

Table 3.3. Stressor Metrics and Monitoring Program Details.

Indicator	Monitoring Metric / Parameter	Monitoring Data Program / Responsible Party	Frequency
CEC Loading in Fish	Fish tissue samples for contaminants of emerging concern (e.g., flame retardants)	No current programs	Opportunistic surveys / research
Sediment Contaminant Load (Legacy Contaminants)	Percent surface area of legacy contaminants (PCB, DDT, mercury)	LACSD and CLA-EMD sediment chemistry (contamination) monitoring (subset of benthic monitoring stations)	Annually
Hypoxic Zones / Dissolved Oxygen	Persistence of exposure to hypoxia by area	SCCWRP modeling	Opportunistic surveys / research
Fish Tissue Contamination (Legacy Contaminants)	Fish tissue samples	CLA-EMD Local Bioaccumulation Trends Survey (LBST, White Croaker and Hornyhead Turbot); CLA-EMD Local Seafood Safety Survey (LSSS, White Croaker, Kelp Bass, Barred Sand Bass, Black Perch, Rockfish); LACSD, CLA-EMD, and SCCWRP Bight Survey fish contamination monitoring	LBST Annually; LSSS Biennially; Bight-wide every five years

Table 3.4. Climate Vulnerability Metrics and Monitoring Program Details.

Indicator	Monitoring Metric / Parameter	Monitoring Data Program / Responsible Party	Frequency
Fish Habitat Change for Key Species	New species records	No current programs	Opportunistic surveys / research
	Distribution of key species and predictive responses	Vantuna Research Group has existing temperature models for fish	Opportunistic surveys / research
Physical Change to Habitat (Area)	Sediment burial of nearshore benthic habitats (e.g., SAV)	No current programs	No current programs
	Changes in sediment grain size	LACSD and CLA-EMD benthic monitoring	Annually
Ecosystem Metabolism	Model predictive outcomes of various climate stressors	Indicator needs further development	No current programs
Dissolution of Carbonate Structures (Organismal)	pH, pCO ₂	Indicator needs further development	No current programs
	Faunal response	Indicator needs further development	No current programs

Data Sharing and Reporting

Soft bottom monitoring data will be compiled and analyzed approximately every five years associated with the 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, and summaries will be publicly available upon request. When possible, data will be incorporated into public databases.

Data Gaps and Future Studies

Former data gaps identified for soft bottom habitat by the 2015 SotB Report were specific to key indicators such as fish community, vertical habitat availability, and all categories of vulnerability. The Report also recommended further development of the habitat extent indicator into habitat types (e.g., eelgrass area) and the advancement of the vertical distribution metric. Data for several of the habitat types, especially the nearshore systems, may be obtained or supplemented using side-scan sonar or similar methods. Additionally, little is known about the benthic community, *Phragmatopoma*; some information was collected for the Bight '18 program but was not available for this plan.

Another of the major recommendations and data gaps is the development of an eelgrass condition index. Standardizing submerged aquatic vegetation (SAV) monitoring practices for Southern California has become an important recommendation by many groups, including the SAV Technical Advisory Committee (SAV TAC) led by SCCWRP and Dr. Christine Whitcraft of CSU Long Beach. The most recent document produced by the SAV TAC, "Methods and Guidance on Assessing the Ecological Functioning of Submerged Aquatic Vegetation in Southern California Estuaries and Embayments," provides detailed recommendations for survey protocols and methods that should be replicated for this habitat. These protocols include several priority recommendations that are not currently being surveyed in the Bay, including above ground biomass, carbon, and nitrogen content, and invertebrate infauna and epifauna. It is also recommended that a potential index be explored building on the protocols recommended and established by the SAV TAC. Additionally, evaluated metrics may also inform sediment burial of nearshore benthic habitats such as SAV beds.

While the Benthic Response Index (BRI) exists and is well developed, additional community data, response indicators, or an index is recommended for fish. Fish community condition or an index was identified as a high priority by the working group, especially because there may be fishery data available that could be utilized as a component of this indicator. Additionally, the CEC loading indicator needs further

development, as many CECs have the potential to bioaccumulate and create food web impacts. Fish tissue samples for CECs are also a data gap. This could be evaluated with a limited analyte list to search for key CECs but should be informed by expert advisors.

Several new metrics associated with the new “climate change vulnerability” category are also identified in the tables above as data gaps. Dr. Dan Pondella at Vantuna Research Group, Occidental College and partners have conducted predictive evaluations of fish response to temperature changes, but additional research would support further evaluations for this indicator. Santa Monica Bay is at the transition between the cold and warm faunas on our coastline, and as such, is sensitive to fish community changes that are a result of climate change. Similarly, SCCWRP has conducted extensive modeling for dissolved oxygen in the Bay, but additional interactions between DO and ocean acidification are not understood, nor are they understood at a high depth or spatial resolution. Both the ecosystem metabolism and dissolution of carbonate structures indicators need further development. Further, there is no known identified threshold that incorporates both concentration and duration of acidification or hypoxia. Additionally, there are no known local studies for faunal impacts of ocean acidification, though SCCWRP is drafting a manuscript detailing response of infauna to acidification with indicator recommendations. Table 3.5 summarizes priority data gaps identified for the soft bottom 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 9.2 of Chapter 9).

Next steps for this habitat type include continuing to prioritize and fill data gaps listed above and in Tables 3.2-3.5, especially the categories that are “no current programs” or “unknowns” and require more information, ”, as well as additional new studies that could further support the evaluation of the key indices for this habitat. New studies that are recommended include supplemental modeling and threshold development for DO, OA, and other stressors or climate indicators; further understanding of the potential impacts of fish contamination to beneficial uses by humans; index development for several of the indicators mentioned above, including SAV and eelgrass; and fish community studies. Additional SAV monitoring and research following the recommended protocols would also improve local understanding for this habitat.

Table 3.5. Soft Bottom Habitat – Summary of Data Gaps and Potential Funding Sources.

Indicator Category	Soft Bottom Habitat Data Gaps	Data Gap Type	Potential Funding Source(s)
Habitat Extent	Eelgrass area mapping using side-scan sonar or similar methods	Single metric; Special study (existing data)	Prop. 50 (2019 CCMP Finance Plan Action #4)
Ecological Condition	SAV Survey of aboveground biomass, carbon, and nitrogen content	Index component	Prop. 50 (2019 CCMP Finance Plan Action #4)
	SAV Survey of invertebrate infauna and epifauna	Index component	Prop. 50 (2019 CCMP Finance Plan Action #4)
	Fish community condition or index informed by fishery	Index development; Index component	NPDES Program, SCCWRP
Stressor	CEC loading in fish	Single metric	SWRCB
Climate Vulnerability	Predictive evaluations of fish response to temperature changes	Special study (existing data)	Unknown
	Interactions between DO and ocean acidification or hypoxia	Special study (existing data)	Sea Grant, OPC, SCC, others (2019 CCMP Finance Plan Action #36)
	Local faunal impacts of ocean acidification	Special study (new data acquisition)	Sea Grant, OPC, SCC, others

Literature Cited

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- Grubbs, M.W., K.K. Johnston, G. Wang, and T. Ford. 2016. *Climate Change Vulnerability Assessment of the Santa Monica Bay National Estuary Program's Bay Restoration Plan. Final Report prepared by the Santa Monica Bay National Estuary Program for the United States Environmental Protection Agency.* 30 September, 2016. 184 pages.