

Table 7.3. Stressor Metrics and Monitoring Program Details.

Indicator	Monitoring Metric / Parameter	Monitoring Data Program / Responsible Party	Frequency
Eutrophication	Dissolved Oxygen	Estuarine MPA data from Malibu Lagoon collected by CSULB and partners	EMPA data downloaded monthly
	Submerged Aquatic Vegetation and algae cover	Estuarine MPA data from Malibu Lagoon collected by CSULB and partners	EMPA data semi-annually
	Nitrogen and phosphorous levels	Estuarine MPA data from Malibu Lagoon collected by CSULB and partners	EMPA data semi-annually
Sedimentation and Contamination	Concentrations of various contaminants in sediments (e.g., organics, heavy metals, trash)	No current programs	No current programs
	Channel cross-sections and flood-plain elevation	Data collected by TBF / CRI associated with Malibu Lagoon and Ballona Wetlands monitoring programs	Opportunistic surveys / research
Anthropogenic Disturbance and Land Use	CRAM index values for the buffer and landscape context component	Data collected by TBF / CRI associated with Malibu Lagoon and Ballona Wetlands monitoring programs; Estuarine MPA data from Malibu Lagoon collected by CSULB and partners	Opportunistic surveys / research; EMPA CRAM data annually

Indicator	Monitoring Metric / Parameter	Monitoring Data Program / Responsible Party	Frequency
Altered Hydrology	Flow	Flowmeters	Opportunistic surveys / research
	CRAM index values for the hydrology component	Data collected by TBF / CRI associated with Malibu Lagoon and Ballona Wetlands monitoring programs; Estuarine MPA data from Malibu Lagoon collected by CSULB and partners	Opportunistic surveys / research; EMPA CRAM data annually
Physical Structure	CRAM index values for the physical structure component	Data collected by TBF / CRI associated with Malibu Lagoon and Ballona Wetlands monitoring programs; Estuarine MPA data from Malibu Lagoon collected by CSULB and partners	Opportunistic surveys / research; EMPA CRAM data annually

Table 7.4. Climate Vulnerability Metrics and Monitoring Program Details.

Indicator	Monitoring Metric / Parameter	Monitoring Data Program / Responsible Party	Frequency
Inundation	Water surface elevation and inundation area/time	Deployed water quality sondes (e.g., Hydrolab, YSI) in Malibu Lagoon as part of EMPA surveys (CSULB); deployed sonde in Topanga (RCDSMM)	EMPA and RCDSMM data downloaded monthly
	Key species distribution changes	Data collected by TBF / CRI associated with Ballona Wetlands monitoring programs; EMPA surveys in Malibu Lagoon (CSULB)	Opportunistic surveys / research; EMPA data semi-annually
	Adjacent buffer and adjacent habitat (CRAM)	Data collected by TBF / CRI associated with Malibu Lagoon and Ballona Wetlands monitoring programs	Opportunistic surveys / research
	SLR and thresholds of submergence	No current programs	No current programs
Change in Freshwater Input to System / Flow	Flow	Flowmeters	Opportunistic surveys / research
	Stream gauge data	LA County Public works stream gauges (5 min interval data loggers in multiple locations)	Data available upon request
	Salinity regimes	Deployed water quality sondes (e.g., Hydrolab, YSI) in Malibu Lagoon as part of EMPA surveys (CSULB); deployed sonde in Topanga (RCDSMM)	EMPA and RCDSMM data downloaded monthly
Estuary Mouth Dynamics	Frequency and length of closure of mouth opening	Satellite imagery (NASA/JPL)	Opportunistic surveys / research
		Camera stations or water level sensors for water surface elevation	Unknown
		Elevation/LiDAR/Bathymetry for estuary mouth dynamics	Opportunistic surveys / research

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Indicator	Monitoring Metric / Parameter	Monitoring Data Program / Responsible Party	Frequency
Dissolution of Carbonate Structures (Organismal)	Indicator not developed	No current programs	No current programs
Ecosystem Metabolism	Net balance of O <sub>2</sub> /CO <sub>2</sub>	No current programs	No current programs
	Dissolved oxygen and salinity	Deployed water quality sondes (e.g., Hydrolab, YSI) in Malibu Lagoon as part of EMPA surveys (CSULB); deployed sonde in Topanga (RCDSMM)	EMPA and RCDSMM data downloaded monthly
	Temperature (water) or SST	Deployed water quality sondes (e.g., Hydrolab, YSI) in Malibu Lagoon as part of EMPA surveys (CSULB); deployed sonde in Topanga (RCDSMM)	EMPA and RCDSMM data downloaded monthly

## **Data Sharing and Reporting**

Coastal wetland monitoring data will be compiled and analyzed approximately every five years associated with production of the SMBNEP SotB Report and led by the NEP's Technical Advisory Committee. The SotB Report will be made publicly available via website. Data will be consolidated and used to develop the SotB condition and trend graphics and will be represented visually when possible. Detailed information on data quality control, quality assurance, database management, and analysis will be available in the next update of SMBNEP's Quality Assurance Program Plan, scheduled for review in 2021. Data will be stored on TBF's servers with summaries available to the public upon request. When possible, data will be incorporated into public databases like the California Rapid Assessment Method database or other similar public data sharing portals.

## **Data Gaps and Future Studies**

Former data gaps identified for wetland habitats by the 2015 SotB Report were extensive, including a lack of development of most of the biological response indicators such as benthic invertebrate community, nursery function for fish, and forage function for birds. However, long-term datasets collected by TBF and partners at the Ballona Reserve and Malibu Lagoon began filling some regional gaps from previous monitoring periods. Additional data gaps identified in the 2015 SotB Report include all of the vulnerability indicators (not developed) and the biological response indicators (not developed). Some of these indicators have been evaluated and updated for this revised CMP and are reflected in Tables 7.2-7.4 as condition metrics. Several new metrics associated with the new "climate change vulnerability" category were identified in the tables above as data gaps (e.g., pCO<sub>2</sub>, species migration, tracking bar-built estuary mouth closure patterns, camera stations or water level sensors for water surface elevation). Several indicators need to be more fully developed, such as 'SLR and thresholds of submergence' and 'dissolution of carbonate structures'. These indicators need metrics developed, monitoring plans compiled, and data to be collected.

Although Malibu Lagoon will be monitored as part of the Estuarine Marine Protected Area grant for at least one year with data evaluated and compared to previous monitoring data, most of the other wetland systems, including the Ballona Reserve, have no funding for long-term monitoring of any of the indicators listed in the tables above. Thus, while there was a substantial amount of new data included in the 2015 SotB Report, most of these systems still have temporal data gaps for many of the indicators in recent years. Most of the smaller systems in the northern Bay (e.g., Zuma, Big Sycamore, Trancas) have some opportunistic data collected associated primarily with tidewater gobies or steelhead trout surveys, but they are largely understudied and remain as a significant data gap for most of the indicators. Additionally, there are some indicators that have a lack of identified data collection for most or all sites (e.g., contaminants, SAV monitoring, ecosystem metabolism). Table 7.5 summarizes priority data gaps identified for the coastal wetlands

habitat; types of data gaps; potential sources of funding at the federal, state, and local levels for filling these data gaps; and cross-references to relevant actions and potential funding sources identified in the 2019 CCMP Finance Plan (also provided in Table 9.6 of Chapter 9).

Next steps for this habitat type include continuing to prioritize and fill data gaps listed above and in Tables 7.2-7.5, especially the categories that are “unknowns” and require more information, as well as additional new studies that could further support the evaluation of the key indices for this habitat. Note that Tables 7.2-7.4 may look complete, but still may have spatial or metric data gaps. New studies that are recommended include habitat extent assessments for the smaller lagoon systems, assessments of commercially or recreationally important fish species, rare plants or birds, eutrophication studies, tracking plant invasions, hydrology studies especially associated with climate change stressors, and many others.

Table 7.5. Coastal Wetlands Habitat – Summary of Data Gaps and Potential Funding Sources.

Indicator Category	Coastal Wetlands Habitat Data Gaps	Data Gap Type	Potential Funding Source(s)
Habitat Extent	Habitat extent assessments for the smaller lagoon systems	Special study (new data acquisition)	Prop. 50, others
Ecological Condition	Long-term monitoring of all indicators/indices (CRAM) Ballona Wetlands and Malibu Lagoon	Index component; Single metric	CDFW, others
	Baseline assessment for most indicators and long-term monitoring for all indicators/indices (CRAM) for most smaller systems in the northern Bay (e.g., Zuma, Big Sycamore, Trancas, many others)	Index component; Special study (new data acquisition)	Prop. 50, others
	Native/non-native vegetation cover change over time	Index component; Single metric	Unknown
	Survey of the condition (presence/area) of commercially or recreationally important fish species, rare plants or birds	Index component; Single metric	Unknown
Stressor	Long-term monitoring of all indicators/indices	Index component; Single metric	CDFW, others
	Eutrophication studies	Special study (existing data, new data acquisition)	Unknown
Climate Vulnerability	Hydrology studies associated with climate change stressors (inundation, freshwater input, estuary mouth dynamics, etc.)	Special study (existing data, new data acquisition)	Sea Grant, OPC, SCC, UCLA, CRI, others (2019 CCMP Finance Plan Action #36)

## Literature Cited

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