



# Estuarine Ecosystem

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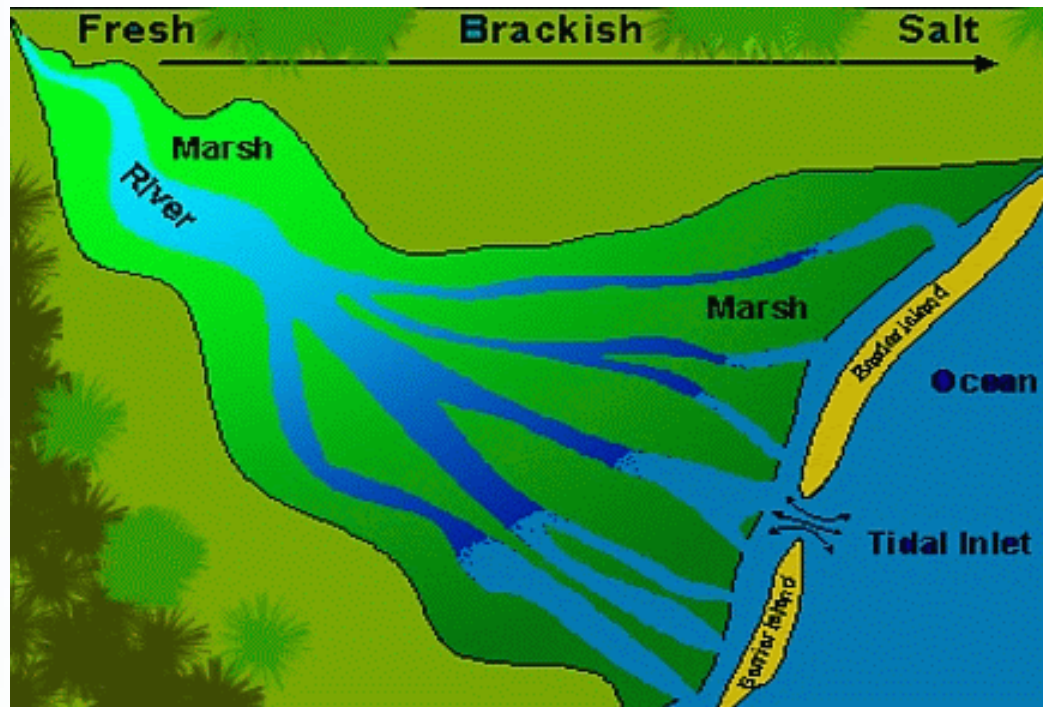
# Outline

- What is an estuary?
- Characteristic features of an Estuarine Ecosystem.
- Biota of Estuarine Ecosystem
- Food Web in Estuarine Ecosystem
- Productivity
- Ecological importance of Estuarine Ecosystem
- Threats to Estuarine Ecosystems
- Conservation and Restoration.

An aerial photograph showing a lush green island or peninsula on the left, with a river or stream flowing from it into a larger body of water on the right. The water transitions from a shallow, light blue-green near the shore to a deeper blue further out, illustrating the mixing of freshwater and saltwater in an estuary.

# What is an Estuary?

- An estuary is a partially enclosed coastal body of water, having an open connection with the ocean (for example, via a river), where freshwater from inland is mixed with saltwater from the sea.
- Estuaries typically occupy coastal areas where effects from the ocean are reduced but still influential.





## Characteristic features of an Estuarine Ecosystem.

- In estuaries, the salty ocean mixes with a freshwater river, resulting in brackish water.
- Brackish water is somewhat salty, but not as salty as the ocean.
- An estuary may also be called a bay, lagoon, sound, or slough.
- Water continually circulates into and out of an estuary.



# Biota of Estuarine Ecosystem

- There are three types of fauna in estuaries:
- marine,
- freshwater, and
- Brackish-water or estuarine.



## Biota of Estuarine Ecosystem

- The marine fauna: It is the largest group in terms of numbers of species and includes three subgroups.
- The brackish-water or true estuarine species are found in the middle reaches of the estuary in salinities between 5 and 18 ppt but are not found in freshwater or in full sea water.
- The third component is derived from freshwater. These animals are able to tolerate salinities much above 5 psu.

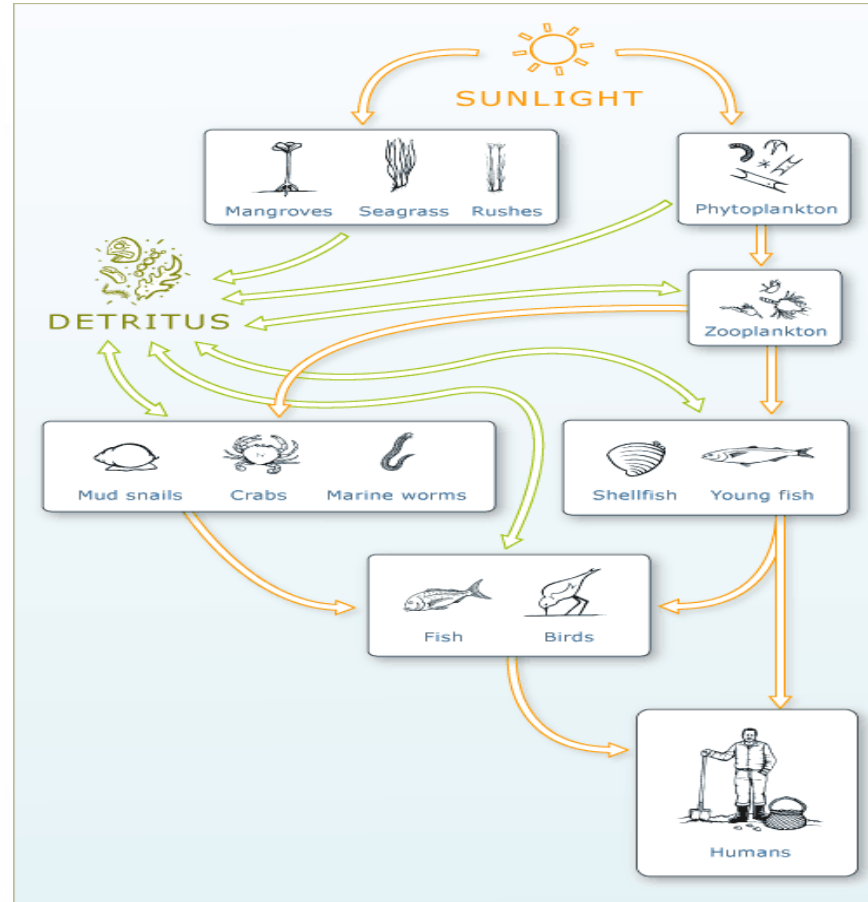


# Food Web in Estuarine Ecosystem

- Estuary food webs begin with the conversion of the sun's energy to food energy by plants
- There are two main feeding pathways. One begins with large plants such as mangroves, sea-grass and rushes. When they die their leaves and roots are broken down by bacteria and fungi to become detritus. Detritus is eaten by small animals such as snails, worms and shellfish and they, in turn, are eaten by larger creatures such as fish and birds.
- A second pathway begins with microscopic phytoplankton. They are eaten by tiny zooplankton which then become food for snails and shellfish.



# Food Web in Estuarine Ecosystem

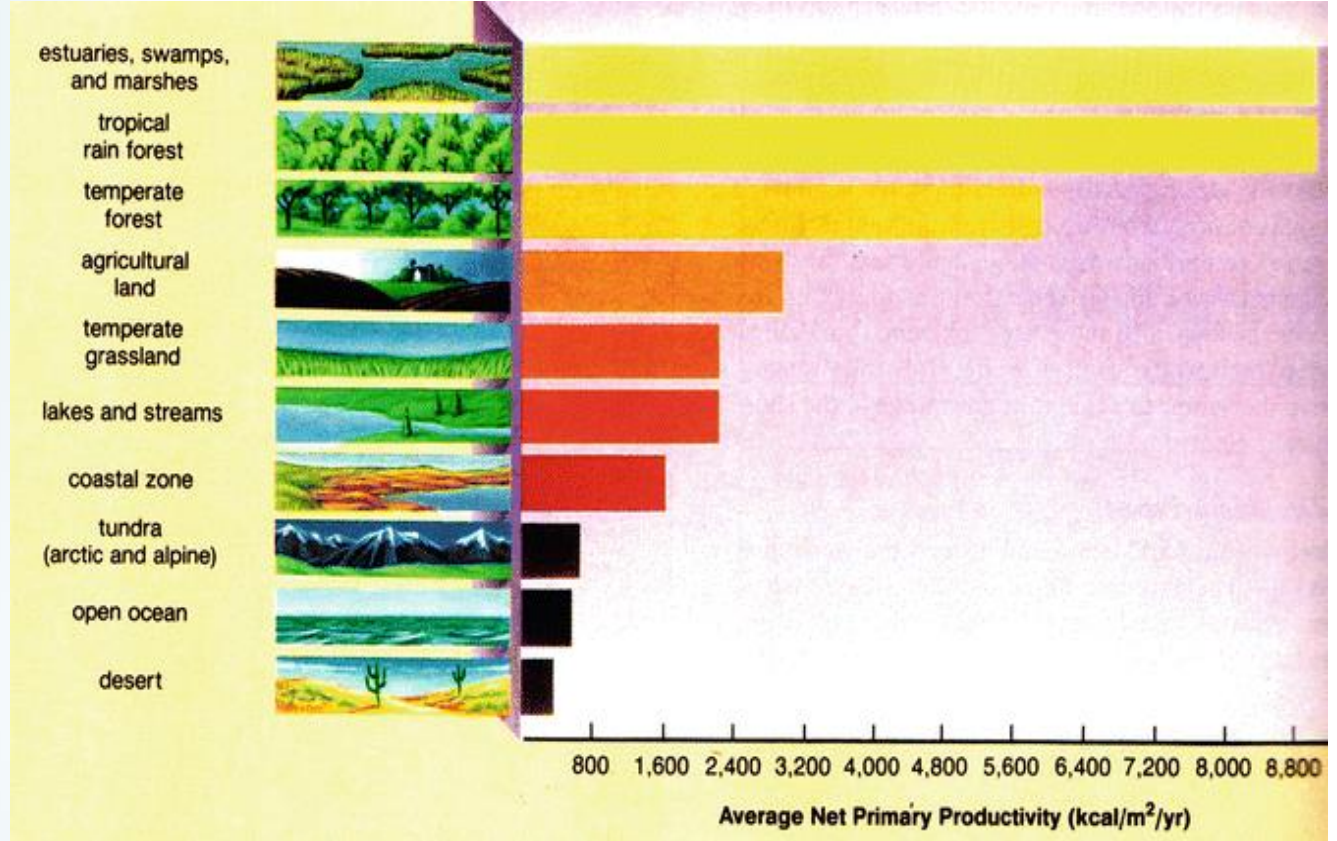


# Productivity

- Estuaries are among the most productive environments on earth.
- They are 4 times more productive in plant matter than any grass pasture and 20 times more productive than the open sea.
- They are extremely rich in organic matter and nutrients.
- Photosynthesis occurs throughout the water column and on the sediment surface



# Productivity



# Importance

- Estuaries provide us with many resources, benefits and services.
- Thousands of species of birds, mammals, fish and other wildlife depend on estuarine habitats as places to live, feed and reproduce
- As fresh water flows through swamps and salt water, much of the sediments and pollutants are filtered out. This filtration process creates cleaner and clearer water, which benefits both people and marine life.



# Economic Value

- Estuaries provide places for recreational activities, scientific study and aesthetic enjoyment.
- When those natural resources are imperiled, so too are the livelihoods of those who live and work in estuarine watersheds.
- Wetland plants and soils also act as natural buffers between the land and ocean, absorbing flood waters and dissipating storm surges.



# Economic Value



# Threats to Estuarine Ecosystems

- Increased nutrients and algal blooms.
- Loss of habitat and biodiversity.
- Contaminants and pollutants.
- Accelerated rates of sedimentation.
- Disturbance of acid sulfate soils.
- Changes to freshwater and tidal flows.
- Climate change.



# Threats to Estuarine Ecosystems





# Conservation and Restoration

- Conservation can be through 3 levels:
- 1. Ecosystem,
- 2. Species and
- 3. Genetic diversity.



# Conservation and Restoration

- In large systems such as estuaries, the design of effective habitat management strategies requires attention to scale related problems
- Developing a representative system of protected areas is often considered an effective way to achieve this goal in the marine environment.
- Protecting species should not prevent restoring damaged habitats or rehabilitating lost habitats.
- A multi-scale approach relies on sensitive socio-ecological assessment procedures, tools for evaluating ecological quality, and well-built monitoring programmes based upon pertinent indicators.



# Conservation and Restoration

## What Can YOU Do to Protect Estuaries?

Estuaries are found where rivers meet the sea. Clean estuaries sustain vibrant economies and healthy coastal communities.

### AT HOME



Reduce, reuse, and recycle packaging



Have your septic system inspected



Choose non-toxic products for household use

### IN THE COMMUNITY



Help plant trees to reduce stormwater pollution



Volunteer at a local clean-up to pick up trash



Don't dump chemicals or trash down storm drains

### IN THE YARD



Pick up your pet's waste and dispose of it properly



Plant a rain garden or install a rain barrel



Minimize use of fertilizers and pesticides on your yard

### ON THE WATER



Use designated sewage pump-out stations



Keep your boat out of seagrass beds



Respect wildlife and keep your distance

# References

- [http://www.coastalwiki.org/wiki/Conservation\\_and\\_restoration\\_of\\_coastal\\_and\\_estuarine\\_habitats](http://www.coastalwiki.org/wiki/Conservation_and_restoration_of_coastal_and_estuarine_habitats)
- <https://www.epa.gov/nep/what-you-can-do-help-protect-our-coastal-watersheds-and-estuaries>
- [https://www.researchgate.net/publication/260871475\\_Estuarine\\_ecosystems\\_conservation\\_needs\\_and\\_economic\\_significance](https://www.researchgate.net/publication/260871475_Estuarine_ecosystems_conservation_needs_and_economic_significance)

