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2015 Environmental Report Card for Los Angeles County

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2015 Environmental Report Card

FOR LOS ANGELES COUNTY

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Executive Summary

The challenge of moving towards sustainability in Los Angeles County is daunting: it is the most populous county in the nation and consists of 88 individual cities. After nearly two years of gathering and analyzing data, the Institute of the Environment and Sustainability at UCLA has developed an Environmental Report Card for the County of Los Angeles, the first of its kind in the nation for a major metropolitan area. The aim of this report card is three-fold: to provide a broad picture of current conditions, to establish a baseline against which to assess the region's progress towards environmental sustainability, and as a thought provoking tool to catalyze policy discussion and change. In collaboration with the Goldhirsh Foundation and the LA2050 initiative, our hope is to start a conversation within the community about what our overall goals should be for LA County's environment, how we can better measure our progress, and what we can do to make substantial strides toward reaching these goals.

Table 1: Summary of Grades

Category	Grade	Indicators
WATER	**C**	Water Sources and Consumption, Drinking Water Quality, Groundwater Quality, Surface Water Quality, Surface Water Discharges, Beach Water Quality
AIR	**C+**	Ambient Air Quality, Stationary Source Toxic Emissions
ECOSYSTEM HEALTH	**C-/INCOMPLETE**	Protected Areas, Wildfire Distribution And Frequency, Drought Stress, Kelp Canopy Coverage, Rocky Intertidal Species Populations, Wetland Conditions
WASTE	**B/INCOMPLETE**	Municipal Waste, Hazardous Waste
ENERGY AND GHG	**B-**	Greenhouse Gas Emissions, Energy Sources/Renewables
QUALITY OF LIFE	**C+**	Community Accessibility, Commute Times & Mode Of Transportation, Park Access & Quality, Community Environmental Health

We used 22 different indicators to grade the environment of Los Angeles County. These indicators fell into six overall categories: Water, Air, Ecosystem Health, Waste, Energy and Greenhouse Gases, and Environmental Quality of Life. Some of the indicators used were developed by environmental groups or government agencies. Also, we developed indicators based on data provided by numerous sources. Many of the factors that are critical to assess environmental condition aren't measured on a routine basis or the data is not readily accessible. Indeed, gathering and analyzing data from numerous sources was the biggest challenge in developing the report card. We have included recommendations on monitoring and data needs at the end of this report.

Another major challenge was developing a grading system. Ideally, grades would be based on an objective system that takes into account how well the region is doing for each indicator. For some areas like ambient air or surface water quality, grading systems could be developed based on compliance with environmental laws. However, the majority of indicators are not tied to any environmental standards or legal requirements. Even those that are tied to standards, such as ambient air quality, pose an assessment challenge. The LA region's air quality has improved dramatically over the last 45 years, but the region is still frequently in non-attainment for ozone and PM10 (particulate matter) standards. As such, how does one grade the region? We decided to use our best professional judgment of current conditions and we took the historical context into account. In addition, we implemented an extensive external review process that utilized some of the leading experts in the six environmental categories. Thus we acknowledge the report card grading is currently subjective, based on our expertise and knowledge of the tremendous changes in environmental quality that have occurred. Further, for this report card, we chose to only assign grades to the six categories, rather than to individual indicators, in order to limit the subjectivity of the grades.

The completion of the "Sustainable LA" UCLA Grand Challenge research plan, and city-level plans such as the City of Los Angeles Sustainability pLAn, may establish numeric targets that could be used to establish a grading system for future report cards. We plan to solicit extensive feedback from government agencies, NGOs, academics, and business leaders, as well as from the community at large, on recommendations for better indicators, and goals and metrics needed to develop a more consistent and explicit grading system. Ideally, the environmental report card will be produced on an annual or biannual basis.

GRADE: C

- Currently, approximately 58% of the water used in LA County is sourced from outside the region.
- Between 2000 and 2013, per capita water demand dropped by roughly 16%; however, there have not been gains in these areas in the last few years and use increased from 2011 to 2013.
- Overall, based on the publicly available sources of data, nearly everyone in the Los Angeles area was provided with clean water in 2012.
- Contamination of groundwater wells is prevalent countywide. The principal contaminants include solvents, nitrates, benzene, MTBE and perchlorate. It is important to note that contaminant levels in public supply wells do not equate to drinking water quality. Where groundwater is used for drinking water, additional monitoring is required and the water almost always undergoes further treatment. Furthermore, not all local groundwater is designated for drinking water supply. However, contamination of drinking water aquifers means that additional energy and resources must be expended for this local resource to replace imported water.
- Surface water quality in Los Angeles County is poor. Approximately 85% of LA County assessed rivers, streams and shorelines, and essentially 100% of assessed bays, harbors, lakes and estuaries, are impaired for one or more pollutants.
- Summer 2013 dry weather water quality at LA County beaches was excellent and winter dry water quality was also very good. Wet weather water quality continues to be an area of concern statewide -,40% of LA County monitoring sites receiving F grades in wet weather

Despite summer beach water quality improvements, continued reductions in pollutant loads from waste water treatment plants and industry, a long history of water conservation, successful water recycling efforts in much of the county, and reliable, high quality drinking water coming out of the vast majority of taps, the LA region received a C on the report card. Surface water quality impairments are prevalent county-wide, stormwater is highly polluted and not improving in quality, groundwater contamination is severe and county-wide, and the region is far too reliant on water supplies from the ecologically sensitive Colorado River, Eastern Sierra, and the Bay-Delta regions. With the passage of Proposition 1, TMDL deadlines looming, and state and local commitments to water recycling and integrated water management, the region has a tremendous opportunity to improve in the near future.

GRADE: C+

- Nearly all areas of LA County experienced exceedances of the Federal ozone standard in 2013. Exceedances of the stricter State standard were more prevalent, occurring nearly 17% of days in the Santa Clarita Valley, and nearly 12% of days in the East San Gabriel Valley.
- Exceedances of the Federal standard for fine particles in 2013 were focused in areas around downtown Los Angeles and the San Fernando Valley.
- The estimated carcinogenic risk from air toxics in the LA Basin has dropped by 65% in 2013 compared to 2005. While diesel PM exposure decreased by ~70%, it still dominates the overall cancer risk from air toxics. Highest risk areas are near the ports and transportation corridors.
- Reported air emissions of many pollutants from industrial facilities have increased significantly since 2009. The top three emitters comprise a significant portion of the annual emissions.
- Exide (now permanently closed) and Quemetco, two large battery recyclers, have historically been two of the largest

emitters of metals (lead and arsenic in particular), but enforcement actions and changes to facility operations have reduced emissions over the last several years.

We acknowledge and applaud the undisputable air quality progress that has occurred over the past 40 years on smog, lead, other air toxics, and diesel particulates. The positive results of these improvements are exemplified by a recent long term study by researchers at USC that demonstrated that lung performance of adolescents improved with improved air quality in the Los Angeles basin[21]. However, air quality continues to be frequently dangerous in some parts of the region, and has negative impacts on surrounding natural areas as well. Achieving attainment with air quality standards is also becoming more difficult due to tougher new, health-based standards and the contribution of overseas pollution, such as from China[22]. We are especially concerned about the prospective impacts on air quality of increased heat incidences due to climate change; warmer temperatures have been shown to increase surface ozone and future increases are expected to be greatest in urban areas[23]. Regional prevailing winds push air pollution inland where there are more lower income residents, and health impacts are likely to be aggravated into the future unless much greater strides are taken to reduce pollutants from all sources. Moreover there is a strong relationship between the location of polluting industrial manufacturing and our goods movement facilities and corridors and low-income residents of color[24]. More protective polices, more inspections and better enforcement of existing regulations continues to be a major need, as is the need for more standardized, comprehensive monitoring and reporting requirements. More research on chemical toxicity is needed, especially on cumulative and synergistic impacts of exposure. More research on clean manufacturing – which has lagged – is also needed. However, continued progress on reduction of diesel particulates, efforts like the Clean Up Green Up[25] initiative, and the transformation of the transportation sector to zero emission vehicles provides promise for better grades in future years.

GRADE: C- / Incomplete

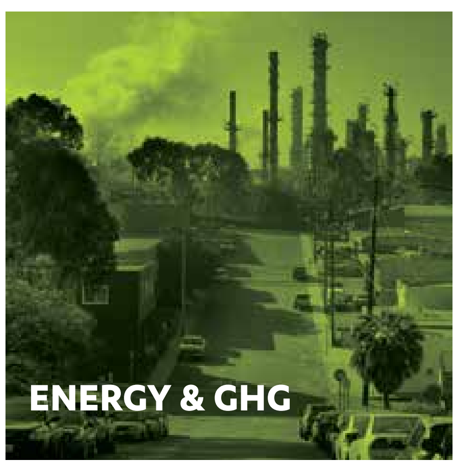
- Thirty-four percent of total LA County land area is protected public land, and regulatory designations limiting use or development encompass an additional 8%. There are 41,807 acres of marine protected areas.
- Nearly 100,000 acres of land in LA County have experienced significant departures from historic fire frequency, with potential for vegetation type change and increased risk of structure loss (in areas that are burning far too frequently) and potential for increased fuel loading and more intense wildfires (in areas burning far less frequently).
- Remote sensing data shows that Los Angeles County vegetation is experiencing extreme water stress due to the ongoing drought.
- Total kelp canopy coverage in LA County has remained relatively stable over the last 10 years.
- Dramatic declines in sea stars at all four monitoring sites and mussels at Point Fermin over the last decade, raise concerns about the health of our local rocky intertidal habitats. Climate change induced sea level rise may lead to larger impacts in the future due to loss of habitat. Sea Stars have been significantly affected by the current bout of wasting syndrome affecting much of the North American Pacific coast.
- Both the total area and types of coastal wetlands have changed dramatically over the last 150 years. LA County has lost 96-98% of its vegetated and un-vegetated estuarine areas from 1850 to the present.
- Urban streams throughout LA County exhibit very poor functional condition, reflecting the impacts of channelization and loss of floodplain connectivity, as well as poor biological condition, potentially due to factors such as changed hydrologic regime, loss of instream habitat and water quality impairments.

Despite the fact that the region continues to make progress in protecting both terrestrial and marine open space, historic habitat loss due to urbanization and the myriad of stressors (invasive species, pollution, shared uses) that coincide with wide scale urbanization have inflicted a damaging toll on the region's diverse ecosystems. With the current indicators available, making an overall assessment on ecosystem health is difficult. For example, although marine protected areas have been recently established in LA County, we don't have the data yet to determine if the Santa Monica Bay and Catalina coastal ecosystems inside MPAs have improved due to reductions in fishing pressure. Also, the state of fish and squid populations off the LA coast is still poorly understood. Further, the fluctuating state of local kelp canopy and rocky intertidal indicator species gives a confusing picture of the state of our coastal ecosystems. Riparian habitat is largely degraded in urban areas because of the loss of natural channels and surrounding buffer zones. The state of the terrestrial biota in the County is even more uncertain. We need insect, bird, mammal, herpetofauna, plants and other indicator data to set baselines and assess terrestrial ecosystem health. For example, constant effort mist-netting and point counts of birds in parks, protected areas, and urban areas is a must. The LA County Museum of Natural History has initiated a number of Citizen Science monitoring projects including Reptiles and Amphibians of Southern California (RASCals), Spider Surveys, and the BioSCAN (biodiversity science: city and nature) insect monitoring program. These may form the basis for future county-wide indicators. There also needs to be a systematic approach applied to monitoring the presence and impact of invasive species in both local aquatic and terrestrial ecosystems. Finally, the ability of urbanized Los Angeles to be home to important habitat area has not been well quantified or imagined. It is critical to determine the extent to which native plants in the urban fabric can add more high-quality habitat for fauna and help maintain native floral biodiversity.

GRADE: B / Incomplete

- Performance against municipal waste per capita disposal rates has improved over the past 5 years and no LA County jurisdiction appears to be exceeding its population-based per capita disposal target for the year 2013.
- Total municipal waste generated by the County peaked in 2005 and has generally decreased since, with 2013 generation just under 9.5 million tons; however, waste tonnage has leveled off over the last 4 years with little improvement since 2010.
- The total amount of hazardous waste generated in LA County in 2013 was approximately 2.2 million tons, although this may be an over-estimate, due to certain limitations in data availability.
- Only a small fraction of the total hazardous wastes generated in LA County are reported through the EPA Toxic Release Inventory requirements, limiting data availability on chemical constituents in hazardous waste streams.
- The Exide Technologies facility in Vernon and the Quemetco facility in the City of Industry (both lead acid battery recyclers) were among the top seven generators for both DTSC-reported wastes and TRI-reported wastes. Quemetco alone generated approximately half of the TRI reported hazardous waste in 2013.

Thanks to AB 939, subsequent regulations, and numerous recycling and source reduction programs, all cities in LA County have successful solid waste diversion programs as required by CalRecycle. However, due to limitations in data collection, there are not reliable data on solid waste recycling programs or even the actual quantities of waste generated and diverted from landfills. With the advent of a city-wide exclusive franchise system for municipal solid waste, the city of Los Angeles has the opportunity to require more complete collection, diversion, and recycling data from their contracted waste management companies. For hazardous waste generation in the region, volumes are extremely high, but that's not surprising from a region as populous and industrialized as Los Angeles County. A more precise analysis is hampered by limitations in data availability; in addition to questions related to volumes and chemical constituents, an evaluation of waste minimization efforts and regulatory compliance was not possible due to lack of readily available information.



GRADE: B-

- LA County annual, per capita GHG emissions in 2010 were 10.1 metric tons; annual per capita electricity consumption in 2010 was 5.9 megawatt hours.
- LA County has one of the lowest per-capita electricity consumption rates in the nation, comparable to San Francisco and New York City. However, due to continued reliance on coal, its greenhouse gas emissions rate is approximately 30% higher than those cities, while still being significantly lower than other metropolitan regions.
- Building energy comprises the largest single portion (>39%) of the County's emissions inventory,
- Almost all LA County utilities met or exceeded the 20% renewable energy standard for 2013. The only exceptions were the City of Cerritos, Vernon Light & Power, and Azusa Light & Water.
- Solar power represents an extremely small percentage (< 1%) of the energy mix for LA County utilities. Renewable energy comes primarily from wind (>10%), geothermal (~ 5%), and biomass/biowaste (~3%).
- Coal energy is still prevalent in the region, with a number of utilities receiving ~30-40% of their energy from coal sources.

Although the region is largely on track to meet renewable portfolio standards and GHG emission targets, there is still too great a reliance on coal as an energy source. Very little of the region's energy is generated by local sources such as solar. Further, GHG emissions and energy use data are often inadequate for accurate assessment. Fleet, busline and truck transitions from diesel to natural gas have reduced GHG emissions, as have more fuel efficient cars. In general, Title 24 and numerous cities' green building requirements are leading to more energy efficient new buildings, but there are not enough comprehensive energy efficiency retrofit programs for existing building stock.

However, overall, the LA region is far more energy efficient and has lower per capita GHG emissions than many large

U.S. cities. Although our mild climate helps greatly, the fact that our per capita energy use and GHG emissions are half the national average demonstrates that energy efficiency and GHG reduction efforts make a difference. At the same time, progress toward sustainability requires an industry trajectory that adds higher levels of value to the economy for each terajoule that is consumed, and cleaner sources of power that release less greenhouse gas per terajoule consumed. Community Choice Aggregation (CCA) is emerging as a promising option for increasing levels of clean energy sources, especially at local levels. Two ongoing examples of CCA in California are Sonoma Clean Power and Marin Clean Energy; within LA County, the City of Lancaster has just approved a CCA Program. A State standard for renewable (bio)gas would provide additional benefits of reducing pressure on landfills, dairies and other methane producing activities. National standards are needed for categorizing and tracking energy sources in order to monitor progress toward renewable goals.

GRADE: C+

- The average Walk Score for the City of Santa Monica was 78, for the City of Los Angeles - 64, and for the City of Long Beach - 66. For comparison, the average of the 141 Walk Score-rated cities was 47; the highest was 88 for New York City, followed by 84 for San Francisco.
- The overwhelming majority of LA County residents, 73%, drove alone to work; 10% carpooled and 7% took public transportation.
- The mean travel time to work was 30 minutes. Only 7.5% of the public commuted less than 10 minutes a day while 22.6% of the workforce commutes over 45 minutes to work. The mean time for public transportation was 75% greater than that for driving alone, and 54.7% of mass transit commuters take over 45 minutes to get to work.
- The City of Long Beach was ranked 24th out of 60 cities in the US with a Park Score of 54. The City of Los Angeles was ranked 45th out of 60, with a Park Score of 42. ParkScores calculated by the Trust for Public Land ranged from a high of 82 (Minneapolis) to a low of 26 (Fresno).
- Census tracts with the highest percentiles of Pollution Burden and Overall EnviroScreen Scores are widespread across the southern half of Los Angeles County, the area with the lowest average annual incomes. As expected, these tracts correspond to major transportation corridors and industrial areas.
- Twenty-one percent of the County's population lives in census tracts ranking in the top (worst) 10% of Pollution Burden scores within the State, and >19% of the County's population lives in census tracts ranking in the top (worst) 10% of Overall EnviroScreen scores within the State

Based on the indicators we analyzed alone, the region would get a C grade or worse for environmental quality of life. However, there are many aspects of the region's quality of life that have improved dramatically over the last two decades. There have been substantial investments in parks through Proposition 12 and County Measure A, and through efforts from the Trust for Public Land, People for Parks, Amigos de Los Rios, North East Trees, Los Angeles Neighborhood Land Trust, and local and state conservancies and the Los Angeles Conservation Corps. Even measures like LA's stormwater bond, Proposition O, have added greatly to parks in a region surrounded by beaches and mountains.

Public mass transportation has improved dramatically with Federal investments and Measure R funds catalyzing numerous far-reaching projects. The vast majority of residents in the region live within walking distance of public transportation. City walkability is a challenge in many areas, but programs like Mayor Garcetti's Great Streets, and efforts in numerous coastal cities give one optimism that communities are becoming more welcoming to pedestrians. And the miles of bike lanes have increased greatly over the last five years as activists and CicLAvia have brought widespread awareness to the need for more bikeable communities. But despite these numerous regional and local improvements in quality of life metrics, the region's traffic continues to be untenable and far too many people are living in areas with low EnviroScreen scores: a strong sign of poor environmental health in many communities.

Conclusions

Based on our analyses, the LA region will not be getting on the Dean's list for its first environmental report card. Grades ranging from C- to a B/I won't make anyone happy. However, the Environmental Report Card is our first effort so some of our indicators may not have best reflected how well the region is doing in each environmental category. Over the years, new indicators will be developed, new goals and targets will be adopted, we'll rely less on one time studies and old baseline data for indicators, and more objective grading approaches will be developed.

Although the region has experienced dramatic improvements in a wide variety of environmental areas over the last few decades, we still have a long way to go till there are safe, healthy neighborhoods for all of the region's residents and workers. At the end of 2013, UCLA Chancellor Block announced the university's first ever Grand Challenge – Sustainable LA, through reaching goals of 100% renewable energy, 100% local water and enhanced ecosystem health by 2050 in all of Los Angeles County. In the first two categories, the trends are in the right direction, but they are definitely not at a pace that will achieve the energy and water goals. As for the biodiversity goal, we don't monitor LA County's ecosystems well enough to even make an assessment on our progress, but we do know that climate change, human population growth, and increasing urban development will make biodiversity conservation a tougher chore in 2050 than it is today. In future report cards, we will assess how well the region is moving towards achievement of these ambitious environmental goals.

The last year has demonstrated that there is the opportunity for tremendous environment and sustainability progress statewide and locally. In Governor Brown's 2015 State of the State speech, he announced five major climate goals: 1) By 2030, half of the state's electricity will come from renewable energy sources; 2) By 2030, energy efficiency savings will double; 3) By 2030, California will cut petroleum use by cars and trucks in half; 4) California will aggressively reduce the release of methane, black carbon and other pollutants; and 5) The state will develop and implement programs that sequester carbon in natural and working lands. These announcements build on the Governor's successes of landslide approval of the Proposition 1 water bond, and considerable major action in response to his drought declaration and the California Water Action Plan.

Regional and local water delivering entities are working much harder to reduce water use across the board, and to plan for a dramatically different water regime in the future involving less reliability on external sources. In response to the state's drought actions, the city of Los Angeles and Santa Monica have adopted bold water conservation targets of 20% in two short years. And the entire region, funded largely by the MWD, has initiated aggressive lawn replacement programs with rebates of up to $3.75 per square foot in the city of L.A., a gradual recognition of the region's unique Mediterranean climate and plants. Also, in April, Mayor Garcetti will release the city of Los Angeles' first ever sustainable city plan. The Sustainable City pLAn will encompass the environment, economy and social equity addressing issues including energy, water, climate, green jobs, and the city's biological resources.

The recent change in the County Board of Supervisors promises to ensure that environmental quality is coupled with greater attention to social equity. The Board of Supervisors recently added two Supervisors with long-standing environmental records: Sheila Kuehl and Hilda Solis. Kuehl has a long history of protecting Santa Monica Bay, the Santa Monica Mountains and better managing California's solid waste and water supply. Solis has a long environmental justice, toxics, and air quality history.

The Los Angeles Regional Collaborative for Climate Action is becoming the go-to place for information about policies cities can adopt to reduce their greenhouse gas emissions. The Metropolitan Transit Authority has bold projects on the drawing boards that will tie the region together more fully, including providing more transit access in and out of the Valley. Youth are flocking to Los Angeles as a place of tremendous opportunity. They are bringing their creative energy, building the Clean-Tech workforce, and exhibiting new transit and bicycle friendly attitudes. This means more local manufacturing as well, and there is a noticeable growth in "Made in L.A." products, from clothing to micro brews. The region is changing, and facing its challenges.

Introduction

By 2050, over 6 billion people are projected to live in urban areas globally. The importance of ensuring that cities protect the environment, provide social equity, and have stable economies continues to become even more critical. The challenge of moving towards sustainability in Los Angeles County is daunting: it is the most populous county in the nation and made up of 88 individual cities.

In Los Angeles County, despite the fact that Santa Monica has been a global leader as a sustainable city for twenty years, there has been no regional effort to move towards making the county's cities more sustainable. In 2012, UCLA completed a draft sustainable city plan for the city of Los Angeles as a potential platform for discussion among mayoral and city council candidates. In 2013, UCLA committed to undertaking a sustainability grand challenge – Sustainable LA– through the achievement of 100% renewable energy, 100% local water supply and enhanced ecosystem health by 2050. And under the leadership of Mayor Eric Garcetti, the city of Los Angeles just produced its first ever sustainable city plan.

In order to determine if a region is becoming more sustainable, there needs to be an evaluation process that encompasses a wide variety of environmental, economic and social equity indicators. After nearly two years of gathering and analyzing data, the UCLA IoES has developed the nation's first *environmental* report card for a major metropolitan area (as opposed to an individual city). We created the report card as a thought provoking tool and snapshot to provide a baseline against which to assess, going forward, the region's progress towards environmental sustainability.

The aim of this report card is three-fold: to provide a broad picture of current conditions, to establish a baseline against which to assess the region's progress towards environmental sustainability, and as a thought provoking tool. In collaboration with the Goldhirsh Foundation and the LA2050 initiative, our hope is to start a conversation within the community about what our overall goals should be for LA County's environment, how we can better measure our progress toward these goals, and what we can do to make substantial strides toward reaching these goals.

WATER

Overview

2013 and 2014 were extraordinary years for water. The three year extreme drought conditions led to an emergency declaration by Governor Brown and the passage of numerous drought response measures at the State Water Resources Control Board. Among those measures were requirements for water conservation statewide and monthly water use reporting. In addition, the $7.5 billion water bond, Proposition 1, passed with two thirds of the vote, providing essential resources for local water supply through water recycling, groundwater cleanup, and stormwater capture. The comprehensive California Water Action Plan was released in 2013 and the state has focused on implementing both the water supply and water quality measures within the plan.

However, despite the admirable history of water conservation in Los Angeles and the future promise of the actions of 2013 and 2014, the Los Angeles region is still experiencing many water quality and supply challenges. While we no longer have a dead zone in Santa Monica Bay, our water supplies are safe to drink, the number of sewage spills has reduced dramatically over the last decade, and our beaches are much cleaner and safer than they were in the 1990s, we still have major groundwater contamination problems, we import far too much of our water from hundreds of miles away, and the vast majority of our waterways are impaired by one or more pollutants.

The indicators we used to assess the state of our local water were: water supply sources and per capita consumption rates, drinking water quality, groundwater quality, surface water quality, discharges to surface waters, and beach water quality. Overall, the Los Angeles region has been moving in the right direction on most of these indicators, but the region has a long way to go to provide an integrated water management approach that provides a sustainable water supply and surface and groundwater quality that meets state and federal laws and is protective of aquatic and human health. Due to those challenges, our grade may seem low despite significant progress.

Water Sources and Consumption

Efforts are underway to decrease consumption and rely more on local water resources in response to multiple factors, including climate change and the current severe drought.

The Water Conservation Act of 2009 (California SBX7-7) set a goal of reducing per capita urban water use by 10% by December 31, 2015, and by 20% by December 31, 2020 (known as 20x2020). Also, last year, Governor Brown declared a drought emergency and called for immediate, voluntary 20% reductions. One example of a bold response to the Governor's declaration was city of Los Angeles Mayor Eric Garcetti's issuance of an executive order for a 20% water use reduction from 2014 consumption levels by January, 2017.

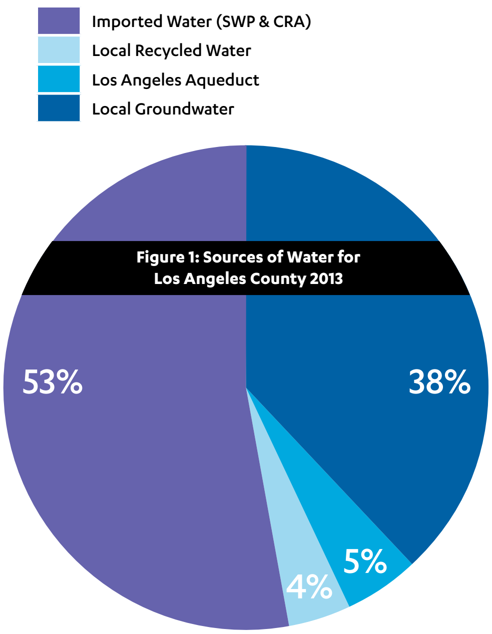


Figure 1: Sources of Water for Los Angeles County 2013

Data

For this indicator, we looked at both water sources and per capita water use. Water is supplied across LA County by approximately 100 different suppliers, including City retailers, County Water districts, County Waterworks Districts, Irrigation Districts, Investor owned utilities, and Mutual water companies. Many of these suppliers source their water through MWD, which serves 91% of the total population (>10million people) and 34% of the total area in the Los Angeles County. MWD is the regional wholesale water agency, importing water from the Bay-Delta via the State Water Project (SWP) and from the Colorado River via the Colorado River Aqueduct (CRA). Since it was infeasible to compile data from all suppliers (see data limitations), we used MWD data for LA County (provided through a data request) to understand both sources and consumptive use. The three categories of water use are: "Total Municipal and Industrial (MI) Demand" which is self-explanatory; "Potable Consumptive Demand" which is MI Demand minus recycled water – this is the value used to calculate gallons per capita per day (GPCD) water use for compliance with SBX7-7; and "Total Demand" which includes MI, agricultural, seawater barrier and groundwater replenishment. We compared 2013 levels to data from the last decade. Case studies from the Cities of LA and Long Beach are based on data from the drinking water information clearinghouse[1].

Findings

- Currently, approximately 58% of the water used in LA County is sourced from outside the region. (Fig 1)
- Countywide, 53% percent of total water demand is met by MWD service water and 5% is supplied by the Los Angeles Aqueduct (LAA, supplies City of Los Angeles only). (Fig 1)
- Groundwater resources provide 38% of total Countywide demand, and local recycled water contributes about 4%. (Fig 1)

Figure 2: Sources of Water for Los Angeles County 2000-2013, Source: MWD

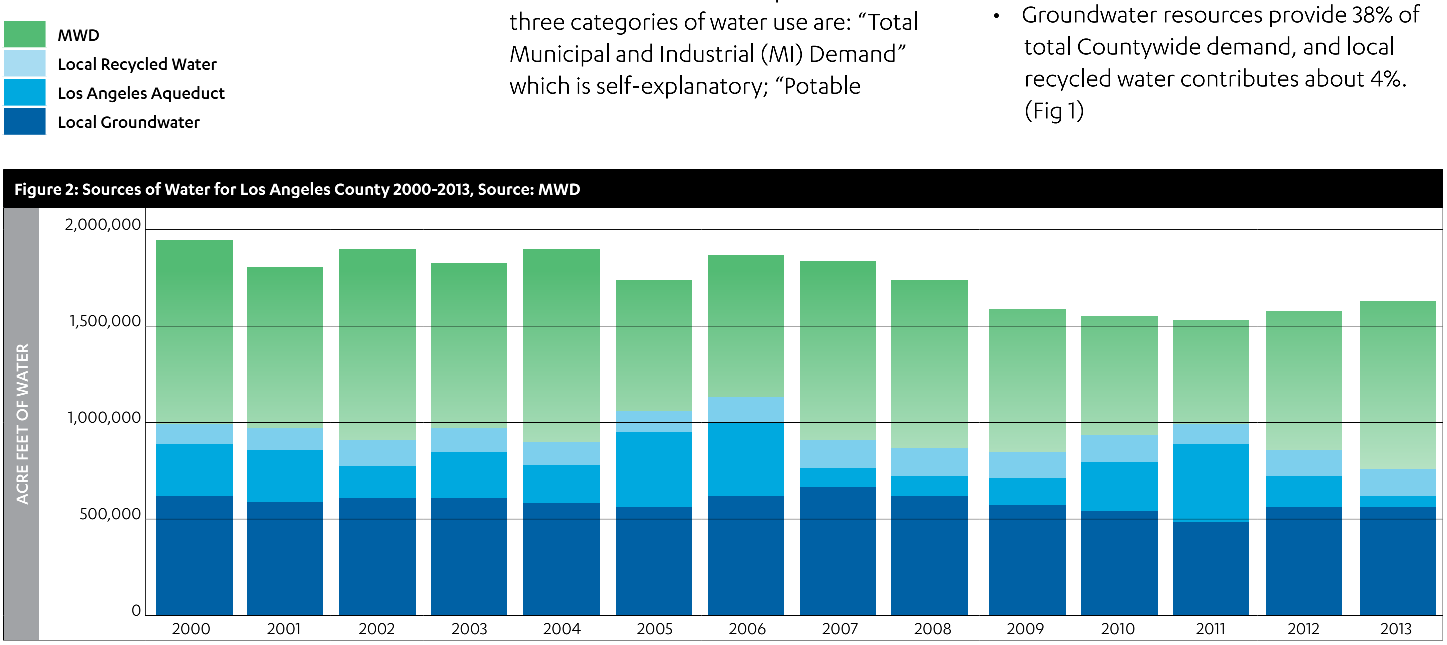
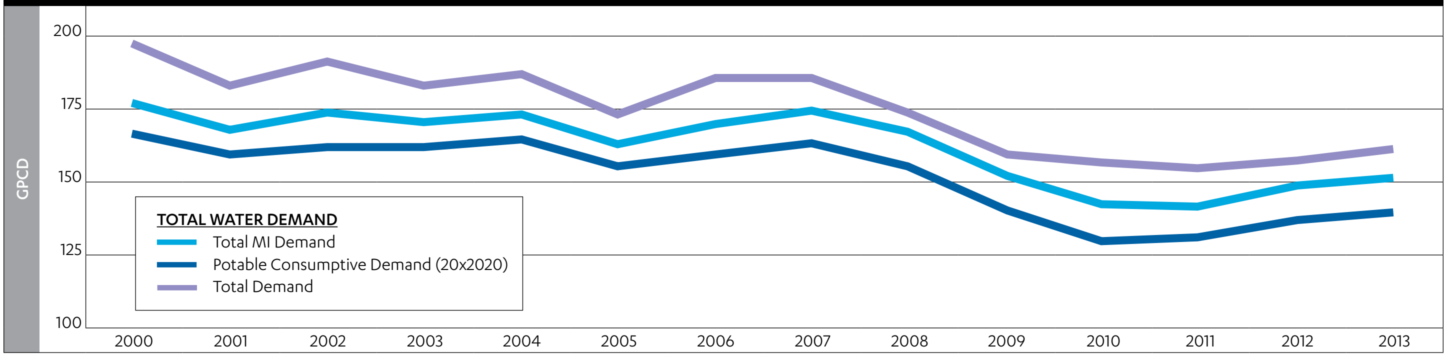


Figure 3: Total Water Demand in Los Angeles County Sourced by MWD. Source: MWD



- There is no overall trend in County water supply since 2000, but MWD is consistently the primary source. (Fig 2)

- The contribution of groundwater to LA County is fairly constant (~32% to 38%) but a small portion of that water is imported MWD water used to replenish groundwater basins. Similarly, local recycled water has been at a constant (~5% to 8%) contribution since 2000. The LAA contribution (supplies City of Los Angeles only) has decreased significantly since its maximum in the year 2011 (~24%) to its smallest level of contribution in 2013, at about 5% of total water supply. (Fig 2)

- Total MI Demand has dropped from 177 to 151 GPCD between the years 2000 and 2013, and Potable Consumptive Demand (20x2020) dropped from 168 to 139 GPCD in the same time period. (Fig 3)

- Despite the region's well documented history of successful water conservation and the current move toward increased water recycling, there have not been major gains in these areas in the last few years (Fig 3). The region's per capita water use is still twice as high as the average European city (76 GPCD)[2] .

- Although there has been a general decreasing trend since 2000, all three categories of use (Total Municipal and Industrial (MI) Demand; Potable Consumptive Demand (20x2020) and Total Demand) increased from 2011 to 2013 (Fig 3). In response to the Governor's drought declaration and State Water Board and local government conservation actions, there has been a drop in countywide consumption in 2014, but the final annual statistics weren't available in time for report completion.

Case Studies

- Los Angeles Department of Water and Power (LADWP) supplies water to the City of LA from the LAA, recycled water, local groundwater and purchased imported water from MWD. Approximately 89% of the City of LA's water supply was imported from more than 200 miles away in 2013-14. Their 2012-13 GPCD consumption is 130, which is below their 2020 target of 138 GPCD, but 20% above Mayor Garcetti's recent target of 105 GPCD by 2017 (Fig 4).

- Long Beach Water Department (LBWD) supplies the water for the City of Long Beach using MWD service water and ground water from Central Basin. The city's 2013 GPCD consumption is 114, which is below their 2015 interim target of 121 (Fig 5). Long Beach's 2020 target is 107 GPCD.

- County totals calculated by drinc.ca.gov are consistent with estimates using MWD data (~ 139 GPCD in 2013 and ~137 in 2012.) (Fig 4 and 5)

Data Limitations

- The byzantine nature of the water supply system currently prevents a comprehensive analysis of total water consumption and per capita water usage in the county. There is no single agency through which to access data for all of LA County, and MWD does not have a specific 20x2020 target for LA County.

- Because the MWD category "groundwater" includes both runoff from local watersheds as well as imported water used for groundwater replenishment, it is not currently possible to accurately answer the question of how much of LA County's supply is truly local.

Figure 4: City of Los Angeles GPCD Compared to Regional Averages (2009-2013). Source: drinc.ca.gov

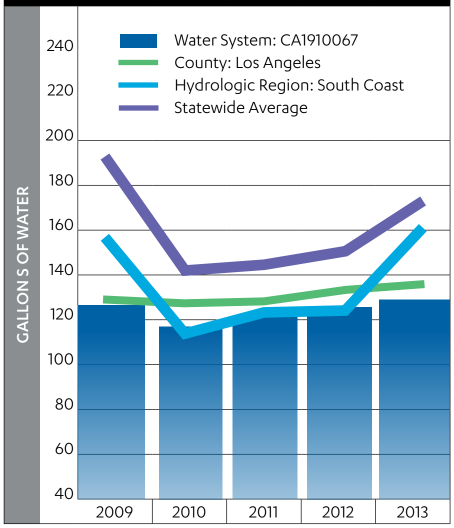
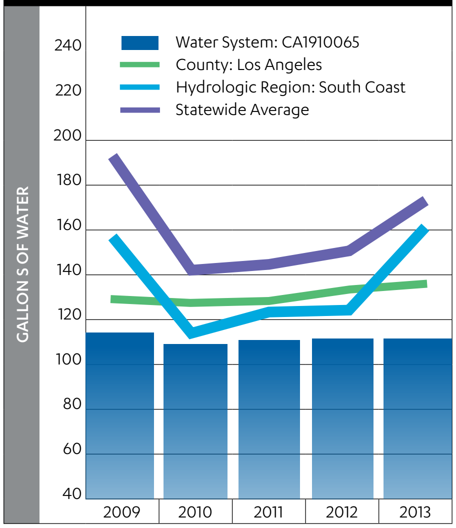


Figure 5: City of Long Beach GPCD Compared to Regional Averages (2009-2013). Source: drinc.ca.gov



Source: DRINC Portal (http://drinc.ca.gov) EAR System

- The MWD data used for LA County is sourced from MWD through a public records request and are estimates as of August 2014. Values for years 2012 may be revised as new data becomes available
- We were unable to review Urban Water Management Plans as part of this first assessment, due to time and resource limitations, but plan to include a UWMP evaluation in the next report card.

Drinking Water Quality

Drinking water quality is among the most fundamental measures of environmental condition directly impacting human health.

There are approximately 225 Community Water Systems serving LA County[3]; these are defined as water systems that serve the same people year round (e.g. in homes or businesses). A majority of these systems purchase water wholesale through the MWD which serves >10 million people in LA County, approximately 91% of the population. Water systems vary greatly in size, from LADWP with close to 4 million customers, to very small systems serving local populations of a few hundred residents. Approximately 38% of the water supply in Los Angeles County comes from groundwater. Federal and State drinking water regulations had previously been overseen by the CA Department of Public Health (CDPH), but effective July 1, 2014 the administration of the Drinking Water Program transferred to the State Water Board.

Data

We looked at two aspects of drinking water quality:

(1) Violations of drinking water regulations, specifically, violations of maximum contaminant levels (MCLs) provided in the Annual Reports issued by the California Department of Public Health (CDPH), now available on the State Water Board's website[4]. We looked at systems serving populations >100 people. We used the 2012 Annual Report for violations data because the 2013 report had not yet been released as of the time or our analysis.

(2) Exceedances of drinking water standards as identified through annual Consumer Confidence Reports (CCRs)[5] provided by water purveyors annually, by law, to all customers. For this analysis, we used a combination of random sampling and deliberate selection of providers in LA County. We randomly selected three small water companies (less than 25,000 individuals served) and three medium water companies (between 25,000 and 100,000 individuals served). We purposefully selected the two largest water purveyors in the County, as well as the City of Maywood's three water companies because of their known history of water quality exceedances. We looked at reported concentrations for 24 drinking water quality parameters, including microbial contaminants, metals, pesticides/herbicides, organic chemicals and radioactive substances. We compared reported values to both maximum contaminant limits (MCLs) and public health goals (PHGs). While most exceedances reported on the CCRs do not represent violations (because regulations are based on percentiles or averages across multiple sampling events), CCRs are the official communication mechanism

Table 2: 2012 MCL Violations

Subject	MCL	System Name	Population Affected	2012 MCL Violations
TCR – Monthly	Absence	City of Beverly Hills	44,290	1
TCR – Monthly	Absence	El Monte-City, Water Dept.	22,968	1
TCR – Acute	Absence	WM. S. Hart High / Placerita JR HS	4,000	1
Arsenic	10 ug/L	Land Project Mutual Water Co	1,500	4
TCR – Monthly	Absence	Hemlock Mutual Water Co.	985	1
TCR – Acute	Absence	Golden Sands Mobile Home Park	450	1
TCR – Monthly	Absence	Sherwood Mobile Home Park	250	1
TCR – Acute	Absence	Mettler Valley Mutual	135	1
TCR = Total Coliform Rule			**74,578**	**11**

Table 3: Total MCL Violations in L.A. County Drinking Water Systems Serving >100 People (2008-2012)

	2008	2009	2010	2011	2012
Number of MCL Violations	10	7	6	16	11
Population Affected	144,552	102,699	57,590	90,318	74,578

Table 4: Selected Water Purveyors for CCR Review

Water District	Population Served
Los Angeles Department of Water and Power	3,855,879
Long Beach Water Department	464,662
Monrovia Water Department	39,147
Crescenta Valley City Water Department	38,000
Compton Willowbrook Park Water Company Compton	27,600
Tract 349 Water Company	7,500
Amarillo Municipal Water Company	3,134
Bellflower Home Garden Water Company	1,200
Maywood Water Company #3	9,500
Maywood Water Company #2	6,700
Maywood Water Company #1	5,500
Total	**4,458,822**

Table 5: Drinking Water Contaminant Results as Reported on CCRs

Category	2008-2012	2013
Omitted From CCR	61%	65%
Range Exceeds PHG	21%	22%
Range Exceeds MCL	1.7%	2.7%
Average Exceeds MCL	0.45%	0%
No Exceedances	16%	10%

to consumers. As such, we believed it was important to evaluate the information provided, both for reported water quality and for clarity of information.

Findings

- Overall, based on publicly available data, nearly everyone in the Los Angeles County area has been provided with clean water. There were only 11 instances of violations of the Maximum Contaminant Limits in 2012, involving 8 separate systems, affecting a total of 75,578 consumers. (Table 1)
- Most violations involved coliform bacteria, but one system had four violations related to arsenic exceedances in 2012. (Table 2)
- The number of MCL violations over the past 5 years shows no clear trend. (Table 3)
- The CCR data was extremely difficult to evaluate, because monitoring requirements and violation triggers are dependent on system size, source water type and treatment type. Many systems are governed by some combination of State regulations and individual treatment system permit requirements, but the specific set of applicable monitoring requirements cannot be determined from the information provided on most CCRs, and site-specific permits are not accessible on-line.
- For the water purveyors selected for review (Table 4), monitoring results for over 60% of the pollutants were not included on the CCRs (Table 5), either due to pollutant concentrations in drinking water were below detection limits or because monitoring was required on a less-than-annual basis for those pollutants for that water system; however, we were unable to determine which reason applied to any given pollutant.
- Overall, we found CCRs to be generally poor communication tools for consumers, since they lack information on the required contaminants and frequency of monitoring for the drinking water system.

Groundwater Quality

Dwindling water resources and a growing population have increased the importance of local supplies; however, despite Superfund actions, hundreds of groundwater cleanup actions, replacement of thousands of underground storage tanks, and enormous regulatory efforts, the state of groundwater quality in the LA region is still extremely poor. Over 75 years of industrial activities, most of which were largely unregulated until the 1970s and 80s, has led to a widespread legacy of groundwater contamination that is focused, but not limited to, areas of historic and current industrial use.

As stated in the drinking water section, unsafe contaminated groundwater is not being served to customers, but the groundwater treatment plants and operating costs necessary to provide clean water cost the region billions of dollars. At the same time, those aquifers which do have high quality groundwater must be protected from degradation through regulatory policies and the salt and nutrient management plan efforts currently underway.

Data

We focused on measures of groundwater contamination. Reports were generated using the GeoTracker GAMA (Groundwater Ambient Monitoring & Assessment) database[6]. GeoTracker GAMA compiles groundwater monitoring data from multiple programs and agencies into a publicly-accessible internet database. Out of the seven major types of datasets, we used two to assess the groundwater quality in LA County: Water Supply Wells (California Department of Public Health [CDPH] database) and Environmental Monitoring Wells (State and Regional Boards). Based on recent reports on ground water quality of LA County, ten pollutants were selected for evaluation, all of which are prevalent in groundwater and are known to pose serious human health problems. Despite the fact that much of the groundwater monitoring data was from wells that do not provide drinking water, state-established Maximum Contaminant Levels (MCLs) were the basis for evaluating reported concentrations because they are the best available,

Table 6: Ground water quality for selected pollutants for the period Sep, 2013 to July, 2014. Source: GAMA

No.	Pollutant	State MCL	Total no. of Monitored Wells	% of Monitored Wells with Conc. > MCL	% of CDPH Wells with Conc. > MCL	% of Samples With Concentrations Greater Than MCL		
						>MCL	>10xMCL	>100xMCL
1	Nitrate	45 mg/L	1,635	8.4%	6.1%	6.8%	0%	0%
2	TCE	5 µg/L	3,977	20.8%	8.9%	17.3%	8.4%	3.2%
3	PCE	5 µg/L	3,988	14.9%	8.6%	13.1%	5.1%	1.2%
4	Perchlorate	6 µg/L	563	10.5%	7.9%	14.4%	0.2%	0.0%
5	Cr6+	10 µg/L	571	17.2%	12.8%	19.4%	6.6%	2.0%
6	MTBE	5 µg/L*	7,413	26.1%	0.0%	22.2%	11.0%	4.4%
7	Benzene	1 µg/L	7,652	30.7%	0.0%	26.5%	20.3%	14.3%
8	1,4 Dioxane	1 µg/L	713	43.5%	25.5%	36.5%	15.1%	5.7%
9	Vinyl Chloride	0.5 µg/L	3,826	8.4%	0.0%	6.8%	4.1%	1.7%
10	Methylene Chloride	5 µg/L	792	0%	0.0%	0	0	0

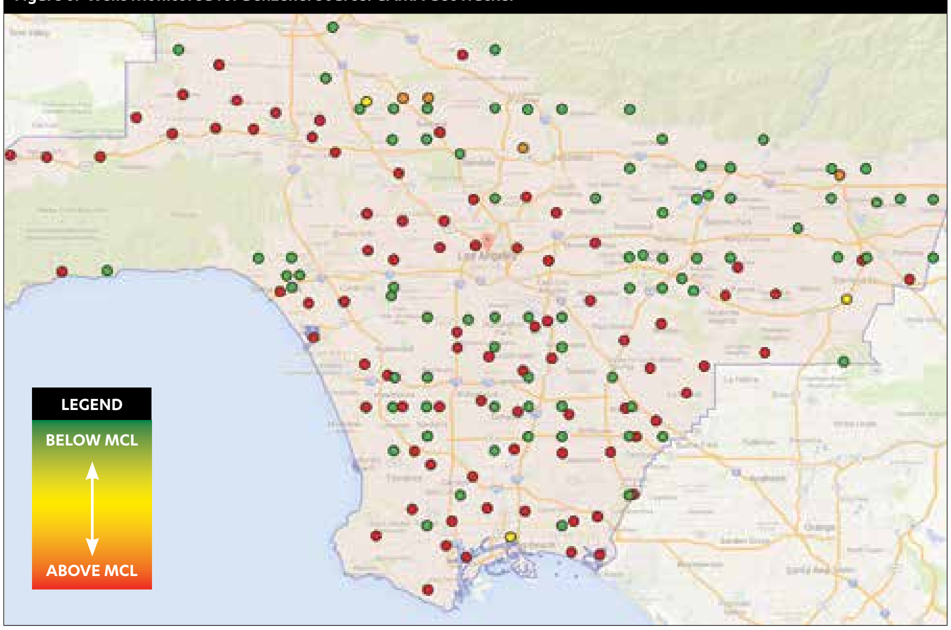
*Secondary MCL

established, health based target values that apply to groundwater quality. We looked at the percent of wells and percent of samples with concentrations above the MCL, as well as the maximum concentrations observed, for both the recent one year period and for the last decade. We also looked at GeoTracker GAMA-generated maps showing the distribution of monitoring well contamination in the lower, urbanized half of the County for the three pollutants for which there were the most exceedances of MCLs. It is important to note, that most of the groundwater monitoring data is from groundwater with known contamination problems. Also, a large portion of the data is from aquifers that do not produce drinking water.

Table 7: Ground water quality for selected pollutants for last decade. Source: GAMA GeoTracker

No.	Pollutant	State MCL	% of Monitored Wells with Conc. > MCL		
			Last 10 yr (Sep,2004-July,2014)	Last 3 yr (Sep,2011-July,2014)	Last 1 yr (Sep,2013-July,2014)
1	Nitrate	45 mg/L	16.4%	11.9%	8.4%
2	TCE	5 µg/L	22.4%	22.0%	20.8%
3	PCE	5 µg/L	18.3%	17.0%	14.9%
4	Perchlorate	6 µg/L	12.2%	10.4%	10.5%
5	Cr6+	10 µg/L	19.3%	16.3%	17.2%
6	MTBE	5 µg/L	42.6%	31.1%	26.1%
7	Benzene	1 µg/L	48.1%	34.8%	30.7%
8	1,4 Dioxane	1 µg/L	34.7%	38.1%	43.5%
9	Vinyl Chloride	0.5 µg/L	9.3%	8.6%	8.4%
10	Methylene Chloride	5 µg/L	0.2%	0.1%	0%

Figure 6: Wells Monitored for Benzene. Source: GAMA GeoTracker



Findings

- Contamination of groundwater wells is prevalent , both in terms of the number of samples above the MCL and the extent to which the limits are exceeded. (Table 6 and Figures 6-8)
- With the exception of Methylene Chloride, all pollutants evaluated were found to exceed MCLs in at least 8% and as many as 43% of monitored wells in the period between Sept 2013 and July 2014 (Table 6).
- Benzene, MTBE and 1,4 Dioxane are the pollutants with the highest percentage of wells above the MCL (Table 6), but note that 1,4 Dioxane is monitored in less than 10% of the number of wells for which Benzene and MTBE are monitored.

- With the exceptions of Nitrate, Methylene Chloride, and Perchlorate, all other contaminants were present at concentrations up to 100 times the MCL in the most recent 1-year period. In the most extreme case, Benzene, over 20% of samples had concentrations 10 times higher than the MCL, and over 14% had concentrations 100 times higher (Table 6).
- Only Methylene Chloride was within the State MCL limit for all samples over the last year. (Table 6)
- Six out of ten contaminants were found in CDPH (public supply) wells in concentrations above the MCL: Nitrate, TCE, PCE, Perchlorate, CR6+ and 1,4 Dioxane. (Table 6)
- Exceedances in public supply wells ranged from 6% of the samples for Nitrate to over 25% for 1,4 Dioxane. (Table 6)
- A review of the last three and ten years of data showed decreases for most pollutants in the number of wells with concentrations greater than the MCL. While there were increases in the percent of wells exceeding the MCL for 1,4 Dioxane, Cr6+ and Perchlorate, there was also a decrease in the number of wells monitored for those pollutants over the same time period. (Table 7)
- Note that contaminant levels in public supply wells do not equate to drinking water quality. Where groundwater is used for drinking water, additional monitoring is required and the water is usually treated. Furthermore, not all groundwater is designated for drinking water supply. However, contamination of drinking water aquifers means that additional energy and resources must be expended for this local resource to replace imported water.

Figure 7: Wells Monitored for MTBE. Source: GAMA GeoTracker

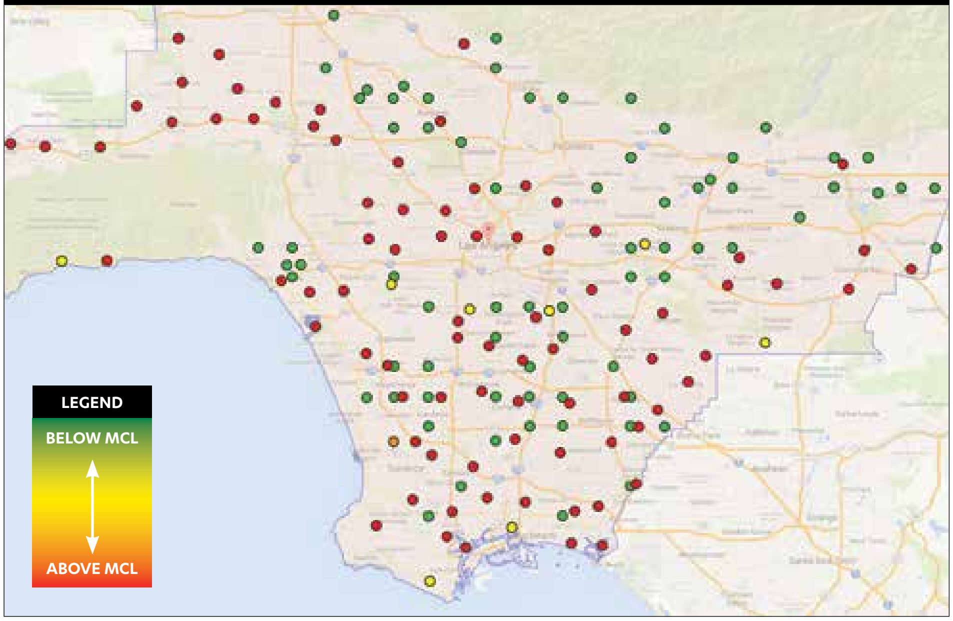
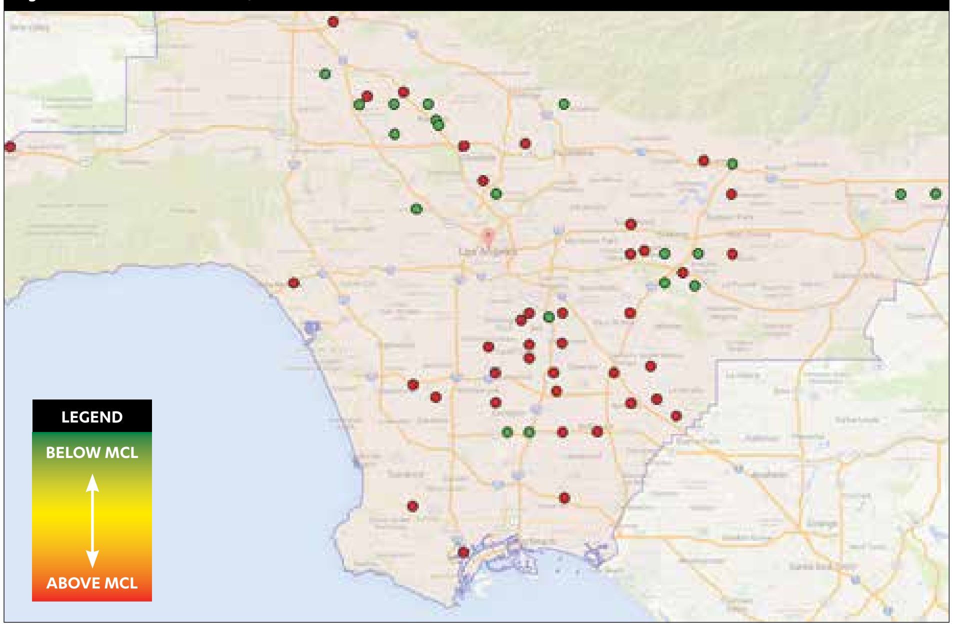


Figure 8: Wells Monitored for 1,4 Dioxane. Source: GAMA GeoTracker



Data Limitations

One of the major limitations of this data set is the lack of uniform monitoring frequency by well and by pollutant across the County. Furthermore, wells in the Environmental Monitoring program decrease in number over time once treatment achieves compliance with State standards, thereby making it challenging to evaluate trends. The GeoTracker GAMA website itself also limited our ability to obtain data for reporting periods comparable to other metrics in this report card. The search toolbar has only fixed options for data display: 1 Year, 3 Year, 10 Year and All Years. Therefore, the report time period is dependent on the date of download from the site (as opposed to by calendar year), and historic reports cannot be generated for individual selected years. While there is an option to download all monitoring well data for a given area, this results in an unmanageably large data set at the County level, with close to 1 million rows of data, therefore the search functionality of GeoTracker GAMA is critical to making this information accessible to the public. More fundamentally, the monitoring data available do not give an accurate picture of groundwater quality in a given basin because the vast majority of the wells were not installed to provide a big picture overview. As such, we can provide general geographic trends across the region, but not assessments for individual groundwater basins.

Surface Water Quality

The Clean Water Act established a process by which each state: 1) identifies beneficial uses of their surface water; 2) monitors and evaluates results against water quality objectives (WQOs) corresponding to those beneficial uses; and 3) categorizes waterbodies that do not meet WQOs as "impaired" under section 303(d).

A total maximum daily load (TMDL) for each waterbody reach that is impaired by one or more pollutant must be calculated and then enforced through permits (or other implementation actions), in order to bring these waterbodies back into compliance with WQOs, thereby meeting their beneficial uses.

Data

We used two metrics for this indicator:

(1) The extent of impaired water bodies in LA County compared to the extent assessed. These statistics were derived from the Statewide 2010 Integrated Report (303(d) List of impaired waterbodies) on the State Water Resources Control Board website[7]. Data for rivers and streams are provided in linear measures, whereas lakes, bays, etc., are provided as area measurements.

Figure 9: Los Angeles County Impaired Water Bodies based on 2010 303(d) List

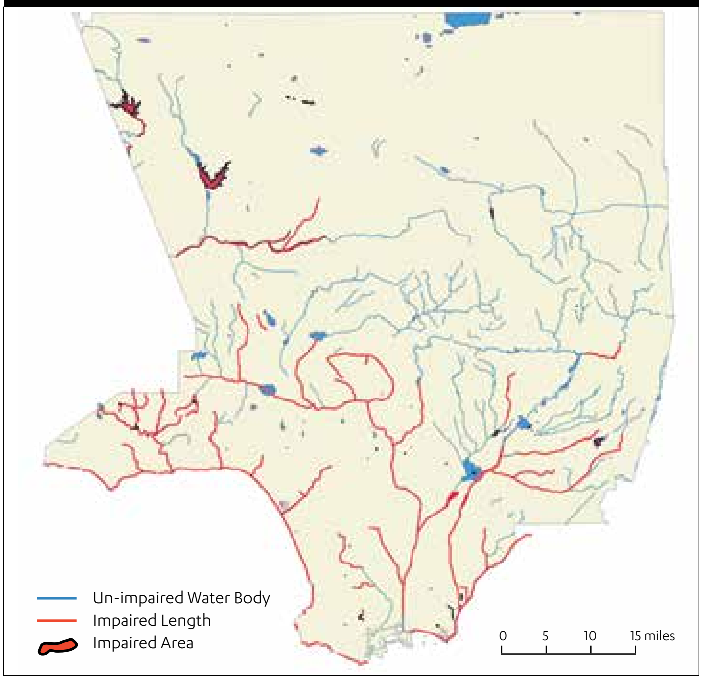


Table 8: Impaired vs. Assessed Rivers, Streams and Shorelines (in Miles) based on 2010 303(d) List			
Water Body Type	Impaired Length	Assessed Length	Percentage
Coastal & Bay Shoreline	57	63	90.4%
River & Stream	452	537	84.1%
Total	**509**	**600**	**84.8%**

Table 9: Rivers, Streams and Shoreline Impairments by Pollutant Category based on 2010 303(d) List		
Pollutant Category	Impaired Length (Miles)	Percent of Assessed Length
Pathogens	389	64.9%
Metals/Metalloids	242	40.3%
Trash	148	24.7%
Nutrients	126	21.0%
pH	117	19.6%
Salinity	94	15.7%
Other Inorganics	85	14.2%
Pesticides	60	10.0%
Benthic-Macroinvertebrate Bioassessments	60	9.9%
Nuisance	51	8.4%
Toxicity	41	6.9%
Sediment	36	6.0%
Invasive Species	36	5.9%
Hydromodification	11	1.8%
Shellfish Harvesting Advisory	2	0.4%

Table 10: Impaired vs. Assessed Bays, Harbors, Lakes and Estuaries (in Acres) based on 2010 303(d) List			
Water Body Type	Impaired Length	Assessed Length	Percentage
Bay	155,146	155,146	100.0%
Harbor	7,722	7,722	100.0%
Lake	4,351	4,351	100.0%
Reservoir	243	243	100.0%
Wetland	302	333	90.8%
Estuary	362	362	100.0%
Total	**168,127**	**168,157**	**100.0%**

Table 11: Bays, Harbors, Lakes and Estuaries by Pollutant Category based on 2010 303(d) List		
Pollutant Category	Impaired Area (Acres)	Percent of Assessed Area
Pesticides	163,322	97.1%
Other Organics	163,232	97.1%
Toxicity	162,741	96.8%
Trash	147,527	87.7%
Fish Consumption Advisory	147,036	87.4%
Metals/Metalloids	8,042	4.8%
Pathogens	4,002	2.4%
Benthic Community Effects	3,194	1.9%
Nutrients	991	0.6%
Exotic Vegetation	289	0.2%
Habitat alterations	289	0.2%
Hydromodification	289	0.2%
pH	275	0.2%
Nuisance	244	0.1%
Fish Kills	21	0.01%

(2) The percent of receiving water samples exceeding WQOs as reported in the LA County Department of Public Works annual stormwater monitoring report[8], conducted under the Municipal Stormwater Permit. Monitoring is conducted at mass emissions stations (long term) as well as at tributary locations that change periodically.

Findings

- As seen by the extent of 303d listed “impaired” waters and by the frequency of exceedances of water quality standards in receiving waters, surface water quality in Los Angeles County is poor and is not measurably improving. To date, most improvements have been seen in summer beach water quality (see beach water quality), and in ocean waters, due to low flow diversions and major improvements at coastal sewage treatment plants (see surface water discharges).

- Approximately 85% of LA County assessed rivers, streams and shorelines are impaired for one or more pollutants. The largest percentage is impacted by pathogens/ fecal indicator bacteria (65%), followed by Metals/Metalloids (40%) and Trash (25%). (Fig 9, Tables 8 and 9)

- Essentially 100% of assessed bays, harbors, lakes and estuaries are impaired for one or more pollutants. Over 97% of these waterbodies are impaired by each of: pesticides, other organics, and toxicity. Trash and fish consumption advisories each impair over 87% of these waterbodies. (Fig 9, Tables 10 and 11)

- There were numerous exceedances of water quality objectives at both stormwater mass emissions stations and tributary monitoring sites. The most common parameters exceeding WQOs at high frequency were fecal indicator bacteria (across all sites), copper and zinc (at mass emissions stations), and sulfate and TDS (at tributary sites). (Tables 12 and 13)

- Wet weather exceedances of copper and zinc at mass emissions stations showed no improvement over the last 5 years. With the exception of Malibu Creek, all watersheds showed some increasing or continued high number of metals exceedances over this time period. (Figure 10, Table 14).

Data Limitations

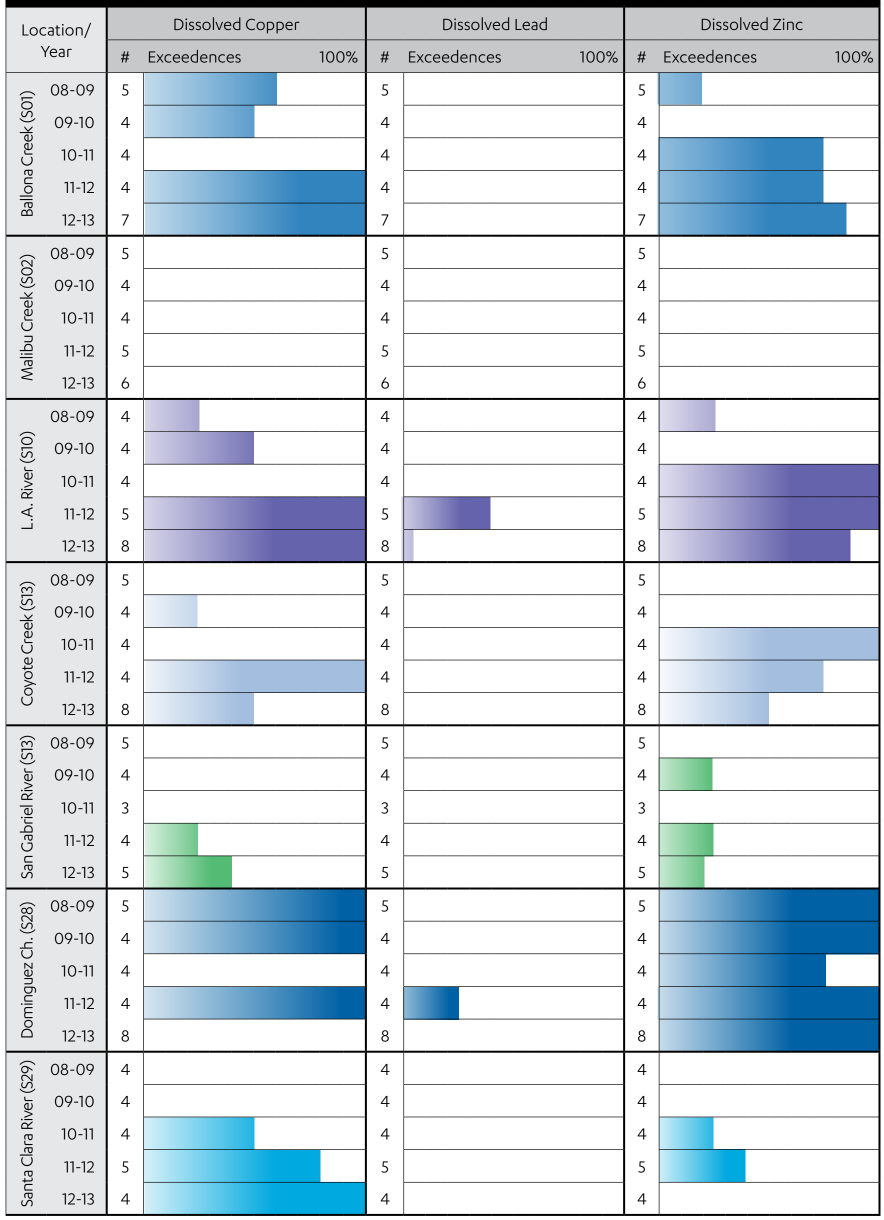
- Despite the amount of data available on 303(d) listings, it was difficult to assemble the information on the extent of impairments within the County boundary. The information we needed was divided between a GIS layer and a separate spreadsheet, requiring a complex and time-consuming effort to interlink the two. Because of the level of effort required, we did not attempt to compile similar statistics for previous years, so trend data is not available at this time.

- There were only two years of data from the current tributary monitoring efforts, so trend data for metals exceedances were only provided for the mass emissions stations.

Table 12: 2012-13 Exceedances of Water Quality Objectives During LADPW Receiving Water Monitoring

Mass Emission Station / Watershed	Wet Weather		Dry Weather	
Ballona Creek (S01)	E. coli (4/6)	67%	E. coli (1/3)	33%
	D. zinc (6/7)	86%		
	D. copper (7/7)	100%		
Malibu Creek (S02)	E. coli (3/5)	60%	pH (1/2)	50%
	Sulfate (6/6)	100%	Sulfate (2/2)	100%
	TDS (1/6)	17%	TDS (1/2)	50%
Los Angeles River (S10)	E. coli (4/7)	57%	E. coli (1/2)	50%
	pH (1/8)	13%	pH (1/2)	50%
	D. copper (8/8)	100%	Cyanide (1/2)	50%
	D. lead (1/8)	13%		
	D. zinc (7/8)	88%		
Coyote Creek (S13)	E. coli (4/6)	67%	E. coli (1/2)	50%
	D. copper (4/8)	50%		
	D. zinc (4/8)	50%		
San Gabriel River (S14)	E. coli (2/5)	40%	Not sampled	
	Cyanide (1/5)	20%		
	pH (1/5)	20%		
	D. copper (2/5)	40%		
	D. zinc (1/5)	20%		
Dominguez Channel (S28)	E. coli (3/7)	43%	E. coli (2/2)	100%
	Cyanide (1/7)	14%	Cyanide (1/2)	50%
	pH (1/8)	13%	pH (1/2)	50%
	D. copper (8/8)	100%		
	D. zinc (8/8)	100%		
Santa Clara River (S29)	E. coli (4/4)	100%	pH (1/2)	50%
Tributary/Sub-Watershed	**Wet Weather**		**Dry Weather**	
Upper Las Virgenes Creek (TS25)	E. coli (5/5)	100%	E. coli (2/2)	100%
	Sulfate (1/6)	17%	Sulfate (2/2)	100%
			TDS (1/1)	100%
Cheseboro Canyon (TS26)	E. coli (5/5)	100%	E. coli (2/2)	100%
	Sulfate (1/7)	14%	Sulfate (2/2)	100%
	TDS (1/6)	17%	TDS (2/2)	100%
Lower Lindero Creek (TS27)	E. coli (5/5)	100%	E. coli (2/2)	100%
	Sulfate (2/6)	33%	Sulfate (2/2)	100%
	D. copper (1/6)	17%		
Medea Creek (TS28)	E. coli (5/5)	100%	E. coli (1/2)	50%
	Sulfate (1/7)	14%	Sulfate (2/2)	100%
			TDS (2/2)	100%
Liberty Canyon Channel (TS29)	E. coli (5/5)	100%	E. coli (2/2)	100%
	pH (1/6)	17%	Cyanide (1/2)	50%
	Sulfate (1/6)	17%	Sulfate (2/2)	100%
	D. copper (2/6)	33%	TDS (1/2)	50%
	D. zinc (1/6)	17%	D. cadmium (1/2)	50%
			D. copper (2/2)	100%
PD 728 at Foxfield Dr. (TS30)	E. coli (5/5)	100%	E. coli (1/2)	50%
			Sulfate (2/2)	100%

Figure 10: Wet Weather Metals Exceedances at Mass Emissions Stations (2009-2013)



= Number of Samples Taken

Table 13: Summary of Total Exceedances at Receiving Water Monitoring Locations (2012-2013)

Station	Wet	Dry
S01	17	1
S02	10	4
S10	21	3
S13	12	1
S14	7	Not sampled
S28	21	4
S29	4	1
TS25	6	6
TS26	7	6
TS27	8	4
TS28	6	5
TS29	10	9
TS30	5	3

Table 14: Summary of Wet Weather Metals Exceedances at Mass-Emissions Stations (2009-2013)

	Dissolved Copper	Dissolved Lead	Dissolved Zinc
2008-09	27%	0%	21%
2009-10	32%	0%	18%
2010-11	7%	0%	56%
2011-12	71%	10%	58%
2012-13	63%	2%	57%

Surface Water Discharges from Sewage Treatment Plants and Industry

Because data on receiving water quality is limited spatially and temporally, we chose to include an additional indicator focusing on the discharge of pollutants to surface waters.

Overall, we know that the quality of effluent from water treatment plants and industrial dischargers has improved dramatically over the last few decades. In particular, pollutant loads of metals and sewage solids have decreased greatly over the last 40 years. As a result, Santa Monica Bay no longer has a dead zone and fish haven't had tumors or fin rot for over twenty years. Also, the frequency of sewage spills has decreased tremedously with increased investments in sewer infrastructure and enhanced inspection and maintenance programs. These improvements have been an extraordinary success story; however, there is still work to be done.

The major categories of dischargers are publically owned treatment works (POTWs) and large industrial facilities, both of whom are regulated under the Clean Water Act through individual NPDES (National Pollutant Discharge Elimination System) Permits, and are required to conduct self-monitoring and report results to the Regional Water Board. Some NPDES permit limits reflect Total Maximum Daily Loads (TMDLs) that have been developed for impaired waterbodies to which these facilities discharge.

Data

We looked at two measures of discharges to surface waters:

NPDES Violations

We generated reports using the California Integrated Water Quality System Project (CIWQS) database for interactive violations reports[9]. We looked at Class 1 and Class 2 violations from large, individual industrial NPDES permittees in 2013 and for the previous 4 years.

- Class 1 violations are violations that pose an immediate and substantial threat to water quality and that have the potential to cause significant detrimental impacts to human health or the environment. Violations involving recalcitrant parties who deliberately avoid compliance are also considered class I.

- Class 2 violations are violations that pose a moderate, indirect, or cumulative threat to water quality. Negligent or inadvertent noncompliance with the potential to cause or allow the continuation of unauthorized discharge or obscuring past violations are also class 2 violations.

POTW Mass Discharges

We used data from the 2013 annual reports for 12 of the largest waste water treatment plants (eight operated by the Los Angeles County Sanitation Districts and four operated by the City of Los Angeles), to calculate total mass discharges of the following pollutants: Ammonia, Nitrate+Nitrite Nitrogen, Zinc, Nickel, Copper, Arsenic, Lead, and Mercury. Data for LA County Sanitation Districts facilities were obtained from Annual Reports available through CIWQS[10]; data for City of Los Angeles facilities were obtained by request to the City Bureau of Sanitation.

Findings

NPDES Violations

- There are 38 major point source facilities in LA County regulated under the NPDES Program.
- There were no Class 1 violations in 2013, nor have there been any for the last 5 years. (Tables 15 and 16)
- There were 53 Class 2 violations in 2013. Of the 10 facilities involved, just three accounted for over 75% of the violations: Owens-Brockway Glass Container, Alamitos Generating Station and William E Warne Power Plant. (Tables 15 and 16)
- The sewage treatment plants did not have significant violations in 2013. (Table 15)
- 2013 was the first year that violations decreased since 2009 - about a 50% reduction from the previous two years, but still only slightly lower than 2009 levels. (Table 16)

POTW Mass Discharges

- The Joint Water Pollution Control Plant (JWPCP) and Hyperion Treatment Plant (HTP) each discharged over 30 million pounds of ammonia nitrogen to the ocean in 2013. The remaining ten facilities (8 are inland) discharged nitrogen primarily as Nitrate + Nitrogen, ranging from 100,000 pounds to over 550,000 pounds in 2013. (Table 17, Fig 11-12)
- Metals contributions from the 12 plants are broadly proportional to overall discharge volumes, but with notable disproportionate contributions from JWPCP for nickel; from Hyperion for copper, lead and zinc; and from San Jose Creek WRP and Donald Tillman WRP for zinc. (Table 17, Fig 13-18)

Table 15: NPDES Violations by Facility, 2013

Facility	Owner/Operator	Class 1	Class 2
Owens-Brockway Glass Container	Owens-Illinois, Incorporated	0	19
Alamitos Generating Station	AES Alamitos LLC	0	12
William E Warne Power Plant	CA Dept of Water Resources Pearblossom	0	10
Scattergood Generating Station	Los Angeles City DWP	0	5
Al Larson Boat Shop	Al Larson Boat Shop	0	2
Castaic Power Plant	Los Angeles City DWP	0	1
Harbor Generating Station	Los Angeles City DWP	0	1
Haynes Generating Station	Los Angeles City DWP	0	1
Morton Salt, Inc.	Morton Salt, Inc.	0	1
Redondo Generating Station	AES Redondo Beach LLC	0	1
Southwest Terminal Area I	ExxonMobil Oil Corporation Terminal Island	0	0
Total		**0**	**53**

Table 16: Total NPDES Violations (2009-2013)

Violation Category	2009	2010	2011	2012	2013
Class 1	0	0	0	0	0
Class 2	59	94	110	101	53

Data Limitations

- While violations are relatively easy to quantify for large facilities with individual NPDES permits, there are thousands of small industrial facilities, covered under the Industrial General Permit, whose compliance status is much harder determine. We were unable to include compliance or discharge information for these facilities, but hope to address this in a future report card.
- Due to differences in data accessibility, we were only able to provide mass discharge data for 12 of the larges treatment plants. Our analysis did not include Tapia WRF (Calabasas), Burbank WWRP, Edward C. Little WRP (El Segundo), Carson Regional WRP, or Avalon WWTF (Catalina).
- Due to time and resource limitations, we were unable to perform a historical trend analysis for this report. However, we know there have been significant improvements in nutrient discharges (including ammonia) as a result of the Basin Plan requirements and TMDLs that led to widespread implementation of nitrification/denitrification at treatment plants.

Table 17: POTW Annual Discharge Volumes and Receiving Waters TD = Total Discharge

	Treatment Facility	TD (MG)	Receiving Water
JWPCP	Joint Water Pollution Control Plant	96,265	Pacific Ocean
HTP	Hyperion Treatment Plant	92,558	Pacific Ocean
SJCTP	San Jose Creek WRP	11,968	San Gabriel River, San Jose Creek
DCTTP	Donald C. Tillman WRP	11,402	Los Angeles River, Balboa Recreation Lake, Wildlife Lake
LCTP	Los Coyotes WRP	7,738	San Gabriel River
LAGTP	Long Beach WRP	6,826	Los Angeles River
VTP	Valencia WRP	5,333	Santa Clara River
TITP	Terminal Island WRP	4,480	Los Angeles River
LBTP	Los Angeles-Glendale WRP	3,918	Coyote Creek
WNTP	Whittier Narrows WRP	3,004	San Gabriel River
STP	Saugus WRP	1,880	Santa Clara River
PTP	Pomona WRP	1,573	San Jose Creek

Figure 16: POTW Annual Discharges of Nickel (2013)

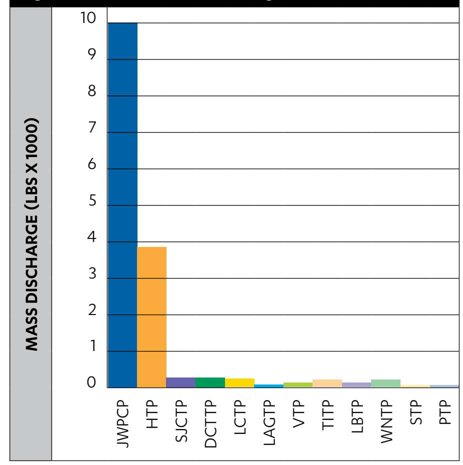


Figure 11: POTW Annual Discharges of Ammonia Nitrogen (2013)

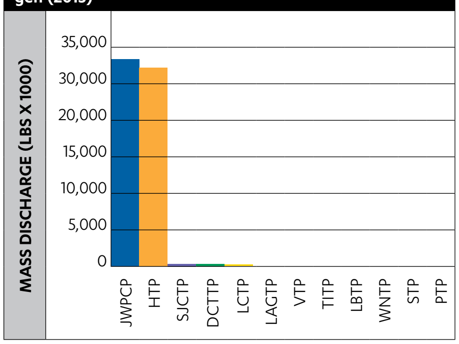


Figure 13: POTW Annual Discharges of Arsenic (2013)

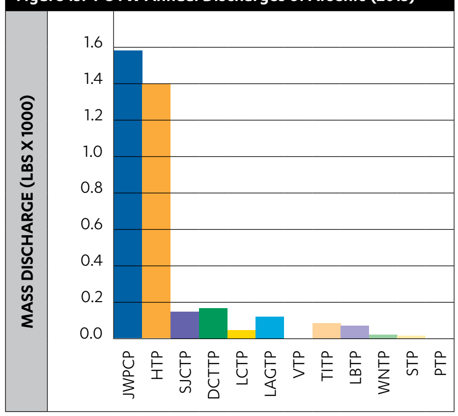


Figure 17: POTW Annual Discharges of Mercury (2013)

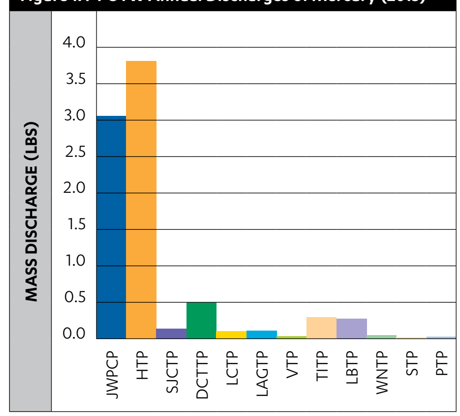


Figure 12: POTW Annual Discharges of Nitrate + Nitrate as Nitrogen (2013)

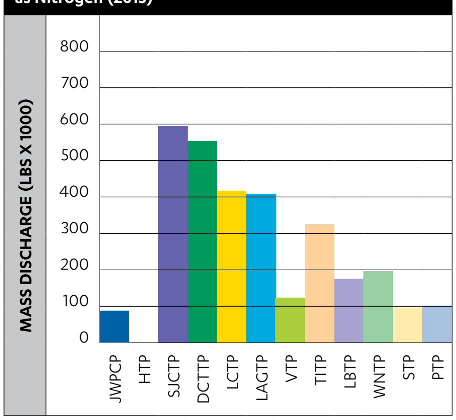


Figure 14: POTW Annual Discharges of Copper (2013)

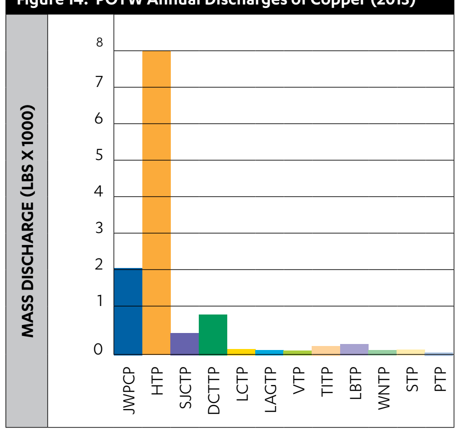


Figure 15: POTW Annual Discharges of Lead (2013)

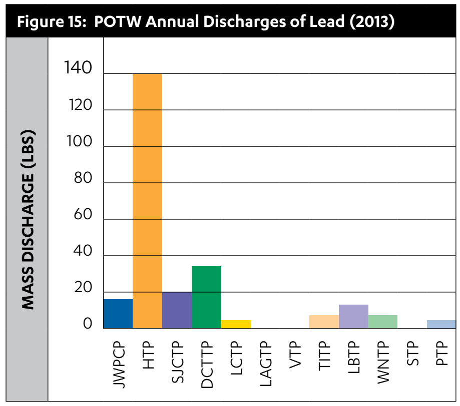
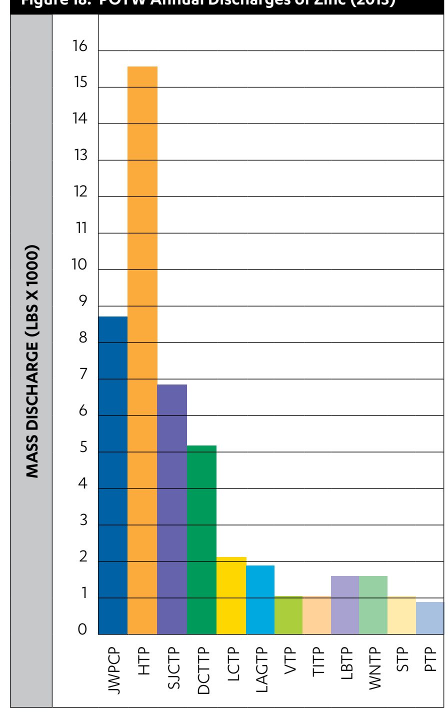


Figure 18: POTW Annual Discharges of Zinc (2013)



Beach Water Quality

Over 50 million residents and visitors enjoy swimming and surfing at LA County's beaches every year. Maintaining high levels of water quality is vital for public safety and enjoyment of these iconic landscapes.

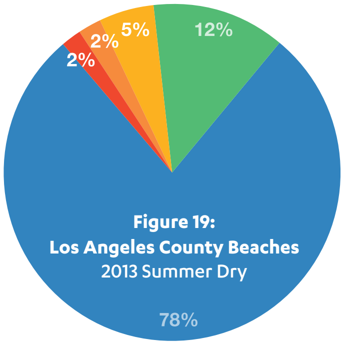


Figure 19:
Los Angeles County Beaches
2013 Summer Dry

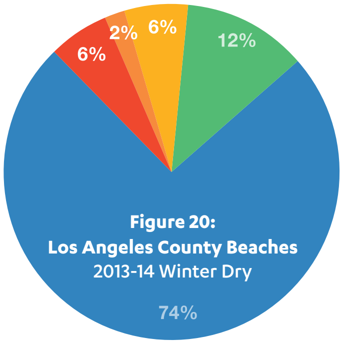


Figure 20:
Los Angeles County Beaches
2013-14 Winter Dry

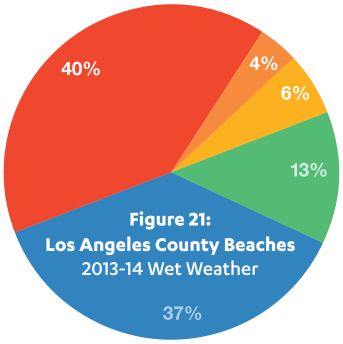


Figure 21:
Los Angeles County Beaches
2013-14 Wet Weather

Data

We used grades and analysis from Heal the Bay's 2013-2014 Beach Report Card[11].

Findings

- Summer 2013 dry weather water quality in LA County was excellent with 90% A or B grades. Summer grades continue to improve due to successful, large scale investments (over $100 million in the last fifteen years) in dry weather runoff diversions to the sewer system, and other dry weather runoff treatment and source abatement projects. (Figure 19 and 22-24, Table 18)
- Winter dry water quality was also very good with 86% A or B grades (Fig 20, Table 18), besting the five-year average of 73% A or B grades.
- Wet weather water quality continues to be an area of concern statewide. Wet weather grades in LA County are no exception, with only 50% A or B grades, and with 40% receiving F grades. (Fig 21, Table 18)
- Though wet weather grades slipped slightly from 2012-13 (when there were 57% A or B grades), they were still above the county's five-year average of 37% A or B grades. (Table 19 and 20) However, LA County's percentage of wet weather A or B grades was lower

than the statewide average of 69% A or B grades.

- LA County was host to three of the 10 beaches on the statewide Beach Bummer list for 2013-14: Santa Monica Municipal Pier, Cabrillo Beach (harborside) and Marina del Rey Mother's Beach.

Table 18: 2013 Grades, Los Angeles County

	Summer Dry	Winter Dry	Wet Weather	Totals
A	72	69	32	**173**
B	11	5	16	**32**
C	5	2	11	**18**
D	2	3	7	**12**
F	2	7	18	**27**

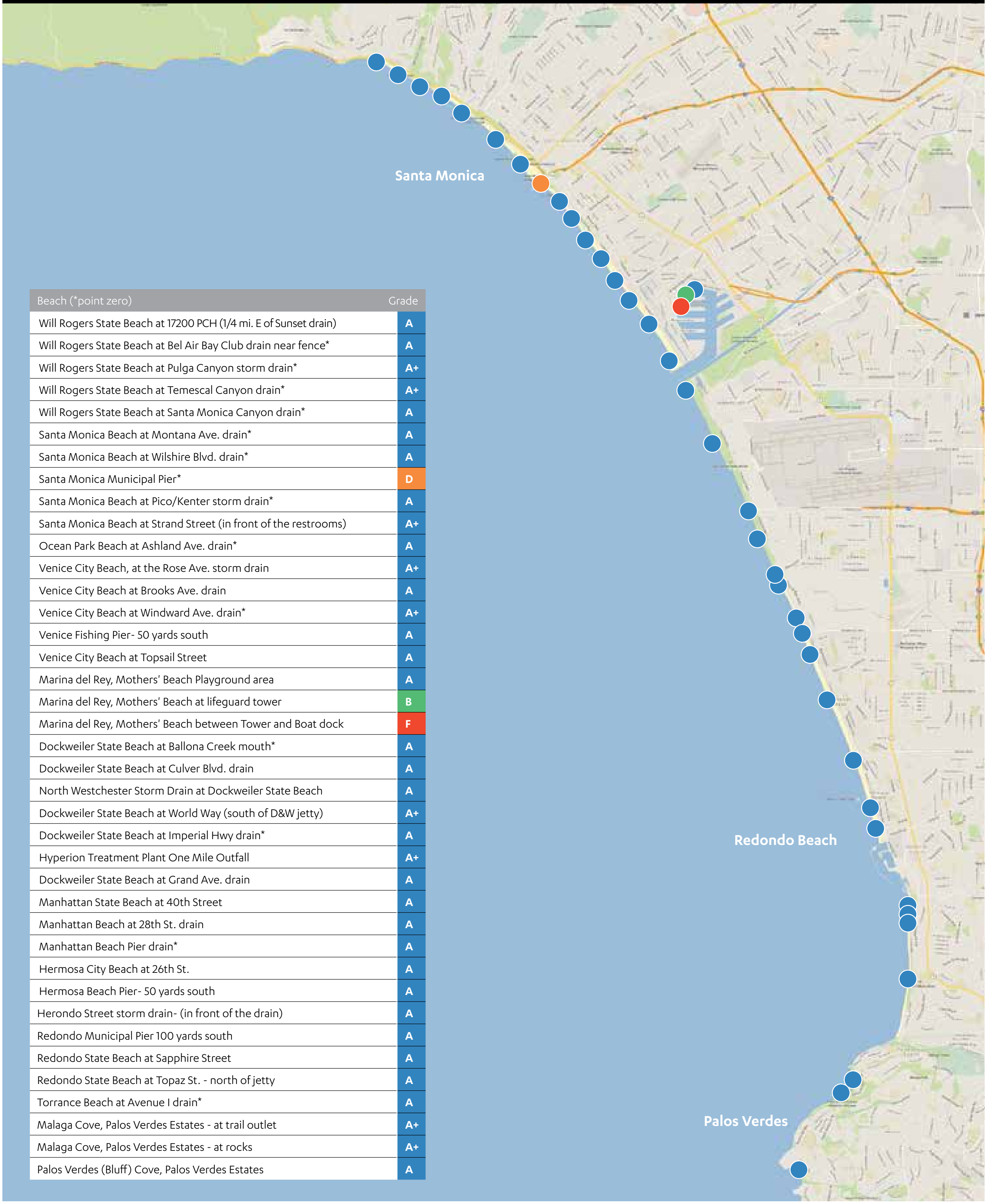
Table 19: 2012 Grades, Los Angeles County

	Summer Dry	Winter Dry	Wet Weather	Totals
A	59	56	20	**135**
B	16	13	9	**38**
C	7	6	7	**20**
D	1	5	8	**14**
F	6	5	41	**52**

Table 20: 2011 Grades, Los Angeles County

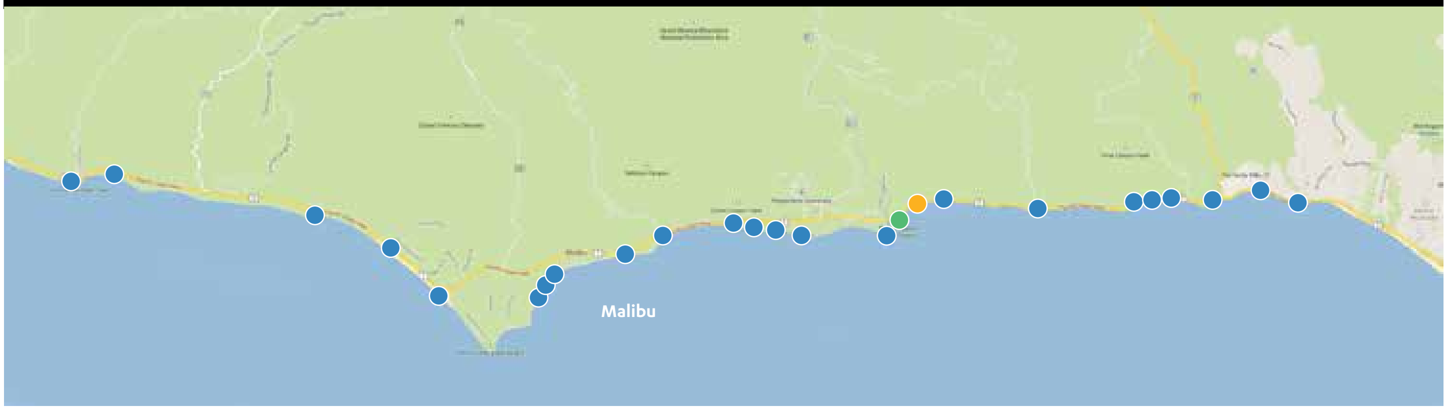
	Summer Dry	Winter Dry	Wet Weather	Totals
A	55	50	15	**120**
B	19	6	10	**35**
C	3	7	9	**19**
D	2	4	12	**18**
F	11	19	40	**70**

Figure 22: 2013 Grades during Summer 2013, Santa Monica Bay. Source: Heal the Bay



Beach (*point zero)	Grade
Will Rogers State Beach at 17200 PCH (1/4 mi. E of Sunset drain)	A
Will Rogers State Beach at Bel Air Bay Club drain near fence*	A
Will Rogers State Beach at Pulga Canyon storm drain*	A+
Will Rogers State Beach at Temescal Canyon drain*	A+
Will Rogers State Beach at Santa Monica Canyon drain*	A
Santa Monica Beach at Montana Ave. drain*	A
Santa Monica Beach at Wilshire Blvd. drain*	A
Santa Monica Municipal Pier*	D
Santa Monica Beach at Pico/Kenter storm drain*	A
Santa Monica Beach at Strand Street (in front of the restrooms)	A+
Ocean Park Beach at Ashland Ave. drain*	A
Venice City Beach, at the Rose Ave. storm drain	A+
Venice City Beach at Brooks Ave. drain	A
Venice City Beach at Windward Ave. drain*	A+
Venice Fishing Pier- 50 yards south	A
Venice City Beach at Topsail Street	A
Marina del Rey, Mothers' Beach Playground area	A
Marina del Rey, Mothers' Beach at lifeguard tower	B
Marina del Rey, Mothers' Beach between Tower and Boat dock	F
Dockweiler State Beach at Ballona Creek mouth*	A
Dockweiler State Beach at Culver Blvd. drain	A
North Westchester Storm Drain at Dockweiler State Beach	A
Dockweiler State Beach at World Way (south of D&W jetty)	A+
Dockweiler State Beach at Imperial Hwy drain*	A
Hyperion Treatment Plant One Mile Outfall	A+
Dockweiler State Beach at Grand Ave. drain	A
Manhattan State Beach at 40th Street	A
Manhattan Beach at 28th St. drain	A
Manhattan Beach Pier drain*	A
Hermosa City Beach at 26th St.	A
Hermosa Beach Pier- 50 yards south	A
Herondo Street storm drain- (in front of the drain)	A
Redondo Municipal Pier 100 yards south	A
Redondo State Beach at Sapphire Street	A
Redondo State Beach at Topaz St. - north of jetty	A
Torrance Beach at Avenue I drain*	A
Malaga Cove, Palos Verdes Estates - at trail outlet	A+
Malaga Cove, Palos Verdes Estates - at rocks	A+
Palos Verdes (Bluff) Cove, Palos Verdes Estates	A

Figure 23: 2013 Grades during Summer 2013, Malibu. Source: Heal the Bay

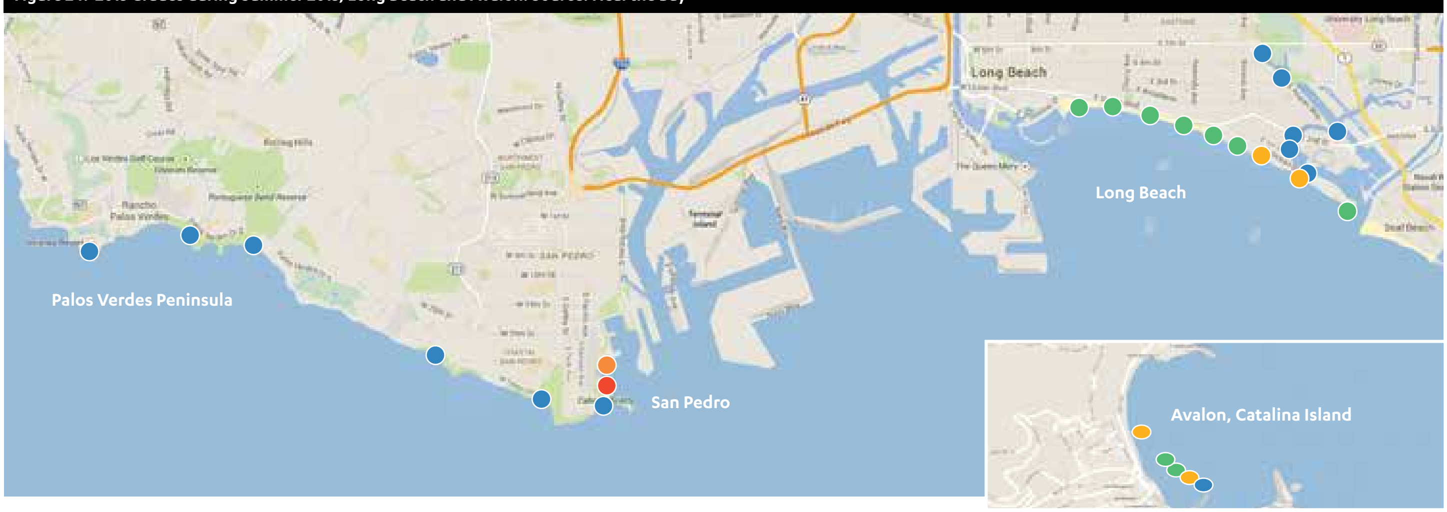


Beach (*point zero)	Grade
Leo Carrillo Beach at Arroyo Sequit Creek mouth*	A+
Nicholas Beach at San Nicholas Canyon Creek mouth*	A+
Encinal Canyon at El Matador State Beach	A
Broad Beach at Trancas Creek mouth*	A
Zuma Beach at Zuma Creek mouth*	A
Walnut Creek outlet	A+
Unnamed Creek, proj. of Zumirez Drive (Little Dume)	A+
Paradise Cove Pier at Ramirez Canyon Creek mouth*	A+
Escondido Creek, just east of Escondido State Beach	A

Beach (*point zero)	Grade
Latigo Canyon Creek mouth*	A
Solstice Canyon at Dan Blocker County Beach	A
Unnamed Creek, adj. to stairway at 24822 Malibu Rd.	A
Puerco State Beach at creek mouth*	A
Marie Canyon drain at Puerco Beach, 24572 Malibu Rd.	A
Malibu Point	A+
Surfrider Beach (breach point)	B
Malibu Pier, 50 yards east	C
Carbon Beach at Sweetwater Canyon	A

Beach (*point zero)	Grade
Las Flores State Beach at Las Flores Creek*	A
Big Rock Beach at 19948 PCH stairs	A
Pena Creek at Las Tunas County Beach	A+
Tuna Canyon	A
Topanga State Beach at creek mouth	A
Castlerock Storm Drain at Castle Rock Beach	A+
Santa Ynez drain at Sunset Blvd.	A+

Figure 24: 2013 Grades during Summer 2013, Long Beach and Avalon. Source: Heal the Bay



Beach	Grade
Long Point, Rancho Palos Verdes	A+
Abalone Cove Shoreline Park	A+
Portuguese Bend Cove, Rancho Palos Verdes	A+
Royal Palms State Beach	A
Wilder Annex, San Pedro	A+
Cabrillo Beach, oceanside	A+
Cabrillo Beach, harborside at restrooms	F
Cabrillo Beach, harborside at boat launch	D
Long Beach City Beach, projection of 5th Place	B
Long Beach City Beach, projection of 10th Place	B
Long Beach City Beach, projection of Molino Avenue	B
Long Beach City Beach, projection of Coronado Avenue	B

Beach	Grade
Belmont Pier, westside	B
Long Beach City Beach, projection of Prospect Avenue	B
Long Beach City Beach, projection of Granada Avenue	C
Alamitos Bay, 2nd Street Bridge and Bayshore	A
Alamitos Bay, shore float	A
Mother's Beach, Long Beach, north end	A
Alamitos Bay, 56th Place, on bayside	A
Long Beach City Beach, projection of 55th Place	C
Long Beach City Beach, projection of 72nd Place	B
Colorado Lagoon-north	A
Colorado Lagoon-south	A

Catalina Island (inset)	Grade
Avalon Beach - east of the Casino Arch at the steps	C
Avalon Beach - 100 feet west of the Green Pleasure Pier	B
Avalon Beach - 50 feet west of the Green Pleasure Pier	B
Avalon Beach - 50 feet east of the Green Pleasure Pier	C
Avalon Beach - 100 feet east of the Green Pleasure Pier	A

Grade for Water = C

Despite summer beach water quality improvements, continued reductions in pollutant loads from waste water treatment plants and industry, a long history of water conservation, successful water recycling efforts in much of the county, and reliable, high quality drinking water coming out of the vast majority of taps, the LA region received a C on the report card. Surface water quality impairments are prevalent county-wide, stormwater is highly polluted and not improving in quality, groundwater contamination is severe and county-wide, and the region is far too reliant on water supplies from the ecologically sensitive Colorado River, Eastern Sierra, and the Bay-Delta regions. With the passage of Proposition 1, TMDL deadlines looming, and state and local commitments to water recycling and integrated water management, the region has a tremendous opportunity to improve in the near future.

AIR

Overview

The improvement of air quality in the Los Angeles region is one of the great environmental success stories in our nation's history. The days of public schools frequently cancelling outdoor physical education and athletics because of extremely poor air quality are long gone.

The success story is testament to effective regulation by EPA, the California Air Resources Board and the South Coast Air Quality Management District under the Clean Air Act and state laws. Los Angeles was one of the first regions in the country to develop an air quality district before the Clean Air Act was even passed. The environmental and research communities also have contributed greatly to this effort. However, despite the success story, the Los Angeles region still has some of the worst air quality in the nation because of our climate and topography, mobile sources like cars and trucks, a large industrial sector, and the two major ports. Days exceeding state and federal air quality standards ("non-attainment days") for ozone and particulate matter occur frequently, and air toxics continue to pose a major health risk, especially in low income communities. Climate change induced heat will create conditions for higher ozone concentrations, a criteria pollutant the region is still combating. Other major factors affecting air quality include the vehicle fleet mix and energy source, as well as energy use by buildings.

Ambient Air Quality

Air pollution can cause or contribute to a range of health impacts, from watery eyes and fatigue to respiratory disease, lung damage, cancer, birth defects, heart attacks, and premature death. The American Lung Association State of the Air 2014 Report[12] puts Los Angeles County among the top 5 polluted areas in the country for ozone and PM2.5.

Air pollution in the County is primarily monitored by the South Coast Air Quality Management District (SCAQMD), which oversees all of the urban portions of LA, Riverside and San Bernardino counties, and all of Orange County. A small area in Northwest LA County is under the Antelope Valley AQMD (AVAQMD).

We base this discussion on criteria set by the Clean Air Act and the state implementation plan. USEPA designates areas of the country where air pollution levels persistently exceed the national ambient air quality standards as "nonattainment." Portions of the South Coast Air Basin are listed as 'extreme non-attainment' for ozone (8hr), and 'moderate non-attainment' for PM2.5 (particulate matter with diameter equal to or less than 2.5 microns). State and federal law requires these areas to meet clean air standards by the year 2015 for PM2.5, and by 2023 for ozone. EPA lowered the annual standard for PM2.5 in 2012 (from 15 to 12 ug/m3), and with the likely toughening of the Federal ozone standard this year due to extensive research demonstrating human health risks at lower ambient ozone concentrations, even more of the region will be in non-attainment soon. LA County also is designated as "partial non-attainment" for lead based on two source-specific monitors in the Los Angeles County Cities of Vernon and Industry; all other areas are in attainment.

Data

We have chosen to show ambient air quality at the basin scale rather than just within LA County due to downwind impacts of pollutants originating in LA County. SCAQMD-created maps[13] for 2013 show the geographical distribution of days exceeding the Federal ozone standard and areas where the annual mean PM2.5 concentrations exceed the Federal standard. We compiled data from 38 locations throughout the four-county area where SCAQMD monitors air quality, as well as the one location in LA County monitored by AVAQMD, as provided in these agencies' annual reports[14,15]. Results are shown for ozone, PM10, and PM2.5 for 2013 by monitoring location for all sites. Trends since 2009 are shown just for LA County monitoring locations for seven "criteria contaminants": ozone, particulate matter (10 and 2.5), lead, carbon monoxide, nitrogen oxides (specifically NO_2) and sulfur dioxide. Figures for NO_2, CO, SO_2, and lead are based on maximum concentrations observed.

We also looked at results of the draft Multiple Air Toxics Exposure Study (MATES) IV conducted by SCAQMD[16]. Started in 1986, MATES studies aim to determine the basin-wide risks associated with major airborne carcinogens. MATES IV monitoring and evaluation results are based on a one-year study (2012-13) of air toxics, and a comparison of these results with previous studies from 2005 (MATES III) and 1998 (MATES II). For the first time, MATES IV included ultrafine particle concentrations, specifically diesel particulate matter (DPM). Sources of DPM include Point Sources (facilities with equipment permitted by AQMD), Area Sources (small sources that can have collective impact), On-Road Sources (cars, trucks, buses and motorcycles), and Off-Road Sources.

Figure 25: OZONE 2013, Number of Days Exceeding Federal Standard

8-hour average > 0.075ppm

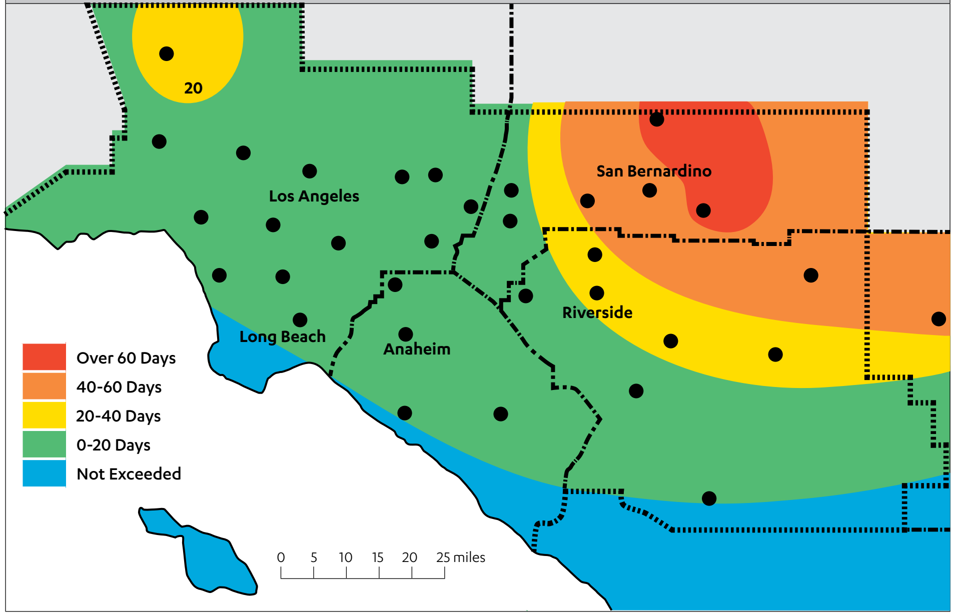
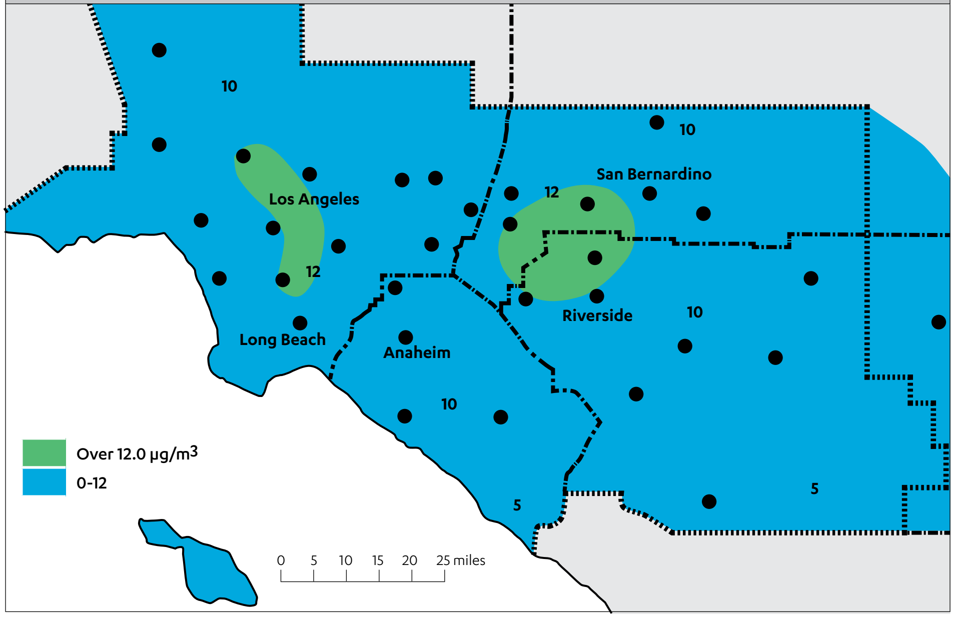


Figure 26: PM2.5 2013*, Annual Arithmetic Mean

Federal Standard *Based on preliminary data



SCAQMID AIR MONITORING NETWORK
- South Coast Air Basin (SCAB)
- County Lines
- Air Monitoring Station

Findings

- Overall, the LA Basin continues to demonstrate air quality improvements for both national ambient air standards and for air toxics. However, the region is still in non-attainment for ozone and particulate matter. Also, diesel particulate is still a major health concern despite reductions in its emissions.
- All SCAQMD counties had exceedance days for the 1-hr (70 total days) and 8-hr (119 total days) ozone State standard in 2013. In both cases, the highest individual values were over 160% of the standards (Table 21, Fig 27). A total of 88 days in 2013 exceeded the less-stringent Federal 8-hr standard for ozone. (Fig 25, Table 21)
- Ozone exceedances extend through San Bernardino and Riverside Counties valleys in the eastern Basin, as well as the northeast (Santa Clarita and Antelope Valleys, and East San Gabriel Valley had the highest exceedance rates) and northwest portions of Los Angeles County in the foothill and valley area. (Figures 25 and 27, Table 21)

- All counties had exceedance days for the 24-hr PM10 State standard (East San Gabriel Valley was the highest in the County) (Table 21, Fig 28, but there were no exceedances for the much less stringent Federal PM10 standard in 2013.
- All counties had exceedance days for the 24-hr PM2.5 Federal standard in 2013 (13 total days). The highest 24-hr concentration was 172% of the standard. Exceedances are focused in areas around downtown Los Angeles and the San Fernando Valley, as well as in San Bernardino and Riverside Counties (Figures 26 and 29, Table 21).
- NO_2, CO, SO_2, and lead concentrations have been well within Federal and State standards since 2009. PM10 and PM2.5 show generally declining trends, although with some increases over the last few years. Ozone levels have shown small decreases in 2013 compared to 2009, although with variations in the intervening years. (Figures 30-33)
- The carcinogenic risk from air toxics in the Basin is estimated at 418 cancer cases per million in 2012, which is 65% lower than the monitored average in 2005. This risk refers to the expected number of additional cancers in a population of one million individuals if they were exposed to these levels over a 70-year lifetime. (Figure 34)
- About 90% of the risk in 2012 is attributed to emissions associated with mobile sources, with the remainder attributed to toxics emitted from stationary sources, which include large industrial operations such as refineries and metal processing facilities, as well as smaller businesses such as gas stations and chrome plating. (Fig 35)
- While diesel PM exposure decreased by ~70% over the last seven years, it still dominates the overall cancer risk from air toxics. (Fig 34) Highest risk areas are near ports and transportation corridors. Risk from other air toxics continue to decline, with limited exceptions. Ultrafine Particle measurements show higher levels in areas with higher population and traffic density. (Fig 36)

Table 21: Number of exceedances of non-attainment pollutants. Source: SCAQMD 2013 Annual Report

		% Days Ozone Exceedance - Federal 8 hr (>0.075ppm)	% Days Ozone Exceedence State 8 hr (>0.070 ppm)	% Samples PM10 Exceedences State 24 hr (>50 μg/m3)	% Samples PM2.5 Exceedences Federal 24 hr (>35 μg/m3)
LOS ANGELES COUNTY					
1	Central LA	0.0	0.0	2.0	0.3
2	Northwest Coastal LA County	0.0	0.3	-	-
3	Southwest Coastal LA County	0.3	0.3	0.0	-
4	South Coastal LA County 1	0.0	0.4	0.0	0.6
	South Coastal LA County 2	-	-	2.0	0.3
	South Coastal LA County 3	0.0	0.0	-	-
6	West San Fernando Valley	3.5	5.8	-	0.8
7	East San Fernando Valley	1.7	4.7	2.0	1.2
8	West San Gabriel Valley	0.0	0.8	-	0.0
9	East San Gabriel Valley 1	1.7	4.1	10.0	0.0
	East San Gabriel Valley 2	7.5	11.8	-	-
10	Pomona/Walnut Valley	4.4	6.2	-	-
11	South San Gabriel Valley	0.0	0.8	-	0.0
12	South Central LA County	0.4	0.3	-	0.9
13	Santa Clarita Valley	11.0	16.8	0.0	-
14	Antelope Valley	0.4	1.4	4.3	0.0
ORANGE COUNTY					
16	North Orange County	0.3	0.5	-	-
17	Central Orange County	0.0	0.0	2.0	0.3
18	North Coastal Orange County		0.6	-	-
19	Saddleback Valley	0.6	1.4	2.0	0.0
RIVERSIDE COUNTY					
22	Norco/Corona	-	-	4.0	-
23	Metropolitan Riverside County 1	7.8	10.4	8.0	1.7
	Metropolitan Riverside County 2	-	-	-	0.9
	Mira Loma	6.0	9.4	24.0	2.5
24	Perris Valley	10.0	16.6	18.0	-
25	Lake Elsinore	3.5	6.8	-	-
26	Temecula	0.9	3.4	-	-
29	Banning Airport	17.0	18.1	2.0	-
30	Coachella Valley 1	12.9	22.5	5.0	0.0
	Coachella Valley 2	4.9	10.4	19.0	0.0
SAN BERNARDINO COUNTY					
32	Northwest San Bernardino Valley	7.8	12.1	-	-
33	Southwest San Bernardino Valley	-	-	5.0	0.9
34	Central San Bernardino Valley 1	12.2	18.6	31.0	0.8
	Central San Bernardino Valley 2	10.7	14.5	5.0	0.9
35	East San Bernardino Valley	17.9	25.5	3.0	-
37	Central San Bernardino Mountains	19.8	27.9	0.0	-
38	East San Bernardino Mountains	-	-	-	1.7

Data Limitations

- Monitoring locations differ widely in terms of monitoring frequency, pollutants and sampling techniques; this is apparent in the differences in data available in Figures 27-33.
- The MATES IV report is based on the results of only 10 fixed sites designed to represent varying land-use types and geography across the Basin.

Figure 27: % of Days Exceeding State 8-Hour Standard for Ozone

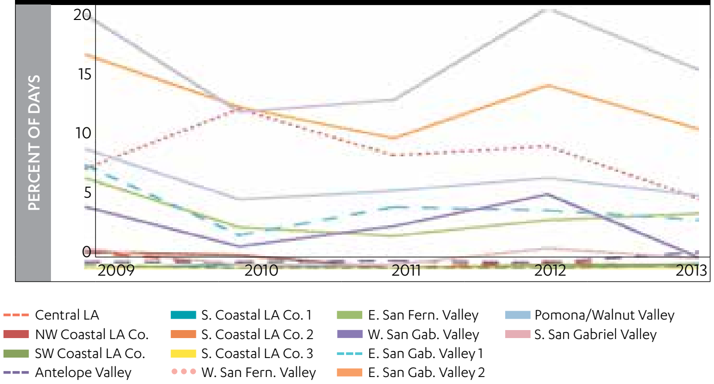


Figure 28: % of Samples Exceeding State 24-Hour Standard for PM10

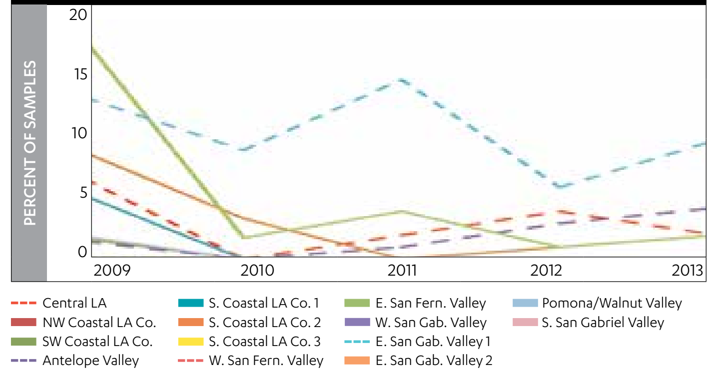


Figure 29: % of Samples Exceeding Federal 24-Hour Standard for PM2.5

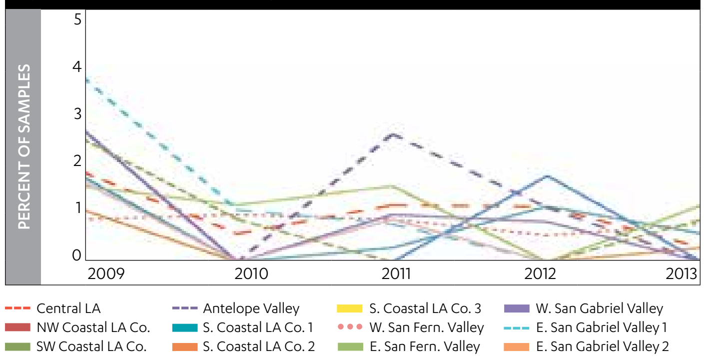


Figure 30: NO_2 Concentration as % of 1-Hour State Standard

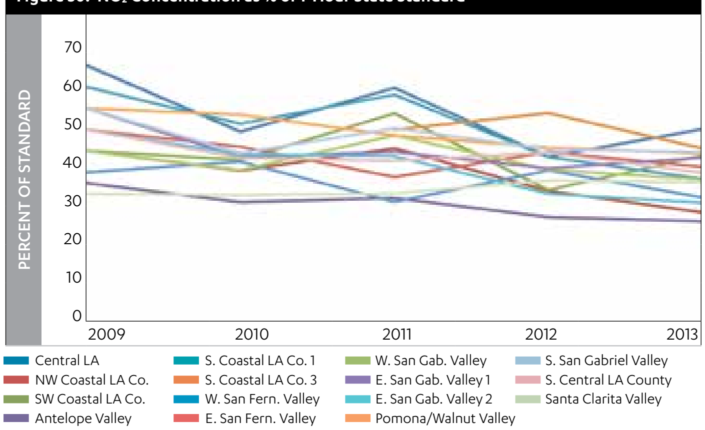


Figure 31: CO Concentration as % of 8-Hour State Standard

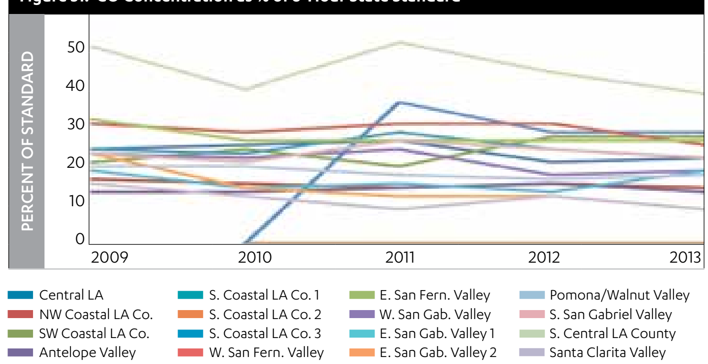


Figure 32: Lead Concentration as % of Monthly Average State Standard

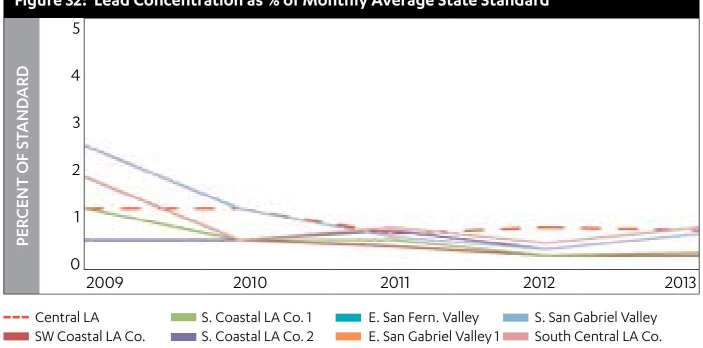


Figure 33: SO_2 Concentration as % of 1-Hour Federal Standard

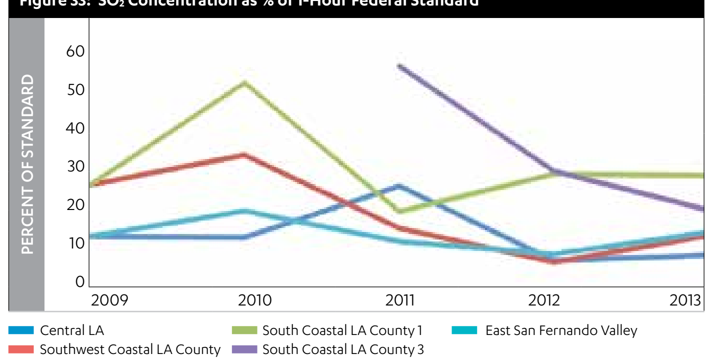


Figure 34: Comparison of Estimated 70-Year Risk from MATES III & IV Monitoring Data

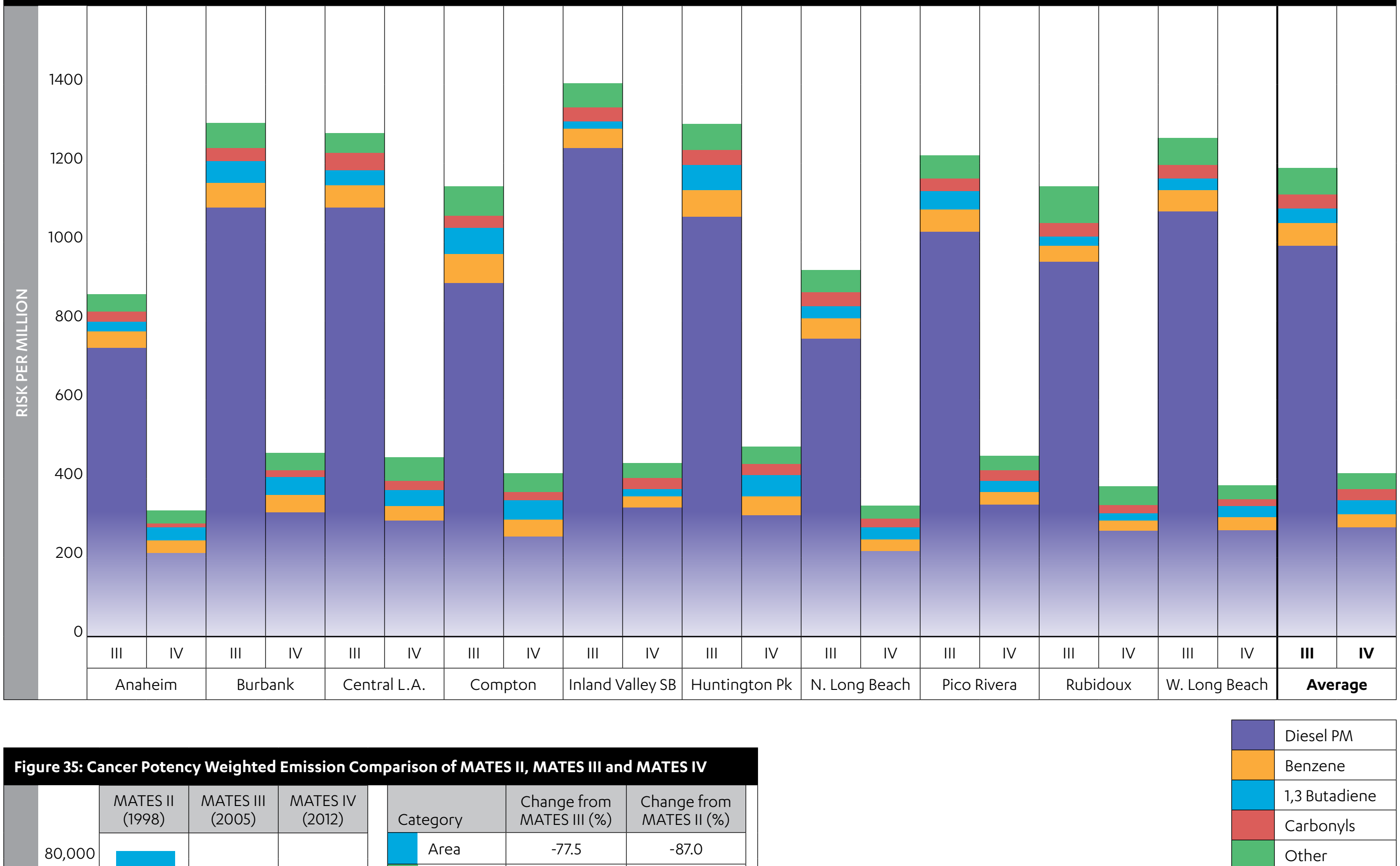
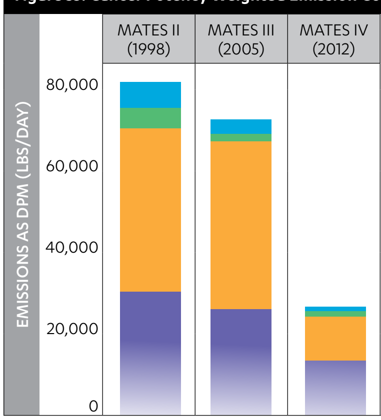


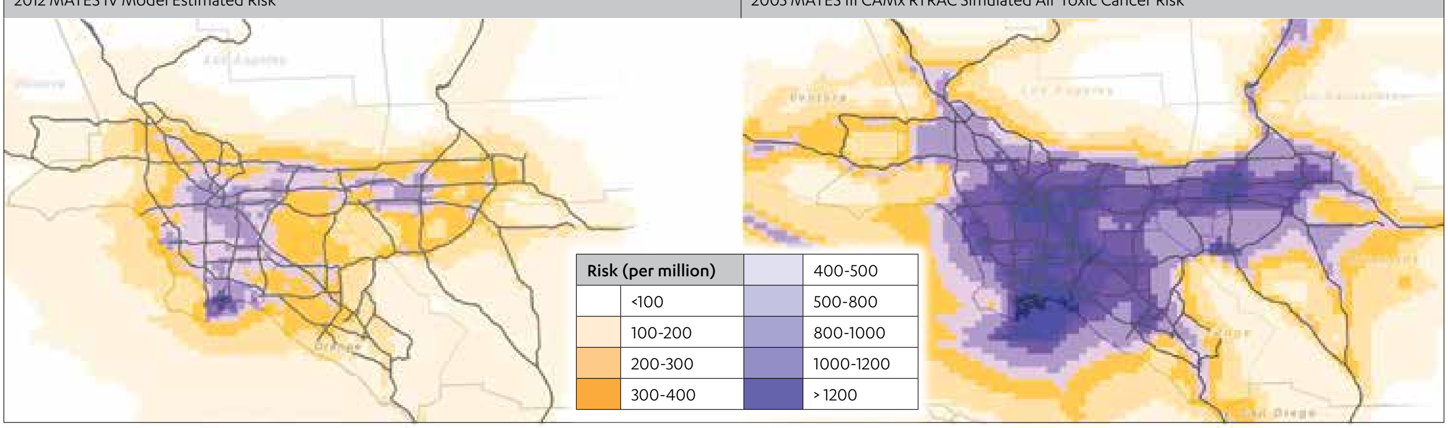
Figure 35: Cancer Potency Weighted Emission Comparison of MATES II, MATES III and MATES IV



Category	Change from MATES III (%)	Change from MATES II (%)
Area	-77.5	-87.0
Point	-20.8	-72.8
Off-Road	-73.5	-73.2
On-Road	-49.4	-55.7

Figure 36: Comparison of Estimated Risk for MATES IV and MATES III

2012 MATES IV Model Estimated Risk | 2005 MATES III CAMx RTRAC Simulated Air Toxic Cancer Risk



Stationary Source Toxic Emissions

Toxic air emissions from stationary sources are a leading indicator for air quality, and provide additional details on the spatial distributions, sources, and mass emissions of a variety of toxic chemical constituents.Los Angeles County remains the largest industrial manufacturing center in the United States with the most employment in this sector. This raises questions into the future about the role of this sector in the economy and its impacts.

Data

We used the Toxic Release Inventory (TRI)[17] data submitted to EPA on an annual basis by facilities which come under this regulation[18]. We included data from the TRI reports for Toxic Air Contaminants (TACs) as defined by the CA Health and Safety Code[19], as well as for Federally-defined Hazardous Air Pollutants (HAPs)[20] released in significant amounts within the County. The top three emitting facilities were identified for each of the eight most emitted contaminants in Los Angeles County in 2013.

Findings

- Reported air emissions of many pollutants have increased significantly since 2009, including methanol, methylene chloride, styrene, and vinyl acetate. (Table 22)
- The five chemicals with mass emissions greater than 10,000 pounds per year in 2013 in descending order are: methanol, methylene chloride, styrene, toluene and benzene. (Table 22)

Table 22: Total Releases of Toxic Air Contaminants in Pounds by TRI-Reporting Facilities (2009-2013)

Pollutant	2009	2010	2011	2012	2013
Methanol	9,628	7,374	223,857	228,104	141,199
Methylene chloride	4	4	1,268	20,932	138,075
Styrene	1,490	2,052	162,252	162,433	136,517
Toluene	27,437	34,262	117,570	109,587	92,351
Benzene	200	220	21195	18,013	10,860
Vinyl Acetate	0	0	6057	5,581	3,354
Lead and Lead Compounds	638	634	781	830	1405
Nickel and Nickel Compounds	19	14	890	756	983
1 3-butadiene	0	0	1962	1,895	738
Formaldehyde	2,327	2,103	1,813	2,091	716
Ethylene Oxide	0	0	384	679	530
Chromium	6	6	364	105	435
Perchloroethylene	1	1	906	472	287
Trichloroethylene	0	0	283	250	250
Chloroform	0	0	0	0	73
Arsenic and Arsenic Compounds	3	4	1,207	199	9
Cadmium	421	7	5	3	2
Dibenzo - p-dioxins and Dibenzofurans	<1	<1	2	2	1
Hexavalent chromium (Cr (VI))	0	0	0	0	0
Chromium compounds	0	0	95	111	0
Asbestos	0	0	0	0	0

Table 23: Top 3 Emitting Facilities for the Eight Most Emitted Contaminants, 2013.

Pollutant	Facility	Pounds	Facility	Pounds	Facility	Pounds
Methanol	Phillips 66 LA Refinery Carson Plant	40,000	ExxonMobil Oil Corporation Torrance Refinery	25,000	Air Products & Chemicals Inc	16,622
Methylene Chloride	Polypeptide Group	137,049	IPS Corporation**	750	IPS Corporation	250
Styrene	Custom Fibreglass Manufacturing Co	51,870	GB Manufacturing Inc. California Acrylic Industries Inc (DBA Cal Spas)	14,291	Americh Corporation	13,624
Vinyl Acetate	Arkema Coating Resins Plant	2,450	Engineered Polymer Solutions Inc.	904		
Benzene	ExxonMobil Oil Corporation Torrance Refinery	3,700	Chevron Products Company Division of Chevron USA	790	Equilon Carson Terminal	750
Lead and Lead Compounds	Valley Processing*	637	Exide Technologies*	283	Tesoro Los Angeles Refinery Calciner Operations*	80
Toluene	Fabri Cote	27,174	Johnson Laminating & Coating Inc	12,451	ExxonMobil Oil Corporation Torrance Refinery	7,400
Nickel and Nickel Compounds	Alcoa Global Fasteners Inc	400	ExxonMobil Oil Corporation Torrance Refinery*	170	Chevron Products Company Division of Chevron USA*	120

**IPS Corp was listed two times for Methylene Chloride, though there is no difference in address, facility id, type of emission etc.

*For compounds

- Reported air emissions of a few pollutants have decreased since 2009, including formaldehyde and cadmium. (Table 22)
- The top three emitters comprise over half of the annual emissions for nearly all of the top eight chemicals discharged. (Table 23)
- Changes from year to year in calculation methods, global economic conditions, facility operations and clean-up activities may all influence the reported values, making it challenging to identify trends.
- Quemetco and Exide, two large battery recyclers, have historically been two of the largest emitters of metals (lead and arsenic in particular) (Fig 37 and 38), but enforcement actions and changes to facility operations have reduced emissions over the last several years. (Exide is now permanently closed due to chronic air quality and hazardous materials regulatory compliance issues. The enormous potential liability led Exide to acknowledge criminal conduct and commit to demolishing and cleaning up the facility in exchange for avoiding criminal prosecution from the US Department of Justice)

Data Limitations

- TRI data are based on facility self-reporting, and therefore represents a non-standardized methodology. Furthermore, TRI regulations do not require facilities to conduct any additional monitoring beyond what is required by other regulations.
- While emissions from mobile sources pose a higher overall risk compared to stationary source emissions, we do not have comparable data on mobile source emissions.

Figure 37: Quemetco, Inc., Self-Reported Toxic Air Contaminant Releases (2003-2013)

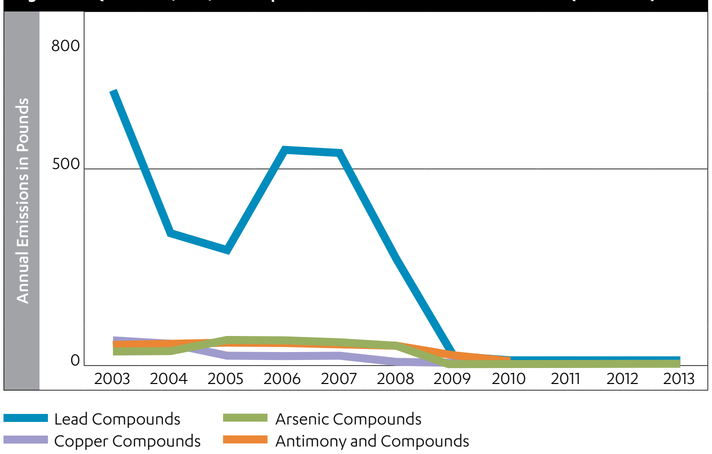
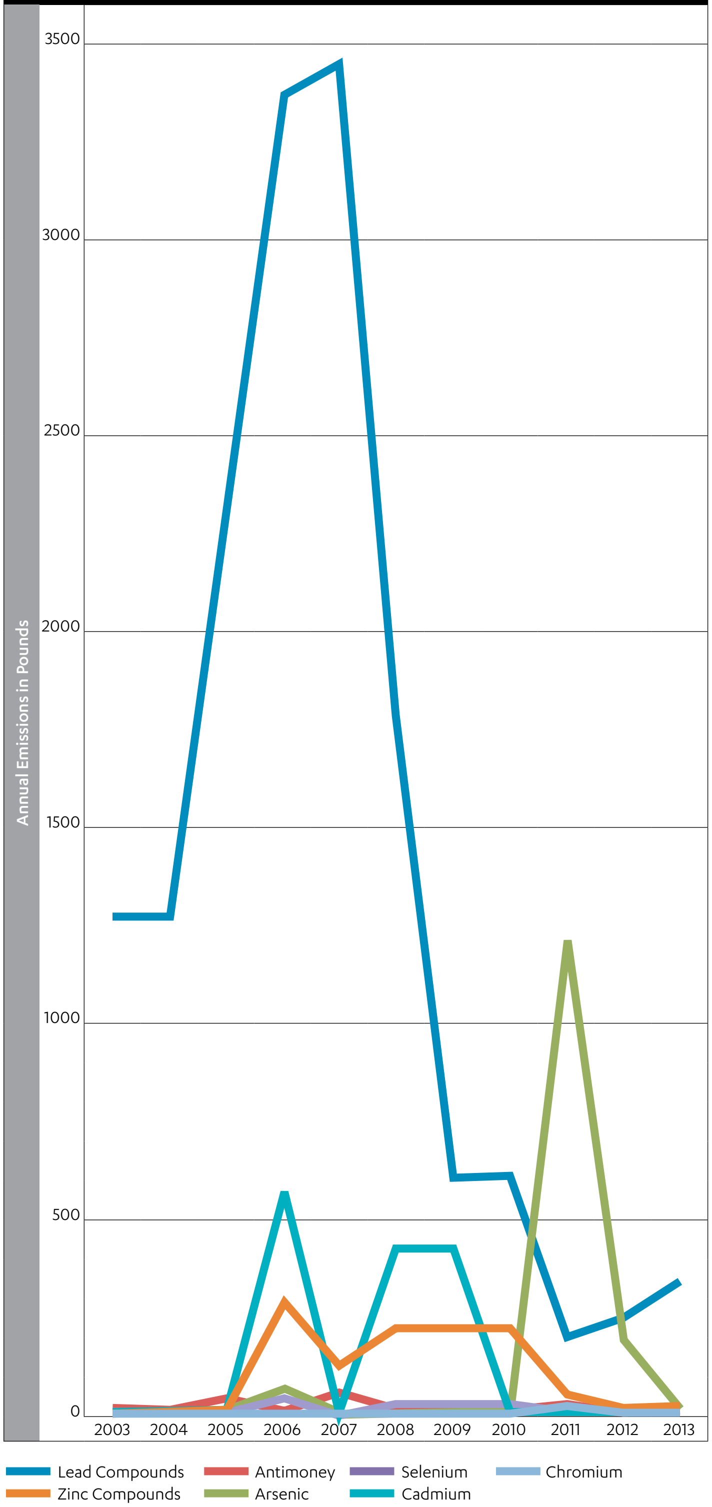


Fig. 38: Exide Technologies, Self-Reported Toxic Air Contaminant Releases (2003-2013)



Grade for Air = C+

We acknowledge and applaud the undisputable progress that has occurred over the past 40 years on smog, lead, other air toxics, and diesel particulates. The positive results of these improvements are exemplified by a recent long term study by researchers at USC that demonstrated that lung performance of adolescents improved with improved air quality in the Los Angeles basin[21].

However, air quality continues to be frequently dangerous in some parts of the region, and has negative impacts on surrounding natural areas as well. Achieving attainment with air quality standards is also becoming more difficult due to tougher new, health-based standards and the contribution of overseas pollution, such as from China[22].

We are especially concerned about the prospective impacts on air quality of increased heat incidences due to climate change; warmer temperatures have been shown to increase surface ozone and future increases are expected to be greatest in urban areas[23]. Regional prevailing winds push air pollution inland where there are more lower income residents, and health impacts are likely to be aggravated into the future unless much greater strides are taken to reduce pollutants from all sources.

Moreover there is a strong relationship between the location of polluting industrial manufacturing and our goods movement facilities and corridors and low-income residents of color[24]. More protective polices, more inspections and better enforcement of existing regulations continues to be a major need, as is the need for more standardized, comprehensive monitoring and reporting requirements. More research on chemical toxicity is needed, especially on cumulative and synergistic impacts of exposure. More research on clean manufacturing – which has lagged – is also needed. However, continued progress on reduction of diesel particulates, efforts like the Clean Up Green Up initiative[25], and the transformation of the transportation sector to zero emission vehicles provides promise for better grades in future years.

ECOSYSTEM

Overview

Los Angeles County has a Mediterranean-type climate, characterized by cool wet winters and warm dry summers. LA County is found in one of the most biodiverse parts of California, which includes most of the North American Mediterranean-climate zone and is itself a global biodiversity hotspot. This remarkable diversity of ecosystems provides extraordinary value to Los Angeles County residents through recreational and educational opportunities, as well as aesthetic enjoyment.

But these ecosystems are also under pressure from the 10 million residents (plus visitors), many of whom recreate in its protected open spaces on a regular basis. Extensive habitat loss and fragmentation, pollution, increased wildfire risk, and invasive species have taken their toll on the region's ecosystems. And despite successful conservation efforts, numerous research projects and monitoring programs, and a regulatory framework created to protect natural resources, assessing the state of the region's ecosystems is extremely difficult as it requires the synthesis of disparate data sets for a very large region, including activities on both public and private lands. In addition, there are very few county-wide biological monitoring programs. For example, birds are the longest term, most widely monitored taxonomic group across the county. However, the bird counts are in multiple large, non-standardized databases that were beyond our capability to analyze in time for this first report card. We recognize that the indicators presented here are woefully inadequate to characterize conditions and trends in ecosystem health, but we believe they represent the readily accessible, County-wide data sets available at this time.

Protected Areas

Protected areas in LA County provide long term conservation of habitats and species, as well as a range of other benefits. Within the county, these areas are major foci for outdoor recreation for over 10 million people. They also provide a wide range of services such as water quality improvements, carbon sequestration, and protection against extreme events including floods and storm surges.

Los Angeles has the great fortune of being situated at the base of vast National Forest lands. The mid-1970's saw the addition of protected areas in the unique Santa Monica Mountain range and over the past 40 years, more lands have been added to the Santa Monica Mountains, and three Marine Protected Areas have also been created since 2012, located at Point Dume in Malibu, Point Vicente off Palos Verdes, and multiple locations off Santa Catalina Island.

In 2014, the Santa Monica Mountains Local Coastal Program (LCP) was adopted by the County Board of Supervisors and the California Coastal Commission, codifying land use protections for 50,000 acres of steep coastal watersheds and canyonlands. Also in 2014, major portions of the Angeles National Forest were included in the new San Gabriel National Monument, which will afford higher levels of protection for this richly biodiverse and geologically active mountain range, and one heavily used for recreation[26].

Data

We used several measures of protected areas within LA County, all of which drew on data from the California Protected Areas Database[27]

- Protected Lands and Marine Areas – these are public areas under management by Federal, State and local agencies and/or municipalities. These also include State Marine Conservation Areas (SMCA) and State Marine Reserves (SMR).
- Regulated Conservation Areas - these are public or private areas for which development or use is limited by regulation. Designations include Significant Ecological Areas (SEA), Sensitive Environmental Resource Areas (SERA) and Areas of Special Biological Significance (ASBS).

- Protected Lands Within Linkages – these public lands fall within designated landscape "linkages" that serve as corridors between large areas of core habitat. Such linkages are critical to maintaining healthy populations of many species, especially large carnivores, and provide opportunities for species' range shifts to occur in response to climate change, particularly important within this heavily urbanized region. This analysis was conducted by the National Park Service, Santa Monica Mountains Recreation Area, and used data from the South Coast Missing Linkages Study conducted by South Coast Wildlands[28].

Findings

- There are 886,443 acres of protected public lands in Los Angeles County, comprising 34% of the total County land area. There are 41,807 acres of marine protected areas. (Fig 39)

- Regulatory designations limiting development or use encompass a total of 10% of all County land area (Fig 40); land areas under these regulations that aren't already in protected public ownership represent 8% of LA County land

- Protected areas are primarily restricted to high elevation, mountainous areas in the San Gabriels and (to a lesser extent) the Santa Monicas, with little protection in some areas such as southeast Los Angeles and the San Fernando Valley. In particular, nearly all of the protected areas are along the coast or in local mountains that are more difficult to develop. There are very few acres of protected area in the portions of the county with flat topography because this land has been utilized for urban development

- Out of 136,697 acres of wildlife linkage area within LA County, 58% (~79,000 acres) is currently protected public land. The areas with large missing wildlife linkages are: San Gabriel to Castaic in the Angeles National Forest, the Santa Monica Mountains to the Sierra Madre in Los Padres National Forest, and the Sierra Madre to Castaic linkage between Los Padres and Angeles National Forests. (Fig 41)

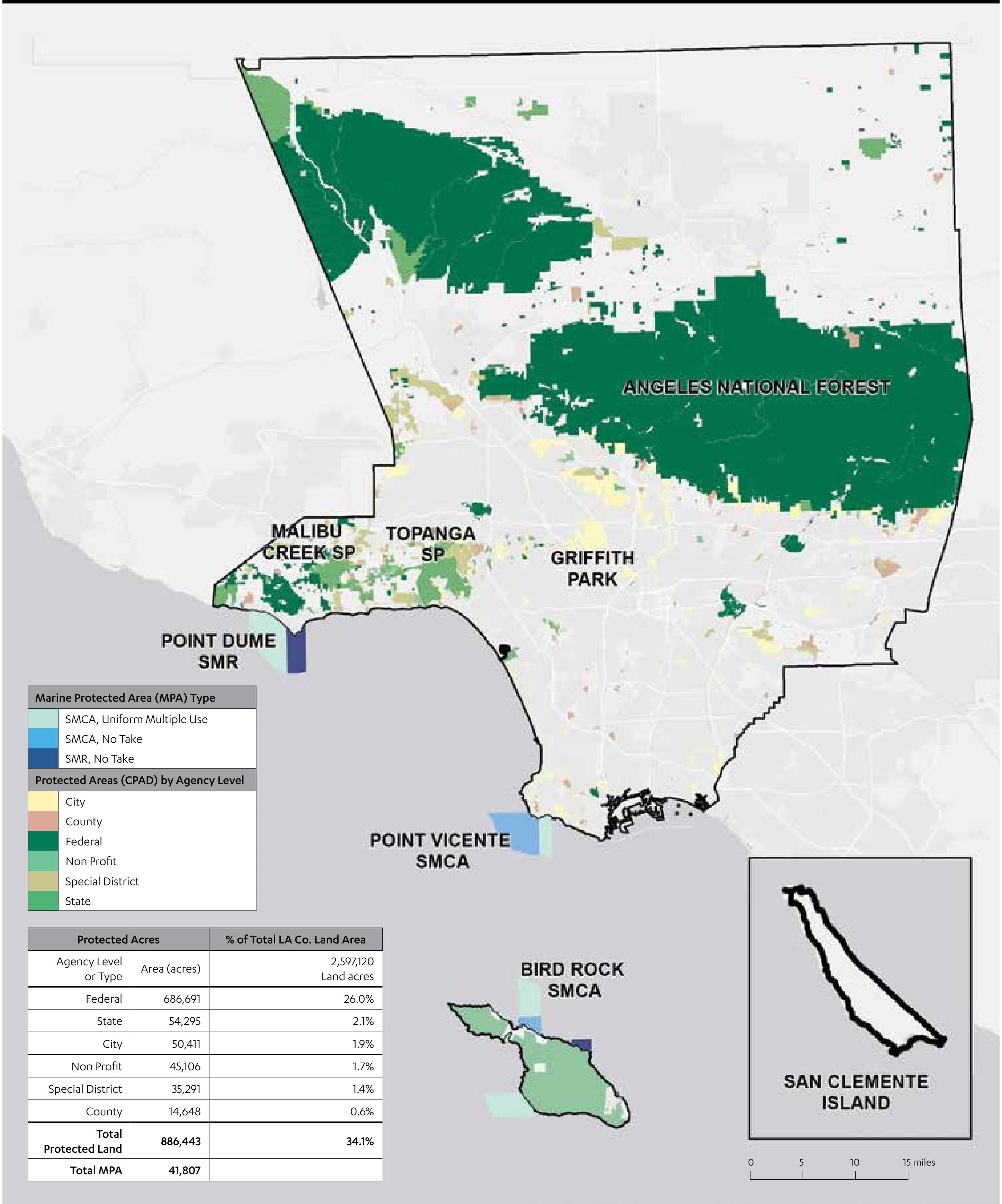
The SMM LCP was over ten years in the making and is a major achievement for ecosystem protection in this area of the county. While the LA County General Plan update is making progress on a less-dispersed pattern of development, as reflected in lower rural densities and a town-center orientation, piecemeal sprawl development projects are still the status quo, for example in the "Town & Country" plan for the Antelope Valley, which at present includes low density development, more roads and highways, and little public transportation. LA County has no growth management system and lags behind Ventura County with its urban growth boundaries that protect habitat and farmland. Furthermore, unlike in neighboring counties (Riverside, Orange, San Diego), comprehensive habitat planning lags in LA, with only one Natural Communities Conservation Plan (in the Palos Verdes Peninsula) and with effective conservation efforts limited to those areas with specific and focused institutional structures in place, e.g., the Santa Monica Mountains. The designation of SEAs, particularly in view of the proposed expansions, constitutes a framework to protect what is left in the once-but-no-longer-remote lower elevations that historically have been lost to development and agriculture.

Data Limitations

- While the California Protected Areas Database fulfills a critical role of centralizing information on protected areas, the database relies on land management agencies and organizations to report land acquisitions, and therefore some public lands may not be currently included.

- We were unable to provide information on changes in vegetated area or vegetation type. However, work currently underway at UCLA (Gillespie lab) will soon be able to provide a historical assessment of vegetation and land use changes in Los Angeles County using remote sensing data. Possible future evaluations also include land use changes within linkage areas and quantification of significant resources and vegetation types that are not currently protected.

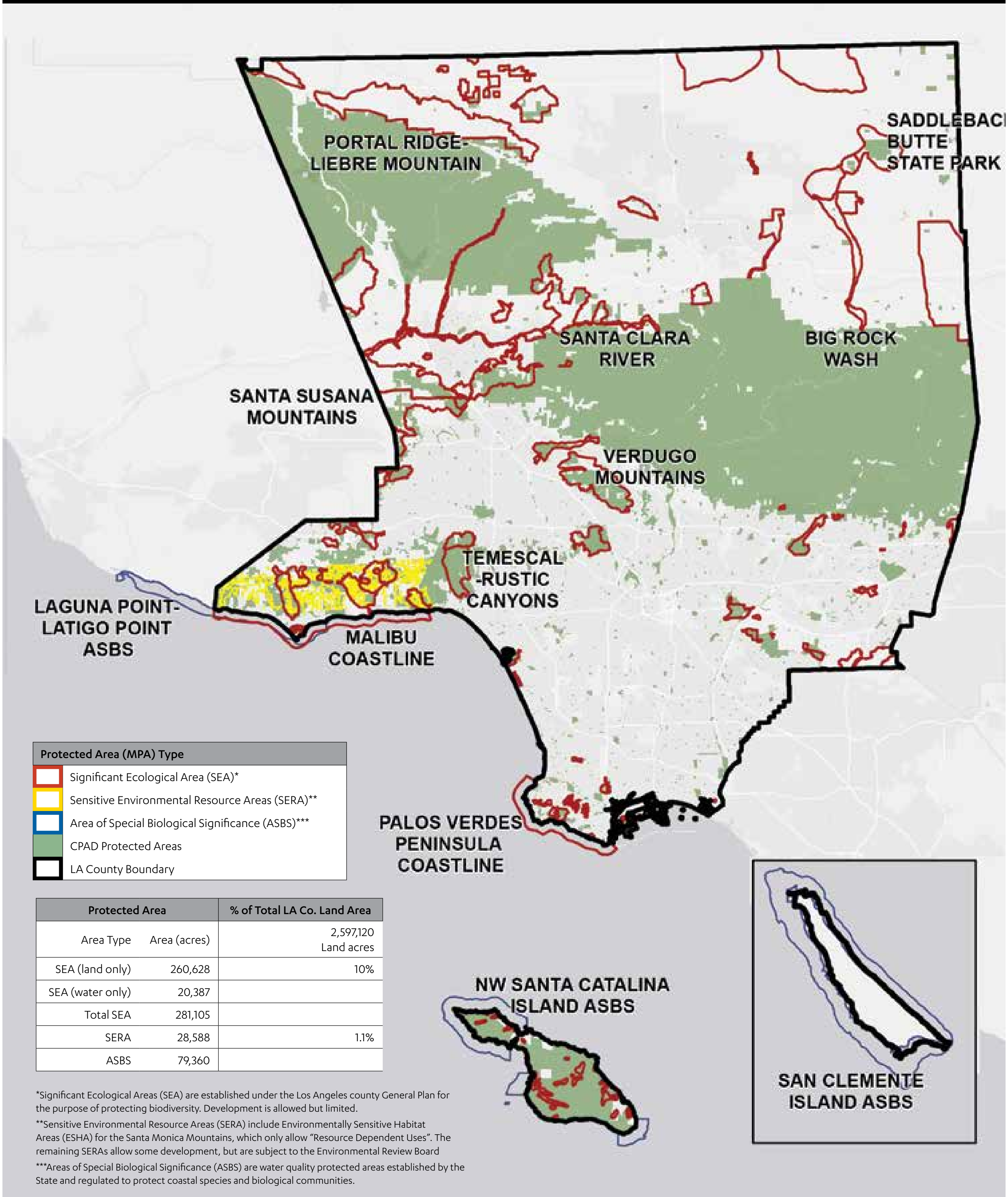
Figure 39: Protected Land and Marine Areas in Los Angeles County



Protected Acres		% of Total LA Co. Land Area
Agency Level or Type	Area (acres)	2,597,120 Land acres
Federal	686,691	26.0%
State	54,295	2.1%
City	50,411	1.9%
Non Profit	45,106	1.7%
Special District	35,291	1.4%
County	14,648	0.6%
Total Protected Land	**886,443**	**34.1%**
Total MPA	**41,807**	

Source Credits: California Protected Areas Database (CPAD) www.calands.org (March 2014); NOAA Marine Protected Areas Center; US Department of the Interior; Total LA County Area - Census Bureau. Created by Olivia Jenkins on 10/1/2014

Figure 40: Regulated Conservation Lands in Los Angeles County



Protected Area		% of Total LA Co. Land Area
Area Type	Area (acres)	2,597,120 Land acres
SEA (land only)	260,628	10%
SEA (water only)	20,387	
Total SEA	281,105	
SERA	28,588	1.1%
ASBS	79,360	

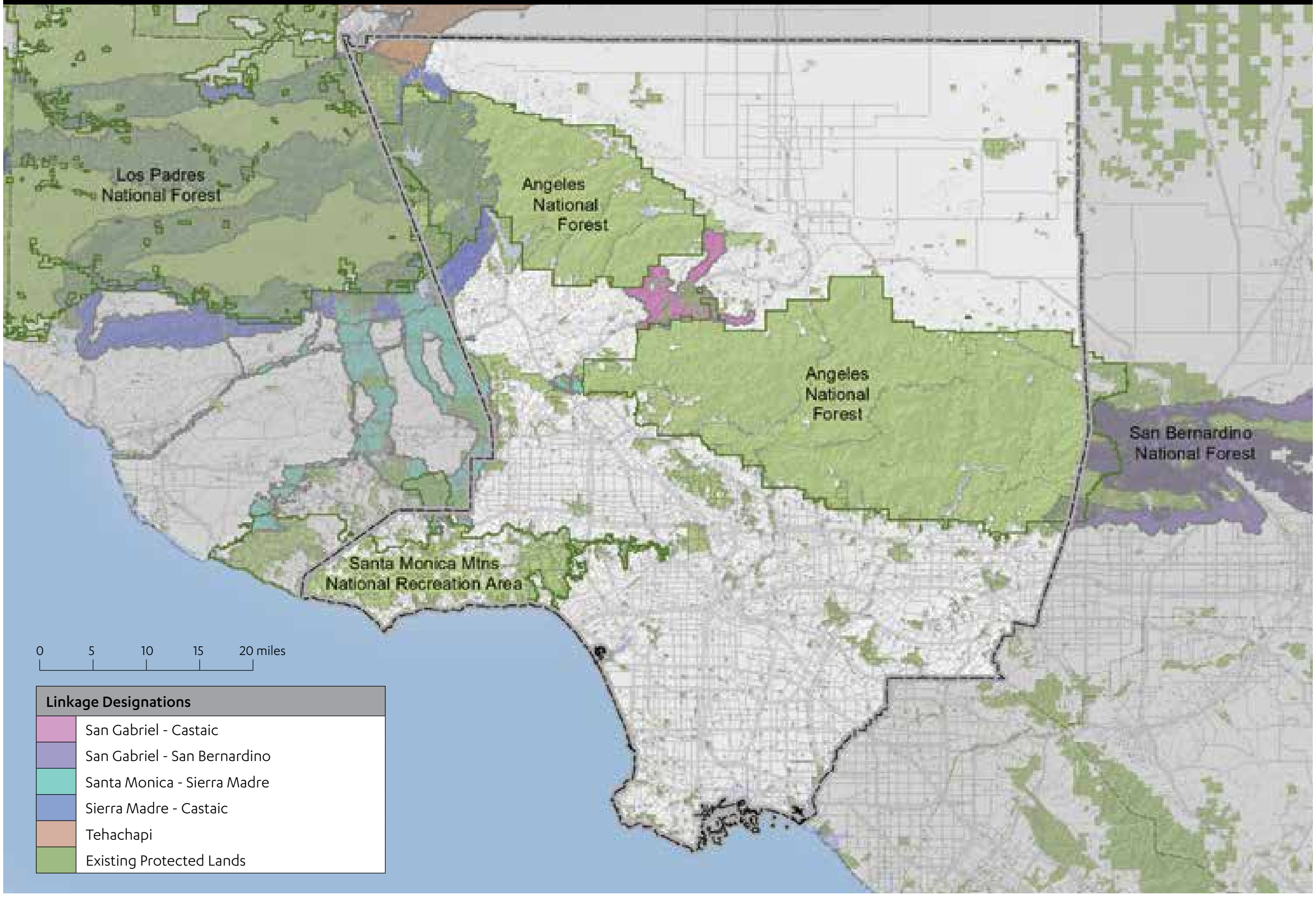
*Significant Ecological Areas (SEA) are established under the Los Angeles county General Plan for the purpose of protecting biodiversity. Development is allowed but limited.

**Sensitive Environmental Resource Areas (SERA) include Environmentally Sensitive Habitat Areas (ESHA) for the Santa Monica Mountains, which only allow "Resource Dependent Uses". The remaining SERAs allow some development, but are subject to the Environmental Review Board

***Areas of Special Biological Significance (ASBS) are water quality protected areas established by the State and regulated to protect coastal species and biological communities.

Source Credits: California Protected Areas Database (CPAD) www.calands.org (March 2014); NOAA Marine Protected Areas Center; US Department of the Interior; Total LA County Area - Census Bureau. Created by Olivia Jenkins on 10/1/2014

Figure 41: Missing Linkages in and around Los Angeles County



Data Sources: South Coast Wildlands; Existing protected areas: CPAD 2014a, NPS, SMMC, MRCA, USFS; Roads: Streetmap Pro 7. Map created by Denise Kamradt, National Park Service.

Table 24: Linkages Status (Analysis conducted by Denise Kamradt, National Park Service

Summary Statistics	Acres	%
Total linkage area in LA County	136,697	
Total linkage area protected in LA County	78,943	58%
Protected Status by Linkage Area	**Acres**	**%**
San Gabriel - Castaic linkage area protected in LA County	5,126	21%
San Gabriel - San Bernardino linkage area protected in LA County	3,303	79%
Santa Monica - Sierra Madre linkage area protected in LA County	5,012	39%
Sierra Madre - Castaic linkage area protected in LA County*	65,524	73%
Tehachapi linkage area protected in LA County	48	1%

* Sierra Madre - Castaic linkage overlaps 3 others so combined acreage of all linkages is greater than total linkage area

Data Sources:

South Coast Missing Linkages Project (SCML_LinkageDesigns, 2006)

California Protected Areas Database (CPAD Holdings), March 2014

Protected areas data compared to and supplemented/updated with:

Santa Monica Mountains Conservancy (SMMC Parks, September 2014)

Los Angeles County Assessor (Parcel database, 2010)

Ventura County Assessor (Parcel database, 2010)

Los Angeles County (Los Angeles and Neighboring Counties, December 2013)

Wildfire Distribution and Frequency

Similar to many other Mediterranean-climate regions, wildfire is an integral component of ecological processes. In Los Angeles, the fire season extends throughout most of the year and is strongly influenced by periodic dry easterly "Santa Ana" winds.

Land use practices and fire management policies have altered fire regimes, affecting ignition frequency, vegetation patterns, and ecological processes. These elements interact with each other, with natural climate variability, and with anthropogenic climate change, in a highly complex system of feedback loops and time lags.[29] Climate change is expected to increase wildfires in LA County as a result of increasing temperatures and higher levels of evapotranspiration.

Native vegetation in this region is fire adapted; however, some vegetation communities are at risk of type-conversion if subjected to greatly increased or decreased fire frequencies. Increased fire frequency in native shrublands can result in cumulative loss of dominant native shrub species, and increase of easily ignitable exotic, annual grasses and broadleaf weeds. Over the course of several critically short fire return intervals this process can lead to vegetation type conversion from native shrubland to exotic annual grassland.[30] Many plant and animal species in the southern California foothills and low mountains are threatened by overly-frequent fire (for example, some species of California lilac, cypress, and pine; the California gnatcatcher). Conversely, higher elevation forestlands may be impacted negatively by reduced fire frequency due to fire suppression policies, changing forest species composition and potentially resulting in higher severity fires when they do burn.

Data

We chose to use two indicators of fire. First, we used CalFire data to map the location of wildfires in 2013 and to look at the last 13 years of wildfire history in terms of the number and area of large (300 acres or more) wildfires in LA County.[31,32]

Second, we built off the work of Safford and Van de Water[33], in which they compared fire return intervals over the last ~100 years in California National Forest lands to historical (prior to 1850) fire return intervals by vegetation type, determined through an exhaustive literature review. We duplicated their analysis methodology to calculate Percent Fire Return Interval Departure (PFRID) for all of Los Angeles County. A negative PFRID value indicates areas burning *more* frequently than in historical conditions; a positive value indicates *less* frequent burning. This indicator will change slowly from year to year, depending on the presence or absence of fire activity.

Figure 42: 2013 Wildfires in and around Los Angeles County (Source: CalFire)

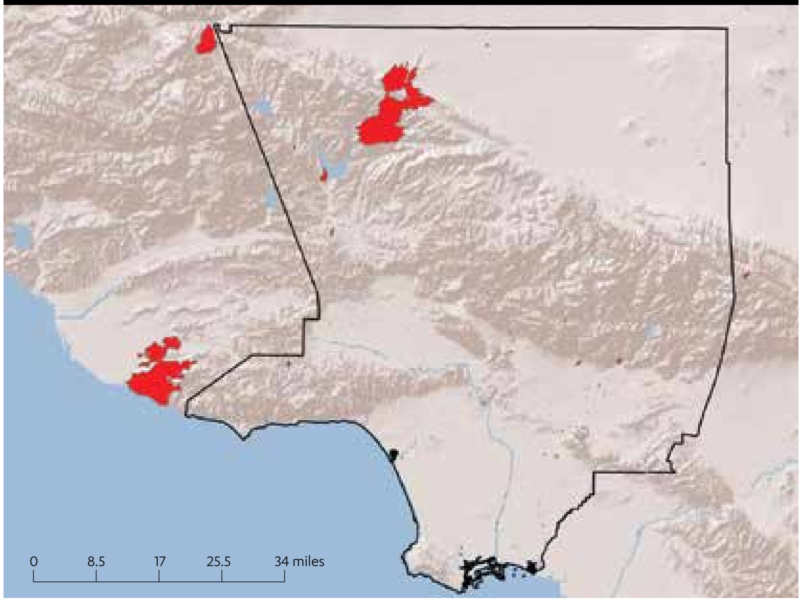


Table 25: Wildfires 300 Acres and Greater in LA County (Source: CalFire)

	# of fires	Total Acres Burned
2013	2	30,923
2012	2	4,717
2011	3	1,489
2010	3	15,040
2009	3	163,049
2008	5	31,863
2007	10	119,635
2006	2	5,958
2005	2	2,294
2004	5	43,076
2003	3	10,250
2002	10	97,823
2001	1	6,544
2000	3	1,651
Average:	4	9,895
Median:		1,755

Findings

- Over the past 13 years, LA County has seen an average of four large fires annually. Annual burned area have ranged from just under 1,500 acres to over 160,000 acres; the median acres burned annually has been 1,755.
- Roughly 31,000 acres within LA County burned in 2013. The Powerhouse Fire comprised the vast majority of that area, at over 30,000 acres.
- Over 575,000 acres in Los Angeles County are currently experiencing increased fire frequencies compared to historical intervals, and over 326,000 acres are experiencing decreased frequencies.
- Of these acres, over 35,000 are in condition class -3, which indicates more than a tripling of fire frequency compared to historical means. The Santa Monica Mountains, the mountains surrounding the Santa Clara Valley, and the foothills of the San Gabriel Mountains contain concentrated areas at the highest risk of over-burning, presenting management concerns for vegetation type change. These areas are dominated by coastal sage scrub and chaparral vegetation, where effective fire prevention and suppression, in the face of huge numbers of human ignitions, are key to maintaining natural conditions. Replacement of chaparral shrubs by annual grasses, due to either increased fire frequency or compliance with fuel clearance rules, may increase the risk of structure loss in wildfires.[34]
- Over 62,000 acres are in condition class +3, where fire frequencies over the last century have been reduced to less than 1/3 their historical average. Highland mixed conifer forests comprise most of these areas, where fire suppression, in strong contrast to its positive effects in low elevation shrublands, has led to changed ecological conditions, increased fuel loading and more intense wildfires when they occur.

Table 26: Vegetation areas at risk due to departure from historic fire return interval

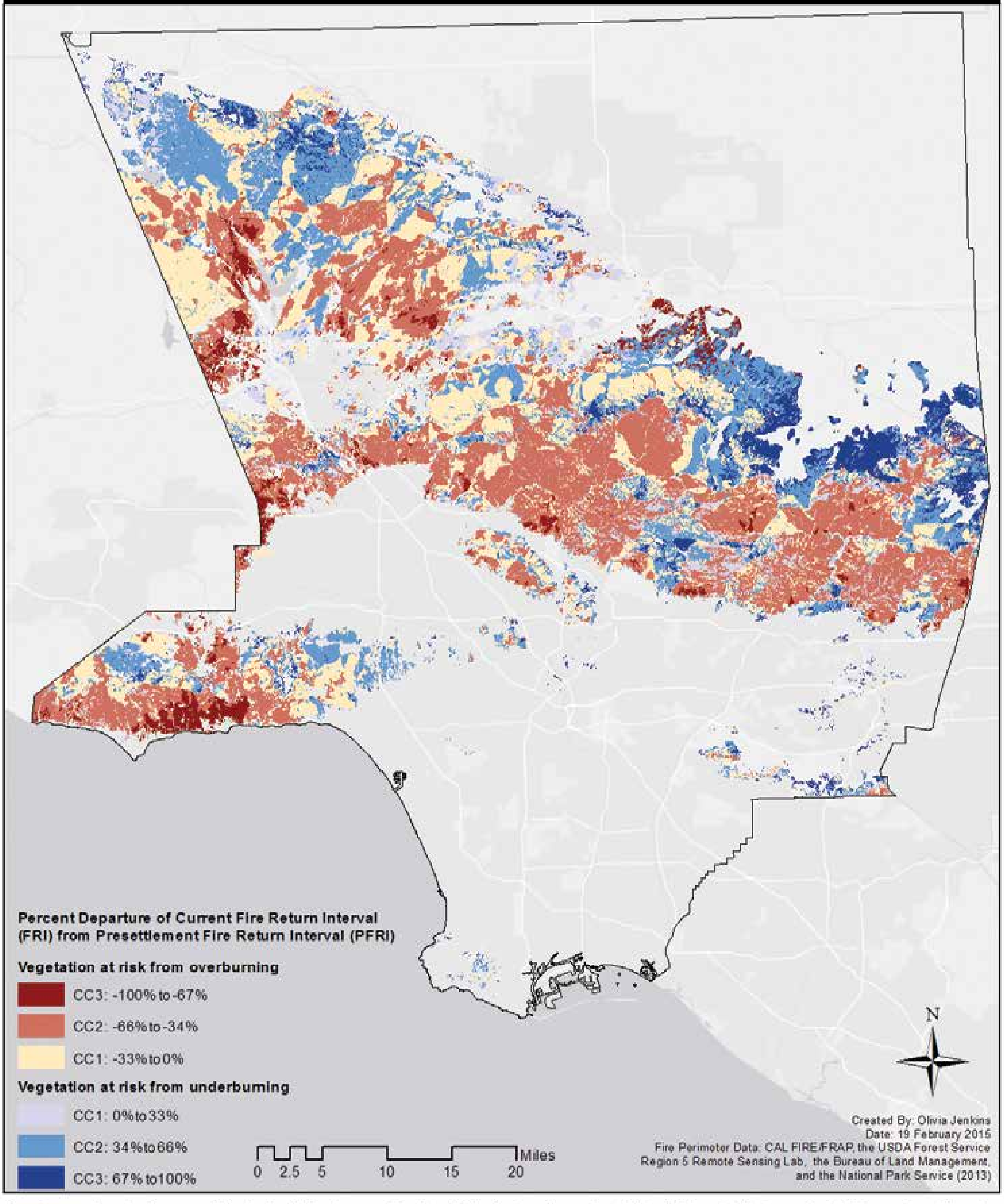
Area at Risk from Overburning		
PFRID		Area (acres)
-100% to -67%	(Condition Class -3) Contemporary fire much more frequent than presumed pre-settlement condition	35,207
-66% to -34%	(Condition Class -2) Contemporary fire moderately more frequent than presumed pre-settlement condition.	292,913
-33% to -0%	(Condition Class -1) Contemporary fire frequencies close to presumed pre-settlement condition.	247,085
Total		**575,205**

Area at Risk from Underburning		
PFRID		Area (acres)
0% to 33%	Condition Class +1: Contemporary fire frequencies close to presumed pre-settlement condition	76,737
34% to 66%	Condition Class +2: Contemporary fire moderately less frequent than presumed pre-settlement condition	187,594
67% to 100%	Condition Class +3: Contemporary fire much less frequent than presumed pre-settlement condition	62,199
Total		**326,530**

Data Limitations

- We used CalFire summary reports to provide the number of large fires and acres burned – these reports only went back through the year 2000.
- Because this analysis uses fire history data from 1925-2013, there are significant areas within the county that had some fire during that time period but were eventually developed and more or less built out. After that, they see no more wildfire because they are no longer wildlands. Some of those areas show as blue on the map (burning less frequently than historically) and will only get bluer in the future. Subsequent analyses will correct for these areas, allowing for a more accurate portrayal of conditions.
- Due to time and resource limitations, we were unable to provide a breakdown by vegetation type for the various condition classes; we hope to provide this in subsequent report cards.

Figure 43: Vegetation at risk based on departure from historic fire frequency



Mean Frequency Departure: A measure of the extent to which contemporary fires (since 1911) are burning at frequencies similar to the frequencies that occurred prior to Euroamerican settlement, with the mean Fire Return Interval (FRI) as the basis for comparison. It measures the departure of the current FRI from the reference mean FRI in percent. Negative values are burning more frequently today than historic conditions, while positive values are experiencing less frequent fire than historic conditions and may not have burned for over 50 years. This measure does not return to zero when a fire occurs,

Source: Safford, H.D., K. van de Water, and D. Schmidt. 2011. California Fire Return Interval Departure (FRID) map, 2010 version.

Drought Stress

Drought stress of vegetation in Los Angles County can be assessed by satellite imagery using a measurement called NDVI (Normalized Difference Vegetation Index), also referred to as “greenness” that is calculated as a function of the visible and near-infrared wavelengths. NDVI ranges from 1.0 to -1.0 with positive values (i.e. 0.5) representing high greenness and negative values (i.e. -0.2) representing little or no vegetation. It contains information the human eye cannot see. While NDVI is technically a measure of photosynthetic activity overall, and is associated with biomass, carbon sequestration, plant water stress, and biodiversity, we are using NDVI as an indicator of drought stress.

Data

We used NDVI at a 250m pixel resolution from the MODIS sensors on the NASA’s Terra and Aqua satellites. MODIS imagery has been available daily since 2000. We looked at 16 day averages of NDVI values for all of Los Angeles County for the period of record. We also looked at the spatial distribution of NDVI differences between 2013 and the average of all previous years, first for March (the end of the typical rainy season) and then for September (the end of summer). We included annual precipitation data from the UCLA weather station in order to provide some context for understanding precipitation’s effect on NDVI variations over time.

Findings

- For the County as a whole, peak greenness has decreased since 2011 and NDVI has not exceeded 0.4 since 2011. (Fig 43) Extreme lows (NDVI < 0.3) in greenness have occurred since 2013 for the County. This suggests that Los Angeles County as a whole has experienced reduced photosynthetic activity, plants are fixing less carbon, and native vegetation is experiencing extreme water stress due to the ongoing drought.
- Vegetation greenness varies naturally with the wet and dry seasons in Los Angeles County and usually peaks in March and has its lowest value in August or September. (Fig 43)

Figure 43: Los Angeles County Greenness. (Source: Katherine S. Willis, UCLA)

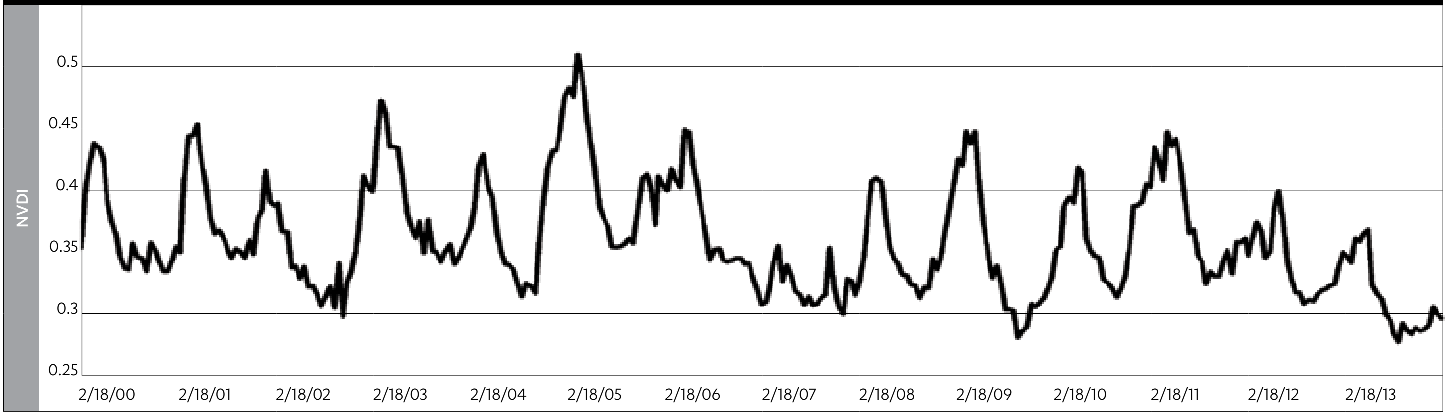
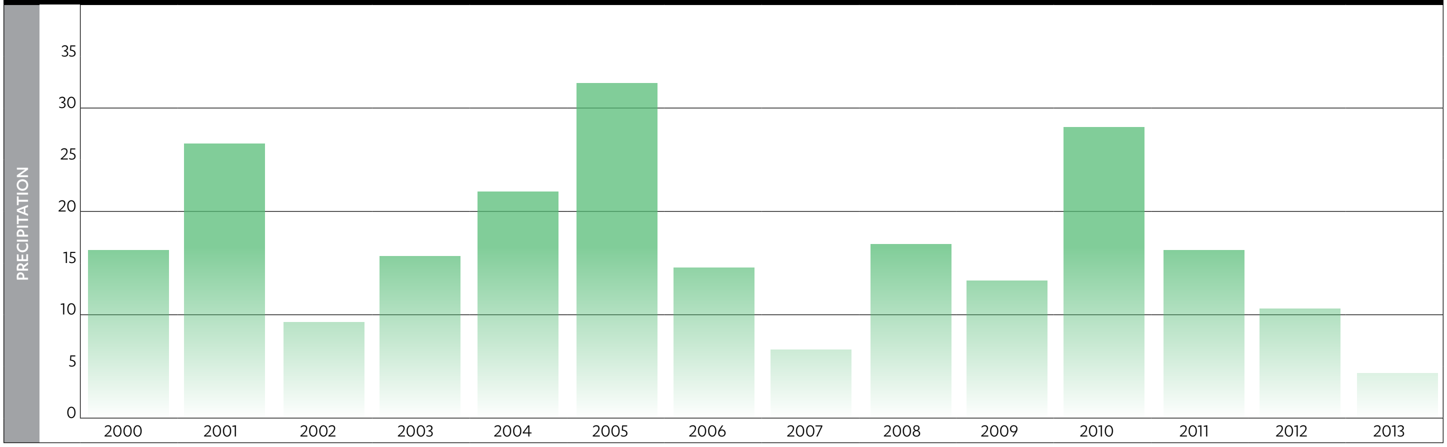


Figure 44: Annual Percipitation at UCLA

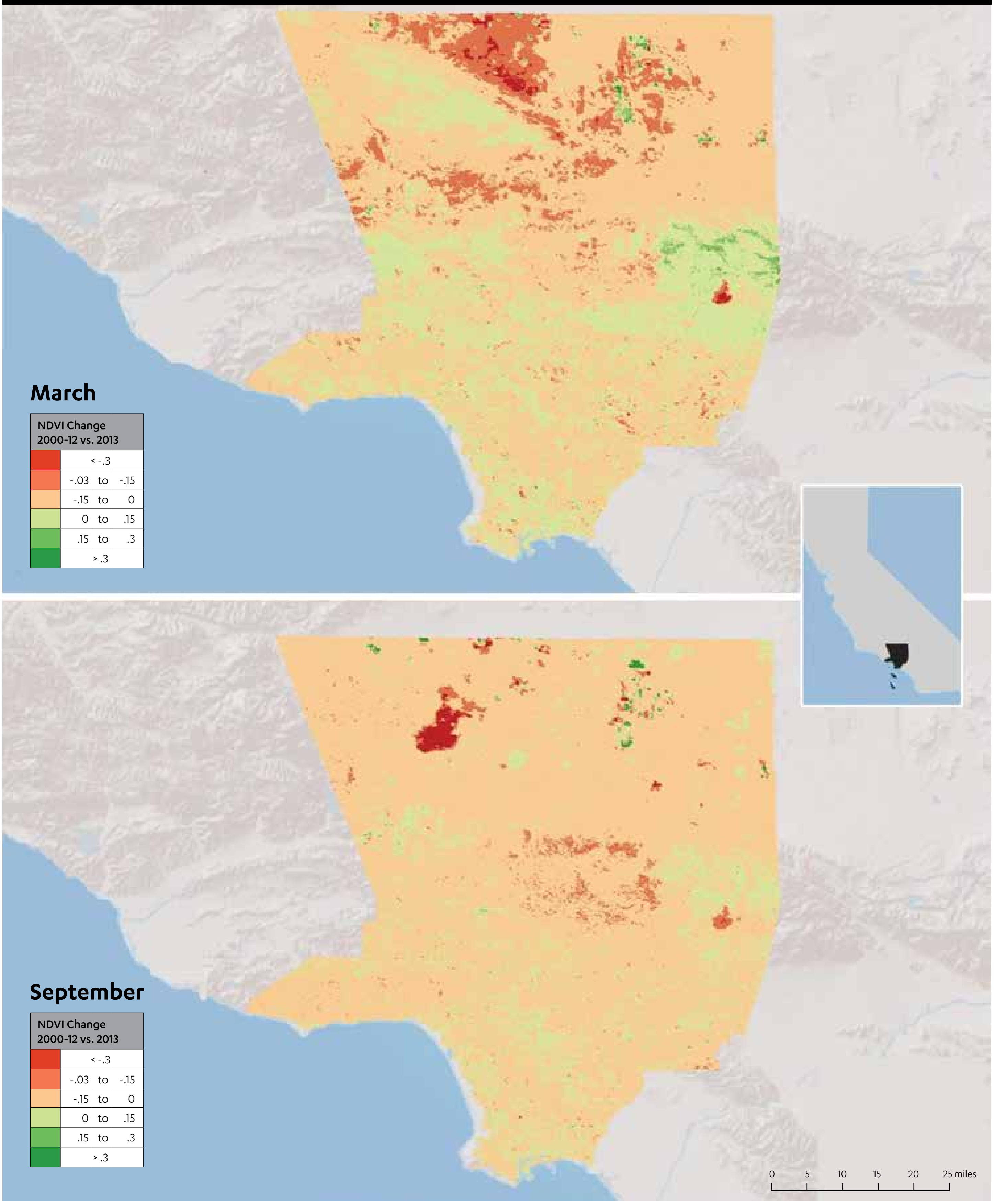


- Since 2000, winter peaks have been in the range of 0.41-0.45, and summer lows in the range of 0.35-0.30. (Fig 43)
- Both 2007 and 2013 were drought years, according to the US Drought Monitor, and these were the only years in the time series when NDVI was below 0.4-0.35 throughout the winter months. (Fig 43-44)
- When Winter conditions in NDVI from 2013 are compared to averages from 2001 to 2012, declines of > 0.3 can be seen in the high desert and areas of recent fires. (Fig 45)
- When Summer conditions in NDVI from 2013 are compared to averages from 2001 to 2012, declines of > 0.3 can be seen in areas of fires (i.e. the 2009 Station Fire and the 2013 Powerhouse Fire). (Fig 45)

Data Limitations

- The correspondence of NDVI/ greenness variations to changes in precipitation, temperature and humidity make it suitable as a broad measure of drought stress; however, greenness varies with other factors including the type and extent of vegetation and the occurrence of wildfire. In the future, we may look at greenness in urbanized areas separately from protected areas in order to better assess the relative impacts of irrigation on greenness.
- No single rainfall gauge can represent the wide range of precipitation across all of Los Angeles County, and we were unable to find, nor did we have time to create, a summary of annual rainfall amounts across the entire region since 2000. We therefore included one example to provide some context for understanding the variation of NDVI with rainfall.

Figure 45. LA County Greenness in 2013 compared to average from 2000-2012. Top: March; Bottom: September. (Source: Katherine S. Willis, UCLA)



Map created by Katherine Willis. Data Sources: MODIS MOD13Q1, ESRI

Kelp Canopy Coverage

Kelp forests provide habitat and protection for hundreds of species of fishes and invertebrates, second only to tropical reefs in the number of marine species supported. In California, kelp forests are formed by the giant kelp (*Macrocystis pyrifera*). Giant kelp can reach lengths of 180 feet and typically creates a dense canopy near the water's surface. The extent of giant kelp canopy is considered an important indicator of subtidal rocky reef health.

Kelp canopy is affected by a variety of factors including storm wave disturbance, density of grazers (especially sea urchins), nutrient availability, and sunlight penetration (which can be reduced by water turbidity or sediment accumulation, potentially from coastal discharges of stormwater and/or wastewater), and erosion in developed areas in the coastal zone).

Data

We used data from the Central Region Kelp Survey Consortium (CRKSC). The CRKSC was formed in late 2002 to fulfill requirements for ocean dischargers to create a regional kelp bed-monitoring program using aerial surveys. The monitoring is methodologically based upon, and coordinated with, the Region Nine Kelp Survey Consortium covering San Diego and southern Orange County[35]. Since 2003, all coastal kelp beds from the Ventura-LA County line to the Mexican Border (~ 220 miles) are surveyed synoptically several times a year.

Findings

- Total kelp canopy coverage in LA County in 2013 is approximately 7.5% lower than in 2012 (Table 27); however, this magnitude of change seems to be within the inter-annual variation of a relatively stable canopy maintained over the last 10 years. (Fig 46)
- From 2003-2013, kelp canopy coverage has approximately doubled overall (from ~2 sq-km to almost 4 sq-km, although canopy cover has decreased from 2009-2013 off Palos Verdes. (Fig 46 & 47)

Table 27: Los Angeles County Kelp Canopy Coverage Over Last 3-Years and comparison to 1911 Historic High

Year	Total Canopy Coverage Area (sq-km)	Percent of Total Historic High Coverage
1911 - Historic high	15.1	–
2011	2.8	19%
2012	4.0	26%
2013	3.7	25%

Source: Central Region Kelp Survey Consortium

- From 2003-2013, Region 4 (Malaga Cove to Point Vicente) has experienced the greatest annual variation, with over a nine-fold increase in area between 2005 and 2009, followed by a 50% reduction over the subsequent 4 years, but 2013 levels remain 5 times those of 10 years ago. (Fig 46 & 47)
- Within the larger historic context, however, kelp canopies in all four regions are less than 30% of the historic high of 1911 (but see data limitations discussed above). (Fig 47)

Thus, while kelp beds have been dramatically reduced over time, they seem to be maintaining their canopies over the past decade. The recent positive trend is likely influenced by the many active restoration efforts recently completed or underway.

Data Limitations

- The methods used in the original 1911 survey were different from those used today to estimate kelp coverage, and therefore historic highs from that time period may not represent an appropriate baseline from which to compare.
- A single surface measure is inadequate to characterize this complex habitat. Further information on the condition of biological communities in the kelp beds is not available at this time, but work underway by local agencies and research institutions will allow for such assessments in the future.
- Because kelp conditions are strongly linked to regional climate variations (El Nino, La Nina) future analyses may compare divergence from the long-term mean for the entire west coast compared to divergence just for Los Angeles County.

LEGEND

Region 1: Deer Creek – Lechuza
1 Deer Creek
2 Leo Carillo
3 Nicholas Canyon
4 El Pescador/La Piedra
5 Lechuza

Region 2: Point Dume – Malibu Point
6 Point Dume
7 Paradise Cove
8 Escondido Wash
9 Latigo Canyon
10 Puerco/Amarillo
11 Malibu Point

Region 3: La Costa – Sunset
12 La Coast
13 Las Flores
14 Big Rock
15 Las Tunas
16 Topanga
17 Sunset

Region 4: Malaga Cove – Point Vicente
18 Malaga Cove - PV Point
19 PV Point - Pt. Vicente

Figure 46: 10-Year Kelp Coverage in Los Angeles County

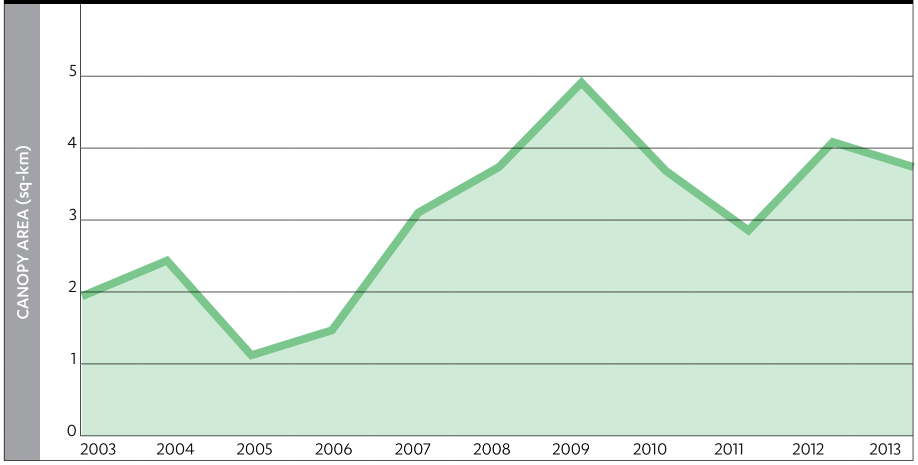
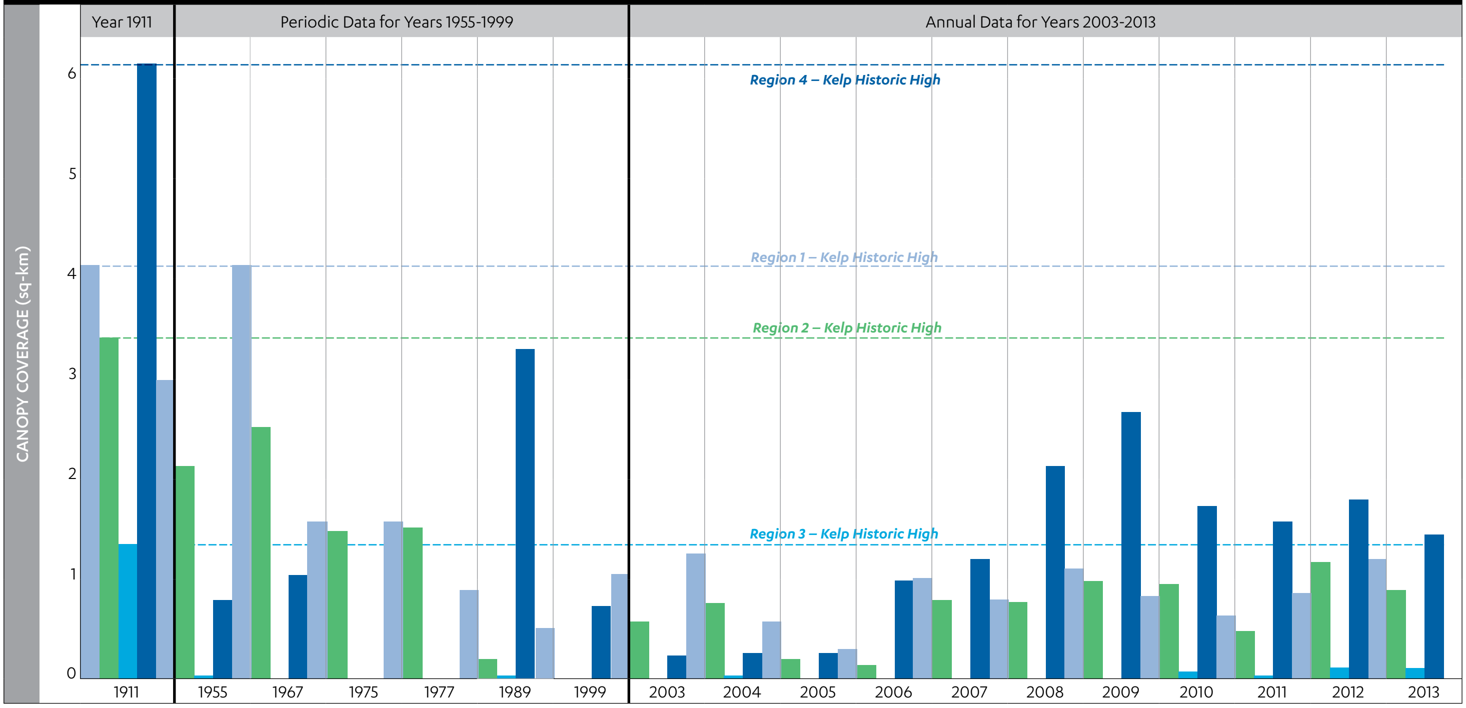


Figure 47: Historic Kelp Canopy Coverage in Los Angeles County by Region



Rocky Intertidal Species Populations

Rocky intertidal shores are areas of high physical complexity and biological diversity at the interface between terrestrial and marine environments. They experience high environmental variability at daily to decadal timescales and are vulnerable to degradation from direct human activities (such as trampling and collecting) due to their accessibility and strong appeal.

A long term monitoring program is currently in place at rocky intertidal sites along the entire Pacific Coast from Alaska to Mexico. The program was coordinated by the Multi Agency Rocky Intertidal Network[36] (MARINe), a long-term ecological consortium funded by many groups, including BOEM (Bureau of Ocean Energy Management), PISCO (Partnership for Interdisciplinary Studies of Coastal Oceans), and NPS (National Park Service).

Data

We used data collected by MARINe for the following key species: ochre seastars (*Pisaster ochraceus*), giant owl limpets (*Lottia gigantia*), mussels (*Mytilus*), and surfgrass (*Phyllospadix*). Seastars and owl limpets were monitored using individual counts; mussels and surfgrass were assessed based on percent cover.

We used data from sites in Los Angeles County that are monitored twice per year: Paradise Cove, White Point, and Point Fermin, as well as for one site, Old Stairs, in Ventura County near the county line, as representative of LA County's western-most coastline. At Old Stairs, two different monitoring methods have been used for seastars; we have included both in order to provide historical context (band transects) and for comparability with methods at the other 3 sites (irregular plots).

Findings

- Due to dramatic declines in seastars at all four monitoring sites and mussels at Point Fermin over the last decade (Fig 50 & 52), there are legitimate concerns about the health of our local rocky intertidal habitats. Because seastars play a key ecological role in the rocky intertidal, their decline has broad implications. Climate change induced sea level rise may lead to larger impacts in the future due to loss of habitat.
- Seastars have been significantly affected by the current bout of wasting syndrome affecting much of the North

Figure 48: Rocky Intertidal Monitoring Sites

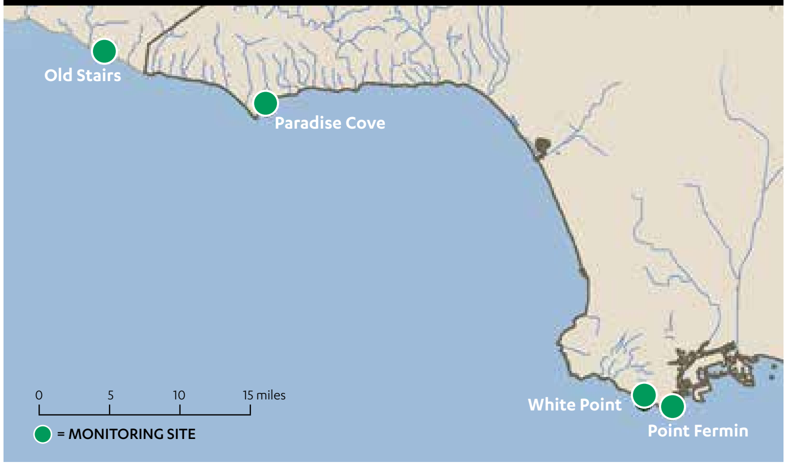


Figure 50: Ochre Sea Stars, Los Angeles County Total *(pisaster ochraceus)*

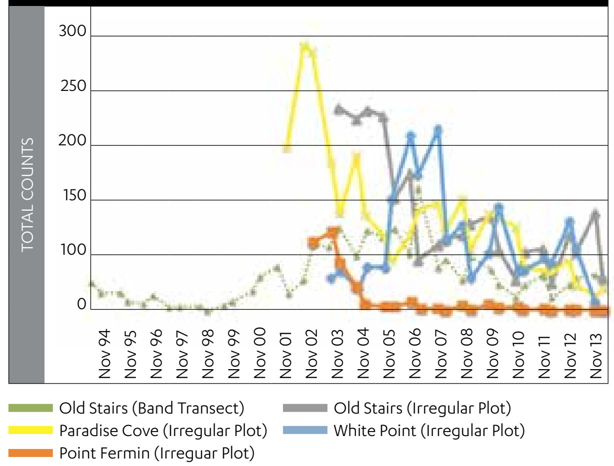


Figure 49: Surfgrass, Average Percent Cover *(Phyllospadix)*

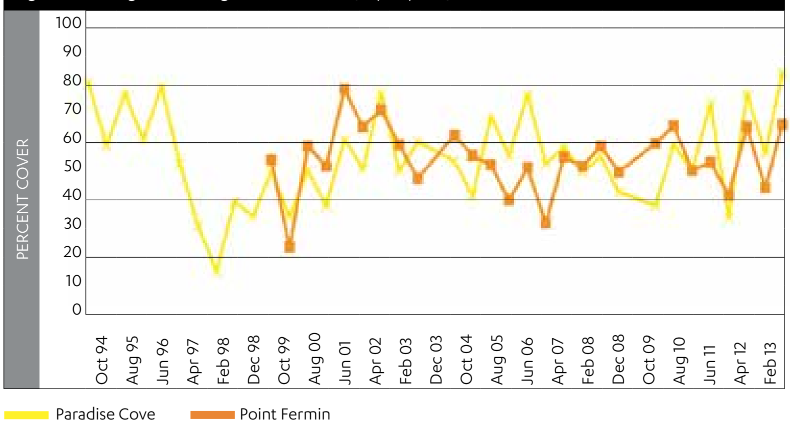
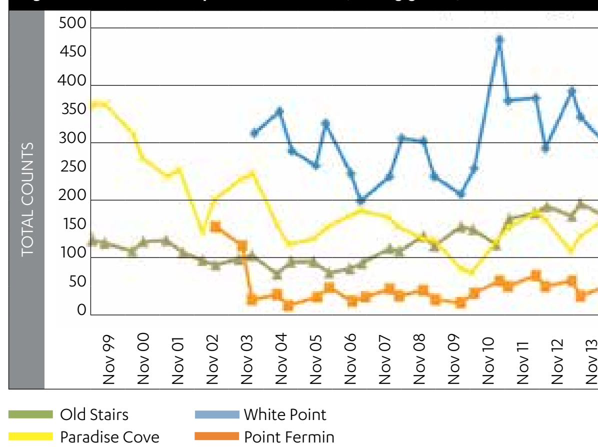


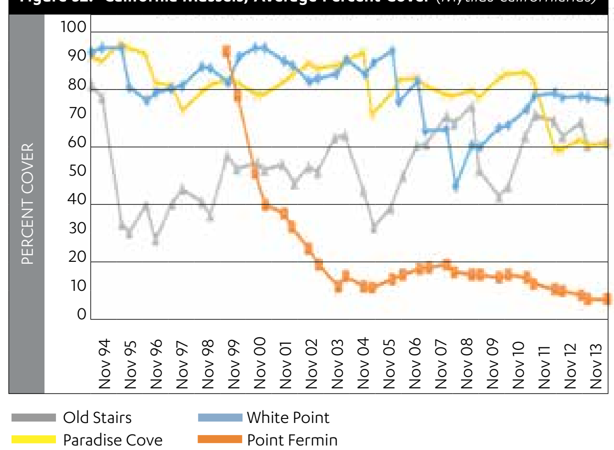
Figure 51: Giant Owl Limpets, Total Counts *(Lottia gigantea)*



American Pacific coast. (Fig 50) Although similar die-offs have occurred periodically since the 1970's, the current magnitude and geographic scope is unprecedented[37]. There are clear declining trends in the number of individuals at Old Stairs, Paradise Cove and Point Fermin over the last 12 years, with populations at the latter site nearly zero over the last decade. White Point experienced growth from 2003-2007, but it has similarly declined over the last six years. Although the data for 2014 hasn't been posted yet, expectations are that all four sites suffered near collapses in the last year.

- Owl limpet counts show varying trends among the four sites, with general declines during earlier monitoring years, and a slight increasing trend over the last 4 years. (fig 51)
- Mussels have slightly declined since monitoring began in 1994 at the Old Stairs, Paradise Cove and White Point sites, although percent cover remains at ~60-75% of the historic high values at these sites. However, Point Fermin has experienced a more dramatic decline, particularly from 1999-2003, with a downward trend continuing since 2007. Current populations average less than 10% cover, from a historic high in 1999 of >90%.(Fig 52)

Figure 52: California Mussels, Average Percent Cover *(Mytilus californianus)*



- Surfgrass cover does not exhibit any visible long term trends in percent cover within the two sites where it is monitored, although populations at Paradise Cove have appeared to recover from the substantial drop associated with the 1997/98 El Nino event, which also impacted other intertidal species in southern California. (Fig 49)

Data Limitations

- The monitoring sites were not randomly selected, but rather deliberately chosen in areas of high cover/number to ensure they represent "good" habitat for those species. This can result in initial apparent declines and therefore site conditions are generally evaluated based on long term trends after several years of monitoring have been completed.
- Only a few sites within LA County are being sampled, so we don't have a good overview of the whole coastline.
- Focusing on a few species doesn't capture what is happening to the community as a whole. It is an indicator of the health of the intertidal, but not a very comprehensive one.
- We have not included data for species that have already been removed from the intertidal, like abalone. This is important for the historical perspective of how humans have affected this community.
- These data do not examine some processes that could be important indicators of health, such as species recruitment or ability to recover from disturbance.
- These data do not include other attributes that are likely to be affected by ocean acidification, such as growth and recruitment.

Wetland Conditions

Wetland habitats play a key ecological role, particularly in semi-arid regions such as Los Angeles. In addition to habitat benefits as fish nurseries, nesting areas, and foraging and resting grounds for the Pacific Flyway, wetlands provide critical hydrologic and biogeochemical services such as carbon sequestration, flood control, groundwater recharge, and water quality improvement. The total area of wetland habitats, the composition of that area among the different wetland types (e.g., estuarine, riverine, depressional), and the physical and biological condition of those wetlands, are all important measures of wetland health.

Data

We used the following measures available at the County scale: historic and current acreage of coastal wetlands; and functional assessment scores and bioassessments scores for perennial, wadable streams.

- Estimates of coastal wetland loss in the County since the late 19th Century were based on a 2014 report by the Southern California Coastal Water Research Project[38]. The report included total area of estuarine habitats, as well as number of systems and habitat types.
- Wetland functional assessment and bioassessment scores for perennial, wadable streams were determined through monitoring conducted at over 380 sites over the last 5 years (2009-2013) by the Stormwater Monitoring Coalition (SMC)[39]. The aim of this program was to assess stream conditions using a probabilistic design that allows inference to the other sites in the region by watershed and land use type.
  - Wetland functional assessments were conducted using the California Rapid Assessment for Wetlands (CRAM) protocol for riverine wetlands, a State-wide methodology for the assessment of wetland condition composed of four attributes: landscape context, hydrology, physical structure and biotic structure.
  - Bioassessments were conducted using standard protocols for sampling benthic macroinvertebrates (BMI). Scores are expressed in terms of the California Stream Condition Index

(CSCI), which incorporates measures of BMI ecological structure, as well as a measure of taxonomic completeness in comparison to reference sites with similar characteristics (e.g., elevation, precipitation, etc).

- Maps and tables show results terms of four classifications, based on percentiles relative to a reference distribution (a normal estimate based on the mean and standard deviation of reference sites), calculated and provided by SCCWRP.

Findings

- Both the total area and types of coastal wetlands have changed dramatically since 1850.
- LA County has lost 73% of its total estuarine area from 1850 to the present, from 8,181 acres to 2,229 acres. (Table 28, Fig 53)
- Vegetated and unvegetated estuarine areas have experienced 96% and 98% losses, respectively. (Table 28, Fig 53) There has been a two-fold increase in subtidal waters (a gain of 1,040 acres), but this was due to the creation of the Ports of LA and Long Beach, and Marina del Rey, which are not natural habitats.
- Urban streams throughout LA County exhibit poor biological condition and very poor functional condition. Forty-six percent of sites assessed scored in the lowest CRAM category, and 40% scored in the lowest CSCI category, indicating conditions highly altered from reference locations. (Fig 54 & 56)
- Low CRAM scores are dominant in urban areas generally, and in the Los Angeles and San Gabriel River watersheds. (Fig 56). None of the assessed LA County urban streams fell within the best CRAM categories (Class 1 or 2), reflecting the impact of channelization and loss of floodplain connectivity. (Fig 55 & 57)
- None of the assessed LA County urban streams scored within the best CSCI category (Class 1), reflecting the degradation of instream biological communities, potentially due to factors such as changed hydrologic regime, loss of instream habitat, and water quality impairments. (Fig 55)
- In urban areas, the CRAM scores indicated more pervasive degradation than CSCI scores did. However in agricultural areas, the opposite was true. (Fig 57)

Data Limitations

- The 2014 study by SCCWRP provides a County-level estimate of losses for coastal wetlands only. There are no studies that estimate total wetland losses (which would include riverine, depressional, etc., in addition to estuarine) for Los Angeles County as a whole, although we know from smaller studies that the losses have been vast. A study by Rairdan (1998)[40] of the Greater Los Angeles Drainage Area showed vast losses (80-100%) of lower riverine, dry wash, ephemeral lakes/ponds, and depressional and slope marshes. Rairdan's study included parts of Orange County and did not include North Santa Monica Bay. Subsequent studies[41] include more detailed analyses by major watershed, including Stein et al, 2007 for the San Gabriel River watershed, Lilien, 2001 for Malibu Creek Watershed, and Dark et al., 2011 for the Ballona Creek Watershed.
- Scores shown for wetland function and bioassessments under the SMC program are only for riverine wetlands; we selected these because of the study design as described earlier. Other wetland types in the county that are not covered by these condition assessments include estuarine, depressional and slope/seep. Furthermore, the streams assessed only included perennial, wadable streams; future monitoring will include a wider range of stream types, as well as re-visits to determine trends.

There have been recent additions to LA County coastal wetland acreage in public ownership. The state purchased parcels expanding Ballona Wetlands to 600 acres in 2003, and 172 acres of Los Cerritos were acquired by the Los Cerritos Wetlands Authority between 2006-2010. Public purchase, protection and enhancement (such as the Malibu Lagoon restoration completed in 2013) of wetland areas in Los Angeles County should be a high priority.

Table 28: Historical Change in LA County Coastal Wetland Area

	Total Estuarine Area (acres)		Absolute Change (acres)	% of Total Wetlands in County	
	Historical	Contemporary		Historical	Contemporary
Estuarine Unvegetated Wetland	3,118	54	-3,064	38	2
Estuarine Vegetated Wetland	4,087	158	-3,929	50	7
Subtidal Water	976	2,016	1,040	12	90
Los Angeles County Total	8,182	2,229	-5,953 (-73%)		

Estuarine Unvegetated Wetland
Estuarine Vegetated Wetland
Subtidal Water

Figure 53: Historical Change in LA County Coastal Wetland Area

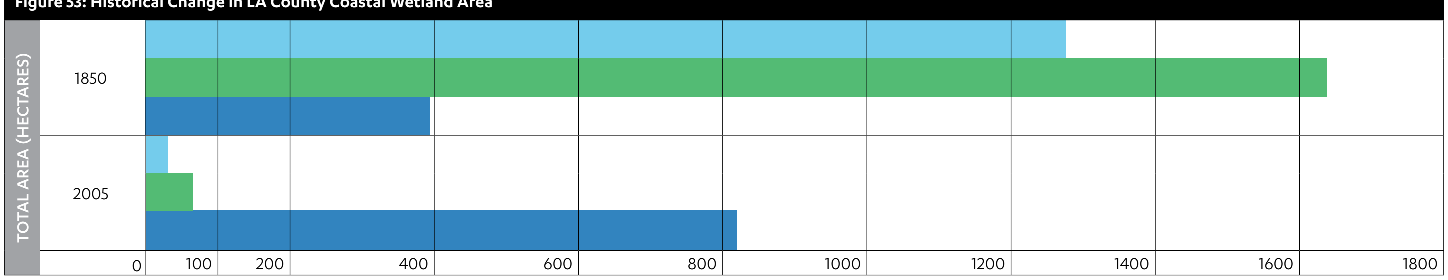


Figure 54: LA County CRAM Scores (Data Source: SCCWRP)

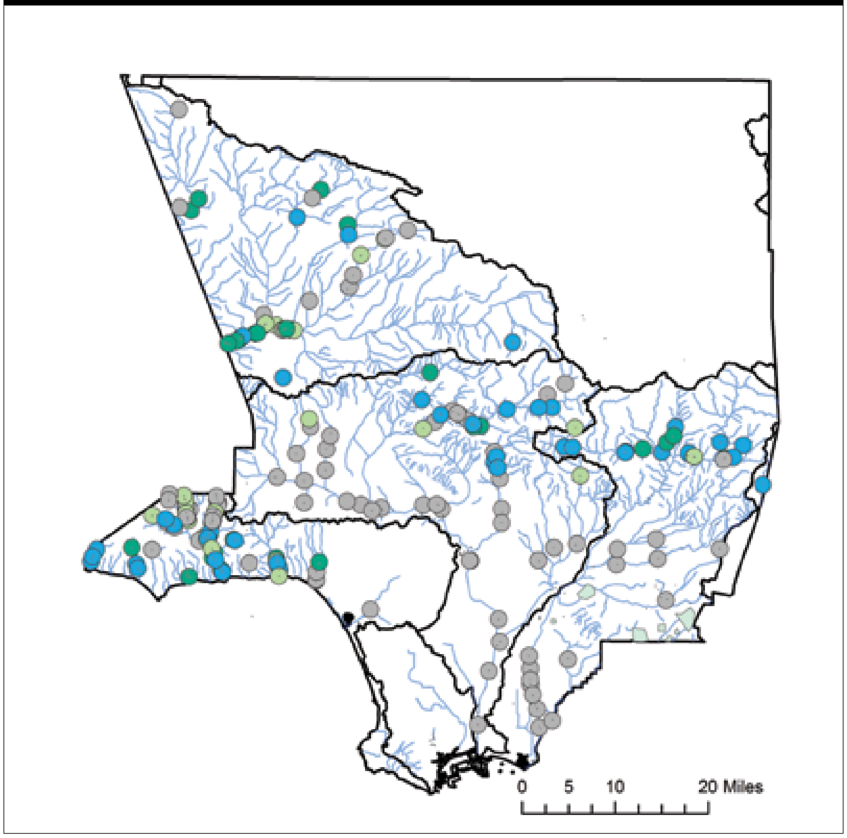
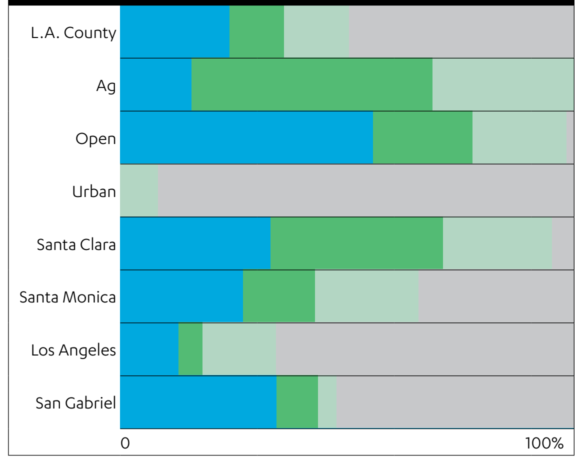


Figure 56: Condition of Stream Miles, CRAM (Generated by SCCWRP)



CONDITION OF STREAM MILES

- Class 1 (Intact)
- Class 2
- Class 3
- Class 4 (Altered)

Figure 55: LA County CSCI Scores (Data Source: SCCWRP)

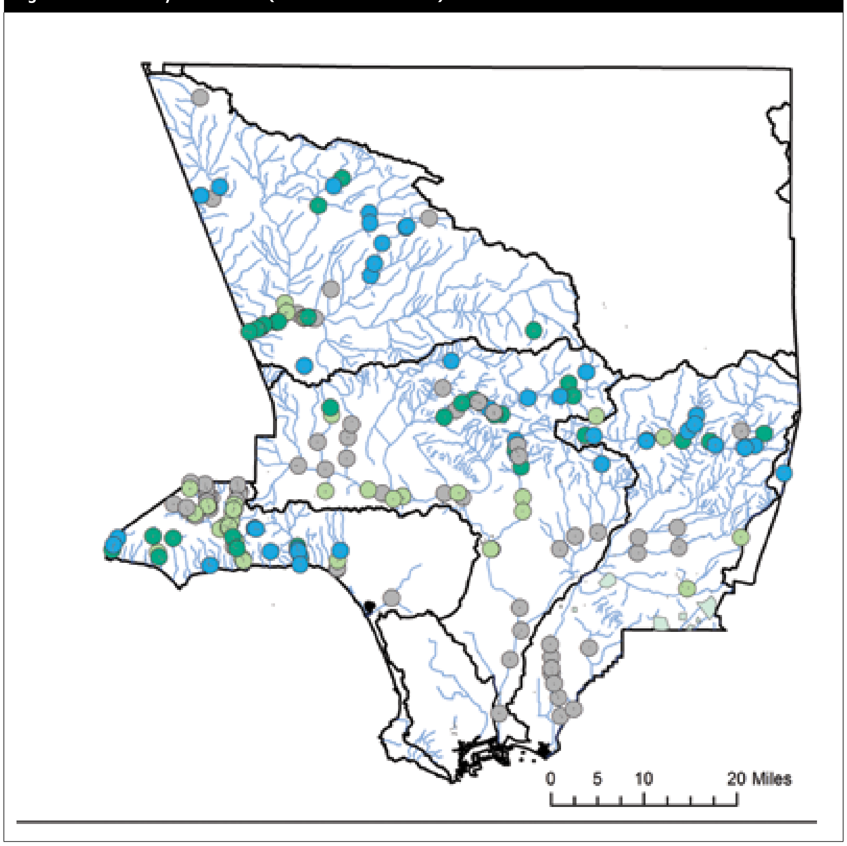
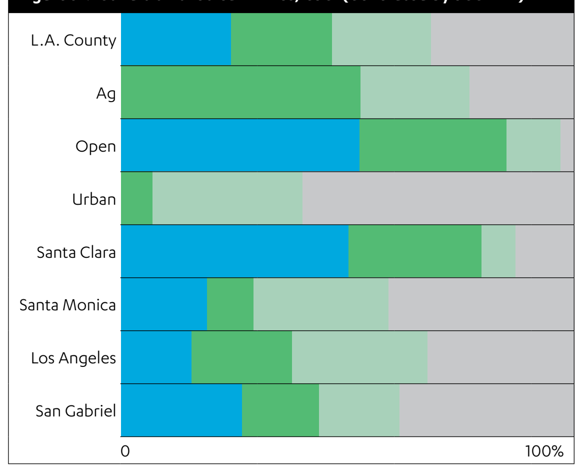


Figure 57: Condition of Stream Miles, CSCI (Generated by SCCWRP)



CONDITION OF STREAM MILES

- Class 1 (Intact)
- Class 2
- Class 3
- Class 4 (Altered)

Grade for Ecosystem Health = C-/Incomplete

Despite the fact that the region continues to make progress in protecting both terrestrial and marine open space, historic habitat loss due to urbanization and the myriad of stressors (invasive species, pollution, shared uses) that coincide with wide scale urbanization, have inflicted a damaging toll on the region's diverse ecosystems. With the current indicators available, making an overall assessment on ecosystem health is difficult.

For example, although marine protected areas have been recently established in LA County, we don't have the data yet to determine if the Santa Monica Bay and Catalina coastal ecosystems inside MPAs have improved due to reductions in fishing pressure. Also, the state of fish and squid populations off the LA coast is still poorly understood. Further, the fluctuating state of local kelp canopy and rocky intertidal indicator species gives a confusing picture of the state of our coastal ecosystems. Riparian habitat is largely degraded in urban areas because of the loss of natural channels. On the terrestrial side of the County, the results are even more uncertain. We need insect, bird, herpetofauna, plants and other indicator data to set baselines and assess terrestrial ecosystem health. For example, constant effort mist-netting and point counts of birds in parks, protected areas, and urban areas is a must.

The LA County Museum of Natural History has initiated a number of Citizen Science monitoring projects including Reptiles and Amphibians of Southern California (RASCals), Spider Surveys, and the BioSCAN (biodiversity science: city and nature) insect monitoring program. These may form the basis for future county-wide indicators. There also needs to be a systematic approach applied to monitoring the presence and impact of invasive species in both local aquatic and terrestrial ecosystems. Finally, the ability of urbanized Los Angeles to be home to important habitat area has not been well quantified or imagined. It is critical to determine the extent to which native plants in the urban fabric can add more high-quality habitat for fauna and help maintain native floral biodiversity.

WASTE

Overview

Waste prevention and waste recovery are key strategies towards reducing resource consumption. Such reductions will have beneficial impacts on greenhouse gas emissions, toxic air emissions, habitat conservation, and water quality, locally, regionally and globally. There is a long history of State and City-level reduction efforts for municipal waste, an issue readily understood by residents as it is present in our daily lives.

Hazardous waste is less understood and mostly invisible to the average person, but the amount generated annually is equal to roughly 20% of the total annual municipal tonnage. State law requires industry to implement programmatic efforts toward hazardous waste reduction, but there are no quantitative targets.

Municipal Waste

Targets for municipal waste reduction for jurisdictions within LA County come primarily from the State, with the exception of a few ambitious city-level programs. In 1989, the Integrated Waste Management Act (AB939) established a 50% waste diversion from landfills requirement for jurisdictions in California on and after the year 2000. Subsequent legislation (SB1016) established a per capita disposal measurement system for the reporting year 2007 onward.

The per capita disposal target is the amount of waste disposal that is approximately equivalent to a 50% diversion rate. This is calculated based on a jurisdiction-specific (often city, county or special district) average of waste generation from the years 2003 to 2006 expressed in terms of per capita disposal. Compliance is determined annually by comparing each jurisdiction's per capita disposal rate with their individual target rate. Each jurisdiction has its own individual per capita disposal target, and jurisdictions are not compared to each other. Target rates are calculated using both population (number of residents) and employment (number of employees working in the jurisdiction). CalRecycle reviews the per resident disposal rate for most jurisdictions. If business is the dominant source of a jurisdiction's waste generation, however, CalRecycle may use the per employee disposal rate instead. SB 1016 also specified that the per capita disposal rate is just one of several factors in determining a jurisdiction's compliance with the intent of AB 939; CalRecycle's annual review assesses other aspects of a jurisdiction's programs through a review of information submitted with the Annual Report, site visits, and review of other data sources.

Additional efforts at both the State and local levels seek to increase diversion of solid waste beyond 50 percent. In October 2011, AB341 established a State policy goal that no less than 75% of solid waste generated must be source reduced, recycled, or composted by 2020. This is a statewide goal, and does not change the individual 50 percent diversion requirement for individual jurisdictions. However, some local jurisdictions have adopted their own policies, plans, or goals to achieve a higher diversion rate than 50%. For example, the City of Los Angeles has committed to reach zero waste goals (90% diversion) by 2025.

Data

We used two statistics generated from the CalRecycle reporting system:

(1) The number of jurisdictions within LA County that did/did not meet their target per capita disposal rate[43],[44].

(2) The total annual tonnage of waste (disposed, transformed or used as alternative daily cover) at the County-level[45].

We also included data on the top ten jurisdictional disposal quantities in 2012, from the Countywide Integrated Waste Management Plan, 2012 Annual Report[46].

Findings

- Performance against per capita disposal rates has improved over the past 5 years (Table 29). No Los Angeles County jurisdiction appears to be exceeding its population-based per capita disposal target for the year 2013. Additional information related to program performance is being evaluated by CalRecycle staff as part of the Jurisdiction Review, which takes place every 2- to 4- years depending on the jurisdiction's previous review status.
- Total municipal waste generated by the County peaked in 2005, at close to 15 million tons, and has generally decreased since, with 2013 generation just under 9.5 million tons (Table 30, Figure 58). It is expected that economic conditions, as well as State-wide and city-level reduction policies and programs, have contributed to this improvement.
- However, waste tonnage has leveled off over the last 4 years with little improvement since 2010. The quantity of solid waste used for energy recovery has remained stable at approximately 535K tons per year, roughly 5.5% of annual waste generated. (Fig 58, Table 30)

Table 29: Performance of reporting jurisdictions against per capita disposal rates under SB1016 (2008-2013)

Year	2013	2012	2011	2010	2009	2008
Jurisdictions meeting all disposal targets	73	72	71	72	72	68
Not meeting population disposal targets	0	0	2 (Gardena and Maywood)	2 (Gardena and Maywood)	0	5 (Compton, Gardena, La Puente, Lawndale, Rolling Hills)
Not meeting employment disposal targets	0	1 (Rolling Hills)v	1 (Gardena)	2 (Bell, Gardena, Lawndale, Maywood)	2 (Maywood, Rolling Hills)	5 (Compton, Gardena, Lawndale, Maywood, Rolling Hills)
Total number reporting	73	73	73*	74	74	74

Figure 58: Total waste generated by Los Angeles County 1995-2013

Includes tons landfilled, transformed, and used as alternative daily cover. Does not included recycled wastes.

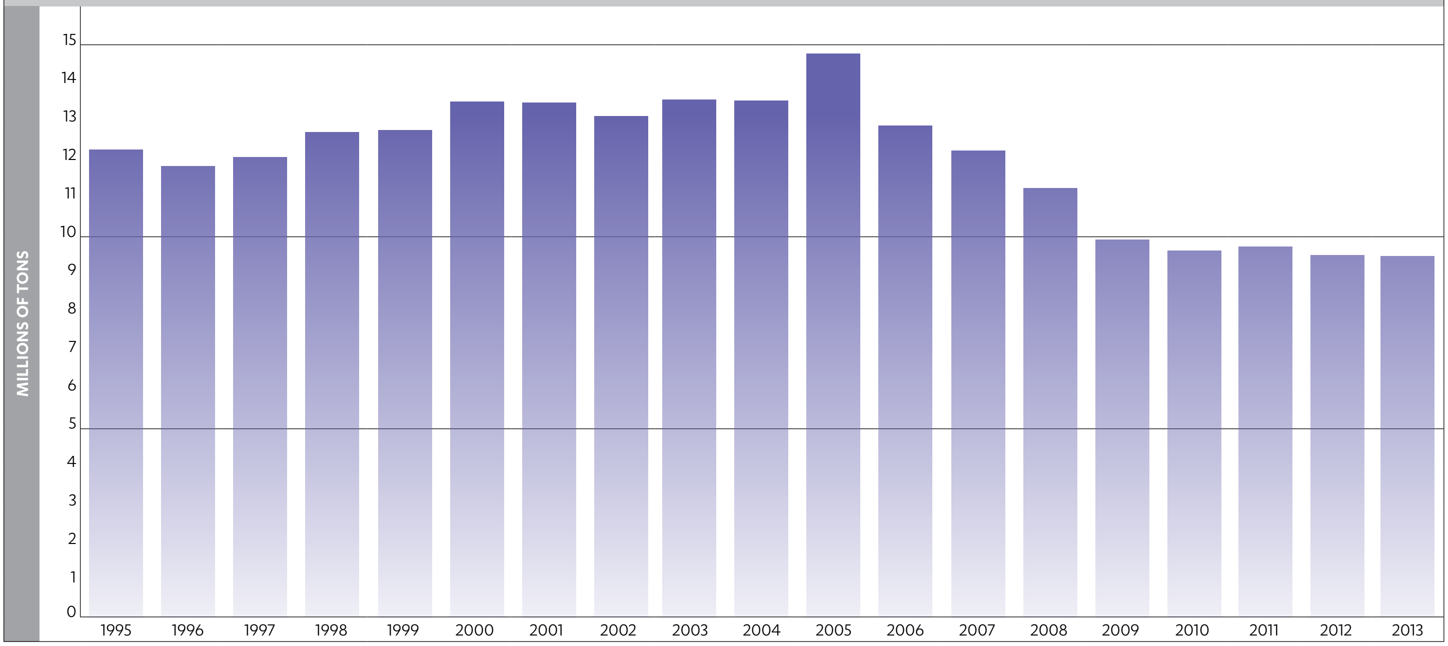
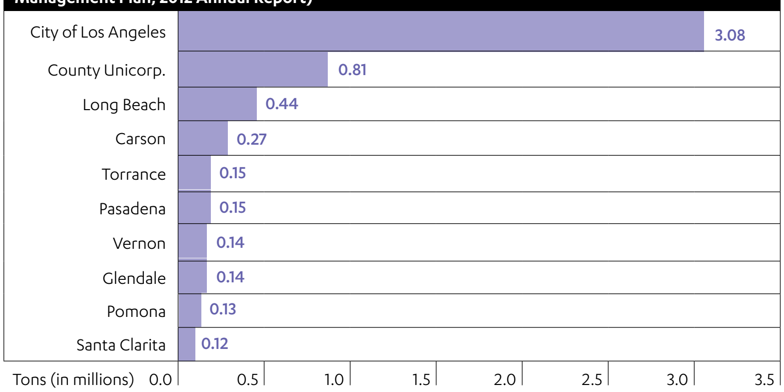


Figure 59: Top 10 Jurisdiction Disposal Quantities in 2012 (Source: LA County Integrated Waste Management Plan, 2012 Annual Report)



- The City of Los Angeles generates approximately 1/3 of all waste in the County (Fig 9).

Data Limitations

The current system of data collection and reporting for municipal waste is severely limited and does not provide information on the actual amount of waste "diverted" from landfills, nor on its ultimate disposition. CalRecycle information on status and trends of specific waste stream recycling programs are provided at the State level only; reports cannot currently be run by County or individual city. That means there are no publicly available centralized data for the quantities of bottles, cans, plastics by recycling code, or the weight of paper, metals, used motor oil, batteries, paint, green waste/composting streams and other materials recycled annually by county or city.

Table 30: Total waste generated by Los Angeles County 1995-2013

Includes tons landfilled, transformed, and used as alternative daily cover. Does not included recycled wastes.

		Breakdown of Tons		
Report Year	Total Tons	Disposal	Transformation	Total ADC
1995	12,277,948	11,517,810	510,063	250,076
1996	11,858,590	11,164,776	423,273	270,541
1997	12,082,135	11,284,766	425,315	372,054
1998	12,764,439	11,782,856	561,896	419,687
1999	12,795,109	11,676,104	575,841	543,164
2000	13,531,917	12,237,445	510,708	783,764
2001	13,513,259	12,263,807	547,610	701,842
2002	13,194,160	12,023,878	539,836	630,445
2003	13,590,484	12,312,500	539,561	738,422
2004	13,581,998	12,140,164	548,960	892,874
2005	14,863,566	13,227,651	536,476	1,099,439
2006	12,889,168	11,471,878	538,224	879,066
2007	12,284,886	10,944,053	521,894	818,939
2008	11,282,986	9,926,639	521,132	835,214
2009	9,917,322	8,688,818	546,571	681,933
2010	9,590,742	8,264,269	539,321	787,152
2011	9,776,656	8,233,623	525,143	1,017,890
2012	9,485,024	8,141,712	528,899	814,412
2013	9,476,309	8,266,415	534,456	675,438

Hazardous Waste

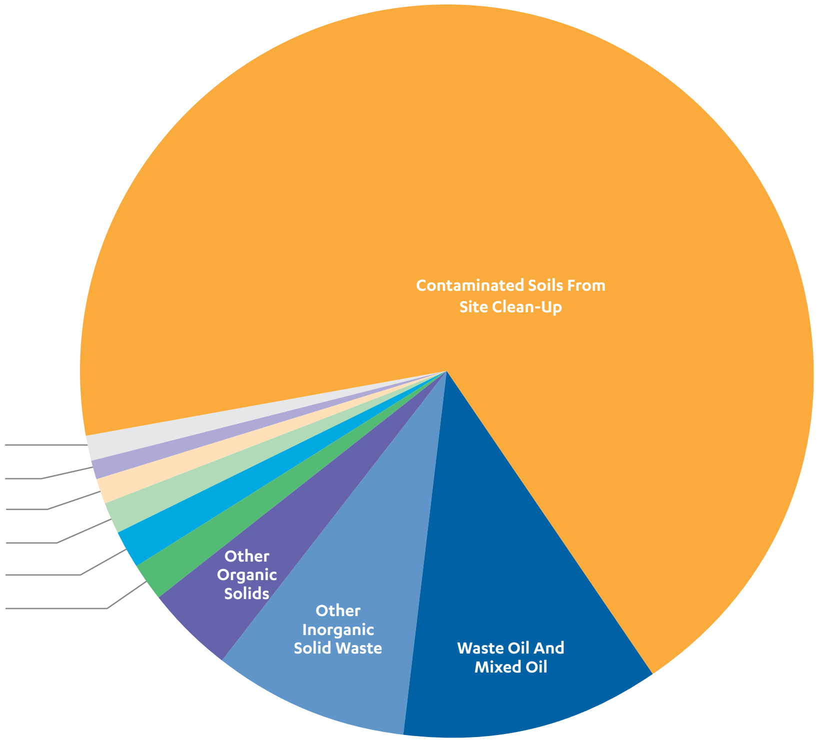
Similar to municipal waste, hazardous waste represents an under-utilized resource and indicates inefficiencies in industrial processes; however, the nature of this waste stream poses additional concerns for human health. By law, wastes must be handled as hazardous when they meet flammable, corrosive, reactive or toxic "characteristics", or when they are generated through specific regulated processes[47].

Table 31: Hazardous waste generation estimates based on DTSC and TRI data

Data Source	Est. total tons generated in 2013	Estimated number of generators
DTSC Report	2,193,184	21,000
TRI Report	1,240	126
TRI Report as a percentage of DTSC Report	0.06%	0.6%

Table 32: Amounts and waste code names for the top 10 categories comprising over 93% of all hazardous wastes generated in LA County in 2013 (Source: DTSC)

Waste Code Name	Tons	%
Polychlorinated Biphenyls & Matls W/Pcbs	18,032	0.9%
Unspecified Solvent Mixture	18,893	0.9%
Aqueous Solution (2 < Ph < 12.5) W Org Residues <=10%	20,773	1.0%
Unspecified Oil-Containing Waste	29,055	1.4%
Baghouse Waste	35,234	1.7%
Asbestos-Containing Waste	35,313	1.7%
Other Organic Solids	78,855	3.9%
Other Inorganic Solid Waste	173,772	8.5%
Waste Oil And Mixed Oil	237,794	11.6%
Contaminated Soils From Site Clean-Up	1,400,693	68.4%
	2,048,415	



Storage, transportation and disposal of hazardous wastes may cause exposure of workers and communities to toxic substances through air emissions, leakage into groundwater or surface water, or dermal contact with contaminated materials. Although these risks are similar to those posed by hazardous materials in general, most hazardous wastes have little or no value within manufacturing or retail process chains and therefore require detailed and strict regulatory oversight to ensure proper management and disposal. California has an extensive regulatory system that imposes requirements above and beyond those established by Federal regulations.

Data

We generated reports using the California Department of Toxic Substances Control (DTSC) database for total hazardous wastes generated[48], as well as from EPA's Toxic Release Inventory (TRI) database on hazardous waste transfers[49]. These two data sources provide somewhat complementary information on the amounts and types of hazardous waste generated. DTSC provides the most complete picture of waste amounts and the processes that generate the waste (through "waste code names"), while the TRI report provides details of the chemical composition of wastes for large industrial facilities required to report to the TRI Program.

Findings

- According to DTSC records, the total amount of hazardous waste generated in LA County in 2013 was ~2.2 million tons, although this number "double counts" wastes that were sent to a transfer station before being transported again to final treatment or disposal. The total amount of waste reported through TRI in LA County was ~2.48 million pounds, or 1,240 tons, which is three orders of magnitude less than reported through DTSC (Table 31).
- Only 126 facilities in the County reported hazardous waste transfers in their TRI reports in 2013. The DTSC public report website only provides information on

Table 33: Total hazardous waste tonnage and total excluding site clean-up soils (2010-2013). Source: DTSC

Year	2010	2011	2012	2013
Total tons	856,531	842,590	2,653,707	2,193,184
Total tons excluding site cleanup soils	701,769	741,490	1,834,399	792,491

Fig. 60: Total hazardous waste tonnage and total excluding site clean-up soils (2010-2013). Source: DTSC

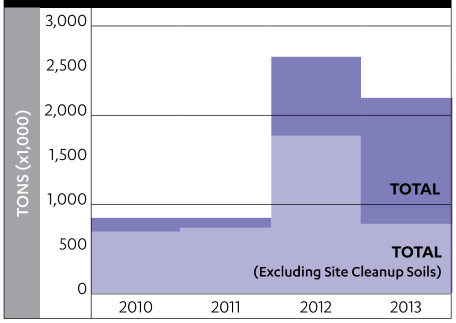


Table 34: Waste Amounts of Top 10 Generators in 2013 Source: DTSC

Facility Name	City	Tons
Pechiney Cast Plate	Vernon	1,383,156
Asbury Environmental Services	Compton	148,642
Veolia ES Technical Solutions LLC	Azusa	33,206
Exide Technologies Inc	Vernon	26,217
Agritec Int DBA Cleantech Environ. Inc	Irwindale	22,325
Chevron El Segundo Refinery	El Segundo	21,378
Quemetco Inc	City of Industry	19,671
Rho-Chem LLC	Inglewood	19,282
Light Metals Inc	City of Industry	17,396
Clean Harbors Wilmington LLC	Wilmington	14,916
78% of total		**1,706,190**

Table 35: Top Five Generators of TRI-Reported Haz. Waste, Accounting for 78% of Total 2013 Tons

Facility Name	Tons
Quemetco Inc	630
Chevron Products Co Div Of Chevron Usa Inc	102
Siemens Water Technologies Llc	85
Exide Technologies	77
Valmont Coatings Calwest Galvanizing	75
	969

the number of generators with annual tonnage >1,000 (those high volume generators alone included 81 individual generators in the County), so we could not obtain an exact total number of individual generators active in Los Angeles County in 2013. However, a rough estimate is 21,000 (pers. comm. w/DTSC staff). TRI-reporting facilities therefore represent less than one percent of total hazardous waste generators in the County (Table 31).

- Over 93% of the total volume of hazardous wastes generated in the County are accounted for in just 10 out of 76 waste code categories; contaminated soils from site cleanup comprised the overwhelming majority: 64% (Table 32).
- A review of three years of DTSC data previous to 2013 showed a significant increase in total hazardous waste generated in the County in 2012 and 2013 compared to 2010 and 2011 – nearly 3-fold (Table 33 and Figure 60). Because year-to-year amounts can be strongly influenced by site-specific clean-up activities, we also looked at yearly totals excluding contaminated soils from site clean-up. With this adjustment, volumes across 2010, 2011 and 2013 looked more consistent, albeit with an increasing trend. The spike in tonnage in 2012 may be associated with other one time or infrequent events such as periodic maintenance work / turnarounds at major facilities. Overall trends also may be related to production changes influenced by global economic conditions.

Table 36: Top 15 Chemicals Comprising >96% of All Haz Wastes Transferred in 2013 by Facilities Reporting Under TRI

Chemical Name	Tons
Lead Compounds	495
Zinc Compounds	212
Arsenic Compounds	93
Antimony Compounds	85
Chromium Compounds	59
Nickel Compounds	57
Nitric Acid	42
Nitrate Compounds	31
4 4'-Isopropylidenediphenol	29
Chromium	27
Acetonitrile	14
Methanol	11
Copper	11
Copper Compounds	10
Cyanide Compounds	10
	1,187

- The top 10 waste generators for 2013 represent 78% of the total hazardous waste generated in the year per DTSC data (Table 34). While some of these companies are individual facilities (the now-closed Pechiney Cast Plate generated approximately 60% of total waste generated as a result of site cleanup), others provide recycling or clean-up services that involve managing wastes from multiple sites.
- The top five generators under the TRI program accounted for 78% of the total (Table 35).
- The Exide Technologies facility in Vernon and the Quemetco facility in the City of Industry (both lead acid battery recyclers) were within the top seven generators for both DTSC regulated wastes and TRI-reported wastes.(Tables 34 & 35) Quemetco alone generated approximately half of the TRI reported hazardous waste in 2013. As stated earlier, Exide is now permanently closed which will reduce countywide hazardous waste tonnage.
- Fifteen chemicals (out of 59 reported under TRI) account for 96% of the hazardous waste transfers reported in 2013 (Table 36). Lead compounds comprise over 40% of the total.

Data Limitations

- There are two significant issues with the waste generation data that make it challenging to present an accurate picture. First, numbers shown in the DTSC reports, either as total tonnage for the County or by waste code type, are an overestimate of amounts generated because these reports draw on transportation records, and therefore wastes are counted twice if a given load is shipped from a generator to a transfer station and then again to a treatment facility (a common occurrence). Second, only a very small percentage of the total waste generated is reported through the TRI Program[51], and only for wastes containing TRI-specific chemicals (a much smaller universe than DTSC regulated wastes); therefore, a detailed chemical composition is not readily available for the vast majority of generated wastes.

- More broadly, we were only able to obtain waste generation volumes readily from the DTSC and TRI databases. County-specific data to support an assessment of waste minimization efforts or of disposal, recycling and transportation compliance performance did not appear to be available.

Grade for Waste = B/Incomplete

Thanks to AB 939, and subsequent regulations, and numerous recycling and source reduction programs, all cities in LA County have successful solid waste diversion programs as required by CalRecycle. However, due to limitations in data collection, there are not reliable data on solid waste recycling programs or even the actual quantities of waste generated and diverted from landfills. With the advent of a city-wide exclusive franchise system for municipal solid waste, Los Angeles has the opportunity to require more complete collection, diversion, and recycling data from their contracted waste management companies. For hazardous waste generation in the region, volumes are extremely high, but that's not surprising from a region as populous and industrialized as Los Angeles County. A more precise analysis is hampered by limitations in data availability; in addition to questions related to volumes and chemical constituents, an evaluation of waste minimization efforts and regulatory compliance was not possible due to lack of readily available information.

ENERGY

Overview

California is leading the nation in greenhouse gas reduction and renewable portfolio standards (RPS) efforts due to AB 32 requirements, the California Air Resources Board's enforceable cap and trade program, and the state's requirement to reach 33% RPS by 2030. Recently, Governor Brown called for a further increase of RPS to 50% by 2030, as well as 50% increases in existing building energy efficiency and a 50% reduction in petroleum use in cars and trucks.

AB 32 requires California to reduce GHG emission levels to 1990 levels (a 25% reduction) by 2020. Large industrial sources are required to report their emissions annually. California's building energy efficiency standards (Title 24) are the toughest in the nation, and the state's Energy Commission has mandated all new residential buildings need to be Zero Net Energy by 2020 and all new commercial buildings to be so by 2030. With all of these relatively new legal requirements, the Los Angeles region has demonstrated leadership in a number of GHG and energy efficiency areas; however, Los Angeles, Pasadena, Glendale, Burbank, Azusa and others still rely on coal as a major energy source and energy retrofits have proven to be a challenge, so we still have a long way to go in these two areas.

Greenhouse Gas Emissions

Scientists, civic and state leaders, prominent businesses, and members of the general public agree that climate change poses a significant threat to our way of life. Recent changes in the global climate, such as temperature increases and sea level rise, have accelerated.

These changes are the result of man-made greenhouse gas (GHG) emissions[51]. Greenhouse gas accounting is a relatively new science that continues to be refined.

Data

We used data from the Los Angeles County Regional 2010 Greenhouse Gas Emissions Inventory, developed by the Los Angeles Regional Collaborative for Climate Action and Sustainability (LARC)[52]. LARC is an organization of leaders from local governments, non-profits, academia and the private sector with a shared goal of fostering collective action at the level of the county to mitigate the effects of and adapt to climate change.

The Regional GHG Emissions Inventory is a part of a larger plan, entitled *A Greater L.A.: The Framework for Regional Climate Action and Sustainability*, that LARC is developing to guide local sustainability efforts across the region. The Regional Emissions Inventory provides the first comprehensive picture of emissions sources and trends for all of Los Angeles County, emissions generated from activities that take place in the county. Emissions that are generated by manufacturing outside of the county, for example, are not part of such an inventory. Because this study utilized consistent methodology and data, the report provides an aggregate understanding of the emissions attributed to all of the cities and unincorporated areas in the County.

For this Report Card, we used data from the Regional Emissions Inventory for the following indicators: per-capita electricity consumption, per-capita GHG emissions, and GHG emissions by sector. GHG emissions are expressed in terms of equivalent carbon dioxide ($CO^{2}e$), a standardized value which accounts for the variation in global warming potential of different greenhouse gases.

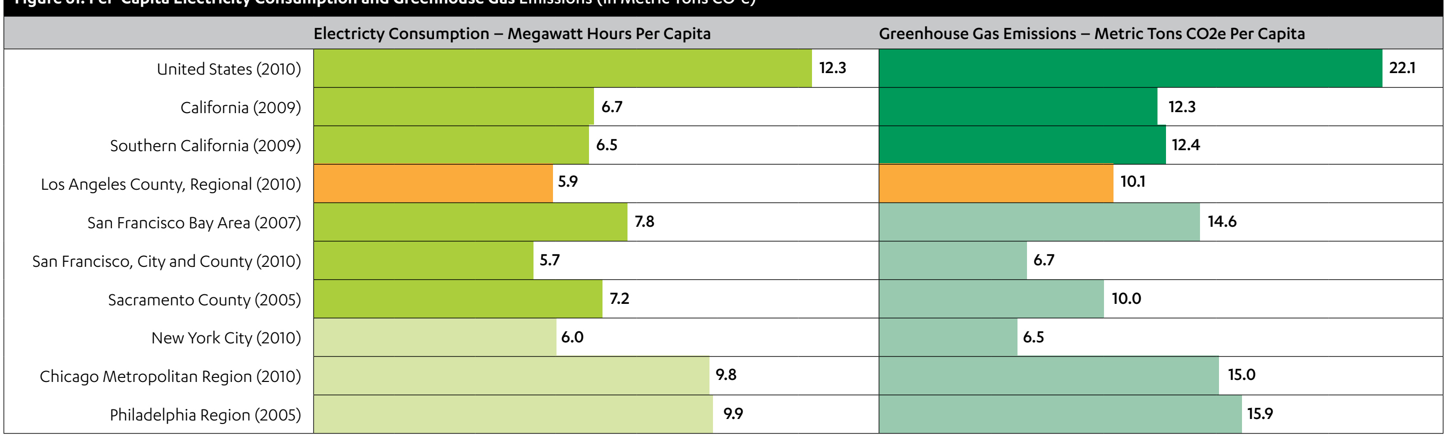
Findings

- In 2010, LA County generated a combined total of 99.1 million metric tons $CO^{2}e$, representing approximately 21.7% of California's GHG emissions in 2009 (the last year available). (Table 37)
- Per capita GHG emissions in 2010 were 10.1 metric tons. (Fig 61)
- Per capita electricity consumption in 2010 was 5.9 megawatt hours. (Fig 61)
- Compared to other large metropolitan areas in the U.S., LA County has one of the lowest per-capita electricity consumption rates, comparable to San Francisco and New York City. (Fig 61) However, due to widespread use of automobiles and trucks and the use of high carbon fuels like coal to generate energy for L.A. and Pasadena, its greenhouse gas emissions rate is approximately 30% higher than those cities, while still being significantly lower than other metropolitan regions.
- Building energy comprises the largest single portion of the County's emissions inventory (39.2%), followed closely by on-road transportation (33.5%) (Table 37). Stationary sources are also a major GHG emissions contributor (19.7%).

Table 37: GHG Emissions by Sector

Sector	Emissions (MT CO2e)	Percent of Inventory
Building Energy	38,900,762	39.2%
On-Road Transportation	33,226,317	33.5%
Stationary Sources	19,516,169	19.7%
Solid Waste	4,327,123	4.4%
Water Conveyance	1,117,283	1.1%
Ports	1,059,131	1.1%
Off-Road Transportation	515,044	0.5%
Wastewater Treatment	443,832	0.4%
Agriculture	26,105	0.03%
Los Angeles Worlds Airport	2,760	0.0%
Total	**99,134,526**	

Figure 61: Per-Capita Electricity Consumption and Greenhouse Gas Emissions (in Metric Tons $CO^{2}e$)



Data Limitations

- Because this is the first countywide Emissions Inventory, the data represents conditions only for 2010 and there is no trend information. According to the Lawrence Berkeley Lab, in 2004, Los Angeles County had the largest CO2 emissions at 83 million metric tons, 24% of state total[53]. However, direct comparison is difficult because calculation methodologies may differ significantly between the two studies.
- Greenhouse gas emissions can be counted in a number of ways and this report card's reporting will evolve over time. Data scarcity – utilities do not provide disaggregated data, for example, nor verifiable totals – in addition to issues about where the boundaries should be set for accounting, mean that any totals reported must be highly contextualized. For example, greenhouse gas emissions produced from powerplants outside the county may or may not be accounted for in an inventory, depending on where the boundaries are set. These are not arbitrary decisions, but not all inventories have the same boundaries.
- In future report cards, we hope to have more extensive GHG emissions and energy use data, as well as data on smaller geographic scales such as individual cities or sub-regions. A recent CPUC decision (Spring 2014) authorized the release of disaggregated investor-owned utility consumption information to research institutions, which will greatly assist with more detailed reporting going forward.

Energy Sources/Renewables

California set aggressive targets for sustainability in the energy sector. SB-1078 (2002) and SB-107 (2006) established a 20% renewable power generation requirement for electricity retail sales by 2010.

Two years later, Governor Schwarzenegger signed executive order S-14-08, mandating all electricity retailers to achieve 33% renewable energy by 2020. Subsequently, Governor Brown signed SB X1-2 requiring publicly owned utilities, investor owned utilities, and electric service providers to achieve a 20% renewable energy portfolio by 2013, 25% by 2016, and 33% by 2020[54]. Industry-standard examples of renewable power include biomass & biowaste, geothermal, hydroelectric, solar, and wind.

In an effort to increase public awareness and support, SB-1305 (1997) and AB 162 (2009) required electricity providers to disclose information about the energy resources used to generate their electricity. This is communicated through a "power content label," a standardized format developed by the California Energy Commission (CEC)[55].

Data

To assess renewable energy progress, we looked at the power content labels for each electric utility within LA County. The 2013 data were provided by the CEC upon request. We compiled data on the percent renewable energy achieved by each local utility, compared this to state targets, and assessed the mix of renewable energy types. We also looked at the complete portfolio of each company to understand the predominant sources of non-renewable energy.

Findings

- The City of Cerritos, Vernon Light & Power, and Azusa Light & Water were the only utilities not meeting the 2013 20% renewable electricity standard. The other utilities which serve over ~98% of the county's population, all exceeded the 20% renewable energy standard for 2013.(Table 38)
- The category of "unspecified power" constitutes a significant percentage of some utility's portfolios, as much as 35% for Southern California Edison. According to the CEC, "unspecified power" is defined as electricity from transactions that are not traceable to specific generation sources. Power purchased from other states that do not have requirements to identify sources will fall into this category. (Table 38)
- Solar power represents an extremely small percentage (less than 1%) of the energy mix for LA County utilities. Renewable energy comes primarily from wind (over 10%), geothermal (approximately 5%), and biomass/biowaste (approximately 3%). (Table 38)
- Coal energy is still prevalent in the region, with Azusa, Pasadena and LADWP receiving 42% or more of their energy from coal sources. Glendale and Burbank receive nearly a third of their energy from coal sources. (Table 38)

Data Limitations

- The power content label does not provide information about the origin of electricity used at any particular household or business user. Rather, it reflects the overall resource mix that is being purchased through that specific utility.
- Energy coming into California from out of state is currently not being categorized or tracked by any national requirements or standards, and this "unspecified power" percentage can be as much as 35% of a utility's portfolio, resulting in significant uncertainty in the overall power mix.

Table 38: Los Angeles County Utilities - Renewable Engergy Portfolio 2013

Utility Name	Total Retail Sales (kWh)	Total Renewable Purchases		Renewable Breakdown (%)					Nonrenewable Breakdown					Unspecified Power
	kWh x 1,000	kWh x 1,000	Percentage	Biomass & Biowaste	Geothermal	Eligible Hydroelectric	Solar Electric	Wind	Coal	Large Hydroelectric	Natural Gas	Nuclear	Other	
Azusa Light & Water	246,927	36,716	15%	0%	0%	2%	0%	13%	74%	2%	0%	7%	0%	3%
Burbank Water and Power (BWP)	not available	not available	25%	18%	0.3%	2%	0.2%	5%	32%	2%	16%	7.0%	0%	18%
City of Cerritos	63,207	0	0%	0%	0%	0%	0%	0%	0%	0%	69%	0%	0%	31%
Glendale Water and Power (GWP)	1,065,146	297,514	28%	13%	0%	2%	0%	12%	29%	6%	26%	7.6%	0%	5%
LA Dept of Water and Power (LADWP)	23,259,917	5,383,250	23%	6%	1%	1%	1%	14%	42%	4%	16%	10%	0%	5%
Pasadena Water and Power (PWP)	1,110,448	301,569	27%	16%	7%	1%	0%	3%	52%	5%	5%	7%	0%	4%
Southern California Edison (SCE)	74,480,095	16,372,277	22%	1%	9%	1%	1%	10%	6%	4%	28%	6%	0%	35%
Vernon Light & Power	1,125,362	156,563	14%	8%	0%	0%	0%	6%	0%	2%	56%	7%	0%	21%

Note: rounding may cause totals to deviate slightly from 100%

- Although the City of Industry is listed by the CEC as having its own power utility, the City website indicated that its power comes from SCE, and no separate power content label was available.
- We were unable to roll up the data to provide a total for the County as a whole, because the power content label for Southern California Edison (SCE) applies to their entire service area, not just Los Angeles County.

Grade = B-

Although the region is largely on track to meet renewable portfolio standards and GHG emission targets, there is still too great a reliance on coal as an energy source (although the city of LA will begin eliminating coal as an energy source this year and will be coal-free by 2025). Very little of the region's energy is generated by local sources such as solar. Further, GHG emissions and energy use data are often inadequate for accurate assessment. Fleet, busline and truck transitions from diesel to natural gas have reduced GHG emissions, as have more fuel efficient cars. In general, Title 24 and numerous cities' green building requirements are leading to more energy efficient new buildings, but there are not enough comprehensive energy efficiency retrofit programs for existing building stock. However, overall, the LA region is far more energy efficient and has lower per capita GHG emissions than many large U.S. cities.

Although our mild climate helps greatly, the fact that our per capita energy use and GHG emissions are half the national average demonstrates that energy efficiency and GHG reduction efforts make a difference. At the same time, progress toward sustainability requires an industry trajectory that adds higher levels of value to the economy for each terajoule that is consumed, and cleaner sources of power that release less greenhouse gas per terajoule consumed. Community Choice Aggregation (CCA) is emerging as a promising option for increasing levels of clean energy sources, especially at local levels. Two ongoing examples of CCA in California are Sonoma Clean Power and Marin Clean Energy; within LA County, the City of Lancaster has just approved a CCA Program. A State standard for renewable (bio)gas would provide additional benefits of reducing pressure on landfills, dairies and other methane producing activities. National standards are needed for categorizing and tracking energy sources in order to monitor progress toward renewable goals.

QUALITY

Overview

In Los Angeles, we often focus on what's wrong with the region. The traffic is miserable. The price of property and rents are high. And the Lakers are a disaster. Unfortunately, we don't focus on what makes the region such a great place to live. We have unbelievable weather. A person can surf, hike, bike and ski on the same day. The region's unparalleled cultural diversity has led to an endless variety of arts and music opportunities, and food choices that can satisfy any palate, just to name a few of the benefits.

With that in mind, the authors would not trade the LA region for the winters of the northeast and the rust belt, the flatlands and humidity of the southeast, or the dreariness of the northwest. We love L.A., which makes assessing the environmental quality of life for the region very difficult. We used indicators comparing our megacity to far less developed and diverse regions of the country, perhaps not the most apt approach. However, the indicators we used captured important quality of life issues and were developed by others that analyzed numerous extensive data sources to arrive at their metrics.

Community Acessibility

Ready access to work, stores, and services by walking, biking, or public transportation enhances urban life and supports efforts toward a carbon-neutral city. The region was developed during a period of inexpensive fossil fuels, abundant land resources and water, and cheap building materials. While the metropolitan region is one of the densest in the United States, labeled 'dense sprawl,' most of the region still depends on the automobile for transportation, impacting the quality of life, as well as creating air pollution and GHG emissions.

Public transportation and bicycle infrastructure have historically been fiscally constrained due to tax reduction initiatives passed since 1978. However, the 2008 passage of the county-wide half cent sales tax -Measure R, the Traffic Relief and Rail Expansion Ordinance, have invigorated public transportation improvements. Public transit use and bicycle use have been increasing, albeit slowly, but public transit infrastructure investments are clearly changing real estate dynamics across the region. An evolution is taking place. Zoning laws still stand in the way of dramatic changes enabling more walkable and transit friendly neighborhoods, as does historic NIMBYism. Despite these entrenched patterns, there is a slow evolution that this report card will begin to track over time.

Data

We evaluated access to shops and services, bike friendliness, and access to public transportation using the Walk Score®, Bike Score™ and Transit Score® ratings developed by the company Walk Score (www.walkscore.com), for cities throughout LA County[56]. All scores are on a scale from 0-100.

- Walk Score ratings measures walkability based on walking routes to destinations such as grocery stores, schools, parks, restaurants, and retail. Scores have been calculated for approximately 2,500 of the largest US cities.
- Transit Score ratings are a measure of how well a location is served by public transit, based on data released in a

standard format by public transit agencies. Transit Scores ratings are calculated by assigning a "usefulness" value to nearby transit routes based on the frequency, type of route (rail, bus, etc.), and distance to the nearest stop on the route.

- Bike Score measures bike accessibility on a scale from 0 - 100 based on bike infrastructure, topography, destinations and road connectivity. For a given location, a Bike Score is calculated by measuring bike infrastructure (lanes, trails, etc.), hills, destinations and road connectivity, and the number of bike commuters.

Findings

- The 141 Walk Score-rated cities with a population 200,000 or greater gave an average Walk Score of 47. The highest is 88 for New York City, followed by 84 for San Francisco. The average Walk Score for the City of Los Angeles was 64 with neighborhoods like Downtown LA, Koreatown, Westlake, Hollywood and Mid City scoring very well. (Table 39, Fig 62). The average WalkScore for the city of Long Beach was 66. (Table 39, Fig 63).
- Of the listed cities, the highest Walk Scores were in Santa Monica. No listed city scored in the "Walker's Paradise" (90-100) and only Santa Monica scored in the next tier of "Very Walkable" (70-89). Six cities scored less than 50, putting them in the "Car Dependent" category, in which most or all errands required a car.(Table 39)
- Transit Scores were only available for four of the largest 20 cities. Santa Monica and Pasadena were rated "Excellent Transit", the second highest ranking. Los Angeles and Glendale were rated "Good Transit" and "Some Transit" respectively.(Table 39)

Table 39: WalkScores, TransitScores and BikeScores for Selected Cities and Neighborhoods in L.A. County

City	Walk Score	Transit Score	Bike Score
Burbank	66		
Carson	49		
Compton	59		
Culver City	73		
Downey	54		
El Monte	56		
Glendale	66	39	
Hawthorne	64		
Inglewood	64		
Lancaster	25		
Long Beach	66		62
Los Angeles	64	50	54
Norwalk	56		
Palmdale	21		
Pasadena	62	71	
Pomona	48		
Santa Clarita	33		
Santa Monica	78	83	
South Gate	61		
Torrance	61		
West Covina	41		
LOS ANGELES NEIGHBORHOODS			
Downtown	93	99	69
Koreatown	90	78	64
Westlake	86	80	56
Hollywood	86	64	61
Mid City	75	62	61
No. Hollywood	69	49	59
South L.A.	67	60	62
San Pedro	64	32	52
Sun Valley	50	42	51
Northridge	46	38	55
Sylmar	39	39	41
Pac. Palisades	32	29	18

Scoring Legend

Score®	Walk Score	Transit Score	Bike Score
90–100	WALKER'S PARADISE Daily errands do not require a car	RIDER'S PARADISE World-class public transportation	BIKER'S PARADISE Daily errands can be accomplished on bike
70–89	VERY WALKABLE Most errands can be accomplished on foot	EXCELLENT TRANSIT Transit is convenient for most trips	VERY BIKEABLE Biking is convenient for most trips
50–69	SOMEWHAT WALKABLE Some errands can be accomplished on foot	GOOD TRANSIT Many nearby public transportation options	BIKEABLE Some bike infrastructure
25–49	CAR-DEPENDENT Most errands require a car	SOME TRANSIT A few nearby public transportation options	SOMEWHAT BIKEABLE Minimal bike infrastructure
0–24	CAR-DEPENDENT Almost all errands require a car	MINIMAL TRANSIT It is possible to get on a bus	SOMEWHAT BIKEABLE Minimal bike infrastructure

Figure 62: Los Angeles Walk Score

Figure 63: Long Beach Walk Score

- Bike Scores were only available for Los Angeles and Long Beach, both of which were rated "Bikeable", but none of the LA neighborhoods were in the Very Bikeable range despite a large increase in city bike lane mileage in recent years. (Table 39)

Data Limitations

- These three measures are trademarked methodologies that are not fully transparent to the public.
- Scores were only available by city, not for the County as a whole, and not for unincorporated areas of the County.
- Bike Scores are only available where bike infrastructure data was available from the city.
- Transit Scores are only available where local agencies provided open data through a GTFS feed.
- Some scores include attributes that cannot be addressed by city planning or individual action, such as the hilliness of a neighborhood as part of the Bike Score. Although obviously important information for prospective residents who intend to bike to work, this aspect of the score will not change with time.
- There is not a clear schedule for updates, although they have been occurring approximately every 18 months.

The County of Los Angeles is a late comer to many of these issues, and complicating this assessment is that there are 88 different cities ranging from very small to quite large, dense to dominated by single family neighborhoods. The County has no land use authority over these individual cities, thus any changes must be initiated one city at a time.

Commute Times and Modes of Transportation to Work

Commute times and mode of transportation to work are linked to many aspects of urban life including accessibility of public transportation and proximity of housing to jobs.

While the previous indicator looked at accessibility measures from a neighborhood perspective, this indicator looks at outcomes from a population perspective, namely: how are people actually getting to work and how long does it take? While land use is the responsibility of cities, the county's Metropolitan Transit Authority provides bus and rail transit to much of the region. There are also individual city transit authorities such as the Santa Monica Big Blue Bus, LADOT's DASH and Commuter Express services, the Culver CityBus, Foothill Transit, Long Beach Transit, and Torrance Transit. Thus the region has a complex transportation network, including city and county streets, state and federal freeways, and private railroads.

Data

We used data from the 2013 American Community Survey 1-year estimates for Los Angeles County. Reports were generated using the advanced search option in the US Census Bureau American FactFinder[57]. We looked at the percent of County workers (16 years and over) who drove alone, carpooled, or took public transportation.

We also looked at the mean travel time to work. Results were compared to those from the 2012 1-year survey and from the 2005 survey, which was the earliest year we could find with these data.

Findings

- Approximately 90% of those surveyed indicated that they traveled to work by one of the three modes of transportation: drove alone, carpooled, or took public transportation. (Table 40)
- The overwhelming majority, 73%, drove alone. Ten percent carpooled and 7% took public transportation. (Table 40)
- The mean travel time to work was 30 minutes. Only 7.5% of the public commuted less than 10 minutes a day while 22.6% of the workforce commutes over 45 minutes to work. The mean time for public transportation was 75% greater than that for driving alone, and 54.7% of mass transit commuters take over 45 minutes to get to work. (Table 40)
- These results differed by only 0.1-0.2 percentage points from 2012 results, well within the margin of error for the estimates.
- Compared to 2005, the number of carpoolers was 2% lower in 2013 (which is greater than the margin of error but less than the percent imputed value for means of transportation to work, which was 2.4% in 2005 and 8.6% in 2013). Differences in all other values were within the margins of error for the estimates.

Data Limitations

- These data do not provide further details on the mode of transportation for the 10% of survey respondent who did not travel to work by one of the three modes of transportation listed. We hope to provide information on the percent of people biking and walking to work in future report cards.
- Due to time and resource limitations, we were unable to research data on mode of transportation for years prior to 2005, to provide a greater context for examining commuting patterns.

Table 40: Los Angeles County Travel Times and Modes of Transportation to Work, 2013. Source: ACS

		Total		Car, truck, or van – drove alone		Car, truck, or van – carpooled		Public transportation (excl. taxicab)	
		Estimate	MoE	Estimate	MoE	Estimate	MoE	Estimate	MoE
Workers 16 years and over		4,492,244	+/-21,728	3,264,307	+/-21,699	449,897	+/-12,272	311,794	+/-8,038
TRAVEL TIME TO WORK	Less than 10 minutes	7.5%	+/-0.2	7.0%	+/-0.2	6.4%	+/-0.6	0.7%	+/-0.2
	10 to 14 minutes	11.2%	+/-0.3	11.6%	+/-0.3	10.9%	+/-0.8	2.9%	+/-0.7
	15 to 19 minutes	13.8%	+/-0.3	14.7%	+/-0.3	13.4%	+/-0.8	4.2%	+/-0.7
	20 to 24 minutes	14.4%	+/-0.3	15.2%	+/-0.3	14.7%	+/-1.0	6.7%	+/-0.9
	25 to 29 minutes	5.5%	+/-0.2	6.0%	+/-0.2	4.5%	+/-0.5	2.2%	+/-0.4
	30 to 34 minutes	17.3%	+/-0.3	17.5%	+/-0.4	17.8%	+/-1.1	20.1%	+/-1.3
	35 to 44 minutes	7.7%	+/-0.2	7.9%	+/-0.2	7.8%	+/-0.6	8.6%	+/-0.7
	45 to 59 minutes	10.0%	+/-0.2	9.8%	+/-0.3	10.8%	+/-0.7	15.2%	+/-1.1
	60 or more minutes	12.6%	+/-0.3	10.3%	+/-0.3	13.7%	+/-0.9	39.5%	+/-1.6
	Mean travel time to work (min)	30.0	+/-0.2	28.5	+/-0.2	30.9	+/-0.5	50.0	+/-0.9

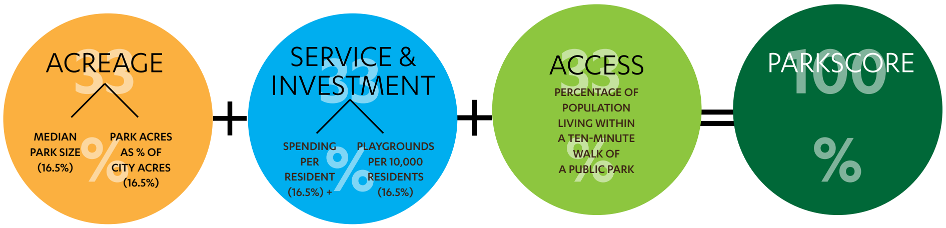
Park Access and Quality

Neighborhood parks contribute to the quality of urban life by providing opportunities for sociability, access to nature, outdoor recreation and enjoyment of green spaces. Measures of park access and quality aim to quantify and combine multiple attributes into a single index that can be used to compare neighborhoods. The results may inform municipal decisions on land use, community development, and public resource allocation, as well as individuals' decisions on where to live.

Data

We used measures of park access and quality created by two different organizations, as follows:

- The Trust for Public Land has developed a ParkScore® that incorporates multiple attributes, including aspects of park size, services and walking distance (see methodology graphic). Publically accessible park and open space data was obtained from City, County, State and Federal agencies. Scores are given on a scale of 1-100, as well as on a scale of 1-5 "benches." ParkScore is only available at the city-level at this time, and the Cities of LA and Long Beach are the only ones within LA County that have been scored. The data are publically available on the ParkScore website[58].



The Trust for Public Land ParkScore Methodology

- GreenInfo Network has developed a ParkIndex[59] rating based on a scale of 1-100. This tool assesses census tracts or block groups based on the extent to which it is close to parks. ParkIndex ratings have been calculated for all neighborhoods and cities throughout Los Angeles County, but are currently in a pre-release draft version. We received permission to include the ratings for LA County as a whole, as well as for the cities of Los Angeles and Long Beach, effective Oct 2014.

Both methodologies include areas such as county beaches and National Forests in their definitions of "park.".

Table 41: ParkScores and ParkIndex Scores for the Cities of Los Angeles and Long Beach

Source:	Trust for Public Land		GreenInfo Network
	ParkScore	Rank	Index Score
Long Beach	**54**	**24/60**	**41**
Los Angeles	**42**	**45/60**	**28**

Findings

- A Park Score has been calculated by the Trust for Public Land for 60 cities within the US, and range from a high of 82 (Minneapolis) to a low of 26 (Fresno).
  - The City of Long Beach was ranked 24th out of 60 with a Park Score of 54.0 (3 out of 5 "benches"). Areas with a very high need for parks are largely in North Long Beach near the LA River. (Table 41, Fig 64)
  - The City of Los Angeles was ranked 45th out of 60, with a Park Score of 42.0 (2 out of 5 "benches"). Areas with a very high need for parks include downtown LA, South LA, East LA, and the Van Nuys area of the San Fernando Valley. (Table 41, Fig 65)
- The average ParkIndex rating calculated by GreenInfo Network across all jurisdictions within Los Angeles County is 34.
  - The City of Long Beach average ParkIndex rating was 41, above the County average. (Table 41)
  - The City of Los Angeles average ParkIndex rating was 28, below the County average. (Table 41)

Data Limitations

The current park access metrics are based largely on the distance to the park and the size of the park, but do not reflect programs, safety or natural resources in the park. Further, they have been developed for use nation-wide and do not reflect differences among cities or regions. For example, current indices do not take into consideration whether a city has a large single family dwelling stock, with each dwelling having an individual yard, or predominantly multiple family apartment buildings. Park access needs are qualitatively different for those different circumstances, and suggest prioritizing new parks in neighborhoods that lack absolute access to open space.

While we recognize the current park indicators represent a huge effort to quantify this important amenity, we believe the methodologies require further refinement to reflect the needs of neighborhoods and nuances among park types themselves.

Figure 64: City of Los Angeles 2014 ParkScore Map. Source: TPL

The Trust for Public Land ParkScore® index analyzes public access to existing parks and open space. The analysis incorporates a two-step approach: 1) determines where there are gaps in park availability, and 2) constructs a demographic profile to identify gaps with the most urgent need for parkland. Park gaps are based on a dynamic 1/2 mile service area (10 minute walking distance) for all parks. In this analysis, service areas use the street network to determine walkable distance - streets such as highways, freeways, and interstates are considered barriers.

Demographic profiles are based on 2013 Forecast block groups provided by Esri to determine park need for percentage of population age 19 and younger, percentage of households with income less than 75% of city median income (Los Angeles less than $35,000), and population density (people per acre). The combined level of park need result shown on the large map combines the three demographic profile results and assigns the following weights:

50% = Population density (people per acre)
25% = Percentage of population ≤ age 19
25% = Percentage of households with income less than $35,000

Areas in red show a very high need for parks.

- Very High Park Need
- High Park Need
- Moderate Park Need
- Parks with Public Access
- Other Parks and Open Space
- Half Mile Park Service Areas
- Cemetery
- University
- Industrial
- Waterbodies

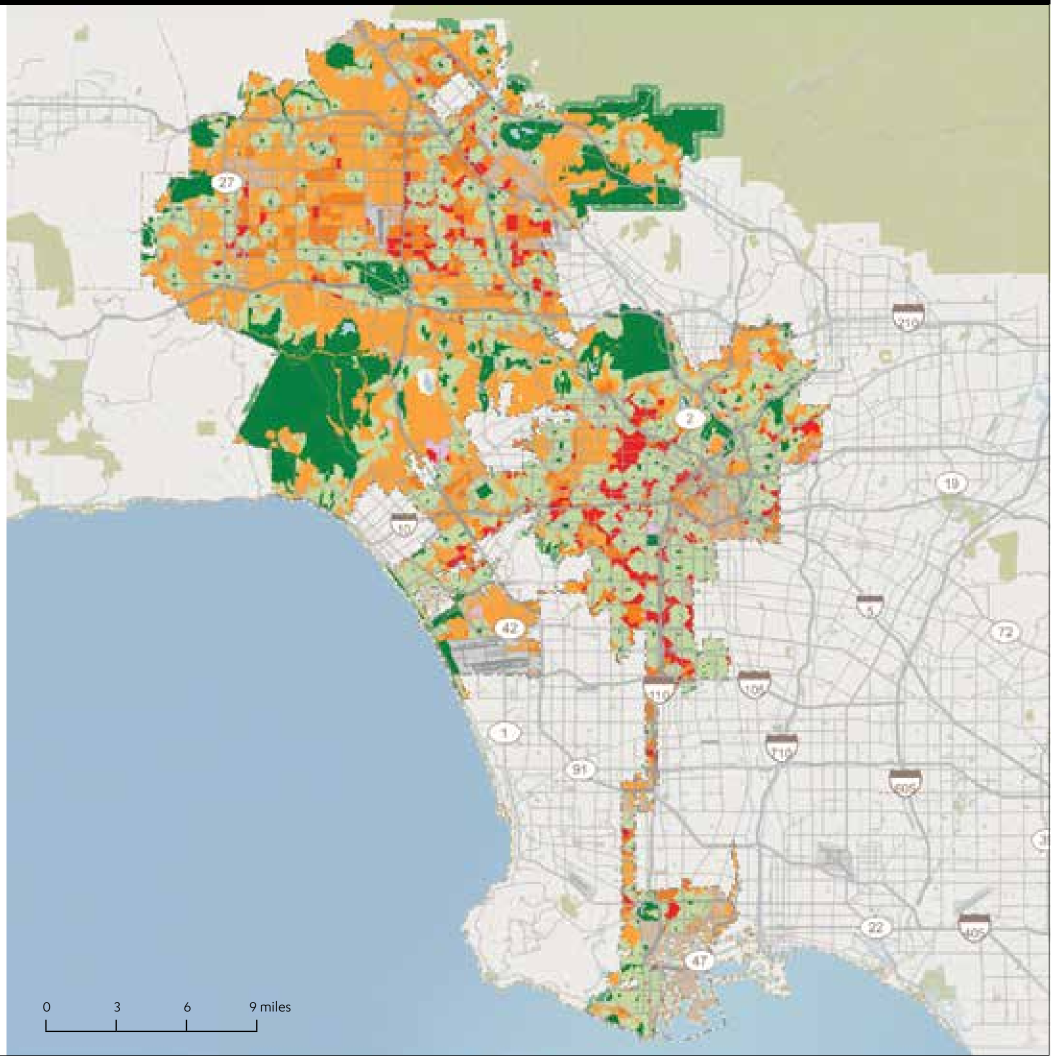


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Table 42: ParkScore Index Calculation, City of Los Angeles. Source: TPL

Rank (out of 60)	Population	Acreage (Max 40)		Services and Investment (Max 40)		Access (Max 40)	Raw Score (Max 120)	ParkScore (Max 100)
45	3,857,799	25		7		18	50	42.0
		Median Park Size	Park Land as % of City Area	Spending per Resident	Playgrounds per 10,000 Residents			
		9 (Max 20)	16 (Max 20)	6 (Max 20)	1 (Max 20)			

Figure 65: City of Long Beach 2014 ParkScore Map. Source: TPL

The Trust for Public Land ParkScore® index analyzes public access to existing parks and open space. The analysis incorporates a two-step approach: 1) determines where there are gaps in park availability, and 2) constructs a demographic profile to identify gaps with the most urgent need for parkland. Park gaps are based on a dynamic 1/2 mile service area (10 minute walking distance) for all parks. In this analysis, service areas use the street network to determine walkable distance - streets such as highways, freeways, and interstates are considered barriers.

Demographic profiles are based on 2013 Forecast block groups provided by Esri to determine park need for percentage of population age 19 and younger, percentage of households with income less than 75% of city median income (Long Beach less than $35,000), and population density (people per acre). The combined level of park need result shown on the large map combines the three demographic profile results and assigns the following weights:

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- Waterbodies

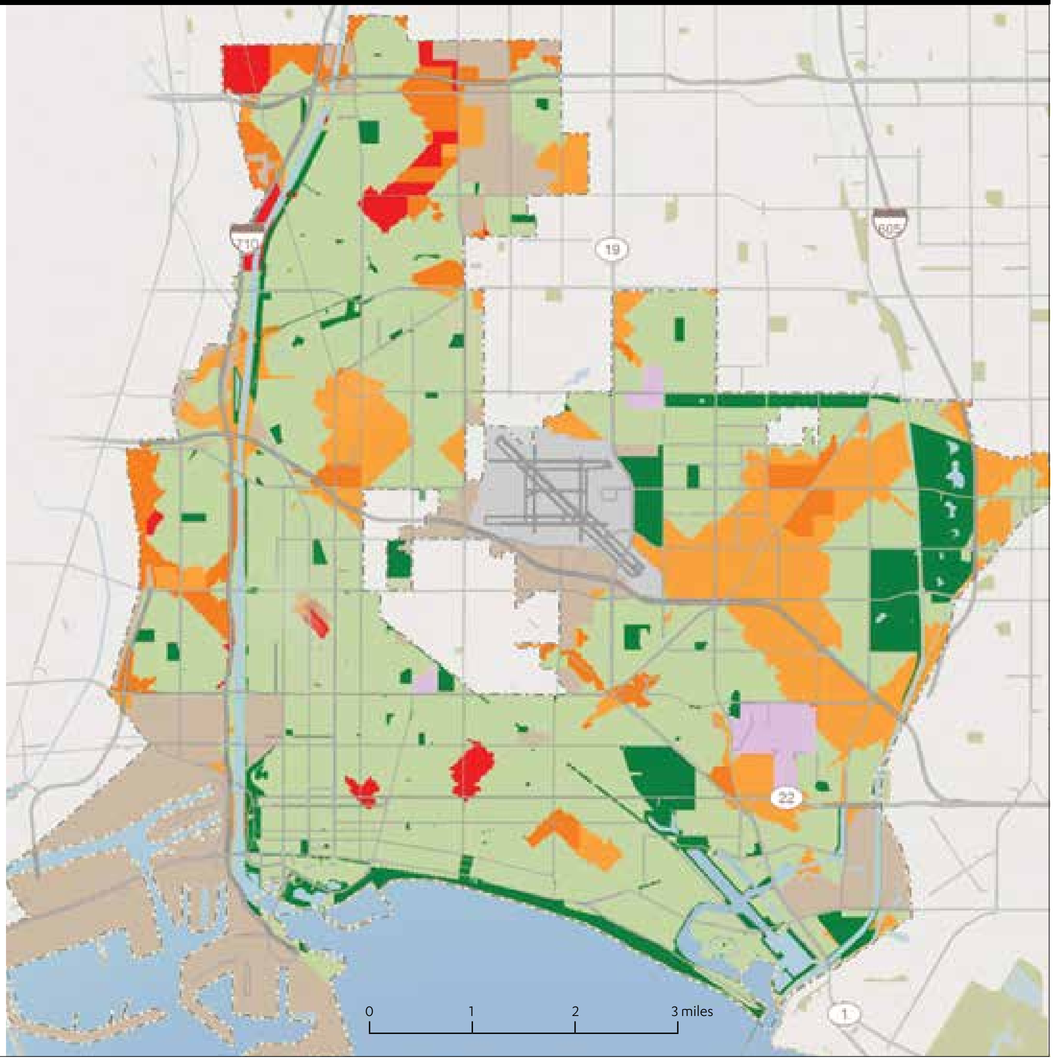

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Table 43: ParkScore Index Calculation, City of Long Beach. Source: TPL

Rank (out of 60)	Population	Acreage (Max 40)		Services and Investment (Max 40)		Access (Max 40)	Raw Score (Max 120)	ParkScore (Max 100)
24	467,892	15		20		30	65	54.0
		Median Park Size	Park Land as % of City Area	Spending per Resident	Playgrounds per 10,000 Residents			
		5 (Max 20)	10 (Max 20)	18 (Max 20)	2 (Max 20)			

Community Environmental Health

The California Office of Environmental Health Hazard Assessment (OEHHA) has developed a methodology for identifying environmental exposures from multiple media pathways, and for characterizing the vulnerabilities of exposed populations, through a tool called Cal EnviroScreen (version 2.0, effective August, 2014)[60]. CalEnviroScreen produces a composite score and ranks all California census tracks relative to each other.

CalEnviroScreen is primarily designed to assist OEHHA in carrying out its environmental justice mission to conduct its activities in a manner that ensures the fair treatment of all Californians, including minority and low-income populations.

Figure 66: CalEnviroScreen 2.0 Scoring Methodology

Pollution Burden		Population Characteristics		
Ozone Concentrations PM2.5 Concentrations Diesel PM Emissions Pesticide Use Toxic Releases from Facilities Traffic Density Drinking Water Contaminants Cleanup Sites (1/2) Groundwater Threats (1/2) Hazardous Waste (1/2) Impaired Water Bodies (1/2) Solid Waste Sites and Facilities (1/2)	X	Children and Elderly Low Birthweight Asthma Emergency Room Visits Educational Attainment Linguistic Isolation Poverty Unemployment	=	**CalEnviroScreen Score**

Data

We used the CalEnviroScreen 2.0 calculated Pollution Burden and Overall Score as indicators of Community Environmental Health. While some individual components of the Pollution Burden score overlap with other indicators in this Report Card, we believe the cumulative nature of this measure, as well as its spatial treatment of waste-related facilities, provide a unique contribution to the report card.

Figure 66 depicts the components and relative weightings. The overall CalEnviroScreen score was calculated from the Pollution Burden and Population Characteristics groups of indicators by multiplying the two scores. Since each group has a maximum score of 10, the maximum CalEnviroScreen Score is 100. Both scores are mapped using decile categories of percentile values by census tract, based on scores across the entire state of California. Populations are based on 2010 census values. Higher scores (redder color) indicate poorer environmental quality and greater vulnerability.

Findings

- Census tracts with the highest percentiles of Pollution Burden and Overall EnviroScreen Scores are widespread across the southern half of Los Angeles County, the area with the lowest income. As expected, these tracts correspond to major transportation corridors and industrial areas. They include tracts near the ports, south LA, Downtown LA, East LA, much of the San Gabriel Valley, and the Pacoima-San Fernando area. (Tables 44 and 45, Fig 67 & 68)
- Twenty-one percent of the County's population lives in census tracts ranking in the top (worst) 10% of Pollution Burden scores within the State, and over 80% of the County's population lives in census tracts ranking in the top half of Pollution Burden scores within the State (Table 1, Figure 2). Only 2% of the population lives in areas ranking in the lowest 10% of Pollution Burden scores. (Table 44, Fig 67)
- Over 19% of the County's population lives in census tracts ranking in the top (worst) 10% of Overall EnviroScreen scores within the State, and over 70% of the County's population lives in census tracts ranking in the top half of Overall EnviroScreen scores within the State (Table 2, Figure 3). Under 4% of the population lives in areas ranking in the lowest 10% of Overall scores. (Table 45, Fig 68)

Data Limitations

- CalEnviroScreen provides a relative ranking of communities based on a selected group of available datasets, through the use of a summary score. This score is not an expression of health risk.
- Further, as a comparative screening tool, the results do not provide a basis for determining when differences between scores are significant in relation to public health or the environment. Accordingly, the tool is not intended to be used as a health or ecological risk assessment for a specific area or site.

Table 44: Percentile Category of Pollution Burden

Score	Population	Percent of Population
0-10	234,785	2%
10-20	216,149	2%
20-30	211,351	2%
30-40	426,657	4%
40-50	739,370	7%
50-60	1,107,576	11%
60-70	1,467,345	15%
70-80	1,705,513	17%
80-90	1,856,652	18%
90-100	2,086,724	21%
Total	**10,052,122**	

Figure 67: CalEnviroScreen 2.0 Pollution Burden by Census Tract

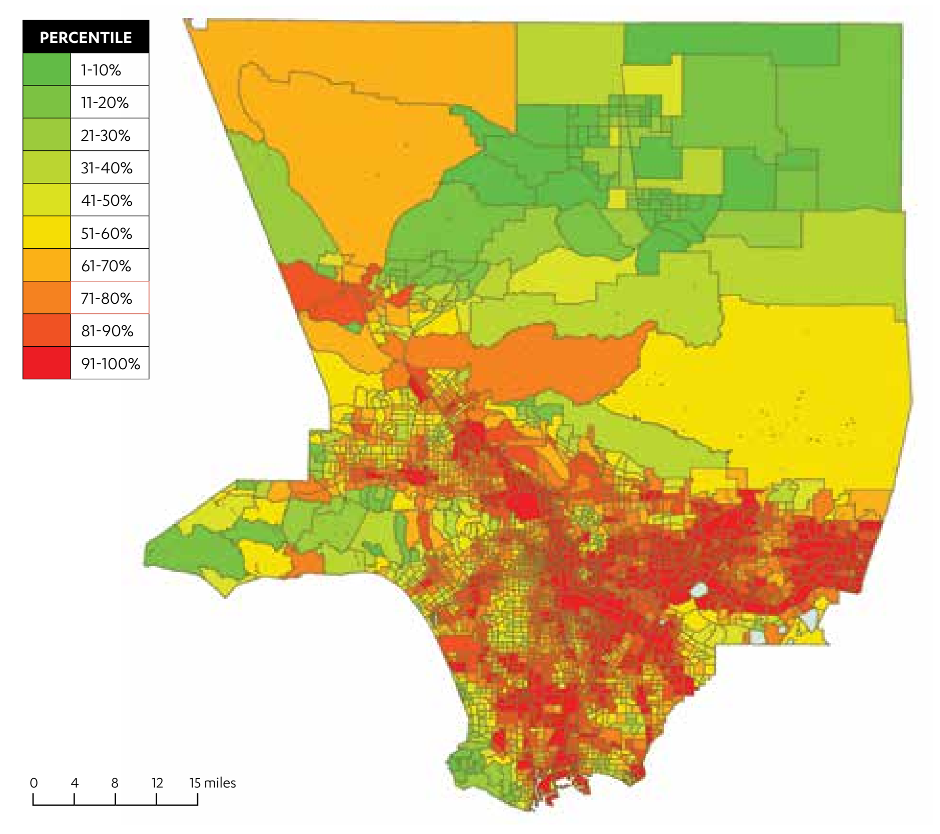
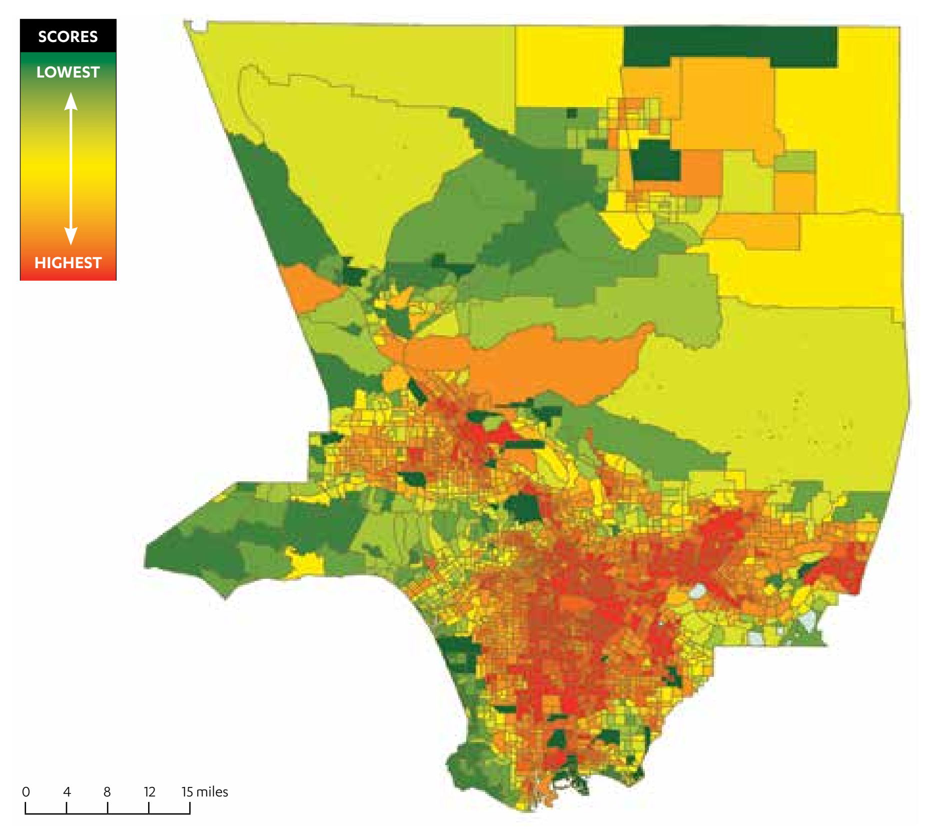


Table 45: Percentile Category of Overall CalEnviroScreen

Score	Population	Percent of Population
0-10	379,571	3.8%
10-20	431,491	4.3%
20-30	524,831	5.2%
30-40	761,258	7.6%
40-50	814,622	8.1%
50-60	887,559	8.8%
60-70	1,206,205	12.0%
70-80	1,344,352	13.4%
80-90	1,775,426	17.7%
90-100 (highest)	1,926,807	19.2%
Total	**10,052,122**	

Figure 68: CalEnviroScreen 2.0 Overall Scores by Census Tract



Grade for Environmental Quality of Life = C+

Based on the indicators we analyzed alone, the region would get a C grade or worse for environmental quality of life. However, there are many aspects of the region's quality of life that have improved dramatically over the last two decades. There have been substantial investments in parks through Proposition 12 and County Measure A, and through efforts from the Trust for Public Land, People for Parks, Amigos de Los Rios, North East Trees, Los Angeles Neighborhood Land Trust, and local and state conservancies and the Los Angeles Conservation Corps. Even measures like LA's stormwater bond, Proposition O, have added greatly to parks in a region surrounded by beaches and mountains.

Public mass transportation has improved dramatically with Federal investments and Measure R funds catalyzing numerous far-reaching projects. The vast majority of residents in the region live within walking distance of public transportation. City walkability is a challenge in many areas, but programs like Mayor Garcetti's Great Streets, and efforts in numerous coastal cities give one optimism that communities are becoming more welcoming to pedestrians. And the miles of bike lanes have increased greatly over the last five years as activists and CicLAvia have brought widespread awareness to the need for more bikeable communities.

But despite these numerous regional and local improvements in quality of life metrics, the region's traffic if often untenable and far too many people are living in areas with low EnviroScreen scores: a strong sign of poor environmental health in many communities. As such, the environmental quality of life score is a C+.

Overall Conclusions

Based on our analyses, the LA region will not be getting on the Dean's list for its first environmental report card. Grades ranging from C- to a B/I won't make anyone happy. However, the Environmental Report Card is our first effort so some of our indicators may not have best reflected how well the region is doing in each environmental category. Over the years, new indicators will be developed, new goals and targets will be adopted, we'll rely less on one time studies and old baseline data for indicators, and more objective grading approaches will be developed.

Although the region has experienced dramatic improvements in a wide variety of environmental areas over the last few decades, we still have a long way to go till there are safe, healthy neighborhoods for all of the region's residents and workers. At the end of 2013, UCLA Chancellor Block announced the university's first ever Grand Challenge – Sustainable LA through reaching goals of 100% renewable energy, 100% local water and enhanced ecosystem health by 2050 in all of Los Angeles County. In the first two categories, the trends are in the right direction, but they are definitely not at a pace that will achieve the energy and water goals. As for the biodiversity goal, we don't monitor LA County's ecosystems well enough to even make an assessment on our progress, but we do know that climate change, human population growth, and increasing urban development will make biodiversity conservation a tougher chore in 2050 than it is today. In future report cards, we will assess how well the region is moving towards achievement of these ambitious environmental goals.

The last year has demonstrated that there is the opportunity for tremendous environment and sustainability progress statewide and locally. In Governor Brown's 2015 State of the State speech, he announced five major climate goals: 1) By 2030, half of the state's electricity will come from renewable energy sources; 2) By 2030, energy efficiency savings will double; 3) By 2030, California will cut petroleum use by cars and trucks half; 4) California will aggressively reduce the release of methane, black carbon and other pollutants; and 5) The state will develop and implement programs that sequester carbon in natural and working lands. These announcements build on the Governor's successes of landslide approval of the Proposition 1 water bond, and considerable major action in response to his drought declaration and the California Water Action Plan.

Regional and local water delivering entities are working much harder to reduce water use across the board, and to plan for a dramatically different water regime in the future involving less reliability on external sources. In response to the state's drought actions, Los Angeles and Santa Monica have adopted bold water conservation targets of 20% in two short years. And the entire region, funded largely by the MWD, has initiated aggressive lawn replacement programs with rebates of up to $3.75 per square foot in the city of L.A., a gradual recognition of the region's unique Mediterranean climate and plants. Also, in April, Mayor Garcetti will release the city of Los Angeles' first ever sustainable city plan. The Sustainable City pLAn will encompass the environment, economy and social equity addressing issues including energy, water, climate, green jobs, and the city's biological resources.

The recent change in the County Board of Supervisors promises to ensure that environmental quality is coupled with greater attention to social equity. The Board of Supervisors recently added two Supervisors with long-standing environmental records: Sheila Kuehl and Hilda Solis. Kuehl has a long history of protecting Santa Monica Bay, the Santa Monica Mountains and better managing California's solid waste and water supply. Solis has a long environmental justice, toxics, and air quality history.

The Los Angeles Regional Collaborative for Climate Action is becoming the go-to place for information about policies cities can adopt to reduce their greenhouse gas emissions. The Metropolitan Transit Authority has bold projects on the drawing boards that will tie the region together more fully, including providing more transit access in and out of the Valley. Youth are flocking to Los Angeles as a place of tremendous opportunity. They are bringing their creative energy, building the Clean-Tech workforce, and exhibiting new transit and bicycle friendly attitudes. This means more local manufacturing as well, and there is a noticeable growth in "Made in L.A." products, from clothing to micro brews. The region is changing, and facing its challenges.

Recommendations for a Improved Report Card

While the ultimate aim of this report card is to effect positive change in the LA County environment, improvements in monitoring, tracking, data availability and setting strategic targets are critical drivers of that goal. Toward this end, we have identified some specific recommendations based on the challenges we encountered in our research that should help improve future report cards:

- County-wide plans should be established that identify short and long term achievement targets across the environmental indicators included here, as well as new indicators that together comprise a comprehensive vision for a future Los Angeles based on wide-reaching stakeholder input.
- The UCLA Sustainable LA Grand Challenge should establish milestones and deadlines for achieving the ambitious energy, water and biodiversity goals. These would help greatly efforts to assess environmental progress in the county.
- Water tracking by each water delivering entity, by month and by sector needs to be implemented so that trends over time can be assessed.
- We recommend improved recordkeeping and a county-wide, centralized data repository on the use of imported water and/or treated wastewater replenishment of groundwater basins, in order to better calculate and understand the extent to which truly local water comprises total use.
- We recommend improved transparency related to drinking water monitoring (required parameters and frequencies. Current requirement for Consumer Confidence Reports give rise to significant variation in the amount and quality of data provided to customers, and even at their best, still fail to provide a complete picture of the monitoring programs in place.
- We believe more frequent monitoring of drinking water is warranted for a range of contaminants including 1,4 – Dioxane which is prevalent in groundwater in concentrations above the MCL, but does not appear as a monitored parameter on any CCR we reviewed.
- There needs to be an overall groundwater monitoring program to assess groundwater quality regionally, with data easily identifiable to drinking water aquifers.
- GAMA's GeoTracker database should be improved to provide groundwater monitoring data search capabilities for specific date-bound time periods, rather than periods such as "the last 1 year", in order to provide repeatability, and should enhance search and data download functionality.
- An indicator based on an ongoing assessment of the countywide impacts of local petroleum extraction would strengthen the report card.
- The State Water Board's 303(d) Integrated Report should be provided in a format easier to analyze for extent of impairments and progress at various municipal levels (County, city). Specifically, there should be a fully integrated GIS database that contains data on all pollutants for which waterbodies are impaired.
- There needs to be a vastly improved system of County-level monitoring and consolidation of data on wildlife (including birds, insects, reptiles and amphibians, fish and plants, among others) as well as on habitat and land use changes.
- Municipal waste disposal and recycling recordkeeping and data availability should be made far more robust and transparent, and should enable disaggregation at the County and City level.
- The Department of Toxic Substances Control website should have more robust search functions and access to more complete information on waste generators (we understand that website changes are currently underway).
- Measures of park access would benefit from improved criteria that account for differences between single family and multifamily residences. Also, park, transit and bike scores for all individual cities across the county would be helpful.

Methodology

Indicators and Data Selection

Previous reports on environmental conditions in LA County have been based on just one or a limited number of indicators, or on assessments of only certain geographic areas within LA County. We believe it is important to look at the entirety of the County, to understand environmental conditions as they exist across the wide range of geographic and socioeconomic settings within this region.

We are also aware of various nation-wide and international indices that have been developed to compare cities on environmental and sustainability metrics. Such comparisons serve a purpose but, by their nature, these indices rely on high level data that can be readily obtained in similar form for each city and these are often not specific to a given country, state or county. This report card differs in that it is a detailed, research based effort using quantitative indicators, linked to compliance with Federal and State regulations where applicable, and designed specifically for Los Angeles County.

Gathering and analyzing data from numerous sources was the biggest challenge in developing the report card. Many of the factors that are critical to assess sustainability aren't measured on a routine basis, so we've included numerous recommendations on data that needs to be measured and reported on a regular basis to better assess environmental conditions and progress. Furthermore, there were certain datasets such as annual bird counts that we did not have the time or resources to analyze. These indicators will be added in future years. Also, although we've touched on social equity and economic issues within the report card, and they are clearly inseparable from environmental quality, this document's primary focus is on the environment.

We have used 22 different indicators, comprising over 40 measures, to grade the environment of Los Angeles County. Our criteria for an adequate indicator for an annual report card is that it must be based on data collected county-wide and at least annually, for topic areas that best reflect the state of the environment. For our first report card, those areas are: water, air, ecosystem health, waste, energy and greenhouse gases, and environmental quality of life. Our ideal criteria for inclusion in the report card were: county-wide, easily obtainable, quantifiable data for the 2013 calendar year; published by agencies, universities, or non-profit organizations; and updated on an annual basis. However, as the project developed, we found the need to make a number of exceptions.

In order to provide even a basic picture of conditions for some indicators, we had to use several one-time or periodic studies (e.g. coastal wetland losses, air toxics exposure). However, we were still left with little usable data for many aspects of environmental conditions, particularly in the Ecosystem Health Category. For example, many wildlife studies are conducted at small geographic scales which cannot be inferred to the county-level. At the other extreme, some studies, such as for migratory birds, were conducted at multi-state scales, making the data too complex to extract at the county level within a reasonable level of time and effort for this report. (Bird data is also often collected though citizen science initiatives, requiring specialized processing and statistical analysis to interpret.) In other cases, with help from agency staff, we were able to extract limited data from multi-county / regional reports that did not include separate county-level analyses (e.g. stream bioassessment monitoring from SCCWRP).

In a few cases, indicators had significant regional implications and we chose to broaden the geographic scope of those data. For example, we mapped 2013 wildfires both within and adjacent to the county boundary, and we included ambient air quality monitoring data for the entire South Coast Basin.

Other data sets searchable at the county-level still had significant limitations. In particular, the EPA's Toxic Release Inventory (TRI) data, which we used for portions of the toxic air emissions and hazardous waste indicators, reflects only a subset of facilities – those large enough to meet the reporting criteria. We chose to include TRI data for these indicators, since they provided additional local and facility-specific information not available through ambient air monitoring or State-level waste reports, but note there are important caveats.

Many data sets are not aligned to the calendar-year (e.g. receiving water monitoring data, which is conducted on a water-year basis). Furthermore, some information was not yet available for 2013 during the data collection phase of this project (e.g. CalRecycle data on City compliance with per capita disposal goals). In either case, the most recently available data was utilized in completing the report card analysis.

Many of the indicators we used for the report card were developed by government agencies, NGOs or other researchers. These groups spent considerable time and expense collecting and analyzing data to develop these indicators. Since they did an excellent job developing the indicators, and often there were no others, we decided to directly report the results rather than reanalyze the data. Examples include Heal the Bay's Beach Report Card grades for beach water quality, and the Trust for Public Land's park scores. Also, since this is UCLA's first comprehensive Los Angeles County environmental report card, we included historic data to provide baseline environmental conditions and to begin to establish trends. In the future, environmental report cards will focus more on the incremental changes in indicator values since 2013, the last full year of data for the majority of the indicators. In addition, we plan to add better indicators as they get developed, and to discontinue using those indicators that aren't providing a strong assessment on the state of a given environmental area.

Grading

Ideally, grades would be based on an objective system that takes into account how well the region is doing for each of the environmental areas, but we encountered numerous challenges to developing such an objective system for this first report card. There are many examples of approaches to multi-metric index development and grading, particularly in the water quality / bioassessment fields. However, such indices usually benefit from large data sets that help establish reference conditions and allow selection of the most meaningful component metrics using robust statistical tools. Grades can also be based on progress towards accepted environmental legal requirements or policy targets. This may be feasible for indicators such as ambient air quality or surface water quality. However, the majority of indicators are not tied to any environmental standards or legal requirements. Even those that are tied to standards, such as ambient air quality, pose an assessment challenge. The LA region's air quality has improved dramatically over the last 45 years, but the region is still frequently in non-attainment for ozone and PM10 standards. As such, how does one grade the region?

Grades could also be based on the achievement of regional environmental numeric goals, but in many cases those goals have not been established for Los Angeles County. Even where associated targets are identified, a grading scheme must still be developed to characterize conditions when targets are not being met (i.e. if zero exceedances is an "A," what exceedance levels are associated with grades B through F?). This, of course, raises thorny questions about what is clean enough, or qualifies for an A in a highly urbanized region. Environmental quality characterization is highly contentious and we will never return to a pristine state, even with aggressive policies and programs.

Furthermore, as we assembled indicators across a wide range of environmental dimensions, we recognized there are combinations of stressors, conditions and responses; for example, ambient air quality exceedances as well as toxic air emissions. These two indicators are not equivalent measures -- ambient air quality conditions will respond to changes in emissions levels (the stressor) – but they are also not redundant because the underlying data differ in many aspects, including the spatial density of the monitoring / reporting locations, and the specific air contaminants measured. As a result, we believe that it would not be appropriate to give them equal weight in an overall Air Quality category grade.

Because the bulk of our effort on this first report card focused on identification and quantification of indicators, we have used a less complex and more subjective grading approach. We have chosen to grade only at the Category level, rather than at the level of individual indicators, and have therefore issued six subjective grades, rather than 22 separate grades, based on the best professional judgment of the authors and taking the historical context into account.

We plan to develop a more objective approach through subsequent report cards. In addition, we hope to improve our ability to understand and account for the factors that contribute to variations in these indicators over time. For example, economic conditions may result in higher levels of industrial air emissions and hazardous wastes due to production increases, despite minimization activities and per-unit efficiencies.

The completion of the City of Los Angeles Sustainability Plan and the Sustainable LA UCLA Grand Challenge research plan (goals of 100% local water, 100% renewable energy and enhanced ecosystem health by 2050) may establish numeric targets that could be utilized in establishing a grading system for future report cards. We plan to solicit extensive feedback from government agencies, NGOs, academics, and business leaders on recommendations for better indicators, and goals and metrics needed to develop a more consistent and explicit grading system.

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The California Center for Sustainable Communities (CCSC) is a statewide University of California collaboration, funded and supported by the Public Interest Energy Research Program of the state Energy Commission. The Center conducts work on topics important to the transition toward greater urban sustainability, bringing together the leading edge researchers and centers from across several campuses. CCSC provides research, insights, data, methods, models, case studies, tools and strategies to address land use and transportation challenges facing California communities, and serves as a resource for policy makers, stakeholders and the residents of the state. Our mission is to assist the state's communities in the transition to greater sustainability on multiple fronts.

The Center is housed at UCLA and is a collaboration between the UC Berkeley's Center for Resource Efficient Communities, UC Davis Extension's Land Use and Natural Resources Program, UC Davis' Plug-in Hybrid and Electric Vehicle Center, UC Davis' Center for Regional Change, and UCLA's Institute of the Environment and Sustainability.

The Goldhirsh Foundation - LA2050

www.la2050.org

LA2050 is an initiative to create a shared vision for the future of Los Angeles, and to drive and track progress toward that vision.

LA2050 looks at the health of the region as it exists today along eight well-defined indicators of human development, and we've made informed projections about where we'll be in the year 2050 if we continue on this current path.

The condition of Los Angeles today matters because who we are and how we live now sets us on a course for who we will be and how we will live tomorrow. We are confident that with your help, we will shape the LA story anew – and build the LA2050 of our dreams.

Sustainable LA – Thriving in a Hotter Los Angeles Grand Challenge

www.grandchallenges.ucla.edu

UCLA's first campus-wide Grand Challenge Project, Sustainable LA – Thriving in a Hotter Los Angeles is designed to accelerate a solution to the seemingly unsolvable societal problem of sustainability in the Los Angeles region through a mega, multidisciplinary research effort. The purpose of this effort is to align interdisciplinary groups of scientists and scholars around the goal of developing a plan by 2020 to transition the Los Angeles region to 100% sustainability in energy, water, and biodiversity by 2050. More than 140 UCLA faculty from dozens of campus departments are involved, including several faculty associated with the UCLA Water Resources Working Group. Thriving in a Hotter Los Angeles will strengthen partnerships with stakeholders and galvanize the next generation of leaders committed to improving the region's environment, economy and social equity – serving as a model for other urban areas.

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