



Indian River and Banana River Lagoon Basin Management Action Plans

PRESENTER Stacy Cecil

Division of Environmental Assessment and Restoration

Water Quality and Restoration Program

Florida Department of Environmental Protection

IRL NEP STEM | Up the Creek Farms, Grant-Valkaria, FL | May 10, 2022



FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

PRESENTATION AGENDA

- What a Basin Management Action Plan (BMAP) Does.
- BMAP Project Prioritization.
- Targeted Restoration Area (TRA) Evaluation.
- Feedback Needed.





What a BMAP Does

**Reduce External
Loads**

**Remove
Internal Loads**

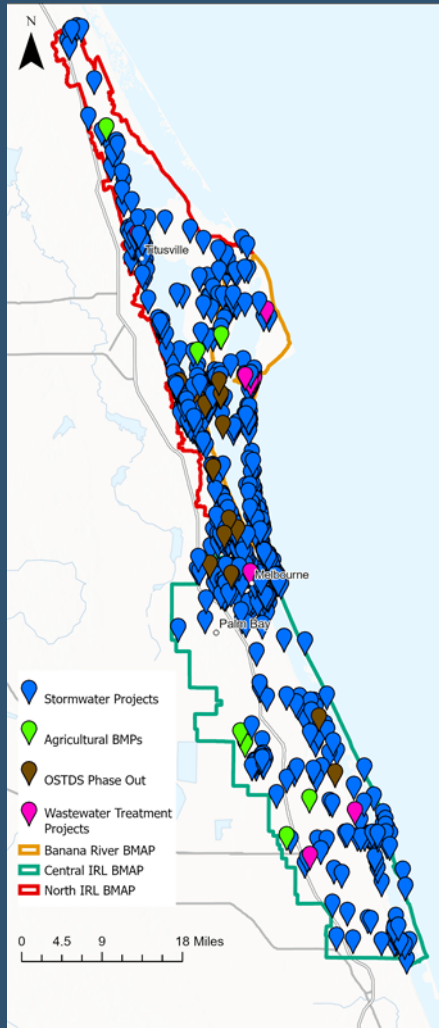
**Restore
Damage to the
System**

**Respond
and
Adapt**





BMAP Project Prioritization



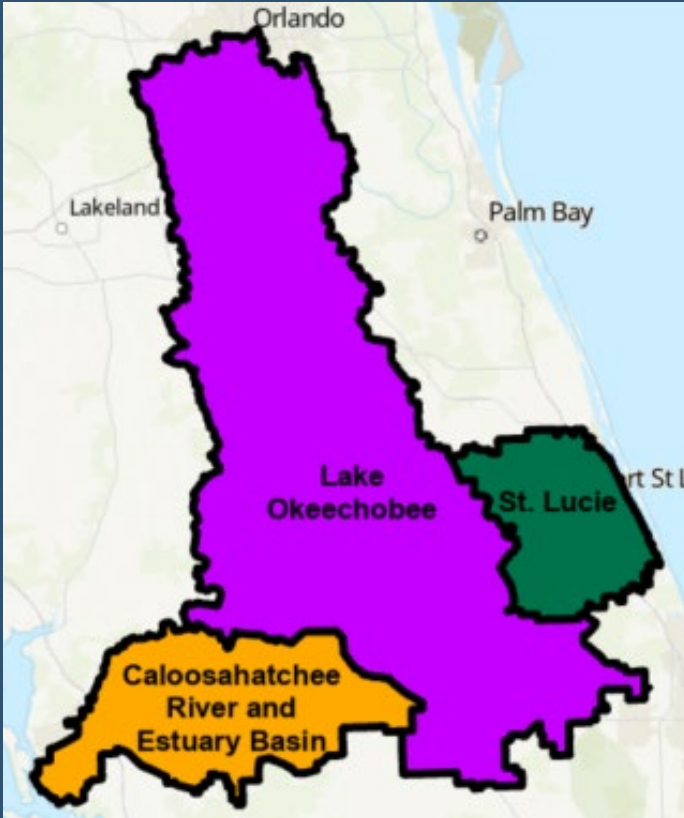
- Many projects, but a long way to go for water quality improvement.
- Where are projects needed the most?
- Where will funding be best used?
- Focus on water quality.





TRA Evaluation

Northern Everglades and Estuaries Protection Plan (NEEPP)



1. Highest Priority.
2. Receives attention after priority 1 areas.
3. Receives attention after priority 2 areas.

Concentration Targets:

Lake Okeechobee &
Caloosahatchee
TN: 1.54 mg/L
TP: 0.12 mg/L

St. Lucie
TN: 0.72 mg/L
TP: 0.081 mg/L

Mean five-year station concentration.

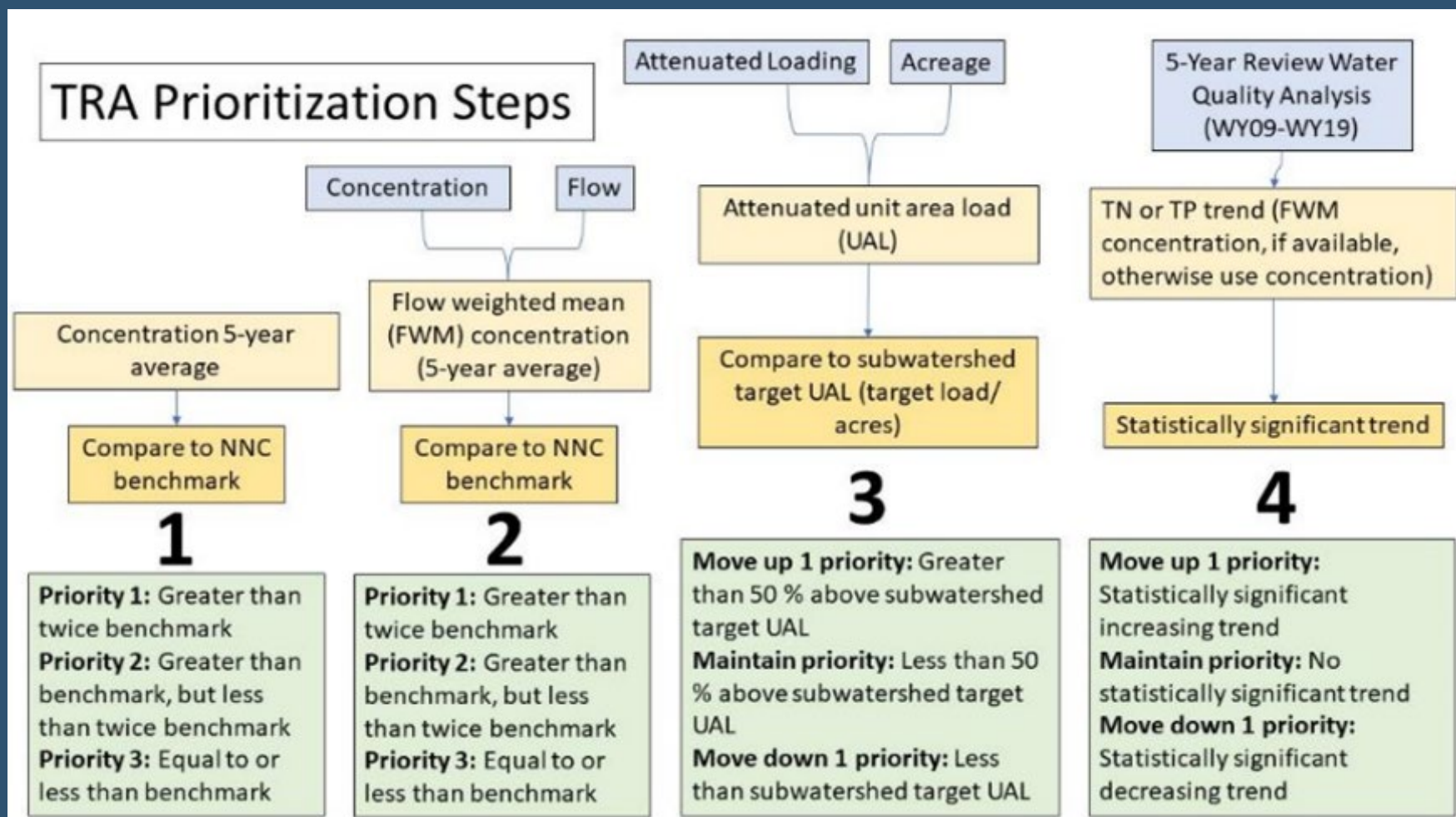
Flow-weighted mean (FWM) five-year station concentration.

Unit area load (UAL) per acre comparison.

Long term seasonal trend at station.



NEEPP TRA Evaluation





Feedback Needed

Period of record (POR):

- USGS Water Year
 - October - September
- Calendar Year
 - January - December
- SFWMD Water Year
 - May - April

Station Aggregation:

- Aggregate to project zone
- Aggregate to TMDL segment
- Don't aggregate, need more basin representation

Concentration Target:

- State Numeric Nutrient Criteria for peninsular streams
- SJRWMD single target
- Multi-target
 - Derived from PLSM
 - Derived from SWIL v4

Unit Area Load (UAL):

- How to best calculate target
 - SWIL
 - PLSM
- Alternatives

Trends:

- Seasonal-Kendall with flow
- Seasonal-Kendall without flow
- Use entire station POR
- Maintain POR for all stations

Adjust Priority Order:

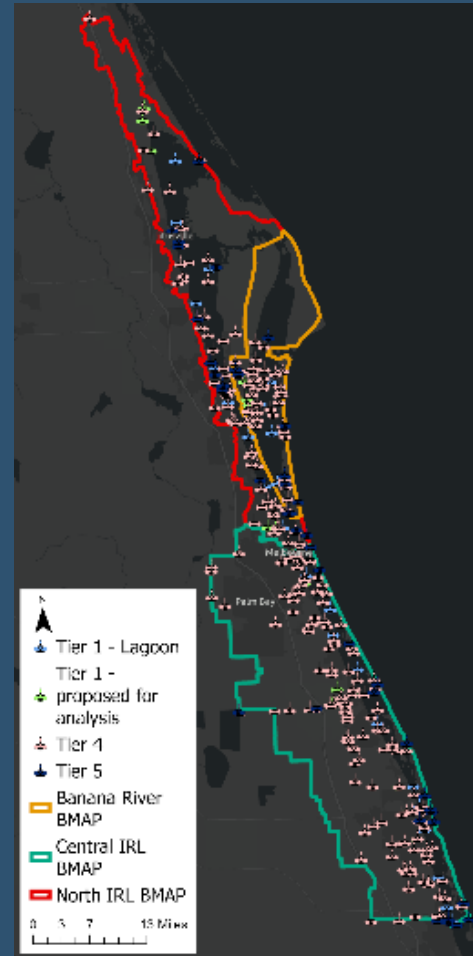
- Establish with five-year FWM/mean concentration
- Increase/decrease with UAL
- Increase/decrease with trend



Adapt TRA Evaluation for IRL

- Focus on inputs from watershed.
 - Tributary pour points
 - Many in Central IRL.
 - Virtually none in Banana River.
 - Gaps in North IRL.
- Outfalls
 - Infrequent discharge.
 - Poor period of record and monitoring results.

All Water Quality Sites Watershed Information Network (WIN)



Proposed Sites for Evaluation





Proposed Station Concentrations

Station	BMAP PZ	Measured Mean TN 2017-2021 (mg/L)	Measured Mean TP 2017-2021 (mg/L)	FLW Mean TN 2017 - 2021 (mg/L)	FLW Mean TP 2017 - 2021 (mg/L)
ODIX	NIRL A	0.15	0.24		
IRLTBC	NIRL A	0.07	0.16		
TC2	NIRL A	0.16	0.25		
IRLBFC and IRLBRR	NIRL A	0.17	0.16		
IRLSCPW	BIRL B	0.07	0.06		
IRLNHFH01 and IRLNHFH01S	BIRL B	0.04	0.06		
IRLUPHC and IRLHUS	NIRL B	0.19	0.11		
IRLUPEGWR	NIRL B	0.24	0.19		
IRLEGU	NIRL B	0.11	0.12	0.92	0.11
CC03	CIRL A	0.28	0.09		
IRLCCU	CIRL A	0.14	0.11	0.88	0.10
IRLTPM	CIRL A	0.11	0.05		
IRLTUS	CIRL A	0.10	0.07	0.76	0.07
IRLUPGC	CIRL A	0.24	0.04		
IRLUPSFW	CIRL SEB	0.17	0.12	0.95	0.16
IRLSEBNP	CIRL SEB	0.11	0.07	0.95	0.09
IRLSUS	CIRL SEB	0.07	0.09		
IRLVNC and IRLVNCODH	CIRL B	0.34	0.16	1.15	0.18
IRLVMC	CIRL B	0.24	0.12	1.15	0.17
IRLVSC	CIRL B	0.24	0.11	0.69	0.10
C25S50	CIRL SIRL	1.19	0.17	1.52	0.31

*USGS water year October 2017 to September 2021.



Determine Concentration Target

Multi-target Derived from PLSM

Project Zone	PLSM Aggregated Target TN mg/L	PLSM Aggregated Target TP mg/L
NIRL A	0.21	0.01
NIRL B	0.49	0.07
BIRL A	Insufficient Data	Insufficient Data
BIRL B	0.39	0.04
CIRL A	0.24	0.04
CIRL SEB	0.24	0.04
CIRL B	0.29	0.05
CIRL SIRL	0.72	0.07

Multi-target Derived from SWIL

Project Zone	SWIL v4 Aggregated Target TN mg/L	SWIL v4 Aggregated Target TP mg/L
NIRL A	0.42	0.07
NIRL B	0.49	0.08
BIRL A	Insufficient Data	Insufficient Data
BIRL B	0.70	0.10
CIRL A	0.61	0.09
CIRL SEB	0.61	0.09
CIRL B	0.61	0.09
CIRL SIRL	0.72	0.07

State Numeric Nutrient Criteria for peninsular streams

TN: 1.54 mg/L

TP: 0.12 mg/L

SJRWMD single target

TN: 0.98 mg/L

TP: 0.05 mg/L



Consider Station Aggregation

Station	BMAP	PZ	TMDL Segment Group
ODIX	North IRL	A	IR1-5
IRLTBC	North IRL	A	IR1-5
TC2	North IRL	A	IR1-5
IRLBFC and IRLBRR	North IRL	A	IR1-5
IRLSCPW	Banana River	B	BR-6
IRLNFOH1 and IRLNFOH1S	Banana River	B	BR-6
IRLUPHC and IRLHUS	North IRL	B	IR8-11
IRLUPEGWR	North IRL	B	IR8-11, EauGallie
IRLEGU	North IRL	B	IR8-11, EauGallie
CC03	Central IRL	A	IR12-21
IRLCCU	Central IRL	A	IR12-21
IRLTPM	Central IRL	A	IR12-21
IRLTUS	Central IRL	A	IR12-21
IRLUPGC	Central IRL	A	IR12-21
IRLUPSFW	Central IRL	SEB	IR12-21
IRLSEBNP	Central IRL	SEB	IR12-21
IRLSUS	Central IRL	SEB	IR12-21
IRLVNC and IRLVNCODH	Central IRL	B	IR12-21
IRLVMC	Central IRL	B	IR12-21
IRLVSC	Central IRL	B	IR12-21
C25S50	Central IRL	SIRL	IR-SouthCentral



Proposed Unit Area Loading

Pollutant Load Screening Model (PLSM) UAL

BMAP	Project Zone	UAL TN (lb/acre)	UAL TP (lb/acre)
North IRL	A	2.64	0.19
North IRL	B	5.01	0.59
Banana River	A	2.22	0.15
Banana River	B	5.49	0.55
Central IRL	A	2.87	0.47
Central IRL	SEB	2.87	0.47
Central IRL	B	3.60	0.69
Central IRL	SIRL	8.81	0.86

**Spatial Watershed Iterative Loading (SWIL) Model version 4
UAL**

BMAP	Project Zone	UAL TN (lb/acre)	UAL TP (lb/acre)
North IRL	A	1.03	0.16
North IRL	B	2.45	0.44
Banana River	A	1.61	0.21
Banana River	B	2.30	0.34
Central IRL	A	3.23	0.38
Central IRL	SEB	3.25	0.35
Central IRL	B	4.11	0.49
Central IRL	SIRL	2.43	0.57



Trends

SJRWMD runs annual trends at their stations.

Surface Water Quality Sampling at the St. Johns River Water Management District

Nutrients: Total Phosphorus

Phosphorus is an element found in organic and inorganic forms that contributes to the growth of aquatic plants and algae. Total phosphorus contains both dissolved and particulate components and is from an unfiltered water quality sample.

Colors on the map indicate status

- LOW (0th-25th percentile)
- medium (25th-75th percentile)
- high (75th-100th percentile)

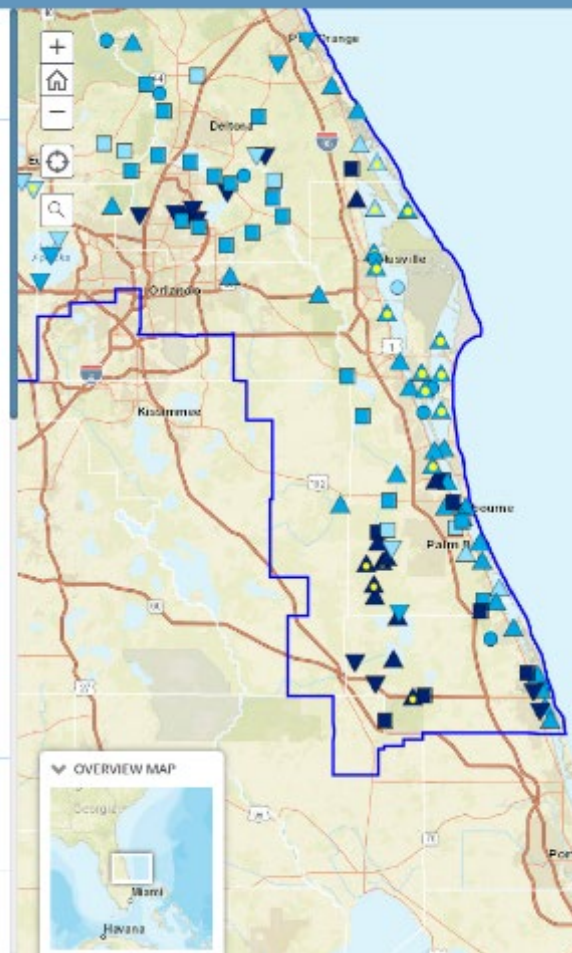
Note that these values are low, medium, or high relative to each other, not to a specific water quality standard.

Symbols on the map indicate trends over the past 15 years

- ▲: Increasing (a yellow dot indicates greater than 5% increase per year)
- ▼: decreasing (a yellow dot indicates greater than 5% decrease per year)
- : stable (no detectable change)
- : not enough data to evaluate a trend

Nutrients: Total Nitrogen

Nutrients: Dissolved Nitrite and Nitrate



Station	BMAP	PZ	SJRWMD 15-yr TN Trend	SJRWMD 15-yr TP Trend
ODIX	North IRL	A	NA	NA
IRLTBC	North IRL	A	Significantly Decreasing Trend	No Significant Change
TC2	North IRL	A	NA	NA
IRLBFC and IRLBRR	North IRL	A	No Significant Change	Significantly Increasing Trend
IRLSCPW	Banana River	B	Significantly Increasing Trend	Significantly Increasing Trend
IRLNFH01 and IRLNFH01S	Banana River	B	Significantly Increasing Trend	Significantly Increasing Trend
IRLUPHC and IRLHUS	North IRL	B	Significantly Increasing Trend	Significantly Increasing Trend
IRLUPEGWR	North IRL	B	Significantly Increasing Trend	Significantly Increasing Trend
IRLEGU	North IRL	B	No Significant Change	No Significant Change
CC03	Central IRL	A	Significantly Increasing Trend	Significantly Increasing Trend
IRLCC and IRLCCU	Central IRL	A	No Significant Change	No Significant Change
IRLTPM	Central IRL	A	No Significant Change	No Significant Change
IRLTUS	Central IRL	A	No Significant Change	No Significant Change
IRLUPGC	Central IRL	A	Significantly Increasing Trend	Significantly Increasing Trend
IRLUPSEFW	Central IRL	SEB	No Significant Change	No Significant Change
IRLSEBNP	Central IRL	SEB	No Significant Change	No Significant Change
IRLSUS	Central IRL	SEB	No Significant Change	Significantly Increasing Trend
IRLVNC and IRLVNCODH	Central IRL	B	Significantly Increasing Trend	No Significant Change
IRLVMC	Central IRL	B	No Significant Change	Significantly Decreasing Trend
IRLVSC	Central IRL	B	No Significant Change	Significantly Decreasing Trend
C2S550	Central IRL	SIRL	NA	NA

<https://floridaswater.maps.arcgis.com/apps/MapSeries/index.html?appid=cc919a031793426f875c801e49b92eed>



Questions & Discussion





THANK YOU

Division of Environmental Assessment and
Restoration

Water Quality Restoration Program

Florida Department of Environmental Protection

Stacy Cecil, IRL BMAP
Coordinator

Stacy.Cecil@FloridaDEP.gov

850-245-8683

Diana Turner, South Florida
Environmental Administrator

Diana.M.Turner@FloridaDEP.gov

850-245-8825