Drivers of Biodiversity Loss:

OVEREXPLOITATION

Over the past 50 years, the natural world has experienced unprecedented rates of change with devastating implications.[1] Today, approximately one million species are at risk of extinction globally and integrally linked ecosystem services– from disease buffering to pollination– are at risk of loss. The direct drivers of biodiversity loss with the largest global impact are changes in land and sea use; direct exploitation of organisms; climate change; pollution; and invasion of nonnative species. These drivers are largely a result of underlying societal values and behaviors; if left unaddressed, they are predicted to continue or increase their detrimental impact. Transformative action is needed to alleviate these threats and the species declines that they contribute to.

Overexploitation occurs when humans extract more of a natural resource than can be replaced naturally. This unsustainable practice threatens biodiversity and can degrade ecosystem services by reducing species populations below natural self-sustaining levels and disrupting ecosystem functions and species interactions. Population growth and increasing demand or consumption of material goods mainly drives overexploitation. Extraction of living biomass increased six-fold between 1970 and 2010.[1] In the Americas, the usage and exploitation of available natural resources are expected to intensify.

OVER-EXPLOITATION

Exploitation of renewable and non-renewable resources has increased rapidly and is not sustainable.

Overexploitation of species can lead to extirpations, trophic cascades, and evolutionary changes.

Market-based instruments and adaptive resource management are two important tools to promoting more sustainable practices.

Key Facts

- Overexploitation poses a threat to 46% of threatened and near threatened species. According to the IUCN Red List, over 1680 terrestrial animals are threatened by overexploitation, 1118 freshwater and marine animals by unsustainable fishing, and 557 plants from unsustainable gathering.[1]
- Direct exploitation of a species can cause evolutionary pressure by selecting against the traits for which humans are targeting a species (e.g., tusk-less elephants pose an evolutionary advantage against poaching). As such, it is the most important driver of changes in species traits (23.5%), followed by climate change.[1]
- Increased harvest and exploitation, such as hunting, can change pathogen dynamics causing disease jumps from species-to-species and allowing for novel disease spread to humans.[2]
- Overexploitation is the second most common threat to terrestrial species and had the second largest relative negative impact on terrestrial and freshwater ecosystems (preceded only by land-use change).[1] Migratory species are heavily impacted by overexploitation.[3]
- In marine ecosystems, direct exploitation of organisms (mainly fishing) has had the largest relative impact on species. 33% of marine fish stocks are classified as overexploited and greater than 55% of ocean area is subject to industrial fishing. Overfishing coupled with warming ocean temperatures, increased traffic, and other threats have caused bleaching and wide-spread coral die-off. Corals are not only important for the rich ecosystems they support, but also for providing a coastal buffer (which can ameliorate the effects of storm surge).[1]

Possible Solutions

- *Remove harmful subsidies and increase positive incentives to alleviate overexploitation.* Governments should consider the fiscal and environmental implications of their policies and work to identify and assess both their direct and indirect impacts on terrestrial and marine ecosystems. Many support policies were put in place for other reasons, such as to maintain the economic viability of rural areas, but such objectives can be achieved with policies that promote public goods, rather than the overexploitation of natural resources.[1]
- *Increase adaptive fisheries management.* Adaptive fisheries management that responds to climate-induced changes of fish biomass and spatial distribution could help offset the detrimental impacts of climate change on fish biomass and catch.[1]
- *Improve upon global and domestic fishing regulations.* Globally, fishing regulations put in place to prevent overexploitation of fish stocks have often failed to protect marine fisheries. Even though the U.S. has relatively stringent fishing regulations, they can be improved by enhancing traceability, sanctioning, surveillance, and enforcement. Co-management between government and local fishers is also essential.[1]
- *Avoid heavy reliance on aquaculture.* Aquaculture development could potentially reduce fishing pressure on wild fish populations, but not to an extent that could compensate for projections of increases in demand for seafood products and fishing technology, both of which result in increased fishing pressure. In addition, aquaculture may cause negative environmental impacts including the discharge of effluents and chemical contaminants, and the spread of invasive species.[1]
- *Expound on the use of market-based instruments.* Market-based instruments can help temper overexploitation. For example, Marine Stewardship Council certification is increasing, with about 10% of global wild-caught seafood in some stage of the certification process by 2015. Similar mechanisms can be applied to terrestrial systems as well.[1]
- *Invest in ecosystem restoration and protected areas.* In some heavily exploited systems, achieving maximum sustainable yield may require ecosystem restoration.[1] Strategically placed protected areas can also help safeguard species from overharvesting and improve fishery productivity.[4]

References

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