

Model Guidance for Gulf of Maine *Alexandrium catenella* Bloom Potential (release date: May 20, 2022)

Toxicities reported by the Maine DMR increased last week in the western Maine coast, with highest toxicity at >100 ug/g at Bear Island. Toxicities by State of New Hampshire were mussel-tissue negative for Hampton. For the next several days, modeled *A. catenella* cell concentrations over top 10-m will be low at < 100 Cells/L for eastern Gulf of Maine, with higher concentrations near the coastal western Gulf (Fig.1). Winds were predominantly upwelling-favorable during the past one week. Forecast projects wind will be upwelling-favorable for upcoming 3.5 days (Fig.2); downwelling favors onshore cell accumulation. Model captured the low cell concentrations in NH coastal waters in mid-May slightly overestimated the bloom in early May. Modeled cell concentrations in the past week were higher than 100 cells/L in western MA, NH waters and western MA waters as shown in the time-average cell concentrations near the coast (Fig.4). This was consistent with elevated toxicity in the western Gulf of Maine, although observations in MA and NH in May (Fig.3) suggested that limited high cells were available.

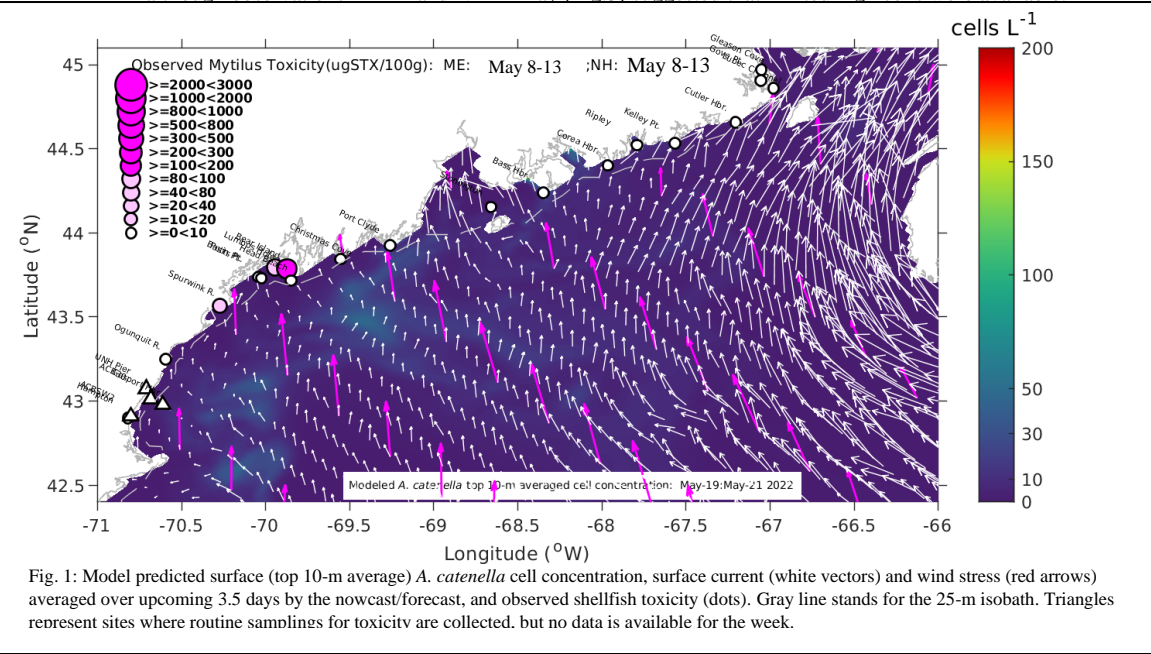


Fig. 1: Model predicted surface (top 10-m average) *A. catenella* cell concentration, surface current (white vectors) and wind stress (red arrows) averaged over upcoming 3.5 days by the nowcast/forecast, and observed shellfish toxicity (dots). Gray line stands for the 25-m isobath. Triangles represent sites where routine samplings for toxicity are collected, but no data is available for the week.

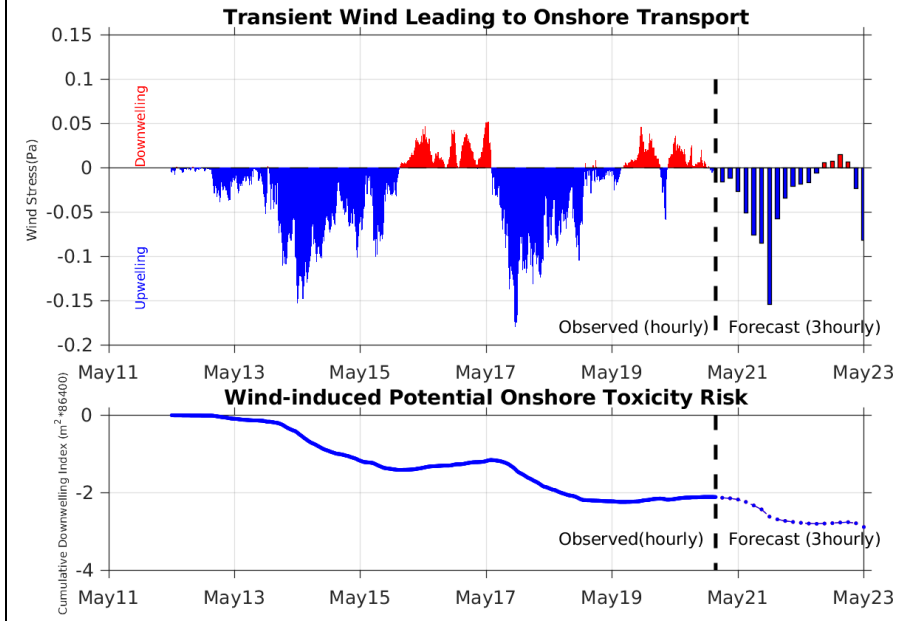


Fig. 2. (Upper) Transient alongshore wind for buoy I in the eastern Gulf of Maine during the past week. Forecast wind is from the NOAA NOMADS. Downwelling (red) means higher potential of cells transporting onshore, while upwelling (blue) means less potential of onshore transport. (Lower) cumulative wind-induced downwelling as a way to predict potential onshore toxicity risk. Positive means more onshore transport, thus higher toxicity risk should offshore cells be readily available.

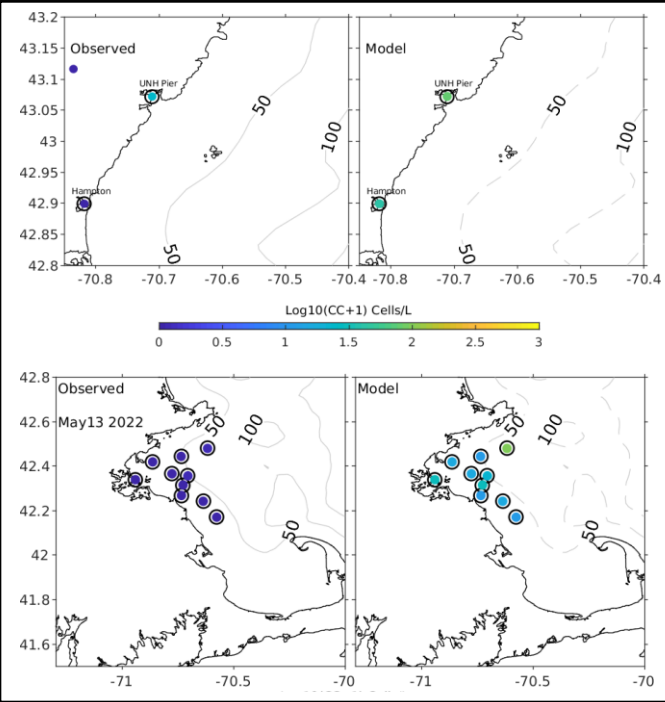


Fig.3. Model-data Comparisons of *A. catenella* surface cell concentrations for (Upper) NH samples during 9-12 May, and (Lower) MA samples on 13, May, 2022. Credit: Chris Nash, NH DES & Scott Libby (Battelle & MWRA)

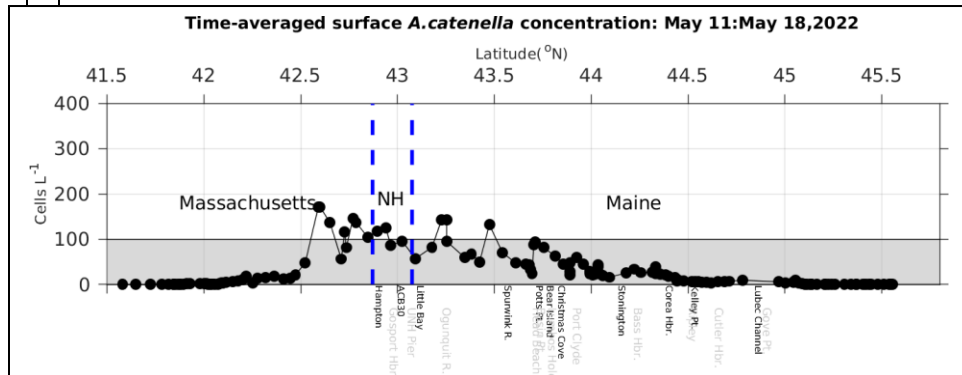


Fig.4. Weekly-averaged modeled surface *A. catenella* cell concentrations along 25-m isobath (see Fig.1 for isobaths locations). Also labeled are the closest onshore locations where toxicity was routinely sampled. It shows the weekly-averaged cell concentration when shellfish was exposed to the potential toxicity associated *A. catenella* blooms. 100 cells/L is the nominal threshold above which *A. catenella* tends to be toxic.

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