Application of National Coastal Assessment Pollution & Ecosystem Health to LMEs in Regional Seas

Kevin Summers
U.S. EPA/ORD

National Coastal Assessment Goal

- Build the scientific basis, and the local, state and tribal capacity, to monitor for status and trends in the condition of the Nation's (US) coastal ecosystems.

National Coastal Assessment Uncertainties/Questions

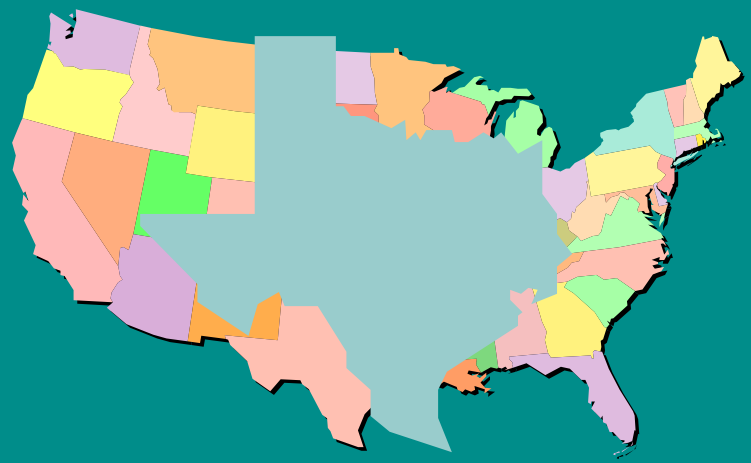
- What is the status, extent, and geographical distribution of ecological resources?
- What proportions of these resources are declining or improving? Where? At what rate?
- What factors are likely to be contributing to declining conditions?
- Are pollution control, reduction, mitigation, and prevention programs achieving overall improvement in ecological condition?

Indicator Selection Criteria
Critical Criteria

- Regionally responsive
- Unambiguously interpretable
- Simple quantification
- Index period stability
- Low year-to-year variation
- Environmental impact

Indicator Selection Criteria
Critical Criteria

- Regionally responsive
  - Must reflect changes in ecosystem condition, and respond to stressors of concern across most resource classes and habitats within the monitored region

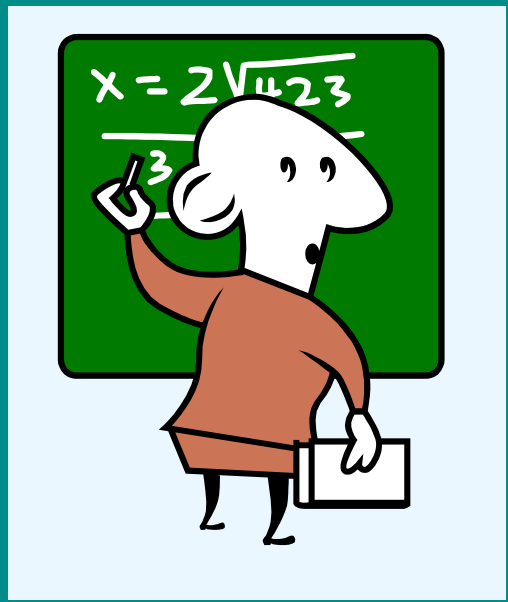


Indicator Selection Criteria
Critical Criteria

- Unambiguously interpretable
  - Must be related unambiguously to an assessment endpoint relevant exposure or habitat variable that forms part of the ecosystem's overall conceptual model of ecological structure and function

Indicator Selection Criteria
Critical Criteria

- Simple quantification
  - Can be quantified by synoptic monitoring or by cost-effective automated monitoring



Indicator Selection Criteria
Critical Criteria

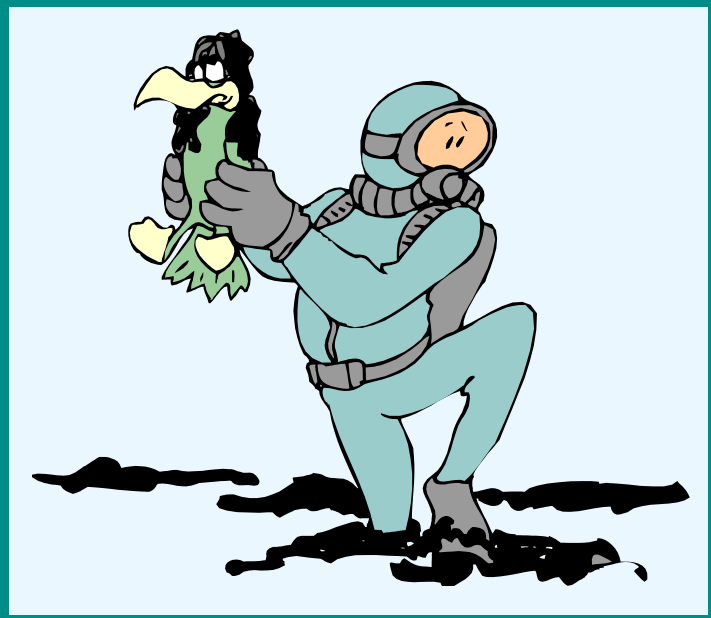
- Index period stability
  - Exhibits low measurement error and stability of regional cumulative frequency distribution during index period (low temporal variation in regional statistics)

Indicator Selection Criteria
Critical Criteria

- Low year-to-year variation
  - Must have sufficiently low natural year-to-year variation to detect ecologically significant changes within a reasonable time frame

Indicator Selection Criteria
Critical Criteria

- Environmental impact
  - Sampling must have minimal environmental impact



Indicator Type	Indicator
Exposure	Nutrients Sediment Contaminants Sediment Toxicity Dissolved Oxygen concentration Contaminants in fish and shellfish
Response	Benthic community composition Benthic abundance Fish community composition Pathology in Fish
Habitat	Percent light transmittance Salinity, temperature, pH Percent silt-clay

Indicators to Indices

- Water Quality Index
  - Nitrogen, Phosphorus, Water Clarity, Chlorophyll, Dissolve Oxygen
- Sediment Quality Index
  - Sediment Chemistry, Toxicology Tests, TOC
- Habitat Quality Index
  - Long-Term Decadal Mean Loss, Recent Decade Loss Rate
- Benthic Index
  - Diversity, Tolerant & Sensitive Species
- Fish Contaminant Index
  - Tissue Chemistry (Whole & Fillet)

Percent Area in Poor Condition

by Indicator (except Coastal Habitat Index) and Region

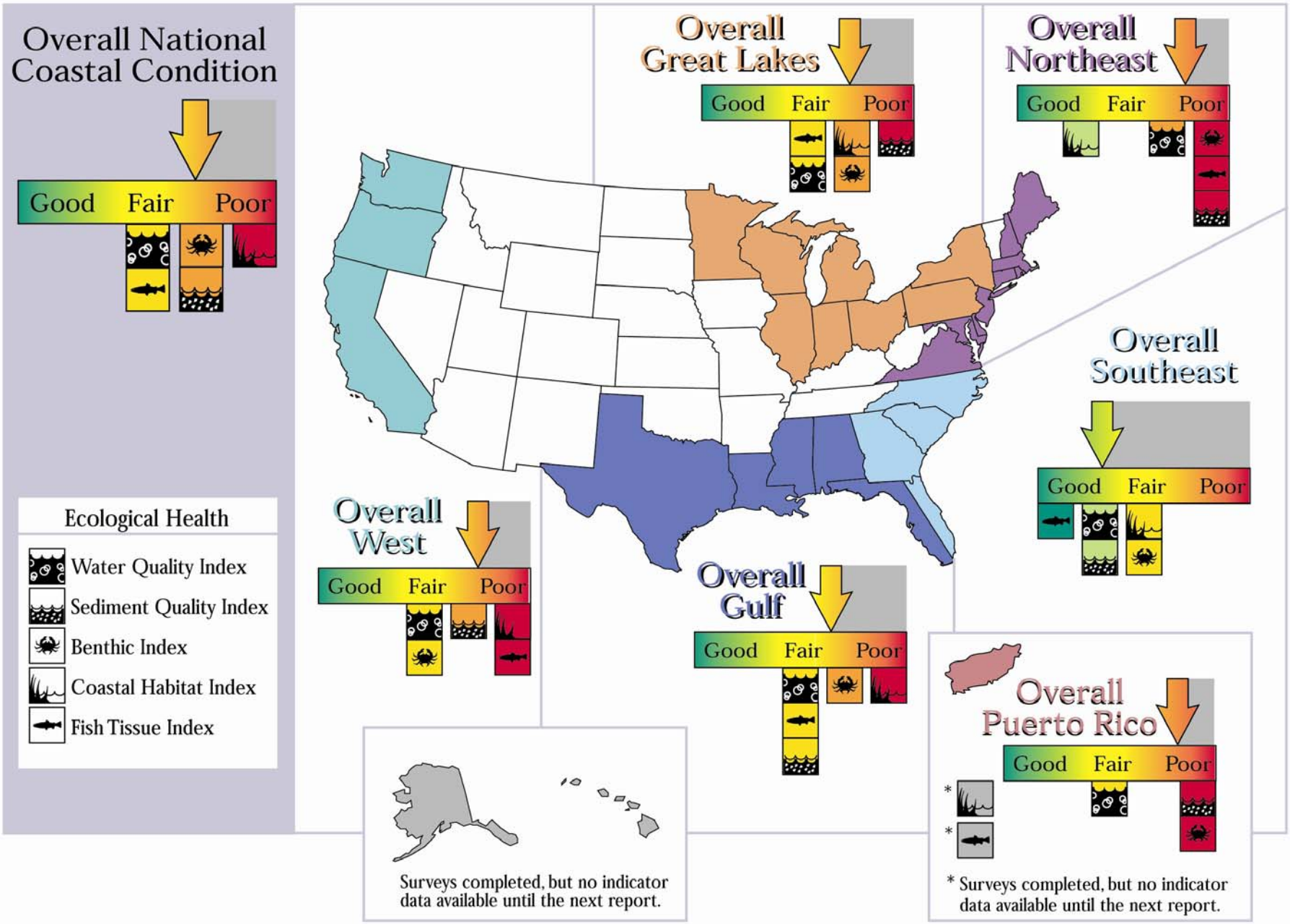
Indicator	Northeast Coast	Southeast Coast	Gulf Coast	West Coast	Great Lakes	Puerto Rico	United States
Water Quality Index	19	5	9	12	—	9	12
Sediment Quality Index	16	8	12	14	—	61	13
Coastal Habitat Index	1.00	1.06	1.30	1.90	—	—	1.26
Benthic Index	25	11	17	13	—	35	18
Fish Tissue Contaminants Index	31	5	14	27	—	—	22
Overall Poor Condition	40	23	40	23	—	77	35

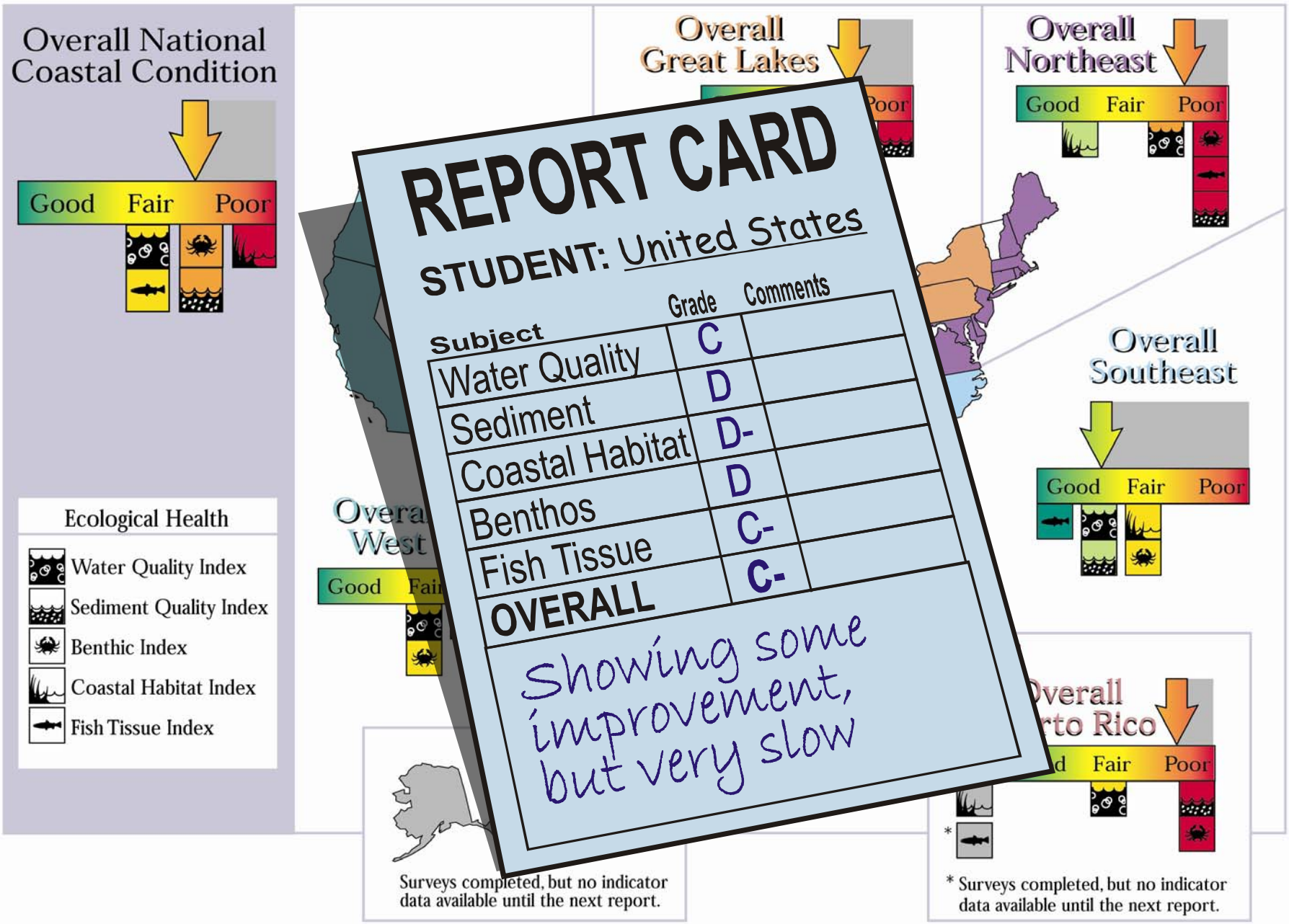
United States
Environmental Protection
Agency

Office of Research and Development/
Office of Water
Washington, DC 20460

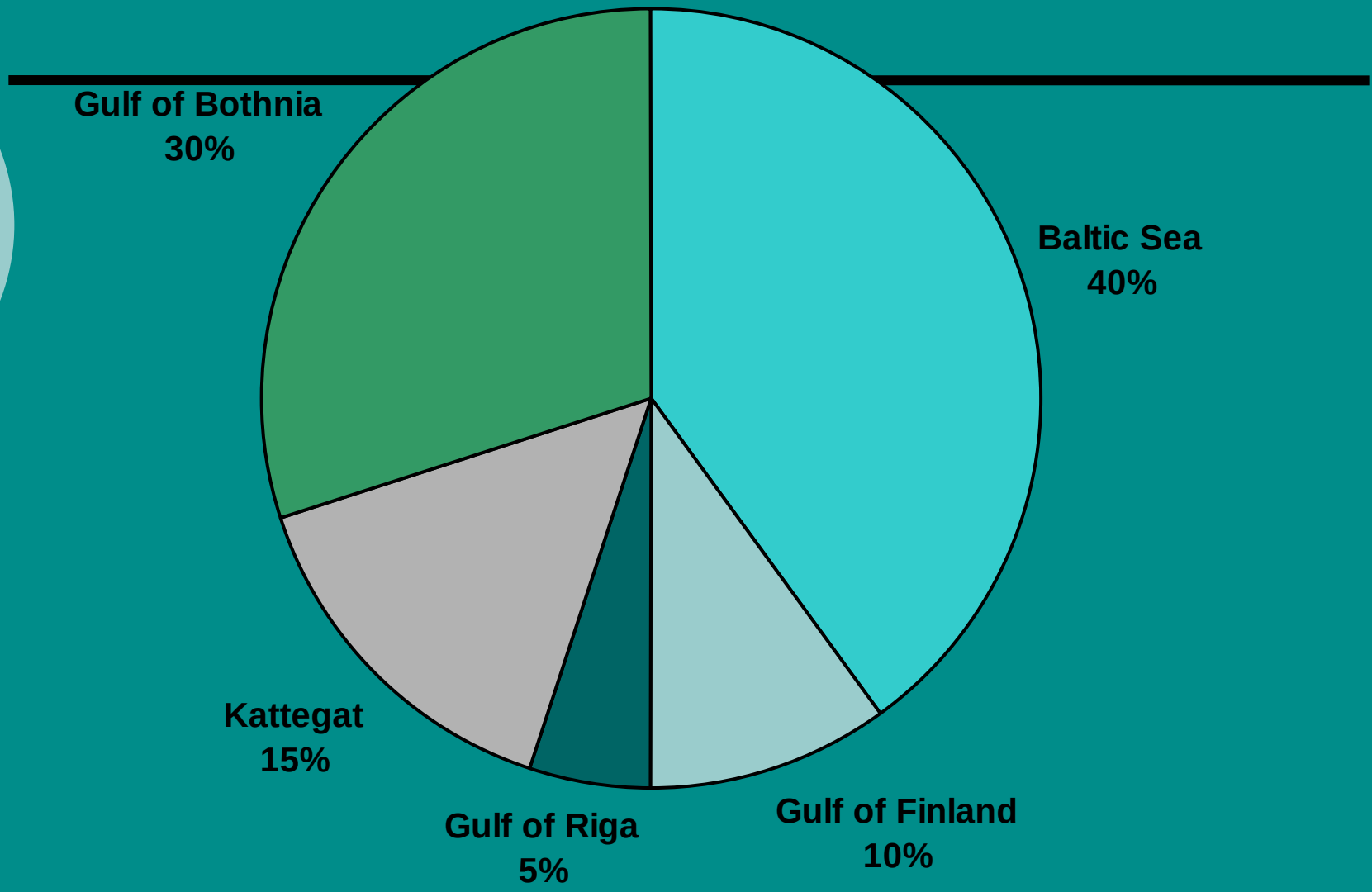
EPA-620/R-03/002
September 2004
www.epa.gov/owow/oceans/NCCR/index

Draft National Coastal Condition Report II


Overall National Coastal Condition
Good Fair Poor
Overall Great Lakes
Good Fair Poor
Overall Northeast
Good Fair Poor
Overall Southeast
Good Fair Poor
Overall West
Good Fair Poor
Overall Gulf
Good Fair Poor
Overall Puerto Rico
Good Fair Poor
Ecological Health
Water Quality Index
Sediment Quality Index
Benthic Index
Coastal Habitat Index
Fish Tissue Index
Surveys completed, but no indicator data available until the next report.
* Surveys completed, but no indicator data available until the next report.


Overall National Coastal Condition
Good Fair Poor
Ecological Health
Water Quality Index
Sediment Quality Index
Benthic Index
Coastal Habitat Index
Fish Tissue Index
Overall Great Lakes
Overall Northeast
Good Fair Poor
Overall Southeast
Good Fair Poor
Overall West
Overall Puerto Rico
Good Fair Poor
REPORT CARD
STUDENT: United States
Subject | Grade | Comments
Water Quality | C
Sediment | D
Coastal Habitat | D-
Benthos | D
Fish Tissue | C-
OVERALL | C-
Showing some improvement, but very slow
Surveys completed, but no indicator data available until the next report.
* Surveys completed, but no indicator data available until the next report.

Norwegian Sea
FINLAND
NORWAY
SWEDEN
ESTONIA
RUSSIA
LATVIA
LITHUANIA
DENMARK
Baltic Sea
North Sea
RUSSIA
BELARUS
POLAND
GERMANY


Gulf of Bothnia
30%
Baltic Sea
40%
Kattegat
15%
Gulf of Riga
5%
Gulf of Finland
10%

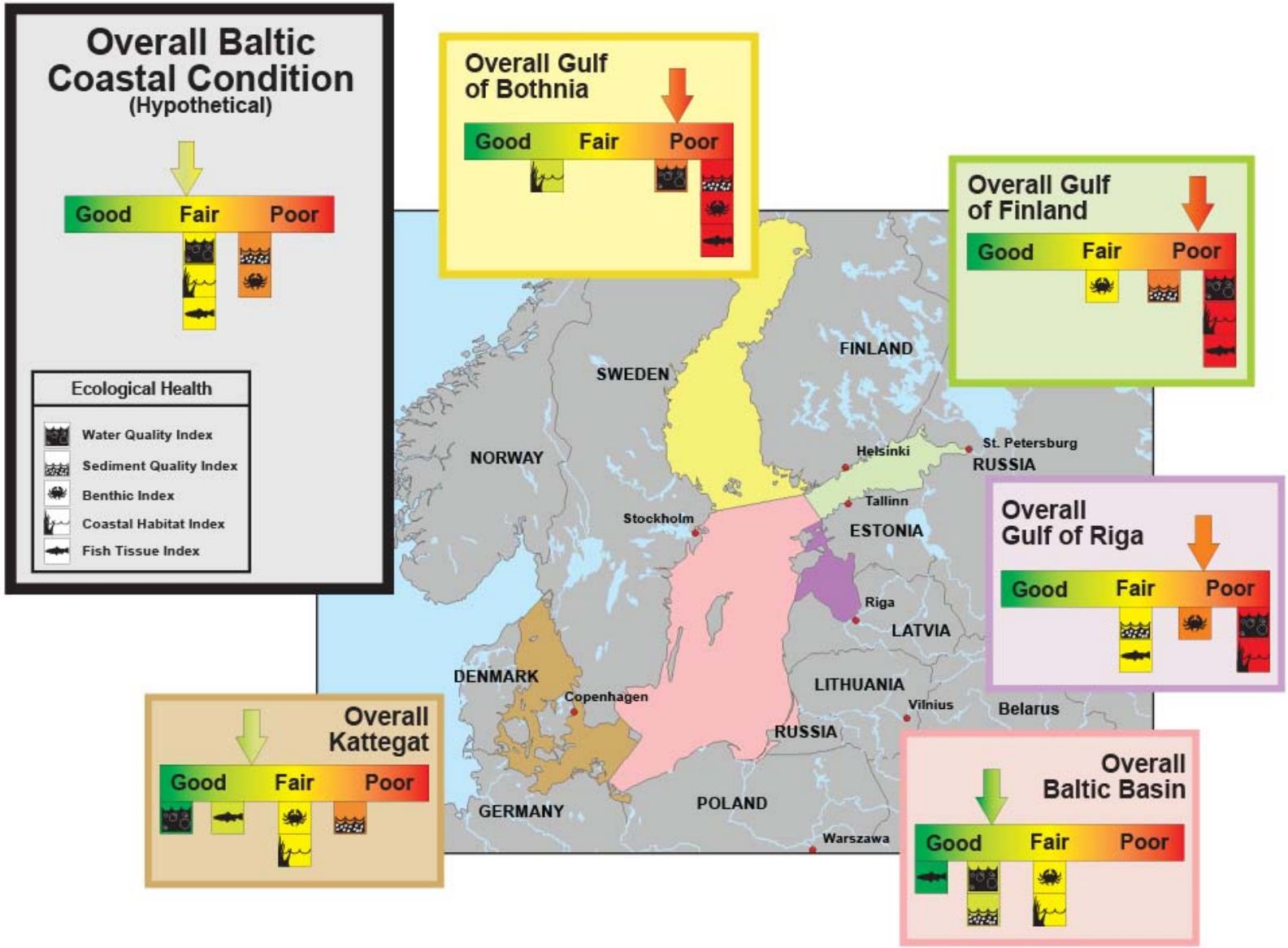
Percent Area in Poor Condition

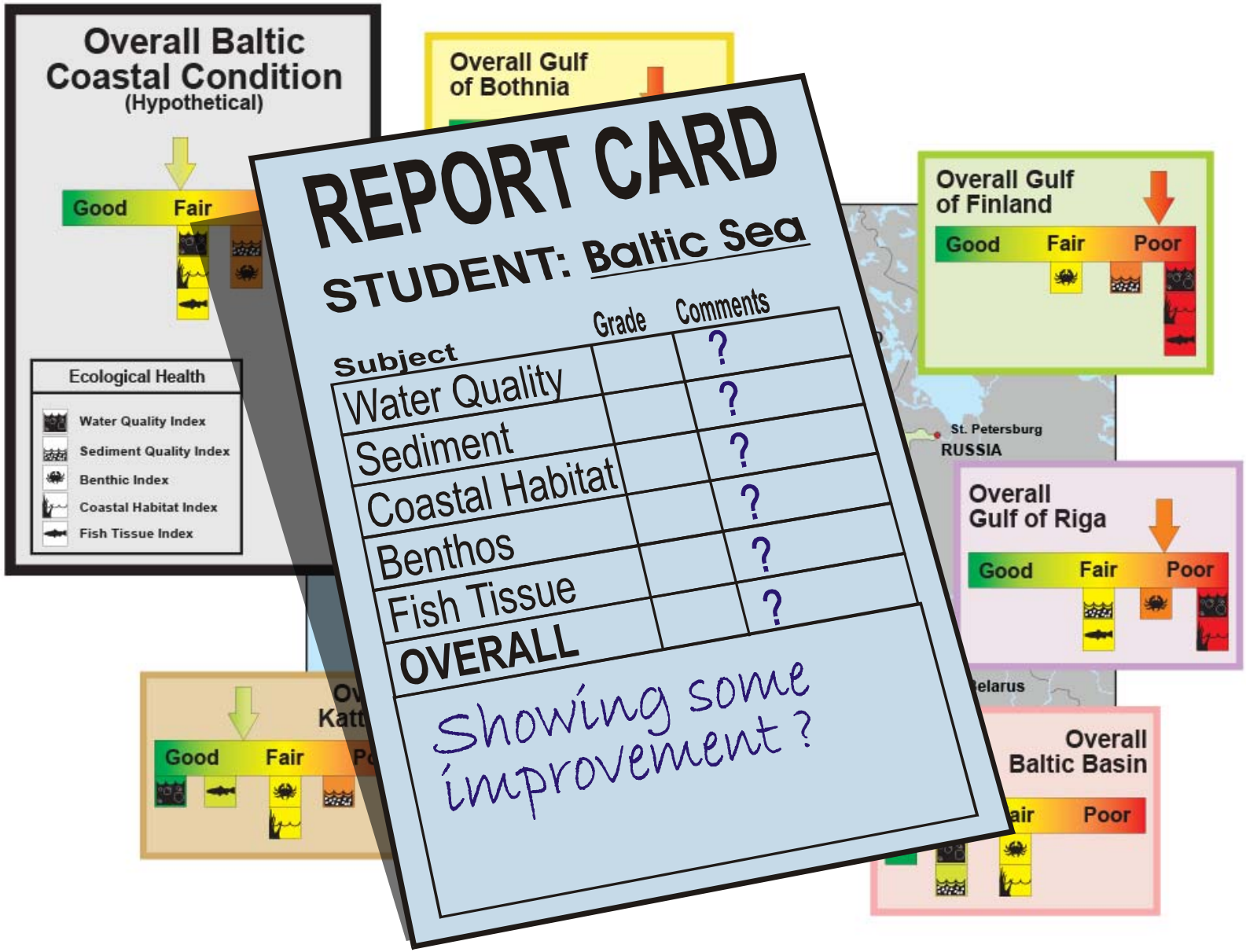
by Index (except Coastal Habitat Index) and Region

Indicator	Gulf of Bothnia	Baltic Basin	Gulf of Riga	Gulf of Finland	Kattegat	Baltic Sea
Water Quality Index	19	5	29	22	7	13
Sediment Quality Index	16	8	12	14	14	12
Coastal Habitat Index	1.00	1.06	1.30	1.90	1.10	1.14
Benthic Index	25	11	17	23	12	16
Fish Tissue Contaminants Index	31	5	14	27	7	16
Overall Poor Condition	40	23	40	33	26	30

Baltic Sea Regional Project HELCOM

Baltic Coastal Condition Report


Overall Baltic Coastal Condition
(Hypothetical)
Good
Fair
Poor
Ecological Health
Water Quality Index
Sediment Quality Index
Benthic Index
Coastal Habitat Index
Fish Tissue Index
Overall Gulf of Bothnia
Good
Fair
Poor
Overall Gulf of Finland
Good
Fair
Poor
Overall Gulf of Riga
Good
Fair
Poor
Overall Kattegat
Good
Fair
Poor
Overall Baltic Basin
Good
Fair
Poor
SWEDEN
FINLAND
NORWAY
Helsinki
St. Petersburg
RUSSIA
Tallinn
Stockholm
ESTONIA
Riga
LATVIA
DENMARK
Copenhagen
LITHUANIA
Vilnius
Belarus
RUSSIA
GERMANY
POLAND
Warszawa


Overall Baltic Coastal Condition
(Hypothetical)
Good
Fair
Ecological Health
Water Quality Index
Sediment Quality Index
Benthic Index
Coastal Habitat Index
Fish Tissue Index
Overall Gulf of Bothnia
REPORT CARD
STUDENT: Baltic Sea
Subject
Grade
Comments
Water Quality
Sediment
Coastal Habitat
Benthos
Fish Tissue
OVERALL
?
Showing some improvement?
Overall Gulf of Finland
Good
Fair
Poor
St. Petersburg
RUSSIA
Overall Gulf of Riga
Good
Fair
Poor
Overall Baltic Basin
Poor