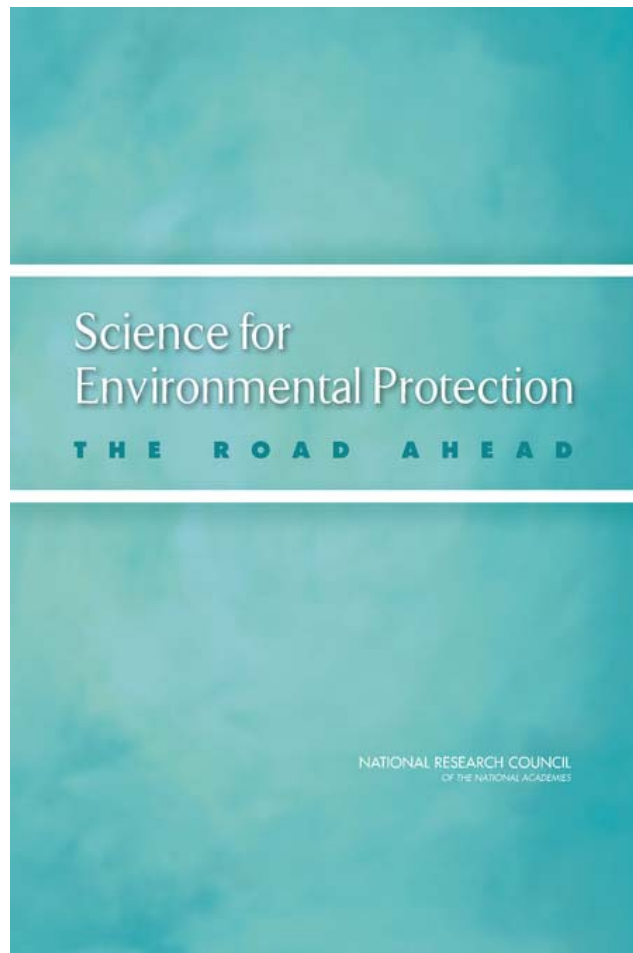


Environmental Measurement Symposium

Environmental Science and Policy – The Road Ahead

**by Paul Gilman, Ph.D.
August 8, 2018**

Many of the thoughts for this talk come from...



Science for
Environmental Protection
THE ROAD AHEAD

Committee on Science for EPA's Future

Board on Environmental Studies and Toxicology

Division on Earth and Life Studies

NATIONAL RESEARCH COUNCIL
OF THE NATIONAL ACADEMIES

Whither Science and its workforce?

The best way to answer that question is to determine what the exciting issues are going to be.

Academic researchers generally gravitate towards the exciting issues – when they aren't following the money – or when they aren't following their passions.

So funders of research have to have an eye towards emerging issues.

To the issues!



Some things will be happening and they will lead to change:

- **Population growth, demographic change, socioeconomic change**
- **Changes in land use**
- **Changes in Energy Technology**
- **Changes in Technology and Consumption**

These will affect:

- **Water Quality**
- **Air Quality/Climate Change**
- **Soil Quality**
- **Human and Ecosystem Health**

How will these changing factors affect the air, water, soil, and their inhabitants?

- **Land use change will often result in habitat loss and the ensuing changes in ecosystems can result in changes in the services these ecosystems provide – THINK LOSS OF MARSHLANDS AND WETLANDS AND HOW THAT EFFECTS RESISTANCE TO CATASTROPHIC STORMS**
- **Changes in energy use affect climate, habitat, and water usage**
- **Changes in consumerism and technology effect the chemicals in our environment**

Sounds like it is back to the future?

- Maybe the current tools, workforce, and knowledge is enough?
- Besides the fact that we clearly have had a need for improvement the manifestation of the changes are different than in the past...
- For the future:
 - Area sources to global sources will be the focus – not point sources
 - Lower doses over longer periods and multiple stressors
 - Complex feedback loops are involved
 - Social and economic drivers will effect outcomes

Solutions will be more difficult for these more complex problems. Applying systems thinking and fashioning sustainable solutions will be critical.

Needs for the future

- Longer term and larger scale monitoring will be needed
- Biomonitoring, personal sensors, and health tracking will be needed
- Trans-disciplinary individuals and organizations
- Informatics, computation, social sciences, systems level focus
- New tools for decision makers that can help them with these more subtle and complex challenges