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The Brunswick Wood Preserving Site housed wood treatment and preserving operations from 1958 until 1991 and now requires long-term cleanup due to the regular use of chemicals such as Creosote, Pentachlorophenol (PCP), and Copper chromium arsenate which contaminated the ground-water and soil. Other chemicals of concern on the site include **dense non-aqueous phase liquids (DNAPL)** and sediment chemicals such as naphthalene, benzene, and **semi-volatile organic compounds (SVOCs)**. The cleanup is managed in two parts, called operable units (OUs), with operable unit 1 (OU-1) covering the “upland” or site-wide soils, sediments, and groundwater and operable unit 2 (OU-2) covers the ecological risks in Burnett Creek and other surface waters.

Historical Highlights

- **June 1998:** Remedial Investigation Report
- **June 2001:** Final Feasibility Study (Upland)
- **June 2002:** Record of Decision
- **September 2012:** Five Year Site Review

A **Feasibility Study** is a review of the various cleanup and containment options for a site with an analysis of which are most applicable based on goals, costs, and other considerations such as community concerns.

(Record of Decision defined on page 5)

Current Activities

The Environmental Protection Agency believes remedy construction complete at this site, with human exposure currently under control and groundwater not under control with implementation and monitoring to continue until the site is removed from the

National Priorities List.

September-October 2012: Comments on the *Burnett Creek Proposed Plan for Remedial Action* noted that the decision to take “no action”, because the Environmental Protection Agency does not believe it poses a grave risk to the local ecology or inhabitants, is not sufficiently supported. Environmental Stewardship Concepts, LLC noted three main errors in how data were presented, the age and relevance of information, and sampling errors or omissions. Recent groundwater analysis shows high levels of chemicals remain in the groundwater wells closest to Burnett Creek. Animals and the people who consume them remain at risk for toxic exposure. The area affected could include St. Simons Sound estuary where some people depend on fishing for their subsistence.

October 2012: A review of fish tissues sampled in all three sites (Brunswick Wood Preserving, LCP Chemical, and Terry Creek/Hercules) show chemical levels often remain above acceptable levels. Chemicals of concern include **Polychlorinated Biphenyls**

Glynn County Advisory Area for Fish You Catch and Eat

Consumption Guidelines for Advisory Area

NO LIMIT – EAT AS OFTEN AS YOU LIKE



Shrimp*

EAT ONLY ONCE PER WEEK



Red Drum (Red Fish)



Blue Crab



Spotted Seatrout



Flounder

EAT ONLY ONCE PER MONTH



Spot*



Black Drum



Striped Mullet*



Whiting



Atlantic Croaker*



Sheepshead

***Purvis and Gibson Creeks** and the adjoining area of **Turtle River**: Eat Shrimp only once per month; Do not eat Atlantic Croaker, Spot, or Striped Mullet. **Terry and Dupree Creeks**: Do not eat Spot. **Buffalo River**: Do not eat Striped Mullet.

Fish Age & Size

Generally, older and larger fish may be more contaminated than younger, smaller fish.



Cooking Methods to Reduce Risk

GOOD

Broiling
Baking
Grilling

OKAY

Deep-fat frying
(do not reuse oil)

POOR

Pan frying

(PCBs), toxaphene, dioxins, furans, and mercury, which are known to have settled in the mud and sediments at some or all three sites.

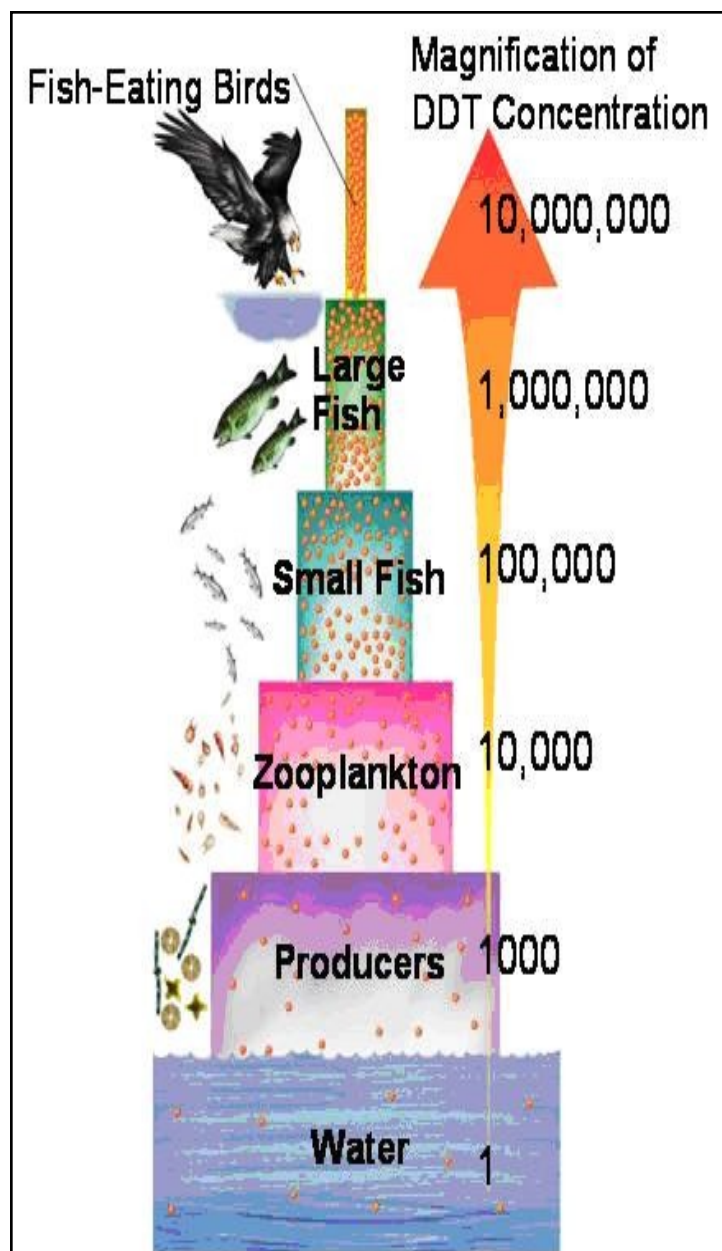
Through a process known as bioaccumulation, toxins in the mud and sediments are consumed or absorbed by smaller organisms, which are then consumed by larger organisms. This process continues with toxins accumulating in greater amounts as you move up the food chain from microorganisms to worms to fish to humans. Thus, small concentrations of lethal chemicals have a more significant impact over time as they accumulate and move throughout an ecosystem

At the Brunswick Wood Preserving Site, a very small sample of smaller-sized fish (smaller than typically caught for human consumption) were tested for dioxins, with at least a quarter showing levels twice the acceptable level of 1.2 parts per trillion (ppt), some showing 3 times that level, and the remaining showing levels at or close to the acceptable limit. Only dioxins and furans were tested, while other known chemicals at this site, **polyaromatic hydrocarbons (PAHs)** and **copper chromium arsenate (CCA)**, were not tested.

November 2012: The *Five Year Site Review* was finalized and reported that the site was “generally functioning” with no changes identified. Comments were submitted noting some issues regarding incomplete review, lack of report availability, and insufficient contaminant monitoring. Of greatest concern, the groundwater plume closest to Burnett Creek is not fully identified nor analyzed, and further Human Health Risk Assessments are recommended.

Burnett Creek Fish Tissue

Fish were collected in the fall of 2012 to measure chemicals that might cause health problems and these results will be reported at a later time.



The above Bioaccumulation model is for DDT; however, it applies to any chemical or contaminant likely to collect and accrue in body tissues as it moves up a food chain or web. Typically, these contaminants build up as more of the lower food or “trophic” levels are consumed by larger organisms. Some chemicals known to bioaccumulate are DDT, Mercury, Dioxins, and Furans.

Source: <http://www.goldiesroom.org/Note%20Packets/22%20Ecology/00%20Ecology--WHOLE.htm>

LCP Chemical Site-Turtle River

Background

From the 1920s through 1994, various industries - - oil refining, electrical power, paint/varnish, and a chlor-alkali chemical plant - - have used this site. Contaminants still being received as runoff and impacting the soil, groundwater, tidal marsh sediment, and marsh plants/animals include **polychlorinated biphenyls (PCBs)**, mercury, lead, dioxins, and cancer-causing hydrocarbons. The site cleanup is being managed in 3 parts, that EPA calls Operable Units (OUs), which include the estuary (OU-1), the groundwater (OU-2), and the upland soils and sediments (OU-3).

Historical Highlights

- **August 2010:** *The Baseline Ecological Risk Assessment for the Upland (OU-3)*
- **April 2011:** *Baseline Ecological Risk Assessment (BERA) for the Estuary (OU-1)*
- **July 2011:** *Human Health Baseline Risk Assessment for the Estuary, (OU-1) and Human Health Baseline Risk Assessment for the Uplands Soils (OU-3)*
- **March 2013:** *Estuary Feasibility Study Tech Memo (OU-1)*
- **April 2013:** *Final Uplands Feasibility Study Technical Memo (OU-3)*



Current Activities

EPA notes cleanup actions have begun and site studies are in progress. The EPA further states human exposure concerns do not require additional action at this time as they are considered currently under control; however, they do note that contaminated groundwater concerns are not currently under control.



October 2012: A review of fish tissues sampled in all three sites (Brunswick Wood Preserving, LCP Chemical, and Terry Creek/Hercules) show chemical levels often remain above acceptable levels. Extensive fish tissue samples were taken at Turtle River, a site furthest from the LCP Chemical Site; this sampling included six different types of fish, a species of crab, and a type of shrimp; all of these were sampled for **polychlorinated biphenyls (PCBs)** and metals. Mercury was found in all the samples and **polychlorinated biphenyls (PCBs)** were found in all but one sample. Dioxins were not tested at this site, even though they have been present in prior tests and sampling.

Estuary Area

January 2013: The final *Baseline Ecological Risk Assessment (BERA)* has been reviewed and

shows no natural reduction in chemical concentrations within the sediments from the period of 2000-2007.

River water showed mercury and PCB concentrations were greater than the State criteria for protection of aquatic wildlife. River and marsh sediments



also had mercury, PCB, lead and polycyclic aromatic hydrocarbons (PAHs) at likely harmful levels as well. Cordgrass, eastern oysters, fiddler crabs, blue crabs, and mummichogs showed chemical

concentrations of mercury, PCB, and lead above reference site levels. Large finfish also registered the same for mercury and PCBs. Benthic (bottom dwelling) populations were not as plentiful as at cleaner sites used for comparison purposes. (The PCBs were measured as Aroclor 1268, a commercial mixture).

Laboratory tests exposing amphipods (small crustaceans) and grass shrimp to LCP sediments showed negative impacts on reproduction and development. Field caught fish, mammals, birds, and turtles all showed chemicals at higher levels than considered “safe” or not likely to cause harm to the animal. Some animals had five times more chemical than considered safe. Only one turtle species showed low levels of chemicals.

This study showed chemical exposure put bottom-dwelling animals at risk; meat/plant-eating birds, plant-eating mammals, meat/plant-eating mammals, and fish-eating mammals at minimal risk; and fish-eating birds at moderate risk. Only meat/plant-eating reptiles and finfish appear to be at no risk.

A draft of the *Health Risk Assessment (HHRA)* was submitted in 2010 and our review noted unacceptable non-cancer risk to all but one group of people (marsh trespassers) who might be exposed to site-related toxic chemicals. Populations included marsh trespassers, consumers of recreationally caught fish, high-quantity consumers of fish, consumers of shellfish, and consumers of clapper rail. The EPA minimum acceptance level for cancer risk at a Superfund site is 1 in 10,000 people, which is the standard used in this document.

Pending Activities/Documents

A *Record of Decision (ROD)* is pending final EPA review and acceptance.

A *Feasibility Study* is currently being reviewed. More details will be given in a future newsletter.

A **Record of Decision (ROD)** is the legally binding document stating how a site will be managed (contained, cleaned, etc.) Public hearings will be held to present the proposed clean up plan for a site to the community prior to making the ROD final.



Groundwater

June 2013: A review was conducted of the *Work Plan* and *Proof of Concept Report* for a treatment system to remove the metals that persist because the caustic brine pool (CBP) treatment currently in place is not working as planned. The proposed solution involves injection of carbon dioxide gas into the caustic brine pool to neutralize the caustic conditions. A test trial showed promising results and implementation of a partial site installation should be completed by fall of 2013.

Contaminated Upland Soil

January 2013: The *Baseline Ecological Risk Assessments* for the Uplands reviewed the primary chemicals of concern that include polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), and the metals antimony, copper, nickel, vanadium, zinc, and mercury. Risk levels were assessed for earthworms, eight bird species, and six mammal species based upon their feeding behaviors (seed-eating, insect-eating, crustacean-eating, plant-eating, meat-eating, or a combination of these).

Laboratory experiments have determined the upland chemicals do not pose a risk to earthworms, moderate risk to seed-eating mammals and insect-eating mammals, and low risks to other non-land and

estuary birds and mammals. Lead does pose unacceptable risks to land and estuary birds that eat insects, crustaceans, and fish (or a combination of these), and mercury poses an unacceptable risk to birds that eat insects, fish, or crustaceans (or a combination of these) as well as mammals that eat insects, meat, or both meat and plants.



The Human Health Risk Assessment completed on the Uplands area noted acceptable non-cancer risks for Commercial/Industrial Workers and Trespassers, unacceptable non-cancer risks were noted for Excavation workers and Future Residents in 3 of 4 areas studied. Acceptable cancer risks were noted within or below risk ranges for all populations except one area studies for Future Residents.



Pending Activities/Documents

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The *Feasibility Study* is currently being reviewed. More details will be available in a future newsletter.

Terry Creek/Hercules Outfall



Background

The Terry Creek Spoil Area/Hercules Outfall site consists of 3 disposal areas and the Hercules Outfall Ditch. Toxaphene, a chlorinated pesticide, was produced at the plant from 1948 to 1980 and discharged via wastewater during this period into Dupree Creek which then flows into Terry Creek. Toxaphene contamination is present in the outfall ditch sediments, Terry and Dupree Creek sediments, and the dredge disposal areas.

October 2012: A review of fish tissues sampled in all three sites (Brunswick Wood Preserving, LCP Chemical, and Terry Creek/Hercules) show chemical levels often remain above acceptable levels. The review of the fish tissue samples taken at the Terry Creek site tested fish for toxaphene and found levels often 2-16 times the acceptable limit of 180 parts per billion (ppb); other aquatic species and chemicals were not reviewed or thoroughly tested.

Historical Highlights

- **January 2012:** *Focused Remedial Investigation/ Feasibility Study for Outfall Ditch*
- **December 2012:** *Draft Remedial Alternative Screening Technical Memo*

Current Activities

EPA notes early actions have begun and site studies are in progress. The EPA further states human exposure concerns do not require additional action at this time as they are considered currently under control.



This report was produced by Environmental Stewardship Concepts, LLC (ESC, LLC) for and in cooperation with the Glynn Environmental Coalition. As a Technical Advisor, ESC, LLC provides independent analysis of the reports and data related to the Superfund Sites referenced to help support a well-informed community.



Glynn Environmental Coalition

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This project has been funded wholly or partly by the U.S. Environmental Protection Agency under Assistance Agreement Numbers 198448298, 198453298, 199485001 to The Glynn Environmental Coalition, Inc. The contents of this document do not necessarily reflect the views and policies of the U.S. Environmental Protection agency, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.