THE HEINZ CENTER

Key Findings

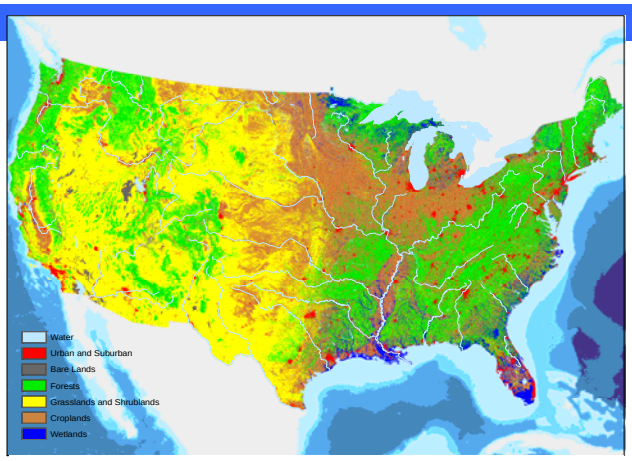
From The State of the Nation's Ecosystems 2008

Conditions and Trends – The Nation's Lands, Waters, and Living Resources

The State of the Nation's Ecosystems 2008 presents 108 indicators that describe the condition and use of U.S. ecosystems. The report focuses on key characteristics such as ecosystem area and composition, chemical and physical properties, condition of biological resources, and the goods and services that people derive from ecosystems.

The State of the Nation's Ecosystems 2008 is the product of extensive collaboration between government agencies, universities, businesses, and conservation organizations, supported by public and private funds. The core premise behind the report is that decision makers and the American public should receive periodic, high quality, non-partisan reports on the condition of the nation's lands, waters, and living resources.

This fact sheet provides a glimpse into the contents of *The State of the Nation's Ecosystems 2008*. We have highlighted a few key topics to illustrate the nature and depth of the contents; readers are encouraged to explore the full report, which is available from **Island Press (www.islandpress.org)**.



Land Cover and Ocean Depth
Data from Multi-Resolution Land Characterization Consortium (MRLC) and NOAA

What's New – More Data, Improved Indicators

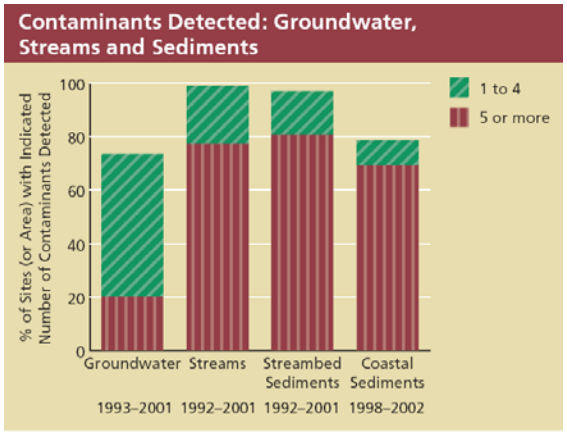
The 2008 *State of the Nation's Ecosystems* report builds on the strong foundation of its 2002 predecessor. However, it contains more data and many improved indicators. More than half of the indicators have been refined or redesigned, to better track trends in ecosystem condition. Data availability has also improved, with the number of indicators with all or partial data increasing by 12%.

Key Findings

Spotlight on Water Quality

Contaminants

- One or more contaminants were detected in virtually all streams and about three-quarters of groundwater wells.
- Contaminant levels exceeded benchmarks set to protect aquatic life in half of all streams tested and exceeded benchmarks for human health in one-third of groundwater wells tested.
- Four out of five freshwater fish tested had at least one contaminant—most commonly PCBs and DDT—at levels above wildlife benchmarks (mercury was not tested for). One out of three saltwater fish had at least one contaminant—most commonly PCBs, PAHs, DDT and mercury—at levels above human health benchmarks.



- Concentrations of DDT and PCBs, but not mercury, have declined in mussels and oysters since 1988 (USGS, EPA, NOAA).

Nitrogen and Agriculture

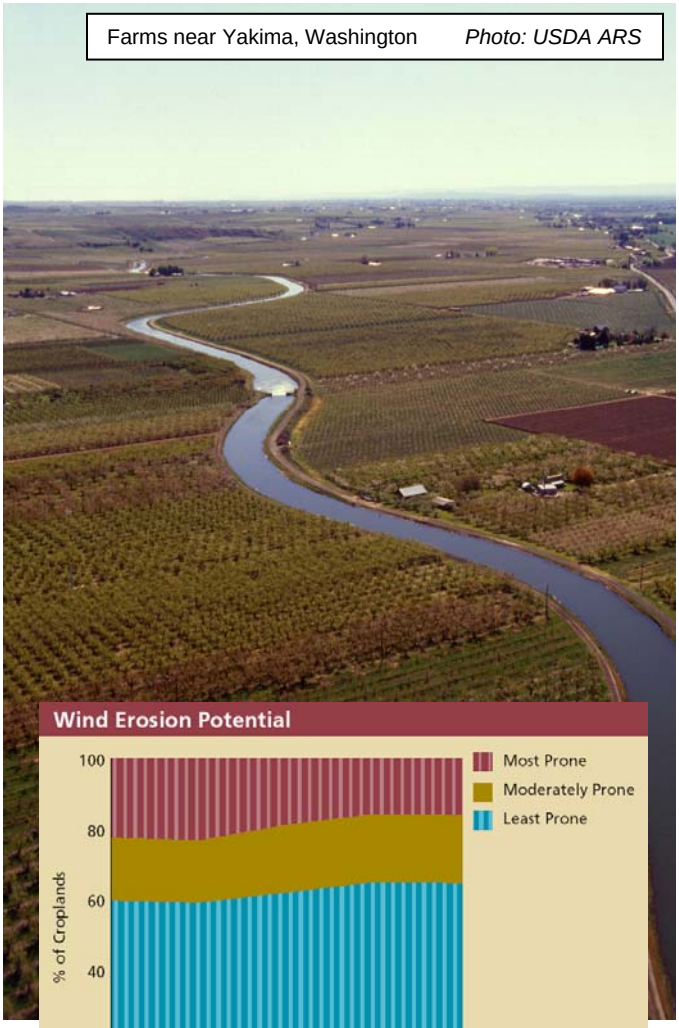
Over the past 60 years, farmers have increased the use of nitrogen fertilizers – in fact, nitrogen is one of the few agricultural inputs whose use per unit of crops produced has risen during this time. The increased use of nitrogen, along with other factors such as use of pesticides, crop breeding, and other management practices, have contributed to the increase in yields of major crops such as corn—yields of corn alone have increased nearly fourfold over the past 50 years.

However, excess fertilizer can end up in streams and groundwater wells in areas dominated by agricultural uses. Farmland streams and groundwater wells have higher concentrations of ntitrate than streams and groundwater in forested or urban areas. Not all nitrogen comes from farming, however: other sources include fertilizer applied to lawns, sewage treatment plants, and the burning of fossil fuels.

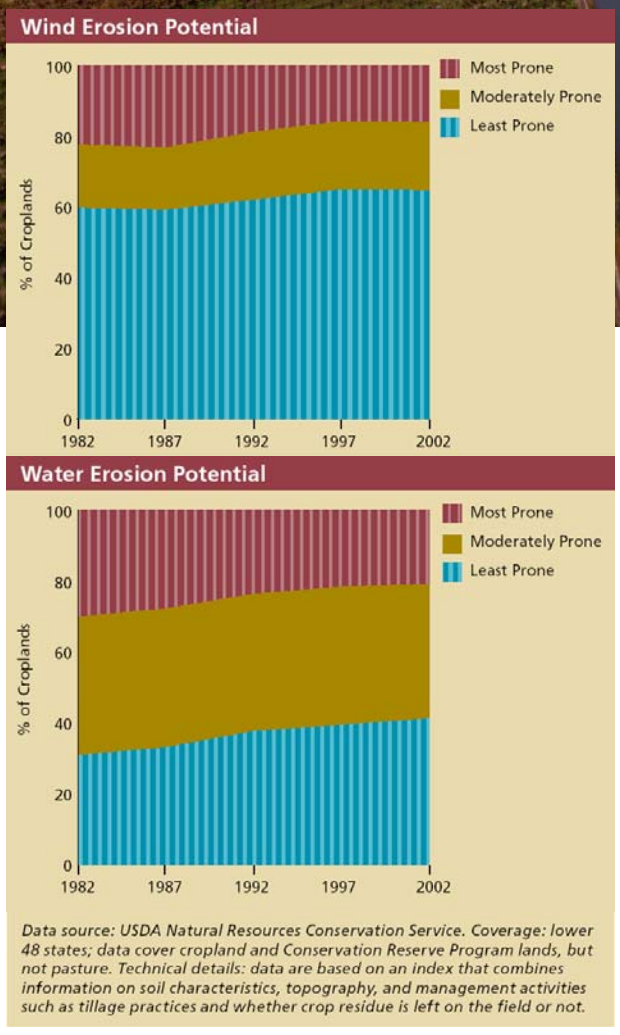
- Twenty-one percent of groundwater wells and 13% of stream sites in the farmland landscape have concentrations of nitrate that exceed federal drinking water standards (USGS).
- Three rivers (Mississippi, Columbia, and Susquehanna) together deliver about one million tons of nitrogen per year to coastal waters (USGS).
- These discharges contribute to low- or no-oxygen conditions, which can harm marine life. The area with low or no oxygen in the Gulf of Mexico has doubled in recent decades to 7900 square miles, larger than Connecticut or Massachusetts (Data from Rabelais, Turner; full citation in report).

Erosion

Over the past 25 years, the proportion of U.S. croplands with the greatest potential for wind erosion decreased nearly one third (based on measurements of soil conditions that promote erosion.) A similar decline was seen in cropland soils with the greatest potential for water erosion. The potential for wind erosion is greater in the Western U. S., while the potential for water erosion is greater in the East (USDA NRCS).



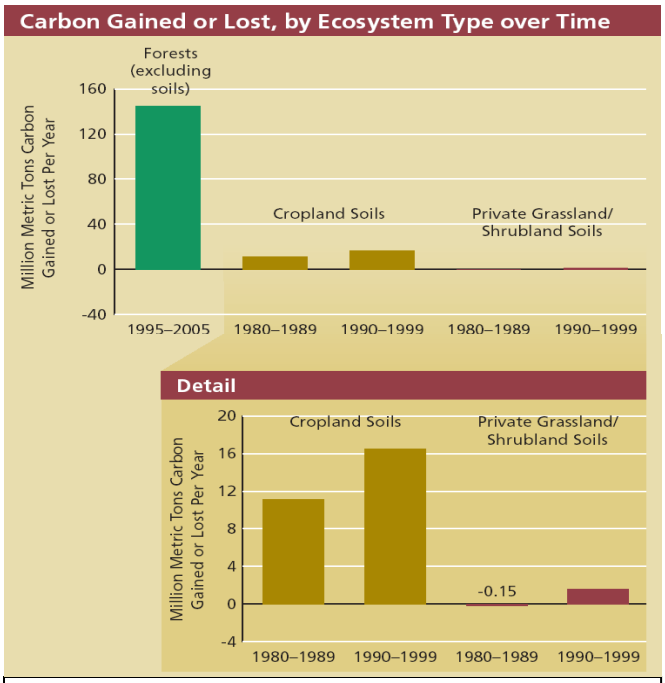
Farms near Yakima, Washington *Photo: USDA ARS*



Data source: USDA Natural Resources Conservation Service. Coverage: lower 48 states; data cover cropland and Conservation Reserve Program lands, but not pasture. Technical details: data are based on an index that combines information on soil characteristics, topography, and management activities such as tillage practices and whether crop residue is left on the field or not.

Proportion of U. S. croplands and Conservation Reserve Program lands that fall in one of three erosion potential categories: most prone, moderately prone, or least prone.

Carbon Storage – A Climate Change Tool



Data from Natural Resource Ecology Laboratory, Colorado State University and USDA Forest Service. Coverage: lower 48 states (all data); 1 metric ton = 1.10 U.S. tons.

Ecosystems store or "sequester" carbon in living or dead plant or animal material, in soil and other organic materials, and dissolved in oceans, lakes, and rivers. Increased storage can help offset carbon emissions, such as those from fossil fuel combustion, that contribute to climate change. Likewise, *reductions* in carbon stored in ecosystems add carbon to the atmosphere.

- From 1995-2005, forests gained 150 million metric tons annually in above and below-ground plant materials; information on forest soil carbon is not widely available. Carbon stored in cropland soils and soils on private grasslands and shrublands increased by 16.5 million metric tons and 1.6 million metric tons annually (from 1990-1999), respectively.

- National-scale estimates of carbon storage are not available for most ecosystem types so it is not possible to provide a complete picture of carbon sequestration in the U.S.

Other Climate Change Indicators

The State of the Nation's Ecosystems 2008 tracks trends in important ecological conditions that will be influenced as climate continues to change. These include indicators of climate change itself (such as sea surface temperatures), as well as features affected by climate change, such as stream flows, groundwater levels, crop yields, wildfire frequency, coastal erosion and others. Other indicators may show the effects of coping strategies, such as increased biofuels development or responding to sea level rise. Sustained tracking of these and other indicators is needed to fully inform key decisions about both reducing and coping with climate change.

Wildlife and Biodiversity

Species at risk:

Approximately one-third of U. S. native plant and animal species are at risk of extinction. ("At risk" is used here to mean "at elevated risk of extinction.") Key factors contributing to extinction risk include small population sizes, declining populations, and threats from human activities and other sources.

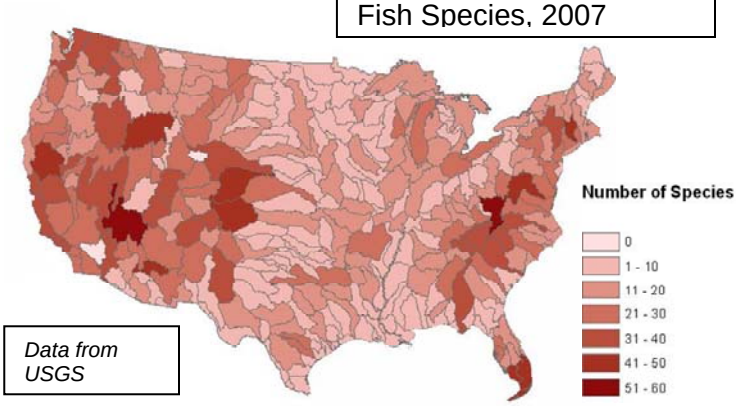
Golden-cheeked Warbler *Photo: U.S. FWS*

- Examples of at-risk wildlife species include Whooping Crane, California Condor, North Atlantic Right Whale, Bog Turtle, and the Florida Manatee. Many native plant species are also at risk.
- Among native vertebrate animals at risk, 28% have declining populations, 23% have stable populations, and 1% have increasing populations. Population trends among the remaining at-risk native vertebrate species (48%) are unknown (NatureServe).

Non-Native Species

Non-native species can have negative effects on the economy, human, and ecological health, but certain non-native species are used and valued for game, fishing, forage, and other purposes.

- In 2007 there were only two watersheds in the lower 48 states without established non-native fish; most (58%) have more than 10 such species.
- Information about most other non-native species is not adequate for reporting at a national level.



A Changing American Landscape

In the past several decades:

- Cropland area has decreased by about 5% (1982 to 2002) (USDA).
- Forest area has been more or less stable (since 1953). (USDA Forest Service).
- Coastal and freshwater wetland area has declined (by about 9%) (since 1955), and the area of ponds has increased (U. S. FWS).
- The area of urban and suburban area tripled between 1945 and 2002 (US Census).
- The area of land enrolled USDA's Conservation Reserve Program (CRP), and planted to grassland or shrubland cover, has fluctuated between 26 million acres and 33 million acres since 1994 (USDA).

More goods from less land

U. S. agricultural yields and overall farm production have increased over time, even as the total area dedicated to growing crops in the U.S. has declined. The amount of land needed to produce each unit of farm output dropped by 70% over the past half century; amounts of energy and durable goods like tractors also declined, accompanied by increases in pesticide and fertilizer use per unit output. The area covered by forests in the U.S. has remained stable – dropping less than 1% over the past 50 years; over the same period timber harvest increased by 40%. Fresh water withdrawals have also increased over time; surface water and ground water withdrawals combined increased by 46 % from 1960 to 2000 (USDA, USGS, USDA Forest Service).

The H. John Heinz III Center for Science, Economics and the Environment

At the crossroads of science and environmental policy, The Heinz Center brings leaders together from business, government, academia, and environmental groups to brainstorm solutions that are both scientifically and economically sound. Founded in 1995 in honor of Senator H. John Heinz III, the Center's guiding philosophy is that only by working together can we solve today's environmental challenges and leave the world a better place for generations to come.

THE HEINZ CENTER

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