LSU Expert Teams With Ohio State Researcher To Track Species Affected By Gulf Oil Spill

EurekAlert

BATON ROUGE - To establish a baseline for measuring and predicting the biological impact of the Deepwater Horizon oil spill, a LSU ichthyologist and an Ohio biomedical informatics researcher are using Ohio Supercomputer Center, or OSC, systems to help map data on the extent of the spill and chemicals and the distribution of various fish species.

"We know very little about deep-sea life and even less about the interactions between this biota and these toxic chemicals," said Prosanta Chakrabarty, curator of ichthyology at LSU's Museum of Natural Science. "The northern Gulf of Mexico is home to more than 600 species of fish, and new ones are being described every year. Through our efforts and by making the informatics tools available over the web, our aim is to map baseline data about nearly every northern Gulf of Mexico species that may be impacted."

Several universities and federal agencies, including NASA, NOAA and USGS, are focused on tracking the oil and dispersants on the surface of the Gulf and in shallow waters and marshes. To complement these efforts, the researchers are repurposing a computer application that was designed to track infectious diseases to collect and reinterpret data for oil, dispersants and fish, including those at great depth.

"We have developed DEPTHMAP (depthmap.osu.edu [1]), a web-accessible mapping application for historical species collection records, to combine baseline information about the range of these species with respect to data on the extent of the spill," said Daniel Janies, associate professor of Biomedical Informatics at The Ohio State University. "From museum records, wildlife and fisheries collections data, we can measure the impact of this spill on marine species with various habitats, life histories and ranges."

Janies has created several applications to track the avian influenza virus (H5N1) - and, more recently, to monitor the H1N1 virus - on a real-time geographic information system. Janies and his colleagues teamed up with OSC staff to tune these codes to run on the center's IBM Cluster 1350 Glenn system, which features 9,500 cores and 24 terabytes of memory.

Now, wildlife data are being mapped onto a similar real-time geographic information system to show researchers which species' habitats are located in the region of the Gulf affected by the spill over time.

"Without historical baseline data like that we are mapping, future faunal surveys will not illustrate the impact of this deep-water oil spill," said Janies. "We will make the maps and underlying informatics tools we develop available to a wide community of

users via the web, such that other resource managers and researchers can leverage our efforts for a wide variety of species of interest."

The species being tracked will include commercially important grouper, snapper and croaker species, as well as ecologically important species near the bottom or top of the food chain, including batfishes and sharks. Data collected at intervals since the spill began is being incorporated and compared to show changing distributions, deaths, lost spawning seasons and year classes, and, potentially, extinctions.

"Unfortunately, the deployment of an unprecedented amount of dispersant at the well-head a mile below the surface has created plumes of oil microdroplets that are known to be toxic," said Chakrabarty. "The majority of the millions of gallons of oil that was introduced to the Gulf environment resides subsurface. While treatment of the surface oil can be conducted by burning and skimming, there is no treatment for subsurface oil and no plans from BP or the federal or state government to treat subsurface oil."

Chakrabarty and Janies hope to collect and integrate several types of information during this project:

- How the expanding spill will affect migrating and spawning organisms that travel through the Gulf. This information will help wildlife officials better manage these situations (e.g., saving vulnerable eggs and larvae of blue-fin tuna);

- Which species of organisms migrating at great depths will be most severely impacted by concentrated plumes of sub-surface oil and dispersant (e.g., pancake batfishes that feed on the vulnerable layer of plankton now covered in chemicals);

- The interaction between important fisheries and non-commercial and commercial fishes in sites of subsurface oil plumes (e.g., deep ocean coral species in Louisiana and Florida that are in the path of the plumes);

- How the plumes might affect the life-history stages of different fish species.

"Although the toxic effects of oil and dispersants and how they break down with sunlight are well understood, their effects below the surface are not known," said Chakrabarty. "Oil and dispersants break down in contact with sunlight and the rich microbial community of the warm waters near the surface. However, the deep sea is very cold, under high pressure and extremely dark. We don't know how oil and dispersants break down under these conditions, but evidence suggests that it will

be incredibly slow."

SOURCE [2]

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http://www.chem.info/news/2010/08/lsu-expert-teams-ohio-state-researcher-track-species-affected-gulf-oil-spill

Links:
[1] http://depthmap.osu.edu
[2] http://www.eurekalert.org/pub_releases/2010-08/lsu-let082510.php