

**A Survey of State  
Environmental Indicators Contact Information  
2006**

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**I. Defining Environmental Indicators**

For the purpose of this discussion, indicators shall be defined by the following parameters:

- 1) An indicator must be dependably measurable
- 2) An indicator must be some aspect of a larger issue that can help signify the status to some degree of that larger issue.

- 3) An indicator should be able to be repeatedly measured so that a general trend can be established.

To be more precise, an indicator is some part of a system that when observed can give some indication to the state of that overall system. Systems can be mechanical, societal, environmental, or any number of other forms. For example, the condition of motor oil in a car could be a mechanical indicator for the overall condition of the engine. The crime rate of an area could be a societal indicator of the overall sense of community in that area. Likewise, *Environmental Indicators* (EIs) are those indicators that are specifically employed to monitor the health of the environment, its sustainability, and/or its effect(s) on populations. Examples of EIs could include the amount of persistent chemicals found in the local fish population, tree stand population increase/decrease of a particular forest, and the increase in respiratory illnesses of a specific area's population linked to low air quality.

For EPA's Report on the Environment, an indicator is a numerical value derived from actual measurements of a pressure, state or ambient condition, exposure or human health or ecological condition over a specified geographic domain, whose trends over time represent or draw attention to underlying trends in the condition of the environment (1).

According to California's Environmental Protection Agency, Environmental indicators are quantitative measurements which can be used to evaluate overall environmental quality, trends in environmental quality over time, and the relative success of environmental regulatory programs in maintaining and improving the quality of the environment. Environmental indicators provide a mechanism for measuring regulatory program effectiveness more directly than the traditional measures such as the number of inspections, permits, and enforcement actions (2).

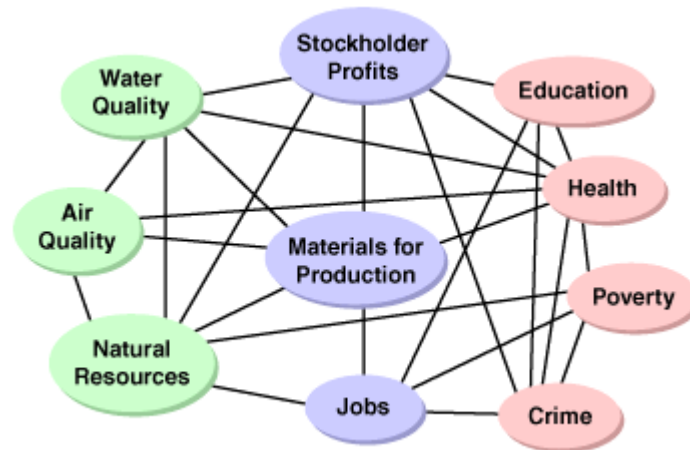
The Organization for Economic Cooperation and Development (OECD) defines the elements of a indicator as follows: **Parameter** – A property that is measured or observed; **Indicator** – A parameter, or value derived from a parameter, which points to, provides information about, or described the state of a phenomenon, environment, or area with a significance to extending beyond that directly associated with a parameter value; and **Index** – A set of aggregated or weighted parameters or indicators (3).

The New Jersey Center for Environmental Indicators states that “Environmental indicators are selected measures that represent or summarize status and trends in significant aspects of environmental quality (5).”

Sustainable Measures, an organization that is dedicated to developing indicators that measure progress towards the new environmental paradigm of sustainability, says “an indicator is something that helps you understand where you are, which way you are going and how far you are from where you want to be. A good indicator alerts you to a problem before it gets too bad and helps you recognize what needs to be done to fix the problem. Indicators of a sustainable community point to areas where the links between

the economy, environment and society are weak. They allow you to see where the problem areas are and help show the way to fix those problems.” (4)

They further state that “indicators of sustainability are different from traditional indicators of economic, social, and environmental progress. Traditional indicators -- such as stockholder profits, asthma rates, and water quality -- measure changes in one part of a community as if they were entirely independent of the other parts. Sustainability indicators reflect the reality that the three different segments are very tightly interconnected, as shown in the figure below:”(5)



**Communities are a web of interactions among the environment, the economy and society.**

“As this figure illustrates, the natural resource base provides the materials for production on which jobs and stockholder profits depend. Jobs affect the poverty rate and the poverty rate is related to crime. Air quality, water quality and materials used for production have an effect on health. They may also have an effect on stockholder profits: if a process requires clean water as an input, cleaning up poor quality water prior to processing is an extra expense, which reduces profits. Likewise, health problems, whether due to general air quality problems or exposure to toxic materials, have an effect on worker productivity and contribute to the rising costs of health insurance.”(5)

## **II. Indicator Examples**

\*Note: These indicators list no time frame that the measurements are to be taken over. This is because depending on the intended use, the indicator can be measured on any number of time scales. It is significant to note that even though they can be measured anywhere from a week to a decade, environmental indicators are most commonly presented annually.

### Sustainability:

1. Average Age of Fish Harvesters – “This indicator, from the Maine Economic Growth Council and the Maine Development Foundation measures the perception among fish harvesters that there is a promising future in the fishing industry. This is a measure that shows links between the environment, economy and society. It connects the health of the fish stocks with the economy of the fishing industry and the stability of the way of life based on the fishing industry.”(4)
2. Ecological Footprint – “This indicator is an estimate of the amount of space on the earth that an individual uses in order to survive using existing technology. This space includes the biologically productive land and water area that produces the resources consumed by that individual such as food, water, energy, clothing, and building materials. It also includes the amount of land and water required to assimilate the wastes generated by that person. In other words, the ecological footprint measures a person's demand on the bio-capacity of the Earth.”(4)

### Solid Waste:

3. Total Solid Waste Generated – “This indicator from the Sustainable Community Roundtable of the South Puget Sound region in the state of Washington looks at the amount of solid waste sent to the landfill. It estimates the total of all residential, commercial, industrial and recycled waste. Sustainability is about using resources no faster than they can be renewed and generating wastes no faster than they can be assimilated. The number of tons of solid waste produced relates to both these issues.” (4)
4. Percent Solid Waste Diverted – This indicator looks at the amount of solid waste that has been diverted from landfills. This helps indicate the effectiveness of recycling, composting, and other resource reclamation programs is having on decreasing the solid waste stream (6).

### Hazardous Waste:

5. Hazardous Waste Generation, One-Time Cleanup Incidents – Releases, spills, or other incidents where the cleanup of hazardous wastes is a one-time occurrence are indicated by this indicator. The increase in this factor may show a need for better safety procedure regulations for hazardous waste. Conversely, a decrease can signify that regulations that are implemented are more effective than previous regulations (thus possibly demonstrating that regulations are headed in the right direction). (6)
6. Hazardous Waste Generation, Recurring – Industrial and commercial operations can continuously produce hazardous waste when manufacturing as a byproduct. This indicator is a volumetric or weight measurement of these materials.
7. Hazardous Waste Generation, Shipments – Hazardous waste shipments to treatment, storage, and disposal facilities are a good indicator for approximately how much hazardous waste is being generated in the specified area.
8. Hazardous Waste Generation, By Volume and Type – This indicator allows the agency to break up hazardous waste into various groups and identify the most troubling areas of pollutants.

9. Hazardous Waste Generated per Dollar of U.S. Gross Domestic Product – Though the goal of regulatory agencies will usually consist of limiting the amount of hazardous waste released, sometimes the increase in the total amount of waste can be due to increased economic activity as opposed to worsening industry standards. This indicator has been developed to assess this possibility (3).
10. Amount of Hazardous materials per acre – This indicator looks at the concentration of hazardous waste over a given area. It can be used to show the reduction of toxicity in a particular region over time to prove improvement in a Brownfields or Superfund site.
11. Acreage Cleaned – This indicator looks at the amount of acres that have shifted from contamination levels above what is designated as acceptably safe to levels that meet environmental standards.
12. Number of Contaminated Sites – Though this indicator does not directly measure the contaminated acreage, it does indicate the number of defined sites that are considered contaminated. This can help give a progress report of closed cases and new ones.

#### Radioactive Waste:

13. Total Volume of Radioactive Waste – This indicator looks at the volume and/or weight (depending on the desired use of the results) of waste that could be classified as radioactive (3).
14. Volume and Radioactivity of Spent Nuclear Fuel – Radioactive reactors produce a byproduct of irradiated nuclear waste that is no longer efficient to use in the nuclear chain reaction. To measure the danger of such wastes, the radioactivity and amount are measured. The greater either one of these factors is the greater the danger (3).

#### Industrial Waste:

15. Amount of Mining Wastes Generated – For states with heavy mining activity, the by-products of such endeavors can be an important environmental impact. This indicator is designed to keep track of such wastes. Examples of categories it could be broken down into are acidic water/runoff, waste rock, and mill tailings (3).
16. Amount of Medical Waste Treated – Medical wastes are a very important and potentially dangerous waste stream to monitor and this indicator does just that (3).
17. Amount and Types of Waste Generated by the Oil and Gas Industry – Few resources are as important or as used as oil and gas products. Because of this extensive use it is significant to track the wastes produced by such an enormous industry. Examples of oil and gas industry waste categories are produced water (saline water brought to the surface with oil and gas), drilling waste, and associated waste (3).

#### Waste Management

18. Amount of a Material Recycled – Just as important as keeping track of the amount of materials that are produced is how much is recycled. This helps indicate how well the state is doing at diverting materials from landfills or other terminal

disposal facilities. The higher the amount, the greater the amount that has been successfully diverted.

19. Percentage of a Material Recycled – The percentage of a material recycled is another perspective on how well the state (or other entity) is doing at diverting certain materials from terminal facilities compared with the overall material produced. The higher the percentage, the greater the amount of the total waste stream for that material that has been diverted.

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\*\*Note: No staff assigned to EPA's Environmental Indicator Initiative\*\*

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**Arizona** - <http://www.azdeq.gov/>

\*\*Note: List is coordinated to the list of EPA indicators found in the EPA report at  
<http://www.epa.gov/indicators/roe/html/roeLandWa.htm> \*\*

- Quantity of municipal solid waste (MSW) generated and managed  
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- Quantity of RCRA hazardous waste generated and managed  
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- Number and location of municipal solid waste (MSW) landfills  
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- Number of RCRA hazardous waste management facilities  
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- Number and location of Superfund national priority list sites  
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- Performance Partnership Agreement w/EPA at <http://www.dep.state.ct.us/deao/ppa/ppa.pdf>
- Environmental Quality Branch Strategic and Operational Plans at <http://www.dep.state.ct.us/cmrsoffc/strategicplan/eqplan.htm>

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- 2006 Strategic plan with environmental indicators in it (pg. 15) at  
[http://www.deq.idaho.gov/about/publications\\_deq/strategic\\_06.pdf](http://www.deq.idaho.gov/about/publications_deq/strategic_06.pdf)

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- “2005 State of Michigan's Environment Second Biennial Report” with environmental indicators at [http://www.michigan.gov/deq/0,1607,7-135-3307\\_7255-11648--,00.html](http://www.michigan.gov/deq/0,1607,7-135-3307_7255-11648--,00.html)

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1) EPA - <http://www.epa.gov/indicators/>

- Proposed Indicators for 2007 Report on the Environment (ROE 2007) at

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- US EPA Office of Environmental Information

General information on the Initiative, the Draft Report on the Environment, or policy decisions such as the indicator selection process at <http://www.epa.gov/oei/>

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### Sources

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5. "About Us: What are indicators?" 27 Oct. 2005. New Jersey Center for Environmental Indicators. <[http://www.scc.rutgers.edu/cei/about/about\\_index.htm](http://www.scc.rutgers.edu/cei/about/about_index.htm)>
6. "EPIC: Environmental Protection Indicators for California – April 2002" California Environmental Protection Agency.
7. Various as personal, phone, and email interviews.