Florida Specifier

Practical Information For Environmental Professionals

Single Copy Price: $5

February 2016

Volume 38, Number 2

Got a story lead?

Got an idea for a story? Like to submit a column for consideration? Fire when ready. And don't forget to fill us in on your organization's new people and programs, projects and technologies—anything of interest to environmental professionals in Florida. Send to P.O. Box 2175, Goldenrod, FL 32733. Call us at (407) 671-7777; fax us at (407) 671-7757, or email mreast@enviro-net.com.

Address label changes?

If your mailing label is inaccurate or incomplete, please contact us with your current information at P.O. Box 2175, Goldenrod, FL 32733; call us at (407) 671-7777; fax us at (407) 671-7757; or e-mail us at mreast@ enviro-net.com. We appreciate your help.

Presorted Standard
U.S. POSTAGE
PAID
ORLANDO, FL
PERMIT 1556

1602

CHANGE SERVICE REQUESTED

Florida Specifier
P.O. Box 2175
Goldenrod, FL 32733

Photo courtesy of Clay County Utility Authority

Workers install reclaim water mains to deliver water to the Clay County Utility Authority's Shallow Aquifer Rapid Infiltration Facility. The utility is now conducting operational testing to determine how much water infiltration that these shallow aquifer infiltration basins can handle. See story below.

EPA reverses field, signs off on Sabal Trail natural gas pipeline

By ROY LAUGHLIN

In a mid-December letter, James D. Giattina, regional water division director in the U.S. Environmental Protection Agency's Region 4 office, notified the U.S. Army Corps of Engineers that the agency was dropping its objections to the Sabal Trail natural gas pipeline.

Giattina's letter reversed significant objections to the project raised in late October by Christopher Militscher, chief of the EPA's National Environmental Policy Act program office.

Militscher's October letter pointed out concerns to the Federal Energy Regulatory Commission that the natural gas pipeline project could have serious environmental impacts.

Militscher questioned the destruction of wetlands; impacts on wildlife habitat, rivers and springs; potential contamination to the Floridan Aquifer; and environmental justice concerns arising from impacts on minority communities along the pipeline's route.

Giattina said that the agency had changed its mind on the issues after discussions with officials of the Sabal Trail pipeline partnership, providing point-by-point comments to justify the agency's 180-degree reversal.

He supplied a revised estimate of the number of impacted jurisdictional wetland acres. That estimate is now 882 acres, down of an original 1,255 acres, a figure that was "not correct as a result of calculation issues," Giattina wrote. "The pipeline project as proposed will permanently affect approximately 235 acres (of wetlands)."

The EPA and corps will have an additional opportunity to mitigate those impacts during the Section 404 permit process, he noted.

Militscher had urged pipeline officials to consider alternatives routes to avoid environmentally sensitive areas and geologically risky locations, and to ensure environmental justice goals.

Giattina noted that the pipeline will be co-located with existing utility rights of way along 65.5 percent of its proposed route. Further, he wrote, pipeline planners evaluated 294 reroutes.

Co-location was the crux of the environmental justice concerns raised in Albany, GA. Pipeline opponents there were concerned that the route—about 200-300 feet from the city's drinking water wellfield—posed an unacceptable risk to a largely minority community.

Giattina noted that the pipeline and a pump plant will be co-located with an existing gas pipeline. The pipeline in the disputed area will have thicker walls for safety and will be buried about eight feet deep.

In addition to co-location and route changes, the pipeline project applicants proposed to further limit effects on wetlands by limiting the right of way in wetlands to 75 feet, cross wetlands at

PIPELINE
Continued on Page 12

CCUA reclaimed water system to use shallow aquifer storage

By ROY LAUGHLIN

By April, the Clay County Utility Authority should be operating a series of sandy bottom ponds on 31 acres of land to "bank" up to 2.2 million gallons a day of treated wastewater in the shallow aquifer.

Ken Fraser, chief engineer with CCUA, said the utility is now conducting operational testing to determine how much water infiltration these shallow aquifer rapid infiltration basins, or SARIBs, can handle.

"We're fairly confident it will be more than the currently permitted two million gallons a day," he said.

The benefits of this new facility include making additional water available for landscape irrigation during the dry months, perhaps limiting water withdrawals from the Floridan Aquifer and largely discontinuing wastewater releases to the St. Johns River.

Currently, CCUA treats about seven million gallons of wastewater per day, primarily in its four major wastewater treatment plants.

On average, about four million of those gallons are reclaimed for landscape irrigation, primarily in Clay County subdivisions constructed within the last decade.

During the rainy season, up to a couple of million gallons a day are not needed. That water, along with some of the nitrogen and phosphorus remaining in the treated effluent, has to be released into the St. Johns River.

CCUA
Continued on Page 12

Environmental Protection Agency releases 2015 enforcement score card

Staff report

Record-setting settlements with hazardous waste polluters, fines for Clean Air Act violations and Superfund settlements reflected big wins for U.S. Environmental Protection Agency enforcement in 2015.

The EPA estimated that compliance agreements will reduce air pollutants by 430 million pounds, provide $2 billion in commitments from responsible parties to cleanup Superfund sites and provide more than $39 million for environmental projects that provide direct benefits to communities harmed by pollution.

EPA's enforcement actions will require companies to invest more than $7 billion in improved processes and equipment to better control pollution and cleanup contaminated sites.

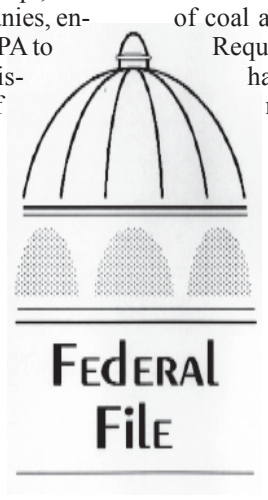
It also yielded more for more than $404 million in combined federal administrative, civil and judicial penalties, and criminal fines.

Florida was one of the beneficiary states this year. After negotiating for several years, the EPA reached agreement with Mosaic Fertilizer LLC to properly treat, store and dispose of 60 billion pounds of hazardous waste, primarily gypsum stack piles, at eight facilities across Florida and Louisiana.

The agency said this was the largest amount of hazardous waste ever covered under a Resource Conservation and Recovery Act settlement.

Florida also benefits from the BP settlement.

Elsewhere, Duke Energy Corp., one of Florida's big four power companies, entered into an agreement with EPA to cut coal-fired power plant emissions, control other forms of pollution and engage in projects to promote renewable energy development and energy efficiency.



Other major cases include a $100 million penalty under Clean Air Act with Hyundai-Kia. Another agreement requires Noble Energy Inc. of Colorado, a leading oil and gas producer, to use advanced monitoring technologies to detect air pollution problems in real time so that it can effectively use pollution control at its facilities.

The EPA's criminal program also had a good year, securing $4 billion in court-ordered environmental projects, winning more than $200 million in fines and restitution and sentences that total 129 years of incarceration for convicted defendants.

Duke Energy agreed to pay $68 million in criminal fines and spend an additional $34 million on environmental projects to benefit rivers and wetlands in North Carolina. The criminal penalties arose from the company's poor handling of coal ash impoundments in the state. Required improvements in coal ash handling will cost Duke an estimated $3.4 billion.

The Obama administration will be remembered as one involved in more court challenges to EPA rules and regulations than any of its predecessor administrations.

Perhaps the court challenges arose because the administration aggressively voiced its intent to enforce EPA regulations.

Coal to natural gas. A new report by Bluefield Research indicated that utilities in 32 states across the country will retire 20.4 gigawatts of coal-fired power plants in the near future.

Natural gas plants that replace them are substantially more efficient in their use of cooling water, which may reduce water demand where conversion occurs.

A September 2015 EPA rule requiring additional emission controls may require upgrades to 12 percent of U.S. power plants larger than 50 megawatts. Plant upgrades will be required between 2019 and 2023 as permit renewals occur.

These will primarily affect power generating plants in the mid-Atlantic and Midwestern states where coal remains an economically viable fuel.

Bluefield's report noted that the mature power sector depends on established "water firms," and those will be the primary recipients of an expected $3.1 billion in expenditures during the next decade.

Much of the expenditures will be for water treatment expected to be provided by GE, Veolia and Aquatech. According to the report, business expansion opportunities could occur for market entrants who work with established electrical power companies such Bechtel, Fluor and Kiewit.

Bluefield, whose reports are primarily intended to characterize market opportunities, suggests that the U.S. power companies' complex reliance on water is shifting, providing business opportunities for engineering, consulting and construction companies.

Fracking's impact on home values. Academic researchers found that when fracking occurred within 1.5 kilometers of a residential property, home prices declined by an average of $30,000.

But the researchers also listed a number of caveats that make their findings highly case specific.

For example, homes likeliest to lose value relied on water wells on the property. Homes on piped-in water did not show any loss of value. Those homes increased by an average of nearly $5,000 when fracking wells were drilled within 1.5 kilometers, as long as the drilling equipment was out of sight.

Proximity to gas well development was the biggest factor in changes in home values on susceptible properties. Those within one kilometer experienced the greatest loss of value, up to 14 percent, while those further away than two kilometers experienced no change in value.

The research team, led by Duke University Economics Professor Christopher Timmins, PhD, looked at home values in 36 Pennsylvania counties from 1995 through 2012. The analysis considered potentially confounding factors, such as the influence of the recession and lease payments.

This is one of the first studies to document fracking's influence on home values.

The strong correlation with distance between a fracked well and homes that depend on potable water wells, according to researchers, shows the public's substantial uncertainty over perceived risks to drinking water.

The report did not examine actual risks, which may take years to characterize accurately.

Pennsylvania has been a region with continuing news reports and investigations of fracking well contamination of drinking water wells, so perception is far ahead of data on this subject.

This finding may advise events in Florida. Here, the state Legislature is again considering a law to allow fracking anywhere in Florida. In its present form, the state rule will take precedent over any local city or county ordinance.

Many local governments have weighed in officially to oppose the proposed legislation, claiming it will allow fracking wells adjacent to residential developments and could lower house values.

The only currently active oil production wells in Florida are in Southwest Florida, notably Collier County.

It remains to be seen if lack of local restrictions will open up other areas of the state to fracked wells for oil and gas exploration and production.

FEDFILE

Continued on Page 14

Florida Specifier
P.O. Box 2175
Goldenrod, FL 32733
Phone: (407) 671-7777
Fax: (407) 671-7757
www.enviro-net.com

MICHAEL R. EASTMAN
Publisher/Editor
mreast@enviro-net.com

Support services provided by
OSS
Orlando, FL

Contributing writers and columnists

PRAKASH GANDHI
Senior Environmental Correspondent
Orlando, FL

BLANCHE HARDY, PG
Environmental Correspondent
Sanford, FL

ROY LAUGHLIN
Environmental Correspondent
Rockledge, FL

The *Florida Specifier* (ISSN 0740-1973), founded in 1979, is published each month for $24.95 per year ($49.95 for three years) by National Technical Communications Co., Inc., P.O. Box 2175, Goldenrod, FL 32733. Subscription refunds are not provided.

Standard postage paid at Orlando, FL 32862.
POSTMASTER: Send address changes to the FLORIDA SPECIFIER, P.O. Box 2175, Goldenrod, FL 32733.

ENVIRO-NET
www.enviro-net.com

National Technical Communications Company, Inc.
P.O. Box 2175 • Goldenrod, FL 32733
(407) 671-7777 • Fax (407) 671-7757
info@enviro-net.com

State officials drop state park cattle grazing proposal

Staff report

State environmental officials have decided to drop plans for a pilot cattle grazing program proposed for Myakka River State Park near Sarasota.

The proposal triggered immediate local opposition. The Florida Department of Environmental Protection said it doesn't plan to move ahead with the project.

The decision was reached after DEP officials talked with park staff biologists, cattle ranchers and the U.S. Department of Agriculture.

DEP officials said they may try cattle grazing at a different state park, but so far no others have been mentioned.

A DEP study last year found that about 27 million people visited Florida's parks and generated an economic impact of $2.1 billion.

However, DEP Secretary Jon Steverson said the parks cover only 77 percent of their expenses. He wants to increase that to 100 percent.

He said he believes the park system can protect the environment while becoming self-sustaining at the same time.

Steverson wanted his staff to launch two pilot projects. They planned one for cattle in Myakka River, and the other for timber harvesting on the Marjorie Harris Carr Greenway.

Those opposed to the cattle project noted that the state spent many years and dollars at Myakka River turning what had been cattle pasture into a restored natural landscape. They did not want to see that effort reversed.

St. Pete investment decision. The city of St. Petersburg has decided to stop investing in fossil fuels. The city voted to stop purchasing bonds from carbon-intensive industries.

This means the $5.6 million St. Petersburg currently holds in fossil fuel bonds won't be renewed once they mature.

The decision came after a local group called Awake Pinellas called for divestment from carbon-polluting companies.

There has been a growing divestment movement across the country.

Groups gathered signatures from 1,000 residents who called on the city to shift investments away from firms that pollute the atmosphere with greenhouse gases.

Gainesville biomass plant dispute. A Gainesville biomass plant filed for arbitration in a dispute with Gainesville Regional Utilities.

The Gainesville Renewable Energy Center claimed that GRU owes it $223,732 that it refuses to pay.

GREC alleged that GRU breached the power purchase agreement between the two organizations. It claimed that GRU's actions unfairly interfered with GREC's receipt of the contract's benefits.

GREC requested that an arbitrator award financial damages to GREC, declare that GRU violated the terms of the purchase agreement, and award attorney's fees and costs incurred to GREC in the arbitration.

The city auditor released a report in September last year that found that a math error led to GRU paying $56,826 more each month to GREC than it should have. GREC said no such error happened.

Species change considered. An updated proposal by the Florida Fish and Wildlife Conservation Commission could phase out the least severe species protection in the state called "species of special concern."

There are currently 42 species of special concern. The proposal would either reclassify them as the top listing of "threatened" or de-list them altogether.

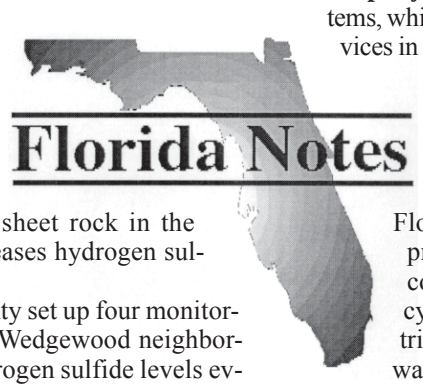
Five species would remain as is because researchers don't know enough about them yet.

FWCC commissioners will vote on the proposal in April. If they approve it, the category is expected to be eliminated sometime in 2017.

Panhandle air quality. Hydrogen sulfide levels are high in an area in the northern part of Pensacola.

The high levels were detected near a construction and demolition debris landfill in a neighborhood bounded on the east by Pensacola Boulevard and on the north by Interstate 10.

Escambia officials said the colorless gas emitting from the C&D landfill remains at ground level in cooler temperatures.



Moisture in the air accelerates the decomposition of sheet rock in the landfill, which releases hydrogen sulfide gas.

Escambia County set up four monitoring stations in the Wedgewood neighborhood to assess hydrogen sulfide levels every 30 minutes.

The county issues health advisories whenever two consecutive readings top 200 parts per billion per hour.

DEP is in charge of shutting down the Rolling Hills landfill.

Solid waste experts from Tallahassee and Pensacola have completed the initial site evaluation to develop a scope of work for designing a comprehensive closure plan for the landfill.

DEP filed a lawsuit against the owner, South Palafox Properties, in civil court for various compliance and long-term issues at the site, including its failure to implement the required remedial action plan to address groundwater impacts.

Company news. Southern Waste Systems, which provides trash hauling services in Miami-Dade, Broward, Palm Beach, Martin and St. Lucie counties, was acquired by Waste Management.

Southern Waste employs 700 workers in South Florida. Founded in 1999, the privately-held firm provides collection, processing and recycling of commercial, industrial, municipal and residential waste.

People news. Tina Fritz joined Action Environmental as a business development representative in their Tampa office for the Florida region. She has more than 25 years of environmental industry experience.

Carlos Adorisio, PE, has joined the Broward County Environmental Permitting Division as environmental licensing manager.

Marathon wastewater system upgrades could surpass $20 million

Staff report

A preliminary draft of a consultant's report said that the Florida Keys city of Marathon should spend $11.27 million on capital improvements for needed wastewater plant structural and odor control equipment, along with $1.13 million for plant maintenance.

Marathon could also spend an additional $6.38 million to improve its wastewater treatment system's force main and pump stations.

The city has $17 million of Mayfield grant money, the remaining portion of $200 million the Florida Legislature allocated in 2009 for sewer system projects in the Keys.

Marathon has other funding available from Florida Department of Environmental Protection grants that could be used for the proposed upgrades, said city officials.

In addition to funds in hand, officials said they will seek additional financing from DEP for their wastewater upgrades.

Marathon began building its current wastewater treatment system during the real estate boom and most of it is less than 10 years old. The wastewater treatment plant cost $80 million.

The award-winning combined sewer, reuse and stormwater system cost more than $120 million to build.

The additional funds are described by city officials as necessary for improvements that will make the system more efficient and minimize future maintenance costs.

Marathon is not currently experiencing capacity problems and proposed upgrades will not increase capacity. The upgrades will also not address salt water infiltration.

The study, produced by Wade-Trim, is currently available for public review and comment.

THE WATER WATCH

DEP mandates, funds Havana study. The city of Havana in Gadsden County must perform a sewer infiltration study under DEP mandate.

The department will underwrite the study with a $200,000 loan and forgive $172,000 of it. The loan will come as a Community Redevelopment Block Grant, part of the Neighborhood Revitalization Program.

Havana hired Robin Phillips, president of Jones-Phillips and Associates, for professional grant administration services.

At a city council meeting in December, the town also approved increases in sewer rates of $1.18 per month to become effective with the December 2015 billing.

Springs protection funding. The Central Florida Water Initiative and the North Florida Regional Water Supply Partnership, Florida's two regional water supply planning efforts, are set to receive funding from four of Florida's five water management districts.

The North Florida Regional Water Supply Partnership is supported by the St. Johns River and Suwannee River water management districts.

Three water management districts—the St. Johns River, Southwest Florida and South Florida districts—support the Central Florida Water Initiative.

The membership of these two regional groups includes public and private water utilities that cross political and water management district boundaries.

The St. Johns district is the lead in this effort to provide cooperative funding for conservation projects.

"Projects in close proximity to the targeted springs will be favorably considered," said Casey Fitzgerald, director of the Springs Protection Initiative at the St. Johns district.

He also noted that projects will be judged on both benefits to springs and water conservation within the two regional water planning areas.

"Implementation of water conservation projects in both initiative areas, especially in these critical springsheds, will offset groundwater withdrawals and enhance spring flows," he said.

The Lower Santa Fe, Ichetucknee and Wekiva river systems are among the program's highest priorities for funding conservation projects that result in measurable water savings affecting priority springs.

The project funding will be cost share with water management districts providing up to half of the implementation costs, not to exceed $1 million for a single project.

Rural Economic Development Initiative communities may receive full funding for projects and were highly encouraged to apply.

SFWMD to limit public comment. In December, the South Florida Water Management District Governing Board set more restrictive time limits on all speakers addressing the board at its public meetings.

Speakers now may have a total of three minutes per meeting to address the board, unless the board chairman agrees to extend the time limit.

Formerly, each speaker had three minutes per agenda item to address the governing board.

Speakers who wish to address the board often travel two or more hours to board meetings for the opportunity to provide input.

At its first meeting after the policy change, SFWMD Board Chairman Dan O'Keefe cut off Tropical Audubon Executive Director Laura Reynolds who wished to discuss ecological conditions in Florida Bay, and, separately, the effects of sea level rise on the district's flood control structures.

$2.4 million for Northwest water supply. Thirteen water supply projects selected through a competitive grant application process will receive funding from the Northwest Florida Water Management District.

The funding for local government and nonprofit utilities is intended to help them meet local water supply challenges as well as regional water supply protection and management needs.

Recipients in Bay, Calhoun, Escambia, Gadsden, Gulf, Jackson, Jefferson, Liberty, Okaloosa, Santa Rosa (2 recipients), Wakulla and Walton counties will receive a total of $2,436,406 for the projects.

The projects include traditional water supply development projects, alternative water supply projects and conservation projects that achieve quantifiable groundwater savings.

Grants ranged from about $53,000 to $291,000, with a median of $168,374.

Generally, recipients use district funds to leverage local, state and federal funding from the U.S. Department of Agriculture's Rural Development grant program and the Community Development Block Grant program.

The total project spending and scope may be greater than that implied by the NWFWMD's contribution.

Kissimmee River restoration permit. DEP issued an environmental resource permit to the U.S. Army Corps of Engineers authorizing backfill of 34,000 linear feet of the C-38 canal.

That section of the canal begins about a quarter of a mile north of the U.S. Highway 98 bridge and continues north about six miles. When completed, water flow will revert to nine miles of the Kissimmee River's historic channel and restore 7,400 acres of the river's flood plain.

Kissimmee River restoration is more than half complete.

Already, more than 24 of the 43 miles of the historic winding river channel have been restored. When the recently permitted segment is completed, the total will increase to 33 miles.

The Kissimmee River work, which began in 1999 and is expected to be complete by 2019, aims to restore 27,000 acres of wetlands adjacent to the 43 miles of the meandering historical river channel.

Seagrass in Sarasota Bay improves. Sarasota Bay's seagrass coverage increased by more than 700 acres in 2014, and now totals more than 13,288 acres.

That's good news for the Southwest Florida Water Management District's Surface Water Improvement and Management program.

Sarasota Bay includes five segments in Manatee and Sarasota counties. All segments exhibited increases in seagrass coverage between 2012 and 2014. Coverage across all segments increased 5.6 percent during those years.

The results are encouraging for the effectiveness of nutrient reduction and stormwater management programs initiated to improve ecological conditions in estuaries.

Sarasota Bay now has more seagrass bed coverage than at any time since mapping began in the 1950s.

Laminar flow diffusers help cleanup muck, improve water quality in lakes

By ROY LAUGHLIN

Jay Barfield, chief executive officer of Allied Group USA Inc., is a man who says he doesn't go to work in the morning—he goes to play.

But he and his colleagues spend their days in what appears to be serious efforts to use their patented diffusion aeration technology to enhance oxidative remediation processes in muck-bottom lakes, such as Lake Apopka.

Their goal is to oxidize muck and nitrogen to gases that leave the water, and to oxygenate bottom waters to significantly slow internal phosphorus loading from anoxic sediments.

Allied's current showcase project is at Lake Apopka, northwest of Orlando. The company has placed 99 diffusers across 270 acres at the northeast side of the lake.

Two compressors provide atmospheric air to the diffusers. They have been in operation for a little more than a year.

The diffusers produce microbubbles that don't surface rapidly, and may stay suspended in the water column. They gently provide oxygen to the sediments without resuspending them.

When diffusers provide sufficient oxygen, muck oxidizes noticeably over a period of weeks.

Oxygenation also changes the chemical environment so that reduced nitrogen can be oxidized to nitrogen gas, which is not a nutrient and partitions to the atmosphere.

When the water column and sediments are oxygenated, Barfield said, bioaugmentation begins to degrade muck.

The Florida Fish and Wildlife Conservation Commission is supporting the pilot project in Lake Apopka.

According to Barfield, the portion of the lake where aeration and bioaugmentation treatments have occurred have seen muck sediment levels decline by 12 inches in two months, corresponding to 506,000 cubic feet of muck.

Worms, snails and insect larvae have become abundant, and fish and fish-eating birds have followed as the food chain has returned to a condition of lower eutrophication.

Barfield said that the gentle aeration their system provides does not re-suspend muck even though it eventually leads to its oxidation.

"When you compare our technology to dredging, our process is a fraction of the cost and we don't disrupt the ecosystem," he said. "And we don't have to deal with hauling the muck to landfills."

The pilot project will continue until April, and then FWCC will closely examine chemical and biological data associated with the work.

"We hope the state will renew our contract and increase it," Barfield said with some confidence.

He said that the technology was originally implemented for treating chemical oxygen demand in treatment ponds prior to releasing water, where it has been in use for almost two decades.

The group just recently began offering the devices to treat ponds and lakes on private property.

The majority of his customers and projects have been in Europe and Asia.

Barfield said that the opportunities to work with public agencies in Florida is expanding.

The Lake Apopka project is this company's most visible pilot project, but he said the Allied Group expects to provide diffusers for public agency-funded project in South Florida in the near future.

The idea that improving oxygen levels in lakes and ponds improves water quality is not one any expert doubts. But the fixtures that Allied provides will yield, they claim, better results over the long term and may be useful to improve water in muck-bottomed lakes and ponds throughout Florida.

So far, the results in Lake Apopka are promising.

MIT researchers demonstrate promising new method to purify water

By ROY LAUGHLIN

A research team at the Massachusetts Institute of Technology recently described a new method of removing electrolytes from water, suggesting it could be the basis of a scalable water purification process.

Separation of electrolytes depends on a process named shock electrodialysis, or SED, that separates a stream of water into two regions, one with high electrolyte concentrations, the other with low electrolyte concentrations.

Splitting the flow between the two and collecting water from the region with low electrolytes provides purified water. The high electric currents that create the shock wave may also disinfect water subjected to SED.

The investigators' initial research demonstrated the process in an experimental cell that included water moving through a central slab of fritted glass. The fritted glass slab had ion impermeable membranes on both outer sides. The membranes on the outside of the glass slab prevented ions from moving through them.

The process is different from electrodialysis because the electric field does not drive ions across a semipermeable membrane to purify water. The membranes on the outside of the fritted glass in SED cells are a focusing point for the current density that generates a useful electrostatic force that separates ions in solution.

"The desalination performance of SED is thus mainly controlled by the properties of the porous medium and does not explicitly depend on the ion type, salt concentration, current or flow rate," the authors noted, with the porous medium being the fritted glass.

The smaller the pores are in the fritted glass, the more effective the separation of streams of fresh water from salt water.

The researchers said that this phenomenon is not one predicted by "the classical picture" in which declining ion concentrations would generate a diffusion-limited electrical current.

The separation these investigators exploit may arise from surface conduction by electro migration and surface convection by electro osmosis, which can occur when an electrolyte is confined to porous medium with the surface of opposite charge to that of the mobile ions.

Electroshock is a transient response to an over limiting current. When electrical current density reaches a point at a voltage below that which causes electrolysis of water or oxidation of chloride to chlorine, an electrostatic shock wave occurs.

It propagates an ionization shockwave through the microchannel of porous medium that has a sharp boundary between concentrated and depleted zones. When water is flowing through a porous medium such as the fritted glass, a physical splitter in the region of the shock allows separation of the ion-depleted zone from the enriched zone.

The research might yield a commercially useful technology. Using a single cell for experimentation, the MIT team showed that power requirements are high because only a small fraction of the electricity current flow acts specifically to separate ions.

In comparison, the authors noted that more than 80 percent of the electrical power used for electrodialysis moves ions across semipermeable membranes.

Scalability is a promising feature of the technology. Multiple SED cells could be stacked between electrodes and water production scaled accordingly. That might also increase efficiency.

At this point, the researchers suggest that SED probably cannot compete economically with membrane filtration methods to provide drinking water on a large scale. But it could be used to temporarily provide drinking water after disasters that damage public drinking water supplies or in areas with no fresh water sources.

Robust monitoring program needed to support Gulf of Mexico recovery

By ROY LAUGHLIN

With the recent Deepwater Horizon oil spill settlement, the Deepwater Horizon Natural Resource Trustees have the means and responsibility to restore natural resources to pre-spill conditions.

That effort includes monitoring the progress of the restoration projects.

In a recent report, the Ocean Conservancy identified significant gaps that exist in past and current monitoring data.

As part of Gulf of Mexico's regional recovery program, the report lists 13 critical categories, including specific species, ecological communities and environmental drivers for which it characterized data gaps to be filled to establish a robust, extensive monitoring effort.

The report endorses a much more extensive monitoring effort than looking only at the effects of oil and in the worst affected regions or species. The report urges monitoring efforts across the entire pelagic region of the Gulf, from the surface through the deepest waters.

Currently, monitoring programs of limited scope exist, but the vast majority of them occur near the shore and are limited only to surface waters.

The Gulf of Mexico region has been the focus of dozens of monitoring efforts. The data from these efforts, however, is often not translatable at the ecosystem scale to characterize the health of the ecosystem, or even to assess the recovery of a single resource.

Fisheries resources have the most extensive past monitoring data sets. But often that monitoring was done at intervals of years or longer, or focuses on only one part of the life history.

The report endorses a much more extensive monitoring effort than looking only at the effects of oil and the worst affected regions or species. The report urges monitoring efforts across the entire pelagic region of the Gulf, from the surface through the deepest waters.

Oysters, for example, have been monitored for decades, the information consisting primarily of catch records. Currently, according to the report, the geographical occurrence of oyster beds across the region is uncertain because it hasn't been monitored.

Suitable monitoring data for resource assessment and recovery evaluation in the Gulf of Mexico goes back to about 1950 for a few resource categories. The scope and sophistication of those efforts has increased as the years passed.

However, those data sets are not entirely suitable for integration into a unified data set, or directly germane to guide future recovery efforts.

Different sampling intervals and the lack of similar data across geographical regions are some characteristics of monitoring data sets that could limit their future usefulness to inform future recovery efforts.

In about half of the thirteen categories examined in the report, there are more data gaps than useful data.

Deep pelagic communities of invertebrates and fish are virtually uncharacterized, as is the role they may play in surface food webs or the transport of contaminants from deep-sea waters to surface waters.

The report includes a category of ecosystem drivers such as freshwater and nutrient inflows, extent of the anoxic layer each summer and other ecological relationships that influence the population dynamics of many fisheries resources in the Gulf of Mexico.

Insufficient monitoring of ecosystems drivers is a key lack, according to the report, because they substantially influence population dynamics.

Unless they are also monitored along with putative oil spill parameters, it will be impossible to know the cause of future population fluctuations.

The report references the importance of monitoring ecosystem drivers with a case study of single fishery species monitoring in the northern Gulf of Alaska following the Exxon Valdez oil spill.

It illustrates how essential including ecosystem driver data is, from understanding salmon, herring and sea otter population fluctuations to discerning the resource recovery effort's progress.

Expanding the monitoring program in 1994 to emphasize the ecosystem approach that included oceanographic forcing factors, plankton production, salmon predation and salmon hatchery fry release improved insight into the population dynamics and fisheries management.

With the Gulf of Alaska experience as an example, the report writers stated that "if a resource is not responding to restoration actions, it may be due to natural forces or chronic stressors acting as a drag on recovery."

A robust monitoring effort that includes ecosystems drivers is essential.

The Deepwater Horizon oil spill was unique because it occurred nearly a mile deep. The use of dispersants introduced a staggering amount of dissolved oil into the Gulf's deep pelagic waters.

Deep water regions are among the Gulf's most extensive ecosystems with the greatest need for monitoring, according to the report.

The pelagic community species composition, zooplankton densities and density of gelatinous zooplankton are all subjects with no or incomplete monitoring data.

New tools and monitoring programs will be required, the report noted. The same is true for other pelagic species monitoring, including juvenile and male sea turtles, and pelagic seabirds

For some of the report's 13 categories, such as submerged aquatic vegetation, deep-sea corals and shorelines, the monitoring data has more "no gap" cells than either "partial gap" or "full gap" in the matrix evaluated. But even in those, at least one of the identified priorities is deficient and needs to be addressed in future monitoring.

The report does not suggest specific monitoring protocols. Rather, for each category it presents a matrix characterization.

The matrix's horizontal axis consistently includes three categories: species, space or time. The matrix's vertical axis is list of priorities of varying length for each of the 13 categories.

For shorelines, for example, the first priority is "monitor shoreline position and form." Each cell in the matrix is then color-coded to show a full gap, "partial gap," or "no gap." "Not applicable" is also indicated.

The Ocean Conservancy based its recommendations on "an extensive inventory of existing and past natural resource monitoring efforts … and expert-based assessment of long-term monitoring needs."

The report also noted that its authors excluded studies and related data collection activities initiated under the Deepwater Horizon Natural Resource Damage Assessment because those efforts have lasted less than five years, a criterion for inclusion for evaluation.

The report is intended to provide an overview of the monitoring needs to develop the robust regional monitoring program the Ocean Conservancy endorses.

It is a useful read for professionals currently engaged in Gulf of Mexico recovery programs, or who aim to be involved in them in the future.

It could also be a blueprint for planning integrated data sets from related recovery efforts that are funded now or will receive funding in the next couple of decades.

New SELC report on drilling off Atlantic coast disputes industry claims of benefits

By BLANCHE HARDY, PG

The Center for the Blue Economy at the Middlebury Institute of International Studies at Monterey recently completed a report in which the findings counter many of the conclusions presented in the 2013 American Petroleum Institute and National Ocean Industries Association's Quest report.

The Quest report is frequently used to justify proposed offshore drilling along the Atlantic coast.

"We hope that all elected officials weighing in on this decision will pay attention to this report—from the Obama Administration to our governors and local representations—and to the broader question of who stands to gain and who stands to lose economically if Atlantic drilling moves forward," said Erin Malec, director of program communication for the Southern Environmental Law Center, who commissioned the report.

The report's publication follows the U.S Bureau of Ocean Energy Management's 2015 announcement of a draft proposed program that will offer a potential lease sale in federal waters along the Mid- and South Atlantic Ocean.

The new report, The Economic Effects of Outer Continental Shelf Oil and Gas Exploration and Development in the South Atlantic Region: Issues and Assessment, examines coastal economics from a different perspective.

Rather than focusing on potential petroleum-related jobs and well lease revenues, the report evaluates the potential impact to existing jobs and businesses by petroleum-related offshore industrialization, residual contamination, construction activities and the threat of major spills.

"The analysis from the Center for the Blue Economy finds that industry economic projections—which drilling proponents have used as the basis for their support—are based on faulty assumptions that lead to overestimations of jobs and income, while discounting existing tourism- and recreation-based economies," Malec said.

The Center for Blue Economy's report claims that Quest's results are based on an incomplete and misleading economic picture that resulted in overstating the reported regional economic effects of offshore oil and gas exploration and development.

Malec noted that the Quest projections, although frequently quoted with certainty, are not based in reality.

"The calculations use very different leasing scenarios than what is actually proposed, are based on oil prices being three times higher than they currently are, and assume $19 billion in revenue sharing—even though revenue sharing is not allowed under federal law, which means $0 is the likely amount coastal states would see," she said.

In addition to faulty assumptions about oil revenue, Economic Effects states the number of existing ocean economy jobs in the target states of Virginia, North Carolina, South Carolina and Georgia already exceed the proposed jobs generated by Quest in 2035. This puts more jobs at risk than are estimated to be created.

"The negative impacts of offshore drilling are widely known, which is why nearly 100 communities up and down the Atlantic coast have passed resolutions officially opposing oil exploration and development," Malec said.

"Since the Obama administration proposed opening the Atlantic to drilling, it's become very clear that the communities that would be most impacted by this don't want it," she said.

The advocacy organization Oceana posts lists and makes reference to 100 East Coast municipalities, 100 members of Congress, more than 650 state and local elected officials, and over 750 business interests that are publicly opposed to offshore drilling due to the potential threat to marine life, coastal communities and local economies.

According to Oceana, approximately 1.4 million jobs and over $95 billion in gross domestic product rely on healthy ocean ecosystems, mainly through fishing, tourism and recreation along the Atlantic coast.

New Deltona wastewater plant will support expected east-side growth

By PRAKASH GANDHI

Officials in the city of Deltona are heralding a new $27 million wastewater treatment plant that will allow capacity for the city's future growth.

The Eastern Water Reclamation Facility will be a major part of Deltona's infrastructure for years to come, according to city officials.

The facility is located on the eastern edge of Deltona.

Deltona retained Baskerville-Donovan to design, permit and provide services for the construction of the water reclamation facility.

Construction began in January 2014. When all phases are complete, it will cost a total of about $45 million.

The new treatment plant will increase Deltona's capacity for handling wastewater by 1.5 million gallons per day. The plant can be expanded to meet future demand.

State Representative David Santiago secured $500,000 from the state to help cover the costs. The city also received a state revolving fund loan of about $28 million at less than two percent interest to finance construction.

The facility will have an initial operating treatment capacity of 1.5 million gallons a day. When all the phases of the plant are built by 2035, the capacity will increase to 4.5 mgd.

"The main benefit of the plant is that it will allow the eastern part of the city to be developed with sanitary sewer rather than septic tanks and drainfields," said Gerald Chancellor, the city's public works director. "We will be able to provide sanitary sewer service to those areas on septic tanks now that may come off septic tanks in the coming years because of springs legislation."

Chancellor said the city can now transfer about 400,000 gallons of flow to the new treatment plant from its existing plant in South Deltona. "That will free up additional capacity at the existing facility," he added.

The state Department of Transportation widened State Road 415 and there is a lot of vacant property out there, Chancellor said. "We are prepared to service that entire area, and the opening of this new plant will definitely help.

"This facility will also help us provide reclaimed water services to the eastern side of the city."

The new plant will employ eight people at startup. It also puts Deltona, a city of 86,000, in a position to adopt to new state standards for treating sewage and disposing of waste.

About four in five homes in Deltona employ septic systems that are not tied to sewers, but might someday be required to connect. But city officials said the new plant wasn't built for that purpose specifically.

The new plant will be integrated into a system that already includes a wastewater treatment plant on Fisher Drive. That plant, however, is operating at near-capacity, which means that Deltona's ability to grow was limited.

The city has seen signs of commercial expansion on its eastern edge.

The eastern plant includes tanks for added recycled water capacity, fulfilling a promise to subdivisions built with irrigation systems.

The state-of-the-art Kubota Membrane Bioreactor will take the waste out of the wastewater in a compact, environmentally friendly way.

The resulting effluent will be a Class A agricultural fertilizer, suitable for nurseries and orange groves.

NOAA conservation funding

Staff report

NOAA's Coral Reef Conservation Program is awarding more than $8.4 million in grants and cooperative agreements this year to support conservation projects and scientific studies that benefit coral reef management across seven U.S. states and territories, the Caribbean and Micronesia.

All projects focus on the three primary threats to coral reefs including global climate change, land-based sources of pollution and unsustainable fishing practices, as well as priority coral reef regions and watersheds.

Alliance Dairies installs methane digester to further sustainable practices

By BLANCHE HARDY, PG

Alliance Dairies in Gilchrist County is again leading the way for Florida farmers in establishing innovative agricultural sustainability practices.

The dairy has installed a DVO Inc. "mixed plug flow" methane digester designed to operate with a free-stall barn flush system.

Alliance is now turning "poop to power" by recycling its manure to generate electricity for dairy operations.

The digester is the first of its kind in the south.

The dairy has a history of environmental trend-setting. The operation was the first in North Florida to receive a permit from the Florida Department of Environmental Protection for its sustainable wastewater management practices.

They represent themselves as "firm believers in renewable resources" and were awarded an Outstanding Dairy Farm Sustainability Honorable Mention by the Innovation Center for U.S. Dairy in 2015.

Alliance is Florida's largest single location free-stall dairy. Cows in a free-stall dairy are unrestrained and housed in open-stall barns where they have easy access to food, water and bedding and may enter, lie down and leave at will.

The 1,600-acre facility houses a herd of over 5,000 adult black and white Holsteins each producing roughly 120-150 pounds of waste per day.

The anaerobic digester recycles the manure into methane, generating seventy percent of the farm's electricity year-round. The one-megawatt system is estimated to save up to a million dollars in electricity costs annually.

Alliance's Farm Manager Jan Henderson, a third-generation dairy farmer, noted that the digester-generated electricity is "equivalent to the power needed for 425 homes year round."

Excess electricity, when available, is sold to the local Central Florida Electric Cooperative.

The dairy's digester receives manure and related wastes daily. The unit is comprised of long 16-feet-deep concrete tanks with gas-tight covers and ancillary equipment.

Manure digestion begins with liquefaction. During liquefaction, acid-forming bacteria break the manure down into simple organic compounds.

Methane-forming bacteria then convert the organic compounds into biogas that collects above the manure and under the gas-tight cover. The biogas is drawn off and piped to an on-site generator to produce the electricity.

Liquid effluent is collected in a secondary lagoon and used for fertilization.

The residual nutrient-rich digested solid material emits little to no odor and may be applied as a fertilizer.

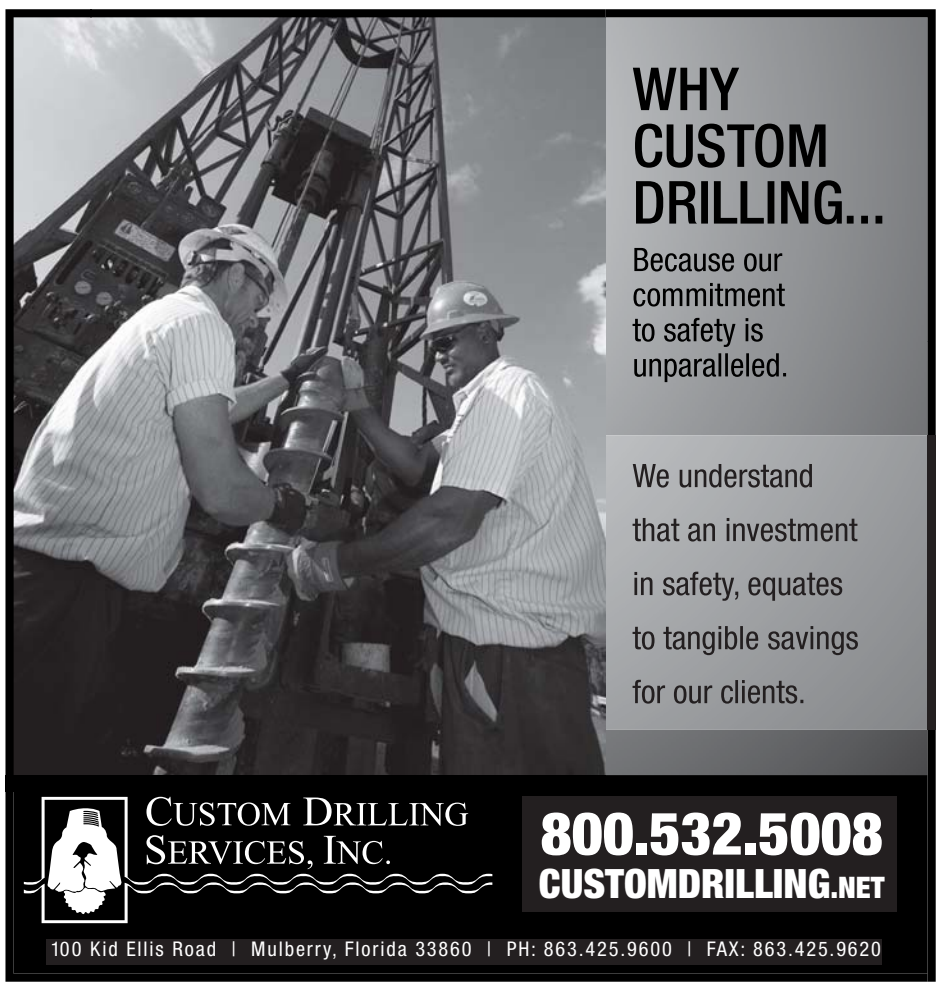
"We use the manure from the cows to make electricity and then we turn around and put that manure on crops as fertilizer that we grow and then harvest and feed back to the cows," said Henderson.

The dairy also has a system to improve nutrient utilization by crops and uses recycled compost for new cow bedding.

Solids are also separated and used for bedding, cutting the costs in half for materials needed to provide a comfortable rest surface for the dairy's lactating cows.

While benefits such as reduced greenhouse gas emissions, the sale of electricity, reusable bedding and the retention of nutrients for fertilizer are beneficial for the dairy, improved air quality and odor reduction are favorites among the surrounding community.

Cow manure stinks. But the manure digester at Allied captures most odors, creating a much more pleasant atmosphere in vicinity of the dairy operation.



Cyclodextrin-based water filters may challenge activated charcoal

By ROY LAUGHLIN

Activated charcoal's ability to filter a broad range of organic chemicals from water is the utility standard other molecular filters must meet to be useful.

Recently, a team of Cornell University chemists synthesized a novel polymer of rings of the familiar sugar glucose called dextrins, linked by tetrafluoro terephthalobitrile.

The researchers demonstrated that these polymers are a better filter material than activated charcoal for many small organic molecules such as bisphenol A and other emerging organic contaminants of concern in water.

In this case, "better" means that these cyclodextrin polymers are effective at lower contaminant concentrations, accumulate them much more rapidly, are less expensive to synthesize and can be regenerated with a solvent rinse.

Cyclodextrin polymers are not your father's chemistry. They are rings of glucose molecules with the rings cross-linked by organic compounds.

The Cornell team focused initially on beta-dextrin, a ring of seven glucose molecules. Cyclodextrin polymers are not that novel, but in this case, the team used tetrafluoro terephthalonitrile as a cross-linking agent, a rigid molecule that prevents the cyclodextrins from folding around each other.

The cyclodextrins remain accessible "cups" that trap small organic molecules.

"The cup shape is the working unit," said Dr. William Dichtel, professor of chemistry at Cornell and leader of the research team that synthesized and tested these new cyclodextrins. "The molecules (removed by filtration) dock inside the cups."

Cyclodextrin polymers' notable technological and economic promise comes from the researchers' demonstration that they strongly bind small organic compounds with both hydrophobic and polar characteristics—those described by chemists as "amphipathic."

The result is better filtration than is achievable by other granular filtration media of a whole class of molecules such as pharmaceuticals and hormone mimics—contaminants of emerging concern.

And the filtration rates are much more rapid. Laboratory experiments by the Cornell researchers demonstrated that cyclodextrin polymers reached 95 percent of filtration capacity in 10 seconds, much faster than activated carbon, which required half an hour in laboratory comparison tests.

In addition to beta-cyclodextrins, the research group is also examining properties of alpha- and lambda-dextrins, which are rings of six and eight glucose molecules, respectively.

FILTERS

Continued on Page 16

Palm Beach County sod farm draws ire of activists, attention of regulators

By BLANCHE HARDY, PG

The Palm Beach County Property Appraiser's Office has questioned the agricultural property designation of the Dan Griffin Sod Co. in Loxahatchee.

The site is in the Everglades Agricultural Area, 700,000 acres of predominantly sugar cane farmland created by the draining of the northern Everglades.

Griffin Sod has been accepting and spreading truckloads of sewage sludge from Broward County on their site since 2009, including sludge from the Southern Regional Wastewater Treatment Plant in Hollywood.

Property appraiser records indicate that as much as 10,000 tons of sludge a year have been disposed of on the 317-acre property.

Griffin officials did not inform the property appraiser of the change from sod farming to mixed-waste disposal as the land's primary use.

Sludge processing and mixed waste disposal are not considered agricultural designations within the county.

Environmental advocates are concerned about the sludge's potential impact on the Everglades and its water quality.

Although they can't see the sludge dumping operation through a sugar cane buffer planted along the property boarder, local residents are complaining about the odor that has been described by county staff as "noxious."

"The Property Appraiser's Office removed the agricultural classification from both properties totally 317 acres in 2015 based on the fact that the agricultural classification was for commercial sod production, which ended in 2013," said Diane Pendleton, MAI, CFE, agricultural department manager for the property appraiser's office. "The primary use of the property is as a biosolids processing operation."

The Dan Griffin Sod Co. considers the sludge to be fertilizer. The sludge from Hollywood is treated to the degree necessary to qualify as fertilizer and, as such, can be spread anywhere that fertilizer application is allowed.

State regulators support the use of sludge as fertilizer as long as the required pollution controls are in place.

In this case, the property appraiser's files include statements from staff of the Palm Beach County Agricultural Cooperative Extension Service identifying the sod company site as "a mess" and noncompliant with agricultural best management practices.

Much of the Everglades Agricultural Area suffers from soil subsidence. Since draining the previously flooded sawgrass prairie for agricultural use in the early 1900s, organic matter decomposition has exceeded accretion, as measured by the University of Florida Institute of Food and Agricultural Sciences.

Griffin contends that spreading sludge and mulched debris, sometimes containing rubber and plastic, on company property is a soil restoration effort.

The company countered the property appraiser's action and, after planting 60 acres of sugar cane in 2014, was able to again meet the "good faith commercial agricultural use" qualification allowing the property to regain its agricultural property designation.

"The property owner filed two petitions," Pendleton said. "The special magistrate granted the agricultural classification on the entire 317 acres based on intent to farm in the future. The agricultural classification cannot be based on intent. It must be the current, primary use of the property.

"The property appraiser's office has the option to go before the Value Adjustment Board to request a rehearing once petition season ends," she said. "Denial of the agricultural classification would enable PBC code enforcement to require a cleanup of the property."

Port St. Joe seeks funding for study of former industrial wastewater lagoon

By PRAKASH GANDHI

Port St. Joe City Commissioners are trying to get state funds to finance a planning study of a industrial wastewater lagoon there, part of an effort to redevelop property at the port.

The city applied to the state revolving fund for $175,000 and has received preapproval. However, they will not know if the money will be made available until March. The funds would be divided into a loan and a grant.

The lagoon was originally built for the St. Joe Paper Co. and its paper mill. It was intended for industrial purposes, but the city does not have those same industrial needs.

City Manager Jim Anderson said the 75-acre lagoon has been used a part of their wastewater treatment process since 1972.

"We have gone primarily to residential use," he said. "There is not a lot of use for industry."

City commissioners have discussed the lagoon study for months as part of a visioning effort to consider what the city and its port may look like in 30 years.

"We are seeing what our options are," Anderson said. "We are still in the early stages. We don't know yet who will be conducting this study. We have not even gone out to bid."

Eastern Shipbuilding is one company that's interested in using part of the current lagoon land for its operations. They are already leasing part of the old paper mill site and have run out of space at their two main Bay County facilities.

Eastern wants exclusive use of the site while also helping the city in identifying potential funding sources to meet the debt burden created by the study.

If the study and Eastern's plans play out as hoped, it could mean as many as 100 new jobs for the area, said officials with Eastern.

The next task toward a possible lagoon dredging is to build the spoil site infrastructure, most of which will be on land donated by St. Joe.

"We are trying to reduce the size of the lagoon and to see if there are other options for treatment," Anderson said. "We are still part of a rural county but most people on the west side of the county are on central sewer."

The Port Authority has submitted an application to secure county-allocated RESTORE Act funds to provide administration expenses for two years, although the money is not likely to be available until 2017.

The city is continuing talks with companies that have an interest in moving to the port.

State leaders say that further funding for dredging and port development is dependent on securing customers for the port.

Pilot projects expected to improve IRL

Staff report

The St. Johns River Water Management District will implement two water farming projects to benefit the Indian River Lagoon.

The projects will reduce freshwater flows and prevent thousands of pounds of nutrients from reaching the lagoon.

Under the proposed plan, Fellsmere Joint Venture LLC and Graves Brothers Co. will build water farms at two rural locations in Indian River County.

Together, the projects will capture nearly 9,000 pounds of phosphorus and nearly 60,000 pounds of nitrogen annually.

National Academy of Sciences report endorses stormwater, grey water for potable reuse

By ROY LAUGHLIN

In a recent National Academy of Sciences report, an expert panel wrote that substituting grey water and stormwater for potable water effectively reduces water demand from traditional drinking water sources.

But research on critical topics to ensure safe use, technical guidelines for safe and cost-effective use, and legal obstacle streamlining must be done before stormwater and grey water reuse can yield benefits nationwide.

For the purposes of this report, grey water is water from sinks, showers and laundry drains. The report focuses primarily on domestic reuse of grey water, perhaps because that is where the greatest opportunities for reuse exist.

The report indicated that industries frequently have well-developed water conservation measures in place that offset the benefits of reusing grey water or stormwater.

The report focused on several primary uses of grey water and stormwater as substitutes for potable water—toilet flushing, landscape irrigation and crop irrigation under specific scenarios.

Pathogens and contaminants

A major impediment to recommending stormwater and grey water reuse, even for toilet flushing, is the uncertainty about human pathogen risk.

The panel encouraged additional research to characterize that risk, which would include identifying those pathogens likely to be a problem and what sanitation methods most effectively reduce the risk. This is true whether the water is reused for toilet flushing or for landscape irrigation.

"Pure as rainwater" is a cliché that does not survive scrutiny for microorganisms and contaminants in stormwater. Stormwater acquires contaminants from the air through which the rain falls and from the surfaces and soils over which it flows.

Contaminants in urban stormwater include both heavy metals and organic chemicals in such variable compositions and concentrations that the report panel was unable to make broad generalizations except to note the challenge of setting stormwater fit-for-use standards.

Microorganisms are also commonly found in stormwater, but they may not be human pathogens.

The panel encouraged more research to better identify human pathogens in stormwater—if in fact they are present—and their potential risk during stormwater reuse.

Landscape irrigation is one water use the panel focused on because even a reuse strategy as simple as draining a washing machine directly to the landscaping is effective and affordable.

The panel also noted that there is a conflict between the economic benefit of year-round use of flushing with reuse water and irrigating with it. For most areas in the country, giving priority to year-round water reuse to flush toilets would save more water than irrigating with it.

The most effective strategy to do both involves landscaping with drought resistant or xeriscape plants to minimize their water demand year round and give priority to reuse for flushing.

Technical guidelines

Technical guidelines were an area where the report presented only the broadest conclusions.

Under the assumption that some disinfection would be necessary for almost any reuse, and that those responsibilities were normally exercised at the state and local level, the report noted that few states and local governments have health rules and building codes for grey water and stormwater reuse.

Both the scale and the specific application factor into rule development.

Grey water reuse for landscape irrigation would require almost no maintenance, while disinfection in a system that supplied water for flushing would require frequent maintenance, and perhaps third party inspection on a timely schedule.

This is a scenario that local governments follow only rarely for residences.

The report included substantial discussion of the economics of the most beneficial use of grey water and stormwater.

Toilet flushing is about 25 percent of typical household water use, excluding landscaping irrigation. In general, more water conservation benefit accrues from using reuse water for flushing than for landscape irrigation.

Given that premise, the panel encouraged local authorities to ensure that availability of reuse water for landscape irrigation does not encourage "inappropriate landscaping," the use of high water demand plants instead of those with water demands appropriate for the local environment.

The report noted that most homeowners over-watered, especially with reuse irrigation water, and said that research into human behavior is necessary to underpin an effective water conservation campaign involving landscape irrigation.

Cost-effectiveness is an aspect the panel discussed as a technical guideline.

Cost-effective stormwater reuse is very much a function of the amount and seasonal rainfall pattern. The less rainfall there is and the less predictable its occurrence, the larger the cistern required to make stormwater an economically beneficial source even for flushing.

The report's conclusions are based primarily on case studies in the arid Southwest and the Midwest.

Local regulations

Local authorities are responsible for building codes, stormwater management programs and utilities that provide drinking water and wastewater treatment. Across the nation, very few building codes address grey water and stormwater use, even for flushing toilets.

Neighborhood or subdivision-wide stormwater management plans that encompass reuse are also rare outside of Florida, but are on the horizon for many local governments.

Local utilities face a particular challenge. If too much grey water is diverted to residential landscaping, the flows to wastewater treatment plants would be reduced and the proportion of solids in the sewage could increase significantly, requiring new treatment protocols.

Stormwater treatment plants required for area-wide stormwater reuse could also make new demands on utility department budgets.

Wastewater treatment utilities that recharge aquifers as a potable water source will need to weigh carefully the benefits of diverting grey water, and increasingly stormwater, for landscape irrigation, according to the panel.

Legal obstacles

In many western states, water rights restrict stormwater capture and use.

The report panel encouraged a thorough review to determine how laws need to be changed or appropriately interpreted to encourage stormwater application to the uses discussed in the report.

The Florida angle

Readers who remember the mid-1990s tourist marketing jingle, "Florida: The Rules Are Different Here," might borrow it to consider how germane the NAS report is to current stormwater and grey water reuse here.

Florida leads the nation in water reuse, largely based around community-wide wastewater reclamation for landscape irrigation.

In the Southwest Florida Water Man-

NAS
Continued on Page 13

Calendar

February

FEB. 4 – Course: Asbestos Refresher: Worker, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

FEB. 5 – Course: Introduction to Lift Station Maintenance, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

FEB. 6-7 – Backflow Prevention Recertification, Bradenton, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

FEB. 11 – Workshop: From Blight to Right: Brownfield Transformation, Key Largo, FL. Free workshop hosted by Monroe County and the Florida Department of Environmental Protection's South and Southeast districts. Contact Probad Adak at padak@broward.org or call (954) 519-1439.

FEB. 11 – Workshop: Taking Control of Odors & Corrosion on Both Sides of the Fence, Boynton Beach, FL. Presented by the Air Quality Committee of the Florida Water Environment Association. Contact Larry Hickey at (352) 237-1869 or visit www.fwea.org.

FEB. 15-19 – Course: Backflow Prevention Assembly Tester and Certification, Destin, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

FEB. 16 – Course: Asbestos Refresher: Management Planner, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

FEB. 16 – Course: Asbestos Refresher: Inspector, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

FEB. 16-17 – Symposium: Sustainable Water Resources: Complex Challenges, Integrated Solutions, Gainesville, FL. Hosted by the University of Florida Water Institute and Duke Energy. Call (352) 392-5895 or visit www.waterinstitute.ufl.edu.

FEB. 17 – Course: Asbestos Refresher: Contractor/Supervisor, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

FEB. 17-18 – Seminar: Winter Water Seminar, Tallahassee, FL. Presented by the Florida Engineering Society and the Florida Association of Professional Geologists. Call (850) 224-7121 or visit www.fleng.org.

FEB. 18-19 – Course: Backflow Prevention Recertification, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

FEB. 18 – Course: Asbestos Refresher: Worker Trainer, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

FEB. 21-23 – Summit: 2016 Joint Summit: Partners in Progress, Orlando, FL. Presented by SWANA Florida and Recycle Florida Today. Call (727) 940-3397 or visit www.swanafl.org.

FEB. 22-23 – Course: Backflow Prevention Recertification, Destin, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

FEB. 23-25 – Course: Train the Trainer: How to Design & Deliver Effective Training, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

FEB. 27-28 – Course: Backflow Prevention Recertification, Tampa, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

Florida Specifier
P.O. Box 2175
Goldenrod, FL 32733

Michael R. Eastman
Publisher/Editor
mreast@enviro-net.com

The *Florida Specifier* welcomes columns, articles and letters to the editor on any subject or issue pertinent to the environmental, regulatory and technical areas the newspaper covers. We reserve the right to edit all submissions for newspaper style and publish submissions on a space-available basis only. The opinions expressed on this page are those of the authors.

March

MAR. 1 – Course: Refresher Training Course for Experienced Solid Waste Operators-4 Hours, Crestview, FL Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

MAR. 1 – Course: Initial Training Course for Spotters at Landfills, C&D Sites and Transfer Stations-8 Hours, Crestview, FL Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

MAR. 1 – Course: Refresher Training Course for Experienced Solid Waste Operators-8 Hours, Crestview, FL Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

MAR. 1-2 – Course: Initial Training for Transfer Station Operators of and Materials Recovery Facilities-16 Hours, Crestview, FL Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

MAR. 1-2 – Course: Refresher Training Course for Experienced Solid Waste Operators-16 Hours, Crestview, FL Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

MAR. 1-2 – Course: Refresher Training Course for Experienced Solid Waste Operators-16 Hours, Crestview, FL Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

MAR. 1-2 – Summit: Emerging Contaminants Summit, Westminster, CO. Produced by BNP Media. Contact Margie Heisler at (847) 405-4127, e-mail heislerm@bnpmedia.com or visit www.contaminantssummit.com.

MAR. 1-3 – Course: Initial Training for Landfill Operators and C&D Sites-24 Hour, Crestview, FL Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

MAR. 1-4 – Course: Water Class C Certification Review, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

MAR. 5-6 – Course: Backflow Prevention Recertification Exam, Bradenton, FL Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

MAR. 5-6 – Course: Backflow Prevention Recertification Exam, Tampa, FL Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

MAR. 5-13 – Course: Backflow Prevention Assembly Tester Training and Certification, Jacksonville, FL Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

MAR. 7-8 – Course: Backflow Prevention Recertification Exam, Altamonte Springs, FL Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

MAR. 7-11 – Course: Backflow Prevention Assembly Tester Training and Certification, Lake Buena Vista, FL Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

MAR. 7-11 – Course: Asbestos: Contractor/Supervisor, Gainesville, FL Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

MAR. 8-10 – Course: Water Distribution Systems Operator Level 1 Training, Gainesville, FL Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

MAR. 10 – Course: 8-Hour OSHA HazWoper Annual Refresher, Tallahassee, FL Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

Florida Specifier

Help us keep our readers informed

Every month, we publish this calendar of environmental industry events...have been for well over 35 years. It's the most comprehensive calendar available of local events here in Florida and regional/national events of interest to Florida's environmental professional community.

Send notices of conferences, seminars, courses, workshops, meetings, expos and other events of interest to environmental professionals working in Florida **at least 45 days in advance of event** to Calendar, *Florida Specifier*, P.O. Box 2175, Goldenrod, FL 32733-2175; fax, (407) 671-7757; e-mail mreast@enviro-net.com.

Thank you!

CCUA

From Page 1

By April, that unused two mgd excess will be drained to a chain of five-foot-deep, sand-bottomed ponds, CCUA's new SARIBs.

In the surficial aquifer, some of the water moving down slope will be recaptured in a horizontal well collection system. That recaptured water can augment the reclaimed water system as needed.

In addition, a pond on the property could provide another source of reclaimed water at some times of the year, Fraser said.

The greatest need for extra water occurs during the dry spring months, when water from the surficial aquifer will be pumped through a filtration plant, disinfected and then distributed through the reclaimed water system.

The site where infiltration ponds are now being tested was originally purchased for a 135-million-gallon reclaimed water reservoir. But technical challenges led CCUA officials to abandon the reservoir plan.

The site includes a mothballed wastewater treatment plant that will be reactivated when the infiltration tests are completed.

Fraser said the plant already has filters and a chlorine contact chamber.

"The filter plant is a month or two from coming on line," he said.

If a dry spring follows this winter, Clay County's new reclaimed water system will be ready to roll.

Fraser said CCUA requires new developments to install reclaimed water distribution pipes to provide irrigation water to residents. And the utility is obliged to fill those pipes with reclaimed water.

The county is again experiencing growth, with a 5,000-home development just one example of the increasing growth. The development is also pushing CCUA to look beyond treated wastewater for its reclaimed water system.

Fraser said that the utility has a plan to develop reclaimed water storage that will be able to provide irrigation water through seasonally dry spring weather. The rest of the year, rainfall is generally sufficient.

CCUA has already constructed a reclaimed transmission system tying its four major wastewater treatment plants together.

The SARIB facility is along one of those main transmission lines and will give the authority the capability to move stored water from it to reclaimed water customers in any part of CCUA's system.

In the more distant future, if expected development and population growth occurs, harvesting stormwater is another part of Clay County's plan for its reclaimed water system.

A 2014 study identified 46 stormwater detention ponds along a new major highway in Clay County that could serve as a source of up to eight million gallons per day of reclaimed water.

The detention ponds would need to be tied in with either the reclaimed water system, or the SARIBs.

Even with an expected $27 million cost over 30 years, CCUA officials consider using stormwater drainage from major roadways as a viable source of alternative water supply.

As a first step to adding stormwater sources, Fraser said that CCUA is currently working with the Florida Department of Transportation on a pilot study to use an FDOT stormwater pond collecting water from the First Coast Outer Beltway.

The plan is to install a horizontal well, similar to a French drain with "beefed up pipes for long life and covered with a fabric filter," as Fraser described it, that will be buried adjacent to the beltway's detention pond.

Water pulled from the horizontal well will either be treated onsite or sent to the filtration plant for treatment and then distributed to customers.

That particular project, dependent on highway construction schedules, is perhaps 18 months away, said Fraser.

"We'll coordinate with FDOT on their pond sites to coordinate their infrastructure with our infrastructure, he said. "One of the anticipated benefits of this type of stormwater harvesting will be the reduction in nutrients discharged to surface waters, which will essentially help their stormwater system and the reclaimed water system in Clay County."

Construction of the First Coast Outer Beltway is just beginning and could continue for as long as a decade. In the short term, CCUA is looking for other sites where it can use stormwater detention ponds and horizontal wells to reclaim stormwater from roads and reuse it for subdivision landscape irrigation.

Because of limits to the available water supply and the need for protection of environmental systems while maintaining sustainable water supplies, water conservation and reclaimed water efforts are gaining traction in Florida in anticipation of renewed growth following the recession.

There are no plug-and-play scenarios so far. While some of CCUA's projects resemble those in other parts of the state, they also represent a unique assemblage tailored to existing water supply and anticipated water demand.

PIPELINE

From Page 1

their narrowest points, avoid high quality cypress-dominated wetlands and establish setbacks from wetlands where possible.

"EPA understands that the applicants have purchased $12.3 million of mitigation credits along the route in the basins where wetlands are expected to be impacted," noted Giattina.

He acknowledged that pipeline leaks and explosions can't be avoided, but the construction effort follows a route carefully surveyed with LIDAR followed by geotechnical and geophysical analysis in an attempt to avoid the most sensitive below ground Karst structures that would not support the pipeline.

The agency was satisfied that horizontal drilling would further improve prospects for avoiding Karst features and sinkholes.

The Federal Energy Regulatory Commission had delayed approval of the final environmental impact statement pending a decision by Administrative Law Judge Bram D.E. Canter.

The WWALS Watershed Coalition challenged the Florida Department of Environmental Protection's intent to approve the Sabal Trail permit issued last July.

Judge Canter ruled that the environmental group lacked the necessary legal standing to challenge the permit and rejected its arguments. He ruled the project to be in the public interest and recommended DEP move forward to issue the permit.

With key procedural issues involving the EPA and DEP removed, FERC approved the Sable Trail pipeline's final environmental impact statement in mid-December. That opened the way for DEP and the corps to permit the project.

Nakeir Nobles, a corps spokesperson in their Jacksonville District, responded to a query regarding the corps' likely schedule for granting a permit by replying that there is "no set time frame for a decision."

With its final draft environmental impact statement approved and DEP's intention to issue a permit no longer under challenge, it's only a matter of time until permits are issued and construction begins on the natural gas pipeline.

Gulf Power to build three naval base solar plants

Staff report

Gulf Power Co. is building three solar electric plants in Florida's Panhandle. Construction has started on the projects to expand the company's efforts to produce power using alternative sources of energy.

The work is being conducted jointly by the U.S. Navy, the U.S. Air Force and the Southern Company, the corporate owner of Gulf Power.

Together, the three facilities will have about 1.5 million solar panels that could generate up to 157 megawatts of direct current. This translates into powering about 18,000 homes on a sunny day.

The facilities will be constructed at Naval Air Station Pensacola, Naval Air Station Whiting Field and Eglin Air Force Base.

Gulf Power and its third party developer, Coronal Development Services, will build the facilities.

Last year, the Florida Public Service Commission approved the projects. The initiative is part of the U.S. Department of Defense's commitment to renewable energy.

Together, the facilities will be the largest photovoltaic array in Florida and have the potential to reduce carbon dioxide emissions by more than eight million tons annually.

The parties expect the solar facilities to be operational by December, 2016, and serve all Gulf Power customers.

Once operational, the facilities are expected to power about 7,400 Escambia County homes from NAS Pensacola; about 6,100 Santa Rosa County homes from NAS Whiting Field; and about 4,500 Okaloosa County homes from Eglin Air Force Base.

Mercury level in IRL dolphins, fishermen alarmingly high due to bioaccumulation

By ROY LAUGHLIN

Three researchers associated with Florida Atlantic University's Harbor Branch Oceanographic Institution recently published a summary of a decade's worth of mercury bioaccumulation through the food chain in the Indian River region.

Their research shows similar notably high mercury levels in Indian River Lagoon dolphins, and exceptionally high mercury in the hair of area sports fishermen who volunteered samples for the study.

The discovery of record high mercury levels in the lagoon's porpoise populations was a prelude to research on humans.

Researchers measured high mercury levels in blood and fish of bottlenose dolphins in sampling conducted since 2003. Dolphins from the Indian River had a mean blood mercury concentration of 658 ± 519 microgram per liter. Dolphins from Sarasota Bay showed similar high blood mercury concentrations, 570.3 ± 433.5 µg/L.

The researchers raised a red flag in their report by noting that mercury levels in the blood and skin of Florida dolphins are three times higher than mercury measured in dolphins elsewhere.

And they are almost an order of magnitude higher than mercury measured in captive dolphins at the National Aquarium in Baltimore.

"The levels of total mercury in blood and skin of Florida bottlenose dolphins are among the highest recorded in free-living marine mammals worldwide," noted the report.

The researchers said that methylmercury comprised 73 percent of the total mercury in the skin of dolphins from the Indian River Lagoon, and 96 percent in dolphins from Sarasota Bay.

Methylmercury is the chemical form that bioaccumulates through the food chain. It is also the form linked to developmental defects and behavioral changes associated with damage to the nervous system in adult animals.

"There was a peak (in mercury tissue) concentrations but they appear to have lev-

MERCURY
Continued on Page 16

Growth of Brazilian pepper trees degrades Estero River

By BLANCHE HARDY, PG

Interest is growing for the restoration and preservation of Lee County's Estero River. The river's eastern boundary is a few miles east of Interstate-75 and terminates in Estero Bay to the west.

The Estero is a popular attraction for canoeing, kayaking, boating and fishing, and offers access to the historic, now-defunct Koreshans religious movement site that housed 250 residents at its peak.

The Koreshans believed the world existed completely within a sphere. The site is a state park containing eleven well preserved, turn-of-the-century structures and ornately landscaped grounds.

The river is mapped as part of the Calusa Blueway. While it sounds ideal, the Estero River has a Brazilian pepper problem that has narrowed passage on the river to single file kayaks in some places.

The University of Florida Institute of Food and Agricultural Sciences regards the Brazilian pepper tree as one of the most aggressive non-native invaders.

Brazilian pepper plants were once considered an attractive addition for landscaping until the invasive species began to degrade Florida's natural habitat.

They have overtaken so much of the river that they leave little light for native species to survive. The plant's invasiveness is compounded by the enormous amount of fruit produced by each plant.

To make things worse, Brazilian pepper plants are in the poison ivy family and some people develop a skin rash when they come in contact with the tree.

Due to the potential for a serious reaction, the plants can't be burned. Inhaling the smoke could set off a systemic allergic reaction.

Private property along the river banks requires permission for access to conduct any cleanup activity, slowing the process.

But the river does have advocates that want to mitigate the problem. The newly created Estero Historic Preservation Citizens Committee is one. But as yet, no organized effort to remove the pepper trees is currently underway.

Reported methodologies for removing the pepper trees include cutting them down and using herbicides to prevent their immediate re-emergence.

But until the necessary financial resources for cleanup are available, the problem will continue to worsen along the Estero and other Florida rivers.

Brown tide hits IRL

Staff report

St. Johns River Water Management District scientists are monitoring a brown tide in portions of the Indian River Lagoon.

Brown tide is prominent in most of the Banana River and Indian River lagoons, according to Dr. Charles Jacoby, supervising environmental scientist at the district.

He said that chlorophyll levels also remain high in Mosquito Lagoon due to a mixture of single-celled algae, including the one responsible for brown tides.

Algal blooms are a primary focus of the district's Indian River Lagoon Protection Initiative.

That effort includes a multi-year investigation in which the district and outside experts will increase their scientific understanding of blooms through data collection, field and lab analysis, and model development.

NAS
From Page 10

agement District, approximately half of all wastewater plant effluent is treated and reused, primarily for landscape irrigation. And the other four water management districts are quickly catching up.

Current reuse practice in Florida, based as it is on community-wide systems, is no obstacle to a stormwater or grey water subloop for flushing within a household or multi-family residential building.

Florida's seasonally abundant rainfall makes stormwater capture for flushing viable but perhaps less cost-effective than needed to pay the capitalization costs of 2,000-3,000 gallon cisterns that would be necessary to store sufficient stormwater during dry years and dry seasons.

The report's expert panel included no water supply experts from Florida. Florida's water supply circumstances are unique.

The aquifers flowing underneath the state are a source of water almost anywhere a well can be drilled, although aquifer water quantity is declining as is its quality in some places.

Statutory requirements for protecting springs, streams and lakes are another major obstacle to supply from the state's aquifers.

Florida's aquifers are not running dry, but currently available water supplies will not sustain continued population growth.

One of Florida's primary water management goals is conservation. The approach has been to implement centralized, engineered water conservation measures at scales above that of the neighborhood.

Nevertheless, grey water and stormwater use at the household and multifamily residential level, and in some commercial enterprises such as hotels, schools and health clubs could be a future option for additional water conservation practices in Florida.

With appropriate and affordable equipment for residential scale of use, it could even be cost-effective.

The recent passage of Senate Bill 552 reportedly sets the stage for favorable regulatory and local ordinance revision to encourage some of the measures endorsed in the NAS report.

If Floridians would accept and make the capital investment necessary for non-potable water flushing, Florida's water conservation goals would receive a substantial boost.

Bunnell boasts one-of-a-kind ion exchange water treatment plant

By PRAKASH GANDHI

The small Flagler County city of Bunnell celebrated the grand opening of its new water treatment plant. The new one million gallon-per-day water treatment plant features the first treatment process of its kind in the world, according to local officials.

The city broke ground on the $4.8 million project in August, 2014. It features ion exchange treatment to remove contaminants from the water in an exchange with substances that are non-contaminating. The facility came online in late 2015.

The co-exchange process uses both softening and dissolved organic carbon resins in the same contactor. This removes both hardness and total organic carbon from the city's groundwater supply source.

Ron Cook, lead operator of the plant, said the end result is better-tasting, higher quality drinking water that is less likely to cause issues with water heaters, plumbing and other household appliances.

McKim & Creed Inc. served as the engineer of record for the project, working closely with the city's public works and engineering staff, the equipment manufacturer and the contractor to plan, design, test and build a facility that meets both the city's needs and regulatory requirements.

Cook said the city obtained a $1.5 million Rural Development grant from the U.S. Department of Agriculture that helped fund the construction costs of the ion exchange plant.

He said that water is pumped from the ground via one or more of five public water wells. The raw water is then aerated to remove hydrogen sulfide gas that would otherwise cause the water to have a bad odor.

The water is then brought into contact with a dual-phase ion exchange resin that binds with naturally occurring dissolved minerals such as calcium, magnesium and iron as well as organic matter.

Cook said this helps to remove these constituents from the aerated water.

"The water is then filtered to capture fine particulates," he said. "The next step involves chrome disinfection."

Finally, a pH adjustment step occurs to ensure the finished water is slightly higher in pH than neutral.

FEDFILE

From Page 2

EPA mercury rule in effect. The U.S. Court of Appeals for the District of Columbia sided with the EPA in a case brought by states and industries against Mercury and Air Toxics Standards.

The appeal courts' decision allows the rule to remain in effect, at least long enough for the agency to complete another cost-benefit analysis of its controversial rule.

That new cost-benefit analysis, expected to be available in April, 2016, follows a late June 2015 Supreme Court decision. The Supreme Court found that the EPA did not meet the Clean Air Act's requirement that rules be "necessary and appropriate" by performing an acceptable cost-benefit analysis.

The courts may still weigh in on the cost-benefit analysis when it is completed, but the Dec. 15 appeals court decision provides EPA with the opportunity to complete its analysis and substantially improves the MATS' prospects for surviving further court challenges.

The plaintiffs are widely expected to return to court where they may challenge the EPA's cost-benefit analysis' methodology, perhaps focusing on "co-benefits," those health benefits not directly attributable to reductions in mercury, but which occur as a result of measures to reduce its emissions.

Chief Justice John Roberts questioned that practice when the case was before the Supreme Court. Currently, the EPA estimates that MATS will prevent 11,000 premature deaths and provide $90 billion in health benefits.

MATS opponents calculate starkly lower values for premature deaths and health benefits from MATS, ones far too low to tip the cost-benefit in favor of the rule.

MATS opponents include a number of power companies, but not all. A substantial number, perhaps more than half the power producers in the country, have already made plant upgrades or are planning to do them to meet MATS requirements.

Those companies, including Calpine Corp., Exelon Corp., National Grid Generation LLC and Public Service Enterprise Group Inc. supported the rule in testimony delivered by their lawyer.

They have invested in new equipment and upgrades under the assumption that MATS will affect wholesale electricity supplies and prices. They support the rule because in its absence, they will face competitive disadvantages.

The EPA published a proposed supplemental finding on Dec. 1, 2015. Its public comment period ended Jan. 15, 2016, keeping the EPA on track to meet the April, 2016, deadline for the revised cost-benefit analysis. By then, if not earlier, the ball will be back in the plaintiffs' court.

Support for Clean Power Rule. Several Florida cities including West Palm Beach, Coral Gables, and Pinecrest have filed an amicus curiae brief with the U.S. Court of Appeals for the District of Columbia in support of implementation of the EPA's Clean Power Rule.

Joining the Florida cities in filing the brief are the U.S. Conference of Mayors and the National League of Cities.

The U.S. Conference of Mayors is a nonpartisan organization comprised of the mayors of cities with 30,000 or more residents. It has 1407 members. The National League of Cities represents over 19,000 cities and towns.

Perhaps as many as 14 other states may join the lawsuit on behalf of the EPA in support of the rule.

Such strong support by individual cities and organizations representing them is important because cities are responsible for more than 70 percent of global greenhouse gas emissions.

At the same time, urban leaders recognize that more heat-related deaths, worsening air quality, longer droughts, increasingly frequent and severe storms, damaged and disappearing coastlines and degraded ecosystems will affect cities first, but in different ways across the country.

None can expect immunity from climate change effects.

Plaintiffs in the case against the EPA's rule are led by West Virginia Attorney General Patrick Morrisey, who is joined by the attorney generals of 24 states, including Florida's Pam Bondi, and energy company Murray Energy.

They asked the court overturn the Clean Power Rule and immediately suspend its implementation until the lawsuit is settled.

Salt marshes a good sink for atmospheric carbon. New NOAA research in North Carolina indicates that salt marsh grasses can effectively sequester atmospheric carbon dioxide and transfer it to soils as organic matter over the long term.

The researchers measured organic carbon content in soils of five transplanted marshes, 12 to 38 years old. The "green shoreline" marshes (created marshes) were less than 30 meters wide, and some of them were high on the shore, so they were immersed for less of the tidal cycle.

The carbon accretion rates reported in this research fall into the lower half of reported values for marshes globally, a finding that may reflect higher beach elevation along North Carolina shores and coarse, sandy sediments that allow for the exchange of organic carbon and oxygen with the overlying water and air.

The research also includes other characterizations of North Carolina's green shoreline marshes that indicate that created salt marsh could be an effective sink for atmospheric carbon dioxide.

They estimated that the 124 permitted green shorelines in North Carolina, with a total length of 10 kilometers, would sequester nearly 19 metric tons of carbon corresponding to 64 metric tons of CO_2.

These calculations imply that North Carolina's green shorelines offset the equivalent of 7,525 gallons of E10 gasoline annually.

North Carolina has more than 839 miles of shore line stabilizing armoring and about half are bulkheads. The 10 kilometers of living shoreline are insignificant in comparison.

The authors note that in the future, shoreline armoring may become more commonplace, and where green shorelines are part of the effort, substantial benefits of CO2 sequestration are co-benefits of substantial value.

Gasparilla Island Water Association announces improvements to water, wastewater systems

By BLANCHE HARDY, PG

Leslie Diaz, president of the Gasparilla Island Water Association, recently announced a series of water and wastewater improvements planned for 2016.

Diaz described the focus of the first project that will include an expansion to the water treatment facilities, including two new deep wells north of the existing facility.

In addition, the reverse osmosis drinking water treatment plant will be rehabilitated, including changes that will allow it to operate more efficiently and increase production capacity to 194,000 gallons per day.

The increased capacity will allow the association to reduce its dependency on Charlotte County Utilities during peak demand flows.

Construction of the RO water treatment plant expansion, raw water main and raw water wells 8 and 9 will be handled by Brandes Design Build Inc.

The project was anticipated to kick off in January 2016.

The total project cost is estimated at approximately $5.1 million by the Florida Department of Environmental Protection who is assisting GIWA in financing the improvements with a 1.16 percent 20-year loan through the state's revolving loan fund.

GIWA is under a Southwest Florida Water Management District consumptive use permit mandate to reduce its average daily water consumption to 150 gallons per person by the end of 2019.

The president's announcement included several reminders about irrigation and leak control with emphasis on the association's procedures for managing leaks related to seasonally unoccupied homes.

The water management district is conducting a Gasparilla Island water conservation workshop to assist local residents in better understanding and managing their water use on Thursday, Feb. 24, at the Boca Grande Community Center Auditorium.

GIWA's existing wastewater treatment plant is nearing the end of its useful life, Diaz said. "We are reviewing options, one of which is to replace the existing treatment facility with a plant constructed to last fifty years."

The president's report indicated the estimated cost for the new plant is approximately $13 million.

The utility isn't eligible for a low interest state revolving fund loan for the wastewater project, but will be retiring an existing loan that will free up funds and will seek other low interest financing options over the next several months.

FWS to reclassify West Indian manatee from endangered to threatened

Staff report

The U.S. Fish and Wildlife Service announced that the West Indian manatee—as a result of significant improvements in its population and habitat conditions—is proposed to be downlisted from endangered to threatened status under the federal Endangered Species Act

The proposal to downlist the manatee to threatened will not affect federal protections currently afforded by the ESA. FWS remains committed to conservation actions to fully recover manatee populations.

The ESA defines an endangered species as one currently in danger of extinction throughout all or a significant portion of its range, and a threatened species as one that is likely to become endangered within the foreseeable future.

Given its review of the best scientific and commercial data available including analyses of threats and populations, FWS said that the West Indian manatee no longer falls within the ESA's definition of endangered and should be reclassified as threatened.

They published their proposal in the Federal Register in January, beginning a 90-day comment period during which time the public is invited to submit scientific or technical information that will aid the agency in reaching its final decision.

The manatee protection measures currently in place would remain in force if the species is downlisted from endangered to threatened.

These measures played a key role in reversing the species' decline.

Retrofitted water control structures have resulted in significant decreases in manatee fatalities.

In addition, power companies are working cooperatively with federal and state conservation managers to address warm water outflows at wintering manatee congregation sites.

Florida counties have made significant progress in developing and implementing manatee protection plans and siting boat facilities to reduce boater impacts on manatees.

FWS works with the U.S. Coast Guard to enforce manatee protection areas and minimize collisions with high-speed boats. Significant advances have also been made in reducing the threat from entanglement in fishing gear.

Additionally, manatee rescue, rehabilitation and release organizations help save dozens of manatees yearly, with a majority successfully released back into the wild.

Today, the range-wide minimum known population of manatees is estimated to be at least 13,000 , with more than 6,300 in Florida.

When aerial surveys began in 1991, there were only an estimated 1,267 manatees in Florida, meaning that over the last 25 years there's been a 500 percent increase in the species population.

The manatee also remains protected under the Marine Mammal Protection Act.

The finding and additional information is available online at the federal eRulemaking portal at www.regulations.gov.

Classified Advertising

Environmental Professional

Taylor Environmental Consulting is seeking an environmental professional with at least 3 years of experience in environmental assessment and FDEP PRP projects. The candidate must have a Bachelor's degree in engineering, geology, environmental science, or other related field; working knowledge of FAC, Ch. 62-770 and 780; valid driver's license and good driving record; and the physical capability to perform field and office work. 40-hour HAZWOPER training and/or PG is a plus.

The job will include:
- Project management
- Performing Phase I/II ESAs, UST closure assessments, site assessments, and soil and groundwater sampling, and natural attenuation monitoring in accordance with FDEP SOP's
- Subcontractor management and oversight including drilling and excavations
- Preparing technical reports and proposals
- Preparing dewatering permitting applications
- Communicating effectively and constructively with coworkers, regulators, and clients

If interested, please e-mail your resume to Lee Taylor at lee.taylor@taylorenv.com.

MERCURY

From Page 13

eled off with no linear decreasing trend," said Dr. Adam Schaefer, MPH, an epidemiologist at Harbor Branch and the chemist for the research effort.

Mercury in the lagoon's fish and porpoises is not an event, it is the new normal.

By 2014, the researchers turned their attention to the possibility that humans who consume seafood from the Indian River Lagoon could bioaccumulate mercury in the same fashion and to the same levels as bottlenose dolphins.

Both are consumers at the top of food chains with multiple levels, the kinds of food chains that foster the highest mercury bioaccumulation.

In human studies, researchers measured mercury in the hair of 135 sports fishermen who volunteered samples and reported information about the frequency and source of their seafood consumption.

They measured a grand mean for total hair mercury of 1.53±1.89 µg/gram for the 135 volunteers who ate at least some seafood from the Indian River. The researchers reported this level was among the highest reported nationwide.

Furthermore, even higher total mercury concentrations were measured in hair from people who reported frequent seafood consumption sourced from the IRL.

Among all participants who ate all locally caught seafood, 28 volunteers had the highest total mercury levels in their hair. This group also displayed the highest median concentration of total mercury in hair.

"While the standard deviations are high, the mean values as still significantly different across seafood consumption frequency," said Schaefer.

Furthermore, the authors noted that "over 50 percent of the participants had a hair (mercury) concentration (that) exceeds the U.S. Environmental Protection Agency exposure guidelines."

Mercury bioaccumulation through Florida food chains that includes freshwater and marine seafood has been known and characterized for at least 20 years. Public perception of it was one of the major drivers for Everglades restoration.

The Florida Department of Health has published statewide consumption advisories by location and species for freshwater and marine seafood species.

For almost all marine and estuarine fish and shellfish species eaten by humans, the advisory encourages consumption not to exceed two times per week, and several species of top-level predators should be avoided completely by pregnant women.

Some of the subjects in the Harbor Branch study reported seafood consumption in excess of those advisories. That consumption was reflected in high mercury burdens in their hair.

In its 2015 guidelines, FDOH posted no special seafood consumption restrictions intended to avoid excess mercury exposure for the IRL region.

A request to the department in Tallahassee as to whether they were considering specific guidelines for fish consumption for the Indian River yielded only a reference to the current guidelines.

This research makes it clear that those guidelines are not suggestions to be followed casually if local seafood consumers want to avoid excess mercury bioaccumulation.

Like mercury bioaccumulation processes elsewhere, atmospheric deposition is the source and microbial methylation is the essential transformation step that begins the metal's bioaccumulation through the food chain.

Schaefer said that other researchers at Harbor Branch are conducting studies to "look at the microbiology of the lagoon, which plays a role in the bio-transformation of elemental mercury into the harmful form known as methylmercury."

A quick fix is not on the horizon for high mercury bioaccumulation in Indian River food chains and that includes humans.

FILTERS

From Page 8

The use of rings of pentose and triose sugars is another prospect for molecular tuning.

Substituting other cross-linking molecules, a third substantial opportunity for molecular design, promises a range of polymers with optimized performance varying with specific molecular structure.

The researchers, in their report in the journal *Nature*, also compared the removal of bisphenol A and other small amphipathic organic molecules from water by brand name commercially available point-of-use water filters.

"It will take a year to make this stuff on a large scale," said Dichtel. "After that, all strategies are open for people who want to use this, and what they want to use it for."

After that, the big question is how it can be manufactured at a cost that justifies those uses. Dichtel said he expected cyclodextrin polymers to be commercially available initially as a powder amenable for use in a filter column.

Later, "it would be conceivable to synthesize it on the surface of another filter," he said.

Other questions remain for the cyclodextrin polymer commercialization phase of the R&D effort. Biodegradability is one of the major ones.

"Cyclodextrins are biodegradable, but when linked in this polymer, it's an open question," he said. "Early samples have been soaking in water for a year and it doesn't look like (biodegradation) is happening."

The Cornell team uses methanol rinses to regenerate filtration capacity over "many cycles—but not thousands." The use of regeneration solvents other than methanol and longevity with respect to both biodeterioration and loss of capacity for other reasons are parts of a life cycle analysis yet to be completed.

But so far, nothing observed raises a red flag to reduce the team's optimism over cyclodextrin polymers' early promise as uniquely capable, faster and less expensive alternatives to activated charcoal as a filtration medium to remove small, amphipathic organic molecules.

Index to Display Advertisers

Support from the above organizations makes it possible for the *Specifier* to hit your desk every month. Why not show them your gratitude by giving them a shot on your next project? Hmm?