

Activity 14: Estuaries in the Balance



Summary

Students will explore how freshwater availability affects estuarine ecosystems.

Objectives:

Students will be able to:

- Define an estuary
- Describe how Whooping Cranes are affected by changing conditions in estuaries
- Explain how drought affects a Whooping Crane's ability to survive

Standards:

Social Studies A.8.11

Science F.8.8 and F.8.9

Environmental Education B.8.3, B.8.8, B.8.17

Materials Needed:

- Computer with internet access

Background

Whooping Cranes in the Aransas-Wood Buffalo flock rely on **estuaries** to survive. An estuary is a wetland ecosystem where freshwater mixes with saltwater, usually where rivers empty into the sea. Many Whooping Cranes spend the winter along the San Antonio Bay in Texas where they can find food high in protein. In the San Antonio Bay, Whooping Cranes rely heavily on blue crabs and wolfberries for sustenance.

Estuaries are not only important for Whooping Cranes. They are highly productive ecosystems that provide support to numerous species of plants and animals. Because food is abundant, lots of birds use estuaries as stopover sites during migration. Other birds, such as Whooping Cranes, spend the duration of the winter in estuaries.

Although estuaries are highly productive, they are also delicate. The amount of salt found in an estuary is the **salinity**, measured in parts per thousands (ppt). Since the salinity of an estuary is dependent upon the amount of freshwater entering the sea, any change in the volume of freshwater can have drastic effects on the ecosystem.

Productivity is greatly affected in years in which drought is prevalent. Low rainfall means less water in the river will reach the sea, thereby increasing salinity in estuaries. Animals that live in estuaries are able to adapt to a range of salinity. However, once the water in an estuary becomes too salty, they must move closer to the mouth of the river where more freshwater is available.

Whooping Cranes may be greatly affected by salinity levels during drought years. They will seek freshwater when salinities exceed 20 ppt (about 20 grams of salt per one liter of water). Having to continuously fly to reach freshwater sources wastes energy and time that could be used foraging. In addition, during droughts blue crabs, the primary food source for Whooping Cranes in the San Antonio Bay, move further upstream to reach water with lower salinity. This is a problem because wintering Whooping Cranes in the San Antonio Bay are territorial. If their food is not present in quantities to sustain them, they must leave their territory each day in search of food. The extra energy expended coupled with food scarcity can lead to higher mortality rates during drought conditions.

Procedure

- 1) Have students complete the Estuaries in the Balance activity online:
<http://cgee.hamline.edu/CoastalBendEstuaries/>
- 2) Have students fill out the pre-/post-test in Appendix 3 in the Teachers Guide (pg. 81 in the following link):
<http://cgee.hamline.edu/CoastalBendEstuaries/EstuariesTeachersGuide.pdf>