Lagoon Update
Outcomes of the Lagoon Action Assembly 2014

Marine Resources Council
Leesa Souto, Ph.D.
Executive Director
Presentation Overview

• Why Assemble?
• Who were the delegates?
• What was presented?
• What were the outcomes?
Diversity
Independence
Decentralization

WISDOM OF CROWDS
JAMES SUROWIEKI (2005)
Many are Smarter

- The right information delivered to the right people in the right place at the right time, the right way.

- Best decisions are a product of disagreement and contest
Representativeness
Leadership
Consensus

AMERICAN ASSEMBLY PROCESS
Lagoon Action Assembly Goals

- Recognize our potential
- Prioritize actions
- Work cooperatively
LAA Steering Committee

- Virginia Barker
- Anne Birch
- Stephen Chalmers
- Ed Fielding
- Lisa Frazier
- Kathy Hill
- Suzie Stempel Housley (Coordinator)

- Patricia Jotkoff
- Monique Miller
- Katherine Martin
- Dr. George Maul
- Ted Moorhead
- Dr. Leesa Souto (Chair)
Who were the Delegates?

91 Delegates
- Community representatives
- Power to act
- Responsibility to report

Stakeholder Groups
- Agriculture
- Business
- Recreation / Ecotourism
- Government
- Youth
- Science / Education
- Environmental
- Infrastructure
- Community Groups
- Tourism
Senators and Representatives

- Representative Larry Lee
- Representative Perry Thurston
- Barbara Arthur, Aide to Senator Nelson
- Ashley Guinn, Aide to Rep. Crisafulli
- Rick Kendust, Aide to Senator Altman

Rep Larry Lee
<table>
<thead>
<tr>
<th>Category</th>
<th>Name</th>
<th>Title</th>
<th>Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recreation/Eco-tourism (7)</td>
<td>Nancy Beaver</td>
<td>Sunshine Wildlife Tours</td>
<td>Sunshine Wildlife Tours</td>
</tr>
<tr>
<td></td>
<td>Jim Durocher</td>
<td>Space Coast Paddlers</td>
<td>Space Coast Paddlers</td>
</tr>
<tr>
<td></td>
<td>John Hitchcock</td>
<td>United Waterfowlers of Florida</td>
<td>United Waterfowlers of Florida</td>
</tr>
<tr>
<td></td>
<td>Vince Lamb</td>
<td>Brevard Expedition</td>
<td>Brevard Expedition</td>
</tr>
<tr>
<td></td>
<td>Terry Otoole</td>
<td>Sebastian Inlet State Park</td>
<td>Sebastian Inlet State Park</td>
</tr>
<tr>
<td></td>
<td>Damon Pullias</td>
<td>Florida Sport Fishing Association</td>
<td>Florida Sport Fishing Association</td>
</tr>
<tr>
<td></td>
<td>Phil Stasik</td>
<td>Brevard County Tourist Development Council</td>
<td>Brevard County Tourist Development Council</td>
</tr>
<tr>
<td></td>
<td>Terry Otoole</td>
<td>Sebastian Inlet State Park</td>
<td>Sebastian Inlet State Park</td>
</tr>
<tr>
<td></td>
<td>Damon Pullias</td>
<td>Florida Sport Fishing Association</td>
<td>Florida Sport Fishing Association</td>
</tr>
<tr>
<td></td>
<td>Phil Stasik</td>
<td>Brevard County Tourist Development Council</td>
<td>Brevard County Tourist Development Council</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Category</th>
<th>Name</th>
<th>Title</th>
<th>Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Science/Education (15)</td>
<td>Greg Braun</td>
<td>Sustainable Ecosystems International</td>
<td>Sustainable Ecosystems International</td>
</tr>
<tr>
<td></td>
<td>Leroy Creswell</td>
<td>Florida Sea Grant</td>
<td>Florida Sea Grant</td>
</tr>
<tr>
<td></td>
<td>Amy Fenwick- Reaume</td>
<td>Brevard Zoo</td>
<td>Brevard Zoo</td>
</tr>
<tr>
<td></td>
<td>Dennis Hanisak</td>
<td>Florida Atlantic University/HBOI</td>
<td>Florida Atlantic University/HBOI</td>
</tr>
<tr>
<td></td>
<td>Kevin Johnson</td>
<td>Florida Institute of Technology - DMES</td>
<td>Florida Institute of Technology - DMES</td>
</tr>
<tr>
<td></td>
<td>Sarah Krejcis</td>
<td>Bethune-Cookman University</td>
<td>Bethune-Cookman University</td>
</tr>
<tr>
<td></td>
<td>Ken Lindeman</td>
<td>Florida Institute of Technology</td>
<td>Florida Institute of Technology</td>
</tr>
<tr>
<td></td>
<td>Mark Perry</td>
<td>Florida Oceanographic Society</td>
<td>Florida Oceanographic Society</td>
</tr>
<tr>
<td></td>
<td>Megan Stolen</td>
<td>Hubbs Sea World</td>
<td>Hubbs Sea World</td>
</tr>
<tr>
<td></td>
<td>Chad Truxall</td>
<td>Marine Discovery Center</td>
<td>Marine Discovery Center</td>
</tr>
<tr>
<td></td>
<td>Robert Weaver</td>
<td>Florida Institute of Technology - IRLIR</td>
<td>Florida Institute of Technology - IRLIR</td>
</tr>
<tr>
<td></td>
<td>Edie Widder</td>
<td>ORCA</td>
<td>ORCA</td>
</tr>
<tr>
<td></td>
<td>Graham Worthy</td>
<td>University of Central Florida</td>
<td>University of Central Florida</td>
</tr>
<tr>
<td></td>
<td>Gary Zarillo</td>
<td>FIT</td>
<td>FIT</td>
</tr>
<tr>
<td></td>
<td>Adam Schafer</td>
<td>Florida Atlantic University/HBOI</td>
<td>Florida Atlantic University/HBOI</td>
</tr>
<tr>
<td></td>
<td>Bob Baigher</td>
<td>Brevard County Tourist Development Council</td>
<td>Brevard County Tourist Development Council</td>
</tr>
<tr>
<td></td>
<td>Mary Chapman</td>
<td>Marine Resources Council</td>
<td>Marine Resources Council</td>
</tr>
<tr>
<td></td>
<td>Scott Herber</td>
<td>Eastern Florida State College</td>
<td>Eastern Florida State College</td>
</tr>
<tr>
<td></td>
<td>Grant Lewis</td>
<td>Boy Scouts of America</td>
<td>Boy Scouts of America</td>
</tr>
<tr>
<td></td>
<td>Jacqui Thurlough</td>
<td>River Kidz</td>
<td>River Kidz</td>
</tr>
<tr>
<td></td>
<td>John Windsor</td>
<td>Florida Institute of Technology - DMES</td>
<td>Florida Institute of Technology - DMES</td>
</tr>
<tr>
<td>Category</td>
<td>Name</td>
<td>Organization/Role</td>
<td></td>
</tr>
<tr>
<td>---------------------</td>
<td>---------------</td>
<td>-----------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Agriculture (6)</td>
<td>Rebecca</td>
<td>Florida Dept. of Agriculture and Consumer Services</td>
<td></td>
</tr>
<tr>
<td></td>
<td>David</td>
<td>USDA Natural Resources Conservation Service</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Linda</td>
<td>UF IFAS Extension - Brevard County</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Jonnie</td>
<td>Jim and Jonnie Swann Foundation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Matt</td>
<td>Syngenta</td>
<td></td>
</tr>
<tr>
<td></td>
<td>David</td>
<td>Deseret Cattle &amp; Citrus</td>
<td></td>
</tr>
<tr>
<td>Business (14)</td>
<td>Mark</td>
<td>National Association of Realtors</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Duane</td>
<td>Aquafiber</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Terry</td>
<td>Fly and Light Tackle Angler Magazine</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Suzanne</td>
<td>Massey Services Inc.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Molly</td>
<td>The Scotts Miracle-Gro Company</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bill</td>
<td>BKI Consulting Ecologists</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ed</td>
<td>Indian River Seafood/Aqua Gem Farms</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mike</td>
<td>Wild Ocean Seafood</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Jane</td>
<td>Kennedy Space Center</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dave</td>
<td>Atlantic Environmental Solutions, Inc.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rodney</td>
<td>Little Pond Publishing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Laurilee</td>
<td>Florida Restaurant and Lodging Assoc</td>
<td></td>
</tr>
<tr>
<td>Community (5)</td>
<td>Brent</td>
<td>Freedom Property Preservation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tony</td>
<td>League of Women Voters</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Spence</td>
<td>Space Coast Progressive Alliance</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Craig</td>
<td>North Beach Association</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tony</td>
<td>Keep Brevard Beautiful</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Herb</td>
<td>Indian River Neighborhood Association</td>
<td></td>
</tr>
<tr>
<td>Environmental (10)</td>
<td>Linda</td>
<td>Turtle Coast Sierra Club</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dave</td>
<td>Marine Resources Council</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Richard</td>
<td>Audubon Society</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Marty</td>
<td>Indian Riverkeeper</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bob</td>
<td>Friends of the Thousand Islands</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Andrea</td>
<td>The Nature Conservancy - Blowing Rocks</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ken</td>
<td>Indian River Land Trust</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Donna</td>
<td>Martin County Conservation Alliance</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Judy</td>
<td>Indian River Lagoon Coalition</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Katie</td>
<td>Save the Manatee</td>
<td></td>
</tr>
<tr>
<td>Government (18)</td>
<td>Name</td>
<td>Title/Position</td>
<td></td>
</tr>
<tr>
<td>----------------</td>
<td>-----------------</td>
<td>-------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Robin Armhold</td>
<td>Water Program Manager, 45 Space Wing- Patrick AFB</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Barbara Arthur</td>
<td>Senator Nelson's Office</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Jeff Beal</td>
<td>Fish and Wildlife Conservation Commission</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Chris Dzadosky</td>
<td>St. Lucie County Board of County Commissioners</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ed Fielding</td>
<td>Martin County Board of County Commissioners</td>
<td></td>
</tr>
<tr>
<td></td>
<td>John Galvez</td>
<td>US Fish &amp; Wildlife Service</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ed Garland</td>
<td>St Johns River Water Management District</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Richard Gilmor</td>
<td>Treasure Coast League of Cities</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Stuart Glass</td>
<td>Space Coast League of Cities</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Layne Hamilton</td>
<td>Merritt Island National Wildlife Refuge</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Chuck Jacoby</td>
<td>Indian River Lagoon National Estuary Program</td>
<td></td>
</tr>
<tr>
<td></td>
<td>George Jones</td>
<td>Retired State</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Jan Landsberg</td>
<td>Florida Fish and Wildlife Conservation Commission</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dan McIntyre</td>
<td>US Coast Guard Auxillary, Flotilla 17-6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wayne Mills</td>
<td>Representative Larry Lee's Office</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Chuck Nelson</td>
<td>Brevard County Board of County Commissioners</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Shirisha Rayaprolu</td>
<td>Jacksonville District, U.S. Army Corps of Engineers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tim Zorc</td>
<td>Indian River Board of County Commissioners</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Jim David</td>
<td>Retired - Mosquito Control</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hugh Harling</td>
<td>East Central Florida Regional Planning Council</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Chris Harnden</td>
<td>BKI Consulting Services</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ron Hix</td>
<td>Florida Power &amp; Light</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Carol Noble</td>
<td>Canaveral Port Authority</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Marty Smithson</td>
<td>Sebastian Inlet Tax District</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Don West</td>
<td>Ft. Pierce Port</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Infrastructure (7)</th>
<th>Name</th>
<th>Title/Position</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Jim</td>
<td>David Retired - Mosquito Control</td>
</tr>
<tr>
<td></td>
<td>Hugh</td>
<td>Harling East Central Florida Regional Planning Council</td>
</tr>
<tr>
<td></td>
<td>Chris</td>
<td>Harnden BKI Consulting Services</td>
</tr>
<tr>
<td></td>
<td>Ron</td>
<td>Hix Florida Power &amp; Light</td>
</tr>
<tr>
<td></td>
<td>Carol</td>
<td>Noble Canaveral Port Authority</td>
</tr>
<tr>
<td></td>
<td>Marty</td>
<td>Smithson Sebastian Inlet Tax District</td>
</tr>
<tr>
<td></td>
<td>Don</td>
<td>West Ft. Pierce Port</td>
</tr>
</tbody>
</table>
Delegate Residency

Q1 I live in the following county.

Answered: 74   Skipped: 4

Seminole (2), Charlotte, and Manatee also reported
Delegate Tenure

Q2 Years living in the Indian River Lagoon area

Answered: 76  Skipped: 2

31% live directly on the Lagoon or on a tributary
1. Nutrient inputs
2. Toxic and unhealthy water
3. Drainage canals
4. Algal blooms
5. Septic tanks
6. Sea grass restoration
7. Groundwater
8. Sedimentation
9. Road runoff
10. Wastewater discharges
Q12 Which pollutant is having the greatest negative impact on the Lagoon?

Answered: 76  Skipped: 2
Q13 Effective strategies for reducing pollution inputs to the Lagoon.

Answered: 76  Skipped: 2

- Wastewater upgrades
- Stormwater treatment areas
- Public education
- Shoreline restoration
- Low Impact Development
- Smart growth
- Fertilizer/pesticide BMPs
- Stormwater baffle boxes
- Muck removal
- Canal re-diversion
- Septic tank inspections
- Permit enforcement
- Agricultural BMPs
- Construction BMPs
Q14 Strategies that are very or extremely difficult to implement.

Answered: 75  Skipped: 3
Issues, Pollutants and Sources

Lagoon Action Assembly Working Sessions
Issues, Pollutants & Sources
Florida Institute of Technology
150 W. University Blvd, Melbourne, FL
Presentations

- Virginia Barker
- Robert Weaver
- John Trefry
- Chuck Jacoby
- Adam Schaefer
- Grant Gilmore
- Leesa Souto
Lagoon Action Assembly: Circulation, Climate Change and Resilience

Robert J Weaver, Ph.D.
Assistant Professor of Ocean Engineering
Director Indian River Lagoon Research Institute
Department of Marine and Environmental Systems, College of Engineering
rjweaver@fit.edu

May 15-17, 2014
155 mile long estuary
• 6 inlets (5 connect to the ocean freely)

1. Ponce de Leon Inlet, Natural
2. Port Canaveral Inlet, Locks
3. Sebastian Inlet, (1924)
4. Fort Pierce Inlet (1900)
5. Jupiter Inlet, Natural
6. St. Lucie Inlet (1892)
Lagoon Flushing

- Can we help increase flushing through built projects?
  - New Inlet
    - Navigation?
    - Costly to construct
    - Costly to maintain
      - Sedimentation
      - Erosion
    - Flushing effect localized
Muck and Metals in the Indian River Lagoon

Lagoon Action Assembly, May 16, 2014

John H. Trefry
Florida Institute of Technology
Indian River Lagoon Research Institute
Indian River Lagoon

"MUCK"

Natural sand and shell (pre-1950)

Credit: John Trefry, Florida Institute of Technology
WHERE DOES MUCK COME FROM?

1. Runoff
   a. Poor soil retention during construction and farming, wash out of soil from sod on lawns
   b. Plant remains, aquatic plants, lawn trimmings
   c. Urban stormwater runoff

2. In-lagoon production of algae, fertilized by nitrogen and phosphorus from fertilizer and muck.
Muck ...

- Increases turbidity and inhibits seagrass growth.
- Promotes oxygen depletion in sediment and water.
- Stores and releases nutrients.
- Covers the natural bottom and destroys natural communities of organisms.
- Accumulates potential pollutants.
Muck Accumulation
Marine Mammals as Sentinels for the IRL Estuary

Adam M. Schaefer, M.P.H.
FAU’s Harbor Branch Oceanographic Institute

John Reif, D.V.M, M.Sc (med), Colorado State University
Pat Fair, Ph.D., NOAA, NOS

Gregory Bossart V.M.D., Ph.D., Georgia Aquarium
# Mercury and IRL Dolphins

## High Mercury Concentrations in IRL Dolphins is associated with:

- Changes in the function of key organs (Liver, kidney, and thyroid dysfunction)

- The immune system’s ability to fight disease (Adaptive and Innate Immunity)

<table>
<thead>
<tr>
<th>Study Site</th>
<th>Skin Concentration (sample size)</th>
<th>Blood Concentration (sample size)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sarasota Bay, FL (2003-2005)</td>
<td>$2.1 \pm 1.7 \mu g/g$ (n = 54)</td>
<td>$570.3 \pm 433.5 \mu g/L$ (n = 55)</td>
</tr>
<tr>
<td>Indian River Lagoon, FL (2003-2005)</td>
<td>$7.0 \pm 5.9 \mu g/g$ (n = 75)</td>
<td>$658 \pm 519.0 \mu g/L$ (n = 75)</td>
</tr>
<tr>
<td>Charleston Harbor Area, SC (2003-2005)</td>
<td>$1.7 \pm 0.9 \mu g/g$ (n = 74)</td>
<td>$147 \pm 88.0 \mu g/L$ (n = 74)</td>
</tr>
</tbody>
</table>

- Schaefer AM, Stavros HW, Reif JS, Fair PA, Bossart GD. (2011). Effects of Mercury on Hepatic, Renal, Endocrine and Hematological Parameters in Atlantic Bottlenose Dolphins (*Tursiops truncatus*) along the Eastern Coast of Florida and South Carolina. Archives of Environmental Contamination.
- Reif JS, Schaefer AM, Stavros HW, Peden-Adams MM, Romano TC, Rice CD, Fair PA, Bossart GD. (2009). BOTTLENOSE DOLPHINS AS SENTINELS FOR EXPOSURE TO MERCURY: EFFECTS ON IMMUNE FUNCTION. Society for Marine Mammology Quebec, Canada, October 15
Mercury and Local Public Health

• Schaefer et al studied 135 coastal residents, hair sample and questionnaire for seafood consumption patterns and sources

• Study participants had a higher mean concentration of mercury (1.5 ppm) than similar studies
  - Louisiana fishermen – 1.1 ppm
  - Montreal anglers – 0.82 ppm
  - Fishing license holders in Wisconsin – 0.86 ppm

• Mercury exposure among coastal residents consuming locally caught fish is higher than the national average
Important Findings

• Orogenital Neoplasia (Papillomavirus)

• Serologic evidence of infection with morbillivirus, vector borne disease viruses, and other human and animal pathogens.

• Fungal Skin Disease (*Lacazia loboii*)

• Antibiotic Resistant Bacteria

• High Concentrations of Mercury

References:


Developing a Restoration Strategy

Virginia Barker
Watershed Program Manager
Brevard County Natural Resources Management Department
Aerial photographs of lagoon seagrass are taken every two years and new seagrass maps are produced from this photography. Scientists monitor seagrass transects and collect water quality samples monthly.

Scientists recorded a 60 percent loss of seagrass in the lagoon between 2009 and 2012.
Nutrient and Sediment Sources
Sources of TN and TP Loading

**ILR North - TN Load Comparison**

- Baseflow
- Stormwater
- Atmospheric Deposition
- Point Sources

**ILR North - TP Load Comparison**

- Baseflow
- Stormwater
- Atmospheric Deposition
- Point Sources
Brevard Clam harvest is .2% of what it was 27 years ago.
Brevard Blue Crab harvest is 11% of what it was 27 years ago.

1996
Brevard Oyster harvest is 0.7% of what it was 27 years ago.
INDIAN RIVER LAGOON

NATURAL RESILIENCE

BALANCED ECOSYSTEM

HEALTHY PLANET
LOSS OF FILTRATION

POLLUTANT LOADING

MUCK

TIPPING POINT
Urban Nitrogen Budget

Inputs
- Wet deposition
- N Fixation
- Commercial Fertilizer
- Food
- N-containing chemicals

Subsystem
- Natural System
- Near-surface atmosphere
- Agricultural Lands
- Humans
- Pets
- Wastewater
- Residential Lands
- Subsurface

Outputs
(10 X Natural)
- Denitrification and volatilization
- Surface water
- Food
- Landfills

Adapted from Baker et al 1999
Small Working Groups

Sources
- Residential Lands
- Agricultural Lands
- Drainage Canals
- Sewage & Septic Tanks

Brainstorm
- Polluting Potential
- Reduction Strategies
- Challenges
- Priority Actions
LAA Facilitators

- Stephen Chalmers
- Nancy Higgs
- Suzie Stempel Housley
- Dr. Ken Kaswick
- Dr. George Maul
- Dr. Jon Shenker
- Warren Wnek
- Lisa Frazier
- Kathy Hill
LAA Mediators & Rapporteurs

Mediators
- Virginia Barker
- Ernie Brown
- Elizabeth Melvin
- Jennifer Meyer
- Jim Moir
- Ted Moorhead
- Dr. Leesa Souto
- Dr. John Trefry

Rapporteurs
- Kate Beckett
- Victoria Benjamin
- Hannah Briant
- Chris Hoey
- Genny Scott
- Andrew Shipitofsky
- Joffrey Muceli
- Kai Nakachi
- Alex Nickerson
- Nicole Pallan
**Solution:**
Switch to city water sewer hybrid systems
Inspectors
Require sewer system on all new development
Frequent or regular Inspections (field, program tanks)
AWT advanced water treatment
Reclaimed water
Fail test--fix it?
Porta-potty until fixed

**Issues:**
High cost
Permitting/ regulations
Half have septic
Monitoring
Proximity to water bodies
Older installations
Staffing
Need for research
Live-aboard dumping

Benefits of retrofitting septic to sewer:
Reduced chemical and pharmaceutical leaching
Reduce microbial loading

**Source:** Septic Tanks
Final Consensus Building

Reaching Agreement

• Top 3-5 actions from each source
• 114 actions voted on by the group
• >90% Yes and <3% No
• 17 Actions categorized into Top 5
Develop a lagoon wide mapping program for sewage loading (biological, pharmaceutical, toxicity)

1. Yes, I can support it
2. Yes, I can live with this
3. I need more information
4. No, I cannot live with this
Action: Establish and fund a report card with measureable indicators in the following categories: pollution, habitat, and dependent species.

1. Yes, I can support it
2. Yes, I can live with this
3. I need more information
4. No, I cannot live with this
1) Encourage Societal Adoption of Lagoon-friendly Practices

Develop a lagoon-focused education program that affects and measures behavior change through incentives and targeted communications, similar to the “Be Floridian” program, focused on:

- Lagoon-friendly landscaping practices
- Sustainable water and energy use
- Integrated pest management and
- Reducing pollutants
2) Report back to the Public

- Establish and fund a “State of the Lagoon” report card similar to the Chesapeake Bay Foundation Report Card
- Report relevant indicators of ecological, economic, and human health
- Measure pollution, habitat and species
3) Muck Management

- Develop and implement a comprehensive muck management plan
- Identify and prioritize muck removal
- Investigate beneficial uses of muck
- Prevent muck by addressing sources
- Monitor muck accumulation
- Report results
4) Address Septic Tanks

✓ Support a lagoon-wide mapping program for septic tanks

✓ Develop, prioritize and implement corrective actions

✓ Identify sources of nutrients (nitrogen and phosphorus), bacteria, pharmaceuticals, and toxins and calculate relative loads
5) Stormwater Management

- Improve storm water management by retrofitting aging storm water systems
- Promote retention/detention and water reuse on residential and agricultural lands
- Implement street sweeping programs to prevent pollutants from entering storm drains
- Work to implement the FDEP statewide storm water rule to reduce the pollutants from new development
The Indian River Lagoon means...
**LAA Support Personnel**

**MRC Staff**
- Julie Albert
- Anne Mayer
- Beth McMillen
- Nicholas Sanzone

**Technical Support**
- Kaitlin Wood
- Kelsie White
- Andrew Walker
- Florida Institute of Technology
- Treasure Coast Regional Planning Council

**Volunteers**
- Kathe Brewer
- Mary Bowman
- Paul Callahan
- Diane Chasick
- Rachel Dial
- Nicole David
- Alex Jotkoff
- Eric Jotkoff
- Chris Kane
- Terry LaPlante
- Leslie Maloney
- Vernon Mattioli
- Elizabeth Melvin
- Donald Mildrum
- Joanie Regan
- Sandy Shenker
- Karen Smith
- John Vallery
- Kim Yoshiwara
Thank you, LAA 2014 Sponsors!

Jim and Jonnie Swann Foundation

FPL

Florida Institute of Technology

INDIAN RIVER LAGOON PROGRAM

Jotkoff Financial Group

Little Pond Publishing

MRG

Yellow Dog Café & Ron Taylor

Brevard County Democrats, Brevard Zoo, Cura Oceanus Foundation, Dixie Crossroads, Florida Sports Fishing Association (FSFA), Marine Discovery Center, United Waterfowlers – Florida, Dr. Duane DeFreese, John and Judy Orcutt, Kim Yoshiwara, & Patricia Walsh