

Role of Indicator Species in Determining Aquatic Ecosystem Health

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Indicator species

These are organism often a microorganism or a plant that serves as a measure of the environmental conditions that exist in a given local. Indicator species are species that testify the well-being (health) of the entire ecosystem. Indicator species are biological indicators of groups of sites representing habitat types or combinations of habitat types; they are of prime interest for ecosystem conservation and management. An indicator species is an organism whose presence, absence or abundance reflects a specific environmental condition. Indicator species can signal a change in the biological condition of a particular ecosystem, and thus may be used as a proxy to diagnose the health of an ecosystem. The work of indicator species helps us maintain the integrity of an ecosystem and detect potential hazards, hopefully before they become irreversible. A declining population of an indicator species serves as an early warning sign for a potential environmental issue. For example, greasewood indicates saline soil; mosses often indicate acid soil. The presence of certain species of plants suggests how well other might grow in the same place. Monitoring all life forms in an ecosystem to understand the health of an environment is very expensive and, logistically, nearly impossible. Therefore, indicator species are a solution to the cost and logistical restrictions of studying all species in an environment. This is similar to the way indicator bacteria are used to assess the recreational water quality. Indicator species serve as surrogates to the overall well-being of the plant and animal life in a particular environment. In other words, conclusions can be drawn about an ecosystem by studying an indicator species.

Criteria for selecting indicator species

- Abundance or wide distribution.
- Simple procedure of identification and sampling.

- High tolerance for the pollutants analyzed .
- Pollution stability.
- High accumulating capacity.

Accumulation indicators

They are distinguished for toxic effects bioindicator, with the effect being studied on different biological organisation level. Example- Mussels, Lichens.

Prominent Indicator Species

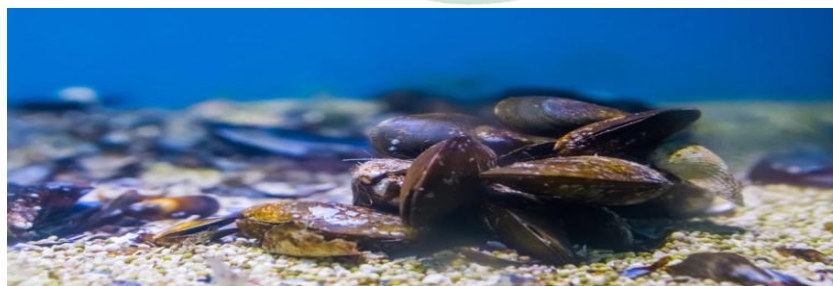
Platypus: indicates improving water quality

Platypuses are a very resilient species. Rather than serving as an indicator of pollution, they actually serve as an indicator of rehabilitated water quality and successful conservation efforts. Platypuses are typically one of the first species to return to a waterbody when the quality starts to improve. They let scientists and researchers know that the health of the environment is starting to get better.



Mollusk/ Mussels: indicates contamination and overall water body health

Fresh and salt water mussels are a beloved indicator species. They are sessile, meaning fixed in one place. Their fixed address combined with their filter feeding make them extremely sensitive to contamination or to changes in the conditions of their environment, such as temperature, oxygen levels, and acidity.



Grunion: indicates sandy beach ecosystem health

Grunions are a land lubbing fish, found along the Pacific Coast of California and the Baja Peninsula. These little fish take to the sand on high tides following the full moon to mate. They lay their eggs at the high tide level and the beach serves as a sandy nursery for grunion eggs and larvae. So, researchers found that the success of the grunion's reproductive cycle is a good indicator of the ecological health of the sandy beaches. Grunions are particularly sensitive to human impact on beaches, such as beach grooming, imported sand and fill.

Redside Dace: indicates clean, clear freshwater and natural physical habitat

The Redside Dace is an endangered fish species under Canada's Federal Endangered Species Act. They need clean, clear water to thrive as they leap out of the water and eat air-based insects. They are an important indicator species for the overall health of a waterbody.



Redside Dace need clean water and overhanging vegetation to survive. Urban development and sewage pollution are the biggest threats to Dace. Ontario is home to 80% of the world's population of this vital indicator species and due to rapid urban development it is at risk of total extinction. Shoreline destruction and wastewater runoff is depleting red side dace habitat.

**Mayflies: indicates health of freshwater bodies**

As annoying as a mayfly in your drink, your hair, your everything, may be their presence is cause for celebration. Mayflies are incredibly sensitive to pollution, and are considered a indicator species for the health of freshwater bodies.



Lobsters: indicates climate change and rising ocean temperatures

Lobsters have become the face of rising ocean temperatures, serving as a climate change indicator in marine coasts around the world. Rising ocean temperatures impact oxygen levels, salinity, currents, and many other conditions to which lobsters are sensitive. Lobster species, and regional populations, are reacting to climate change in different ways. Therefore, they are helping scientist understand the impact of rising temperatures and changing marine conditions.

