

Quiz: Marine Life Sustainability

Question 1

A marine protected area (MPA) allows for some fishing activities, but prohibits bottom trawling and limits the size and type of catch. A nearby fishing community argues that these restrictions are economically devastating and that they should be allowed to fish as they always have. Which of the following arguments BEST supports the long-term sustainability of the MPA, even if it causes short-term economic hardship?

- A)** Maintaining biodiversity within the MPA will create a more resilient ecosystem, leading to higher overall fish stocks in the long run, benefiting the community.
- B)** The MPA regulations are based on scientific data, which is always more reliable than the anecdotal evidence provided by the fishing community.
- C)** The fishing community can be compensated by the government for their losses, making the economic impact negligible.
- D)** The MPA will attract tourists, creating new economic opportunities that will offset the losses from fishing restrictions.

Question 2

Ocean acidification, caused by increased atmospheric CO₂, poses a significant threat to marine ecosystems. Which of the following scenarios BEST illustrates the cascading effects of ocean acidification on a coral reef ecosystem?

- A)** Increased CO₂ directly kills all coral polyps, leading to the immediate collapse of the reef structure and displacement of all reef inhabitants.
- B)** Ocean acidification reduces the availability of carbonate ions, hindering the ability of corals and shellfish to build their skeletons and shells, leading to weakened reef structures and reduced biodiversity, which then impacts fish populations that rely on the reef for habitat and food.
- C)** Ocean acidification primarily affects large predatory fish, causing them to migrate to other areas, leaving an overabundance of smaller fish and disrupting the food web.
- D)** Ocean acidification only affects coral bleaching, which is a temporary phenomenon that does not have long-term consequences for the reef ecosystem.

Question 3

A remote island community relies heavily on a single species of fish for sustenance and income. Scientists discover that the fish population is declining rapidly due to overfishing and habitat degradation. Which of the following strategies would be the MOST sustainable and comprehensive approach to address this issue?

- A)** Implement a complete fishing ban for several years to allow the fish population to recover, while providing temporary food aid to the community.
- B)** Introduce a new, fast-growing fish species to replace the declining one, providing a new source of food and income for the community.

- C)** Develop a community-based fisheries management plan that incorporates sustainable fishing practices, habitat restoration, and alternative livelihood options for the community.
- D)** Focus solely on habitat restoration efforts, assuming that the fish population will naturally recover once the habitat is improved.

Question 4

A large-scale aquaculture operation is proposed in a coastal area known for its sensitive mangrove ecosystems. While the operation promises economic benefits, concerns are raised about potential environmental impacts. Which of the following environmental impact assessment (EIA) findings would be MOST critical in determining the sustainability of the aquaculture project?

- A)** The projected increase in local employment opportunities due to the aquaculture operation.
- B)** The potential for nutrient runoff from the aquaculture ponds to pollute the surrounding waters, leading to algal blooms and oxygen depletion, and the extent of mangrove destruction for pond construction.
- C)** The estimated increase in property values in the surrounding area due to the presence of the aquaculture operation.
- D)** The projected increase in seafood production and export revenue for the region.

Question 5

A scientific study reveals that microplastic contamination is widespread in a particular marine ecosystem, affecting various trophic levels. Which of the following represents the MOST significant long-term threat posed by microplastic contamination to the sustainability of this ecosystem?

- A)** The aesthetic pollution caused by the visible presence of microplastics on beaches and in the water.
- B)** The potential for microplastics to act as vectors for persistent organic pollutants (POPs) and other toxins, leading to bioaccumulation and biomagnification in the food web, ultimately impacting top predators and potentially human health.
- C)** The physical irritation caused by microplastics to the digestive tracts of marine organisms.
- D)** The temporary reduction in phytoplankton growth due to the shading effect of microplastics in the water column.

Answer Key

1. Answer: A

While tourism and compensation might offer some relief, the core argument for long-term sustainability lies in the ecological resilience created by maintaining biodiversity. A healthy, diverse ecosystem is more likely to withstand environmental changes and support sustainable fish populations.

2. Answer: B

Ocean acidification's primary impact is on calcifying organisms like corals and shellfish. This weakening of the base of the food web and physical structure of the reef has cascading effects on the entire ecosystem, impacting biodiversity and fish populations.

3. Answer: C

A comprehensive approach that addresses both the ecological and socio-economic aspects of the problem is the most sustainable. This includes sustainable fishing practices, habitat restoration, and alternative livelihoods to reduce pressure on the fish population and ensure the community's long-term well-being.

4. Answer: B

Nutrient runoff and mangrove destruction are the most critical environmental impacts to assess. Nutrient pollution can lead to eutrophication and oxygen depletion, harming marine life, while mangrove destruction removes vital habitat and reduces coastal protection.

5. Answer: B

While all options represent potential impacts, the bioaccumulation and biomagnification of toxins associated with microplastics pose the most significant long-term threat. This process can lead to high concentrations of toxins in top predators, disrupting the food web and potentially impacting human health through seafood consumption.