Humboldt County Water Quality
At the Water's Edge

SUMMARY

Humboldt County abounds with beautiful sights. One of the most striking of these is just north of McKinleyville where the Pacific Ocean pops into a breathtaking view along Highway 101. On the inland side, steep bluffs are covered with deep green windswept bushes and trees; small streams course towards the sea. On the ocean side, wide, sandy Clam Beach is lapped by rows of waves. Often there are kids splashing in the water, folks walking dogs, others hiking, and families setting up to spend a night in the small campground. Trinidad Head towers in the north.

Perfect, right? But, there is a downside to all this beauty. Strawberry Creek, one of those little streams cascading down the hillside, carries pollution onto Clam Beach and into the ocean. The *Heal the Bay Beach Report Card for 2016/2017* lists the top ten least healthy beaches in California. Clam Beach was the infamous winner of the number one spot; its neighbor Luffenholtz made the list at number eight. The *Heal the Bay Beach Report Card for 2017/2018* shows Clam Beach has moved down the list to number four. Unfortunately, Luffenholtz Beach has moved up to number six.

Several people who live in the Clam Beach and Strawberry Creek area expressed their concerns regarding pollution, water quality, and the disappearance and possible deaths of local otters and other animals. Local press echoed their concerns. On June 17, 2017, the *Times-Standard* published the article, *Clam Beach State's Worst*. The author subtitled the article: *High Bacteria Levels in County Trigger Search for Cause*.

There are many environmental agencies studying the impacts of pollution on water quality and the deaths of animals along the entire California coast, including Clam Beach. Vegetation, animals, and humans may all contribute to the pollution via sewer spills, leaky septic tanks, improper disposal of dead animals, agricultural practices, and everyday life activities. Studies indicate that the level of contamination fluctuates with the seasons. Bacteria levels increase when the rains wash contaminants down to the ocean -- the water's edge. Since not all pollution testing is done at the same time, assigning a rating takes time.

BACKGROUND

As the Humboldt County Civil Grand Jury (HCCGJ) was considering selection of Clam Beach's pollution as an investigative topic, two longtime residents who lived near Strawberry Creek contacted us. Both residents were concerned about declining water quality and the disappearing wildlife. Each had theories of what was causing the degradation: increased animal and human population upstream; leaking septic systems; marijuana grows in the area; and recent climate changes such as drought and flooding.

When the HCCGJ began to investigate the potentially negative effects of the pollution on human health, we discovered that several organizations were already closely monitoring the water

quality as it related to the well-being of people and animals. This group included the Humboldt County Public Health Laboratory (Lab) which is working to identify specific causes of pollution.

The Lab is a gem in Humboldt County about which its citizens should know more. It performs many public functions. The Lab:

- processes bacteriological water samples
- performs clinical microbiology, blood lead testing, influenza and tick testing
- vaccinates overseas travelers
- provides consultation and training services

In addition, it is certified by the Department of Homeland Security (DHS) as a bioterrorism laboratory. Several times each year the Lab receives from the DHS samples of substances to qualify. The testing done for DHS, referred to as proficiencies, has resulted in DHS providing modern equipment to the Lab which allows it to perform even greater services for county residents. The modern equipment has allowed the Lab to look more closely at water quality in the area of the Humboldt County beaches. The North Coast Regional Water Quality Control Board (Regional Board) funded the development of this testing. Even though the specific causes of contamination are not yet known, cutting edge tests to determine them have been developed using the DHS-funded lab equipment to identify the sources. The Lab has taken the lead in this process.

METHODOLOGY

Many hours of research, reading reports and articles regarding water quality was done by members of the Humboldt County Civil Grand Jury. This was coupled with interviews of state, county and local environmental experts.

DISCUSSION

In doing its extensive research, the Humboldt County Civil Grand Jury (HCCGJ) found there are many potential types and causes of pollution to our local beaches. To complicate matters, those causes may vary according to the time of year. These factors are what makes it so difficult to accurately measure pollution and assign a permanent rating to the state's beaches so pollution will be mitigated.

Domoic Acid and Blue-Green Algae

Various environmental agencies are studying the impacts of pollution on water quality and the death of animals along the California coast and inland. The HCCGJ learned from its reading and interviews that domoic acid may contribute to the death of local wildlife. This neurotoxin, also known as the red tide, thrives in warmer water. Domoic acid is found in algae blooms in the ocean during spring and summer. According to the Marine Mammal Center, it "is produced by algae and accumulates in shellfish, sardines, and anchovies, which are then eaten by sea lions, otters, cetaceans, and humans, among others. Exposure to the biotoxin affects the brain, causing them to become lethargic, disoriented, and have seizures that sometimes result in death."

The Eel River, Mad River, and other Humboldt County waterways have blue-green algae blooms in summer when the shallow water is warmer and moving slowly. An author wrote in *Scientific American* that winter flooding, followed by low flow in the summer, "led to warm, stagnant, barely connected pools of water. That is bad news for salmon, but ideal for early summer algal blooms. The algae then rot, creating an oxygen-deficient paradise for toxic cyanobacteria, which have been implicated in the poisoning deaths of 11 dogs along the Eel River since 2002." The blue-green algae may have contributed to the decrease in wildlife along creeks and rivers.

Cannabis Grows

The effects of cannabis grows are another area of water quality concern. Although many of the growers in Humboldt County are aware of the watershed and other environmental issues, a few seem not to care. They illegally bulldoze soil from steep slopes into nearby creeks and rivers to level areas for their crops. People, as well as fish and wildlife, depend on these water sources.

Many of the articles the HCCGJ read expressed great concern over cannabis grows which are "endangering California watersheds and wildlife." A senior environmental scientist for the California Department of Fish and Wildlife stated in an April 2015 article in the *Los Angeles Times:* "The reality is that marijuana cultivation has significant negative effects on our watersheds and the fish and wildlife that depend on them...Marijuana growers are a diverse group. They range from illegal international cartels to small medicinal operations on private land." Unpermitted water use and bulldozing hillsides into sensitive streams were the author's main concerns.

An *Eco Watch* article declared: *Humboldt County's Marijuana Boom is Destroying Redwoods and Killing Rare Wildlife*. The article praised the growers who are trying to sustain their businesses and lamented the fact so many of the newer growers and international cartels destroy the landscape due to lack of understanding of or concern for the ecosystems.

In an article in *Scientific American,* its author noted: "Creek diversions threaten fish habitat and spur toxic algal blooms. Road building and clear-cuts erode soil and cloud streams." She related that an environmental scientist had analyzed aerial photos of over 4,000 "grow sites in 60 Humboldt County watersheds" and "found that one in 20 grow sites sat within 100 meters of fish habitat and one in five were located on steep land with a slope of 17 degrees or more." The scientist told her: "Cannabis is being grown in the headwaters." She noted another study which had been done, radio-tagging fishers, an animal in the weasel family, in Hoopa Valley and near Yosemite. "Between 2006 and 2011, 58 of the fishers...turned up dead." Rat poison, used to protect cannabis grows, was the cause of 46 of the deaths.

Other Pollution Concerns

As stated above, contamination levels vary with the seasons. During good weather, large birds may spread trash from garbage cans which beachgoers sometimes leave uncovered. Pet owners who do not clean up after their animals may also lead to pollution. Debris from camps, picnics, and other human usage can also increase environmental damage. During rainy months, upstream

livestock and farm operation contaminants can increase the pollution levels in the streams flowing down to the beach and the ocean.

Humboldt County Public Health Laboratory

The Humboldt County Public Health Lab (Lab) has developed cutting edge test procedures. The causes of all the pollution are not yet known but the Lab has developed markers which will track microbial sources and determine the various pollution causes. This will be beneficial to agencies throughout California and beyond its borders.

The information from the Humboldt County study will be available on a website as soon as possible. This website will be similar to the one set up for the Russian River Study, which is already available. Once pollution sources are determined, corrective actions can be developed and implemented by the State Water Resources Control Board.

Lack of staffing has held back progress on the project in Humboldt County. The county has budgeted for a Lab Manager and three other microbiologists, but it currently only has one working. A second is in training and should be available in August 2018. Microbiologists can earn $20,000 to $30,000 more in annual income working in other California counties, a fact which makes recruitment difficult. The Lab is further understaffed, having two open Lab Assistant positions. In addition, several times each year the Lab receives requests to qualify materials for DHS. When this happens, all other testing must be put on hold until the DHS proficiencies are done. The accuracy of these proficiencies determines whether certification and funding from DHS continue. Despite the challenges of recruiting and retaining employees, Humboldt County may well have the best Public Health Laboratory in the state.

Collaboration

The Lab collaborates closely with other environmentally conscious agencies. These include:

- The Sonoma County Public Health Laboratory, its sister lab
- Humboldt County Environmental Health, which monitors five Humboldt County beaches weekly
- The North Coast Regional Water Quality Control Board, a division of the State Water Resources Control Board
- Humboldt Baykeeper, a non-profit organization
- The Lab Response Network, the national system for responding to biological, chemical, and radiological threats and natural disasters

The HCCGJ discovered, even though the specific causes of contamination at the beaches are not yet known, cutting edge microbial source tracking tests have been developed to identify the sources. The Lab has provided the expertise for the development. The North Coast Regional Water Quality Control Board (Regional Board) paid for the testing and the Department of Homeland Security (DHS) paid for the equipment to develop the procedures.

Microbiologists at the Lab have developed a procedure to identify microbial sources:

- The ruminant assay, or marker, will detect if the pollution source is from cows, horses, deer, and other animals.
- The dog assay will tell if the pollution source is a member of the canine family.
- The gull assay will spot pollution from seagulls and other birds.
- The human marker will detect human sources.

Sonoma County Public Health Laboratory has repeated the tests in their lab using their samples to confirm the validity of the Lab's testing process. Once protocols to quantify safe levels of contamination are established and sources are identified, corrective actions can be developed and implemented by the state to reduce or eliminate pollution levels. Additional studies will be needed to target pollution upstream from the beaches. Mitigation efforts will need to be established and focused.

FINDINGS

F1. The Humboldt County Public Health Laboratory is leading the way in developing groundbreaking water pollution assessment methods.

F2. The Humboldt County Public Health Laboratory has developed assays, or markers, for tracking microbial pollution sources from ruminant animals (cows and horses), dogs, birds, and humans, which will benefit the residents of the county.

F3. Additional testing is needed to pinpoint upstream sources of water contamination in order to reduce or eliminate some pollution and increase public safety at the beaches, which will benefit both residents and tourists in the county.

F4. Humboldt County beaches are safer to use and enjoy during certain seasons of the year, and can potentially be dangerous at other times.

F5. Only five Humboldt County beaches are tested regularly for water pollution levels, leaving in doubt the safety of other county beaches.

RECOMMENDATIONS

R1. The Humboldt County Civil Grand Jury recommends that the Board of Supervisors direct the Humboldt County Department of Health and Human Services to seek and apply for grants to fund studies in upstream locations to help pinpoint animal and vegetation sources of contamination. This should be done by October 1, 2018. **(F3, F4, F5)**

R2. The Humboldt County Civil Grand Jury recommends that the Board of Supervisors publicly commend the Humboldt County Public Health Laboratory for its outstanding work in the development of tools to determine the sources of pollution in our streams and on our beaches. This should be done by October 1, 2018. **(F1, F2, F5)**

R3. The Humboldt County Civil Grand Jury recommends the Humboldt County Department of Health and Human Services hire an outside consultant, who can assess and interpret organisms as they relate to countywide human health risks and environmental issues, to

make recommendations for pollution mitigation to the Board of Supervisors. This should be done by January 1, 2019. **(F3, F4, F5)**

R4. The Humboldt County Civil Grand Jury recommends that the Board of Supervisors require an assessment of human health risk and related recommendations for pollution mitigation, provided by an outside consultant, to be presented to the Board of Supervisors before April 1, 2019. **(F3, F4, F5)**

REQUIRED RESPONSES

Pursuant to Penal Code section 933.05, the Grand Jury requires responses from the following governing bodies:

- Humboldt County Board of Supervisors **(R1, R2, R3, R4)**
- Humboldt County Department of Health and Human Services **(R1, R3)**

Reports issued by the Grand Jury do not identify individuals interviewed. Penal Code section 929 requires that reports of the Grand Jury not contain the name of any person or facts leading to the identity of any person who provides information to the Grand Jury.

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