

CHAPTER 2.3 - WET Testing of Lagoon Systems

The purpose of this chapter is to explain why the WDNR may require WET testing at facilities that use lagoons for wastewater treatment, even if WET test species are already present (and maybe even raised for bait) in the systems.

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WET Monitoring of Lagoon Systems

The WDNR does not allow the reduction or deletion of WET testing for lagoon systems with active aquatic vertebrate or invertebrate species, including fathead minnows, *Ceriodaphnia dubia*, and *Selenastrum capricornutum* (green algae), even if the system is used to raise bait minnows. This would not be appropriate, mostly because individuals present in a lagoon system would not be good representatives of those that would normally be found in the wild. Other reasons include: 1) lagoon reared organisms may have become "acclimated" to potential toxicants in the system. These organisms may be able to tolerate low levels of contaminants that would impact "wild" populations of the same organism, 2) WET testing is conducted under controlled conditions of temperature, feeding, light, pH, dissolved oxygen, and other variables. The test organisms are compared to control organisms to assess the potential impact of the discharge in the environment, and 3) WET test organisms are raised under controlled conditions to be genetically diverse (representative of native populations), but not super organisms that are resistant to certain possible toxicants.

Fathead Minnows

Laboratory raised fathead minnow used in WET tests are intended to represent that more sensitive fish that are normally found in our receiving waters. The "*State of Wisconsin Aquatic Life Toxicity Testing Methods Manual, 2nd Edition*" (Methods Manual) requires that WET test minnows be between 4 - 14 days old in acute tests and < 24-hr old in chronic tests (see Section 4, Tables 4.1 - 4.4). Test-specific age categories are necessary to evaluate the potential effects of toxicants on the most sensitive lifestages of these fish. While it is possible that these lifestages may inhabit a lagoon system, there are no means to determine a recruitment rate of the population (i.e., the percentage of fertilized embryos that reach sexual maturity). This is important because a low recruitment rate would be reflective of an imbalance in the receiving stream fish and aquatic life community.

***Selenastrum capricornutum* (green algae)**

The WDNR does not allow the reduction or elimination of WET tests due to the presence of algae in treatment lagoons, because the algae that appear in lagoons and other bodies of water during "bloom" conditions (rapid increases in algae, most noticeable during the summer months) are usually mostly blue-green algae. These blue-greens are NOT true algae. In fact, blue-greens are more closely related to bacteria because of their similar biochemical and structural characteristics. Green algae are more often the dominant algal forms found in lower nutrient and non-human impacted lakes. The presence of these types of algae is normally thought of as an indicator of a healthy aquatic environment.

S. capricornutum is a freshwater green algae and is therefore more representative of higher order vascular plants. It is NOT a blue-green species that would normally be associated with nuisance conditions. This species was chosen for use in WET tests because it's an important source of food for higher organisms, and because it is a good representative of other aquatic plants.