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Tidings The Newsletter of the Friends of Perdido Bay

February 2023 Volume 36 Number 1 Jackie Lane -Editor
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Welcome to a New Year

And as always, Thank you for being a member of Friends of Perdido Bay. We look forward to having a successful year. Maybe this will be the year the bay gets cleaned up. We hope. Your dues and donations have allowed us to run tests and block the paper mill from getting a current permit. IP's chances of getting a permit to discharge their effluent into Perdido Bay are very slim. Why would they even would try? Perdido Bay is a small bay with a river which is so clean it is designated a "Florida Outstanding Water". The reason it is unpolluted is that so much of the Perdido Watershed is forested with pine trees grown for paper making. There is some agriculture along the Blackwater River in Baldwin County, AL. The shoreline of the bay itself is not densely populated, until you get into the lower bay. Many acres in the upper bay in Alabama have been purchased by the state for preservation. As I look across the bay to Alabama from my house in Florida, all I can see on the shoreline is the mouth of the Perdido River. There are no houses or condos. We are lucky. All we have is one giant paper mill and its effluent which I can see coming out of Elevenmile Creek and the wetlands. Even though International Paper is supposedly discharging to a wetland, there is a very alkaline effluent being discharged into Elevenmile Creek periodically. I can see it. I have reported this to the Florida DEP, BUT.....

So we are lucky. We should be living on a pristine body of water. Should be. Of course, there is a domestic water treatment plant, Bayou Marcus, which discharges to the bay just northeast of my beach. It discharges 7 million gallons a day into wetlands. There doesn't seem to be any problem with it as far as nutrients, but that may be artificial. The last study which was done in 1986 and 1987 on nutrients from septic tank leakage along the bay, did not find any indication of any leaking septic tanks into the bay. La Paz subdivision is one place along the shoreline of Upper Perdido Bay which may have had a problem with septic tanks leaching into the bay. It was converted to sewer about 15 years ago. So when I go to a meetings or read reports that say the problems in Perdido Bay are caused by leaky septic tanks,

I say show me the data. There is none. Why spend a lot of money converting septic tanks to sewer, if there is no data showing septic tanks are the problem in Perdido Bay.

So What is the Problem?

It is obvious - the paper mill. It is too big a discharge for this little bay which doesn't flush very well. But the problems the paper mill caused in the past, may have changed. The permit which IP was given back in 2012, allowed then to discharge oxygen consuming substances (BOD) which caused the oxygen to be depleted in the water, especially on the bottom. A study which the DEP had commissioned back in 2007, showed the oxygen-depletion problem, especially in the summer. But today, if you go to Escambia County's water quality monitoring site, Upper Perdido Bay has the highest dissolved oxygen's of all the bays in the area, at least in the surface waters. The average percent saturation of dissolved oxygen in 2022 was 110% saturation in the Upper Bay. Wow!! In Lower Perdido Bay, the percent oxygen saturation was only 98%. What is causing this high oxygen saturation in the Upper Bay?

High oxygen saturation is possible. The surface waters get churned up with wave action and oxygen gets dissolved. Algal blooms produce oxygen. However, the constantly elevated dissolved oxygen in the surface waters in Upper Perdido Bay is pretty unusual, especially if you have an oxygen consuming effluent entering the bay. This is what we know. The pH has been going up in the bay for the past few years. In past newsletters, we noted that there was positive relationship between pH and dissolved oxygen; the higher the pH, the higher the dissolved oxygen. We know that International Paper uses chlorine dioxide for bleaching. Chlorine dioxide is a gas made at the mill from sodium chlorate. When released into the environment, chlorine dioxide breaks down into chlorite and chlorate. We actually have measured the concentrations of chlorine dioxide and chlorate in Elevenmile Creek when the paper mill was discharging into Elevenmile Creek (before they went to the wetlands). There was also a study done by NRDC at the mill in 2007 which showed that chlorine dioxide reconverts to chlorate. There are several papers in engineering journals which also show the same thing. According to Goggle, chlorate is a non- selective contact herbicide, considered phytotoxic to all green plant parts. I am sure the paper industry would think that this is a good thing because the build up of slime on the pipes in the mill is a problem. So chlorate would act as a slimicide as well.

Goggle has more interesting information, especially if you search for "chlorine dioxide and alkalinity". In an alkaline medium, chlorine dioxide oxidizes to hydrogen peroxide and oxygen. **Bingo**. That is the chemical equation I was looking for. Why waste good oxygen molecules. Let this reaction occur in the surface waters of Perdido Bay and you get an oxygenated bay. So where does the alkalinity come from? It is coming down Elevenmile Creek, even though the county data taken in Elevenmile at 297A does not show this. If you go up Elevenmile Creek to the Kingsfield Road Bridge, just to the North, as the creek comes off of the mill site and take a measurement, you will find an extremely elevated pH. I have taken pH's around 8.8 (7 is neutral) at this site. I also have reported this information to DEP. I can see this discharge from my house, as the surface tension is different. But our environmental

agencies no longer have biologists in the field. Their budgets have been cut. This would be an illegal discharge.

Entirely Consistent with Observations and Data. It is herbicidal

The presence of herbicidal chemicals into Perdido Bay such as chlorate, is entirely consistent with our data and observations over the years. I used to study the snail, *Neritina*, which crawls around on seagrasses ingesting the small algae growing there. To do different studies, I grew the little algae on glass plates I had put in the water. I had been doing this for several years prior to 1995. In mid-1995, I began to see something strange. Algae would not grow on the glass plates. I discovered that Champion, who were the owners of the paper mill at that time, had switched over from chlorine bleaching to chlorine dioxide bleaching. Because I couldn't get algae to grow on the glass plates, I stopped the studies. In addition, the seagrasses which were growing in the bay and at the mouth of Herron Bayou, had developed red fronds (instead of green). I examined the fronds under the microscope and could see that the chloroplasts were damaged; they were crenulated. I wrote to the EPA several times and contacted the DEP about the problem. They denied there was a problem. The EPA sent me three papers which the paper industry's scientific group had done. Two of the papers showed there wasn't a problem with using chlorine dioxide bleaching. The third paper showed a decrease in algal growth using chlorine dioxide bleaching, but the decrease wasn't significant.

To cover up the effect of herbicidalicty (is this a word?), it looked like the paper mill began to pour nutrients into Perdido Bay. In the mid and late 1990's, we had huge amounts of drift algae at out beaches. It covered our crab traps and our beaches. But, the sea grasses were still red in the summer. Then in the winter of 2000, every plant in Upper Perdido Bay died. Even the trees which were growing on the pile of ash in the upper bay, died. These trees were roosting areas for the white herons. At sunset, you could see the herons with the drying wings expanded. They looked like giant white flowers.

In November 1995, Friends of Perdido Bay sent a water samples to a laboratory to test for chlorine dioxide and chlorate in Elevenmile Creek, at 297 A and at the mouth of the creek. Both times we found relatively high amounts of chlorate. Chlorate decreased in concentration from upstream to down stream. But it was there.

Friends of Perdido Bay's most recent studies showing decreased algal productivity when exposed to Perdido Bay water is further proof that the water is herbicidal. And we no longer have any algal blooms at our beach. So it is pretty obvious, there is inhibition of algal growth. The EPA and the DEP are ignoring the problem.

What about the Hydrogen Peroxide?

Chlorate is one byproduct of chlorine dioxide bleaching. Hydrogen peroxide is another. While we have not tested for the presence of hydrogen peroxide, chemical equations do not lie. Given the correct temperature and pH, the reaction will occur. I am assuming this is the reason we see so little larval life in Upper Perdido Bay. Hydrogen peroxide is toxic to aquatic organisms. In 2020, a paper in a scientific journal measured the aquatic toxicity of hydrogen peroxide in rivers in Japan. It is toxic. Certainly, we know what hydrogen peroxide does to our wounds when applied. It is a very reactive chemical which quickly oxidizes any bacteria and

other smaller organisms it comes in contact with. Larval forms of life would probably perish with it strong oxidizing properties. It is used to disinfect fish farms. Larger forms of life probably benefit from these disinfecting properties and maybe, even domestic wastewater treatment plants. The presence of hydrogen peroxide is probably helpful in keeping the bacterial population down in Upper Perdido Bay. So when the county measures the presence of *micrococcus* as an indicator of pollution, it probably does not find anything. Also the decrease in dissolved oxygen in water bodies is caused by bacterial decomposing organic matter. If you kill the bacteria, you don't get decomposition and no oxygen is used up. Perfect chemical if you want a disinfected bay. I would rather have life and algae blooms and not an artificially manipulated body of water.

Is chlorine dioxide more environmentally friendly that chlorine?

The media wants you to think so. Most paper mills have gone to using chlorine dioxide as the bleaching agent because bleaching with chlorine gas produces dioxin. That is 2,3,7,8 TCDD dioxin. According to EPA, that dioxin was the most dangerous chemical known to man. The EPA's water quality standard has a level for dioxin, but only for one type - 2,3,7,8 TCDD. What we didn't know at the time that level of dioxin was set, was that **chlorine dioxide also produces dioxin.** Over the years, Friends of Perdido Bay has sent sediment samples off to a certified laboratory for dioxin analyses, the most recent in 2021. There is are nearly a dozen different dioxin types which can be as toxic and as dangerous as the 2,3,7,8 TCDD. But none of these dioxin types have an EPA limit. The reports which we get back from the lab have the toxicity given as equivalent to 2,3,7,8 TCDD. There are also furans which are chemically similar to dioxins. The amount of different dioxins has diminished in the past years, but it was still present in sufficient quantities to be alarming. So this is why we thought the paper industry had converted from chlorine bleaching to chlorine dioxide bleaching. It was more environmentally friendly. It didn't produce dioxin. But bleaching with chlorine dioxide does produce dioxin, but not 2,3,7,8 TCDD. Dioxin has become a non issue and the word is seldom mentioned. The results from dioxin testing are on our website.

Membership and Renewals

Tidings is published six times a year by Friends of Perdido Bay and is mailed to members. To keep up with the latest news of happenings on Perdido Bay, become a member or renew your membership. For present members, your date for renewal is printed on your mailing label.

Membership is $30.00 per **year per voting member**. To join or renew, fill out the coupon to the rightand mail with your check to the address on the front.

Friends is a not-for-profit corporation and all contributions are tax-deductible. Funds received are all used for projects to improve Perdido Bay. No money is paid to the Board of Directors, all of whom volunteer their time and effort.

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