PROCEEDINGS OF THE
2020 CHNEP WATERSHED SUMMIT

From Heartland to Coast:
Protecting our Water, Wildlife, and Future

June 1-2, 2020

CHNEP Watershed Summit

From Heartland to Coast: Protecting our Water, Wildlife, and Future

June 1-2, 2020

Summit Sponsors

The CHNEP is pleased to receive support for this Summit from the following organizations, agencies and businesses.

American Water Resources Association & WGCU Public Media

Financial Partners

The CHNEP is a partnership of citizens, elected officials, and resource managers working together to protect and restore water and wildlife habitat in Central and Southwest Florida. A cooperative decision-making process is used to address diverse resource management concerns in the 5,416 square-mile study area.

The current CHNEP financial partners who support the overall work of the CHNEP include the U.S. Environmental Protection Agency, Southwest Florida Water Management District, Florida Department of Environmental Protection, Peace River Manasota Regional Water Supply Authority, South Florida Water Management District, the counties of Polk, Glades, DeSoto, Highlands, Sarasota, Manatee, Hendry, Hardee, Lee and Charlotte, and the cities of Bonita Springs, Arcadia, Bartow, Sanibel, Fort Myers, Fort Myers Beach, Cape Coral, Punta Gorda, North Port, Venice, Winter Haven, and the Village of Estero.

June 1, 2020 Session 1: Water Quality Improvement

9:00 Session 1 Opening Remarks
Jennifer Hecker, Coastal & Heartland National Estuary Partnership

9:10 *Karenia brevis* Bloom Induced Dead Zone in Southeast Gulf of Mexico (pg. 9)
AJ Martignette, Sanibel Captiva Conservation Foundation

9:40 Peace River Watershed Threats Assessment, GIS Restorations Prioritization and What's Next (pg. 10)
Greg Knothe, Florida Fish & Wildlife Conservation Foundation

10:10 Early Performance Results for a Constructed Filter Marsh on Sanibel Island (pg. 11)
Mark Thompson, Sanibel Captiva Conservation Foundation

10:40 Do Stormwater Ponds Function as Designed? Improving Detention Ponds with Ecological Design (pg. 11-12)
Rebecca Tharp, Just Water Consulting

11:10 Hurricanes, Humans, and Red Tide: What is 30 Years of Seagrass Mapping is Telling Us (pg. 13-14)
Christopher Anastasiou, Southwest Florida Water Management District

11:40 Establishing Baselines and Tracking Trends: 15 Years of Water Quality Monitoring in Estero Bay * (pg.14-15)
Rebecca Cray, Florida Department of Environmental Protection – Aquatic Preserves

11:55 Continuous Nutrient Monitoring in the Caloosahatchee Estuary* (pg. 15-16)
Kevin Jones, Sanibel Captiva Conservation Foundation

* Indicates a poster lightning talk presentation
Note: Each presentation includes an interactive question and answer session at the end

12:10 Water Quality – It's Not Just Nutrients: How Climate Change is Necessitating New Restoration Strategies.* (pg. 16-17)
Judy Ott, Estuary Escapes

12:25 Charlotte Harbor Estuaries Volunteer Water Quality Monitoring Network Program, 1998 – 2020 * (pg. 18)
Arielle Taylor – Manges, Florida Department of Environmental Protection – Aquatic Preserves

12:40 Closing Remarks for Water Quality Improvement Session
Nicole Iadevaia, Coastal & Heartland National Estuary Partnership

June 1, 2020 Session 2: Hydrological Restoration

1:00 Session 2 Opening Remarks
Jennifer Hecker, Coastal & Heartland National Estuary Partnership

1:10 Charlotte Harbor Flatwoods Initiative Hydrologic Restoration Project (pg. 19-20)
Kim Fikoski, South Florida Water Management District

1:40 SWFWMD 2020 Update of Charlotte Harbor SWIM Plan (pg. 20 -21)
Lizanne Garcia, Southwest Florida Water Management District

2:10 Stream and Wetland Restoration on Agricultural Lands: A Case Study with Broad Application (pg. 21-22)
Kristen Nowak, Wood Environment & Infrastructure Solutions

2:40 A One Water Plan for the Headwaters Region (pg. 22)
Mike Britt, City of Winter Haven

* Indicates a poster lightning talk presentation
Note: Each presentation includes an interactive question and answer session at the end

3:10 Influence of Water Withdrawals on Distributions and Populations of Species in Upper Charlotte Harbor (pg. 22-23)
Peter Rubec, Florida Fish & Wildlife Conservation Commission

3:40 South Lee County Watershed Initiative Hydrologic Restoration Project (pg. 24)
Jennifer Hecker, Coastal & Heartland National Estuary Partnership

3:55 Closing Remarks on Hydrologic Restoration Session
Nicole Iadevaia, Coastal & Heartland National Estuary Partnership

June 2, 2020: Session 3: Fish, Wildlife, & Habitat Protection

9:00 Session 3 Opening Remarks
Jennifer Hecker, Coastal & Heartland National Estuary Partnership

9:10 Movements of Large Juvenile and Adult Smalltooth Sawfish in Southwest Florida (pg. 25)
Rachel Scharer, Florida Fish & Wildlife Conservation Commission

9:30 An Environmental DNA Tool to Monitor Recovery of the USA's Smalltooth Sawfish Population (pg. 26)
Alia Court, Florida Fish & Wildlife Conservation Commission

9:50 Habitat Restoration with Purpose: A Fisheries Case Study (pg. 27)
JoEllen Wilson, Bonefish & Tarpon Trust

* Indicates a poster lightning talk presentation
Note: Each presentation includes an interactive question and answer session at the end

10:10 Comparison of Hotspot Consistency of Two Sport Fish in Charlotte Harbor (pg. 28)
Nathan Miller, Florida Fish & Wildlife Conservation Commission

10:30 Charlotte Harbor: An Exceptional Estuary that Needs Our Close Attention (pg. 29)
Dave Blewett, Florida Fish & Wildlife Conservation Commission

10:50 Aquatic Habitat Conservation and Restoration in the Charlotte Harbor Watershed (pg. 30-31)
Corey Anderson, Florida Fish & Wildlife Conservation Commission

11:10 Oyster Restoration in San Carlos Bay and Tarpon Bay (pg. 31-32)
Eric Milbrandt, Sanibel Captiva Conservation Foundation

11:30 Towards a Better Assessment of Estero Bay Seagrass Health Status and Stressors* (pg. 32)
James Douglass, Florida Gulf Coast University

11:45 Hard Clam Restoration in San Carlos Bay: A Pilot Project* (pg. 33)
Leah Reidenbach, Sanibel Captiva Conservation Foundation

12:00 Charlotte Harbor Aquatic Preserves' Bird Nest Monitoring and Protection Program: 2009-2019* (pg. 34)
Mary McMurray, Florida Department of Environmental Protection – Aquatic Preserves

12:15 Multidimensional Scaling Ordination for Bird Nesting Activities on Estero Bay's CWA Islands* (pg. 35-36)
Neil Ayers, Florida Department of Environmental Protection – Aquatic Preserves

* Indicates a poster lightning talk presentation
Note: Each presentation includes an interactive question and answer session at the end

12:30 Closing Remarks on Fish, Wildlife, & Habitat Protection Session
Nicole Iadevaia, Coastal & Heartland National Estuary Partnership

June 2, 2020: Session 4: Public Engagement for Protecting Our Water and Wildlife

1:00 Session 4 Opening Remarks
Jennifer Hecker, Coastal & Heartland National Estuary Partnership

1:10 Student Research on Oyster Larvae within the Charlotte Harbor and Caloosahatchee Estuary (pg. 36-37)
Bass Dye, Florida Gulf Coast University

1:30 Connecting University Researchers and K-12 Teachers for Environmental Education (pg. 37-38)
Jennifer Jones, Florida Gulf Coast University

1:50 Eyes on Seagrass Citizen Scientists: Document Seagrass and Macroalgae in Charlotte Harbor (pg. 39)
Elizabeth Staugler, University of Florida – Sea Grant

2:10 Removal of Derelict Fishing Gear from the Artificial Reefs in Charlotte Harbor Aquatic Preserves (pg. 40)
Melynda Brown, Florida Department of Environmental Protection – Aquatic Preserves

2:30 Using the Encounter Hotline as a Tool to Promote Smalltooth Sawfish Recovery in the U.S. (pg.41)
Andrew Wooley, Florida Fish & Wildlife Conservation Commission

* Indicates a poster lightning talk presentation
Note: Each presentation includes an interactive question and answer session at the end

2:50 Ideas for Enhancing Charlotte County's Management of Our Exceptional Estuaries &Waterways (pg. 42)
Dr. William Keller, Ecopapak

3:10 Sanibel Communities for Clean Water Program (pg. 43)
Dana Dettmar, City of Sanibel

3:30 Making the Case for the Statewide Stormwater Rule (pg. 43-44)
Marisa Carrozzo, Conservancy of Southwest Florida

3:50 Closing Remarks on Public Engagement Session
Nicole Iadevaia, Coastal & Heartland National Estuary Partnership

* Indicates a poster lightning talk presentation
Note: Each presentation includes an interactive question and answer session at the end

SESSION 1 – WATER QUALITY IMPROVEMENT

Karenia Brevis Bloom Induced Dead Zone in the Southeast Gulf of Mexico

AJ Martignette, amartignette@sccf.org
Mark Thompson, mthompson@sccf.org
Eric Milbrandt, emilbran@sccf.org
Rick Bartleson, amartignette@sccf.org
Sanibel-Captiva Conservation Foundation Marine Lab,
900A Tarpon Bay Road, Sanibel, FL 33957

The Southeast Gulf of Mexico experienced an extended and expansive bloom of *Karenia brevis* from November 2017 through December 2018. During late August 2018, mean surface concentrations reached over 11 million cells per liter offshore of Sanibel, Florida causing massive fish kills. Over 1.3 million kilograms of dead marine life was removed from Lee County coastlines during August 2018. Decomposition fueled by the fish kills depleted the dissolved oxygen in the lower water column. Large volumes of fresh water discharged from the Caloosahatchee River system, combined with relatively calm weather, allowed the formation of a pyconcline, isolating nearshore Gulf bottom waters from the surface water and atmospheric oxygen. Seven transects perpendicular to shore were established off of Sanibel. They extended up to 16 km offshore with a depth range of 4.2 m to 15.5 m. Vertical water column profiles were collected using an YSI EXO 2. The data was interpolated using ArcGIS. The total area surveyed was 744 km^2. On September 26, 2018, the interpolated anoxic area was 355 km^2 with 628 km^2 hypoxic. The mean dissolved oxygen level in the bottom water column layer was 1.1 mg/L with a mean hypoxic layer thickness of 5.48 m. On October 9, 2018, hurricane Michael came through the Gulf and passed approximately 440 km west of Sanibel. Post Michael surveys showed a well-mixed water column with a mean dissolved oxygen level of 6.4 mg/L at the bottom.

* Indicates a poster lightning talk presentation
Note: Each presentation includes an interactive question and answer session at the end

Peace River Watershed Threats Assessment, GIS Restorations, Prioritization and What's Next

Greg Knothe, greg.knothe@myfwc.com
Craig Mallison, craig.mallison@fwc.com
Florida Fish and Wildlife Conservation Commission,
3900 Drane Field Road, Lakeland, FL 33812

The Peace River (106 miles) is a large black water river in peninsular Florida that flows through an unconfined alluvial valley of unconsolidated quartz sand, silt, and clayey sand sediments. The watershed has experienced high levels of habitat degradation due to urbanization, agriculture, industry, mining, and altered flow regimes. The objectives of this assessment were to: (1) identify and inventory the location and magnitude of habitat degradation within the Peace River riparian corridor including navigable tributaries; (2) identify and inventory fish passage impacts at road crossings in the watersheds; (3) develop restoration recommendations at each impacted location; and (4) develop a prioritized Basin Restoration Plan for state, federal, and local agencies and private landowners to implement conservation and restoration efforts. We assessed approximately 167.7 river miles in the Peace River Watershed and evaluated 512 impairment sites. Restoration recommendations for impairment sites were developed into 3 summarized options based on river geomorphology and the cause of degradation. Impairment sites were prioritized into focal areas for restoration using Geographic Information System heatmaps that were weighted by site abundance, site length, and calculated severity scores. Our Basin Restoration Plan recommends that focal areas take restoration priority, since they are concentrated areas of habitat degradation where multiple sites could be restored concurrently to minimize costs. Moving forward, the next logical step following the Peace River Watershed threats assessment project was to implement restoration based on the results. Funding was secured to restore and monitor two severely degraded streambanks located within restoration focal areas. We partnered with the United States Fish and Wildlife Service to restore the streambanks utilizing Natural Channel Design methodologies during 2020 and 2021. Monitoring will include pre-and-post restoration assessment of fish communities, permanent cross-sections, photo-points, and side-scan-sonar.

* Indicates a poster lightning talk presentation
Note: Each presentation includes an interactive question and answer session at the end

Early Performance Results for a Constructed Filter Marsh on Sanibel Island

Mark Thompson, mthompson@sccf.org
SCCF, 900A Tarpon Bay Road, Sanibel, FL 33957

In January 2019, the City of Sanibel placed a 3.4 acre constructed filter marsh on line. The Jordan Treatment Marsh is intended to provide nutrient removal for the Eastern basin of the Sanibel Slough, a Florida DEP impaired waterbody. The TMDL for the eastern Sanibel Slough requires 54% TN and 74% TP reductions to achieve a chlorophyll a concentration of 21 ug/l. The required mass reductions are estimated to be 1,281 kg TN and 350 kg of TP annually. As designed, the Jordan Treatment Marsh was expected to remove between 15% - 46% of the TN entering the marsh and between 34% - 81% of the TP. The operating flow rate is designed to be between 0.5 to 2 cfs. The system should remove up to 460 kg of TN and 80 kg of TP each year. These reductions would hypothetically meet 36% on the required TN load reduction and 23% of the required TP load reduction. The system has now been operating for one year. A monitoring program was implemented to track the treatment capabilities of the system since it was first brought on line. The monitoring results with overall treatment efficiencies and a breakdown of internal removal efficiencies at different stages within the marsh will be presented in this presentation.

Do Stormwater Ponds Function as Designed? Improving Detention Ponds with Ecological Design

Rebecca Tharp, becky@justwaterconsulting.com
Just Water Consulting, 160 Lefebvre Lane, Williston, VT 05495

Stormwater ponds (also known as wet ponds or retention basins) are engineered structures designed to temporarily retain runoff from developed land to reduce the impact of increased flow and pollutant loading to aquatic ecosystems. Despite their widespread use, their performance is widely variable, and drivers of pollutant removal by stormwater ponds remain poorly understood. Several recent studies have explored the internal

* Indicates a poster lightning talk presentation
Note: Each presentation includes an interactive question and answer session at the end

dynamics that influence soluble phosphorus (P) release from sediments – presenting a previously unknown source of highly bioavailable P in pond effluent. The driving characteristics of stormwater pond stratification and nutrient release from sediments are not known. This study examined the morphometric details, watershed characteristics, water quality, sediment chemistry, and thermal structure of seven permitted stormwater ponds in northern Vermont – a cold climate with comparatively less risk of long term stratification due to frequent rain and low radiant heat from the sun. Water quality temperature was recorded continuously at three depths in each pond from May to October 2017 and grab samples were collected for nutrient analysis on six dates in wet and dry periods. Ecological assessments (following the wetland rapid assessment protocol) were performed at the peak of the growth season. Four of the ponds were found to thermally stratify with depth correlating strongly to stratification intensity. Water quality measures of total phosphorus (TP) and soluble reactive phosphorus (SRP) were strongly correlated with floating plant and algae coverage of the ponds, indicating that internal nutrient cycling may dominate pond performance. A combination of water depth, soil chemistry, and biological community structure are most strongly related to water column P concentrations suggesting that pond design could result in better water quality outcomes through a more holistic approach to pond placement, sizing, and planting design. A related study explored the use of floating treatment wetland (FTW) on the water quality performance of a stormwater pond as an approach to improve performance with minimal expense and invasive redesign. The findings of that study support that FTW may alter the dominant plant type in stormwater ponds (from floating algae to rooted macrophytes) which may allow for greater dissolved (DO) oxygen in the water column. However, reduced mixing as a result of FTW coverage of the surface impeding wind turnover may negate those benefits. A full presentation of water and sediment chemistry as well as plant tissue analysis to assess uptake rates by species will be presented along with a summary of the liabilities of stomwater ponds for water quality. Finally, some promising approaches that use ecological assemblages and natural processes to improve water quality within stormwater ponds will be explored.

* Indicates a poster lightning talk presentation

Note: Each presentation includes an interactive question and answer session at the end

Hurricanes, Humans, and Red Tide: What 30 Years of Seagrass Mapping is Telling Us

Christopher Anastasiou, chris.anastasiou@swfwmd.state.fl.us (1)
David Tomasko, dtomasko@esassoc.com (2)
(1) Southwest Florida Water Management District, 7601 US Highway 301 North, Tampa, FL 33637
(2) Environmental Science Associates, Inc., 4200 West Cypress Street, Suite 450, Tampa, FL 33607

The Southwest Florida Water Management District's Surface Water Improvement and Management (SWIM) Program has been mapping seagrass habitat in estuaries along Florida's Gulf Coast for over 30 years. This is accomplished by acquiring aerial imagery specifically flown for the purpose of mapping seagrass. Imagery is then photo- interpreted by qualified mappers, increasingly with the help of semi-automated computer software. Here we provide an overview of this mature yet evolving mapping program. But why should we care about seagrass habitat? Florida has more than 2.5 million acres of seagrass habitat contributing more than $20 billion a year to the state's economic health. Approximately 70% of commercially and recreationally important fish spend at least part of their lifecycle within seagrass meadows. Seagrasses also stabilize marine sediments and filter pollutants. From a diagnostic perspective, seagrasses are very sensitive to changes in water and sediment quality and therefore make good indicators of overall estuarine health. Wastewater, stormwater, sea level rise, and warming sea surface temperatures are but some of the factors that can contribute to seagrass loss. And globally, seagrass abundance is declining, disappearing at a rate of two football fields an hour. In the past hundred years, almost 30% of the world's seagrasses have been lost. A major reason for this loss is declining water quality. Like the rest of the world, Florida's total seagrass coverage continues to decline along much of the state's coastline. For example, seagrass coverage in the Indian River Lagoon has decreased by over 80% (42,000 acres) during the past decade. However, estuaries on Florida's Gulf Coast have a somewhat different story to tell. Seagrass meadows in Southwest Florida have expanded over the past 30 years, though more recently, acreage has leveled off and, in some areas, even declined. We'll discuss why the story is so different on the Gulf Coast, what this may tell us about the success (or not) of our past resource management actions, and what this may tell us about the future.

* Indicates a poster lightning talk presentation
Note: Each presentation includes an interactive question and answer session at the end

Establishing Baselines and Tracking Trends: 15 Years of Water Quality Monitoring in Estero Bay

Rebecca Cray, rebecca.cray@floridadep.gov
Stephanie Erickson, stephanie.erickson@floridadep.gov
700-1 Fishermans Wharf, Fort Myers Beach, FL 33931

Water quality greatly influences the health and productivity of estuarine habitats as well as human health, recreation, and economic opportunity. Over fifty years ago, Estero Bay was designated as Florida's first aquatic preserve to maintain it in its essentially natural condition for the benefit of future generations. It and its tributaries are designated as Outstanding Florida Waters and therefore their water quality is protected by the Florida Department of Environmental Protection. Estero Bay is a shallow estuarine system with saltwater in-flows from the Gulf of Mexico and freshwater inputs from five tributaries—Hendry Creek, Mullock Creek, Estero River, Spring Creek, and Imperial River. Many activities within the watershed have the potential to impact water quality within the bay, such as point- and non-point sources of pollution, hydrological modifications, increased development and associated impervious surface area, and loss of wetlands. Since mid-late 2004, Estero Bay Aquatic Preserve staff has maintained a network of continuously deployed multi-parameter water quality instruments (datasondes) at three sites located in northern, central, and southern reaches of Estero Bay. The datasondes measure temperature, specific conductivity, salinity, pH, dissolved oxygen, turbidity, and depth at fifteen-minute intervals. The data undergo a quality assurance check utilizing the procedures of the National Estuarine Research Reserves' Centralized Data Management Office during which readings are rejected or marked as suspect if appropriate. The purpose of this network is to establish baseline water quality for Estero Bay and evaluate daily, seasonal, and long-term trends in water quality. The frequency of data points provides DEP and other local water quality managers the ability to assess short-term impacts of specific events, such as hurricanes, and long-term trends across the span of years. With fifteen full years of data recorded, it is possible to conduct some of these long-term analyses using seasonal Mann-Kendall tests and report on changes in parameters over time. Some of the results and graphs also raise the question of how to define baselines and whether the Estero Bay system is experiencing shifts in baseline water quality over time. Long-term datasets, such as those from Estero Bay Aquatic Preserve's continuous water quality

* Indicates a poster lightning talk presentation
Note: Each presentation includes an interactive question and answer session at the end

monitoring program, are invaluable as a resource to assist in advancing our understanding of how human activities within our watersheds may potentially impact downstream, estuarine water quality as well as the habitats and organisms that these waters support.

Continuous Nutrient Monitoring in the Caloosahatchee Estuary

Kevin Jones, kjones@sccf.org
Eric Milbrandt, emilbran@sccf.org
AJ Martignette, amartignette@sccf.org
900A Tarpon Bay Road, Sanibel, FL 33957

Since 2007, SCCF's River, Estuary and Coastal Observing Network (RECON), has been providing real-time water quality data from the Caloosahatchee estuary and the surrounding waters. These data have been used in numerous SCCF publications, and relevant parameters are provided in a weekly report to the U.S. Army Corps of Engineers to advise water management decisions regarding water releases from Lake Okeechobee into the Caloosahatchee. While basic parameters such as salinity, turbidity and chlorophyll have always been available from the RECON network, nutrient data has been largely missing from this data set until now. In the past, sampling for phosphorus and nitrogen concentrations in the study area has only been available by collecting and preserving water samples for later laboratory analysis, severely limiting the size of this data set. Excessive phosphorus and nitrogen loading in the estuary have been shown to promote phytoplankton growth. Historical data from a U.S. Geological Survey study and a RECON sensor show correlation between nitrogen flux and chlorophyll near the mouth of the Caloosahatchee, but more frequent nutrient data are needed to further investigate this relationship. Nutrient pollution is thought to have contributed to harmful blooms of cyanobacteria within the estuary and to annual red tide blooms in the Gulf of Mexico. With one nitrogen analyzer already in the field and plans in the works to deploy one more nitrogen and one phosphorus analyzer at the upper estuary RECON sites, critical nutrient data from the Caloosahatchee will soon be more available. The types of nutrient sensors that are being deployed will be presented, along with the challenges associated with operating them, and the research that can be done with this expanded data set. Through improved

* Indicates a poster lightning talk presentation
Note: Each presentation includes an interactive question and answer session at the end

continuous monitoring of nutrients in the Caloosahatchee estuary, we can achieve a better understanding of the dynamics of nutrient concentrations and ecosystem responses.

Water Quality – It's Not Just Nutrients Anymore: How Climate Change is Necessitating New Restoration Strategies

Judy Ott, judyott@embarqmail.com (1)
Dr. William Keller, wckeller@earthlink.net (2)
(1) Estuary Escapes, LLC-Estuary Science & Education, 10715 Habitat Circle, Bokeelia, FL 33922
(1) Ecopapak, 16911 O'Hara Drive, Port Charlotte, FL 33948

Water quality impairments, degraded seagrasses and increasing filamentous algae blooms have recently been documented in the Charlotte Harbor estuaries. Declining water quality threatens our economy and lifestyle. It is well studied that that nutrients from stormwater runoff and wastewater are the primary causes of these water quality declines. In addition, we now understand that climate change, bringing increasing sea levels, water temperatures, and storm intensities, has become the third contributor to our water quality crisis. A combination of federal, state, regional, and local actions is needed to protect and restore our local estuaries' health while it is still physically and fiscally feasible. Addressing water quality and climate change issues is time sensitive and requires immediate action in two areas: adaptation and mitigation. Climate change adaptation and resiliency are the processes of adjusting to anticipated changes by protecting existing infrastructure, homes, and people from rising seas, fires, and stronger weather. Mitigation directs efforts towards solving the causes of climate change: reducing heat-trapping emissions and removing carbon already in the atmosphere. Resistance to vigorous climate change mitigation is dangerous, especially for Florida. For example, while Florida's Governor has acknowledged climate change exists, the title for the new climate change director is "Chief Resilience Officer", reflecting focus on adaptation but not mitigation. Charlotte County's Comprehensive Plan updates do not consider the causes of sea level rise and warming, thereby ignoring mitigation. And, while Lee, Collier and Charlotte Counties are developing a "Southwest Florida Resiliency Compact", a comprehensive "climate compact" is more

* Indicates a poster lightning talk presentation
Note: Each presentation includes an interactive question and answer session at the end

critical. We must expand our focus beyond adaptation and resiliency. Without mitigation, the climate will continue to change and long-term impacts will become too severe to manage. To avoid rapidly increasing algae blooms, water quality decline and other devastating consequences we must enhance our mitigation strategies immediately. Scientists estimate that we must implement significant climate mitigation actions and policies within 10 years or rapid natural processes, such as melting of the permafrost and associated methane release, will render us incapable of slowing the uncontrollable heating of our plant. Critical mitigation goals include: 1) reducing emissions by 70-100% by 2030 through conservation and transition to non-emitting energy sources; and 2) removing excess carbon from the atmosphere by reforestation and soil management.

Actions by businesses and individuals are essential, but the greatest leverage can come from federal, state, and local governments applying their specific authorities and policies as strongly as possible, including:

• Federal – enact a national law which establishes a rising price on carbon and returns revenues to households, thereby reducing emissions, benefitting the economy, and improving public health.

• State – adopt regulations which: 1) require energy providers to create low-carbon energy portfolios with 100% zero emission electricity by 2030; 2) prohibit utilities from earning higher profits from selling more electricity, and require them to focus on improving service and reducing emissions; 3) eliminate barriers to rooftop solar energy; and 4) ban fracking

• Local - implement building codes, landscaping and farming rules, and public transportation policies which conserve, sequester and transition to zero emission fuels.

* Indicates a poster lightning talk presentation

Note: Each presentation includes an interactive question and answer session at the end

Charlotte Harbor Estuaries Volunteer Water Quality Monitoring Network Program, 1998-2020

Arielle Taylor-Manges, arielle.taylormanges@floridadep.gov
David Hersi, david.hersi@dep.state.fl.us
Mary McMurray, mary.mcmurray@floridadep.gov
Melynda Brown, melynda.a.brown@floridadep.gov
FDEP-Charlotte Harbor Aquatic Preserves, 12301 Burnt Store Road, Punta Gorda, FL 33955

The Florida Department of Environmental Protection, Charlotte Harbor Aquatic Preserves office manages a long-term volunteer water quality monitoring program aptly named the Charlotte Harbor Estuaries Volunteer Water Quality Monitoring Network (CHEVWQMN). This program was established in 1998 and consists of 46 fixed sites located throughout six aquatic preserves in southwest Florida. Nineteen different water quality parameters are taken once a month at sunrise by volunteers at each of the sampling stations. Synoptic sampling allows for a uniform snapshot look at water quality across southwest Florida. This effort would not be possible without citizen scientists, who are trained on the protocols and are required to attend biannual quality assurance sessions in order to ensure the quality of data. Volunteers and partnering agencies, such as the Charlotte Harbor Environmental Center, Estero Bay Aquatic Preserve and the Coastal & Heartland National Estuary Program are the crux of this program. The data continues to be used for a wide variety of purposes, including establishing baseline water quality conditions, educating the public, and for regulatory purposes such as setting impaired waterbodies and forming regional numeric nutrient criteria. The data is managed by Charlotte Harbor Aquatic Preserves staff and is also uploaded into the federal database called STORET/WIN and into the Water Atlas for the public to graph or view.

* Indicates a poster lightning talk presentation
Note: Each presentation includes an interactive question and answer session at the end

Session 2 – Hydrological Restoration

Charlotte Harbor Flatwoods Initiative Hydrologic Restoration Project

Kim Fikoski, kfikowski@sfwmd.gov
Southwest Florida Water Management District
23701 McGregor Blvd. Ft. Myers 33901

The Charlotte Harbor Flatwoods Initiative (CHFI) regional hydrologic restoration area encompasses over 90,000 acres of land including the Babcock/Webb and Yucca Pens Unit Wildlife Management Areas (WMA's), and numerous creeks that flow into the Charlotte Harbor and Caloosahatchee Estuaries. This watershed has experienced damage to natural resources as a result of the construction of major roadways such as US 41 and I-75, the Seminole Gulf Railway, drainage canals, agricultural improvements, residential development, and the Deepwater Horizon oil spill. These environmental alterations have increased pollution and hydrological degradation within local coastal watersheds. The goals of the CHFI are to restore hydrologic connections for enhanced wetland hydroperiods in Babcock/Webb and Yucca Pens WMA's, increase regional wet season water storage for enhanced dry season freshwater flows to the tidal creeks of Charlotte Harbor and the Caloosahatchee Estuary to improve water quality and hydrology, restore groundwater recharge, reduce peak discharges from man-made canals to tidal waters in Matlacha Pass Aquatic Preserve and Charlotte Harbor, reduce peak discharges to the impaired Caloosahatchee River, reduce wet season flooding in North Fort Myers, enhance fish and wildlife habitat, enhance community resilience, and restore and revitalize the local economy. The ongoing efforts to restore this area involves collecting and synthesizing data using an integrated, three dimensional, hydrological model to determine the appropriate hydropatterns, timing, and quantity of water flows required to improve hydrologic conditions and habitat.

The South Florida Water Management District (SFWMD) has led this collaborative effort for many years, and the CHFI partners have made great progress in furthering the regional hydrologic restoration through the state acquisition of the Bond Farm property. Additionally, SFWMD worked with

* Indicates a poster lightning talk presentation
Note: Each presentation includes an interactive question and answer session at the end

the Coastal & Heartland National Estuary Partnership (CHNEP) to apply and successfully obtain the first BP Oil Spill NRDA grant in Southwest Florida. With that funding, the CHNEP is now working with a team of technical experts and consultants to develop a science-based, data driven, Strategic Hydrological Planning Tool that will provide guidance to resource management agencies related to the appropriate restoration and management of surface waters currently flowing through this area. This comprehensive approach of data collection, evaluation and planning along with the collaborative assistance of the many partner agencies and stakeholders will guide the success of this restoration project. There are opportunities for other interested stakeholders and the public to stay involved to assist this regional hydrologic restoration effort.

Southwest Florida Water Management District's 2020 Update for the Charlotte Harbor SWIM Plan

Lizanne Garcia, lizanne.garcia@watermatters.org (1)
Christopher Anastasiou, chris.anastasiou@watermatters.org (2)
David Tomasko, dtomasko@esassoc.com (3)
(1) Southwest Florida Water Management District-Surface Water Improvement and Management Program, 2379 Broad Street, Brooksville, FL 34604
(2) Southwest Florida Water Management District-Surface Water Improvement and Management Program, 7601 US Highway 301, Tampa, FL 33637
(3) Environmental Science Associates, 4200 West Cypress Street, Suite 450, Tampa, FL 33607

The Surface Water Improvement and Management (SWIM) Act was established by the Florida Legislature in 1987. The SWIM Act requires the five water management districts to maintain and update a priority list of water bodies of regional or statewide significance within their boundaries and develop plans and programs for the improvement of those water bodies.

Charlotte Harbor was on the first Southwest Florida Water Management District (SWFWMD) SWIM Priority Waterbody List in 1988 and the first SWIM Plan was adopted by the SWFWMD Governing Board in 1993 and

* Indicates a poster lightning talk presentation
Note: Each presentation includes an interactive question and answer session at the end

updated in 2000. The SWFWMD's 2020 Charlotte Harbor SWIM Plan update focuses on those watersheds within our boundaries and primarily on goals and actions that are within the SWFWMD's water quality and natural systems restoration (including Hydrologic Restoration) Areas of Responsibility. Implementation of the Charlotte Harbor SWIM plan will assist the CHNEP in carrying out 2019 Comprehensive Conservation and Management Plan for Charlotte Harbor. This presentation will provide an overview of the updated Charlotte Harbor SWIM plan including water quality status and trends, management actions for water quality, natural systems and hydrologic restoration as well as provide examples of some ongoing and proposed projects.

Stream and Wetland Restoration on Agricultural Lands: A Case Study with Broad Application

Kristen Nowak, kristen.nowak@woodplc.com (1)
John Kiefer, john.kiefer@woodplc.com (2)
Shelley Thornton, shelley.thornton@mosaicco.com (3)
(1) Wood Environment & Infrastructure Solutions, Inc., 1101 Channelside Drive, Suite 200, Tampa, FL 33602
(2) Wood Environment & Infrastructure Solutions, Inc., 2000 E Edgewood Drive, Lakeland, FL 33803
(3) The Mosaic Company, 13830 Circa Crossing Drive, Lithia, FL 33547

The Myakka Headwaters Restoration project is an offsite mitigation project involving stream and wetland enhancement, restoration, creation, and preservation on an 87-acre agricultural property in Manatee County, Florida. The property was divided into six areas, each of which received different treatments: in Area 1 a meandering stream was constructed to restore a ditched portion of the Myakka River; in Areas 2, 3, and 4 retrofits were applied to ditched waterways, including construction of new stream bends and installation of various woody structures; in Areas 5 and 6 wet prairie wetlands were constructed in what was previously pasture land. Each area had varying degrees of tree canopy, which affected the extent to which various treatments could be applied. Following the initial phase of construction, which began in the summer of 2019 and was completed in early 2020, upland restoration will also occur and will involve conversion of

* Indicates a poster lightning talk presentation
Note: Each presentation includes an interactive question and answer session at the end

pasture to flatwoods by treating the existing Bahia grass, re-establishing the desired upland community, and reintroducing fire. Additionally, the property has been placed under conservation easement. Although this project was built on agricultural lands, it is an excellent case study with broader applications to other environments, such as urban canals, to improve water quality and habitat for fish and macroinvertebrates.

A One Water Plan for the Headwaters Region

Mike Britt, mbritt@mywinterhaven.com
City of Winter Haven, 401 6th Street SW, Winter Haven, FL 33880

The City of Winter Haven is developing a One Water Master Plan that is focusing on Green Infrastructure and the benefits provided to social and economic sectors, in addition to the environment. Winter Haven is located in the headwaters region of the Peace River and Floridian Aquifer systems that provide significant benefits to Charlotte Harbor. This area also has a high concentration of water bodies that do not meet minimum flows and levels as well as water quality standards. The on-going One Water Master Plan will benefit all aspects of water, including water supply, flooding, water quality and habitat and enhance opportunities for future development and economic growth.

Influence of Water Withdrawals on Distributions and Populations of Species in Upper Charlotte Harbor

Peter Rubec, peterrubec@cs.com (1)
Christi Santi, christi.santi@myfwc.com (2)
Xinjian Chen, xinjian.chen@swfwmd.state.fl.us (3)
Yonas Ghile, yonas.ghile@swfwmd.state.fl.us (4)
(1) Florida Fish & Wildlife Conservation Commission, 2335 Murilla Way South, Saint Petersburg, FL 33712
(2) Florida Fish & Wildlife Conservation Commission, 100 Eighth Ave SE, Saint Petersburg, FL 33702

* Indicates a poster lightning talk presentation
Note: Each presentation includes an interactive question and answer session at the end

(3) Southwest Florida Water Management District, 7601 Highway 301 North, Tampa, FL 34604
(4) Southwest Florida Water Management District, 2379 Broad Street, Brooksville, FL 34604

The Southwest Florida Water Management District (SWFWMD) is reevaluating adopted Minimum Flows for the lower Peace River, lower Shell Creek, and Upper Charlotte Harbor estuary. Habitat suitability modeling (HSM) and mapping of fish and invertebrate species life stages were used to seasonally predict changes in spatial distributions and population numbers associated with reductions in freshwater inflows. Seasonal salinity grids and temperature grids from 2007-2014 derived from data predicted by hydrodynamic modeling were similar between Baseline (i.e., flows not affected by water withdrawals) and Minimum Flows (i.e. flows associated with reduced freshwater inflows). Depth grids, bottom type grids, and seasonal dissolved oxygen grids, derived from sampling data (collected by fisheries-independent monitoring from 1996 to 2013) were held constant between the two scenarios. Seasonal HSMs were applied to 32 fish and invertebrate species life stages with affinities for low or moderate salinities. Salinity was the most significant factor in seasonal models for species life stages. The seasonal HSM maps produced were very similar between Baseline and Minimum Flows for each species life stage. Most seasonal estimates of population numbers under Minimum Flows were less than the estimates for the Baseline condition indicating some impact on population numbers associated with flow reductions. Reductions in population numbers under Minimum Flows ranged from 1 to 21% with 3 out of 32 seasonal comparisons exceeding 15% and 15 others between 5% and 15% loss. The HSM analyses and mapping used to estimate population numbers for species life stages of fish and invertebrates confirms that the percent-of-flow approach used by SWFWMD can be used to manage freshwater inflows without markedly impacting biological resources in the study area.

* Indicates a poster lightning talk presentation
Note: Each presentation includes an interactive question and answer session at the end

South Lee County Watershed Initiative Hydrologic Restoration Project

Jennifer Hecker, jhecker@chnep.org
Coastal & Heartland National Estuary Partnership,
326 W Marion Ave, Punta Gorda, FL 33950

The South Lee County Watershed is comprised of the Estero River, Spring Creek, and Imperial River watersheds, which flow into the Estero Bay Aquatic Preserve. Much of the native wetland habitats have been lost to agriculture, development, the installation of drainage canals, surface mining, and major roadways. These activities have significantly altered the historic flow of water from the southern region of Lehigh Acres south to the Corkscrew Sanctuary and southwest to Estero Bay. The surrounding wetland ecosystems are highly susceptible to over-drainage, flooding, habitat changes, water quality degradation, and climate change stressors. The rivers and creeks in this area experience significant flooding during storm events and very low flows during the dry season. To address these concerns partners in the area came together to form the South Lee County Watershed Initiative (SLCWI), which aims to restore more natural water flows, improve water quality and environmental conditions, and increase natural water storage and moderation of flooding events.

The South Lee County Watershed Initiative (SLCWI) is a long-standing collaborative multi-agency and non-governmental effort. CHNEP has been leading the SLCWI since 2016, and is presently funding for the development of a science-based, data-driven integrated surface/ground water hydrologic model that is capable of simulating both dry and wet season water levels and flows. It will fill data gaps and bridge the various modeling efforts in the area to build a regional watershed-scaled picture. This tool will be used by resource management agencies to guide appropriate restoration and management of surface waters in the Imperial and Estero River basins. There are opportunities for other stakeholders and the public to participate.

* Indicates a poster lightning talk presentation
Note: Each presentation includes an interactive question and answer session at the end

Session 3 – Fish, Wildlife, & Habitat Protection

Movements of Large Juvenile and Adult Smalltooth Sawfish in Southwest Florida

Rachel Scharer, rachel.scharer@myfwc.com (1)
Alia Court, alia.court@myfwc.com (1)
Andrew Wooley, andrew.wooley@myfwc.com (1)
Michael McCallister, mmccallister@fau.edu (2)
Matthew Ajemian, majemian@fau.edu (2)
Gregg R. Poulakis, gregg.poulakis@MyFWC.com (1)
(1) Florida Wildlife Commission, Charlotte Harbor Field Laboratory, Fish & Wildlife Research Institute, Port Charlotte, FL 33954
(2) FAU, Harbor Branch Oceanographic Institute, Fort Pierce, FL

Sawfishes constitute one of the most threatened families of marine fish in the world and substantial management efforts are required to stabilize and recover their populations. Previous Smalltooth Sawfish (*Pristis pectinata*) acoustic tagging research conducted by FWRI scientists and their collaborators has been focused on movements of small juveniles (up to ~2 m total length) within the Charlotte Harbor estuarine system. However, the focus of our acoustic work has shifted, in part, to documenting movements of large juveniles (>2 m) and adults within and beyond Charlotte Harbor. Research on these larger size classes is in its infancy, but is vital for understanding current and future patterns of habitat use, seasonality, and recovery of this endangered species. During 2017–2019, 37 large sawfish were caught and tagged internally (V16s programmed for 10-year tag life), mostly in deep holes (3–7 m) within the Charlotte Harbor estuarine system. So far, 14 of these individuals left Charlotte Harbor between October and January. Eleven that left Charlotte Harbor were detected in the lower Florida Keys and so far, three have returned to Charlotte Harbor. With the help of invaluable data sharing networks like iTAG and FACT, we will continue collecting long-term acoustic data on this species state-wide to determine the extent of connectivity within and beyond southwest Florida.

* Indicates a poster lightning talk presentation
Note: Each presentation includes an interactive question and answer session at the end

An Environmental DNA Tool to Monitor Recovery of the USA's Smalltooth Sawfish Population

Alia Court, alia.court@myfwc.com (1)
Andrew Wooley, andrew.wooley@myfwc.com (1)
Rachel Scharer, rachel.scharer@myfwc.com (1)
Nicole Phillips (2)
Ryan Lehman (2)
Gregg R. Poulakis, gregg.poulakis@MyFWC.com (1)
(1) Florida Wildlife Commission, Charlotte Harbor Field Laboratory, Fish & Wildlife Research Institute, Port Charlotte, FL 33954
(2) The University of Southern Mississippi, School of Biological, Environmental, and Earth Sciences, Hattiesburg, MS

In U.S. waters, the Critically Endangered Smalltooth Sawfish, Pristis pectinata, historically occurred from Texas to North Carolina, but experienced major reductions in range and abundance over the last century. As a result, the species became protected in Florida in 1992, and was federally listed under the Endangered Species Act in 2003. Southwest Florida, from Charlotte Harbor to the Keys, constitutes the core range of the remaining U.S. population, which includes multiple well-known nursery areas and two federally designated juvenile critical habitat areas. Status of the species outside the core range is not well understood, which needs improvement to aid future recovery assessments and management decisions. With this in mind, we developed and validated a species-specific environmental DNA (eDNA) assay to detect Smalltooth Sawfish DNA in water samples. We collected 120 estuarine water samples over a two-year period in random locations and in locations where recent encounter reports had been verified (e.g., photographic evidence) in our non-core-range study areas: the Indian River Lagoon and Tampa Bay. Data analysis is ongoing, but so far, there have been 5 positives out of 60 samples from the Indian River Lagoon. These data show that this eDNA tool can be used as a reliable method for gathering evidence of any potential re-establishment of Smalltooth Sawfish in non-core range waters and for guiding the next phases of field research in these regions.

* Indicates a poster lightning talk presentation
Note: Each presentation includes an interactive question and answer session at the end

Habitat Restoration with Purpose: A Fisheries Case Study

JoEllen Wilson, jwilson@bonefishtarpontrust.org
Bonefish & Tarpon Trust
2937 SW 27th Avenue, Suite 203, Miami, FL 33133

Habitat restoration is quickly becoming an accepted means of combating global habitat loss and degradation. However, many restoration projects are lacking a clear purpose. In order to have an applicable project you must 1) be able to gauge success; 2) design for a specific habitat type or species to increase productivity; and 3) inform resource management. Habitat loss and degradation due to development, altered water flows and introduced contaminants is decimating our coastal fisheries habitats. Nursery habitats that are essential for early life stages are the most vulnerable since young organisms typically have an inability to move far distances and common reproductive strategies equate to the most young fish with less and less survivors as they age. Two species in particular that have sustained heavy impacts to nursery habitats are common snook and Atlantic tarpon. In 2016, Bonefish and Tarpon Trust (BTT) completed 16 months of pre-restoration monitoring at one of our habitat restoration sites. Although we used mark-recapture of snook and tarpon to quantify results, we are essentially measuring how well the habitat was functioning prior to restoration. Now that restoration is complete, we will continue 18-24 months of post-restoration monitoring to use as a comparison to gauge the success of the restoration (higher survival, faster growth, higher population density). This restoration project also featured 3 potential nursery habitat designs with physical components that we think provide essential nursery habitat. Each design was duplicated, giving us 6 connected mini-nursery habitats that can be compared with each other for productivity. Results from this study will inform design plans for future nursery habitat restoration projects. BTT is also using anglers to identify and locate essential snook and tarpon nursery habitat locations and asked them to classify the habitat as natural or degraded. Degraded habitats are then ground trothed and prioritized for their feasibility for habitat restoration. Our management agency is currently adopting a strategic plan to incorporate habitat into fisheries management, and a prioritized list of potential sites will give a huge advantage to the process. Ultimately, we can't have healthy ecosystems without healthy habitats and habitat restoration could provide a resolution to our continuous degradation of all habitat types, if it is done well.

* Indicates a poster lightning talk presentation
Note: Each presentation includes an interactive question and answer session at the end

Comparison of Hotspot Consistency of Two Sport Fish in Charlotte Harbor

Nathan Miller, herman.miller@myfwc.com
Janelle Johnson, janelle.johnson@myfwc.com
Dave Blewett, dave.blewett@myfwc.com
Courtney Saari, courtney.saari@myfwc.com
Florida Fish & Wildlife Conservation Commission, 585 Prineville Street, Port Charlotte, FL 33954

Charlotte Harbor is Florida's second largest estuary and hosts an important recreational fishery. Two of the most important inshore fish species are Red Drum and Common Snook. Little information on Red Drum distribution in the Harbor exists and Common Snook distribution has only been examined with relatively short-term datasets. Using a spatial analysis (Getis Ord Hotspot) that is new to fisheries research, the changes in distribution for these species were examined over a 21-year time period. To examine the data temporally, the 21-year data set was divided into 3-year increments. Within each time period, the Snook data were divided into spawning (May-Oct) and non-spawning (Nov-Apr) to examine seasonal differences. While the Getis Ord Hotspot analysis has been used frequently in social sciences, it is a relatively novel approach to analyzing fisheries data. This analysis spatially defines statistically hot and cold spots by comparing each sampling site's n value with its neighbor's values within a defined distance band. Results show that Red Drum populations were relatively stable through the 21-year time period while their hotspots shifted regularly throughout the study period. Conversely, Snook populations fluctuated more than Red Drum, while their hot and cold spots were consistent both geographically and temporally. Snook displayed a noticeable shift towards the passes during spawning seasons. Identifying the areas that these sport fish consistently use may help to ensure their conservation as anthropogenic influence on the estuary continues to increase. While this is apparent for Common Snook due to their consistent hotspot distribution, further monitoring and analysis is needed to support the findings that Red Drum exhibit highly variable spatial distribution.

* Indicates a poster lightning talk presentation
Note: Each presentation includes an interactive question and answer session at the end

Charlotte Harbor: An Exceptional Estuary that Needs Our Close Attention

Dave Blewett, dave.blewett@myfwc.com
Courtney Saari, courtney.saari@myfwc.com
Florida Fish & Wildlife Conservation Commission, 585 Prineville Street, Port Charlotte, FL 33954

FWC's Fisheries-Independent Monitoring (FIM) program has been monitoring fish abundance in Charlotte Harbor for over 30 years (est. 1989). During that time, fisheries scientists with the program have collected over 250 different fish species in the estuary and have documented a variety of exceptional habitats for both juvenile and adult sport fishes and their prey. One of Florida's most iconic sport fish, Common Snook, typically spend their entire lifespan (up to 20 years) in a single estuary, such as Charlotte Harbor. Two other iconic species, Red Drum (40-year lifespan) and Tarpon (100-year lifespan), rely on estuaries like Charlotte Harbor for both nursery and juvenile habitat, spending the first portions of their lifespans in the estuary before heading offshore as adults. All three of these species have unique and specific critical nursery habitats within Charlotte Harbor that support abundant and healthy sport fish populations and a strong recreational fishing and tourism industry. Many of these critical habitats have already been identified and more continue to be discovered each year by FWC and other fisheries agencies. However, in 2012 we started noticing changes in the harbor during routine monitoring. Large green filamentous algae blooms were first discovered in the upper harbor and along the western shoreline, and now more recently along the eastern harbor from the Peace River to Matlacha Pass. Other estuaries around the state, such as Tampa Bay and the Indian River Lagoon, have had, or are currently having issues with large algae blooms. Episodic algal blooms are typically caused by excess nutrients and can indicate degradation of a system; hence, our current concern for Charlotte Harbor and critical fisheries habitats. Recently, local and state agencies have come together with stakeholders to discuss water quality and action plans for guiding this estuary into a healthy future and maintaining its reputation as an exceptional estuary.

* Indicates a poster lightning talk presentation
Note: Each presentation includes an interactive question and answer session at the end

Aquatic Habitat Conservation and Restoration in the Charlotte Harbor Watershed

Corey Anderson, corey.anderson@myfwc.com (1)
Maria Merrill, maria.merrill@myfwc.com (2)
(1) Florida Fish & Wildlife Conservation Commission, Charlotte Harbor Research Laboratory, 585 Prineville Street, Port Charlotte, FL 33954
(2) Florida Fish & Wildlife Conservation Commission, Fort Lauderdale Research & Education Center, 3205 College Ave. Davie, FL 33314

The Florida Fish and Wildlife Conservation Commission (FWC) Aquatic Habitat Conservation and Restoration (AHCR) Section restores, enhances and manages publicly owned aquatic resources including bays, estuaries, wetlands, lakes, and rivers for their long-term wellbeing and the benefit of people. AHCR staff utilizes strategic partnerships to improve aquatic habitat conditions and ensure the long-term sustainability of fish and wildlife that depend on these resources. AHCR is partnering with U.S. Fish and Wildlife Service, Florida Department of Environmental Protection (FDEP), Sanibel-Captiva Conservation Foundation (SCCF), Lee County, West Coast Inland Navigation District, Coastal and Heartland National Estuary Partnership, U.S. Army Corps of Engineers, Sarasota County, and City of North Port to implement three habitat restoration projects in the Charlotte Harbor watershed. The Don Pedro Island State Park Tidal Marsh Restoration Project is located in Placida on the shores of Lemon Bay on a 100-acre mainland base managed by DEP's Park Service. The project includes restoring historical hydrology and plant communities in seven acres of saltmarsh, controlling exotic plant infestation over 67 acres of conservation land, and featured two community volunteer events. Initiated in 2016, the project will conclude in 2020. The Mangrove and Oyster Reef Restoration Project is located on multiple islands and freestanding oyster reefs spanning Pine Island Sound, Tarpon Bay, San Carlos Bay, and Matlacha Pass in Lee County. AHCR is assisting SCCF and partner organizations with restoration of healthy oyster reefs resilient to sea level rise and enhancement of nesting habitat for colonial wading and diving birds within a designated Critical Wildlife Area. This partnership began in 2017 and will continue through 2021. The Warm Mineral Springs Habitat Restoration Project is a multi-agency collaboration to improve habitat quality and increase the capacity of an important warm water refuge for Florida manatee. Located in North Port, and flowing into the Myakka River, Warm Mineral Springs Creek and Salt

* Indicates a poster lightning talk presentation
Note: Each presentation includes an interactive question and answer session at the end

Creek comprise the largest natural warm water aggregation site for manatees wintering in southwest Florida. Land use in the watershed has degraded in-stream habitat through sedimentation, erosion, and pollution. Restoration opportunities to improve accessibility for the Florida manatee and the enhance the carrying capacity of the stream include restoring fluvial geomorphological conditions, stabilizing stream banks, and removing invasive species. This project, currently in the engineering and design phase, is an ongoing initiative led by AHCR. Including these three projects, FWC's AHCR Section has collaborated on and partially or fully funded 23 restoration and monitoring projects in the Charlotte Harbor watershed since 2016, providing significant benefits to wildlife and fisheries.

Oyster Restoration in San Carlos Bay and Tarpon Bay

Eric Milbrandt, emilbran@sccf.org
Mark Thompson, mthompson@sccf.org
AJ Martignette, amartignette@sccf.org
Sanibel-Captiva Conservation Foundation
900 Tarpon Bay Road, Sanibel, FL 33957

Oyster reef habitat is declining worldwide despite their value as habitat for fish and invertebrates and to people. The decline of oyster reefs in southwest

Florida has been the result of direct destruction of reefs for road construction since the 1950s and is illegal today. However, reef decline in San Carlos Bay and Tarpon Bay can be attributed to the timing and volume of flow from the Caloosahatchee watershed and Lake Okeechobee. The oyster reefs in San Carlos Bay and Tarpon Bay are intertidal and through extensive field visits, a rapid condition index was developed along with measurements of elevations. The optimal elevations for several high-quality intertidal reefs were determined using a scientific approach to help prioritize restoration. Spat settlement has been monitored since 2015 to determine potential for restoration. Two large (1 acre) reefs and 2 smaller (0.5 acre) reefs were restored following the recommendations in the CHNEP Oyster Restoration Plan. Fossil and restaurant collected oyster shell was added to sites determined to be highly degraded oyster reef sites. Oyster density was measured annually at restored, control and reference sites. Other ecosystem

* Indicates a poster lightning talk presentation
Note: Each presentation includes an interactive question and answer session at the end

services, such as filtration rates were measured. Oyster densities were similar to reference sites within 2 years of construction. Volunteer events were used to coordinate restoration around environmentally sensitive sites, such as sites with seagrass surrounding reefs. The next phase of the project is starting in July 2020 with an FWC State Wildlife Grant to restore mangrove and oyster habitat in Pine Island Sound. Other oyster reef restoration sites have been designed and permitted in San Carlos Bay and Tarpon Bay which will be restored in the next 3 years.

Towards a Better Assessment of Estero Bay Seagrass Health Status and Stressors

James Douglass, jdouglass@fgcu.edu
Florida Gulf Coast University, 10501 FGCU Blvd S, Fort Myers, FL 33965

Estero Bay is a shallow, 4500 hectare estuary in SW Florida. Though the bay is managed as an aquatic preserve, its watershed is heavily developed, which subjects to the bay to a variety of direct and indirect anthropogenic stressors. Seagrasses are monitored in the bay and used an indicator of overall bay health. However, it is difficult to make conclusive assessments of seagrass health status in the bay due to the limited extent of in-water monitoring, the infrequency of aerial photographic mapping, and the heterogeneous and ephemeral nature of the bay's macrophyte communities. It is even more difficult to detect significant year to year changes in seagrass health and correctly attribute those changes to the forcing factors responsible. Florida Gulf Coast University faculty and students have been working with science staff of the Estero Bay Aquatic Preserve and the South Florida Water Management District to integrate each organization's monitoring efforts into a more precise and helpful diagnosis of the bay's seagrass health. Preliminary results indicate that seagrasses in the bay have declined since the early 2000s due to a combination of poor optical water quality, eutrophication, and physical disturbance.

* Indicates a poster lightning talk presentation
Note: Each presentation includes an interactive question and answer session at the end

Hard Clam Restoration in San Carlos Bay: A Pilot Project

Leah Reidenbach, lreidenbach@sccf.org
Eric Milbrandt, emilbran@sccf.org
Sanibel Captiva Conservation Foundation
900A Tarpon Bay Road, Sanibel, FL 33957

Hard clams (*Mercenaria spp*.) provide essential ecosystem services in estuaries and improve water quality. They increase water clarity by filtering phytoplankton from the water column, create habitat structure, and facilitate seagrass growth. Hard clams were once abundant in southwest Florida (primarily the southern hard clam, *Mercenaria campechiensis*), but populations have declined due to a combination of factors including overharvesting, declining water quality, altered salinity and flow regimes, nutrient enrichment, and prolonged red tide events. In order to understand the potential for hard clam restoration to improve water quality and restore valuable ecosystem services in San Carlos Bay, we are evaluating the effectiveness of restoration in the region by creating a spawner sanctuary using 12,000 hard clams in a 900 m^2 area. We are monitoring it using condition index, gonad ripeness, growth, and survival. We are also determining the impact that hard clam restoration has on phytoplankton community structure and water quality. Water samples will be taken from the spawner sanctuary and the control site to measure nutrients in the water column (total nitrogen, total phosphorous, nitrate, nitrite, silicate, orthophosphate, and ammonium) and to determine phytoplankton community structure down to the genus level using microscopic FlowCam particle analysis. This project and pilot study will have the potential to encourage larger scale restoration efforts in the future, which could result in the enhancement of important ecosystem services and better water quality in clam sanctuaries as well as increasing our understanding of hard clam biology and ecology in southwest Florida.

* Indicates a poster lightning talk presentation
Note: Each presentation includes an interactive question and answer session at the end

Charlotte Harbor Aquatic Preserves' Bird Nest Monitoring and Protection Program: 2009-2019

Mary McMurray, mary.mcmurray@floridadep.gov (1)
Melynda Brown, melynda.a.brown@floridadep.gov (1)
Heather Stafford, heather.stafford@floridadep.gov (1)
Arielle Taylor-Manges, arielle.taylormanges@floridadep.gov (1)
Jeremy Conrad, jeremy_conrad@fws.gov (2)
(1) Florida Department of Environmental Protection, 12301 Burnt Store Road, Punta Gorda, FL, 33955
(2) J.N. Ding Darling National Wildlife Refuge, 1 Wildlife Drive, Sanibel, FL 33957

Charlotte Harbor Aquatic Preserves (CHAP) provides important habitat for many important and unique species, including wading and diving birds. Wading birds are often used as indicator species for the health of estuaries since they feed at a relatively high trophic level, maintain a high aesthetic and recreational value to humans and their reproductive performance is a crucial aspect of their population dynamics. Little blue heron, Reddish egret, Tricolored heron, and Roseate spoonbill are listed as state threatened (ST), and are among the wading bird species that rely on mangrove islands as nesting sites within the aquatic preserves. Other imperiled species nest on these islands including Brown pelicans, White ibis, and Snowy egrets. All of these species mentioned have a Species Action Plan outlined in Florida's Imperiled Species Management Plan 2016-2026 developed by the Florida Fish and Wildlife Conservation Commission that details major threats, conservation goals, and key actions to ensure increased protection. Due to this ecological importance, and the need to preserve and protect wading and diving birds and their nesting sites, the CHAP Colonial Water Bird Nest Monitoring Program was developed. This program provides baseline status and trends data on the nesting effort of wading and diving birds within CHAP.

* Indicates a poster lightning talk presentation
Note: Each presentation includes an interactive question and answer session at the end

Multi-dimensional Scaling Ordination for Bird Nesting Activities on Estero Bay's CWA Islands

Neil Ayers, neilson.ayers@floridadep.gov
Estero Bay Aquatic Preserve, 700-1 Fisherman's Wharf, Fort Myers Beach, FL 33931

Populations of colonial wading and diving birds are an essential aspect of Estero Bay's ecosystem and a major contributor to the esthetic appeal of its waters. Although the bird populations are a perennial and pleasant presence on the bay, monitoring efforts over the years have historically ebbed and flowed. Most recently the management of Estero Bay Aquatic Preserve reintroduced a formal Rookery Monitoring program (2008 to present). Surveys are performed monthly by boat. Staff and trained volunteers follow a strict protocol to respect and minimize disturbance to nesting birds. Results are tabulated monthly and reported annually to other agencies and the public. Although staff and volunteers currently monitor 35 mangrove islands in Estero Bay for nesting activity, on average there are usually about a half dozen islands that will have the majority of the nesting activity. Of these, three islands have been designated as Critical Wildlife Areas (CWAs) by virtue of their popularity as a nesting site by the colonial wading and diving birds of the bay. These CWAs are distributed throughout the bay, with one located in Matanzas Pass, one north of Big Carlos Pass, and one near the mouth of Spring Creek. This study focuses primarily on the CWAs, investigating species diversity and ordination over time, from 2008 to the present. These indices and ordinations are based on annual peak nesting effort as calculated from monthly survey data. First, Bray Curtis similarity indices are calculated, then a non-metric multidimensional scaling (NMDS) ordination technique is applied to visually reveal 'distances' between species and island communities. Comparisons of CWA site ordinations to the other sites are calculated for several sample years. Ordinations are also done for select individual sites comparing nesting over the data collection period. Although these calculations are quite lengthy and technical, software packages in the R statistics environment have made them accessible to workers and investigators. Once generated, the NMDS results are tested by R functions Betadisper, for homogeneity of dispersion; and Adonis, for differences between groups. NMDS may reveal patterns that workers and investigators can provide biologists and managers with a better

* Indicates a poster lightning talk presentation
Note: Each presentation includes an interactive question and answer session at the end

understanding of how to manage and protect CWAs and other nesting areas in the future.

Session 4 – Public Engagement for Protecting Our Water and Wildlife

Student Research on Oyster Larvae within the Charlotte Harbor and Caloosahatchee Estuary

Bass Dye, bass.dye@gmail.com (1)
Felix Jose, fjose@fgcu.edu (2)
Joelle Richard (3)
Jonas Brandi Mortensen (4)
Eric Milbrandt, emilbran@sccf.org (5)

(1) Florida Gulf Coast University, 10501 FGCU Blvd South, Department of Earth Sciences, Fort Myers, FL 33912
(2) Florida Gulf Coast University, 10501 FGCU Blvd South, Department of Marine & Earth Sciences, Fort Myers, FL 33965
(3) University of Western Brittany, Laboratory of Marine & Environmental Sciences, Brest, France
(4) DHI Water & Environment, Copenhagen, Denmark
(5) Sanibel-Captiva Conservation Foundation, 3333 Sanibel-Captiva Road, Sanibel, FL 33957

Bio-physical factors influence the larval transport and dispersal of benthic species and ultimately determine the recruitment success and connectivity of a population within an estuarine/bay ecosystem. To fully comprehend the connectivity of larval organisms between geographically separated but hydrologically connected regions (reefs), it is necessary to develop a realistic representation of the hydrodynamics and resulting larval pathways within a study area. Especially considering the highly managed water flows within the system and its vulnerability to extreme events related to climate change. In this study, a validated hydrodynamic model (MIKE 21) was coupled with an agent-based model (MIKE ECO Lab) designed specifically for *Crassostrea virginica* oyster larvae in order to simulate oyster larval

* Indicates a poster lightning talk presentation
Note: Each presentation includes an interactive question and answer session at the end

transport and dispersal within the estuarine system. The agent-based model contains the following parameters: salinity tolerances, natural morality rates, larval development periods, and settling rates, in addition to active settlement behavior and the availability and nature of the substrate (footprint of known oyster reefs). Oyster larval settlement data collected from 4 healthy reefs in the Caloosahatchee River Estuary provided the necessary data to validate the biophysical model which is capable of recreating larval transport and settlement patterns that are largely dominated by the tidal circulation under average hydrologic conditions. The model's ability to realistically simulate larval settlement dynamics provided insight into the importance of an upstream oyster reef serving as a major larval source for downstream reefs. Furthermore, clusters of oyster larvae were consistently retained in mid regions of the estuarine system thus indicating potential locations for oyster reef restoration. The biophysical model and results serve as an effective tool to support oyster management strategies by providing recommendations for future oyster reef restoration sites.

Connecting University Researchers and K-12 Teachers for Environmental Education

Jennifer Jones, jejones@fgcu.edu
Molly Nation, mnation@fgcu.edu
Lee Hughes
Susie Hassett

Florida Gulf Coast University, 11805 Five Waters Circle, Fort Myers, FL 33913

Water quality in Southwest Florida is declining due to pollution from human populations, development, automobiles, overuse of fertilizer, faulty septic systems, and agricultural runoff. Water quality improvement requires a more focused effort to build awareness and knowledge to ensure resiliency for environmental and human health. The Watershed Teacher Leadership Academy (WeTLAnd) partners Florida Gulf Coast University (FGCU) with the School District of Lee County to develop curricular resources and education solutions to improve water quality. WeTLAnd uses a 'Community of Practice' (COP) framework that convenes diverse groups for solutions to

* Indicates a poster lightning talk presentation
Note: Each presentation includes an interactive question and answer session at the end

a common concern, including mitigation strategies and improved environmental literacy through standards-based outdoor learning. The COP focuses on building leadership and infrastructure for university researchers and K-12 teachers so as to advance district and state-wide Environmental Education. Through a process of co-design, partners identified the need for teacher improvement for 'The Nature of Science' standard within the context of water quality education at their own schoolyards. Goals of WeTLAnd are to (1) help K-12 teachers increase self-efficacy, and gain the skills, confidence, and inspiration to incorporate authentic inquiry-based scientific practices into their curricula by participating in authentic field research with university researchers, and (2) improve research scientists' ability to communicate their work to a more general audience. The WeTLAnd Academy had three phases whereby (1) K-12 teachers from the School District of Lee County engaged in hands-on experience alongside FGCU researchers conducting real-world field research, (2) the COP completed onsite schoolyard training with FGCU researchers to transfer the scientific practices to the schoolyard, and (3) final professional development to link the academy experience to individualized needs. Findings suggest teachers need district-focused initiatives to incorporate standards-based research into their existing curricula and university researchers, when given the opportunity, can meaningfully connect their research to the community resulting in informed citizenry and community transformation. We present our experiences with 'The Role of Shared Expectations' among COP partners, including (1) the need to provide critical context early during the Academy so participants understand the forthcoming experience, (2) clarifying roles and responsibilities between groups that don't frequently work together, and (3) creating a shared definition of water quality issues and the potential for real-world solutions.

* Indicates a poster lightning talk presentation

Note: Each presentation includes an interactive question and answer session at the end

Eyes on Seagrass Citizen Scientists: Document Seagrass and Macroalgae in Charlotte Harbor

Elizabeth Staugler, staugler@ufl.edu (1)
Ashley Smyth, ashley.smyth@ufl.edu (2)
(1) Florida Sea Grant, 1120 O'Donnell Blvd, Port Charlotte, FL 33953
(2) University of Florida, 18905 SW 280th Street, Homestead, FL 33031

Coastal communities are concerned about the observed increase in macroalgae in their waterways. Macroalgae often display marked seasonal abundance patterns, peaking in spring and declining in the summer. These patterns may be related to salinity, temperature and light conditions. In Charlotte Harbor, on the west coast of Florida, there is an anxiety that increasing macroalgal abundances are damaging seagrass habitats and their associated economic value by outcompeting for light and nutrients, creating hypoxic conditions, and interfering with boating, fishing and tourism. Despite these concerns, a comprehensive monitoring program to evaluate macroalgal trends during their peak abundance has been lacking. To fill this gap, we developed a citizen science monitoring program to observe seagrass and macroalgal distribution patterns. Piloted in 2019, each year, during April and July, volunteer snorkelers complete standardized data reports that we compile and submit to management. The goal of this study is to improve our understanding of macroalgal bloom dynamics in shallow seagrass areas. Extension efforts in collaboration with citizen scientists allow for coordinated data collection over broad areas within short time periods. Trained volunteer monitors will become advocates for their estuary and generate information needed by scientists. Long-term, survey results can provide documentation of macroalgal distribution patterns, and aid in distinguishing between inter-annual variability and management-linked changes in macroalgal biomass.

* Indicates a poster lightning talk presentation
Note: Each presentation includes an interactive question and answer session at the end

Removal of Derelict Fishing Gear from the Artificial Reefs in Charlotte Harbor Aquatic Preserves

Melynda Brown, melynda.a.brown@floridadep.gov
Department of Environmental Protection-Charlotte Harbor Aquatic Preserves, 12301 Burnt Store Road, Punta Gorda, FL 33955

The Florida Department of Environmental Protection, Charlotte Harbor Aquatic Preserves (CHAP) office manages five aquatic preserves throughout Lee, Charlotte and Sarasota counties. CHAP received a National Fish and Wildlife Foundation Fishing for Energy grant in September 2019 to remove derelict fishing gear from the four artificial reefs within CHAP. These reefs have been placed in deeper waters to attract fish and have become popular fishing spots. Unfortunately, they also have become hotspots for derelict fishing gear, including line, anchors, poles, tackle and nets. These types of marine debris pose an entanglement threat to estuarine animals and contribute to the ever growing microplastics and debris issue in the coastal areas. This project will assess the debris at each reef in its current state, before and after the removal process, by volunteer divers with the Volunteer Scientific Research Dive Team. Florida Marine Works and Fantasea Watersports, LLC will conduct the removal of the debris at each reef as well as sorting, documenting and weighing the debris. The derelict fishing gear will be taken to Covanta Lee Facility where it will be turned into energy. Data of the type and weight of debris will be posted on the Southwest Florida Reefs website to help educate the public on marine debris issues in our local waterways. An educational video by Pelican Media will also be made to document the removal success of this project and assist with outreach efforts to specific user groups, such as recreational and commercial fishers, to prevent this debris from occurring. This project involves the various partners mentioned above along with time and match from Charlotte and Lee County, and West Coast Inland Navigation District.

* Indicates a poster lightning talk presentation
Note: Each presentation includes an interactive question and answer session at the end

Using the Encounter Hotline as a Tool to Promote Smalltooth Sawfish Recovery in the U.S.

Andrew Wooley, andrew.wooley@myfwc.com
Alia Court, alia.court@myfwc.com
Rachel Scharer, rachel.scharer@myfwc.com
Gregg R. Poulakis, gregg.poulakis@myfwc.com
Florida Wildlife Commission, Charlotte Harbor Field Laboratory, Fish & Wildlife Research Institute, Port Charlotte, FL 33954

Historically, the Critically Endangered Smalltooth Sawfish, Pristis pectinata, has been reported in U.S. waters from Texas to North Carolina. Over the last century, substantial reductions in range and population size have occurred and the core range is now limited to southwest Florida. The species was protected by the State of Florida in 1992, and in 1999 scientists began collecting sawfish encounter reports from sources such as anglers, boaters, and charter captains. These reports laid the groundwork for the current Sawfish Hotline (1-844-4SAWFISH) and the associated Sawfish Encounter Database, which helps researchers collect information on when and where sawfish are being encountered throughout the southeastern United States. These tools have become important for research, monitoring, outreach, and overall conservation of the species. For example, since the late 1990's, Fish and Wildlife Research Institute staff have collected thousands of individual Smalltooth Sawfish reports from four countries. In 2009, these data were used, in part, to develop the National Marine Fisheries Service's (NMFS) Smalltooth Sawfish Recovery Plan that outlines conservation needs and research priorities and for designation of juvenile critical habitat, also by NMFS. Encounter data have played and will continue to play important roles in the success of research and many of the management decisions that need to be made to foster recovery of the species. This talk will discuss several recent examples of how these data have been used to enhance research and management.

* Indicates a poster lightning talk presentation
Note: Each presentation includes an interactive question and answer session at the end

Ideas for Enhancing Charlotte County's Management of Our Exceptional Estuaries & Waterways

Dr. William Keller, wckeller@earthlink.net (1)
Judy Ott, judyott@embarqmail.com (2)
(2) Ecopapak, 16911 O'Hara Drive, Port Charlotte, FL 33948
(3) Estuary Escapes, LLC-Estuary Science & Education, 10715 Habitat Circle, Bokeelia, FL 33922

Ideas for enhancing Charlotte County's management of our exceptional waterways, waterways and water quality presented, so that needed changes can be implemented before irreversible damage occurs. The ideas are presented to encourage discussions between citizens, staff and elected officials which lead to positive actions in a timely manner. Charlotte County is a special place with a water based lifestyle, but it is changing rapidly. Correcting current water quality issues and planning to accommodate future growth are essential to long-term sustainability of our estuaries, waterways and economy. Four underlying principles are presented: 1) healthy local estuaries are essential to our economy; 2) we have a water quality crisis in the making; 3) wastewater and stormwater, aggravated by climate change, are the two main causes of our water quality problems; and 4) our county government isn't organized to best manage our estuaries, waterways and water quality. Five essential elements for efficiently and effectively managing our waterways and water quality are discussed: 1) water quality monitoring and reporting; 2) wastewater management; 3) stormwater treatment; 4) supplemental water resource management programs; and 5) education and awareness. Ten solutions to local water quality issues are presented in detail to promote discussions and actions: 1) acknowledge there are water quality problems in the county; 2) manage county water quality to meet state standards; 3) create a comprehensive county water quality management function; 4) create a county water quality monitoring and reporting program; 5) focus county efforts on reducing high nutrients from wastewater and stormwater; 6) initiate complementary county water resource management programs; 7) pursue county actions relating to climate change; 8) create a county education and awareness program; 9) engage with strategic partners and allies; and 10) manage county government organizational changes with assistance from experts. Conclusions and critical actions are presented, including internal county government and external partnership and alliance actions.

* Indicates a poster lightning talk presentation
Note: Each presentation includes an interactive question and answer session at the end

Sanibel Communities for Clean Water Program

Dana Dettmar, dana.dettmar@mysanibel.com
City of Sanibel, 800 Dunlop Road, Sanibel, FL 33957

As a response to improving water quality on Sanibel Island and requests from residential communities and Homeowners Associations for assistance in water quality testing, identification of potential water quality issues, and guidance on appropriate Best Management Practices (BMPs), the City of Sanibel developed the Sanibel Communities for Clean Water Program. The primary goals of this program are to educate island residents about water quality in their individual communities and to provide science-based solutions on how to cost-effectively improve water quality. The program is based on the results of biennial water quality studies conducted by the City of Sanibel and the Sanibel-Captiva Conservation Foundation (SCCF) Marine Laboratory. The studies include sampling of more than 78 waterbodies throughout the island. The data collected is presented on an interactive website, which allows residents to see how their community lakes or other waterbodies rank in water quality compared to other waterbodies on the island or to State water quality standards. Through the website, residents are able to examine the role they can play in protecting water quality and how their actions can improve the health of their lakes, wetlands, and other waterbodies. The program recommends Best Management Practices to improve water quality tailored to each individual community with the goal that residents will adopt these cost-effective and environmentally friendly measures.

Making the Case for the Statewide Stormwater Rule

Marisa Carrozzo
Conservancy of Southwest Florida, 1495 Smith Preserve Way,
Naples, FL 34102

Stormwater runoff is a major contributor of harmful pollutants to Florida's waterways, and the stormwater standards for development projects are decades out of date, leading to continued degradation of water quality as the state's population has grown over the years. For example, stormwater

* Indicates a poster lightning talk presentation
Note: Each presentation includes an interactive question and answer session at the end

transports excess nutrients like nitrogen and phosphorus from lawns, agricultural areas, and golf courses, contributing to the growth of harmful algal blooms (HABs) which have extensively impacted the environment, the tourism-based economy, and quality of life in southwest Florida. As the state prepares to revisit the stormwater standards through rulemaking, this presentation will explore why the stormwater rule is needed, what should be included in the rule, lessons learned from prior attempts at rulemaking, and how the public can effectively engage decision-makers on this critical water quality issue.

* Indicates a poster lightning talk presentation
Note: Each presentation includes an interactive question and answer session at the end

Coastal & Heartland National Estuary Partnership
Policy Committee

Mr. Brian Smith, Co-Chair
US Environmental Protection Agency (EPA) Region 4

Mr. Jon Iglehart, Co-Chair
Florida Department of Environmental Protection (FDEP) South District

Cities

Hon. Robert Heine Jr.
City of Arcadia

Hon. Billy Simpson
City of Bartow

Hon. Fred Forbes
City of Bonita Springs

Hon. Jessica Cosden
City of Cape Coral

Hon. Fred Burson
City of Fort Myers

Hon. Bill Veach
Town of Fort Myers Beach

Hon. Debbie McDowell
City of North Port

Hon. Debby Carey
City of Punta Gorda

Hon. Mick Denham
City of Sanibel

Counties

Hon. Bill Truex
Charlotte County

Hon. Judy Shaefer
Desoto County

Hon. Donald Strenth
Glades County

Hon. Colon Lambert
Hardee County

Hon. Karson Turner
Hendry County

Hon. James Brooks
Highlands County

Hon. Frank Mann
Lee County

Hon. Priscilla Trace
Manatee County

Hon. Bill Braswell
Polk County

Hon. Nancy Detert
Sarasota County

Agencies

Ms. Kali Spurgin
Florida Fish & Wildlife Conservation Commission (FWC)

Mr. Don McCormick
Southwest Florida Regional Planning Council (SWFRPC)

Ms. Patricia Steed
Central Florida Regional Planning Council (CFRPC)

Mr. Jack Bispham
Southwest Florida Water Management District (SWFWMD)

Mr. Chauncey Goss
South Florida Water Management District (SFWMD)

* Indicates a poster lightning talk presentation
Note: Each presentation includes an interactive question and answer session at the end

Cities cont.

Hon. Ron Feinsod
City of Venice

Mr. M.J. Carnevale
City of Winter Haven

Hon. Katy Errington
Village of Estero

Hon. Bill Read
City of Lakeland

Management Committee Co-Chairs
Mr. Corey Anderson Mr. James Evans

Technical Advisory Committee Co-Chairs
Mr. Justin Saarinen Mr. Devon Moore

Citizens Advisory Committee Co-Chairs
Ms. Debi Osborne Ms. Sheila Scolaro

CHNEP Staff
Jennifer Hecker, Executive Director
Nicole Iadevaia, Research & Outreach Manager
Andrew Webb, Finance & Budget Specialist
Chelsea Bojewski, Conservation Associate intern
Elizabeth Noll, Conservation Associate intern

* Indicates a poster lightning talk presentation
Note: Each presentation includes an interactive question and answer session at the end

Thank you for participating in the 2020 CHNEP Watershed Summit. Please visit our website at www.CHNEP.org to find materials created as part of the Watershed Summit, including the abstracts, all the presentations as PDF files, links to the WebEx recordings (audio and PowerPoint) and links to videos on YouTube.

Uniting Central and Southwest Florida to Protect Water and Wildlife.

Coastal & Heartland National Estuary Partnership
326 West Marion Avenue
Punta Gorda, FL 33950-4417
941/575-5090, Toll-free 866/835-5785
www.CHNEP.org

* Indicates a poster lightning talk presentation
Note: Each presentation includes an interactive question and answer session at the end