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August/September 2019

Volume 41, Number 4

State of the Lab business 1,5,6

Our annual environmental laboratory industry review starts below; the latest lab directory starts on Page 5; and Jeff Flowers' commentary on the new MDL procedure starts on Page 6.

Battle against invasives 8

A new report from UF and the Nature Conservancy said that the \$45 million spent annually to control invasive plants has worked effectively in conservation areas, but urged agencies to consider more temporally-consistent application of herbicides to stay ahead of outbreaks.

Regional solid waste plan 10

Broward County will move forward on a memorandum of understanding with municipalities in the county to establish a regional solid waste and recyclables management system. Sound familiar?

DEP compliance questioned 12

A new PEER report claims that DEP officials worked deceptively and consistently to create the illusion of high levels of compliance with environmental rules and regs during the Rick Scott regime.

PFAS cleanup 18

Federal standards for polyfluorinated alkyl substances in drinking water and soil may be years away, but scientists and engineers are now developing methods for cleaning up water and soil contaminated by PFAS.

Departments

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Got a story lead?

Got an idea for a story? Like to submit a column for consideration? Let us know. 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 (321) 972-8937, or email mreast@enviro-net.com.

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Photo courtesy of Aqseptence Group

Stormwater and ocean surge can create big problems for municipal sewage systems, as excess water can overwhelm system capacity. Because vacuum sewers are "closed systems," they can be shut down before a hurricane's arrival, and then quickly restarted once the storm has passed. See story below.

State of the Lab Industry

Florida's environmental laboratories remain busy as consolidation moderates

By ROY LAUGHLIN

Over the past year, Florida's commercial environmental laboratories have been busy. Most lab managers and owners we spoke with characterized business as "good."

Some used "stable" to characterize the past year. Others were just plain giddy.

"We're as busy as we've ever been," said Jason Weeks, president of Marinco Bioassay Laboratory Inc. in Sarasota.

Clients from public utilities, NPDES permit holders, landfills, remediation projects and others continue to provide

a steady stream of work that helps keep Florida's environmental labs humming.

Nationwide, remediation work is said to be decreasing, but apparently not in Florida where developers are ready to commit to construction projects once soil and groundwater cleanup work is complete.

Federal lab work is also seeing an uptick with a focus on perfluorinated alkyl substance analyses.

Consolidation slows

Since 2015, lab consolidation has been a phenomenon reported in each of our annual reviews of the Florida environmental lab industry.

During the five years, more than a

dozen environmental labs either closed or were acquired by larger firms.

In 2019, consolidation took a pause. One lab, TRAC Laboratories Inc.'s bioassay laboratory in the Panhandle, closed its doors.

Acquisition of smaller laboratories, especially by national laboratory networks, appears as of July to have slowed.

Bucking the consolidation trend, one small environmental lab, Anascol USA LLC, recently opened its doors in Hollywood, FL.

Our prior industry reviews did not focus on ownership changes at the largest multi-state laboratories beyond to note their acquisition of the state's smaller labs. Their ownership, though, has been turning over as well.

For example, TestAmerica experienced three changes of ownership over the prior four years, including a merger with China's JSTI Group in 2016. In 2018, JSTI sold TestAmerica to Eurofins and their Florida lab is now known as Eurofins TestAmerica.

Our reviews have focused on the loss of small labs, closures that seemed to indicate an increasing instability in Florida's environmental lab enterprise.

In that same time frame outside of Florida, virtually all of the large U.S. environmental labs changed ownership,

LABS
Continued on Page 6

Hurricane preparedness

NC town's sewer system weathers impacts of storms well

By MARK MOORE

Hurricanes are terrifying but not surprising in the Carolinas. Statistically, we can expect one to hit our shores every other year and, over the past two years, we've met our quota.

In October, 2016, Hurricane Matthew skirted the coast of North and South Carolina. It made landfall briefly at McClellanville, SC, before tracking northeast back into the Atlantic.

Over the course of two days, it brought high winds, heavy rains and a massive storm surge to our city, Oak Island, NC.

Almost two years later, in September, 2018, Hurricane Florence hit the Carolina coast. It made landfall near Wrightsville Beach, NC, about 30 miles

north of Oak Island.

The slow-moving Category 1 hurricane brought with it more than 30 inches of rain over a three-day period.

In both instances there was significant damage, much of it due to flooding. And there were fatalities resulting from both events: 39 deaths in North Carolina attributed to Florence, and 26 to Hurricane Matthew.

But we were prepared for the hurricanes and, as a result, our systems weathered the storms well.

In neither storm did we ever lose electrical power. We also experienced no sewage overflows during or after the storms, and sewer service was restored

VACUUM
Continued on Page 18



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Correction

In a story in our June/July issue entitled "Clearwater approves water supply and treatment master plan study," we erroneously stated that construction costs had increased to \$235.2 million. The correct amount is \$35.2 million. We regret the error.

Florida communities receive brownfield grants to support assessment, cleanup

Staff report

The U.S. Environmental Protection Agency announced that seven Florida communities will receive grants under the agency's Brownfield Redevelopment Program.

All communities will receive \$300,000. Depending on the community, the money will be divided into variable portions, one to focus on toxic substances, the other for petroleum contamination.

The funding will support Phase I and Phase II environmental site assessments.

It will also fund cleanup plan preparation, community involvement plans and expansion of existing brownfield site inventories.

Many grants are earmarked for specific neighborhoods or areas.

Recipients include the cities of Brooksville, Jacksonville and Palatka; Pinellas County; the University Area Community Development Corp. of Tampa; and the Treasure Coast Regional Planning Council.

The Treasure Coast RPC award was for \$600,000, twice what any other recipient received. It will support assessment grants in the cities of Ft. Pierce, Rio and Port Salerno in St. Lucie and Martin counties and a project in the Northwest-Progresso-

Flagler Heights Community Redevelopment Area in Fort Lauderdale.

In his comments on the funding, EPA Administrator Andrew Wheeler noted that 108 communities nationwide will receive grants for redevelopment within Opportunity Zones, a new designation created by EPA to guide brownfield funding to specific target areas.

"Approximately 40 percent of the selected recipients are receiving brownfields grants for the first time, which means we are reaching areas that may previously have been neglected," he said.

1,4 dioxane draft risk evaluation. 1,4 dioxane is one of the first 10 chemicals subject to accelerated risk evaluation under the Frank R. Lautenberg Chemical Safety for the 21st Century Act.

In late June, the EPA released a draft risk evaluation for the organic compound that will guide further scrutiny.

The EPA's draft assessment finds 1,4 dioxane an unreasonable risk only "to workers in certain circumstances."

The draft assessment states that the

chemical is not an unreasonable risk to occupational non-users—"workers in the general area of 1,4 dioxane use but not directly in contact with the chemical."

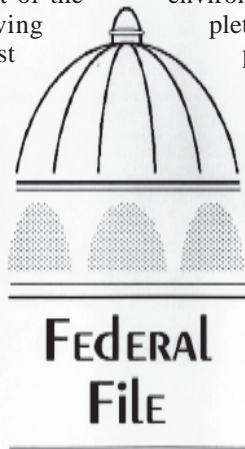
The EPA also found no unreasonable risk to the environment for all other conditions of use included in the draft risk evaluation.

1,4 dioxane is widely dispersed in the environment at low levels. It is completely miscible in water and is reportedly found widely in public drinking water sources.

The EPA classifies it as a likely human carcinogen, while California lists it on its registry of chemicals known to cause cancer.

In a summary document for the public, "Understanding the Risk Evaluation of 1,4 Dioxane," the EPA wrote that "2016 CDR data shows only two manufacturers were producing or importing more than one million pounds of 1,4 dioxane into the U.S. in 2015."

In its risk assessment, it accounted for approximately half of that quantity, noting 270,000 pounds used as processing aids, less than 150,000 pounds used as functional fluids in open and closed sys-



tems, and less than 150,000 pounds used as laboratory chemicals.

The remainder is used in adhesives and sealants including polyurethane foams, and in printing and printing compositions. It is also used in dry film lubricants.

Since the draft assessment found no risk, there will be no risk assessment and no follow-up exposure limits proposed for drinking water.

Public health advocates expected that the risk assessment would be the first step toward a drinking water standard.

The EPA noted that its 1,4 dioxane draft risk evaluation may "become more refined through the public and peer review process."

The draft risk evaluation will be published in the Federal Register, perhaps about the time this story appears. A public comment period of 60 days follows the date of publication.

Clean Power Plan replaced. The EPA announced that its new Affordable Clean Energy rule, or ACE, will replace the Obama administration's Clean Power Plan.

In brief, ACE adheres to the Supreme Court-ordered regulation of greenhouse gases under the Clean Air Act by allowing the agency to establish the best systems of emission reduction.

In contrast to the rule it replaces, state regulators will set the standards of performance.

While the Clean Power Plan was tied up in court and its implementation suspended over the last three years, the move away from coal for electricity generation has continued.

Five major coal mining companies from Appalachia to Wyoming have declared bankruptcy.

In the short term, market forces that favor natural gas and renewable energy for electricity generation are putting Big Coal out of business in the U.S.

The practical consequences of the new rule are therefore few, except for those living near the remaining coal-burning plants.

New York state officials were the first to announce they would challenge ACE in court for violating the Clean Air Act. Connecticut soon followed.

Meanwhile, CO2 levels in the atmosphere reached 411 parts per million this year, a new milestone.

Priorities for EPA enforcement, compliance. In addition to being a data-driven science agency, the EPA is also responsible for compliance with legislation through rules that protect human health and the environment.

Towards that end, the EPA announced seven National Compliance Initiatives. EPA Assistant Administrator for Enforcement and Compliance Assurance Susan Bodine described them in June.

The initiatives are broadly grouped into four major EPA program areas.

Under air quality programs, the agency will focus on reducing excess emissions of harmful air pollutants from stationary sources, reducing air emissions from hazardous waste facilities and ending the use of aftermarket defeat devices for vehicles and engines.

With respect to clean water programs, the agency intends additional compliance efforts to reduce significant noncompliance with National Pollutant Discharge Elimination System permits and reduce noncompliance with drinking water standards at community water systems.

In addition, the agency plans to protect the public from hazardous chemicals by efforts to reduce the risks of accidental releases at industrial and chemical facilities.

Finally, the agency's Federal Action Plan to Reduce Childhood Lead Exposures and Associated Health Impacts will focus on the persistent goal of reducing childhood lead exposures.

Corps sued over Lake Okeechobee discharges. The Center for Biological Di-



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Plant City fertilizer manufacturing plant to close doors

Staff report

The Mosaic Co. announced the closing of its idled Plant City phosphate manufacturing facility in Hillsborough County. The facility has been inactive since 2017 due to the declining demand for phosphate fertilizers.

Mosaic will retain the employees currently responsible for maintenance activities on-site to complete decommissioning of one of two phosphogypsum stacks. The other stack is already closed.

The team will manage closure and compliance responsibilities over the next several years.

“Our decision to close the Plant City phosphate facility reaffirms our commitment to low-cost operation,” said Mosaic President and CEO Joc O’Rourke. “We will continue to meet global demand for high-quality phosphate fertilizers with production from our low-cost facilities in Florida, Louisiana, Brazil and Peru, and through our joint venture in Saudi Arabia.”

Mosaic projected a notable non-cash charge of up to \$390 million for permanent closure of the facility.

The annual cash cost for closure over the next five years, per year, is expected to be close to the cost of managing the idled facility in 2018.

But the company hopes to reduce some closure costs by evaluating innovative approaches to water management and by repurposing part of the facility for productive use. No specific site use plan was announced.

Duke building more electricity storage. Duke Energy Florida is undertaking three battery storage projects totaling 22 megawatts to enhance Florida’s smart grid and to improve their overall reliability and support critical services during power outages.

Duke hopes the storage project’s back-up generation ability will address the increasingly important need to provide service during the growing number power outages in the state.

The facilities include an 11-megawatt Trenton lithium-based battery facility located 30 miles west of Gainesville, a 5.5-MW Cape San Blas lithium-based battery facility approximately 40 miles southeast of Panama City, and a 5.5-MW Jennings lithium-based battery facility 1.5 miles south of the Florida-Georgia border in Hamilton County.

Duke is both the grid manager and operator so they can maximize the versatility of battery technology to include multiple customer and electric system benefits, such as “balancing energy demand, managing intermittent resources, increasing energy security and deferring traditional power grid upgrades,” reducing customer cost and increasing efficiency.

Solar-powered compactors. Waste Management is developing different ways to reduce its environmental impact while achieving business goals. Among their innovations is the SmartEnergy compactor that harnesses solar energy.

SmartEnergy compactors have several benefits including remote monitoring service and up to a 70 percent reduction in electricity consumption with equal compaction performance and cycle times compared to traditional compactors.

Collier County’s Solid and Hazardous Waste Management and Parks and Recreation divisions worked with the solid waste company to place solar trash compactors at 10 Collier County beaches and marinas.

Waste Management of Florida installed 24 solar-powered waste and recycling compactors throughout the county’s public facilities.

The compactors hold roughly 180 gallons of waste, about five times the standard receptacle. They look like typical large upright square enclosed trash or recycling bins with a solar logo.

Collier County officials said that “the solar-powered trash compactors prevent unsightly litter in public places as the fully

enclosed units keep waste in and animals out.”

Waste collection personnel are alerted automatically when a receptacle is full, helping to avoid overflowing bins.

The pilot program will run through the summer while county staff evaluates its impact on reducing litter and collection costs in high-traffic parks and beaches.

Sandco agrees to \$85K fine. The Florida Department of Environmental Protection sued Sandco Inc., builders of the Canopy development in Tallahassee, in August, 2018, for 11 violations related to sediment and erosion control violations.

Sandco recently agreed to pay \$85,000 in fines. The lawsuit will now be dismissed.

Canopy is a 500-acre mixed-use development project with a stated environmental focus that includes protection of an existing 45-acre freshwater pond and preservation of open space and conservation lands.

The development proposed considerable stormwater planning including treatment, management and control of all stormwater on-site.

DEP acted after heavy rains resulted in offsite flooding and sediment discharge from the project.

The department’s lawsuit claimed Sandco failed to maintain best management practices during site work and did not comply with all of the requirements of its stormwater pollution plan.

Sandco has since added more on-site controls.

Green Marine recertification. Port Canaveral received its second Green Marine certification.

The port is one of only two seaports in Florida and one of 22 ports nationwide to receive this distinction.

The Green Marine certification is awarded for advancing environmental excellence in maritime transportation and demonstrating “green” corporate leadership.

Bob Musser, the port’s senior environmental director, accepted the certification at the annual GreenTech 2019 conference in Cleveland, OH.

“This benchmark certification measures and evaluates our environmental performance,” Musser said. “Our engagement in multiple initiatives demonstrates our commitment to greener environmental practices.”

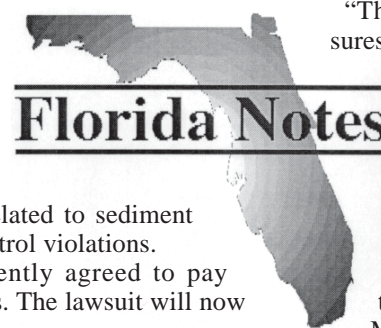
“Port Canaveral is raising the bar in the maritime industry’s commitment to best environmental practices,” said Port CEO Capt. John Murray. “Green Marine certification is more than a one-time achievement and involves responsibility for the implementation of long-term sustainable environmental goals.”

Green Marine is an international certification program that includes ports, terminal operators, shipyards and ship owners. Port Canaveral initially joined the Green Marine program in 2016.

Green Marine promotes voluntary measures to improve environmental performance. Certification is a rigorous process requiring action beyond regulatory compliance in key areas.

Performance is self-assessed annually and verified by a third party biennially.

Info Tech announces LEED award. Info Tech Inc., Gainesville, FL, recently joined the University of Florida and the city of Gainesville as the third recipient of



NOTES
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Preliminary development of Everglades Agricultural Area STA now underway

Staff report

Preliminary construction of a stormwater treatment area in the Everglades Agricultural Area is now underway in Palm Beach County.

In June, the South Florida Water Management District applied for permits from the U.S. Army Corps of Engineers and the Florida Department of Environmental Protection to clear a 700-acre strip of land.

The water management district will build a canal and perimeter levee for the STA there.

Canal construction should begin in October. The district is about 18 months ahead of its original schedule for beginning the STA work.

The completed STA will cover 6,500 acres. Its primary purpose will be to remove nutrients from water flowing from the planned EAA reservoir.

Both the STA and EAA reservoir are part of the \$1.8 billion project intended to reduce the amount of water released from Lake Okeechobee by 60 percent.

If STA construction is completed before the reservoir, district officials noted that it could be used to treat Lake Okeechobee water before sending it south into Everglades National Park.

SFWMMD began preparations for reservoir construction last November by clearing 560 acres of land to temporarily store as much as 800,000 cubic yards of rock destined for inclusion in the dike around the EAA reservoir. The first rock deliveries were made in February.

Within the first year of the project, significant preparatory steps for both the EAA reservoir and its associated STA occurred ahead of schedule. The entire project is expected to take about eight years, and be complete by 2024.

Advancing the STA construction schedule offers the possibility but not the certainty that water now being sent east and west from Lake Okeechobee could be sent south to the Everglades earlier than 2024.

St. Pete Beach sewer system upgrade. The St. Petersburg Beach City Council approved \$12 million to improve its sanitary sewer system to prevent overflows.

In 2016, city officials commissioned a study that proposed the funding for im-

provements to the wastewater collection system.

The city plans to borrow \$2 million from the State Revolving Fund and will use an additional \$3.1 million of previously issued debt.

The city council also approved a three-year phased increase of sewer fees by more than 24 percent to provide the remaining capital improvement costs.

The Florida Legislature recently approved the use of tourist tax funds by local governments to cover infrastructure improvement capital costs.

St. Pete Beach may also request funding from the Pinellas County Commission, however, the prospects of getting tourist tax development dollars from the county seems shaky at best.

St. Pete Beach is under a building and development moratorium following a 2014 consent decree, until its wastewater treatment system deficiencies are corrected.

Local officials justified the \$12 million for the sewage system improvements on the basis that it will raise taxable prop-

erty income for the city.

But those property taxes will not directly pay for the approved system upgrades. Those costs will be recovered only through levees on sewer system users.

Green Cove Springs wastewater upgrades. With Jacksonville metropolitan area development expected to reach well into Clay County after completion of the Jacksonville Outer Beltway, officials there are expecting rapid population growth in the coming years.

In preparation, Green Cove Springs officials proposed to begin a wastewater treatment system upgrade soon.

City officials plan to spend up to \$30 million to improve the wastewater treatment system, allowing more water reuse and removing nutrients that might otherwise end up in the Floridan Aquifer or the St. Johns River.

Over the next several years, Green Cove Springs will also replace and update some of its drinking water supply distribution system by replacing aging pipelines, some of which were installed in the 1940s.

Orange City drinking water out of compliance. In one calendar quarter during 2018, Orange City's potable water supply exceeded the U.S. Environmental Protection Agency's trihalomethane standard at a single sampling site.

The sampling site measurement was 80.7 parts per billion. The agency standard is 80 ppb, but they use a 70-parts-per-billion guideline, 10 ppb lower than the standard.

"Trihalomethane" refers to the aggregate concentration of up to four chlorinated organic compounds formed when chlorine reacts with low molecular weight naturally occurring organic compounds during the disinfection of potable water.

There is a trade-off when using chlorine for disinfection that effectively removes the high risk of microorganism-borne disease in exchange for a slight risk of cancer, kidney disease or nervous system impairment after decades of drinking treated water.

As a result of the overage, the Florida Department of Health sent a compliance assistance offer to the city outlining steps it must take to ensure lower trihalomethane levels in its drinking water.

In the final quarter of 2018 after the Department of Health issued its offer, trihalomethane levels in the city's potable water supply consistently met trihalomethane standards.

DEP resilience planning grants. DEP plans to provide about \$1.6 million to 24 coastal communities to help them plan and prepare for sea level rise.

The funding comes from the 2015 Peril of Flood Legislation, SB 1094.

The effects of sea level rise include coastal flooding, erosion and ecosystem changes.

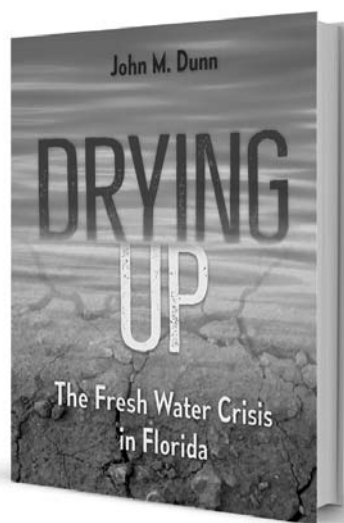
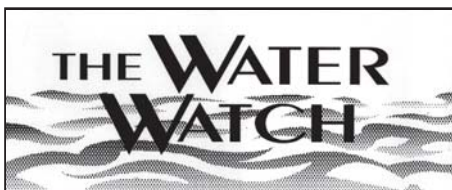
The grants will cover planning for current and expected changes through vulnerability assessments, and resilience and adaptation planning.

The grant recipients were spread evenly around Florida's coastline. Jacksonville received \$75,000, Jacksonville Beach received \$45,000 and Nassau County got \$40,000.

The city of Mexico Beach, which bore the brunt of Hurricane Michael last September, is slated to receive \$75,000. That amount, which a few other local governments were awarded, was the highest amount awarded this year.

DEP accepts applications for the grants annually. The department will begin accepting applications on Aug. 1, 2019, for FY 2020-2021 grant awards.

Winter Haven water resource study. The city of Winter Haven has begun a water sustainability blueprint master plan



Water is the top issue for Florida's future, and *Drying Up* is a must-read primer.

—CRAIG PITTMAN
author of *The Scent of Scandal*

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WATCH
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Environmental Laboratories Serving Florida - 2019

Lab name and contact information	1) Capabilities/specialties, 2) Sample types, 3) Personnel info, 4) State of incorporation	1) Certs., 2) Add. capabilities, 3) Years in bus., 4) Other locations
Advanced Environmental Laboratories Inc. 6681 Southpoint Parkway Jacksonville, FL 32216 (904) 363-9350 • Fax: (904) 363-9354 Walter Kronz, Vice President wkronz@aellab.com www.aellab.com	1) Seven labs across Florida providing a full range of inorganic and organic testing. In-house and in Florida analysis of EPH, VPH, low level mercury and dissolved gases by RSK-175. Ability to run FL-PRO and PAHs in water from one 250 ml bottle. 2) Drinking water, groundwater, wastewater, surface water, soil, sediment, industrial waste, hazardous waste and air 3) Total: 135 Engineers/Scientists: 95 Technicians: 30 4) FL	1) TNI/NELAP, DoD ELAP and ISO 17025 2) SELECT AEL software enabling you to compare lab results to FDEP 62-777 limits, and generate FDEP petroleum summary forms and benzo(a)pyrene conversion tables. Various deliverables including CLP reports, ADR, EQUIS and ADaPT EDDs. Permit to import foreign soils. Courier services throughout Florida. 3) 25 years 4) Altamonte Springs, Fort Myers, Gainesville, Miramar, Tallahassee, Tampa
ALS 9143 Philips Hwy., Suite 200 Jacksonville, FL 32256 (904) 874-5826 • Fax: (904) 739-2011 Donna Jackson, Technical Sales Representative donna.jackson@alsglobal.com www.alsglobal.com	1) Environmental testing, NPDES, RCRA, CERCLA, process control, product certification, field sampling, customized electronic data deliverables, CLP like deliverables 2) All matrices 3) Total: 31 (Jax) Engineers/Scientists: 14 Technicians: 17 4) FL	1) NELAC, DoD ELAP, most SE states 2) Project review and validation, data reviews, method development, information (data) management consulting 3) 31 years
Benchmark EnviroAnalytical Inc. 1711 12th St. East Palmetto, FL 34221 (941) 723-9986 • Fax: (941) 723-6061 Dr. Dale Dixon, Laboratory Director dale.dixon@benchmarkea.net www.benchmarkea.com	1) Full analytical and sampling services are provided for government agencies, industrial operations and engineering firms 2) Surface water, marine water, groundwater, drinking water, wastewater, sediment and soil 3) Total: 31 Engineers/Scientists: 8 Technicians: 14 4) FL	1) NELAP, MBE, DBE, SBE 2) Courier, field sampling, DIEL studies, project management, custom spreadsheet reporting, ADaPT, STORET and WIN reporting 3) 27 years
Certified Compliance Laboratories Inc. dba XENCO Laboratories 1412 Tech Blvd. Tampa, FL 33619 (813) 620-2000 Eduardo Builes, PhD eduardo.builes@xenco.com www.xenco.com	1) Analytical testing services 2) Groundwater, wastewater, drinking water, surge water, soil, hazardous waste and air. 3) Total: 122 Engineers/Scientists: 57 Technicians: 50 4) TX	1) NELAP, NVLAP, FL DOH, MBE, DBE, SBE 2) Sampling capabilities. ADaPT and DEP EDD with final reports in 5-7 days TAT 3) 29 years 4) XENCO has labs in Tampa and Lakeland, bought Palm Beach Environmental Laboratories in South Florida in February, 2019, and opened a new facility in Tallahassee in June, 2019.
Eurofins TestAmerica 6712 Benjamin Road, Suite 100 Tampa, FL 33634 (813) 885-7427 • Fax (813) 885-7049 John Meade, Senior Account Executive john.meade@testamericainc.com Rhonda Moll, Account Executive rhonda.moll@testamericainc.com George Morrison, Account Executive george.morrison@testamericainc.com www.testamericainc.com	1) ADaPT reporting, MADEP VPH/EPH, TPHCWG, ICP/MS, low level mercury, phosphated pesticides by GC/MS, low volume extractions, RSK 175, 1,4-dioxane, ISM protocols, microwave/microextractions, field sampling, 24/7 data access. PFAS including PFOA/PFOS up to 30 related compounds by EPA methods 537.1, 537M and supporting DOD QSM Table B15 2) Drinking water, wastewater, groundwater, surface water, stormwater, generic discharge, soil, sediment, solid and liquid wastes, and air testing; textiles 3) Total: 104 (FL) Engineers/Scientists: 33 (FL) Tech/Admin: 71 (FL) 4) DE	1) NELAC, A2LA, LAB, ISO/IEC 17025, DoD ELAP, USDOE, USDA Foreign Soil Permits, USF&W Import License as well as many private audits, approvals and certifications for various industrial oil, gas, chemical, waste and automotive companies. 2) EMLabs P&K (a TA company) does asbestos, mold and bacteria analysis. Other TA Labs perform radiological, dioxin, PFAS including PFOA/PFOS, Methyl Hg, ISM, LEAF methods, CCR GWM, air toxics, including VI, Enhance Hydrocarbon analysis, including fingerprinting, Ind. hygiene, Bioassessible Pb & As, GIS Key, EquiS, CLP Methods. 3) 27 years 4) Labs: Pensacola and Tampa. Services centers: Fort Lauderdale, Orlando and Tallahassee
Flowers Chemical Laboratories Inc. PO Box 150597 Altamonte Springs, FL 32701-0597 (407) 339-5984 • Fax (407) 260-6110 John W. Lindsey, Jr., water/ww analytical June Flowers, environmental analytical Lew Denny, North Florida and Georgia www.flowerslabs.com	1) Full service laboratory analyzing environmental and drinking water parameters. Providing defendable data in organics, inorganics, metals, microbiology and nutrients. ADaPT reporting, field and courier services. PhD chemist on staff. Now certified for Legionella pneumophila in drinking and non-potable water. 2) All water matrices, soil, sediment, waste, oil and SPLP/TCLP 3) Total: 50 Engineers/Scientists: 36 Technicians: 14 4) FL	1) Florida DOH TNI in drinking water, non-potable water, solid and chemical materials categories. 2) EDDs, microbiologicals for routine water and wastewater at four labs in Florida 3) 62 years 4) Port St. Lucie, Madison, and Marathon in the Florida Keys
Jupiter Environmental Laboratories Inc. 150 Old Dixie Highway Jupiter, FL 33458 (561) 575-0030 • Fax (561) 575-4118 Kacia Baldwin, Client Services www.jupiterlabs.com	1) Full service lab specializing in advanced analytical analysis for both standard EPA methods and emerging research and development methods. Latest GC QQQ & LC MS MS instrumentation for detection of unusual compounds including Sucralose and Acetaminophen, hormones, PFOS, PFOAs, low level pesticides and explosives. Full custom EDD capabilities including ADaPT, Equis and SED. Data review, method development and auditing services available. Forensic analysis, fuel fingerprinting, melamine, food and flavor analysis. Specializing in rush TAT. 2) Ground water, soil, sediment, waste water, drinking water, food and nutraceuticals 3) Total: 32 Engineers/Scientists: 22 Technicians: 10 4) FL	1) NELAP, DoD, WMBE: State of Florida, SFWMD, Palm Beach County, Palm Beach County School Board SBE, Tampa Bay 2) Full field capabilities, SW, GW, marina and lake sampling 3) 24 years 4) Tampa, Miami
Marinco Bioassay Laboratory Inc. 4569 Samuel St. Sarasota, FL 34233 1-800-889-0384 • Fax (941) 922-3874 Jason Weeks, President weeks@biologylab.com www.toxtest.com	1) Acute and chronic NPDES toxicity testing, toxicity identification and reduction evaluations, ion imbalance toxicity studies (MSIIT) 2) Domestic and industrial treated effluents, remediation site discharges, storm-water discharges, reverse osmosis reject, product testing 3) Total: 10 Engineers/Scientists: 4 Technicians: 6	1) NELAP accredited 2) Toxicity consulting, supply high quality bioassay organisms for testing 3) 29 years
Pace Analytical Services Inc. 8 East Tower Circle Ormond Beach, FL 32174 (386) 672-5668 • Fax (386) 673-4001 David Chaffman, Sales Manager david.chaffman@pacelabs.com www.pacelabs.com	1) Full drinking water and environmental testing services. Monitoring for CERCLA, RCRA, NPDES, SDWA, UCMR3, RCRA/UST, PFOA, CCR and CWA 2) Drinking water, environmental water, groundwater, surface water, soil, sediment, air, biota 3) Total: 150 4) MN	1) NELAC, NELAP NAICS 541380 2) Field sampling, courier services 3) 41 years under same ownership 4) Labs in Tampa, Ormond Beach, Pompano Beach and service centers in Miami Lakes and Jacksonville
Phoslab Environmental Laboratories Inc. 806 W. Beacon Rd. Lakeland, FL 33803 (863) 682-5897 George A. Fernandez, President georgeaf@phoslab.com www.phoslab.com	1) Full range of environmental analysis. NPDES, RCRA, UST, PRP, BTEX, PAH, EDB, TCLP/SPLP, FL PRO-TRPH, VOCs, SVOCs, 8260, 8270, organics, inorganics, metals, micro, in-house sampling and courier services covering the state of Florida 2) Wastewater, groundwater, surface water, drinking water, soil, sediment, petroleum, used oil and solid waste 3) Total: 31 Engineers/Scientists: 15 Tech/Admin: 15 4) FL	1) NELAC/TNI, MBE, DBE, SBE, state of Florida 2) Custom reporting via Promium Element LIMS, EDDs, ADaPTs, fast turn around times for organics and TCLP/SPLP analysis 3) 53 years 4) Serving all of Florida, domestic (US) and international clients

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LABS
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reflecting that same volatility.

Low prices persist

Larger labs that moved into Florida over the last 10 years have been waging a price war.

The large labs weaponized the lowest advertised price to keep their cash flow moving, with investors holding the bill for capitalization.

That strategy has put a lid on prices for all of Florida's environmental labs. The

persistence of the price war continues to be a significant factor for Florida's environmental laboratory industry.

Eduardo Builes, Southeast technical director of XENCO Laboratories in Tampa, provided several examples of pricing challenges.

A few years ago, analysis for volatiles was typically priced in the \$200-\$225 range. Currently, the common price is about \$175, and can be as low as \$150.

Analysis for a suite of metals in a sample several years ago was \$30-\$40. A simi-

lar analysis today can go for less than \$15.

Builes also described a recent bidding process for a county utility contract for analyses. The county had budgeted \$400,000. But labs submitted bids for about half that amount, with the winning bid coming in at \$175,000.

Builes provided another comparison to illustrate how Florida's low-price climate for environmental lab services is affecting the workforce, noting that similar lab techniques are used for cosmetics analysis, food product analysis and other industry-associated techniques.

Consider his example of the current price of less than \$15 for a suite of metals in the sample. Food product testing laboratories still receive \$30-40 for the same work. It's only environmental labs that are accepting the lower costs, and Florida labs in particular.

Other lab owners we spoke with made similar comments about the static low pricing. However, this year its effect is becoming more significant.

This year, more than in any of the past five years, lab managers emphasized the urgency to raise the pricing for their services to keep up with their increasing costs for labor, especially for entry level employees.

Supplies, expendables costs rising

While service fees remain low, laboratory operating costs have experienced inflationary pressures over the past several years of as much as 10 percent, according to lab managers.

"Consolidation of our vendors that changes our consumable supply is . . . influencing pricing, making things higher," said Caitlin Brice, general manager with SGS North America Inc. in Orlando.

"Recently Agilent purchased Ultra Scientific," she said. "Average markup was 150 percent higher for same items."

Brice said that if she wants to continue

using specific expendables and lab supplies to ensure consistency, she'll have fewer vendors for price-comparison shopping.

SGS has a specialty capability in perfluorinated alkyl substance analyses, which requires specific items with limited availability.

"It creates more work to check prices and vendors constantly" to maintain the lower costs that allow her laboratory to maintain low pricing.

Instrumentation costs

Laboratory instruments come primarily from the U.S., Japan and Europe, especially Germany. Instrument prices have also increased over the past five years, according to respondents who've made recent major equipment purchases. And the prices are not particularly flexible.

In place of pricing flexibility, manufacturers are providing other types of incentives, such as two full years of complete warranty protection, to close deals.

Chuck Ged, founder and president of Advanced Environmental Laboratories Inc.

headquartered in Jacksonville, noted that an extended warranty offer is extremely valuable. In fact, it was a deciding factor in a recent instrument purchase.

Wages, hiring issues

Wages for Florida's skilled lab technicians and support staff represent a mixed bag of challenges for Florida's environmental labs.

Wages have increased a little in Florida over the past several years. Those for laboratory entry level workers and their support staff have increased the most.

This trend is part of an economy-wide effort to increase pay in the minimum and low wage categories. Wages that were

New MDL procedures

By JEFFERSON S. FLOWERS, PhD

How low can your lab go? The method detection limit has been the measure that labs report to show the lowest value that is different than the blank.

This value had been calculated using a U.S. Environmental Protection Agency procedure put in place many years ago.

The big news in the certified lab world is that the MDL procedure has changed for the first time and may, in the near future, alter the concentrations that labs report down to.

It is very likely that these low values will increase when labs implement the new procedures.

To make sure that only the best professionals can figure this out, labs now have two slightly different procedures for performing the MDL calculation, the EPA procedure given in "Definition and Procedure for the Determina-

MDL
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Tampa - (813) 630-9616
Sheila Wilcox - swilcox@aellab.com



Environmental Laboratories Serving Florida - 2019

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Lab name and contact information	1) Capabilities/specialties, 2) Sample types, 3) Personnel info, 4) State of incorporation	1) Certs., 2) Add. capabilities, 3) Years in bus., 4) Other locations
Professional Environmental Testing and Consulting LLC 4650 SW 51st St., Suite 702 Davie, FL 33314 (954) 440-3537 • Fax (754) 223-3874 Dr. Carol Vassell Kreitner, Owner/Manager petc702@comcast.net www.petc702.com	1) Full service laboratory specializing in water testing (microbiology, wet chemistry) 2) Drinking water, wastewater, groundwater 3) Total: 6 Engineers/Scientists: 3 Tech/Admin: 2 4) FL	1) NELAP, FDOH #E861109, Minority business certification 2) Lab chemical sales - SE FL Coop Bid #14-57 3) 6 years
Sanders Laboratories Inc. 1050 Endeavor Ct. Nokomis, FL 34275 (941) 234-1000 • Fax (941) 484-6774 Jeff Walsh, Operations Manager jeff@sanderslabs.net www.sanderslabs.net	1) Surface water and groundwater monitoring, facility compliance and process control monitoring, ASR, injection well analysis and food microbiology 2) Drinking water, wastewater, groundwater, surface waters, cooling towers, soils and sediments; meat, juice/beverages, seafood, citrus, produce; materials testing; textiles 3) Total: 21 4) FL	1) NELAP: Drinking water, non-potable water, solid and chemical, ISO 17025 for food and mold testing 2) Now offering Legionella testing. Full field sampling capabilities. Sanders Labs is the only lab in Florida with A2LA/FSMO sampling certification: Certification #3544.02. PCR molecular detection in several matrixes. 3) 28 years 4) Two locations: Sarasota and Fort Myers
SGS North America Inc. 4405 Vineland Rd., Suite C-15 Orlando, FL 32811 (407) 425-6700 • Fax: (407) 425-0707 Caitlin Brice, M.S., Laboratory Director www.sgs.com/ehsus	1) Full service laboratory specializing in organics and inorganics by SW-846 Methodology (VOCs, SVOCs, pesticides, herbicides, PCBs, metals, nutrients, etc.) in addition to incremental sample processing (ISM), explosives, perchlorate, PFOAs, PFCs, EPA 537 and DoD QSM 5.1 in DW, AQ, and SO, 1,4-dioxane by 4 methods 2) Water, soil, air, oil, sediments and wipes 3) Total: 80 4) NJ	1) NELAC, DoD/ISO 17025 and multiple state certifications 2) Electronic data deliverables including ADaPT, EQUIS, ERPIMS, and state forms. LC-QQQ and reduced sample volume via LVI (8270, 8270 SIM, 8081, 8082, 8151, 8141, 8015, AK102, FLPRO LVI. Courier throughout Florida, rush analysis, LC-QQQ including PFCs in DW, AQ, and SO with method 537 and QSM 5.1. Sampling services, surface water, wastewater, soil and marine. 3) 22 years 4) South Florida Service Center - 7769 NW 48th St., Suite 250, Miami, FL 33166

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about \$10 per hour a couple of years ago are now in the \$12-13 range.

Skilled lab staff wages have also increased, but given other factors such as experience and the specific skills involved that affect compensation, generalizations are harder to make.

Lab owners and managers said entry-level technical staff are typically earning in the mid-\$30,000 range annually. Middle level technical staff earn up to the mid-\$40,000 range.

The very best and most experienced senior staff members and managers may be earning salaries in the \$60,000 range. Staff in high cost-of-living areas receive a few percent more to cover their expenses.

Florida's wages are lower than national averages. This influences staffing at Florida laboratories in two ways.

First, turnover of entry-level staff is high. Frequently, new hires work long enough to get experience with one company, and then quickly move to another for the promise of higher pay.

This means that a lab loses its training investment in entry-level staff as well as potential workers that could be promoted to higher levels in the lab.

Related to this is that—for employees willing to move out of Florida—labs such as product testing laboratories, compete successfully with Florida's environmental labs for trained staff.

Hiring middle and management level staff is also influenced by low wages.

Hiring experienced replacement personnel in the Florida labor market is increasingly difficult, according to two laboratory owners who commented specifically about it.

The national market provides recruits with higher salary expectations. The most qualified job applicants ask for and sometimes receive higher pay than is typical in Florida.

AEL's Ged explained it this way: "Our industry has become confined to its own group. It has become more difficult to find a reasonable pool for any position in the lab (of workers) who have experience."

Ged further explained the importance of having the best and most qualified managers.

"Laboratory managers have to have knowledge," he said. "They need to be technically astute because it is the lab manager who communicates with clients."

One work-around for a limited pool of lab staff candidates is to cross-train capable staff for different analyses, according to Jefferson Flowers, PhD, president of Flowers Chemical Laboratories Inc. in Altamonte Springs.

XENCO's Builes noted that increasing levels of automation in the labs has reduced some staff requirements significantly.

This is one option open to labs willing to make significant capital investments. They can reasonably expect a sufficient workload to keep robotic machines active most of a 24-hour day.

However, these machines are not labor-free. They may rely on at least one experienced if not skilled operator for successful integration into a productive laboratory.

Given the points made by lab officials above, increasing staff costs hit modestly capitalized small labs the hardest and may be a factor in consolidation as smaller labs are acquired by larger ones or shut their doors.

Certification, regulation

TNI 2016 implementation finally occurred last fall. Most respondents said that they are operating smoothly under TNI 2016 quality assurance protocols.

Flowers mentioned a few remaining reservations on technical issues. He said relative standard error and method detection limit determinations remain challenges to be resolved.

Flowers also said that the Florida Department of Environmental Protection needs to have a quality assurance overseer in Tallahassee.

Mike Blizzard recently retired, leaving DEP's quality assurance oversight position vacant. Currently, questions are being

handled at the district level.

Both Flowers and Ged mentioned they would be more comfortable with one person in Tallahassee making a decision applicable statewide for quality assurance issues in labs.

This year, the Florida Department of Health reduced its certification fees by 20 percent. This occurred after a five-year delay from the time DOH agreed they would lower fees.

This is not directly related to TNI quality assurance site inspections, which are now performed by third party inspectors paid for by the laboratories.

One respondent put these costs into perspective. DOH fees are lower by \$500-\$1,200 per lab depending on the range of services offered. But the QA certification costs could now be \$5,500-\$6,000 at a minimum.

DOH reductions cover less than half the increased costs of the newly required annual QA inspections by independent contract reviewers/inspectors. This comparison is an issue because five years ago, the annual DOH fee covered site inspection costs.

Permit sampling requirements

The largest cohort of clients utilizing environmental labs services do so to comply with permit requirements.

Two rules have been amended recently

to reduce sampling frequency. One amended rule now requires less post-closure monitoring at landfills. The second, the coliform rule that primarily affects wastewater dischargers, has also eased sampling frequency.

Lab managers noted the frequency reductions, but said they had not experienced a large impact on overall lab budgets because the unit price of coliform tests, for example, is relatively low.

PFAS analysis

Perfluorinated alkyl substance analysis has come to Florida recently. SGS is one lab heavily invested in PFAS analysis. Their lab is certified for a range of PFAS isomers under U.S. Department of Defense protocols.

The Orlando laboratory's samples come from sites both in the state and beyond its borders, said Brice.

AEL's Ged said his lab is in the process of expanding its facilities and will join the ranks of Florida laboratories with the instrumentation capabilities for perfluorooctanoic acid as well as other analytes that require the most sophisticated HPLC-tandem mass spectroscopy equipment.

In addition to handling PFAS analysis, these instruments will give Florida labs the ability to analyze pharmaceuticals, and other xenobiotics that are emerging contaminants of concern.

Brice said the price for PFAS compound analysis has dropped by about 30 percent as more labs have obtained the capability to analyze them.

Analyses demand for these compounds may be a significant opportunity for labs that perform high-performance liquid chromatography with tandem tri quadpole detectors.

PFAS substances are currently unregulated but are ubiquitous in the environment and may cause a variety of health effects following exposures to parts-per-trillion levels in water or food.

The compounds bioaccumulate and are more persistent than most other classes of organic chemicals.

These characteristics make it seem they are in line for substantial surveillance and remediation efforts that will substantially involve environmental labs.

Impact of public sector labs

About 200 of Florida's licensed environmental laboratories are operated by public utilities. Utilities with no in-house laboratory capability comprise one of the largest groups of clients for Florida's commercial environmental labs.

Some lab managers indicated they are getting more work from drinking water and

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Report: State, federal investment in invasive plant control paying off

By ROY LAUGHLIN

State and federal agencies spend about \$45 million a year in Florida to control invasive plant species.

A recent report from the University of Florida and the Nature Conservancy said that the spending effectively reduced invasion by introduced species in conservation areas, but urged agencies to consider more temporally-consistent application of herbicides—especially in aquatic systems—to prevent outbreaks.

The report also called for consistent surveillance and data reporting of invasive plants to conduct treatment before signifi-

cant outbreaks occur.

In addition to its conclusions, the report provided a notably condensed set of facts about invasive plant control in the state.

About 1,500 invasive species inhabit Florida's terrestrial and aquatic ecosystems. A tenth of those create problems in Florida's natural areas where their invasive growth suppresses biodiversity and alters ecosystems.

Florida spent, on average, \$45 million annually during the six years studied from 2009 to 2014. Cumulative spending totaled \$265 million over these years.

The spending for invasive plant con-

trol focused on just a few species. \$10 million per year, on average, went for hydrilla control in conservation areas, and to maintain navigation and lakes and flowing waters.

Control expenditures were highly variable by year, ranging from \$3.1 - \$17.6 million per year. On land, the melaleuca tree was the target requiring the greatest spending for invasive plant control.

In 2014, the state spent \$45 million and the federal government added about \$5 million more with a total spending reaching about \$50 million. Spending has been on an upward trend since 2012.

"Funding was allocated toward asset protection in highly invaded aquatic and terrestrial habitats," the report summarized.

Geographically, the greatest effort for aquatic invasive species occurred in Central Florida where hydrilla control was the dominant target.

Just over a fifth of all invasive plant control spending for herbicides was for control of this aquatic plant.

The southeastern part of the state was the focus of the bulk of spending for terrestrial plant control. There, a melaleuca eradication effort in the Everglades has been ongoing for almost 25 years.

The study used data sets from conservation lands maintained by both state and federal agencies. The funding was extremely lopsided. Florida average \$41 million per year for invasive plant control while the federal government spent only \$4 million.

Florida treats about 60 percent of the area involved, which includes both conservation land and navigable waters, while the federal government is responsible for about 40 percent of the land under consideration.

The data set for treatment used in this study covered "at least 10,000 hectares of conservation land ... which represented 90 percent of all conservation areas in Florida."

Invasive plant control using herbicides was correlated more with habitat maintenance for endangered and threatened animals than endangered and threatened plants.

This is perhaps not surprising given that herbicide treatment could destroy endangered plants where they were sprayed, making alternative invasive control measure for plant conservation more effective.

The report's authors concluded from data they collected and a multivariate linear model statistical analysis of it that herbicide and other invasive species control management efforts were effective.

This was true particularly for hydrilla.

There is a statistically significant negative correlation between spending to reduce invasive plants, and the density and coverage of the target invasive plants. In plainer language, where spraying occurred, invasive species were not as abundant after the spraying.

The report concluded that invasive plant control efforts in Florida effectively reduced invasive plant coverage and density.

However, invasive plant control efforts could be more efficient, especially in the case of hydrilla, if spraying were more consistent over time and less focused on beating back outbreaks that often follow rain cycles.

"Every \$5 million spent on (hydrilla) management would result in approximately 5,500 less hectares invaded," the report noted. "More broadly, the cyclic spending and area-invaded pattern suggests that consistent and sufficient allocations of management expenditures are more effective than reducing spending when populations appear low."

The report also noted that consistency in data collection would help better evaluate invasive plant control efforts.

"Our study highlights the need for consistent reporting by agencies of invasive plant management expenditures, including area invaded, retreatment history and other explanatory variables to facilitate analysis of management efficacy and efficiency across multiple taxa," according to the report.

Going forward, the report writers noted that "(o)verall, although it is unclear if total expenditures are adequate to effectively manage invasive plants over the long term, expenditures appeared to be appropriately allocated to the conservation areas that are most critically threatened by invaders."

Stormwater management systems

Conservation lands are not the only areas where invasive plants are a problem. Stormwater ponds and ditches are another ecological habitat that University of Florida researchers have scrutinized recently for invasive plants.

Assistant Professor Basil Iannone, PhD, University of Florida School of Forest Resources and Conservation, led a research team that censused how many invasive plants were present in 30 stormwater ponds around Gainesville. His team studied 15 wet ponds and 15 dry ponds.

They found wide variation in the number of invasive plants in the ponds.

Up to 77 percent of the pond flora were introduced. Many were well-known landscaping species.

The report noted that even though the landscaping plants were listed as invasive plant species, they were still available on the landscape market.

With so many introduced species in the stormwater ponds, the researchers performed a geospatial inventory of Florida's stormwater ponds. That query indicated at least 70,000 stormwater ponds are present in Florida, predominantly in urban and suburban areas.

The connection between the study on conservation lands and the study on stormwater management systems is that the second group of researchers are interested in assessing the potential of the engineered stormwater ecosystems for conservation in developed areas.

Clearly, management of invasive species will have to be considered for managing stormwater ponds for conservation.

The studies clearly show that invasive species in Florida pose a significant obstacle with relatively high costs for meeting conservation land management goals.

"Expenditures for managing invasive species to reduce their economic and ecological effects are expected to escalate over time," noted the first report.

This may be even more true of the efforts to control invasive plants in urban stormwater systems than on conservation lands.

In a state where the wealthy want to move in and stop paying taxes, this poses a problem for the environment.



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SJRWMD, Volusia utilities collaborate on Blue Springs recharge project

By **BLANCHE HARDY, PG**

The St. Johns River Water Management District is working with several Volusia County utility departments to use vacant land for treating stormwater and wastewater in order to recharge Blue Spring in Orange City.

Blue Spring is the largest first-magnitude spring on the St. Johns River discharging an average of 102 million gallons of water a day with a 130-square-mile spring shed.

The spring is designated as an Outstanding Florida Spring and is a refuge home to a growing population of West Indian Manatees. The spring draws large numbers of visitors during manatee season, mid-November through March.

The district secured an option to buy 60 acres formerly used as a borrow pit about a half mile east of the spring. They plan to install a constructed wetland treatment system on the property that will use natural processes involving wetland vegetation, soils and their associated microbial assemblages to improve water quality.

The wetland treatment system will accept stormwater and treated reuse water from Volusia County and the cities of DeLand, Deltona and Orange City, plus surface water from the St. Johns River.

"The project will provide beneficial recharge to help recover flow at Volusia Blue Spring," said district spokesperson Danielle Spears. "The water quality treatment provided through the treatment wetland will ensure that nutrient concentrations are maintained below regulated targets prior to recharge."

The Florida Department of Environmental Protection Division of Water Res-

toration Assistance Springs Restoration Project Plan for the Legislative Budget Commission, 2018, described the proposed wetland site as an active borrow pit currently in commercial operation.

DEP indicated that acquisition of the site will serve as the initial phase of a multiphase project to provide water quality treatment and aquifer recharge at up to five million gallons a day to benefit Blue Spring.

The project will provide significant recharge of high-quality water to the spring, will mitigate groundwater pumping impacts and help the spring achieve future minimum flow and level discharge thresholds.

Future operation and management of the constructed project will be the responsibility of the local utility members of the West Volusia Water Suppliers group.

The DEP cost estimate of approximately \$1.2 million would be split between the state and county parties, and includes land acquisition, appraisals, due diligence, and design and permitting support.

"The preferred conceptual design from the recently completed preliminary design report proposes a 3.2-acre treatment cell using biosorption-activated media, a 15-acre infiltrating wetland and open water features at the points of recharge," Spears said.

A hydraulic load test to determine the site's infiltration capacity will be performed in the coming year and is expected to better define design parameters in the conceptual design.

Not all environmental advocacy groups are on board with the proposed plan, which is still in the study phase. The district is now in the process of public outreach and

education.

"We've already participated in several meetings with the county and other stakeholder groups," Spears said.

The first public information meeting was held in DeLand on July 31.

Volusia County and the participating cities will discuss the project with their respective councils and commissions throughout August.

Spears said that additional public meetings will be conducted during the design process to promote public engagement.

Several steps have been undertaken to

assure the viability of the spring and associated waters.

The district approved a minimum flow regime for Blue Spring and Blue Spring Run in December, 2006, and the district's governing board approved a comprehensive strategy to protect Blue Spring in November, 2013.

To protect water flow into the spring and help meet the spring's adopted MFL, the district provided \$6 million in cost-share funds to construct reclaimed water lines connecting the reuse distribution systems of DeLand, Deltona, Orange City and Volusia County.

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TBEP board approves EPA work plan, budget for next fiscal year

By **BLANCHE HARDY, PG**

The Tampa Bay Estuary Program completed its latest U.S. Environmental Protection Agency annual workplan and budget under new Executive Director Ed Sherwood.

Sherwood succeeded Holly Greening who retired after 26 years with the TBEP, the last 10 as director.

The proposed 2020 EPA work plan and budget were presented at a spring meeting of the TBEP management board.

Tampa Bay was designated as an estuary of national significance by Congress in 1990, laying the foundation for the creation of the TBEP in 1991.

TBEP is one of 28 estuaries in the National Estuary Program. The program is governed by a policy board of elected officials from local governments, the Southwest Florida Water Management District, EPA and the Florida Department of Environmental Protection.

Administrators from local, regional and state government agencies and organizations comprise a larger management board that makes recommendations to the policy board.

At the spring management board meeting, Sherwood explained the work plan, required annually by EPA for funding.

The agency had not yet finalized appropriations, but suggested using federal appropriations of \$600,000 for planning purposes for this work plan year.

According to meeting details, many of TBEP's ongoing technical and outreach programs will continue in FY 2020.

Projects on the technical side include benthic, seagrass and flow monitoring, technical support and data management, harmful algal bloom assessment and support for ocean acidification monitoring.

Education and outreach projects include website enhancements, support for online environmental journals, an adaptation action plan and support for a niche social media campaigns.

Sherwood outlined the funding components for the work plan noting the \$600,000 EPA estimate and \$548,000 in

local dues, which will require an in-kind project of \$84,000 or more.

The director provided additional funding details including identifying a \$3,177 reduction in operating expenses from the previous year primarily due to an additional \$105,000 in grant funds to cover salary and benefits, inclusive of an anticipated hiring of another position.

Currently, TBEP is managing \$16.2 million in projects.

TBEP will use the work plan and related financial details as the program's application for cooperative funding to the U.S. EPA.

The work plan is specifically composed to meet the requirements of the agency's federal grant criteria.

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Broward proposes regional solid waste plan to local municipalities ... again

By **BLANCHE HARDY, PG**

Broward County Commissioner Beam Furr received unanimous commission approval in June to move forward on a memorandum of understanding with county municipalities to establish a regional solid waste and recyclables management plan.

“There is an urgent need for regional management of solid waste disposal and recyclables processing,” said Furr. “Through the MOU, the county seeks to partner with county municipalities that are willing to agree to work together toward

establishing an integrated and comprehensive regional solid waste and recyclables management system.”

The effectiveness of the MOU is contingent upon approval by the municipalities collectively representing no less than 50 percent of the county’s total population by Oct. 1, 2019.

If the MOU is in place by that deadline, any municipality that has not executed the MOU may still join as a participating municipality if a majority of participating municipalities approve the addition of the late-coming municipality.

The MOU establishes a milestone

schedule that includes deadlines for the county and participating municipalities to achieve as they work toward establishing a regional solid waste and recyclables management system.

The commission’s action and the MOU were guided by a study contracted by the county and several municipalities in June, 2017.

An Arcadis U.S. Inc. team, including Kessler Consulting Inc., Total Municipal Solutions LLC, and GMAC Consulting LLC, were retained to conduct the study and recommend methods to achieve a 75 percent countywide recycling goal, to determine the impact that continued public ownership of a parcel of land known as Alpha 250 would have on the stated recycling goal and countywide solid waste disposal, and to address other general solid waste issues identified through the study.

The Arcadis team report recommended the county and municipalities evaluate three different scenarios through which the 75 percent countywide recycling goal could be achieved or approached by 2025, Alpha 250 could be retained as publicly owned for its viability as a location for the development of solid waste processing facilities as described in the report, and an independent special district could be created as the governance structure for any established regional solid waste management system.

The team also recommended that the solid waste processing facilities developed as part of the regional solid waste management system be based on a public/private partnership ownership option.

While some local governments are participating, others are hesitant to enter into

the agreement. The cities and county have been under agreement before. In the late 1980s, they joined to bond two waste-to-energy incinerators.

Within a few years of that agreement, the participating municipalities were paying far more than non-participating utilities for waste management.

Although tipping fees on local waste payed the bond on the incinerators, the facilities were privately owned and operated.

Eventually, the management of waste reverted to several individual local contracts and the county/municipalities group disbanded.

Many of the participating municipalities feel they got a bad deal and may get another if they choose to participate again.

Although the Arcadis team study recommended the establishment of public-private partnerships for the management of waste and recycling, the control and ownership of any facilities would stay in the hands of the public partners.

The county and the participating municipalities would agree to jointly undertake further study and analysis of additional critical solid waste and recycling issues identified by mutual agreement, such as issues related to flow control options and recycling programs to address on-going and future issues under the MOU.

The scope of any additional study and analysis would be developed by a working group that would consider the findings and recommendations of a larger technical group, both of which would be established pursuant to the MOU and would have county and municipal representation.

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EPA will seek no additional financial requirements to cover costs of potential contamination from power plants

Staff report

The U.S. Environmental Protection Agency announced that it found that risks from electric power generation, transmission and distribution facilities do not warrant financial responsibility requirements to cover the costs of possible contamination due in part to existing state and federal requirements for these facilities.

Using the authority of the Comprehensive Environmental Response, Compensation, and Liability Act (Superfund), Section 108(b), the agency analyzed the need for financial responsibility requirements.

The evaluation was based on the de-

gree and duration of risk associated with the production, transportation, treatment, storage or disposal of hazardous substances within the industry.

After completing its risk analysis, the agency declined to require additional responsibility requirements for this sector, reflecting their interpretation of the statute and evaluation of the record for the proposed rule.

EPA officials said that the release of coal combustion residuals—the power plant hazardous substance that most concerns environmental advocates calling for a financial responsibility requirement—is already being addressed by the their 2015 CCR rule that significantly reduced the risk of a Superfund response being necessary at these facilities.

“After careful analysis, EPA believes that modern industry practices, along with existing state and federal regulations, address risks from operating electric power facilities and, therefore, CERCLA financial responsibility requirements are unwarranted,” said EPA Administrator Andrew Wheeler. “By proposing no new financial requirements, we will be ensuring that no duplicative or unnecessary burdens fall on America’s energy producers.”

Section 108(b) of CERCLA directs the agency to develop regulations requiring classes of facilities to establish and maintain evidence of financial responsibility to cover the costs associated with releases or threatened releases of hazardous substances from their facilities.

The recent proposal was published in the Federal Register, and the agency invited stakeholders and the public to provide input during the 60-day public comment period.

EPA is under a court-ordered deadline to take final action on this rulemaking by Dec. 2, 2020.

The agency is also working toward court-ordered deadlines for rulemaking addressing CERCLA 108(b) financial responsibility for two additional industries: chemical manufacturing, and petroleum and coal products manufacturing.

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Authoritative report on climate change relates risks, informs planning

BY ROY LAUGHLIN

The U.S. Global Change Research Program released its “Fourth National Climate Assessment” late last year, presenting “an authoritative assessment of the science of climate change with a focus on the U.S. to serve as the foundation of efforts to assess climate-related risks and informed decision-making about responses.”

The report shouldered the task of demonstrating that climate change science relies on facts—not the beliefs and blindly aspirational propaganda of the Trump administration and climate change deniers.

The report characterized its conclusions in two ways. The first is confidence in data interpretation. It’s extremely likely the data accurately portray a significantly warming earth.

The second is the likelihood of outcomes that result from a warming global climate. For example, a sea level rise caused by melting polar ice of one foot by 2050 is highly likely.

This report presents a clear response to criticisms from climate change deniers. One is that there is not enough data to support the conclusion that human activity, particular greenhouse gas emissions, is the dominant influence of global climate change.

Au contraire, the report writers said: “Many lines of evidence demonstrate that it is extremely likely that human influence has been the dominant cause of the observed warming since the mid-20th century.”

The other criticism with wide acceptance among denier pundits is that global change is an issue to be addressed in the future. However, the report is replete with data-supported illustrations that climate change is well underway now.

Increased precipitation events, Arctic ice melts, increased frequency of record warm weather events and decreased frequency of record cold events, a substantial increase in ocean heat content, record-setting increases in global atmospheric temperatures, increases in ocean acidification, and more are documented.

MDL From Page 6

tion of the Method Detection Limit, Revision 2,” and The NELAC Institute procedure given in “TNI 2016 Standard; EL-V1M4 Sections 1.5.1 and 1.5.2.”

These replace the single EPA procedure from 40 CFR Part 136 Appendix B (Oct. 26, 1984), which was covered in one solitary page. Naturally, the new procedures take eight pages each to state how to now calculate your new MDLs.

The big difference between the old and new procedures is having to calculate the standard deviation of replicate measurements of both a set of lab fortified blanks (a lab standard of known value) as well as a set of actual blanks (lab prepared solutions known to have no analyte present).

The main difference in the EPA and TNI procedures is in the set of blanks to be used. Labs may select the TNI procedure if the method does not “require” them to follow the EPA procedure.

The lab must analyze at least seven low level spikes (s) and seven blanks (b) on non-consecutive days throughout the year. So, for instance, two sets of spikes (s) and blanks (b) collected from on-going data batches each quarter would accumulate eight data values each at the end of the year.

Then to calculate: $MDL(s) = SD(s) * t$ and $MDL(b) = X + SD(b) * t$, where t is the t statistic; X is the mean of the blanks.

The $MDL = \text{Maximum} [MDL(s), MDL(b)]$.

What gets tricky is that the lab must verify this initial MDL on an ongoing basis. To verify the initial MDL, use the two spikes per quarter as well as all the blanks measured in the last 24 months. That’s a lot of blanks!

The other surprise is that the lowest standard in the calibration curve used for the test must be greater than this calculated

The authors make it clear that today’s older adults will not be dead before they witness a panoply of spectacles of unprecedented destruction and suffering wrought by global climate change.

Scientists from three federal data science agencies, including the National Oceanic and Atmospheric Administration, the National Aeronautics and Space Administration and the National Science Foundation, dominate the report’s lead author list.

That list is also populated to a lesser extent by academic research scientists from national laboratories and contract research institutions. The presentation therefore is extremely data-focused.

The report’s discussion relies heavily on numerical comparison, a characteristic that will appeal especially to our work and nerd readers.

For example, based on data and concept, the report said that cumulative CO2 emissions “must remain below 800 gigatons carbon, or GtC, to provide a two thirds likelihood of preventing two degrees centigrade of atmospheric warming.”

Current global annual CO2 emission rates are 10 GtC per year. That means that over the next 23 years, net CO2 emissions must be reduced to zero in order to prevent climate warming of greater than two degrees centigrade.

The report acknowledged that no clear path exists to reach a 230 GtC reduction goal in the next two decades. The Paris climate accord, from which the U.S. withdrew shortly after Trump took office, would not alone reduce CO2 emissions globally by 10 gigatons annually.

Could humanity wake up one day and find out that the recent global climate change symptoms were reversing, because climate variability or a haywire climate cycle extreme had temporarily caused them? Not likely, the report’s data selection and analysis suggest with another quantitative numbers presentation.

Human-caused atmospheric warming averaging about 2.3 watts per meter squared has occurred since 1750, the beginning of the Industrial Revolution when burning coal and other fossil fuels for energy began. Solar energy changes account

MDL value. So, the calibration curve could have the MDL level effectively increase the lowest standard above the level of the client’s permit. After all, the permit levels were set using the old procedure, not the new one, so mismatches are bound to occur.

There will no doubt be a period of adjustment as labs implement and are assessed using these new MDL requirements.

Jefferson Flowers, PhD, is president of Flowers Chemical Labs in Altamonte Springs.

for 1/10 of a watt per meter squared of global temperature cycles. Volcanic activity accounts for a minus 1/10 watt per meter squared of cycles.

The energy involved in the earth’s natural cycles and feedback mechanisms are far too little to be responsible for atmospheric temperature increases.

The report is a scientific discussion of hypotheses, data, data analysis, uncertainty and explanatory conclusions.

Although intended to inform public policy, it does not discuss specific policy changes that could be implemented by rule or legislation. Its primary focus is what sci-

entists know from observations and what prospects the recent past holds for the remainder of the 21st century.

The climate study is available in two formats. The longer extensively illustrated full report, about 400 pages, is concisely written, and divided into chapters that give readers a choice of how much exposure they want to the report, and in what order.

The executive summary alone is available for readers who want a concise presentation of the major findings with abbreviated supporting data.

Both are available at <https://nca2018.globalchange.gov/>.

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PEER: DEP misrepresented compliance data during Scott administration

By ROY LAUGHLIN

As early as July, 2012, Jeff Littlejohn, PE, then Florida Department of Environmental Protection deputy secretary for regulatory programs, claimed that compliance with DEP environmental rules and regulations in the state had reached significantly high levels under Gov. Rick Scott's administration.

DEP claimed that environmental compliance of the regulated community had

risen to historic levels due to the changes in environmental regulations and policies to deal with noncompliance under Scott.

Those changes, DEP officials claimed, included compliance assistance offers, programs to educate the regulated community and reductions in formal enforcement actions to only the worst and most recalcitrant violators.

But a recent report by Public Employees for Environmental Responsibility contradicts these claims.

PEER researchers based their conclusion on an analysis of raw data obtained through repeated formal records requests and the responses provided. Their analysis indicated that DEP administrators worked deceptively and consistently to create the illusion of extremely high compliance with environmental rules.

The deception was orchestrated by referencing nonexistent data, reducing enforcement significantly and selectively including data that overstated compliance rates by as much as 23 percent.

The illusion was further enhanced by reducing the number of facility inspections, notifying facilities that inspections were imminent, failing to enforce permit requirements for submitting periodic reports and significantly reducing the number of formal enforcement actions against violators.

The PEER report noted that, in 2017, "enforcement actions were initiated for only 10 percent of all cases in which facilities were out of compliance."

The report singled out what it described as one of the most easily discerned deceptions of compliance data interpretation and reporting since 2011: DEP's redefinition of the term "out of compliance."

After DEP's redefinition, the official tallies for compliance included only facilities that were "significantly out of compliance," an undefined term under most DEP regulatory programs.

Only data from facilities actually inspected were used to characterize noncompliance, even as inspections declined by almost a half from 15,500 in 2012-2013 to 8,500 in 2015-2016.

According to the report, DEP regulated approximately 75,000 facilities across Florida, so 8,500 is a small sampling of the total.

DEP's ability to discover noncompliance was further eroded by failing to enforce reporting requirements and schedules under permit requirements, or ignoring information for those that were submitted.

"What this data tells us is that the use of this regulatory approach has not resulted in greater compliance," the report stated bluntly.

The report's investigative team formally requested the raw data for inspection and compliance activities since 2011. Their report included multiple pages of narrative describing how DEP officials evaded the requests and provided incomplete responses.

Nevertheless, PEER researchers eventually received enough information to illustrate a troubling, perhaps dangerous, level of misstating compliance results.

In 2015-2016, DEP claimed compliance rates of 93 percent to greater than 97 percent across all six district offices. The state average was 96 percent, they claimed.

The department based its assessment only on inspections where the result was a finding of "significantly out of compliance."

Looking at all noncompliance, whether "significant," noncompliant in a lesser category than "significant" or instances where facility managers did not submit a permit-required report, the compliance rates spanned 81 percent to 60 percent statewide with an average of 74 percent.

The average difference between claimed and actual compliance statewide average was 22 percent.

This difference ranged from a low of 12 percent in the Southeast District office to a high of 34 percent in Central District office. Three districts had differences greater than 25 percent.

The point that report writers make about the need for inspections is reflected in the data. Districts with the two lowest differences between claimed and actual were the ones with the largest total number of inspections.

By program, the findings of PEER's data re-analysis are even more alarming.

Across all programs, PEER's estimate of DEP-reported compliance and actual compliance showed that potable drinking water, wastewater and NPDES/wastewater had the largest difference between reported compliance and PEER determined compliance.

For wastewater and NPDES-permitted wastewater, DEP stated compliance rates of 93.8 and 96.3 percent, respectively. PEER investigators calculated actual compliance rates for these two programs to be 47 percent and 52 percent, respectively.

The failure to accurately report potable water violations was particularly notable.

DEP claimed 88.7 percent compliance by regulated potable water producers. PEER calculated 41.6 percent compliance, a 47 percent difference. These numbers are based on a three-year cumulative average.

"What should give every Floridian pause is that the lowest compliance rates were found to be in the potable water program, followed by two domestic wastewater program categories," said the report. "Over the past three reporting cycles, only 41.62 percent of the potable water facilities were found to be in compliance and less than 52 percent of domestic wastewater facilities were in compliance."

"Further, the compliance rates have been dropping in each of the programs since the 2015-2016 fiscal year."

The report, although compact at just 18 pages, presents the data analysis results in tabular format. The plethora of details the report's investigators gleaned from going through the raw data and DEP program reports since 2011 are explained at greater length within the report's narrative.

The department's "cooked book statistics" obscured Gov. Scott's kid glove handling of privileged polluters.

This year, Florida citizens will cough up at least \$100 million to fix water quality problems that DEP let polluters cause—with a total of \$600 million to be spent in the near future to complete the planned fix.

The report concluded that "citizens have a right to honest, open government. It has been many years since they have gotten this from DEP." And time will tell how the new administration will enforce compliance with environmental laws.

The report, "Compliance Results at Rick Scott's Florida Department Of Environmental Protection," is available online at www.peer.org.



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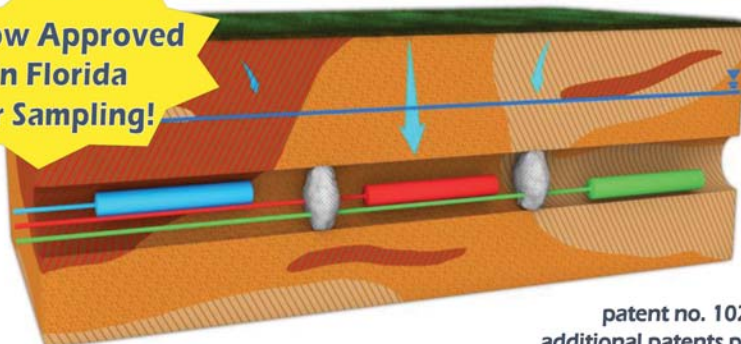
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Hydraulic carving recreates historic stream in Hillsborough preserve

By **BLANCHE HARDY, PG**

Wood Environment & Infrastructure Services Inc. and the Southwest Florida Water Management District are restoring surface water flow to the Balm Boyette Scrub Nature Preserve in southeastern Hillsborough County.

Wood engineers are using hydraulic carving to recreate a stream that ran through the preserve in the 1960s.

Prior to acquisition of the property for conservation, the land was mined for phosphate.

Surface water flow was altered and predominately confined in a series of stagnant pools in abandoned phosphate pits.

“Hydraulic carving is the use of flowing water to construct natural stream restoration projects instead of relying entirely on earthmoving equipment,” explained John Kiefer, PhD, PE, PWS, principal engineer for water resources at Wood and a pioneer of the process.

“The water and transported sediments carve, pattern and dimension the channel,” he explained. “The approach creates a natural curve to the streams and habitats that appeals to native animals.”

When the designed channel-forming discharge is carefully matched to that of the stream’s natural watershed, he said, the result is a fully-formed and self-sustaining channel.

For the site at the Balm Boyette-Stallion Hammock Restoration Project, Wood is restoring a stream that was heavily impacted by mining in the 1960s prior to state regulations requiring reclamation.

“The construction consists of filling in the old mine pits that were left behind to create a stream valley, which can be considered the floodplain of the stream, and then recirculating water in a closed loop at the ‘bank full’ flow rate,” said Susanna Martinez Tarokh, public information officer with the water management district.

“This is the flow rate that carves the channel,” she said. “The process of hydraulic carving condenses what would take decades through natural weathering into a period of weeks.”

The project is managed by the Surface Water Improvement and Management Program of the Southwest Florida Water Management District.

Hillsborough County provided the land for the project and is responsible for its long-term maintenance.

Funding for the work was provided through a grant from the Florida Department of Environmental Protection. The total cost for design, construction and three years of vegetation maintenance is approximately \$2.2 million.

Hydraulic carving is beneficial in site restoration because it simplifies design and construction, yet results in complex channels with a broad array of natural variation in their instream habitats, Kiefer said.

“The technique rapidly matures the restoration and mimics what occurs during natural weathering in a timeframe of about

two months versus the effects of decades of weathering,” he continued. “It also pre-conditions the channel prior to allowing natural flow through the project, providing some advantages for troubleshooting under highly-controlled conditions.”

Implementation can be less expensive than conventional means with savings of up to 25 percent.

“In my opinion, the process is a great option in a rural landscape with adequate land to effectively manage the process,” said Martinez Tarokh. “The process has benefits over mechanical construction because the variability in site conditions, such as soil type and slope, influence the shape and character of a stream.”

This means the carving results in a more sustainable stream with less potential for extreme erosion, she said. The process also decreases the need for highly engineered streambank protection.

“Implementation consists of isolating the project area then recirculating the channel-forming discharge through the valley with a pump and pipeline until the equilibrium pattern and dimension are achieved,” said Kiefer.

Once the channel is mostly formed, large woody debris, logs and stumps are installed with small earthmoving equipment and hand labor, and are further conditioned with flowing water.

“The large woody debris is arrayed in both standard configurations and random placements to create combinations of specific habitat types and to induce pool formation and armor bends,” he said.

The use of large woody debris is prescribed for Florida streams because it provides fish habitat and dissipates energy leading to more stable conditions.

“Following the installation of woody debris, the banks and floodplain are then densely planted with fast-growing native plants and slower-growing trees desired for the mature forest,” he continued. “Once the floodplain is stabilized with initial vegetation cover, the restored segment can be reconnected to its upstream and downstream waters.”

“The primary design variable is the channel-forming discharge,” Kiefer noted. “This is the flow quantity that does the most overall work to carve and maintain channels in nature, referred to as the ‘effective discharge.’

“It varies with watershed size, following a predictable gradient within any given hydrophysiographic region,” he said. “We find that the bankfull discharge is a close match to the effective discharge.”

This can be predicted using statistical relationships called regional curves, which Wood, the U.S. Fish and Wildlife Service and others have developed throughout Florida’s three hydrophysiographic regions.

“Regional curves enable designers to fit the discharge and the channel to its watershed,” Kiefer said. “For example, the Stallion Hammock project’s watershed generates bankfull flow at about 2,000 gallons per minute and that is used to carve

the channel.”

Following mechanical construction of the wide stream valley, water was recirculated at a rate of 2,000 gallons per minute along the 1,600 foot long valley. The water found its path and natural bends began to form.

“The design engineer monitored the process and after about a week began identifying locations for natural structures to be installed using logs from the clearing operation at the site,” Martinez Tarokh

said. “At times, it was like watching an artist painting on a canvas.

“But in this case, the engineer observed where the stream was going and identified locations where natural structures in the form of logs and root wads could be placed to preserve the natural path of the stream.”

Following completion of the stream carving process, the site will be planted with wetland vegetation including emergent, shrub, and hard wood species.

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Report: Composting could eliminate significant trash flow to landfills

By **BLANCHE HARDY, PG**

A new report released by U.S. PIRG Education Fund, Environment America Research and Policy Center, and Frontier Group reported that composting all organic waste, including food scraps and yard trimmings, could eliminate nearly one-third of all materials sent to landfills and trash incinerators across the U.S.

The report, “Composting in America,” outlined best practices for composting programs that are critical for mitigating the negative impact of waste on the climate and public health.

U.S. PIRG Education Fund is an independent, non-partisan group that works for consumers and the public interest. The

group serves as a counterweight to the influence of special interests through research, public education and outreach efforts.

“Composting can work for a community in a number of ways by immediately relieving landfill space and associated tipping fees, and by reducing the cost and frequency of garbage pick-ups,” said Alexander Truelove, director of PIRG’s Zero Waste Campaign.

In addition, a successful composting program can reduce greenhouse gas emissions, primarily methane build-up as a result of organic waste anaerobically digesting in landfills, and create nutrient-rich

COMPOST
Continued on Page 18

Can molecular biology help rescue Florida waters from cyanobacteria blooms?

By ROY LAUGHLIN

The iridescent cyanobacteria responsible for the spate of harmful algal blooms in Lake Okeechobee and its drainage waterbodies have few proven remedies—other than to let the bloom run its course.

Sharon Isern, PhD, a professor in the

Department of Biological Sciences at Florida Gulf Coast University, along with fellow department professor Scott Michael, PhD, and laboratory coordinator Hidetoshi Urakawa, are conducting research that may provide a control treatment to quell cyanobacteria blooms without risk to other aquatic organisms.

The research is currently focusing its

efforts on *Microcystis*, the cyanobacteria species responsible for the damaging blooms during the past decade.

The idea is simple: infect the bloom's cyanobacteria with a phage, a type of virus specific to *Microcystis*, to quell the microsystem's blooms.

Phages are always present in their host cells, but the phage's propagation pattern lends itself to exploitation for cyanobacteria control, explained Isern.

The phage life cycle consists of two phases. When cyanobacteria cell densities are low, phages hijack a cyanobacteria's metabolic pathways to synthesize more phage particles.

If and when cyanobacteria cell densities become higher, for example during a bloom, the phages enter a "lytic phase." They cause the cyanobacteria host cells to disintegrate, releasing infective particles into the water, and spreading the virus particles to other cyanobacteria cells.

The FGCU researchers started collecting *Microcystis* cells early this summer, the season when *Microcystis* and other cyanobacteria typically form patches and

small blooms.

In the laboratory, researchers cultured cyanobacteria in flasks and used well-known techniques to isolate phages for further study and propagation.

Microcystis, like all bacteria cells, almost always contain phages that are specific for each species. The number of possible phages is huge. According to Isern, the total number of possible phages could be greater than 10^{31} .

The expectation is that the researchers will isolate multiple phage strains specific for each or a few *Microcystis* species that are amenable to laboratory propagation and isolation, and are sufficiently infective when added to an algal bloom to begin the lytic phase that will end a *Microcystis* bloom.

Compared to most other academic research projects the *Florida Specifier* has featured in the past, this one is notable because currently the researchers have no extramural funding. FGCU supports it and the research is "powered by undergraduate help," noted Isern.

The researchers currently teach an undergraduate course on phage isolation from bacteria. If the results warrant, isolation of phages from cyanobacteria specifically can be included in the undergraduate course.

This is very much cutting-edge research despite the fact that the work is being done by undergraduates rather than graduate students in the usual research university model.

In June and early July, 2019, the group was finessing culture methods for the *Microcystis* they are collecting and phage collection will begin soon from those cultured cyanobacteria cells.

The researchers expect they will find and isolate phages that are sufficiently virulent that a useful amount of infective phage particles can be collected from a few liters or less of laboratory-cultured *Microcystis* cells.

Isern said she didn't expect they would be growing vats of cyanobacteria to isolate sufficient phage.

They would however be consistently sampling *Microcystis* blooms to isolate infective phages that evolve over time, and to obtain phages from the *Microcystis* species causing the blooms.

"Ideally, it's not going to be one phage that will kill all *Microcystis* species. We may have to isolate phages for specific blooms," she said. "We may need a cocktail of cultures. We may have to begin an effort to keep isolating phages from individual hosts."

In her interview with the *Specifier* and earlier interviews with other media outlets, Isern noted that her research will isolate phage viruses that are virtually ubiquitous in wild *Microcystis* populations in the state.

Frequently, endemic phages influence bloom dynamics when the phage transitions to the lytic stage that causes disintegration of cyanobacteria cells.

Isern noted that the research will not produce genetically modified organisms. Phages are specific even to the species of cyanobacteria they infect, in this case, *Microcystis*. It is that naturally occurring variation that could be exploited in cyanobacteria control.

Isern said that she was surprised to see comments on social media discussions and elsewhere that were critical of the imagined risks of her research.

"We are not engineering anything in the lab that will be harmful to the environment or to us," she said. "The specific host is the only organism at risk."

Phages have been known and understood for at least the past 40 years, but have never been a highly researched.

That could very well change in just a few short years following any breakthrough finding of utility for environmental managers.

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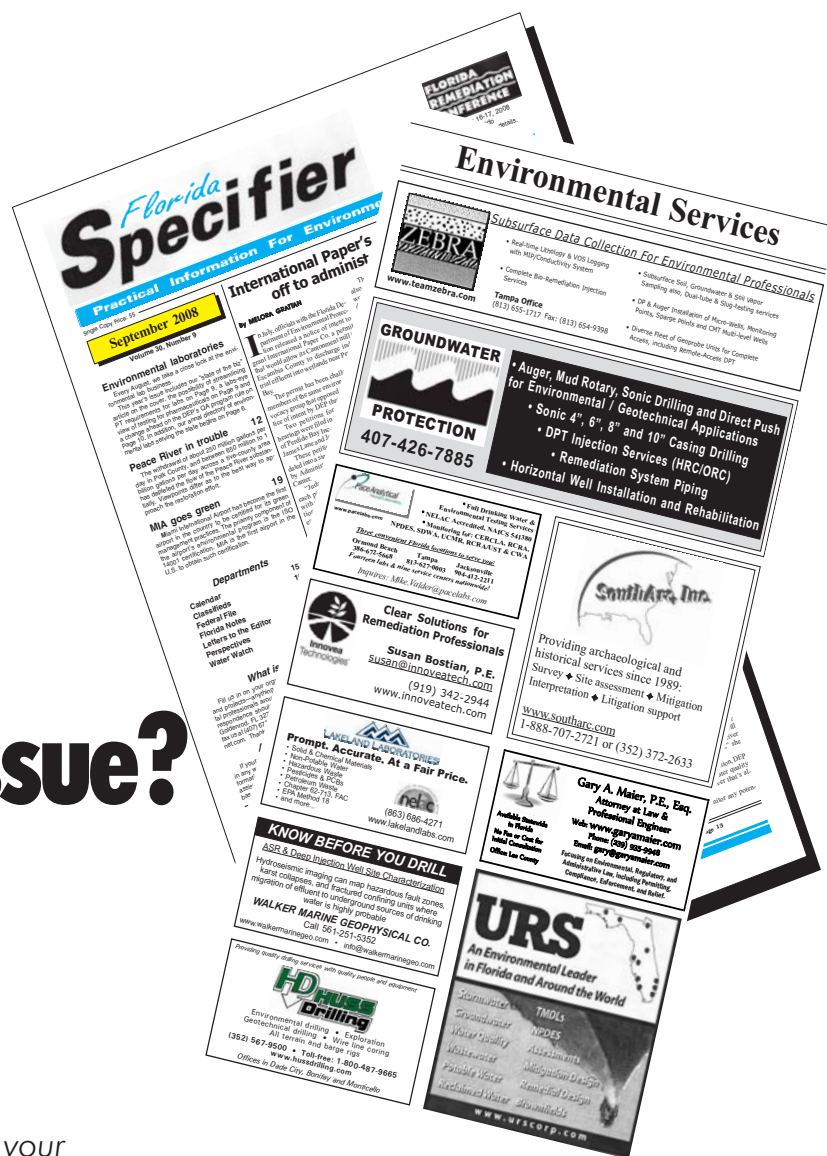
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Calendar

August

AUG. 16 – Course: Asbestos Refresher: Contractor/Supervisor, Naples, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeco.ufl.edu.

AUG. 17-18 – Course: Backflow Prevention Recertification, Tampa, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570.

AUG. 19-20 – Course: Backflow Prevention Assembly Repair and Maintenance Training and Certification, Venice, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570.

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AUG. 19-21 – Course: Backflow Prevention Assembly Repair and Maintenance Training and Certification, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570.

AUG. 19-21 – Course: Backflow Prevention Assembly Repair and Maintenance Training and Certification, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570.

AUG. 21-23 – Conference: Georgia Environmental Conference, Jekyll Island, GA. Presented by Event Management Technologies LLC. Contact David Mook at (678) 427-2430 or visit georgiaenet.com.

AUG. 23-24 – Course: Backflow Prevention Recertification, Jacksonville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeco.ufl.edu.

AUG. 23-31 – Course: Backflow Prevention Assembly Tester Training and Certification, Fort Myers, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeco.ufl.edu.

AUG. 26-29 – Course: Backflow Prevention Assembly Tester Training and Certification, Jacksonville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570.

AUG. 27-28 – Course: Effective Utility Leadership Practices, Bonita Springs, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeco.ufl.edu.

AUG. 27-29 – Course: Respiratory Protection, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570.

AUG. 27-30 – Symposium: FLMS 30th Annual Technical Symposium, Duck Key, FL. Presented by the Florida Lake Management Society. Contact Maryann Krisovitch at (352) 434-5025 or visit www.flms.net.

AUG. 27-30 – Course: Activated Sludge Process Control & Troubleshooting, St. Petersburg, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeco.ufl.edu.

AUG. 29 – Expo: Region V Twelfth Annual Water and Wastewater Expo, Punta Gorda, FL. Presented by the Florida Section of the American Water Works Association, Region V Chapter. Call Cherie Wolter at (239) 278-7996 x 114 or visit www.fsawwa.org.

September

SEPT. 2-6 – Course: Backflow Prevention Assembly Tester Training and Certification, Pensacola, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeco.ufl.edu.

SEPT. 6-7 – Course: Backflow Prevention Recertification, Venice, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570.

SEPT. 7 – Meeting: Quarterly Membership Meeting of the Florida Ground Water Association, Lakeland, FL. Call (850) 205-5641 or visit www.fgwa.org.

SEPT. 7-8 – Course: Backflow Prevention Recertification, Bradenton, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570.

SEPT. 7-15 – Course: Backflow Prevention Assembly Tester Training and Certification, Tampa, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeco.ufl.edu.

SEPT. 8-11 – Symposium: 34th Annual WateReuse Symposium, San Diego, CA. Presented by the WateReuse Association. Call (571) 445-5500 or visit watereuse.org.

SEPT. 9 – Course: Asbestos Refresher: Project Design, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570.

SEPT. 9-13 – Course: Backflow Prevention Assembly Tester Training and Certification, Orlando, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeco.ufl.edu.

SEPT. 9-13 – Course: Water Class A Certification Review, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570.

SEPT. 10 – Course: Asbestos Refresher: Inspector, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570.

SEPT. 10 – Course: Asbestos Refresher: Management Planner, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeco.ufl.edu.

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

SEPT. 16-20 – Course: Backflow Prevention Assembly Tester Training and Certification, West Palm Beach, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeco.ufl.edu.

SEPT. 16-20 – Course: Backflow Prevention Assembly Tester Training and Certification, Davie, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeco.ufl.edu.

SEPT. 18 – Course: Initial Training Course for Spotters at Landfills, C&D Sites and Transfer Stations - 8 Hour, Jacksonville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeco.ufl.edu.

SEPT. 18 – Course: Refresher Training Course for Experienced Solid Waste Operators-8 Hours, Jacksonville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeco.ufl.edu.

Florida Association of Environmental Professionals 2019 Annual Conference



Hosted By



Conference Dates: September 19th-20th

Training Sessions on Wednesday, September 18th:
Living Shorelines,
NEPA Workshop,
& HAZWOPER Refresher

Evening Reception on Thursday, September 19th at the
Florida Aquarium

Presentations on September 19th-20th:
Resiliency, Transportation,
Ecosystem Management,
Living Shorelines,
Assessment & Remediation

Field Trips on Friday, September 20th

<https://www.faep-fl.org/faep-conference>

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ASBESTOS COURSES

Respiratory Protection

Aug. 27-29 2019 | Gainesville, FL | CEUs: 2.4

Asbestos: Contractor/Supervisor

Oct. 21-25, 2019 | Gainesville, FL | CEUs: 3.5

Asbestos: Inspector

Oct. 7-9, 2019 | Gainesville, FL | CEUs: 2.1

Asbestos: Management Planner

Oct. 10-11, 2019 | Gainesville, FL | CEUs: 1.4

Asbestos Refresher: Project Design

Sept. 9, 2019 | Gainesville, FL | CEUs: 0.8

Asbestos Refresher: Inspector

Sept. 10, 2019 | Gainesville, FL | CEUs: 0.4

Nov. 6, 2019 | Gainesville, FL | CEUs: 0.4

Asbestos Refresher: Management Planner

Sept. 10, 2019 | Gainesville, FL | CEUs: 0.4

Nov. 6, 2019 | Gainesville, FL | CEUs: 0.4

Asbestos Refresher: Contractor/Supervisor

Sept. 11, 2019 | Gainesville, FL | CEUs: 0.8

Nov. 7, 2019 | Gainesville, FL | CEUs: 0.8

WATER & WASTEWATER COURSES

Effective Utility Leadership Practices

Aug. 27-28, 2019 | Bonita Springs, FL | CEUs: 1.35

Water Distribution Systems Operator Level 1 Training Course

Sept. 24-26, 2019 | Kissimmee, FL | CEUs: 2.4

Wastewater Class B Certification Review

Sept. 30 - Oct. 3, 2019 | Gainesville, FL

Wastewater Class C Certification Review

Sept. 23-27 2019 | Gainesville, FL

Water Class A Certification Review

Sept. 9-13, 2019 | Gainesville, FL

Water Class B Certification Review

Oct. 29 - Nov. 1, 2019 | Gainesville, FL

Water Class C Certification Review

Aug. 13-16, 2019 | Gainesville, FL

TRAIN THE TRAINER COURSES

Train the Trainer: How to Design & Deliver Effective Training

Nov. 5-7, 2019 | Gainesville, FL | CEUs: 2.4

BACKFLOW PREVENTION COURSES

Backflow Prevention Assembly Tester Training & Certification

Sep. 2-6, 2019 | Pensacola, FL

Sep. 7-15, 2019 | Tampa, FL**

Sep. 9-13, 2019 | Orlando, FL

Sep. 16-20, 2019 | Davie, FL

Oct. 5-13, 2019 | Tampa, FL**

Oct. 7-11, 2019 | Gainesville, FL

Oct. 21-25, 2019 | Pensacola, FL

Oct. 28-31, 2019 | Jacksonville, FL

Nov. 4-8, 2019 | Orlando, FL

Nov. 4-8, 2019 | Destin, FL

Nov. 8-16, 2019 | Venice, FL**

Nov. 11-14, 2019 | Miami, FL

*Two consecutive Sat. & Sun. **Two consecutive Fri. & Sat.

Backflow Prevention Assembly Repair and Maintenance Training & Certification

Oct. 9-11, 2019 | Orlando, FL

Oct. 18-19, 2019 | Venice, FL

Backflow Prevention Recertification

Sep. 6-7, 2019 | Venice, FL

Sep. 7-8, 2019 | Bradenton, FL

Sep. 19-20, 2019 | Gainesville, FL

Sep. 26-27, 2019 | Pensacola, FL

Sep. 28-29, 2019 | Tampa, FL

Oct. 4-5, 2019 | Ft. Myers, FL

Oct. 7-8, 2019 | Orlando, FL

Oct. 17-18, 2019 | Pensacola, FL

Oct. 25-26, 2019 | Jacksonville, FL

Nov. 2-3, 2019 | Tampa, FL

Nov. 4-5, 2019 | Altamonte Springs, FL

Nov. 7-8, 2019 | Davie, FL

Nov. 12-13, 2019 | Destin, FL

Nov. 14-15, 2019 | Gainesville, FL

SOLID WASTE COURSES

Initial & Refresher Solid Waste Courses

Sept. 18-20, 2019 | Jacksonville, FL

Nov. 11-13, 2019 | Gainesville, FL

HAZWOPER COURSES

Hazardous Waste Regulations for Generators

September 24, 2019 | Gainesville, FL | CEUs: 0.8

40-hour OSHA HAZWOPER Training Course

October 14-18, 2019 | Gainesville, FL | CEUs: 4.0

24-hour OSHA HAZWOPER Training Course

October 16-18, 2019 | Gainesville, FL | CEUs: 2.4

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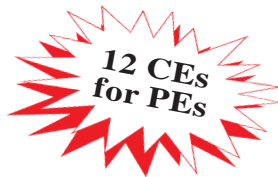
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The Florida Specifier welcomes columns, articles and letters to the editor on any subject or issue pertinent to the environmental, regulatory and technical areas the newspaper covers. We reserve the right to edit all submissions for newspaper style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



25th Annual Event
Technical Program
 -- Tentative Agenda --
 Nov. 7-8, 2019 • Omni Orlando Resort at ChampionsGate



Day One, Thursday, Nov. 7

Opening Session

A Word from the Chair

Jim Langenbach, PE, BCEE, Senior Principal, Geosyntec Consultants, Titusville

Keynote Address

Michael J. Deliz, PG, Remediation Program Manager, NASA John F. Kennedy Space Center

Session 2: Advancing the Understanding of PFAS and Emerging Contaminants

PFAS: Navigating Challenges, Best Practices and Current Affairs

Taryn McKnight, Product Manager, Test America, W. Sacramento, CA

A Vertical Recirculation Well System for In-Situ Removal of PFAS

William Kerfoot, PhD, Principal, Kerfoot Technologies Inc., Mashpee, MA

Cometabolic Treatment of Emerging Groundwater Contaminants

Paul Hatzinger, PhD, Director, Biotechnology Dev. and Apps. Group, Aptim Federal Services LLC, Lawrenceville, NJ

PFAS in Groundwater – Remediation Options

Viraj deSilva, PhD, PE, BCEE, Wastewater Treatment Director, SCS Engineers, Miami

PFAS Sites: How Uncertainties in Site Identification Influence Sampling Design and Remediation Strategies

Rosa Gwinn, PhD, PG, Resource & Technology Manager, AECOM, Germantown, MD

Analytical Review of High Concentration PFAS Treatment Projects

AnnieLu DeWitt, Remediation Tech. Bus. Dev. Mgr., Env. Services, Clean Harbors, S. Portland, ME

Session 3: Refining CSM Strategies

Building Useful Conceptual Site Models Using 3D Modeling Technology

Jim Depa, 3D Visualization Group Manager, St. John-Mittelhauser & Associates, Chicago, IL

New Geophysical Imaging Tool for Environmental Site Assessment

David Harro, PG, Director Geologic Services, G3 Group, Odessa

Changing the Perspective on 30 Years of Granularity with HRCD

Robert Schatzman, PG, Senior Project Manager, LS Sims and Associates Inc., Rockledge

Vapor Intrusion: How Many Vapor Samples Are Enough?

Jim Fineis, PG, President, Total Vapor Solutions, Alpharetta, GA

Chemical Speciation: Insights for Site Assessment and Closure Strategies

Nick Barnes, PE, Project Engineer, and Zeke HE, PhD, PE, Env. Engineer, HSW Engineering Inc., Tampa

Chlorinated Solvent Forensics: Applying Multiple Lines of Evidence

Joshua Richards, PG, CHMM, Program Manager, Pace Analytical Services, Indianapolis, IN

Session 4A: Speed Talks

Well Flow Dynamics During Groundwater Sampling: A Comparison of Purge and Passive Sampling Approaches

Sanford Britt, PG, CHG, Sr. Hydrogeo., QED Env. Systems, Dexter, MI

Site Assessment Techniques with Vapor Pin

Laurie Chilcote, Mng. Director, Vapor Pin Enterprises, Plain City, OH

Lead Remediation Using Regeneration' PetroFix

Wm. Gordon Dean, PE, Vice President, AEL, Tallahassee

ZVI Nanoparticles for In-Situ Groundwater Remediation

Patrick Randall, PE, Vice President, Hepure, Hillsborough, NJ

Pit Bottom Emplacement of Self-Activated Persulfate to Polish Excavation Remedy

Mark Smith, Senior Field Manager, EHS Support, Tallahassee

Significant Improvements for Horizontal Wells Which Facilitate Additional Capabilities

Wesley Wiley, PG, Senior Geologist, EN Rx Inc., Parker, CO

Real-Time Data through Horizontal Soil Sampling

Kyle Carlton, PG, Sr. Geologist, Directional Tech., Miramar Beach

Soil Sampling Utilizing Horizontal/Directional Methods

David Bardsley, PG, VP, Directed Tech. Drilling, Bellefonte, PA

Session 4B: Petroleum Cleanup Optimization

How to Estimate LNAPL Remediation Costs to Support Conditional Site Closure

Stephen Hanks, PE, Senior Engineer, Wood, Pensacola

Performance of a New Activated Carbon Amendment for Bioremediating Petroleum-Impacted Soils

Chad Northington, PE, SE District Mgr., Regeneration, Tallahassee

Best Value for the State: Identifying Non-Program Related Contamination at PRP Sites

Donna Beares, PG, Project Mgr., Gannett Fleming, Jacksonville

Funding the Remediation of a Petroleum Contaminated Property to Facilitate Redevelopment

Scott Graf, PG, Principal/Env. Dept. Manager, Terracon, Tampa

Integrating Multi-Technology Surfactant-Enhanced Bioremediation and Oxidation Approaches for Treatment of Petroleum Hydrocarbons

Dan Socci, Project Manager, EthicalChem, South Windsor, CT

In-Situ LNAPL Treatment Following Pipeline Transmission Rupture

William Brab, CPG, PG, Sr. Geologist, AST Environmental, Midway, KY

Day Two, Friday, Nov. 8, 2019

Opening Address

Michael Goldstein, The Goldstein Environmental Law Firm PA, Coral Gables

Session 5: Young Professionals

The Metabolic Miracle: A Bioremediation Refresher

Anthony Giannetti, Client Services Manager, Cascade, Philadelphia, PA

Expedited Site Rehabilitation of TRPH-Impacted Soils

Davis Lofton, PhD, EIT, AMASCE, Senior Staff Engineer, Geosyntec Consultants Inc., Houston, TX

ASCTLs, and Innovative Soil Management and Remediation Techniques in Golf Course Redevelopment

Sanaul Khan, Staff Professional, SCS Engineers, Boca Raton, FL

One Man's Wastewater is Another Man's Treasure: Water Reuse Options for a Hydraulic Control System

Jaclyn Vu, JEA, Jacksonville, FL, and Alexis Johnson, Geosyntec

CVOC Contaminated Zone Remediation with the use of Zero Valent Iron and Bentonite

Peter Moretuzzo, PE, Product Manager, Geo-Solutions, St. Petersburg, FL

What Does PFAS mean to You?

Kollan Spradlin, PE, CHMM, SCS Engineers, Tampa

Implementing Bioremediation to Address Trichloroethene Source Zones at a Legacy Hydraulic Containment Site

James Mills, MS, Senior Staff Professional, Geosyntec Consultants Inc., Tampa, FL

Designing Away Common In-Situ Bioremediation Complications

Lydia Ross, MS, PE, EOS Remediation, Research Triangle Park, NC

Session 6A: Remediation Case Studies

ERH Remediation in Interstate Median

Chris Blundy, Senior Project Manager, TRS Group, Longview WA

Leveraging Warm Water from Source Area Thermal Remedy for Combined Biotic/Abiotic Degradation of CVOCs

Dan Bryant, PhD, PG, Director, Woodard & Curran, E. Windsor, NJ

Effective Distribution of Emulsified Vegetable Oil in the Subsurface

David Alden, PE, Tech Services Mgr, Tersus Env. Inc., Wake Forest, NC

Combined Remedy Treatment of Multi-Chemical Solvent Plume in Fine-Grained, Low Permeability Sediments

William Brab, CPG, PG, Geologist, AST Env. Inc., Midway, KY

Session 6B: Iron Amendment Technologies

One Permeable Reactive Zone, Two Years, 365 Feet and Complete Mass Flux Reduction by BiRD

James Studer, PE, Prin. Tech., InfraSUR LLC, Albuquerque, NM

Shifts in Magnetic Susceptibility and Physical Trends of Experimental ZVI PRBs Exposed to High c-VOC-Impacted Groundwater

Alexander Korff, Engineer, Hogan Env. Solutions, Cary, NC

Optimization, Performance of ZVI Amendments for In-Situ Chemical and Biological Reduction

Gary Birk, PE, Managing Partner, Tersus Env., Wake Forest, NC

Full-Scale Remediation of Subsurface Chromium Impacts with Multiple Media

Bob Kelley, PhD, Vice President, Hepure, Hillsborough, NJ

Remediation of Lakes, Rivers and Canals Using Innovative Ferrate-Based Treatment

Thomas Waite, PhD, PE, Ferrate Solutions Inc., Melbourne

Session 7B: In-Situ Oxidation Technologies

Combined ISCO and Stabilization/Solidification for Full-Scale Remediation of a Coal Tar Source Area

Jeff Roberts, MSc, Ops Manager, SiREM, Guelph, Ontario, CN

Treating 1,4 Dioxane with Activated Potassium Persulfate

Brant Smith, PE, PhD, Tech. Apps. Mgr., ISCO, PeroxyChem, Philadelphia, PA

ISCO Generator for Continuous Production of Reactive Oxygen Species to Remediate Soil and Groundwater – Ideal for PRB Applications

Jim Mueller, PhD, President, Provectus Env. Products Inc., Freeport, IL

Session 7A: Innovative Remedial Approaches

The Hybrid Remedial Approach

Sean Rome, Operations Manager, TRC Solutions, St. Augustine

Post-Hurricane Maria and Remediation Efforts to Address Chlorinated/Non-Chlorinated VOCs and 1,4 Dioxane Impacts at Puerto Rico Facility

Brad Pekas, PG, PE, Sr. Eng./Team Leader, Trihydro Corp., Tampa

A Simplified Approach to Closure of C&D Areas at Power Plants—RBCA, Solid Waste Rules and the Old Dump Guidance

Ryan Tuttle, PG, Proj. Geologist, Geosyntec Consultants, Tampa

Mitigation of Vapor Intrusion Preferential Pathways for a Challenging Industrial Building

Joseph Corsello, PE, Proj. Mgr., Sanborn, Head & Assoc., Boston MA

Session 8: Annual Regulatory Panel Discussion

Moderator: Joe Applegate, PG, Sr. Prin. Hydrogeo., Geosyntec Consultants

Register on-line under the FRC logo at www.enviro-net.com.

Questions?

Contact Mike Eastman at (407) 671-7777 or mreast@enviro-net.com

FEDFILE

From Page 2

versity and several other environmental groups filed a lawsuit in June that seeks to end Lake Okeechobee discharges to Gulf of Mexico and Atlantic Ocean estuaries.

The lawsuit names the U.S. Army Corps of Engineers, the U.S. Fish and Wildlife Service and the National Marine Fisheries Service as defendants.

The suit aims to have the corps update its Lake Okeechobee regulation schedule to reduce the conditions that cause and sustain blue-green algae blooms and contribute nutrients for red tide organisms.

The Center for Biological Diversity was joined by Calusa Waterkeeper John Cassani, the Waterkeeper Alliance of New York and Treasure Coast's Indian River-keeper Marty Baum.

They filed the lawsuit in the U.S. District Court for the Southern District of Florida in Fort Pierce.

New app for cyanobacteria assessment. The Cyanobacteria Assessment Network Mobile application, or CyAN App, developed by the EPA, is now available for download from Google Play Store for android devices.

It uses satellite spectral data of specific water color changes of more than 2,000 of the U.S.' largest lakes and reservoirs to predict cyanobacteria blooms.

The National Aeronautics and Space Administration, the National Oceanic and Atmospheric Administration and the U.S. Geological Survey also contributed to the app's development.

CyAN is intended for use by lake managers, water quality managers, outdoor enthusiasts and boaters to warn them of developing harmful algal blooms.

Carnival Corp. fined. In June, Carnival Corp., better known in for its Carnival Cruise Line, agreed to pay a \$20 million fine because it violated the conditions of a prior lawsuit to restrict ocean dumping from their cruise liners. The company admitted in court to charges of probation violation.

In 2016, Carnival officials admitted that one of its Princess Cruise Line ships illegally discharged oily wastes. The judge assessed a \$40 million fine, and five years of probation for that offense.

All Carnival Corp. cruise brands, 105 ships globally, are subject to that probation order. Three of those ships operate or have operated from Florida's Port Canaveral.

Violations of the probation order include dumping gray water in Alaska and tossing plastic waste overboard in the Bahamas.

The company also falsified compliance documents and assigned cleanup teams to visit ships before scheduled inspections, thus obscuring any potential violations.

In addition to the recent \$20 million fine, which was only half of the original fine of \$40 million, Carnival agreed to additional audits for violations, reorganization of training and compliance programs, and a more robust reporting system for environmental violations with reporting of waste management practices to both state and federal agencies.

Carnival Corp. has until Sept. 13 to create and improve its compliance plan, and until Oct. 9 to make other changes.

If the company fails to meet the first deadline, fines of \$1 million per day will be levied. Failure to meet the second deadline will carry fines of up to \$10 million per day.

Over the longer term, Carnival also committed to reducing single-use plastic items across its entire fleet and to make improvements in handling waste from food and beverage systems.

To more clearly make her point this time around, Senior U.S. District Judge Patricia Seitz advised that if Carnival Corp. executives do not keep their commitments to this agreement, she may impose prison time and criminal fines for company officials.

FEDFILE

Continued on Page 17

Lakeland Electric to shut down coal-burning unit at McIntosh facility

Staff report

Next May, Lakeland Electric will retire McIntosh Unit No. 3, a 365-megawatt coal-burning generator placed into service in the early 1980s.

The utility anticipates full closure of the plant by 2024, “although a significant equipment failure, regulatory requirement or other unexpected development could result in a sooner closure,” officials said.

McIntosh Unit No. 3 is shared with the Orlando Utility Commission who owns 40 percent of the power. Lakeland Electric owns the remaining 60 percent.

The utility anticipates the need to acquire 136 megawatts of additional capacity by the plant’s closure in 2024.

Lakeland Electric management based the closure recommendation on the age of

the unit, the cost of operating it relative to more efficient units such as the natural gas-powered McIntosh Unit 5, historical data that indicates a declining number of hours of operation, recent experience with costly maintenance discoveries during planned outages, and the environmental challenges Unit 3 would face in the future.

They considered capital and O&M spending trends going forward, as well as the opportunity to plan a shuttering timeline that would match the expected attrition of staff due to retirements over the coming years, according to officials.

The plant has already exceeded its expected life span. Coal-fired power plants are typically designed with a life expectancy of 30 years. McIntosh Unit 3 was built in 1982 and is currently 37 years old.

Although some coal units run longer

The building features a 2,400-square-foot green roof, reserved parking for hybrid and electric vehicles, bike lockers, low-flow plumbing fixtures, and no-irrigation landscaping.

In addition, 20 percent of the electricity used is solar-generated.

Names in the news. Joe Gomez, PE, was named principal and director of Florida construction services in Terracon’s Miami Lakes office.

His areas of expertise include transportation planning, design, construction management, construction engineering and inspection.

Gomez has worked for both state and local government clients, and he will work nationally as a manager assisting other Terracon offices with construction-related projects.

the unrestrained growth phase of youth. Attrition is inevitable in any industry as it matures, and smaller labs are leaving the enterprise, either through closure or acquisition.

Some of the numbers gleaned this year suggest that no plague of commercial lab closures is on the horizon. The numbers also suggest that multi-state labs may have suffered the most damage from their campaigns to take market share through low-cost pricing campaigns.

In the face of continuing low-price pressures, the most successful labs today are providing “something extra” in the level of services their clients need through contact with the labs’ technical and service staff and management.

Advisory Committee Act.

In a second set of failures, the “EPA did not consistently ensure that members appointed as special government employees—who are expected to provide their best judgment free from conflicts of interest and are required by federal regulations to disclose their financial interests—met federal ethics requirements.”

GAO investigators found that 17 of 74 financial disclosure forms reviewed failed to have a signed and dated significant global entity filing signed by an ethics official.

The report also found the EPA negligent because the agency has not reviewed its ethics procedures by audits or spot checks as required by federal regulations.

“Until EPA’s Ethics Office evaluates the quality of financial disclosure reviews of SGEs as part of its periodic review of its ethics program, it will not have reasonable assurance that it will address noncompliance with federal ethics requirements and prevent conflicts of interest on its advisory committees,” the report stated.

In summarizing these findings, the GAO recommended that the agency follow its own rules to document staff rationales for proposed advisory committee membership. It also wants the EPA’s Ethics Office to competently evaluate the quality the SGE ethics forms for appointees to advisory committees.

The EPA agreed with the recommendation to include staff rationales for appointment but disagreed with the one pertaining to Ethics Office review of financial disclosure.

than designed, McIntosh 3 recently showed signs of degraded conditions and is faced with environmental challenges.

Environmental advocates support the utility’s decision.

“When you look at the numbers across

the state, coal just doesn’t cut it anymore,” said Tom Palmer, chair of the Sierra Club’s Ancient Islands Group. “Retirement of the CD McIntosh coal unit is comparable to removing 394,736 passenger vehicles from the road in one year.”

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NOTES

From Page 3

a U.S. Green Building Council LEED Gold award.

InfoTech is the first private company in the city to receive the award.

The infrastructure construction software and litigation consulting services provider received the award for its recently completed headquarters.

“Sustainability was top of mind when we built our first-owned building, so we are honored to receive Gold certification from the U.S. Green Building Council,” said Amber McClave, Info Tech vice president of operations and chief legal officer.

“We put a lot of effort into designing and building a green facility, and we’re proud to see that reflected as the only non-UF or city of Gainesville Gold project in our community,” she said.

LABS

From Page 7

wastewater utility plants in Florida.

Others noted that more utilities have established in-house labs for routine permit-required analyses.

This may be a trend to watch, however, as utility departments are raising costs across the state. The cash required to open an in-house lab seems in many places to be available.

Florida lab resiliency

Florida’s environmental labs have been one of the state’s most successful and widespread high tech industries over the past three decades.

However, the industry is no longer in

FEDFILE

From Page 16

GAO finds fault with EPA appointments to advisory groups. As EPA administrator, Scott Pruitt changed qualification rules for the agency’s Scientific Advisory Committees that eliminated primarily academic and institute researchers who had received EPA funding in support of their research.

Accepting funding support was deemed to taint a member’s independence.

Advisors with a history of EPA support were asked to resign immediately. Most did, which necessitated replacements on several of the 22 advisory committees after the new rule became active in January, 2017.

A recent U.S. General Accountability Office report found that “EPA generally follows its established process for most of its 22 advisory committees,” except for 20 committee members on two committees.

The two were the Science Advisory Board and the Clean Air Scientific Advisory Committee. Both have significant advisory roles pertaining to environmental regulatory matters.

The CASAC is essential to advising the EPA about legislatively mandated five-year appraisals of air quality standards. Its new appointees were seated just before the ground-level ozone standard was to be appraised.

In its report, the GAO found that appointment packets for these two committees did not include certain documents reflecting EPA staff “rationales” for the appointments. Those rationales are called for under the Federal

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COMPOST

From Page 13

compost to provide for residents, farmers, community gardens and parks.

The report noted that only 326 towns and cities out of more than 19,000 nationwide offer curbside food waste collection. As a result, most Americans have no option but to throw their food remnants in the trash.

Each year, American landfills and incinerators process enough organic material to fill a line of 18-wheelers stretching from New York to Los Angeles—10 times over, the report noted.

On the brighter side, the number of communities offering composting programs has increased by 65 percent in the past five years, the report noted.

“We recognize that communities have different structures for governance, financing and public-private partnerships,” Truelove said. “With that said, every successful program has two important elements: convenience and affordability.”

A successful composting program will feature a high level of convenience for residents and businesses. They will contribute more organic material to a composting program if it is picked up curbside, as is most trash and recyclable materials.

In addition, municipalities can incentivize their residents and businesses to participate in composting by making it more affordable than trash disposal.

“Increased compost collection can often be offset by decreased garbage pick-

ups. The end product, compost, can be sold, compared to a landfill where it costs money to dispose of material,” Truelove added.

Payment systems can be amended to encourage residents to compost and recycle organic materials instead of tossing them into the trash.

“This can be achieved through programs like “Save Money and Reduce Trash” in which residents pay less if they throw out less trash, creating a direct financial incentive for residents to toss their organic waste into the composting bin instead of the trash,” Truelove said.

Other suggestions for ramping up composting include requiring organic waste producers such as grocery stores to divert their waste to composting facilities and creating municipal buy-back programs that distribute locally generated compost to community gardens or similar recipients.

“One person’s trash is another person’s treasure—especially when that trash can be turned into compost,” said Faye Park, president of the U.S. PIRG Education Fund. “By reusing food and yard wastes, we reduce our garbage and the negative impact it has on the earth and our health.”

The report also discussed some of composting’s other wide-ranging benefits, including replenishing soil, preventing erosion and reducing the need for chemical fertilizers.

The report is on the PIRG website at <https://uspirg.org/reports/usp/composting-america>.

VACUUM

From Page 1

throughout our city within hours of the storms’ passing.

We also kept our public works crews safe as they prepared for the onslaught.

Oak Island is located along North Carolina’s Atlantic shoreline about 40 miles northeast of Myrtle Beach, SC.

Our city is small with a population of 6,800 in the off-season, but we grow substantially in the summer to approximately 30,000 or more. There are about 3,000 households and about 6,600 housing units in Oak Island.

We have two sewer systems in place, a gravity system with 1,000 connections and 32 lift stations, and a vacuum system with 8,700 connections and nine vacuum stations.

The gravity system was built in 1992, the vacuum system in 2007-10, so both are relatively new by public utility standards.

Two of the biggest concerns that sewer operators face with a hurricane are the loss of electrical power and stormwater infiltration/system overflow.

The loss of power at the vacuum and lift stations means the loss of sewer service in the community, while infiltration can overload a system and cause backups and overflows that contaminate groundwater and, potentially, potable water supplies.

Excess infiltration can also overload a local treatment center. All of these are significant problems.

Losing power is not a big concern for us. Our power lines are buried so they are not exposed to the extreme winds caused by hurricanes. Plus, we have backup generators ready should the electric grid be shut down for any reason.

Oak Island was one of the only towns in this area to maintain power during the most recent hurricanes.

Prior to a storm’s arrival, we shut down our vacuum stations near the beachfront and in low-lying areas.

This added benefit of protecting our vacuum system infrastructure is something that is not possible with a gravity system as there really is no way to shut down a gravity system.

With vacuum, this is a precaution to prevent stormwater or ocean surge from infiltrating and overwhelming the system and damaging the vacuum pumps.

Although vacuum sewers are “closed systems” that prevent both infiltration and exfiltration, stormwater will sometimes enter the system from man-made sources.

Shutting down the vacuum stations is a simple process, basically five steps: fuel and check the generators, check vacuum

cleanout caps to ensure all are intact, pick up around the vacuum stations to prevent flying debris, alert residents that the system will be shut down during the storm, and close specific isolation valves and mark them with a stake in case sand should wash in and obscure them.

We wait until the last possible moment to shut down the vacuum stations, factoring in a safety margin for our staff. Residents who have not evacuated can still use their toilets and run water on a limited basis as the vacuum pits and the laterals that connect the houses to the pit have some capacity to hold sewage.

Once the storm has passed, our crews can reopen the isolation valves and vacuum stations within a couple of days.

Gravity lift stations typically remain online during storms. But overflowing the system is always a concern as collection lines and manholes always allow some infiltration.

During Hurricane Florence, we were very close to breaching the lift stations, within a foot or so at some locations, but it never happened. We were fortunate given the size of the storm surge during that event.

Hurricane preparedness is a matter of planning, learning from past experiences and on-going maintenance.

Part of our preparedness lies in the fact that we have vacuum sewers that prevent the threat of infiltration and exfiltration. Unless a component is damaged, such as a cleanout cap or valve pit, there is no threat of sewage contaminating the environment or stormwater overwhelming the system and treatment plant.

Past experience, along with advice from our vacuum technology provider Airvac, has taught us how to prepare for a hurricane. With a few simple steps we are ready for a storm, no matter how severe.

We conduct ongoing rehabilitation and maintenance programs on our gravity sewer collection lines and manholes to help reduce infiltration during storm events.

Some stormwater inevitably enters the system, but we’ve managed to keep it to a manageable minimum.

The benefits of sewer preparedness are significant. Protection of our environment from sewage, the ability to restore sewer service quickly after a storm, and the safety of our staff are all priorities for us.

We can expect hurricanes to come through on a regular basis, so it is vital for our public works officials to do everything within their control to prepare for storms and keep the sewers functional.

Mark Moore is the wastewater superintendent for the town of Oak Island, NC.

Polyfluorinated alkyl substance remediation moving forward despite lack of standards

By ROY LAUGHLIN

Standards for polyfluorinated alkyl substances in drinking water and soil may be years in the future, but scientists and engineers are not waiting to develop methods for water and soil contamination cleanup.

For example, downstream of the Chemours fluoropolymer plant on the Cape Fear River in North Carolina, water treatment plants are filtering source water to rid it of PFAS, even in the absence of U.S. Environmental Protection Agency drinking water standards.

Once developed, the standards are expected to be lower than 70 parts per trillion, EPA's current health advisory limit, posing significant challenges for potable water plant operators.

Sorption filtration

Activated carbon and colloidal activated carbon are the most widely used filtration mediums used today to reduce PFAS concentrations below one part per billion in water.

The Sweeney Water Treatment Plant that draws its supply from the Cape Fear River now uses activated carbon beds to filter predominantly three-carbon and six-carbon PFAS compounds to low parts per trillion concentrations.

The length of the carbon chain backbone affects PFAS water solubility. The influence is inverse: smaller chain length compounds are more water soluble and conversely have less affinity for activated carbon or other binding agents.

For PFAS with shorter alkyl backbones, more carbon in deeper beds are needed to increase contact time to yield the desired adsorption. They also require a shorter interval between regenerating the charcoal used to remove PFAS.

At the Sweeney plant, regeneration occurs after one year of use, compared to as much as four years for activated charcoal beds that filter out other organic compounds. Over time, this can lead to a high volume of PFAS-contaminated solid wastes.

Membrane filtration

Membrane filtration and filtration with high affinity anionic exchange media are alternative treatment candidates. Some appear to have the capability. But the same inverse relationship between carbon backbone length and adsorption exists.

These technologies are not as cost effective as activated carbon. Eventually, PFAS-loaded filters and resins will become disposal problems at the end of their useful service life.

PFAS are among the most degradation-resistant organic compounds known. The carbon-fluorine bond has such high energy that even incineration fails to completely break all the carbon-fluorine bonds and mineralize PFAS to CO₂ and fluoride.

The result of some apparently effective degradation processes is a panoply of lower molecular weight fluorinated organic compounds.

Moving PFAS from water or soil into landfills or air, via emissions, is not considered a useful permanent solution for the larger PFAS problem.

Chemical destruction

The search for a post-filtration PFAS destruction process is proceeding on multiple fronts.

The one likeliest to yield near-term solution is washing-extraction of filtration media, whether it is carbon or an exotic synthetic material of high PFAS specificity, to regenerate the filter material for reuse and concentrate its PFAS burden.

In the most effective scenario, the wash solvent could be regenerated, perhaps by evaporation separation, to yield a contaminant residue that would then be subject to a treatment for PFAS destructive treatment.

There is almost no prospect that biodegradation is a viable destruction option. The carbon-fluorine bond energy exceeds the energy available even from known coupled, enzyme-mediated reactions in cells.

Researchers may not have given up hope of finding a bioremediation solution,

but the consensus of opinion gleaned from speakers at the Florida Remediation Conference over the past two years is that a search elsewhere will bear more fruit.

Several years ago, researchers reported from preliminary investigations that chemical oxidation using ozone to generate hydroxyl radicals broke down PFAS. Persulfate radicals also oxidized PFAS. Either were thought to be candidate in-situ treatment methods

Closer scrutiny of the breakdown products indicated that while complete destruction of some PFAS in the initial mixture occurred, the daughter products were usually smaller, shorter chain-length perfluorinated compounds.

Recent research indicates that nucleophilic reactants effectively mineralize the carbon-fluorine bond in PFAS.

Suitable nucleophile have been generated using catalyzed hydrogen peroxide to form superoxide radicals or hydroperoxide.

Geo-Cleanse International Inc. reported in 2017 that a method they developed and patented "destroys PFOA, without measurable formation of shorter-

chained PFAS compounds," and was effective against some compounds present in trace concentrations.

Nucleophile reactions are stepwise, so it remains to be seen if they are fast enough and amenable to destroying PFAS washed from filtration media.

Combustion

Combustion at temperatures above 1,000 degrees C. is a prevalent PFAS destructive technology. A challenge for using traditional fossil-fueled kilns is PFAS' resistance to rapid oxidation.

In a forced-air kiln, PFAS compounds could be vaporized before degradation or partial degradation products could escape as vapors.

A custom kiln for PFAS destruction seems possible, but its designers will have to show that the disappearance of fluorinated organic compounds is due to destruction rather than vaporization.

DoD efforts

The U.S. Department of Defense, because of its prolonged and widespread use of PFAS fire-fighting foams, is a lead federal agency developing remediation tech-

nologies for PFAS in soil and groundwater.

DoD has funded research that provides novel candidate methods.

One emerging candidate method "uses a combination of ultraviolet light and a silicon-carbon and single atom catalyst," as described by RTI International in a research summary. This method is aimed at potable water treatment facilities.

Plasma incineration appears to be, at least initially, a candidate for successful incineration. It can generate the high temperatures needed, but again the burden is to prove that complete oxidation leads to fluoride mineralization, rather than PFOA vaporization, in the disappearance of PFAS being treated.

Electrochemical methods using electrodes coated with exotic materials to make them oxidation resistant has been shown to cause substantial PFAS destruction in water.

The method requires high voltage and high electrical current, which makes it a likely prospect for concentrated solutions,

PFAS
Continued on Page 20



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PFAS

From Page 19

such as a solvent rinse of sorption media, according to a recent *Chemical and Engineering News* report.

Additional methods

Beyond chemical methods involving catalysis and enhanced combustion, more exotic methods for PFAS destruction are now under investigation.

Sonolysis has been shown to effectively degrade PFAS in laboratory experiments. The process generates PFAS-destroying radicals through the breakdown of water.

The technology appears to have a long road ahead of it before its possible commercial use in large-scale systems, according to a recent article in *Remediation Journal*.

In a recent review of PFAS destruction research, *Chemical and Engineering News* reported that high temperature-high pressure treatment is an effective destruction

WATCH

From Page 4

to guide its water management activities over the next five decades.

Its study consultant, Black & Veatch, will use the "One Water" paradigm to incorporate all the city's water uses into a single plan.

Drinking water, wastewater, stormwater, reclaimed water, indirect and direct potable reuse and groundwater will be considered as a single water resource available for future use.

Winter Haven is a member of the Polk Regional Water Cooperative. In 2010, the cooperative adopted a sustainable water management plan to characterize how water will be needed for economic future and quality of life in the area. Winter Haven's work meets that plan's vision.

In addition to Black & Veatch, design firm Brown and Caldwell will collaborate to assess Winter Haven's water resources and utility systems that now serve 43,000 residents.

Data and findings will be incorporated into a land and water use planning document that includes its lakes and natural systems promoting city-wide water sustainability and economic growth over the next 50 years.

Stetson institute names interim leadership. Jason Evans, PhD, was named interim executive director of Stetson University's Institute for Water and Environmental Resilience.

Evans succeeds Clay Henderson who retired after four years as director.

Henderson said he planned to relocate to Boston, MA, where he will write about environmental topics.

Although a Stetson press release char-

technique. But it may not be cost-effective for general use.

Prospects for effective complete PFAS chemical mineralization include a number of potential technologies with widely differing methods of action, likely high costs and limitations for implementation.

None appears to completely address the unique challenge of PFAS. They resist widely used chemical destruction methods, and are widely dispersed in many chemical forms with different physicochemical characteristics. The desired removal will yield PFAS concentrations perhaps in the single digit parts per trillion range.

If and when a successful treatment scheme is developed, it may involve a treatment train whose components will be determined by specific conditions.

The technical challenge of achieving PFAS remediation, either in potable water purification or site remediation, is still open and looming larger as time passes.

acterized Evans' appointment as temporary, it also included four goals he plans to accomplish during his appointment.

These goals include equipping an environmental field station at the Sandra Stetson Aquatic Center, partnering with Volusia County on a green infrastructure project, installing a solar array at SSAC's facility, and conducting workshops on sustainable landscaping, green infrastructure, climate change and flood insurance.

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