



Legacy Reef Tires: Yesterday's disposal becomes today's challenge

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So...We put tires in the ocean

1970s - 1980s

Too many tires & limited recycling options
Artificial reefs were considered beneficial

Present Day

Legacy disposal challenge



Large-scale tire reef construction efforts in Florida (1970s).
Source: Osborne Reef Project

Why does it matter?

- › Past disposal decisions don't disappear
- › Impacts often show up years or decades later
- › This applies across solid waste; not unique to reefs
- › Requires coordination beyond traditional roles
- › Solid waste programs often become part of the long-term solution



Project Overview



Evaluate five
artificial reef sites in
Pinellas County



Focus on legacy
tire reef areas



Establish baseline
conditions before
evaluating removal
options

CLEARWATER REEF

RUBE ALLYN REEF

MADEIRA BEACH REEF

TREASURE ISLAND REEF

ST. PETE REEF

Largest Site

- ~2,800 tires
- Dense clusters
- Significant partial burial

Mid-Size Sites

- 100–160 tires
- Distinct clusters
- Limited spread

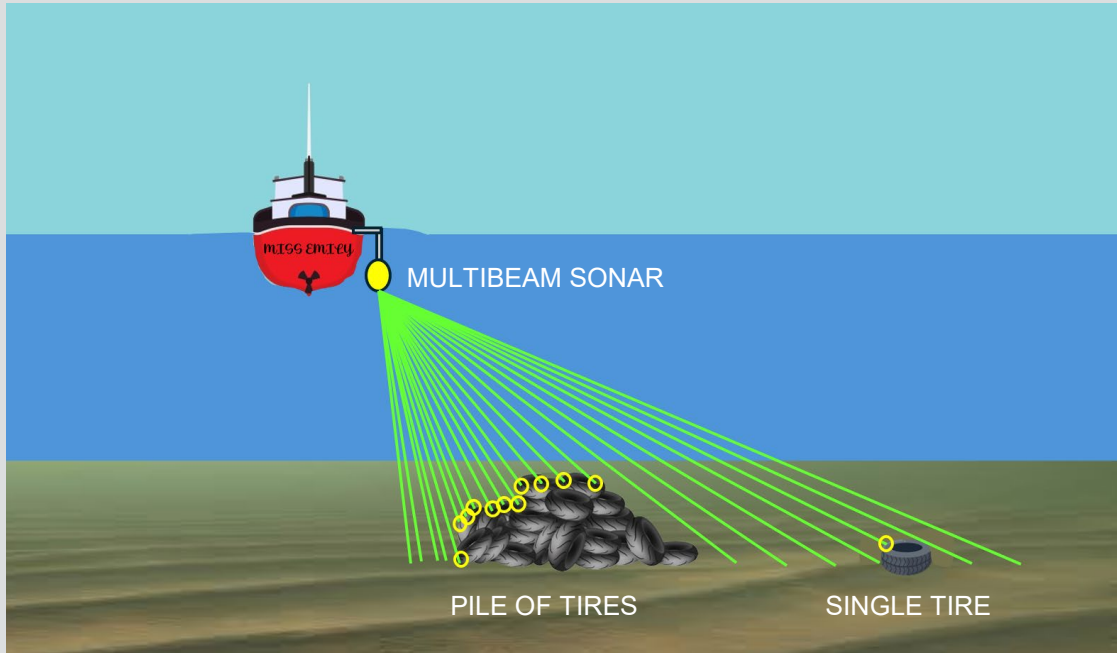
Smaller Sites

- <100 tires
- Narrow corridors or grouped pockets
- Minimal outliers

Key findings across all sites

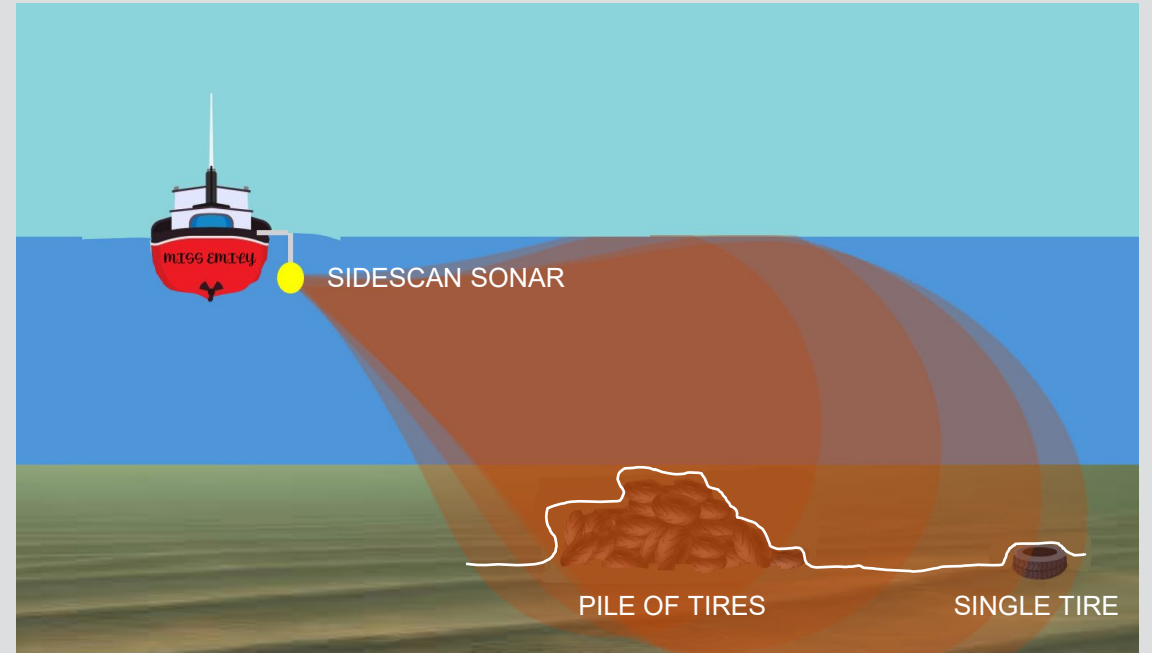
- › Tires remain largely within reef boundaries
- › Distribution is clustered
- › Movement is limited and directionally influenced
- › Many tires are partially buried or embedded

How we collected the data



Multibeam Sounding Density & Object Detection

The density of soundings determines the smallest object that can be reliably detected.



Sidescan Sonar Coverage

Emits wide, fan-shaped acoustic pulses that sweep across the seafloor on both sides of the sensor.

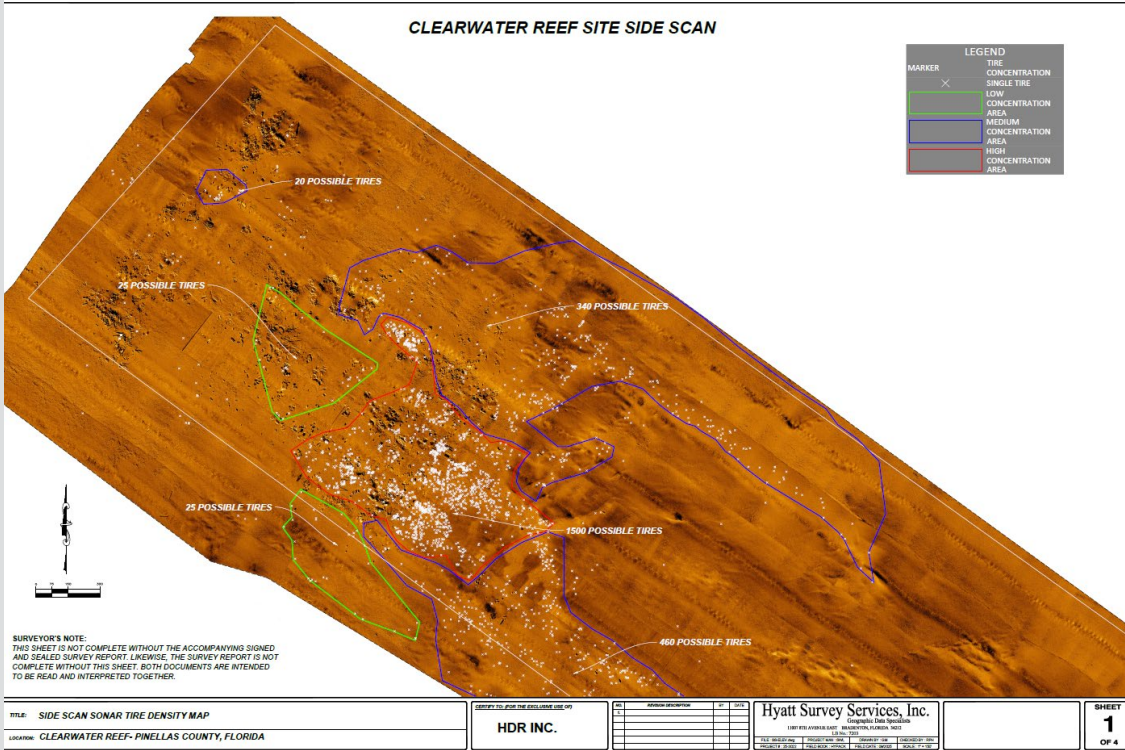
Combined methods improve detection and interpretation

What the data tells us

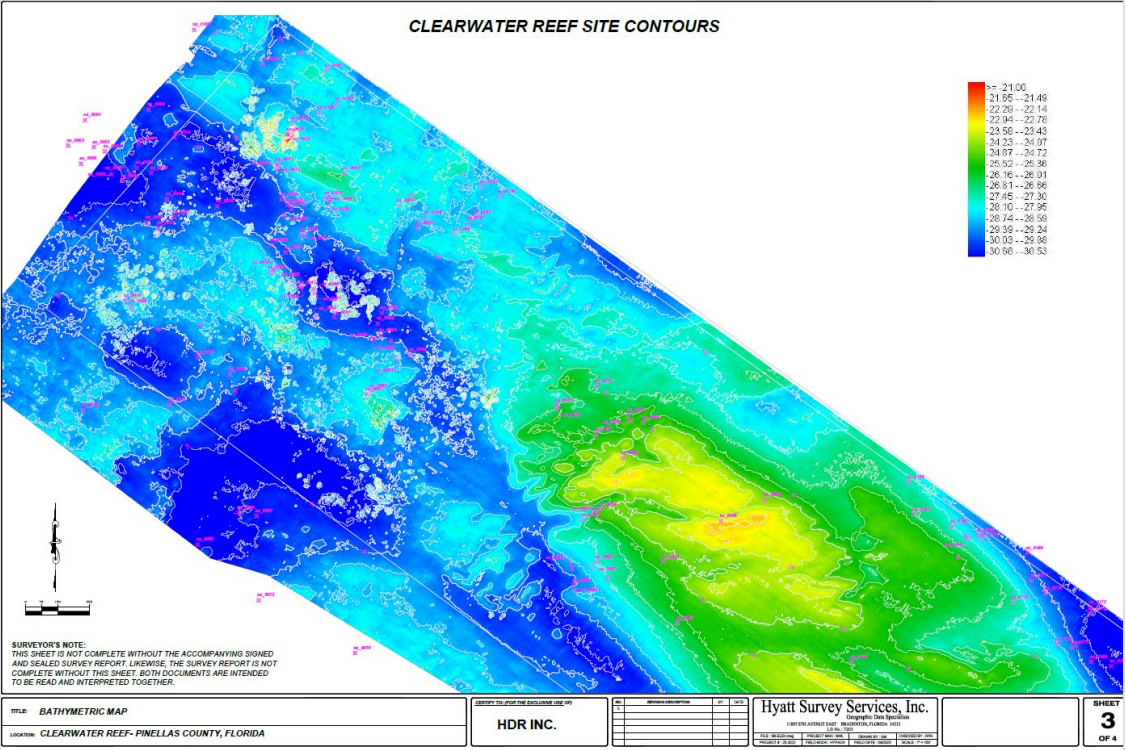
- › Tire locations and distribution patterns
- › Distinct clusters vs. isolated outliers
- › Relationship to reef features and boundaries
- › Reduced visibility where tires are partially buried



What this looks like in the field



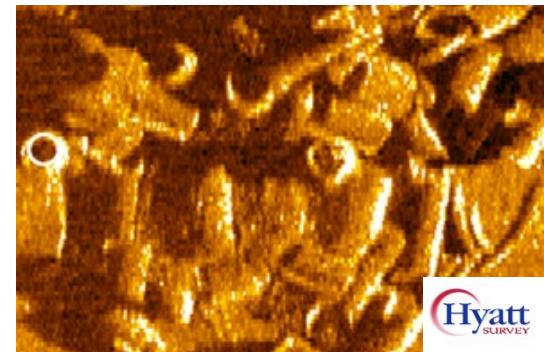
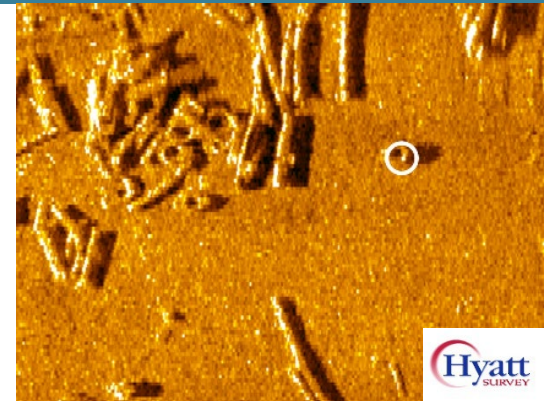
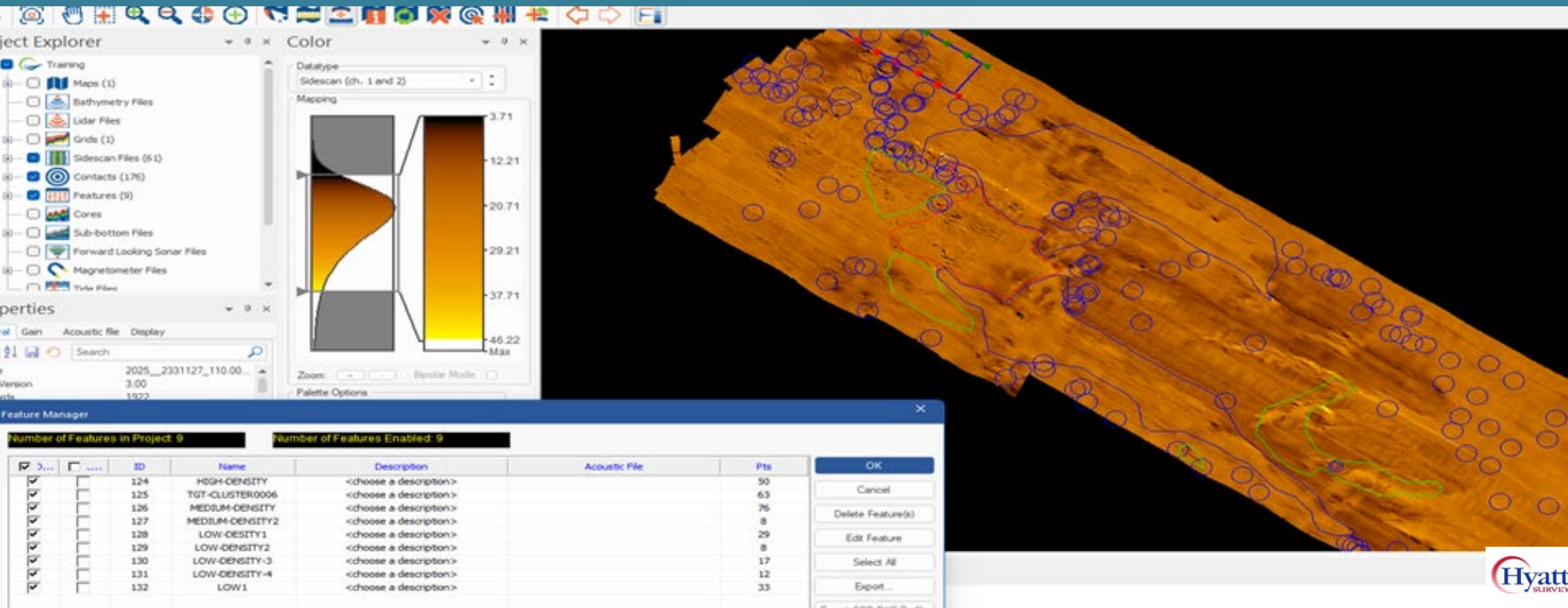
Clearwater Reef site side scan



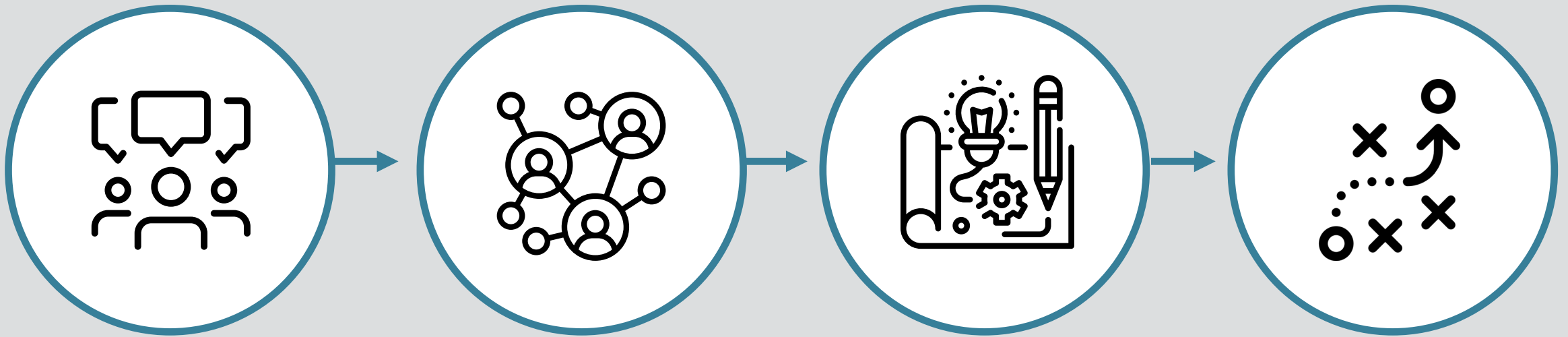
Clearwater Reef site contours

Contained, Structured, and Complex

- › Contained, structured and complex
- › Not widely dispersed beyond reef boundaries
- › Clustered in distinct accumulation areas
- › Movement is limited and episodic
- › Many tires partially buried or embedded



What do we do with this?



Phase 1

Define Goals and
Success Criteria

Phase 2

Coordinate Early
with Agencies

Phase 3

Develop & Permit
Removal Approach

Phase 4

Implement in
Stages



Phase 1: Define Goals and Criteria

1

DEFINE SCOPE EARLY

Full removal vs Targeted Approach

2

DETERMINE FOCUS

Mobile vs Partially Buried Tires

3

IMPLEMENTATION APPROACH

Pilot vs Full-Scale

4

PRIORITIZE AREAS

Sites and Sequencing

5

DEFINE SUCCESS

Establish Success Criteria

From decisions to execution

PHASE 1 Current Progress

- Define goals and success criteria
- Define and align on scope and priorities
- Coordinate with agencies and stakeholders

PHASES 2-4 Next steps

- Develop and permit the removal approach
- Implement in stages
- Track progress and verify conditions

What this means for solid waste



Legacy disposal decisions can create long-term challenges



Impacts may emerge years or decades later



Not unique to reefs — applies across solid waste systems



Requires coordination across disciplines and agencies



Solid waste programs play a role in long-term solutions

Final thoughts

An underwater photograph showing a large, circular, metallic structure, possibly a shipwreck or a large pipe, partially covered in coral and marine life. The water is clear blue, and several small fish are visible swimming around the structure. The overall scene suggests a long-term environmental impact or a challenge in managing such structures.

What started as a disposal solution is now a long-term management challenge

- › Requires a thoughtful, phased response
- › Balancing impact, effort, and feasibility is key
- › Applies beyond this project — relevant across solid waste

Questions?

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