

5. The Priority Pollutants and Environmental Stress Indicators

An Inter-Agency W/G on Monitoring (UNEP, UNESCO, IOC, WHO, WMO, IAEA, FAO, IMCO, UNSCEAR) met frequently in 1973 and selected a tentative list of priority pollutants that should be examined for feasibility and significance in the context of GEMS. The list was reviewed in September 1973 by a Working Party of SCOPE: Dr. G.C. Butler (chairman), Dr. R.E. Munn, Dr. F.N. Frenkiel, Dr. I. Nisbet, Dr. D.A. Rennie, Dr. R.E. Waller, Dr. G.F. Humphrey, Dr. F. Webster and Mr. R. Citron (Rapporteur). The Working Party agreed on four lists of substances and environmental stress indicators:

1. Priority substances that should be examined for feasibility of measurement;
2. Selected substances drawn from list 1 that should be measured in GEMS Phase I;
3. Selected substances drawn from list 1 that could be monitored locally or regionally wherever there are special local problems;
4. Substances in list 1 not recommended for routine monitoring (mainly because feasibility has not yet been demonstrated).

List I: Substances and environmental stress indicators that are potentially important with respect to their direct and indirect effects on man and the biosphere:

1. Airborne sulphur dioxide and sulphates.
2. Suspended particulate matter.
3. Carbon monoxide.
4. Carbon dioxide and other trace gases that affect the radiative properties of the atmosphere.
5. Airborne oxides of nitrogen.
6. Ozone, photochemical oxidants and reactive hydrocarbons.
7. Polycyclic aromatic hydrocarbons.
8. Toxic metals, especially mercury, lead, and cadmium.
9. Halogenated organic compounds, especially DDT and its metabolites, PCB, PCT, Dieldrin and short-chain halogenated aliphatic compounds.
10. Asbestos.
11. Petroleum hydrocarbons.
12. Toxins of biological origin (from algae, fungi, and bacteria).
13. Nitrates, nitrites, and nitrosamines.
14. Ammonia
15. Selected indicators of water quality: biological oxygen demand (BOD), dissolved oxygen (DO), pH, coliform bacteria.
16. Selected radionuclides.
17. Airborne allergens.

18. Eutrophicators (e.g., nitrates and phosphates).
19. Soluble salts of the alkali metals and the alkaline earth metals.
20. Other substances that have caused significant local environmental problems in the past such as arsenic, boron, elemental phosphorus, selenium, and fluoride.
21. Noise.
22. Waste heat.

After evaluating the substances and indicators included in List I, the following were selected as having high priority and also as being technically feasible for monitoring in GEMS Phase I. Many of these are already being monitored in existing national, regional and/or global programs.

List 2: Substances and environmental stress indicators recommended for monitoring in GEMS Phase I:

<i>Substance or Indicator</i>	<i>Media</i>
1. Airborne sulphur dioxide and sulphates	air
2. Suspended particulate matter	air water
3. Carbon monoxide	air
4. Carbon dioxide	air, oceans
5. Airborne oxides of nitrogen	air
6. Ozone, photochemical oxidants and reactive hydrocarbons	air
7. Toxic metals	
a. mercury	man soil food biota water
b. lead	man soil food biota water air
c. cadmium	man food biota water
8. Halogenated organic compounds, especially DDT and its metabolites, PCB's and Dieldrin	man soil food biota
9. Petroleum hydrocarbons in water	water

10. Selected indicators of water quality	water
a. biological oxygen demand (BOD)	water
b. dissolved oxygen (DO)	water
c. pH	water
d. E.coli	water
e. ammonia	water
11. Nitrates, nitrites, and nitrosamines	water food soil
13. Specific radionuclides (Cadmium 137, Strontium 90)	all media

List 3: Substances that could be monitored locally or regionally wherever there are special local problems:

1. Soluble salts of the alkali metals and alkaline earth metals	groundwater soil
2. Eutrophicators (e.g., nitrates and phosphates)	water soil
3. Other substances that have caused significant local environmental problems in the past such as arsenic, boron, elemental phosphorus, selenium, fluoride, and selected heavy metals	soil water food
4. Noise	air
5. Waste heat	air water
6. Ammonia	soil

List 4: Substances not recommended for GEMS Phase I (mainly because the feasibility of systematic monitoring has not yet been demonstrated):

1. Polycyclic aromatic hydrocarbons
2. Asbestos
3. Allergens
4. Selected microbial contaminants
5. Myco-toxins

The SCOPE Working Party also considered the operational question of the frequency of observations and the density of networks. Some guidelines are included in the Abstract (to be found at the beginning of this report).

For comparison, Appendix C contains the lists of priority pollutants contained in the Convention on Ocean Dumping, the text of which was approved in London in November 1972: Annex I of that Convention contains a list of substances to be prohibited completely while Annex II gives substances requiring a special permit.