SintMaarten TRUST FUND

ASSESSMENT

Shipwreck Options Assessment Guide (2018)

Overview

This document, prepared by EE&G Environmental Services, LLC (EE&G) for the World Bank Group, presents an Options Assessment for managing hurricane-related shipwrecks in Sint Maarten following Hurricane Irma (October–November 2017). It is a core deliverable under the International Advisory Support for Debris Management and Short-Term Solid Waste Priorities for the Hurricane Irma Reconstruction, Recovery and Resilience Program, dated July 7, 2018.

The assessment responds to widespread damage to vessels across Simpson Bay Lagoon and adjacent waters. Post-hurricane, the Government of Sint Maarten, working with marine insurers, authorized salvage or recovery of up to 143 vessels. Many became “constructive total losses” (CTL) and remained abandoned—some partially submerged or stranded in informal “graveyards” and salvage yards—creating legal, environmental, and safety concerns. Moreover, numerous uninsured vessels and fully submerged wrecks, not captured in initial inventories, compounded the challenge.

The document covers the end-to-end lifecycle of shipwreck management—from public legal notification and identification through recovery, de-polluting, decommissioning, materials handling, and final disposal—within Sint Maarten’s operational and regulatory constraints. It proposes a phased, task-based approach to reduce environmental risk, clear navigational hazards, and create a practical pathway to safely process and dispose of diverse vessel types and associated debris. The guidance is designed for decision-makers and implementers in the Government of Sint Maarten and the World Bank to operationalize a coordinated removal and disposal program.

Objectives and Audiences

The report's purpose is to provide a clear, actionable framework to move from diagnosis (inventory and characterization of wrecks) to implementation (safe recovery, processing, and disposal). It offers defined tasks, sequencing, roles, and procedures to ensure environmental safeguards, legal defensibility, and operational efficiency.

Key objectives include:

- Establish a legal and logistical foundation: initiate formal constructive notice to declare vessels abandoned and secure a suitable marine yard as the central staging and processing site.
- Prioritize and categorize recovery efforts: segment shipwrecks by condition and location (afloat, aground/beached, submerged, or parked in salvage yards) to focus on high-risk categories first.
- Standardize handling procedures: define best-practice methods for recovery, de-polluting/decommissioning, and materials segregation to minimize environmental harm and worker safety risks.
- Evaluate disposal pathways: analyze feasible options for steel, aluminum, fiberglass, and wood vessels under constraints of limited local landfill capacity and prohibitions (e.g., fiberglass disposal).
- Ensure complete site restoration and accountability: return the designated marine yard to pre-operational conditions and provide thorough documentation (assessments, manifests, photographic evidence) at project closeout.

The primary audience includes Mr. John Morton of the World Bank Group and decision-makers within the Government of Sint Maarten charged with Hurricane Irma recovery and resilience. Secondary audiences include World Bank technical and project management staff overseeing debris management and funding; government ministers and agency leaders responsible for procurement, permitting, and coordination with local authorities; salvage operators and environmental contractors implementing recovery, de-polluting, dismantling, and materials processing; and international development and disaster-response organizations seeking a model for post-disaster marine debris management in small island and coastal contexts.

Findings

The assessment identifies intertwined legal, logistical, environmental, and public policy challenges in a post-disaster maritime context. The plan is organized into five core tasks, each specifying intent, actions, and risk considerations, building a comprehensive operational blueprint from setup through closeout.

Task 1: Establishing the Framework (Public Notice and Marine Yard)

- Legal status is a primary barrier: many vessels are effectively abandoned but not legally declared. EE&G recommends a constructive notice process via local newspapers for two weeks, employing detailed descriptions and photographs where identification is unclear (especially for submerged wrecks).
- Immediate need for a designated processing site: salvors are stalled without disposal direction; CTL vessels occupy space in yards and shallows. A central marine yard is necessary for hauling, blocking, de-polluting, dismantling, and materials sorting.
- Candidate yard: St. Maarten Maritime Services yard in Simpson Bay Lagoon is highlighted due to ample space and deep-water access. To manage environmental liability, conduct Phase I and II Environmental Site Assessments (ESAs) before operations and after completion.

Task 2: Vessel Recovery Strategy

- Prioritization based on risk:
    - Abandoned vessels that are moored/anchored/rafted: highest priority due to immediate environmental and damage risks, especially ahead of future storms; tow directly to the marine yard.
    - Vessels in salvage yards/graveyards: de-pollute and decommission promptly to free capacity for incoming wrecks.
    - Aground/beached vessels: lift and transport to yard after in situ de-polluting to mitigate spill risks during handling.
    - Fully submerged vessels: mostly in less than 15 feet of water and visible; raise via barge-mounted cranes. Months underwater increase biomass, complicating refloat/tow operations; treat case by case.
- Debris beyond hulls: cabin tops, hull segments, and other scattered materials pose navigational and environmental hazards and require integrated recovery planning.

Task 3: De-polluting and Decommissioning

- Standardized BMP sequence:
    - Remove hazardous items and fluids: batteries, fuels, oils, propane tanks, flares.
    - Contain and store: use double-walled storage for petroleum products; store batteries in weatherproof, secure bins.
    - Segregate materials: recover recyclable metals (e.g., brass, stainless steel) separately; segregate wood, fabrics, cushions for landfill disposal or potential incineration (subject to constraints).
- Environmental and safety emphasis: procedures limit spill risks, ensure compliant handling, and maximize recyclables' recovery to help offset costs.

Task 4: Disposal Options and Constraints

- Landfill capacity: the SXM Landfill has minimal capacity and does not permit fiberglass disposal, elevating logistical complexity and cost.
- Steel and aluminum boats: preferred to cut and recycle; artificial reefing is less ideal but possible with appropriate controls. Landfilling large metals is strongly discouraged.
- Fiberglass and wood boats: the most significant disposal challenge:
    - Crush and landfill: local landfill ban for fiberglass necessitates off-island disposal with pre-authorization and confirmed receiving facilities.
    - Grinding: fiberglass can be ground and used as additive in non-structural concrete and rip-rap; requires air/dust monitoring and fire risk controls.
    - Incineration (aerobic/anaerobic): technically feasible but not recommended due to environmental and political concerns.
    - Deepwater offshore disposal: most economical but not recommended due to microplastic pollution risks and anticipated public relations issues; inconsistent with prevalent environmental standards.
- Trade-offs: sustainable choices may be costlier and require innovation or regional cooperation for acceptable end-of-life pathways.

Task 5: Reporting and Site Restoration

- Closeout requirements:
    - Remove all project materials and equipment; repair yard infrastructure.

- Conduct final Phase II ESA to validate post-project soil and groundwater conditions.
- Provide comprehensive documentation: photographic records, disposal manifests, final vessel inventory, and process reporting to establish accountability and defendability.

Lessons Learned

Proactive legal mechanisms matter, as post-disaster frameworks should empower governments to expedite declaration and disposition of obviously abandoned assets to reduce prolonged environmental hazards and navigational risks. Infrastructure bottlenecks persist due to limited landfill capacity, bans on certain materials (fiberglass), and absence of adequate processing sites, underscoring that resilience planning should pre-identify temporary debris sites and pursue long-term solutions for problematic waste streams. Holistic, integrated project management is essential, and multi-stakeholder coordination is critical to align permissions and logistics. Disposal choices involve real compromises, making innovation and regional partnerships important. Documentation underpins accountability and learning, creating institutional knowledge for future events. Risk anticipation for future storms remains vital so prioritizing removal of easily mobilized abandoned vessels reduces downstream damages.

Expanded Contextual Considerations and Practical Guidance

- **Sequencing operations:** begin with legal declaration and mobilization of the marine yard, then focus on highest-risk abandoned vessels afloat, followed by clearing graveyards and beached/grounded vessels. Address submerged wrecks systematically, using sonar/visual surveys to confirm locations and plan crane operations.
- **Environmental controls:** deploy spill kits and booms during lifts; mandate double-walled tanks and secure battery storage; implement dust suppression during grinding; maintain updated hazardous materials logs and chain-of-custody for waste streams.
- **Worker safety:** enforce PPE use, lifting and rigging standards, hot-work permits for cutting, and confined-space protocols for enclosed compartments. Conduct toolbox talks and maintain incident reporting.
- **Community engagement:** anticipate and manage public concerns around disposal choices (particularly for fiberglass and any offshore options) through transparent communication, environmental rationale, and demonstration of best practices. Early engagement reduces reputational risk and fosters support.
- **Cost management:** maximize salvage of metals and reusable components; consider economies of scale by batching similar vessel types; negotiate regional disposal or recycling rates; include contingencies for specialized equipment (e.g., crane barges) and unforeseen site conditions.
- **Monitoring and adaptive management:** track throughput and bottlenecks; adjust recovery priorities based on emergent risks (e.g., leaking vessels, navigational hazards); implement environmental monitoring at the yard and in adjacent waters, with threshold-based corrective actions.

Limitations and Risk Notes

Key limitations include identification challenges, as submerged vessels without clear markings complicate legal notice and disposition, and while photographic and descriptive notices help, they do not fully eliminate ambiguity. Local landfill constraints and fiberglass disposal ban are structural limitations that necessitate off-island solutions or alternative processing (grinding), and permitting and authorizations can delay implementation. Environmental sensitivity presents further constraints, since grinding and incineration carry air quality and fire risks and offshore disposal is environmentally and politically contentious, requiring continuous monitoring and robust controls to maintain compliance and community trust. In addition,

biofouling impacts pose challenges, as extensive biomass accumulation on submerged wrecks increases handling complexity, refloat challenges, and potential invasive species when moving vessels.

Methodology

The assessment employs a programmatic, task-oriented approach informed by field investigations, GPS-based inventory and mapping (as summarized in the Shipwreck Inventory Table), and expert evaluation of legal, logistical, environmental, and technical dimensions. It advances a structured five-task plan, each with defined objectives, workflows, and risk points. The recovery strategy incorporates prioritization based on vessel condition and risk, while de-polluting protocols follow Best Management Practices with explicit hazardous materials handling standards. Disposal options are evaluated through qualitative risk-benefit analysis that considers economic feasibility, environmental compliance, and public acceptability. Environmental Site Assessments (Phase I and Phase II) are incorporated to baseline and verify conditions at the marine yard before and after operations, providing a defensible record of environmental management.