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Tidings

The Newsletter of the Friends of Perdido Bay

November 2011

Volume 24 Number 5

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www.friendsofperdidobay.com

Update on International Paper's Wetland Project

In the most recent report that International Paper submitted to Florida's DEP in late September 2011, the upgrades to the wastewater treatment system, and the wetland planting and construction have been completed. According to a DEP engineer, International Paper may begin applying wastewater to the wetland as early as December. The upgrades to the wastewater treatment system include: using activated sludge, adding more aeration and mixing, and increasing the capacity to store water in times of heavy rainfall. Activated sludge is not a new technology. Many paper mills installed activated sludge treatment in the early 1970's when secondary treatment of industrial effluent was required. In activated sludge treatment, bacteria in the sludge which break down the organic matter in paper mill effluent, are pumped from a settling pond into the main treatment pond to maintain a constant, high level of treatment bacteria. This continuous introduction of treatment bacteria allows the organic matter in the effluent to be broken down at a much faster rate. More effluent can be treated in a shorter period of time, according to our research. This fits International Paper's plan to increase their production.

One drawback to activated sludge is the increased amount of sludge produced which does not settle well. Therefore having several ponds in which the sludge settles after the main treatment pond is rather futile, because the sludge will not settle. We suspect that this is the one reason, IP decided to go to a wetland. Hopefully, their sludge will settle out in the wetland and decompose. In the system which IP now has, there are two settling ponds after the main treatment ponds. Sludge (a mixture of dead bacteria, cooking salts, etc) settles out in these ponds. Dissolved oxygen in these settling ponds is very low and the sludge which accumulate in these ponds decompose slowly and release ammonia. In the summer, this ammonia may reach such high concentrations that it becomes very toxic. This is the source of the frequently high ammonia in Elevenmile Creek and Perdido Bay. Eliminating these settling ponds will help

eliminate the toxic ammonia. IP can also use chemicals to help the sludges settle. The salt of aluminum (alum) and several polymers can be used to help the sludges settle.

By going to activated sludge, IP can eliminate several settling ponds. These ponds were environmental headaches for paper mills. The ponds periodically had to be cleaned out which was a very messy and expensive business. I am sure in order to save money, paper mills simply skip cleaning out these ponds and allow the sludges to overflow into the nearest body of water. A heavy rain would facilitate the cleaning out. Now the sludges will go into the wetland. We are going to see how well this works.

Adding additional aeration and mixing will definitely help the quality of the effluent. Removal of pollution (BOD) in paper mill effluent is directly correlated with the amount of mixing in the treatment ponds. It appears to me that IP has already increased their aeration. Perdido Bay has looked better the first couple of weeks in November. Usually in the morning when the water is calm, a black layer of very fine silt covers the bottom of the bay. When there is no rainfall, I suspect that this black layer is caused by the suspended solids settling out of the water. Recently no black layer has been present. Perdido Bay acts much like a settling pond for the paper mill. Organic material which is not treated in IP's treatment ponds is further treated in Perdido Bay. The bacteria which break down the organic material die and settle out on the bottom. Solids which are discharged by the paper mill also settle out on the bottom of the bay. IP is permitted to discharge up to 8,000 pounds per day of solids. The additional aeration is going to cost IP more to treat their wastes.

While I suspect that the quality of the effluent coming out of the wetland will be better for a while, it is difficult to know how much better the water quality will be in Perdido Bay. Many of the constituents in paper mill effluent are natural products from pine trees. These products are found in small quantities, however when so many tons of pine trees are processed these products may reach lethal proportions (see following article). Whether or not the wetland will be able to treat these "natural products" is unknown. Further, the effect of all these chemicals on the plants in the wetland probably will cause damage to the wetland over time. In 1992, the former owners of the paper mill, Champion, built an experimental wetland at the mill. They planted trees and other plants in the experimental wetland. Only 2% of the trees survived after 5 years. Being continuously flooded with highly alkaline water with very little or no oxygen is not an environment most trees can stand. Supposedly, IP is going to set up a committee to evaluate the effect of the effluent on the wetland. We were not invited. Whether or not this committee actually forms and gives an honest assessment of the effect of paper mill effluent on the wetland flora, remains to be seen.

Another problem which is sure to arise once the wetland discharge begins is the degradation of the small tidal lakes at the end of the wetland. IP calculated that 70% of the effluent will travel through these lakes. Currently, the lakes are affected somewhat by effluent from Elevenmile Creek. The lakes will be IP's new settling ponds. They will catch and retain some of IP's sludges which do not settle out in the wetland. At one time these lakes were great places to catch bass and net mullet. But with the general decline in water quality in Perdido Bay, these lakes have lost a lot of life. They are sure to lose more life once IP begins discharging to the wetland. As with the wetland, the effect of the effluent on these lakes is supposed to be monitored by scientists. How honest this assessment will be, we can't say.

ECUA Submits Application to Discharge Flow to Pipeline

As we described in the past newsletters, Emerald Coast Utilities Authority is planning on discharging up to 7 million gallons a day of their effluent from the new mid county sewage treatment plant to the Rainwater wetlands (the same ones to which IP will discharge). This effluent is not going to be used by IP, but is being piped around IP's treatment ponds to be added to the pipeline going to the wetlands. Why would anyone plan on discharging more effluent to Perdido Bay? As we reported in the past newsletters, the total nitrogen found in Perdido Bay is very high already and would exceed the limits of the new nutrient rule, if it ever passes. While the DEP engineer who is working on the ECUA permit has said that the new discharge by ECUA was considered in evaluating IP's permit, the high levels of Total nitrogen in Perdido Bay were never considered. This is sort of a long and involved story, but the nutrient "model" which was done by Dr. Livingston (he is the dishonest scientist who worked for Champion for years but was later fired by IP) never calculated a Total nitrogen value for Perdido Bay. Dr. Livingston only calculated an ammonia value for IP's discharge to Perdido Bay.

Nitrogen can come in various forms. The nitrogen which is found in dead and decomposing matter which was once living is called organic nitrogen. It is measured as Total Kjeldhal nitrogen. This is the major form of nitrogen discharged to Perdido Bay by the paper mill and no limit was established for this type of nitrogen in the current IP permit. This organic nitrogen from paper mills is associated with the sludges. In Perdido Bay, this organic nitrogen settles to the bottom and continues to decompose. Bacteria decompose organic nitrogen and convert it to ammonia. If oxygen is present, this ammonia will then be changed to nitrate and nitrite. Most plants require nitrogen as either ammonia nitrogen or nitrate to grow.

Remember from the past newsletter, we found a very high Total Nitrogen value of 3.0 ppm and 3.2 ppm in the vicinity of Bayou Marcus. This number would exceed the nitrogen value which is currently being proposed for estuarine waters. We have not determined the type of nitrogen or the source of nitrogen. One of our citizen monitors has been measuring nitrate nitrogen in the canal behind the La Paz subdivision. Nitrate nitrogen is very low or not detectable by the test which our monitor is using. So the high nitrogen we detected, must be one of the other types of nitrogen.

Yes there is an increased risk for infection by swimming in Perdido Bay.

Occasionally, one of our members will send a note asking the question about whether it is safe to swim in Perdido Bay. Yes, there is an increased risk of infection and from exposure to chemicals. The incompletely degraded organic matter which is released into the bay from the paper mill is further degraded in the bay by bacteria and other microorganisms. The end result is that Perdido Bay has a high population of bacteria and other microorganisms. Some of these bacteria are pathogenic and can cause disease. One bacteria which is associated with effluents high in organic matter such as paper mill and sugar cane producers, is Klebsiella pneumoniae. This bacteria is an opportunistic pathogen which can cause pneumonia, urinary tract infections and several other types of human infections. Klebsiella is one of the coliform bacteria and will be detected in the "total coliform" test. It is not necessarily associated with human waste. Vibrio bacteria are also common in Perdido Bay and may cause a variety of digestive tract ailments. Because of the high concentrations of sulfur released by paper mill (they use sodium sulfate in cooking the chips), sulfur bacteria which form filaments are sure to be present. The reasons the populations of bacteria are high in Perdido Bay is because the concentrations of paper mill effluent is high in the bay, especially the closer you get to Elevenmile Creek. There is insufficient dilution especially when it does not rain. So bottom line, if you have a cut, don't go

swimming in the bay. All the members of our family have gotten infections from swimming in the bay.

Another danger in swimming in Perdido Bay is from exposure to chemicals - some man-made, others natural. We have talked about the heavy metals found in paper mill effluent. These are not degraded by bacteria (although they may be changed) and remain pretty much in the system. Dioxin was a chemical which was produced by paper mills making bleach paper. In the 1990's, government scientists found relatively high concentrations in Perdido Bay. We found high concentrations in the sludges washed onto our properties after Hurricane Ivan. The bay bottom has not been tested recently for the presence of dioxin. With IP's conversion to mostly brown paper, hopefully, dioxin is present in very low quantities in the water.

There are also chemicals found naturally in pine trees which can cause some problems due to their high concentrations. The article below will describe.

Masculinized Females

In the 1980's, a researcher from the University of West Florida found mosquito fish in Elevenmile Creek which looked and acted like males. After testing a variety of creeks, only three places were found where this occurred - Elevenmile Creek near Pensacola, Fenholloway Creek near Perry Florida and a creek in Italy. All three streams were small creeks which received large volumes of papermill effluent from mills which processed pine. Researchers have been studying this phenomena since it was discovered. The consensus among scientists is that pine tress contain a chemical which either mimics a male hormone or inhibits the female hormone, estrogen. One of the drugs which is popular for treatment of breast cancer and other forms of cancer is taxol. This drug was found in the Pacific yew tree and now is synthesized. So scientists are thinking that there may be something in pine trees which may act in the same fashion. Can this chemical affect people? Probably, but no one knows. This little story is just an illustration of potential dangers of swimming in bodies of water which receive paper mill effluent. And the less diluted the paper mill effluent is, the greater the danger.

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 \$10.00 per **year per voting member**. To join or renew, fill out the coupon to the right and mail with your check to the address on the front.

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