When the Berm Blows:

History and Prospectus of Contaminants Entering the Marine Environment from the Former Fort Bragg Mill Site

by

William Lemos, Ph.D

February 14, 2022

Table of Contents

Summary:

For over 140 years the property west of the city of Fort Bragg, California, was an industrial mill site. Prior waste disposal practices have created the probability that the marine environment will be contaminated if the berms holding back toxic soils fail. Toxics found in the soils on the property have been identified as harmful to humans and wildlife. Berms close to high tide level that hold back these contaminated soils now show signs of aging and eminent collapse. The California Department of Toxic Substances Control (DTSC) has suggested that new berms and other redial structures need to be constructed to keep these soils from entering the marine environment. It remains unknown what the new property owner, Mendocino Railway, will do about this situation. In the meantime, the Pacific Ocean water level rises inch by inch, and more extreme weather situations are predicted to occur worldwide. Thus, the question for Mendocino Railway is: What will be done to fix the problem that now exists on their property that contains toxic waste materials?

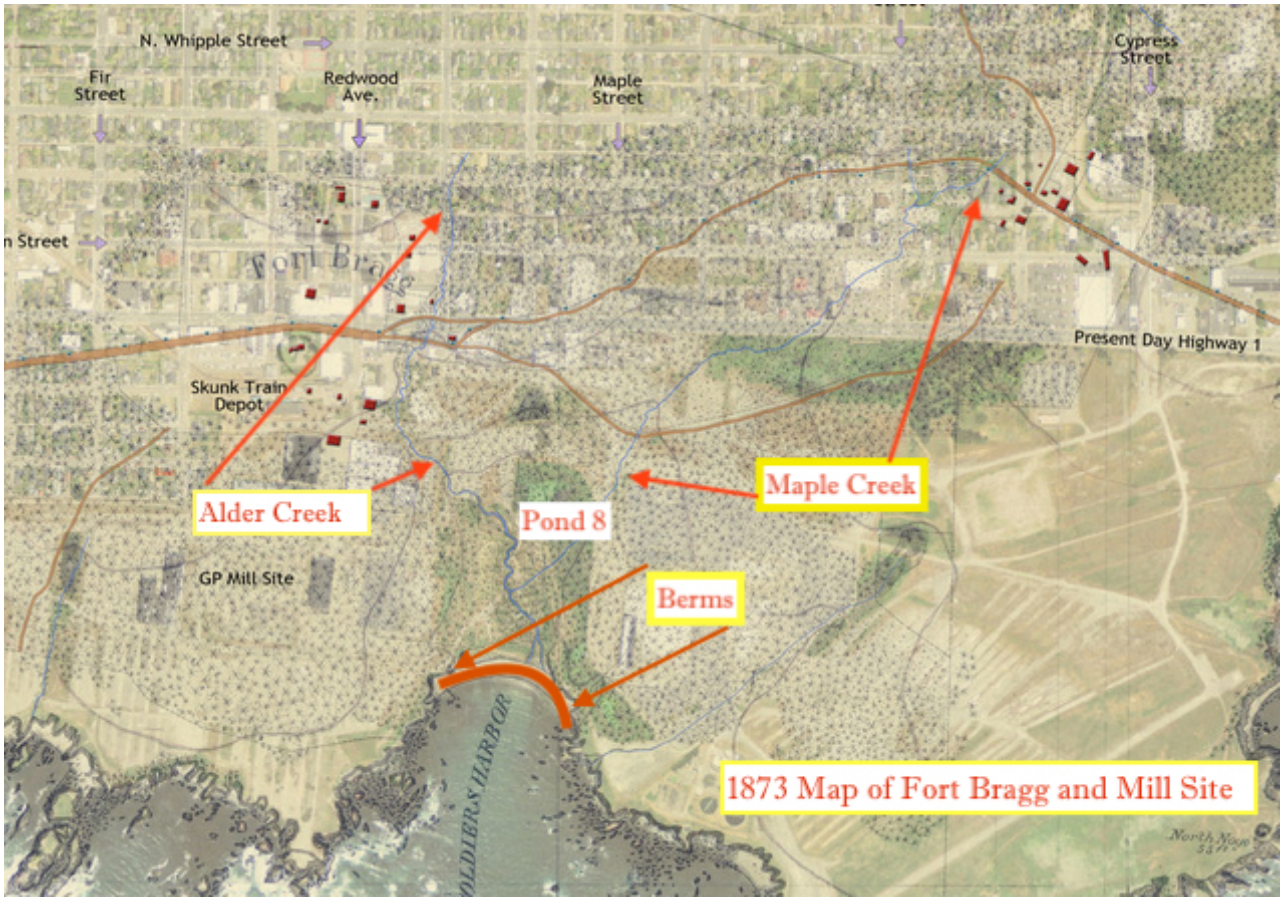
Introduction and Historical Background:

Visitors to the Noyo Headlands west of the city of Fort Bragg, California, will encounter the recently installed signage (on title page) during walks on the fenced in Coastal Trail. The sign has been posted by the new owners of the property, Mendocino Railway. In the late 1880s, this open stretch of the Northern Pacific coast was once the site of the Johnson Family lumber business, known then as the Fort Bragg Lumber Company. In 1903, this holding became the Union Lumber Company's land, who, in 1969, sold their holding to Boise Cascade. Four years later Georgia Pacific bought the mill and surrounding land. Operations ended with the closure of the mill in 2002. "The mill, (when) owned by Georgia-Pacific, took up a space roughly half the size of Central Park, (New York City), between downtown Fort Bragg and the Pacific Ocean."[1] In 2021, the property was purchased from G.P. by the Mendocino Railway (MR). The newly purchased 272 acres adds to 77 acres on the north end of the property purchased by Mendocino Railway in 2019, creating a total of 349 acres now in MR hands. The closing price for the 272 acres was $1,230,000.[2] For comparison purposes, three acres of open, undeveloped coastal property eight miles south of this site is listed for $2,600,000.[3]

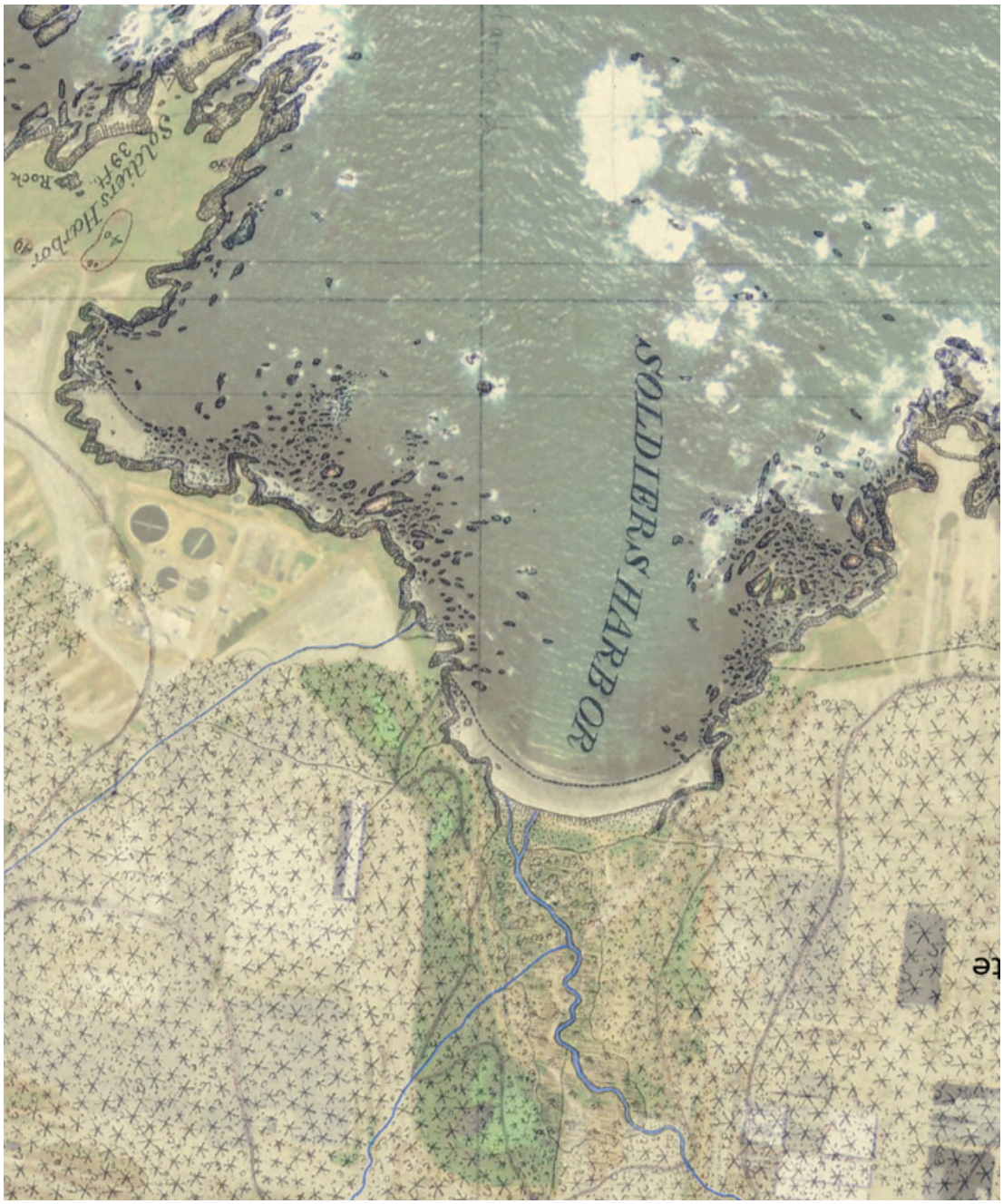
The yellow caution sign depicted above presents the visitor to the headlands with information about contamination that exists on the Mendocino Railway's property. This paper will present background information about what is known — and what is not known — about the toxins on this property, and what would happen if the berms holding back these toxic materials enters the ocean. Specifically, it will focus on the approximately 20 acres, labelled OU-E on City Council community development documents, by the California Coastal Commission, and the Department of Toxic Substances Control planning guides. This area was once an estuarian connector between the now subterranean Alder and Maple creeks (see Map 1 below). Now a cattail swamp created by the construction of compacted soils and a redwood log berm to the

[1] https://www.healthymendocino.org/resourcelibrary/index/view?id=123931326432134048 Accessed on 2/14/2022.
[2] https://mendovoice.com/2021/12/gp-mill-site-was-second-fort-bragg-property-the-skunk-train-has-acquired-through-eminent-domain/ Accessed on 2/7/2022.
[3] https://www.realtor.com/realestateandhomes-detail/11800-Rd-500D_Mendocino_CA_95460_M24935-41116 Accessed on 2/8/2022.

west, this area was once a conifer forested area, (see map 2). The two streams are now mostly buried under asphalt. The remnant of Alder Creek surfaces from its run to the ocean under a building on West Redwood Ave (now Lyme Redwood Forest Company offices). It then runs south down the pavement, and exits Chief Celeri Street, as it heads west towards Pond 8. Maple Creek's origin is east of Highway One just north of the Noyo bridge.



Map 1: Maps from the 1890 Sanborn Fire Insurance company archives show the size and streambed configuration of Alder and Maple Creeks as they meander through west Fort Bragg and the Mill Pond and eventually make their way to the Pacific.



Map 2: Early map showing Alder Creek entering Soldier's Harbor. Note Maple Creek entering from left into riparian area.

With the development of the infrastructure of the sawmill both creeks were submerged beneath soil, concrete, and asphalt. The wetlands were, over the decades, used in various ways to support the lumber operations. Water was diverted to ponds used to float logs ready for milling. Hydraulic pumps siphoned water to steam boilers and de-barking machines. And most importantly for this discussion, water was historically used to dilute, or to get rid of, toxic materials associated with wood treatments and processing.

As we can see from examples present at former ocean waste disposal sites such as Glass Beach north of the mill site, or the bluff immediately south of Kasten Street in Mendocino, and on the Caspar Headlands west of Caspar, for decades the ocean was the preferred waste treatment facility for local residents and businesses. It wasn't until plastics began to be part of the waste stream — and as a consequence began piling up on local beaches — that our coastal waste stream was diverted in the 1960s to the landfill site on Prairie Way east of Caspar.

To set the stage for the discussion below regarding what exists in Pond 8, and why the collapse of the berm that holds the sediment behind it would have dire consequences for the marine life offshore, it is good to be reminded of past practices with regard to waste disposal.

A brief history of the City of Fort Bragg and the County of Mendocino (unified within a Joint Powers Agreement) waste management planning during the early years of the JPA, helps frame the mind-set of the disposal methodology of unwanted items. In the Caspar Landfill scenario, which are the headwaters of Doyle Creek, once the site was purchased in the mid-1960s, large trenches were dug into the pygmy forest soils. Everything from table scraps to automobiles were dumped in these toughs. The meager soils from the property were occasionally used to cover the refuse in order to keep vermin at bay. This worked for a few years. Eventually, the trenches became full and other methods were used to compact and reduce the volume of the trash. Tractors went into the ditches and stomped things down a bit, but the best method for getting rid of this waste was a determination that seemed perfectly acceptable at the time: douse the trenches in diesel oil and set them on fire. (Personal observation).

Suffice it so say that toxic materials were once used on a regular basis at the landfill. Eventually, a black sludge formed in ponds west of the site. In water quality documents on the toxicity of the liquid, this waste was called "leachate." In the early 1990s, the residential community in the Doyle Creek area formed a group to raise awareness of these water quality issues. Citizens for Sensible Solid Waste Planning eventually sued the County. The suit settlement was an agreement that the landfill would be closed and capped. While technically this closure was accomplished in 1992, the City/County did an end run around the agreement by keeping the site open as a waste transfer station. At first the waste at Caspar was trucked to Willits and buried in the landfill there. When that site closed, the JPA and County Waste Management decided that the only solution for disposal of the coast waste would be to truck it over Highway 20 to 101, and then move it about 140 miles to the Potrero Hills Landfill in Suisun City near Fairfield for final dumping.[4] As of today, though there have been years of planning and discussion about a state-of-the- art coastal transfer/recycle station by City and County agencies and boards, no such facility currently exists and our coastal trash continues to be buried at the landfill near Fairfield.

Completing the nexus of the landfill with the mill site is this report from the California Department of Water Resources:

> Test Information: Information provided by the Harbor District in early 2009, based on 30 grab samples of dredge spoils collected May 22 and 23, 2008, from the upland receptacle, combined into 5 composites (Noyo Harbor District Soil Evaluation, Weston Solutions,

[4] https://www.advocate-news.com/2014/02/27/trash-issues-beyond-transfer-site/ Accessed on 2/8/2022.

> Inc., June 2008), showed concentrations of arsenic in excess of the California Human Health Screening Levels (CHHSLs, used to screen soils for residential or industrial land uses). In addition, the samples contained a number of polynuclear aromatic hydrocarbons (PAHs), and Order No. R1-2010-0046 13267b - 2 - April 21, 2010 Noyo Harbor and Walter Stornetta Ranch (where some of the soils were spread) concentrations of a number of metals above the soluble threshold level concentration (STLC). One of the five composite samples contained PCBs.
>
> However, as noted above dredge spoils from the Noyo River and Harbor Channels have been historically recognized to be, and should be handled as a contaminated, rather than an inert material. Past analyses of samples from the stockpile at the upland receptacle and from the Harbor Channels have shown levels of metals and other contaminants that may pose a threat to water quality and/or human health and the environment, depending on the method and location of use/disposal.[5]

After on-site soils were exhausted, hundreds of truckloads of this contaminated silt ended up at the Caspar landfill to cover refuse. Today, on the north bank of the Noyo River, a pile of these soils still remains in close proximity to a popular human use area and within a few yards of high tide in Noyo Bay.

Thus, the point of this historical examination of waste disposal on the coast is this: if regulatory agencies, including the Fort Bragg City Council and the Mendocino County Board of Supervisors, and all related environmental agencies, have permitted the use of contaminated soils for various purposes in our community in the early part of the 21st century, think what the attitude of those planning, building, and operating the mill site must have been when it came to long-term planning for waste removal, storage, and elimination of mill waste products in the 19th and 20th centuries. The adages, "Out of sight; out of mind," and "The solution to pollution is dilution," come to mind.

There are contaminated soils in Pond 8. That fact is as clear as the message on the sign post above. The question that needs answering is how long can the aging berms hold back these contaminated soils from entering Soldier Harbor and the nearby marine environment?

DTSC's test results[6] from soils within and around the ponds on the entire 415 acres formerly owned by Georgia Pacific Corporation reveal the following information: Potential Contaminants of Concern include Dioxin (as 2,3,7,8-TCDD TEQ, Lead, Polychlorinated Biphenyls (PCBs), Polynuclear Aromatic Hydrocarbons (PAHs), and TPH-Gas.

> The contaminants of concern that I have consistently found in excess of regulatory standards are typically dioxins, PCBs, Arsenic, Lead, pentachloral phenol, Polynuclear Aromatic Hydrocarbons (PAH), Petroleum Hydrocarbons (diesel, jet fuel, and/or gas),

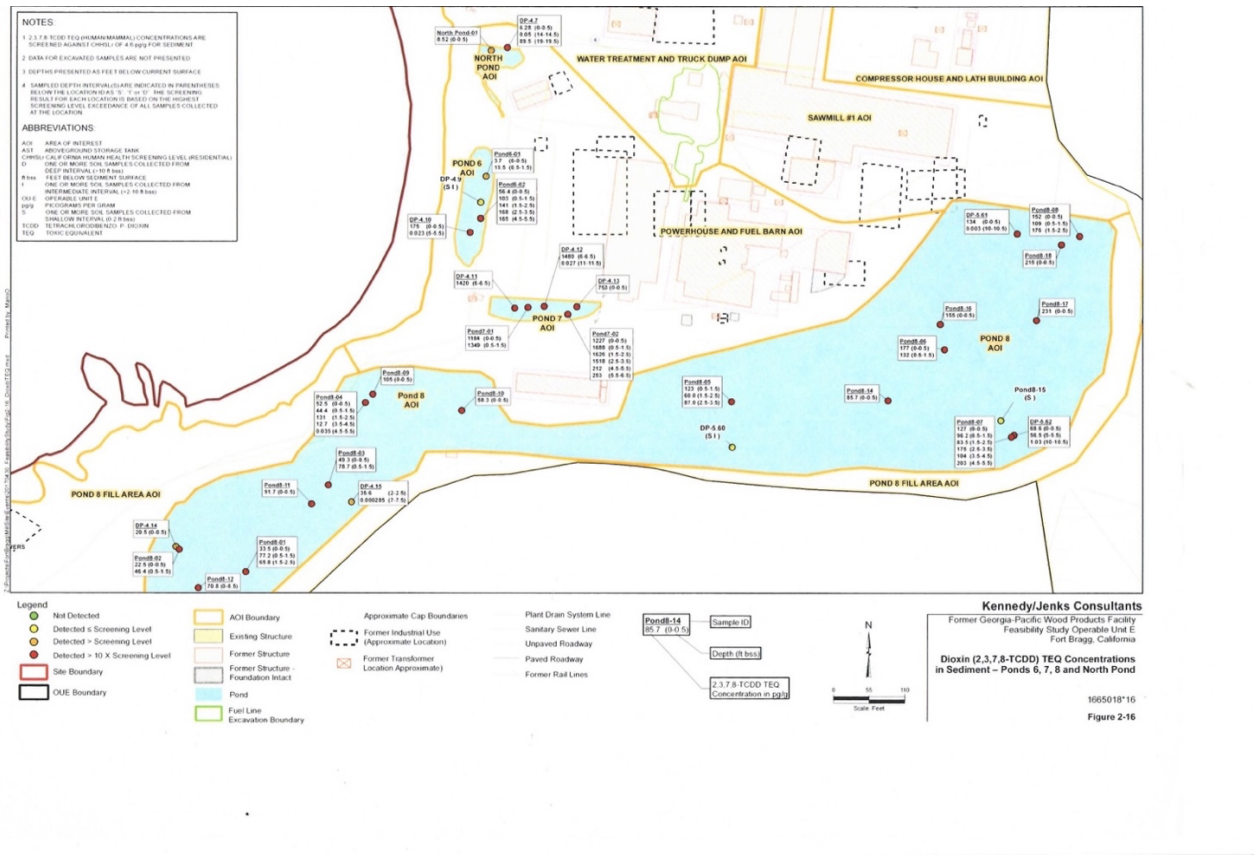
---

[5] https://www.waterboards.ca.gov/northcoast/board_decisions/adopted_orders/pdf/2010/100421_10_0046_13267b_NoyoHarbor_StornettaRanch.pdf Accessed on 2/8/2022.

[6] https://www.envirostor.dtsc.ca.gov/public/profile_report?global_id=23240008&ou_id=1000338&hideside=True&printerfriendly=True Accessed on 2/10/2022.

and Barium. I have also seen references to Chromium and Hexavalent chrome (the most toxic form for people).[7]

The map below shows exact sample locations in Ponds 6, 7, and 8, and the North Pond, (Areas of Interest):



Map 3: The inset note in the lower right corner of this Kennedy/Jenks Consultant report map of Operable Unit E (OE-E) show Dioxin (2,3,7,8-TCDD) TEQ Concentrations in Sediment — Ponds 6, 7, 8 and North Pond.[8] Arsenic and lead were also found in this same report on soils contamination on the former mill site property.

Thus, we can say with certainty that the warning sign shown above exclaiming the area to contain hazardous substances is an accurate assessment of environmental conditions on the site.

The question this leads to is, “What will happen if the berm shown in photograph below collapses and the contaminated soils held behind this manmade structure enters the ocean?”

---

[7] Personal email from James Schoonover, Department of Microbiology and Environmental Toxicology, University of California, Santa Cruz, received 2/7/2022.

[8]https://www.envirostor.dtsc.ca.gov/public/community_involvement/8551792740/20_FortBragg_Doc-out_DRAFTOUERAP-Revised_10142020.pdf

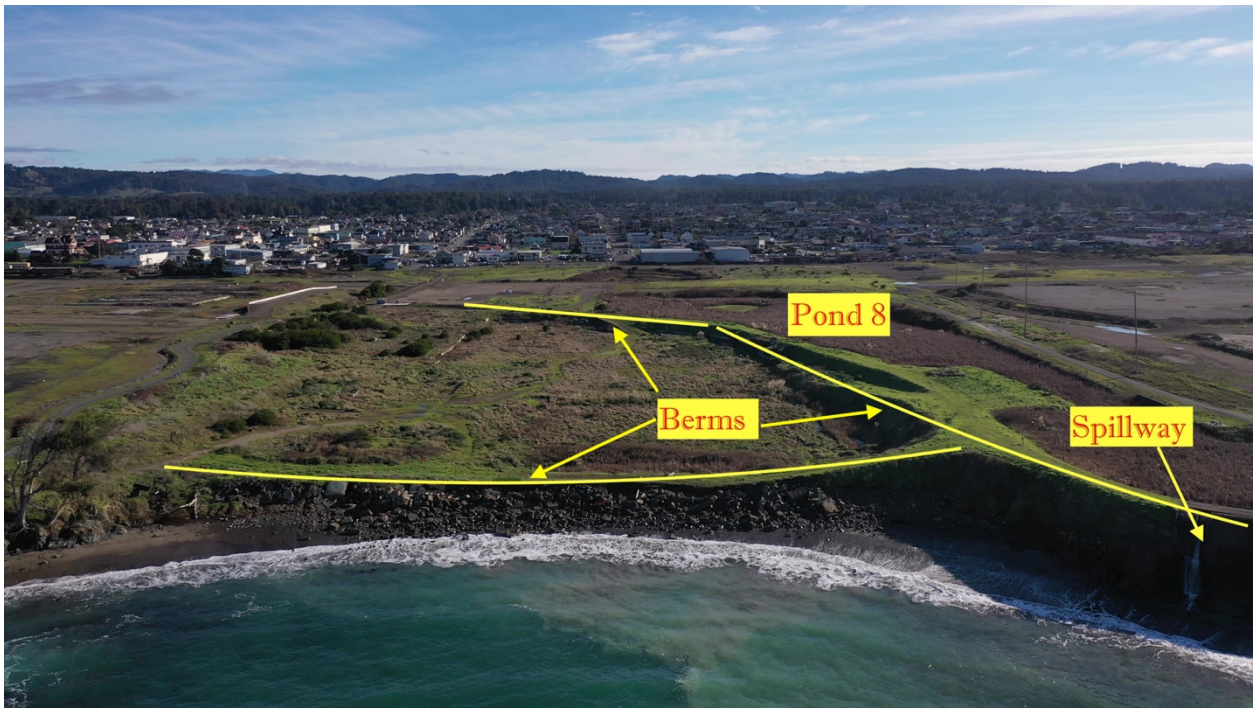


Photo 1 (with Graphics): Looking east toward downtown Fort Bragg, this aerial shot of OE-E shows that, for the time being, the ponds in this section of the old mill site, are contained by the rocks and dirt used to create the berms holding the sediments from entering the bay referred to historically as Soldier Harbor.

Photo of site without graphics:


Photo 2:

The recent two photos below show the extent erosion and decay factor into the question of what would happen if the berm fails:

Photo 3:

Photo 4:

The cribbing on the south side of the spillway shows signs of fire, adding to the weaking of the old redwood logs used in this attempt to keep Pond 8 from delivering sediment to the ocean.

These two historic pictures reveal how close the original mill was to the edge of the bay:

Historical View 1: Note the proximity of the pond to the edge of the bay.

Historical View 2: Note schooner docked in the bay in background.

The historical record also allows us to see how the ocean was used as a dump site:

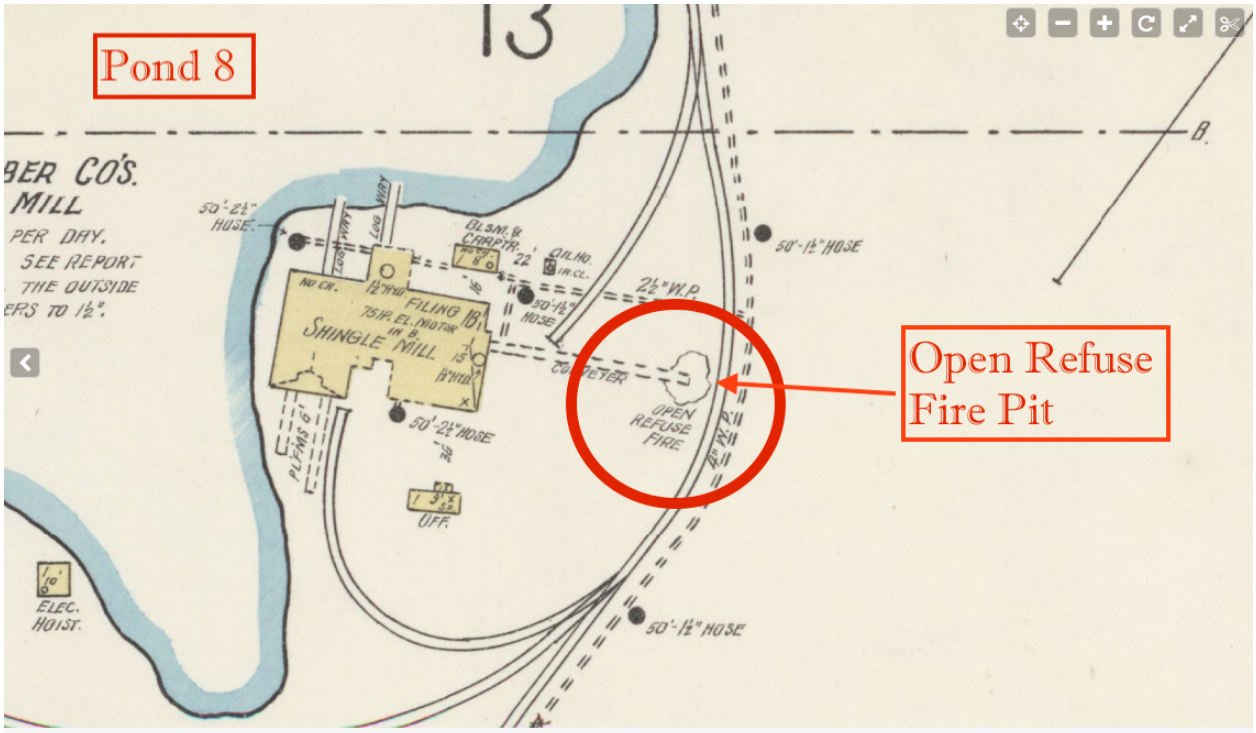
Photo 5: Glass Beach circa 1930.

Photo 6: A section of drain near Glass Beach today showing coastal erosion and where waste water went.

So far in this paper it has been shown that 1.) historically, dumping waste into the ocean was once seen as an acceptable way to dispose of unwanted materials, and 2.) contamination exists on the old mill site;

Ocean level rise, coastal erosion, and predictions about climate change will be discussed in relation to the stability — or lack thereof — of the berms holding back contaminated soils from entering the Pacific will be discussed below.

First, fire, burning, and incineration of waste materials, another method of waste disposal, that must be discussed because it pertains to the aerial distribution of potentially toxic byproducts of timber processing to the entire Forb Bragg community. We know from maps and photographs, the saw mill produced electricity in the power house by burning waste materials. There was an onsite teepee burner that burned sawdust and other waste materials. There were also several "Open Refuse Fire" pits scattered throughout the site. (See 1873 fire insurance map below). Those of us who lived in the area in the 1950s and 1960s can recall the fly ash from these burn pits and the teepee burner routinely settling on houses, streets, and cars all over Fort Bragg. Obviously from the insurance maps of the late 19th century, this was a common occurrence and was accepted as a byproduct of having an industrial complex near the town.



Map 4

Sea level Rise and Coastal Erosion:

Sea level rise, coastal erosion, and predictions about climate change will now be discussed in relation to the stability — or lack thereof — of the berms holding back contaminated soils from entering the Pacific.

"Under climate change, sea-level rise is expected to bring about large changes in the world's coastlines. Now, research predicting future shoreline change from satellite data indicates loss of nearly 50% of sandy beaches by the end of the century."[9]

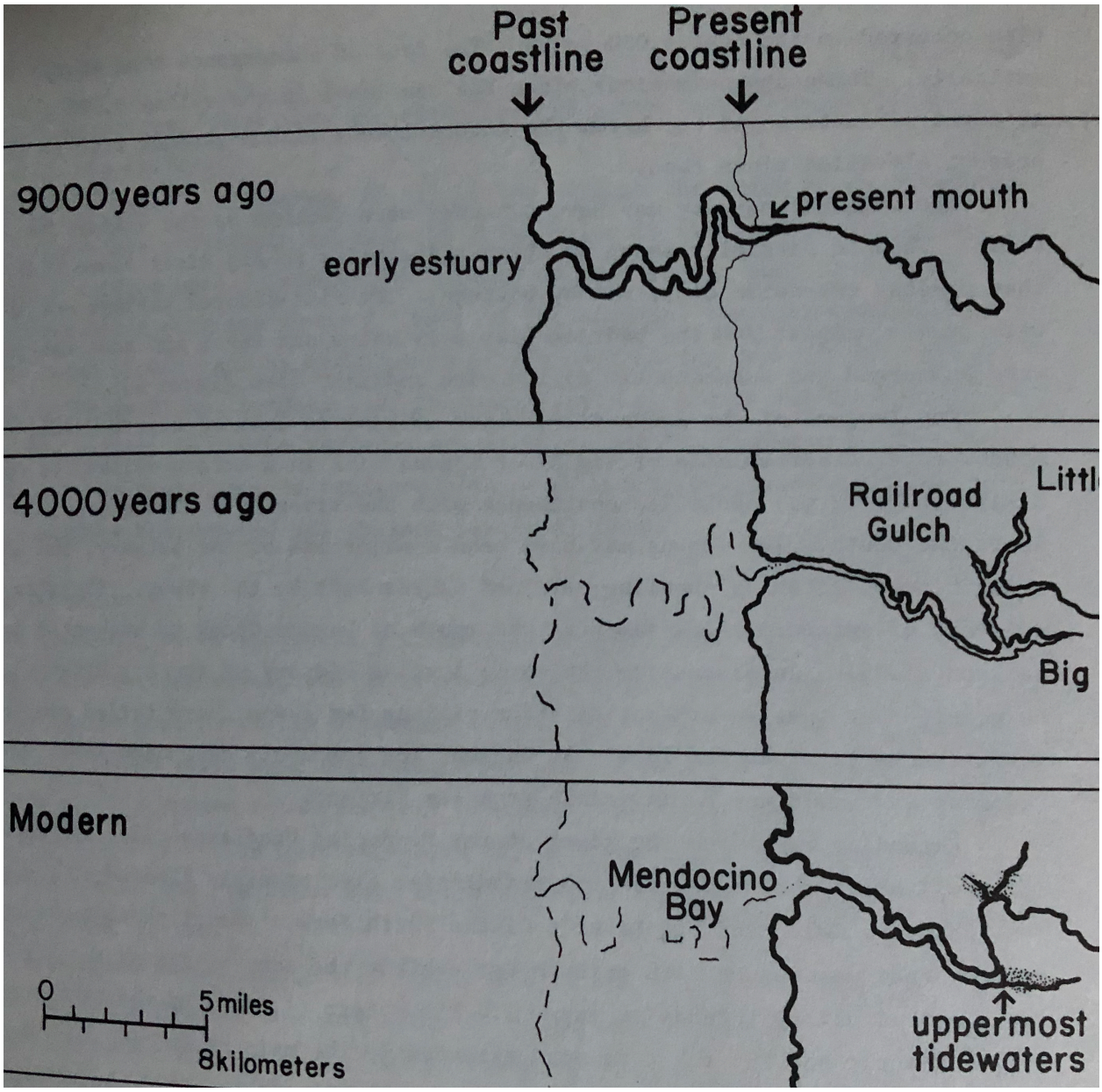
At some point in the mill site history, the storm drain pipe on the left was connected as it exited the headlands and spilled its contents into the ocean. Note that there appears to have been quite a bit of coastal bluff erosion since this pipe was laid, as photo at left shows. Below, coastal erosion of haul road at Laguna Point, MacKerricher Beach State Park today.

Photos 7 & 8

Additionally, climate predictions indicate that more severe weather is on the horizon worldwide. NOAA is now updating data on severity of weather events across the globe. (See at: NOAA ATLAS 14 POINT PRECIPITATION FREQUENCY ESTIMATES: KS [https://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html].

What this means for the berm holding back Pond 8 seems clear. Higher sea levels and more intense rain events will eventually weaken the berm until it is breached or it collapses. Again, historical reminders are important. In a geological blink of an eye, as the following graphic shows, sea levels have been on the march inland since the last Ice Age ten thousand years ago:

[9] https://www.nature.com/articles/s41558-019-0656-9



Graphic 1:

Nine thousand years ago the mouth of Big River was approximately three miles west of its present confluence with the Pacific.[10]

We can say with certainty that this sea level rise will continue as the polar ice caps continue to melt.

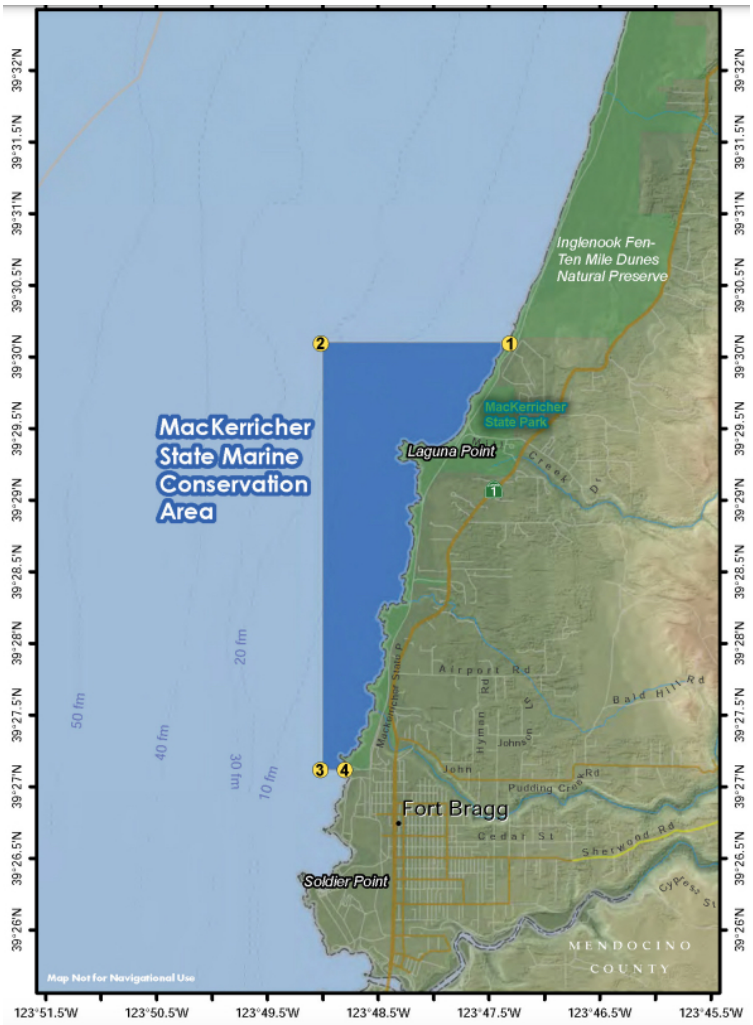
Inside Climate News headline: "Coasts Should Plan for 6.5 Feet Sea Level Rise by 2100 as Precaution, Experts Say."

[10] Big River: The Natural History of an Endangered Northern California Estuary. UC Santa Cruz Field Program Publication No. 6, 1981, p. 22.

"Coastal decisions by and large require long lead times, and it would be nice if we could wait for the science to clear up, but we can't," one scientist said.[11]

Effects on the Marine Environment:

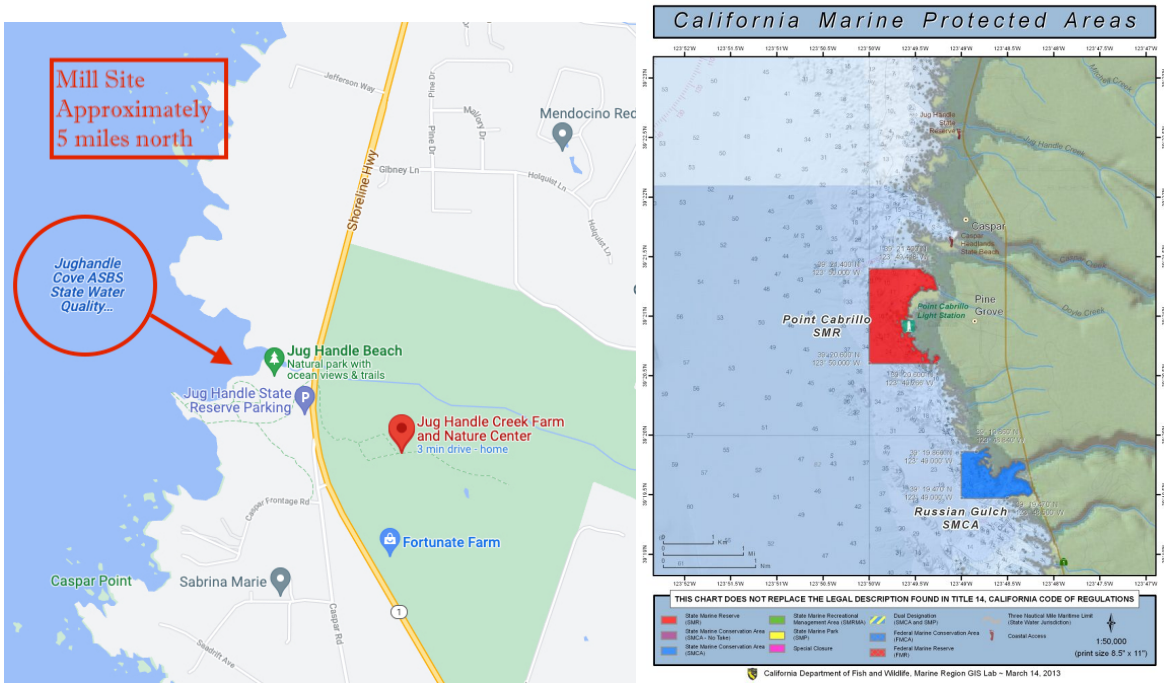
The berms holding back soil and water in the ponds on the old mill site are in close proximity of State Marine Protected Area (SMCA) and an Area of Special Biological Significance (ASBSs). Just to the north (see map below) is the Mackerricker State Marine Conservation Area. To the south, the Jughandle State Reserve is an ASBS.



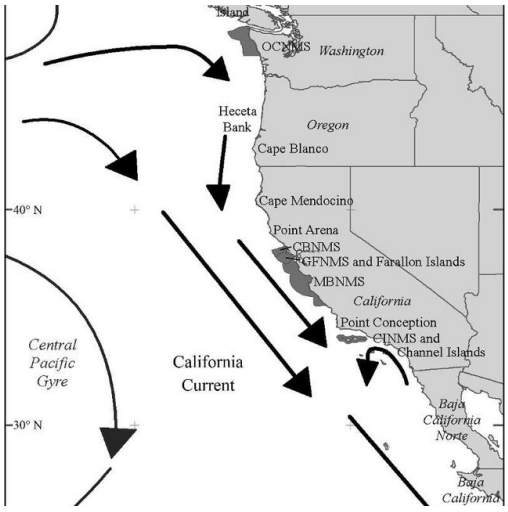
Proximity of SMCA to Ponds on the old mill site.

Maps 5 & 6

[11] https://insideclimatenews.org/news/21052019/antarctica-greenland-ice-sheet-melting-sea-level-rise-risk-climate-change-polar-scientists/?gclid=Cj0KCQiAmKiQBhClARIsAKtSj-lJwUBktFLfhjpMk__3X6jWODeknRe7OrWUzMn5LsfSZu-yIolhpksaAqIVEALw_wcB Accessed on 2/14/2022.



Maps 7 & 8 & 9: Three marine protected areas within ten miles of the old mill site are "down current."



The release of contamination into the marine environment will likely affect all aspects of the ecosystem along the coastline. Consider what happens when PCBs are released into seawaters:

"San Francisco Bay is facing a legacy of polychlorinated biphenyls (PCBs) spread widely across the land surface of the watershed, mixed deep into the sediment of the Bay, and contaminating the Bay food web to a degree that poses health risks to humans and wildlife."[12]

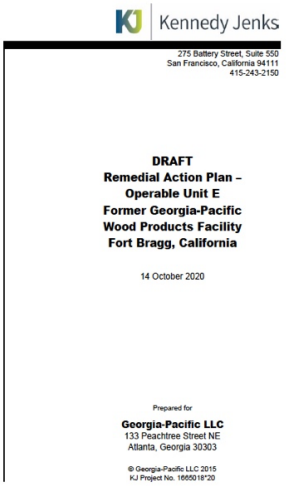
This is the likely result of the berm collapse at Pond 8. Furthermore, from the same paper referenced above, "The more-heavily chlorinated PCBs can also biomagnify in food webs. Other high-molecular-weight congeners have specific structures that render them susceptible to metabolism by such species as fish, crustacea, birds, and mammals."

> The toxicological effects of dioxins have mostly been studied in mammals. They can cause a whole section of health problems including: liver enlargement, liver lesions, cancer and endocrine disruption. Lethal doses for hamsters are 5 mg per kg body weight. In fish one of the first signs of toxicity is the cessation of food intake, followed by a decreased growth. Other manifestations are minor internal bleedings just below their skin and fins, as well as skeletal deformities and an increased vulnerability to fungal infections.[13]

None of this information is good news for the marine life offshore of the site.

"The coastal marine environment is a major repository for much of the chemical waste produced by human activity. Estuaries and coastal seas are important sites of living resources such as fisheries and yet it is these areas that are most at risk from toxic contamination."[14]

The DTSC has suggested that the construction of a new berm would solve the problem of the soil being flushed into the bay. Here is a section of their remediation plan Executive Summary from 2020:


Kennedy Jenks

275 Battery Street, Suite 550
San Francisco, California 94111
415-243-2150

DRAFT
Remedial Action Plan –
Operable Unit E
Former Georgia-Pacific
Wood Products Facility
Fort Bragg, California

14 October 2020

Prepared for
Georgia-Pacific LLC
133 Peachtree Street NE
Atlanta, Georgia 30303

KJ Project No. 166501820

Graphic 2:
The Cover of the Current Plan of Action (RAP) for Cleaning up the toxins at the Mill Site Proposed by the California Department of Toxic Substances Control

[12] https://pubmed.ncbi.nlm.nih.gov/17451673/ Accessed on 2/14/2022.
[13] http://www.coastalwiki.org/wiki/Dioxins Accessed on 2/14/2022.
[14] https://www.sciencedirect.com/science/article/abs/pii/S0048969705801408 Accessed on 2/7/2022

Pond 8 AOC: Remedial alternatives evaluated in the OU-E FS for aquatic sediment in Pond 8 included the following: 1) No Action; 2) Institutional Control / Containment (containment, land use controls, sediment management, and long-term operations and management); 3) Treating sediment in place through stabilization by the addition of binders and Portland cement to restrict exposure of potential receptors to affected media by limiting potential direct contact with affected sediment or infiltration of water; 4) Construction of an upland vegetated cover to cover each pond to restrict exposure of potential receptors to affected media by limiting potential direct contact with affected sediment or infiltration of water; 5) Excavation and offsite disposal of sediment; and 6) Construction of a vegetated wetland cover to cover each pond to restrict exposure of potential receptors to affected media by limiting potential direct contact with affected sediment or infiltration of water.

Based on the analysis presented in the OU-E FS, the Institutional Control / Containment alternative is the preferred alternative for the Pond 8 AOC as it provides adequate control of potential exposure pathways for future receptors without the destruction of wetlands and associated mitigation. This alternative also allows Pond 8 to continue to receive and treat stormwater from the site and the City. Although it was associated with lower reduction of

toxicity, mobility, and volume, institutional control / containment provide adequate control of potential exposure pathways for future receptors. The benefits of a physical cover were offset by the effort and disruption required for implementation and potentially regular O&M. The benefits of excavation and disposal were offset by the effort and disruption required for implementation and the need to transport and dispose the sediment at a landfill. the cost difference between the alternatives was not justified by limited benefits of the vegetated soil cover or excavation and disposal alternatives. To address California Division of Safety of Dams (DSOD) requirements, the Mill Pond Dam will be modified to add a soil buttress at the northeastern end and a rock slope protection at the crib wall near the ocean. This alternative will require regular inspection and maintenance of both the Mill Pond Dam and the beach berm, including vegetation control on the beach berm, as well as annual inspection, maintenance, vegetation control, and periodic survey of the Mill Pond Dam.

15

The question remains: Will these measures be enough to counteract the effects of sea level rise, increased weather severity, and climate instability on the old berms?

[15] https://www.envirostor.dtsc.ca.gov/esi/uploads/geo_report/5695249259/19_FortBragg_doc-out_OU-E_FS_DTSC_09132019.pdf Accessed on 2/10/2022.

This final photograph is evidence that our efforts to control these unpredictable conditions are a rather meager attempt to put a finger in the dam and hope for the best:

Photo 9: King tide erosion, Old State Highway One, Caspar Cove, circa 1980. (From personal collection).

A Possible Solution:

While it has been stated that there is not enough contaminated soil to allow bioremediation to work at this industrial site, why did G.P. stop the only effort to use fungi to clean up their mess? "Mushrooms can feed on the organic compounds and break down the lignins that bond them. Previous studies have shown that they not only remove the petroleum-based contaminants from the soil, but also break them down in such a way that even the mushrooms themselves are nontoxic.[16] (Mushrooms Being Tested for Cleaning up Contaminated

[16] https://www.usnews.com/news/best-states/wisconsin/articles/2021-12-06/mushrooms-being-tested-for-cleaning-upcontaminatedsoil#:~:text=Mushrooms%20can%20feed%20on%20the,the%20mushrooms%20themselves%20are%20nontoxic Accessed on 2/14/2022.

Soil by Associated Press Dec. 6, 2021). It may be impossible to answer the question why the earlier experiment was abandoned, but according to this AP article bioremediation can work.

> In 2009, over 14,000 cubic yards of soil [contaminated with polychlorinated biphenyls (PCBs), lead, and dioxin] were removed from OU-A, prior to the development of Noyo Headlands Park and Coastal Trail. In 2008 and 2009, over 1,000 cubic yards of soil contaminated with lead and PCBs were removed from OUs C and E. This work included bioremediation (using microbes for cleanup) of approximately 40,000 cubic yards of soil contaminated with petroleum.[17]
>
> Why was this bioremediation using microbes discontinued?

Bioremediation could be a way forward. Rather than doing extensive excavations and infrastructure repairs, as suggested in the Remedial Action Plan, why not use mushroom mycelium to clean up the ponds? Much less impact would result from using a natural process rather than mucking around in contaminated soils to rebuild berms that are destined to eventually fail.

If the RAP exposed contaminated soil that had to be removed from the site of construction of the new "soil buttresses and rock slope protection," the soil would have to be transported via truck to the nearest contaminated waste site in Kettleman City, California, over 350 miles away. The carbon footprint for this kind of disposal of contamination is quite high and unacceptable to many local residents.

The new owners of the property, Mendocino Railway, say they are serious about cleaning up the site. They say they have set aside funds to do this, but rather than trucking and dumping this problem on another community, why not immediately begin exploring ways to naturally clean up these polluted areas that they now own?

Conclusion:

Headlines such as this: "Mind boggling: CNN meteorologist shows how rising sea levels will affect the coasts,"[18] attest to the fact that the berms holding back contamination from the ocean will eventually collapse due to sea level rise. Just how affective rebuilding or recreating new berms per DTSC's remedial action plan, and the new property owner's obligation to make an effort to clean up this mess, remain to be seen.

In the meantime, the ocean continues to eat away at the base of the berm. Additionally, the logs holding back the contaminated soils continue to rot, and the hydraulic pressure behind the berms continues to put pressure on old compacted soils in the berms. If these structures fail, and forces combine to create a toxic marine toxic spill, the entire Mendocino coastline would pay the price of past and present waste disposal practices.

---

[17] http://www.noyoheadlands.org/uploads/5/0/9/0/50907121/community_update_gp__5-14-18_final_with_map_.pdf
[18] https://www.cnn.com/videos/weather/2022/02/16/sea-level-rising-2050-nr-sater-vpx.cnn Accessed on 2/17/2022.

The time has come to immediately address these issues and act now to protect the marine ecosystems of the Mendocino Coast.

Selected Resources:

California Regional Water Quality Control Board North Coast Region Order No. R1-2010-0046 Requiring Technical Information Pursuant to Water Code Section 13267(b) for Noyo Harbor District and Walter Stornetta Ranch, April 20, 2010.

Coastal Wiki, "Dioxins."

Davis, J.A., et. al., "Polychlorinated biphenyls (PCBs) in San Francisco Bay." *National Journal of Medicine, April 23, 2007.*

Disappearing beaches. Global Shoreline Change." *Nature Climate Change,* March 2, 2020, State of California, Department of Toxic Substances Control Report, Georgia Pacific (23240008), *EnviroStor*, Cleanup Status, Active as of 8/1/2006.

Kennedy/Jenks. Draft Remedial Action Plan – Operable Unit E Former Georgia-Pacific Wood Products Facility Fort Bragg, California, October 14, 2020.

Kennedy/Jenks. "Final Feasibility Study Operable Unit E Former Georgia-Pacific Wood Products Facility Fort Bragg," *Envirostor*, DTSC, California 12 September 2019.

Mazur, Thaïs, Ph.D. "The Georgia-Pacific Mill Site in Fort Bragg," *Healthy Mendocino*, December 5, 2017.

"Mind boggling: CNN meteorologist shows how rising sea levels will affect the coasts." *CNN*, February, 17, 2022.

Moore, Michael N. "Biomarkers of contaminant exposure and effect: a way forward in marine environmental toxicology," *Science of The Total Environment*, Volume 134, Supplement 2, 1993, Pages 1335-1343.

Realtor.com. For Sale: $2,600,000. 3.03 acres; Rd # 500D, Mendocino, CA 95460. February 17, 2022.

Shankman, Sabrina. “Coasts Should Plan for 6.5 Feet Sea Level Rise by 2100 as Precaution, Experts Say,” *Inside Climate News*, May 21, 2019.

UC Santa Cruz Field Program Publication No. 6: *Big River: The Natural History of an Endangered Northern California Estuary*, 1981.

Waraich, Sonia. “GP mill site was second Fort Bragg property the Skunk Train has acquired through eminent domain,” *Mendocino Voice*, December 17, 2021.

Zeitler, Morgan. “Trash issues beyond Transfer Site,” *Fort Bragg Advocate News*, February 27, 2014.