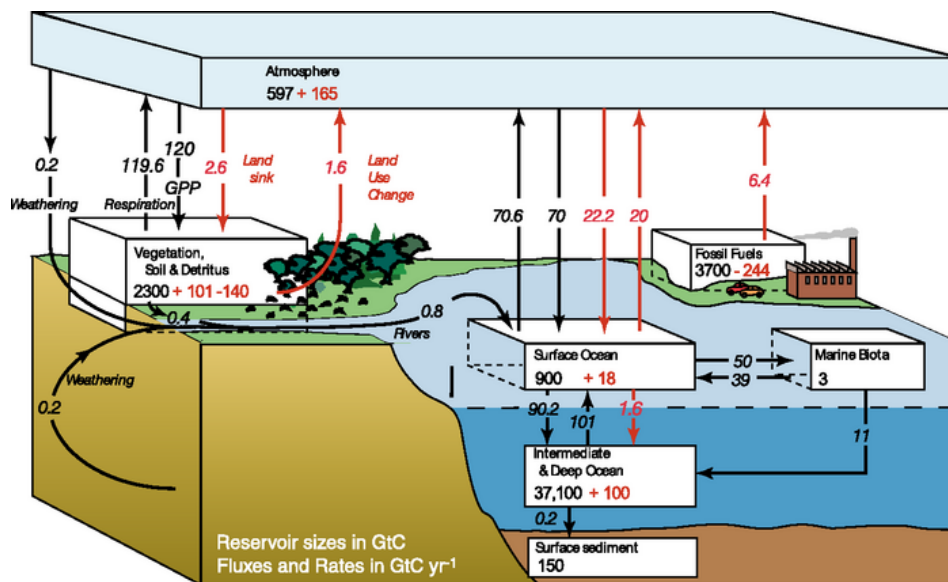


AIR QUALITY AND ECOSYSTEM SERVICES

Green Week 2013

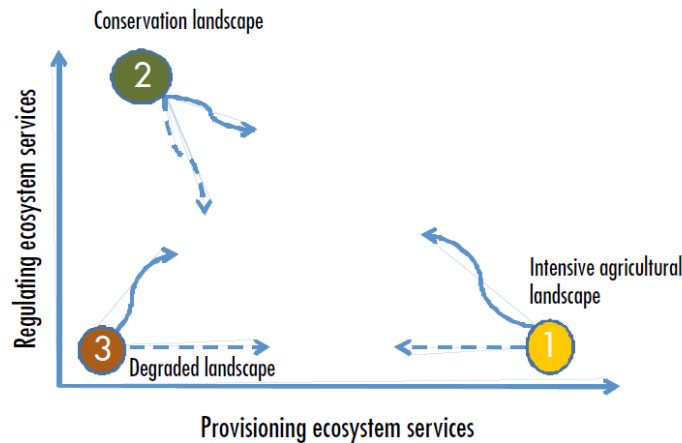
1. SERVICES PROVIDED BY ECOSYSTEMS

- The biosphere, formed of all living organisms, is one of the Earth's Carbon sinks. **Forests** are one of the main reservoirs, with more Carbon stored in the biomass than in the soil. As opposed to them are degraded habitats such as intensive agricultural ecosystems, which have low soil Carbon storage due to intensive production methods. Deforestation is also a major contributor to climate change and affects climate regulation.
- **Oceans** are the greatest active sinks in the Carbon cycle, Carbon being dissolved from the atmosphere and partly transformed into organic Carbon through photosynthesis. It is then stored in the form of dead organisms, particles, dissolved organic Carbon and carbonate sediments. CO₂ concentration increases at depth where it is stored for decades to centuries, causing the concentration of atmospheric CO₂ lower than it would be in the absence of life.
- Other major Carbon sinks are the **atmosphere** and the **lithosphere**, the latter being the Earth's greatest Carbon reservoir in the form of minerals and organic matter.
- However, the **Carbon cycle** is a complex and long process where Carbon is slowly absorbed from the atmosphere to Carbon sinks.



Source: IPCC, 2007.

- **Well preserved ecosystems** have greater capacity to provide regulating services such as climate, floods, disease, waste, and water quality. Climate change affects negatively the capacity of ecosystems to deliver services. Conversion from intensively managed landscapes to conservation landscape would increase their capacity to produce services, such as CO₂-sequestration, as well as soil formation, water conservation and desertification control.



Source: Millennium Ecosystem Assessment, 2005.

2. TRENDS IN CLIMATE CHANGE

- The main greenhouse gases are H₂O, CO₂, NH₄, N₂O and O₃.
- Over the past 50 years, humans have **changed ecosystems** more rapidly and extensively than in any comparable period of time in human history, largely to meet rapidly growing demands for food, fresh water, timber, fibre, and fuel. This has resulted in a substantial and largely irreversible **loss in the diversity** of life on Earth.
- **Warmer regional temperatures** have already had significant impacts on biodiversity and ecosystems, including causing changes in species distributions, population sizes, the timing of reproduction or migration events.
- Agriculture accounts for 44% of anthropogenic methane emissions and about 70% of anthropogenic nitrous oxide gases, mainly from the conversion of new land to agriculture and nitrogen fertilizer use.
- There are currently **60% of the ecosystem services being degraded** due to human activities such as land use change for food production.

3. CONSEQUENCES OF CLIMATE CHANGE TO ECOSYSTEM SERVICES

- Decreased ability of the atmosphere to cleanse itself
- Increased habitat degradation by droughts, desertification, eutrophication, acidification
- Decreased capacity of absorbing and storing Carbon to become overall net sources of Carbon
- Species diversity loss
- Increase in invasive species
- Decreased ecological conservation value
- Decreased overall productivity
- Increased natural disasters frequency (extreme weather such as heat waves and storms, floods, fires, etc.)
- Changes in distribution, sometimes becoming rarer
- Changes in the species' phenology (time and duration of blooming, pollination, etc.)
- Overall decreased ecosystem services provided (pest regulation, flood control, water quality, etc.)

4. FACTORS MODIFYING ECOSYSTEM SERVICES 'AIR QUALITY'

CONTRIBUTING TO CLIMATE CHANGE	CONTRIBUTING TO CARBON SEQUESTRATION
- Intensive agricultural, pasture, and forest practices: use of pesticides and fertilizers increasing atmospheric nitrogen and CO ₂ , drainage, water over extraction.	- Environmentally friendly habitat management: organic farming, agroforestry, sustainable natural resources.
- Deforestation for timber extraction, illegal trade and urban development.	- Afforestation, reforestation, forest management.
- Unsustainable fishing methods: cyanide fishing, coral reef mining, overexploitation, bottom trawling, ghost fishing.	- Sustainable capture methods.
- Habitat loss and fragmentation to increase the built environment, agriculture, etc.	- Conservation landscapes, green infrastructure, biodiversity, habitat restoration.
- Pollution of ecosystems.	- Water quality policies.
- Use of fossil fuels and other sources of greenhouse gas emissions.	- Conversion to renewable energies.
- Use of inefficient technology.	- Efficient technology.
- Subsidies to unsustainable economic activities.	- Development and implementation of sustainable policies (green technologies, payment of ecosystem services, sustainable natural resources management, etc.) as well as support to environmental bodies and scientific research.

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