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Ecological Forecasting of Vibrio sp. in U.S. Coastal Waters using an Operational Platform

Bob Daniels

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The Pathogens group of the NOAA Ecological Forecasting Roadmap has begun a range of efforts to monitor and predict potential pathogen occurrences in shellfish and in U.S. Coastal waters. NOAA/NCCOS along with NMFS/NWFSC have led the development of web based tools and forecasts for both Vibrio vulnificus and Vibrio parahaemolyticus. A strong relationship with FDA has resulted in forecasts that will serve U.S. shellfish harvesters and consumers.

NOAA/NOS/CSDL has provided modeling expertise to help the group use the hydrodynamic models and their forecasts of physical variables that drive the ecological predictions. Daily forecasts have been demonstrated and are available from the web for several U.S. Coastal regions.

A daily average prediction of the probability of occurrence of Vibrio vulnificus is provided for the previous 5 days, current day, and 48hrs in advance. Predictions use a logistic regression model based on temperature and salinity averaged over the top 1 meter. This model takes the average daily concentration at time of harvest and calculates additional accumulation of V. parahaemolyticus based on air temperature. The model begins at sunrise each day and projects post harvest growth out to 10 hours based on the 12 km resolution NWS North American Model (NAM) air temperature guidance. The empirical models relating temperature and salinity to V. parahaemolyticus concentration in oysters were developed and provided by the US Food and Drug Administration and represent expected levels at time of harvest. For more information on the models see: http://www.fda.gov/Food/FoodScienceResearch/RiskSafetyAssessment/ucm050421.htm.

Once an oyster is harvested, Vibrio parahaemolyticus will continue to grow within the organism until it is placed under refrigeration and cooled to 50°F. The forecast systems run on a daily basis being fed by regional NOS model data generated by NWS/NCEP super computers and maintained and currently hosted by the NWS/Ocean Prediction Center: origin.opc.ncep.noaa.gov/restricted/Vibrio/Vibrio_Forecasts.shtml

(Please contact robert.daniels@noaa.gov for username and password.)

A more complete prototype web page is being developed by NCCOS and will eventually become the operational page: coastalscience.noaa.gov/products/vibrioforecast/default

Vibrio vulnificus Probability of Occurrence

Vibrio parahaemolyticus Post Harvest Concentration in Shellfish