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Introduction to "Red Tides" in the Northern Gulf of Mexico: Harmful Algae Blooms

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- ## "Red" Tides: Misnomers and Misinformation
- ❑ Blooms of harmful algae do not always appear red in color; they can be brown, green, yellow, or colorless
 - ❑ Not all algal blooms are harmful
 - ❑ Not all harmful blooms result from high levels of nutrients (pollution)

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Known Harmful Algal Bloom (HAB) Species Northern Gulf of Mexico

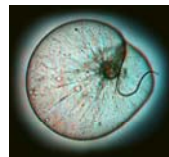
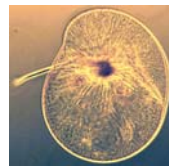
Genus and species	Problem(s)
<i>Alexandrium monilatum</i>	toxic to fish and invertebrates
<i>Anabaena</i> spp.	toxicity (mammalian neurotoxins); low D.O.
<i>Ceratium furca</i>	possible cause of DSP
<i>Ceratium hircus</i>	low D.O.
<i>Dinophysis caudata</i>	DSP; tumor promoter
<i>Gonyaulax polygramma</i>	low D.O. (fish and shellfish)
<i>Gymnodinium breve</i>	NSP (brevetoxin producer)
<i>Gymnodinium sanguineum</i>	associated with fish kills
<i>Heterocapsa</i> sp.	low D.O.
<i>Heterosigma akashiwo</i>	toxic to fish
<i>Lingulodinium polyedrum</i>	toxic (PSP?); limited food value for fish
<i>Oscillatoria erythroa</i>	toxicity (neurotoxins); toxic to copepods
<i>Prorocentrum</i> spp.	DSP (okadaic acid producer)
<i>Pseudo-nitzschia</i> spp.	ASP (domoic acid producer)

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The 34-foot research vessel Bill Demoran sits at the edge of a harmful algal bloom; "normal" water is off the bow of the boat

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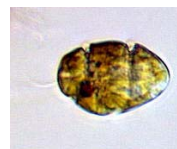
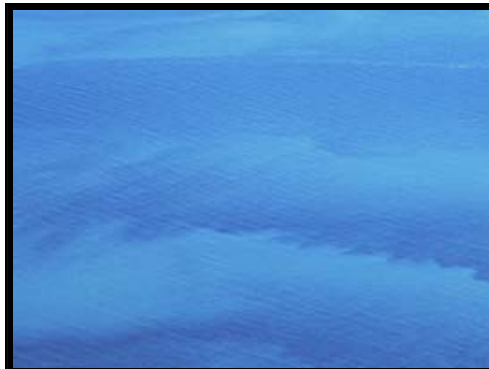


@ PJS Franks

Red tides occur in places besides the Gulf of Mexico; this is a bloom of *Noctiluca scintillans* off of the California coast

Sources of images: <http://www.redtide.whoi.edu/hab/rphotos/rphotos.html> and http://www.marbot.gu.se/sss/dinoflagellates/Noctiluca_scintillans.GIF

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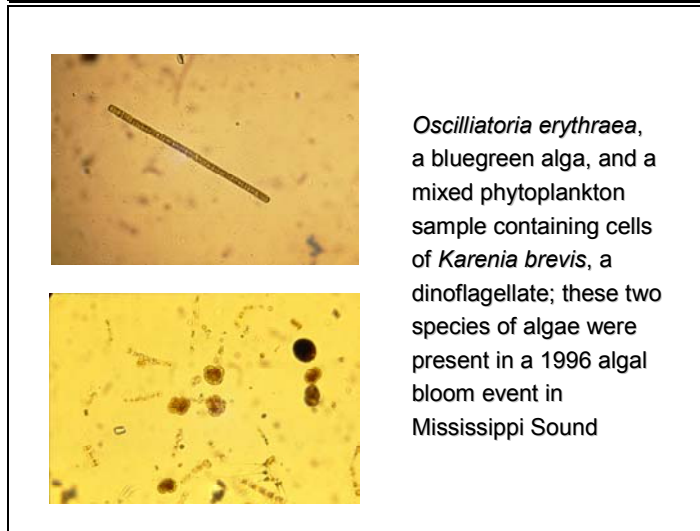
This is a bloom of *Cochlodinium* in the Chesapeake Bay area

Sources of images: <http://www.redtide.whoi.edu/hab/rphotos/rphotos.html> and <http://www.minc.ne.jp/suishi/page008.html>

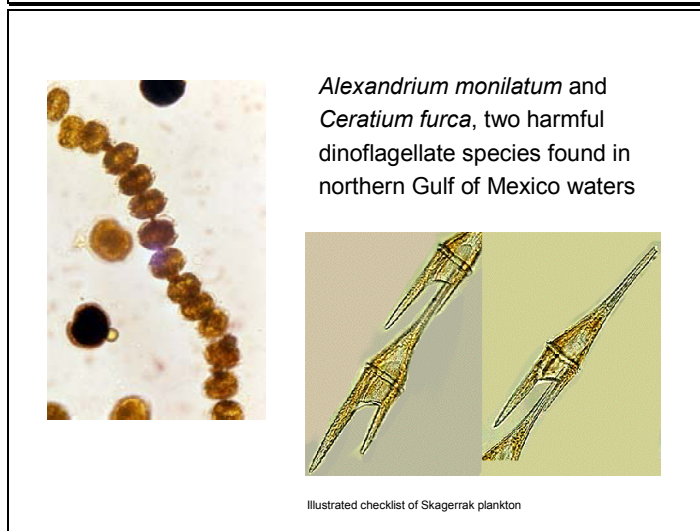
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Dinophysis caudata and *Prorocentrum micans*, two other harmful dinoflagellate species from northern Gulf of Mexico waters that have been linked with diarrhetic shellfish poisoning (DSP), one of the "harms" associated with HAB events



Illustrated checklist of Skagerrak plankton

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A microscopic view of a mixed dinoflagellate bloom from Mississippi Sound

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Chances for future blooms?

