

# MARCO ISLAND

## Waterways Advisory Committee

Clean Water Initiative — Priority Framework

Draft for Committee Review | March 20, 2025

### Organizing Principle

**"Stop the Input → Remove the Accumulation → Sustain Aquatic Life While We Fix It"**

This framework sequences the Committee's recommendations by root cause first, then remediation, then ongoing management — providing a defensible, science-based rationale for prioritizing budget and staff attention.

#### TIER 1 — ROOT CAUSE, PART 1 | Highest Priority: Address First

##### 1. AWT / Higher-Level Wastewater Treatment (Reuse Water)

City Council has already hired an outside engineering firm, Black and Veatch, to study alternatives and costs for implementing higher levels of potable and sewage treatment to reduce nitrogen and phosphorus in reuse water.

This is the foundational fix. Reuse water distributed island-wide for irrigation is the primary identified source of phosphorus and nitrogen entering the canal system. All other interventions are downstream mitigation until this source is addressed.

Status: Already moving at City Council level with Black & Veatch report underway. Committee role: stay aligned and maintain momentum.

#### TIER 2 — ROOT CAUSE, PART 2 | Stop the Nutrient Input

##### 1. Proactive Fertilizer Ordinance Enforcement

Enforce the existing ordinance rigorously. Specific required actions:

- Ensure all fertilizer vendors are registered with the City and adhering to controlled application rates
- Conduct regular random testing of vendor fertilizer products for phosphorus and nitrogen content
- Stop landscapers from blowing lawn debris into canals and canal drains — fine violators
- Fund dedicated Code Enforcement resources to patrol canals for violations
- Stop City overspray of reuse water on Collier Boulevard medians
- Recommend a one-year island-wide ban on fertilizer application, or alternatively encourage all landowners to voluntarily reduce fertilizer application by at least 50% with progressive reductions in future years

High impact, low cost, immediately actionable — no capital expenditure required. Ordinances exist; the gap is enforcement.

## 2. Florida-Friendly Landscaping & Turf Reduction

Reduce fertilizer-dependent turf island-wide through ordinance reform and public encouragement. Specific actions:

- Encourage Florida-native ground covers that require little or no added fertilizer
- Increase Florida-Friendly plantings in City-maintained medians
- Coordinate with the Beautification Committee and Collier County on sustainable planting standards
- Support and monitor ongoing landscape ordinance reform efforts

Directly reinforces fertilizer enforcement — fewer fertilizer-dependent lawns means less nutrient loading regardless of enforcement levels. Draft Ordinance revisions already on WAC Agenda.

## 3. Stormwater Ordinance Reform — Close the Residential Exemption

Recommend City Council amend or replace the existing Stormwater Ordinance to require stormwater treatment for all new and substantially rehabilitated single-family homes.

Current gap: residential construction on lots under one acre is exempted from MS4 stormwater regulations — while commercial and industrial construction is covered. This exemption creates a significant unregulated pathway for nutrient-laden runoff into the canal system.

### TIER 3 — REMEDIATION | Address What Has Already Accumulated

#### 1. Sediment Removal / Canal Dredging

Decades of nutrient-laden sediment on canal bottoms continues leaching phosphorus and nitrogen upward into the water column — even if all surface inputs are eliminated today. Dredging can be a complement to AWT.

Advocate for a phased dredging plan. Coordinate with any available federal, state, and private grant opportunities to reduce City cost. Explore targeted suction dredging. Explore encapsulation. Explore microbe eating bacteria.

#### 2. Canal Bubblers — Aeration Demonstration Program

The current demonstration program is the correct approach: test before scaling. Aeration/bubblers address low dissolved oxygen (a symptom of nutrient loading) rather than the underlying cause, but provide a valuable bridge measure that can sustain aquatic life while larger fixes proceed.

Evaluate demonstration results rigorously before committing to island-wide expansion.

#### 3. Deep Injection Wells

Investigate increased use of deep injection wells for excess reuse water supply during periods when demand is low — until reuse water quality is improved through AWT. This reduces the volume of nutrient-laden reuse water distributed for irrigation.

#### 4. DEPRIORITIZED: Tidal Leveling / Hydraulic Culvert Interconnect Project

The Committee recommends against pursuing this project. A technical policy review finds it is not scientifically viable, financially justifiable, or capable of reducing nutrient concentrations in Marco Island's canal system. The tidal leveling and hydraulic culvert interconnect proposals are variants of the same concept and share the same fatal flaws.

##### Key technical findings:

- Marco Island's canal system holds over 3.16 billion gallons. Actual tidal exchange is only 1–3% per tide — far below what is required to meaningfully displace nutrient-rich water.
- Achieving even a 50% nutrient concentration reduction would require replacing more than 1.5 billion gallons per day — over 25 times the realistic tidal exchange capacity.
- Nutrient loading is continuous from reclaimed irrigation water, stormwater, and sediment release. Dilution through tidal exchange cannot keep pace with ongoing inputs.
- Nearshore Gulf waters periodically contain moderate nutrient levels and harmful algal species. Increased tidal exchange may import problems rather than reduce them.
- The infrastructure required — reconstruction of canal entrances, tidal gates or high-capacity pumps, extensive dredging — would likely cost hundreds of millions of dollars while delivering marginal or no measurable water quality benefit.
- Artificial currents can damage seawalls, disturb sediments, and create unintended ecological impacts.

The project would merely shift pollution offshore rather than reduce it. Resources should be directed to proven, source-focused strategies: AWT, fertilizer enforcement, aeration, and sediment management.

### TIER 4 — PUBLIC EDUCATION AND ONGOING MONITORING | Sustain and Measure

#### 1. Hire an Outside Public Relations Consultant

Engage an outside PR consultant to develop and execute a comprehensive public education campaign on water quality issues — covering fertilizer reduction, irrigation best practices, and canal stewardship — targeted to both homeowners and landscaping professionals.

Supplement with water quality information in monthly utility bills.

#### 2. Irrigation Education & Smart Controllers

- Promote the IFAS Urban Irrigation Scheduler app and similar tools to homeowners and landscapers
- Encourage installation of soil moisture sensors on irrigation systems
- Consider converting median spray heads to subsurface drip or microspray systems to minimize reuse water overspray on impervious surfaces
- Include fertilizer and irrigation education in monthly City water bills

#### 3. Monitor MS4 and 4E Plans — Report to Committee

Monitor and evaluate Marco Island's MS4 stormwater management plan and FDEP 4E alternative water quality plan. Track milestones, report progress to the Committee, and flag any reporting deficiencies to City Council.

#### **4. Street Sweeping Program — Publish Results**

Monitor results of the ongoing street sweeping program and publish findings publicly. Verify that inlet screens and sweeping are reducing nutrient and sediment loading entering the canal system.

#### **5. Annual Water Quality Reviews**

Continue conducting annual water quality reviews with outside, independent water quality consultants to monitor trends, review data, and provide future recommendations to the Committee and City Council.

#### **6. Rain Sensors on All Reuse Water Users**

Install rain sensors on all reuse water irrigation systems — including City-owned properties — to automatically stop overwatering during rain events. Excess irrigation drives nutrient leaching and fungal/pest pressure that leads to additional chemical applications.

#### **7. Jacobs Report — Outstanding Recommendations**

Implement the remaining outstanding recommendations from the Jacobs Engineering Report:

- Conduct additional soil sampling of representative public access areas and golf courses to assess phosphorus levels and P Capacity Indexes
- Install additional shallow groundwater monitoring wells to assess nutrient impacts to groundwater
- Update irrigated area records for all reuse customers for more accurate tracking of irrigation and nutrient loading rates
- Promote use of soil moisture monitoring sensors on irrigation systems with smart controllers
- Convert median spray heads/rotors to subsurface drip or microspray systems to minimize reuse water application to road surfaces

### **TIER 5 — INSTITUTIONAL REFORM | Structural Capacity to Sustain Progress**

#### **1. Create a Department of Environment & Stormwater Management**

Recommend the City form a dedicated department — separate from Public Works — focused exclusively on water quality and stormwater issues, led by a licensed engineer. The current organizational structure does not provide sufficient dedicated institutional capacity to address these issues at the required scale.

#### **2. Establish a Stormwater Utility District**

Investigate adopting a Stormwater Utility District to assess modest fees and create a dedicated, sustainable funding source for water quality improvements.

Over 165 Florida cities and counties already operate Stormwater Utility Districts. Marco Island lacks a dedicated funding mechanism — relying instead on general fund appropriations that compete with other priorities. A utility district creates predictable, ring-fenced revenue for this work.

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This framework was prepared to assist the Marco Island Waterways Advisory Committee in prioritizing a comprehensive, science-based approach to clean water. It is intended as a working draft for Committee discussion and refinement.

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