

# ***EPA's Report on the Environment: Human Health, Environment and Sustainability***

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## Disclaimer

The work described today for the Report on the Environment 2012, including the specifics of the draft conceptual models, is under development and subject to revision.



The views expressed are those of the author and do not necessarily reflect the views or policies of the U.S. Environmental Protection Agency.

# Acknowledgements

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### **Eastern Research Group**

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# Today's Presentation

## EPA's Report on the Environment (ROE)

- ROE purpose and general content
- Brief background/evolution
- Looking to our sustainable future--Changes and enhancements for ROE 2012 and beyond



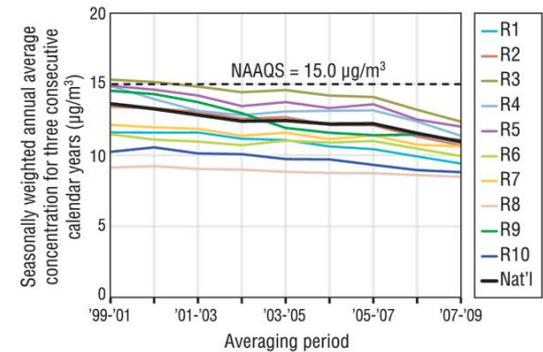
# Report on the Environment

- Comprehensive source of **national-level indicators of status and trends** and important gaps in **environmental and human health conditions** to answer questions important to EPA's mission

--Does *not* analyze or diagnose the reasons for, and relationships between, trends in stressors and environmental and health outcomes

- Provides **objective, reliable information** on status and trends and important scientific input to EPA planning, decision making and priority setting

**Exhibit 2-23.** Ambient annual PM<sub>2.5</sub> concentrations in the contiguous U.S. by EPA Region, 1999-2009<sup>a</sup>

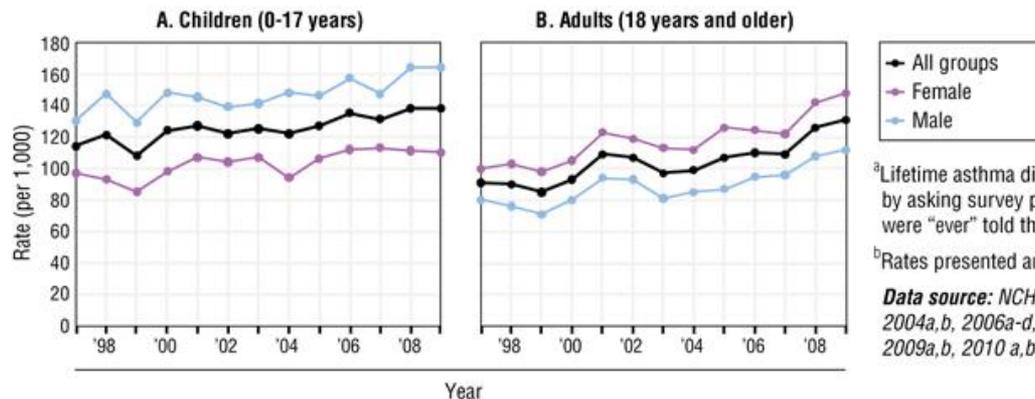


<sup>a</sup>Coverage: 661 monitoring sites in the EPA Regions (out of a total of 803 sites measuring PM<sub>2.5</sub> in 2009) that have sufficient data to assess PM<sub>2.5</sub> trends since 1999.

Data source: U.S. EPA, 2010



**Exhibit 5-29.** Estimated lifetime asthma diagnosis prevalence in children and adults in the U.S., 1997-2009<sup>a,b</sup>



<sup>a</sup>Lifetime asthma diagnosis is determined by asking survey participants if they were "ever" told they had asthma.

<sup>b</sup>Rates presented are crude rates.

Data source: NCHS, 2002a-d, 2003a-f, 2004a,b, 2006a-d, 2007a,b, 2008a,b, 2009a,b, 2010 a,b



# ROE Indicator Definition

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 or human health.

**Exhibit 3-40.** Lake fish tissue PBT contaminant concentration estimates for predators (fillets) in the contiguous U.S., 2000-2003<sup>a</sup>

Contaminant	Number of samples	Number of samples above MDL <sup>b</sup>	Percentiles for fillet tissue concentrations (ppm) <sup>c</sup>						
			5 <sup>th</sup>	10 <sup>th</sup>	25 <sup>th</sup>	50 <sup>th</sup> (median)	75 <sup>th</sup>	90 <sup>th</sup>	95 <sup>th</sup>
Mercury	486	486	0.059	0.089	0.177	0.285	0.432	0.562	0.833
Total PCBs	486	486	0.000351	0.000494	0.001000	0.002161	0.008129	0.018159	0.033161
TEQ dioxins/furans only	486	395	*	*	*	6 x 10 <sup>-9</sup>	46 x 10 <sup>-9</sup>	109 x 10 <sup>-9</sup>	318 x 10 <sup>-9</sup>
Total inorganic arsenic	486	2	*	*	*	*	*	*	*
Total chlordane	486	96	*	*	*	*	*	0.003617	0.008266
Total DDT	486	378	*	*	*	0.00147	0.00694	0.01966	0.03057
Dicofol	486	15	*	*	*	*	*	*	*
Dieldrin	486	24	*	*	*	*	*	*	0.001193
Total endosulfan	486	18	*	*	*	*	*	*	*
Endrin	486	3	*	*	*	*	*	*	*
Heptachlor epoxide	486	6	*	*	*	*	*	*	*
Hexachlorobenzene	485	0	*	*	*	*	*	*	*
Lindane (gamma-BHC)	486	28	*	*	*	*	*	*	0.000994
Mirex	486	10	*	*	*	*	*	*	*
Toxaphene	486	0	*	*	*	*	*	*	*

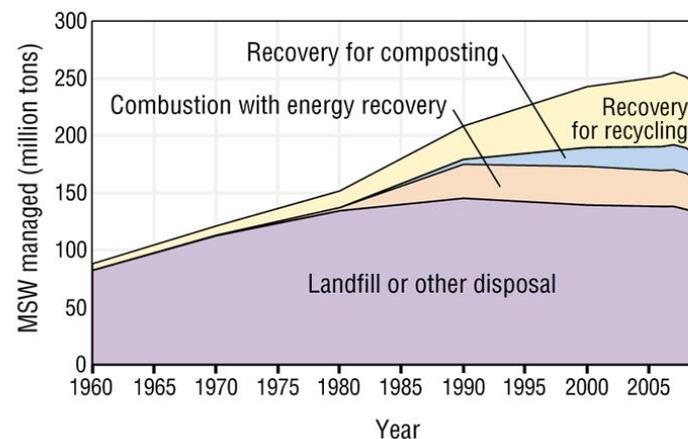
<sup>a</sup>**Coverage:** Lakes and reservoirs of the contiguous 48 states. Each sample reported here is a composite sample from one lake.

<sup>b</sup>MDL = method detection limit; MDLs are available online at <http://www.epa.gov/waterscience/fishstudy>.

<sup>c</sup>\* = less than MDL

**Data source:** U.S. EPA, 2006b

**Exhibit 4-13.** Municipal solid waste management in the U.S., 1960-2009



**Data source:** U.S. EPA, 2010



# ROE Indicator Criteria

- The indicator is **useful**.
  - It answers (or makes an important contribution to answering) a question in the ROE.
- The indicator is **objective**.
  - It is developed and presented in an accurate, clear, complete, and unbiased manner.
- The underlying data are **characterized by sound collection methodologies**, data management systems to protect the data's integrity, and quality assurance procedures.
- Data are available to **describe changes or trends** and the latest available **data are timely**.
- The data are **comparable across time and space**, and representative of the target population.
  - Trends depicted in this indicator accurately represent the underlying trends in the target population.
- The indicator is **transparent and reproducible**.
  - The specific data used and the specific assumptions, analytic methods, and statistical procedures employed are clearly stated.

## The ROE Questions—Examples

- What are the trends in...
  - *...outdoor air quality and their effects on human health and the environment?*
  - *...the quality of drinking water and their effects on human health?*
  - *...land cover and their effects on human health and the environment?*
  - *...human exposure to environmental contaminants?*
  - *...the extent and distribution of the nation's ecological systems?*



# ROE Evolution

Administrator Whitman  
--ROE and Environmental  
Indicators Initiative

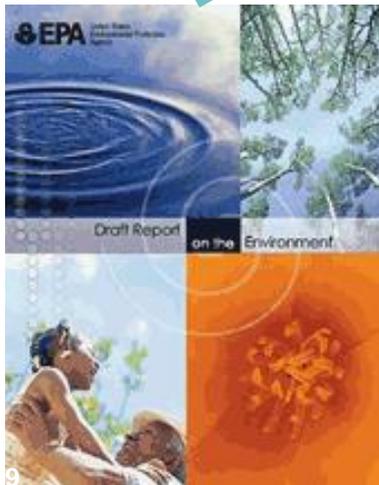
2001

# ROE Evolution

Administrator Whitman  
--ROE and Environmental  
Indicators Initiative

2001

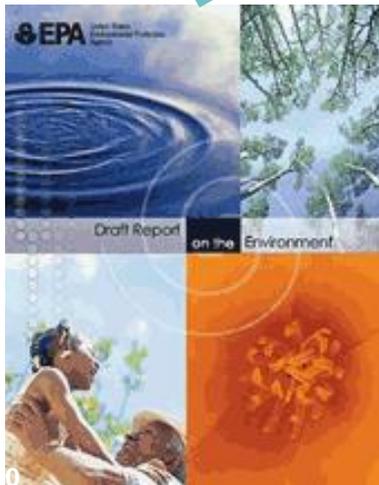
2003



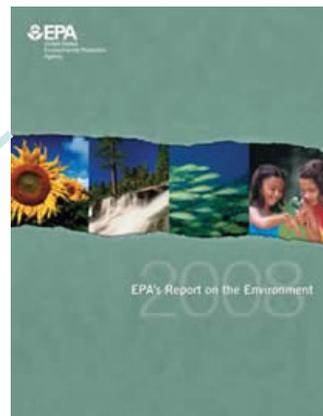
# ROE Evolution

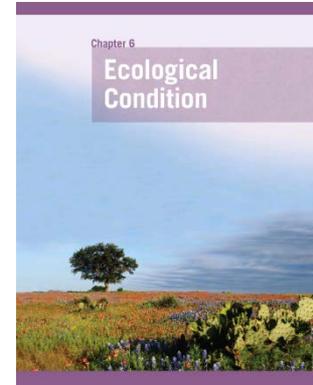
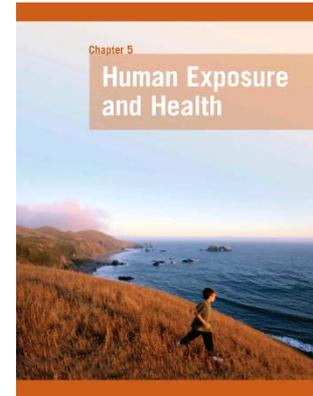
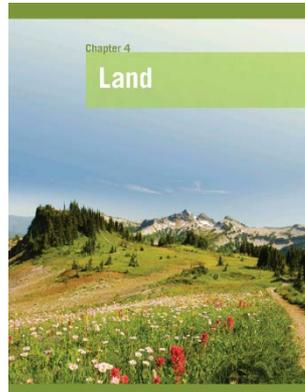
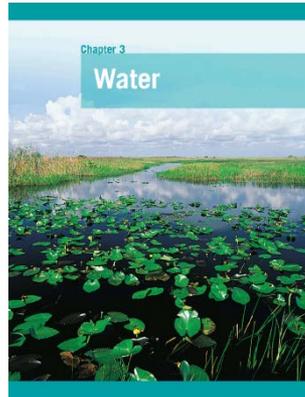
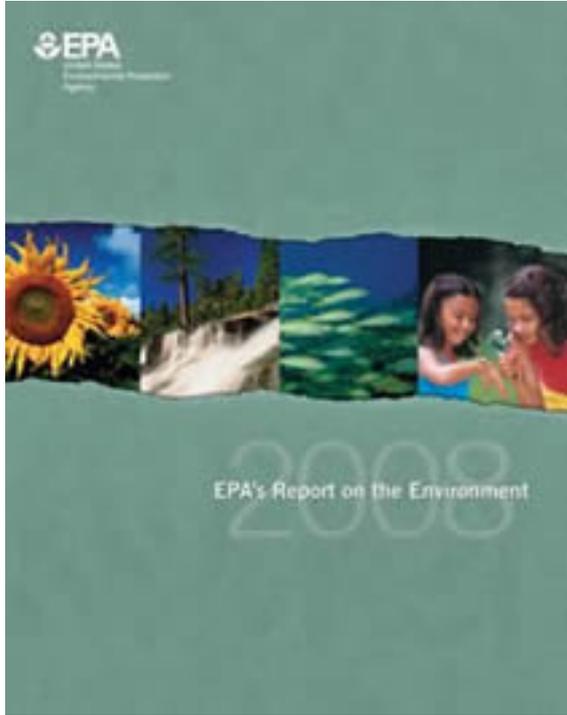


- Review and revision
  - Indicator Definition & Criteria
  - Question-based format
  - 5 main themes
  - Indicator deletions & additions
  - Multiple ROE products



# ROE Evolution





# ROE Evolution

2008

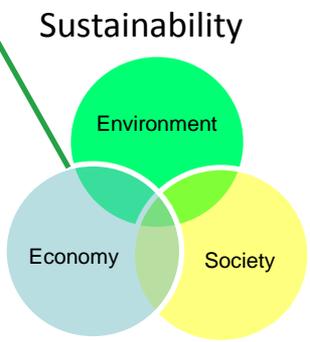
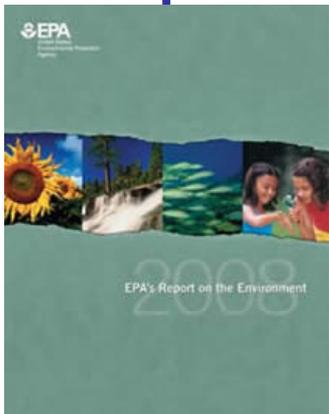
- Review/revise/enhance
  - Overarching conceptual framework with causal linkages
  - Better integration
  - Uncertainty/statistical analyses
  - Indicator deletions & additions
  - Enhanced upgraded website-
  - Web-based ROE 2012

2010

2011

2012

...



# Embracing Sustainability



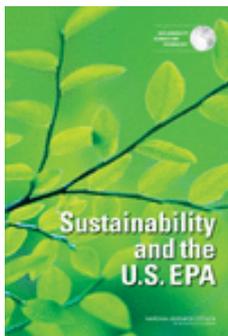
“Sustainability is our true north”

--Paul Anastas, AA-ORD  
March 4, 2010

...”a systems perspective with sustainability as our goal”

”EPA and the National Academies are convening the best minds in the field to explore the topic of sustainability and determine how it can be systematically incorporated into every aspect of EPA’s work”.

--Lisa Jackson Remarks to NAS  
Nov 30, 2010



NRC, August 2011



# What is Sustainability?

*Development* that meets the needs of the present without compromising the ability of future generations to meet their own needs

—Brundtland Commission, 1987



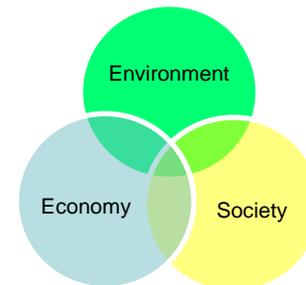
Sustainability: “to create and maintain conditions, under which humans and nature can exist in productive harmony, that permit fulfilling the social, economic, and other requirements of present and future generations”  
(NEPA[1969]; E.O.13514[2009].

--NRC, 2011

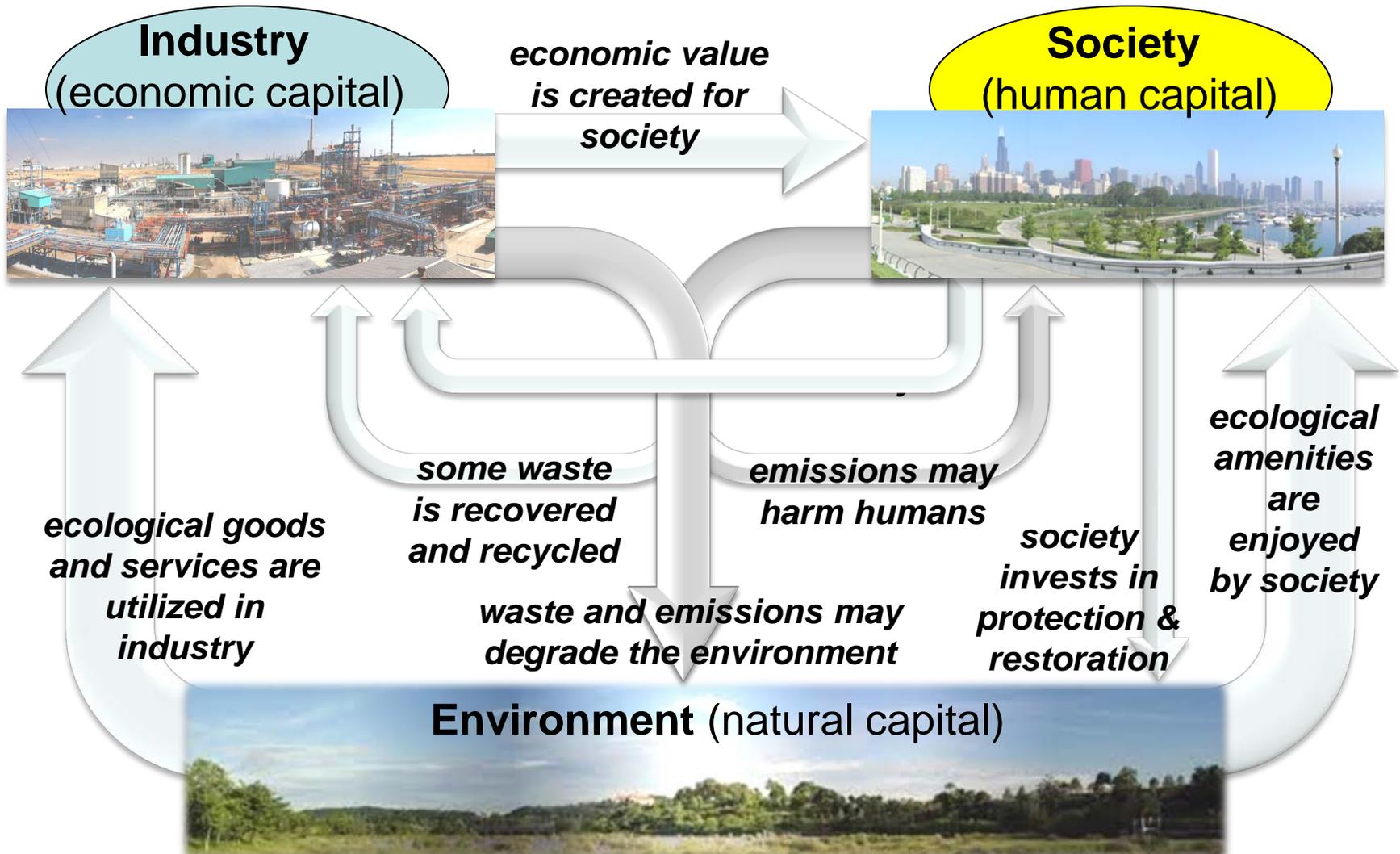


Sustainability is the continued protection of human health and the environment while enhancing economic prosperity and societal well being.

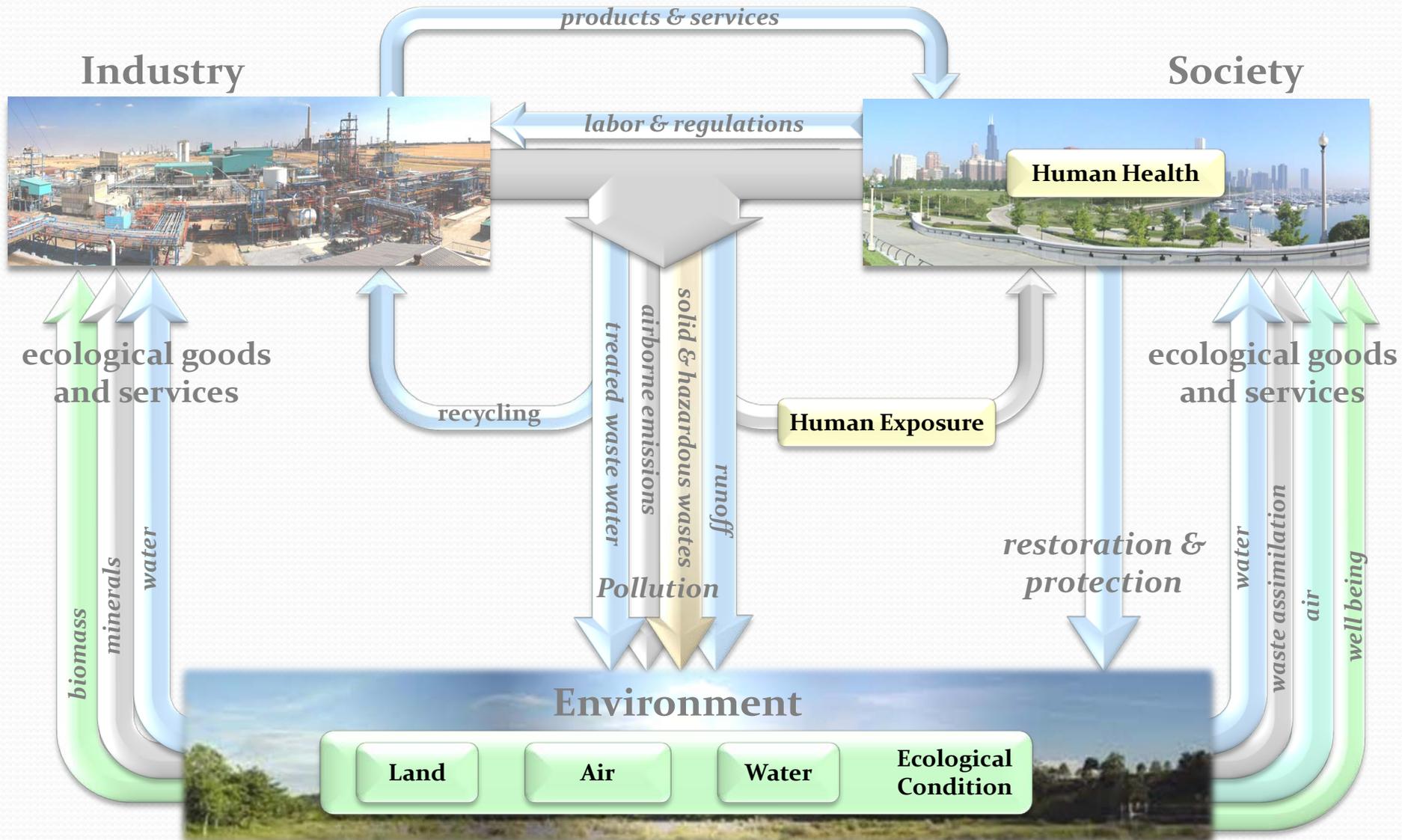
--ORD Sustainability Indicators Work Group  
working definition, 9/2011



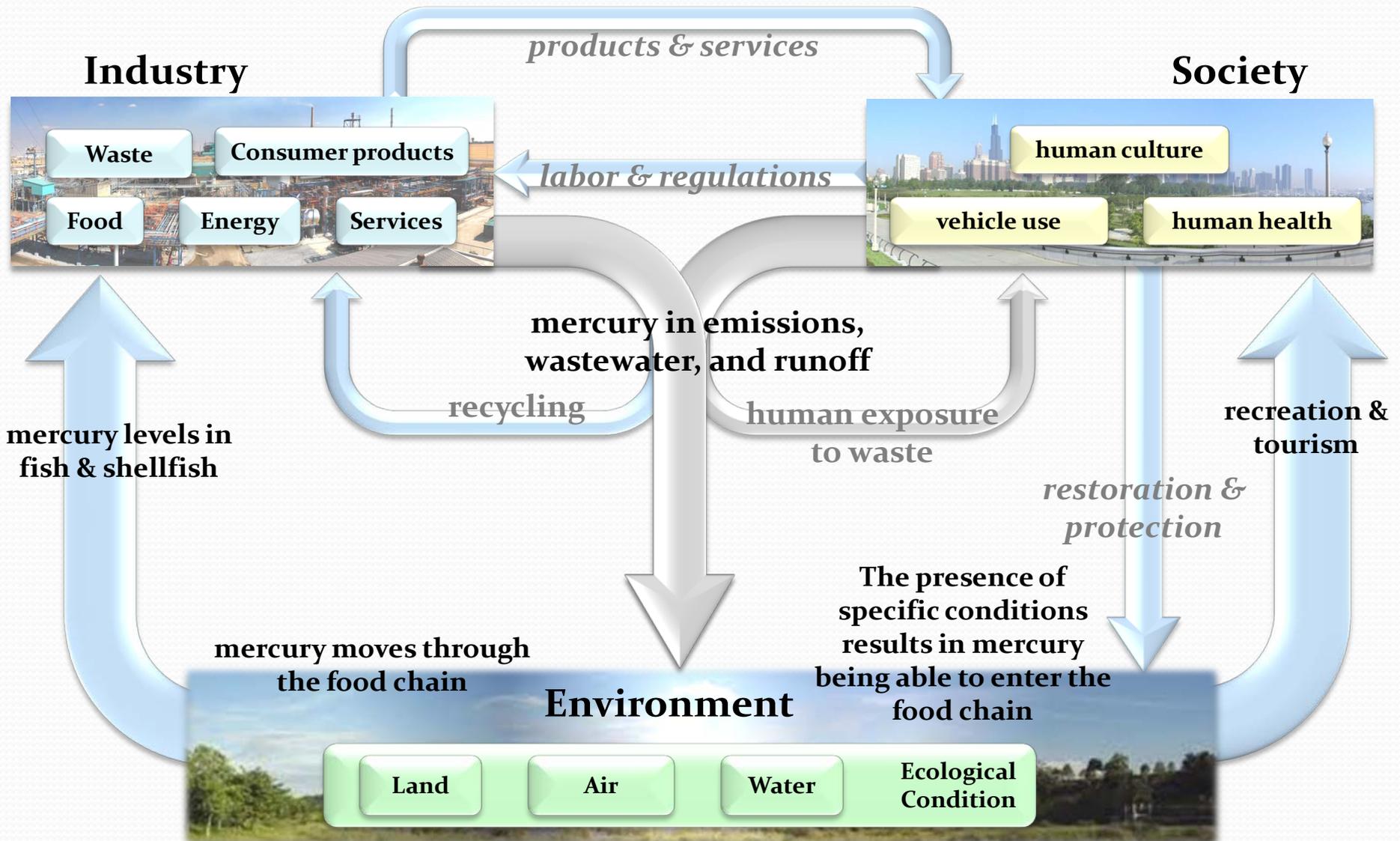
# Triple value model of sustainable systems, including resource flows, value creation, adverse outcomes, and system conditions



# Level II Model – ROE Themes



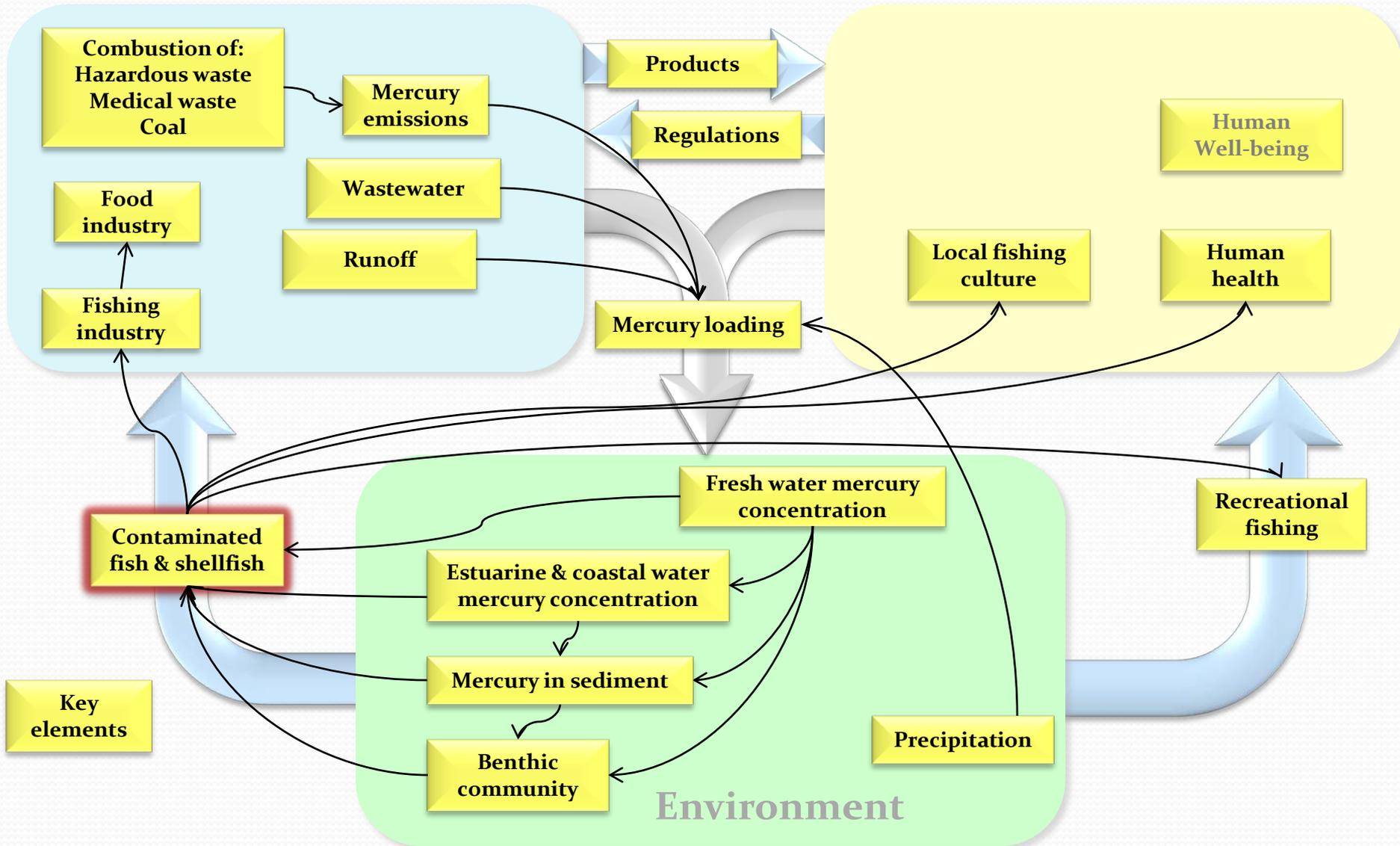
# Level III Model of Fish Hg Contamination



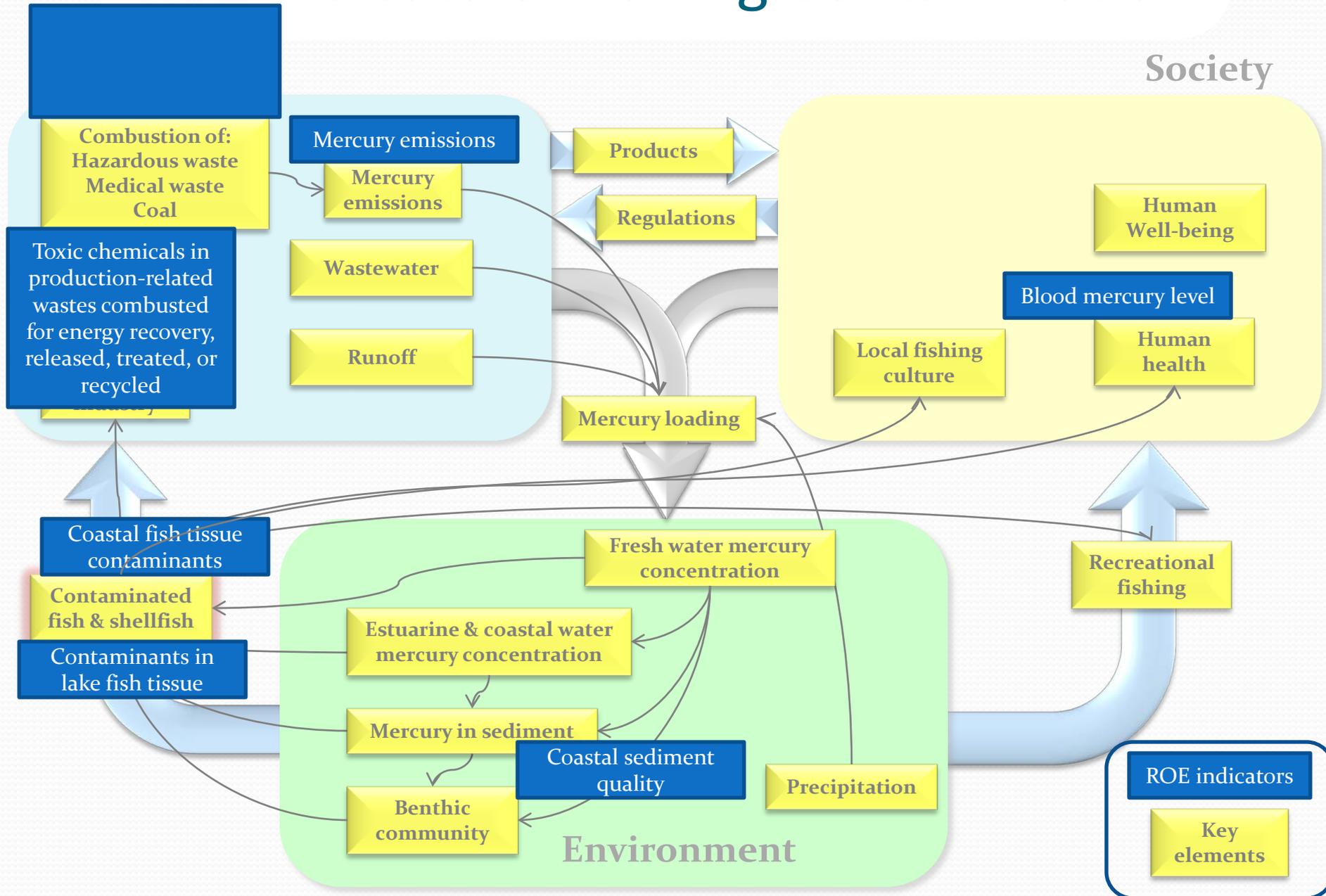
# Level III Model: Fish Hg Contamination

Industry

Society



# ROE Indicators: Fish Hg Contamination



# ROE 2012 and Beyond?

- EPA and ORD Sustainability and systems thinking focus carries over into the ROE
  - Conceptual frameworks
  - New ROE theme area and associated national-level indicators
  - Compatibility of sustainability-related indicators across scales/EPA programs
- Creates need for revised indicator definition and criteria
  - Opens the door for different types of indicators and indices
- Continued evolution anticipating new scientific knowledge, changing technologies, and EPA program and stakeholder information needs



**Thanks for your attention!**

[www.epa.gov/roe](http://www.epa.gov/roe)

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