake) may compromise lagoon water quality and potentially impact other habitats within the lagoon system. • Salt marsh habitats may migrate upslope, replacing existing High Marsh habitats; however the local topography within Goleta Slough is such that there are few areas where this upslope migration is viable, the most notable are pond areas near Los Carneros and Mesa Rd.
Vulnerability	• Conversion of habitat types may lead to the loss of intertidal pickleweed habitats and loss of animals dependent on those plant species. • The loss of salt marsh habitat would disrupt bio-geochemical cycling associated with vegetated marsh, including carbon sequestration and nutrient uptake.
Risk of Changes	Risks associated with the conversion of salt marsh habitats and associated losses are linked directly to rising water levels within the slough and increased inundation frequencies. Habitat evolution modeling predicts a significant loss of salt marsh habitat under future sea level rise conditions. The extent of habitat loss varies and is based on the availability of sediment within the water column. An increased sediment supply may reduce the risk of salt marsh habitat loss.

Table SH-5. Belding's Savannah Sparrow Habitat Hazard Summary

Function	**Belding's Savannah Sparrow** A rare songbird native to salt marshes along the southern California and Baja California coasts. Belding's Savannah Sparrow (BSS) are year round inhabitants of coastal salt marshes that nest primarily in intertidal pickleweed habitat (vegetated salt marsh).
Location	Mid and High salt marsh
Types of Hazard	The loss of salt marsh habitat may eliminate a substantial proportion of the current high density nesting habitat for state-endangered BSS in Goleta Slough.
Exposure to Hazard	Habitat Evolution Modeling for the Goleta Slough ecosystem predicts the conversion of a large fraction of the existing salt marsh to mudflats. The modeled losses of vegetated tidal salt marsh and corresponding increases in mudflat areas in the main intertidal basins of Goleta Slough would have substantial impacts on the current breeding habitat of Belding's Savannah Sparrow. • Primarily in basins south of the airport runways
Sensitivity to Hazard	• Increased sea level and inundation times would cause upslope migration of intertidal salt marsh habitats leaving large areas of unvegetated mudflats which would be unsuitable for nesting habitat for BSS. • Remaining intertidal marsh, and areas of new intertidal marsh would be in closer proximity to upland habitats, leading to increased vulnerability from competitor and predator species.
Vulnerability	• The loss of intertidal pickleweed habitat, used for nesting, could have a profound negative impact on the local population, especially if intertidal pickleweed habitats do not have room to move upslope.
Risk of Changes	The risk of loss to key BSS nesting areas is linked directly to the risk of loss of vegetated salt marsh habitats. The risk increases with more rapid increases in water levels within the slough, while an increased sediment supply may reduce the rate of salt marsh habitat conversion to mudflat.

Figure SH-3. Salt Marsh Habitat 2100 SLAMM Results Without Tide Gate

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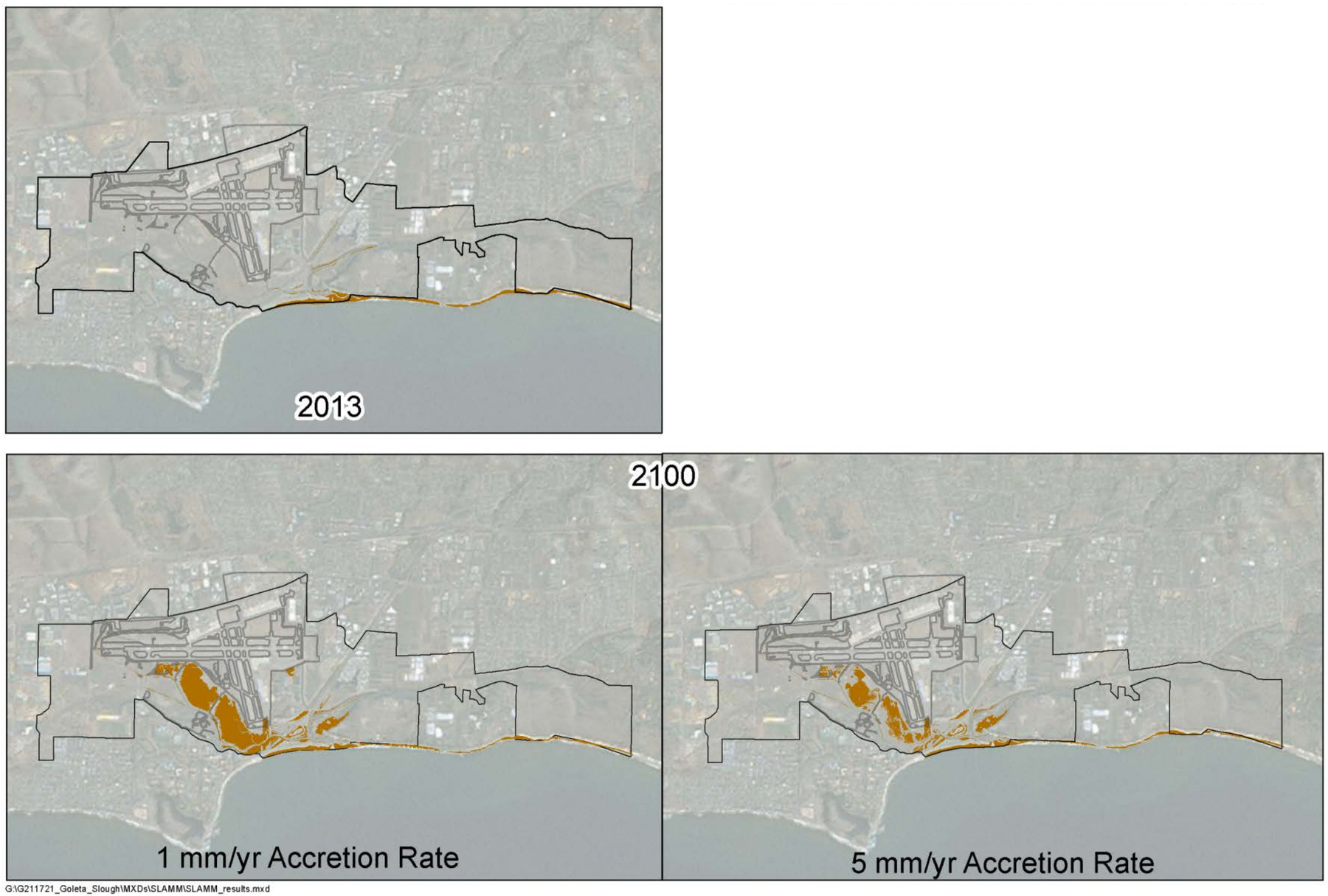
Table SH-6. Tidal Mudflats Habitat Hazard Summary

Function	**Tidal Mudflats**
Location	Tidal mudflats areas are frequently inundated inter-tidal habitats which are not heavily colonized by wetland vegetation but rather characterized by deposits of silty or clayey sediment. These areas are typically inundated 45% to 100% of the time, corresponding to an elevation band between 0 and 3.5 ft NAVD at Goleta Slough under historic lagoon mouth management to maintain an open inlet[1]. Tidal mudflats are currently distributed along the edges of tidal channels from the inlet at Goleta Beach westward through to the tidal saltmarsh areas south of the airport runways. Unvegetated muddy habitat also occurs in depressions in both tidal and non-tidal areas.
Types of Hazard	Habitat evolution modeling indicates that there will be substantial INCREASES in mudflat habitat under future sea level rise conditions due to the conversion of vegetated salt marsh into mudflat through increased tidal inundation.
Exposure to Hazard	The most substantial changes anticipated in the Goleta Slough ecosystem (by area) under projected sea level rise conditions are the loss of vegetated intertidal marsh and the increase in the extent of unvegetated tidal mudflat. This habitat conversion is most prominent in the basins south of airport runways.
Sensitivity to Hazard	Increased water levels and inundation times is expected to cause upslope migration of both mudflat and vegetated intertidal habitats. Due to the limited extent of available transitional habitats, this upslope migration will result in a net increase in mudflat area while the extents of tidal saltmarsh will be greatly reduced.
Vulnerability	• Change in existing management may increase area of mudflat habitats • Increased extents of unvegetated mudflats will provide increased forage and habitat opportunities for shorebirds. • Loss of characteristic saltmarsh plant species (pickleweed) will adversely affect animals dependent on those species, including rare species associated with those habitats (e.g. Belding's Savannah Sparrow). • Loss of bio-geochemical cycling functions associated with vegetated marsh (carbon sequestration, nutrient uptake) may compromise lagoon water quality.
Risk of Changes	There is potential for the significant expansion of tidal mudflats within Goleta Slough due to sea level rise. Risks associated with the conversion of habitats and associated losses are linked directly to rising sea level and water levels within Goleta Slough.

Table SH-7. Shorebirds Habitat Hazard Summary

Function	**Shorebirds**
Location	Shorebirds feed primarily on tidal mud flats areas that are currently distributed along tidal channels from the inlet at Goleta Beach westward through to the tidal saltmarsh areas south of the airport runways. Unvegetated muddy habitat also occurs in depressions in both tidal and non-tidal areas. Shorebird numbers vary through the year with low numbers in the summer peaks during two migration seasons (Aug-Nov) and Spring (Mar-early May) and intermediate densities during the over-wintering period (Dec-Feb). Typical mudflat feeding species include: Western Sandpipers, dowitchers, Marbled Godwits, Willets, Black-bellied Plovers, Whimbrels, Least Sandpipers, Killdeer, and Greater Yellowlegs.
Types of Hazard	Habitat evolution modeling indicates that there will be substantial increases in mudflat habitat under future sea level rise conditions due to the conversion of vegetated salt marsh into mudflat through increased tidal inundation.
Exposure to Hazard	The most substantial changes anticipated in the Goleta Slough ecosystem (by area) under projected sea level rise conditions are the of loss of vegetated intertidal marsh and the increase in the extent of unvegetated tidal mudflat. This habitat conversion is most prominent in the basins south of airport runways.
Sensitivity to Hazard	Increased water levels and inundation times are expected to cause upslope migration of both mudflat and vegetated intertidal habitats. Due to the limited extent of available transitional habitats, this upslope migration will result in a net increase in mudflat area, while the extents of tidal saltmarsh will be greatly reduced. Shorebirds may experience significant benefits from these changes due to the larger foraging areas.
Vulnerability	• Increased extents of unvegetated mudflats will provide increased forage and habitat opportunities for shorebirds. • Increases in macroalgae, epibenthic microalgae, characteristic invertebrates of tidal mud flats • Increased density and diversity of migratory and over-wintering shorebirds can be expected with increased habitat and prey resources.
Risk of Changes	Shorebird populations may benefit from larger forage areas due to the conversion of salt marsh to mudflats under future sea level rise conditions. Risks associated with the conversion of habitats and associated losses are linked directly to rising sea level and water levels within Goleta Slough.

Figure SH-4. Mudflat Habitat 2100 SLAMM Results Without Tide Gate



SOURCE: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

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Table SH-8. Tidal Creek and Subtidal Habitat Hazard Summary

Function	**Tidal Creek and Subtidal Habitat**
Location	Tidal creeks & subtidal habitats are deep open water habitats that are hydraulically connected to the lagoon mouth. These areas area continually inundated even during the lowest tides. Creek and subtidal habitats are distributed from the inlet at Goleta Beach through Goleta Slough to the non-tidal creek reaches that enter the estuary from the upper watersheds.
Types of Hazard	• Habitat evolution model results indicate little change in the area of these habitats with sea level rise. The models show a *very* slight increase in subtidal habitat area in Goleta Slough. • The quality of subtidal habitat may decline due to changes in other habitat zones due to potential loss of shade trees associated with upland habitat and reduction in water quality benefits associated with decline in salt marsh health.
Exposure to Hazard	Subtidal open water occurs near the lagoon mouth. In addition, tidal creeks/creeks are significant features of the western, southern & eastern edges of Goleta Slough, e.g. Tecolotito, Los Carneros, San Pedro, San Jose, Atascadero
Sensitivity to Hazard	Increased lagoon water levels might cause expansion and upslope migration of both deepwater & tidal creek habitats. SLAMM habitat modeling indicates little change in subtidal habitat area under projected sea level rise conditions, probably due to: 1. the relatively high elevations of Goleta Slough marsh plain; 2. the steep-sided character of channelized creeks in GS; and 3. the limited ability of the SLAMM habitat model to represent the development of new tidal channels.
Vulnerability	• Potential minor increase in fish habitat, and increase of Southern Steelhead nursery habitat. • Potential benefits to fish passage- higher water levels, reduced barrier thresholds • Potential water temperature benefits with increased depths, possibly offset by loss of channel shading due to increase inundation of upland/transitional habitats. • Potential minor increase in tidewater goby habitat. • Potential impacts to creek/subtidal habitat quality due to changes in nutrient availability related to the conversion of saltmarsh to mudflats
Risk of Changes	There is little risk of loss of creek/subtidal habitat areas due to sea level rise. The primary risks to the creek and subtidal habitats in Goleta Slough are related to potential habitat quality and water quality impacts due to changes in extent of neighboring saltmarsh and transitional riparian habitats.

Table SH-9. Water Birds Habitat Hazard Summary

Function	**Water birds (waterfowl, waders, gulls)**
Location	• Tidal open water areas • Periodically inundated wetland basins • A variety of migratory and local waterfowl populate Goleta Slough
Types of Hazard	Elevated water levels within the slough increase the area of inundation, which has been observed to attract larger populations of water birds. High densities of water birds near the airport lead to an elevated risk of bird air strike hazards.
Proximity to Hazard	Modeling indicates that as sea level rises, larger areas of Goleta Slough will be inundated by tides for longer periods. • Topographic basins may be filled by high tides and retain salt or brackish water for more days of the year. • The presence of large areas of open water may increase the use of the area by guilds of birds associated with this habitat type. • Wetland areas with tidal connections to the ocean occur throughout Goleta Slough.
Anticipated Changes	The increased water bird populations may greatly increase the Bird Airstrike Hazard (BASH).
Severity of Changes	Recent data from the airport has shown that the densities of waterfowl increased dramatically with increased availability of open water (eg. due to lagoon inlet closure) during migration season. Increased densities can elevate the Bird Airstrike Hazards, which can pose critical aviation risks • Increased frequency of hazing actions leading to higher operations costs. • Potential disruption to aviation service. • Potential for damaging bird airstrike.
Risk of Changes	Increased inundation times due to tidal action and increases in slough water levels are linked directly to rising seas levels and beach sand levels. Water levels within the slough, and consequently water bird populations, are also strongly affected by the management of the lagoon mouth inlet.

Table SH-10. Southern Steelhead and Tidewater Goby Habitat Hazard Summary

Function	**Southern Steelhead and Tidewater Goby** These endangered fish species have been observed in the open water/subtidal areas of Goleta Slough. Steelhead have historically migrated through tidal lagoons along the California coast to reach spawning habitats in upstream reaches of coastal creeks, however changes in land use and channel structure (armoring, culverts, fish passage barriers) have greatly reduced the availability of spawning habitat. Tidewater Goby are year round residents of Goleta Slough
Location	These endangered fish species have been observed in the tidal creeks and subtidal habitats that are distributed from the inlet at Goleta Beach through Goleta Slough to the non-tidal creek reaches that enter the estuary from their upper watersheds.
Types of Hazard	Model results indicate that there will be little change in the area of these habitats with sea level rise given the largely constrained channels. These species may be adversely impacted by changes in lagoon water quality.
Exposure to Hazard	Subtidal open water occurs near the lagoon mouth. In addition, tidal creeks are significant features of the western, southern & eastern edges of Goleta Slough: Tecolotito, Los Carneros, San Pedro, San Jose, Atascadero Creeks.
Sensitivity to Hazard	Increased lagoon water levels might cause the expansion and upslope migration of both deepwater & tidal creek habitats. SLAMM habitat modeling indicates very little change in subtidal habitat area under projected sea level rise conditions, probably due to the relatively high elevations of Goleta Slough marsh plain; the steep-sided character of channelized creeks in GS; and the limited ability of the SLAMM habitat model to represent the geomorphic development of new tidal channels.
Vulnerability	• Potential minor increase in fish habitat, including a potential increase of Southern Steelhead nursery habitat. • Potential benefits to fish passage- higher water levels within the lagoon may reduce effect of some fish passage barriers between lagoon and lower creeks. • Potential water temperature benefits with increased depths. • Potential minor increase in tidewater goby habitat. • Potential decrease in water quality with conversion of saltmarsh to mud flat habitat area and associated diminished capacity for nutrient uptake. • Potential reduction in channel shading and vegetation structure near subtidal habitat due to inundation of transitional riparian habitat. • Freshwater interface will move upstream leading to increased salinities in lower lagoon.
Risk of Damage	There is little risk of loss of creek/subtidal habitat areas due to sea level rise. The primary risks to these species in Goleta Slough, relative to existing conditions, are related to potential habitat quality and water quality impacts due to changes in the extent of neighboring saltmarsh and transitional riparian habitats.

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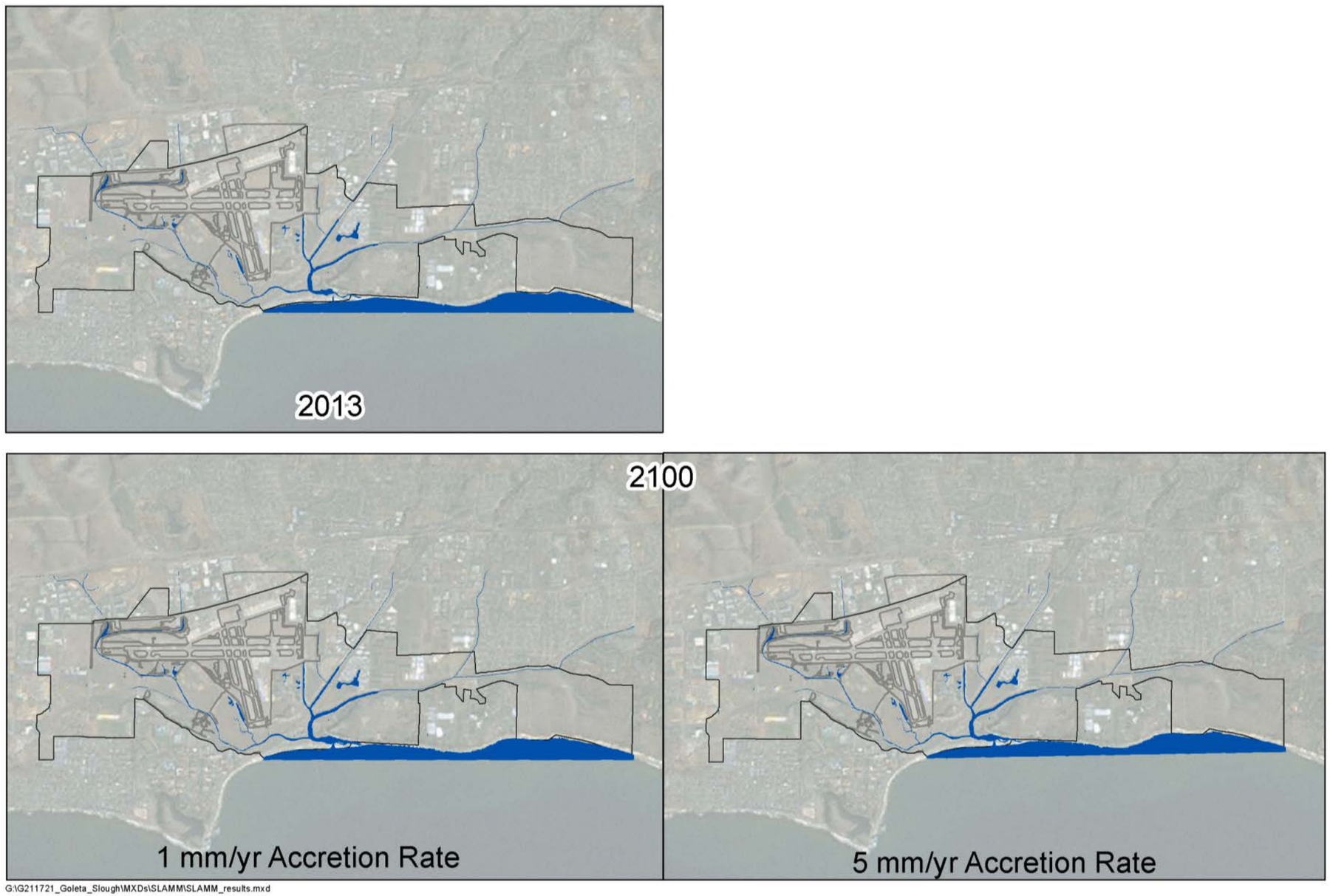
Figure SH-5. Creek Channels and Subtidal Habitat 2100 SLAMM Results Without Tide Gate



SOURCE: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

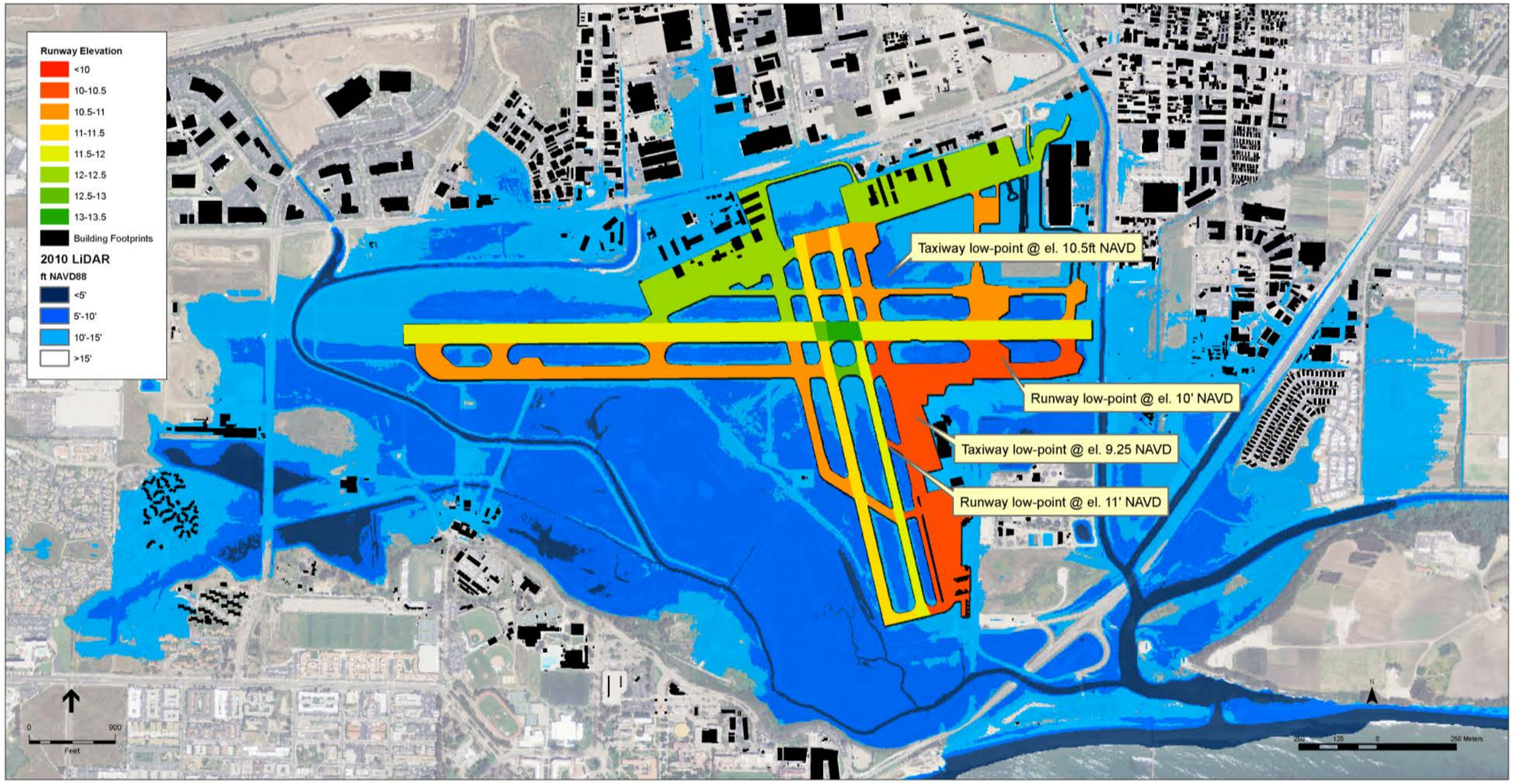
Appendix F – Infrastructure Vulnerability and Adaptation Summary Sheets

Table of Contents

Table SI-1. Santa Barbara Municipal Airport Infrastructure Hazard Summary

<table>
<tr><th>Infrastructure Category</th><th><u>Santa Barbara Municipal Airport (SBA)</u></th></tr>
<tr><td>Location</td><td>The Santa Barbara airport was constructed on landfill within the former footprint of Goleta Slough. The airport property currently occupies the parcel immediately to the north and east of Goleta Slough. The Santa Barbara Municipal Airport (SBA) is a regional domestic airport serving over 700,000 passengers annually.</td></tr>
<tr><td>Types of Hazard</td><td>Tidal inundation – Airport is located in the middle of the tidal slough. Hazard increases with SLR
Fluvial flooding – Elevated risk of fluvial floods during precipitation events when the lagoon mouth is closed.
Local runoff – Accumulation of local runoff due to failure of local storm drainage system may cause ponding on tarmac and taxiways.</td></tr>
<tr><td>Exposure to Hazard</td><td>The Airport is located in the middle of Goleta Slough, protected from tidal inundation by uncertified berms at approximately El. 8.5’. This area experienced flooding during the 1969 and 1995 storm events.</td></tr>
<tr><td>Sensitivity to Hazard</td><td>• Flooding of the runways, taxiways and service buildings through accumulation of local runoff, berm overtopping and backwater through drainage system.
<table>
<tr><th colspan="2">Critical Flood Elevations</th></tr>
<tr><td>Taxiways</td><td>10ft NAVD88</td></tr>
<tr><td>Runways</td><td>11ft NAVD88</td></tr>
<tr><td>Terminals</td><td>13ft NAVD88</td></tr>
</table>
• Bird air-strike hazard (BASH) by waterfowl.
• Loss of access to airport control tower.
• Loss of access or flooding damage to utilities/lights/fuel storage/pipelines.</td></tr>
<tr><td>Vulnerability</td><td>Water levels within the slough exceeding elevation 10.0’ NAVD88 will disrupt normal Airport operations.
Potential flood damage to structures and facilities. Deeper, more frequent flooding leads to greater risk of damage.
Birds striking low flying aircraft pose a major hazard, potentially damaging the aircraft and leading to injuries, death and property damage.</td></tr>
<tr><td>Risk of Changes</td><td>The risk of damage will increase over time with rising sea levels.
<table>
<tr><th colspan="2">Recurrence Interval of Critical Coastal Flood</th></tr>
<tr><td>Taxiways</td><td><50 yrs (no SLR)</td></tr>
<tr><td>Runways</td><td>100 yrs (no SLR)</td></tr>
<tr><td>Terminals</td><td>>100 yrs (no SLR)</td></tr>
</table>
Elevated slough water levels lead to larger waterfowl populations, and increase the frequency of runway, taxiway, and service building flooding.</td></tr>
<tr><td>Potential Adaptation Measures</td><td>• Increase elevation of runway.
• Construct levees and tide gates.
• Manage slough inlet mouth for open conditions.
• Manage waterfowl populations.</td></tr>
</table>

Figure SI-1. Airport Runway Elevations



SOURCE:

LiDAR: NOAA Digital Coasts

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Table SI-2. Santa Barbara Municipal Airport Adaptation Strategy

Adaptation Strategy	Adaptation Measure	Benefits	Drawbacks	SLR Accommodation	Relative Cost	Estimated Lead Time
No Action	**Do Nothing** (*no managed breaches)	No upfront cost.	Future costs due to more frequent airport closure, flood damage.	0ft – Runways flood for multiple days every year under existing conditions if lagoon mouth is closed during winter storm.	N/A	N/A
Management Options	**Breach Inlet** Excavate lagoon inlet channel following closure events as part of planned lagoon management. **Manage Beach Elevation** Breaching to limit height of beach berm	Significant reduction in lagoon water levels. Potential benefits for tidal habitats within lagoon and Slough.	Permitting Requirements. Potential impacts to sensitive/endangered species. Impacts to beach access/recreation.	Potentially Effective for 2-3' SLR. Eventually higher tide levels will cause runways to flood even with inlet mouth open.	Low to Moderate (depending on cost of permitting process)	1 day (emergency breach) 1-5 years (permitted managed breaches)
Management Options	**Sediment Management** Limit removal of sediment from lagoon system through reduced dredging and/or strategic sediment placement.	Potential benefits to habitats, including benefits some sensitive species. Potential reduction in erosion of perimeter berm due to waves during flood events. Uses existing natural resources. Encourages existing physical deposition and accretion processes.	Minimal flood protection. Permitting Requirements. Potential changes to fluvial flood levels. (May require new FEMA mapping) Potential impacts to some sensitive species.	Minimal Benefit. May reduce quantity of fill required to elevate outfield.	Low to Moderate	1-2 years
Relocation	**Elevate Runways Over Time** Increase thickness of runway during regular resurfacing e.g. 6" lifts every 10 yrs.	Costs distributed over time.	Potential to elevate runways is limited by elevation of adjacent infield and overrun areas.	Potentially Effective for 1-2ft SLR. Limited by elevation of adjacent infield and overrun areas.	Low/Moderate (depending on level of fill)	Could be incorporated into existing runway resurfacing. 5-10 year cycle
	Elevate Airfield Apply fill across airfield site, including tarmac, infield and outfield areas.	Greatest potential reduction in flood hazard at Airport. Fill may become available from nearby Devereux Slough site.	May require new FEMA flood mapping. May be subject to strict permitting requirements. Filling of wetlands generally not viewed favorably. Might require temporary closure of airport during grading operations. Subject to availability of fill.	Potentially Effective for 5+ ft of SLR, depending on availability of fill.	High to Very High	1-5 yrs, depending on location and extent of fill placement and permitting requirements
Protect in Place	**Construct Levee** Construct flood control levee around airfield and airport, w/ pumping.	Potentially large reduction in flood hazard.	Would require new FEMA flood mapping. May be subject to strict permitting requirements. Allowable levee height may be limited by flight path/FAA regulations.	Depends on allowable levee height, potentially effective for 4-5ft of SLR.	High to Very High	3 to 10 yrs
Change Uses	**Cease Operation of Airfield**	Elimination of flood hazard.	Santa Barbara Airport is a critical regional transportation link with no similar facility in the region. Closure of the airport could have large adverse impact on local residents and businesses.	Effective for all levels of SLR.	High to Very High	Unknown

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Table SI-3. Commercial, Residential and Airport Buildings Infrastructure Hazard Summary

<table>
<tr><th>Function</th><th><u>Buildings</u></th></tr>
<tr><td>Location</td><td>The region around Goleta Slough is populated by a large number of commercial and residential structures, as well as numerous buildings associated with the airport.</td></tr>
<tr><td>Types of Hazard</td><td>The primary risk to structures within the vicinity of Goleta Slough stems from potential flood damage causes by elevated water levels. Flood levels within Goleta Slough are project to rise due to sea level rise, presenting a potential future flood hazard to structures that are currently outside of the mapped floodplain. Hazards to structures include:
Water damage to building materials and contents
Structural damage due to fast flowing water</td></tr>
<tr><td>Exposure to Hazard</td><td>The buildings most at risk of flooding include the structures immediately adjacent to the airport, several homes and other structures on southwestern edge of the slough, and scattered commercial and residential buildings adjacent to the northern and eastern tributary creeks.</td></tr>
<tr><td>Sensitivity to Hazard</td><td>Increased frequency of flooding of buildings leading to water damage and other flood related damages
Increased wind-wave erosion of levees and banks leading to incremental reduction in level of flood protection and/or increased maintenance costs</td></tr>
<tr><td>Vulnerability</td><td>The severity of damages is dependent on building elevation, depth of flooding, velocities of flow, and the salinity of flood waters, as well as the effectiveness of existing flood protection infrastructure.

The following table summarizes the floor area of structures at risk of flood damage based on the building’s ground floor elevation:<table><tr><th colspan="2">Footprint of Buildings at Risk</th></tr><tr><td>El<10</td><td>90500 sf</td></tr><tr><td>El 10-12.5</td><td>553000</td></tr><tr><td>El 12.5-15</td><td>939000</td></tr></table></td></tr>
<tr><td>Risk of Changes</td><td>The risk of flood damage to buildings will increase over time as sea level rise increases the frequency of extreme high water events within the slough. The specific risk of flooding will vary based on the function of new and future flood control structures, the rate of sea level rise, and the management of the lagoon mouth.</td></tr>
<tr><td>Potential Adaptation Measures</td><td>Elevate structures
Revise construction standards
Revise land-use plan
Construct levees /maintain existing levees
Management of the slough mouth</td></tr>
</table>

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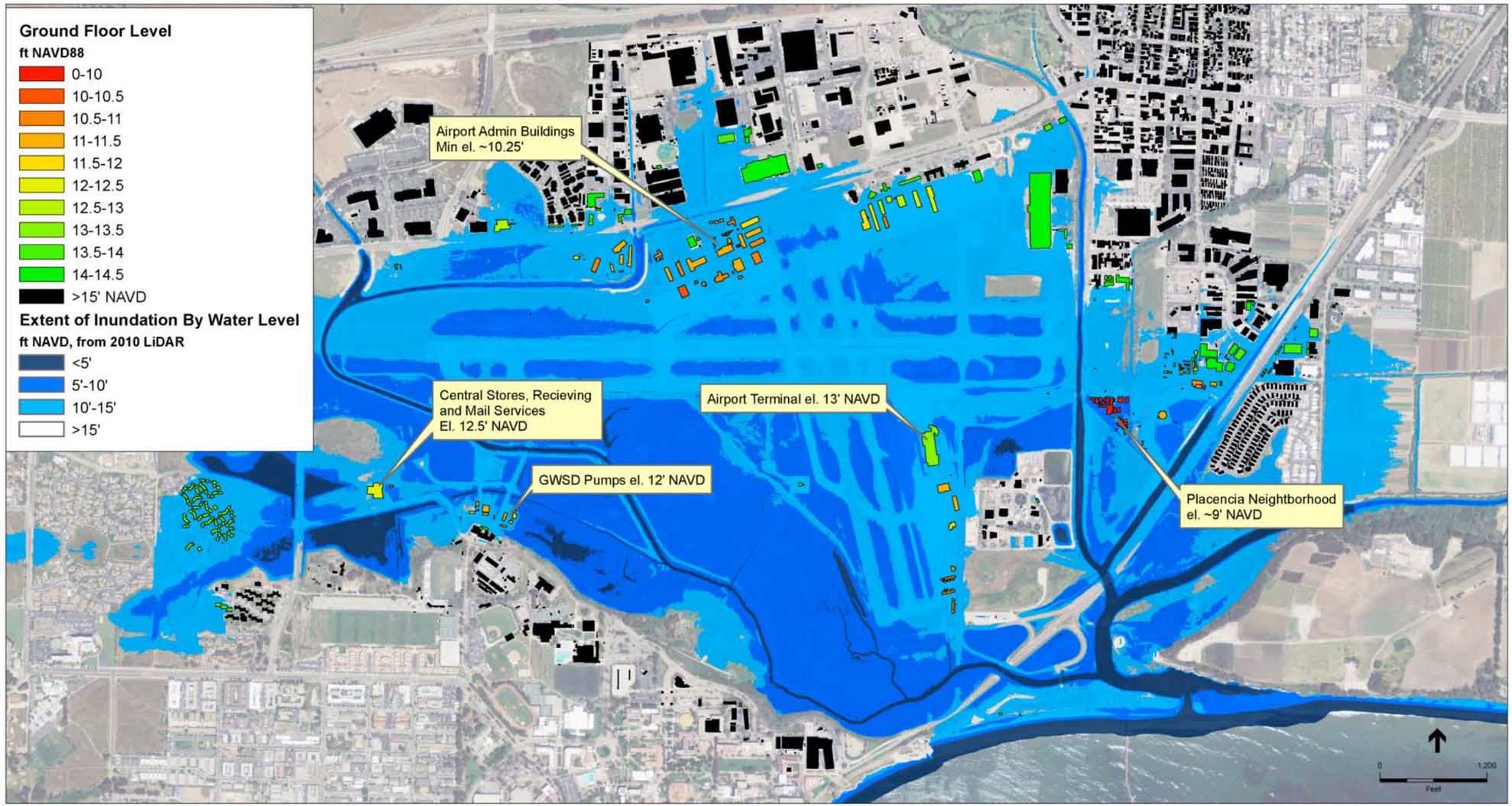
Figure SI-2. Building Ground Floor Elevations near Goleta Slough



SOURCE:

Building Footprints: P&S 2010

Elevations: NOAA Digita Coasts Bare Earth LiDAR

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Table SI-4. Structures Adaptation Strategy

Adaptation Strategy	Adaptation Measure	Benefits	Drawbacks	SLR Accommodation	Relative Cost	Estimated Lead Time
No Action	**No Action**	No upfront cost.	Future costs due to more frequent flood damage to structures, increased risk to life and property.	0ft - Placencia St. neighborhood floods during high water events under existing conditions. Airport hangars and maintenance facilities expected to flood regularly with 1-2ft of SLR.	N/A	N/A
Management Options	**Inlet Management** Manage lagoon inlet through breaches or beach shaping to limit the elevation of ponding during lagoon closures.	Significant reduction in lagoon water levels.	Permitting Requirements. Potential impacts to sensitive and endangered species. Impacts to beach access/recreation.	2-3' SLR – Placencia St neighborhood may flood due to high tide elevations even if inlet is open.	Low to Moderate (depending on cost of permitting process)	1 day (emergency breach) 1-5 years (permitted managed breaches)
Relocation	**Elevate Ground Floor Elevations**	Reduce flood hazard to life and property. May allow some continued use of threatened properties.	Disruption of building use during renovation. Limited applicability due to constructability constraints (e.g. building foundation type, accessibility requirements).	SLR accommodation varies by structure, requires site specific assessment. Potential candidates include Airport maintenance facilities.	Medium to High	2-5 years
Protect in Place	**Construct Levee** Construct flood control levees to protect threatened buildings.	Potentially large reduction in flood hazard.	Significant, potentially insurmountable constraints on constructability/engineering feasibility. May require new FEMA flood mapping. May be subject to strict permitting requirements. May create long-term maintenance obligations for county flood control. Allowable levee height near runways may be limited by FAA regulations.	Effectiveness varies by location. Potentially high (3-5ft SLR) for some threatened neighborhoods. (eg. Placencia St.) Less effective in areas without a clearly defensible perimeter (eg. airport maintenance buildings).	High	3 to 10 yrs
Change Uses	**Abandon Threatened Buildings**	Reduce flood hazards to life and property. Expiration of existing leases may present opportunities to phase out use of structures in threatened areas.	Potentially contentious for some properties. More easily implemented for government owned properties. Privately owned properties may require exceptional planning/permitting mechanisms, voluntary participation, or fee simple acquisition.	Potentially effective for all buildings, implementation depends on terms of lease/land ownership.	Low to High, varies with property ownership and available planning mechanisms	3-50yrs

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Table SI-5. Hazardous Material Remediation Sites Infrastructure Hazard Summary

<table>
<tr><th>Function</th><th><u>Hazardous Material Remediation Sites</u></th></tr>
<tr><td>Location</td><td>The California State Water Board has aggregated records of unauthorized chemical waste discharges and spills which require remediation*. Numerous sites have been identified in or adjacent to Goleta Slough at various stages of remediation.</td></tr>
<tr><td>Types of Hazard</td><td>• Mobilization of sub-surface contaminants due to changes in groundwater levels.
• Mobilization of surface contaminants due tidal or fluvial inundation.
• Groundwater and/or surface water contamination due to inundation and/or changing ground water levels.</td></tr>
<tr><td>Exposure to Hazard</td><td>There are 14 sites at various stages of remediation listed within the Goleta Slough Ecosystem Management Plan area, and an additional 43 remediation sites within 0.5 miles of GSEMP area boundary.
<table>
<tr><th>Category</th><th>In GSEMP</th><th>In 0.5 Mile Buffer</th></tr>
<tr><td>Completed</td><td>9 sites</td><td>26</td></tr>
<tr><td>Open</td><td>0</td><td>8</td></tr>
<tr><td>Open - Assessment and Remedial Action</td><td>3</td><td>3</td></tr>
<tr><td>Open - Monitoring or Eligible for Closure</td><td>2</td><td>4</td></tr>
<tr><td>Open - Inactive</td><td>0</td><td>2</td></tr>
</table>
“Open” sites indicate the recent or past observation of surface or groundwater contaminant(s). “Completed” sites indicate the completion of site clean-up and remediation efforts to the satisfaction of the State Water Board.</td></tr>
<tr><td>Sensitivity to Hazard</td><td>• Changing (elevated) ground water levels may mobilize subsurface contaminants, increasing extent of groundwater contamination and possibly also affecting surface water quality.
• Elevated water levels during surface flood events may mobilize surface contaminants. Subsurface contaminants are unlikely to be affected by short-term surface flood events, but may be affected by long-term inundation.</td></tr>
<tr><td>Vulnerability</td><td>The severity of damage varies based on a variety of factors, including the existing extent and concentration of the contaminant(s), the mobility of the contaminant, soil porosity, and groundwater hydraulics. Potential consequences of contaminant mobilization include:
• Expansion of contaminated area
• Exposure of contaminants to surface processes
• Contamination of groundwater wells
• Human health impacts
• Ecological impacts</td></tr>
<tr><td>Risk of Changes</td><td>The risk of damages is expected to increase over time as both sea levels and ground water levels rise.</td></tr>
<tr><td>Potential Adaptation Measures</td><td>• Continued monitoring of remediation sites to assess how changing hydrologic conditions impact contaminant mobilization and transport.
• Enhanced remediation or protection of sites known to pose a significant risk and to be vulnerable to flooding and/or changing hydrologic conditions.</td></tr>
</table>

*These records are available at the GeoTracker database lists http://geotracker.waterboards.ca.gov.

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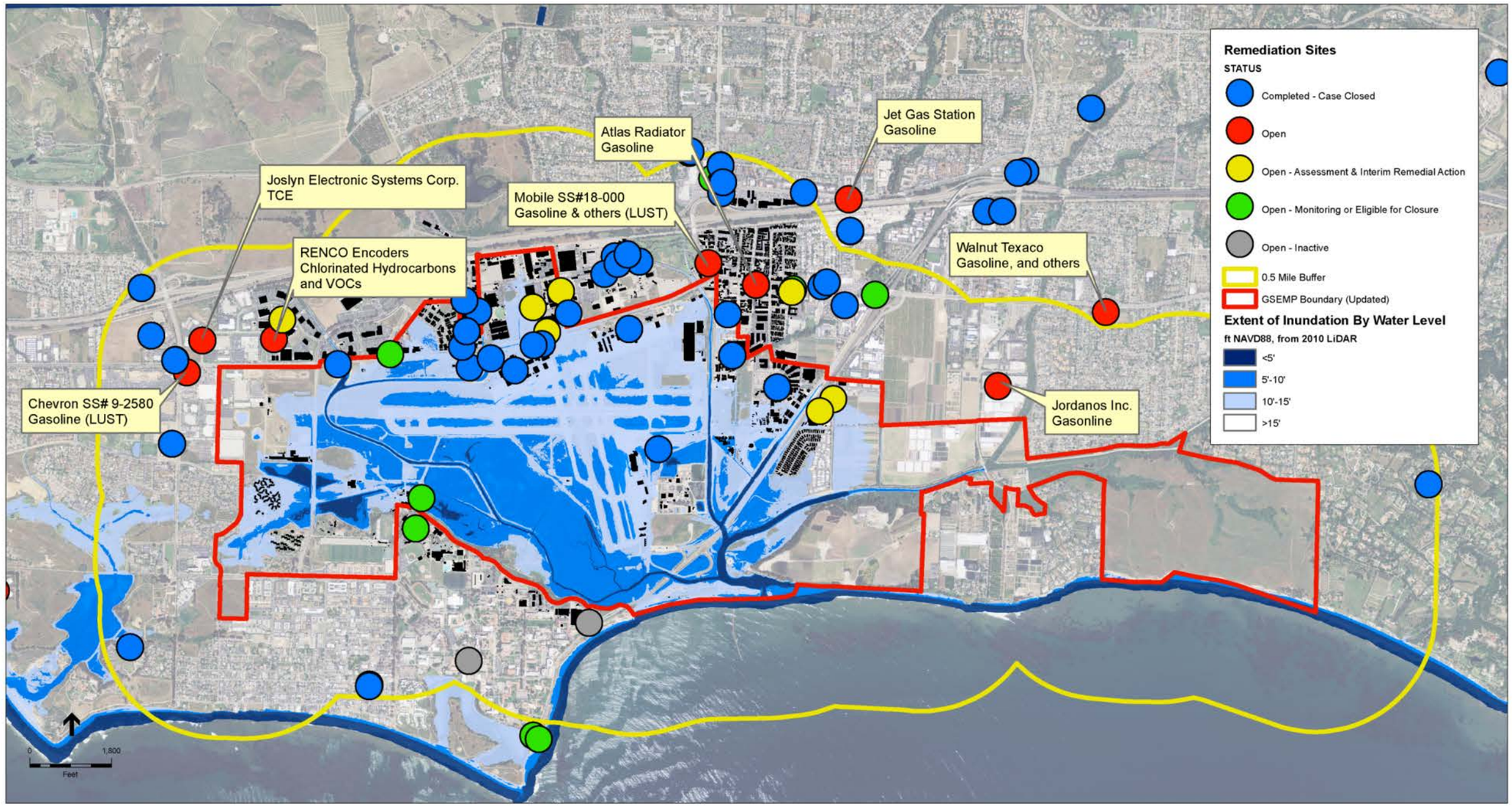
Figure SI-3. Remediation Sites near Goleta Slough



SOURCE:

Remediation Sites: Geotracker, Acessed November 2013

LiDAR: NOAA Digital Coasts

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Table SI-6. Hazardous Materials Business Plans Hazard Summary

Function	Hazardous Materials Business Plans
Location	Businesses which use significant quantities of regulated materials are required to file Hazardous Materials Business Plans (HMBPs) with local regulators. The Santa Barbara Fire District records the locations of all businesses with filed HMBPs for the Goleta/Santa Barbara area. These records show that there are numerous businesses within the vicinity of Goleta Slough which have filed HMBPs.
Types of Hazard	Varies depending on specific hazardous material present and method of storage. Businesses which handle or store hazardous materials are obligated to do so in a safe and responsible manner that minimizes the risk of spill or accidental release. Proper handling and storage practices should greatly reduce the risk of spill or release during the normal course of events, however local businesses may not anticipate elevated flood waters when devising their hazmat storage plans.
Exposure to Hazard	There are 625 business locations that have filed HMBPs for addresses within 0.5 miles of the Goleta Slough study area.
Sensitivity to Hazard	Elevated lagoon water levels are expected to lead to higher flood elevations, potentially increasing the flood risk to structures used for the storage of hazardous materials. The increased flood risk may increase the likelihood of an accidental hazardous material release, depending on the storage facility location, material type, and storage configuration. Hazardous materials which are water-soluble or which react with water, materials which are stored in non-waterproof containers, and materials which are stored in buildings which have an elevated risk of flood damage are expected to have the greatest risk of accidental release during a flood event. An accidental release of hazardous materials may lead to the: • Mobilization of hazardous materials in surface water • Mobilization of hazardous materials in groundwater • Airborne/Aerosol release of hazardous materials
Vulnerability	The severity of an accidental hazardous materials release varies based on the specific hazardous material(s) that is present, the quantity that is mobilized due to the release, and the likelihood of exposure based on the extent of contamination. Accidental releases of hazardous materials may lead to contamination of • Surface water & groundwater • Low-level atmosphere • Soils Such a release may expose humans and wildlife to toxic, corrosive or otherwise harmful materials. The consequences of exposure can vary greatly depending on the hazardous material, the mode and duration of exposure, and the dosage received.
Risk of Changes	The risk of flooding due to rising sea levels and fluvial flood events is expected to increase over time. The risk of damaging hazardous materials release due to flooding varies based on material type and storage configuration.
Potential Adaptation Measures	• Education and outreach to encourage/promote safe HazMat storage practices in areas with elevated flood risk. • Planning/Land-use restrictions on HazMat storage in areas susceptible to elevated flood risk.

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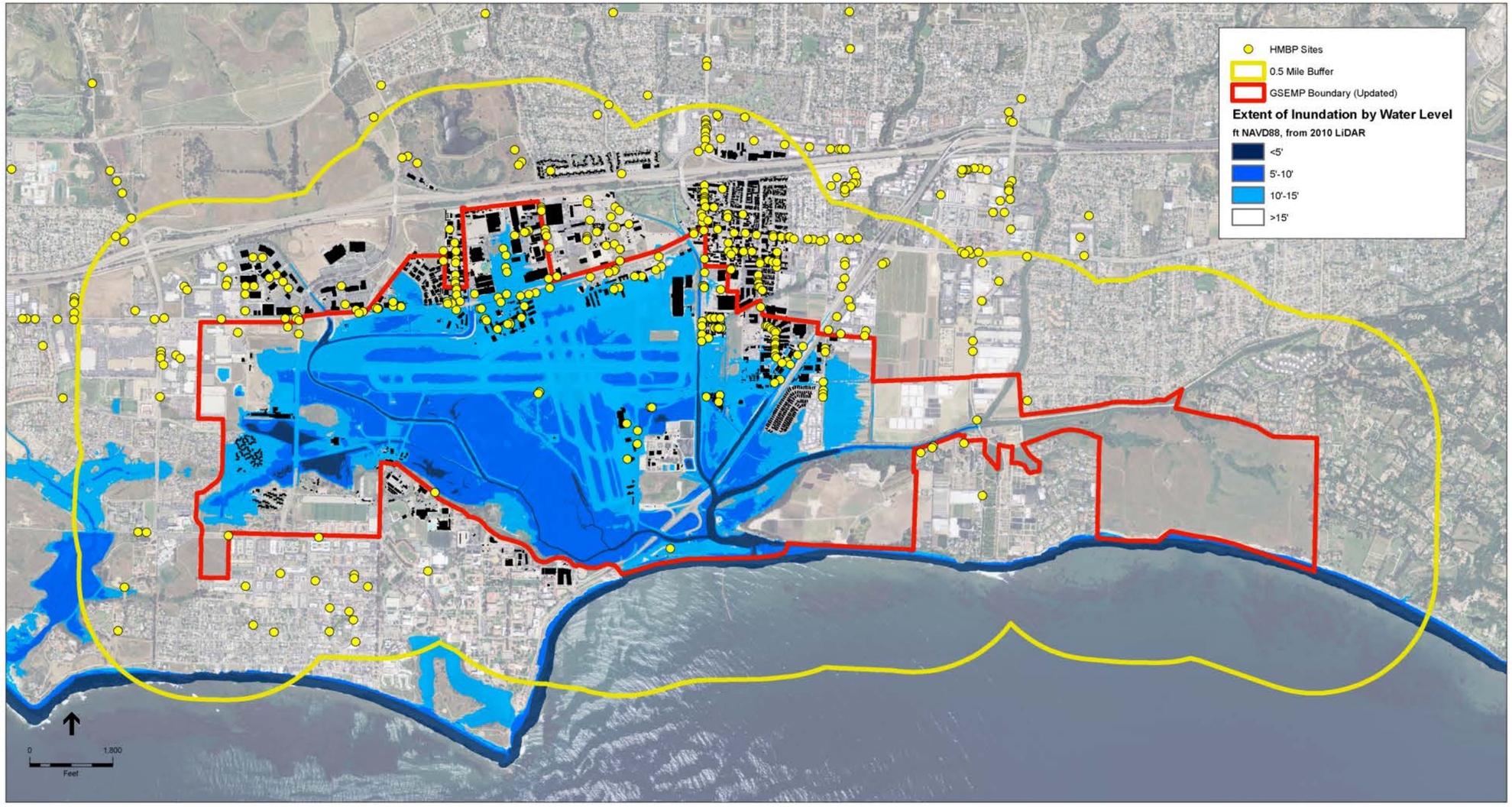
Figure SI-4. Filed Hazardous Materials Business Plans near Goleta Slough



SOURCE:

HMBPs: Santa Barbara Fire Dept.

LiDAR: NOAA Digital Coasts

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Table SI-7. Hazardous Materials and Remediation Sites Adaptation Strategy

Adaptation Strategy	Adaptation Measure	Benefits	Drawbacks	Sea Level Rise Accommodation	Relative Cost	Estimated Lead Time
No Action	Continue to enforce applicable regulations (EPA, CEPA, OSHA and others)	Low Cost	May require increased levels of monitoring and enforcement and or reopening of closed cases as SLR alters groundwater hydrology.	N/A	Low	N/A
Management Options	**Inlet Management** Manage lagoon inlet through breaches or beach shaping to limit the elevation of ponding during lagoon closures.	Significant reduction in lagoon water levels.	Permitting Requirements. Potential impacts to sensitive and endangered species. Impacts to beach access/recreation.	Unknown; vulnerability of existing hazmat and remediation sites depends on specific storage configuration and elevations of hazardous materials, such analysis is beyond the scope of this study.	Low to Moderate (depending on cost of permitting process)	1 day (emergency breach) 1-5years (permitted managed breaches)
Relocation	**Incentivize the relocation** Use permitting mechanisms to incentivize relocation of businesses which use Hazardous Materials to areas outside of the coastal flood hazard zone.	Reduced risk of chemical release during flood events.	Potential opposition from existing businesses. Need for local businesses to relocate. Difficulty finding suitable alternative locations for displaced businesses.	5'+ Removing Hazardous Materials from coastal flood hazard zone would greatly reduce rise of accidental release.	Unknown	2-10 years
Protect in Place	Install levees or other flood protection structures to reduce the extent of the coastal flood hazard zone.	High level of flood protection. Reduced risk of flood related release of hazardous materials.	High cost, including cost of land acquisition for the installation of new flood protection structures and the cost of maintenance.	5'+ Flood control structures which reduce the extent of the flood hazard zone would greatly reduce rise of accidental release.	High-Very High	5-10 years

Note:
Details about specific storage measures and elevations of hazardous materials were not available for this analysis. The evaluation of vulnerability of specific Hazardous Materials storage and use sites is beyond the scope of this study. Additional study is required to properly evaluate the potential impacts of Sea Level Rise on Hazardous Materials used in industrial and commercial processes and on existing toxic spill sites and to develop appropriate material handling and storage guidelines for the use of hazardous materials in coastal flood hazards zones.

We recommend that the appropriate regulatory agencies consider the expected increase in flood hazard due to sea level rise when evaluating the use and storage of hazardous materials in areas that may be exposed to coastal flooding.

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Table SI-8. Roads and Highways Infrastructure Hazard Summary

Function	**Roads and Highways**
Location	Several major transportation corridors pass through or adjacent to the Goleta Slough Management Area. • Highway US101/CA1 is the largest highway in the region, passing north-south through the city of Goleta about 1.5 miles inland. Highway US101/CA1 provides a critical transportation link for Central California. • State Route 217 serves as the main surface connector between US101/CA1, the Santa Barbara Airport, and UCSB. • There are also numerous smaller surface streets in the area including South Fairview Ave, Mesa Road, South Los Carneros Road and Hollister Ave which provide access to local businesses and residences.
Types of Hazard	Disruption of traffic flow due to flooding of low-lying roads and highways Damage to existing roadways and related infrastructure due to scour and erosion of embankments, footings and other structural/geotechnical elements.
Exposure to Hazard	The roads and highways most at risk of flooding are: • Intersection of Los Carneros Rd and Mesa Rd (el 9.2) • South Fairview Ave near the airport terminal (el 10.0) and at approach to Hwy 217 (el. 11.2) • Hollister Ave (el 11.8) • Parking areas and access roads near the airport administration buildings and at the housing development on Mesa Rd west of Los Carneros Rd. • Low-lying access roads adjacent to tributary creeks.
Sensitivity to Hazard	Elevated water levels within Goleta Slough under project SLR conditions are expected to increase the frequency of flood events in areas neighboring the slough. Consequences of flooding include: • Standing water on road surfaces preventing safe vehicle passage. • Potential damage to road grading and pavement surface due to scour and buoyancy effects.
Vulnerability	The severity of damage varies based on the depth and duration of flooding, as well as the velocity of flood waters. Flood waters above the road surface elevation may • Disrupt access pathways critical for the provision of emergency services. • Disrupt of transportation links to local businesses, residences, and municipal infrastructure. In addition, flood waters below the road surface elevation may still present an increased risk of damaging scour and erosion to embankments and road subgrades, which may lead to structural damage to the roadway.
Risk of Changes	The frequency of disruptive/damaging flooding is expected to increase with rising lagoon water levels and with changes to fluvial flood frequency. The future flood risk will be strongly influenced by the future lagoon mouth management regime.
Potential Adaptation Measures	• Manage lagoon mouth to minimize risk of high flood elevations. • Increase levee elevations and/or build new levees. • Raise road elevations. • Revise transportation plans to route traffic away from low-lying access corridors.

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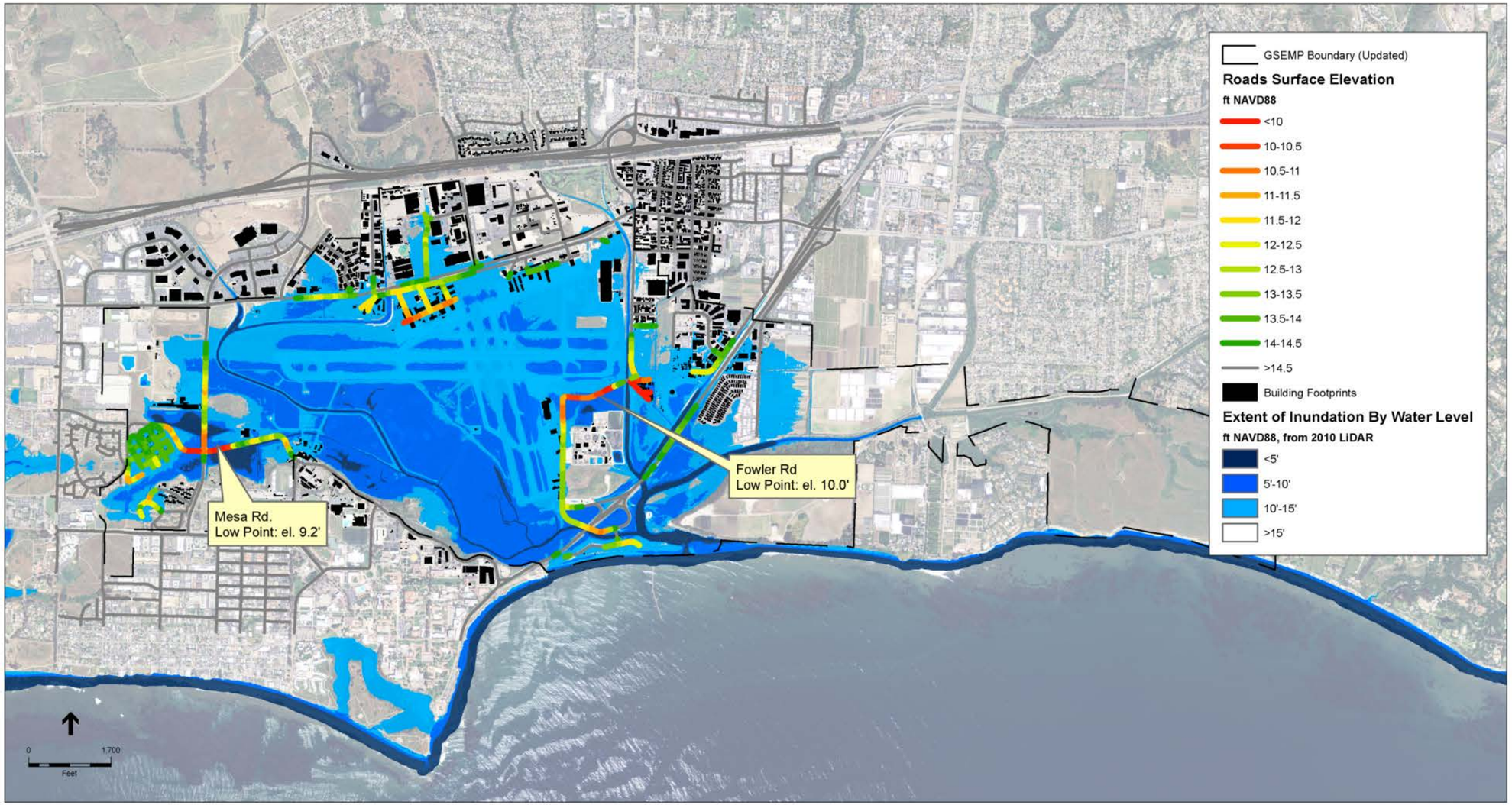
Figure SI-5. Critical Flood Elevations of Roads and Highways near Goleta Sloug



SOURCE:

LiDAR - NOAA Digital Coasts

Roads - Santa Barbara County

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Table SI-9. Roads and Highways Adaptation Strategy

Adaptation Strategy	Adaptation Measure	Benefits	Drawbacks	Effectiveness	Relative Cost	Estimated Lead Time
No Action	**No Action**	No upfront cost.	Increased costs due to more frequent road closures and potential flood damage. Increased risk to life and property.	Mesa Road, Fowler Road, and other low-lying roads and parking areas are likely to experience regular flooding under existing conditions.	N/A	N/A
Management Options	**Inlet Management** Manage lagoon inlet through breaches or beach shaping to limit the elevation of ponding during lagoon closures.	Considerable reduction in flood extents.	Considerable permitting challenges. Potential impacts to threatened and endangered species.	Occasional flooding of Mesa road with 1-2 ft of SLR, Fowler road with 2-3 ft of SLR, Hollister road with 4-5 ft of SLR.	Low to Moderate (depending on cost of permitting process)	1 day (emergency breach) 1-5 years (permitted managed breaches)
Management Options	**Elevate Road Surface Elevations During Regular Repaving** Apply thicker lifts of paving material as part of regular road maintenance to gradually increase road surface elevation for low-lying transit corridors.	Reduce flood hazard. Opportunities to minimize costs by coordinating with planned resurfacing and other improvements.	Capacity to elevate road surface is limited by stability of subgrade and adjacent slopes. Capacity to keep pace with sea level rise depends on actual rate of rise. Subject to availability of fill material. Constructability constraints including adjacent/connecting roads and utilities sharing road corridor.	Potential accommodation for 1-4ft of SLR. Smaller increases in road surface elevation are most feasible, but offer limited long-term protection. Larger elevation increases provide increased protection but will face greater constructability constraints.	Medium to High Varies with road elevation, corridor geometry and maximum feasible lift size	2-10 years Can be incorporated into existing capital improvement plans.
Relocation	**Abandon Threatened Roads and Construct or Improve Alternate Access Corridors**	Reduce flood hazard and long term maintenance costs. Opportunities to remove barriers to tidal connectivity and habitat continuity through constructions of causeways or bridges.	Alternative access corridors will need to be identified. Potentially contentious with affected residents and business owners.	Potentially effective for 5+ ft of SLR, assuming safe alternative transportation corridors exist or can be constructed.	High	10-50yrs
Protect in Place	**Construct Levee** Construct flood control levee around threatened roads. **Construct Causeway** Elevated road structures may allow continued use of existing road alignments. **Slope Contouring** Re-grade wetland transition slopes.	Potentially large reduction in flood hazard. Causeways may allow for increase tidal connectivity and habitat continuity. Contoured wetland transition slopes may provide wave dissipation, increase sediment accumulation and habitat benefits.	Significant, potentially insurmountable constraints on constructability/engineering feasibility. Cost, including future maintenance costs. Difficult permitting process for grading work done on existing wetland areas.	Depends on feasible levee height, potentially effective for 4-5ft of SLR.	High to Very High	3 to 10 years
Change Uses	(no alternate uses were identified)	-	-	-	-	-

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Table SI-10. Sanitary Sewer and Water Treatment Infrastructure Hazard Summary

Function	Sanitary Sewer and Water Treatment
Location	Sanitary sewer pipes, pumping stations and treatment plants are essential to the function of the municipal sewer system. • The Goleta Sanitary District treatment plant is located on Mescalitan Island, to the East of the airport terminal. The treatment plant serves both the Goleta Sanitary District and Goleta West Sanitary District. • The Goleta West Sanitary District pumping station is located at the western end of the slough. • There are numerous sewer pipes in the neighboring areas. There is a critical force sewer main which travels from the Goleta West Sanitary District pump station, across the slough, under the airport, and to the sewer treatment plant. • The Goleta Sanitary District treatment plant outfall pipe crosses the slough near the highway 217 bridge, passes under the beach and discharges approximately 6000 ft offshore.
Types of Hazard	• Tidal and/or fluvial flooding of critical sewer utility facilities, including pumps and treatment facilities. • Increased ground water levels leading to unanticipated buoyant forces on buried pipelines.
Exposure to Hazard	The GWSD Pumping station is immediately adjacent to slough. Critical flood elevation @ pumping well: 12.5ft NAVD The Goleta Sanitary District treatment plant is on Mescalitan Island to the southwest of the airport. Critical flood elevation to overtop treatment ponds: 17.3 ft NAVD Critical access road elevation: 12 ft NAVD
Sensitivity to Hazard	• Increased risk of flooding/inundation of critical infrastructure (pumps, utilities), disrupting operations and potentially damaging equipment. • Rising surface waters may limit access to facilities and pipelines for maintenance and operations. • Rising ground water levels may place unanticipated buoyancy forces on buried pipelines, potentially leading to leaks and/or pipe failure. Current maintenance staff does not anticipate significant problems due to buoyancy, however observation and monitoring is recommended to verify pipe stability under rising sea levels.
Vulnerability	• Both the Goleta West pumping station and the Goleta Sanitary District treatment plant, as well as the force main adjacent to the airport and the GSD outfall are critical to the function of the sanitary sewer system in the region. • The Goleta West pumping station may experience more frequent damaging flooding with rising sea levels. • The Goleta Sanitary District may become temporarily inaccessible due to flooding of key access roads. • The failure of local collection pipes may cause disruption of sewer function to localized areas of service. • Failure of municipal sanitary sewer system may lead to discharge of untreated sewage, presenting risks to human health and habitat.
Risk of Changes	The risk to the sewer utilities within the vicinity of Goleta Slough is expected to increase with sea level rise and rising ground waters.
Potential Adaptation Measures	• Construction of levees to protect key infrastructure, such as the GWSD pump station. • Increasing the elevation and/or relocating vulnerable infrastructure. • Protection or increasing the elevation of critical access corridors. • Placement of additional ballast on buried pipes.

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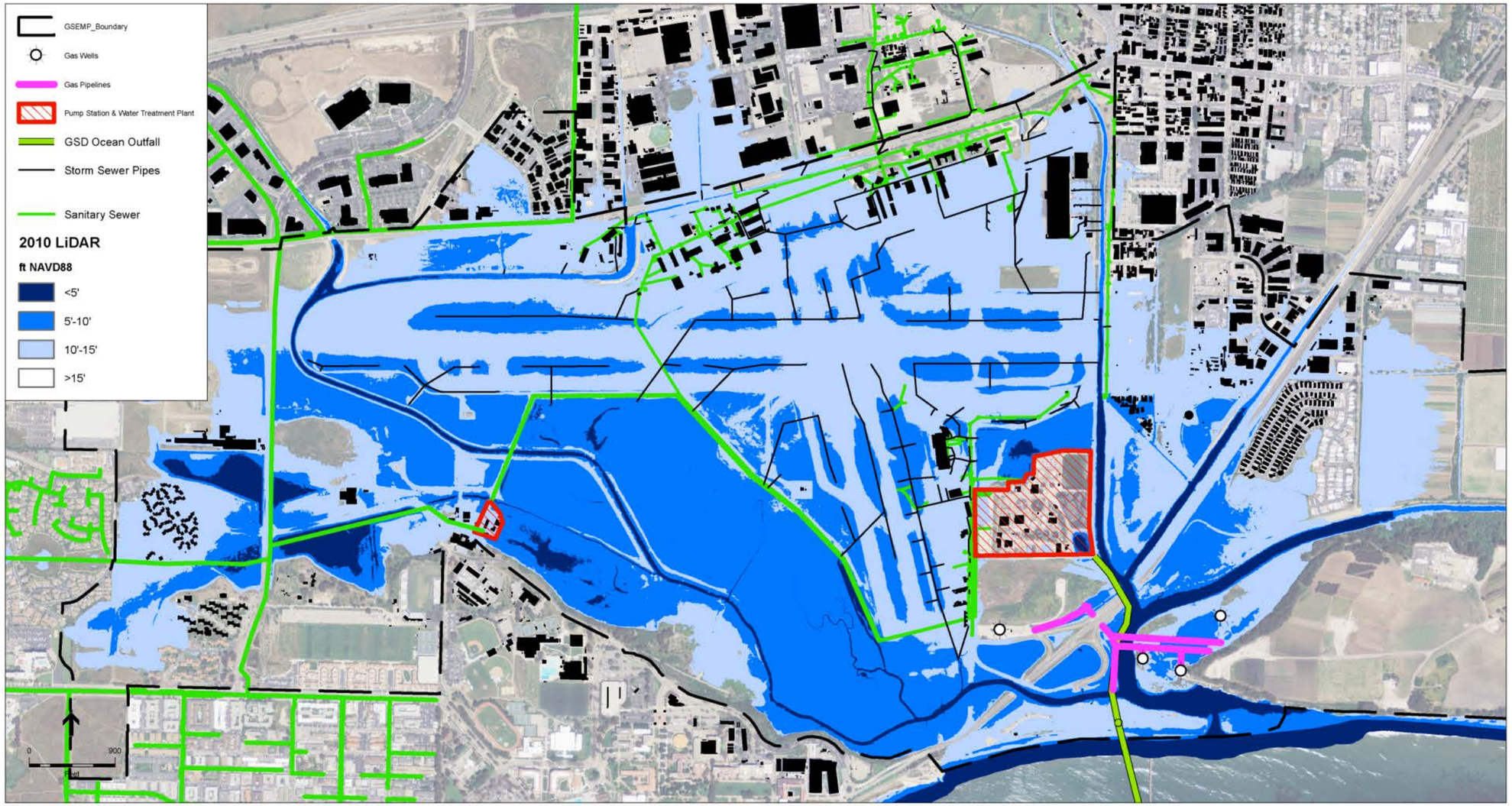
Figure SI-6. Storm and Sanitary Sewer Pipes near Goleta Slough



SOURCE:

Pipe Alignments - Goleta Sanitary District; Pennfield &Smith

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Table SI-11. Sanitary Sewer and Water Treatment Adaptation Strategy

Adaptation Strategy		Benefits	Drawbacks	Sea Level Rise Accommodation	Relative Cost	Estimated Lead Time
No Action	**Do Nothing (*no inlet management)**	No upfront cost.	Flooding and potential for sewage releases from manholes in low-lying Placencia neighborhood.	0ft Regular (annual) flooding will likely result in releases from existing sewer infrastructure in low-lying areas.	N/A	none
Management Options	**Inlet Management** Manage lagoon inlet through breaches or beach shaping to limit the elevation of ponding during lagoon closures.	Significant reduction in flood levels.	Permitting Requirements. Potential impacts to sensitive and endangered species. Impacts to beach access/recreation.	2-3' – Placencia neighborhood floods 5' – GWSD pump station floods	Low to Moderate (depending on cost of permitting process)	1 day (emergency breach) 1-5 years (permitted managed breaches)
Relocation	**Relocate sewer infrastructure in low-lying areas** **Relocate GWSD pump station**	Potentially significant reduction in vulnerable infrastructure.	Options for relocation constrained by need to tie in to existing sewer line alignments. Feasible options for relocation may be limited by land ownership and/or easements.	5'+	Medium to High (sewer pipes) High to Very High (Pump Station)	5-10 years
Protect in Place	**Install water-tight manholes and/or levees similar to those on Mesa Road**	Significant decrease in likelihood of stormwater infiltration into system and accidental sewage spills.	High cost. Potentially increased difficulty of maintenance.	5'+ Substantially reduces the risk of sewage spill due to flooding of low-lying manholes.	Low - Moderate	2-5 years
	Construct flood walls or levees to protect GWSD pump station	Reduction of flood risk to pump station.	Levees or flood walls would require regular inspection and maintenance. Requires engineering evaluation to determine feasibility.	5+ Expense increases with desired level flood protection.	Moderate	
Change Uses	**Change Placencia neighborhood to land use that does not require sewer service.** (it is not feasible to stop sewer service for the Goleta West Sanitary District.)	Reduction of flood risk and elimination of risk of sewage spill.	Potential conflicts with existing tenants/land owners. May require fee simple acquisition or voluntary participation. Loss of services. Difficulty identifying suitable replacement locations for existing tenants.	5+ Would eliminate hazard at Placencia neighborhood.	High	10-50 years

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Table SI-12. Storm Drains and Sewers Infrastructure Hazard Summary

Function	Storm Drains and Sewers
Location	Municipal storm drain systems serve the communities adjacent to Goleta Slough. Several of these drain pipes discharge into Goleta Slough via gravity drainage. The Santa Barbara airport uses a network of storm drains and pipes to convey runoff from the runways and taxiways into Goleta Slough. Drain pipes are connected to Goleta Slough via culverts and tide gates, which prevent the inland flow of slough water during high tides but allowing storm water to drain during low tides.
Types of Hazard	• Failure of these storm drain systems may lead to flooding at upstream storm drain inlets. • Overbank flooding of drainage channels.
Exposure to Hazard	Storm drain systems are directly connected to Goleta Slough along the perimeter of the airport as well as along the San Jose and Carneros Creek channels.
Sensitivity to Hazard	• Blockage of inlets or outlets. Tide gates are particularly susceptible to blockage due to high downstream water levels. • Backwater effects due to downstream flow blockage or constrictions. • Insufficient capacity for (potentially) increased rainfall.
Vulnerability	Failure of storm drainage system may cause flooding and property damage, and an increased risk to public health and habitats.
Risk of Changes	The risk of damage increased with more intense precipitation events and rising lagoon water levels. The risk of damage is projected to increase over time with rising sea levels. The risk of damage is greatest for drainage networks serving low-lying areas which may be subject to backflow due to insufficient storm water discharge and retention under future elevated slough water levels.
Potential Adaptation Measures	• Construction of new storm water retention capacity • Adoption/Update of BMPs to improve upstream infiltration and stormwater retention for new construction in nearby and upstream areas. • Channel maintenance to prevent flow obstruction • Maintenance of tide gates to prevent blockage and backflow • Installation of pumps to manage excess storm water runoff

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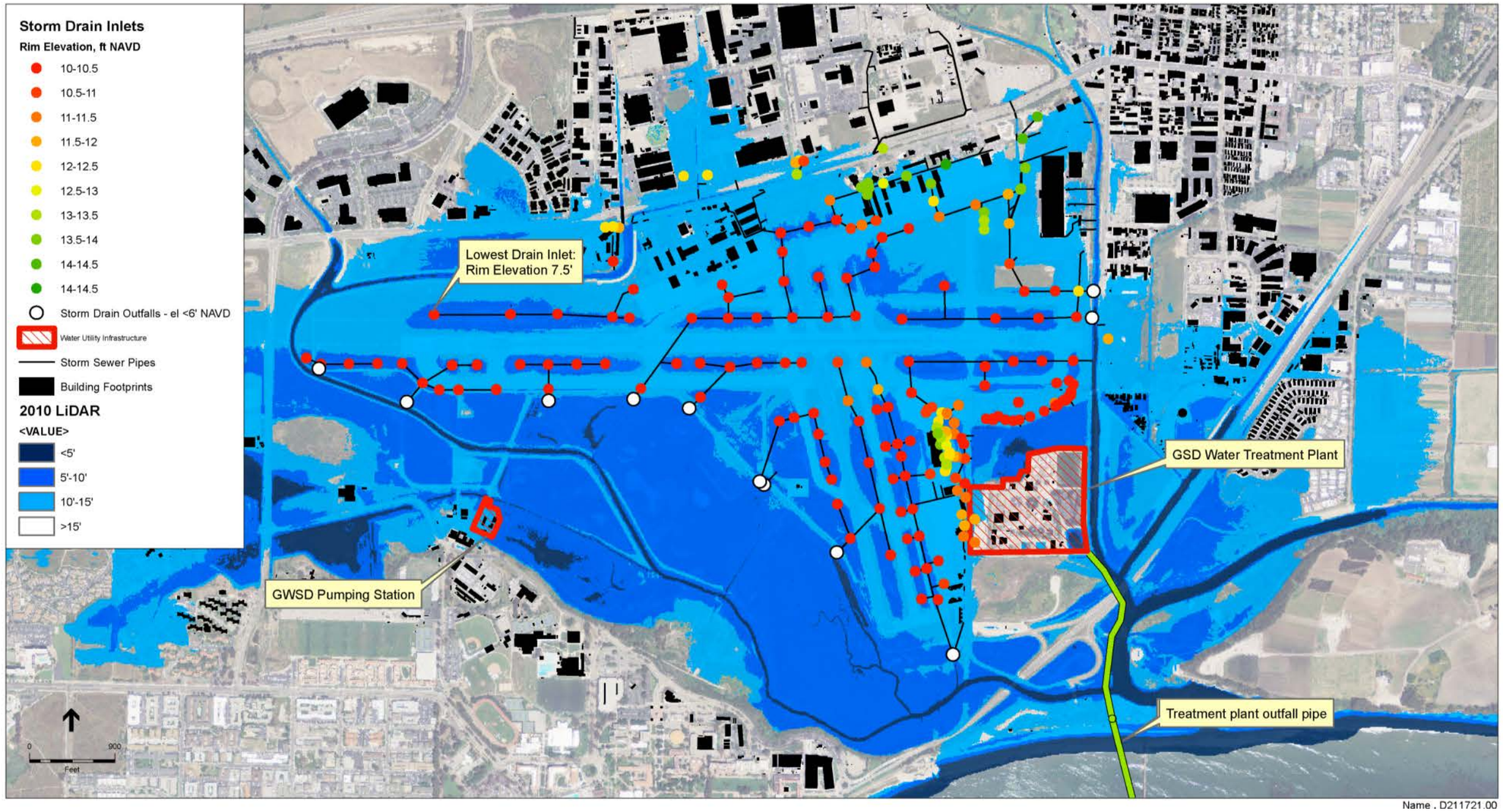
Figure SI-7. Water Utilities and Storm Sewer near Goleta Sloug



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Pipe and Inlet/Outfall Locations - Pennfield & Smith; Goleta Sanitary District

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Table SI-13. Storm Drains and Sewers Adaptation Strategy

Adaptation Strategy	Adaptation Measure	Benefits	Drawbacks	Sea Level Rise Accommodation	Relative Cost	Estimated Lead Time
No Action	**Do Nothing** (no artificial lagoon mouth breaches)	No upfront cost	Future operations and maintenance costs due to more frequent flood damages to structures and increased risk to life and property.	0ft – Storm drains in Placencia St. neighborhood flood during high water events under existing conditions. Storm drains on airport infield may drain poorly when lagoon water levels are >5.0'.	N/A	N/A
Management Options	**Inlet Management** Manage lagoon inlet through breaches or beach shaping to limit the elevation of ponding during lagoon closures.	Significant reduction in lagoon water levels.	Permitting Requirements. Potential impacts to sensitive and endangered species. Impacts to beach access/recreation.	1ft Storm drain system becomes less effective when lagoon water levels exceed 6.0'. During open inlet conditions, drainage reduced during high tides.	Low to Moderate (depending on cost of permitting process)	1 day (emergency breach) 1-5 years (permitted managed breaches)
Management Options	**Install pumps or siphons to drain infield during rainfall events with high lagoon water levels**	Allows system to manage some level of storm water runoff during high lagoon water level events.	Increased operations, maintenances and equipment storage/rental costs. Potential complications associated with discharge or permitting associated with tying into ocean outfall pipe from Sanitary district.	~2 ft (with Inlet and Beach Management) The storm drain system will fail if the taxiways flood due to elevated lagoon water levels.	Low-Medium	1 week (Temporary pumps) 1 year (permanent pumps)
Relocation	N/A – Airfield requires storm drainage system, no relocation possible without relocating airfield.	-N/A	-	-	-	-
Protect in Place	**Construct new levees and add additional storm water retention capacity.** May be combined with pump systems as	Allows for accommodation of larger amounts of rainfall and longer duration of elevated lagoon water levels before storm drain capacity is exceeded.	Cost of installation. Disruption of airfield operations during construction. Potential permitting requirements for new levee construction. Feasibility of new levee construction may be limited due to geometric constraints presented by existing roadways, buildings and runways.	>5' (if combined with inlet management and pump system)	High – Very High	5-10 years
Change Uses	N/A – Cannot change usage of storm drains without changing usage of airfield.	-	-	-	-	-

Appendix G – Goleta Slough Inlet Modeling Study

This Appendix presents the results of the study conducted by Environmental Science Associates (ESA) to model how various management practices and sea level rise scenarios affect the dynamics of the Goleta Slough lagoon mouth[1]. The study provides an improved understanding of how changing the management of the lagoon inlet may impact water levels within the Slough and patterns of breaching and closing of the lagoon mouth, with implications for local flood risk and habitat. This study was conducted for the City of Santa Barbara to inform ongoing efforts to develop a sustainable inlet management plan that addresses both flood control and ecological uses of the Slough.

This study was made possible thanks to the Santa Barbara Coastal Resource Enhancement Fund (CREF), US Fish and Wildlife Service, the City of Santa Barbara, Coastal Conservancy and the Goleta Slough Management Committee (GSMC).

We would also like to acknowledge the contributions of Dr. Lisa Stratton and others at the Cheadle Center for Biodiversity and Ecological Restoration, who contributed to field data collection and site observation in support of this study.

KEY FINDINGS

The following are the key findings of the Goleta Slough Inlet Modeling Study based on simulations conducted by ESA using the Coastal Lagoon Quantified Conceptual Model (QCM). Details related to the QCM set-up and specific scenarios modeled are described in more detail in the "Model Development" and "Scenario Modeling" sections later in this memorandum.

Storage Volume Adjustments:

ESA has evaluated a set of model scenarios which test the sensitivity the lagoon mouth to adjustments to the storage volume of the Slough. This sensitivity analysis evaluates the expected impact of large changes to the Goleta Slough landscape on the dynamics of the lagoon. These scenarios are representative of landscape-scale changes to the Goleta Slough topography, such as large scale habitat restoration projects and major flood protection projects. The following are the key findings of this study related to storage volume adjustments:

- Alterations to the Goleta Slough landscape which increase the volume of the Slough are predicted to have two main effects on the lagoon inlet:
    1. An increased lagoon volume delays natural mouth breaches that are caused by watershed inflows due to the larger storage capacity below the breaching water level; and

[1] The lagoon mouth is also called the lagoon "inlet" due to the tidal inflows which enter Goleta Slough through the lagoon mouth under open conditions.

2. An increased lagoon volume delays the closure of the lagoon mouth due to increased tidal scour associated with the increased intertidal volume, also called "tidal prism".

- Specific projects can be designed to emphasize open conditions or closed conditions by adding or removing storage volume within certain elevation ranges. Storage volume added in the intertidal range enhances tidal scour, which encourages open conditions. Storage volume added between the high tide elevation and the elevation of the beach berm encourages closed conditions by increasing the potential for ponding during rain events.

- Decreasing the Slough volume is predicted to cause a small decrease in the percent of time that the lagoon mouth is closed since the lagoon will breach more quickly during rain events, but it will also reduce tidal exchange and increase the likelihood of closure during dry conditions.

- Sensitivity analysis suggests that increasing the tidal prism of the lagoon by ~600-800 ac-ft would result in an almost-always open system. Such an increase in lagoon tidal prism may greatly reduce the frequency of mechanical breaches required in order to achieve flood protection and habitat goals. There does not appear to sufficient open space available near Goleta Slough to achieve this level of tidal prism enhancement through the creation of inter-tidal habitat without significant land use changes.

- Smaller increases in lagoon volume, on the order of ~200-400 acre feet may increase the frequency of natural open conditions, but may require intermittent lagoon mouth management to avoid flooding. This result suggests the potential for multi-benefit projects through the creation of new tidal wetlands in areas of the Slough that are currently diked off from tidal action.

Sea Level Rise:

ESA has evaluated several scenarios which represent existing conditions and expected future conditions at the Slough based on projected rates of sea level rise. The following are the key findings of this study related to sea level rise:

- Rising sea levels are predicted to increase the elevation of the beach berm, which will in turn increase the storage volume of the lagoon and decrease the likelihood of the lagoon breaching naturally during small and medium sized rain events.

- For small amounts of sea level rise (up to +1 foot) the model results indicate an increased likelihood of extended periods of mouth closure, especially during dry years (assuming no managed breaches occur).

- If the lagoon mouth is not managed, model results predict an increase in the duration of ponded conditions at the lagoon for sea level rise up to +1 foot. The increased occurrence of ponding causes predicted average water levels within the lagoon to rise faster than the rate of sea level rise under unmanaged conditions for up to +1 foot of sea level rise.

- As sea levels continue to rise, eventually the tidal prism of the lagoon will grow large enough that the lagoon channel will become self-scouring. At this point the lagoon will

transition to an almost always open system, with water levels controlled primarily by the tide elevation. Model results indicate that the lagoon mouth will almost always be open once sea levels rise +3 feet above existing conditions, with or without inlet management.

Inlet Management:

ESA has evaluated several scenarios representing potential future inlet management strategies where the lagoon mouth is mechanically breached whenever water levels within the lagoon exceed a pre-determined threshold elevation. The following are the key findings of this study related to these management strategies:

- Existing infrastructure near the Slough is at risk of flooding when water levels in the Slough reach approximately El. 9.0' NAVD. Model results indicate that the managed breaching threshold elevations of 1.25 and 2.25 feet above MHHW (El.6.5' and 7.5' NAVD) greatly reduces the frequency of occurrence of water levels above El. 9.0' NAVD in the Slough for scenarios with +0 and +1 feet of sea level rise.

- Model results for breaching at 3.75' above MHHW (El. 9.0' NAVD) and for unmanaged conditions showed the regular occurrence of water levels greater that El. 9.0' in the Slough, indicating a significant risk of inundation of nearby infrastructure for these scenarios.

- Model results indicate that managed breaching at any elevation cannot prevent the occurrence of water levels in the Slough above El. 9.0' NAVD for scenarios with +3 and +5 feet of sea level rise. The predicted frequency of occurrence of elevated water levels within the Slough continues to increase as sea levels rise.

- Sensitive pickleweed marsh habitat in the Slough may become degraded if inundated (water levels >7.0' NAVD) for an extended duration. Model results indicate that managed breaching with threshold elevations at 1.25 and 2.25 feet above MHHW (El.6.5' and 7.5' NAVD) can greatly reduce the frequency of occurrence of water levels above El. 7.0' NAVD relative to unmanaged conditions, both for existing sea levels and for scenarios with +1 feet of sea level rise.

- Based on these results, we conclude that inlet management is likely to be a viable strategy for achieving flood protection and habitat goals at Goleta Slough during the short- to medium-term for conditions on the order of +1 foot of sea level rise. The model results indicate that inlet management will become less effective at achieving flood protection and habitat goals under conditions with 3 or more feet of sea level rise.

- The model results indicate that the selection of a lower threshold elevation results in an increase in the number of predicted managed breaches, and a corresponding increase in the frequency of open lagoon conditions.

Key Study Limitations

- Due to the limited availability of water level and beach elevation observations at Goleta Slough, the analysis presented herein has only evaluated the expected patterns in breaching and closing of the lagoon mouth and lagoon water levels under "typical conditions" similar to those observed at Goleta Slough between 2010 and 2014. While this

time period includes a range of wet and dry conditions, we recommend additional study to better characterize the potential for elevated water levels, flooding and prolonged mouth closures due to extreme events such as El Nino, major floods and prolonged drought.

- The modeling conducted for this study simulates spatially averaged water levels within the Slough and is not intended to resolve small scale variations caused by local hydraulic features. This study has not evaluated the suitability of the modeled lagoon management strategies for achieving flood protection or ecological benefits or impacts at any specific parcel or location within the Slough.

- The modeling of coastal lagoon systems is an area of active research. This study attempts to apply the best available analytical methods to improve our understanding of the Goleta Slough system but several areas of uncertainty remain; see the "Model Limitations and Uncertainty" section bellow.

BACKGROUND

Goleta Slough is a coastal estuary in Santa Barbara County with more than 300 acres of tidal wetland habitat, a key resource for several threatened and endangered species including Tidewater Goby and southern Steelhead. Goleta Slough has experienced several large flood events over the past century; including major floods which forced the closure of the Santa Barbara Airport in 1969 and 1995. As the climate changes and sea levels rise, the risk of flooding and other adverse impacts to both infrastructure and habitats due to elevated water levels within Goleta Slough will increase. Figure G-1 shows the Goleta Slough study area, which is located at the downstream end of the 45 square mile Goleta Slough watershed.

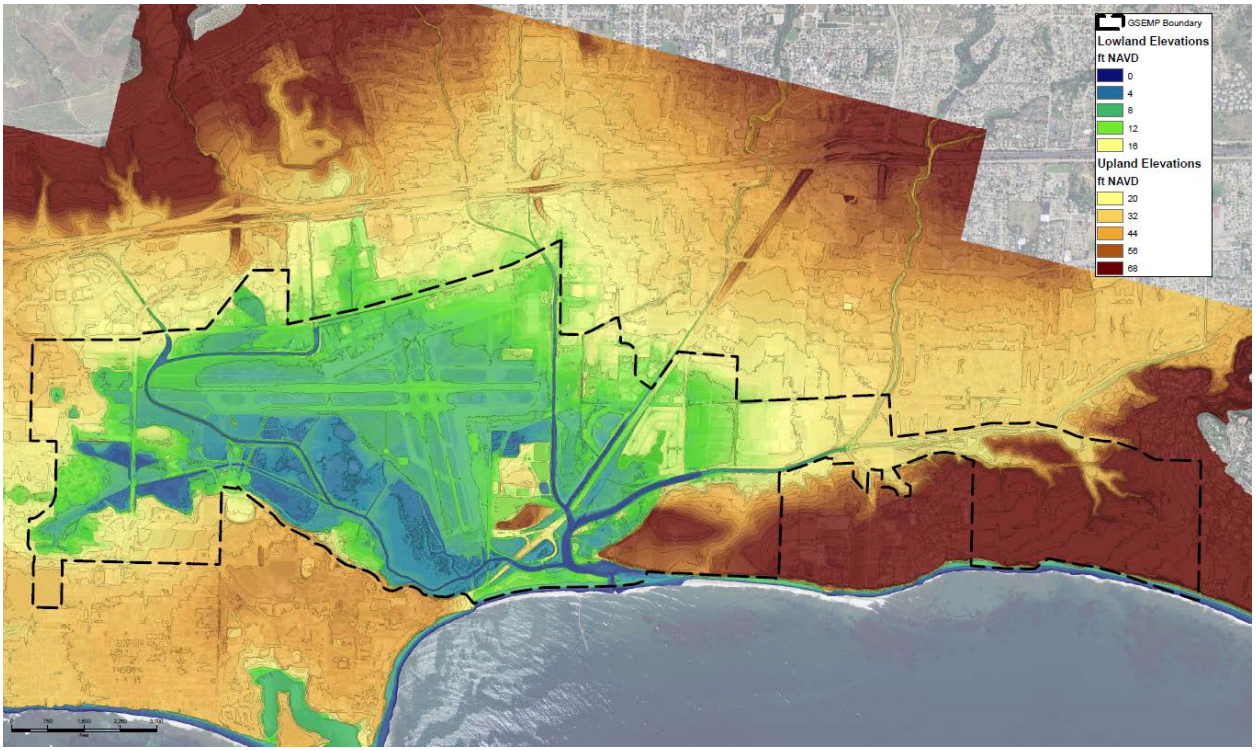

Figure G-1 – Goleta Slough Study Area with NOAA Lidar (NOAA, 2012)

Historic maps show that Goleta Slough once contained an extensive open-water area at the location of the present-day Santa Barbara airport. The large tidal prism associated with this open-water area suggests that under pre-development historic conditions Goleta Slough was most often a tidal coastal lagoon with internal water levels closely matching ocean water levels. Over the last century extensive infill and sediment deposition within the lagoon has led to a massive reduction of tidal prism which has resulted in a lagoon that, when unmanaged, naturally tends towards closed inlet conditions. Under closed inlet conditions water levels within the lagoon are controlled primarily by watershed inflows and the beach elevation.

Goleta Slough is located in Central California approximately 8 miles west of Santa Barbara. This region experiences mixed semi-diurnal tides, with a great diurnal tide range of 5.4 feet. Table G-1 lists several key tidal datums measured at the nearby Santa Barbara Tide gage (NOAA #9411340).

Datum	Elevation (ft NAVD)
Mean Higher High Water (MHHW)	5.27
Mean High Water (MHW)	4.51
Mean Sea Level (MSL)	2.66
Mean Low Water (MLW)	0.85
Mean Lower Low Water (MLLW)	-0.17

Table G-1 – Goleta Slough Study Area

For purposes of this study it is assumed that all tidal datums will shift upwards equally with rising sea levels.

In recent years the lagoon has often been mechanically breached by excavating through the beach berm in order to open the lagoon mouth during extended periods of closure. Following these mechanical breaches, the lagoon eventually returns to closed conditions. This most often occurs during the following dry season, with the timing of mouth closure varying depending on wave conditions and the amount of streamflow entering the lagoon from the watershed. Managed breaches had historically been conducted by the Santa Barbara Flood Control District with the presumptive goal of reducing flood risk and improving water quality, however it is not clear what if any analysis was conducted to support these goals and there are few records documenting the frequency and manner in which these breaches occurred.

In 2013, the Flood Control District decided not to continue managed breaching of the lagoon. This decision was attributed to the high expected costs of the biological studies that would be necessary to renew the permits. A limited number of managed breaches have occurred since 2013 under emergency permits strictly to prevent flooding during major rain events; meanwhile the City of Santa Barbara has commissioned studies to evaluate the impact of managed breaches on the local ecology and to plan for the long term management of the Goleta Slough estuary.

STUDY OBJECTIVE

This study is intended to inform an ongoing effort among local stakeholders to plan for the long-term management of Goleta Slough by providing an improved understanding of how various management strategies are likely to affect lagoon hydrodynamics. ESA has developed a Quantified Conceptual Model (QCM) which represents the key physical processes that control water levels and breaching dynamics for coastal estuaries and lagoons. ESA has calibrated this model for Goleta Slough based on available historical water level data and then applied this model to study the expected conditions at the lagoon under several potential future conditions scenarios.

The goal of the Goleta Slough Inlet Modeling Study is to apply a quantified conceptual model ("QCM") of lagoon hydrodynamics to evaluate and compare several potential lagoon management strategies under existing conditions and for future sea level rise scenarios. This study has evaluated three sets of scenarios addressing the following topics:

- Adjustments to Lagoon Storage Volume
- Sea Level Rise
- Lagoon Mouth Management

These scenarios were evaluated based on wave, tide, precipitation and watershed conditions observed during a period spanning from October 2010 to July 2014. This period was selected

based on the availability of observed calibration data, and includes a "wet" year, WY[2] 2011; a "dry" year, WY 2013; and an "intermediate" year, WY 2012.

THE INLET QUANTIFIED CONCEPTUAL MODEL

A Quantified Conceptual Model ("QCM") is a numerical model that attempts to simulate the evolution and interaction of complex physical systems through the use of numerical representations of each of the key processes which control how that system behaves. The QCM used for the Inlet Modeling Study represents the key processes which control water levels within Goleta Slough. These include the growth and erosion of the lagoon inlet bed ("sill") and beach berm due to waves, inlet bed scouring from tides and stream flows; inflows to the lagoon due to precipitation and watershed inputs; and outflows from the lagoon due to evaporation, groundwater seepage, and flow through the lagoon channel. By tracking these several processes over time, the QCM can be used to predict water levels within the lagoon and to evaluate the periodic opening and closure of the lagoon mouth.

The QCM uses observed historic data to represent the influence of coastal and watershed processes on the lagoon. Key input parameters include:

- Topography and bathymetry of Goleta Slough, derived from 2010 Coastal LiDAR (NOAA, 2012) and surveyed cross sections (CCBER, 2015)
- Nearshore wave data derived from prior ESA studies at Goleta Beach
- Synthetic stream flow time series based on hydrologic analysis of the Goleta Slough watershed (see Attachment A)
- Evaporation and rainfall data from CIMIS Station #94 (Goleta Foothills)
- Seepage rate estimates based on basic beach geometry, observations of beach sediment size, and nearby seepage studies.
- Beach growth rate parameters estimated from local observations of beach elevation

The following sections contain detailed descriptions of the model setup, the input parameters, and the limitations and uncertainties of the model results.

The evaluation of changes in watershed hydrology due to climate change was outside of the scope of this study. Changes in watershed runoff may affect the dynamics of the lagoon inlet, including the frequency of breach and closure events and therefore future investigation in this area may prove informative for lagoon management.

Modeling Approach

At its core, the QCM is a water balance model which accounts for the different flows of water entering and leaving the lagoon. This water balance is coupled with a dynamically-varying beach

[2] WY – "Water Year", a 12-month period commonly used in hydrologic analysis which begins on October 1 and ends on September 30. Water year 2011 began on October 1, 2010 and ended September 30, 2011.

and inlet system, accounting for the fact that bar-built estuaries, such as Goleta Slough, are often defined by a morphologically unstable mouth (inlet) that influences the lagoon stage, volume, and flowrates.

The model dynamically simulates time series of inlet, beach, and lagoon state based on external forcing from waves, tides, and stream input (Battalio et al. 2006; Behrens et al. 2013; Rich and Keller 2013). The model is based on two core concepts:

- All water flows entering and leaving the system should balance.
- The net erosion/sedimentation of the inlet channel results from a balance of erosive (fluvial and tidal) and constructive (wave) processes.

Rules enforcing beach berm growth, equilibrium inlet geometry, beach seepage, and inlet closure and breaching, are drawn from the research literature and approaches derived from prior project experience.

The model provides the following outputs:

- Time series of inlet state (open or closed to the ocean) and geometry (depth and cross sectional area)
- Time series of lagoon stage and volume (which can be used to assess inundation frequency and flood risk)
- Estimated hydrologic inputs and outputs, including wave overwash, berm seepage, evapotranspiration, and inlet flows.

When a range of external conditions (beach management, climate change) vary with time, these outputs can be used to predict potential changes in short-term and seasonal behavior at the inlet, and to inform future management for habitat and flood risk. The model has been verified extensively using field data. The most recent work on the Russian River, Mission Creek, San Lorenzo, and Devereux Slough lagoons has shown that the model performs well under a wide range of hydrologic and oceanic conditions. Preliminary results discussed below also suggest a high level of model competence for Goleta Slough.

MODEL DEVELOPEMENT

This section outlines the process of applying the inlet QCM to a coastal lagoon system. We list the steps needed to initialize the model and also discuss the methods the model applies to characterize the key lagoon and coastal processes which shape the system response to external forcing. Figure G-2 provides a flow chart schematic of the model procedures described in this section.

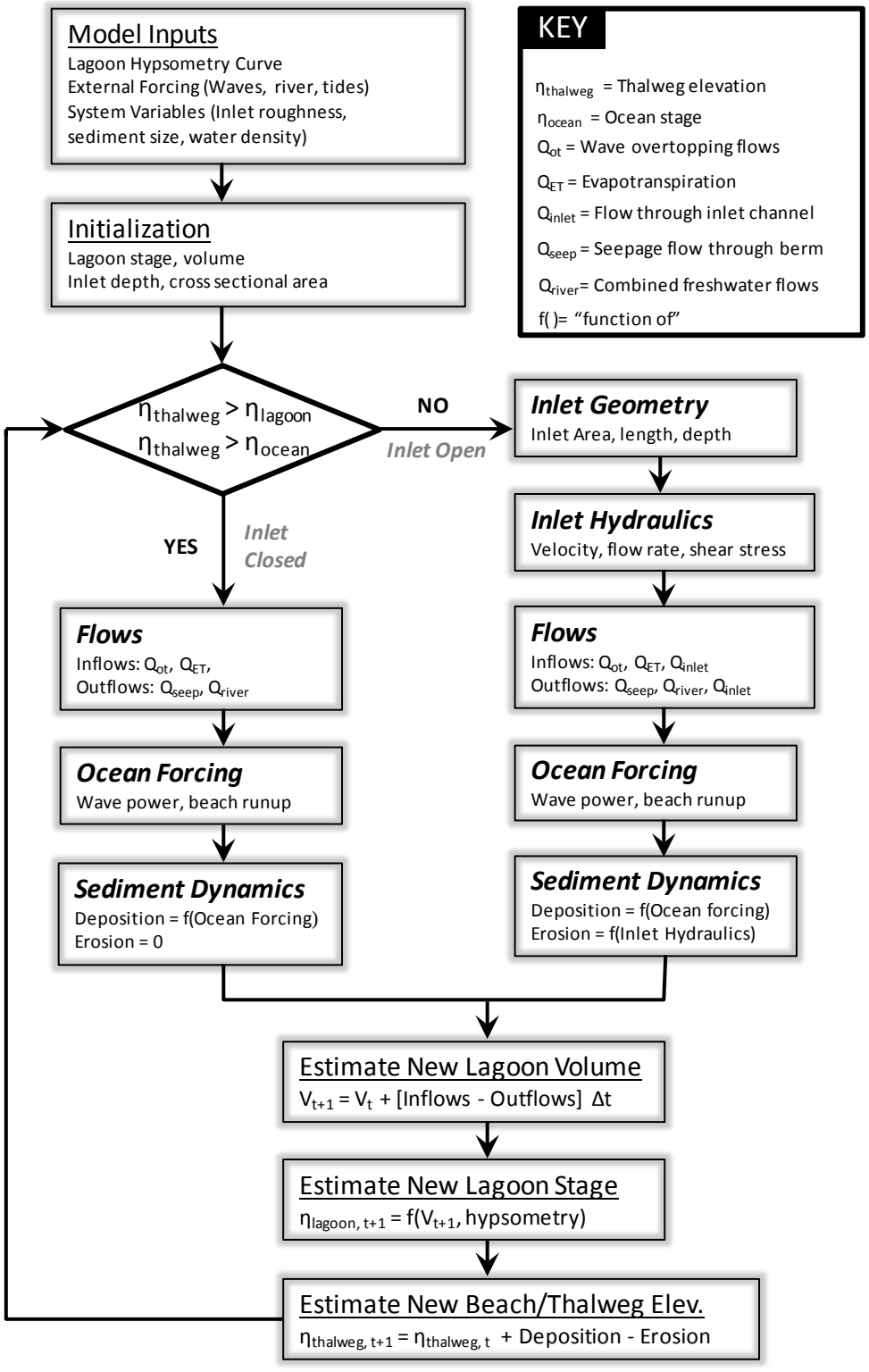

Figure G-2 – Inlet QCM Schematic

Lagoon Representation

The lagoon is modeled as a basin with a known hypsometry (stage-storage relationship). Lagoon characteristics, including surface area, stage, and volume, are derived from the hypsometry. Figure G-3 shows the hypsometry curve for Goleta Slough.

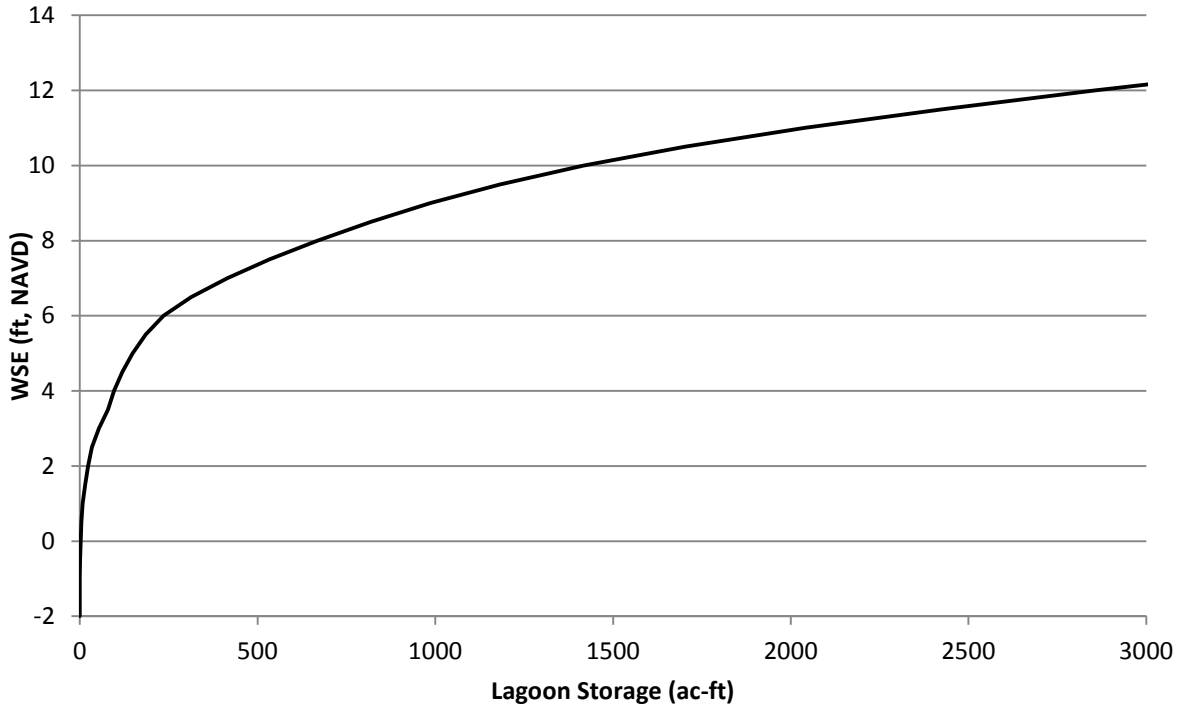

Figure G-3 – Goleta Slough Hypsometry

The beach is characterized by a known length (shore-parallel length), width (cross-shore length), beach face slope, median sediment grain size, and permeability (used to estimate seepage flows). When the inlet is open to the ocean, it is treated as a channel having variable width, length, depth, cross sectional area, and channel roughness. The depth of flow through the inlet is calculated as the difference between the lagoon stage and the mean elevation of the channel bottom.

Boundary Conditions

Boundary conditions are applied to the lagoon representation as inputs/outputs and sources/sinks. A source term is used to represent inflows to the lagoon from the upland watershed. Wave overwash and inlet flows, which can be directed either into or out of the lagoon, connect the lagoon to the ocean. Water is also allowed to leave the lagoon via berm seepage and evapotranspiration. The beach is treated as a barrier between the lagoon and the ocean. Coastal processes (waves and tides) are allowed to shape the beach, a process that occurs simultaneous with the balance of lagoon water inflows and outflows. Table G-2 lists the sources of data used to populate boundary condition time series.

Parameter	Source/Location	Position	Measurement Period
Offshore Waves	NDBC Buoy 46216: Goleta Point	34.333 N 119.803 W	2004-present
Nearshore Waves	ESA PWA transformation matrix from NDBC Harvest Buoy (46218)		2004-present
River Flow	USGS: Atascadero Cr Near Goleta USGS: San Jose Cr Near Goleta	34.425 N 119.811 W 34.459 N 119.808 W	2007-present 2007-present
Ocean Stage (water level)	NOAA: Santa Barbara (9411340)	34.405 N 119.692 W	2005-present
Inlet Condition (Open/Closed)	Anecdotal Reports from GSMC and local stakeholders	(various)	(various)
Inlet Shape	Photos provided by GSMC and City of Santa Barbara	(various)	(various)

Table G-2 - Summary of sources of data used for modeling

Model Initialization

The QCM was applied to Goleta Slough by first defining the following:

- Coastal and fluvial boundary conditions for the site (see Table G-2),
- Lagoon hypsometry,
- Beach roughness, sediment size, and shape,
- Time step, and
- Initial conditions.

LiDAR and cross section survey data were processed in ArcGIS to provide stage-storage and stage-area relations for the lagoon. The median beach sediment size was taken as 1 mm, following Behrens et al. (2013), and we applied a Chezy roughness value corresponding to coarse sand for the inlet. Aerial Photography described in the Goleta Slough Ecosystem Management Report were used in ArcGIS to characterize the beach length, width. A typical beach face slope of 1:10 (vertical: horizontal) was identified based on surveyed beach profiles (CCBER, 2015).

The model advances in time using a constant time step chosen by the user. The choice of the time step influences model stability and level of accuracy in resolving the lagoon water level time series, especially during high river flows. Testing of the Goleta Slough QCM indicated that a model time step of 20 seconds met these modeling criteria and was used for the preliminary results discussed below. All of the time series boundary condition data sets are interpolated to match the chosen time step.

Lastly, the model is initialized by assuming initial inlet channel dimensions, and the initial lagoon stage and volume. The inlet is typically assumed to be open at the first time step and is allowed to adjust to the boundary conditions over several time steps. We found that model results were typically independent of the initial condition within several days after the first time step.

Water Balance Components

When the inlet is closed, the water balance is calculated as a sum of wave overwash, evapotranspiration, berm seepage, and river inflows. Wave overwash is estimated using the coastal engineering approaches described in the Existing Conditions Report (ESA PWA 2012). We estimate evapotranspiration using the nearest node of the California Irrigation Management Information System (CIMIS) database. Berm seepage is estimated using a D'Arcy approach based on the work of Rich and Keller (2013) in Carmel Lagoon.

When the inlet is open, inlet flows represent additional terms in the water balance. Estimating these terms requires knowledge of the inlet geometry and hydraulics. The inlet geometry is calculated based on flows in the prior time steps. A daily-average cross sectional area is estimated from Hughes (2002) based on flows through the inlet during the previous 24 hours and beach parameters. This mean is amplified or decreased according to the level of the tide by applying a multiplier based on the deviation of the ocean tide from its 24.5-hour lunar mean. The inlet depth is represented using the knowledge of the lagoon stage and the shape of the inlet cross sectional area, as described above. The inlet length is taken as the beach width (length in the cross-shore direction). Inlet velocity, flow rate, and shear stress are then estimated using the Van de Kreeke (1967) approach, which is based on a solution for inlet momentum in the along-channel dimension.

The change in lagoon stage is evaluated using the flows described above. The sum of the inflow and outflow terms is multiplied by the time step to give the change in lagoon volume. This is used in conjunction with the known stage-storage curve to arrive at the new lagoon stage for each time step.

Inlet Morphology Components

Inlet morphology in the QCM is treated as a balance of beach/inlet erosion and deposition. Ocean waves are assumed to deposit sediment on the beach, raising the inlet thalweg, while currents in the inlet remove (erode) sediments, lowering the inlet thalweg. Closures result in the model when deposition is greater than erosion for a long enough period of time to allow the inlet thalweg to rise above both the lagoon and ocean stages.

Inlet erosion is evaluated using the inlet velocities and flow rates described in Section 2.4. We use the Bagnold (1966) energetics approach, which accounts for both bedload transport and the bed material that is eroded and transported out of the inlet as suspended load.

Inlet deposition is evaluated using two approaches. When the thalweg is below high tides in the ocean, inlet deposition is based on the adjacent wave power. When the inlet accretes above the high tide level, deposition becomes a function of the total water level (combined tide and wave runup levels), which has a decreasing likelihood of depositing sediment when the inlet thalweg rises higher above the total water level.

At each time step, the change in the inlet thalweg elevation is taken as the sum of the deposition and erosion at that time step. The total net rate of deposition and erosion is achieved by multiplying by the time step, and the total rate of bed movement in the vertical direction (i.e. net erosion or accretion) is attained by dividing this volume by the total area of the inlet bed. This operation influences the depth, but not the cross sectional area, which we estimate empirically. The change in inlet depth subsequently influences the inlet flows.

Determining Inlet State

Prior to evaluating the water balance and inlet morphology at each time step, the model evaluates the following rule: “Is the inlet thalweg higher than both the ocean and lagoon stage?” When this is true, the inlet is considered to be “closed”, and inlet flows are assumed to be zero. When this is false, inlet flows are above zero, and the inlet is either tidal or has one-way flow over the beach.

The model automatically transitions from having a closed inlet to an open inlet when ocean or lagoon water levels surpass the inlet thalweg elevation. In the latter case, the model reintroduces a small channel on the beach, which either leads to non-breaching perched overflow conditions or a full inlet breach depending on hydraulic conditions (predominantly driven by slope between the lagoon and ocean stages).

Inlet shape (cross sectional area, width, depth) can vary in response to channel hydraulics and wave deposition in the model. For this study the inlet is assumed to be oriented perpendicular to the beach, and does not move laterally (migrate) along the beach. Deflection of the mouth due to sedimentation in one side of the channel and eventual mouth migration are important processes, as continued migration can lead to channel lengthening and increased wetted area (and thus seepage to the ocean). This is an area of ongoing research.

MODEL VALIDATION

The aim of the validation process is to use the QCM to reproduce observed historic conditions as closely as possible, in order to establish confidence that the QCM produces a realistic representation of the physical system and to reveal potential shortcomings or limitations of the model. The QCM was validated based on observed water levels in Goleta Slough from 2010 to 2014. This period includes dry and wet years, as well as varying degrees of active lagoon mouth management. Several managed breaches are believed to have occurred during the validation period: July 11, 2011, October 25, 2011, February 12, 2012, and March 1, 2014 (Andrew Bermond, pers. coms. 2014). For the validation scenario managed breaches were specified to occur on these dates in order to accurately model these events, since these breaches were not the result of natural physical processes and therefore would not otherwise have been captured by the model.

Figure G-4 shows the measured and modeled lagoon stage within Goleta Slough for the validation period. The model was found to perform well during the simulation of the validation period. During

the validation period, and throughout the period from 2010 to 2014, the QCM predicted lagoon stages that replicated the patterns of observed lagoon stage.

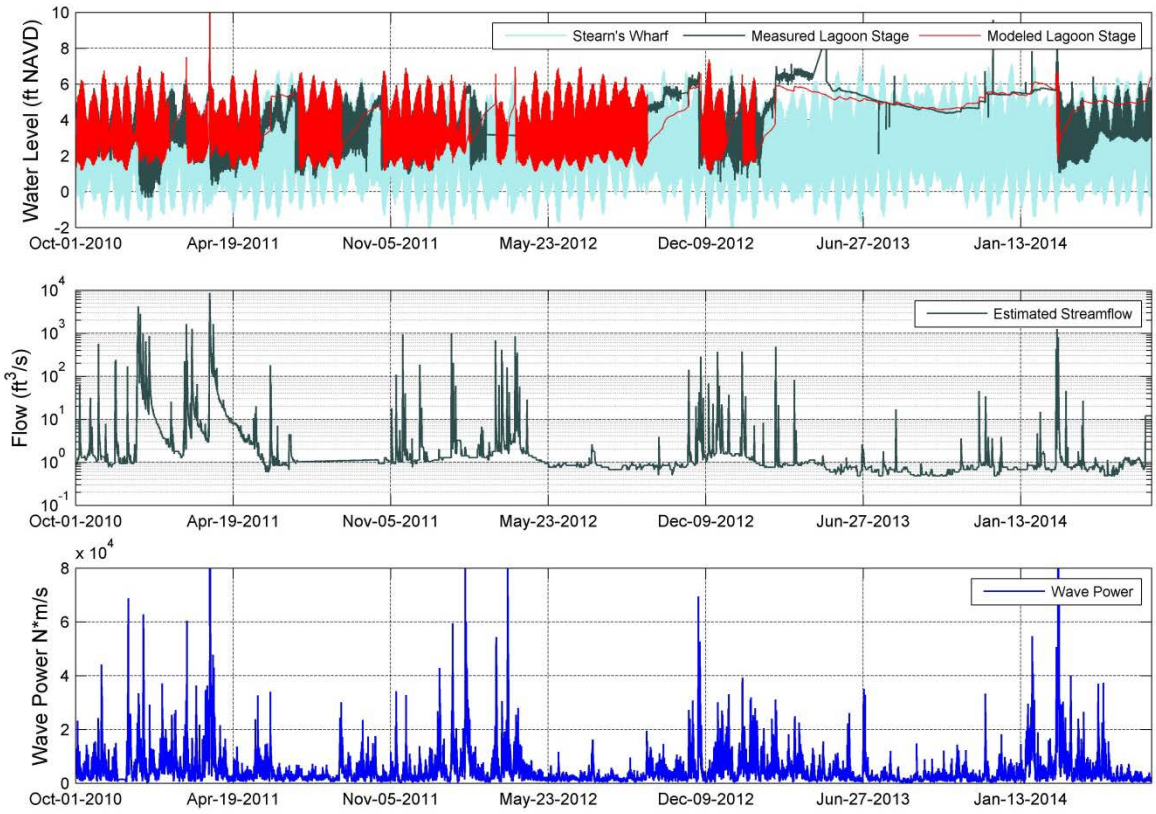

Figure G-4 – Predicted vs Observed Water Levels at Goleta Slough, with Watershed and Wave Inputs

This model skill was achieved even with simplified representations of the relevant processes. Although there are a few events where the model does not accurately predict the timing or duration of closure events, the validation simulation nevertheless demonstrates that many of the key physical processes governing lagoon behavior are accurately represented by the QCM. Some of the processes observed to be captured by the model include:

- coincidence of modeled and observed closure events during periods of high wave power and/or low shear stress from flows in the inlet,
- a slow rise in modeled lagoon stage during inlet closure events that is generally consistent with observations,
- a tendency of the modeled inlet thalweg to shoal during neap tides, leading to subsequent tidal muting in the lagoon and risk of closure,
- fluvial floods causing similar increases in modeled and observed lagoon stage, and
- coincidence of modeled and observed self-induced breach events induced by lagoon flows overtopping the beach.

One of the challenges of applying a QCM approach to Goleta Slough is that there are no direct measurements of flow rates through the mouth, wave overwash into the lagoon, subsurface seepage through the beach, or evaporative losses at Goleta Slough. Although these are all crucial

hydrologic processes, it is rare for any of these data to be available for California lagoons. The only indicator that these processes are being captured by the model is the modeled lagoon water level time series, which we found closely matches observed water levels. Most breach and closure events were predicted within several days of the observed events, and the modeled water levels generally matched the observed water levels. The model appears to underestimate the depth of scour during large rain events, including the the 2010 winter rains and the spring 2014 breach event, however it appears to accurately capture scour during moderate rain events. The model does show minor errors in the predicted timing of breach events, and appears to slightly overestimate the speed at which the lagoon mouth closes during times when the lagoon experiences muted tidal conditions. Such errors are to be expected given the difficulty in modeling a complex coastal system.

Model Limitations/Uncertainty

The QCM provides estimates of lagoon conditions based on our best understanding of the various processes which shape the beach, slough, and inlet. Coastal lagoons are highly complex systems which are influenced by a wide range of physical forces, and which can be highly sensitive to modest changes in the timing and/or magnitude of the physical forcing which drives the system. Efforts were made to use the best available input datasets and numerical parameterizations to drive the QCM, however these efforts were constrained by the limited availability of data documenting historic lagoon conditions and by the general uncertainty related to several key physical processes known to occur at the lagoon. In particular, the following factors introduce uncertainty with respect to the accuracy of the QCM's predictions:

- The rate of beach growth/accretion and the geometry of the lagoon channels are not well documented at Goleta Beach.
- The rate of subsurface outflows ("seepage") through the beach is not well understood.
- Stream gages are present on only 2 of the 5 main creeks flowing into Goleta Slough (Atascadero and San Jose Creeks.). Attachment A describes the method used to adjust the streamflow input time series to account for the ungaged streams.
- There is only limited documentation for the timing of historic lagoon management actions.
- There is significant uncertainty with respect to the expected impacts of climate change on the Goleta Slough region. For this study we have evaluated scenarios which consider the impact of increased sea levels, however the QCM does not capture other potential impacts due to climate change, including changes to stream flow rates, evaporation, and wave conditions.
- The ability to establish confidence in the model results through calibration/validation is limited by the relatively short duration (~4 water years) of observed water level data within the lagoon, and lack of historic beach elevation surveys.

Each of the above-listed factors represents an area of uncertainty that may influence the model results leading to potentially inaccurate predictions. In some cases uncertainty introduced by these factors could be reduced by the incorporation of additional historic data or field observations. In particular, we recommend continued observations of lagoon water levels, beach elevation and inlet channel dimensions over the coming years.

SCENARIO MODELING

The Goleta Slough QCM has been used to evaluate a range of potential future scenarios in order to provide additional understanding of the role that key processes in driving lagoon dynamics, and to inform future lagoon management. These scenarios were developed in order to evaluate the following topics:

- Changes to the Lagoon Storage Volume

  For these scenarios the Stage-Storage relationship that is used to represent the volume of the lagoon was increased and decreased by +/-25% in order to represent the hydrodynamic impact of potential future projects which may cause alterations to the Goleta Slough landscape, changing the size of the lagoon. Additional sensitivity tests representing larger changes to the lagoon Stage-Storage relationship were also conducted in order to evaluate the sensitivity of the system to larger scale landscape alterations.

- Sea Level Rise

  Sea Level Rise scenarios were developed by applying a vertical shift to the tidal boundary condition in order to represent +0', +1', +3' and +5' of sea level rise.

- Inlet Management Practices

  The Inlet Management scenarios simulate mechanical breaches of the lagoon inlet whenever lagoon water levels within the lagoon exceed a pre-determined threshold elevation. This study assumes mechanical breaches area shallow (2-3' deep).

The QCM was used to model each scenario based on wave and watershed conditions observed during a continuous period spanning from 2010 to 2014. Results tracking the duration of closures and breach frequency were tabulated for separately for Wet (2011) and Dry (2013) years in order to highlight the range of variability which may occur due to year-to-year variations in precipitation. Table G-4, at the end of this memorandum, lists output statistics for the key model runs used for this analysis. Detailed descriptions of each of these scenarios, as well graphics highlighting the modeled changes in lagoon dynamics for each scenario are presented in the sections below.

Storage Volume Scenarios

The storage volume adjustment scenarios are intended to examine the expected impact of changes to the Goleta Slough landscape which alter the volume and tidal prism of the lagoon. The construction of levees to reduce the flood risk to infrastructure such as the airport and other low-lying parcels may result in a decrease in the lagoon volume and tidal prism. Creating hydraulic connections between existing diked areas and the existing marsh network (e.g. as part of habitat restoration efforts) would increase the lagoon volume and tidal prism.

The stage-storage adjustments used for these scenarios were implemented by multiplying the existing conditions stage-storage curve by a constant factor. Consequently, these scenarios represent conditions where the lagoon storage has been increased or decreased by a constant

factor at all elevations. These storage volume adjustment scenarios are intended to test the Slough's response to volume changes in general, and do not represent any particular physical project or landscape alteration. The impact of real landscape altering projects (restoration or flood control) would most likely only alter a specific range of the Slough's stage-storage curve, and the impact of said alterations on the Slough's hydrodynamics will vary depending on the elevation of the changes to the lagoon volume.

Figure G-5 shows time series and water level exceedance curves for existing conditions and for scenarios where the lagoon storage volume has been increased or decreased by 25%.

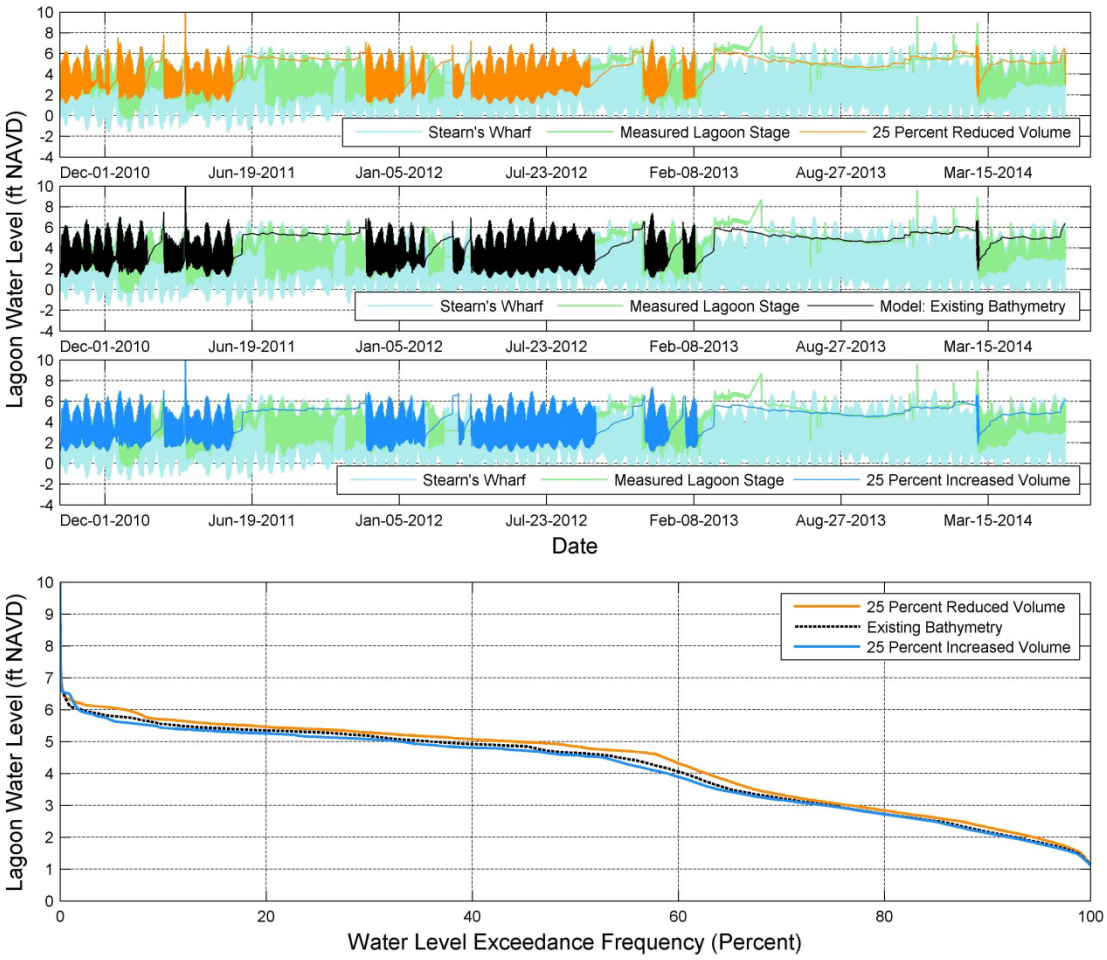

Figure G-5 – Model Results for Storage Volume Scenarios

While the differences between the increased and decreased storage volume scenarios were subtle, adjusting the tidal prism of the Slough was found to have two notable effects:

1. Increasing the size of the Slough delays breaching during rain events (and possibly causes the Slough to not breach during small rain events), while decreasing the size of the Slough accelerates breaches due to rain events. This effect is most strongly influenced by

changes in the storage area at elevations between MHHW and the beach berm crest elevation.

2. Increasing the size of the Slough delays the closure of the lagoon due to an increase in tidal scour (possibly preventing closure altogether), while decreasing the size of the Slough reduces tidal scour and makes it more likely for the lagoon mouth to close earlier in the season. This effect is primarily influenced by changes in the storage are at elevations between MLLW and MHHW.

There is a complex relationship between lagoon tidal prism and the fraction of time that the lagoon mouth is closed. For small coastal estuaries (like the existing Goleta Slough), modest increases in the tidal prism can result in an increase in the percent of time that the lagoon is closed. This occurs because for small systems Effect #1(delayed breaching during rain events) is stronger than Effect #2 (delayed closure during the dry season). As the tidal prism of the lagoon increases, Effect #2 becomes increasingly important, to the point that very large estuaries (eg. Bolinas lagoon, Elkhorn Slough, Tomales Bay) rarely close even during prolonged droughts. Figure G-6 shows a diagrammatic representation of this relationship for un-managed conditions.

Under present day conditions the Slough has an estimated potential tidal prism of ~200 ac-ft. The QCM results show that a 25% increase in lagoon volume results in a net increase in percent time that the lagoon mouth is closed. However, sensitivity tests also indicate that a much larger increase in volume (eg. +300%) results in a self-scouring lagoon mouth that is open year round during all but the driest years. Historic maps suggest that Goleta Slough likely had a tidal prism approximately five times greater than that occurring under existing conditions. The QCM indicates that with a tidal prism greater than 1000 acre-feet the lagoon experiences only brief closures during dry years and no closures during wet years.

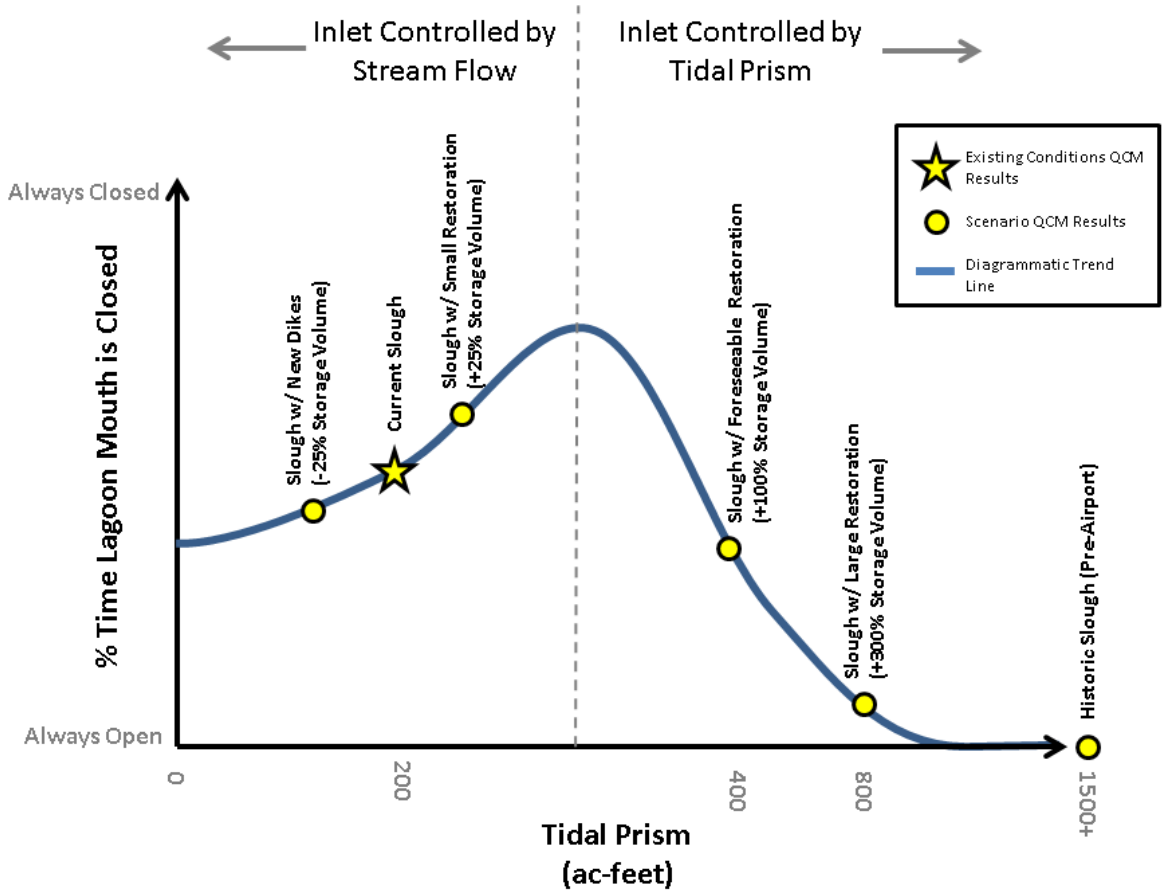

Figure G-6 – Trends in Frequency of Inlet Closure with Adjustments to Tidal Prism

While this study has only evaluated changes in the stage storage relationship that were applied uniformly across all elevations, real-world projects typically only increase or decrease the storage volume within a certain elevation range. The elevation range affected by such projects can be tailored during project design in order to achieve desired effects. For example, in order to manage for a more frequently open lagoon mouth it would be desirable to implement projects which increase the storage volume between MLLW and MHHW in order to encourage tidal scour, while not increasing the storage area above MHHW in order to avoid delayed breaches during rain events. In contrast, in order to manage for a more frequently closed lagoon mouth it would be desirable to reduce the storage volume between MLLW and MHHW so as to minimize tidal scour, and increase the storage volume between MHHW and the beach berm elevation, delaying breaching during rain events.

The historic strategy for managing the lagoon favors more frequent open conditions in order to reduce flood risk, maintain water quality, and to provide existing tidal wetlands within the Slough with a suitable tidal inundation regime. Increasing the inter-tidal storage volume of the lagoon through restoration and enhancement of tidal wetlands within the Slough is one method that may encourage extended periods of open conditions while potentially reducing the need for managed breaches.

Sea Level Rise Scenarios

The QCM was used to evaluate conditions under +0, +1', +3' and +5' of sea level rise. Rising sea levels were represented by applying a uniform upward shift to the tidal water level input time series. The elevated tide levels in turn increase the predicted elevation of wave run-up and beach berm elevation. No other lagoon input parameters were changed. Current climate change projections indicate that the Santa Barbara/Goleta area may experience warmer and slightly drier conditions by the end of the next century. These projections suggest that changes in the local climate could lead to a reduction in the average watershed inflows entering Goleta Slough; however this effect was not included in this study.

Additionally, climate change may alter prevalent wave conditions at Goleta Breach. Changes in wave conditions may alter the rate of growth of the breach berm, which would in turn affect the frequency of lagoon mouth closure. There is currently no consensus as to the expected impact, if any, that climate change and rising sea levels will have on wave patterns in the Pacific. For the present study we have assumed that future wave patterns will be similar to those observed in the present day.

Figure G-7 shows time series of water levels and water level exceedance curves for three sea level rise QCM scenarios. These runs show QCM results for 0', 1' and 5' of sea level rise, with managed breaching when lagoon water levels exceed MHHW + 1.25' (El. 6.5', 7.5' and 11.5', respectively).

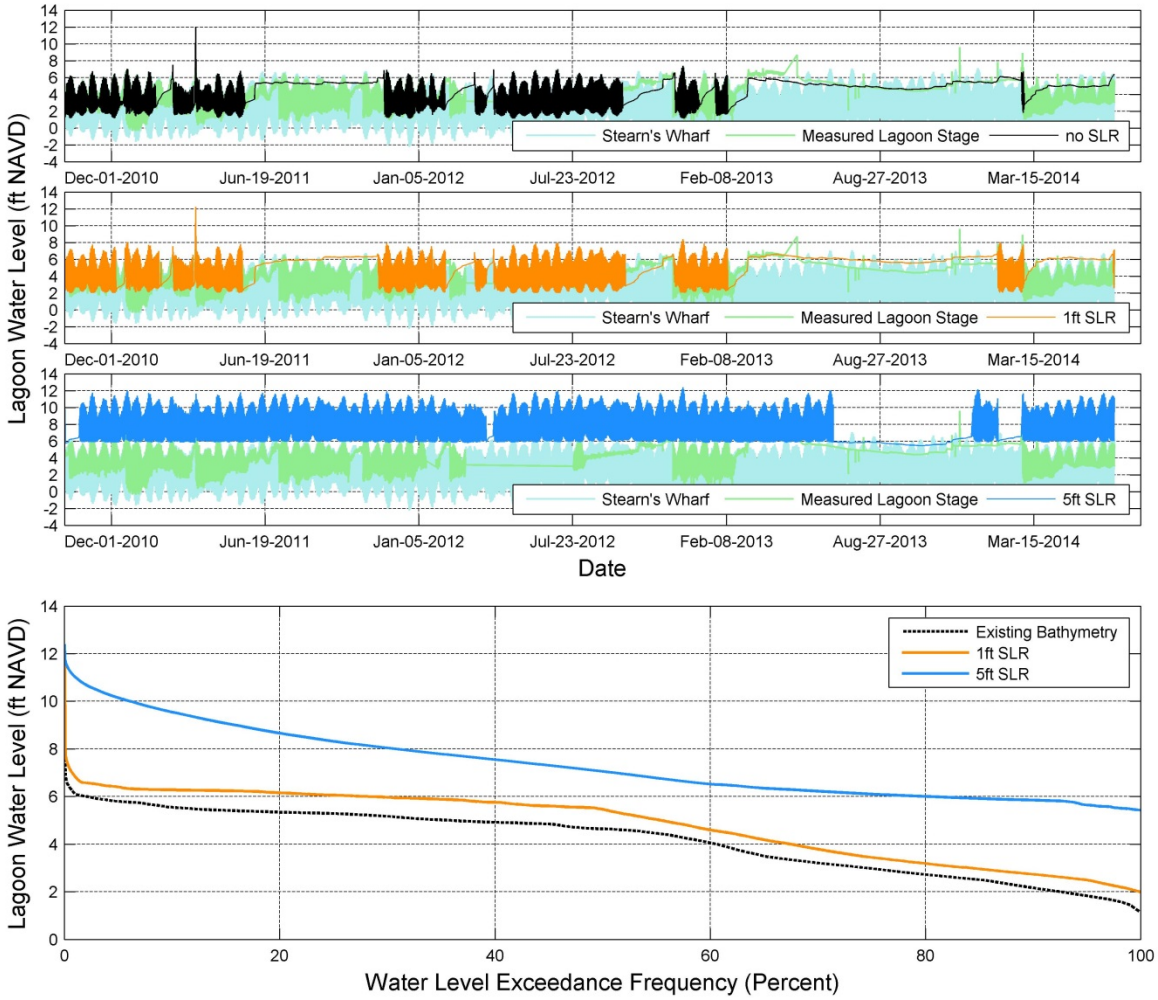

Figure G-7 – Model Results for Sea Level Rise Scenarios (with managed breaches at MHHW +1.25')

The main effect of elevated sea levels is to shift water levels within the lagoon upwards. The higher tidal water levels increase the tidal prism of the lagoon, while also increasing the elevation of the beach berm due to the increased elevation of wave runup. If the lagoon mouth is not managed, the net effect of these shifts is that for small amounts of sea level rise (+1ft) the lagoon will remain closed more often as the higher beach berm increases the storage capacity of the lagoon, delaying breaching during rain events. The higher beach berm and increased duration of closure leads to more frequent ponding, and generally increased water levels within the Slough. For larger amounts of sea level rise, the lagoon tends to be open more frequently due to the larger tidal prism and increased tidal scour of the inlet channel. Figure G-8 shows a diagrammatic representation of the general trends in lagoon inlet closure for various amounts of sea level rise:

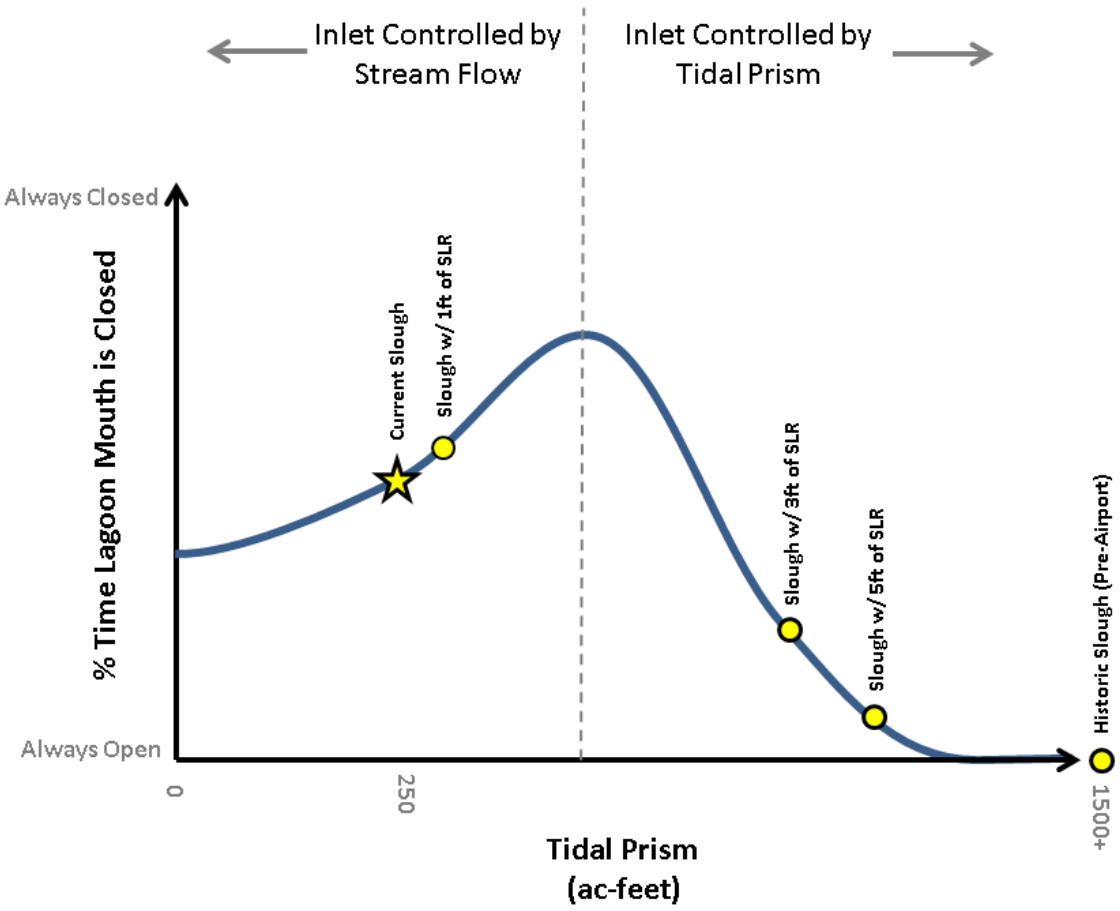

Figure G-8 – Trends in Frequency of Inlet Closure with Rising Sea Levels

Inlet Management Scenarios

Stillwater Sciences, in collaboration with Rincon Consultants and the City of Santa Barbara, has developed a set of proposed lagoon mouth management strategies that are intended to protect existing marshplain habitat which is adapted to historic managed lagoon conditions and also to provide flood protection to the airport and other infrastructure near the lagoon. The proposed strategies include seasonal management actions which will be conducted should water levels within the lagoon exceed a pre-determined threshold elevation. During the winter season (October 15 to March 31) the lagoon mouth would be mechanically breached if water levels exceed the threshold elevation. During the summer season a siphon would be installed and operated during times when lagoon water levels exceed the threshold elevation. The siphon would be used to lower water levels to an acceptable elevation. The proposed management strategies also include triggers for managed breaches in the event of increased waterfowl populations in close proximity to the airfield runways in order to minimize the hazard to aircraft operations.

ESA has analyzed the expected impact of the use of various threshold elevations to trigger managed breaches at Goleta Slough on overall trends in lagoon water levels and frequency of breaches and closures. ESA has not evaluated the suitability of these proposed management

strategies for the achievement of specific ecological or flood objectives, nor has ESA evaluated the potential environmental impacts and engineering feasibility of mechanical breaching. More information concerning the proposed management strategies will be provided in the forthcoming management plan currently under development by Stillwater Sciences and the City of Santa Barbara.

For this study, we have evaluated a set of management scenarios based on mechanically breaching the lagoon when water levels within the Slough exceed a pre-determined threshold elevation. These scenarios have been evaluated for conditions both with and without sea level rise. The modeled scenarios only include managed breaching based on water levels exceeding the threshold elevation, the modeled scenarios do not include the other management interventions proposed by Stillwater Sciences (pumps, siphons, breaching due to waterfowl, etc.).

There is uncertainty regarding the long-term management of the lagoon inlet as sea levels rise. For the purposes of this study, it was assumed that the threshold elevation for inlet management will be tied to the tide elevation, specifically the mean higher high water tidal datum ("MHHW"), and thus will shift upwards to match rising sea levels. Threshold inlet management elevations of MHHW +1.25', MHHW +2.25' and MHHW+3.75' were modeled. Under present day conditions these correspond to elevations of 6.5', 7.5' and 9.0' NAVD, respectively.

In addition, a "no-management" scenario was also modeled. Under the no-management scenario the beach is allowed to grow until it reaches the estimated maximum equilibrium beach berm elevation. Under the no-management scenario no managed breaches were simulated and natural breaches were assumed to occur whenever the inboard lagoon water levels exceed the elevation of the beach berm. For purposes of this study it was assumed that the beach berm elevation would grow to a maximum equilibrium elevation of MHHW +4.5' (9.75' NAVD under existing conditions). This elevation was identified based on the surveyed elevation of the low-point in the beach berm following the year-long inlet closure of 2013-2014 (CCBER 2015). This elevation was found to correspond to the 99.2-percentile of wave run-up elevation (a.k.a. "Total Water Level") at Goleta Beach during the 2010 to 2014 study period.

Figure G-9 shows time series of water levels and water level exceedance curves for three inlet management QCM scenarios. These runs show predicted conditions for three scenarios:

1. Unmanaged: max beach berm elevation at MHHW +4.5 (9.75' NAVD)
2. Managed breaches at MHHW +1.25' (6.5' NAVD)
3. Managed breaches at MHHW +3.75' (9.0' NAVD)

These scenarios represent present day conditions with no sea level rise.

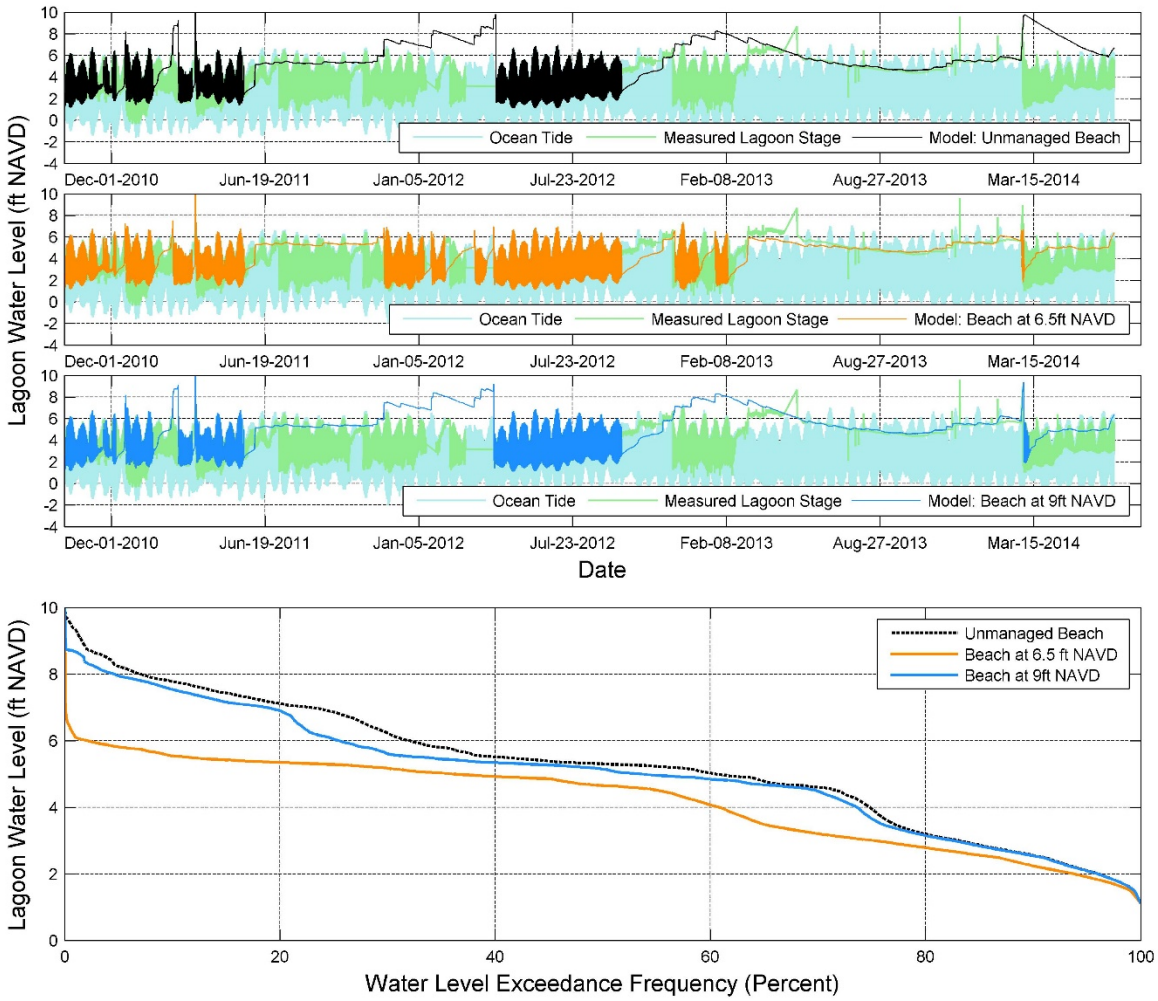

Figure G-9 – Model Results for selected Inlet Management Scenario (with no Sea Level Rise)

Figure G-10 shows the percent time that the lagoon is predicted to be closed for the several management scenarios modeled, with and without sea level rise. The x-axis on Figure G-10 shows the breach elevations normalized to the MHHW datum for each sea level rise scenario. For this study it is assumed that MHHW will be 6.25' NAVD under conditions with +1' sea level rise (1' higher than MHHW under present day conditions); 8.25' NAVD for +3' of sea level rise; and 10.25' NAVD for +5' of sea level rise. This convention is also used for Figures G-11 and G-12.

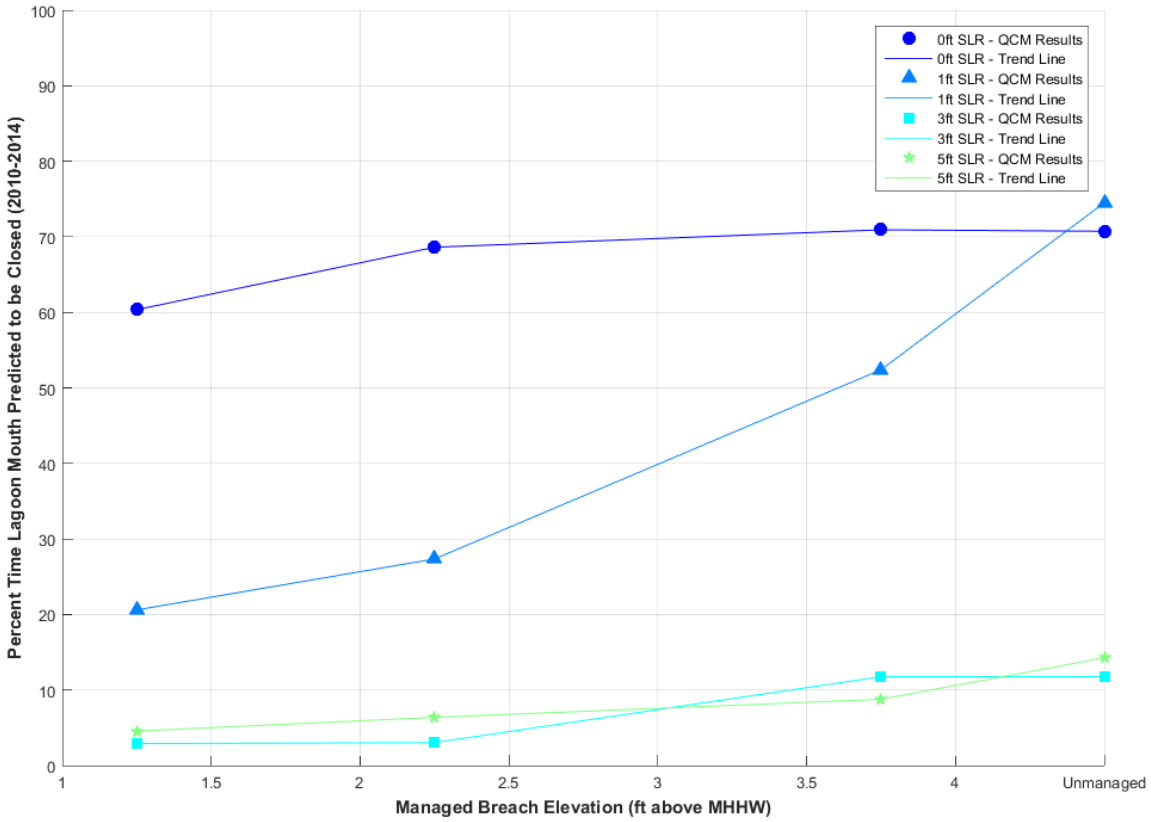

Figure G-10 – Frequency of Inlet Closure with Rising Sea Levels and Inlet Management

These results indicate a key trend in the effectiveness of inlet management for various amounts of sea level rise. In general, the QCM shows that breaching at lower elevations results in more frequent open conditions. One measure of the effect of a managed breaching regime is the predicted change in the percent time that the lagoon mouth is closed due to managed breaching relative to unmanaged conditions. Table G-3 lists the predicted potential change in frequency of inlet closure due to inlet management, as calculated by comparing the frequency of closure for the no-management scenario vs the breach at MHHW +1.25ft scenario, for various amounts of sea level rise.

Scenario	Wet Year (2011)	Dry Year (2013)	2010 to 2014
0ft SLR	0%	-15%	-11%
1ft SLR	0%	-86%	-55%
3ft SLR	0%	0%	-9%
5ft SLR	-9%	0%	-8%

Table G-3 – Absolute Change in Predicted Frequency of Closed Inlet Conditions for Managed Breaches at MHHW +1.25' Relative to No-Management Scenario

The QCM predicts that inlet management is only marginally effective altering the percent time that the lagoon mouth is closed under existing conditions, but it has the potential to have a much larger

influence on the inlet condition under future conditions with small amounts of sea level rise. The QCM results also indicate that, for scenarios with +0' or +1' of sea level rise, the impact of managed breaching is most significant during dry years and relatively insignificant during wet years. The QCM results show that the effectiveness of inlet management will decrease as sea level rise increases over the coming century since rising sea levels will increase the effectiveness of tidal scour in maintaining an open lagoon inlet. The differences between wet and dry years disappears for scenarios with higher sea level rise as the lagoon mouth is more strongly influenced by tidal scour rather than watershed inflows.

Figure G-11 shows the percent time that water levels within the Slough are predicted to exceed El. 9.0' NAVD. El. 9.0' is approximately the elevation of the lowest-lying critical infrastructure, including the lowest airfield runways and several streets adjacent to the Slough.

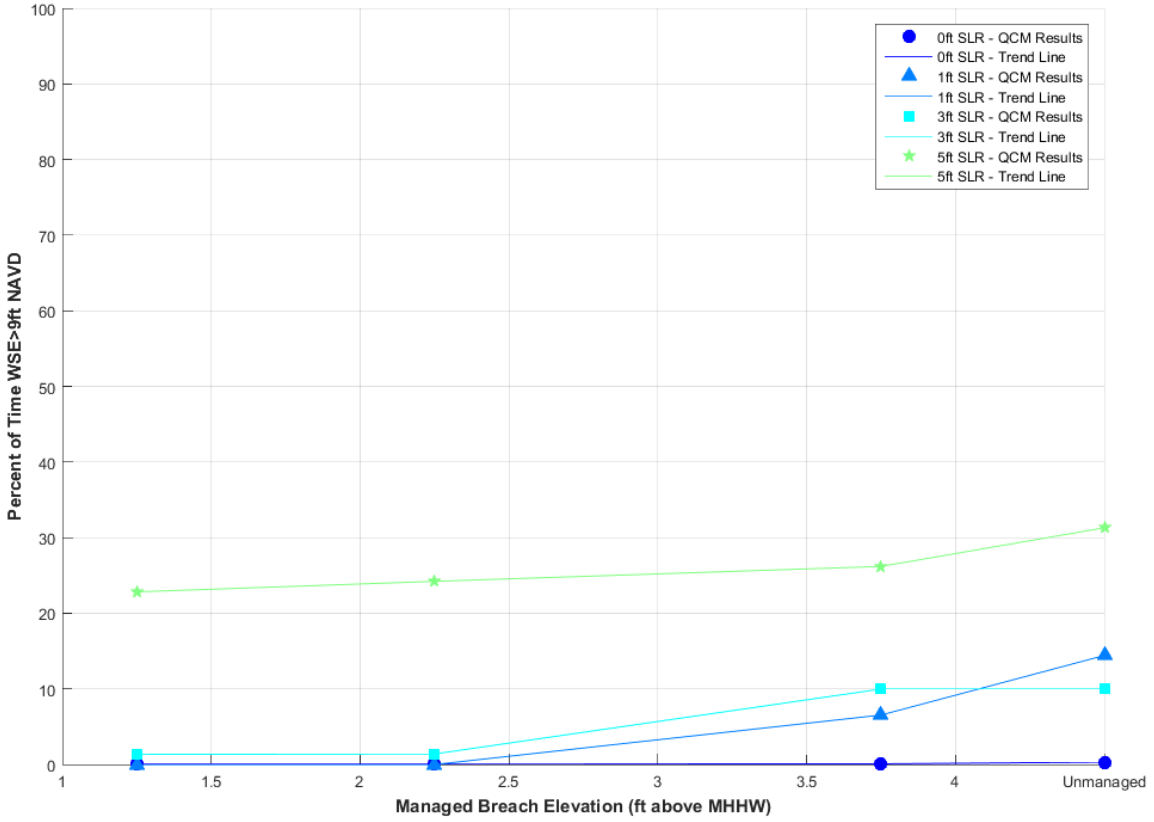

Figure G-11 – Frequency of Flood Conditions with Rising Sea Levels and Inlet Management

Figure G-12 shows the percent time that water levels within the Slough exceed El. 7.0' NAVD. El. 7.0' is approximately the elevation at which the pickleweed marsh plain becomes inundated under existing conditions. There is concern that continuous inundation of the marshplain for several days or weeks may result in the conversion of existing pickleweed marsh to unvegetated tidal mudflat. Such habitat conversion may be harmful to sensitive species including Coulter's Goldfields and Belding's Savanah Sparrow (David Hubbard, pers. coms. 2014).

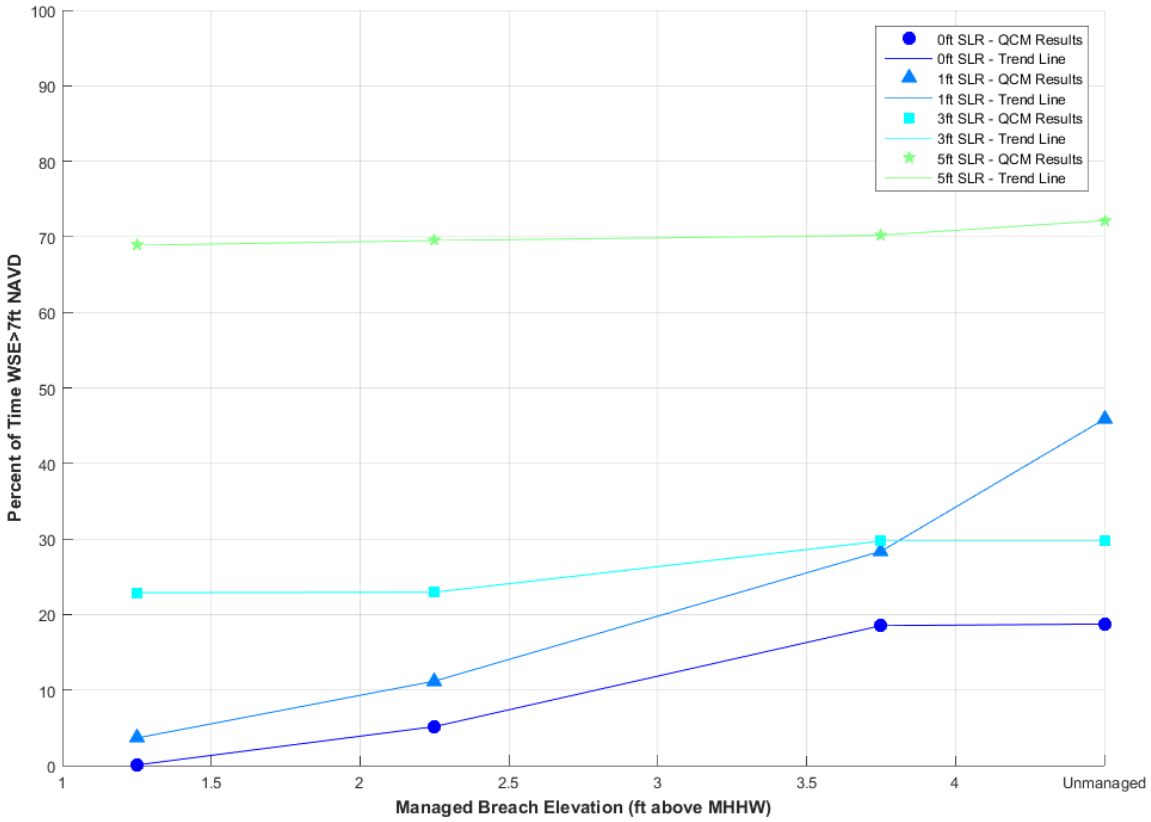

Figure G-12 – Frequency of Pickleweed Marshplain Inundation with Rising Sea Levels and Inlet Management

A key observation revealed by Figures G-10, G-11 and G-12 is that without lagoon inlet management, water levels within the lagoon will initially increase faster than the rate of sea level rise. For scenarios without inlet management the percent time the lagoon is closed, and the percent time water levels exceed El. 9.0' and 7.0' are higher for the scenario with 1ft of sea level rise than for the scenarios with 0ft or 3ft of sea level rise. This is a result of the more frequent ponding which occurs with 1 foot of sea level rise, compared to the more frequent open conditions which occur for +3ft of sea level rise due to the lagoons larger tidal prism causing stronger tidal scour of the inlet channel.

Figures G-11 and G-12 show a similar trend to that observed in Figure G-10: the QCM results indicate that inlet management appears to be a viable strategy for managing water levels within the Slough for the short- to medium-term but will become less effective as sea level rise increases over time.

The QCM results also show that the selection of managed breach elevation can be used to influence the percent time that the pickleweed marsh plain is inundated for scenarios with +0' or +1' of sea level rise. With no sea level rise the marsh plain is predicted to be submerged 19% of the time if the lagoon mouth is not managed, however with breaching at MHHW +1.25' the

marshplain is inundated less than 1% of the time. With one foot of sea level rise the marsh plain is predicted to be submerged 46% of the time if the mouth is not managed, and with breaching at MHHW +1.25' the marshplain is inundated 4% of the time. The choice of managed breach elevation has much less of an impact on the frequency of marshplain inundation for scenarios with +3' and +5' of sea levels rise.

The QCM results indicate that managed breaches can greatly reduce the risk of tidal flooding for scenarios with +0' or +1' of sea level rise. With zero feet of sea level rise the predicted water levels exceed the flood stage (El. 9.0') ~1% of the time (generally during large rain events) if the inlet is not managed. The predicted water levels never exceed 9.0' with inlet management thresholds at MHHW+0.5' or MHHW+1.5'. At one foot of sea level rise the unmanaged water levels exceed El. 9.0' nearly 15% of the time, indicating significant and frequent flooding, but the QCM predicts that with inlet management at MHHW+0.5' or MHHW+1.5' water levels once again never exceed El. 9.0'. However, once sea levels rise by 3', water levels exceed El. 9.0' regardless of the inlet management threshold elevation.

Figure G-13 shows a diagrammatic representation of how the choice of inlet management elevation shifts the general patterns of inlet closure as sea levels rise.

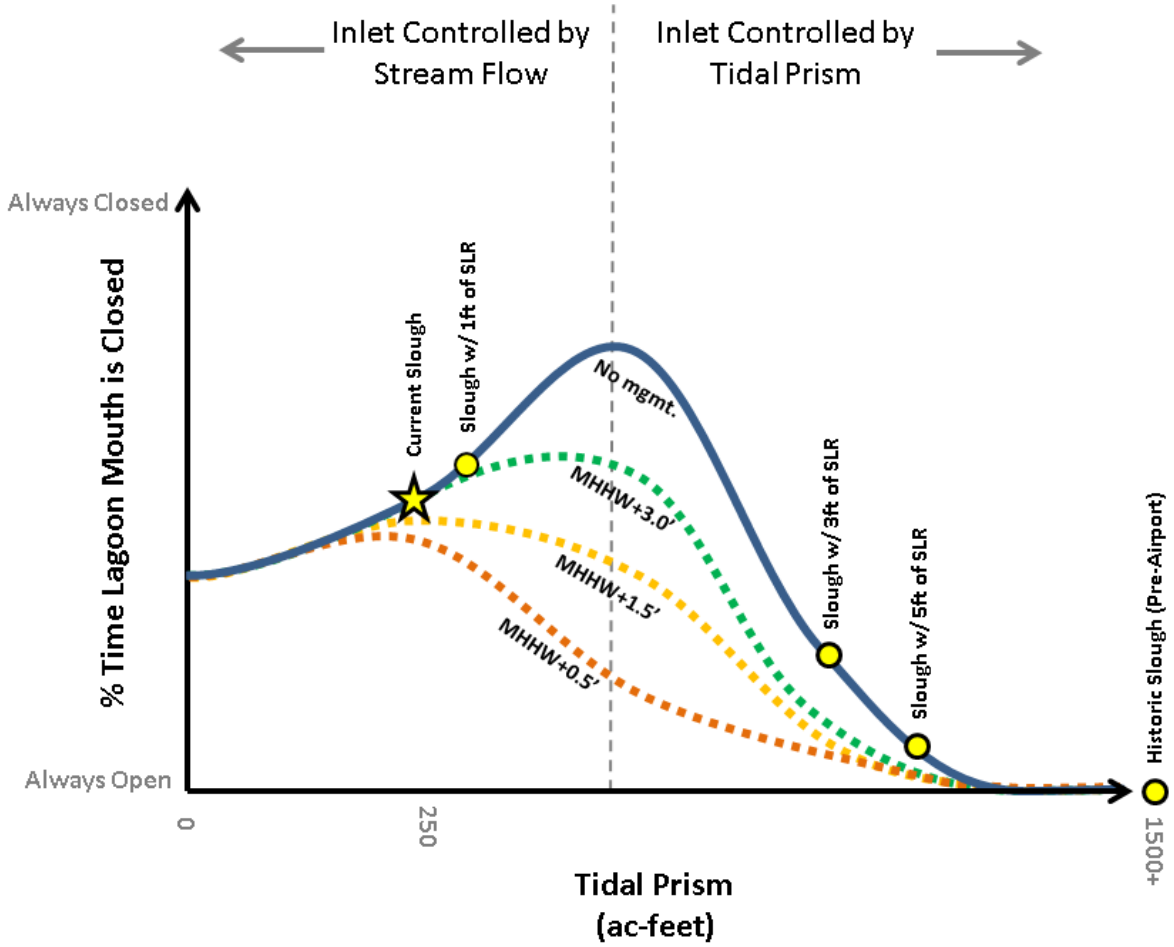

Figure G-13 – Trends in Frequency of Inlet Closure as Sea Levels Rise for Various Inlet Management Elevations

TABULATED QCM RESULTS:

Table G-4 tabulates detailed statistics from the QCM results conducted for this study:

Scenario			# of Closure Events			# of Breach Events			% Time Closed			% Time WSE>9.0'			% Time WSE>7.0'		
Storage Volume	Breach Elevation	Sea Level Rise	2011 "Wet"	2013 "Dry"	2010 to 2014	2011 "Wet"	2013 "Dry"	2010 to 2014	2011 "Wet"	2013 "Dry"	2010 to 2014	2011 "Wet"	2013 "Dry"	2010 to 2014	2011 "Wet"	2013 "Dry"	2010 to 2014
+0%	MHHW +1.25'	+0ft	3	3	9	2	2	8	40	85	60	0.2	0	0.05	0.3	0.05	0.1
		+1ft	3	0	5	2	0	4	4.3	14	20	0	0	0	1.4	1.5	3.7
		+3ft	0	0	1	0	0	1	0	0	2.9	1.4	1.2	1.3	21	21	23
		+5ft	1	0	2	0	0	2	9.3	0	4.6	24	22	23	67	69	69
	MHHW +2.25'	+0ft	2	1	8	2	1	7	41	96	69	0.2	0	0.05	0.3	5.9	5.2
		+1ft	2	1	5	2	1	6	4.4	21	27	0	0	0	1.4	7.7	11
		+3ft	0	0	1	0	0	1	0	0	3.1	1.4	1.2	1.4	21	21	23
		+5ft	1	0	2	0	0	2	15	0	6.4	29	22	24	69	69	70
	MHHW +3.75'	+0ft	3	0	5	2	0	4	41	100	71	0.2	0	0.1	0.7	34	19
		+1ft	2	1	7	1	1	8	4.4	97	52	0	10	6.5	1.4	5.5	28
		+3ft	0	0	1	0	0	0	0	0	12	1.4	1.2	10	21	21	30
		+5ft	1	0	2	0	0	2	18	0	8.8	31	22	26	70	69	70
	No Managed Breaches	+0ft	3	0	5	2	0	4	41	100	71	0.2	0	0.3	0.7	34	19
		+1ft	2	0	3	1	0	3	4.4	100	75	0	11	14	1.4	56	46
		+3ft	0	0	1	0	0	0	0	0	12	1.4	1.2	10	21	21	30
		+5ft	1	0	2	0	0	2	18	0	14	31	22	31	70	69	72
+25%	MHHW +0.5'	+0ft	3	2	9	2	2	9	39	84	60	0.2	0	0.04	0.2	0.05	0.1
+0%			3	3	9	2	2	8	40	85	60	0.2	0	0.05	0.3	0.05	0.1
-25%			5	2	12	4	2	12	45	85	62	0.2	0	0.05	0.3	0.05	0.1
+25%		+1ft	2	0	7	3	0	6	0	19	18	0	0	0	1.4	6.7	4.4
+0%			3	0	5	2	0	4	4.3	14	20	0	0	0	1.4	1.5	3.7
-25%			2	1	7	1	1	6	9.0	80	59	0	0	0	1.4	1.0	1.7
+25%		+3ft	0	0	1	0	0	1	0	0	2.4	1.4	1.2	1.3	21	22	23
+0%			0	0	1	0	0	1	0	0	2.9	1.4	1.2	1.3	21	21	23
-25%			0	0	2	0	0	2	0	0	2.3	1.4	1.2	1.3	21	21	21
+25%		+5ft	0	0	2	0	0	2	0	0	2.2	21	22	22	69	69	69
+0%			1	0	2	0	0	2	9.3	0	4.6	24	22	23	67	69	69
-25%			1	0	3	2	0	3	7.0	0	3.8	23	22	23	67	69	69

Table G-4 – QCM Results for Key Model Runs

Note: The results for the storage volume adjustment scenarios represent uniform 25% percent increase/decrease of basin volume at all elevations, as explained in a "Storage Volume Scenarios" section above. Additional sensitivity tests (not shown in Table G-4) suggest that slough expansion alternatives which include larger increases in storage volume could lower lagoon water levels to the ocean levels by changing the lagoon state to open or mostly open.

DISCUSSION OF WATER QUALITY IMPACTS

Expected changes in lagoon hydraulic conditions may lead to changes in water temperature, dissolved oxygen and salinity which could have impacts on habitats within the Slough. Higher temperatures and lower dissolved oxygen are generally considered to be characteristics of degraded lagoon water quality although these characteristics are known to occur in natural lagoon systems. Salinity is not a pollutant but can be considered an indication of degraded water quality relative to some flora and some fauna at particular times, especially when anadromous fish are not

yet acclimated to salinity and have limited fresh / brackish water refuge in the estuary. The following is a brief discussion of the expected general trends in water quality that may result from changes in breach frequency and lagoon water level. This discussion is informed by the QCM results and general observations of water quality at Goleta Slough and similar coastal lagoons. No water quality parameters were directly modeled as part of this study.

The QCM results indicate two main trends in lagoon hydrodynamics as sea levels rise over the coming century:

1) Generally increased water levels within the Slough
2) Sensitivity of the mouth conditions (open vs closed) to the selected management practices, but with a general long term trend towards more frequent open conditions.

Increased water levels are expected to result in greater water depths and a larger overall volume of water in the lagoon. Deeper water is less likely to experience complete mixing due to wind and channel flows, and thus is more likely to become stratified due to temperature and density gradients.

Stratified conditions are characterized by an upper layer of fresh water with relatively high dissolved oxygen that sits above a lower layer of saltier water with relatively low dissolved oxygen. The existence of stratified conditions at a coastal lagoon is not necessarily problematic, however fish kills have been observed at other lagoons along the California coast when stratified lagoons breach suddenly, and the upper layer drains from the lagoon leaving behind only the low dissolved oxygen lower strata of the water column. Care should be taken when planning and conducting mechanical breaches to avoid sudden or rapid breaches, especially when stratified conditions may exist.

The state of the lagoon mouth is also an important factor influencing water quality in the lagoon. Open mouth conditions allow for greater mixing between ocean and lagoon waters. This leads to higher salinities and lower temperatures within the lagoon. Tidal flushing tends to increase mixing in open lagoons, leading to relatively higher dissolved oxygen levels and reducing (but not necessarily eliminating) stratification.

Closed lagoons experience less mixing, and are more likely to tend towards stratified conditions. Conditions within a closed coastal lagoon are strongly influenced by the rate of freshwater inflows and seepage through the beach berm. High inflows and seepage rates tend to force the lower layer of saltier water out of the lagoon through the beach berm. This reduces the likelihood of stratification and leads to brackish or freshwater conditions within the lagoon. A closed lagoon with low inflows and seepage rates will tend towards strongly stratified conditions.

RECOMMENDATIONS

Based on the results of the inlet modeling study, we offer the following recommendations to help guide future planning actions:

- We recommend the development of a long-term management plan for Goleta Slough which clearly articulates goals and objectives for habitat management, land use and flood protection.

- The QCM results suggest that flood protection can be achieved under a range of managed breach thresholds (eg. 6.5' and 7.5' NAVD). We recommend further refinement of the proposed mechanical breach thresholds to achieve optimum benefits for the local ecology.

- The QCM results do not predict the occurrence of elevated water levels above El. 6.5' NAVD during the summer months for scenarios with +0 and +1 feet of sea level rise (with or without inlet management). This finding indicates that summer time pumps/siphons are unlikely to be needed under typical conditions.

- Long-term plans for the Goleta Slough region should anticipate the decreasing effectiveness of inlet management as a management tool for achieving flood protection and habitat goals as sea level rises reaches +3 feet.

- Long term plans for the Goleta Slough region should incorporate adaptation strategies that anticipate significant increases in lagoon water levels and near-continuous open-lagoon conditions by the end of the century.

- We recommend additional study to evaluate the feasibility of large-scale landscape shaping and to evaluate specific opportunities for multi-benefit projects for habitat enhancement, restoration and lagoon management. We recommend that the evaluation of potential project alternatives include a refined analysis of impacts on local channel hydraulics and lagoon inlet dynamics.

- We recommend that future studies include a statistical analysis of coastal and hydrologic processes in order to better characterize the expected frequency occurrence of extreme conditions including prolonged droughts, El Nino and extreme rain/flood events.

In addition, we encourage local planning agencies to continue data collection efforts to enhance the understanding of the physical processes which shape Goleta Slough. In particular, we feel that the following monitoring actions would provide highly valuable data for refining the QCM model:

- Continued monitoring of water levels within the Slough

- Regular surveys of the elevation of the beach berm and the dimensions of the lagoon channel. Survey data collected immediately before and after the lagoon mouth breaches is expected to be most useful for continued model refinement.

- Documentation of future managed and natural breaches, including timing of the breach, excavated channel width and depth, and the timing of future lagoon mouth closures.

Finally, while this study has not considered the impacts of climate change on watershed inflows and evaporation rates, we acknowledge that these impacts may be significant in shaping future conditions at Goleta Slough. We recommend that future studies evaluate the projected changes in hydrologic conditions and the potential impacts of these changes on water levels and breach and closure patterns at the lagoon.

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Attachment A – Watershed Analysis for Goleta Slough Inlet Modeling

INTRODUCTION

The Goleta Slough QCM requires a time-series of watershed discharge as one of the key inputs driving the lagoon water levels. This document discusses two methods which were used to estimate the watershed discharges for the ungaged streams which flow into Goleta Slough: a peak flow scaling method and the Rational Method. These two methods were found to produce generally similar results. The peak flow scaling method was selected to develop the input streamflow time series used in the Goleta Slough QCM.

BACKGROUND

There are 5 major creeks that flow into Goleta Slough. Only two of these creeks have active or historic streamflow gages, the Atascadero Creek gage is located at the weir near the S. Patterson Ave. crossing, while the San Jose Ck. gage is located near the N. Patterson Ave. crossing. Figure G-1 shows the Goleta Slough watershed. Atascadero Creek has by far the largest watershed of the 5 major creeks entering Goleta Slough, so it is no surprise that the creek is responsible for the largest fraction of total annual stream flow entering the slough. Streamflows from Atascadero Creek are recorded at USGS gage # 11120000 near the confluence of Atascadero Creek with the slough proper.

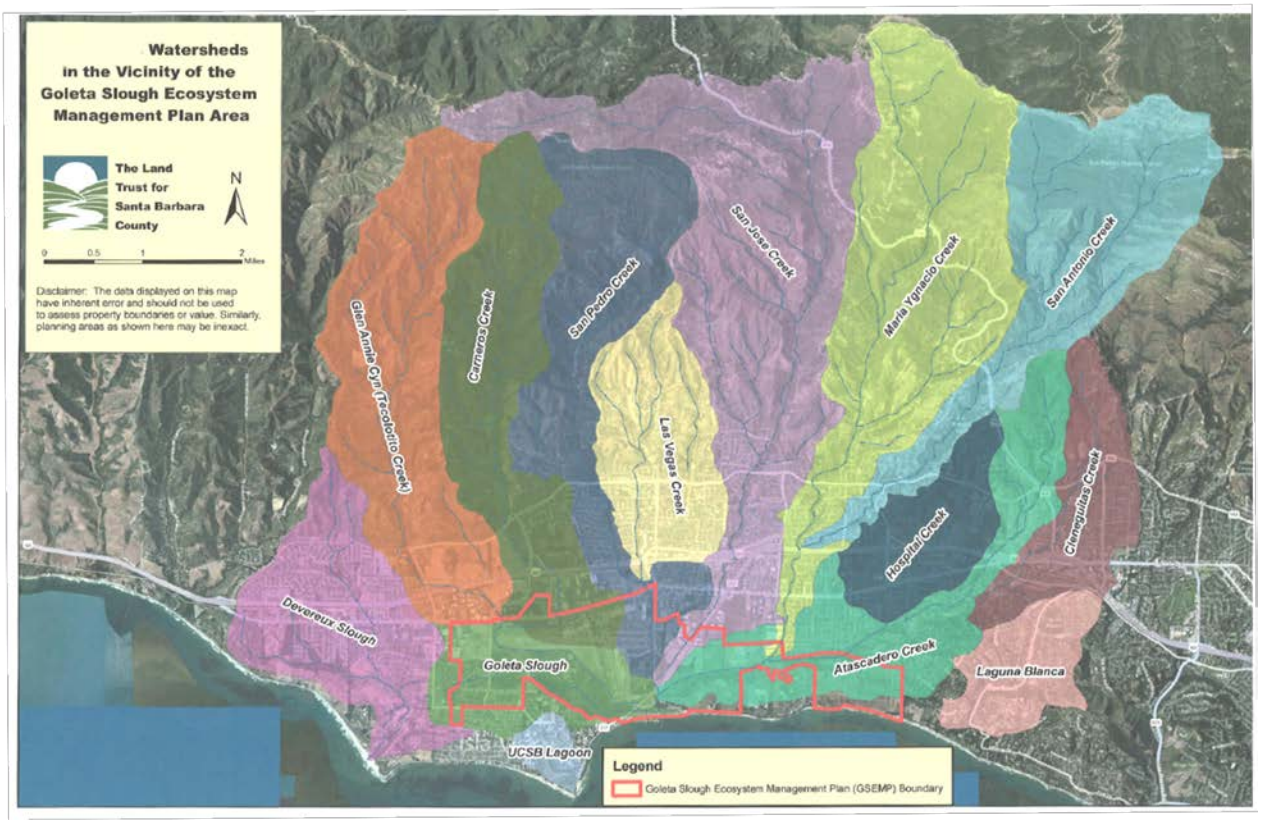

Figure 1 – Goleta Slough Watershed

Figure 2 shows the estimated recurrence intervals for streamflows at the Atascadero and San Jose Creek gages.

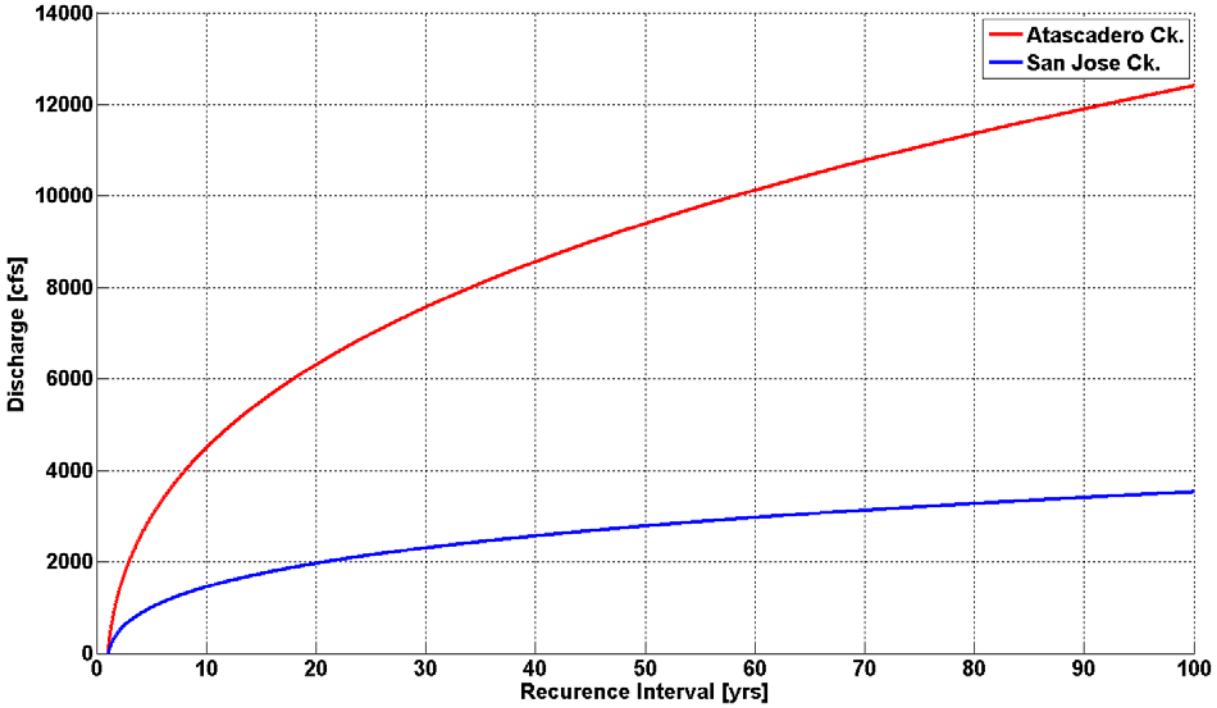

Figure 2 – Estimated Recurrence Interval for Streamflows on Atascadero and San Jose Creeks, based on records from 1940 to 2014.

PEAK FLOW SCALING METHOD

Synthetic hydrographs for each of the 5 creeks were developed for the period of interested (2010-2014) using a peak-flow-scaling method in order to estimate the contribution of each stream to the total watershed discharge entering Goleta Slough. The peak-flow-scaling method estimates a streamflow time-series for an ungaged stream by scaling streamflow data from a nearby, gaged stream. A scaling relationship was developed for each creek based on the estimated peak discharge for storms of various recurrence intervals using the method presented in Gotyald, et al (2012). Goleta Slough and the 5 major creeks which flow into the slough are located within the South Coast region (Region 5 in Gotyald, et al).

The estimated recurrence intervals of various peak discharges along each of the 5 creeks are shown in Figure 2. The ratios between the peak discharges on the gaged creek (Atascadero Ck) and each of the four ungagged creeks were calculated for storm events of with 2, 5, 10, 25, 50, 100, 200 and 500 year recurrence intervals. These ratios are used to develop rating curves which relate the flows on the gaged creek with the predicted flows on the ungagged streams over a wide range of streamflows. These rating curves were then used to scale a time-series of observed discharges on Atascadero Ck. to estimate the discharges for each of the 4 other creeks in the watershed.

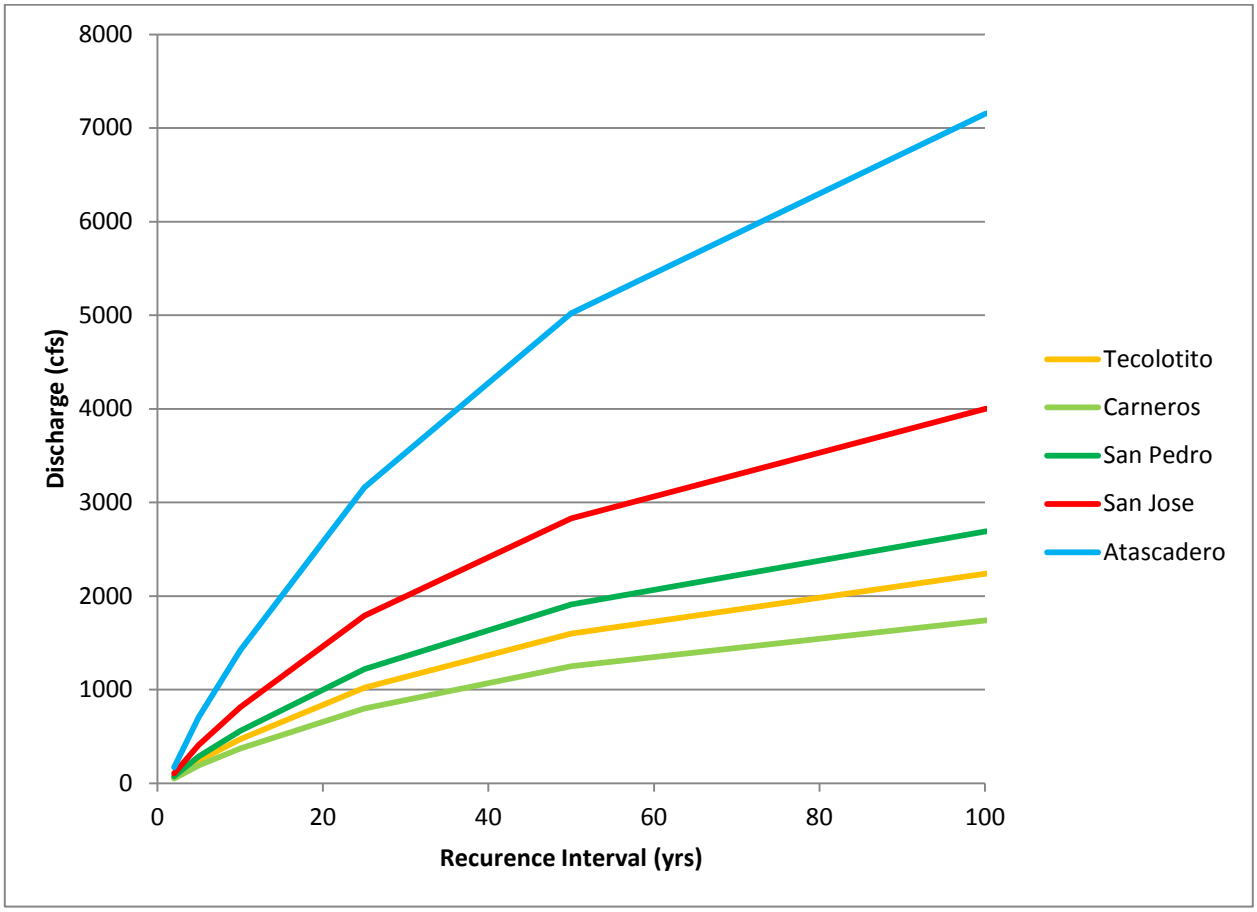

Fig 2 – Estimated recurrence interval of flows for creeks in Goleta Slough watershed

This analysis includes a considerable amount of inherent uncertainty. The uncertainty related to the use of regional regression equations to estimate peak discharges on ungaged streams is discussed in great detail in Gotyald et al.

This analysis assumes that the recurrence interval associated with the discharge on two neighboring streams will be similar for the same storm event. We have not been able to rigorously test this assumption for the Goleta watersheds due to the lack of data on the ungagged streams, and we acknowledge that this assumption is less likely to hold for basins where there is a larger difference in watershed area, land use, climate and topography is for between the various creeks.

RATIONAL METHOD

The total average annual streamflow for each creek for the period of interest was also estimated using a Rational Method calculation. The Rational Method is a method for estimating the volume of stormwater runoff as the product of the watershed area, precipitation rate, and a runoff coefficient. The runoff coefficient describes the fraction of rain falling on the watershed that leaves the watershed as streamflow. Runoff coefficients were estimated for each of the 5 major

watershed using land use data available on StreamStats (USGS, 2012), typical runoff coefficients for 4 different land use categories (Lindeberg, 2012), and calibrated using precipitation measured at the Goleta Fire Station and stream flows measured at the Atascadero gage.

RESULTS

The results of these two sets of streamflow estimates are summarized in Table 1:

	Watershed Area	**Peak Flow Scaling Method**		**Rational Method**	
		Avg. Annual Streamflow 2006-2013	% of Total Annual Streamflow	Avg. Annual Streamflow 2006-2013	% of Total Annual Streamflow
	Square Miles	Ac-Ft	%	Ac-Ft	%
Atascadero	19	2950*	35	2950*	46
San Jose	8	1800	22	1200	18
San Pedro	7	1450	17	1050	16
Los Carneros	4	975	12	550	8
Tecolotito	5	1200	15	750	11
Total	44	8375	-	6500	-

Table 1 – Estimated Watershed Discharge for Creeks flowing to Goleta Slough

*Discharge measured at USGS Gage

The Peak Flow Scaling Method predicts higher stream flows from the 4 smaller creeks compared to the Rational Method. This is a result of the regional regression equations placing less weight on watershed area for small storm events, and the lack of major storm events during the study period. The largest stream flow observed during the period of interest was in Marsh, 2011, when flows reaching 3600cfs were observed on Atascadero Creek. This was a 10-20% chance annual exceedance event. While there remains uncertainty with respect to the accuracy of the Peak Flow Scaling Method, and the validity of several of the assumptions inherent in the use of this method, we have found that the synthetic flow time series produced by this method provides a satisfactory input dataset for the Goleta Slough QCM based on the satisfactory performance of the QCM during the model validation scenario. Note that this estimate includes considerable uncertainty, however we believe that the error introduced by the use of the synthetic streamflow input time series is less than or on the order of the error related to other flow rates used in the QCM model, including wave overtopping and seepage through the beach berm. Consequently we believe that the stream flow rates developed using the peak flow scaling method provide an adequate input dataset for the QCM modeling, given the limitations of the available input data.

RAINFALL VS LAGOON WATER LEVELS

As an additional investigation, the rational method calculation was also used to estimate the rate at which water levels within the lagoon rise during rain events. The USGS StreamStats utility was used to estimate the land use distributions of each watershed flowing into Goleta Slough. Each land use category (Forrest, Open Water, Impervious and Developed) was assigned a typical runoff coefficient, listed in table 2:

Land Use Category	Runoff Coefficient	Area in GS Watershed	Fraction of GS Watershed
Forrest	0.14 in/in	6380 acres	21%
Open Water	1	60	0.2%
Impervious	0.97	3280	10.8%
Developed	0.4	20670	68%
Area Weighted Average	0.41	-	-
Calibrated Average	0.132	-	-

Table 2 – Land Use in Goleta Slough Watershed

These values were used to calculate an area-weighted Average runoff coefficient, representing the expected runoff coefficient of the whole watershed. Finally, a calibrated average runoff coefficient was calculated based on the comparison on the area-weighted average runoff coefficient for the Atascadero watershed (0.40) with the observed runoff coefficient calculated from the measured rainfall with the discharge at the Atascadero Creek gage (0.132). This analysis of the Atascadero watershed suggests that the typical runoff coefficient values over-estimate the discharge entering Goleta Slough by a factor of 3.

The resulting calibrated average runoff coefficient describes the estimated fraction of rain falling on the watershed that flows into Goleta Slough during a major storm event (with the calibration factor assumed to account for flows diverted into storm sewers, retention basins, infiltration, etc.).

A first order approximation for the total runoff entering the Slough during a storm event can be found by using this effective runoff coefficient and the area of the Goleta Slough watershed (30400 acres). For example, if 1" of rain falls on the Goleta Slough watershed during a storm event, the runoff entering the Slough can be estimated as follows:

Runoff = Rainfall * Watershed Area * Runoff Coefficient
= 1/12ft * 30400 Acres * 0.132
= 334 acre*ft

One can then use the hypsometry of the lagoon to estimate the expected change in lagoon water surface elevation. Figure G-3 shows the hypsometry of Goleta Slough based on the 2010 NOAA coastal LiDAR and channel cross section surveys conducted by CCBER in 2013 and 2014.

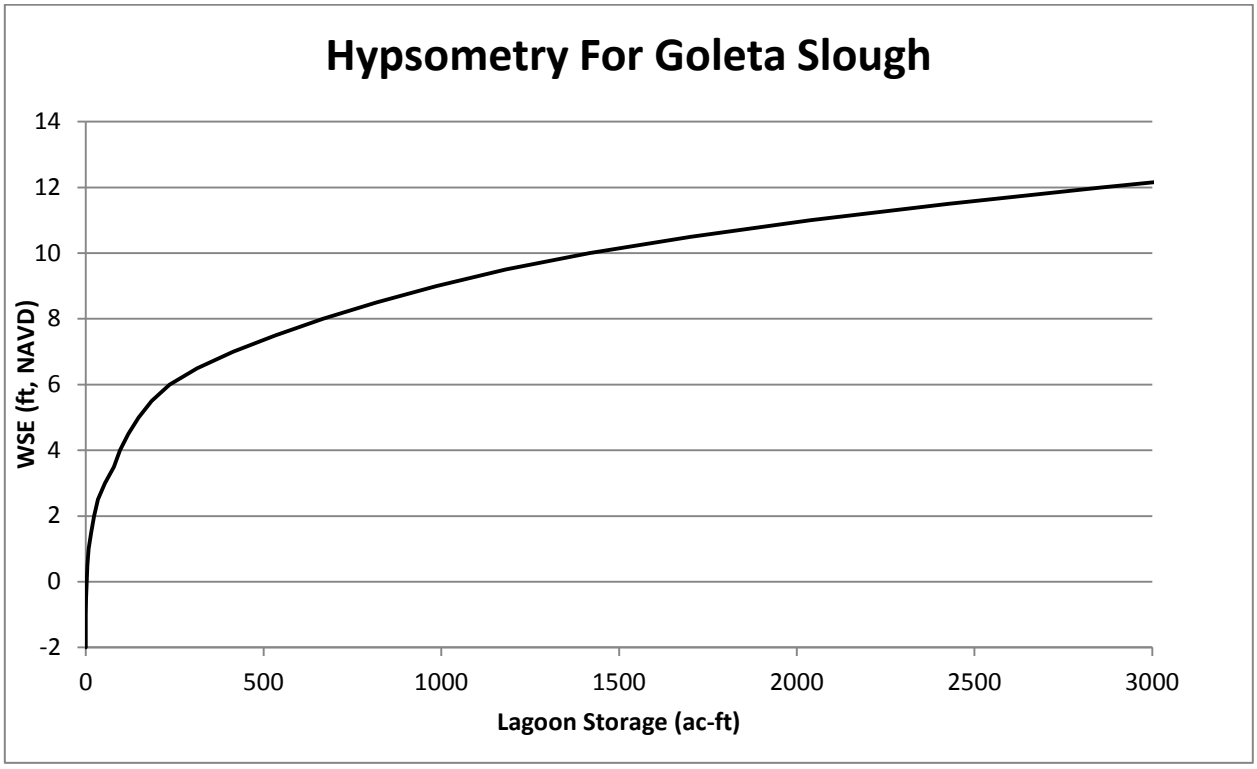

Fig 3 – Goleta Slough Hypsometry (from NOAA, 2012; CCBER 2015)

If we know the initial water level in Goleta Slough, say it is at elevation 6.0' NAVD, we then estimate the expected change in water level from the storm event.

Initial water level:	6.0
Initial Lagoon Storage (from Fig 3):	236 ac-ft
Final Lagoon Storage:	236+334= 560 ac-ft
Final Lagoon water level(from Fig 3):	~7.5 ft

References

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