PCB in Dillingham

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The Bristol Bay is Dillingham’s main source of commerce and subsistence. On November 4, 2011 a super sack containing polychlorinated biphenyls was accidentally dropped into the Bristol Bay. PCB is a pollutant and can harm the local ecosystem including the community that utilizes the resources of the bay. Dillingham does not have any of its own regulations for dealing with hazardous material, therefore not much enforcement can be placed. To prevent further accidents the recommended management plan would include increased regulations on shipping and handling of chemicals into or out of Dillingham, improvements to the physical structure of the dock, as well as continued testing of the marine environment.
Introduction

The Nushagak bay is located in the Bristol Bay of the South West Alaska. Dillingham is located on the west part of the Nushagak bay. One of the river, north of the Nushagak bay is the Nushagak river. The Bristol Bay is located to the east of the Bering Sea and to the north of the Aleutian chain. The Nushagak bay has 3 other rivers that flow into it; they are the Wood River, Igushik River, and Snake River. The Nushagak bay is affected by tides. The Nushagak bay gets a high and low tide twice a day. While able to change the height of the water level the tide is not strong enough to bring salt water up the bay as far as Dillingham.

When you walk at the beach here in Dillingham there is a mixture of sand and mud sediments. Soil samples taken by our team revealed about 30% of fine sand, 15% of medium sand, 25% course sand and 30% gravel. These were estimated guesses. With a beach sein the Tsunami Bowl team caught a few stickle backs, rainbow smelts, two juvenile starry flounders, and a snail at the City Dock. At Kanakanak the team caught amphipods, rainbow smelts, and stickle back fish. According to research done by Todd Radenbouagh and other University scientists, the Bristol Bay is also home to invertebrates such as the Baltic Macoma mussels, Horse barnacle, Cargon shrimp and smooth and rough amphipods. Some of the vertebrates include sculpine, Spiney Head Smelt, Rainbow Smelt, eelpout, 9-stickle back, 3-stickle back, lump sucker, starry flounder, river lamprey, Pacific Alaska blackfish, and salmonoid. Mammals that are used for cultural activities, by people in the Nushagak Bay are whales, seals, otters, and beavers.
The Nushagak Bay flora and fauna is our resource. The mammals in the bay are important to our native culture. Another major importance of the salmon fishery is subsistence. When Dillingham residents fish for subsistence, not only do they keep it for their families, but also give their fish to elders and other community members. Thousands of fishermen from all over the world come to the Bristol Bay to fish. They catch the fish in the bay then give it to the local canneries in the Bristol Bay region. The fish is then processed. The fish are caught in the same area where the PCB bag had been dropped. The Bristol Bay salmon is shipped all over the world for commercial use. If PCBs were found in the Bristol Bay estuary, fishing could potentially be brought to a halt.

Nushagak became known as Nushagak in 1837. It was known as Nushagak when a Russian Orthodox mission was established. The indigenous people around the bay were Eskimos and Athabaskans. In 1918-1919 influenza hit all around the region and left about 500 survivors. Fishing first started in the Nushagak Bay in 1884. It was established by Arctic Packing Co.

A healthy Nushagak Bay will have an abundant amount of salmon returning each year. There wouldn’t be a trace of PCB in the soil, water, or animals. Another sign of a healthy bay would be the continued diversity of the current wild life. There also shouldn’t be a significant change in populations, whether increased or decreased.

In the 1950’s the Air Force received 172 acres of land in Fort Morrow. They built the White Alice site, which was an Air Force telecommunication center during the Cold War. The Air Force had control over warning radar stations that were constructed to detect possible attacks from the Soviet Union, during that time they had a petroleum, oil, and lubricant farm and pump house. PCB is a controlled substance in the oil and
lubricant. Its presence in the equipment eventually can lead to the contamination of the soil. After the White Alice sight was shut down, infrastructure and products were abandoned which lead to further contamination. The production of PCB was stopped in the U.S. in 1977 due to the evidence of build up in the environment and the harmful health effects, but the chemical is still in use today.

Polychlorinated biphenyls (PCB) are made up of 209 chlorinated compounds. It is a toxic waste. PCB is man made material. PCBs are found to be either an oily liquid or a solid that is either colorless or light yellow. PCB has not been found to have a smell or taste. The U.S. makes PCB by the name of Aroclor. PCB is used as coolants and lubricants in electrical devices because they do not burn easily.

Due to the abundant use of PCB in the past, certain animals have been found to have PCB in them and even humans have been found with PCB in their system. It says in Agency for toxic substances and disease registry (ATSRD) that PCBs enters everything because of manufacture, use, and disposal. Contamination happens from accidental spills, leaks, and fire during the transportation of the products contaminated by PCB. Humans can be exposed to PCB by eating contaminated food such as fish, meat, and diary products. Humans can also be contaminated if they have prolonged exposure to substances containing PCB’s. PCB only affects humans if large amounts build up in the system. The most common effects in people are conditions such as rashes or acne. Researchers at ATSRD found evidence that PCB is linked to a certain cancer in humans. They tested this by giving rats food with high amount of PCB for 2 years and they developed liver cancer. According to ATRSD PCBs may reasonably be anticipated to be carcinogens. Carcinogen means to have the potential to cause cancer. Women who were
exposed to high levels of PCB in the workplace or even consumed large amounts of fish with PCBs, gave birth to infants that weighed less than infants with mothers that were not exposed. (ATRSD, 2012)

PCB gets transmitted from animal to animal starting from bottom of the food chain. In other words, this means that all the animals at the bottom of the food chain in the bay that feed on the bottom of the ocean eat the PCB, but due to the low levels of PCB ingested they do not suffer any ill effects. However, the next animal up on the food chain eats the animals at the bottom gaining more PCB then the animals before. The levels of PCB in each animal increase as you go up the food chain with the animals eating more PCB. When fishing season comes the fish have been exposed to PCB.

On November 4, 2011 PCB super sacks from Port Heiden’s clean up cite were transported to Dillingham, Alaska by the Seattle-based Alaska Logistics for further transportation. While unloading the barge, an 11,000-pound PCB super sack fell through the wooden dock in Dillingham. Picking the PCB bag up from under the ice was postponed until spring because it was too dangerous to retrieve due to ice flow and currents. The tides pulled it out of place and then the currents carried it further out into the bay. Patrick Roth, from the air force, claims that there is no sign of the PCB super sack where it fell in. Air Force representatives are saying it would be best to leave it to the EPA for the finding of the PBC super sack. An EPA representative is still evaluating the information on the situation. (Dispatch, 2012) Experts in the science community think that the chemicals in the super sack won’t be a problem due to the fact that PCB levels in the lost soil were low, but there will have to be more tests before they know for sure. (KDLG, 2011)
The Potomac River is located along the mid-Atlantic coast of the U.S. It is about 405 miles long and flows into the Chesapeake Bay. The river is the fourth largest along the Atlantic Coast of the US. Over five million people live within the Potomac region.

PCB has been entered into the estuary by wastewater, agricultural run-off, storm water, and air pollution. PCB is still used in modern technology of today and as the items break down and release toxins they wash off into the river. (Cumberland, 2012)

A few similarities between the two estuaries are the economical and subsistence importance in that region. Both estuaries are located at the peninsula of a state. Each estuary is a popular tourist attraction every year. The difference between the two estuaries is the fact that PCB entered the Nushagak Bay because the dock could not support the 11,000-pound bag, but the PCB entered Potomac River by the release of toxins. The PCB in Nushagak Bay did not harm the salmon and Potomac was put to a restriction due to the fish of that region being contaminated.

A few things we can learn about the Potomac River are that Nushagak Bay is in a unique position of protecting it. Dillingham has so little of a population that there is an insignificant impact from humans; the only time the bay is used is in the summer with boats. Due to the amount of time between the seasons it gives any pollution enough time to flow out of the system.

**Management Plan**

Dillingham follows the regulations put in place by DEQ (Department of Environmental Quality) for dealing with hazardous waste such as PCB. The DEQ protocols state that any owner or operator of an on land facility that ships pollutant
materials must have a pollution prevention incident plan. (DEQ, 2001) After extensive research into regulations and protocols, we were unable to find any specific regulations dealing with hazardous materials for the City of Dillingham. It is therefore that our suggestion that the City of Dillingham review the regulations and protocols for hazardous material and for dealing with the possibility of future spills.

According to the U.S. Department of Transportation’s RSPA (Research and Special Programs Administration), a hazardous material is classified by nine categories: explosives, gases, flammable liquids and solids, oxidizing substances, toxic, radioactive, corrosives, and miscellaneous hazardous materials. These only apply to materials that are harmful to people. Also any hazardous material must be able to pass the shock, leak, stacking, vibration, cooperage, and hydrostatic test in order to be transported. By following the RSPA’s protocol more stringently, Dillingham could protect its environment and it’s main source of economic income– the Nushagak Bay. This protects our environment by reducing the amount of hazardous chemicals that go through Dillingham.

The RSPA has three tiers of hazardous material packing standards. The first tier is for materials, which can pose the most risk and tier three posing the least amount of risk. This does not include non-hazardous materials with chemicals and only apply to materials containing a pollutant, such as polychlorinated biphenyls. The proposed regulation for our community, based off the RSPA, could ignore the tiers and consider all materials tier one for Dillingham’s general safety. This would reduce the amount of chemicals that would enter the Bristol Bay.
Another way to prevent the contamination of the bay is to reinforce the physical structure of the dock and practice the emergency protocols should another super sack fall through. Jody Seitz from the city of Dillingham said when asked, “The city is always looking for grants to improve the life of the residents, and sure enough I am looking at a couple of grants to help reinforce the city dock.” No grant in particular were mentioned but she did say that if they got a reasonably sized grant the city would be able to hire a team of out of town contractors, to redo the support and actual surface of the dock. When asked what Jody would do afterwards she said, “I’ll probably look for more grants for the city appliances.” (Seitz, 2012)

According to soil samples collected by Dillingham Tsunami Bowl Team there is no evidence of PCB contamination, in the Nushagak Bay, therefore there is no removal needed. We took samples of the soil on the beach in Dillingham and sent the samples in to SGS, a company that chemically analyzes various materials. Our samples from Kanakanak, Dragnet Beach, and the City Dock Beach came back non-detectable for Aroclor. Although testing on humans is not needed, we would like to continue testing the Nushagak estuary. Testing would be conducted on the water and marine animals.

The testing on mammals would occur twice a year, in early spring and fall. We would have our local University get samples of the mammals by collecting scales from fish that they catch and water. Once samples were collected, the samples would be sent to ALS in Washington. The total for testing the soil would be roughly $265 per sample.

If PCB shows up in mammals, the university, hospital, and Tsunami Bowl members would get together and discuss a possible testing plan. A Public Service would
be sent out on the radio for duration of one week. The local beaches would be closed off until further notice.

The Bristol Bay is a source of commerce and subsistence; it is a very vital part of Dillingham and provides resources that can make a difference in a rural community. In conclusion, with a strenuous regulation, we can reduce the amount of toxins in the estuary.
Bibliography


