



## **Operational Considerations for Geomorphological and Ecological Forecasting**

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Applying predictive models beyond weather and water has become a relatively new topic of research in the operational setting. It has become increasingly important to provide answers related to:

- fate and transport of pollutants and hazardous wastes
- shoaling and impacts to navigation
- water quality and its potential impacts to ecology
- deltaic processes.

The Water Institute and Deltares are currently working on a pilot project to develop a system that will potentially answer these questions. The Mississippi River Delta is the area of focus for this pilot project. This project is utilizing and enhancing the capabilities of the Flood Early Warning System (FEWS).

The Mississippi River Delta has been devastated by anthropogenic influences over the last century. These influences in conjunction with subsidence and sea level rise have caused astounding land loss rates. Government agencies are in the process of developing innovative ways to reconnect the river with the dying delta. One of the alternatives being planned is a system of sediment diversion projects. These diversions are much like flood water diversions which already exist along the river today. These planned diversions provide Deltares and The Water Institute of the Gulf the perfect case scenario to test both morphology and ecological models within an operational system. In order to build an operational system such as this, it was necessary to use FEWS as a platform to analyze multivariate and disparate sources of environmental data. This was necessary for monitoring the delta and providing boundary conditions to the models. Applying morphological models in a predictive manner is a new concept. Researchers from Deltares and The Water Institute have had to develop new methods to provide predictive boundaries and warm states to the models. It is intended that this system will ultimately be used to provide forecasted guidance on the optimal operation of the diversions to reduce the impacts to ecological health and increase the volume of sediment diverted to the receiving areas.