

# WATER POLLUTION AND SUSTAINABILITY: *Palo Alto's History of Response to New Challenges*

## *Background*

In April 2001 the Council adopted a Sustainability Policy; in December 2002 it approved an implementation plan that divided City activities into 10 categories and adopted indicators to measure progress; and in June 2003 the staff presented a progress report on all 10 categories. Then in the spring of 2004, staff recommended a new approach to progress reports, calling for them to be submitted one department at a time and written by the Sustainability Partnership with input from the relevant personnel. This is the first such report.

The 2003 report on Water combined the issues of the sustainability and quality of water supply with that of water pollution. In discussions of the new policy, however, it was decided that in the interest of clarity they should be treated separately.

## *Overview*

Since Palo Alto has always directed its sewage to the Bay, sustainability under water pollution has to be measured in terms of reducing pollution, with the ultimate goal of eliminating it. Starting with its initial incorporation as a city, however, the City has been a leader, both in treating that effluent to reduce water pollution in the Bay, and in educating companies and citizens to avoid polluting storm water (which is not treated). To do so, it has had to adapt and upgrade numerous times, in response to new knowledge about pollutants, increased requirements by the Regional Water Quality Control Board (RWQCB), and changes in effluent caused by changes in the local economy. This report will provide a brief history of those upgrades, and present sample indicators for measuring progress on current issues.



*Goal: To prudently manage water resources to sustain plant and animal life, support urban activities, and protect public health and safety. (Comprehensive Plan, Goal N-4)*

## *History*

*1894-1934: From non-treatment to primary; organic waste from canneries*

When Palo Alto incorporated in 1894, sewage was handled in private outhouses and cesspools. In 1898, the population of 3000 passed a \$28,000 bond issue to build a sewer network that discharged untreated sewage in Mayfield Slough (near the old Sea Scout building). While that was an improvement, unusually high tides caused sewage to back up onto city streets.

*This report was prepared by Walt Hays, Chair of the Sustainability Partnership for Palo Alto, CA.*

That, together with concerns about contamination of a planned Baylands park and yacht harbor, led the City to build its first treatment plant in 1934, by which time the population had grown to 27,000. That plant was one of the first on the Bay, and while it again was an improvement, it provided only primary treatment, consisting only of removing solids.



The primary effluent problem at that time was the large quantities of organic matter, much of it from local canneries. Discharging it into the Bay created an enormous biological oxygen demand (BOD), which caused aquatic creatures to suffocate. The decomposition also caused the Bay to stink.

1934-1972: Cease and desist orders; secondary treatment

The capacity of the plant was increased in response to the growth of population and industry, first in 1948 and again in 1956. However, primary treatment was increasingly insufficient. The resulting pollution led the state, in the late 60s, to issue a "cease and desist" order to Palo Alto, as well as to Mountain View and Los Altos, who had built their own small plants. In response, the cities agreed in 1968 to collaborate in building a new plant to provide secondary treatment. That plant was completed in 1972 for \$11 million, with 55 percent of the funding provided by the EPA under the Clean Water Act. In addition to the three cities mentioned, it now serves the East Palo Alto Sanitary District, Stanford, and Los Altos Hills. Called the Regional Water Quality Control Plant (RWQCP), it does not, as its name may suggest, deal with the quality of drinking water, but rather with improving the quality of water in the Bay through continuously improved treatment.

1972-1990: Metals from electronics; tertiary treatment

Secondary treatment, a large part of which involves "digestion" of sewage by bacteria, greatly reduced overall pollution. However, there remained the problem of how to dispose of the leftover sludge. To keep the plant as small as possible in order to minimize its impact on the Baylands, the City chose incineration. (San Jose, by comparison, dries its sludge in open furrows for use in agriculture, with result that with six times Palo Alto's service area population it uses 72 times as much space.)

As time went on, canneries were replaced with the electronics plants that led to the title of Silicon Valley, and the pollution problems evolved from organic matter to metals, particularly copper and nickel, which are highly toxic. Fortunately, it turned out that these metals naturally bonded to the bacteria in the plant, which removed most of those metals. The percent removed improved in 1978, with the addition of tertiary treatment, in which filters remove very fine particles, including heavy metals. In the early '80s, the EPA began to require *pre-treatment* of waste by industries, i.e., mandating that they remove as much contamination as possible prior to discharge to the sewer. And over time, most of the electronic fabricating plants moved to Asia, reducing metal discharges even further. Combined, those improvements led to a dramatic decrease in the discharge of metals into the Bay from the treatment plant, as indicated in Figure 1 [copper discharge to Bay]. However, copper also enters the Bay through storm water, which is not treated. One of the main sources of copper in storm runoff is the wearing of brake pads in vehicles. To solve that problem, the City has joined the Brake Pad Partnership, through which manufacturers have agreed to reduce the use of copper, as tests show it to be a significant source of pollution. Another major source is pesticides, discussed below.

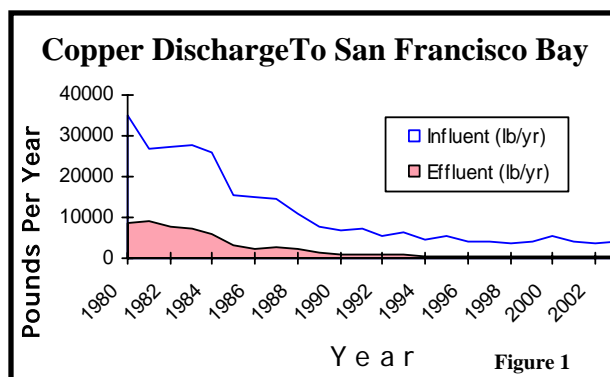
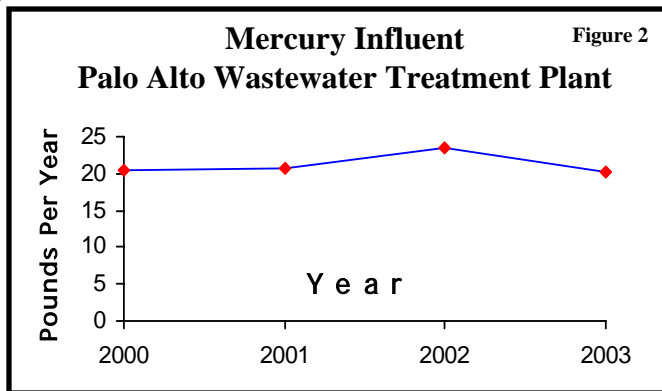


Figure 1

1990-2000: Bio-accumulation; mercury and pesticides

In the '90s, a new issue raised its head; namely, the bio-accumulation of toxics in fish and birds. As awareness of this problem increased, the City (and its partners in the RWQCP) has again adopted and introduced new programs. One example is mercury, a highly toxic substance which remains in very small amounts in the sludge produced by the treatment plant, volatilizes into the air when the sludge is incinerated, and then falls into the Bay. Mercury is contained in fluorescent lights, certain older thermometers, and the amalgam dentists use for tooth fillings. The City has instituted programs to deal with each, paying hardware stores to collect old lights, offering free digital thermometers in exchange for ones with mercury, and working with dentists to eliminate discharge of mercury. (Mercury in fillings does not cause harm; its primary threat to humans is in the consumption of contaminated fish.) These actions have yet to cause levels of mercury to fall (Figure 2), but that indicator should show progress by next year.



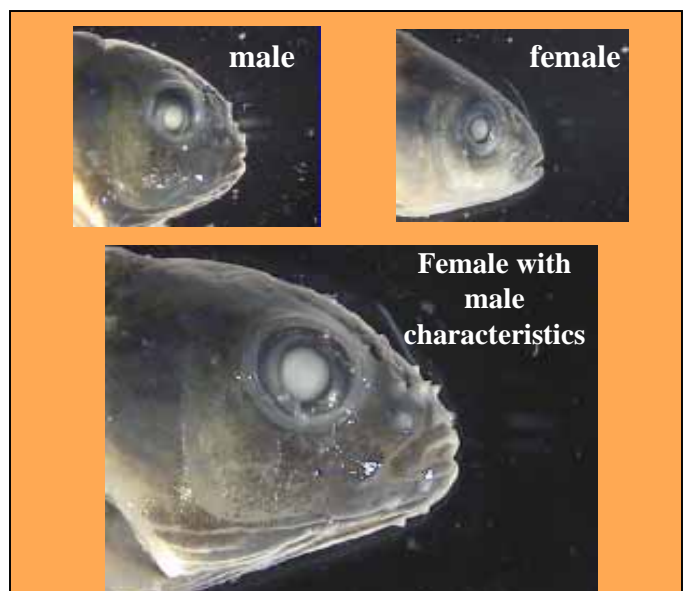
Another example is runoff of pesticides. Many people assume that their primary source is agriculture. In our area, however, it is residences. And while the City's use of pesticides is regulated, residential use is not. In response to this threat, the City has gone beyond regulatory compliance, initiating a rigorous Integrated Pest Management program to monitor pesticide use, use as little as possible, and use the least toxic chemicals when use is required. The studies involved, and actions taken and recommended, are contained in a thick volume entitled "Pest Management and Pesticide Use Report-2002." The report contains its own indicators of progress, and is much too voluminous to summarize. However, one recommendation for fiscal year 2003-4 is typical:

*"Change the policy to allow aluminum phosphide [a highly toxic pesticide] use under the following conditions: Only as a last option for gopher or ground squirrel control in large areas such as the golf course or Baylands in circumstances where trapping or baiting, burrow destruction, and other control measures cannot control the population within a reasonable time."*

In addition, the City has undertaken major regional efforts to educate retailers and consumers about less toxic pest control through quarterly workshops and extensive store partnerships which promote the sale of less toxic pest products. Proper disposal of pesticides is promoted through the Household Hazardous Waste program.

2000-present: Endocrine disrupters

While the City is making progress on the toxics issue, the first decade of the 21<sup>st</sup> century has brought to light still another challenge — endocrine disrupting compounds (EDCs). Scientific studies have shown a relationship between exposure to EDCs and abnormal thyroid function, sex alteration, poor hatching success, decreased fertility and growth, and altered behavior, especially in aquatic organisms. The EPA has undertaken a study of 87,000 chemicals to determine which may have disrupting effects. In this case, one of the major sources is disposal of expired medications in the sewage system, and the City has launched a program to educate citizens to also treat those medications as hazardous waste.



(Provided by G. Ankley, U.S. EPA, Duluth, MN)

## Recent Awards

The pollution prevention programs of the City have received a number of awards, including the following:

- In 2002, the Water Quality Control Plant received a national second place award from the EPA for an "Outstanding Pretreatment Program."
- In 2003, the California EPA presented the City of Palo Alto the "Integrated Pest Management Innovator Award" for its leadership in alternative pest control.

## Summary

From its inception, the City of Palo Alto has led the charge in committing to deal proactively and creatively with new challenges in reducing pollution in the Bay. That commitment involves in-depth analysis, training and implementation on many more fronts than a summary report like this can cover. However, the programs shown in the graphs are typical, and thus represent appropriate indicators of continuing progress.

## CITY OF PALO ALTO SUSTAINABILITY POLICY

"It is the intent of the City of Palo Alto to be a sustainable community - one which meets its current needs without compromising the ability of future generations to meet their own needs. In adopting this policy, the City of Palo Alto accepts its responsibility, through its programs and services, to:

□ **Economy:** Maintain a healthy, thriving and well-balanced economy comprised of a blend of large and small business, businesses and is resilient to the economic changes common to California's economy.

**Social Equity:** Continuously improve the quality of life for all Palo Alto community members.

**Environment:** Reduce resource use and pollution in a cost-effective manner while striving to protect and enhance the quality of the air, water, land and other natural resources; promote and support the conservation of native vegetation, fish, wildlife habitat and other ecosystems; and minimize human impacts on local and regional ecosystems.

In working toward these goals, the City will, when appropriate, align and partner with community groups, businesses and non-profits."

### VISION FOR THE WATERSHED



SANTA CLARA BASIN  
WATERSHED MANAGEMENT INITIATIVE

### Water Pollution Sustainability Objectives:

- **Reduce** the mass of persistent, bio-accumulative, or toxic chemicals discharged to San Francisco Bay.
- **Achieve** "no-net increase" in the volume of Bay discharge from the RWQCP through reuse of effluent.
- **Achieve** "no-net increase" of the mass discharge of each pollutant to the creeks and bay through a combination of RWQCP effluent reuse, RWQCP pollutant decreases, and storm water pollutant decreases.
- **Achieve** "no-net increase" of pollutant concentrations in the ecosystem (air, water, and land) from the residuals generated by the RWQCP.
- **Eliminate** (in the long term) the mass and concentration of pollutants entering the ecosystem (air, land, and water) from the RWQCP.

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