PRMRWSA Water Quality & Environmental Monitoring Programs











Peace River Manasota Regional Water Supply Authority Regional Vision for 2035





Multiple Programs - Multiple Goals

Program	Monitors	Focus
HBMP	Lower Peace River & Upper Charlotte Harbor	Document existing conditions and assess relationship of changes in flow & WQ. Regulatory Compliance
Horse Creek Stewardship	Horse Creek	Document existing WQ conditions and assess changes due to activities in Horse Creek basin. Also - early warning for dam breach in mine area.
Peace River & Whidden Creek	Peace River & Whidden Creek	Document WQ changes from USAC gyp- stack closure
Raw PRF Supply WQ Monitoring	Peace River Intake & Reservoir System	Raw water quality to support Reservoir Management and Treatment Operations
Raw Water to WTP	Raw Water to WTP from Reservoir system	Process Control & Regulatory Compliance
Finished WQ Monitoring	Finished Water from PRF & Reg. Trans. Syst.	Product excellence and Regulatory Compliance
ASR System Monitoring	ASR Production & Monitor Wells	WQ & WL response to ASR operations & Regulatory Compliance

Multiple Programs - Multiple Goals

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Peace River Basin Land Use

Figure 4.3.1.3. Developed Land Use in the Peace River Watershed in 1999

2,200 Miles²

Land Use	% of the Basin
Agriculture	43%
Uplands/Wetlands/Streams/ Lakes	36%
Mining	11%
Urban	10%



PBS

Peace River Facility



4-48

Peace River Cumulative Impact Study January 2007

Projected Future Land Use Peace River Basin

- Increased Urban
- Increased Mining
- Reduced Agriculture
- Reduced Native Uplands/Wetlands



HydroBiological Monitoring Program (HBMP)

- Monitoring on the Lower Peace River & Upper Charlotte Harbor
- Identify Impacts from Withdrawals
- In Place since 1976
- Focus on Water Quality & Biology



HBMP

- Continuous WQ Data
 @ 11 Recorder
 Stations
- Monthly WQ Data @ 16 Fixed Stations
- Rainfall & Flow Data
- Chlorophyll A
- Annual Data Reports
- 5-Year
 Comprehensive
 Summary Reports
 - Data Shared on WIN





HBMP Continuous Recorders & Gages

Parameters	Value	
Temperature	All Recorders – Used to Calculate TDS/Salinity	
Conductivity	All Recorders – Used to Calculate TDS/Salinity	
Water Level	USGS Recorders - Tide Stage, Calculate Flow, Public Access	
River Flow	USGS Gages – Regulatory, Modeling, Public Access	
And and		





USGS Peace River @ Platt

HBMP

USGS Recorder -Peace River @ Platt





USGS Recorder -Peace River @ Arcadia



≊USGS

USGS 02296750 PEACE RIVER AT SR 70 AT ARCADIA, FL 900 Ъ 800 secol 700 600 per feet 500 cubic 400 Discharge, Δ 200 Dec Dec Dec Dec Dec Dec Dec Dec 09 10 11 12 13 14 15 16 2020 2020 2020 2020 2020 2020 2020 2020 Provisional Data to Revision Sub ject.

🛆 Median daily statistic (89 years) — Discharge

HBMP Monthly Fixed Station & Salinity Zone Monitoring

Parameters	Value
Temperature	Calc. for TDS/Salinity
Dissolved Oxygen	Habitat / Mixing
Conductivity	Calc. for TDS/Salinity
Depth	Reference
рН	Reference
Light Extinction	Water Clarity
Color	Light Penetration & GW Influence
Chloride	GW – or marine waters
Suspended Solids	Turbidity / Bio. Production
Volatile Solids	Turbidity / Bio. Production
Nitrite + Nitrate	Nutrient
Ammonia/Ammonium	Nutrient
Total Kjeldahl Nitrogen (TKN)	Nutrient
Orthophosphate	Nutrient
Silica	Micronutrient
Iron	Micronutrient
Chlorophyll A	Bio-Mass / Productivity





The Estuarine-Dependent Life History

Interactions of Flows, Nutrients and Residence Time



The estuarine-dependent life history

Modified from Peebles (2002)

- Fresh Water Inflow Provides Nutrients
- Nutrients = Phytoplankton Growth
- Beginning of Estuarine Food Chain Growth
- Results in Greater
 Harbor Production

Some HBMP Monitoring Program Findings

- Dry Season Conductivity Upstream of the Peace River Facility is Increasing
- Phosphorous Concentrations have been Declining in the Peace River near Intake
- Nitrogen Concentrations have been Declining in the Peace River near Intake



Figure 7.79 Monthly long-term surface conductivity at river kilometer 30.7 (S.R. 761)



Figure 7.90 Monthly long-term surface ortho-phosphorus at river kilometer 30.7 (S.R. 761)

019 HBMP Data Repo

Orth Phosphorous 1976 - 2019



Excessive
 Phosphorus
 has a Negative
 Impact to the
 Estuary

Phosphorus Levels Declining Since mid 1980's

2019 HBMP Data Report

Figure 7.90 Monthly long-term surface ortho-phosphorus at river kilometer 30.7 (S.R. 761)

Total Nitrogen 1978 - 2019



Excessive
 Nitrogen has a
 Negative
 Impact to the
 Estuary

 Nitrogen Levels are trending Lower

Figure 7.89 Monthly long-term surface total nitrogen at river kilometer 30.7 (S.R. 761)

2019 HBMP Data Report

Chlorophyll 1976 - 2019



Figure 7.94 Monthly long-term surface Chlorophyll a at river kilometer 30.7 (S.R. 761)

Excessive
Chlorophyll
Levels have a
Negative Impact
to the Estuary

 Chlorophyll Levels are a Relatively Steady Trend Showing Positive WQ

2019 HBMP Data Report

Horse Creek Stewardship Program

- Result of 2003 Settlement with IMC (now Mosaic)
- Implemented In 2003
- Identify Impacts from Phosphate Mining
- Water Quality, Flow, Biology
- Automated Alerts of High Turbidity Water Release from Mine Site.



Horse Creek Real-Time Continuous Turbidity Monitoring (Spill Warning)

- Located at Horse Creek on SR 64
- Continuous Monitor for Turbidity
- Immediate (automated) Notification for Authority and Mosaic if Turbidity Threshold Exceeded
- Approx. 1.5 Days Flow
 Duration Upstream of
 Peace River Intake







Peace River / Whidden Creek Monitoring Program

- Monitoring Associated with USAC Gyp-Stack Closure site Polk County
- Characterize Impacts from Gyp-Stack Closure
- 10 Fixed Stations
- 1-3 Times Per Year
- 2007 to Present



Peace River / Whidden Creek WQ Monitoring

Parameters	Value
Temperature	Calc. for TDS/Salinity
Dissolved Oxygen	Habitat
Conductivity	Calc. for TDS/Salinity
Turbidity	Mine Release or Local Disturbance
рН	Reference
Total Dissolved Solids (TDS)	GW component / higher in marine waters
Magnesium	GW Component
Chloride	GW component or marine water influence
Sulfate	GW component / Gyp. Stack Runoff
Fluoride	Associated with Phosphate Deposits
Potassium	Nutrient – higher in marine waters
Calcium	GW influence
Silica	Micro-nutrient
Sodium	Salinity / GW Component
Total Nitrogen	Nutrient
Nitrite + Nitrate	Nutrient
Nitrite Nitrogen	Nutrient
Nitrate Nitrogen	Nutrient
Total Kjeldahl Nitrogen (TKN)	Nutrient
Orthophosphate	Nutrient



Peace River / Whidden Creek





- Total Dissolved Solids Increase at Whidden Creek (Station 3)
- Declines Due to Added River Flow
- Increase Again at Joshua Creek (Station 8) Due to Irrigation Runoff

Peace River / Whidden Creek





- Total Phosphorus Increase at Whidden Creek (Station 3)
- Declines Due to Added River Flow
- Increase Again at Horse Creek (Station 10)

Peace River / Whidden Creek Monitoring

- Water Quality in Whidden Creek is affected by Gypsum Stack closure activity
- Data Provides Important Information on the Potential Impacts of Gypsum Stack Closure to Receiving Water Quality
- Adverse effects have not been discernable at PRF Intake due to downstream dilution



Peace River Facility Influent Water Quality Monitoring

- Monitoring River Water Quality at the Intake
 - Supports WQ Management in Reservoirs
 - Supports Treatment Operations
 - Warning for Upsets in the River
- Important Background Reference
- Multiple Parameters/Constituents
- Various Schedules from Daily to Semi-Annual





Peace River / Primary & Secondary Drinking Water Monitoring

- Drinking Water Parameters
 - 17 inorganic parameters
 - 21 Volatile Organics
 - 29 Synthetic Organics
 - 4 Radiological
 - 15 secondary (aesthetic) parameters
- 2 times per year at River Intake
- Implemented 2009

Peace River / Weekly Withdrawal Quality

Parameters	Value
Temperature	Field Parameter
Dissolved Oxygen	Field Parameter
Conductivity	Field Parameter
рН	Field parameter
Total Dissolved Solids	Salinity / GW or Marine Waters
Total Suspended Solids	Loading & Turbidity
Chlorophyll A	Algae & Biomass
Copper	Background reference
Iron	GW influence
Sulfate	GW influence
Ammonia Nitrogen	Nutrient
Nitrite + Nitrate	Nutrient
Total Nitrogen	Nutrient
Total Kjeldahl Nitrogen (TKN)	Nutrient
Orthophosphate	Nutrient
Total Phosphorous	Nutrient
Geosmin & MIB	Algal activity

- Weekly when Withdrawing from the River
- Collected at River Intake
- Implemented In 2013

Peace River Daily (Operations)

Parameters	Value
Temperature	Field Parameter / Reference
Dissolved Oxygen	Field Parameter / Reference
Conductivity	Field Parameter / Reference
рН	Field parameter / Reference
Color	TOC and Loading
Odor	Taste & Odor background
Turbidity	Sediment/Debris Loading
Algae Count	Taste & Odor
Alkalinity	GW Influence
Hardness	GW influence
Fluoride	Mining influence
Sulfate	GW Influence
Chloride	Seawater Influence
Total Organic Carbon (weekly)	Background & Disinfection

- Daily Monitoring of the River (Operations)
- Collected at River
 Intake
- Implemented In 1980



QUESTIONS