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Keystone Species – Treasures of Marine Ecosystem

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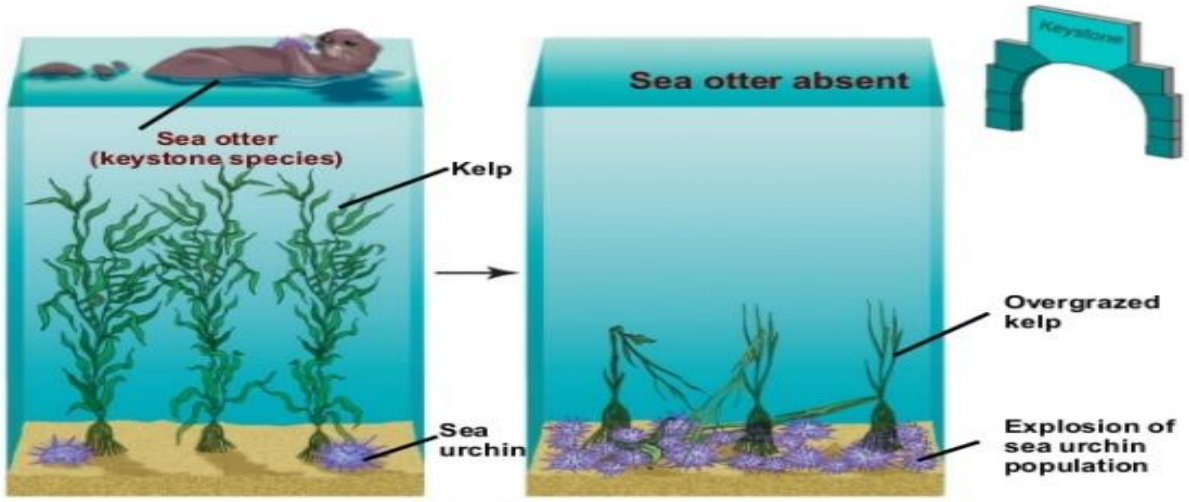
SUMMARY

Keystone species is an organism that helps define an entire ecosystem. Without its keystone species, the ecosystem would be dramatically different or cease to exist altogether. This species have low functional redundancy and tends to disappear from the ecosystem. No other services would be able to fill its ecological niche. These species has a huge influence on food webs, habitat etc. At present this keystone species has drastically declining due to several activities like illegal fishing, mining, pollution and climate change. Hence conservation of this keystone species is very essential. The article mainly focuses on the categories and steps involved in conservation of keystone species.

INTRODUCTION

A keystone species is a plant, animal, fungi or even bacteria that have disproportionately large impact on their ecosystem. The term "Keystone" coined in 1966 by the ecologist "Robert T. Paine". These keystone species plays an important role in their natural environments as their impact on other species may reshape the entire ecosystems (Robert T. Paine, 1966). Without the presence of keystone species, many ecosystems would look incredibly different, could face collapse or may not even exist in the certain environment. Hence these are the living things that play a pivotal role in how their ecosystem functions.

Predator Species – impact of Sea otter as a keystone species



Removal of the keystone sea otter : sea urchins overgraze kelp and destroy the kelp forest community.

Prey species - Antarctic krill

Plant Species – Ivory Coral

Ecosystem Engineers – Mangrove dwelling crab

Categories of Keystone Species

Keystone species falls into several broad categories.

Predator Species:

Predators help control the populations of prey species, which in turn affects the quantity of plants and animals in the food web. The subsequent effects create a change in diversity of the play as well as competitor species. Their removal or increase drastically affects the prey species in the particular environment. Most of the keystone species are predators in nature.

Example: Shark, Star fish, Sea otters.

Prey species:

Keystone preys have a big role to play in the ecosystem. It serves as a critical food source for predator populations. There are resilient creatures and more susceptible to becoming rare or extinct within an ecosystem. Some keystone prey species were found to increase the diversity of other species and maintain healthy populations.

Example: Antarctic Krill

Plant Species:

Keystone plant species provides a critical source of food and shelter for other species. When certain plants act as keystone species, removal or increase of such species results in change of diversity of dependent herbivore animals, Pollinators.

Example: Ivory tree coral.

Ecosystem Engineers:

Keystone species create, modify or maintain the landscape around them. It influences the prevalence and activities of other organisms and helps define the overall biodiversity of the habitat and ecosystem. It is otherwise called as “Habitat Modifiers”.

Example: Mangrove – dwelling crabs.

Mutualists:

These keystone species function to maintain the mutualistic relationship. It describes the ecological interaction between multiple species and each species has a mutual or net benefit. This mutualistic keystone

species may be in the form of plants, animals etc., It is otherwise called as "Mobile links". It can also be a link between the different trophic levels of the community (Humphries *et al*. 2017).

Example: Mangrove trees (It serves a keystone role in many coastlines by firming up shorelines and reducing erosion).

Significance of keystone species in conservation:

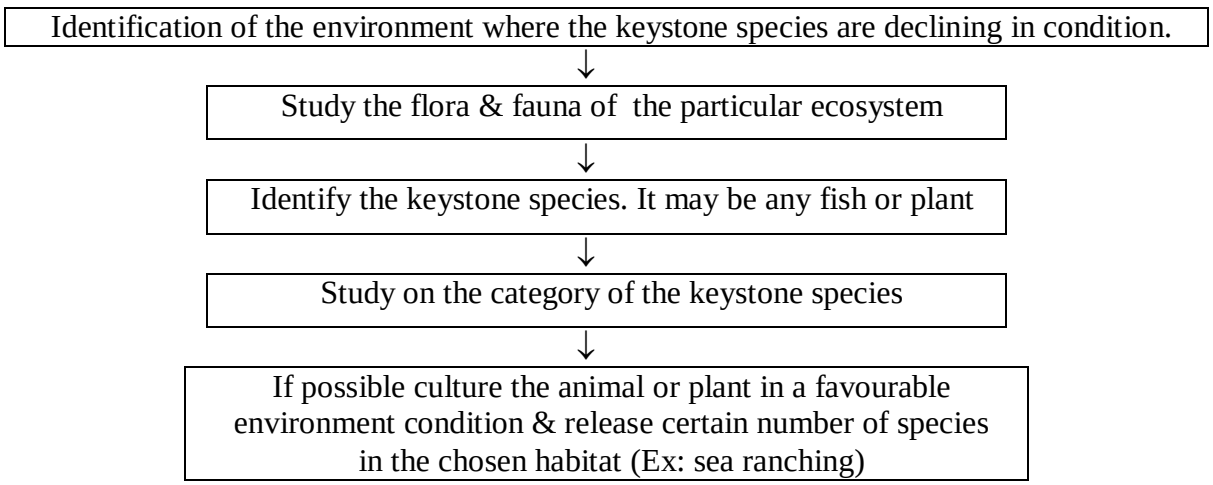
Keystone species can prove pivotal in the conservation of species and even entire ecosystems.

- Keystone species can be targeted for conservation approaches to maintain diversity.
- It creates new niches for the organisms in the ecosystem for better survival.
- These are food resources which are solely responsible for maintaining the local species diversity.
- The keystone species used to retain the community structure by protecting the animals thrive in the ecosystem from predators, natural calamities, etc.
- It also support the viable populations of other species in the community which otherwise needs expensive methods of conservation.
- It re-establishes the ecosystem by restoration of plants, animals, etc in the particular habitat.
- It fills a critical ecological role that no other species can & without the keystone species the entire ecosystem may radically change or cease to exist in near future (Robert T. Paine, 1969).

Steps to conserve the keystone species:

It is important to note that a species role can change from one ecosystem to the other ecosystem. The species that is considered a keystone in one environment may not be considered the same in other.

There are certain steps involved in the conservation of keystone species.



In addition to this we are supposed to study the parameters like, wind pattern, physical and chemical properties of water and soil in the chosen environment or ecosystem for better analysis and results.

Organizations involved in conservation of keystone species:

Keystone species plays a key role in maintaining the integrity of the ecosystem they belongs to. Without keystone species, ecosystem and all species living in them would experience drastic changes that could threaten their existence. There are certain organization, convention and commissions involved in conserving the keystone species are listed below;

- CBB (Convention on Biological Diversity)
- UNEP (United Nation Environment Programme)
- WPA (Wildlife Protection Act)
- SSC (Species Survival Commission)
- WCPA (World Commission on Protected Areas)
- Whaling Commission

CONCLUSION

The keystone species plays various roles for proper functioning of ecosystem. Hence, identification, culture and ranching of keystone species may brighten the entire marine ecosystem for near future.

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