



# Water Contamination in Creeks and Bays

Excerpted from:

*Measuring What Matters: Neighborhood Research for Economic and Environmental Health and Justice in Richmond, North Richmond, and San Pablo*



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# WATER CONTAMINATION IN CREEKS AND BAYS



Photo: Tom McGuire

*Wildcat Creek in Richmond*

**“I am way more careful when I am out with a group by the water.** It is hard. You do not want them to be afraid but if they don’t know the reality, they could get themselves into trouble,” explains Doria Robinson, who leads creek tours and restoration projects in Richmond. Before she tells people about the water contamination, they “need to establish that connection first, a personal commitment to the space before you get into the troubles, because it can bring you down so much to think, ‘Why is my creek, shoreline so torn up and other people’s aren’t so?’”

From creeks to bays, West Contra Costa County is home to many bodies of water (see Table 1 for a list of West County creeks) and is situated within the lower portion of seven watersheds. These watersheds are areas of land where all the water under them or draining into them goes into the same place, whether it is to a stream, lake, or ocean.

Urban waterways provide recreational opportunities for nearby residents. They serve as important sources of wildlife in urban areas, a break in miles of concrete, and support birds, fish, greenery,<sup>1</sup> and oftentimes local subsistence fishers.<sup>2</sup> Healthy creeks and bays also help to filter pollutants and reduce flooding, erosion, and organic material buildup.<sup>3</sup> Yet most of West County’s creeks are paved over; of those that are not, many have become so polluted they are no longer safe for residents to swim, fish, or even play in.

Much of the water has become contaminated by industrial and municipal facilities that are often located adjacent to or on West County’s creeks and bays. For example, a sewage treatment plant, Chevron’s industrial holding ponds and refinery, and a landfill all border the 300-acre salt marsh at the mouth of the San Pablo and Wildcat Creek watershed.

In addition, urban run-off is a major source of contamination in the Bay.<sup>4</sup> Urban run-off is the water running from our yards, streets, and buildings every day that carries pesticides, heavy metals, and other chemicals into our waterways. Toxins from both urban run-off and industrial discharges can impair the growth of plants and insects along creeks, cause declines in marine life, and create health risks for people.<sup>5</sup>

**Table 1: WEST COUNTY CREEKS**

Creek	Total length (miles)	Beginning (Headwaters)	Drains into	Passes through
Wildcat Creek	22.22	Berkeley, Wildcat Canyon (East Bay Regional Park District Land)	San Pablo Bay at Giant Marsh	San Pablo and Richmond
San Pablo Creek	108.6	Orinda, then into San Pablo Reservoir	San Pablo Bay	San Pablo, Richmond, El Sobrante
Rheem and Garrity Creeks	3.36 and 4.10	Richmond	San Pablo Bay just south of Point Pinole	Richmond, San Pablo, some unincorporated county land
Pinole Creek	46.64	Briones Regional Park	San Pablo Bay	Pinole
Refugio and Rodeo Creeks	9.17 and 31.64	East Bay Regional Park Land	San Pablo Bay	Rodeo, Crockett, Hercules

Source: Contra Costa Watershed Atlas (2003), Contra Costa Community Development Department. Inclusion of creeks is based on the Watershed Atlas, which uses USGS data. It does not include tributaries such as Castro Creek.

## WHAT DID OUR RESEARCH FIND?

The Indicators Project examined two indicators of water contamination in West County: which water bodies are considered contaminated, and how often industries in the area are contaminating waters. To determine which are contaminated, we used data from the San Francisco Regional Water Quality Monitoring Board (Regional Board), the agency in charge of protecting water quality in the San Francisco Bay and in creeks and lakes.

To get a sense of how often industries in the area are contaminating waters, we checked data for how often, if at all, facilities are breaking water quality laws that have been set by the state and federal government. This provided information on whether or not industrial facilities are complying with legal limits on water contamination set under the federal Clean Water Act to regulate point source pollution discharges.<sup>6</sup>

Our analysis does not attempt to create a direct link between water contamination in local water bodies and illegal industrial discharges.

**According to Regional Board listings, all of the creeks and the bays in West County are impaired.**

### What is the evidence of water contamination in West County?

The Regional Board is required by federal law to establish water quality standards based on the ways each water body is typically used. For instance, if an area’s designated use is recreational fishing, the Board must ensure that the fish in that water body are safe for people to eat.<sup>7</sup> The Regional Board then assesses which water bodies do not meet their water quality standards and designates them as “impaired.”

According to Regional Board listings, all of the creeks and the bays in West County are impaired (Table 2). Table 3 provides more specific information on the contaminants present in these water bodies.

**Table 2: IMPAIRED WATER BODIES IN WEST COUNTY**

Water body	Chemical contaminants	Source of contaminants
San Pablo Bay	Chlordane, DDT, dieldrin, dioxin compounds, exotic species, furan compounds, mercury, nickel, PCBs (polychlorinated biphenyls), selenium	Urban run-off and drainage, direct discharges from industry, dumping from boats, atmospheric deposition, municipal discharges, agriculture and natural sources, resource extraction
San Pablo Creek	Diazinon	Urban run-off and storm sewers
Wildcat Creek	Diazinon	Urban run-off and storm sewers
Castro Cove	Dieldrin (sediment); mercury (sediment); PAHs (polycyclic aromatic hydrocarbons ) (sediment); selenium (sediment)	Direct discharges from Chevron refinery, urban run-off
Central Basin (part of central SF Bay)	Chlordane; mercury; PAHs (polycyclic aromatic hydrocarbons); PCBs (polychlorinated biphenyls); selenium	Urban run-off and drainage, direct discharges from industry, dumping from boats, atmospheric deposition, municipal discharges, agriculture and natural sources
Pinole Creek	Diazinon	Urban run-off and storm sewers
Rodeo Creek	Diazinon	Urban run-off and storm sewers
Central SF Bay	Chlordane; DDT; dieldrin; dioxin compounds; exotic species; furan compounds; PCBs (polychlorinated biphenyls); mercury; selenium	Urban run-off and drainage, direct discharges from industry, dumping from boats, atmospheric deposition, municipal discharges, agriculture and natural sources, resource extraction

Source: Proposed 2006 CWA Section 303(d) List of Water Quality Limited Segments. Retrieved 10/15/08 from <http://www.swrcb.ca.gov/rwqcb2/tmdlmain.htm>.

**Table 3: WHAT ARE THE CONTAMINANTS IN WEST COUNTY WATERS?**

Contaminant	What is it?
Chlordane	Pesticide that has been banned, but persists in the environment.
DDT	Pesticide that has been banned, but persists in the environment.
Dieldrin	Insecticide that has been banned, but persists in the environment.
Dioxin/furan compounds	Chemical compounds released as emissions from waste incineration and other combustion; also discharged from chemical factories.
Exotic Species	Animals and plants not native to an ecosystem.
Mercury	Heavy metal used in thermometers, dental fillings, and batteries, discharged from refineries and factories, but also present in the environment as a result of former use in mining.
Nickel	Naturally occurring metal.
Polychlorinated biphenyls (PCBs)	Chemicals used as coolants and lubricants in transformers, capacitors, and other electrical equipment. Due to health impacts, production has been stopped but they persist in the environment and leach from landfills and chemical waste.
Selenium	Naturally occurring mineral element in rocks and soil. Used in the electronics industry, as a nutritional feed additive for poultry and livestock, and in petroleum refineries.
Diazinon	Pesticide used to control pests in soil, ornamental plants, and crops.
Polycyclic Aromatic Hydrocarbons (PAHs)	Chemical compounds formed during the incomplete burning of coal, oil and gas, garbage, or other organic substances. PAHs are found in coal tar, crude oil, creosote, and roofing tar, but a few are used in medicines or to make dyes, plastics, and pesticides.

Source: U.S. EPA Drinking Water Contaminants, available at <http://www.epa.gov/OGWDW/contaminants/> and Department of Health and Human Services Agency for Toxic Substances and Disease Registry ToxFAQs, available at: <http://www.atsdr.cdc.gov/toxfaq.html>.

### How often are industrial facilities illegally discharging contaminated water?

The Indicators Project also looked at how many times industrial facilities in West County violated their regulatory permits by releasing more contaminants than legally allowed. Every industrial facility must obtain a permit from the Regional Board, called a National Pollution Discharge and Elimination Permit (NPDES), which outlines how much wastewater a facility is allowed to discharge.

According to data from the California Integrated Water Quality Information System for January 2005 through October 2008, there were a total of 19 facilities in violation of their permits, 17 of them with repeat violations (Table 4). All of the violations listed are for illegal contaminant discharges.

The Regional Board also issues violations for monitoring and reporting failures. For example, if a facility did not monitor a certain chemical on a daily basis as required by law, it would receive a violation notice. From 2005

through October of 2008, there were 51 reporting and monitoring violations, and one instance where a facility was cited for failure to pay fines for a total of 52 administrative violations spread among eight facilities.<sup>8</sup>

Other studies and sources of data indicate that industrial facilities in West County are contributing to water contamination. In a national study on permit violations from industrial facilities, Contra Costa was one of the top 25 counties in the U.S. with the most industrial facilities exceeding their NPDES permits.<sup>9</sup> It should also be noted that these are just illegal discharges; facilities are allowed to discharge a certain amount on a regular basis. In 2005, for example, Shell Oil released 542,497 pounds of contaminants into surface waters; Chevron released 430,777 pounds of contaminants.<sup>10</sup> While these releases are each individually legal, they add up to a considerable cumulative load of pollutants entering West County waters on a daily basis. Further, industrial facilities contribute regularly to urban run-off—the largest source of water contamination in the Bay Area.

**Table 4: ILLEGAL WATER DISCHARGES FOR CONTRA COSTA INDUSTRIAL FACILITIES, 2005–2008**

Facility	Violations
Rhodia, Inc.	1
Tesoro Refinery — Golden Eagle Waste Water Treatment Plant	1
Chevron Richmond Refinery	2
Crockett Cogeneration	2
Dow Chemical Company	2
GWF — Site I Power Plant	2
US Navy Groundwater Treatment Plant, Pt. Molate	3
West County Waste Water District	4
Mt. View Sanitary District	5
City of Pinole Wastewater Treatment Plant	6
GWF Power Systems, Site IV	10
USS POSCO Industries	11
General Chemical Waste Water Treatment Plant	13
Richmond Water Pollution Control Plant	16
PG& E Shell Pond	20
Rodeo Sanitary District Wastewater Treatment Plant	21
Shell Martinez Refinery	25
Discovery Bay Treatment Plant	30
ConocoPhillips Refinery, Rodeo	32
<b>TOTAL VIOLATIONS</b>	<b>206</b>

Source: California Integrated Water Quality Information System

## WHAT DOES THIS MEAN FOR WEST COUNTY?

### Contaminated water bodies

The data from the Regional Board indicates there is significant water contamination in West County, but the sources vary greatly. The creeks of West County are mostly contaminated with diazinon, a pesticide commonly used on lawns.<sup>11</sup> The bays of West County have a wider array of contaminants, the majority of which are persistent organic pollutants—including chlordane; DDT; dieldrin; PCBs (polychlorinated biphenyls); and PAHs (polycyclic aromatic hydrocarbons)—from agricultural uses, industrial discharges, and urban run-off.<sup>12</sup> Some contaminants originate with industrial discharges, such as the mercury and PAHs in Castro Cove that are from former Chevron refinery operations.<sup>13</sup> In fact, much of the industry-related contaminants may have come from “legacy” pollution—pollution that occurred many years ago—or from a mix of both historical and contemporary sources. For instance, the level of PCBs in the San Francisco Bay primarily comes from their use in electrical equipment during the 1970s, although several companies in the Bay still use them.<sup>14</sup> Most of the mercury in the Bay is from mining operations during the Gold Rush era.<sup>15</sup> The second largest source is from urban run-off. It also continues to enter the Bay through both air and wastewater discharges from local industries.<sup>16</sup>

Mercury and PCBs are of particular concern because they accumulate in the flesh of fish people eat and have many health impacts, from causing cancer to neurological disorders.<sup>17</sup> A walk down Point Pinole pier reveals how

many people regularly fish there and elsewhere in West County. Many people eat the fish they catch, for both cultural and economic reasons. One survey found 87% of Bay Area anglers eat the fish they catch.<sup>18</sup> California’s Office of Environmental Health and Hazard Assessment has issued fish advisories limiting the amount of fish people should consume from the Bay because of the potential health consequences.<sup>19</sup> PCB concentrations in Bay sport fish are still more than ten times higher than levels considered safe for human consumption.<sup>20</sup> In fish tissue testing throughout the Bay, the highest levels of mercury were found in the Central San Francisco Bay region, just off West County’s shoreline, in rates well above a safe consumption level.<sup>21</sup>

### Illegal industrial discharges

All of the violations in Table 4 are based on instances when a facility discharged wastewater that contained levels of contaminants above levels deemed healthy for local ecosystems and public health. Since 2005, there has been an average of almost 4.5 water quality violations per month, based on Regional Board data alone.

While these violations cannot be traced specifically to the data on water contamination in West County presented in this chapter, they convey a pattern of industrial pollution. Together, the two Indicators, which provide data on water contamination and data on industrial permit violations, illuminate part the complex issue of addressing water quality concerns of West County.

## WHAT CAN WE DO?

From working for more protective water quality standards to educating people on how to restore local creeks, many organizations in West County and the Bay Area offer different types of solutions to our water quality problem. Residents can implement solutions on several levels, including limiting one’s own contribution to water contamination, participating in water restoration and clean-up activities, and supporting ongoing advocacy campaigns.

### Limit your own contribution to water contamination.

West County residents themselves can help reduce water contamination.<sup>22</sup> Keep litter, pet waste, and debris out of street gutters and storm drains: they drain directly to streams, rivers, and wetlands. Minimize the use of pesticides and fertilizers. Dispose of used oil and antifreeze, pharmaceuticals, batteries, paints, and other household hazardous materials at local hazardous

material centers (see Resources section). Use nontoxic household cleaners, as most commercial all-purpose cleaners contain dangerous chemicals.

### Help restore your local water bodies.

Participate in local creek clean-up and restoration projects (see Resources section).

### Support ongoing policy efforts to limit water pollution.

Many organizations work to implement policies at both the regional and state level to protect our health and environment. One of the best ways to directly impact local policy is by attending San Francisco Regional Water Quality Control Board meetings. Organizations such as Baykeeper and Clean Water Action have worked at the local level to create comprehensive contaminant limits for the San Francisco Bay, to improve the regulation of industries, and more. (See next section for contact information.)

## COMMUNITY RESOURCES FOR INFORMATION AND CHANGE

### City of Richmond Household Wastewater Web Page

[www.ci.richmond.ca.us/index.asp?NID=170](http://www.ci.richmond.ca.us/index.asp?NID=170)  
Information and local resources on ways to reduce household water pollution.

### Clean Water Action

111 New Montgomery St., Suite 600  
San Francisco, CA 94105  
415.369.9160  
[www.cleanwateraction.org](http://www.cleanwateraction.org)  
Helps citizens make their case for clean water to local, state, and national decisionmakers and to advocate for strong environmental policies.

### North Richmond Shoreline Academy

100 Pine St, #1550  
San Francisco, CA 94111  
415.693.3000  
[www.shorelineacademy.org](http://www.shorelineacademy.org)  
A project of the Natural Heritage Institute working to restore and protect the North Richmond Shoreline for the benefit of local communities.

### San Francisco Baykeeper

785 Market Street, Suite 850  
San Francisco, CA 94103  
415.856.0444  
[www.baykeeper.org](http://www.baykeeper.org)  
Works to reverse the environmental degradation of the past and promote new strategies and policies to protect the water quality of the San Francisco Bay.

### SPAWNERS (San Pablo Watershed Neighbors Education and Restoration Society)

1327 South 46th Street, Bldg. 155  
Richmond, CA 94804  
510.665.3538  
[www.spawners.net](http://www.spawners.net)  
Works to protect and restore San Pablo Creek.

### The Watershed Project

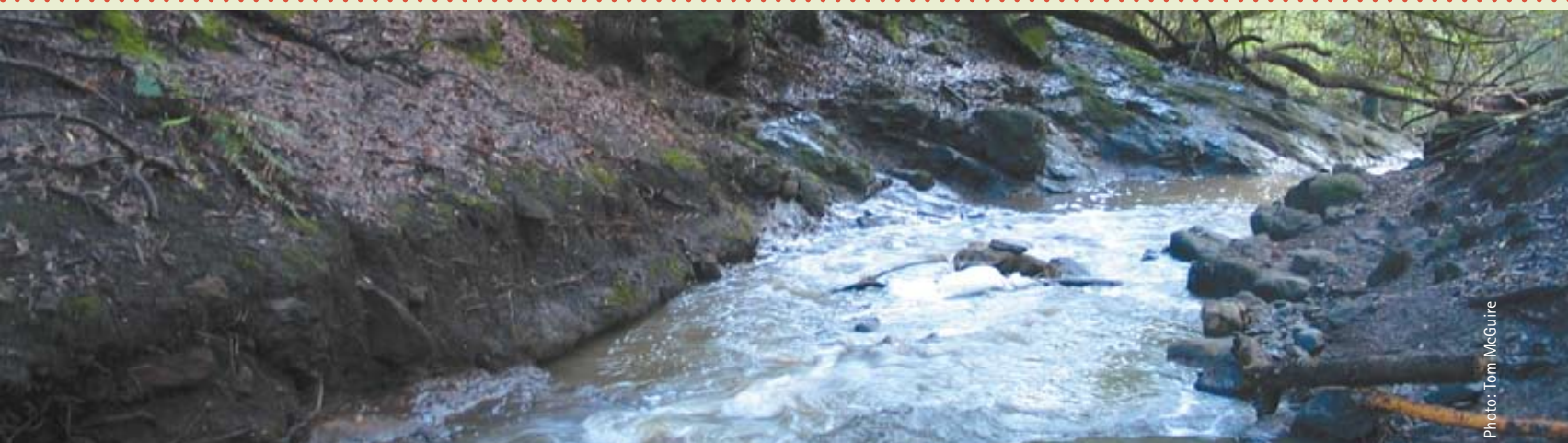
1327 South 46th Street  
155 Richmond Field Station  
Richmond, CA 94804  
510.665.3546; [info@thewatershedproject.org](mailto:info@thewatershedproject.org)  
[www.thewatershedproject.org](http://www.thewatershedproject.org)  
Provides support for watershed restoration projects and runs environmental education programs in Richmond.

### Urban Creeks Council

1250 Addison Street, Suite 107  
Berkeley, CA 94702  
510.540.6669  
[www.urbancreeks.org](http://www.urbancreeks.org)  
Supports efforts to restore urban creeks throughout Richmond and Berkeley.

### West Contra Costa County Integrated Waste Management Services

1.888.412.9277  
[www.recyclemore.com](http://www.recyclemore.com)  
Provides recycling and garbage services for West Contra Costa County, runs a Household Hazardous Waste Collection facility, and has information on how to reduce household pollution.



*Wildcat Creek in Richmond*

## RESEARCH METHODS

### Contaminated water bodies

Our list of impaired water bodies in West Contra Costa County is drawn from the San Francisco Regional Water Quality Control Board’s 303(d) list for the San Francisco region, which provides an overview of water quality information in an area based on comprehensive testing of water bodies. The 303(d) list is required under the federal Clean Water Act and lists water bodies that “do not meet water quality standards, even after point sources of pollution have installed the minimum required levels of pollution control technology.”<sup>23</sup>

We used the Contra Costa Watershed Forum’s Watershed Atlas to identify water bodies that correspond to the geographic boundaries of our research area: north of Interstate 580 and west of 23rd Avenue.

### Industrial discharges

Our data does not set out to provide the complete picture of how many contaminants are getting into West County’s water bodies. We do not address the largest source of contamination in the Bay—urban run-off—or each facility’s contribution to urban run-off, or the large amount of contaminants that industrial facilities are legally allowed to discharge. Accessing information on industrial discharges is challenging as there is a lack of precise data.

Because it measures direct discharges from facilities, we used the State Water Resource Control Board’s California Integrated Water Quality System (CIWQS) to generate reports on National Pollutant Elimination Discharge System (NPDES) permit violations for all local, state, federal, and private facilities in Contra Costa County, 2005 through 2008. In order to comply with the

federal Clean Water Act, the Regional Water Quality Control Boards are required to issue NPDES permits to all facilities discharging wastewater. Analyzing permit violations indicates how many facilities are in violation of existing federal and state clean water laws.

Our report focuses exclusively on permit violations, which provides only a partial picture of the extent of industrial contamination, as violations exclude legal discharges. The permits themselves can allow discharge levels that may be undesirable, as limits are based not only on environmental and health effects, but on the costs of implementation to businesses. The list of contaminants regulated may not cover all the contaminants that are a byproduct of industrial processing. Finally, all the data within the CIWQS is based on reports of compliance or violations submitted by the facilities themselves, which raises questions about the objectivity of the data.

A focus on wastewater discharges also overlooks the many other ways industrial facilities can contaminate water bodies. Wastewater discharges are “point source” pollution, which comes directly from one source, such as pipes. However, “nonpoint source pollution,” which comes from many, diffuse sources, is a large problem that lacks clear regulation.

Another limitation in our data is the state database itself, as CIWQS has been the subject of significant criticism. In May 2007, an independent panel reviewed the system and found the CIWQS to be “a dysfunctional program on the verge of collapse. There were serious and unresolved concerns about the technical soundness of the underlying database design and its implementation.”<sup>24</sup>



*Wildcat Creek at the Richmond Parkway*



*Keller Beach and the Chevron Pier*



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