

National Park Service, Inventory and Monitoring Division

Summary of the most common indicators of natural resource condition (and examples of specific measures) that are being monitored by the U.S. National Park Service long-term ecological monitoring program (from [Fancy and Bennetts 2012](#)).

Indicator Category	Example Measures (varies by network)	Number of Parks
Weather and climate	Temperature, precipitation, wind speed, ice on/off dates	246
Water chemistry	pH, temperature, dissolved oxygen, conductivity	211
Land cover and use	Area in each land cover and use type; patch size and pattern	203
Invasive/exotic plants	Early detection, presence/absence, area	200
Birds	Species composition, distribution, abundance	189
Surface water dynamics	Discharge/flow rates, gauge/stage height, lake elevation, spring/seep volume, sea level rise	158
Ozone	Ozone concentration, damage to sensitive vegetation	140
Wet and dry deposition	Wet deposition chemistry, sulfur dioxide concentrations	114
Visibility and particulate matter	IMPROVE network; visibility and fine particles	113
Fire and fuel dynamics	Long-term trend of fire frequency, average fire size, average burn severity, total area affected by fire	105
Vegetation complexes	Plant community diversity, relative species/guild abundance, structure/age class, incidence of disease	101
Mammals	Species composition, distribution, abundance	93
Forest/woodland communities	Community diversity, coverage and abundance, condition and vigor classes, regeneration	93
Soil function and dynamics	Soil nutrients, cover and composition of biological soil crust communities, soil aggregate stability	91
Stream/river channel characteristics	Channel width, depth, and gradient, sinuosity, channel cross-section, pool frequency and depth, particle size	89
Aquatic macroinvertebrates	Species composition and abundance	86
Threatened and endangered species and communities	Population estimates, distribution, sex and age ratios	85
Air contaminants	Concentrations of SOCs, PCBs, DDT, Hg	71
Groundwater dynamics	Flow rate, depth to ground water, withdrawal rates, recharge rates, volume in aquifer	69
Amphibians and reptiles	Species distribution and abundance, population age/size structure, species diversity, percent area occupied	54
Grassland/herb communities	Composition, structure, abundance, changes in treeline	51
Fishes	Community composition, abundance, distribution, age classes, occupancy, invasive species	50
Insect pests	Extent of insect-related mortality, distribution and extent of standing dead/stressed/diseased trees, early detection	50
Riparian communities	Species composition and percent cover, distribution and density of selected plants, canopy height	45
Nutrient dynamics	Nitrate, ammonia, DON, nitrite, orthophosphate, total K	45
Primary production	Normalized differential vegetation index (NDVI), change in length of growing season, carbon fixation	41
Wetland communities	Species composition and percent cover, distribution and density of selected plants, canopy height, aerial extent	40
Microorganisms	Fecal coliform, <i>E. coli</i> , cyanobacteria	30
Water toxics	Organic and inorganic toxics, heavy metals	30
Invasive/exotic animals	Invasive species present, distribution, vegetation types invaded, early detection at invasion points	29
Coastal/oceanographic features and processes	Rate of shoreline change, sea surface elevations, area and degree of subsidence through relative elevation data	29