

NPS Ecological Monitoring Framework

The NPS Ecological Monitoring Framework is a systems-based, heirarchical, organizational tool for promoting communication, collaboration, and coordination among parks, networks, programs, and agencies involved in ecological monitoring. Vital signs selected by parks and networks for monitoring are assigned to the Level 3 category that most closely pertains to that vital sign. For example, the vital sign “Shoreline Change” is assigned to the Level 3 category of “Coastal/oceanographic features and processes” within the Level 2 category of Geomorphology and Level 1 category of “Geology and Soils”. To promote collaboration among networks, a database has been developed using the framework to show which parks and networks will implement monitoring of vital signs within each Level 1, 2, and 3 category.

Ecological Monitoring Framework			
Level 1 Category	Level 2 Category	Level 3 Category	Comments
Air and Climate	Air Quality	Ozone	
		Wet and Dry Deposition	
		Visibility and Particulate Matter	
		Air Contaminants	
	Weather and Climate	Weather and Climate	
Geology and Soils	Geomorphology	Windblown Features and Processes	
		Glacial Features and Processes	
		Hillslope Features and Processes	
		Coastal/Oceanographic Features and Processes	
		Marine Features and Processes	
		Stream/River Channel Characteristics	
		Lake Features and Processes	
	Subsurface Geologic Processes	Geothermal Features and Processes	
		Cave/Karst Features and Processes	
		Volcanic Features and Processes	
		Seismic Activity	
	Soil Quality	Soil Function and Dynamics	
	Paleontology	Paleontology	
Water	Hydrology	Groundwater Dynamics	
		Surface Water Dynamics	

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Level 1 Category	Level 2 Category	Level 3 Category	Comments
	Water Quality	Marine Hydrology	
		Water Chemistry	
		Nutrient Dynamics	
		Toxics	
		Microorganisms	
		Aquatic Macroinvertebrates and Algae	
Biological Integrity	Invasive Species	Invasive/Exotic Plants	
		Invasive/Exotic Animals	
	Infestations and Disease	Insect Pests	
		Plant Diseases	
		Animal Diseases	
	Focal Species or Communities	Marine Communities	Includes coral communities
		Intertidal Communities	
		Estuarine Communities	
		Wetland Communities	Marshes, swamps, bogs
		Riparian Communities	
		Freshwater Communities	Standing water (inland ponds and lakes) and flowing water (rivers and streams); emphasis on aquatic biota
		Sparsely Vegetated Communities	
		Cave Communities	Cave flora and fauna. Physical and chemical features and processes should go under Caves/Karst Features and Processes
		Desert Communities	
		Grassland/Herbaceous Communities	Includes tundra and alpine meadows, lichens, fungi
		Shrubland Communities	
		Forest/Woodland Communities	
		Marine Invertebrates	
		Freshwater Invertebrates	
		Terrestrial Invertebrates	
Fishes			

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Level 1 Category	Level 2 Category	Level 3 Category	Comments
		Amphibians and Reptiles	
		Birds	
		Mammals	
		Vegetation Complex (use sparingly)	Catch-all category to be used in rare cases where no other community type can be used.
		Terrestrial Complex (use sparingly)	Catch-all category to be used in rare cases where no other category can be used.
	At-risk Biota	T&E Species and Communities	
Human Use	Point Source Human Effects	Point Source Human Effects	
	Non-point Source Human Effects	Non-point Source Human Effects	
	Consumptive Use	Consumptive Use	
	Visitor and Recreation Use	Visitor Use	
	Cultural Landscapes	Cultural Landscapes	
Landscapes (Ecosystem Pattern and Processes)	Fire and Fuel Dynamics	Fire and Fuel Dynamics	
	Landscape Dynamics	Land Cover and Use	Includes landscape pattern, fragmentation
	Extreme Disturbance Events	Extreme Disturbance Events	Records of floods, windthrow, ice storms, hurricanes, etc., which might also be placed in Climate category.
	Soundscape	Soundscape	
	Viewscape	Viewscape/Dark Night Sky	
	Nutrient Dynamics	Nutrient Dynamics	
	Energy Flow	Primary Production	

Key Sources consulted during development of the framework: National Vegetation Classification system; Parks Canada Ecological Integrity Monitoring Framework; H. John Heinz III Center for Science, Economics and the Environment. 2002. The State of the Nation's Ecosystems. Cambridge University Press; M. A. Harwell et al. 1999. A framework for an ecosystem integrity report card. BioScience 49(7):543-556; Noss, R. F. 1990. Indicators for Monitoring Biodiversity. A Hierarchical Approach. Conservation Biology 4:355-363; Cowardin Wetland Classification System; EPA Framework for Assessing and Reporting on Ecological Condition; European EUNIS Habitat Classification System.