



Environmental prophet Rachel Carson called dragonflies a “sentinel” species: Their presence provides insights into the health and pollution levels of our wetlands. Just as canaries were used by miners to signal the presence of harmful gases in the mines, the presence (or absence) of dragonflies gives us clues about the state of our ecosystems and whether harmful chemicals such as pesticides are present<sup>1,2</sup>.

Dragonflies, similar to mosquitoes, lay their eggs in standing water. The resulting larvae (or nymph) can live underwater for up to six years, depending on the species. Dragonfly nymphs have voracious appetites and mosquito larvae are an important part of their diet — they can eat the equivalent of their body weight in food in about 30 minutes. Moreover, according to recent studies<sup>3</sup>, mosquito larvae actually stop developing when in the vicinity of dragonfly larvae.

But, dragonflies appear to be vanishing on Long Island. One potential reason is the larvicide Methoprene. The chemical is used in coastal wetlands to control mosquitoes, a key dragonfly food source. What’s more, studies have shown that larvicides interfere with the development of all arthropods including dragonflies and crustaceans such as crabs, lobsters and zooplankton. Zooplankton include many small crustaceans that float in the water, and are sensitive to Methoprene. These small animals feed on phytoplankton, which are single-celled plant-like organisms that photosynthesize. Phytoplankton, stimulated by excess nitrogen, can form dense populations creating algal blooms<sup>4</sup>. Algal blooms can ultimately result in low oxygen, and some species produce toxins. Fewer Zooplankton means more toxic or harmful algal blooms.

**In other words, the human desire for mosquito-free summers has upset the marine food web. More science is needed concerning declining dragonfly numbers and the possible connection to Methoprene, but the warning signs are clear.**

It’s time we heeded the subtle, but dire signals of the dragonflies. Our tidal wetlands are in peril, which poses a risk not only to all the species that rely on these unique habitats but also to our health. To meet future challenges, we need to step up science-based approaches to develop habitat preservation and restoration programs to increase wetland biodiversity (including mosquito predators) as well as green infrastructure to protect our bays, coastlines and wetlands. Protecting and expanding wetland buffer zones in the face of sea level-rise and extreme weather events can save millions of dollars<sup>5</sup> (as well as lives).

**Support legislation for an official day that New York State celebrates wetlands!  
An annual “Dragonfly Day” on the 2nd Saturday of June.**

Set the second Saturday of June aside to enjoy group hikes, participate in citizen science studies, attend an educational workshop or spot dragonflies while exploring nature at a local wetland area. Learn about what you can do to help increase biodiversity and coastal resilience in New York and to protect our coastlines from flooding by expanding wetland habitats and increasing plant and animal biodiversity.

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<sup>1</sup> Cairn N, Portland Press Herald (2013), 'Dragonfly in mud a canary in coal mine for our times'[online]. Available at:<http://www.centralmaine.com/2013/09/07/dragonfly-in-mud-a-canary-in-coal-mine-for-our-times/>

<sup>2</sup> Simon M., (2012) 'Dragonflies - Indicator Species of Environmental Health' [online], Available at: <http://www.earthtimes.org/nature/dragonflies-indicator-species-environmental-health/2033/>

<sup>3</sup> Ellis M., (2013) 'Influence of Dragonfly Larvae on Mosquito Development and Survival' [online]. Available at: <http://www.caryinstitute.org/publications/influence-dragonfly-larvae-mosquito-development-and-survival>

<sup>4</sup> Suffolk County Government (2018), 'Harmful Algae Blooms'[online]. Available at: <http://www.suffolkcountyny.gov/Departments/HealthServices/EnvironmentalQuality/Ecology/MarineWaterQualityMonitoring/HarmfulAlgalBlooms.aspx>

<sup>5</sup> Narayan et al (2017), 'The Value of Coastal Wetlands for Flood Damage Reduction in the Northeastern USA' [online]. Available at: <https://www.nature.com/articles/e41598-017-00769-z>

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