

Thoughts on the San Francisco Bay Bioregion

"The first treasure California began to surrender after the Gold Rush was the oldest: her land."

-John Jakes



The San Francisco Bay Bioregion, which encompasses the entire San Francisco Bay Area and Sacramento-San Joaquin River Delta, is known throughout the world as a region of beauty, culture and geographic diversity. Its glorious coastlines, wine producing vineyards, majestic redwoods, and iconic Golden Gate Bridge are legendary.

Despite - and perhaps because of - its popularity, the San Francisco Bay Bioregion has a long list of ecological enemies. Industrial pollution, sea level rise, habitat loss and fragmentation, invasive species, water diversions and loss of wetlands are just some of the region's mounting threats.

Are the region's ecosystems as valued as its recreational sites, agricultural products and cultural icons? What is being done to help the San Francisco Bay Bioregion combat these threats? Join us as we head west and try to find out.



We'll begin by interviewing two experts on the Bioregion. First we chat with [Dr. Matt Kondolf](#), a professor of environmental planning at UC Berkeley and a world-renowned fluvial geomorphologist. Dr. Kondolf shares some insight - and alarming facts - about the dynamics of the Bioregion's river systems. We also talk with [Mr. Rick Rayburn](#), chief of natural resources for California State Parks. Mr. Rayburn tells us about the San Francisco Bay Bioregion's rich biodiversity, and efforts to sustain that biodiversity in the face of climate change.

In [your responses to our reader survey](#), 90% of you agree on what you consider to be the number one threat to biodiversity in the San Francisco Bay Bioregion. Find out what that is, and take a look at some of your other thoughts and questions about the San Francisco Bay Bioregion.

Leaf Litter

Winter Solstice 2008

Restore the Earth and Inspire Ecological Stewardship

www.biohabitats.com

Vol. VI

Edition 5



In her article [What's In A Leaf](#), landscape architect Allegra Bukojemsky, officially unveils " and draws a personal connection to - the leaf that will adorn the logo of the Biohabitats San Francisco Bay Bioregion office she leads.

For those of you who want to explore the San Francisco Bay Bioregion in more detail, we've provided lots of helpful links in the [resources](#) section of Leaf Litter. Finally, [catch up on the latest at Biohabitats](#).

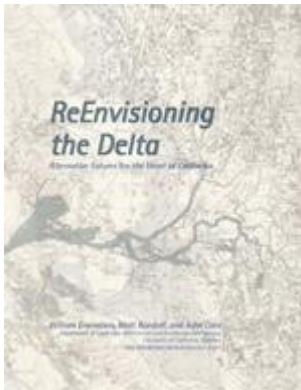


As always, we want to know what you think. Share your thoughts on Leaf Litter by [contacting our editor](#).

Leaf Litter Talks with Dr. Mathias Kondolf

Professor of Environmental Planning
University of California Berkeley

We were thrilled to have an opportunity to chat with Matt Kondolf, an internationally recognized expert in aquatic system dynamics and river restoration who has conducted much of his research in the San Francisco Bay-Delta Bioregion. Dr. Kondolf is Professor of Environmental Planning at the University of California Berkeley, where teaches courses in hydrology, river restoration, and environmental sciences. He is a fluvial geomorphologist who has been involved with numerous programs and studies pertaining to river systems in the Bioregion and beyond.



Dr. Kondolf was a co-author of the [CALFED Ecosystem Restoration Program Strategic Plan](#) and served on the program's science board until 2005. He developed the restoration flow regime for the San Joaquin River below Friant Dam, which was adopted in recent settlement negotiations to restore salmon in the San Joaquin. He co-authored the report *ReEnvisioning the Delta*, and as chair of the board of the [UC Berkeley Delta Initiative](#), organized a 2006 symposium on urbanization of the Sacramento-San Joaquin Delta, its potential impacts, and alternative futures.

Dr. Kondolf was also a principal investigator in the [National River Restoration Science Synthesis project](#), a national-level study of river restoration. He is a member of the Federal Interagency Levee Policy Committee and the National Research Council Committee on Hydrology, Ecology, and Fishes of the Klamath River Basin. He also serves on the Environmental Advisory Board to the Chief of the US Army Corps of Engineers.

From an ecosystem perspective, what do you think makes the Bay Delta region so special?

San Francisco Bay itself is one of the largest estuaries on the West Coast. The upper part of the estuary is the San Joaquin Delta, which, historically, was a very productive area ecologically. But this area has been wholly transformed, with the reservoirs on most of the rivers altering flow regimes, sediment load and access to upstream habitat. You also have the largest population concentrated in the lower part of the estuary.

The region is also an interesting place in that the climate, overall, is Mediterranean, yet we have these salmonid fish species, which are not Mediterranean. In a way, these fish are relics of the Pleistocene, during which they spread, extending their range from Baja, California all around the Pacific Rim to Japan. So [the San Francisco Bay Bioregion] is an unusual area ecologically, as it's the southern limit of many of these salmonid species, and with this Mediterranean climate, the fish were already on the edge. Now, with tremendous pressures for water diversion, alteration of catchment areas for urban and agricultural use, and alterations to physical and ecological processes, well, you have quite an exciting mix of factors.



This is also an area in which the populace tends to have a very high environmental awareness and motivation to improve and restore the environment broadly.

Let's talk about these "pressures" for a minute. What do you see as the biggest challenge(s) to the region over the next decade?



There are two big trends. One is continued expansion of population and how we handle that. Up to the present, we have not done a very good job. We have allowed the real estate market to drive many of the development patterns. It's not even a pure market because certain things, such as highway construction and delivery of water in this region, are highly subsidized. So we have these incentives toward sprawl. Sprawl creates a whole set of problems, such as air pollution and urban runoff. Because of the economics of developing in marginal areas, it also presents a huge incentive for developers to go to places like the Sacramento/San Joaquin Delta, where they can buy land that is relatively cheap and build subdivisions that appeal to people who work in the metropolitan

region but can't afford to buy a house in the city or nearby suburbs. Up until the recent crash, people were motivated to pay very high prices for houses that were in areas like the Sacramento/San Joaquin Delta, many of which are below sea level or, if above sea level, are in floodplains that would be inundated by ten feet of water during a 100-year flood.

The other challenge is how we manage water in coming decades, especially in light of the changing climate. The water problem in California has often been characterized as one of shortage. In fact, we have a lot of water, but its distribution in time and space is not the most convenient to us. Then, the way we allocate the water we use is not necessarily in keeping with current realities. Our water allocation system is basically a holdover from the 19th century. Because of that, it's serving us very poorly in the 21st century. In California, we don't regulate groundwater extraction. We don't even know how much groundwater is taken out. The state doesn't require permits to take water out of the ground - unless it is shown that your well is affecting an adjacent river. The

burden of proof is on someone else to show that. Unless that's shown, groundwater is essentially unregulated. Our system of appropriate rights has frozen in place many uses that don't make a lot of sense now, economically or environmentally. They are not serving society today. They are inherited from a very different time.

I realized only recently that the entire Sacramento-San Joaquin Delta area, which is part of the San Francisco Bay Delta Bioregion is below sea level, and in many areas, more vulnerable than pre-Katrina New Orleans. I also learned that it hasn't always been that way. How did this happen?

This is a result of the incentives we've created. Local governments are financially strapped, and their ticket to increasing revenues is to attract big box stores. To do that, they need to be able to put them in or near existing developments. If they can't do that, they need to build the developments for them. So some jurisdictions that are in the Delta have been promoting growth or reacting favorably to developer proposals.

The way our flood management policies operate, if you build a levee that is certified to provide protection against the 100-year flood, the area behind that levee is officially no longer in the floodplain. Someone can buy a house there, and they are never informed that they're in the floodplain - officially they are not - and they are not required to get flood insurance, yet they are still at a substantial risk of flooding. The 100-year flood is not the biggest flood. There's the 200-year, 500-year, 1,000-year flood, and all of those floods have a non-trivial chance of occurring in any year. This is what's called the "residual risk." You've taken care of the risk of the 100-year flood by building this levee. Assuming the levee continues to function the way it's supposed to and it does protect you against the 100-year flood. It's not going to protect you against the 200-, 300-, 400- or 500-year flood. So if you buy a house behind that levee and take out a 30-year mortgage, over the lifetime of your mortgage, you still have a 26% chance of being flooded by one of those floods that is bigger than the 100-year flood.

What percentage of the population do you think is aware of that risk?

That's a good question. One of my graduate students is going to do a study of risk perception in one of these communities in the Delta. My sense is that most people don't understand this. Most people are used to the government requiring them to use a seatbelt in a car. The government doesn't let them smoke cigarettes in buildings and restaurants anymore. [They think] "Certainly the government would not let me build or buy a house in a region that is not safe."

Tell me about the Delta Initiative, and its attempt to improve the threatening situation.

The [Delta Initiative](#) is a research and planning initiative at the University. As part of that initiative, we published a report a couple of years ago that was one of the first reports to highlight the land use dimensions of the Delta issue. We held a couple of charrettes for

the [Delta Vision](#) process during which we emphasized land use and got stakeholders and some very knowledgeable people together. We developed maps that would articulate ideas about how to solve some of the problems in the Delta in the future. In addition, we've been working with legislative staff trying to bring land use considerations into some of the legislation. Last year there were a couple of bills passed that have improved the situation. They require local jurisdictions to address some of these flooding issues that were ignored before. They are, over time, requiring higher standards for flood protection. There certainly have been improvements, but there is still a long way to go.

Do "higher standards" mean higher levees?

Yes. Higher levees to protect against 200-year flood.

What kind of opposition have you encountered?

What you'd expect. The real estate industry doesn't like this because of potential restrictions. With the housing market having collapsed, this is a good time to put in place rational measures to prevent mistakes in the future.

Has a slowdown in the economy and development/housing market given any new footing to protecting creeks/streams/rivers where encroachment into buffer zones has made it difficult to restore without structural armament?



It is giving us a breathing pause. It creates a very good opportunity to buy up some critical pieces of land. In the Delta, some areas that are either slated for, or being eyed for development, should clearly be set aside as flood bypass. Now is the best time to try to have those acquired by government agencies and other responsible parties. That'd be their highest and best use for society - to create flood bypasses at strategic points to reduce the risk to existing development - and avoid building new houses that will, one day soon, be under water.

In the newspapers recently, there have been articles about people whose houses are "under water." The expression refers to houses on which people owe more for the mortgage than the house is now worth. The irony is that so many of these "under-water" houses are in the Sacramento/San Joaquin Delta, where probably very soon - within the next few decades - they will physically be under water.

Has this "breathing pause" that's been granted by the decline of the housing market been enough of a pause to make any progress in terms of policy changes?

A lot of things are being held in abeyance pending the finalization of the [Delta Vision Task Force](#) recommendations. The Governor appointed a Blue Ribbon Task Force to

make recommendations to him and to the legislature regarding the future of the Delta. They are just wrapping up their process now.

The Delta Vision process is a high level process. Last fall they produced a Vision document that was quite impressive. It emphasized that we can't go on doing the same thing we've been doing. We really need to rethink how we treat this area and not approach it unidimensionally, but recognize the interrelations between land use, economy, water supply and ecology.

Was the report you produced referenced in the creation of the Delta Vision Document?

It was referred to quite a bit in the discussions, and we presented before the Task Force. The next stage was a strategic plan. As the strategic plan was being implemented, they tended to focus more on water supply issues. We came before the Task Force again and reminded them not to forget about the land use issues.



It is my understanding that most of California's water system is designed with snow serving as reservoirs. How is this system being impacted by global warming, and what, if anything, is being done to address this?

Some rivers will be more vulnerable than others. For example, the San Joaquin River is impounded by Friant Dam. Friant Dam is a relatively small dam, in terms of how much of the river's annual flow it can impound. We have many reservoirs that impound two, three or four years' worth of flow in a river. Those are designed to provide year-to-year carry-over storage.

The Friant Dam only impounds about a half of a year's flow. You might expect that it would have less of an impact on the hydrology of the river, but the San Joaquin is a very much snowmelt dominated river system. It has its big flows in June. By June, they've already started irrigating.

There's a small canal that diverts water to the north, and a larger one that diverts water to the south with capacity to move 5,000 cubic feet/second. During the snowmelt flow, the river is essentially diverted toward the south, where it irrigates five counties, which are almost always within the top 10 agricultural producing counties in the nation. From the point of view of agriculture, it's a very important water supply system. On the other hand, it has basically killed the San Joaquin River. It exterminated what was formerly a run of spring-run Chinook salmon numbering up to a half a million fish. The dam cuts off access to the upstream reaches, and by changing the hydrology, it has dried up the river in two reaches downstream.



Leaf Litter

Winter Solstice 2008

Restore the Earth and Inspire Ecological Stewardship

www.biohabitats.com

Vol. VI

Edition 5



Photo courtesy of [Christopher Beaver](#) and [LightHawk Tales](#) of the San Joaquin.

The [Central Valley Improvement Act of 1992](#) required that restoration of salmon on the San Joaquin River be studied, and a lawsuit by environmental groups led by the [Natural Resources Defense Council](#) prevailed so that the Bureau of Reclamation and the Friant Water Users Association (the contractors who buy this water) are required to implement a new flow regime that would restore the fish. One of my former students and I developed the 'restoration flow regime' that was ultimately adopted.

I point out the San Joaquin because it is a system that is very much dependent upon snow melt. To the extent that some of that snow that we have been getting in the past becomes rain in the future, Friant Dam is not built to store that water. It is really built for snowmelt. If you go to other parts of the system - rivers that are already rain dominated - then it's not going to make such a difference.

Last year, the journal *Restoration Ecology* published an article written by you and four colleagues entitled '[Two Decades of River Restoration in California: What Can We Learn?](#)' In this study, you looked at stream and river restoration projects undertaken in California between 1980 and 2003. Your goal was twofold: compile a database (and contribute to the [NRRSS](#)) AND gather information to inform and improve future practice. What *did* you learn?

We didn't learn as much as we would've hoped because there has been so little documentation of river restoration projects and how they performed in the years since they've been built. There has been very little monitoring and systematic evaluation. That was one of the big outcomes of the study. It was a disappointing outcome, but an important one to recognize.

We also documented a tremendous increase in urban stream restoration projects. A lot of the benefits of urban stream restoration projects are difficult to quantify in scientific, ecological terms, but probably have more to do with social cohesion in the neighborhood and developing community.

Part of our study was a detailed look at what are called "compound channel projects." These are projects that are designed to improve flood capacity and ecological function in rivers. In a compound channel, if you have an existing channel with some ecological value, you leave it alone and just try to increase your capacity - not by bulldozing the stream and turning it into a huge, trapezoidal channel - but rather, you bench along the sides and create a floodplain by which you can convey the 100-year discharge. You leave the original channel in tact as much as possible. These projects had been implemented in many areas. Our analysis of numerous projects shows that it is much better if you can implement these projects



before or during urbanization, when it's possible to set aside a wide corridor for the channel and floodplain. Then you can create a system that has tremendous ecological value. It is able to accommodate the 100-year flood without any problem, with excess capacity, in which you can allow a channel to erode and migrate around without running into conflict with human infrastructure. That's what you can do if you can implement before build out is complete. In many cases these projects have been attempted in urban areas that have already been built out, where existing buildings and infrastructure limit the potential width of your river corridor. In these situations, you are much more limited in what you can achieve. In those cases, the benefits may be more on the social side than the ecological side.

Was any action taken as a result of the study findings? Have there been any changes in the way stream restoration is approached in California since your article came out?

We are working with State and federal agencies to find ways in which we can create a database in which information about more projects can be uploaded and be widely availability. That's been one of the difficulties. There's been no single clearinghouse.

Based on your experience conducting this study, how do you think collaboration between institutions/academics, government, and consultants can be improved so that the practice of stream restoration can be linked with the best available science?

Graduate students in my hydrology and river restoration courses are required to do a significant term project involving original research. Many of them perform post-project appraisals of stream restorations. Their work is then presented at a public symposium. The final papers are available on line at <http://www.lib.berkeley.edu/WRCA/escholarship.html>. This is potentially a very useful model that can be applied broadly to restoration.

As a university professor, have you noted any trends in the education system in response to regional issues?

I started teaching a graduate course on river restoration in 1992. At that time, all of my students were environmental planners and ecologists. Then, engineers began taking my course. Now, civil and environmental engineers make up 50% of my classes. I think that's a good sign.

What themes do you hear from your past students when they make the transition from school to the working world?

Often, students come in looking to learn "how to implement." I try to convince them to step back and truly understand how a river works first. Sometimes, it's best not to implement anything and leave the river alone. I also focus on the social dimension of river restoration, and the ability to communicate. Once they are in the working world,

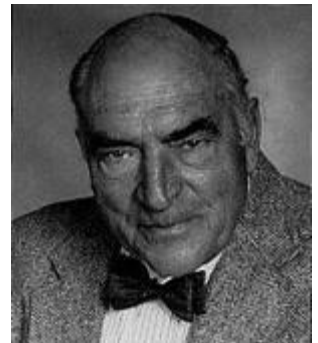
many of my former students value their understanding of natural processes and their sharpened communication abilities because they need these skills in order to know what a river can be and effectively convey their vision to colleagues, clients, stakeholders, officials and members of the community.

More than one of our staff members has, at one point, been a student of yours. If you had to choose one thought or idea that you hope your students (of LA and geology) took away from your teaching, what would it be?

To step back and look at the big picture. Almost always, we are approached by clients with very specific questions and possible solutions for the perceived problem, such as "My bank is eroding. Should I protect it with rock vanes or root wads?" I hope my students remember that they need to understand a site spatially and temporally first and foremost. They may need to look at a site in a watershed context and examine the changes have occurred over a long period of time in order to better understand "the problem." (And whether it really is a problem at all.)

Your mentor, Luna Leopold, legendary geomorphologist & hydrologist, passed away in February of 2006. Can you tell us one or two things that he taught you that greatly impacted you and your views on issues today?

I have talked to many of my former classmates and one thing we all felt he imparted to us was his sense of professionalism. In my first class with him, he was very clear about how we should publish, how much we should publish, how we should take notes, store data and organize our thinking. He had a very systematic approach.



Leaf Litter Talks with Rick Rayburn

Chief, Natural Resources Division
California State Parks

Rick Rayburn's involvement with California's natural resources has spanned four decades. He began his career as a coastal program analyst for the California Coastal Commission. He became regional director of that agency in 1977 and remained in that position for eight years. Since 1985, Mr. Rayburn has been the chief of natural resources for California State Parks, where he is responsible for classifying state park units, land use planning, natural resource policy formulation, stewardship funding programs, and natural resource acquisitions. He also served as chief for cultural (prehistoric and historic) resource management until 2001, when a new division was established. Mr. Rayburn is a member of the executive committee of the [California Biodiversity Council](#), a group of federal, state and local agencies and organizations focused on coordinating efforts to conserve biodiversity in California. He is co-lead for the Habitat and Biodiversity working group of the California Resources Agency's Climate Change Adaptation Strategy. He has also participated on management oversight teams steering statewide connectivity/linkage projects for the state and non-profit sectors.



Rick Rayburn and his wife, Marianne.

Mr. Rayburn graduated from University of California Los Angeles in 1969 with a management degree. After serving in the U.S. Air Force officer corps, he attended the graduate school of forestry at Humboldt State University, where he concentrated on redwood forest ecology.

Your agency, California State Parks, is responsible for more than 1.5 million acres of land in more than 270 park units. Approximately what percentage of this land is within the San Francisco Bay-Delta Bioregion?

About 15% of this land is within the Bay-Delta Bioregion.

If you had 30 seconds to tell someone about the rich biodiversity of the Bay-Delta Bioregion, what would you say?

It is extremely rich in that you have two large rivers - the San Joaquin and the Sacramento - coming together in the delta and into the San Francisco Bay, which drains over one third of California. It is a bioregion that is heavily influenced by the North Coast, Central Coast and Central Valley Bioregions. It's a meeting point for a number of geomorphic and floristic sub-provinces. The ecosystems begin with the sub-tidal, the mud flats, salt marshes, chaparral, scrub, variety of oak savannah, oak woodlands and conifer forests. It has a huge representation in terms of the vegetation types and ecological zones of California.

Do you think the general public - both within and outside of the Bioregion - is aware of this biological richness? If so, why? If not, why not?

The general public in Northern California is. The general public beyond Northern California is probably less aware. With so much of the San Francisco Bay Area being developed, people tend to assume it's not as rich as it really is.

Why do you think people are more aware in Northern California?

Possibly, people in Northern California are more environmentally conscious of their surroundings. Issues such as environmental protection, climate change and habitat fragmentation get regular play in the newspapers. There are also a number of universities with influence on the general public. It's been a hot topic in Northern California since the 1960s.



If you had to choose one State Park in the San Francisco Bay-Delta Bioregion that best showcases this biodiversity, which park would it be and why?

Mount Diablo State Park and its 25,000 acres is the high point in the Bay Area at almost 4,000 feet. It's also a part of a larger, protected lands network. There are over 60,000 linked to Mount Diablo, so you have a large, sustainable landscape, some of which is near sea level through the drainages associated with the Bay. It has most of the life zones I mentioned earlier. It doesn't have salt marshes, but terrestrially, it has most of the habitat types. It's been a reserve for over 70 years.

When polled, 90% of *Leaf Litter* readers named expanding urbanization as the number one threat to the ecological health of the San Francisco Bay-Delta Bioregion. In terms of biodiversity, would you agree?

Yes. Habitat conversion is the greatest threat to biological diversity anywhere, but along with habitat conversion come two other important factors: fragmentation and continued introduction and spread of invasive, exotic species.

I read in [California's Wildlife Action Plan](#), that 490 vertebrate species inhabit the Central Valley and Bay-Delta Region at some point in their life cycle, including 279 birds, 88 mammals, 40 reptiles, 18 amphibians, and 65 fish. Now these are numbers on a web site. To help bring this to life, can you tell us about one or two of these species that are threatened or endangered?



Photo courtesy of Charles C. Benton.



Photo courtesy of Bill Stagnaro, [WRA](#).

The [California clapper rail](#) has long been recognized as a species of high risk. It is found in the tidal sloughs and coastal marshes in San Francisco Bay and two other regions. They are primarily endangered because of the loss of marshes and estuaries along the California coast. It's a relatively large (12 to 15 inches), attractive, chunky bird. You might find it in some of the small tidal sloughs within the marshes of the southern San Francisco Bay. They are very hard to find.

The [San Francisco garter snake](#) is an interesting reptile that is also associated with marsh areas. It can be found in San Mateo County. It's a beautiful snake that few people will ever see—orange head, multiple colors, scaled. They feed primarily on small frogs, including the listed red-legged frog, in ponds and other freshwater areas.

Is there any hope on the horizon for the clapper rail? Are there any conservation efforts underway?

Since 1972, we've been adding salt marsh along the California coast. That was the first time in 150 years that we halted the destruction of coastal wetlands in California and slowly began the restoration process. Tens of thousands of these acres are in the North Bay and South Bay in San Francisco. I'm not up to speed on the clapper rail recovery. They have not recovered in great numbers yet, but time will tell.

Our mission at State Parks isn't to focus on endangered species, but to preserve the full array of species. Common species or near risk species, as well as threatened species, are equally important to us. A number of our specific actions on certain ecosystems, where we can focus on species like the San Francisco garter snake, have been certainly successful. You'll find a lot of listed species in parks.

There are a variety of classifications for the 270 units in the State Parks system. The most protected classification, which applies to most of the acreage of the parks, is a preservation designation. In 90-95% of our parks, habitat is preserved. Very little habitat conversion has taken place in these parks. We have a great opportunity to restore and/or improve the conditions for some of these listed species while ensuring the common species remain common.

What about plants? What is one of the Bay-Delta Bioregion's most threatened plant species?

A plant that has gotten the most attention over the last three years is the [Mount Diablo buckwheat](#), which is a tall (8 inch) very open, pink flowering perennial. In the 1930s, it was thought to be extinct. About three or four years ago, [a botanist from U.C. Berkeley discovered 20 or 30 flowering buckwheat in an area of Mount Diablo State Park](#). It wasn't a carefully managed, preserved area. So there seems to be a certain amount of disturbance that goes along with this particular area of buckwheat. The folks at Berkeley are taking the lead in propagating the buckwheat and ensuring recovery.



Photo courtesy of Scott Hein, [Save Mount Diablo](#).



Is there one invasive species in the Bioregion that is considered Enemy Number One?

I don't know about number one, but thress species have been headaches for State Parks- [starthistle](#), [eucalyptus](#) and [ammophila](#) (European beach grass).

Eucalyptus has really taken hold in Marin and Contra Costa Counties. Eucalyptus comes with a host of other problems. It is very fire prone - and I mean catastrophic fire. Both eucalyptus and starthistle provide more of a homogenic environment. Eucalyptus came into the region in the mid-1800s from Australia. A fast growing species it was brought into California to be used for railroad ties and other wood products. It was also used for wind breaks for fruit trees and agricultural operations, as well as for firewood. An example of its colonization can be found on Angel Island, the only natural island in San Francisco Bay. Ten percent of this 800-acre island was a hundred plus years eucalyptus colony. We removed most all of them.



I have heard that ammophila came in with the California Transportation Department as they tried to stabilize dunes alongside the freeway system. The seed is dispersed on the currents and wind all along the coast. It's a nasty competitor while restoring native dunes.

What role are these and other invasive species playing in terms of biodiversity within the San Francisco Bay Bioregion?

It's a big role. Like I said, habitat conversion, fragmentation and exotics are the big three in terms of destroying biodiversity in the San Francisco Bay area and really anywhere in California. We have between 24-30 that we consider very bad actors in the State Park system. We're generally trying to get those that are most invasive and eliminate them while they first start to be established.

What treatment and management efforts have you found to be successful with some of these invasive species?

We use a number of different devices, depending on the species. We're experimenting with using heavy equipment to uproot the ammophila in coastal dunes. We have had some success in spraying and burning them. In other places where the public is concerned about herbicide use, we've attempted hand crews, but that just doesn't seem to cut it. It's very expensive and volunteers are often involved on a short term, rather than a long term basis.

In dealing with exotics, we're using cutting, burning, repeated burning and herbicide application. We'll cut something, burn it, and then come back next year and get the sprouts with a hand-applied herbicide. We use a variety of methods, including screaming and swearing at times



I read on the Parks web site that of all of California's 202 major habitat types, coastal dunes are the most impacted and 33.7% of them are in the State Park System.

They've been heavily converted. 80% of Californians live within 10 miles of the coast. The dunes are, for the most part, along the coast. They've been converted and fragmented. Years ago, most people probably didn't think too much of them, as there weren't trees or large areas of vegetation on them. They continually got abused or converted. Now, there are very little left. Of the State Park dunes, at least half of them have problems with European beach grass that I mentioned earlier.

Let's talk for a minute about climate change. Sea level rise and changes in precipitation and in the amount and timing of snow melt runoff present serious threats to California's water supply and natural resources. The California Resources Agency is currently developing the State's first comprehensive [Climate Adaptation Strategy](#). You are co-leading the Biodiversity and Habitat working group for this effort, which is charged with developing strategies to maximize species and habitat resiliency in the face of climate change. How did



you become involved?

The problems that are furthest out in the future often receive the least amount of attention. For several years, we knew there was this looming, long-term issue of climate change but I continued to deal with the day to day work. About four years ago, I got serious about it and decided we really needed to spend some time on this within State Parks. I read a lot of the literature and discussed the issue with other conservation biologists with a background in climate change and came up with some crude strategies for dealing with climate change in the State Park System.

A small group of us on the [California Biodiversity Council](#) executive committee decided it was time to advance climate change and biodiversity issues. The California Biodiversity Council is a group of about 35 land managing and land acquiring conservation agencies. There are federal agencies like the Forest Service, Fish & Wildlife and the National Park Service. There are California conservation agencies, and some local and non-profit representation. When it was established some 15 years ago, the idea was to improve our overall management and conservation of California land through collaborative efforts and bring the researches together with the land managers. So, at the Council's quarterly meeting that year, we put together a day that was devoted to climate change. We decided to focus on how to bring to the land managing agencies the research that was going on. We also wanted to evaluate the research. That got things started. We ended up revising our acquisition goals and natural resource management policies for the State Park system based, in part, on climate change.

About a year ago, the State Resources Agency hired a climate change manager, and our efforts, State Parks and the Department of Fish and Game, became more formalized and included more agencies. So it made sense that Fish and Game and State Parks would take the lead within the Resources Agency in adapting to climate change as it relates to biological diversity and habitat.

We got started a few years before the formalized effort.

Is the Climate Adaptation Strategy intended to serve as a model for other states? (If not, do you think it will be?)

It *could* serve as a model for other states, but obviously it is tailored to California. Some of it may apply. The first strategy [of the Habitat and Biodiversity working group's plan] which is the most critical at this point, related to establishing a system of landscape reserves in California, may not apply to a lot of states lacking an abundance of protected and managed land. In California, we've spent 400 million dollars annually on conserving or restoring the landscape. The protected land coverage of California is significant but in many cases fragmented. Other climate change strategies should be of value, especially those involving restoration and long-term coordination of research.

In the work you and your colleagues have done on the Biodiversity and Habitat working group, have you studied the efforts of countries? Has any other country or part of the U.S. been a resource of information or innovation?

Not really. We did look at the research that has been done elsewhere, such as in Australia, Mediterranean countries and some countries in Europe, but that has been more about the global effects. With the exception of perhaps South Africa, there are not that many areas where they have advanced to the point of having some of these solutions on the land applicable to California. Now, some of these solutions are short-term - the next 20 years. These are solutions we can get on right now to address certain problems. We can afford to put money and effort into them because despite not knowing all of the ramifications of climate change, it's good land management and conservation. These efforts will help reduce the stress on native species and provide some resiliency as things heat up in California.

We feel confident that we can move forward even though we don't have good regional modeling at this point - especially for precipitation - that gives us a sense of what the landscape will look like in 50 years.

I have personally looked at [Maryland's work](#) and the work from [King County, Washington](#). It's less about their conservation strategies, but their analytical approaches. That has proven to be helpful.

The Biodiversity and Habitat working group has drafted a report recommending five key strategies: landscapes reserves; management of habitat and restoration; research and guidelines; regulatory requirements and implementation. This draft report was just presented to the public last Wednesday. How has it been received?

Generally, it has been well received. It has been carefully reviewed by the academic community: UC Berkeley, UC Santa Barbara, UC Santa Cruz and Stanford. California has a very strong environmental regulatory community and they also weighed in on it. I'm pleased. I think we hit the mark, but we have a number of new ideas to consider.

Specificity is an issue. Some other areas of adaptation, like agriculture and public health, are not as far along as biodiversity. When all are folded into one report we are told to find some commonality.

So when you say that there were additional things that came up during the public meetings, are you referring to that level of detail they weren't seeing?

In addition to the detail, there were a few other comments, such as "what will you do about species that can't adapt as quickly as the temperatures rise?" There are some species that don't begin their reproduction until they are 70 years old. In 70 years, the conditions in the near area may be such that they can't survive. Some people wanted to see more of the assisted migration concept in the report. There are a lot of people

looking into this topic throughout the country. It's one of those idealistic approaches to climate change where money is a huge factor.

Some researchers looked at one particular assisted migration scenario. It was a listed butterfly in the South San Francisco Bay Area. They predicted the habitat on which this butterfly was dependent upon was going to move. When asked what the cost would be to move of the population of the butterfly to adapt to those new locations, it was something like \$20 million. The reality is that \$20 million can buy you a lot of nice habitat. It comes down to "where are you going to put your money to get the greatest impact?" For some of us this is a very tough question. However in California it has been predicted that 28-35 % of our species will be extinct within something like 100 years from climate change and other related impacts. It's triage.

So will assisted migration be considered for incorporation into the strategy?

We said that we need better research on cost and effectiveness.

Were any new ideas brought up at any of these public meetings?

There were a number including the following:

- Link sequestration and mitigation with adaptation were they overlap;
- Beef up the aquatic ecosystems, possibly using a watershed scale;
- Link the Subdivision Map Act and it's opportunities to biodiversity objectives;
- Ensure basic research is encouraged and funded;
- Ensure research has a funding and decision making framework;
- Better integrate local land use goals into habitat objectives;
- Give disease more attention-it maybe a bigger factor than fire;
- Engage with the Western Governor's Association.

This is a quick sample, we receive a number more good ideas from which to amend our document.

Many of the substrategies presented in the draft report seem as though they'd require a substantial amount of inter-departmental and inter-agency coordination, as well as coordination between State, Federal, academic, private and non-profit entities. How will this work?

We've had mixed results in California working together. It is very clear to me that if California is to take this challenge head on, the land managing and land acquiring agencies and non-profits statewide must to work together. the planning framework for federal, state and local collaboration needs to be institutionalized very soon.

Working together is critical if we are to develop a landscape reserve system. That's going to require some serious collaboration on the part of these groups. Those folks with the most land and the most money to put into it need to come together and put

together this reserve system. Then we put it out for public review and continually improve upon it. Just to take that initial step.

All this collaboration is only going to happen if there is serious leadership. Without serious leadership, we will probably do a little better than lip service to collaboration.

What do you see as the key challenges to bringing the strategies of your working group to action? Would this collaboration be one?

Yes. The other challenge is that the capacity of agencies in these times is dwindling. With the budgetary problems in the country and the State, I don't see that improving soon.

But the long-term conservation potential in California is inviting. There are ten very diverse ecological regions in California. They are all large and they are all filled with endemic species-1/4th of plant species are endemic. They all have a lot of natural land. An effort to conserve California is very doable IF we do things right. Directors of the 10-12 entities in California that have statewide involvement are going to have to get very serious about priorities and let some things go so we can focus on this long-term. We need to get away from short-term thinking.



One other thing that is going to be a bit of a challenge is the retirement of baby boomers. A lot of the people who are working together now are older baby boomers who have been around the conservation agencies a long time and know that in order for conservation to work in California you need to work together. A lot of people will be retiring, leaving significant gaps, but every day I'm happily surprised to hear committed, young conservationists talking the way we talked in the 70s. Those of us retiring in a few years are leaving huge challenges for these folks to confront.

There is one other thing that is important on a state and national level. Right now, California has a Governor who is very supportive of addressing climate change. This is also true of the upcoming administration in Washington, DC. If you get a Bush type administration after Obama, or a Bush type administration in California after Schwarzenegger in California, things can break down very suddenly. If there is not a priority in the administration to address climate change, it can very easily fall off the page.

Under the Landscape Reserves strategy, "provide for public access and recreational use" and "pursue opportunities for public education" are among the principles listed. If you had limitless funding and resources to accomplish this, what would you do?

I'm one of those guys who would put a majority of the money into preserving or restoring the land. Ultimately, that's what we're trying to do. Then I'd look into the factors that go into sustaining that type of effort and I'd continue funding those activities

That means building a constituency that crosses into a variety of racial and ethnic groups. In California, the environmental movement through the 70s, 80s and 90s has been really about white guys initially and then white guys and white gals. The majority of California will be Hispanic in the near future. So we need to put a lot of effort into interpreting and educating the groups that haven't been a part of the conservation efforts. We need to be doing that in a more effective way. I think we will get a big boost from the Obama administration in that regard.

There is no substitute for direct protection of the natural resources, including the working landscape, but we need to educate the general public about what we are doing. But then there's the issue of access.

Access to protected lands in California continues to need improvement. In California, we put a lot of into conservation without access. We need to continually find ways to support these preserved areas for some kind of public use. I'm not talking about uses that are going to overrun protected areas, as you see on some of our beaches in Southern California. I'm talking about low-intensity uses of land, interpretation of our rich natural heritage and issues of climate change - how it is affecting resources and how they are adapting to it.

Many of our readers are landscape designers, biologists and ecological engineers. If you had one piece of advice to offer them about how they could help protect and enhance biodiversity within the San Francisco Bay-Delta bioregion, what would you tell them?

I'll answer three ways.

First, continue educating citizens in the Bay Area that a long-term sustainable environment is what is in their best interest, in terms of quality of life. And when they can access natural areas, they should turn off the PC, and take a hike in nature with friends.

Second, a long-term, sustainable environment is dependent on continued management of the land and the ability to link protected areas to larger protected areas. Many populations will persist without a lot of heavy, expensive resource management if given the proper acreage.

In the Bay Area we haven't provided good access opportunities to the underrepresented communities or people of significant financial need. We need to find a way to get folks from these communities from their homes to our protected lands to really experience nature. You can do scattered, small, 2-5 acre parks amongst urban areas, but those are too small to really serve nature well. In those areas, say Oakland, a little further away,

perhaps 15 miles away - like Mount Diablo - you have a greater opportunity for larger areas. It's very hard for them to get out to these areas and develop a strong appreciation. It's a challenge that's doable, but now we're struggling with that one.

In your four decades of service to the State of California, you have, no doubt, seen a lot of change. What do you think has been the single, most positive change?

I remember first starting in the late 1960s - during the environmental movement - and then becoming more engaged in the 1970s when a lot of the major environmental laws were passed. (I was with the [California Coastal Commission](#)). At that time, environmentalists were looked on negatively - as those that were fighting growth and jobs. There was constant head butting.

We have now evolved to a point where a majority of thinking individuals - those who stop to think about quality of life and what they want their children and grandchildren to be able to experience - consider the environment to be very important. Certainly in California, a majority of the people see the benefit of putting money and effort into protecting the environment.

That one change has been the most important in my mind.

We're continually growing and getting stronger. It's no longer us vs. them. It's us together trying to make things work for economic growth as well as conservation.

"You Said It" Survey



The ecosystems of the San Francisco Bay Bioregion provide invaluable services to hundreds of species of birds, fish, mammals, amphibians, reptiles and mammals - including humans. But its salt ponds, mudflats, salt marshes, vernal pools, open bays, uplands, oak savannahs, redwood forests and coastal scrub communities must deal with many challenges in order to stay ecologically viable. Can the ecology of this majestic region cope with the pressure of

human population growth and urban development?

While only 9% of you live and/or work in the San Francisco Bay Bioregion, half of you say you play there. It's not surprising, then, that many of you contributed your thoughts about the Bioregion in response to our reader survey...

A few of you have actually been involved in ecological restoration, conservation planning work in the San Francisco Bay area and were kind enough to tell us about your experience and provide links:

- I was the assistant planner for [Association of Bay Area Government's](#) first ocean coastline plan (1967-68).
- Remediation of contaminated groundwater sites for the USEPA
- [South Bay Salt Pond Restoration](#)
- [Creekside Center for Earth Observation](#)
- I was the coordinator of ecological restoration projects in [the Presidio](#) of San Francisco for several years, including grassland, dune, and marsh sites.



A majority of you say that open space is the San Francisco Bay Bioregion's most important natural resource in terms of the area's overall ecological health. Here's how you ranked the Bioregion's resources overall:

Leaf Litter

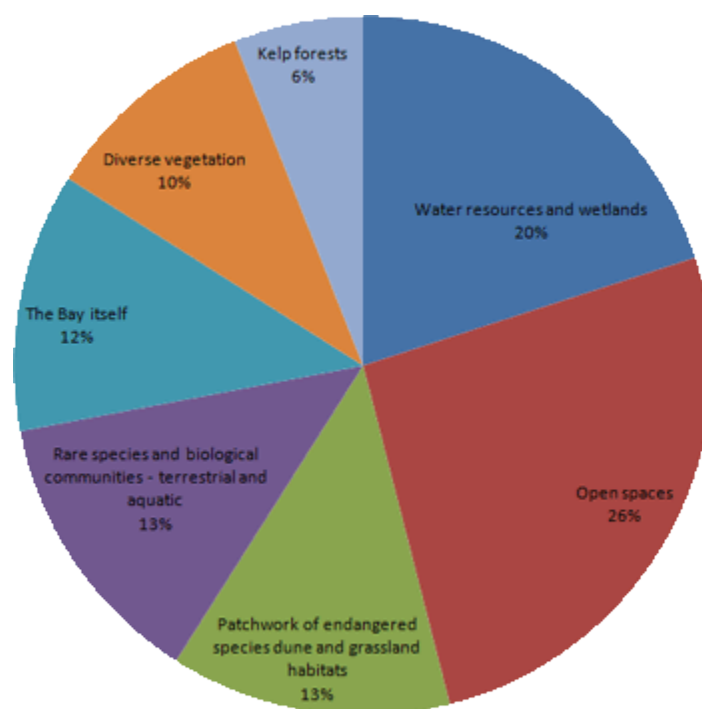
Winter Solstice 2008

Restore the Earth and Inspire Ecological Stewardship

www.biohabitats.com

Vol. VI

Edition 5



[Click on the graph for a larger version](#)



Whether you are specifically concerned about runoff, loss of floodplain or habitat fragmentation and destruction, **90% of you consider "expanding urbanization" enemy #1 when it comes to ecological health and environmental quality within the San Francisco Bay Bioregion.** Other threats mentioned included invasive species, climate change and industrial agriculture.

82% of you consider the San Francisco Bay Bioregion to be ahead of the curve in terms of environmental policy and/or sustainable design, when compared to the rest of the U.S. Here's what some of you had to say:

- I can only respond about the Puget Sound and the SF bay area. They are probably on a par. I know a lot of work is also being done in other areas but not the specifics. [Steinberg's bill](#) from the last session of the legislature is the best example.
- We have already established over 1 million acres of protected open space, and are realizing how broad and deep the stewardship needs are
- The 'Governator' is ahead of the curve.
- Now living in MA, another relatively progressive place, it's quite clear that SF/CA is well ahead in terms of number of people knowledgeable about natural resources, green politics and green design.



- It's a lot more active in conserving habitat and preventing pollution than, say, Texas.
- The State agencies, such as regional water boards and air quality boards have serious mandates and they enforce these mandates (compared to many other states)

That said, **87% you say that local, state and federal agencies are not doing enough to protect the natural resources of the San Francisco Bay Bioregion. Most of you blame the economy and competition for resources.** To quote one of you, "Funds...funds...funds..." Some of you said that the region needs more resources for outreach and management. As one of you said, "There is an overwhelming need for more stewardship/management resources to catch up with ongoing land acquisition (which we are very good at so far)."



One of you offered another interesting suggestion:

In such as densely populated area, it is good to know that environmental issues have remained at the forefront of discussions. Possibly, the designation of some areas, like the Presidio and sections of GG Park, and other open spaces, could have greater emphasis on management for rare species and communities. The Bay area is a place where you might be able to pull it off!!

So say you are the executive director of an environmental non-profit organization, or a public official like "The Governorator." **What would you do to improve the ecological conditions in the San Francisco Bay Bioregion? Here are some of your suggestions:**

- Prohibit building on flood plains. Put them into conservation. Restore flood plains. Restore river and stream riparian areas. Preserve areas that are still in good ecological condition.
- Emphasize habitat restoration. Emphasize smart growth. Conserve water.
- More citizen involvement in stewardship and political oomph for conservation of endangered species
- Use natural processes to address ecological deficiencies.
- Sustainable development, public and green transportation, urban and agricultural stormwater BMPs (controlled drainage as an ag BMP)
- Work toward finding solutions that all Americans can get behind to address global warming and ensure large natural areas are not developed through a public-private partnership approach.
- Use electric vehicles and expand the native plant nursery program at the Presidio Trust to the whole Bay area.



Leaf Litter

Winter Solstice 2008

Restore the Earth and Inspire Ecological Stewardship

www.biohabitats.com

Vol. VI

Edition 5

- Water conservation, wetland restoration and education.

As always, we welcome your feedback. If you have any comments regarding this survey or about Leaf Litter in general, please [contact our editor](#).

What's In A Leaf?

By Allegra Bukojemsky, Biohabitats San Francisco Bay Bioregion Leader

Opening the San Francisco Bay Bioregion Office of Biohabitats has been a very exciting opportunity for me. With my background and interest in both ecology and design, and having lived in the Bay Area since my early childhood, I am pleased to be able to apply all of my skills to our current work in California. I did not, however, expect that I would use my design and ecology skills to choose a leaf for the San Francisco Bay Bioregion Office logo. In case you were not aware, each of Biohabitats' bioregional offices has its own logo, complete with a leaf of a local, native tree that has significance in the bioregion. So I undertook my quest for the perfect leaf.



While many people associate the Coast Redwood or the Giant Sequoia with California, many Californians think of the rolling golden hills of the oak savannah as the state's dominant landscape. California is home to 18 species of Oak trees, with 30 distinct variety types covering about 13 million acres of the state in woodlands and forest.²

Oak trees are a prominent landscape element in many of my childhood memories. I enjoyed many a picnic in the shaded, dome under the wide, arching canopy of gnarled branches. I continue to enjoy their beauty, shade, and the occasional climbing opportunity they provide. The large, twisted, low growing branches invite climbing, but also encourage reclining and lounging. And, of course, there is the teeming life associated with the trees: caterpillars, moths, spiders and salamanders. The amazing granaries of red headed woodpeckers; the perfect perch for a red tailed hawk. Oh, the hours one can spend searching for and watching the diversity of life amidst these trees.



California's oak savannahs and woodlands contain the highest biodiversity of California ecosystems, with more than 300 animal species depending on them for food and shelter.² One must be respectful and careful, however. One of my leaf collection expeditions resulted in a wasp sting, as I inadvertently disturbed a ground nest in an old stump.

I specifically chose the California blue oak, *Quercus douglasii* as the tree for Biohabitats' San Francisco Bay Bioregion office logo for a variety of reasons. The blue oak is California's dominant oak species, covering over 18,000 acres of the state. In the San

Leaf Litter

Winter Solstice 2008

Restore the Earth and Inspire Ecological Stewardship

www.biohabitats.com

Vol. VI

Edition 5

Francisco Bay Bioregion, oaks represent more than 95 % of the native tree species, with blue oaks comprising about a third of this number.¹ A mature blue oak is a very majestic specimen. The blue tint of their leaves is due to the thick, waxy coating on the upper leaf surface that enables them to survive the dry hot summers in California, where they receive only 15 to 35 inches of rain during the winter and spring months.² Being a designer, I also chose this tree due to the irregular and unique shape of the leaf. The leaves are typically between 3/4 to 1 1/2 inch long. They vary widely in shape and margin, with some being a simple oblong leaf, and others having irregular wavy margins or shallow lobes.¹ The blue oaks range is exclusive to California. They can be found in the foothills bordering hot interior valleys in poor soils.



I hope that when you see the logo for the Biohabitats' San Francisco Bay Bioregion, you will be reminded of the rolling, golden hills of the oak savannah, the diversity of life and habitats supported by the Bay Area and the state at large, and how we work to inspire communities to rediscover a

sense of place through preserving indigenous ecosystems, restoring biological diversity, and inspiring ecological stewardship. I hope that you, too, have the chance to enjoy the sheer beauty of these oaks, the diversity of indigenous wildlife they support, and perhaps even a climb into or a picnic under these majestic trees.

References:

¹ Gaman, Tom and Jeffrey Firman. Oaks 2040: The Status and Future of Oaks in California. Produced by for the California Oak Foundation. November 2006 available online at www.californiaoaks.org/html/reference.html

² Pavlik, Bruce, Pamela Muick, Sharon Johnson, and Marjorie Popper. Oaks of California. Cachuma Press and the California Oak Foundation. 1991

Resources

In addition to the many links that appear throughout this issue (including those you provided in [response to our survey](#)), we have gathered the following recommended resources on San Francisco Bay Bioregion.

[Association of Bay Area Governments](#)

[Bay Area Water Supply and Conservation Agency](#)

[The Bay Institute](#)

[California Bay Delta Authority](#) oversees the implementation of the CALFED Bay-Delta Program for the 25 state and federal agencies working cooperatively to improve the quality and reliability of California's water supplies while restoring the Bay-Delta ecosystem.

[California Biodiversity Council](#)

[California Climate Change Adaptation Strategy](#)

[California Environmental Resources Evaluation System](#)

[California Environmental Protection Agency](#)

The [CALFED Bay-Delta Program](#) is a unique collaboration among 25 state and federal agencies that came together with a mission: to improve California's water supply and the ecological health of the San Francisco Bay/Sacramento-San Joaquin River Delta.

[California Department of Fish & Game](#)

[California Department of Water Resources](#)

[California Invasive Plant Council](#)

[The California Resource Agency's overview of the Bay Area/Delta Bioregion](#)

[California State Parks](#)

[California Wildlife Center](#)

[Delta Vision](#)

[Golden Gate National Recreation Area](#)

[Guide to the Exotic Species of San Francisco Bay](#)

[Natural Community Conservation Planning](#)

[San Francisco Bay Conservation and Development Commission](#)

[San Francisco Bay Joint Venture](#) brings together public and private agencies, conservation groups, development interests, and others to restore wetlands and wildlife habitat in San Francisco Bay watersheds and along the Pacific coasts of San Mateo, Marin and Sonoma counties.

[The San Francisco Estuary Project](#)

[San Francisco Estuary Institute](#)

[San Francisco Bay-Delta Science Consortium](#)

[San Francisco Bay Regional Water Quality Control Board](#)

[Save The Bay](#) is the oldest and largest organization working exclusively to protect, restore and celebrate San Francisco Bay.

[The Nature Conservancy California Chapter](#)

[University of California â€” Berkeley Department of Landscape Architecture and Environmental Planning](#)

[U.S.G.S. page on the Bioregions of the Pacific Southwest](#)

[Water Quality of San Francisco Bay](#)

[Reuters World Environmental News](#)

[Capitol Reports Environmental News Link](#)

[Grist Magazine](#)

[EnviroLink](#)

[Earth Trends: The Environmental Information Portal](#)

Biohabitats' Projects, Places and People

Biohabitats' Projects

In The Name Of The Father - Odum School Of Ecology Study

Eugene Pleasants Odum is often referred to as the father of modern ecology. Some even say brought the term "ecosystem" into the vernacular. A scientist with a holistic approach, Odum was one of the first to study the interaction of Earth's ecological systems. Although he died in 2002, his name lives on in the [Odum School of Ecology](#), which he founded in 1960. Housed at the University of Georgia, where Odum taught for over 40 years, the School has the distinction of being the first stand-alone academic unit of a research university dedicated to ecology. With its increasing programs and popularity, the School has outgrown its walls, utilizing



Eugene Odum. Photo courtesy of the Odum School of Ecology.

other locations in order to meet classroom, laboratory and office demands. Biohabitats is honored to be on a team selected by the University of Georgia to begin developing conceptual designs for a new facility. The team, led by [BNIM Architects](#) recently began work on this exciting project. The new facility will accommodate administrative, research and teaching functions should reflect the environmental stewardship values of the school's founder. The building design and concept is expected to employ the most progressive sustainable design principles and strive for a carbon neutral construction process and sustained operation. It should also support environmental stewardship and facilitate intellectual growth of its faculty, students, and staff.



Photo courtesy of Baltimore City Department of Public Works.

Groundbreaking

The Chesapeake Bay is about to get a little healthier, thanks to the City of Baltimore and the U.S. Army Corps of Engineers' Maiden Choice Run project. Ground was broken on December 2 for this \$1.4 million urban stream restoration. A tributary to Gwynns Falls, which flows into the Chesapeake Bay, Maiden's Choice Run had been heavily influenced by urban conditions, including stormwater runoff, loss of riparian vegetation and floodplain constrictions. To address these challenges, we used a natural channel design approach that

incorporated daylighting, creation of wetlands and reforestation. With its location in between two schools, Maiden's Choice Run offers great potential as a vehicle for recreation, education, outreach, and the development of community stewards.

From Battered to Beautiful

Terry's Branch, a stream that drains a 2.8-square-mile watershed in Knott County, Kentucky, had experienced the effects of logging, relocation, and straightening. Were it not for the efforts of the Kentucky Department of Fish & Wildlife Resources (KDFWR), the stream would likely have remained in a degraded condition. Through an agreement with the U.S. Army Corps of Engineers, KDFWR restores streams to offset impacts caused by activities such as road construction or mining. Working with KDFWR, we designed and supervised restoration construction of a 2,900-foot reach of the stream. We are currently monitoring the site, and are pleased to report that one year after the completion of construction, things are looking up for Terry's Branch! With newly acquired access to its floodplain, the stream's flows are able to spread out over the valley, depositing sediment and building new point bars in the channel. New plants are taking hold on the point bars, improving the diversity and habitat of the system. Aquatic habitat has also improved with the increase of riffle habitat in the channel. While beauty is, indeed, in the eye of the beholder, it's hard to deny that Terry's Branch is looking gorgeous.



Places

Biohabitats San Francisco Bay Bioregion leader, Allegra Bukojemsky, will be in Las Vegas on January 21 to review and discuss development plans at the [NAHB/ASLA Land Planning Workshop at the 2009 International Builders Show](#).

The Windy City is the place to be on January 22-23, as the [Alliance for the Great Lakes](#) hosts the first ever [Great Lakes Urban Habitat Restoration Symposium](#) on January 22-23 in Chicago. Be sure to stop by the Biohabitats booth and say hello to Biohabitats president, Keith Bowers, and the leader of our Great Lakes Bioregion office, Ivette Bolender.

Biohabitats Senior Fluvial Geomorphologist Vince Sortman will dazzle the crowd at the [Northwest Stream Restoration Conference](#) with his presentation on regenerative stream restoration and legacy sediments. This conference will take place in Stevenson, WA February 2-5.

Environmental Scientist Suzanne Hoehne will depart the Ohio River Bioregional office for St. Louis, Missouri to present "Rethinking Stream Restoration and Stormwater Management" at the [USDA-Cooperative State Research, Education, and Extension Service \(CSREES\) National Water Conference](#) February 8-12.

Biohabitats Southern Rocky Mountain Bioregion Leader, Claudia Browne, will present "Whole System Campus Planning" at the [Rocky Mountain Sustainability Summit](#) which

will take place February 11-13 and will focus on Forging Solutions at Colleges and Universities.

Biohabitats president Keith Bowers will speak at the [2009 Sustainable Landscaping Symposium](#) at the Denver Botanic Gardens on February 12. Keith will join experts from around the region in sharing information about using water creatively, improving efficiency and incorporating natural habitat in landscape designs.

People

Our fearless leader, Biohabitats president Keith Bowers, was recently appointed to the Board of Directors of the [Wildlands Project](#), an organization that creates large scale, science-based conservation plans that include core wild areas, wildlife linkages and stewardship lands. The plans are used by conservation groups, state and federal agencies, local governments, land trusts, private landowners, and others to inform land use decisions.



The land that connects our wild areas is often in need of restoration," said Margo McKnight, Executive Director of the Wildlands Project. "Keith brings to our Board not only his passion and personal commitment to the environment, but his savvy as someone who has achieved remarkable success in the business of ecological restoration."

Congratulations, Keith!

Glossary

- **Assisted migration** - the practice of deliberately repopulating members of a species from their present habitat to a new region with the intent of establishing a permanent presence there, generally in response to the degradation of the natural habitat due to human action. (source: Wikipedia)
- **CALFED** - The CALFED Bay-Delta Program is a unique collaboration among 25 state and federal agencies that came together with a mission: to improve California's water supply and the ecological health of the San Francisco Bay/Sacramento-San Joaquin River Delta.
- **California Climate Adaptation Strategy** - To prepare for the expected impacts of climate change, California is developing a statewide CAS in coordination with efforts targeting greenhouse gas mitigation policies. The CAS will synthesize the most up-to-date information on expected climate change impacts to California for policy-makers and resource managers, provide strategies to promote resiliency to these impacts and develop implementation plans for short and long term actions. (Source: California Resources Agency)
- **California Resources Agency** - California's state agency with a mission to restore, protect and manage the state's natural, historical and cultural resources for current and future generations using creative approaches and solutions based on science, collaboration and respect for all the communities and interests involved. (source: California Resources Agency)
- **Catchment Area** - an area that serves to catch water. (source: Merriam-Webster on line)
- **Chaparral** - a shrubland or heathland plant community found primarily in the U.S. state of California and in the northern portion of Lower California, Mexico. It is shaped by a Mediterranean climate (mild, wet winters and hot dry summers) and wildfire. Similar plant communities are found in the four other Mediterranean climate regions around the world, including the Mediterranean Basin (where it is known as maquis), central Chile (where it is called matorral), South African Cape Region (known there as fynbos), and in Western and Southern Australia. (source: Wikipedia)
- **Compound Channel Projects** - projects that are designed to improve flood capacity and ecological function in rivers. (source: Matt Kondolf)
- **Habitat conversion** - the change of land quality, for example through land transformation or intensification of land use. Common reasons for habitat conversion are deforestation/reforestation, suburbanization, corridor construction, desertification and agricultural intensification, e.g. wetland drainage, irrigation or degradation due to overgrazing. (source: Food and Agriculture Organization of the United Nations)
- **Habitat fragmentation** - the emergence of discontinuities (fragmentation) in an organism's preferred environment (habitat). (source: Wikipedia)
- **Water diversion** - Changing the natural flow of water to another location by using dams, canals, or pipelines. (source: Colorado State University)

About Leaf Litter

Leaf Litter is a publication of Biohabitats, Inc. Coinciding with the earth's biorhythms, it is published at the Fall Equinox, Winter Solstice, Spring Equinox and Summer Solstice to probe issues relating to conservation planning, ecological restoration, and regenerative design. Biohabitats has attempted to ensure the accuracy and veracity of the information provided in *Leaf Litter*, however, information contained in *Leaf Litter* should not be construed as a recommendation or endorsement by Biohabitats. Please click [here](#) to contact Leaf Litter editors with questions, comments or content ideas.

Send Leaf Litter to a Friend! We encourage you to share *Leaf Litter* with your friends and colleagues. [Click here](#) to send it now!

Share Leaf Litter! We encourage you to share the contents of *Leaf Litter*, all we ask is that you include this credit: *"The following is an excerpt from Leaf Litter, a publication of Biohabitats, Inc. The full document can be found at www.biohabitats.com."*

Biohabitats is an ecological design and consulting firm specializing in conservation planning, ecological restoration, and regenerative design. To learn more about our ecological services, mission and vision, visit us at www.biohabitats.com.

**Chesapeake/Delaware
Bay Bioregion**

Baltimore, MD
(410) 554-0156

**San Francisco Bay
Bioregion**

San Francisco, CA
(415) 274-2822

**Ohio River
Bioregion**

Louisville, KY
(502) 561-9300

Southeast Bioregion

Raleigh, NC
(919) 518-0311

**Southern Rocky
Mountain Bioregion**

Denver, CO
(303) 477-0660

**Great Lakes
Bioregion**

Cleveland, OH
(216) 921-4430