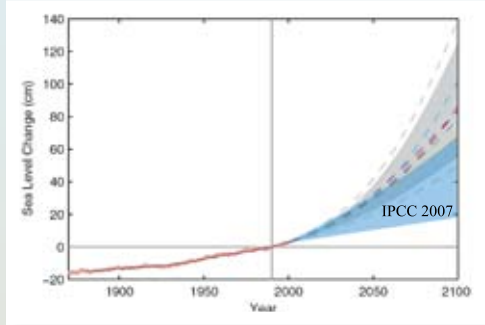


## Assessing Coastal Vulnerability to Sea Level Rise: Coastal Elevation and Modeling for Adaptation

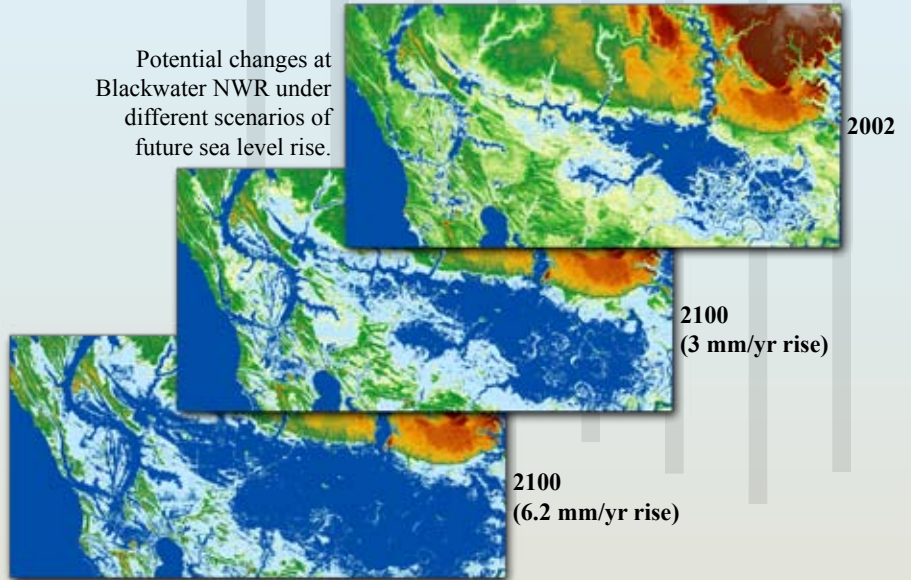
Sea level is rising at rates predicted to accelerate during the next century. Due to their low elevation, coastal wetlands around the world are vulnerable to sea



Past, current and projected sea level rise.

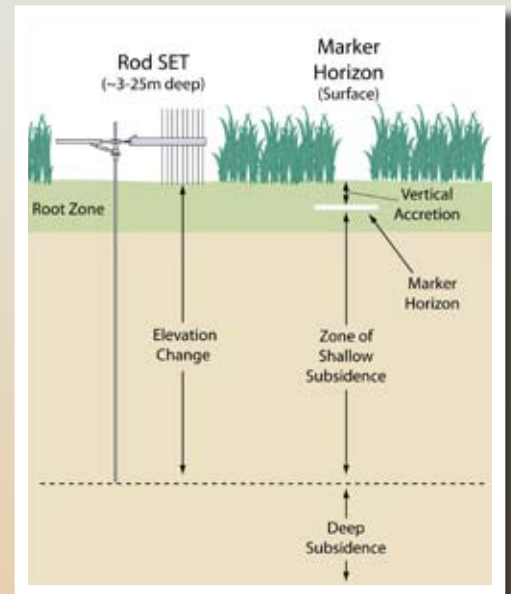
level rise impacts. Particularly at risk are low-lying Pacific islands and deltaic environments, such as the Mekong River delta in Vietnam. Many of these coastal wetlands provide critical habitat for plant and animal species and offer protection to coastal cities and communities.

To better manage these coastal wetland areas, and maintain their associated benefits, it is critical to measure the wetland response to sea level rise and use that information to develop models and other tools to conserve these important habitats.



Potential changes at Blackwater NWR under different scenarios of future sea level rise.

The Surface Elevation Table (SET) is a device which accurately measures elevation change in wetland environments. The SET is currently used in a variety of wetland and shallow water habitats throughout the world for long-term monitoring of elevation change in wetland environments. SET's are currently used in the United States (all three coasts) and over 20 countries worldwide.



Conceptual diagram showing the SET and marker horizon techniques. Refer to the SET website for more information.



Global distribution of SET study sites.

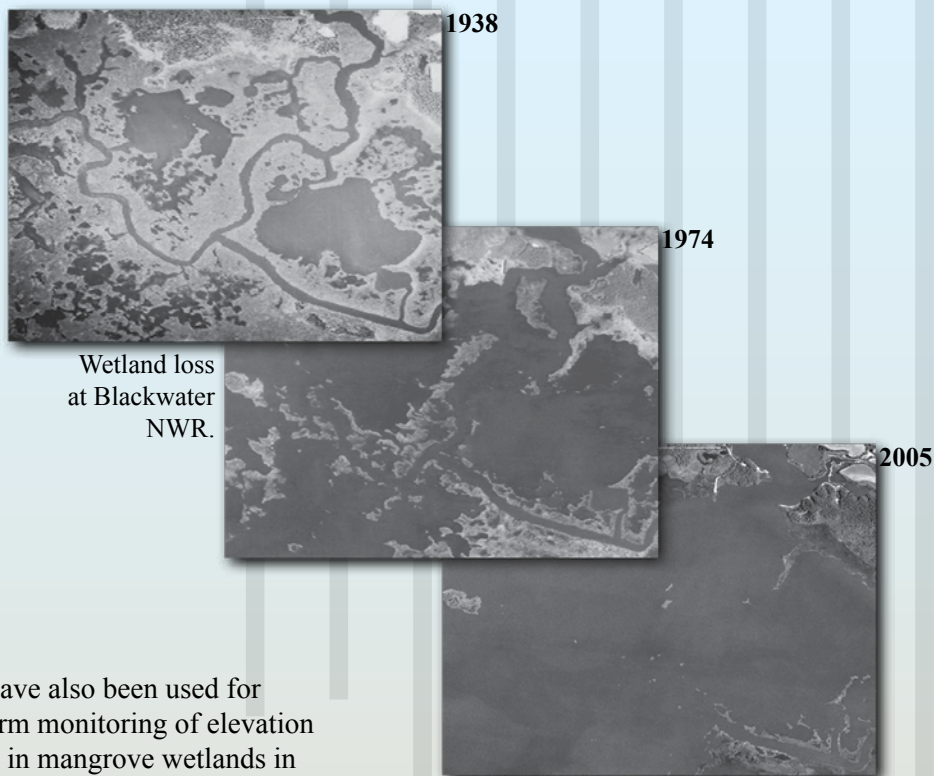
For more information contact:

U S Geological Survey  
Patuxent Wildlife Research Center

Dr. Gregory J. Smith, Director  
smithg@usgs.gov

SET website  
<http://www.pwrc.usgs.gov/set>

Blackwater National Wildlife Refuge on the eastern shore of Chesapeake Bay in Maryland, USA is an example of a coastal system heavily affected by sea level rise. Blackwater has lost over 60% of its wetlands since 1938. USGS/PWRC has installed over 75 SETs on the Refuge, and has been working closely with managers to evaluate the processes driving elevation change in these habitats. These measurements are also being used to model the response of these wetlands to past, present, and future rates of sea level rise so that managers can develop adaptive strategies for these natural resources.



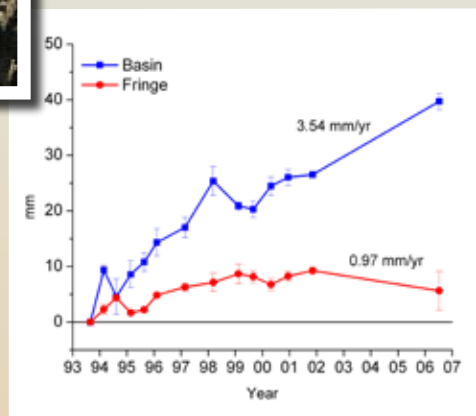
Wetland loss at Blackwater NWR.



Above: SET device, Queensland, Australia

Right: SET elevation change measured at two mangrove forests in Florida, USA.

SETs have also been used for long term monitoring of elevation change in mangrove wetlands in the Caribbean, Micronesia, New Zealand, Australia, and the U.S. Some of these data sets go back as far as 15 years.



Below: Coastal Mangrove SET study site Everglades National Park, Florida, USA.



**USGS Patuxent Wildlife Research Center has developed the tools and techniques to accurately measure and monitor elevation change in coastal wetland ecosystems. We are also developing the analytical models necessary to interpret these data and improve our ability to forecast future responses of these vulnerable areas around the world. Sea level rise is threatening the coastal regions of Asia. The approach described here can empower decision makers in Asia to develop robust and realistic adaptation strategies for the next century.**