



# Bay Area Monitor

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A Bimonthly Review of Regional Issues

## Regional Vote on Bay Restoration?

By Alec MacDonald

Regional governance in the Bay Area tends to keep a low profile. Most inter-county agencies just don't attract as much attention as those operating on the local and state levels. One regional agency in particular has stayed virtually invisible over its short lifespan, but in an intriguing turn, it could soon generate sweeping publicity with a move that's never been tried here before.

The San Francisco Bay Restoration Authority was established in 2008 to "raise and allocate resources for the restoration, enhancement, protection, and enjoyment of wetlands and wildlife habitat in the San Francisco Bay and along its shoreline," according to its founding legislation, Assembly Bill 2954 (Lieber). The authority has remained inconspicuous ever since for the simple fact that it hasn't yet raised any resources to allocate; according to the State Coastal Conservancy's Amy Hutzel, "The authority has not had any funding — no funding at all — for the last six years."

Hutzel, her colleagues at the conservancy, and employees of the Association of Bay Area Governments have been fulfilling the authority's staffing needs at no charge while its board and advisory committee work on procuring a funding source. Early on, the authority decided a region-wide parcel tax represented the most viable option, and began preparing to submit the idea to the voters. Now, with the economy having crawled back from recession into recovery, the November 2014 election could be an opportune time to ask the public for financial backing.

Backing for what, exactly? Well, after the California Gold Rush transformed this region into a commercial and industrial hub, the San Francisco Estuary suffered massive ecological degradation and lost some 95 percent of its original wetlands.

Experts believe that at least 100,000 acres of wetlands should encircle the estuary, but it's currently



Estuary proponents would like to see more funding for wetlands restoration.

*photo courtesy of Save the Bay*

surrounded by less than half that amount. The authority hopes to boost the existing acreage, among other goals, by drawing on an estimated \$15 million in annual parcel tax revenue.

The money could help pay for restoration activities around the rim of the San Francisco, Suisun, and San Pablo bays, as well as along the Carquinez Strait and much of the northern edge of Contra Costa County, enhancing sites like the South Bay Salt Ponds, Yosemite Slough, Breuner Marsh, Hamilton Airfield, and the Bel Marin Keys. Hutzel said that efforts to improve and expand wetlands habitat could prevent the extinction of the California clapper rail and the salt marsh harvest mouse — two endangered animals found only in this region — while also benefiting migratory ducks and shorebirds, steelhead trout, salmon, Dungeness crab, and "a lot of the aquatic species that make up the base of the food chain." Besides addressing habitat needs, funding would go toward removing pollution, bolstering flood protection, and increasing public access to the shoreline, with no more than 5 percent reserved to cover administrative costs.

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## Regional Vote on Bay Restoration? (from page 1)

Carrying out this ambitious agenda won't mean starting from scratch. For the past 15 years, the State Coastal Conservancy has collaborated with various partners to acquire land, develop plans, and initiate restoration projects. The budget for these undertakings has been drying up, however; Hutzel said not only is her agency "running on fumes at this point," but that "it's also been challenging to bring federal dollars to bear." Therefore, "we're looking to a regional measure to be able to continue the work," she explained, adding that the new revenue stream created by a prospective parcel tax would yield opportunities to leverage matching grants while also providing for greater spending flexibility.

Of course, any talk of such revenue is purely speculative at this point. The authority's board has not yet decided whether to place the parcel tax measure on the November 2014 ballot. And even if the measure ends up going before the voters — either this fall or in a subsequent election — they might not provide the two-thirds majority necessary to pass it.

Once the board does commit the measure to an upcoming ballot, responsibility for coordinating the attendant campaign would likely fall to Save the Bay, which sponsored the authority's founding legislation in the first place. In the meantime, the nonprofit organization has been facilitating preliminary stakeholder outreach. Save the Bay's Patrick Band reported that "we've sat down with every state and federal elected in the Bay Area, the vast majority of county supervisors, community organizations representing businesses, representing the environment, representing organized labor... and had a conversation about what the

authority's plans were."

Along the way, they have compiled a substantial list of supporters while receiving "a lot of very enthusiastic feedback thus far," Band claimed.



**Wetlands restoration could save the endangered California clapper rail.**

*photo courtesy of dansullivanimages.com*

Although authority insiders and outside interests have deliberated over this issue at length, several key details are still pending. Precisely how much tax parcel owners would need to pay, for example, has not been determined. Band maintained the cost would run between nine to 14 dollars annually, a range well below parcel taxes typically assessed for school, fire, or sewer districts. "Comparatively this is a very, very small amount of money — nine bucks a year to restore San Francisco Bay is a steal at twice the price," he contended.

Will voters agree? The Bay Area faces myriad concerns — environmental and otherwise — worthy of a helping hand, so why award funding priority to wetlands restoration? The authority's allocations would have a positive impact on the region as a whole, but won't communities closer to specific projects benefit disproportionately? And most fundamentally, does approving any tax increase, no matter how minor, encourage the government to continue dipping into the public's pocket without restraint?

Authority proponents will eventually need to wrangle with such difficult questions. Resistance is inevitable, and all sorts of logistical challenges await as well. As Band said, "Obviously, running a nine-county Bay Area measure of any kind is a big lift. It's a lot of work. It's never been done before."

And, if it goes forward, it should be interesting to watch. ❖

*Alec MacDonald is the editor of the Bay Area Monitor.*

### **Bay Area Monitor**

1611 Telegraph Avenue  
Suite 300  
Oakland, CA 94612

[www.bayareamonitor.org](http://www.bayareamonitor.org)

Marion Taylor  
LWVBAEF President

Alec MacDonald  
Bay Area Monitor Editor

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For more information, call (510) 839-1608 or e-mail [editor@bayareamonitor.org](mailto:editor@bayareamonitor.org).

## Know Your Ballot History: Regional Measure 2 Turns Ten

By Leslie Stewart

Caldecott Fourth Bore? Check! Clipper Card? Check! Ferry service to South San Francisco? Check! Construction of BART and SMART lines? On track. Dumbarton rail? Um, we'll get back to you on that...

Ten years into the transportation funding plan created by Regional Measure 2 (RM2), planners are taking stock of progress. In March 2004, a cumulative majority of voters across seven Bay Area counties approved the ballot measure, adding \$1 to tolls on the region's seven state-owned bridges to generate \$125 million in annual funding for transportation improvements.

The ballot measure was authorized by state legislation — 2003's Senate Bill 916 (Perata) — and according to the ballot pamphlet sent to voters prior to the election, featured a “balanced set of transportation projects in the bridge corridors that include new mass transit choices and critical highway improvements at key regional bottlenecks.” The list was hammered out in hours of public meetings, with a goal of balancing geographic areas, transportation modes, and “poster projects,” and the work paid off. Ezra Rapport, now executive director for the Association of Bay Area Governments, was a key Perata staffer for SB 916. He noted recently that when the measure went to the voters, “The percentage of approval by bridge and non-bridge users was about the same.” It passed in all seven counties except Solano.

Local agencies and transit districts sponsor the projects and programs funded by RM2. It's up to them to plan the projects or define the programs, and to apply to the Metropolitan Transportation Commission for funding approval. By April 2013, 60 to 70 percent of funding for 37 RM2 capital projects was on track, with many projects already completed. However, sponsors for 14 projects — including Capitol Corridor stations in Vallejo and Fairfield/Vacaville, AC Transit Enhanced Bus Service, Berkeley/Albany commute ferry service, and southbound HOV lanes on I-680 — had not yet submitted plans for committing funds.

### PLAN HIGHLIGHTS FROM RM2 BALLOT PAMPHLET (DOLLAR AMOUNTS IN MILLIONS, YEAR 2002 VALUE)

New Mass Transit Options	
BART extension to Warm Springs and to Oakland International Airport	\$125
BART connection to East Contra Costa County	\$96
Dumbarton Bridge rail service linking Union City and Millbrae BART stations	\$135
Sonoma-Marin commuter rail extension to Larkspur/San Quentin	\$35
Comprehensive regional express bus network	\$171
Ferry service to San Francisco from East Bay, North Bay, and Peninsula	\$84
Traffic Bottleneck Relief	
Improvements to Interstate 80/Interstate 680 interchange	\$100
A new fourth bore for the Caldecott Tunnel	\$51
Eastbound Interstate 80 carpool-lane gap closure at Carquinez Bridge	\$50
U.S. 101 interchange improvements at Greenbrae	\$65
Seamless and Safe Transit Connections	
BART transbay tube seismic strengthening	\$143
New Transbay Terminal in San Francisco	\$150
Implementation of a universal transit fare payment card	\$42
Real-time transit information	\$20
Better access to mass transit for pedestrians and bicyclists	\$22
Vallejo intermodal terminal, linking express bus and ferry service	\$28

Craig Bosman, MTC staff, said, “We asked [sponsors] to respond by September 2013 on how they were planning to use the RM2 funds.” This nudged at least one agency into action, as Marin's transportation agency rapidly approved a proposal for Highway 101 Greenbrae interchange improvements.

Bosman is preparing an implementation strategy for review by MTC's Programming and Allocations Committee on February 12. He reported he's been “spending a lot of time” on the responses, and “there is more development to be done with sponsors.” He suggested, “Money is likely to stay with the projects where at least some allocations have already been made,” such as Alameda/Oakland/Harbor Bay commute ferry service and the Express Bus North project where money has been committed to the Benicia park-and-ride facility.

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## Regional Measure 2 Turns Ten (*from page 3*)

However, the strategy might also remove funding from some dormant projects and allocate it elsewhere. The process for transferring funding is defined in the original legislation; it guarantees that the funds will be spent according to the original intent of RM2 while giving flexibility to respond to changes in regional transportation needs.

One project on Bosman's list has already been involved in a funding shift. In 2009, amid some controversy, commissioners decided to temporarily move \$91 million from the Dumbarton rail project to the BART Warm Springs extension to address cash flow needs. David Schonbrunn, founder of TRANSDEF, a transportation watchdog group, opposed the funding shift. He recently explained, "The number one problem in Bay Area transportation is the shortage of transbay capacity on BART. Rail across the Dumbarton could provide capacity for ACE commuters and other riders from the East Bay into the Caltrain corridor," while other options are explored for increasing capacity across the Bay.

In addition to the capital projects, the ballot measure included funding for 14 operating projects. Jeff Hobson, deputy executive director at the nonprofit TransForm, noted that "lots of the transit that crosses the Bay is funded by RM2." He believes "RM2 funded some ongoing projects that really needed to be funded, like Safe Routes to Transit for ten years. We just committed the final segment. It's been really effective in letting jurisdictions put together projects that otherwise would have gone begging for funding."

MTC conducts annual performance reviews of transit operations funded by RM2. The agency's Theresa Romell explained, "If progress is slipping, the commission has two

options: to give extra time, or to decommission the project." She cited the BART Owl Service bus as an example of a program that was defunded for not meeting ridership goals. "We either redistribute the funds to similar projects or hold them for consideration for another project that meets RM2 goals," she confirmed.

The success of RM2 in delivering the promised improvements around the region already seems clear, even if some projects don't develop as planned. Hobson asserted, "There are a lot of things in there that wouldn't have happened without it or wouldn't have happened as quickly." Rapport agreed: "There's a critical shortage of funds for transportation in key regional corridors, and RM2 has been invaluable for improving transportation expansion and capacity in those corridors." He added, "But it's only one piece — county 'self-help' expenditure plans are the other piece."

If anyone looks to authorize a similar regional measure in the future, RM2's track record will be something to take into account, while keeping in mind that it was not intended as the sole source of funding for most of its projects. On the whole, it served well in augmenting or jump-starting other funding sources.

Hobson acknowledged that RM2 "had some pieces we don't like, such as the Oakland Airport Connector," but blamed some implementation problems on factors that were not part of the ballot measure. He concluded, "RM2 was definitely a significant accomplishment for the Bay Area — it needed to happen." ♦

*Leslie Stewart is the former editor of the Bay Area Monitor.*

### **MTC SEEKS NOMINATIONS FOR TRANSPORTATION AWARDS**

When it comes to transportation, the Metropolitan Transportation Commission wants to know: What moves you? Has an organization or company in your community worked hard to promote alternatives to driving alone, improve public transit, or encourage climate-friendly behaviors? Are you impressed by innovative activities that promote efficient use of the transportation network or wowed by local efforts to calm busy streets? Is your bus driver exceptionally friendly and helpful? Now is your chance to nominate a person, project, or organization for an MTC Excellence in Motion Award.

Winners will be selected by a jury representing MTC and the community. Nominations may be submitted online at [www.mtc.ca.gov/about\\_mtc/awards/index.htm](http://www.mtc.ca.gov/about_mtc/awards/index.htm). To obtain a paper nominating form, send an e-mail to [info@mtc.ca.gov](mailto:info@mtc.ca.gov) or call (510) 817-5757. The deadline for nominations is Monday, March 31.

For the past 36 years, MTC's Excellence in Motion Awards Program has recognized individuals, projects, and organizations that have had a positive impact on transportation in the nine-county region. Past winners include the Ed Roberts Campus in Berkeley, for showcasing transit-oriented development that allows the disabled access to vital transit and other services; Safe Routes to Schools, for educating the next generation to make environmentally friendly transportation choices; Fannie Mae Barnes, who broke through a long-entrenched gender barrier to become the first female cable car grip for San Francisco Muni; and Safeway Inc., for converting its entire truck fleet to biodiesel fuel that helps reduce greenhouse gases. Recognition also has gone to volunteers, community leaders, and government employees dedicated to improving transportation for Bay Area residents. The awards are conferred every two years.

## Students Engage Sustainability Issues through Service Learning

By Quynh Tran

Students across the Bay Area are receiving hands-on lessons in environmental stewardship thanks to a local nonprofit organization's partnerships with high schools and government agencies.

Strategic Energy Innovations in San Rafael has been supporting high school student participation in action-oriented, project-based service learning that promotes sustainability, cultivates youth leadership, and correlates to curriculum standards. It recently received a \$96,000 grant from the State Farm Youth Advisory Board to expand its work with San Francisco's Gateway High School, San Rafael High School, and the Marin School of Environmental Leadership (MarinSEL), as well as to begin work with Skyline and Castlemont high schools in Oakland, Lincoln and Downtown high schools in San Francisco, and Berkeley High School.

Students will design and launch sustainable enterprises; conduct sustainability audits for local businesses; conduct school waste, water, and energy audits; and conduct school solar assessments, said Emily Courtney, SEI's K-12 education program manager.

"Students will develop real-life job skills and experience the rewards of a career that benefits their community," she said.

At Gateway High School, students are conducting water and energy audits to learn the benefits of water conservation and its connection with energy use and the climate. They investigate the water flows in energy production and the energy flows in water pumping, treatment, and distribution. They calculate water consumption to identify strategies for water conservation. The goal is for students to understand the real cost of water use and to adopt water-saving techniques.

At San Rafael High School, SEI's staff is working with the school's Green Team to help recycling and waste reduction become the norm on campus. Students are also focusing on conducting a school energy audit and solar analysis under the guidance of physics teacher Steve Temple.

At MarinSEL, students created their own sustainable enterprise business plans, which they presented to an "investor" panel of community business leaders. Some of their

sustainable enterprises included Be Green Bracelets, Sprouting Gardens, Reclaimed Wood Designs, Organic Clothing, Eco Dog Toys, Karma Kookies, Butterfly's Closet, and the Ecoville board game.

The service projects will also help local school districts plan for their energy efficiency retrofits using Proposition 39 funding, which California voters approved in 2012 to tax out-of-state corporations to fund clean energy job creation. This year about \$381 million will be directed to California schools for energy efficiency retrofitting. California will invest \$2.5 billion dollars in school energy retrofitting over the next five years.

The State Farm grant allows SEI to build upon its experience with energy districts such as San Diego Gas & Electric (SDG&E) and the Sacramento Municipal Utility District (SMUD), which helped it to train students. The projects helped local schools maximize their energy retrofit efforts.

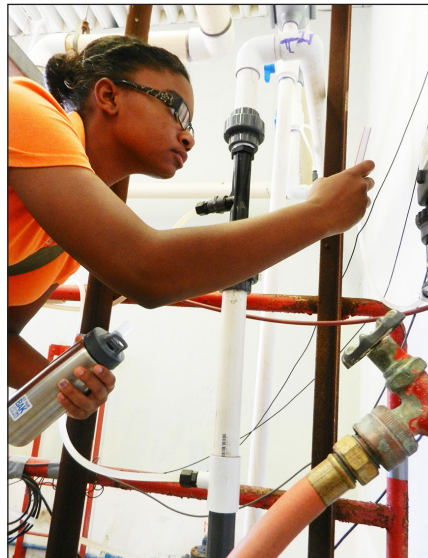
For example, SMUD provided an additional subsidy to school districts to adopt the student retrofit recommendations, in addition to the standard rebates and incentives offered.

(SMUD's extra subsidy comes from the sale of excess permits under the cap-and-trade program established through California's Global Warming Solutions Act of 2006.)

After an energy audit at Natomas Charter School last fall in Sacramento, students recommended that the school replace old appliances with Energy Star rated appliances; replace magnetic ballasts with electronic ballasts; install light-emitting diodes in all exit signs; and upgrade heating, ventilation, and air conditioning units to those with a higher seasonal energy efficiency ratio value.

"We provide technical services to schools while helping students develop leadership skills," said Courtney. "Students are able to compare their work with professionals."

Partner schools also receive access to SEI's complete high school curriculum library and extensive teacher support. Courtney said teachers are able to tailor the curriculum to each classroom's needs as well as align it with the Common Core and Next Generation Science Standards. Teachers or



**A student checks a pool pump as part of an energy audit conducted through SEI educational programming.**

*photo courtesy of SEI*

## Students Engage Sustainability Issues (*from page 5*)

coordinators at the partnership schools also receive a \$500 stipend.

However, while the grant allows SEI's sustainability expertise to reach more high schools, local teachers still face challenges that SEI cannot address. For example, because SEI trains teachers primarily during school hours or afterschool,

"teachers just don't have enough time for the training," Courtney said. "They don't have release time for professional development." ❖

*Quynh Tran is a writer and communications professional based in the East Bay.*

## From Drain to Grid: Transforming Wastewater into Energy

By Beth Hillman Tagawa

Each time we flush the toilet, brush our teeth, take a shower, or use the garbage disposal, we don't typically think about the final destination of what goes down the drain. Pumped through a system of pipes, our daily waste ends up at a wastewater treatment facility, of which there are 40 in the San Francisco Bay Area.

Traditionally, the process that happens next — the treatment of waste to remove chemicals and prepare it for reuse — has been an energy-intensive one. However, researchers are making strides toward developing new systems aimed to reduce the amount of energy used for waste treatment — and even make the process energy-positive.

The Delta Diablo Sanitation District in Antioch is currently supporting two groundbreaking research projects that have the potential to result in new technology for treatment of biosolids and wastewater. Such technology could have a global impact by making the treatment process more environmentally friendly.

There is a pressing need for such innovation, since our increasing population will produce all the more waste in the future. And, with the advent of stricter government regulations — such as California's Global Warming Solutions Act of 2006, which requires a major reduction in greenhouse gas emissions by 2020 — wastewater facilities like Delta Diablo need to reconsider their traditional systems, according to Angela Lowrey, spokesperson for Delta Diablo. Biosolids have conventionally been used for soil amendment and landfill cover. "It's already a resource, but it's got more potential," Lowrey said.

As such, Delta Diablo has taken a proactive stance toward research and adopted the role of "an incubator for exploring new technologies," Lowrey said.

"The way we're doing business is not sustainable," she said. "So we can wait until we get up one day and we're regulated and we must do this, at the cost of millions of dollars, which we must pass along to customers. Or we can say, 'Hang on a moment. Are there other ways we can start

looking at the viability and benefits that wastewater has to our community?'"

One of the current research projects aiming to answer that question involves testing a technology that converts wet biosolids into hydrogen gas. Scientists then feed the gas into fuel cells that produce electricity.

A partnership with Lawrence Livermore National Laboratory and Florida-based Chemergy Inc., the project is funded in part by a grant from the California Energy Commission and sponsored by Bay Area Biosolids to Energy (BAB2E), a coalition of 19 San Francisco Bay Area public agencies responsible for wastewater treatment.

BAB2E — whose members include agencies in Marin, Burlingame, Livermore, Millbrae, Richmond, San Jose, Santa Rosa, San Ramon, San Mateo, Sausalito, and San Francisco, among others — was created precisely to explore ways of further utilizing biosolids to generate sustainable energy resources.

According to a Lawrence Livermore press release, the project leader for the collaboration anticipates that, in a year, the treatment plant will be processing one ton per day of wet biosolids and producing up to 30 kilowatts of electricity, which will be used to power select functions at the plant.

The other project at Delta Diablo, led by Stanford's Dr. Yaniv Scherson, tests a process that both removes nitrogen from wastewater and recovers energy.

The main components of wastewater are organics and nutrients. Organics are typically converted into energy as biogas and can be burned to generate electricity. But no process has been developed for recovering energy from nutrients. Instead, a lot of energy has been invested in getting rid of nutrient components — mostly nitrogen and phosphorus — through removal processes, Scherson said.

Nitrogen in particular can wreak havoc on the environment if not fully removed, Scherson said, and problems related to nitrogen in wastewater are a global challenge.

"We're at a point where, in many places, it's so severe



that water quality is so majorly impaired,” Scherson said. “On a regional level, there is a lot of nitrogen being discharged into the San Francisco Bay and it has been causing a lot of problems for aquatic ecosystems for many years.”

Scherson’s method of wastewater processing converts the nitrogen in the wastewater to nitrous oxide gas and then uses it for methane combustion, removing the nitrogen and, at the same time, generating energy.

This process, Scherson added, “flips the thinking on nitrous oxide,” a powerful greenhouse gas, by actually using it to recover energy.

After first initiating the project four years ago and testing the system on synthetic wastewater, the team has since undergone a successful bench-scale system and is now undertaking the yearlong pilot project with Delta Diablo, after which Scherson said they hope to launch a full-scale commercial test.

This type of research is much more common in Europe,

Scherson said, adding that advances in technology haven’t been as well funded or aggressively pushed in the United States. Given that wastewater treatment technologies in the United States have traditionally been energy-intensive, Scherson said

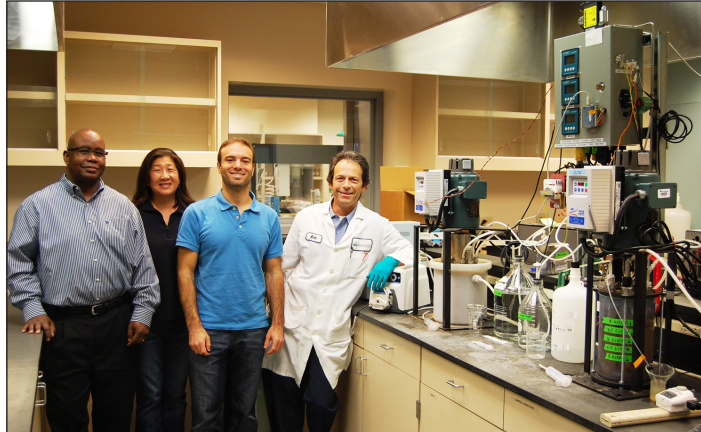
it’s understandable that the process might not be thought of by the public as a viable renewable energy resource, like solar or wind power.

But Scherson believes that this attitude will change.

“It really is the ultimate renewable energy source,” Scherson said. “Unlike solar and wind, it’s close to the end users. It’s delivered in a constant flow all throughout the year and all throughout the day. It has to be done to protect the environment and

it produces freshwater... If we can reuse water and clean it in a net energy-neutral or even energy-positive way, that feels like a remarkable process.” ❖

*Beth Hillman Tagawa is an editor and freelance journalist living in San Francisco.*



**Darrell Cain, Amanda Roa, Yaniv Scherson, and Bill Svoboda are working on a process to remove nitrogen from wastewater while recovering energy.**

*photo courtesy of the Delta Diablo Sanitation District*

## Black Carbon: Particulate Matter’s Darkest Side

By Chris Ingraham

As names go, “black carbon” may sound like a sleek new product in design technology — a composite for an unbreakable set of skis, maybe, or an ultramodern material for a lightweight car — but the reality is far more worrisome. An especially baleful type of particulate matter, black carbon is formed when fossil fuels, biofuels, and biomass incompletely combust. Those dark aerosol clouds you see spewing from smokestacks or trucks and eventually strewn over snow or other places that used to be clean? That’s black carbon. Many call it soot — but that doesn’t sound as sleek.

Recently, black carbon has been the focus of government efforts to determine the nature of its dangers for climate warming, human health, and our ecosystems. Recent reports by the U.S. Environmental Protection Agency and by the Bay Area Air Quality Management District’s Advisory Council both found that black carbon is, in fact, a major culprit of the increasingly exigent climate and health problems in need

of attention in years ahead. As policy makers the world over continue looking for the most efficient ways to resolve such concerns, the turn to black carbon suggests a growing consensus about at least one target worth addressing for the common good.

By mass, black carbon is the most strongly light-absorbing kind of particulate matter, so it makes the atmosphere retain heat that would otherwise be dispersed or reflected away. Also, when deposited on snow or ice, black carbon increases their light absorption as well by reducing the natural reflectivity — or “albedo” — that makes snow and ice so essential to keeping the planet cool. And if that weren’t bad enough, black carbon reduces the ability of clouds to absorb and reflect solar radiation. On the whole, its undeniable influence makes black carbon second only to carbon dioxide in its consequences for climate change.

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 PHONE: (510) 839-1608 / FAX: (510) 839-1610  
 E-MAIL: EDITOR@BAYAREAMONITOR.ORG

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## Black Carbon: Particulate Matter's Darkest Side (*from page 7*)

Unlike carbon dioxide, however, which stays active in the atmosphere for anywhere between five years to two centuries, black carbon is considered a “short-lived climate pollutant,” meaning it has an atmospheric lifetime ranging only from days to weeks. One implication of its short lifespan is that policies that reduce black carbon emissions will have a more immediately observable impact on global warming than policies directed more specifically toward reducing carbon dioxide emissions, though the latter have been a predominant focus of environmental policy to date given carbon dioxide’s majority share of responsibility for a changing climate. Now, that trend might be shifting. Indeed, this past December the Air District’s board of directors received strong advice from its Advisory Council to make short-lived climate pollutants, and black carbon in particular, the focus of its climate protection strategies going forward.

But protecting the climate is not the only reason to concentrate on black carbon. Black carbon also shows evidence of being dangerous for human health and ecosystems. Its long and short term health effects range from acute respiratory conditions, cardiovascular illness, and even premature death, to the visibility or dizziness problems known to anyone who has seen the hazy shroud of a polluted day. And, although

black carbon has been linked to creating more fertile soil in some tropical regions, in other places it has been shown to reduce agricultural production and to damage the flora.

With biomass burning and transportation emissions serving as the world’s primary sources of black carbon, our ecosystem and our public health here in the Bay Area are both particularly vulnerable, as we have more than our fair share of wood smoke and diesel pollution. Fortunately, statewide, California is already ahead of the curve with its policies directed toward black carbon reduction. Diesel engine controls, clean-car regulations, and burning restrictions have made black carbon contribute only 11 percent of the state’s estimated impact on climate change as projected by a 100-year global warming prognosis — compared to a 23 percent impact of black carbon on the same prognosis globally. Nevertheless, 2014 and the years to follow may well see continued efforts more widely and strictly to regulate biomass burning and diesel engines in the region, alongside refortified monitoring programs that follow black carbon’s prevalence and influence in the Bay Area. ❖

*Chris Ingraham works as a freelance writer while completing his Ph.D. in rhetoric.*