TIME: 1900 CDT Monday, March 17, 2008
TO: NOAA SSC Charlie Henry
FROM: NOAA Office of Response and Restoration
Emergency Response Division
Seattle, WA 98115

SUBJECT: Fluosilicic Acid release

For additional information, please contact Robert Jones or Chris Barker,
NOAA Emergency Response Division, Seattle, WA.
Phone: (206) 526-4911.

Per your request, we have looked at trajectory implications of releasing up to 12,500 barrels of 30% Fluosilicic Acid into the Mississippi River near Belle Chase, LA. The proposal is to pump the entire quantity into the river over a period of about 6 hours.

If any of this initial information is incorrect, please let us know ASAP, as it would affect any trajectory implications.

WEATHER:

Tonight and tomorrow morning:
Chance of rain tonight and tomorrow morning is 20%.
Any rain would be in the form of showers and short lived.

Tomorrow afternoon:
Chance of rain increases to 30% tomorrow afternoon.

Tomorrow night:
80% chance of rain with expected overnight rainfall to be 1/2 - 1". Rain is expected to start between 1600 and 1800 on Tuesday.

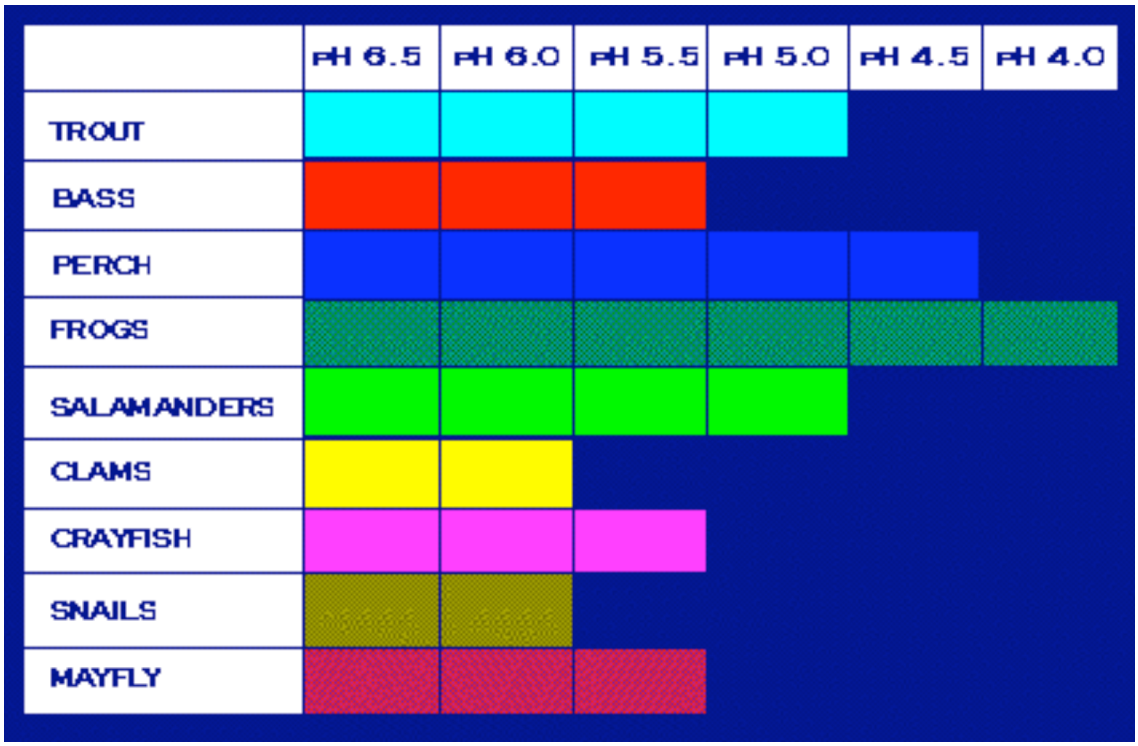
The river is running about 1-1/2 time average flow, at about 700,000cfs at New Orleans, expected to slowly increase to 775,000cfs by March 25th. The average velocity of the river near the potential release site is about 3.5 miles per hour.

DISCUSSION:

Movement and Effects:

The most significant effect of pumping the acid into the river is a substantial lowering of pH, possibly over miles of river. Threshold for low pH toxicity generally falls between pH 4.0 and 5.0. As the chart below shows, a range of susceptibility exists, with mollusks showing greater sensitivity to low pH than fish and amphibians. Low pH affects aquatic

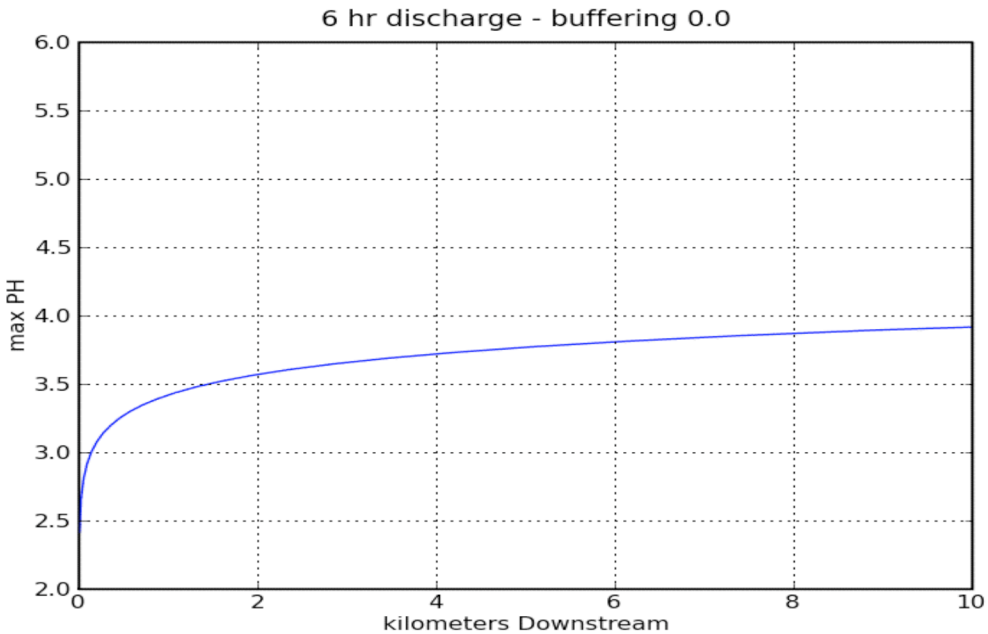
organisms by interfering with respiration (ability to excrete carbon dioxide), therefore relatively short-term exposures to low pH can be fatal. If the acid is released over this short a period of time, we expect that pockets of water in the river will be toxic to fish and other aquatic organisms.



Acidic tolerance of selected aquatic organisms. Source: USEPA.

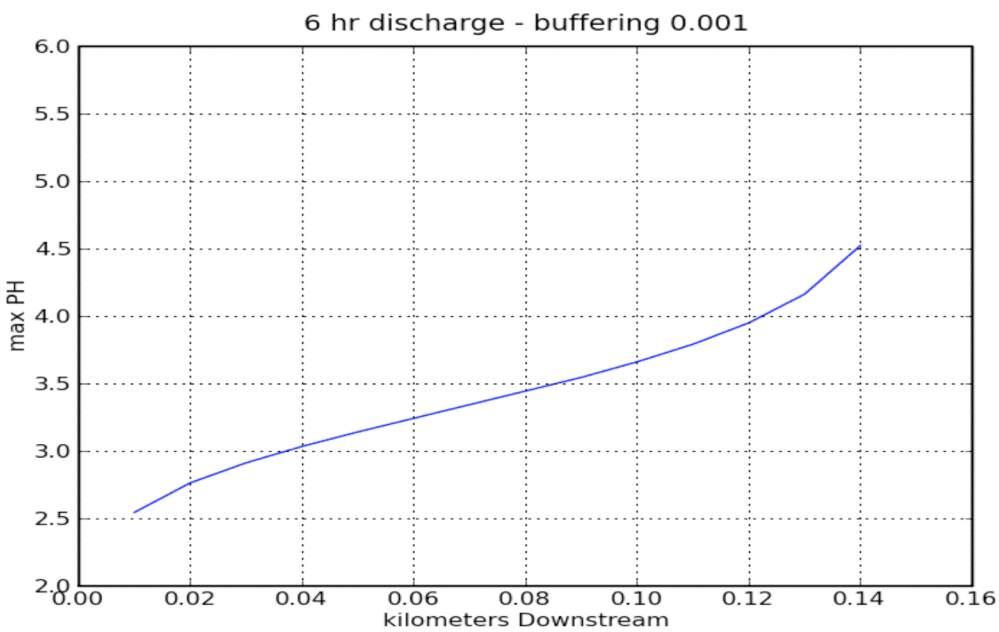
The extent of impact depends critically on the buffering capacity of the Mississippi River (the ability of substances found in the river to neutralize the acid). We do not have current values for the buffering capacity of the river near Belle Chase, but our initial review of the literature suggests values from 1 milliequivalence per liter (meq/L) to greater than 2 meq/L. We analyzed two scenarios, both are conservative.

The first scenario corresponds to no natural buffering capacity and represents an extreme worst case. In this case we would expect the patchy areas of peak acidity in the pH range of 3.5 within about 2 miles of the release site, increasing as it spreads across the river and it moves downstream. At about 25 - 30 miles downstream, the plume is expected to be well-mixed across the river, with a pH of about 4.0. This plume will continue down to the mouth of the river, slowly diluting as it moves downstream. Graph 1 illustrates the peak acidity as the plume moves downriver. At a given location, the plume will pass over in about 8 hours. The toxic-plume length is expected be about 25-30 miles long.



Graph 1: Peak acidity assuming no buffering capacity in the river.

The second scenario corresponds to a buffering capacity of 1 meq/L and represents our current best estimate. In this case we would expect the patchy areas of peak acidity exceeding toxic levels only within the first quarter mile downriver of the release point.



Graph 2: Peak acidity assuming 1 meq/L buffering capacity in the river.