



Silicon Valley Environmental Partnership 2010 Environmental Indicators
Released December 2010

The Silicon Valley Environmental Partnership (SVEP) is pleased to provide this 3rd edition of our Silicon Valley Environmental Indicators. This suite of measures, assessing various aspects of the regional environment, is designed to provide views of where we have been and where we are now with respect to achieving a healthy, sustainable environment. For all these indicators, we give examples of what individuals, business and government can do to sustain our planet.

These are just a few suggestions—we hope they inspire you to do more!

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INTRODUCTION

Climate change—the central environmental issue of our time—is a theme throughout this document. Greenhouse gases, including CO₂, methane and nitrous oxides, are rapidly accumulating in our atmosphere due to burning fossil fuels, burning forests, and other human activity. The decade ending in 2009 was the warmest on record. Retreating glaciers and the shrinking Arctic ice cap give further evidence of a warming planet. According to the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report (2007), “Most of the observed increase in global average temperatures since the mid-20th century is *very likely* due to the observed increase in anthropogenic greenhouse gas concentrations.”

A warmer planet will have major impacts in our region. Sea levels are expected to rise 1-1.5 feet by 2050 (relative to 2000 levels) and will continue rising into the future, which will affect habitats and development along the Bay edge. State assessments of likely climate change impacts indicate a potentially devastating decrease in the Sierra snowpack which could reduce water availability in the Bay Area and across the state. And, studies show significant habitat and species disruption, and accelerating species extinctions.

According to the IPCC, we must reduce the amount of CO₂ we produce to 80 percent below 1990 levels. While this is a huge decrease, the fact is we waste about 40 percent of the fossil fuels we use, so plenty of progress toward this goal can be achieved with energy efficiency and conservation. For the energy needs that remain, using renewable energy sources is key and, in Silicon Valley, we are leaders in alternative energy innovation and use. We are already moving into the energy efficiency and renewables age, but we need to do more. Regionally, one of our biggest issues is reducing gas-powered car use—which results in about 40 percent of the carbon we put into the atmosphere in Silicon Valley and contributes significantly to human health problems.

Our responsible use of resources, through improved energy efficiency, waste reduction, and habitat protection simply make sense for long term sustainability of our environment and of the planet, whether you believe in human induced climate change or not. The indicators we present here suggest that, in many areas—including water use, energy use and solid waste production—we are moving in the direction of more sustainable resource use, but there is much more to do. And, there are new, emerging issues we will need to track. We have rated our progress over the last decade based on whether trends are heading in the direction of sustainability or not. We hope these indicators give you valuable information you can use to take action that will move Silicon Valley toward sustainability.

INDICATOR SELECTION AND DEVELOPMENT

These indicators were selected by the Silicon Valley Environmental Partnership Board members. In selecting these indicators, we sought measures that spanned a wide range of sustainability categories, including energy, air, water, waste, toxics, transportation and species. This selection followed the protocol for our past two reports, which also included a wide range of indicators. In addition, indicators had to meet these standards:

1. At least 3 years of data so that performance could be tracked over time.
2. Data relevant to the Silicon Valley region, which we defined as Alameda, Santa Clara and San Mateo Counties. We accepted data Santa Clara County alone when data for all three counties were not available or manageable.
3. Data must have been developed by government agencies or other highly reliable sources.
4. Be a factor that individuals, business and government can affect through action.

The indicators were researched and developed by SVEP Board members with the assistance of San Jose State University, Presidio Graduate School, and Dominican University of California students and graduates. Each indicator was evaluated by at least one external reviewer and revised based on reviewer comments. Sources of data are given with each indicator.

These indicators provide a view of our region's sustainability from different angles, but they do not give a complete or static picture of our environmental status. Each of these indicators is very complex and much more can be said about each. Our goal here is to provide basic and accurate information on a variety of resources and issues that affect the environmental health and offer some actions we can take to improve our region's sustainability. More information on these indicators is accruing all the time and solutions are evolving. We encourage readers to use these measures as a starting point to continue learning how we may be affecting the environment and how *we can be the answer* to protecting our planet now and for future generations.

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ENERGY

CONVENTIONAL ENERGY USE DECREASING PER CAPITA

What Is This Indicator about?

Silicon Valley, with its high-tech industry and growing population, has demanding energy requirements. Most of the energy we use in our daily lives is produced from fossil fuels - coal, oil, gasoline and natural gas. All of these resources, when combusted, generate carbon dioxide, a primary greenhouse gas that contributes to global climate change. In 2008, California ranked 47th in energy consumption per capita in the United States in 2008 (DOE 2009), as our state's average per capita usage was 30% lower than the national average. However, almost all of the energy consumed in the transportation sector is petroleum based (US EPA, 2010) and, of the total electricity used (generated and imported) in California in 2008, 63.9% came from burning fossil fuels (natural gas and coal). Other sources of electricity are nuclear power plants (14.5%), large hydroelectric plants (11.0%) and renewable sources (10.4%), such as solar, geothermal, wind, biomass and small hydro (CEC 2009a). Not only are fossil fuels a significant factor in climate change, but the US has only 2.1% of the global oil reserves. Since we use approximately 20% of the world's oil production, we are largely dependent on other nations to feed our expensive fossil fuel habit.

The simplest ways to reduce our dependence on non-renewable energy sources are to use energy much more efficiently and to increase our investment in renewable sources. Energy conservation measures, such as using CFL bulbs, insulating homes, and driving less not only help protect the environment, but they save money too. For the energy we do need, new energy technologies are emerging that are based on resources that create significantly less pollution – technologies such as wind, geothermal, biomass, and solar. These energy technologies allow us to tap into energy sources available in our county that do not require fossil fuel extraction, damming of rivers, or creation of nuclear waste. For example, photovoltaic (PV) solar panels are an increasingly viable option for individuals, businesses and governments to produce the energy they need locally from a renewable energy source.

How Are We doing?

In the period between 1997 and 2008, total energy use in Santa Clara County - including electricity, natural gas, gasoline and diesel - peaked around the year 1999 at approximately 273 trillion BTUs. Our total energy declined to approximately 255 trillion BTUs in 2008. In addition, energy use per capita has decreased by approximately 9% by 2008 (Figure 1), even as our County population grew by 7.2% between 1997 and 2008 (US Census Bureau, n.d. at <http://www.census.gov/popest/counties/CO-EST2009-01.html>). These numbers show we are using less energy and using it more efficiently. Approximately, 60% of this energy was from gasoline and diesel, 22% from electricity generation, and 18% from natural gas. On average, each Santa Clara County resident used 448 gallons of gasoline per year in 2008, down 12% from our peak usage of 528 gallons per person in 2001. Electricity use has also declined, down 2% between 2001 and 2008. While these numbers are encouraging, we still need to greatly reduce our consumption of fossil fuels to slow the impacts of climate change.

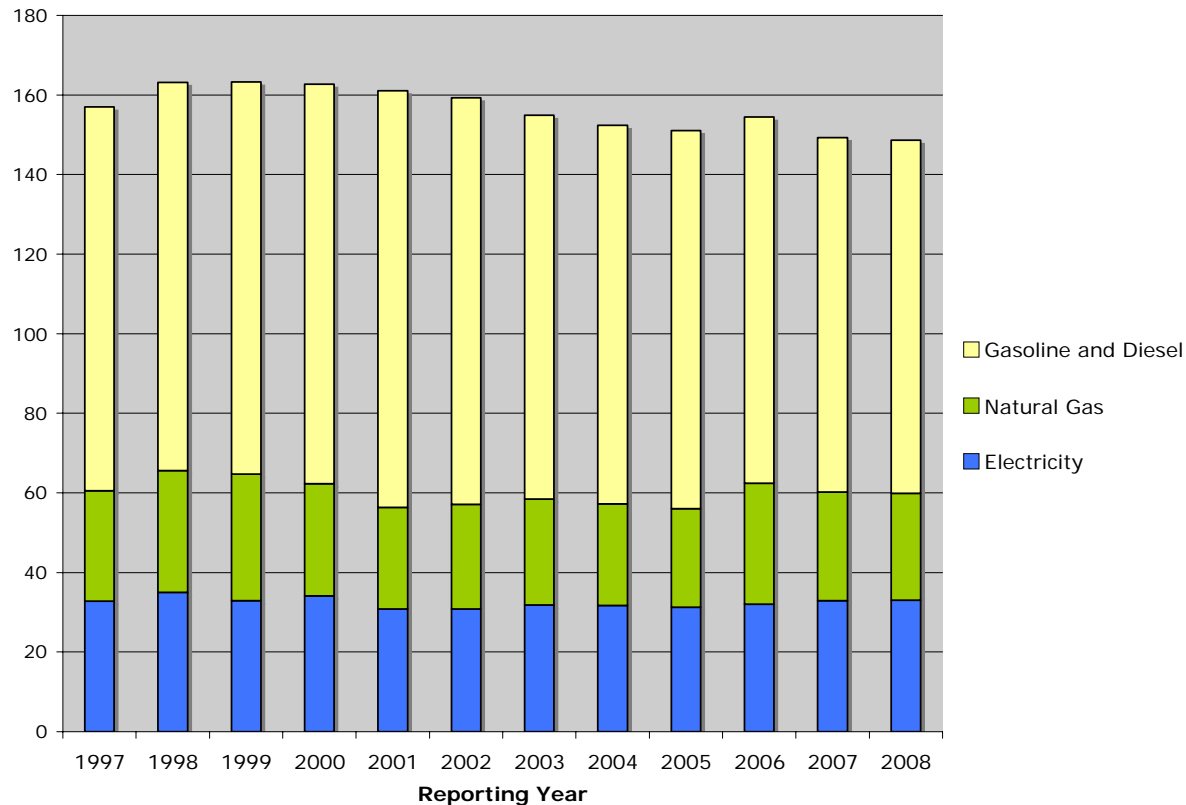


Figure 1. Per capita energy (electricity, natural gas, and gasoline/diesel) used in Santa Clara County (in millions of BTUs) between 1997 and 2008 (Data Sources: CEC 2008 and CDOT 2009)

Note: BTUs represented in the graphs are thermal BTUs. There are assumptions made in this analysis. For example, we assumed that all gasoline bought in Santa Clara County was used by residents, though some may have been purchased by non-residents and residents may have bought gasoline elsewhere.

By adopting, AB 32 (the California Global Warming Solutions Act of 2006), the State of California has set the goal of reducing greenhouse gas (GHG) production to 1990 levels by the year 2020. This legislation will require all of us to reduce our use of fossil fuels to limit the amount of carbon dioxide we are adding to global climate change. Each city in Santa Clara County has prepared, or is preparing, climate action plans to achieve the goals set forth in AB 32.

What Can I Do?

Individuals:

- Conduct an energy audit of your home to identify the most cost-effective ways use less energy.
- Implement as many energy audit recommendations as possible, such as improving insulation through better windows and window treatments, maintenance and/or upgrade of HVAC systems and use of smart meters and thermostats.
- Drive less, use public transportation, carpool or telecommute, whenever possible.
- Use energy efficient appliances and vehicles; install Energy Star products; conserve energy wherever possible.

- Replace incandescent bulbs with compact fluorescent (CFLs) or LEDs.
- Set your thermostat to 78° F in summer months and to 68° F in the winter.
- Consider installing renewable energy sources for your energy needs - PV (solar) panels, solar water heaters, etc.
- Wash in cold water and hang out laundry, when possible; set hot water heater no higher than 120 degrees F,
- Plant a shade tree, use windows to passively control temperature (open/close), replace dirty air filters, shut off heating or A/C when nobody is home.
- Compost your kitchen scraps or put all organic matter in the green bin, never in the garbage.
- Support local businesses that use clean energy like wind, solar, small hydroelectric, geothermal, biofuel, etc. (<http://www.greenbiz.ca.gov/index.html>).

Businesses and Industries:

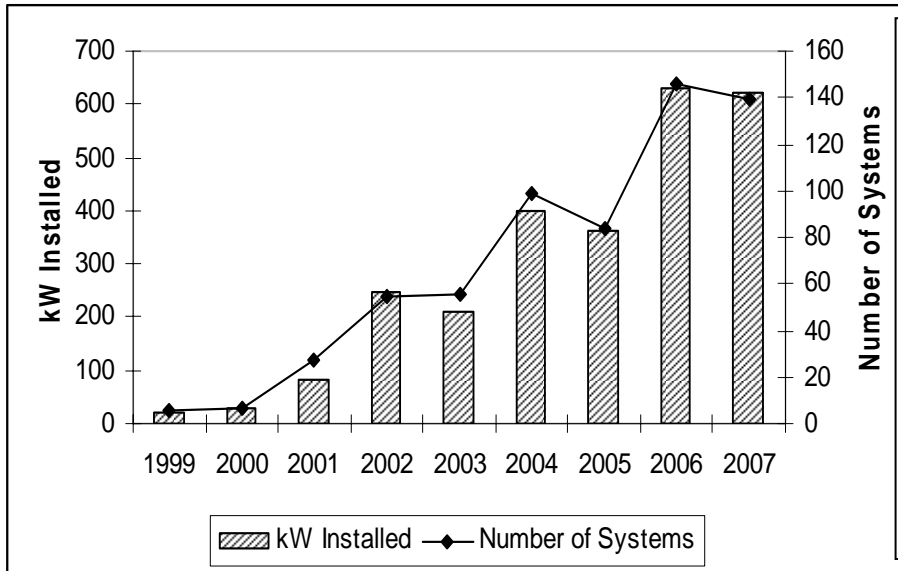
- Turn off lights, heat/air conditioning, and equipment after work hours; install automatic lights.
- Use energy saving features on office lighting and equipment – put computers, copiers and other equipment into sleep mode when not in use or turn them completely off.
- Encourage employees to use public transportation or carpool.
- Purchase energy efficient vehicles for company fleet.
- Install PV panels on buildings and over parking lots.
- Replace incandescent bulbs with compact fluorescent bulbs or LEDs.
- Encourage telecommuting or compute options that save gas.

Governments:

- Develop more efficient and widespread public transportation.
- Encourage the development of renewable energy sources.
- Purchase energy efficient vehicles for company fleet.
- Implement climate action plans.

Where Can I Learn More?

The information for this indicator was taken from the California Energy Commission website: <http://www.energy.ca.gov>. The Energy Commission has information on energy use from electricity, natural gas, gasoline/diesel sources. The website has information on solar energy for your home or business place. There is also an abundance of information on other ways to save more energy at your home or business. The Silicon Valley Energy Map, <http://www.svenergymap.org>, shows data on energy use, solar panels and green buildings by zip code.



EMERGING TREND – Solar Panel Installations Growing

Between 1999 and 2007, the number of photovoltaic (PV) solar panel systems installed by San Jose home and business owners grew rapidly. Only 6 systems were installed in 1999, compared to 140 in 2007. Total kilowatts of power generated by these systems grew to more than 600kW during this time. These gains are encouraging, but this energy generation is only a tiny fraction of the energy used. The CEC reports that only 11% of California’s electricity energy is generated by renewable sources and only 0.2% of all of California’s electricity is supplied by solar (CEC 2009a). Solar power is a tremendous resource available to help meet our electricity needs in California.

Sources Cited:

Department of Energy (DOE). 2009. US Energy Information: Consumption, Price and Expenditure Estimates. http://www.eia.doe.gov/emeu/states/hf.jsp?incfile=sep_sum/plain_html/rank_use_per_cap.html. Accessed on April 6, 2010.

California Energy Commission (CEC). 2009a. 2008 Net System Power Report <http://www.energy.ca.gov/2009publications/CEC-200-2009-010/CEC-200-2009-010.PDF>. Accessed on August 10, 2010

California Energy Commission (CEC). 2009b. California Solar Photovoltaic Statistics & Data. <http://www.energyalmanac.ca.gov/renewables/solar/1998-2006.html>. Accessed on April 5, 2010.

California Energy Commission (CEC). 2008. Energy Consumption Data Management System: Energy Consumption by County. Available: <http://www.ecdms.energy.ca.gov/elecbycounty.aspx> and <http://www.ecdms.energy.ca.gov/gasbycounty.aspx>. Accessed on August 10, 2010.

California Department of Transportation (CDOT). 2009. California Motor Vehicle Stock Travel, and Fuel Forecast (MVSTAFF). <http://www.dot.ca.gov/hq/tsip/smb/mvstaff.html>

US Environmental Protection Agency. 2010. Climate Change – Greenhouse Gas Emissions. Human –related sources and sinks of carbon dioxide. http://www.epa.gov/climatechange/emissions/co2_human.html . Accessed on December 11, 2010.

AIR QUALITY

PARTICULATE MATTER AND OZONE LEVELS IMPROVING

What Is This Indicator about?

Environmental and public health care costs resulting from air pollution are significant. One of the most dangerous air pollutants is particulate matter. Federal and State regulations require monitoring and control of particles with an average diameter of 10 microns (PM₁₀) and of “fine” particles, with average diameter less than 2.5 microns (PM_{2.5}). Both PM₁₀ and PM_{2.5} pollution are composed of very small liquid and solid particles that contribute to air pollution haze and are small enough to be inhaled deep into the lungs. Poor air quality from high particulate matter levels can afflict both urban and rural areas. The major sources of particulate matter include: (1) motor vehicles, (2) wood burning stoves and fireplaces, (3) dust from construction, landfills, and agriculture, (4) wildfires and brush/waste burning, (5) industrial sources such as coal and natural gas burning plants, and (6) windblown dust from open lands (CARB, 2009). When inhaled, these particles can increase the number and severity of asthma attacks, cause or aggravate bronchitis and other lung diseases, and reduce the body's ability to fight infections. In addition to particulate matter, ozone—a major component of smog—is a significant pollutant in Silicon Valley that compounds respiratory problems. Particulate matter and ozone are a health risks for everyone, but children, the elderly, exercising adults, and those suffering from lung diseases are especially sensitive.

How Are We Doing?

California has made great progress in the last 30 years in improving air quality. This state has stronger air pollution standards than federal levels and we are leaders in the use of cleaner-burning gasoline and renewable sources of energy that reduce air pollution. The number of bad air days, when PM_{2.5} exceeded the national standard, has declined greatly in Santa Clara County over the last decade (Figures 1). And the state average annual levels for PM_{2.5} has met California standards of less than 12µg/m³ (micrograms/cubic meter) since 2002, gradually declining from 13.6µg/m³ in 2000 to 10.1µg/m³ in 2009. In the last decade, the number of bad air days due to ozone, when levels exceeded the state 8-Hour standard of 0.070 ppm (parts per million), was between 4 and 16 days; although the numbers vary from year to year, the number of days ozone levels were exceeded has dropped slightly. While Silicon Valley is doing well, we can do more. A study of PM₁₀ (which includes the PM_{2.5} component) in Silicon Valley found that 70% of PM₁₀ in Silicon Valley comes from two sources: wood-burning stoves--accounting for approximately 32-34% of the particles--and motor vehicles, which account for 34-40% of the particulate matter (Hwanq and Hopke, 2006). Auto emissions are also the single greatest contributor to ozone levels. These are sources air pollution we can control. The California Air Resources Board recommends these measures to improve air quality: dust control for roads, construction, and landfills; reducing emissions from wood stoves and fireplaces; cleaner-burning gasoline and diesel fuels; better emission control devices for motor vehicles and industrial facilities (CARB, 2005).

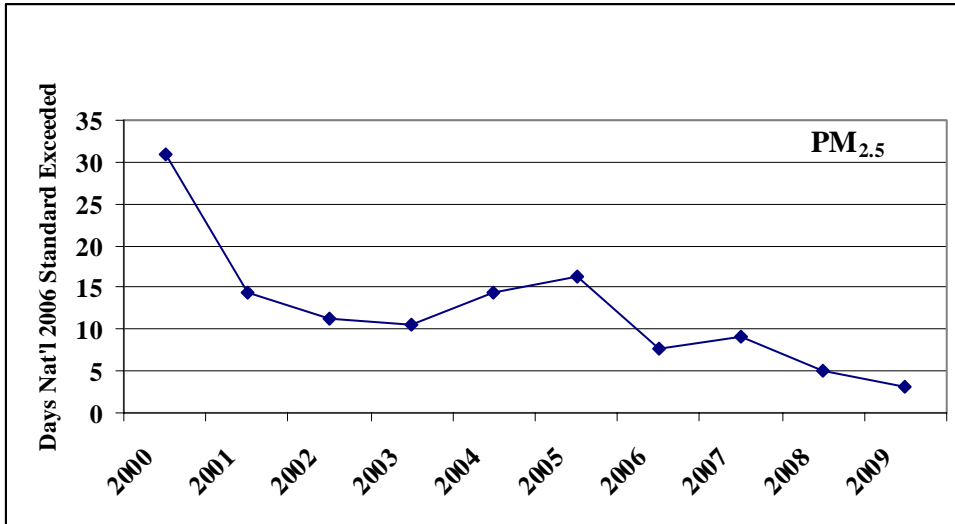


Figure 1. Number of days the PM_{2.5} exceeded the 2006 national standard and the State Annual PM_{2.5} Average for Santa Clara County. (Data from California ARB Air Quality Trend Summaries at <http://www.arb.ca.gov/adam/trends/trends1.php>)

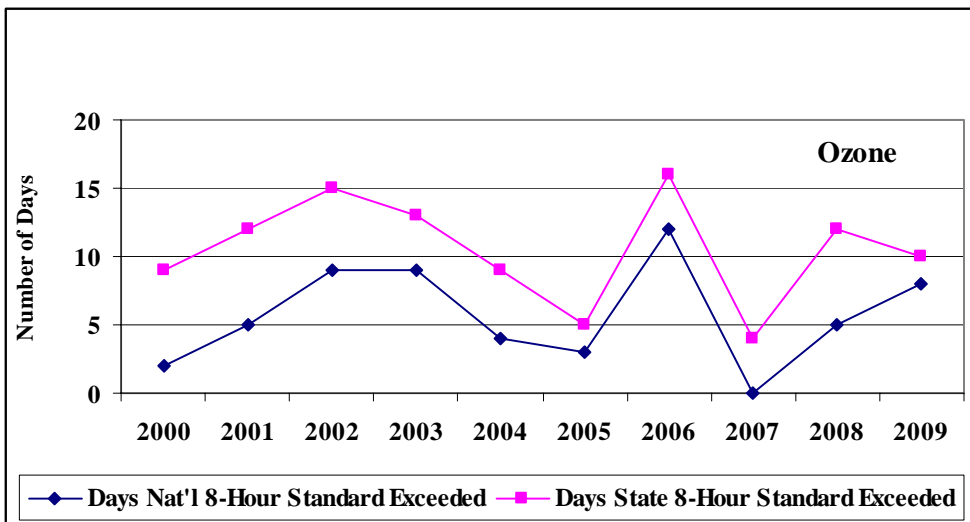


Figure 2. Number of the Ozone level exceeded state and national 8-Hour standards in Santa Clara County. (Data from California ARB Air Quality Trend Summaries at <http://www.arb.ca.gov/adam/trends/trends1.php>)

What Can I Do?

Individuals:

- Reduce travel on motor vehicle travel, especially on poor air days.
- Avoid using your wood stove or fireplace; better yet, change to a cleaner heating source.
- Avoid using leaf blowers and other dust-producing equipment.
- Drive slowly on unpaved roads and other dirt surfaces.
- Avoid vigorous physical activity on days that have poor air quality.
- Get involved with air quality improvement programs in your community.

Businesses:

- Provide incentives to encourage employees to carpool and ride public transit.
- Not allow landscapers to use leaf blowers and other dust-producing equipment.
- Comply with local rules to reduce industrial sources of PM₁₀ that apply; work with local agencies to develop strategies to further reduce PM₁₀.

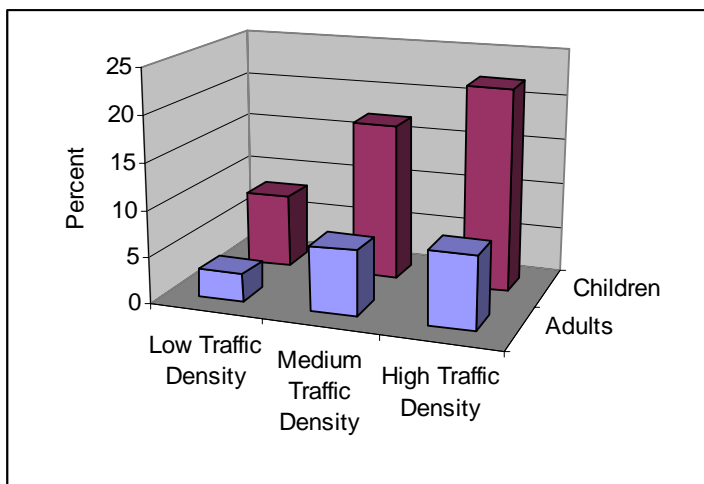
Governments can implement or require:

- Dust control for roads, construction, and landfills.
- Programs to reduce car traffic, especially near children and the elderly.
- Programs to reduce emission from and eventually replace wood stoves and fireplaces.
- Cleaner-burning gasoline and diesel fuels.
- Emission control devices for motor vehicles.
- Controls for industrial facilities.

Where Can I Learn More?

The California Air Resources Board (<http://www.arb.ca.gov>) is an excellent source of user-friendly information on air quality in California, as well as detailed data on air quality at specific locations throughout the state. Another high-quality source of information is California Breathing (<http://www.californiabreathing.org>), a program of the California Department of Public Health's Environmental Health Investigations Branch.

IMPORTANT ISSUE—The Link between Asthma and Air Pollution



Air pollutants, especially particulate matter and ozone, are linked to rates of asthma, one of the most common chronic respiratory disorders in the United States. A report by the UCLA Center for Health Policy Research (2006) found that, as traffic levels increase, so do the rates of hospitalization for children and adults who suffer from asthma (see graph); ethnic/racial minorities and low-income households are most likely to be affected and children are especially sensitive. In 2005, the asthma rates for children aged 0-17 in Santa Clara and San Mateo counties were 13.7% and 12.2% respectively, both below the state average of 16.1%, while the rate in Alameda County was 20.6% (California Breathing, 2006). Cutting levels of particulate matter and ozone is critical to reducing these asthma rates and improving the health of our children.

Sources Cited:

- California Air Resources Board (CARB). 2009. Air Pollution – Particulate Matter Brochure. <http://www.arb.ca.gov/html/brochure/pm10.htm> . Accessed March 26, 2010.
- California Air Resources Board (CARB). 2005. Ozone and Health. <ftp://ftp.arb.ca.gov/carbis/research/aaqs/caaqs/ozone/ozone6.pdf>. Accessed March 26, 2010.
- Hwanq, I. and P.K. Hopke. 2006. Comparison of source apportionments of fine particulate matter at two San Jose speciation trends network sites. *Journal of the Air and Waste Management Association* 56(9):1287-1300
- Meng Y. Y., R.Pl Rull, M. Wilhelm, B. Ritz, P. English, H. Yu, S. Nathan, M. Kuruvilla and E.R. Brown. 2006. Living Near Heavy Traffic Increases Asthma Severity. Los Angeles: UCLA Center for Health Policy Research.
- California Breathing. 2005. California Health Interview Survey: Lifetime Asthma Prevalence, Children Age 0-4 & 5-17 California by County, 2005 http://www.californiabreathing.org/images/stories/publications/new/prevalence_kids_0-17.pdf . Accessed March 26, 2010.

PUBLIC TRANSIT

PUBLIC TRANSIT RIDERSHIP UP -- AUTO TRAVEL STILL HIGH

What Is This Indicator about?

We love our cars and the freedom they provide. But, we know that motor vehicles are a major source of environmental and health problems. Cars are primary contributors to the pollution haze that veils our Valley and they are a major producer of CO₂, which is contributing to global climate change. In fact, approximately half the CO₂ we generate in a typical two-car household is from cars (VTA, 2008). Pollutants from motor vehicles also produce a range of other pollutants, many of which contribute to the particulate matter pollution in our atmosphere, a cause of lung disease and other respiratory ailments. One way to reduce these auto-induced problems is by riding public transit. But, in 2003, 74% of commuters in Santa Clara County commuted alone in their car (MTC, 2003). According to the Valley Transit Authority (VTA), a person commuting alone in their car on 20-mile round-trip each day produces approximately 2.4 tons of CO₂ emissions annually, approximately 10% of the entire carbon output of a typical household (VTA, 2008). Eliminating a car in a two-car household and using public transit reduces that household's carbon footprint by 30%! Taking public transit is one of the most important personal actions we can take to reduce our carbon footprint and global climate change. Significant ridership on public transit and other alternatives to the car will reduce pollution, health problems due to car emissions, and our contribution to climate change.

How Are We Doing?

The good news is, over the last decade and a half, ridership on public transit has grown significantly. VTA's average annual weekday ridership has risen from about 20,000 in 1996 to over 34,000 in 2009, an increase of 70% (VTA, 2009), even though the County population grew only about 10% in this period (MTC, 2005). Caltrain ridership has also grown dramatically, nearly doubling since 1996 (Figure 1). This increased ridership is good news, but the rate of ridership is still low. The bad news is, only 4% of commuters in Santa Clara County use transit (Figure 2); in San Mateo it is 9% and 15% in Alameda County. Also, vehicles miles traveled per person has not declined, showing we are not driving less; in 1990, people in Santa Clara County traveled about 18 miles on a weekday and in 2007 that number was estimated at 22 miles per day (MTC, 2005). According to the Metropolitan Transportation Commission (MTC), in 2006, in Santa Clara, Alameda and San Mateo Counties combined, approximately 65% of all trips were in single-occupancy vehicles. This number has been constant in the Bay Area since 1993, averaging about 67%. Also, carpool levels have remained relatively constant in the Bay Area since 1993, ranging between 14% and 19%. So, although public transit ridership is up, the percent of the population riding public transit is small, carpool numbers are not increasing, and the number of miles we travel in our cars is still big. Alternative modes of travel, such as public transit, carpooling, and biking (see "Emerging Issue"), must increase greatly and translate into reductions in auto miles traveled in order to improve the environment. We are a long way from these goals.

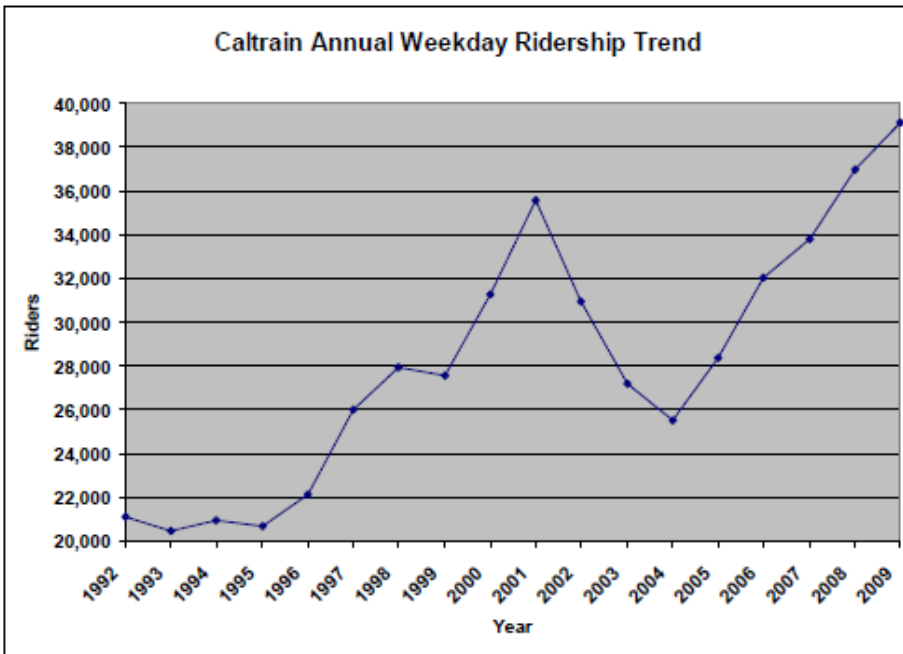


Figure 1. Caltrain Annual Weekday Ridership.
 (From: *Key Findings: February 2009 Caltrain Annual Passenger Counts*.
http://www.caltrain.com/pdf/annual_ridership_counts/2009_Caltrain_Ridership_Counts.pdf)

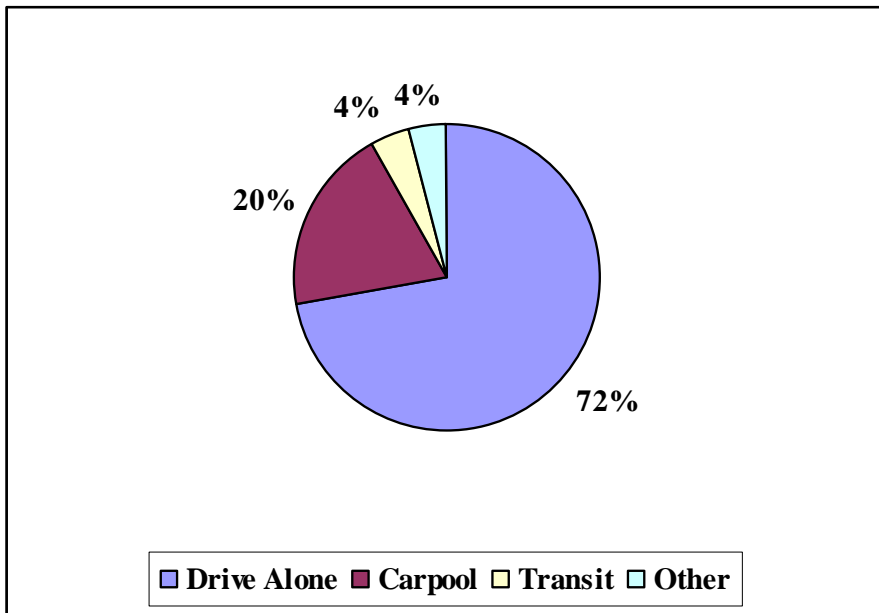


Figure 2. Commuter Modes in Santa Clara County, 2003.
 (From: MTC, 2003)

What Can I Do?

Individuals:

- Use public transit for trips to work or other locations.
- Walk or bicycle to nearby locations.
- When you move, move near your work so that you can walk or bike, or move near public transit.
- Teleconference, rather than driving to meetings, whenever possible.
- Ask city, county and state officials to provide better public transit systems and to subsidize public transit costs to encourage ridership.
- Encourage your city council to build dense housing within a quarter of a mile from existing public transit.
- Advocate for safe biking and walking routes to schools so that children can get to school without being driven there.

Businesses:

- Provide incentives to encourage employees to carpool and ride public transit.
- Provide and actively encourage teleconferences to avoid travel to meetings.
- When moving to new locations, chose facilities near public transit.
- Upgrade auto fleets to hybrids, electric vehicles or other very low emission vehicles.

Governments:

- Ensure that streets are safe and convenient for biking and walking, as well as driving.
- Provide incentives and subsidies to encourage workers to use public transit.
- Develop safe bike lanes and useful facilities for bike commuting.
- Develop and implement a master plan for bike infrastructure and support.
- Promote mixed use development within a quarter of a mile from public transit.
- Subsidize and fund public transit over auto infrastructure.
- Improve pedestrian safety and comfort to promote walking.

Where Can I Learn More?

In Silicon Valley, the Valley Transit Authority, Caltrain, BART, and SamTrans all provide public transit options and have complete information on how to use their system. Many cities provide public transit within their borders, such as San Jose's free DASH buses that serve the downtown area. The Metropolitan Transit Authority, CalTrans and the Bay Area Air Quality Management District have bigger picture information on transportation and its impacts to the Bay Area.

EMERGING ISSUE—As a way to get around, bicycling is growing!



Bicycles have huge potential to reduce greenhouse gasses and improve our health! On the order of 40% of trips we take are under 2 miles, ideal for bike commuting—and for staying in shape, since biking for an hour consumes between 400 and 700 calories. And, polls have indicated that 20 percent or so of adults say they would sometimes bike to work if safe routes and workplace parking and changing facilities were provided (CARB, 2008).

In fact, bicycle ridership is growing. On Caltrain, bike commuters grew by 41% between 2004 and 2006 showing the strong demand for combining biking and public transit. Bike commuting is supported when communities create safe bike routes and install bicycle facilities as parts of new and current projects. Governments and transit agencies need to lead the way by providing bicycle space and facilities and a culture of biking versus driving.

Sources Cited:

- California Air Resources Board (CARB). 2008. ARC Bicycle Awareness Program. <http://www.arb.ca.gov/planning/tsaq/bicycle/factsht.htm>. Accessed on March 22, 2010.
- Caltrain. 2009. Key Findings: February 2009 CalTrain Annual Passenger Counts. http://www.caltrain.com/pdf/annual_ridership_counts/2009_Caltrain_Ridership_Counts.pdf. Accessed on December 28, 2009.
- Metropolitan Transportation Commission (MTC). 2008. Transportation 2035 Plan for the San Francisco Bay Area. Oakland, CA. http://www.mtc.ca.gov/planning/2035_plan/Supplementary/T2035-Travel_Forecast_Data_Summary.pdf. Accessed on March 19, 2010.
- Metropolitan Transportation Commission (MTC). 2005. Maps and Data: San Francisco Bay Area Vehicle Miles of Travel (VMT), Population and Employment, 1990-2030. http://www.mtc.ca.gov/maps_and_data/datamart/stats/vmt.htm. Accessed on August 14, 2010.
- Metropolitan Transportation Commission (MTC). 2003. How Bay Area Residents Commute. Commute Profile 2003. http://rideshare.511.org/research/pdfs/residentscommute_cp03.pdf. Accessed on August 14, 2010.
- Valley Transit Authority (VTA). 2008. Public Transportation: VTA Combating Climate Change. http://www.vta.org/brochures_publications/pdf/climate_change.pdf. Accessed on December 28, 2009.
- Valley Transit Authority (VTA). 2009. VTA Facts: Current Light Rail Service Data, October 2009. http://www.vta.org/services/lrt_facts.pdf. Accessed on December 28, 2009.

WATER USE

WATER USE PER PERSON DECREASES SLIGHTLY—CLIMATE CHANGE EMERGES AS A THREAT TO WATER SUPPLIES

What Is This Indicator about?

The average person in the Santa Clara Valley uses about 70,000 gallons of water per year or about 190 gallons per person a day. Surprised? Much of that water is used on basic daily activities such as washing clothes and dishes, taking a shower, or flushing a toilet. Water for toilets and landscaping are the largest water wasters, in both commercial and residential sectors. Residents use 59% and businesses 35% of Santa Clara County water (SCVWD 2005). While we take our water for granted, there are limits to both the amount of water we can supply and the amount of water that can be disposed of properly. Our current rate of water use leaves little in streams for wildlife such as steelhead trout, a Federally-listed threatened species in Silicon Valley, and little buffer for droughts. As populations grow and climate changes, water is expected to become scarcer. In 2007, Stanley Williams, CEO of the Santa Clara Valley Water District said, “Global climate change is now viewed as one of the most significant long-term threats to water resources management.” Conservation and recycling are essential to achieving a sustainable water future. Since we waste nearly 40% of all the water we use, there’s plenty of room to save water. We have begun to stretch our water supplies through water conservation and the use of recycled water.

How Are We Doing?

Even though the County’s population grew by approximately 5% between 2000 and 2009, total water used remained relatively constant, at approximately 379,000 acre-feet per year—an acre-foot of water being approximately the amount of water that would cover a football field to the depth of one foot. Water use has not increased with increasing population because water used per person declined slightly over the past decade (Figure 1), an indicator of water conservation practices in action. For example, in 1996-1997 each person used approximately 75,000 gallons/year, but in 2005-2006 that amount had dropped to approximately 68,500 gallons per person/year. In fact, conservation and recycled water made up 17% of the water supplied by the Santa Clara Valley Water District in 2008-2009 (SCVWD, 2009a), and this number is expected to grow. In 2008-2009, recycled water was approximately 5% of the conservation savings (Figure 2). Water savings have also conserved energy, eliminating approximately 429 million kg CO₂ that would have gone into the atmosphere—an amount of energy that could power over 265,000 homes for a year (SCVWD, 2008). Although we have done well increasing water conservation and using recycled water, population growth and global climate change are expected to strain Silicon Valley’s water supply in the near future (see “Emerging Issue”, below).

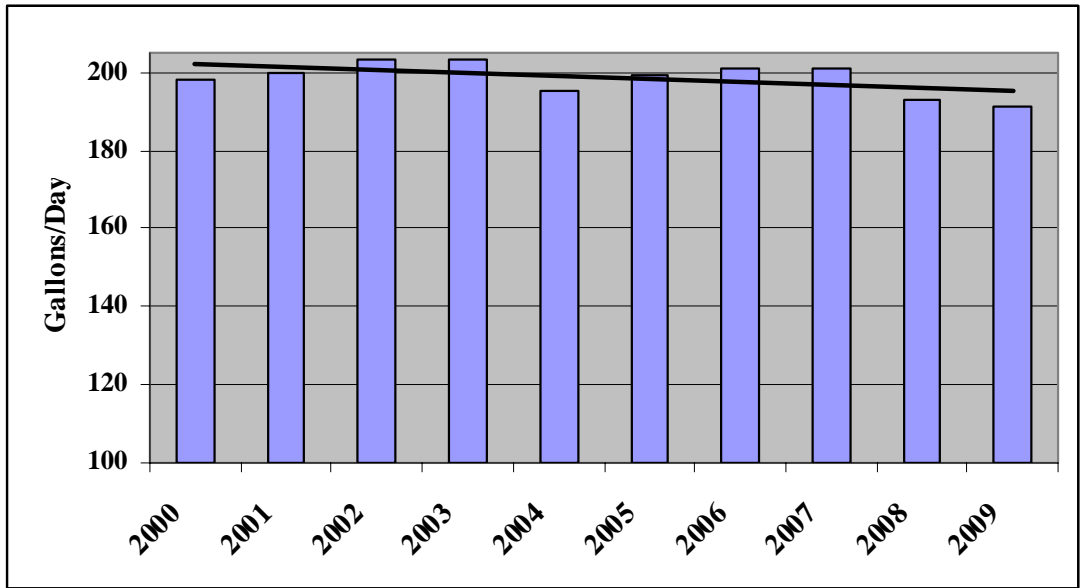


Figure 1. Gallons per Day of Water Used per Person in Santa Clara County, 2000-2009. (Population Data from US Census Bureau, n.d. at <http://www.census.gov/popest/counties/CO-EST2009-01.html>; Water Use Data from SCVWD, 2007, 2009a, 2009b)

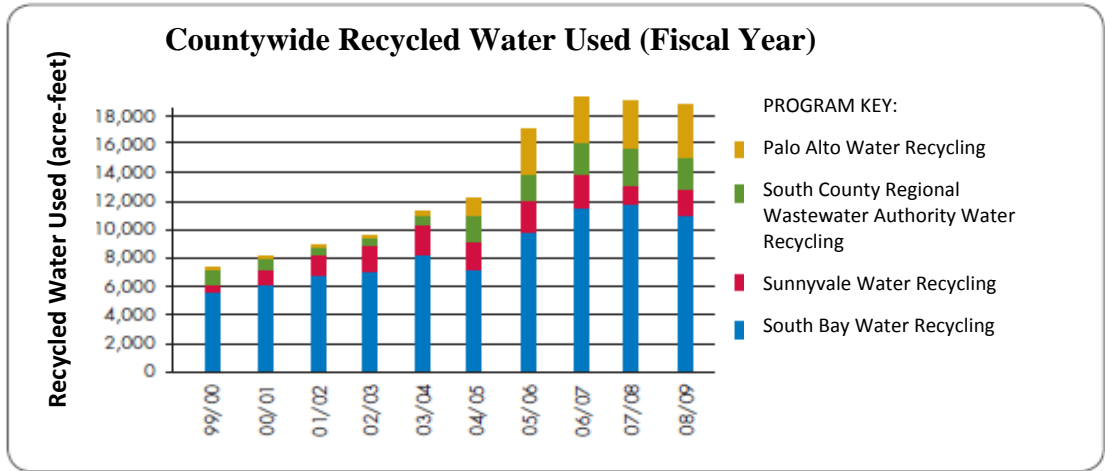


Figure 2. Amount of Recycled Water from South Bay Water Authorities. (SCVWD, 2009a)

What Can I Do?

The Santa Clara Valley Water District has a wide array of programs and rebates to help everyone save water. For a complete list of Santa Clara Valley Water District water conservation program incentives and eligibility rules, please visit www.valleywater.org/conservation.

Individuals: With increasingly limited water resources, it is the individual who will bear the burden of the increased costs. Actions to take include:

- Take advantage of government programs for conservation and recycling. Contact your city or the SCVWD for help in reducing water use. You may even be eligible for rebates.
- Reduce potable water use where not essential.
- Install low-flow taps, shower heads and toilets. The biggest use of indoor water is the toilet, so switching to low flow (1.6 gpf) or Ultra-low Flow Toilets (ULFTs) is the most effective indoor residential action.
- Plant native, drought-tolerant plants that require little to no summer water. 50% of residential water use is for landscape irrigation.
- Reuse water, such as greywater, for appropriate non-potable uses such as watering certain plants and flushing toilets. Diverting water to multiple uses is not especially expensive. Greywater is free and is available during all types of weather. A resource for rainwater and greywater collection is Greywater Action (<http://greywateraction.org/>).

Business: Conserving water resources, reducing consumption and encouraging use of recycled water where possible, will all cut down on costs for businesses. Businesses can:

- Take advantage of the wide array of water conservation programs offered by authorities such as the Santa Clara County Water District, including water use surveys, programs to replace water wasting toilet, and rebates for some water-saving actions.
- Landscape with drought-tolerant native species.
- Use recycled water on landscaping.
- Develop and implement grey water and rainwater capture systems.

Government: Conservation and recycling water are the key tools to meeting water needs as populations grow.

- Invest in recycling projects. Good resource for this is the WaterReuse Association (<http://www.watereuse.org/>).
- Educate citizens about reducing water consumption and waste and improving water conservation.
- Meter all water use.
- Charge higher rates for water that is not for direct consumption or water use over particular thresholds.
- Offer recycled water at costs significantly lower than potable water.

Where Can I Learn More?

Learn more about conserving water at the Santa Clara Valley Water District website: <http://www.valleywater.org>. The Bay Area Water Supply and Conservation Agency (<http://www.bawsca.org>) also has relevant information on water conservation, recycled water and information on the Bay Area water interests. South Bay Water Recycling (<http://www.sanjoseca.gov/sbwr/>) and Palo Alto Wastewater Treatment Plant Recycling (http://www.cityofpaloalto.org/environment/water_quality.asp) are also resources for learning about water issues and signing up to receive recycled water or other water saving measures.



EMERGING ISSUE - Climate Change Threatens Water Supplies!

Rising global temperatures are already causing the Sierra Nevada snowpack, which serves as a frozen storage area for the water we use, to melt sooner than in the past. As more precipitation falls as rain, rather than snow, flood risks increase. And less water is stored in the Sierra for summer water needs and for generating hydroelectric power (Masur and Milanes, 2009). Limited reservoir capacities will not allow us to capture all the melted snow for our use. Recycling, conservation, grey water use and other measures will become even more essential as this occurs.

Anderson Reservoir (USGS photo at <http://3dparks.wr.usgs.gov/3Dbayarea/>)

Sources Cited

- Masur, L. and C. Milanes. 2009. Indicators of Climate Change in California. Office of Environmental Health Hazard Assessment, California Environmental Protection Agency. Sacramento, CA. 197 pp.
- Santa Clara Valley Water District (SCVWD). 2005. Urban Water Management Plan 2005. <http://www.valleywater.org/Search.aspx?searchtext=Urban%20Water%20Management%20plan%202005> . Accessed on August 1, 2010.
- Santa Clara Valley Water District (SCVWD). 2007. From Watts to Water: Climate Change Response through Saving Water, Saving Energy and Reducing Air Pollution. <http://www.valleywater.org/conservation/media/Documents/WUE%20Water%20Energy%20Report.pdf> . Accessed May 5, 2010.
- Santa Clara Valley Water District (SCVWD), 2008. Water Use Efficiency Program, Year End Report, Fiscal Year 2007-2008. <http://www.valleywater.org/Search.aspx?searchtext=2007-2008%20Water%20Use%20Efficiency> . Accessed January 5, 2010.
- Santa Clara Valley Water District (SCVWD), 2009a. Water Use Efficiency Program, Year End Report, Fiscal Year 2008-2009. <http://www.valleywater.org/Search.aspx?searchtext=2007-2008%20Water%20Use%20Efficiency> . Accessed August 1, 2010.
- Santa Clara Valley Water District (SCVWD). 2009b. Water Utility Enterprise Report 2009. <http://www.valleywater.org/Search.aspx?searchtext=Water%20Utility%20Enterprise> . Accessed on August 1, 2010.

SOLID WASTE

OVERALL WASTE PRODUCTION DECREASES—PLASTICS EMERGE AS A THREAT TO WATERS AND WILDLIFE

What Is This Indicator about?

It seems the garbage that we produce, otherwise known as solid waste, magically disappears each week when we put our trash cans and recycling bins at the curb. But, we know all this stuff is going somewhere. Material that cannot be recycled goes to landfills. Not only do landfills occupy precious space and can pollute groundwater supplies, they are California's second largest source of methane, a greenhouse gas that is *21 times* more potent than CO₂ (CARB, 2009). Much of this methane production comes from organic waste such as food and lawn/garden material, which when thrown into a landfill, decomposes in a way that produces significant amounts of methane (CARB, 2009).

The amount of garbage we send to the landfill is a direct measure of the amount of the earth's resources we are consuming and wasting. Over-consumption is one the world's greatest environmental challenges—and the U.S. is a consumption behemoth. The California Department of Resources Recycling and Reduction (CalRecycle) states that over 60 percent of the "garbage" in California landfills can be composted or recycled, reducing landfill space and methane output. Although recycling materials is important, recycling still takes energy and resources. The *most effective* waste reduction methods are to *reduce* purchases and *reuse* what we do buy. Reducing our waste reduces the need for landfills and reduces the amount we need to recycle. Reducing our consumption is one of the best things we can do to move society toward sustainable resource use.

How Are We Doing?

Over the last 10 years, Santa Clara County (estimated using Santa Clara County unincorporated) has successfully increased the amount of solid waste diverted from landfills and is exceeding the overall state diversion rate (Figure 1). In fact, all cities and unincorporated areas in Santa Clara County exceeded the 50% diversion rate required by state law (Figure 2). Recycling programs have been very successful—between 1995 and 2006, the percent of waste diverted from landfills grew from about 40% to 60%. And the amount per person going to landfills has declined from about 1.1 pounds per day to 0.8 pounds per day between 1998 and 2006. While our efforts to recycle have been somewhat effective, we are still throwing huge amounts of materials into landfills. For example, paper and food waste are major parts of the waste stream even though much of it can be recycled or composted. Landfill space is decreasing quickly and some materials, such as plastics, that are not recycled or disposed of properly threaten the environment (see "Emerging Issue", below). To truly be sustainable, we need to follow nature's "zero waste" model—a system in which there is *no waste* because all materials are reused. We must become a "zero waste" society.

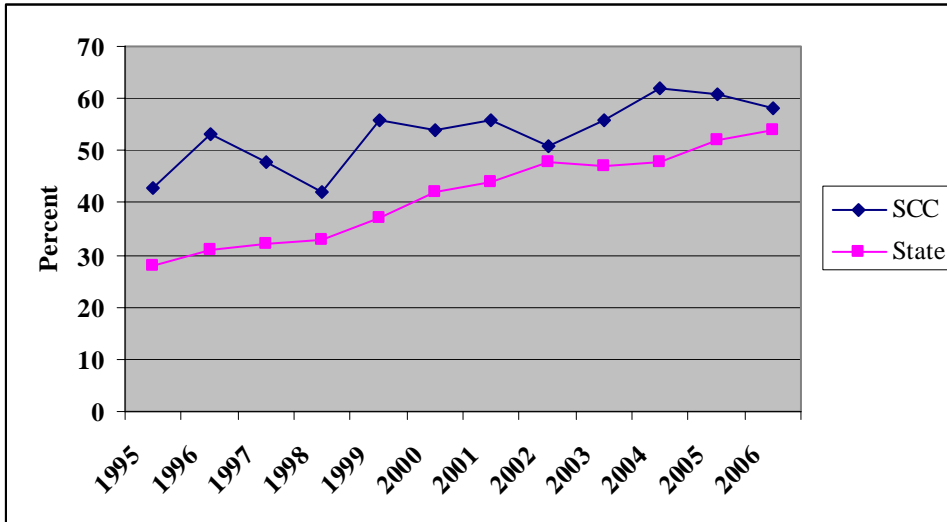


Figure 1. Percent Solid Waste Diverted from Landfills in Santa Clara County-unincorporated compared to Statewide Diversion Rates (From CalRecycle at <http://www.calrecycle.ca.gov/Profiles/Juris/JurProfile2.asp?RG=U&JURID=467&JUR=Santa+Clara-Unincorporated> and <http://www.calrecycle.ca.gov/LGCentral/Rates/Graphs/TotalWaste.htm>)

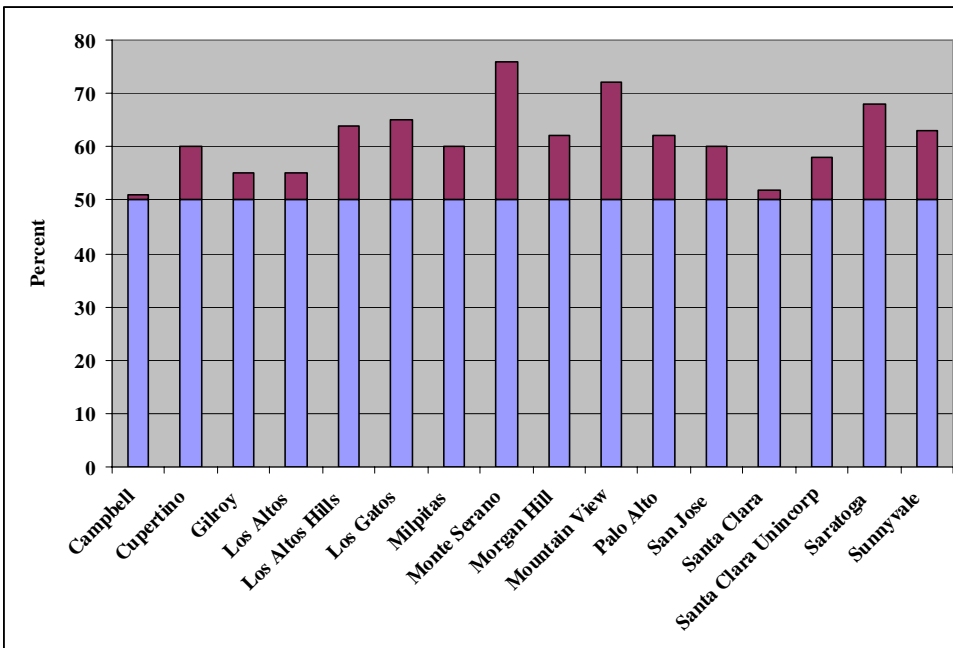


Figure 2. Percent Solid Waste Diverted from Landfills by City in 2006 (statewide requirement is at least a 50% diversion rate) (From CalRecycle at <http://www.calrecycle.ca.gov/LGCentral/Tools/mars/jurdrsta.asp>)

What Can I Do?

Individuals: Reducing consumption is key—reduce what you buy so that you throw away less. But for the things we do buy, we can follow some rules of thumb:

- Keep goods as long as possible; typically, the longer you use a product the lower its the environment.
- Reuse as much as possible, including plastic containers, paper and plastic bags, and other materials.
- Purchase items from reuse shops such as consignment stores and reused building material suppliers.
- Sell items you no longer want to new users.
- Bring your own containers for bulk items at the grocery store. Buy products in easily recyclable materials. For plastic, buy containers of PET or HDPE (numbers 1 or 2).
- Buy products made of recycled products, especially paper and plastics, to contribute to the recycled goods market.
- Compost as much organic material as you can to reduce the amount of methane landfills generate.
- Get more ideas for waste reduction from the California Integrated Waste Management Board at <http://www.calrecycle.ca.gov/> .

Business: Disposing of waste is expensive as landfill space is limited and these facilities charge for waste disposal.

- Buy only products that are necessary and buy products made of recycled materials.
- Encourage reuse of materials.
- Keep office equipment and machines as long as possible.
- Recycle all materials or otherwise dispose of all items properly.
- Use green design and life cycle analysis in product design and manufacture.

Government:

- Create extended producer responsibility (EPR) legislation to reduce the impacts of a product and its packaging for paper and plastic. According to the California Product Stewardship Council, EPR requires “whoever designs, produces, sells or uses a product takes responsibility for minimizing its environmental impact through all stages of the product’s life cycle. And the producer, having the greatest ability to minimize impacts, has the most responsibility.” Read more about EPR at <http://www.calpsc.org/solution/index.html> .
- Institute a “green procurement” policy that requires purchasing products made of recycled materials.
- Invest in facilities that sort recyclables from non-recyclable materials.
- Expand incentive and educational programs to reduce waste production.

Where Can I Learn More?

The CalRecycle website, <http://www.calrecycle.ca.gov/>, offers a wealth of information on the waste we generate. Use this site to learn about locations of recycling facilities and what you can do to help reduce consumption and disposal of the earth's resources. Also, the US Environmental Protection Agency website on Resource Conservation at <http://www.epa.gov/osw/conserve/index.htm> is an excellent source of information on the impacts of waste and what to do about eliminating those impacts.

EMERGING ISSUE—Plastics threaten ocean life!

One material that should be recycled, but often isn't—is PLASTIC. The US EPA (2009) states that less than 7% of all plastic produced was recycled in 2008! While there are many types of plastics, most cities recycle only PET and HDPE plastic (numbers 1 and 2). Where does the non-recycled plastic go? Some of it fills precious landfill space. The rest clogs rivers and streams, pollutes beaches, adds toxins to fish, and kills wildlife. Bay Area streams are choked with plastics and other waste, which makes its way to the Bay and then the Pacific Ocean. Millions of animals every year are killed by plastic and plastic is polluting the fish we eat. Since plastic takes hundreds of years to degrade, *every piece of plastic we have produced is still here on the planet!*



This dead Laysan albatross, which lived in the North Pacific, ingested so much plastic that it died of hunger. In the ocean between Hawaii and California, a place called the Pacific Gyre, over 3 million tons of plastic debris have collected. Waste from Silicon Valley contributed to this huge “plastic island”. This massive junk pile is a hazard for birds, boats, fish and animals, like us, who eat fish. (Moore, et al. 2001; See also:

http://www.fws.gov/midway/Midway_Atoll_NWR_Cigarette_Lighters.pdf)

Photo by Cynthia Vanderlip

Sources Cited:

- California Air Resources Board (CARB). 2009. Staff Report: Initial Statement of Reasons for the Proposed Regulation to Reduce Methane Emissions from Municipal Solid Waste Landfills. Sacramento, CA. <http://www.arb.ca.gov/regact/2009/landfills09/isor.pdf> . Accessed on March 18, 2010.
- California Department of Resources Recycling and Recovery (CalRecycle). 2010. Local Government Central. <http://www.calrecycle.ca.gov/LGCentral> . Accessed on August 5, 2010.
- Moore, C., S.L. Moore, M.K. Leecaster, and S.B. Weisberg. 2001. A Comparison of Plastic and Plankton in the North Pacific Central Gyre. *Marine Pollution Bulletin* **42** (12): 1297–1300, [doi:10.1016/S0025-326X\(01\)00114-X](https://doi.org/10.1016/S0025-326X(01)00114-X) .
- US Environmental Protection Agency. 2009. Plastics. <http://www.epa.gov/osw/conserve/materials/plastics.htm> . Accessed on March 19, 2010.

TOXIC CHEMICALS

RELEASES DOWN BUT REMAIN A CONCERN

What Is This Indicator about?

Silicon Valley is home to many cutting-edge industries that have set the pace for technological innovation around the world. But many of our local industries use chemicals in their manufacturing processes that have been identified as harmful to humans and the environment. In addition to toxic chemicals released by our industries, many products we use in our homes and work places also contain toxics. Toxins released to air, water and land can kill organisms, destroy local environments and harm human health. Evaluating the trends in our disposal of toxic chemicals indicates whether we are reducing the use or creation of toxics in our area. This indicator can serve as a rough measure of environmental progress over time (US EPA, 2010a).

In 1988, the US EPA published the first national Toxic Release Inventory (TRI) to track the use and release of chemicals determined to be toxic by the federal government. The US EPA requires businesses disposing of federally-listed toxic chemicals to account for all “release” activities. A “release” is defined as a discharge of any listed chemical to air, water or soil, either as a result of an accident or normal operating procedures. Listed chemicals transferred off-site to approved institutions for recycling, for use as fuel, or for treatment or storage by wastewater treatment plants are tracked, but not regarded as releases. Release estimates alone are not sufficient to determine exposure or to calculate potential adverse effects on human health and the environment (US EPA, 2010a).

TRI reporting has been a very successful program, resulting in a 45.5% drop in releases, nationwide from 1988 to 1999, of the 340 chemicals initially listed by the US EPA (PEW, 2009). TRI reporting allows communities to make informed decisions about how toxic chemicals are to be managed and they have more power to hold companies accountable for use and disposal of listed chemicals. Companies are often spurred to focus on their chemical management practices since their chemical release data are made public. (US EPA, 2010a). Because it is so effective, TRI is now being used as a model to track emissions of greenhouse gases in the fight against global climate change.

How Are We Doing?

In Santa Clara County between 1988 and 1999, releases of the core chemicals that were listed in 1988 were reduced 88% by weight (US EPA, 2010a). By 2008 - twenty years after the US EPA first started to monitor these chemicals - Santa Clara County has reduced emissions of the 1988 core chemicals 98% by weight (see Figure 1). The average release of 1988 core chemicals dropped from the 1988 high of 27,548 pounds per reporting company to the 2008 low of 1,156 pounds per company.

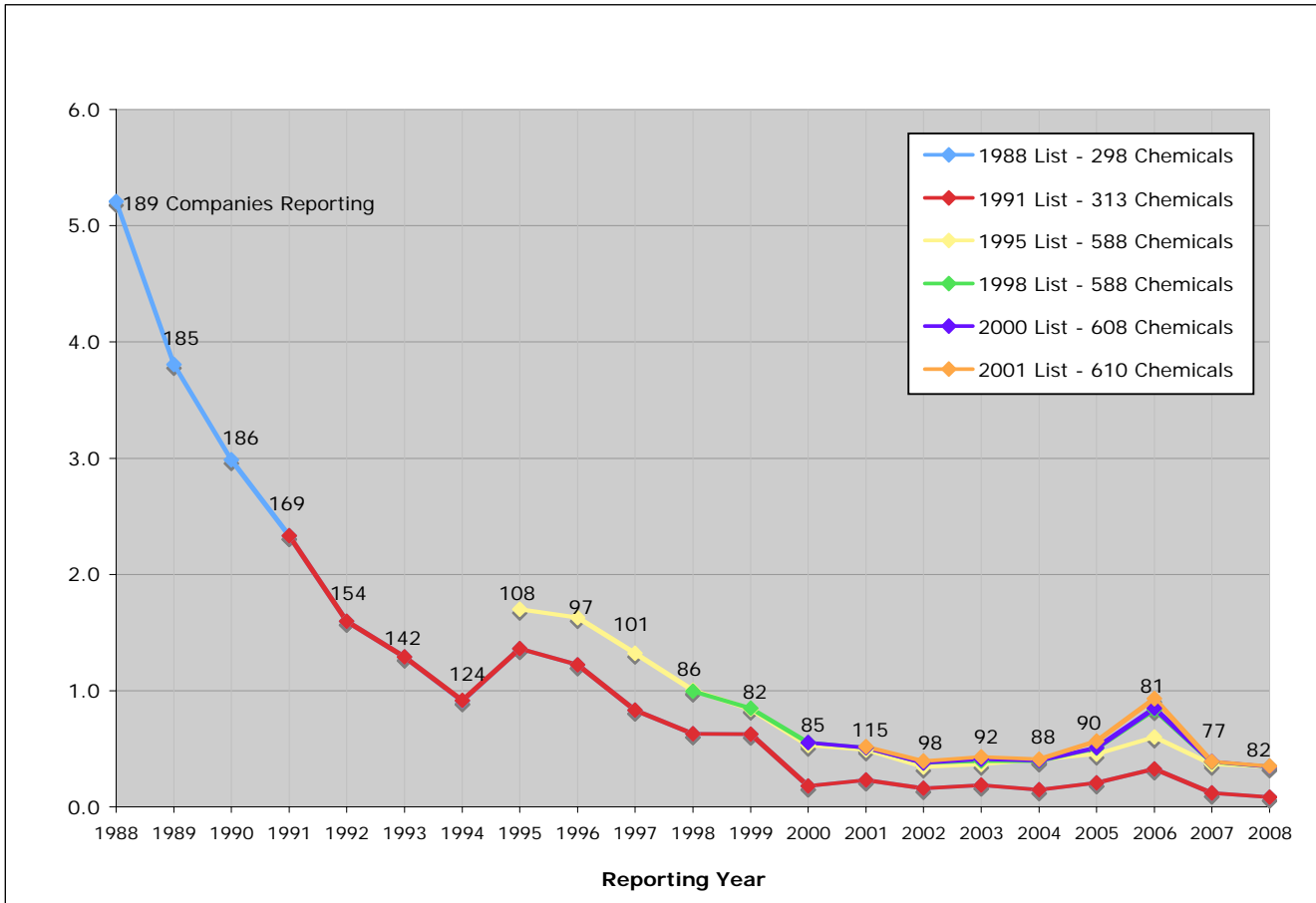


Figure 1. TRI Core Chemical releases from all industries in Santa Clara County reported by year and Core Chemical List. (Data from US EPA, 2010b).

The US EPA continues to update the TRI core chemical list as on-going scientific studies show more chemicals to be toxic to humans or the environment. The list was last revised in 2001 to include 610 core chemicals, up from the 298 on the 1988 list. For these 2001 core chemicals, the average release in 2001 was 4500 pounds per reporting company; seven years later, in 2008, the average release was virtually the same at 4426 pounds per company. Since 2001 there has been little progress in average reductions, clearly we have more work ahead to reduce our usage and disposal of the TRI 2001 core chemicals. While we have made progress in reducing the toxic releases in our region, we can still do more.

Releases to the air between 2001 and 2008 have consistently been above 98% of all on-site releases, which typically amount to over 65% of the County's total toxic releases. TRI data collected between 2001 and 2008 show that approximately 80% of the Santa Clara County's air toxics releases are known/expected process-release (stack and point) emissions and the remaining 20% are

considered accidental (fugitive) emissions. The most common chemicals released into the atmosphere are ammonia, formaldehyde and hydrochloric acid - with the majority of ammonia and formaldehyde coming from the manufacture of fiberglass and acoustic building products. One possible way to reduce these emissions is to encourage the production and use of non-fiberglass insulations - materials that are already on the market and that have been proven effective. Off-site disposal, in which toxic waste is sent away from its source to specific regulated sites, is the second most common fate of toxics in our county. But, these chemicals are still ending up in a landfill that takes space and may, itself, result in environmental impacts. To move towards a more sustainable society, we must reduce the toxic chemicals we use and find ways to dispose of them safely. Green Chemistry provides insight into methods to reduce toxics so that less escape into the environment and less must be disposed of as waste (See “Emerging Issue”, below).

What Can I Do?

As voters, consumers, residents, employees, public servants and business owners, each of us are uniquely positioned to have a very direct impact on the reduction of toxics in our region. We all benefit from the industries in our county through product sales, jobs and taxes and we could benefit even more by encouraging these industries to be as environmentally friendly as possible. We all use products in our homes and workplaces that may contribute small quantities of toxics released to air, water and land but, when multiplied by the roughly 1.8 million people in our County, these contributions add up.

Individuals can:

- Educate yourself about the products you use frequently - watch out for green washing.
- Read labels and buy products free of harmful materials - including household cleaners, paints, pesticides, medications, furniture, carpeting, paper products and personal care items.
- Reduce usage of all gasoline engines.
- Purchase foods that have been grown locally without the use of pesticides.
- Purchase electronic products that may be returned to the manufacturer for safe recycling and disposal.
- Limit purchases of products in plastic packaging and single-use items.

Businesses can:

- Investigate and pursue the tenets of Green Chemistry where applicable.
- Continue production process engineering to eliminate or reduce the use of hazardous materials.
- Conduct life cycle analysis of products.
- Build reuse and/or recycling of toxic materials into the product life cycle.
- Purchase materials and products from suppliers that practice the least toxic methods and material use in their manufacturing.
- Support laws that encourage reporting hazardous chemical use and toxic releases.
- Reduce usage of products containing toxics at the company site, just as individuals can (see above).

Government can:

- Enforce environmental laws on toxics.
- Promote legislation to improve public and environmental health and welfare.
- Assess toxic releases carefully and support scientific studies to understand mechanisms of exposure, species affected, and methods for toxics reduction.
- Encourage technologies that reduce toxic chemical use or provide new waste processing methods.
- Possibly create a “TRI” for consumer chemicals.
- Lead the effort to reach zero waste.
- Reduce usage of products containing toxics in government offices, just as individuals and businesses can (see above).

Where Can I Learn More?

This indicator is based on data compiled by the Environmental Protection Agency Toxic Release Inventory Explorer (<http://www.epa.gov/triexplorer/>) unless otherwise stated. The website allows users to search for data by state, county, chemical, industry, and year. In addition to the list of reportable toxic chemicals and associated regulations, the website is a good resource for basic definitions and information.

The Silicon Valley Toxics Coalition at (<http://www.svtc.org>) has online articles discussing toxic chemicals in Silicon Valley, what products might contain them, and some specific health effects. The Household Products Database (<http://hpd.nlm.nih.gov/>) is one of many websites aimed at educating consumers about what toxins may be in the products they currently use, while a website such as the Guide to Less Toxic Products (<http://www.lesstoxicguide.ca/>) can help consumers choose less toxic alternatives. The Environmental Working Group (<http://www.ewg.org>) is a comprehensive educational website containing information and links on toxics, health, farming, energy choices, natural resources and chemical exposure effects. The California Department of Pesticide Regulation (<http://www.cdpr.ca.gov/>) is an excellent resource for information on pesticide use in California and pest control recommendations for homes and businesses. And finally, Terra Choice at (<http://www.terrachoice.com/>) and the Greenwashing Index (<http://www.greenwashingindex.com/>) can help you sort through green claims and find certified products.

EMERGING ISSUE - Green Chemistry: Benign by Design

Green chemistry is the design of chemical products and processes that reduce or eliminate the use or generation of hazardous substances. Green chemistry applies across the life cycle, including the design, manufacture, and use of a chemical product. Green chemistry is a highly effective approach to pollution prevention because it applies innovative scientific solutions to real-world environmental situations (DTSC, 2007).

Chemical products and processes are designed to the highest level of the hierarchy below and be cost-competitive in the market (US EPA, 2010c).

- Source Reduction/Prevention of Chemical Hazards
 - Design chemical products to be less hazardous to human health and the environment.
 - Use feedstocks and reagents that are less hazardous to human health and the environment.
 - Design syntheses and other processes to be less energy and materials intensive.
 - Use feedstocks derived from annually renewable resources or from abundant waste.
 - Design chemical products for increased, more facile reuse or recycling
- Reuse or Recycle Chemicals
- Treat Chemicals to Render Them Less Hazardous
- Dispose of Chemicals Properly



Sources Cited:

California Department of Toxic Substances Control (DTSC). 2007. What is Green Chemistry?

<http://www.dtsc.ca.gov/PollutionPrevention/GreenChemistryInitiative/index.cfm> . Accessed on August 17, 2010.

PEW Center on Global Climate Change. n.d.. Toxics Release Inventory Model.

http://www.pewclimate.org/policy_center/policy_reports_and_analysis/brief_ghg_reporting_disclosure/ghg_model.cfm. Accessed December 18, 2009.

US Environmental Protection Agency (US EPA). 2010a. What is the Toxics Release Inventory (TRI) Program.

<http://www.epa.gov/tri/triprogram/whatis.htm>, Accessed March 2010.

US Environmental Protection Agency (US EPA). 2010b. US EPA TRI Explorer. <http://www.epa.gov/triexplorer>. Accessed August 17, 2010.

US Environmental Protection Agency (US EPA). 2010c. Introduction to the Concept of Green Chemistry.

http://www.epa.gov/greenchemistry/pubs/about_gc.html . Accessed on August 17, 2010.

BURROWING OWLS AND THEIR HABITAT

BURROWING OWLS CONTINUE TO DECLINE—VALLEY GRASSLANDS AT HIGH RISK OF DEVELOPMENT

What Is This Indicator About?

The Western Burrowing Owl is a native of our region and a highly unusual owl. This small owl is active day and night and is the only species of owl that lives and nests underground. Owls in our region do not dig their own burrows, but depend on California ground squirrels to dig burrows for them. In fact, owls and squirrels often live in the same colonies together—although not in the same burrows. A denizen of flat, low-elevation grasslands, the Burrowing Owl is generally found in valley grasslands and open spaces under 100 feet in elevation. In addition to the owls, grasslands support a wide range of species, from endangered Bay checkerspot butterflies to golden eagles. Grasslands are important habitat, but also valuable recreation areas, providing hiking, biking and natural beauty. But, because they are so highly prized for development, the grasslands that Burrowing Owls need have been disappearing.

The Western Burrowing Owl is declining throughout California and is classified as a Species of Special Concern by the California Department of Fish and Game. It is one of approximately 80 species of concern in Santa Clara County. Once numerous, today fewer than 50 pairs of burrowing owls reside in Silicon Valley. This fact is especially disturbing since these owls are relatively tolerant of human activity. They can survive on golf courses, air fields, closed landfills, parks, and vacant lots. Although they are flexible in where they will live, there are limits to what they can tolerate. Conservationists and wildlife agencies have made little progress in getting developers or cities to set aside and manage grasslands for these birds and other grassland species.

How Are We Doing?

In 2006, the Greenbelt Alliance released a report that showed Santa Clara County had added 54,000 acres of protected open space from 2000 to 2005 -- more than any other Bay Area county over the same period—and has protected 24% of its land. Moreover, Santa Clara County has more protected open space than any other county in the Bay Area (201,800 acres). While Santa Clara County is doing well at protecting hillsides and forests, flat grasslands in the valleys are still at great risk of development (Figure 1), areas such as Coyote Valley south of San Jose, which are the grasslands Burrowing Owls need to survive.

As a result, the Burrowing Owl is declining rapidly in Silicon Valley, where it once flourished. Non-hillside grasslands are prime development sites and, as flat, grassy habitat has been converted to urban uses, the number of owls in Santa Clara County has fallen. Between the 1980s and 1990s, the number of pairs was cut in half, to an estimated 150 pairs (DeSante, et al., 2007). A more recent survey of 111 sites occupied by owls on private or city-owned development lands shows a steady decline in habitat; 66% of these open grassland patches occupied by owls in 1998 were lost to development or other major disturbance by 2002 (Figure 2). As habitat disappears, so do the owls. Recent data that combine numbers of birds at the three largest habitat patches in Santa Clara County show the Burrowing Owl population steadily declining over the last 10 years (Figure 3), with numbers dropping to 50% of 1999 levels (Albion Environmental, Inc., 2010; Chromczak, pers. comm.). At this rate, Burrowing Owls could be gone from our

region in 10 years. In addition to the outright habitat loss, owls are disappearing because of constant ground disturbances (such as discing fields for weed control), killing the ground squirrels upon which owls depend, and reducing the rodents and insects owl prey upon. The Burrowing Owl may require Endangered Species Act protection in the future if proactive grassland protection measures are not implemented.

Stronger protection by the California Department of Fish and Game and measures by cities to protect and enhance owl habitat are needed. One possible vehicle for increasing owl habitat and populations is the Santa Clara Valley Habitat Conservation Plan, which is being designed to protect a large number of species, including the Burrowing Owl.

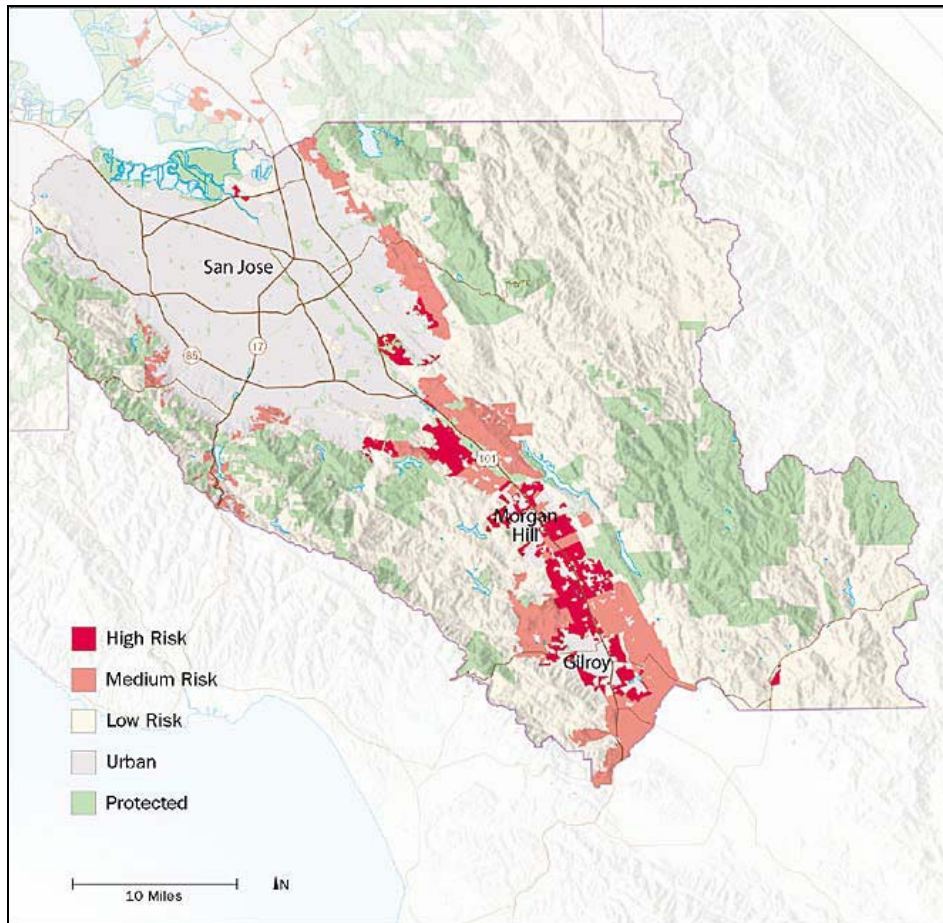


Figure 1. An analysis by Greenbelt Alliance showed Santa Clara County has protected hillsides well, but low elevation grasslands, where owls live, are at high risk of development (Greenbelt Alliance, 2006).

% of 111 Burrowing Owl Sites Occupied in 1988 that were Extant or Lost Over Time

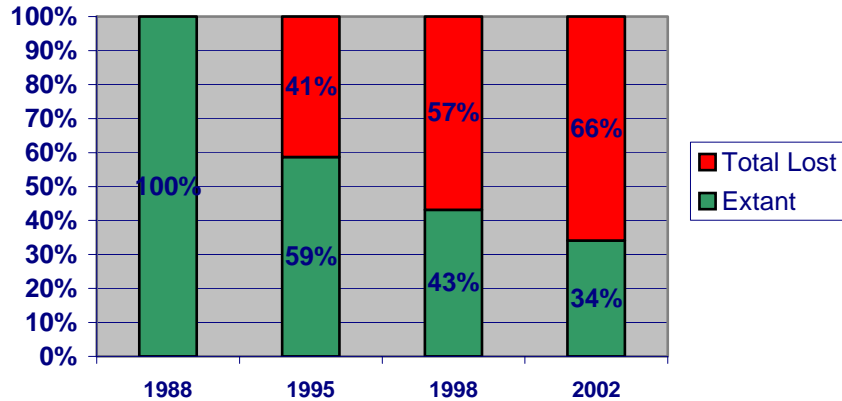


Figure 2. Number of sites where Burrowing Owls were seen in 1988 compared to the number of sites where owls were seen in 2002 (Trulio, pers. comm.).

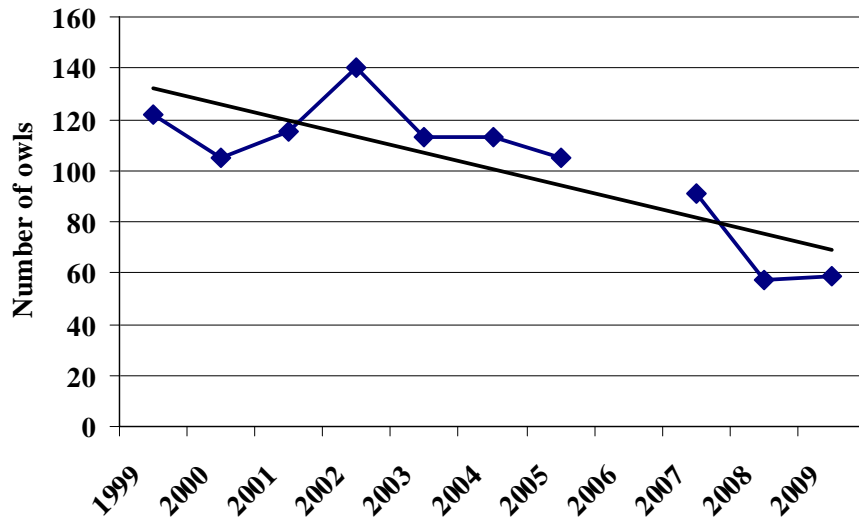


Figure 3. The combined number of Burrowing Owls at the three largest habitat sites in Santa Clara Valley (Moffett Federal Airfield, Shoreline at Mountain View, and San Jose International Airport) shows a steady decline over the past 10 years (data from Albion Environmental, Inc., 2010 and D. Chromczak, pers. comm.).

What Can I Do?

Individuals:

- Support your local Audubon Society's efforts to protect Burrowing Owls in your area.
- Find out where open grasslands exist in your city and look at your city's General Plan to see if those areas are protected.
- Work to protect those open grasslands by telling your City Council you oppose development on Burrowing Owl habitat.
- Work with open space managers to restore and enhance habitat that is appropriate for Burrowing Owls.
- Call the California Department of Fish and Game or your local Audubon Society if you see Burrowing Owls or their burrows being disturbed.

Government:

- Implement ordinances that prevent discing on public and private lands.
- Require all remaining owls be protected through avoidance of impacts to owls and meaningful mitigation when owls are disturbed.
- Work to zone, purchase, and protect open grasslands in Santa Clara Valley as open space for people and other species.

Businesses:

- Landscape large open areas in ways that support burrowing owls and the ground squirrels on which they depend.
- Organize employee outings with the local Audubon Society to see Burrowing Owls and other grassland species.

Where Can I Learn More?

The Santa Clara Valley Audubon Society has ongoing, dedicated programs devoted to the preservation of the Burrowing Owl in Silicon Valley and California. To get involved, go to their website at <http://www.scvas.org>. The UC Santa Cruz Predatory Bird Group conducts research and management projects to protect this species and has information about Burrowing Owls at <http://www2.ucsc.edu/scpbrg/burrowingowls.htm>.

Sources Cited:

Albion Environmental, Inc. 2010. Burrowing Owl population viability analysis, Santa Clara Valley Habitat Conservation Plan/Natural Communities Conservation Plan (HCP/NCCP). Prepared for County of Santa Clara HCP/NCCP Project Team.

DeSante, D., E. D. Ruhlen, and R. Scalf. 2007. The distribution and abundance of burrowing owls in California in 1991-1993. Pages 1-41 in Barclay, Hunting, Lincer, Lincecum and Roberts, editors. Proceedings of the California Burrowing Owl Symposium, November 2003. Bird Populations Monographs #1. Institute for Bird Populations and Albion Environmental, Inc. Point Reyes Station, CA.

Greenbelt Alliance. 2006. At Risk: The Bay Area Greenbelt. http://www.greenbelt.org/downloads/resources/atrisk2006_report/atrisk2006.pdf. Accessed on November 8, 2010.

WETLANDS AND CLAPPER RAILS

WETLAND RESTORATION UNDERWAY – HOPE FOR ENDANGERED SPECIES

What Is This Indicator About?

The San Francisco Bay is the largest estuary on the west coast of North America—an important source of recreation, beauty and pride. Tidal salt marshes, wetlands that fringe the Bay, and other wetlands provide critical habitat to over 500 species of fish, mammals, birds and other wildlife. We share the Bay wetlands with hundreds of thousands of migratory shorebirds and waterfowl, as well as the resident California clapper rail and the salt marsh harvest mouse, both endangered species.

Originally, tidal marsh habitat covered approximately 300,000 acres (Goals Project, 1999). But over the past 200 years we have destroyed or diked off more than 85% of these original wetlands for salt ponds, agriculture and urban development. Loss of these marshes threatens species and people. Wetlands help to filter contaminants and impurities, creating cleaner water for people and wildlife. In the face of climate changes, wetlands along the Bay will help lessen the impact of storms by slowing down and absorbing storm surges, therefore helping to prevent flooding. They also act as a carbon sink taking in atmospheric carbon dioxide and convert it into biomass, thereby helping to combat global warming. Acre for acre, restoring wetlands is a more efficient way to store carbon than restoring forests (Trulio, Crooks and Callaway, 2007). But, with only 15% of our original wetlands remaining, the people and species at the edge of the Bay are vulnerable. Restoring tidal wetlands to the edge of the Bay, where they used to be, is critical to providing the healthy Bay people and species need. Scientists and managers believe approximately 100,000 acres of tidal marsh wetlands are needed for a healthy San Francisco Bay (Goals Project, 1999).

How Are We Doing?

In the South Bay, which abuts Silicon Valley, only approximately 9,000 acres of an estimated 55,000 acres of original tidal marsh remained in 1999. Scientists and managers estimate approximately 30,000 acres are needed for to provide adequate healthy habitat for species and people (Goals Project, 1999). Fortunately, since the 1990s, large areas of former wetlands have come into public hands and are undergoing habitat restoration. For example, Bair Island, a 3,000 acre wetland area in Redwood City, was slated for development in the 1980s. But thanks to citizen action, the area was added to the Don Edwards San Francisco Bay National Wildlife Refuge and is now under restoration to its original tidal marsh habitat. State and federal efforts are currently restoring or actively planning the restoration of 11,000 acres of tidal marsh in the South Bay. The largest project contributing to this effort is the South Bay Salt Pond Restoration Project, with at least 7,500 acres planned for tidal marsh. With this restoration and the existing 9,000 acres, we are about 2/3 of the way to our South Bay goal (Figure 1). This renewed habitat is expected to greatly benefit endangered tidal marsh species (See “Important Issue”, below). Although we have made great strides in restoring former wetlands, we still need to restore 10,000 more acres in the South Bay to reach our goal. Around the entire Bay, another 24,000 acres are needed for wetland restoration to ensure a healthy Bay (Save the Bay, n.d.). In addition to renewing more marshes, we will have to plan our cities well to protect wetland gains while accommodating our population’s needs for housing, transportation and industries.

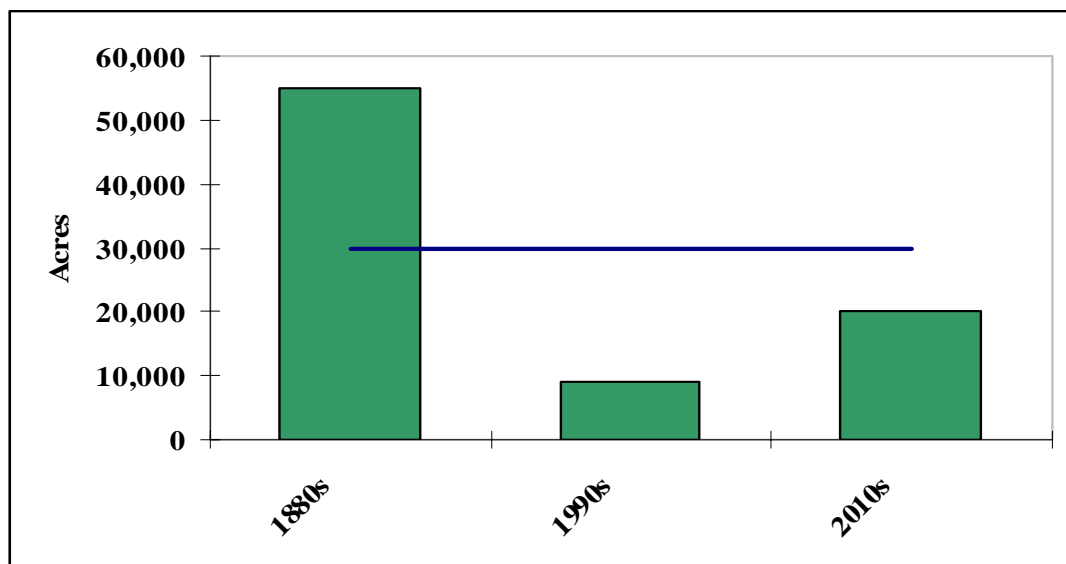


Figure 1. Approximate Acres of Tidal Marsh in the South Bay over Time (line shows wetland acre goal of 30,000 acres) (Goals Project, 1999)

What Can I Do?

Individuals:

- Volunteer with organizations restoring wetlands in the Bay such as Save the Bay and the Don Edwards San Francisco Bay National Wildlife Refuge.
- Support groups promoting wetland health and restoration such as the Citizen’s Committee to Complete the Refuge.

Governments:

- Provide greater protection to preserve existing wetlands.
- Promote wetland restoration in your area.
- Adopt General Plans that include wetland restoration and healthy creeks measures.

Businesses:

- Support groups promoting wetland health and restoration.
- Encourage employees to volunteer with restoration groups.

Where Can I Learn More?

The South Bay Salt Pond Restoration Project is overseeing the largest restoration in the South Bay. Their website (<http://www.southbayrestoration.org>) has information on this project as well as links to general wetland information and links to groups doing wetland restoration projects in the Bay. Save the Bay at <http://www.savesfbay.org/about> provides information and volunteer opportunities to citizens on Bay restoration.



IMPORTANT ISSUE - Restoration and California Clapper Rail Survival

The California clapper rail was once relatively abundant in tidal marshes around the San Francisco Bay, but is now an endangered species. They live and breed only in tidal marshes, over 85% of which have been lost to development. Hunting and predation by non-native species also has taken a toll on the rail population. In the mid-1970s, as many as 3,000 birds lived in the South Bay; by the early 1990s, the rail population in the South Bay was only about 200-300 birds. Protection from hunting and predators benefited the birds whose South Bay population was estimated at 650-700 in 1997-1998 (USFWS, 2009).

The lack of tidal marsh habitat is still a major limiting factor. Wetland restoration efforts now underway are expected to help the population grow to a healthier level so that the species can survive in the South Bay in the long-term. Clapper rails are an indicator of healthy tidal marsh habitat and their increasing numbers will let us know if our restoration efforts are succeeding. (Photo: By Bill Purcell, from Albertson, 1996)

Sources Cited:

- Albertson, Joy. 1996. Restoring salt marsh habitat for the recovery of California clapper rails. *Tideline*. Vol. 16 No. 4 1-3.
- Goals Project. 1999. Baylands Ecosystem Habitat Goals. A report of habitat recommendations prepared by the San Francisco Bay Area wetland Ecosystem Goals Project. U.S. Environmental Protection Agency, San Francisco, Calif., S.F. Bay Regional Water Quality Control Board, Oakland CA.
- Save the Bay. N.d. Wetland Restoration. <http://www.savesfbay.org/wetland-restoration> . Accessed on August 10, 2010.
- Trulio, L., S. Crooks, and J. Callaway. 2007. White Paper on Carbon Sequestration and Tidal Marsh Restoration. Prepared for the South Bay Salt Pond Restoration Project, California State Coastal Conservancy. http://www.southbayrestoration.org/pdf_files/Carbon%20Sequestration%20Dec%2020%202007.pdf . Accessed on August 10, 2010.
- U.S. Fish and Wildlife Service (USFWS). 2009. Draft Recovery Plan for Tidal Marsh Ecosystems of Northern and Central California. Sacramento, California. xviii + 636 pp.