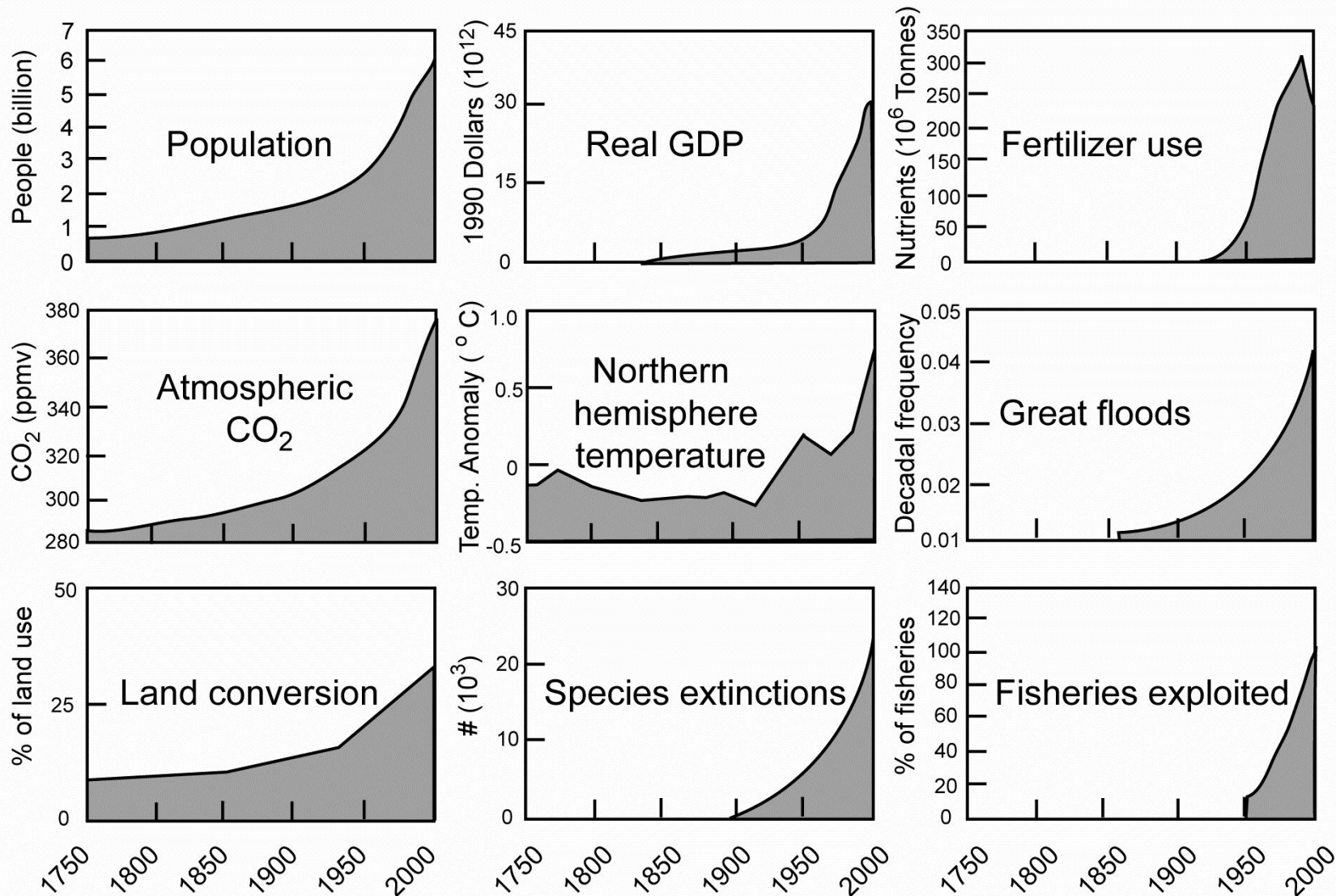


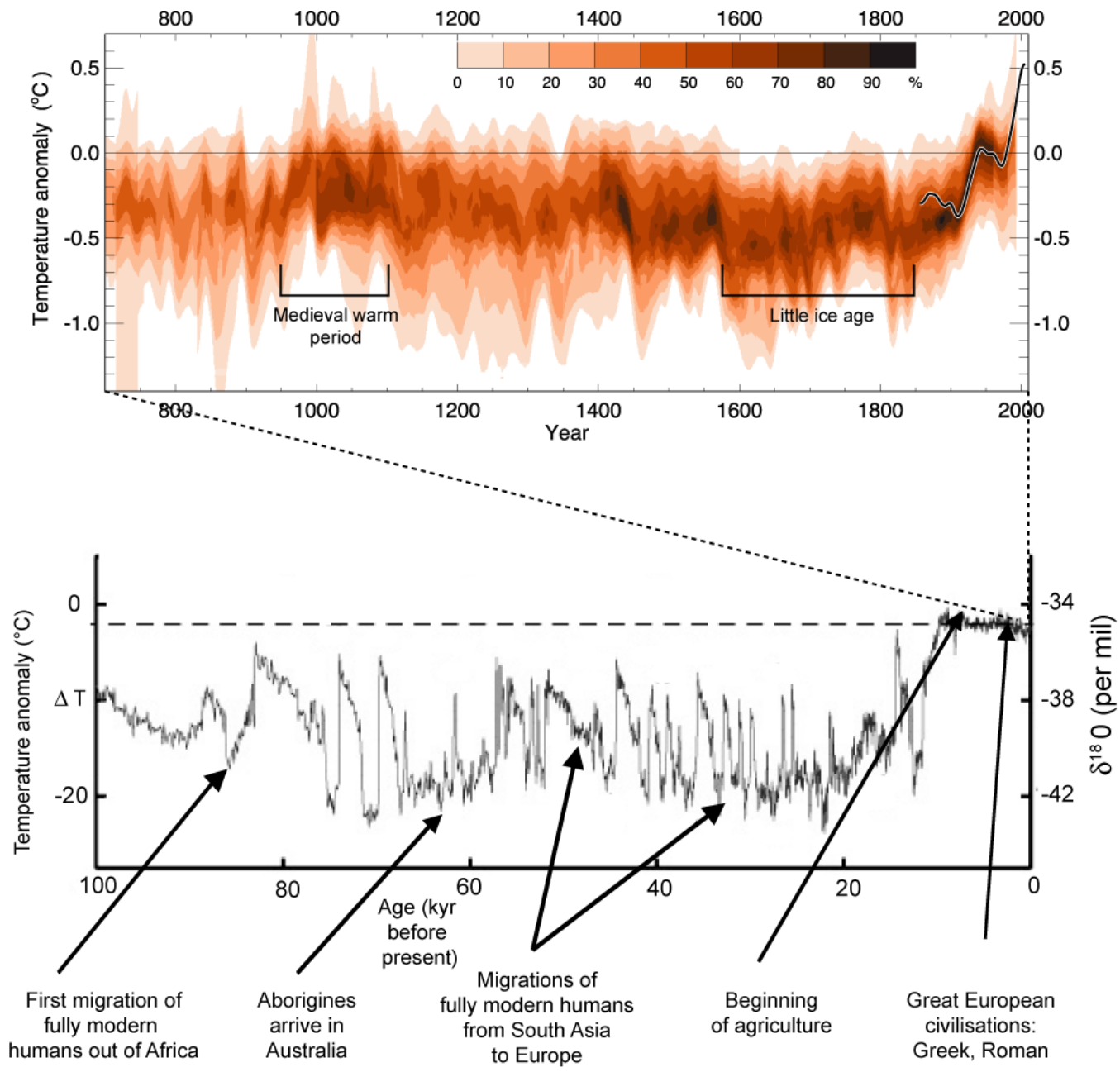
# Shaping sustainable change: ESA's Earth Stewardship Initiative

Cliff Duke  
Ecological Society of America

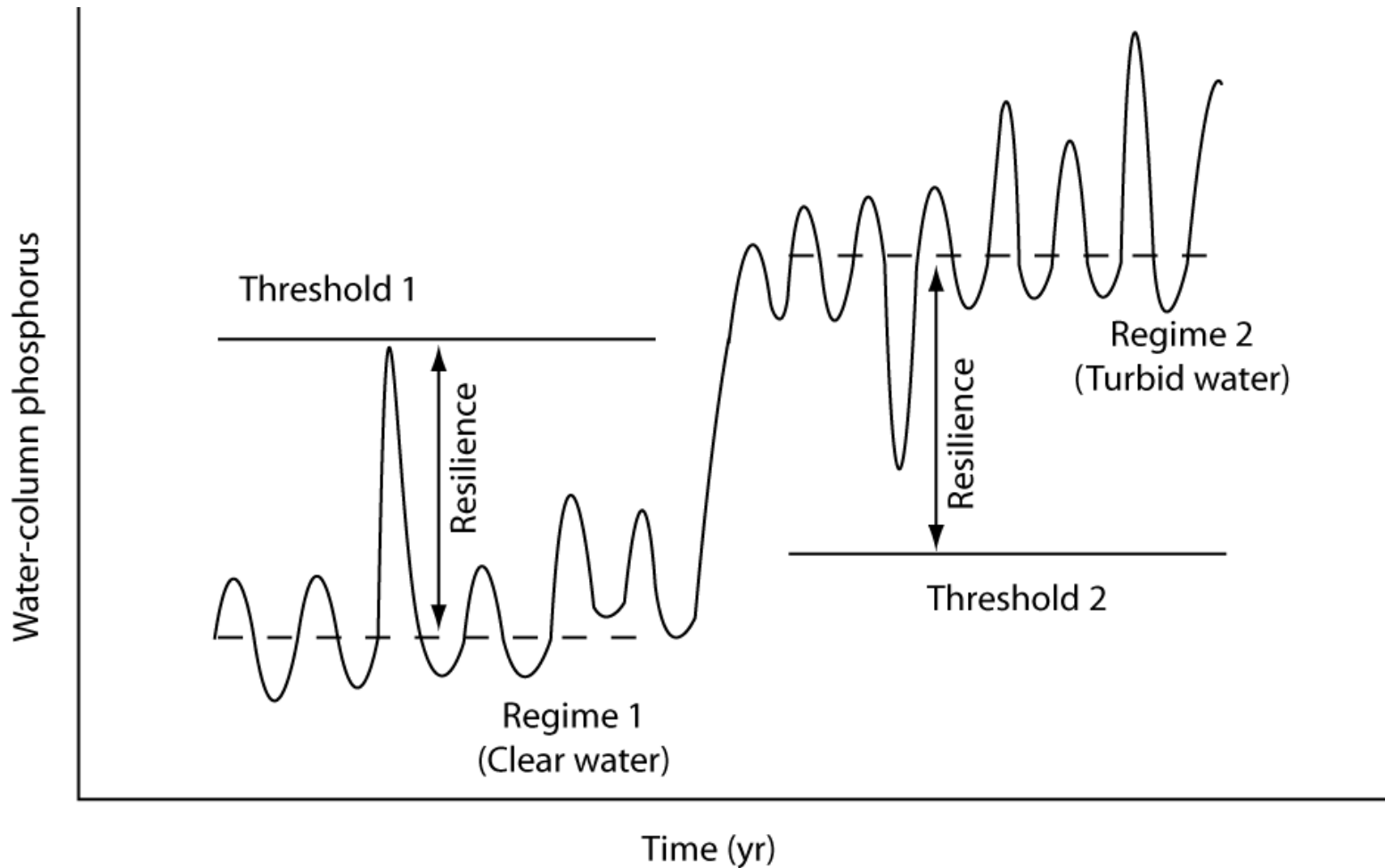
Terry Chapin  
University of Alaska

# Earth is experiencing directional changes in many drivers of social-ecological processes



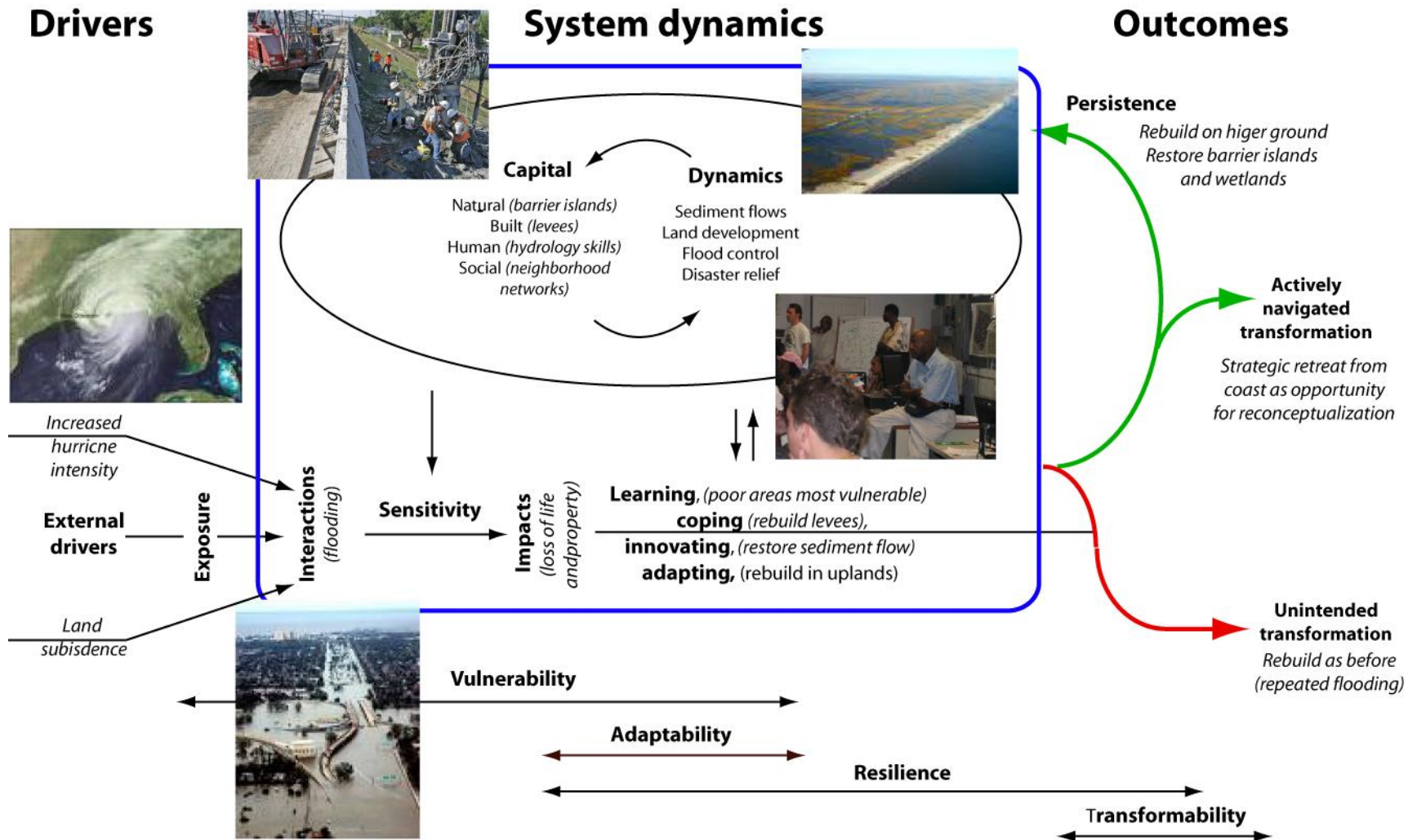


# Resilience: Capacity of a system to absorb shocks and sustain fundamental function and feedbacks



# Hurricane Katrina:

## The interaction of vulnerability with low resilience



# The Earth *will* transform

- Our choice is whether we deliberately shape a transformation to sustainability or let transformation happen to us



# Implications for sustainability

- Most environmental planning assumes the future will be like the past
  - Conservation efforts
  - Disaster preparedness
- In this context, sustainability is a relatively straightforward concept
  - The reference state is well known
- BUT--How do we sustain systems in a directionally changing world?
  - Alaska is an excellent place to address that question because of rapid ecological and social change

# From Sustainability to Stewardship

- Sustainability as a guiding principle
  - Maintain ecological integrity
  - Maintain or enhance human well-being for all
- Shape the future rather than reconstruct the past
  - Guided by goals of ecological integrity and human well-being



# Earth Stewardship

The active shaping of trajectories of change in coupled social–ecological systems at local-to-global scales to enhance ecosystem resilience and promote human well-being

# Key features

- Active intervention
  - Risky—best justified at local scales
- Shaping change
- System of people as part of nature
- Two goals: ecosystem resilience, human well-being
  - Not people *or* nature, but people *with* nature

# Examples of key issues

- Sustainable transformation of cities
- Sustaining cultural and biological diversity
- Meeting food, water, and environmental needs
- Managing uncertainty and transformations
- Fostering environmental citizenship
  - social and environmental justice
- Effective communication of science to society
- Governance of global commons

# Pragmatic strategy for Earth Stewardship

- Build the science
  - Engage *strategic* stakeholders
    - Not everyone, not just scientists
  - Design general principles for a sustainable Earth and transformation to get there
  - Refine in the context of specific issues and places
- Implement it
  - Catalyze sustainable behavior and management
  - Communicate science to inform and support a social movement

# Engage *strategic* stakeholders

- Identify key stakeholder groups
  - Students (they have the passion; it's their world)
  - Communities of faith (already accept stewardship goals)
    - 50-75% of U.S. public (generally the more conservative segment)
    - Receptive to partnerships with scientists
  - Businesses: have power (and incentives) to be responsive
  - Practitioners and policy makers (can make things happen)
- Engage stakeholders
  - *dialogue* about *their* concerns (listen more)
    - Co-design the science and strategy in this context
  - Focus on solutions, not problems (positive messaging)
    - WE have been a major cause of public disengagement

# Education and outreach

- Students are our most important resource
  - It's their world that is most at risk
  - They have the time, passion and energy to make a difference
  - Active involvement is good professional training
- Engaging local communities
  - Citizen engagement to define problems and solutions
  - Advising and participating in local actions

# Accountability

- Define, incentivize and enforce accountability mechanisms
  - Identify incentives and disincentives for stewardship
  - Align incentives with stewardship goals
    - Devise rules consistent with future conditions
  - Design accountability mechanisms that promote stewardship behavior of all stakeholders
  - Implement graded sanctions that allow learning to occur

# Principles to Enhance Earth Stewardship

Integrate in various combinations to foster stewardship, depending on social and political context:

1. Global problems require solutions at multiple scales.
2. Durable solutions must address interactions among multiple issues rather than focusing narrowly on a single sector or problem.
3. Aligning incentives with solutions motivates stewardship.
4. Decision-making that fosters stewardship must be compatible with both the ecology of the resources and the socioeconomic and cultural characteristics of associated human communities.
5. Sense of place, including local concern for aesthetic, cultural, and spiritual dimensions of ecosystems, is a valuable ecosystem service.
6. Some global changes, such as the demographic shift to cities, provide unprecedented stewardship challenges and opportunities.



# Conclusions

- Relationship between society and the biosphere is on a bad trajectory
  - but there are promising signs of change
- Earth Stewardship provides guidelines for sustainability in times of rapid change
  - Engage *strategic* stakeholders
  - Develop design principles for a sustainable Earth
  - Provide science that supports a social movement
- The time to act is NOW!!



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