

NOAA's Oil Spill Response

Guide to Distinguishing Oil From Algal Blooms



When observed from a boat or aircraft, many kinds of natural phenomena can be mistaken for oil on the water surface. Kelp beds, accumulations of jellyfish, and cloud shadows on the water are sometimes mistaken for oil. Oil spill response experts call such phenomena “false positives.” Algal blooms are one kind of false positive. They are sometimes reported as oil on the water, even by trained and experienced observers. This document describes algal blooms and provides tips to help you avoid mistaking algal blooms for oil.

Noctiluca blooms

Algal blooms happen naturally when some kinds of microscopic algae multiply quickly to form visible patches on the water surface. *Noctiluca* is a common, non-toxic alga that forms red, tomato soup-like blooms in the Gulf of Mexico. A *Noctiluca* bloom can look similar



Noctiluca bloom in Hood Canal, Washington State. (Credit: University of Washington)

to the reddish emulsified oil originating from the Deepwater Horizon wellhead.

Algal blooms can develop when nutrients become plentiful and other growing requirements (light, temperature, and salinity) are met. The Mississippi and Atchafalaya Rivers bring nutrient-rich water to the Gulf of Mexico, providing especially favorable conditions for blooms of *Noctiluca* and other species of algae from spring until the hurricane season.

Distinguishing *Noctiluca* from oil

If You're Observing From a Vessel, Aircraft, or the Shore

If you see a reddish patch on the water surface, look for these clues:

1. **Pattern:** A patch of oil tends to appear streaky, or oil may appear as rows of streamers. Algae and water weeds tend not to appear streaky, but instead appear as an amorphous mass. Oil that has emulsified (mixed with water to form an emulsion) typically either has no texture, or appears streaky.

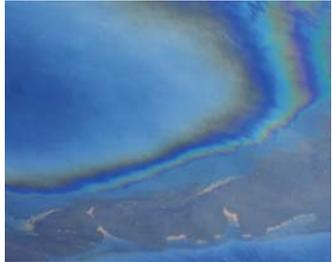


Emulsified oil from the Deepwater Horizon appears as reddish streaks on the water. (Credit: USCG)

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2. **Sheen:** If you observe a dark or reddish patch on the water surface from an aircraft or vessel, look for sheen around it. Sheen is a very thin film of oil on the water



A streamer of oil is surrounded by rainbow-colored sheen, observed during a May 6 overflight in the Gulf of Mexico. (Credit: USCG)

that may be brown, silvery, rainbow-colored, or transparent. Sheen is usually present around patches of thicker oil on the water. You may see small quantities of colorless, sheen-like biofilm around algal blooms, but oil usually produces stronger sheen. Any colored sheen indicates oil (though not all sheen associated with oil is colored).

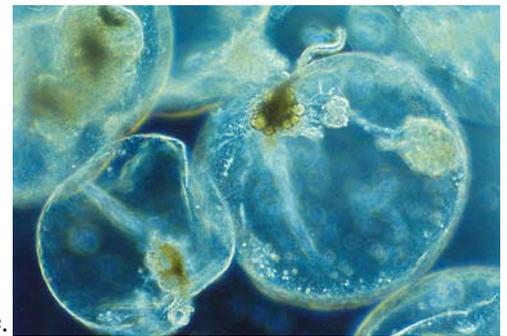
3. **Nighttime luminescence:** *Noctiluca* is bioluminescent: when gently shaken, it produces light from chemical reactions within its cells. Boat crews operating at night may observe glowing stripes or patches on waves, which indicate the presence of *Noctiluca*. Oil does not produce light.

It's possible that in some cases in the Gulf of Mexico, spilled oil may be comingled with algal blooms.

If You Have a Water Sample

Avoid direct contact with substances that could be crude oil, because oil on bare skin can cause mild skin irritation. However, if you have obtained a fresh water sample that you think could contain oil, here are two ways to tell whether the sample contains *Noctiluca* instead, without using a microscope:

1. Pour some of the water into a shallow dish, and inspect it closely. Look for tiny transparent balls somewhat like fish eggs. These balls are very small, less than a tenth of an inch in diameter. If you see them, your sample probably contains *Noctiluca*, and what you're seeing are the mature cells of this tiny algae.



Magnified view of *Noctiluca* cells. (Credit: Instituto de Oceanografia, Faculdade Ciências da Universidade de Lisboa)

2. Take your sample into a completely dark room. Let your eyes adapt for several minutes, and then swirl your sample. Watch for small flashes of light. If you see them, your sample contains *Noctiluca*.

Learn more about NOAA's response to the BP oil spill at <http://response.restoration.noaa.gov/deepwaterhorizon>.

To learn more about NOAA, visit <http://www.noaa.gov>. 