# Improved Disaster Risk Management For Ports In The Caribbean: Risk Management Principles

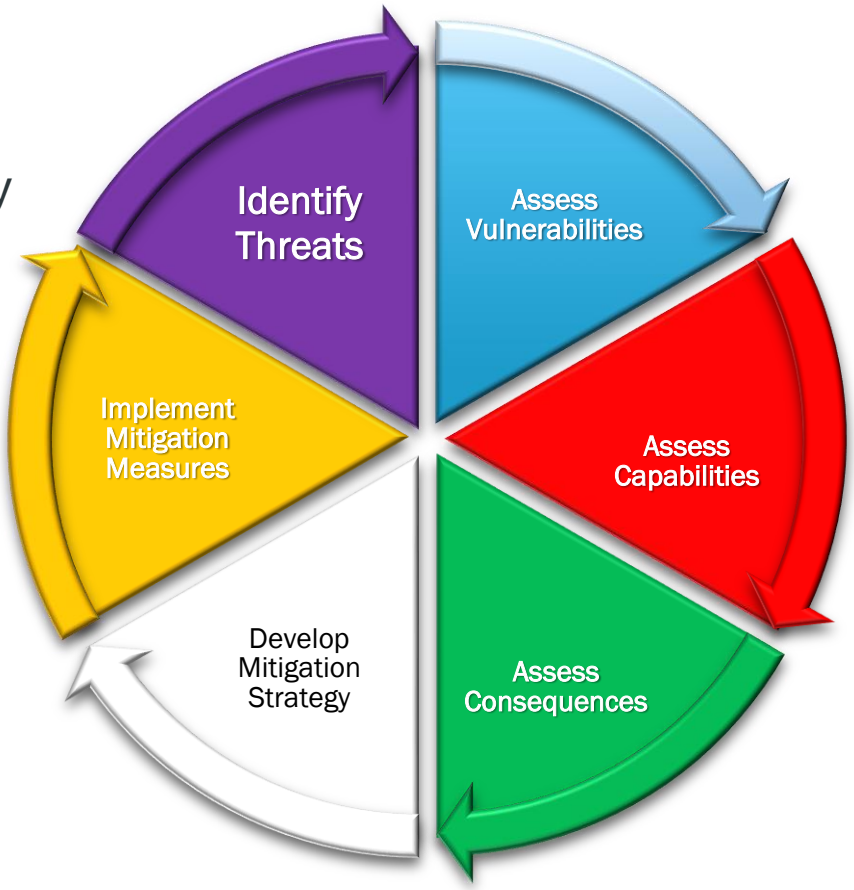
Presented by the Red Team

# OVERVIEW

To appropriately address the Risk Management Principles, the Red Team utilized the Marsh Harbour Port Facility (a Container and Breakbulk Terminal); located in Abaco, The Bahamas, as a focus. Using a Port Facility Security Assessment (PFSA) and a Port Facility Security Plan (PFSP); applicable hazards/threats were identified; vulnerabilities, capabilities and consequences assessed, and risk management strategies were developed for the implementation of risk mitigations measures.


# RISK MANAGEMENT PRINCIPLES

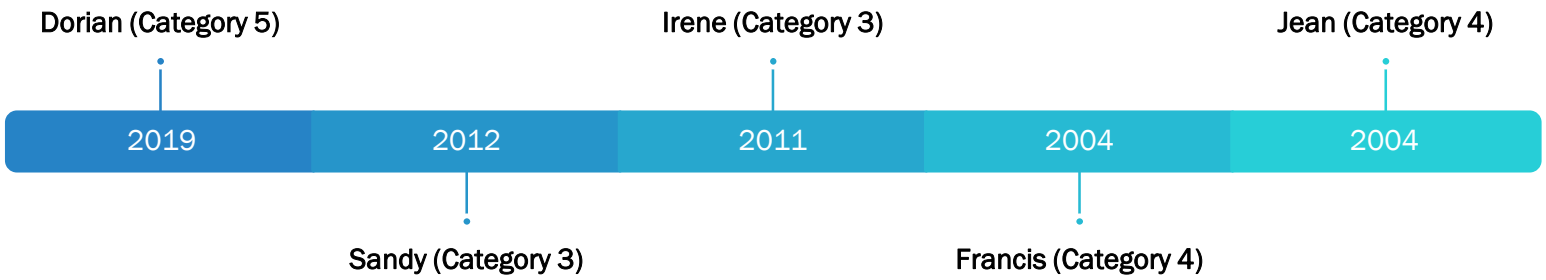
- Identify the threats/hazards to the facility
- Assess the vulnerabilities
- Assess the capabilities
- Assess the consequences
- Develop mitigation strategy
- Implement mitigation measures

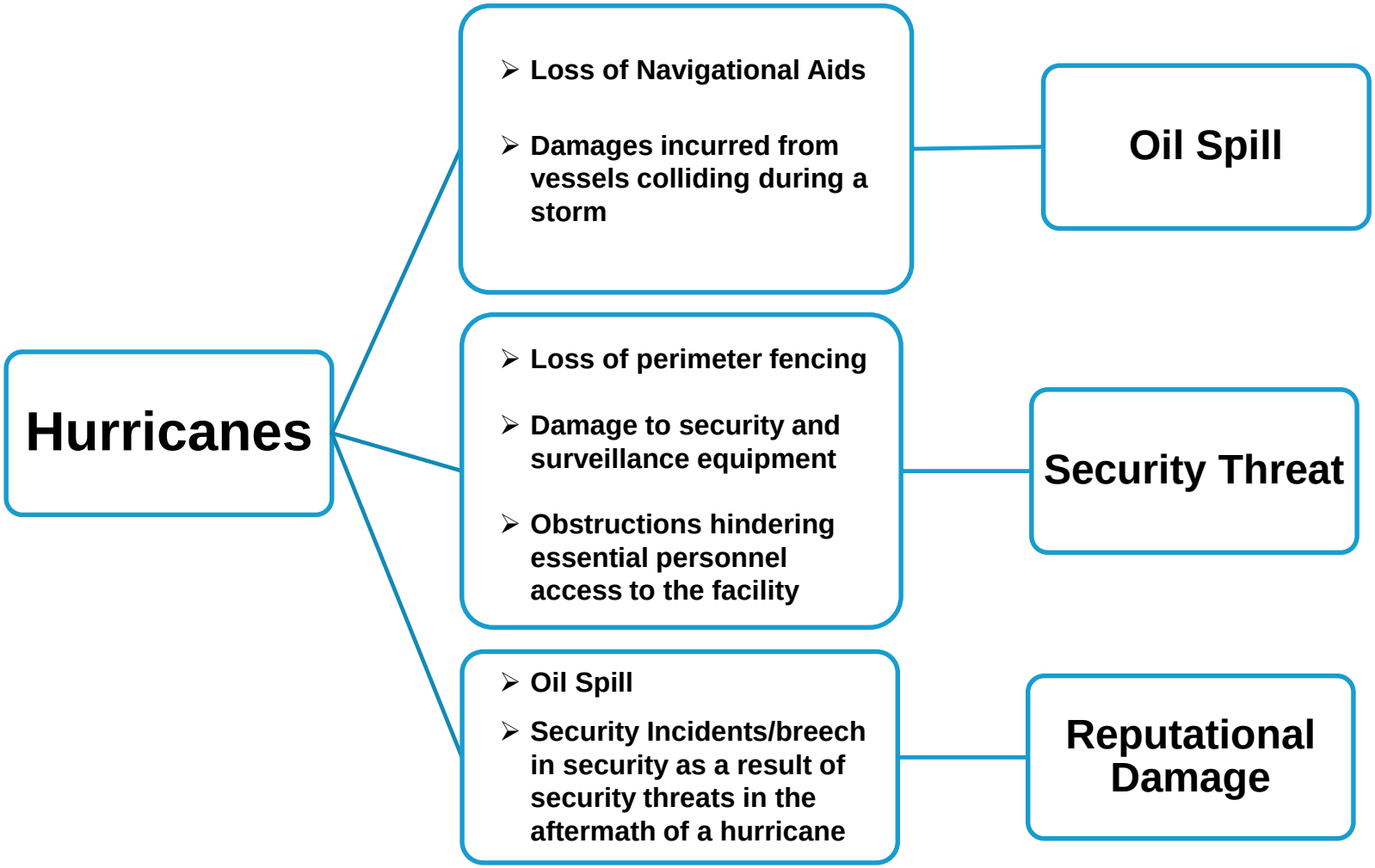


# IDENTIFY THE THREATS TO THE FACILITY

## *Hurricanes*

- This threat/hazard is classified as a natural hazard, consisting of a storm surge and/or storm tide; heavy rainfall, high sea levels and/or inland flooding, along with high winds. The Hurricane season is June 1 to November 30. Due to its geographical location the Marsh Harbour Port Facility, like all Caribbean islands, is highly susceptible to this threat/hazard.




Hurricanes
Loss of Navigational Aids
Damages incurred from vessels colliding during a storm
Oil Spill
Loss of perimeter fencing
Damage to security and surveillance equipment
Obstructions hindering essential personnel access to the facility
Security Threat
Oil Spill
Security Incidents/breech in security as a result of security threats in the aftermath of a hurricane
Reputational Damage

# IDENTIFY THE THREATS TO THE FACILITY CONT'D

***Security Threats***

- The consequence of infrastructure damage including loss of electricity and/or lighting, perimeter fencing and CCTV monitoring capabilities in the aftermath of a hurricane pose a threat to the facility. In the aftermath of a hurricane the Port Facility becomes the lifeline of the island; facilitating all essential supplies imported for the island and some of its surrounding cays. Thus, the likelihood of persons attempting to gain access onto the facility to pilferage is ***high/moderate***. Additionally, the Port facilitates international vessels and is gateway to the rest of the world. With the facility's hardiness compromised by a hurricane, it becomes beguiling to stowaways or nefarious characters wishing to smuggle weapons/drugs, seize or hijack a vessel to use as a weapon, or ransom persons onboard.

# ASSESS THE VULNERABILITIES

Vulnerabilities identified were identified based on the following considerations:

- Waterside and shore side access to the port facility and ships berthing areas at the facility
- Structural integrity of the facility and associated structures
- Existing security measures including identification systems
- Existing security measures relating port services and utilities
- Measures to protect radio and telecommunication equipment, port services and utilities
- Any conflicting policies between safety and security measures and procedures
- Any conflicting port facility and security assignments
- Any enforcement and personnel constraints
- Any deficiencies identified during training and drills
- Any deficiencies identified during daily operations,
- Any deficiencies identified following an incident or alert
- Any deficiencies identified following the report of a security concerns
- Any deficiencies identified following the execution of control measures,
- Any deficiencies identified following an audit, etc.

# ASSESS THE VULNERABILITIES CONT'D

The following four (4) factors were considered in determining the degree of vulnerability to a security incident

- *Availability*
- *Accessibility*
- *Organic Security*
- *Facility Hardiness*

***Critical Facility / Equipment* / Process at Risk**

- Mooring boats
- Tug boats
- Navigational aids
- Cranes/Reach stackers
- Dangerous good storage
- Warehouses/sheds
- External storage
- Security equipment/surveillance cameras / soft ware

# ASSESS THE VULNERABILITIES CONT'D

- Building structures
- Backup power supply
- Communication equipment / IT software
- Access Control Procedures
- Monitoring procedures
- Facility/Country reputation
- Tourism
  - Tourist Shops, Café, etc.

| Type of Incident/Hazard | Vulnerability Assessment | | | | |
|---|---|---|---|---|---|
| | Mooring | Cargo | Transportation of Cargo | Maintaining ISPS Code for continued port functions | Total Vulnerability Rating |
| Hurricane | 5 | 5 | 5 | 5 | 5 |
| Terrorism/ Security Incident | 5 | 5 | 5 | 5 | 5 |
| Oil Spill | 3 | 3 | 3 | 2 | 2.75 |
| | | | | | |
| Minimum | 3 | 3 | 3 | 2 | 2.75 |
| Maximum | 5 | 5 | 5 | 5 | 5 |
| Weighted Average | 4 | 4 | 4 | 3.5 | 3.86 |

| Likelihood \ Impact | Negligible | Minor | Moderate | Significant | Severe |
|---|---|---|---|---|---|
| Very Likely | Low Med | Medium | Med Hi | High | High |
| Likely | Low | Low Med | Medium | Med Hi | High |
| Possible | Low | Low Med | Medium | Med Hi | Med Hi |
| Unlikely | Low | Low Med | Low Med | Medium | Med Hi |
| Very Unlikely | Low | Low | Low Med | Medium | Medium |

**Vulnerability Rankings**

| Low | Low Medium | Medium | Medium High | High |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

# CAPABILITIES

- Hurricane Construction Code for Buildings.
- Generators
- Backup generators, stored quantity of fuel e.g. diesel
- Mature CDM plan; Standard Operation Procedures, Drills/ Exercises to test and evaluation the Plan.
- Personnel trained in the CDM plan; Standard Operation Procedures, Drills/ Exercises to test and evaluation the Plan.
- Mature Port Facility Security plan (PFSP)
- Personnel trained in PFSP
- Ability to utilize National Guard (Defence Force) at the facility until functional operations resume
- Cameras, access control, CCTV arrangements and physical security guards.
- Personal Protective Equipment / hygiene resources reserves – basic toiletries

# CAPABILITIES CONT'D

- Multiple pier/berth & moorings
- Multiple vehicle access points into the Port facility
- Capacity to receive, organize, account for and distribute relief supplies efficiently – logistical hub
- National oil spill contingency plan
- Oil spill event notification list
- Oil spill event manager to manage and coordinate response
- Oil spill response team roster
- Oil spill equipment inventory and locations; dispersants, booms, containers for waste etc.
- Facility evacuation plan
- Conduction of oil spill event exercise pursuant to the National Oil spill contingency plan
- Drills and annual exercises of this oil spill response plan

| Type of Incident/Hazard | Capability Assessment | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Construction Code/ Purpose-built facilities | Redundant Electrical Supply | Mature CDM/ PFSP/ Oil Spill Response Plan | Experienced/ Trained Personnel | Redundant Security Systems | Geographic Location | Multiple Piers/ Jetties/ Access/ Egress Points | PPE/ Hygiene/ Specialized Equipment Stores/Reserves | Total Capability Rating |
| Hurricane | 4 | 4 | 2 | 3 | 3 | 2 | 2 | 3 | 2.89 |
| Security Incident | 4 | 3 | 3 | 3 | 3 | 4 | 2 | 3 | 3.1 |
| Oil Spill | 2 | 4 | 2 | 2 | 3 | 3 | 2 | 3 | 2.75 |
| | | | | | | | | | |
| Minimum | 2 | 3 | 2 | 2 | 2 | 3 | 2 | 3 | 2.38 |
| Maximum | 3 | 4 | 3 | 3 | 3 | 4 | 3 | 3 | 3.25 |
| Weighted Average | 2.5 | 3.5 | 2.5 | 2.5 | 2.5 | 3.5 | 2.5 | 3 | 2.81 |

| Likelihood \ Impact | Negligible | Minor | Moderate | Significant | Severe |
|---|---|---|---|---|---|
| Very Likely | Low Med | Medium | Med Hi | High | High |
| Likely | Low | Low Med | Medium | Med Hi | High |
| Possible | Low | Low Med | Medium | Med Hi | Med Hi |
| Unlikely | Low | Low Med | Low Med | Medium | Med Hi |
| Very Unlikely | Low | Low | Low Med | Medium | Medium |

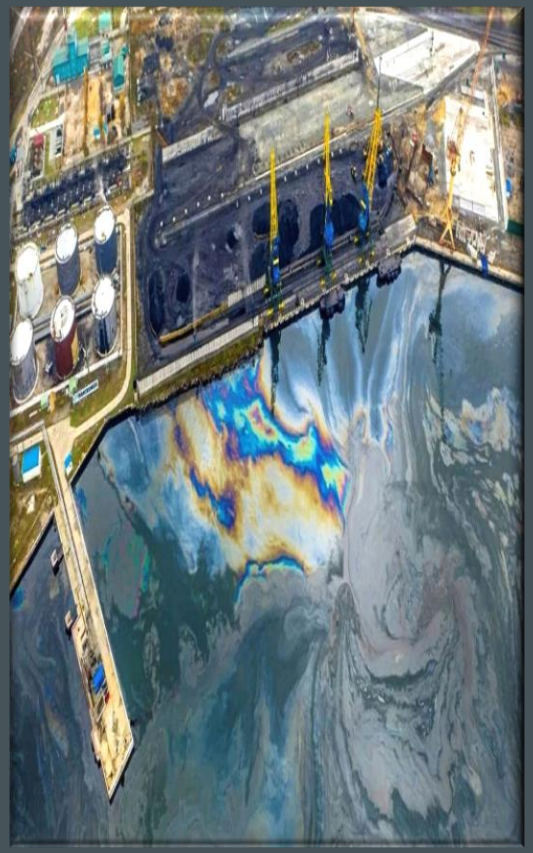
## Capability Rankings

| Low | Low Medium | Medium | Medium High | High |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

# ASSESS THE CONSEQUENCES

***Hurricanes***

- Storm Surges/Flooding
- Disruption to Public utilities i.e. water, electricity, transportation, communications, education, etc.
- Infrastructural damage
- Damage/loss of equipment
- Damage/loss of infrastructure
- Disruption in the availability of essential supplies (i.e. water, food, medicine, etc.)
- Environmental damage (Oil Spills etc.)
- Inaccessible roads
- Injury and death



# ASSESS THE CONSEQUENCES CONT'D

***Oil Spill***

- Devastation to the environment / Pollution effects to Marine Life
- Disruption to Shipping / Trade
- Loss of / contamination of crops and livestock etc.
- Oil contamination in port and at sea
- Facility/Country reputational damage

# ASSESS THE CONSEQUENCES CONT'D

***Security Threat***

- Damage to Port Facilities / Blockage of berthing facilities
- Disruption to the Economy / Trade / Livelihood / Shipping Interests, i.e. Cargo & Cruise Shipping etc.
- Environmental damage (Oil Spills, etc.)
- Disruption in foreign direct investments (FDIs)
- Mass Casualty
- Infrastructural damage
- Loss of credibility due to seeming security lapse

| Type of Incident/Hazard | Consequence Factors | | | |
|---|---|---|---|---|
| | Likelihood/ Probability | Property Damage | Economic Disruption | Total Consequence Rating |
| Hurricane | 5 | 5 | 5 | 5 |
| Oil Spill | 4 | 4 | 4 | 4 |
| Security Incident | 4 | 5 | 5 | 4.67 |
| | | | | |
| Minimum | 4 | 4 | 4 | 4 |
| Maximum | 5 | 5 | 5 | 5 |
| Weighted Average | 4.5 | 4.5 | 4.5 | 4.5 |

| Likelihood \ Impact | Negligible | Minor | Moderate | Significant | Severe |
|---|---|---|---|---|---|
| Very Likely | Low Med | Medium | Med Hi | High | High |
| Likely | Low | Low Med | Medium | Med Hi | High |
| Possible | Low | Low Med | Medium | Med Hi | Med Hi |
| Unlikely | Low | Low Med | Low Med | Medium | Med Hi |
| Very Unlikely | Low | Low | Low Med | Medium | Medium |

## Consequence Rankings

| Low | Low Medium | Medium | Medium High | High |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

# DISASTER EMERGENCY RISK ASSESSMENT

| Type of Incident/Hazard | Total Vulnerability Rating | Total Capability Rating | Total Consequence Rating | Total Risk Rating |
|---|---|---|---|---|
| Hurricane | 5 | 2.89 | 5 | 4.3 |
| Security Incident | 5 | 3.1 | 4 | 4 |
| Oil Spill | 2.75 | 2.75 | 4.67 | 4.4 |
| | | | | |
| Minimum | 2.75 | 2.38 | 4 | 3 |
| Maximum | 5 | 3.25 | 5 | 4.4 |
| Weighted Average | 3.86 | 2.81 | 4.5 | 3.7 |

| Likelihood \ Impact | Negligible | Minor | Moderate | Significant | Severe |
|---|---|---|---|---|---|
| Very Likely | Low Med | Medium | Med Hi | High | High |
| Likely | Low | Low Med | Medium | Med Hi | High |
| Possible | Low | Low Med | Medium | Med Hi | Med Hi |
| Unlikely | Low | Low Med | Low Med | Medium | Med Hi |
| Very Unlikely | Low | Low | Low Med | Medium | Medium |

**Risk Rankings**

| Low | Low Medium | Medium | Medium High | High |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

# DEVELOP MITIGATION STRATEGY

## *Hurricanes*

This risk is a natural hazard and is therefore unavoidable, however, it is possible to mitigate this risk, to reduce its impact by:

- Implementing a contingency plan which is routinely tested by drills and exercises.
- Ensure that all relevant and responding personnel are aware of there roles and responsibility in the aftermath.
- Ensuring proper training of staff
- Ensuring the maintenance of equipment
- Ensuring the maintenance of navigational aids
- Utilizing lessons learnt from past incidents
- Producing oil spill probability map and implementing risk-based as contingency planning
- Specialized response equipment and trained response teams

# DEVELOP MITIGATION STRATEGY CONT'D

- Developing and implementing a Port Facility Security Plan (PFSP)
- Routinely testing the PFSP by conducting drills and exercises.
- Use of  proactive threat management programs to identify emerging threats
- implementation of adequate counter-technologies
- Sufficient response personnel and efficient information sharing
- A defined and enhanced security budget allocation to risk adverse country or region than would otherwise be assigned to other stable subsidiaries.
- Formation of a Crisis Management Team (CMT) comprising key department heads, trained in their respective roles and responsibilities.