

Indicator Category	Indicator	Useful /Relevant Settings	Confounding Factors	Expertise Required	Resources/Accessibility	Overall Utility/Application
Individual - Cellular Responses	HIF	Field, Aquaculture, Lab Expt.	species differences	Physiology	access to specialized laboratory facilities	Specialized
Individual - Sensory Systems	Vision	Lab Expt.	Acidification	Physiology	Requires specialized tools for ERG, b (catch limits, closures) or access to specialized laboratory facilities	Not clear at this time
Individual - Hormonal Responses	Hearing	Field, Laboratory Expt.	Acidification	Physiology/acoustics	Immunoassay facility	Experimental/aquaculture
	endocrine, cortisol levels	Laboratory	Handling stress	Physiology	Access to specialized laboratory facilities	Management of fisheries stocks
	growth hormone	Field, Aquaculture, Lab Expt.	endocrine disruptors	Physiology	Access to specialized laboratory facilities	Fisheries management, conservation, aquaculture
	reproduction/fertility	Field, Aquaculture, Lab Expt.	Size, temperature, food supply	Physiology	Access to specialized laboratory facilities	Fisheries management, conservation, aquaculture
Individual - Growth and condition	body size	Field, Aquaculture, Lab Expt.	Temperature, Food supply	Ecological	sampling gear, calipers,	Fisheries management, conservation, aquaculture
	malformation	Field, Aquaculture, Laboratory	Acidity, food supply, temperature	Basic?	sampling gear, calipers,	Diagnostic for habitat suitability
	mortality	Field, Laboratory Expt.	Temperature, disease	Basic?	sampling gear, calipers,	thresholds, improving
Individual - Immune response	disease	Field, Aquaculture collections, Laboratory	Temperature, disease, crowding	Pathology	sampling gear, calipers,	Diagnostic for habitat suitability
	chemical archive of hypoxia exposures	Field exposures	Growth rate	Trace element fingerprinting	LA-ICPMS, Synchrotron	Hindcasting exposures
Individual - physiology	Metabolic Indices	Past, present and future oceans	Temperature	Ecological/Modeling	Computer	Diagnostic for habitat suitability
Species/Population - Abundance related	Population Size	Field	Food supply	Ecological	gear, personnel	Fisheries management, conservation, aquaculture
	Growth Rate	Field, Aquaculture, Lab Expt.	Temperature, Food supply	Ecological/Modeling	sampling gear, calipers, personnel	thresholds, improving
	Fertility	Field, Aquaculture, Lab Expt.	Temperature, Food supply	Reproductive physiology	sampling gear, calipers, computer	improving aquaculture
	Survivorship	Field, Aquaculture, Lab Expt.	Temperature, Food supply	Ecological	sampling gear, calipers,	improving aquaculture
	Recruitment rate	Field	Temperature, Food supply	Modeling	Computer	improving aquaculture
Species/Population - Behavior	Indicator species/taxa	Field	predation, food supply	Taxonomic	Boats, ships, diving, sampling gear,	hazard, remediation success,
	Avoidance/ Walkouts	Field	temperature	Field ecology, Citizen science	imaging/photography,	species-specific management
	Aquatic surface respiration	Field		Citizen Science	can be observed from piers or boats	conditions: high utility as
	Shoaling distributions	Field	Temperature	Field ecology	Boats, ships, depth-stratified field sampling	management; Fisheries
	Benthic emergence	Field, Aquaculture, Lab Expt.	H ₂ S	Field ecology	Scuba gear, imaging systems	benthic species-specific
Community/Ecosystems	Diversity	Field system, Mesocosms	Food supply, disturbance	Taxonomic expertise	imaging gear, balances, personnel	management, deoxygenation
	Dominance	Field system, Mesocosms	Food supply	Taxonomic expertise	imaging gear, microscopes,	management, deoxygenation
	Density	Field system, Mesocosms	Food supply, H ₂ S	Ecological	imaging gear, microscopes,	management, deoxygenation
	Biomass	Field, Aquaculture, Lab Expt.	Food supply	Ecological	imaging gear, balances, calipers,	management, deoxygenation
	Taxonomic composition	Field system, Mesocosm	Contaminants	/or molecular expertise	Microscopes, Image analysis, eDNA	management,
	Taxonomic ratios	Field system, Mesocosm	Contaminants	Low-level taxonomic expertise	Microscopes, Image analysis, eDNA	detection; co-management of
	Functional Shifts	Field system	Food supply	Low-level taxonomic expertise	literature access	deoxygenation detection; co-
	Trophic Structure	Field system	Food supply	Isotopic, Gut, Modeling	dissecting tools for gut contents,	management of cumulative