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Ports, Logistics & Maritime Infrastructure

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About this series. The Western Hemisphere Readiness Series is an independent body of research published by the HRS Resilience Foundation, examining the structural conditions that determine hemispheric readiness across critical sectors. Each assessment applies the HRS readiness framework to a specific domain, drawing on government and institutional sources while presenting original synthesis and analysis.

EXECUTIVE SUMMARY

Ports, Logistics & Maritime Infrastructure

Ports, logistics corridors and maritime infrastructure form a connected operating system for commerce, energy flows, industrial supply, emergency response and national defense.

Their strategic value is not limited to the port itself. A disruption at a terminal, access channel, rail connection, pipeline interface, digital control system or major maritime chokepoint can propagate through multiple sectors and jurisdictions.

The United States has placed renewed emphasis on maritime capacity, shipbuilding, port infrastructure and supply-chain resilience. The White House's 2026 Maritime Action Plan identifies port infrastructure, commercial and defense shipbuilding, marine transportation capabilities and adjacent workforce as elements of the maritime industrial base. In April 2026, the U.S. Department of Transportation announced \$774 million for 37 port projects, explicitly linking port modernization with supply-chain strength and national security.^[1-3]

For the Western Hemisphere, the readiness question is broader than port capacity. It is whether the hemisphere possesses sufficient capacity, redundancy, access, security, information integrity, repair capability and recovery speed to keep critical flows operating under stress.

HRS assesses this question through six connected readiness functions — Baseline, Exposure, Dependency, Continuity, Recovery and Adaptation — applied across countries, sectors and corridors while respecting the constitutional, legal and sovereign authorities of each nation.

The assessment does not rank countries or prescribe ownership structures. Instead, it identifies system characteristics that decision-makers can use to evaluate strategic exposure: concentrated gateways, single points of failure, foreign-controlled equipment or data systems, inadequate landside connections, insufficient surge capacity, weak repair ecosystems, cyber/OT exposure, and limited alternatives when a major route is disrupted.

LONG-TERM OBJECTIVE

A Western Hemisphere maritime and logistics system capable of supporting national sovereignty, economic continuity, emergency response and defense mobility over a 50–100 year horizon. The immediate analytical priority is not prediction; it is designing systems that remain usable when conditions change.

SECTION 02

Purpose, Scope and Strategic Context

2.1 Purpose

This assessment examines ports, maritime gateways, inland waterways, logistics corridors and their supporting infrastructure as elements of Western Hemisphere readiness, focusing on physical, operational, digital and strategic dependencies that can affect continuity of critical flows.

The study is intentionally sector-level. It does not constitute a country readiness assessment, a port security inspection, a military plan, or an investment recommendation for a particular facility.

2.2 Strategic context in the United States

Current U.S. policy documents show a strong focus on rebuilding maritime capacity and strengthening the infrastructure that supports national security and economic activity. Executive Order 14269 directed development of a Maritime Action Plan; the February 2026 plan broadened attention to commercial and defense shipbuilding, component supply chains, ship repair, marine transportation, port infrastructure and workforce.^[1,2]

The August 2026 presidential memorandum on rebuilding the U.S. Navy and shipbuilding industrial base further emphasized industrial capacity, supplier depth, ship repair and the need to restore competition and capacity in the maritime industrial base.^[4]

These developments are relevant to HRS research because ports and logistics systems connect industrial capacity to the movement of materials, energy, equipment and personnel, and connect civilian infrastructure to defense mobility and emergency response.

2.3 Western Hemisphere context

SOUTHCOM's current public priorities include expanding logistics and sustainment capabilities, strengthening critical infrastructure cooperation, protecting strategically important locations, and addressing threatening maritime, undersea, space and cyber activity.^[5]

The Panama Canal provides a particularly clear example of the interaction between commercial logistics, maritime security, national sovereignty and defense mobility. U.S. defense officials have described canal security as a key U.S.–Panama national interest and have emphasized technical, cyber and maritime-security cooperation with the Panamanian authorities.^[6,7]

Across the hemisphere, the analytical challenge is to understand how port infrastructure, trade corridors, energy systems, mineral supply chains and strategic waterways interact. The same physical gateway may serve commercial, industrial, humanitarian and defense-related functions at different times.

SECTION 03

The Maritime–Logistics System

HRS treats maritime logistics as a system rather than a collection of individual facilities. A port can be modern and productive yet remain strategically fragile if its access channel, rail interface, bridge, power supply, fuel system, digital platform or principal inland corridor has no practical alternative.

3.1 Seven layers of strategic infrastructure

LAYER	READINESS FOCUS
1. Maritime access	Channels, approaches, dredging, navigation aids, locks, bridges, anchorages and vessel access.
2. Port operations	Berths, cranes, terminals, yards, warehouses, storage, fueling, maintenance and cargo-handling systems.
3. Landside connectivity	Rail, road, inland waterway, pipelines, intermodal terminals and border crossings.
4. Energy support	Electricity, fuel, marine bunkering, backup generation, storage and critical utility connections.
5. Digital and control systems	Terminal operating systems, cargo information, communications, sensors, operational technology and cyber-dependent services.
6. Strategic support	Repair, spare parts, equipment availability, emergency procurement, workforce and surge capacity.
7. Security and governance	Physical security, maritime domain awareness, lawful access, regulatory authority and sovereign control.

3.2 Critical flows

- **Energy** — crude oil, refined products, LNG, natural gas equipment, fuels and power-sector inputs.
- **Strategic materials** — minerals, metals, industrial inputs and components used in defense, energy and advanced manufacturing.
- **Industrial cargo** — machinery, components, agricultural inputs and manufactured goods.
- **Humanitarian and emergency cargo** — medical supplies, food, water systems and emergency equipment.
- **Defense mobility** — movement and sustainment of equipment, fuel and personnel when authorized under applicable national and bilateral arrangements.

The readiness of each flow depends on the full chain, not merely the throughput of a port.

SECTION 04

Strategic Exposure and Dependency

HRS defines strategic exposure as the combination of concentration, dependency, consequence and limited alternatives. Foreign participation is not, by itself, a finding of risk. The analytical question is whether ownership, financing, equipment, software, data access, operating rights or supply dependencies create a material loss of national or operational choice.

4.1 Physical concentration

Single ports, bridges, rail links, channels, locks, tunnels, pipelines or storage sites can become bottlenecks when alternative routes cannot absorb displaced demand.

4.2 Technology and information dependency

MARAD has warned that maritime ports can face physical and cybersecurity exposure through foreign-produced port equipment, networks, operating systems, software and infrastructure.^[8] HRS therefore evaluates technology dependency through five questions: Who manufactures it? Who maintains it? Who can update it? What information does it collect? What happens if it becomes unavailable?

4.3 Financial and operating dependency

Long-term leases, concession arrangements, financing structures and operating agreements can be economically efficient while also creating strategic dependencies. HRS recommends examining termination rights, continuity provisions, data access, emergency authorities, maintenance dependencies and alternative operators.

4.4 Chinese strategic presence and maritime infrastructure dependency

Chinese companies and state-linked entities have expanded their participation in Latin American and Caribbean maritime infrastructure through ownership interests, concessions, construction, financing, port operations, logistics technology and cargo-handling equipment. The 2026 SOUTHCOM Posture Statement identifies Chinese investment in critical infrastructure and key ports as a potential source of strategic exposure, including possible dual-use, intelligence, cyber and logistical-denial concerns. MARAD Maritime Advisory 2026-007 separately identifies risks associated with China-linked logistics platforms, security inspection equipment and ship-to-shore cranes.^[5,8,14,15,19]

4.5 HRS analytical treatment of foreign strategic participation

HRS does not classify Chinese participation — or participation by any other foreign country — as inherently unsafe. Each arrangement should instead be assessed against control, access, data visibility, maintenance authority, technology lifecycle, supplier concentration, substitution options and emergency continuity. Greater exposure may arise when several dependencies accumulate at the same node, such as foreign operating control combined with foreign technology, data access, long-duration concessions or limited alternative capacity.

4.6 Criminal and non-state disruption

Ports and logistics corridors can also be affected by organized crime, smuggling, theft, corruption, sabotage and other forms of non-state disruption. These risks should be evaluated alongside state-linked risks.

Documentary basis: 2026 SOUTHCOM Posture Statement; MARAD Maritime Advisory 2026-007; USTR Section 301 findings; CSIS research on Chinese port participation in Latin America and the Caribbean. These sources establish documented activities and stated U.S. concerns; the HRS readiness assessment is original analytical synthesis.

SECTION 05

HRS Port & Logistics Readiness Framework

The HRS Readiness Cycle converts infrastructure observations into an operational readiness assessment. The framework can be applied at facility, corridor, national or hemispheric scale.

CYCLE	CORE QUESTION	ASSESSMENT FOCUS
Baseline	What exists?	Map physical assets, capacities, ownership/operating arrangements, connections, critical services and normal operating conditions.
Exposure	What can disrupt it?	Identify physical, cyber, supply, security, financial and access-related vulnerabilities.
Dependency	What must remain available?	Identify single-source equipment, energy, data, labor, spare parts, transport links and external services.
Continuity	Can it keep operating?	Assess redundancy, backup capacity, alternative routes, surge procedures and emergency authorities.
Recovery	How fast can it return?	Evaluate repair capability, spares, contracts, workforce, logistics access and decision timelines.
Adaptation	Can it remain useful?	Test long-term capacity, technology replacement, corridor evolution and changing strategic requirements.

A readiness finding should be evidence-based. HRS distinguishes between observed conditions, documented dependencies, assessed exposure and future scenarios. This prevents assumptions from being presented as facts.

A port that is resilient in 2026 may not remain resilient in 2050 if vessel sizes, trade patterns, energy systems, cyber architecture or strategic requirements change.

SECTION 06

Western Hemisphere Strategic Architecture

6.1 North America

The United States, Canada and Mexico form a highly integrated continental logistics system. Readiness depends on ports, rail corridors, highways, energy terminals, inland waterways and border interfaces operating as connected networks. Canada's 2026–27 transportation plan emphasizes strategic ports, multimodal hubs, trade corridors, supply-chain visibility and infrastructure designed for long-term reliability.^[9,10]

6.2 Central America and the Caribbean

The region contains maritime passages and transshipment points whose disruption can affect routes between Atlantic and Pacific markets. The Panama Canal is the clearest strategic example, but the analytical model should also consider Caribbean ports, fuel terminals, undersea cables, air–sea logistics and alternative transshipment capacity.

6.3 South America

South American readiness depends on a combination of Atlantic and Pacific gateways, inland waterways, mineral corridors, agricultural export systems, energy infrastructure and cross-border transport links. Brazil is particularly relevant because of the scale and geographic diversity of its port and inland logistics network. Brazil's Ministry of Ports and Airports reports a substantial 2025–26 pipeline of port and waterway projects, while the National Logistics Plan 2050 provides a long-range framework for integrating transport modes.^[11,12]

HRS does not treat any country as the default center of the hemisphere. Country-level assessments should determine which national systems have the greatest strategic relevance for a specific corridor, commodity or security objective.

6.4 Canada–United States maritime depth

Canada's Arctic, Atlantic and Pacific maritime systems add geographic depth to the North American network. Its maritime security framework explicitly links supply-chain security, critical infrastructure, resilience and recovery from port disruption.^[9]

SECTION 07

Chokepoints, Redundancy and Continuity

HRS defines a strategic chokepoint as a location or system component where the loss of capacity produces consequences materially larger than the physical size of the asset itself.

- Canals, locks and constrained navigation channels.
- Single deepwater approaches serving multiple terminals.
- Bridges, tunnels and rail connectors with limited alternatives.
- Major fuel and LNG terminals serving concentrated demand.
- Intermodal hubs connecting maritime cargo to inland corridors.
- Digital platforms controlling multiple terminals or cargo flows.
- Repair facilities or specialized equipment with few substitutes.

The objective is not to eliminate chokepoints — that is rarely possible. The objective is to understand them, reduce unnecessary single points of failure and ensure that recovery options exist.

7.1 Redundancy hierarchy

HRS recommends testing redundancy at five levels: route, facility, equipment, supplier and decision authority. A system may have two ports but still lack meaningful redundancy if both depend on the same navigation equipment supplier, fuel source, software platform or inland corridor.

7.2 Recovery time as a strategic variable

For each critical asset, HRS proposes recording a target recovery window and the resources required to meet it. Recovery planning should identify pre-positioned equipment, qualified contractors, alternate suppliers, emergency access procedures, spare parts and communications channels.

SECTION 08

Maritime Security, Cybersecurity and Strategic Technology

Modern ports are cyber-physical systems. Cargo movement, cranes, gates, vessel scheduling, navigation support, customs processes, warehouse management and communications increasingly depend on software and connected equipment.

The U.S. government has specifically identified foreign adversarial technological, physical and cyber influence as a potential source of maritime-port vulnerability.^[8] HRS therefore treats technology provenance and lifecycle control as readiness variables rather than procurement details.

8.1 HRS technology assurance questions

- Is critical equipment replaceable without redesigning the entire terminal?
- Can systems operate safely in a degraded or disconnected mode?
- Are software updates, credentials and maintenance access controlled?
- Can operational data be exported and retained by the lawful infrastructure authority?
- Are critical components available from more than one qualified source?
- Can a compromised system be isolated without shutting down the entire port?

8.2 Maritime domain awareness

Readiness also depends on the ability of authorized national authorities to understand what is occurring around critical maritime infrastructure. SOUTHCOM identifies maritime domain awareness, cyber cooperation and critical infrastructure capability as elements of its current partnership approach.^[5]

This assessment does not prescribe a particular surveillance architecture. It identifies information availability, lawful access and continuity of decision-making as core readiness requirements.

SECTION 09

Relevance to U.S. Government Missions

Ports and logistics infrastructure sit at the intersection of several U.S. Government responsibilities. The relevance of this sector is therefore cross-agency.

AGENCY	POTENTIAL RELEVANCE
Department of State	Diplomatic engagement, sovereign-to-sovereign cooperation, infrastructure diplomacy, regional risk assessment and support for U.S. interests and lawful commercial activity.
Department of Defense / SOUTHCOM	Defense mobility, logistics and sustainment, maritime security cooperation, critical infrastructure awareness and operational access consistent with U.S. law and bilateral arrangements.
Department of Transportation / MARAD	Port infrastructure, maritime transportation capacity, commercial strategic seaports, maritime industrial base and port readiness.
DHS / U.S. Coast Guard	Maritime security, port security, navigation safety, enforcement and protection of maritime transportation systems.
Department of Energy	Energy terminals, fuel logistics, electricity dependencies and continuity of energy infrastructure supporting ports and critical logistics.
Army Corps of Engineers	Navigation infrastructure, waterways, engineering support and technical assistance relevant to major waterborne systems.
Department of Commerce / USTR	Trade flows, industrial competitiveness, commercial infrastructure and economic implications of logistics constraints.
U.S. Transportation Command	Strategic mobility and the relationship between commercial transportation capacity and defense movement requirements.

The purpose of this mapping is not to imply that HRS speaks for any agency. It identifies where independent readiness research can be relevant to public-sector decision-making.

SECTION 10

Sovereignty, Investment and National Choice

Ports are national assets subject to the laws, constitutions, regulatory systems and commercial arrangements of their respective countries. HRS explicitly respects national sovereignty and does not assume that a particular ownership model is universally appropriate.

A readiness assessment should distinguish between:

- Ownership and operational control;
- Financing and beneficial interests;
- Technology supply and lifecycle access;
- Commercial efficiency and strategic dependency;
- Lawful foreign investment and unauthorized access;
- Normal commercial operations and emergency authorities.

The central question is whether national authorities retain sufficient choice, visibility and continuity options to protect national interests under stress. This approach is compatible with sovereign decision-making: it does not require governments to adopt a common ownership model, exclude lawful foreign investment, or transfer authority to another country.

10.1 Practical due-diligence fields

- Ownership and control structure.
- Concession and lease duration.
- Data ownership, access and retention.
- Critical equipment provenance and maintenance rights.
- Emergency access and continuity clauses.
- Alternative suppliers and replacement lead times.
- Cyber incident response responsibilities.
- Termination, substitution and step-in provisions where legally applicable.

SECTION 11

50–100 Year Strategic Horizon

Port infrastructure has unusually long asset lives. Major channels, breakwaters, bridges, rail connections, terminals, storage systems and industrial sites can remain relevant for many decades. Decisions made in the 2020s can therefore shape strategic options well into the second half of the century.

HORIZON	PLANNING OBJECTIVE	PRIMARY QUESTION
2026–2030	Readiness baseline	Identify immediate bottlenecks, cyber/OT exposures, critical dependencies, maintenance gaps and recovery constraints.
2030–2050	Network resilience	Design redundancy, intermodal capacity, energy support and technology replacement around plausible demand and security conditions.
2050–2075	Strategic adaptation	Test whether infrastructure remains compatible with vessel evolution, trade-route changes, industrial geography and emerging technologies.
2075–2125	Generational continuity	Preserve sovereign choice, corridor diversity, engineering adaptability and institutional knowledge across multiple technology cycles.

The 50–100 year horizon is not a forecast. It is a discipline for avoiding infrastructure decisions that create irreversible or expensive dependencies before their strategic consequences are understood.

DESIGN PRINCIPLE

A resilient port system should be capable of changing its equipment, routes, energy sources, digital architecture and operating model without losing its basic ability to function.

SECTION 12

HRS Readiness Indicators

HRS proposes a practical indicator set for future country and corridor assessments. Indicators should be populated with public evidence where possible and clearly labeled when information is incomplete.

INDICATOR	ILLUSTRATIVE MEASURES
Capacity	Throughput, berth capacity, storage, channel depth, equipment availability.
Redundancy	Alternative ports, routes, terminals, suppliers and transport modes.
Access	Navigation reliability, landside access, border interfaces and emergency access.
Energy continuity	Power reliability, backup generation, fuel and bunkering capacity.
Digital integrity	Cyber controls, OT segmentation, data continuity and technology lifecycle.
Repair capacity	Local/regional repair, spare parts, qualified contractors and response time.
Strategic dependency	Concentration of suppliers, operators, financing, technology or data access.
Surge capacity	Ability to absorb displaced cargo, emergency flows or defense-related demand.
Recovery time	Estimated time to restore essential function after defined disruption scenarios.
Sovereign choice	Legal and practical ability of national authorities to direct, secure or substitute critical functions.

These indicators are intentionally modular. A future assessment may weight them differently depending on whether the subject is a commercial gateway, an energy terminal, a mineral corridor, a strategic waterway or a defense mobility node.

SECTION 13

Principal Findings

- 1 **Port readiness is network readiness.** Terminal capacity alone is insufficient. The relevant unit of analysis is the connected maritime–landside–energy–digital system.
- 2 **Redundancy is a strategic asset.** Alternative routes, suppliers, equipment and decision pathways reduce the consequences of disruption.
- 3 **Technology lifecycle matters as much as procurement.** Equipment that cannot be independently maintained, replaced or isolated can create long-term dependency even when it performs efficiently in normal conditions.
- 4 **Energy and logistics are inseparable.** Ports require reliable electricity, fuel, storage and transport connections; energy-sector disruptions can therefore become logistics disruptions and vice versa.
- 5 **Sovereignty and resilience can be assessed together.** A sovereign authority benefits from knowing where operational control, information access and substitution options may become constrained.
- 6 **The Panama Canal demonstrates the strategic interaction of commerce, security and sovereignty.** Current U.S.–Panama cooperation illustrates how infrastructure security can be addressed through bilateral arrangements, technical assistance and operational planning while recognizing Panamanian constitutional and legal authority.^[6,7]
- 7 **The hemisphere requires long-duration planning.** Port assets can outlive political cycles and technology generations. Strategic assessments should therefore use 50–100 year horizons while maintaining practical near-term milestones.

13.1 Implication for future HRS research

The next analytical step is to apply this framework to specific countries and corridors through the HRS Country Readiness Assessments. Those assessments can examine national port systems, strategic waterways, logistics corridors and critical infrastructure without assuming that one country or one commercial model is the correct template for the hemisphere.

SECTION 14

HRS Methodology and Evidence Standard

This publication uses the HRS Readiness Cycle as its organizing methodology. The framework is intended to support repeatable assessment rather than advocacy.

Evidence hierarchy

- **Level A — Official documentation:** government laws, executive actions, agency strategies, official statistics and published technical guidance.
- **Level B — Documented institutional evidence:** official statements, formal reports, recognized technical institutions and documented industry information.
- **Level C — Analytical assessment:** HRS interpretation, scenario analysis or forward-looking judgment clearly identified as such.

Where evidence is incomplete, HRS states the limitation rather than infer a conclusion. The framework also separates current conditions from future scenarios. The assessment is designed to be updated as infrastructure, ownership arrangements, technologies, trade flows and security conditions change.

SECTION 15

Conclusion

Ports, logistics corridors and maritime infrastructure are foundational to the Western Hemisphere's ability to move energy, materials, industrial goods, emergency supplies and authorized defense resources. Their strategic importance is likely to increase as infrastructure systems become more interconnected and as governments place greater emphasis on supply-chain reliability, industrial capacity and maritime security.

For the United States and its neighbors, the objective is not a single hemispheric infrastructure model. It is a resilient network of sovereign national systems with sufficient capacity, redundancy, lawful access, security and recovery capability to withstand disruption.

The HRS assessment framework provides a practical method for identifying where those systems are strong, where dependencies are concentrated, and where long-term planning can preserve national choice. Applied consistently over the next 50–100 years, this approach can help decision-makers distinguish between ordinary infrastructure constraints and dependencies with strategic consequences.

The HRS Resilience Foundation will use this framework as the basis for subsequent Country Readiness Assessments and sector-specific research within the Western Hemisphere Readiness Series.

Independent research note. HRS Resilience Foundation is an independent research organization. This publication does not represent the views of the U.S. Government, the Department of State, Department of Defense, Department of Energy, Department of Transportation, or any other government agency. References to government policy are descriptive and do not imply endorsement, sponsorship or government affiliation.

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Independent research for institutional readiness, continuity, and 50-year resilience planning across the Western Hemisphere. The Western Hemisphere Readiness Series applies the HRS Readiness Cycle to critical sectors, translating public-source evidence into practical frameworks built to remain valid for governments, infrastructure operators, investors, and institutional decision-makers across changes in technology, suppliers, and political leadership.

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