

## **San Francisco Bay Regional Water Quality Control Board**

# **50 years of Protecting Bay Area Waters**

January 2000

The San Francisco Bay Regional Water Quality Control Board (Regional Board) first met in January of 1950. It has been meeting regularly for 50 years working to preserve and/or restore the quality of waters throughout the Bay Area, including San Francisco Bay and Tomales Bay, local streams that flow into the Bays, the Pacific Ocean off the San Mateo, San Francisco, and Marin coasts, and Bay Area groundwaters. This paper is meant to briefly review the history of the Regional Board and how the efforts to protect water quality have changed over the years.<sup>1</sup>

The Regional Board acts as a focus of public opinion and policy when implementing State and federal water pollution control laws. It sets the standards, adopts permits, requires cleanups, and enforces where necessary. Despite 50 years of efforts, the job of preserving and restoring water quality in the Bay Area is far from finished. The Regional Board anticipates continuing the programs begun during its first 50 years, and foresees some new efforts as it proceeds into its next 50 years. There is a brief discussion of potential new directions at the end of this paper.

The Regional Board does not act alone to protect water quality. The regulated community (usually referred to as the dischargers) of wastewater treatment plants, industries, landfills, companies and individuals doing cleanups, etc., do the day-to-day work implementing Regional Board directions. Also, citizen and environmental groups play a significant role in influencing public policy and laws that the Regional Board implements.

### **Before 1950**

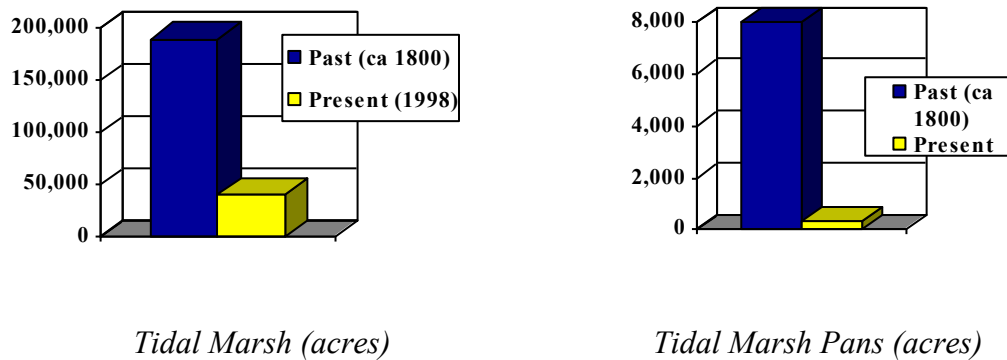
Water quality regulation in California did not begin with the Regional Boards. Some of the earliest efforts include an 1872 law that prohibited discharging materials to streams that could kill fish. There was also a famous 1884 court case which essentially banned hydraulic gold mining in the Sierra Nevada because of all the adverse impacts to down stream landowners in the Central Valley. Impacts were caused by all the silt and debris that was discharged to streams.

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<sup>1</sup> For a description of current Regional Board authorities, procedures, and structure please see either “A Citizen’s Guide to the San Francisco Bay Regional Water Quality Control Board” or “A Business Person’s Guide to the San Francisco Bay Regional Water Quality Control Board”. Both are available on the Board’s Internet web page ([www.waterboards.ca.gov/sanfranciscobay](http://www.waterboards.ca.gov/sanfranciscobay)) or by calling the Board.

Many activities before 1950 had, and continue to have, a significant impact on San Francisco Bay and its ecosystem. Beginning in the 1800s, Bay wetlands were destroyed by filling or diking (only about 10% of the original tidal wetlands around the Bay remain, see Figure 1). In the North Bay the wetlands were converted to hay farms and in the South Bay to salt ponds. Other areas saw urban development or numerous garbage dumps in wetlands around the Bay. Also, all the sediment that resulted from hydraulic mining (e.g. 1.5 billion cubic feet came from just five rivers in the Sierra Nevada) raised the bottom of the North Bay as much as three feet and altered the ecosystem.

*Figure 1. Loss of Tidal Marsh Habitat*



Another legacy from the Gold Rush is mercury contamination of Bay fish, which continues today. Mercury was mined locally and then used and discarded by gold miners. Mercury has been moving into the Bay since the mid 1800s. Other pollutants that were used historically, and are still having impacts, are PCBs and chlorinated pesticides (e.g. DDT). PCBs were manufactured from the 1920s to the 1970s (when their manufacture and sale were banned by federal law), and their use and disposal have left a residual in the Bay that is still showing up in Bay fish. Chlorinated pesticides were first used in the 1940s and mostly banned in the late 70s<sup>2</sup>. Today they also are in fish tissue.

Diversions of fresh water flow to the Bay began in the early 1900s with the Hetch Hetchy project and continued with East Bay MUD's Mokelumne River project, the federal Central Valley Project, and finally in the 1960s with the State Water Project. All these efforts combined have led to a significant reduction in the amount of fresh water entering the Bay, and this has a negative impact on the Bay's aquatic life.

Some of the first efforts in California to deal with water quality issues include the building of the first sewer system in San Francisco in 1850. The system did not include treatment of the sewage, just a means to transport it to the Bay. Most cities discharged

<sup>2</sup> For example, a 1969 study estimated that in 1965 alone, 20,000 pounds of chlorinated pesticides entered the Bay.

their sewage untreated. Because of the sewage discharges shellfish harvesting in the Bay ended in the 1930s. A 1949 report to the Legislature noted that the sewage treatment had not changed much in 100 years. The Report led to the passage of the Dickey Act in 1949, which set up the Regional Boards.

## 1950s

The Dickey Act was passed in 1949, and became effective in 1950. The Regional Board wasted no time. It met on January 12 and 26 and monthly thereafter. During the first few months the Board dealt with administrative matters, such as office location and hiring staff. By June the Board had adopted its first discharge requirements, approving the installation of two stormwater injection wells in Hayward. At the same meeting they also adopted requirements for wastewater from the City of Hercules, essentially requiring the City to treat its sewage, rather than discharge it untreated to Pinole Creek. The Regional Board's budget for FY 49-50 was \$17,884<sup>3</sup>.

The Dickey Act established nine Regional Boards in California based on watershed, rather than political, boundaries which have changed very little in the last 50 years. There were five Board members appointed by the Governor. In setting discharge limits the purpose of the Board was more to advise, encourage, and coordinate the efforts of others<sup>4</sup>. The law gave little enforcement authority to the Regional Board. If discharge limits were violated, the Board would have to hold hearings, document problems, and then could request the local District Attorney to petition the Superior Court to issue an injunction requiring compliance with Board requirements. This cumbersome enforcement process was seldom used.

The emphasis at the time was to get cities and industries to do some treatment of their wastes. In 1950 most sewage discharged to the Bay was untreated, created foul odors and fish kills due to oxygen depletion. The Bay was endured when one had to cross the Bay Bridge and was seen as a good place to dump garbage. A 1953 report prepared for the City of San Jose noted: "Sewage from San Jose and other cities was discharged without treatment to San Francisco Bay. This practice has resulted not only in gross pollution of the receiving waters but has become a principal cause of a seasonal atmospheric condition manifested over a wide area by a sulfide odor, a tarnishing of household silver, and a blackening of painted surfaces." The Bay Area population was about two and a half million people, which meant approximately 250,000,000 gallons of raw or minimally treated sewage was dumped in the Bay every day.

## 1960s

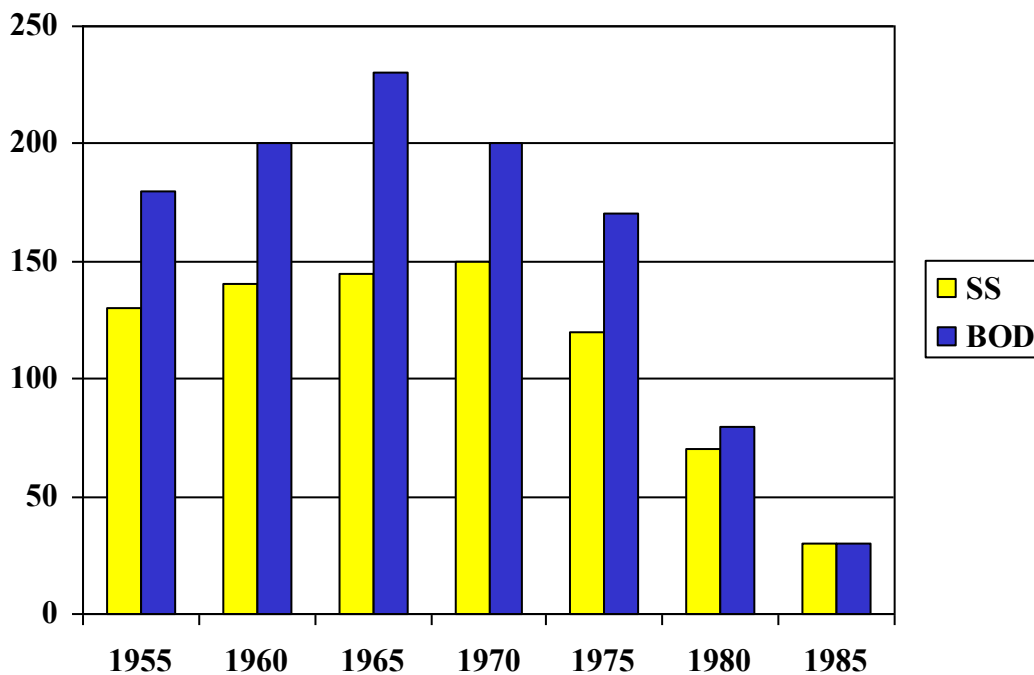
Throughout most of the sixties the Regional Board continued to operate under the Dickey Act, with waste discharge requirements becoming more sophisticated, but

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<sup>3</sup> Current budget is about \$10 million per year (less than \$2 per person in the Bay Area).

<sup>4</sup> For example, Section 13052(b) stated that each Regional Board shall "Encourage and assist in self-policing waste disposal programs for industry, and ... advise the applicant of the condition to be maintained in any disposal area or receiving water..."

still with little enforcement capabilities. Cities and industries implemented more wastewater treatment, but it was not enough to keep up with population growth. The condition of the Bay worsened during this time. Figure 2 shows that the amount of pollutants in sewage discharged to the Bay peaked in the mid to late 60s.



*Figure 2. Loadings of Pollutants to the Bay from Sewage treatment Plants*  
BOD = Biological Oxygen Demands, SS = Suspended Solids, loadings in thousands of kilograms per day.

In 1969 the Legislature passed the Porter Cologne Water Quality Control Act. This law superseded the Dickey Act. The new law greatly increased the power of the Regional Boards throughout California. The Act begins with a legislative finding that the “waters of the state shall be regulated to attain the highest quality which is reasonable” and that “the statewide program for water quality control can be most effectively administered regionally”. The Act gave the Regional Board authority to set standards, issue orders to implement those standards, and, most importantly, the ability to enforce its orders. Enforcement authorities include orders, including ones that can impose sewage system connection bans (essentially building bans) on a community, and referrals to the Attorney General for court ordered injunctions, fines, and/or prison terms. The Act has been amended several times, most significantly in the 1980s, when the Regional Boards were

given the authority to assess fines directly, without going to court.<sup>5</sup> The combined effect of increased authority for the Regional Board, federal and State financial assistance programs, and increased public concern about the environment, all contributed to the significant declines in sewage discharges to the Bay noted on Figure 2, even during a time of population growth.

There were other events during the 1960s that had significant impacts on the Bay, both good and bad. Grass roots environmental activism began at this time, which brought a keener focus to environmental issues and Bay protection. In terms of adverse impacts to the Bay's habitat, the California Water Project began, adding to the significant amounts of fresh water being diverted from the Bay for uses in other parts of the State. Also during the 60s, UC Berkeley conducted a major study of the Bay, noting problems with dissolved oxygen, bacteria, odor problems, oil spills, and toxic compounds, especially pesticides.

## 1970s

The 70s began with the first Earth Day in April of 1970. On the national level, in response to the new environmental awareness, concern, and activism, a host of federal laws were passed. These laws covered water pollution<sup>6</sup>, solid and hazardous wastes<sup>7</sup>, toxic substances<sup>8</sup>, contaminated site cleanups<sup>9</sup>, and endangered species<sup>10</sup>, among other things. The most significant for the Regional Board was the Clean Water Act, which set up the federal NPDES<sup>11</sup> permit system for discharging wastes to surface waters.

The State water quality law was amended to incorporate the federal discharge requirements, and in 1975 the US EPA delegated the authority for issuing and enforcing NPDES permits to the Regional Board. This was significant because it set minimum technological requirements for wastewater treatment. Also at this time, a federal and State grant program was established that would pay for most construction costs<sup>12</sup> for new sewer plants to meet the new requirements. During the late 1970s the Regional Board issued a series of orders requiring the upgrades of sewage treatment facilities throughout the Bay Area. In cases where local officials were reluctant to invest in sewage treatment, the Board used its enforcement authorities. The most significant case occurred when the Regional Board imposed a building ban on the City of San Francisco for a short time. This spurred the City to take significant measures to deal with their sewage discharge problems, and during the next 20 years the City spent about \$1.6 billion to improve their sewage treatment and collection system.

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<sup>5</sup> The authority to issue fines has been extensively used by the Regional Board, for example, between 1997 and 1999 the Board assessed about 45 fines against dischargers totaling approximately \$3.5 million.

<sup>6</sup> Clean Water Act (CWA)

<sup>7</sup> Resource Conservation and Recovery Act (RCRA)

<sup>8</sup> Toxic Substances Control Act (TSCA)

<sup>9</sup> Comprehensive Environmental Response Compensation and Liability Act (CERCLA or Superfund)

<sup>10</sup> Endangered Species Act (ESA)

<sup>11</sup> National Pollutant Discharge Elimination System

<sup>12</sup> 75% federal, 12.5% State, and 12.5% local costs

1975 was also the year the Regional Board issued its first Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan). The Plan defines beneficial uses of the different water bodies in the Bay Area (e.g. drinking water supply, fish habitat, agricultural supply, wildlife habitat, etc.), sets water quality objectives for the different uses (e.g. drinking water standards or toxic levels to protect fish), and sets out an implementation program. The Basin Plan is periodically updated.

Finally, it was during the 1970s, that the Regional Board first took a serious interest in groundwaters. Based on new State regulations and guidelines, landfills and ponds were being regulated to minimize or eliminate the leakage of wastes to the groundwater underneath the sites. Also the Board established guidelines for septic tanks and delegated the authority to regulate septic tanks to the Counties whose ordinances met the guidelines.

## 1980s

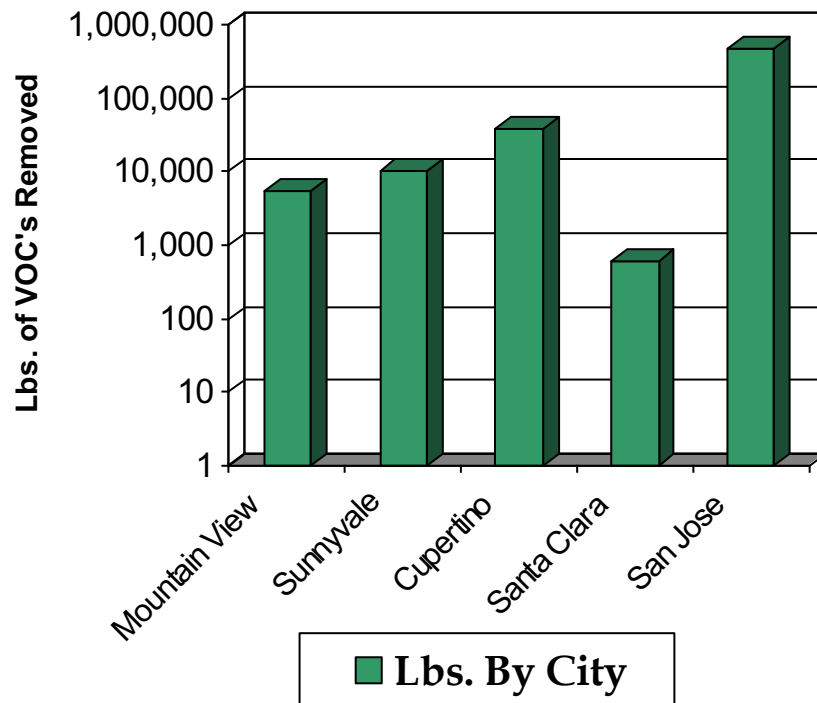
The 1980s saw a major expansion of the Regional Board's role in water quality issues throughout the Bay Area. The most significant new role was in groundwater cleanups. In the early 1980s several major Silicon Valley manufacturing sites discovered that their underground waste solvent tanks had leaked. In one case a major public supply well had been contaminated with solvent levels more than seven times higher than the drinking water standard. Besides working towards cleanup of the known sites, the Board staff also sent out about 2500 letters requiring other owners of underground tanks to determine if their tanks had leaked. This effort eventually led to the discovery of several hundred sites where solvents had leaked into groundwater. About 30 of these sites were considered serious enough environmental threats to be placed on the national Superfund list. The Regional Board, working under an agreement with US EPA, took the lead for cleanup on about two thirds of the Superfund sites, and by the end of the decade most of the sites<sup>13</sup> had approved cleanup plans which were being implemented. The cleanups of these sites resulted in the removal of approximately 500,000 lbs of industrial solvents from groundwater, see Figure 3.

A major outcome of the cleanup of solvent leaks was the discovery that large numbers of underground fuel tanks had also leaked<sup>14</sup>. This discovery led to local, and eventually State and federal, legislation and regulations that required testing underground tanks, replacing old leak prone systems and cleanup efforts. Cleanup efforts were overseen either directly by Regional Board staff or by local agencies working with the Board. In order to expedite cleanup, a Statewide fund was established, based on a gasoline storage fee, which by the end of 1999 had distributed about \$800 million to clean up leaking fuel tanks. To date more than half of the leaking tanks have been cleaned up and the cases closed.

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<sup>13</sup> All Regional Board lead sites by the mid-90s

<sup>14</sup> Currently there are about 8500 known cases of fuel tanks that have leaked in the Bay Area.



*Figure 3. Groundwater Pollution Removed from Selected Superfund Sites*

During the 1980s, progress was also made in the area of surface water cleanup. The major emphasis was on the development of pre-treatment programs for industrial wastes going to sewer plants. This resulted in major reductions in the amount of toxic pollutants being discharged to the Bay. As an example, studies by USGS in the vicinity of the Palo Alto discharge show a significant decrease in copper concentrations in clams at the same time, see Figure 3, thus showing that pollution control efforts do provide measurable environmental benefits.

In conjunction with pre-treatment efforts, discharge permits issued by the Regional Board began including limits for disinfection, toxic pollutants, and fish toxicity, thus going beyond the regulation of conventional sewage pollutants required by State and federal guidelines. As a result of the efforts to clean up discharges, some shellfish harvesting in the Bay resumed during the 1980s, 50 years after it was stopped in the 1930s.

This was also the decade when State law was amended to give the Board the authority to impose fines administratively.

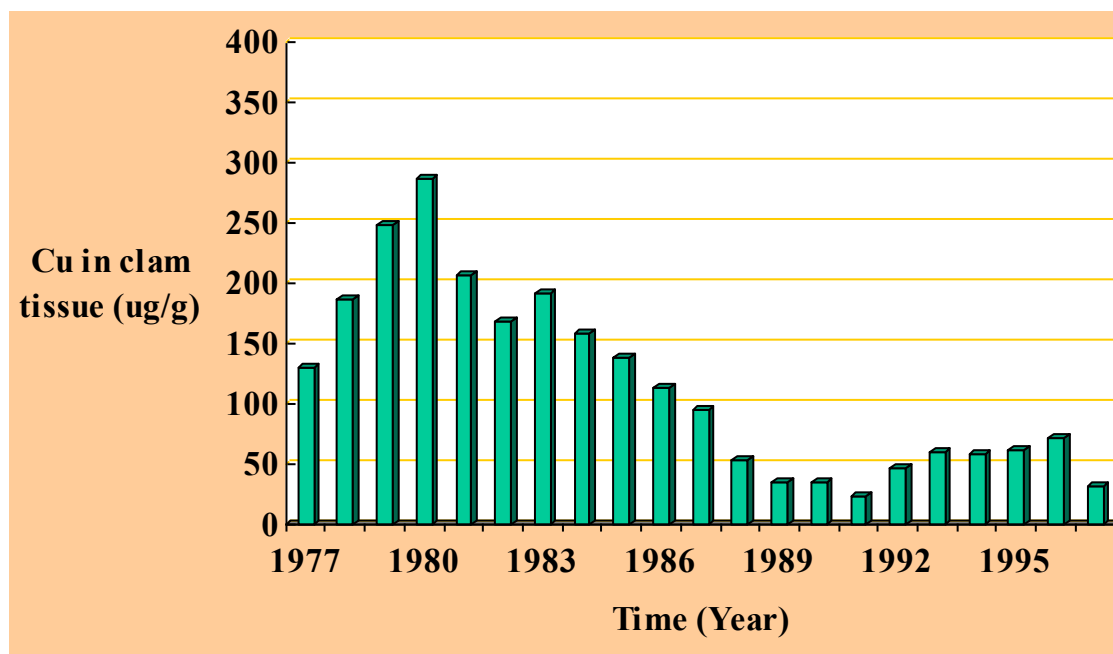


Figure 4. Copper concentrations in clams near the Palo Alto outfall

## 1990s

The 1990s saw a further expansion of the Regional Board’s interests and programs, primarily to address the challenge of non-point sources of pollution. The prior 40 years efforts had a significant impact on reducing point sources of pollution. The main sources of pollution are now non-point sources, such as stormwater runoff, input from Central Valley rivers, atmospheric deposition, spills, and contaminated sediments in the Bay. Programs, both within the Region and nationwide, included the regulation of stormwater discharges from urban areas, industries and construction sites. These programs focused primarily on preventing pollutants from entering stormwater, rather than treating stormwater runoff, which is very difficult to do effectively. For example, the Board addressed the major problem of erosion and sediment runoff from construction sites through a combination of enforcement against problem sites and an education program for the entire industry.

The Board emphasized other forms of pollution prevention, as opposed to just pollution treatment. Board staff worked with local sewer and stormwater agencies to implement this program. One major success was working with the local sewage agencies and the Department of Pesticide Regulation to ban the use of copper based root killers in the Bay Area counties. Other efforts include public education campaigns encouraging the proper use of household toxic chemicals (e.g. pesticides, motor oils, etc.) so that the chemicals do not end up in the local creek.



A new nationwide effort in water quality protection that began in the 90s was watershed management. The Regional Board has been participating in local efforts. These include the large scale San Francisco Estuary Project, which developed a watershed plan, the “Comprehensive Conservation and Management Plan”, for the whole Bay estuary. Board staff is also working with local watershed management efforts. These efforts involve getting all parties with an interest in a watershed (e.g. local government, business groups, environmental groups, landowners, etc.) together to try to come to agreement about what the problems are in the local watershed, what’s causing the problems, and what can be done to correct them.

Another significant Board program that began in the 1990s includes the active role taken by the Board in the regulation of wetland fills and dredging in the Bay. One major accomplishment was the completion of a report describing goals for wetland preservation and creation in order to help assure a healthy ecosystem in the Bay Area.<sup>15</sup> The Board, through its regulatory program, and by working in partnership with other agencies, has begun to reverse the long-term losses of wetland and other critical habitats. Another major accomplishment was in the area of dredging regulation. The Board, in partnership with other State and federal agencies, created the Long Term Management Strategy (LTMS) for dredged material. This program emphasizes the beneficial reuse of dredged material and minimizes the amount disposed of in the Bay.

Finally, the 1990s saw the beginning of comprehensive monitoring programs in the Bay. The primary program is the Regional Monitoring Program, which monitors about 25 stations throughout the Bay. Water, sediment and organisms have been monitored annually<sup>16</sup> since 1993. Board staff has also monitored over 100 sediment locations to determine which areas are potential sources of toxic contaminants in the Bay. A significant finding of the Bay monitoring was that fish in the Bay are contaminated<sup>17</sup>. Based on this study the State has issued an interim health advisory that people should limit their consumption of Bay caught fish<sup>18</sup>.

In the area of groundwater, the major development of the 90s was the introduction of MTBE<sup>19</sup> to gasoline. This compound behaves differently than other gasoline constituents (it’s much more soluble and mobile) and therefore poses a more significant risk to drinking water supplies than was true of past gasoline leaks. The Governor has ordered that MTBE’s use in gasoline be phased out, but it will take a few years.

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<sup>15</sup> “Baylands Ecosystem Habitat Goals”, available on the Internet at [www.sfei.org](http://www.sfei.org)

<sup>16</sup> Two or three times a year, depending on the constituent being monitored and location. All data collected by the RMP is available on the Web at [www.sfei.org](http://www.sfei.org).

<sup>17</sup> Primary chemicals causing the contamination are mercury and PCBs. The contaminants are the result of mostly non-point source pollution, much of which occurred before the Board was even created.

<sup>18</sup> People are advised to not eat more than two meals per month of fish from the Bay, one meal per month for children under six and for pregnant or nursing women.

<sup>19</sup> Methyl Tertiary Butyl Ether, added to gasoline to comply with air pollution regulations.

## Next Steps – 2000 and Beyond

Great progress has been made over the last 50 years to deal with the water quality problems, both surface and groundwaters, in the Bay Area. However, some significant issues remain to be resolved. Among these is the decline in the quantity and quality of the biological resources of the Bay. There are fewer fish and other species, and some of the ones remaining carry contamination in their bodies. There are four main reasons for the problems with the biological resources: pollution; habitat destruction; invasive species; and freshwater diversions. The Regional Board will continue to focus attention on all of these issues.

Pollution control is the main regulatory function of the Board. All past efforts continue, but new ones are just beginning. The major new effort is the establishment of Total Maximum Daily Loads (TMDLs) for pollutants that are causing water quality impairments. The TMDL process involves: determining a safe level of loading for each problem pollutant; determining the existing sources of pollution, both point and non-point; allocating load reductions to all the different sources; and implementing the load reductions. TMDL efforts are just beginning, with initial results expected in 2000. Final TMDLs will take a few years to develop and more to implement. Working in conjunction with TMDL efforts will be continuing and expanding efforts for overall watershed management.

In the area of habitat destruction, the Regional Board will continue its program of regulating wetland fills and requiring mitigation. Watershed efforts will continue and expand, and habitat preservation and re-creation are expected to be a major focus of any watershed management plan. Board staff is just beginning work on developing a stream habitat preservation policy, which would be applicable for a variety of projects, such as construction near streams or flood control projects.

Recent legislation addresses the regulation of invasive species<sup>20</sup>. Board staff will be working with other agencies and local ports and shipyards to reduce the discharge of ballast water and impacts from invasive species.

The questions around fresh water diversions are complicated and statewide. The Regional Board does not have the legal authority to regulate the diversions, but it will work with the State Board<sup>21</sup> and CalFed<sup>22</sup> to maximize positive results for Bay water quality in any solution to the diversion issues. To help reduce the need for fresh water imports, the Regional Board will work with other agencies to maximize the recycling of wastewater for safe uses in the Bay Area. Treated wastewater should be seen as a valuable resource, rather than as a waste to be disposed.

Finally, groundwater cleanup continues. The next steps will include better definition of groundwater uses and better monitoring of the overall impacts on groundwater resources.

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<sup>20</sup> A 1999 bill will require ship ballast water exchange for ships coming from foreign ports.

<sup>21</sup> State Water Resources Control Board, which has water rights authority in California.

<sup>22</sup> A consortium of State and federal agencies that is attempting to resolve the Water Wars.

The Board's efforts to bring polluted industrial sites back into productive use, i.e. the Brownfields Program, will continue and expand. Also, additional efforts will be needed to resolve the problems caused by MTBE pollution from gasoline.

## **Conclusions**

**I**n 1950 most sewage discharged to the Bay was untreated, created foul odors and fish kills due to oxygen depletion. The Bay was endured when one had to cross the Bay Bridge and was seen as a good place to dump garbage. Since then, pursuant to regulation by the Regional Board, all sewage is treated, and while the population of the Bay Area has grown from 2.5 million to 6.5 million people, the pounds of sewage pollutants discharged has been reduced by about 87%. The Bay is no longer a place to avoid, rather it is seen and used as a valuable asset of the Bay area: a place to be further protected, a place that can in the future be made as attractive to fish as it is to people.

Groundwater efforts have discovered thousands of pollution sources with the potential to impact this resource. Under Regional Board guidance and regulation, all the major sites are being cleaned up and a majority have finished their cleanups.

A great deal of progress has been made to monitor, discover, and correct water quality problems throughout the Bay Area over the last 50 years. However, the effort is far from over. We will need the partnership of all stakeholders (public, government, industry, and the environmental community) to reach our goal of a healthy aquatic ecosystem in the midst of a major urban area that is home to millions<sup>23</sup> of people.

Any questions regarding this paper should be addressed to Wil Bruhns, Regional Board Ombudsman, at (510) 622-2327.

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<sup>23</sup> The Association of Bay Area Governments predicts a population of about 8 million by 2020.