Advocating and Achieving Regional Monitoring Collaborations

NWQMC Conference 2016

Examples from the Success of the Southwest Florida Regional Ambient Monitoring Program (SWF RAMP)

Robert Brown
Natasha Dickrell
Dr. David Karlen
Keith Kibbey

What's a Regional Monitoring Program?

- Definition of "Together" versus The 3 C's
- SWF Examples
  - Seagrass Monitoring
  - Bay Benthic Monitoring
  - Florida Sea Grant Initiatives
  - Bathymetric Lake Maps

SWF-RAMP Mission Introduction

To foster ***cooperative*** participation of ***regional*** monitoring program staffs to improve ***comparability*** of surface water sample collection, in situ field measurements, and laboratory methods used by surface water quality monitoring programs ***in Southwest Florida*** marine and freshwater systems.

Dedicated to Collaboration

Facilitate Communication & Information Sharing

Promote Partnerships

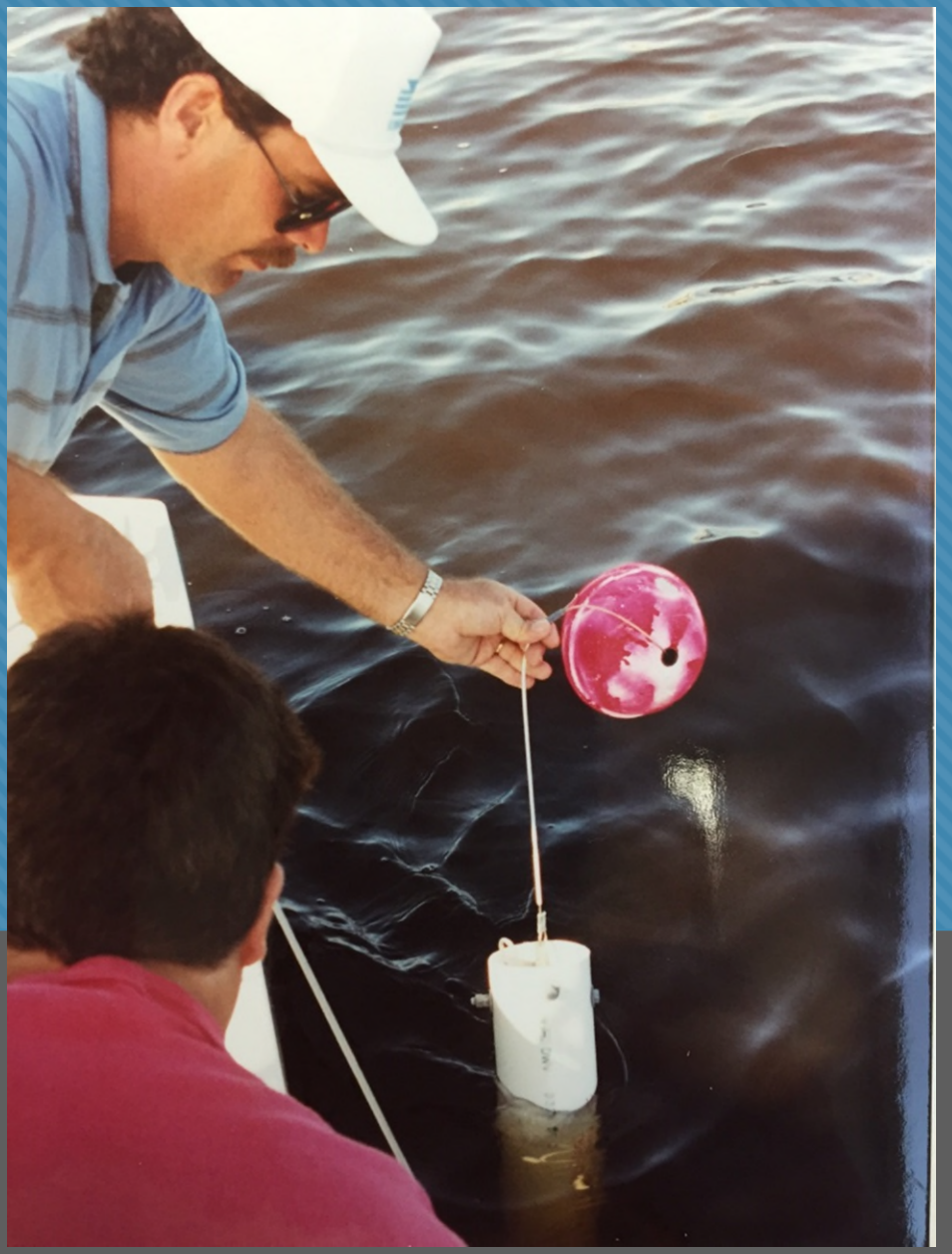
Focus on Data Comparability

Three Generations of RAMP Leadership

"The beauty of collaboration between [mentor and neophyte] generations is that we combine strength with wisdom—a surefire way to accomplish more …"

— **Brett Harris**

SWF-RAMP HISTORY & IMPACT in the Southwest Florida Region



Presented by:

Rob Brown

Manatee County

20+ Years of SWF-RAMP History

- Formation and Genesis
- Early Goals & Objectives
- RAMP Impact on the Status of Tampa Bay

Tampa Bay in the 1970s-Early 1980s

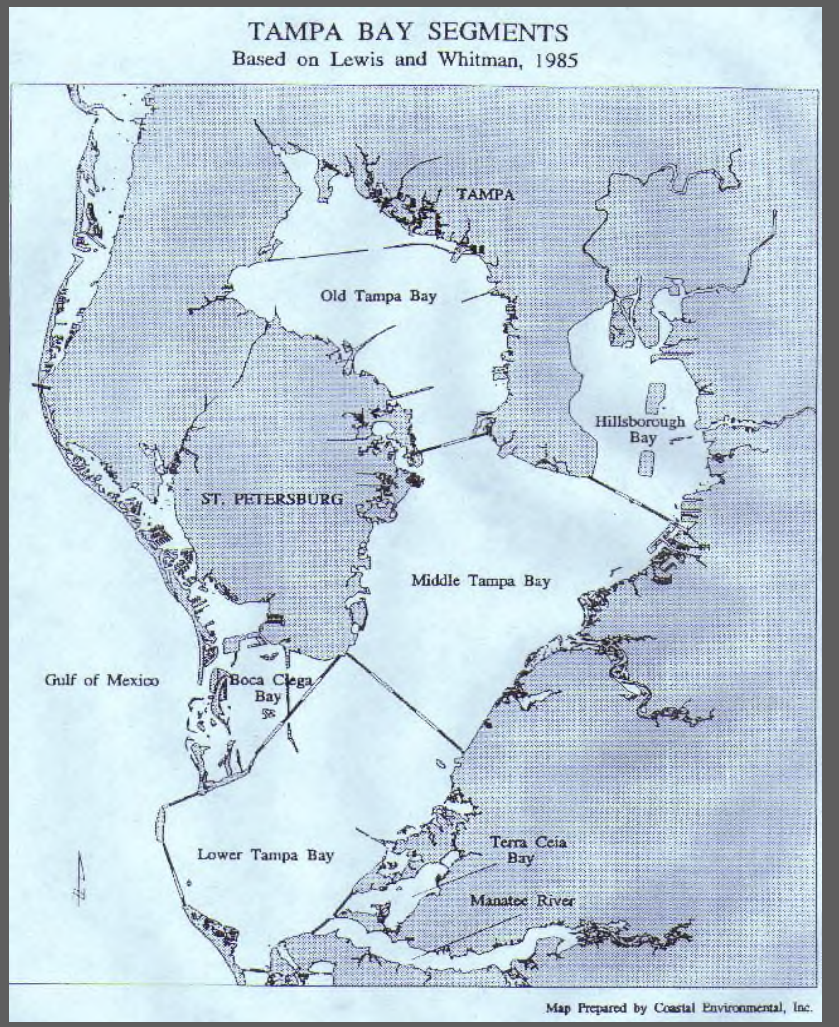
- Poorly-treated Domestic Point Sources, Untreated Industrial Point Sources & Stormwater, Rampant Dredge & Fill Activities
- Phytoplankton and Periphyton dominated basins
- 50% loss of seagrass coverage between 1950 and 1980
- Newspapers declared Tampa Bay "dead"

Introduction of the Tampa Bay Estuary Program

- 1980s-1990s regional efforts provided minimal Bay improvements
- 1990 - Tampa Bay declared an "Estuary of National Significance" by Congress
- 1991 - Unique federal-local ***partnership*** begins
- Enhanced Bay recovery efforts ensue

TBNEP Monitoring Assessment: Available Data Sources in 1990's

- Regulatory compliance data
- Local program ambient or site specific
- Short-term special studies
- Pre-development baseline



TBNEP Assessment: Regional Monitoring Goals

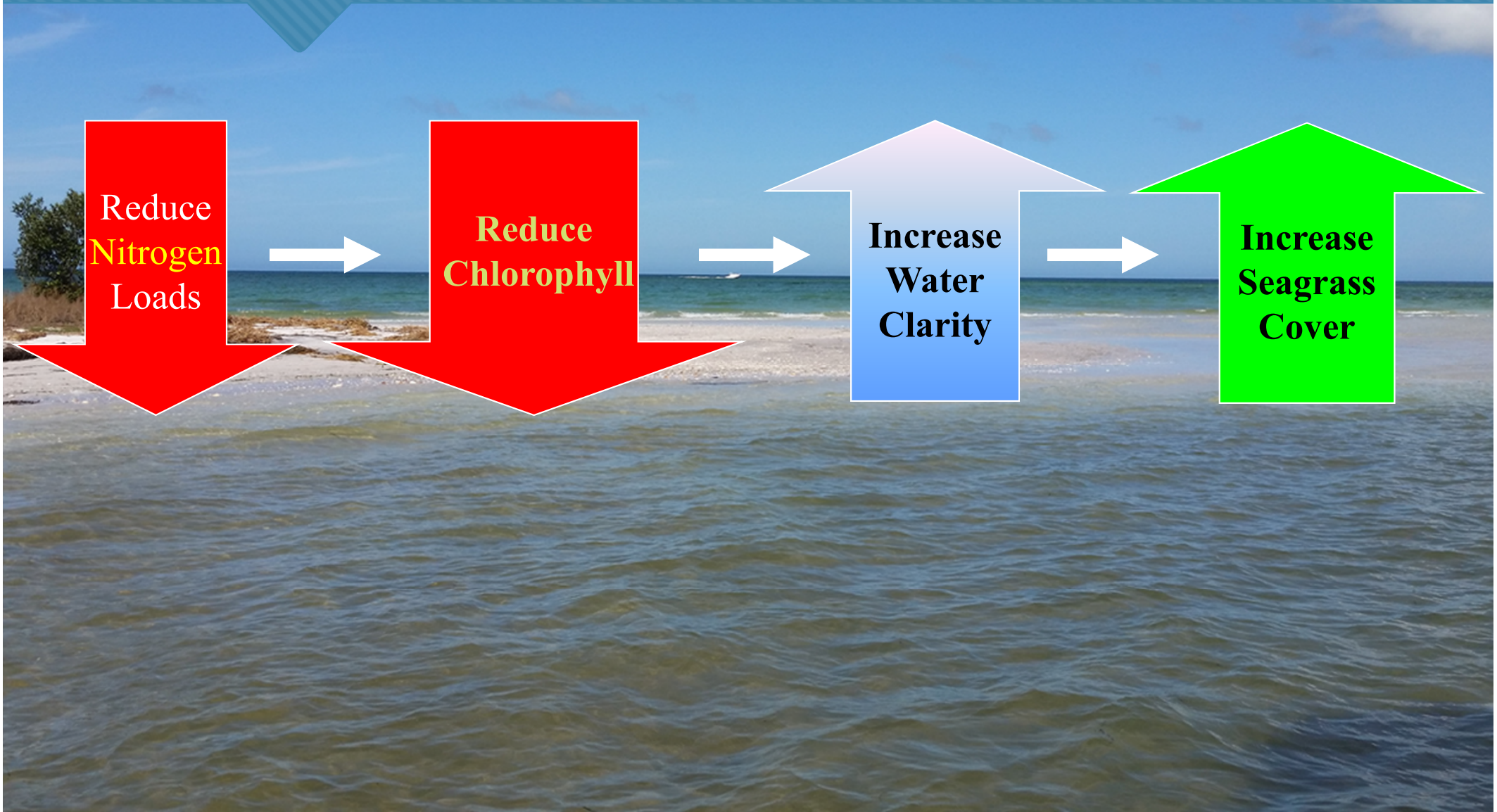
Early Goals and Objectives

- Establish baseline conditions
- Monitoring chemical and biological parameters
- Data to establish and verify models
- Measure effectiveness of management actions
- Estimate long-term trends

Long-term Benefits

- to Measure the Effectiveness of Management Actions and Programs Implemented Under the CCMP *and*
- to Provide Information that can be used to Redirect and Refocus the Management Plan over time.

Tampa Bay Regional Objectives: Nitrogen Management Strategy



TBNEP Monitoring Action: Genesis of RAMP

- 1994 - First Southwest Florida RAMP meeting
  - Discussion of state and local monitoring programs
  - Who, what, when, why!
- Initial RAMP intercalibration
  - core parameter
  - evaluate field/lab methods

Regional Collaboration: SWF -RAMP Objectives

1. Establish Core Parameters (Analytes)
2. Standardize Monitoring Activities
3. Evaluate/Standardize Methodologies
4. Minimize Duplication and Economize

Regional Collaboration: Adopted Water Quality Targets

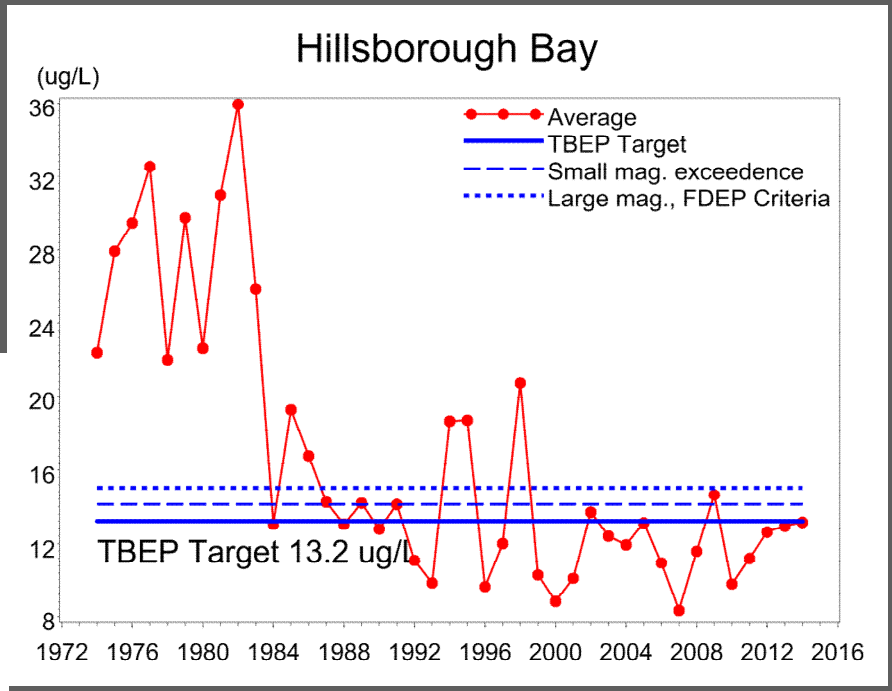
	TBEP Management Targets Established ~2000		Regulatory Threshold Adopted 2002
Bay Segment	Chl-a Management Target (ug/L)	K_d (m^{-1}) Management Target	Chl-a Regulatory Threshold (ug/L)
Old Tampa Bay	8.5	0.83	9.3
Hillsborough Bay	13.2	1.58	15.0
Middle Tampa Bay	7.4	0.83	8.5
Lower Tampa Bay	4.6	0.63	5.1

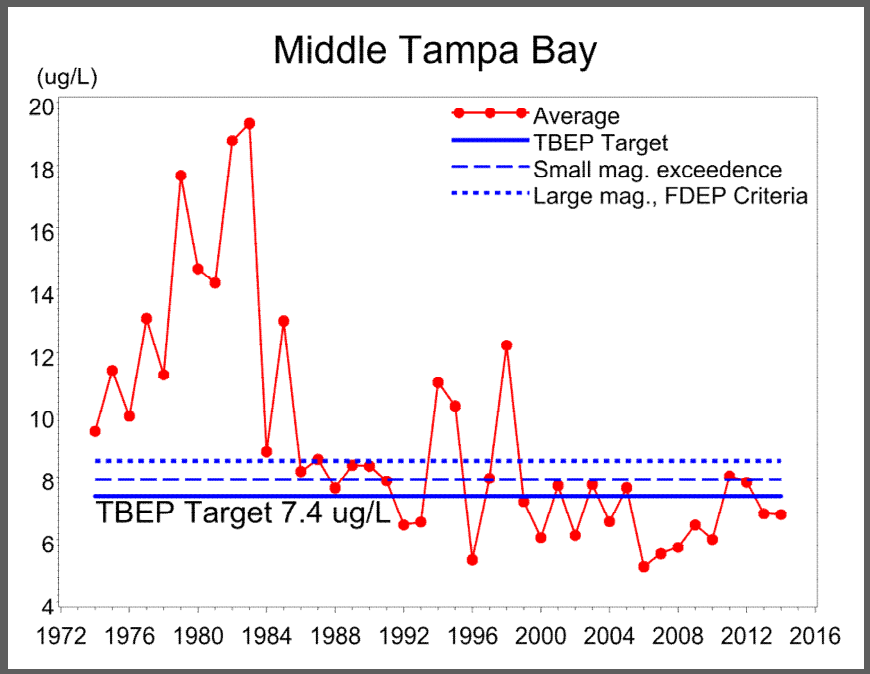
Annual WQ Report Card

Assess Annual TN Load Reduction Effectiveness

Agreement to "Hold the Line" on TN Loads: Preclude 17 tons/yr to offset future growth

Improving Water Quality:





Chlorophyll –a (ug/L)

AWT & Reuse Standards Implemented

Stormwater Regulations Enacted

TBEP Partner & NMC Actions Implemented

Citizen Actions

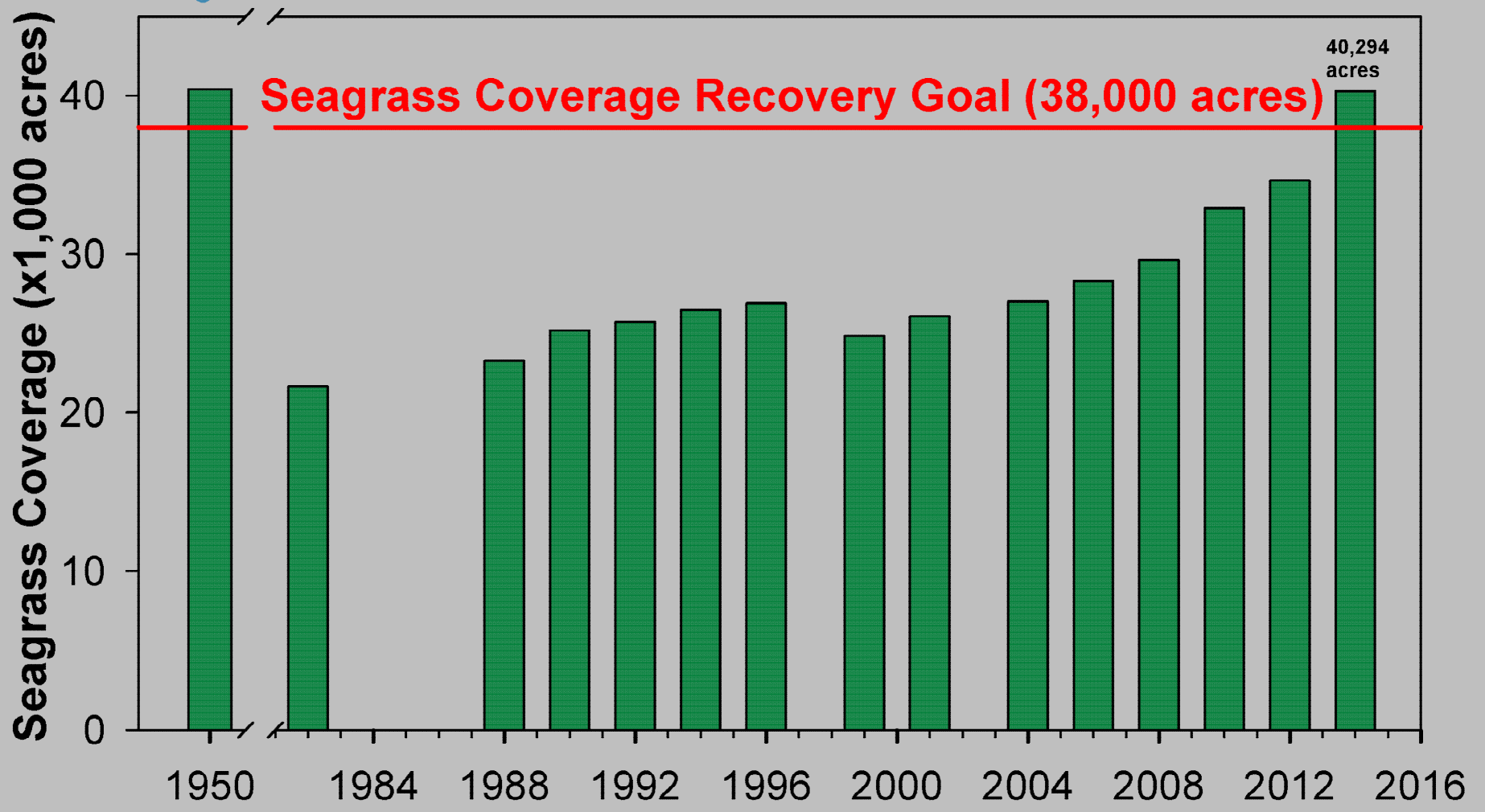
Power Plant Upgrades

Port Facility Upgrades

Year	Old Tampa Bay	Hillsbor-ough Bay	Middle Tampa Bay	Lower Tampa Bay
1975	Red	Red	Red	Green
1976	Red	Red	Red	Yellow
1977	Red	Red	Red	Red
1978	Red	Red	Red	Yellow
1979	Red	Red	Red	Red
1980	Red	Red	Red	Red
1981	Red	Red	Red	Red
1982	Red	Red	Red	Red
1983	Red	Yellow	Red	Red
1984	Red	Green	Red	Yellow
1985	Red	Red	Red	Yellow
1986	Red	Yellow	Red	Green
1987	Red	Yellow	Red	Green
1988	Yellow	Green	Yellow	Green
1989	Red	Yellow	Red	Yellow
1990	Red	Green	Red	Yellow
1991	Green	Yellow	Yellow	Yellow
1992	Yellow	Green	Yellow	Yellow
1993	Yellow	Green	Yellow	Yellow
1994	Yellow	Yellow	Red	Red
1995	Red	Yellow	Red	Yellow
1996	Yellow	Green	Yellow	Green
1997	Yellow	Green	Red	Yellow
1998	Red	Red	Red	Red
1999	Yellow	Green	Yellow	Yellow
2000	Green	Green	Yellow	Yellow
2001	Yellow	Green	Yellow	Yellow
2002	Yellow	Green	Green	Green
2003	Red	Yellow	Green	Yellow
2004	Red	Green	Green	Yellow
2005	Green	Green	Yellow	Yellow
2006	Green	Green	Green	Green
2007	Green	Green	Green	Green
2008	Yellow	Green	Green	Yellow
2009	Yellow	Yellow	Green	Green
2010	Green	Green	Green	Green
2011	Red	Green	Yellow	Green
2012	Green	Green	Green	Green
2013	Green	Green	Green	Green
2014	Green	Green	Green	Green

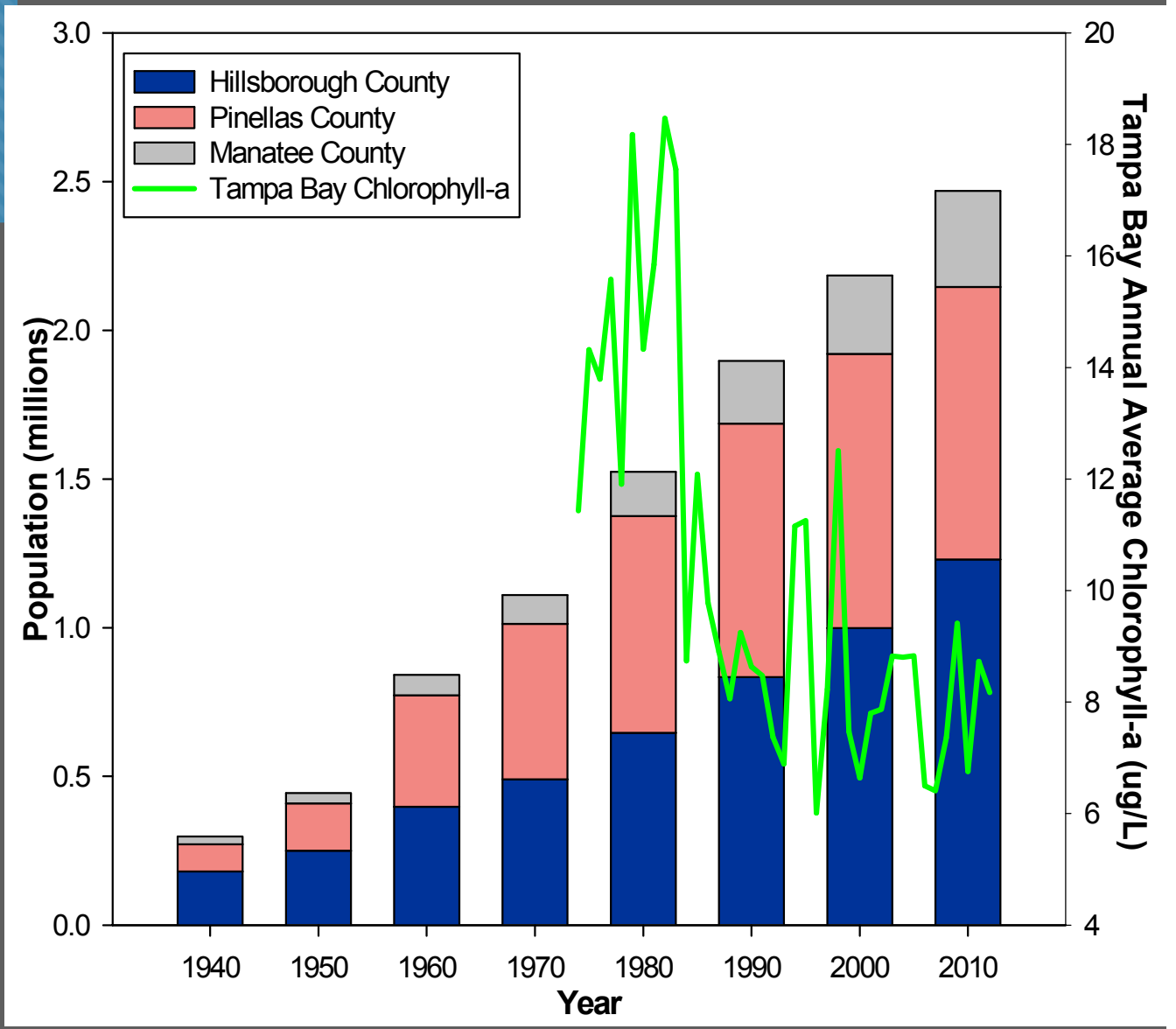
Increase Seagrass Cover

Seagrass Coverage: Now Exceeding Goal



Sustaining Success: Adaptively Managing TB

- Can recovery be maintained w/ increasing population?
- Expected to double by 2050
- New Actions / Offsets will call for SWF-RAMP & Regional Coordination



Split Sampling and Data Comparability

Presented by:

Dr. David Karlen

Environmental Protection Commission of Hillsborough County

Purpose

- Check comparability of lab and field method and equipment results
- Validation of the data to ensure the science is sound and data is defensible
- Discuss procedures if results are different
- Provide feedback

Method

- Collect common source of water
  - 40 gallon trash can w/ circulation pump
  - Alternate marine and freshwater sources
- Individual labs fill sample bottles from homogenized source water

Lab Id	Rep	NH4	TKN	NOx	TN	PO4	TP	Chl a (cor)	Chl a
901	A	0.12	0.51	0.09	0.60	0.08	0.13	6.20	
901	B	0.13	0.49	0.09	0.58	0.08	0.13	6.30	
901	C	0.11	0.51	0.09	0.60	0.07	0.14	6.50	
Mean		0.12	0.50	0.09	0.60	0.08	0.13	6.33	
Std. Dev.		0.01	0.01	0.00	0.01	0.00	0.00	0.15	
Std. Score (Z)		0.85	-1.12	-0.14	-1.11	0.23	0.07	0.56	
1001	A	0.11	1.10	0.11	1.20	0.07	0.10	4.54	
1001	B	0.11	1.30	0.13	1.10	0.07	0.10	4.64	
1001	C	0.11	0.96	0.10	1.40	0.07	0.11	4.16	
Mean		0.11	1.12	0.11	1.23	0.07	0.10	4.45	
Std. Dev.		0.00	0.17	0.02	0.15	0.00	0.01	0.25	
Std. Score (Z)		0.43	1.77	1.93	1.81	-1.18	-1.36	-1.36	
1201	A	0.09		0.08					
1201	B	0.09		0.08					
1201	C	0.09		0.10					
Mean		0.09		0.09					
Std. Dev.		0.00		0.01					
Std. Score (Z)		-0.15		-0.68					
1301	A	0.10	0.65	0.09	0.74	0.07	0.14	4.70	
1301	B	0.10	0.60	0.09	0.69	0.07	0.15	6.50	
1301	C	0.10	0.60	0.09	0.69	0.07	0.14	6.50	
Mean		0.10	0.62	0.09	0.71	0.07	0.14	5.90	
Std. Dev.		0.00	0.03	0.00	0.03	0.00	0.01	1.04	
Std. Score (Z)		0.24	-0.59	-0.41	-0.60	-0.75	0.64	0.12	
1501	A	0.02	0.65	0.09	0.74	0.08	0.13	6.80	
1501	B	0.03	0.80	0.09	0.89	0.08	0.14	6.80	
1501	C	0.02	0.75	0.09	0.84	0.08	0.14	6.80	
Mean		0.02	0.73	0.09	0.82	0.08	0.14	6.80	
Std. Dev.		0.01	0.08	0.00	0.08	0.00	0.01	0.00	
Std. Score (Z)		-2.35	-0.04	-0.34	-0.06	1.02	0.31	1.04	
Std. Dev.									
Std. Score (Z)		0.12	0.42	0.04	0.41				
Overall Mean		0.09	0.74	0.09	0.84				
Overall Std. Dev.		0.03	0.21	0.01	0.22				
Median Value		0.10	0.66	0.09	0.75				
Minimum Value		0.02	0.49	0.08	0.58				
Maximum Value		0.13	1.30	0.13	1.40				

Raw data submitted by labs

Samples analyzed in triplicate for internal comparison

Identify 2x SD as a potential outlier

Averages are used to calculate regional deviation and mean for comparison

Field Equipment: Semi-Annual Comparison

Comparison conducted simultaneously using split sample water.

Ability to compare brands and models as desired.

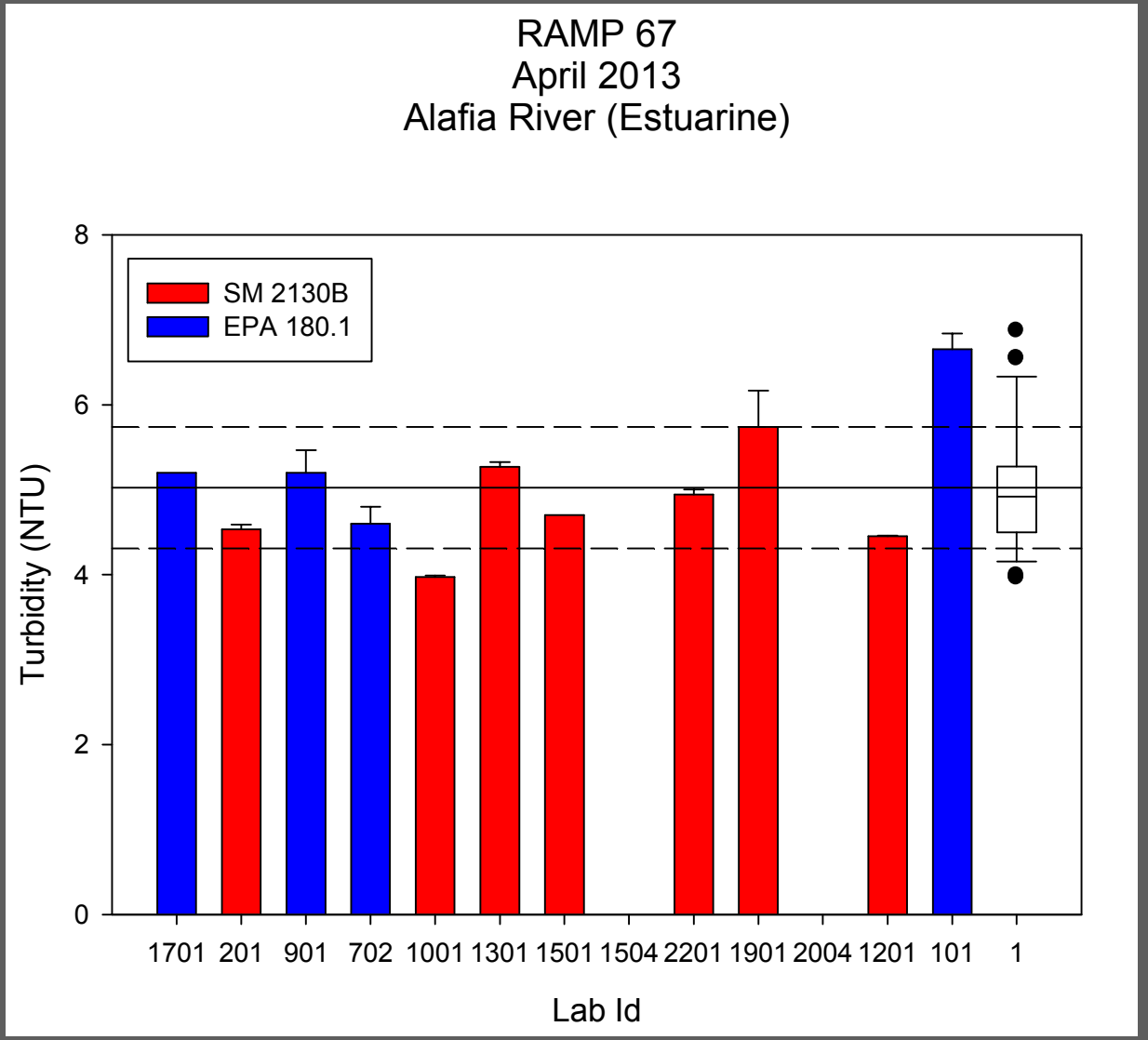
Outlet for industry advancements to be presented and discussed.

1901	1	1.03	30.88	7.96	53778.00	35.40	6.83	111.30	YSI 650 MDS
1901	2	0.96	30.89	7.97	53761.00	35.30	6.76	110.60	YSI 650 MDS
1901	3	1.00	30.86	7.99	53672.00	35.30	6.49	105.60	YSI 650 MDS
Mean		1.00	30.88	7.97	53737.00	35.33	6.69	109.17	
Std. Dev.		0.04	0.02	0.02	56.93	0.06	0.18	3.11	
Std. Score (Z)		**-0.10**	**-1.32**	**-0.74**	**0.74**	**0.69**	**1.29**	**1.25**	
2701	1	1.00	30.94	7.94	48260.00	31.29	4.61	73.60	
2701	2	1.00	30.94	7.96	48251.00	31.29	4.47	71.30	
2701	3	1.00	30.95	7.97	48232.00	31.27	4.30	68.50	
Mean		1.00	30.94	7.96	48247.67	31.28	4.46	71.13	
Std. Dev.		0.00	0.01	0.02	14.29	0.01	0.16	2.55	
Std. Score (Z)		**-0.14**	**-0.31**	**-0.98**	**-1.84**	**-1.89**	**-1.60**	**-1.65**	
Overall Mean		**1.00**	**30.96**	**8.02**	**52166.80**	**34.26**	**5.70**	**92.79**	
Overall Std. Dev.		**0.02**	**0.07**	**0.07**	**2128.74**	**1.57**	**0.77**	**13.11**	
Median Value		1.00	30.96	7.99	53164.00	34.89	5.84	95.30	
Minimum Value		0.96	30.86	7.94	48232.00	31.27	4.30	68.50	
Maximum Value		1.03	31.08	8.13	53800.00	35.40	6.83	111.30	

Quarterly Study: Averaged data comparison

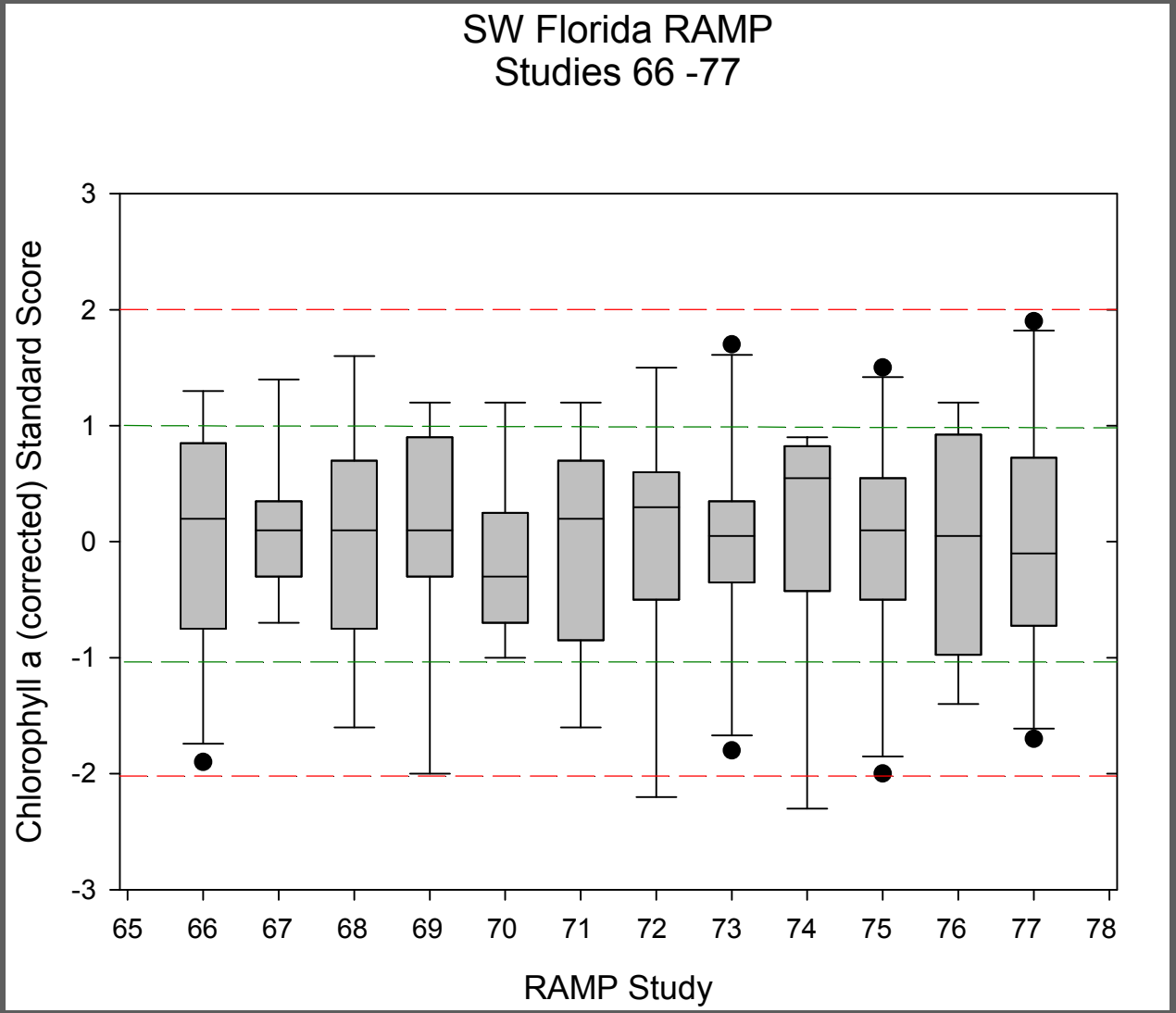
Ability to depict comparability among different methods (e.g. both turbidity methods result in comparable outcomes)

Ability to justify analysis choices – based on regulatory, legislative, or resource management obligations (e.g. cost saving methods, client requests, compliance measures)



Long-term Data Comparability: Chlorophyll

Chlorophyll was the primary analyte to launch SWF-RAMP activities

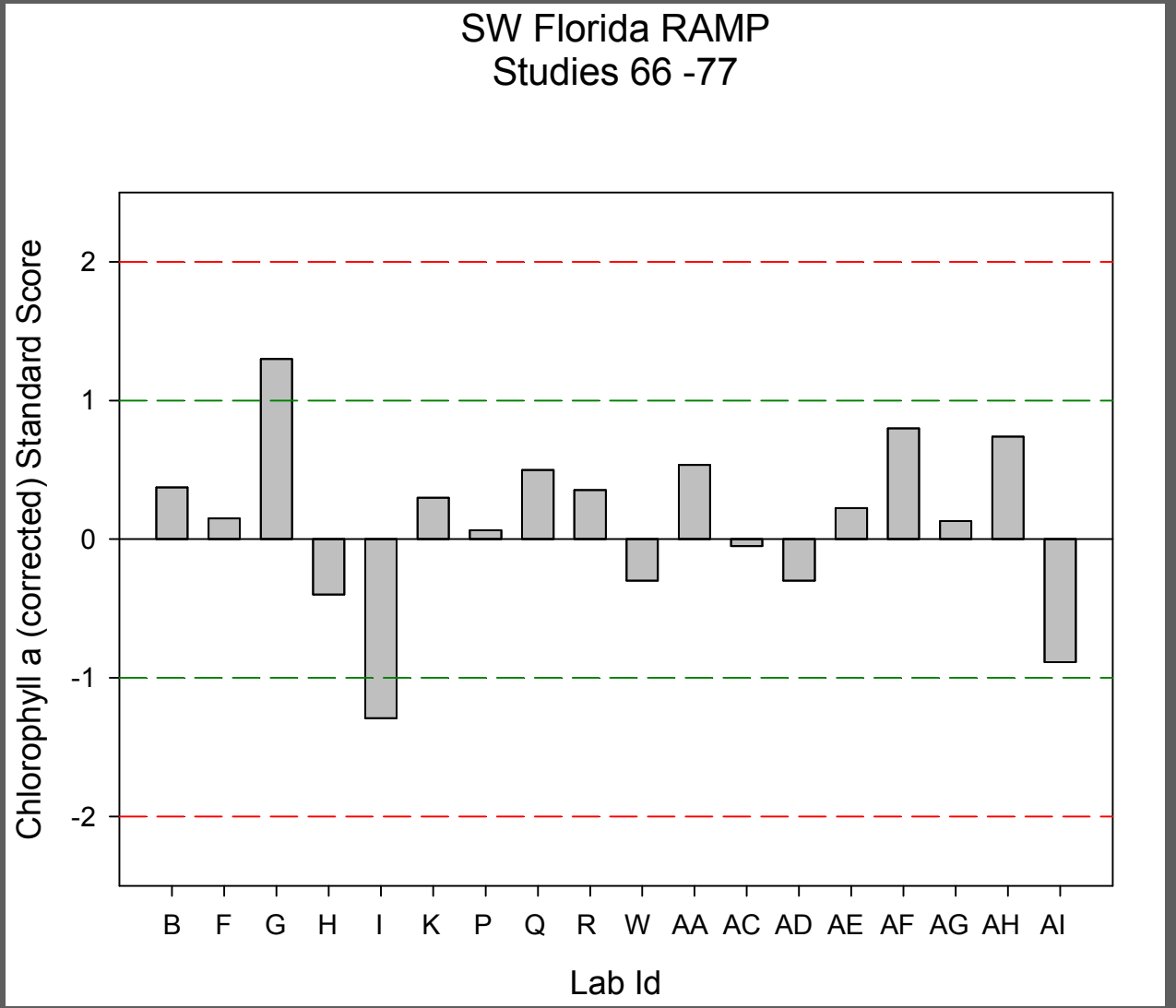


Data Comparability: Standard Scores

$$Z = \frac{\text{Lab Mean} - \text{Overall Mean}}{\text{Overall Standard Deviation}}$$

Z >1 or <-1 exceed ±1 SD

Z>2 or <-2 exceed ±2 SD



Benefits

- Collaboration and "Crowd Sourcing" improves the process for all
- Option for proactive "audits" (either field or lab among participants)
- SWF-RAMP provides a dedicated monitoring audience
- Valuable feedback provided by a variety of participants on technical and regional monitoring options

Laboratory Benefits from SWF-RAMP Participation

Presented by:
Keith Kibbey
Lee County

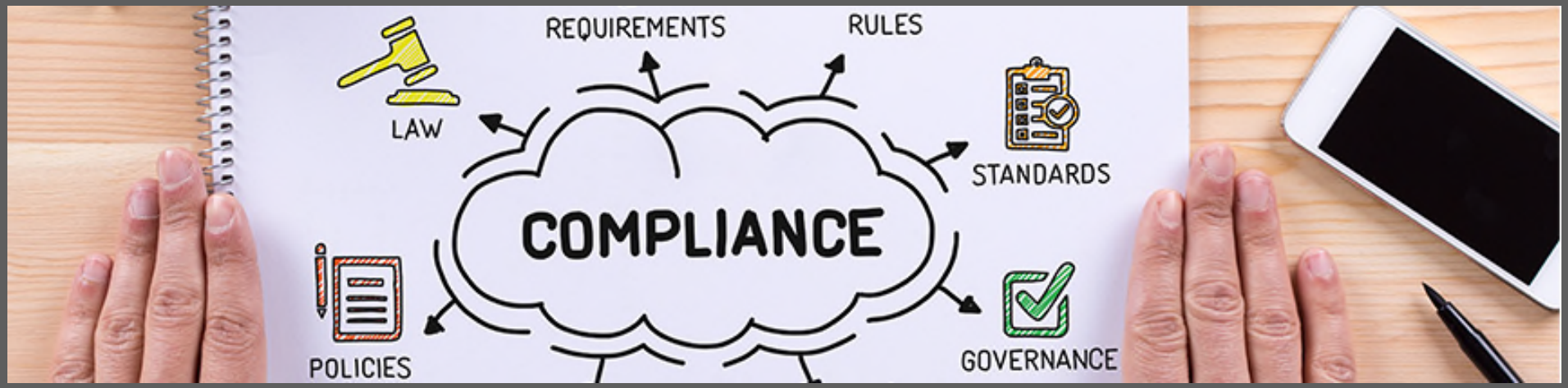
JOHN SEVERSON News-Press

ESTING THE WATERS: Keith Kibbey, director of Lee County Environmental abs, records test results from beach water samples.

Benefits to RAMP Participation

Justify:

- Regulatory Compliance
- Quality System
- Management Strategy



Regulatory Justification TNI

- Review of Requests, Tenders and Contracts
- Management Reviews
- Quality Assurance for Environmental Testing

Regulatory Justification: NELAC

Laboratory uses data from meetings to comply with NELAC Standard 5.5.6.2.2 for chlorophyll analysis.

"Where traceability to national standards of measurement is not applicable, the laboratory shall provide satisfactory evidence of correlation of results, for example by participation in a suitable program of inter-laboratory comparisons, proficiency testing, or independent analysis."

Regulatory Justification: TNI

Review of Requests, Tenders and Contracts (ISO/IEC 17025:2005(E), Clause 4.4)

4.4.1 The laboratory shall establish and maintain procedures for the review of requests, tenders and contracts. The policies and procedures for these reviews leading to a contract for testing and/or calibration shall ensure that:

NOTE 2: The review of capability should establish that the laboratory possesses the necessary physical, personnel and information resources, and that the laboratory's personnel have the skills and expertise necessary for the performance of the tests and/or calibrations in question.

The review may also encompass results of earlier participation in inter-laboratory comparisons or proficiency testing and/or the running of trial test or calibration programmes using samples or items of known value in order to determine uncertainties of measurement, limits of detection, confidence limits, etc.

Regulatory Justification: TNI

4.15 Management Reviews *(ISO/IEC 17025:2005(E), Clause 4.15)*

4.15.1 In accordance with a predetermined schedule and procedure, the laboratory's top management shall periodically conduct a review of the laboratory's management system and testing and/or calibration activities to ensure their continuing suitability and effectiveness, and to introduce necessary changes or improvements.

The review shall take account of:

- the suitability of policies and procedures;
- reports from managerial and supervisory personnel;
- the outcome of recent internal audits;
- corrective and preventive actions;
- assessments by external bodies;
- **the results of interlaboratory comparisons** or proficiency tests;

Regulatory Justification: TNI

5.9 Quality Assurance for Environmental Testing *(ISO/IEC 17025:2005(E), Clause 5.9)*

5.9.1 The laboratory shall have quality control procedures for monitoring the validity of tests and calibrations undertaken. The resulting data shall be recorded in such a way that trends are detectable and, where practicable, statistical techniques shall be applied to the reviewing of the results.

This monitoring shall be planned and reviewed and may include, but not be limited to, the following:

- regular use of certified reference materials and/or internal quality control using secondary reference materials;
- **participation in inter-laboratory comparison** or proficiency-testing programmes;
- replicate tests or calibrations using the same or different methods;
- retesting or recalibration of retained items;
- correlation of results for different characteristics of an item.

NOTE: The selected methods should be appropriate for the type and volume of the work undertaken.

Quality System Justification

- Audits are mostly a paper and procedural look at a laboratory, RAMP is outcome based.
- Makes data more defensible.
- Voice and clout when we speak as a group.
- Real sample matrix.
- The TNI ISO 17025 laboratory standard is built upon a philosophy of Continuous improvement.

Quality System Justification

Florida Environmental Laboratory Quality System (FELQS)

- A network of environmental testing laboratories throughout southern Florida.
- Private labs, county & city labs, utilities labs and water management district labs meet quarterly.
- All, or most, are NELAC/TNI certified and therefore share common concerns with regard to meeting the mandates of the NELAC/TNI Standard.

Several members participate on TNI Expert Committees

Management Justifications

- Watersheds do not always follow geopolitical boundaries.
- Funds saved by ideas from the group
  - Equipment selection
  - Process changes
- Makes data more defensible.
- Private labs joined due to contractual requirements, then learned to use a as bragging rights and a sales tool.
- Voice and clout when we speak as a group.
- The more people or agencies using you data make it more valuable. Valuable programs are less likely to be reduced or eliminated.
- Provides a model for other collaborative efforts

Cost to Laboratory

- Staff time to attend
  - 4 to 8 days/year
- Lab time to process samples
- Return on investment
  - Credibility
  - Better Data
  - Collaborative group for other efforts
- Priceless

Advocating & Achieving a Regional Program

Presented by:

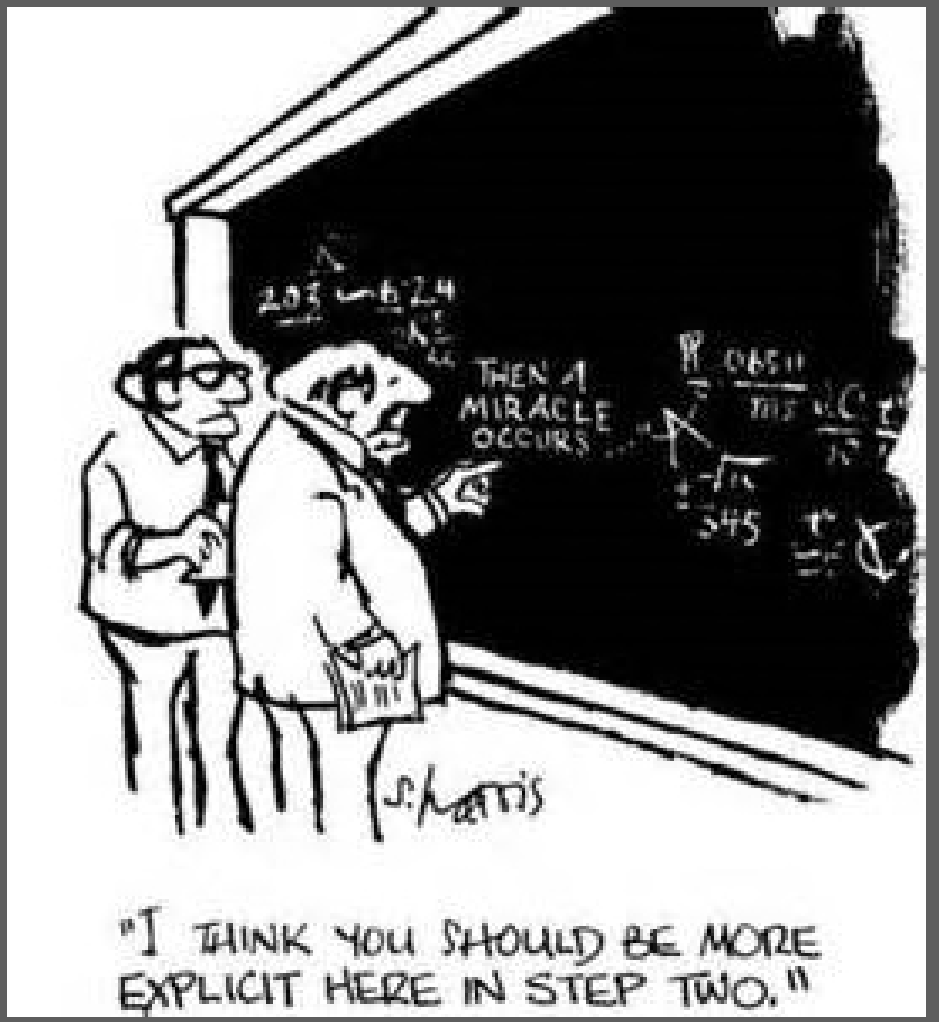
Natasha Dickrell

Pinellas County

Why is voluntary collaboration for monitoring so attractive?

"If you don't know where you're going, you'll probably end up somewhere else and spend a lot of money getting there."

Why does SWF-RAMP work?

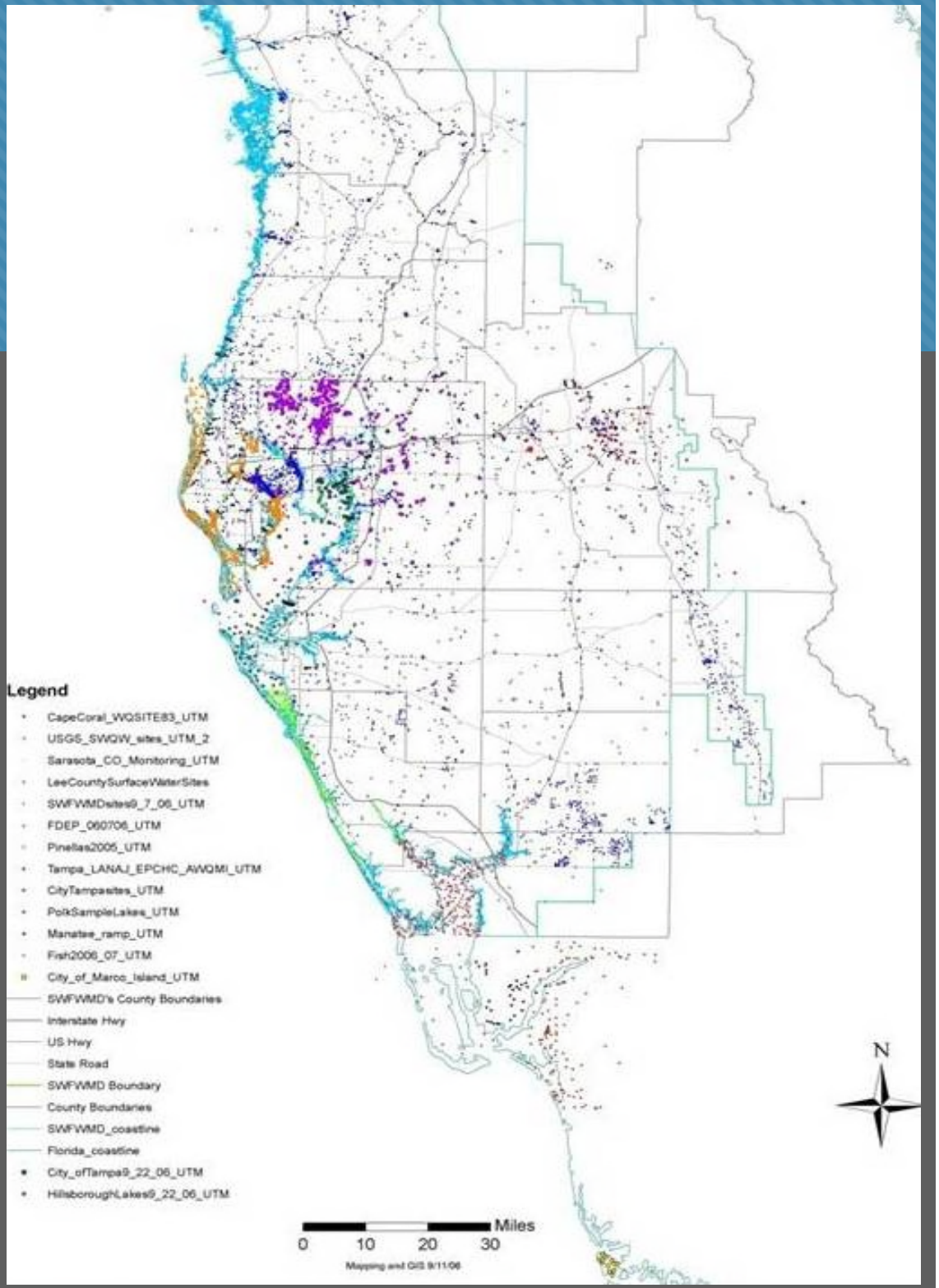


Knowledge Framework

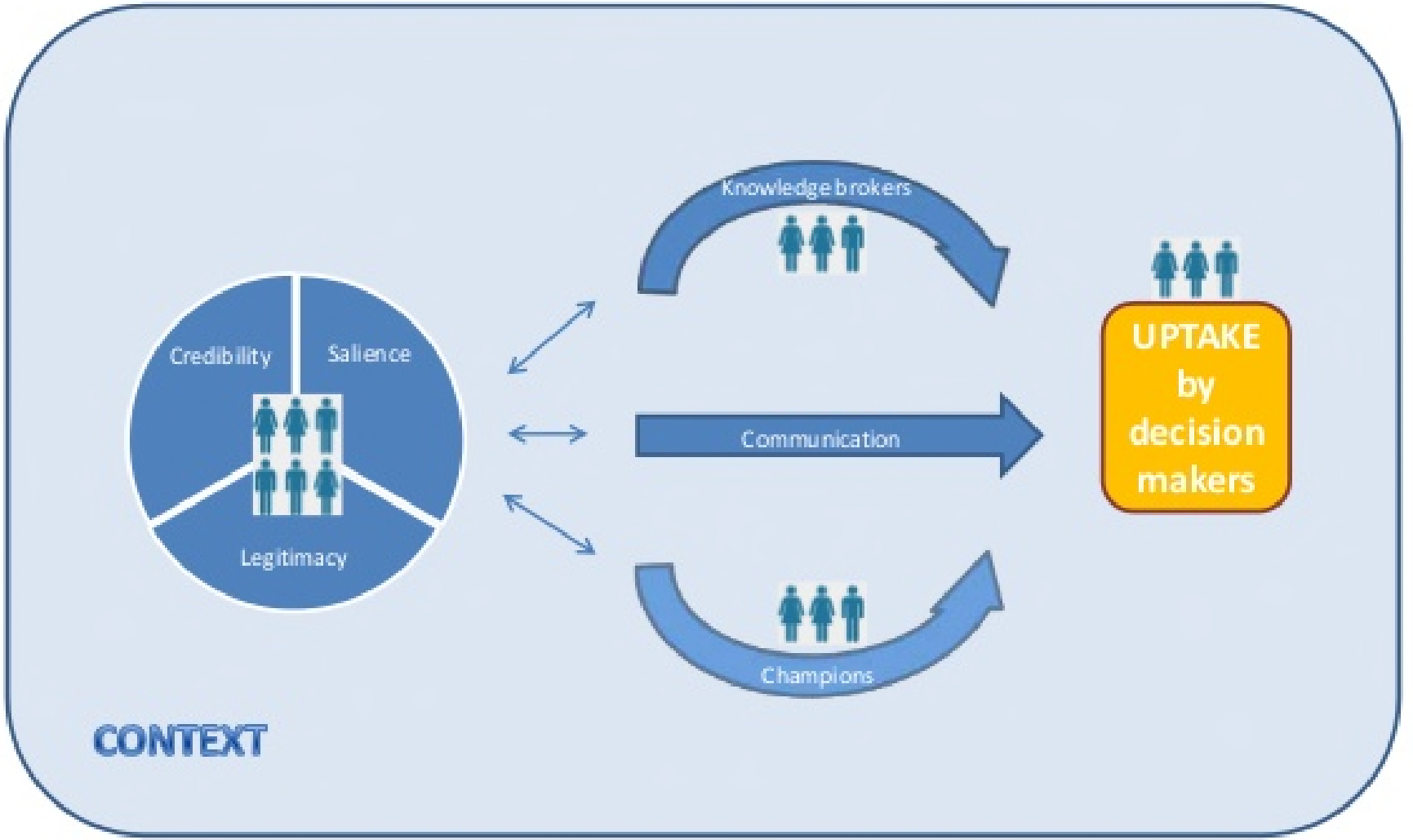
Saliency

Credibility

Legitimacy



A FRAMEWORK FOR UPTAKE



Enduring Framework

SALIENCY: SWF-RAMP ***answers questions*** by proactively identifing regional data comparability objectives and considering regional management impacts.

CREDIBILITY: SWF-RAMP succeeds through information sharing in a suggestive forum that addresses issues and recommends solutions ***to build trust and promote partnerships.***

LEGITIMACY: SWF-RAMP ***supports the efforts and quality of every program***.
Investigating data comparability is highly recommended for monitoring programs which have local, State, or Federal management, assessment, and/or regulatory obligations.

SWF- RAMP relies on participation and achieves continued success because data acquired through monitoring supports the decision-making ***framework*** for Federal, State, and local regions.

Saliency: Answering Questions

1. Evolved from answering questions to asking questions!
2. Expanded regional involvement (upon request) to include freshwater and groundwater systems.
3. Science, legislation, technology, and funding all change and the program evolves based on the current decision-making.

Saliency Challenges: Data Comparability

Incomparable results may provide more questions than answers…but

"…leads to the ***best science***!"

Judy Ott
Charlotte Harbor NEP

The program ***answers questions*** through discussion and assessment using split sample results to ***support credibility***.

Credible Practice: Eliminating Uncertainty

"Over time you see the need for anonymity dissolve because the benefits of improved comparability are powerful."

-Matt Jablonski
SWF-RAMP Co-chair (SWFWMD)

1. Individual ***definition*** for what is good for business.

2. Work to ***overcome*** apprehension about putting procedures and process under scrutiny.

Credible Sources: Ensuring Trust

SWF-RAMP maintains a ***suggestive*** environment.

Individual programs continue to ***determine*** their own practices based on current standards and guidelines.

Program is primarily a tool for internal ***management*** purposes.

"You're not alone."

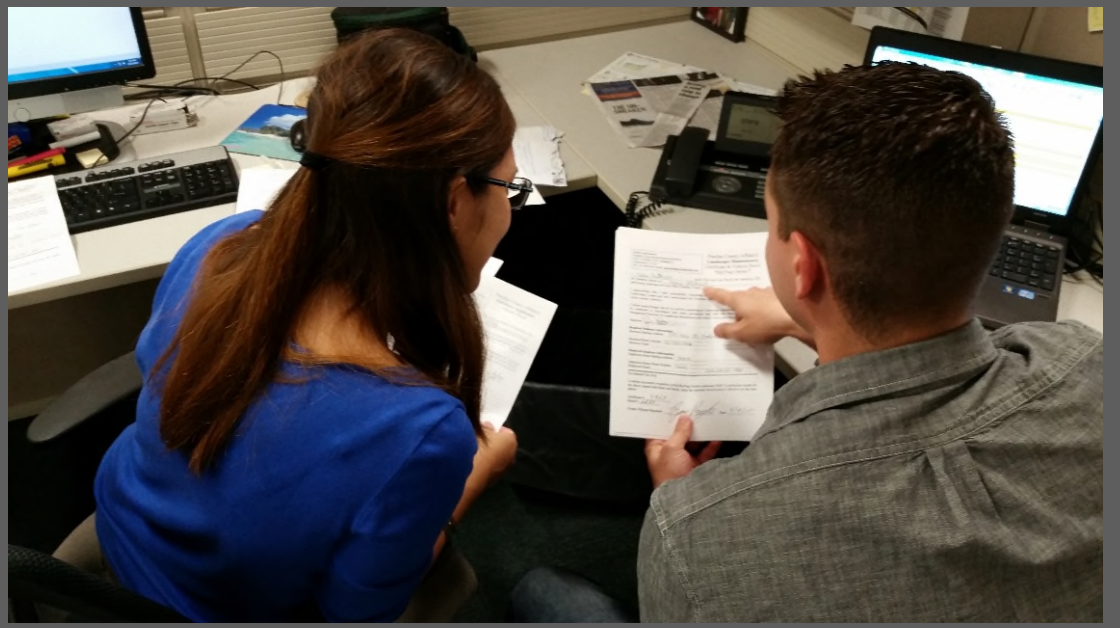
-Kerry Harkinson
Manatee County
Representative

"Street" Credibility: Building Trust

Supports the call for regional participation in State and Federal decision-making.

"We can handle this ***regionally***."

Contrary, if a region can't coordinate a ***voluntary*** program then mandates will be seen as the necessity!



How does your organization, firm, or company's ***vision*** align?

Legitimate Participants & Entities

Existing Legitimacy: Challenges

Do your results compare in your region?

"…but we pass our audits!"

"We follow the method and SOPs and we are right!"

"If our data is a potential outlier how is that going to look?"

Expanded Legitimacy

Does your *work* benefit your monitoring region?

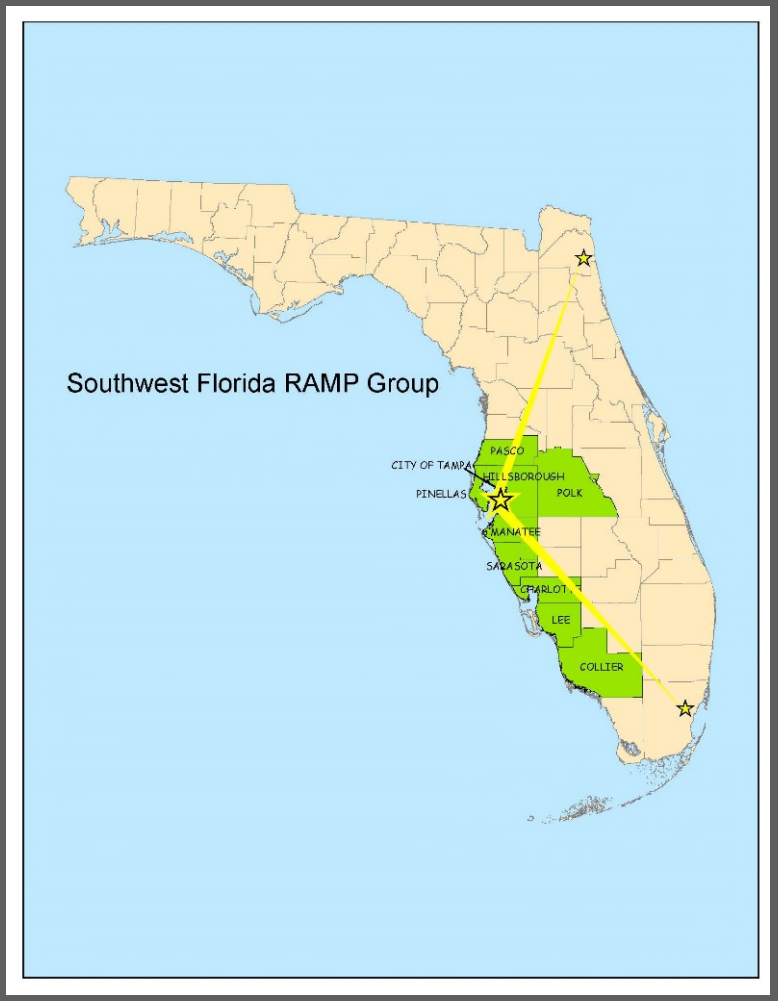
Overcoming *Challenges*

Determining *Consensus*

Implementing *Solutions*

Justifying *Actions*

Legitimate Activities



INSPIRE Activities
(by overcoming challenges)

SUPPORT Initiatives
(by determining consensus)

DEVELOP Solutions
(through communicating concerns)

SHARE Success
(to justify actions)

Legitimate Long-term Benefits

Regionally, we have benefited by meeting ***increasing program requirements*** with ***voluntary collaboration*** and ***coordination!***

Specific Examples Include:

Regulatory Compliance (NPDES)

Equipment & Method Selection

Academic Partnerships

"Legit" Activities

SWF-RAMP Proceedings and Consensus

http://www.tbeptech.org/

under ***Technical Committees*** then ***SW FL Regional Ambient Monitoring Program***