

Kris,

Please take a look at attached Wikipedia explanation of BOD (attached)

Note definition decomposition of “organic matter.” Most environmental biologists state that P feeds algae and algae die and consume DO through bacterial decomposition. Steve Hood states that TMDL on P emanated from “Researches stating that the major cause of Low DO was from Algae decomposition”.

The literature is full of this type of “Conventional Wisdom” which originated from Eutrophication Studies linking phosphates in laundry detergents, hard surface cleaners, and fertilizers to nutrients in water bodies and Algae growth.

I have never seen any of these “studies “examine all causes of Low DO in any body of water and provide fact based evidence for their statement/claim. Researchers would have to perform a mass determination of what % of algae constitutes organic and inorganic matter related to BOD, COD, SOD, NBOD, M+ Oxidation.

Estimates may not be accurate; modeling is an estimate. Unless a researcher has discovered a way to relate DNA analysis to all individual organic matter sources and can accurately differentiate algal organic matter from non-algal organic matter to provide verifiable/irrefutable evidence that Algae constitute 95+% of organic matter than I might believe a researcher’s statement that Algae decomposition is the major cause of Low DO.

Causally we can show that water temp, salinity, and atmospheric pressure all cause DO concentration/availability in all bodies of water. We can use examples of fresh water vs salt water to lessen the effect/cause of salinity in Lake Whatcom. From Bathymetry studies on LW we know that the surface of the Lake is 310 ft. above sea level and that the deepest Basin is 330 ft. deep or 20 ft. below sea level so we can show that atmospheric pressure has a smaller impact /cause on DO solubility/availability in LW than the impact/cause of temperature.

By logical deduction with supported evidence we conclude: Water temperature is therefore the major cause of DO solubility/availability in LW.

If we fail to recognize water temp as a cause of Low DO and implement solutions that do not address this cause, then we cannot expect to solve the Low DO problem because effective solutions address all causes of Low DO.

One has to understand how O₂/DO gets into the lake and whether or not there are any circumstances/phenomena/mechanisms which prevent O₂/DO from getting into the lake not just how DO is consumed in the hypolimnion.

The bottom line: cold water temp allows free exchange of O₂ from a “virtually unlimited source of Atmospheric O₂”. Summer Heat transfer from the sun creates a thermal barrier in LW water in warmer months and fixes/limits a definitive concentration of DO for BOD, COD, and other DO consuming processes in the hypolimnion. Heat, warmer water stratification between epilimnion and hypolimnion prevents atmospheric O₂ exchange to hypolimnion and the replenishing of DO in the hypolimnion.

Solution: Manage/control “cold” water temp in LW to improve and control LW water quality.

Amen! Alleluia! “It’s not nice to fool with Mother Nature!”

Regards

EJ

https://en.wikipedia.org/wiki/Biochemical_oxygen_demand