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Information About Estuaries and Near Coastal Waters October 2002 - Issue 12.5

Table of Contents

- [Americorps and Barataria-Terrebonne National Estuary Program Partner to Restore Wetlands](#)
- [Protecting Least Terns in Southwest Florida](#)
- [BRACE for the Future](#)
- [Strategy and Funding Guides Available for Restoring America's Estuaries](#)
- [Presumpscot River Stakeholders Plan the Future of a Changing River](#)
- [World Oceans Atlas Goes On-line](#)
- [River to Bay Restoration in the Guadalupe River Watershed, California](#)
- [SeagrassNet: Assessing a Critical Coastal Resource on a Worldwide Scale](#)
- [Evaluation of Statewide Watershed Management Approaches](#)



U.S. Environmental Protection Agency

National Estuary Program



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Americorps and Barataria-Terrebonne National Estuary Program Partner to Restore Wetlands



With the passing of each year in the state of Louisiana, 25 to 35 square miles of wetlands disappear due to subsidence and erosion. Put another way, every 30 to 45 minutes, an area of wetlands the size of a football field is transformed into open water. The overwhelming majority of this loss occurs in one of the nation's 28 National Estuaries, the Barataria-Terrebonne National Estuary, a 4.2 million acre

region situated between the Mississippi and Atchafalaya Rivers. This alarming rate of wetland loss is a serious threat to the valuable fish and wildlife resources in this estuary, and is acutely impacting the coastal communities in which hundreds of thousands of people reside. As these once- broad expanses of wetlands disappear, hurricanes become more damaging, and drinking water becomes tainted with salt intruding from the Gulf of Mexico.



The loss of Southern Louisiana's coastal wetlands also impacts the nation. These wetlands are host to some of the richest coastal resources in the United States and are *America's* wetlands. Americans rely on the incredible fertility of Louisiana's wetlands to produce abundant supplies of oysters, shrimp, menhaden and crabs. A total of 25% to 35% of the nation's total catch of estuarine-dependent commercial fisheries are produced in Louisiana wetlands. These nursery habitats are being lost as Louisiana's wetlands disappear.

Fish and shellfish are not the only nationally important products coming out of Louisiana's wetlands. Louisiana and the near-shore regions of the Gulf of Mexico produce a significant portion of the nation's oil and natural gas supply. A total of 17 billion dollars per year are generated through this industry, as Louisiana produces 20% of the nation's oil and 25% of the nation's natural gas. As the shorelines of lakes and bays recede, pipelines transporting oil and gas to other regions of the nation are being exposed, making them more vulnerable to damage from vessel traffic, ports and roads and more susceptible to damage from hurricanes and storm

surges. The risk of oil spills is increasing as a result. In the past, vast wetlands provided barriers to such disasters by helping to slow down storm surges and absorb excess water. Now there is a greater chance for storm damage to occur because there are fewer wetlands to absorb floodwaters.

Ecologically, South Louisiana barrier islands, natural ridges and marshes provide critical resting habitats for the millions of Neotropical migratory birds traveling across the Gulf of Mexico from South America each year. The continued loss of these habitats in Louisiana will affect the numbers and survival of such birds.

Through various partnerships, the Barataria-Terrebonne National Estuary Program (BTNEP) is trying to restore these coastal Louisiana systems. One such partnership is the *AmeriCorps on the Bayou* program. In 1994, President Clinton created the domestic equivalent of the Peace Corps: the AmeriCorps. To join AmeriCorps, an applicant must be 17 years of age or older, a United States citizen or legal resident, and a high school graduate. For full-time service, members must donate a year of their time and complete 1,700 hours of service to receive their educational award. The educational award is a total of \$4,725 that can be used towards existing school loans or future schooling. AmeriCorps works in four main areas: Education, Public Safety, Human Needs, and Environment.

Les Reflections du Bayou

AmeriCorps on the Bayou, a local AmeriCorps program, was founded in 2000 by a host organization, Les Reflections du Bayou, to work on environmental issues. The AmeriCorps on the Bayou program has three main objectives, each corresponding to a section of BTNEP's Comprehensive Conservation and Management Plan. The first objective is to study, protect, clean and beautify the banks and surrounding wetlands of Bayou Lafourche. With the help of BTNEP's educational materials and the training they provide, the members of AmeriCorps were able to learn and study about the wetlands in the area.


AmeriCorps on the Bayou has completed numerous marsh revegetation projects in the region, partnering with many different agencies. Within six months of the start of the program, the seven AmeriCorps members planted 28,950 wetland plants in the Barataria-Terrebonne National Estuary and surrounding areas of south Louisiana. In the future, BTNEP will be organizing additional plantings to help stabilize the banks of Bayou Lafourche, provide habitat, and reduce wave action and saltwater intrusion in the wetlands.

There is a greater chance for storm damage to occur

because there are fewer wetlands to absorb flood waters

A second objective of *AmeriCorps on the Bayou* is to strengthen community support by working with agencies on the Management Conference of the BTNEP to get youth involved in wetlands protection. Since January, *AmeriCorps on the Bayou* has given 85 presentations in the surrounding communities. BTNEP has supplied *AmeriCorps on the Bayou* with many educational tools such as the EnviroScape, providing for activities that teach children about non-point source pollution and the values of wetlands.

The final objective of *AmeriCorps on the Bayou* is to develop within its members a deeper knowledge and appreciation of wetlands, as well as a dedication to community service. The BTNEP has helped tremendously in the training of each *AmeriCorps on the Bayou* member. At each function organized by AmeriCorps members, the Barataria-Terrebonne National Estuary Program has been there to assist. Partnering between NEPs and Americorps makes sense; the *AmeriCorps on the Bayou* and BTNEP partnership should serve as a model for achieving success.

For further information contact, Kelly Cullen, *AmeriCorps on the Bayou*, Office of Les Reflections du Bayou, P.O. Box 993, 14833 West Main, Cut Off, Louisiana, 70345; Phone: (985) 632-6040; E-mail: reflections@mobiletel.com; website: <http://www.orgsites.com/la/americorponthebayou> ; or Kerry M. St. Peí, Program Director, Barataria-Terrebonne National Estuary Program; Phone: (985) 447-0868; E-mail kerry@btnep.org.





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Protecting Least Terns in Southwest Florida

The Rookery Bay National Estuarine Research Reserve (RBNERR) is located in Southwest Florida on the Gulf of Mexico, just south of Naples, the second fastest growing metropolitan area in the nation. Increased urban development along the coast has contributed to significant loss of wildlife habitat, adversely affecting populations of many species, including the least tern, *Sterna antillarum*. Found only in the western hemisphere, least terns arrive on Florida beaches in late March. Nesting begins soon after, peaking in mid-April. By early August, birds begin returning south to their wintering grounds in Central and South America.



Due to declining numbers, the least tern is listed as a Threatened Species by the Florida Fish and Wildlife Conservation Commission (FFWCC) and is also protected by the federal Migratory Bird Treaty Act. Population estimates for Florida least terns are around 10,000.

Least terns need open sand and shell beaches, with elevations well above the mean high tide line to prevent their nests from being washed away during high tides or severe summer storms. They also need nesting sites with short, sparse vegetation that provides cover for chicks but not for predators.



Least terns nest in colonies and lay their two to three well-camouflaged eggs in shallow depressions scraped in the sand. After three weeks, the eggs hatch and the chicks leave the nest within a few hours. Threats to eggs and chicks include raccoons, gulls, trampling by unwary beachgoers, dogs, and vehicles. Adults are very protective parents and will fly up to mob intruders who approach too near, expending precious energy and time better spent tending eggs and chicks. Persistent disturbance may cause terns to abandon the colony.



Increased urban development along the coast has contributed to significant loss of wildlife habitat

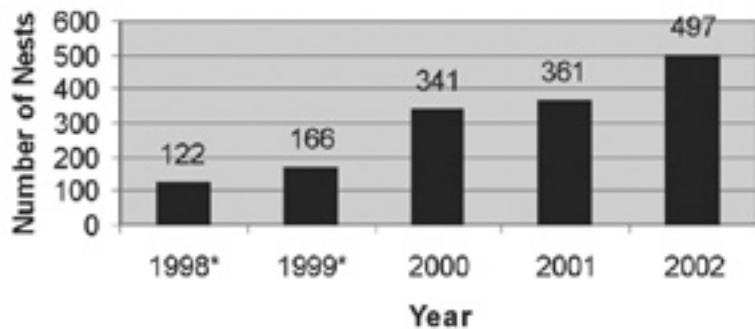
With high-rise condominiums and hotels springing up over much of Florida's coastline, least terns must now compete with development, year-round residents and seasonal visitors for highly desirable recreational space on the beach. The importance of providing beach habitat becomes evident, as least terns have begun to nest on less suitable flat gravel rooftops. Successful nesting is limited because man-made surfaces absorb heat more readily and offer less shade, resulting in rooftop temperatures that can harm eggs and kill chicks. Even worse, rolled plastic roofs, which are unsuitable for nesting terns, are now often used to replace gravel-covered roofs, so even these marginal nesting sites are now being lost.

A recently emerged sandbar within RBNERR boundaries is one of the few remaining areas in Southwest Florida that provides least terns with a shelly substrate suitable for nesting, as well as safety from predators and human activity. Approximately three acres in size, the sparsely vegetated sand bar appeared in 1996, southwest of Marco Island near the northern edge of the Ten Thousand Islands.

This sandbar and its nearby waters attract beachcombers, campers, boaters and

fishermen. This poses a challenge for land managers trying to balance wildlife habitat protection and public demands for coastal recreation. In cooperation with the FFWCC and National Audubon Society (NAS), RBNERR officials have closed the sandbar to all public access during the nesting season (April through July) each year since 1999. Four large signs reading "No Landing", visible from the water, and 50 smaller informational signs strung together and marked with bright orange flagging are installed annually around the perimeter of the sandbar, just above the high tide line. Ensuring visibility of signs enforcing no-landing regulations and providing public information through local media is necessary to ensure nesting terns are protected from disturbance. Two other smaller nesting areas within RBNERR had been posted in previous years, but these colonies were only marginally successful because they were located too close to heavily used beach areas.

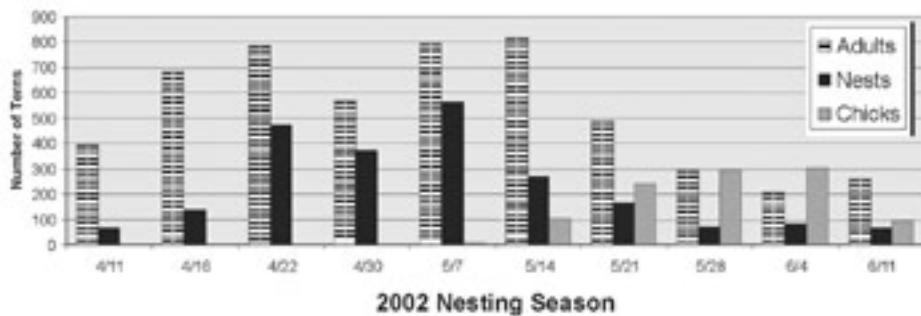
Least Tern Nesting



Least tern adults, nests and chicks are monitored weekly during the nesting season to determine seasonal nesting success and assess population trends. Protection of the colony early in the nesting season is the most important strategy employed to ensure survival of the greatest number of nests and fledglings, because as the season progresses, so does the chance of the sandbar being overwashed by severe summer storms or hurricanes.

Monthly censuses of this sandbar were begun in 1998 by National Audubon Society biologist Ted Below. In 2001, RBNERR biologist began weekly censuses during the nesting season, following placement of the "No Landing" signs. These counts recorded an increase in the peak number of nests on the sandbar, up from 176 nests in 1998 to 363 nests in 2001. In 2002, a record number of adult least terns on the sandbar was estimated at over 1,000 individuals. The highest number of chicks counted was 384, also up from previous years.

Least Tern (*Sterna antillarum*)
Cape Romano Sandbar



The future of this sandbar is not guaranteed. The dynamic nature of the area has brought about gradual changes to the size and elevation of the sandbar over the past several years, as indicated by aerial photography and GIS mapping. Heavy surf, wind and intense storm events have already reshaped it in recent years, and continue to threaten its viability. Because the ephemeral nature of this sandbar permits periodic overwashing with storm events, it could wash away as quickly as it appeared.

However, as a result of early protection and cooperation by the public this year, biologists believe this sandbar provides habitat for the most successful beach-nesting colony of least terns in South Florida. RBNERR officials plan to close and monitor this sandbar during least tern nesting season each year, as long as least terns continue to use it, to help protect this state-listed threatened species.

For further information contact, Renee Wilson, Rookery Bay National Estuarine Research Reserve, 300 Tower Road, Naples, FL 34113 Phone: (239) 417-6310 ext. 204 E-mail: Renee.Wilson@dep.state.fl.us website: <http://www.rookerybay.org>

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BRACE for the Future



In May 2002, researchers from 14 different government agencies, laboratories, universities and companies converged on Tampa, Florida, for a one-month intensive monitoring study of atmospheric pollutants. During this intensive monitoring period, aircraft were used to characterize urban air pollution; continuous sampling of more than 100 gases and particles was accomplished using state-of-the-art instrumentation; nitrogen deposition was measured; hourly vertical profiles of temperatures and winds were obtained; and continuous remote sensing of

atmospheric turbulence over Tampa Bay was conducted.

The intensive monitoring was part of the Bay Regional Atmospheric Chemistry Experiment, or BRACE, a study that seeks to improve the current estimate of nitrogen deposition. BRACE hopes to achieve this by expanding the air pollutant monitoring network, using state-of-the-art sensors and monitors and the most sophisticated atmospheric chemistry and physics computer models available to analyze air pollution and weather conditions. Improved spatial and temporal resolution of the monitoring network is key to understanding the contribution of local, regional and remote nitrogen emission sources to total nitrogen deposition.


Why are we concerned with atmospheric pollutants? Excessive inputs of biologically active nitrogen to estuaries can threaten aquatic ecosystems. The Tampa Bay Estuary Program (TBEP) estimates that direct atmospheric deposition of nitrogen accounts for about 800 tons/year of nitrogen, or 25% of the total nitrogen input to Tampa Bay. Measurement studies begun in 1996 have confirmed preliminary estimates and prompted discussions among regional stakeholders concerning the most effective atmospheric nitrogen management strategies. An effective management strategy relies heavily on the accurate apportionment of nitrogen deposition among the various sources of emissions. In the Tampa Bay region, the presence of a land-sea breeze, on many days, which recirculates the urban pollutants, makes accurate source apportionment a real challenge.

Excessive inputs of biologically active nitrogen to estuaries can threaten aquatic ecosystems

For the May 2002 BRACE intensive study, five air quality sites and four meteorological sites were chosen in order to build on existing data networks. The five air quality sites were located at the eastern end of Gandy Bridge, an existing atmospheric deposition study site with a 5-year continuous record of ambient air and rainfall nitrogen data; Azalea Park in Pinellas County; Simmons Park in southern Hillsborough County; eastern Hillsborough County near Sydney (the BRACE supersite shown in Figure 1); and the Tower Dairy property in central Hillsborough County. The distance between Sydney, the most eastern site, and Azalea Park, the most western site, is approximately 70 km. Two of the meteorological sites, Sydney and Simmons Park, overlap with air quality measurement sites; the two other meteorological sites are located at Weedon Island in Pinellas County and near the Port Manatee Turn channel marker in Tampa Bay, about 5 km west of Port Manatee.

The Florida Department of Environmental Protection (FDEP) funds and manages

the BRACE. A significant portion of the BRACE funding comes from a 1999 Tampa Electric Company, Inc., (TECO) settlement with FDEP. The minimum anticipated project length is six years, including three years of planning, equipment acquisition, contract negotiations, site identification, preparation, and pilot studies; one year of baseline data and one month of intensive air quality monitoring; and the remaining years for data processing, data analyses, modeling of air pollutant transport, dispersion, transformation, and deposition. The purpose of the intensive monitoring period was to obtain enough high quality observations to initialize and evaluate the air quality models. The BRACE will maintain less intensive collections of ambient air and rainfall nitrogen concentration data through May 2003.

For further information, contact Dr. Thomas Atkeson, BRACE Program Manager, FDEP, MS6540, 2600 Blair Stone Road, Tallahassee, FL, 32399; Phone: (850) 921-0884; E-mail: thomas.atkeson@dep.state.fl.us; or Dr. Noreen Poor, BRACE Project Manager, University of South Florida College of Public Health, 13201 Bruce B. Downs Blvd., Tampa, FL 33612; Phone: (813) 974-8144; npoor@hsc.usf.edu. For additional details, visit the BRACE website at <http://www.hsc.usf.edu/publichealth/EOH/BRACE/>. 



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Strategy and Funding Guides Available for Restoring America's Estuaries

The conservation organization Restore America's Estuaries has released two related reports concerning habitat restoration: A National Strategy to Restore Coastal and Estuarine Habitat and Funding for Habitat Restoration Projects: A Citizen's Guide.



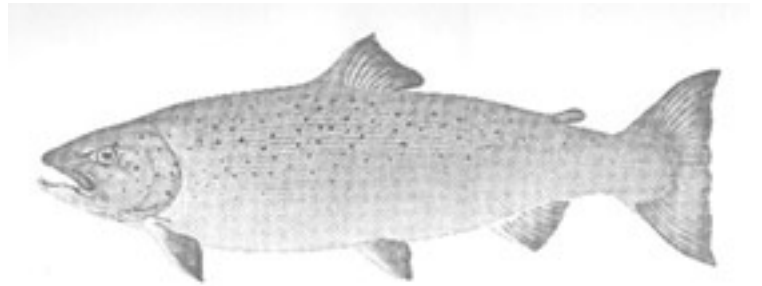
The National Strategy report provides a framework for restoring ecological functions to coastal and estuarine habitats. This framework includes setting restoration priorities, coordinating diverse programs, and establishing and meeting public expectations. The funding guide provides a quick, comprehensive and accessible review of federal funds that may be used to implement on-the-ground habitat restoration projects. Its design and layout provides easy access to critical information about funding, eligibility and program contacts.

A National Strategy is available in print, as an interactive CD-ROM, or on-line at www.estuaries.org. To request a printed copy or CD-ROM, please contact Restore America's Estuaries at info@estuaries.org. The Citizen's Guide is available on-line at <http://www.estuaries.org>. [EXIT disclaimer >](#)



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Presumpscot River Stakeholders Plan the Future of a Changing River



The Presumpscot River, located in southern Maine, flows for 26 miles from Sebago Lake, Maine's second largest reservoir and the water supply for the city of Portland, to the Casco Bay estuary. It takes its name from the native "Pes-ompsk-ut," or "river of many rough places." The river's power was first harnessed by mills early in the 1700's and more recently for hydroelectric power. Early historical accounts mention efforts to ensure passage of fish up the river. However, there are currently nine dams along the Presumpscot River impounding 22 miles of previously free-flowing water in a series of slow-moving reservoirs. There is no fish passage over these dams.

Significant changes took place on the river in 1999 that presented important opportunities both to restore anadromous fish runs and to address the threat of increased development in the river's watershed. The large pulping operation on the river ceased, dramatically reducing water and air pollution in the watershed.

Also, the State of Maine agreed to purchase and remove Smelt Hill dam, the lowermost dam on the river. From a broader perspective, these unique opportunities offer the potential to increase the ecological integrity, quality of life, and prosperity of the communities along the river.



In September 2000, the time was ripe to start the planning process for the management of this long-overlooked resource. The Casco Bay Estuary Project convened a diverse group of stakeholders, ranging from the paper industry to environmental advocacy groups, to develop a management plan for the Presumpscot River.

The future of the River is dominated by three management issues: fisheries management, open space preservation, and the cumulative impacts of activities in and around the river.

Fisheries: The 22 miles of river impoundments support both a small resident fishery and stocked salmon and trout; however, the water flows too quickly to allow for development of the necessary plankton population that would sustain most lake fishes, and too slowly to function ecologically as a river. Thus, the river supports only a relatively small number of fish. The removal of Smelt Hill Dam this fall will open up seven miles of the river to flow freely to Casco Bay and will allow for the upstream migration of fish including Atlantic salmon, alewives, river herring, and shad. Removal of Smelt Hill Dam, restoration of sea run fisheries through removal of three other dams, and ensuring fish passage at up to 3 other dams would cost an estimated \$4 million to \$13 million. This option, one of several management options identified through this process, would significantly increase populations of migratory fish and is the only option that would fully achieve the current management goals of State and federal fisheries management agencies.

Open Space: The Presumpscot riverbank is mostly undeveloped, due in large part to the air and water pollution from the now discontinued pulping operation, reportedly so caustic that it peeled paint from nearby houses. Given that the river is within a major metropolitan area, it is surprising that approximately 83% of the shoreline was undeveloped in 2000. Last year, local land trusts, the Land for Maine's Future Program, and other partners on the project, collaborated to prevent

a 67-home riverfront subdivision; they instead negotiated a 30-home subdivision preserving 48 acres of land along the river. Potential options for protecting open space along the Presumpscot include:

- Development of a water trail;
- Establishment of a greenway along the river;
- Conservation of high habitat value parcels;
- Creation of new public access points; and
- Preservation of the Cumberland and Oxford canal system as a historical and recreational park.

Cumulative Impacts: Early development of the Presumpscot River watershed depended on the river to fuel economic development. Historical activities that led to cumulative impacts on the river included:

- Clearing of land and draining or filling wetlands for agriculture;
- Timber harvesting for fuel wood, lumber, shipbuilding, and pulp and paper manufacturing;
- Mining of sand and gravel;
- Development of settlements;
- Construction of roads, canals, and railroads for transportation;
- Industrial development, including dams for water power and hydroelectric power;
and
- Use of the river for waste disposal by industry and municipalities.

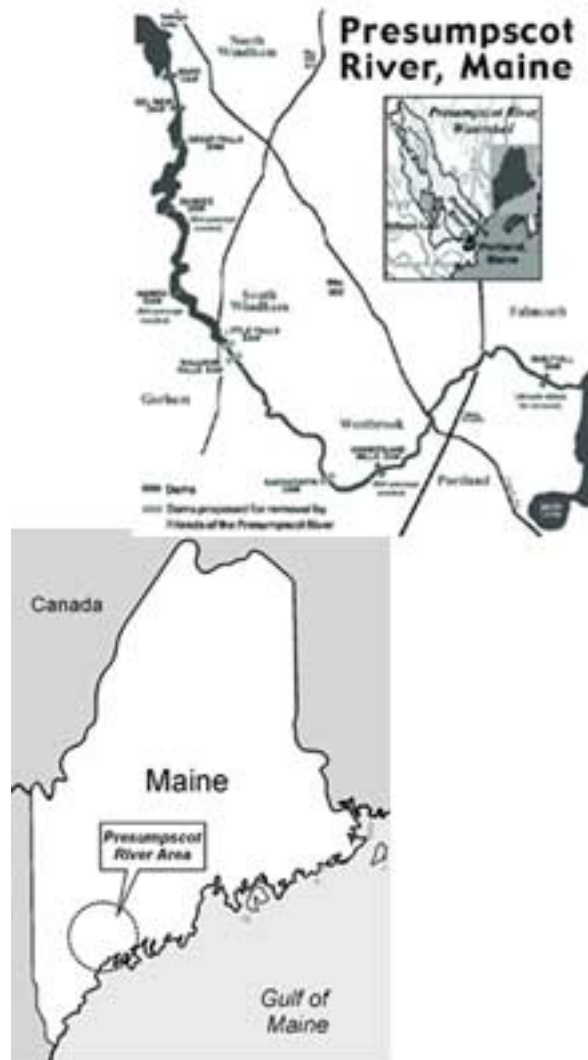
These activities altered the river's flow regime, degraded water quality, increased sedimentation, and destroyed habitat. Options for addressing cumulative impacts are numerous and challenging, but include reducing non-point source pollution, protecting habitat, and restoring sea run fisheries.

Stakeholders Take on Management Planning

The Presumpscot River planning process is modeled after a process used successfully to address other resource management issues. It emphasizes: (1) development of credible information and analyses to lay the foundation for informed decisions; (2) an open public process and collaboration among stakeholders; and (3) a search for creative win/win solutions that ideally address all the interests involved and balance competing interests. A mediator was also brought in to facilitate a consensus on controversial issues.

The Presumpscot River Plan Steering Committee was formed to lead the recent

management effort. The committee is comprised of 17 stakeholders, including South African Pulp and Paper Inc. (SAPPI), which operates most of the dams on the river, environmental advocates for the river (such as the Friends of the Presumpscot River), and local, state and federal government representatives, among others. The goal of the group is to develop a locally-endorsed and State-approved river management plan based on a realistic vision for the future of the river. Over the last two years, the Steering Committee has been compiling information on the conditions, issues, and implementation options for each of these three priorities, and they recently released fact sheets and draft white papers for public review.



This fall, the Presumpscot River Management Plan Steering Committee is taking their research and management options to the public to solicit the public's vision for the future of the river.



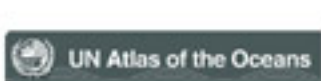
For further information, contact: Karen Young, Casco Bay Estuary Project; Phone: (207) 780-4820; Email: kyoung@usm.maine.edu. To obtain copies of the fact sheets produced in the three subject areas, visit the Casco Bay Estuary Project website at <http://www.cascobay.usm.maine.edu>. [EXIT disclaimer ►](#)



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World Oceans Atlas Goes On-line

To draw attention to the failing health of the world's marine ecosystems, the United Nations has launched an on-line atlas of the oceans. The atlas is funded through a \$500,000 grant sponsored by the United Nations Foundation, and through financial contributions from six United Nations agencies.



The atlas is an information system comprised of fourteen global maps and includes four main entry points to access information:

About the Oceans provides information on the history and biology of the world's oceans, maps and statistical information, and climatological and ecological information;

Uses of the Oceans provides information on the fisheries industry, shipping and mining, ocean dumping, and marine biotechnology;

Issues of the Oceans focuses on food security, climate change and human health;

and

Geography of Oceans provides information categorized by geographical area.

The atlas will be updated continuously and is designed to track the state of the world's ocean resources, covering issues such as over-fishing, the effects of climate change, and changes in the Earth's ice caps, as well as ship piracy, the spread of harmful algae and offshore oil issues.

The atlas is maintained and updated by a worldwide coalition of scientific institutions working with the U.N. The site is intended for use by policy makers, scientists, students, and resource managers.

For further information on the Oceans Atlas, visit the website at

<http://www.oceanatlas.org/index.jsp>. 



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River to Bay Restoration in the Guadalupe River Watershed, California

A series of cascading events over the past century and a half has drastically modified San Francisco Bay and its associated watersheds, and in particular the Guadalupe River watershed. Many residents living near the Guadalupe River are facing increased flood hazards. Since the Gold Rush era, the watershed has experienced land subsidence of up to eight feet in some locations, along with the loss of floodplain area and wetlands. Stream levels have become more variable and unpredictable due to increases in impervious surface area. During an extreme flood event, the Guadalupe River can overtop its banks and levees and flow into the streets, homes and businesses of San Jose.



The Guadalupe River starts out as several small tributaries in relatively undeveloped areas of the Santa Cruz Mountains. Prior to intensive development in the San Francisco Bay area, the Guadalupe River traveled a network of meandering channels in a large tidal marsh, before entering the open waters of the south Bay. This tidal marsh flourished with aquatic life and provided habitat for migrating and resident wildlife and fish. During storm events, steelhead trout threaded their way through these channels on their way to upstream spawning grounds. Their progeny, after spending one or two

years in the cool waters of the upper watershed, found their way to the sea through the transitional tidal marsh system along the Guadalupe River.



During the Gold Rush era, hydraulic mining practices washed silt and mercury into the bay. With development came modifications to the watershed, including manmade river crossings that formed barriers to migrating anadromous fish. More habitat was lost when marshes were filled and stream channels were straightened for hydraulic "efficiency" and to create farmland or residential development. Intense irrigation needs for fruit orchards in the dry Santa Clara Valley resulted in a dramatic drop in groundwater levels, which led to subsidence of the land by as much as 8 feet in the south Bay and downtown San Jose.

The solution to groundwater subsidence was the creation of an extensive recharge system supplied by several upstream reservoirs, to help recharge groundwater aquifers through the dry summers. These reservoirs served their purpose, but also prevented steelhead trout from migrating to upstream spawning habitat. The dams also prevented the transport of gravels to spawning habitat downstream. Eventually, development pressures led to bank failures, loss of riparian vegetation, increases in water temperature, and loss of wildlife habitat.



Today, the Guadalupe River runs downstream through densely developed urban areas, including the City of San Jose, before entering South San Francisco Bay.

Salt production ponds in the vicinity of the mouth of the Guadalupe River confine the River between levee walls, contrasting with its former meandering channel through wetlands and floodplains. Although the ponds provide some wildlife habitat, the high concentrations of salt are prohibitive for many life forms and, unfortunately, much of the tidal marsh habitat has been eliminated.

Flood Protection Efforts

The Santa Clara Valley Water District (the Water District), along with several partners, is planning a series of projects that integrate flood protection, public access, and environmental restoration along the Guadalupe River. Together, these projects would restore the flood conveyance capacity of the existing channel while simultaneously restoring substantial amounts of impaired habitat. The Upper Guadalupe River project, the Downtown San Jose Guadalupe River project, and the Lower Guadalupe River project are being separately funded and managed, but project participants are making significant strides in working together for a common watershed-based implementation and management plan. These multi-objective projects have incorporated input from the US National Marine Fisheries Service, US Fish and Wildlife, the US Army Corps of Engineers, California Fish and Game, the San Francisco Regional Water Quality Control Board and local environmental advocacy organizations such as the Guadalupe-Coyote Resource Conservation District and the National Heritage Institute. Through collaboration and cooperation, the Water District is successfully providing flood protection while enhancing environmental conditions and recreational public access.

The watershed-wide plan to integrate flood control, recreation, and environmental restoration will minimize impacts to existing riparian vegetation through the use of several bypasses to simulate a natural flood plain. Revegetation will focus on shading the stream, ultimately improving water temperatures for steelhead trout, a species now listed as threatened under the federal Endangered Species Act.

Numerous barriers to migratory fish passage are being eliminated as part of the project design. The acreage of riparian vegetation will increase several-fold, restoring lost habitat to many wildlife species.

Water quality in the stream and the bay will be improved by removing contaminated sediments as part of the maintenance of the flood protection channels. A continuous trail system, designed to

protect fish and wildlife habitat, will provide public access along the stream corridor, and will connect with a greater Bay area network of trails.



This story of restoration does not end at the mouth of

the Guadalupe River.

As the plan is implemented, an Adaptive Management Team (AMT), consisting of project sponsors, resource agencies and environmental advocacy groups, will periodically review mitigation monitoring results based on specific quantifiable environmental indicators. The AMT will make recommendations to the Water District if those indicators fall short of pre-established targets. As each segment of the plan is completed, the AMT will ensure that the ongoing monitoring results and restoration efforts are incorporated into the new segments. Ultimately, the AMT concept will be expanded to encompass all significant activities within the Guadalupe Watershed that may impact the environment.

Construction on several portions of the project within downtown San Jose has already begun and most of the revegetation has been completed. A major restoration project was completed this year on a 1.6-mile reach of Guadalupe Creek, a Guadalupe River tributary, as compensatory mitigation and environmental enhancement. Completion of the lower and downtown projects is scheduled for December of 2004. The schedule for completion of the upper portion will depend upon funding by the US Army Corps of Engineers and obtaining the necessary permits.

This story of restoration does not end at the mouth of the Guadalupe River. Recently, it was announced that many of the privately owned South Bay salt ponds will be sold to state and federal agencies for the purpose of tidal marsh restoration. These ponds were formed by diking-off large portions of marshland. The marsh restoration will require a transition plan to handle critical issues such as flood protection, water quality, fish passage through the marsh channels, and obtaining the massive amounts of fill necessary to establish the marsh at a level where it would be subject to tidal action. To this end, the Santa Clara Valley Water District will be working closely with the US Fish and Wildlife Service, the National Marine Service, the California Department of Fish and Game, the Regional Water Quality Control Board, and others to ensure that the tidal marsh restoration is coordinated with, and complements, the Water District's restoration in the Guadalupe Watershed.

For further information, contact Terry Neudorf, Santa Clara Valley Water District; Phone: (408) 265-2600; Email: tneudorf@valleywater.org; or Al Gurevich, Santa Clara Valley Water District; Phone: (408) 265-2600; Email: agurevich@valleywater.org.



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SeagrassNet: Assessing a Critical Coastal Resource on a Worldwide Scale

SeagrassNet is a global monitoring program to investigate and document the worldwide status of seagrass resources and the threats to this important and imperiled marine ecosystem.

The program started with an ongoing pilot study in seven countries of the Western Pacific and is now expanding to other countries. A globally applicable monitoring protocol and web-based data reporting have been established. The plan is to continue the expansion of SeagrassNet to other areas of the globe and establishment of a network of monitoring sites linked via the World Wide Web by an interactive database. The ultimate goal of the Program is to preserve the seagrass ecosystem by increasing scientific knowledge and public awareness of this threatened coastal resource.



Seagrasses are underwater flowering plants that form an important coastal habitat worldwide. They often occur in vast meadows that provide nurseries, shelter, and food for a variety of commercially, recreationally, and ecologically important species (e.g., fishes, sea turtles, dugong, manatee, seahorses, and many invertebrates). Additionally, seagrasses filter estuarine and coastal waters of nutrients, contaminants, and sediments, and are closely linked to other community types. In the tropics, seagrasses are associated with coral reef systems and mangrove communities, and in temperate waters they are linked to algal beds, kelp forests, and oyster reefs. Existing at the interface of the land margin and the world's oceans, seagrasses are threatened by many anthropogenic impacts. While the exact

distribution and degree of decline of sea grasses worldwide is not clearly known, observations of sea grass ecosystems at specific sites support the belief that the global loss of seagrass habitat is large.

There is a lack of information about the status and health of seagrasses worldwide, particularly in the less economically developed regions of the globe. SeagrassNet's efforts to monitor known seagrass areas and to survey uncharted seagrass beds are important first steps in understanding and sustaining the seagrass resource. Monitoring of these ecosystems will eventually reveal both human impacts and natural fluctuations in coastal environments throughout the world. The aim of SeagrassNet is to elevate interest and awareness in seagrasses to the level that currently exists for coral reefs, and to provide a "global report card" on the health of this valuable coastal habitat.



Sampling on the SeagrassNet Transect off Nusa Island, Kavieng, Papa New Guinea, a site dominated by the seagrass *Thalassia hemprichii* and *Cymodocea rotunda*. Paul Lokani (far left) of the Nature Conservancy assists the Kavieng SeagrassNet team. John Aini (right and insert) with the National Fisheries College is the SeagrassNet team leader in Kavieng.

SeagrassNet was initiated with monitoring in the Western Pacific during the summer of 2001, based on research techniques described in *Global Seagrass Research Methods* (edited by F.T. Short and R.G. Coles, Elsevier, 2001). Monitoring includes the collection of samples of different species, photographic records, and data on several biological and environmental parameters, including seagrass cover, canopy height, biomass, sexual reproduction (seeds, flowers, and fruits), shoot density, depth of distribution, tidal information, and environmental data (water temperature, salinity, light level, and surface sediment characteristics).



The Western Pacific pilot program, funded by the David and Lucile Packard Foundation, identified seven sites in Western Pacific countries, recruited local scientists and coastal managers to form monitoring teams, and trained these people in identification of seagrass species and the SeagrassNet monitoring protocol. The seven teams, from Fiji to the Philippines, have now successfully completed several rounds of quarterly monitoring and submitted their seagrass and environmental data to the database via the Internet. A workshop was held in January, 2002, to bring together the seven monitoring teams and scientists from two additional sites in Indonesia and Malaysia to review and update the protocol, receive training in monitoring, and learn how to download and submit data via the web-based system. Additionally, the team leaders were trained in Seagrass Watch, a volunteer-based monitoring program for seagrasses. This award-winning program originated in Australia.

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In the spring of 2002, three SeagrassNet sites were set up in Brazil with funding from the Brazilian government. In the summer of 2002, SeagrassNet and Seagrass Watch will be established at three sites in Indonesia. New sites have also been established in the Malaysian peninsula and on the east coast of the U.S. Investigations are underway to establish SeagrassNet sites in Vietnam at the World Heritage site at Ha Long Bay, as well as in the Caribbean, beginning in Belize. Other scientists and coastal resource managers in Africa, South America, Asia, India, Europe, Australia, and North America are now interested in joining

SeagrassNet and monitoring seagrasses in their regions. Funding is now being sought to move SeagrassNet beyond its pilot phase in the Western Pacific into other regions of the world.

In a related effort, a World Atlas of Seagrasses, edited by Drs. Edmund Green and Frederick Short, will be published late in 2002 by the University of California Press. This atlas will give the best and most up-to-date information available on worldwide seagrass distributions, species ranges, and regional characterizations. Many seagrass scientists have contributed chapters to the regional sections, and an extensive literature review was completed to produce the comprehensive seagrass species distribution maps. The atlas has highlighted areas where seagrass information is sparse, thereby identifying locations for further investigation by SeagrassNet.

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National Estuary Program



Note: This information is provided for reference purposes only. Although the information provided here was accurate and current when first created, it is now outdated.

Evaluation of Statewide Watershed Management Approaches

The Environmental Protection Agency (EPA) Office of Wetlands, Oceans, and Watersheds and the Office of Wastewater Management recently released the Evaluation of Statewide Watershed Management Approaches, a jointly conducted assessment of state experiences in implementing statewide watershed management approaches. The objectives of the review were to identify and describe different statewide watershed management approaches, characterize and assess the experiences of selected states that used different approaches, and develop recommendations to improve EPA's support and state implementation of statewide watershed management. The study concluded that state-facilitated basin/watershed planning processes represent significant opportunities for the EPA to integrate the Clean Water Act and Safe Drinking Water Act water quality program requirements. The study recommends that the EPA work with states to adopt a multi-pronged approach to statewide watershed management.

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