

Synopsis of International Papers impact on Perdido Bay - June 3, 2020

Because of the number of studies which have been done on Perdido Bay and the various aspects which have been studied, I have had to chose several studies and highlight the results of those studies to demonstrate the impact of the paper mill effluent on Perdido Bay. To begin, it is necessary to look at what is discharged from the paper mill in Cantonment Florida to Perdido Bay. The mill is currently permitted to discharge the following: Biochemical Oxygen demand (BOD) - 5,100 pounds per day as a monthly average with 10,200 pounds per day as a daily maximum; Total Suspended Solids - 8,000 dry pounds/ day as a monthly average and 16,000 dry pounds per day as a daily maximum (from current discharge monitoring reports). These materials are released into the environment and continue to use up oxygen in their decay. It takes several months for these materials to completely decay and the ultimate Biological Oxygen demand is approximately four times higher. Perhaps a more realistic measurement of the oxygen-consuming properties of paper mill discharges is the Chemical Oxygen Demand measurement. As of today, this is not an enforced standard. The current average discharge value is about 40,000 pounds per day. The mill is also permitted to discharge 623 pounds per day of adsorbable organic halides, which includes chloroform, dioxins, and many other chlorinated compounds.. The above releases are found in 30 million of gallons of water discharged to the environment each day (MGD). The allowable levels of these permitted chemicals is calculated from the “Best Available Technology” rules which are based on the mills total production of pulp which is currently averaging 2,400 dry tons of wood pulp a day; a third of which is bleached.

What is the effect of International Paper’s discharges on Perdido Bay? Well obviously, these chemicals continue to use up oxygen in Perdido Bay. For years scientists have documented, the low dissolved oxygen levels in Perdido Bay, especially on the bottom. The total suspended solids settle at various places in Perdido Bay and continue to decay. From a 2007 Wasteload Allocation study which was done in Perdido Bay by Camp,Dressler and McKee,, much of the solids settle out in the bay just north of Innerarity Peninsula. This is an area where the flushing is low and the solids can settle out. The wasteload allocation study predicts low (less than 2 mg/l) dissolved oxygen levels in warm weather seasons on the bottom of Perdido Bay, especially in the pocket north of Innerarity Peninsula. The reason Perdido Bay is no longer listed as “impaired” for dissolved oxygen by the state of Florida is that the state no longer considers water deeper than 6 feet. This calculation misses all deeper waters in Perdido Bay.

The toxicity of these solids has been measured, especially by the EPA lab in Gulf Breeze. In a report put out by the EPA in December 1992 (Appendix 1) the contaminates are listed for Perdido Bay Florida as: acenaphthene, benzopyrene, chrysene, fluoranthene, phenanthrene, pyrene, and arsenic. Most of these chemicals would come from the breakdown of pine trees. Arsenic probably comes from the coal ash which is contain in the solids from the papermill as they used to use coal for combustion. In the EPA’s Gulf of Mexico Sediment Inventory, with 41,500 data records from 1980 -1992, Perdido Bay rank number 1 in having the most toxic sediments ahead of Galveston Bay, Tampa Bay, Mobile Bay. Since this report came out, I have petitioned (FOIA) EPA for more data on sediment toxicity in Perdido Bay but have been refused.

I know the EPA has this data, but they said it is not available. More recent data shows that heavy metals and different dioxins are also a component of the sediments and of the solids coming from the papermill. The sludges which were washed onto people's property after Hurricane Ivan were high in dioxins (Friends of Perdido Bay) . Most sludge sediments contained 3,4,7,8 dioxin (most toxic form) of 25 pg/l, which is above the safe level recommended by the EPA. Dr. Wayne Isphording in a report "Chemistry and Particle Size analysis of Upper Perdido Bay and Elevenmile Creek Bottom Sediment" 2005 found high levels of organic halides, aluminum, arsenic, chromium, iron, zinc and carbon levels.

Solids which are discharged into Perdido Bay are also used as food by the bay clam, *Rangia* (Lane 1986). Studies on dioxins and PCB's in clams in August 2007 and again in July 2017 found PCB's and dioxins in the clams (Friends of Perdido Bay). It should be noted that clams are no longer present in the shallow waters of Upper Perdido Bay.

The effect of the papermill effluent on the fish and wildlife of the Bay was studied thoroughly by Dr. Robert Livingston from 1988 to 2007. There is a huge amount of data here but I will include the summary which he gives at the end of the report (December 2007). His overall conclusions are: "Primarily the pulp mill affected the upper part of the bay" (Page 3 Perdido Project: Final Report, 2007). Further in the report, Page 155 gives a summary of the total numbers of infaunal macroinvertebrates, invertebrates, and fish species at monthly stations throughout the bay 1988 to 2007. Livingston says that the number of species is a "powerful index of the overall biological diversity of the Perdido Bay system over a 19-year period....The overall trend of the combined species richness index was down in all parts of the bay with lows reached during the final 3 years of sampling." He blames this decline in life in the bay on blooms of toxic algae, *Heterosigma*, caused by nutrients, mostly from the papermill.

More recent studies of numbers and species of fish and macroinvertebrates in Upper Perdido Bay (Friends of Perdido Bay 2018), found very low numbers of species and numbers in macroinvertebrates and very poor species diversity in fish. There have been no toxic algae blooms noted or the toxic algae, *Heterosigma*, found since 2012 (from IP's annual wetland reports). The lack of species richness would indicate toxicity associated with the the papermill's effluent. Since 2012, International Paper's effluent has been toxic to a waterflea and IP has been doing a toxic evaluation plan. One obvious change at the mill has been the lowering of aeration in their treatment pond as can be seen from aerial photographs. The increase in production in 2012 and the decrease in aeration in their ponds could explain the toxicity of the effluent. IP undertook an analysis of the toxicity in their effluent in 2012 (AECOM). The report from IP's contractor AECOM identified 23 potential toxic components in the mill's final effluent. It is not known if the International Paper addressed any of these toxic components.

We are hopeful that something will be done. Perdido Bay is a valuable resource as both a nursery area for shrimp, crabs and fish and as a wonderful place for recreation.



Last redfish I caught on Perdido Bay - April 2017 after the mill blew up and effluent from IP stopped for two weeks.

Appendix I

From EPA Toxics in Sediments - April 1993

Table 7. Areas of Concern Ranked by Effects Index-based PELs

Rank	Estuary Code	Estuary Name	PEL Effects Index
1	15	Perdido Bay	3051.07
2	23	Tampa Bay	1066.11
3	08	Galveston Bay	641.71
4	16	Escambia Bay	611.10
5	17	Choptank/Hatchers Bay	396.80
6	25	Ten Thousand Islands	349.28
7	10	Calcasieu	328.65
8	18	St. Andrew Bay	301.01
9	19	Academicon Bay	200.16
10	14	Mobile Bay	189.79
11	02	Laguna Madre	131.85
12	24	Charlotte Harbour	127.21
13	13	Mississippi Sound	99.10
14	12	Mississippi Delta Region	70.28
15	05	San Antonio Bay	60.59
16	03	Corpus Christi Bay	54.99
17	20	Apalachee Bay	26.55
18	13a	Lake Pontchartrain	14.92
19	06	Matagorda Bay	14.84
20	26	Florida Bay	11.78
21	11	Atchafalaya/Vermilion Bay	11.44
22	09	Sabine Lake	7.31
23	07	Brizeo River	7.07
24	13b	Lake Borgne	4.99
25	22b	Homasassa River	2.11
26	04	Aransas Bay	1.63
27	21	Suwanee River	1.40
28	18a	St. Joseph's Bay	1.00
29	22a	Crystal Bay	0.89
30	22	Withlacoochee Bay	0.28
31	22c	Archie Anchorage	0.28