

# Evaluation of Efficiency and Effectiveness of State Ports at Wilmington and Morehead City

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A presentation to the Joint Legislative  
Program Evaluation Oversight Committee

October 21, 2019

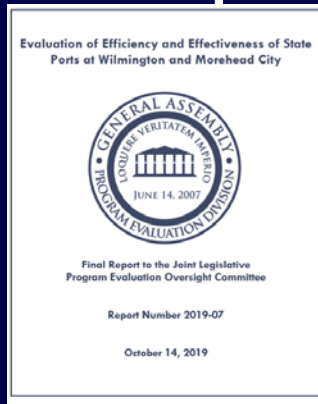
Sean Hamel, Principal Program Evaluator

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# In Your Folder

## Full Report



## Slides



## Handout

Indicator	Performance Measure	Definition & Performance Interpretation	Port Applicability	
			Wilmington	Morehead City
Utilization	Crane Cycles	Crane cycles is the number of times a crane is used and is based on the number of times the crane is used to move cargo. The number of cycles represents the number of times a crane is used to move cargo. Increased number of cycles represent increased level of utilization.	✓	✓
	Crane Hours	Crane hours represents the total number of hours that a crane is used to move cargo. Increased crane hours represent increased level of utilization.	✓	✓
	Crane Hours per Ton	Crane hours per ton is a measure of a port's utilization of cranes. Increased crane hours per ton represent improved utilization.	✓	✓
	Crane Hours per Container	Crane hours per container is a measure of a port's utilization of cranes. Increased crane hours per container represent improved utilization.	✓	✓
Throughput	Container Throughput	Container throughput is a measure of a port's ability to handle cargo. Increased container throughput represent increased level of utilization.	✓	✓
	Container Throughput per Crane Hour	Container throughput per crane hour is a measure of a port's utilization of cranes. Increased container throughput per crane hour represent improved utilization.	✓	✓
Handling	Crane Hours per Container	Crane hours per container is a measure of a port's utilization of cranes. Increased crane hours per container represent improved utilization.	✓	✓
	Ship Turn Time	Ship turn time is the time it takes for a ship to be turned at a port. Decreased ship turn time represent improved utilization.	✓	✓
Productivity	Container Throughput per Crane Hour	Container throughput per crane hour is a measure of a port's utilization of cranes. Increased container throughput per crane hour represent improved utilization.	✓	✓
	Crane Hours per Container	Crane hours per container is a measure of a port's utilization of cranes. Increased crane hours per container represent improved utilization.	✓	✓
	Ship Turn Time	Ship turn time is the time it takes for a ship to be turned at a port. Decreased ship turn time represent improved utilization.	✓	✓
	Turn Time	Turn time is the time it takes for a ship to be turned at a port. Decreased turn time represent improved utilization.	✓	✓
Cost	Cost per Container	Cost per container is a measure of a port's cost to handle cargo. Decreased cost per container represent improved utilization.	✓	✓
	Cost per Crane Hour	Cost per crane hour is a measure of a port's cost to handle cargo. Decreased cost per crane hour represent improved utilization.	✓	✓



# Our Charge

- Directive: Examine the efficiency and effectiveness of the North Carolina State Ports Authority (the Authority) and its operation of the Wilmington and Morehead City ports
- Agency: North Carolina State Ports Authority
- Team: Sean Hamel, Jacob Ford, and Sidney Thomas

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# Overview: Findings

1. Generally, operations of the ports are efficient and effective, largely due to performance at the Port of Wilmington (Findings 1-3)
2. Port of Wilmington has experienced operational gains following implementation of capital investments (Finding 4)
3. Operations of two maritime ports is not duplicative (Finding 5)



# Overview: Findings

4. Operations are not in compliance with statute requiring container cargo operations in Morehead City (Finding 6)
5. The Authority does not adequately monitor service quality from its customers (Finding 7)
6. The Authority has not implemented an Environmental Management System (Finding 8)



# Overview: Recommendations

The General Assembly should

1. Direct the Authority to establish operational objectives to improve performance at the Port of Morehead City, improve service quality monitoring, and develop and implement an Environmental Management System
2. Modify statute pertaining to container cargo operations to align with current practice



# Background



# Maritime Ports

- Ports are important to statewide and regional economies
  - \$15.4 billion
  - 87,000 jobs (indirect)
- Access to ports can affect the cost of goods for buyers and sellers

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# Maritime Port Cargo

Cargo Type	Description	Throughput Unit of Measure
Container	Uniform containers for cargo transportation, supply, and storage	Container moves
General	Dry bulk, liquid bulk, and break bulk	Tons

**Throughput is an important performance measure**

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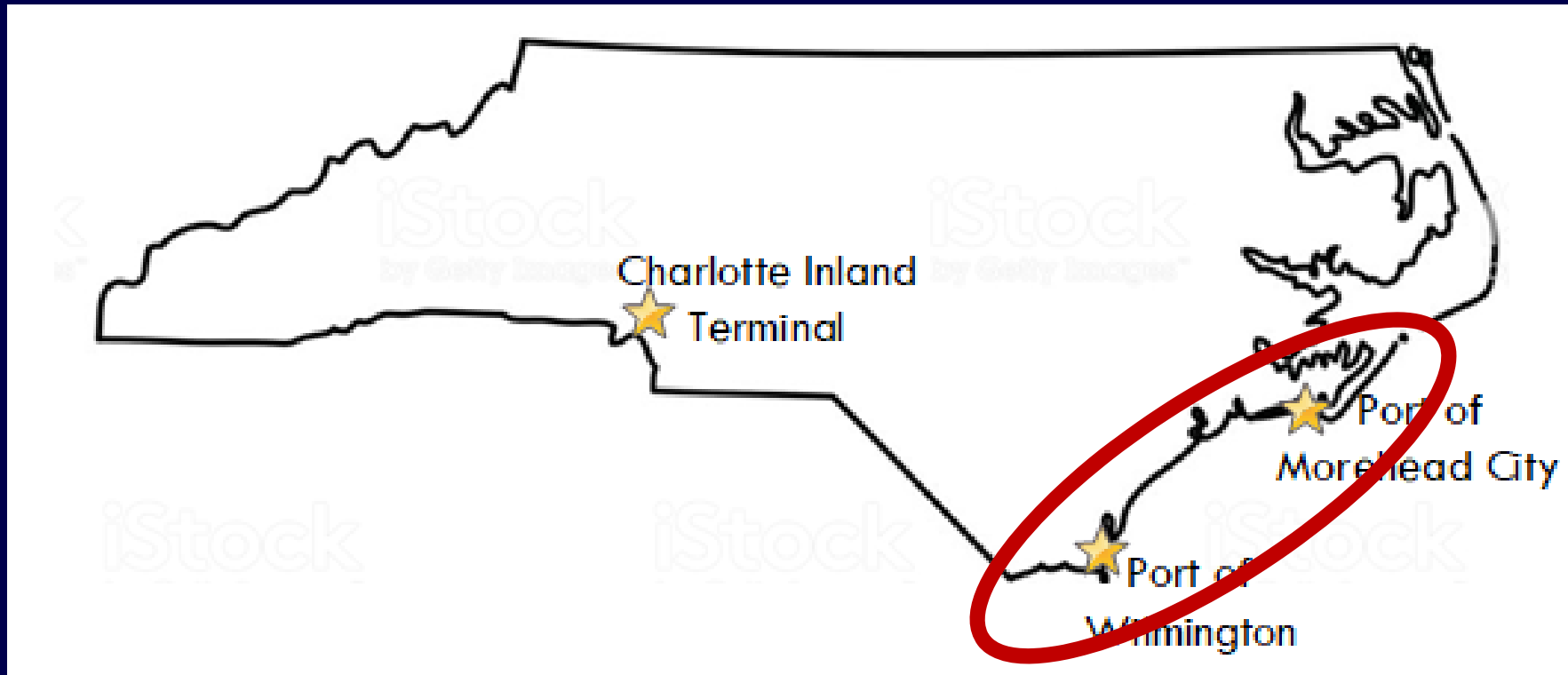
# Maritime Port Infrastructure

- Maritime port operations require specialized capital infrastructure
- Capital infrastructure
  - may differ based on the cargo and materials handled at a port
  - will affect capacity thereby dictating potential throughput

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# North Carolina Ports



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# Morehead City



**Legend**

- For Development
- Buildings/Leased Areas
- Container Storage
- Open Storage
- Transit Shed /Warehouse

Geographic and Infrastructure	
Miles from Open Ocean	4 miles
Mean Lower Low Water (MLLW)	45 feet
Harbor Width	450 feet
Total Acres	128
Storage Acres	29
Number of Berths	9
Linear Feet of Berth	5,366 feet
Number of Cranes	2

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# Wilmington



## Legend

-  For Development
-  Buildings/Leased Areas
-  Container Storage
-  Open Storage
-  Transit Shed/Warehouse

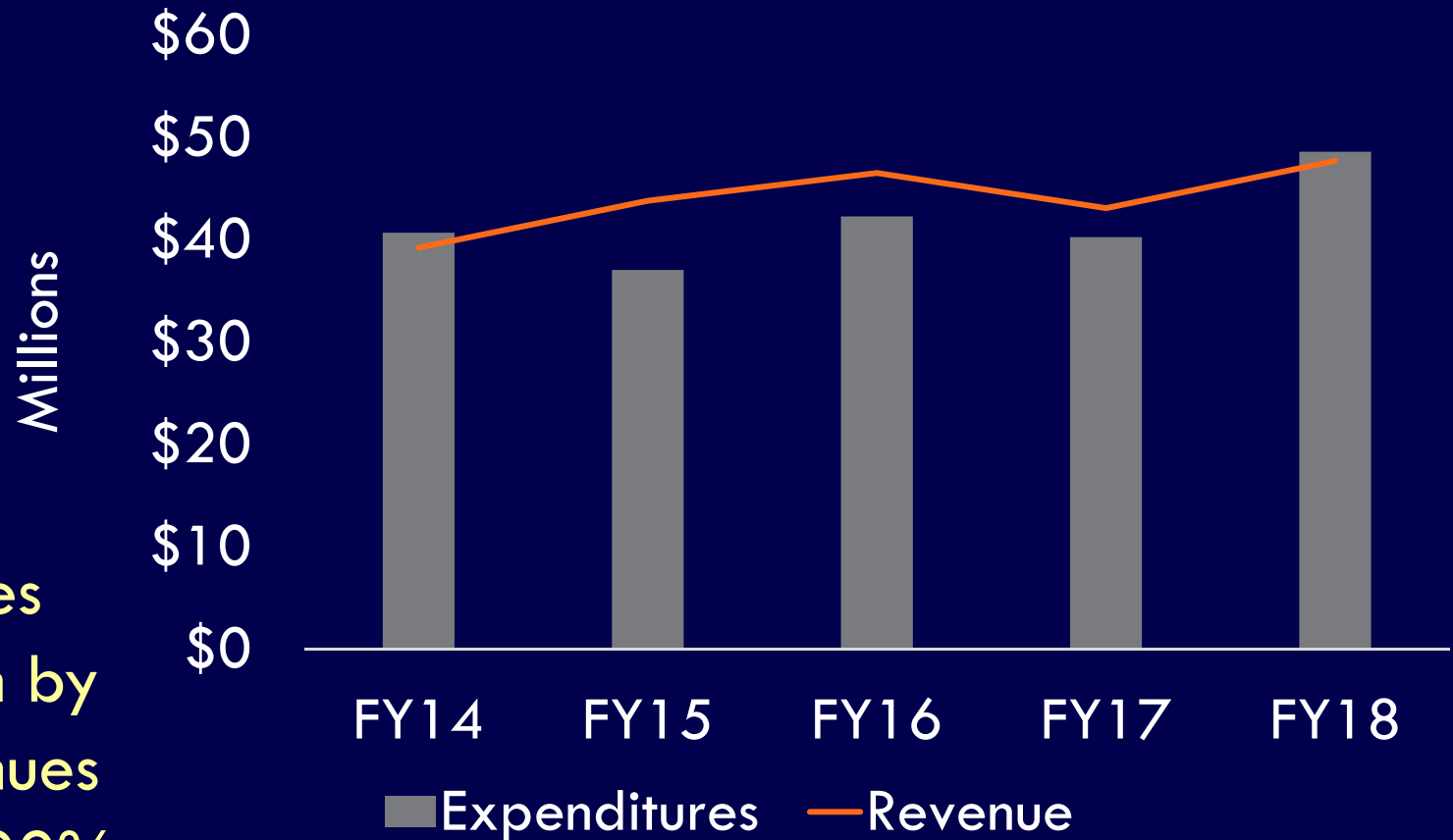
## Geographic and Infrastructure

Miles from Open Ocean	26 miles
Mean Lower Low Water (MLLW)	42 feet
Harbor Width	500 feet
Total Acres	284
Storage Acres	124
Number of Berths	9
Linear Feet of Berth	6,740 feet
Number of Cranes	11



# Operations Generate Revenue to Cover Operating Expenditures

Although expenditures have grown by 19%, revenues are up by 22%



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# Findings



# Finding 1

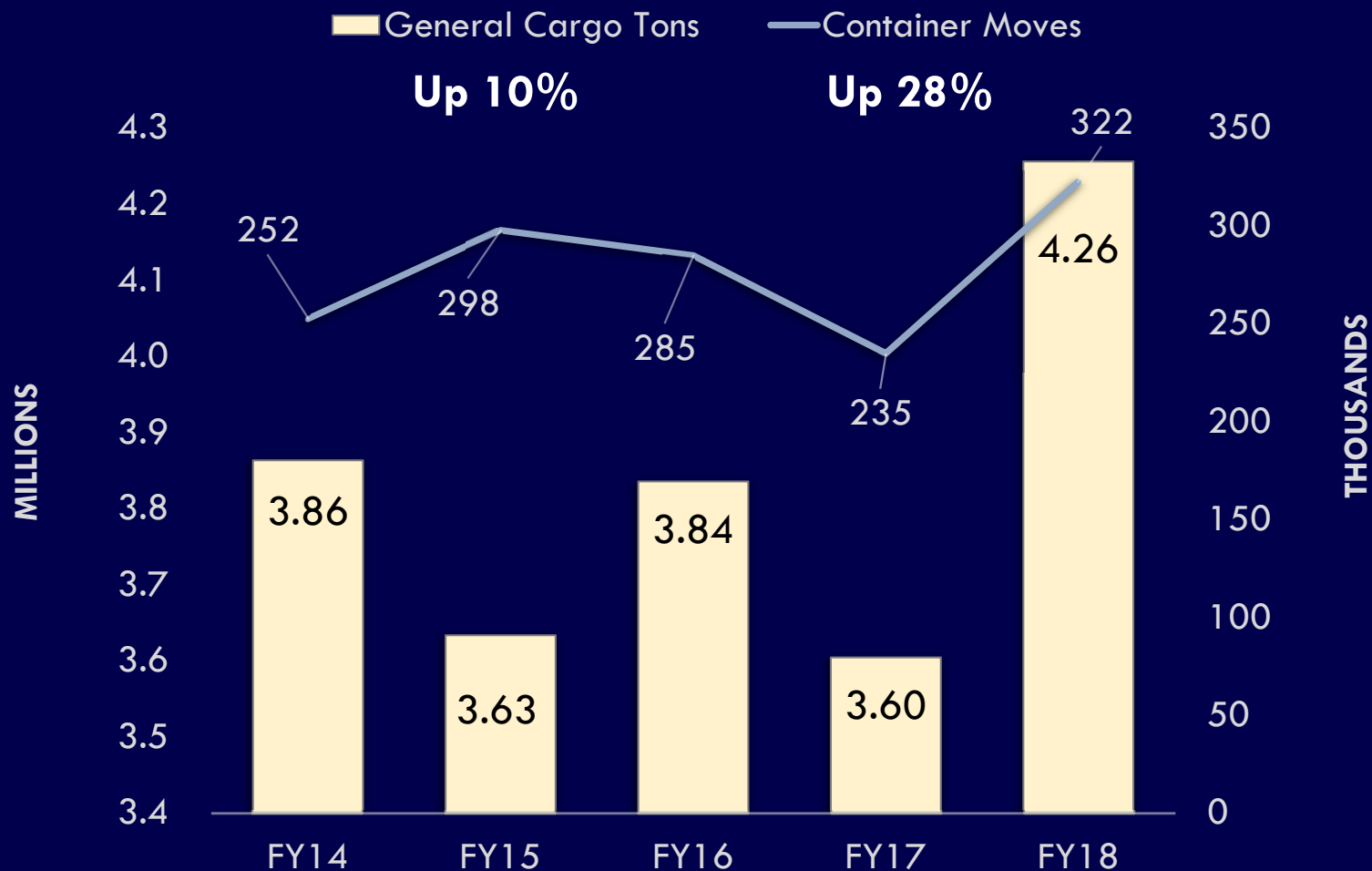
Taken together, North Carolina ports are effective and efficient as demonstrated by increased throughput and decreased unit costs; however, examining port performance at the enterprise level obscures a determination of whether the two port locations are individually effective and efficient

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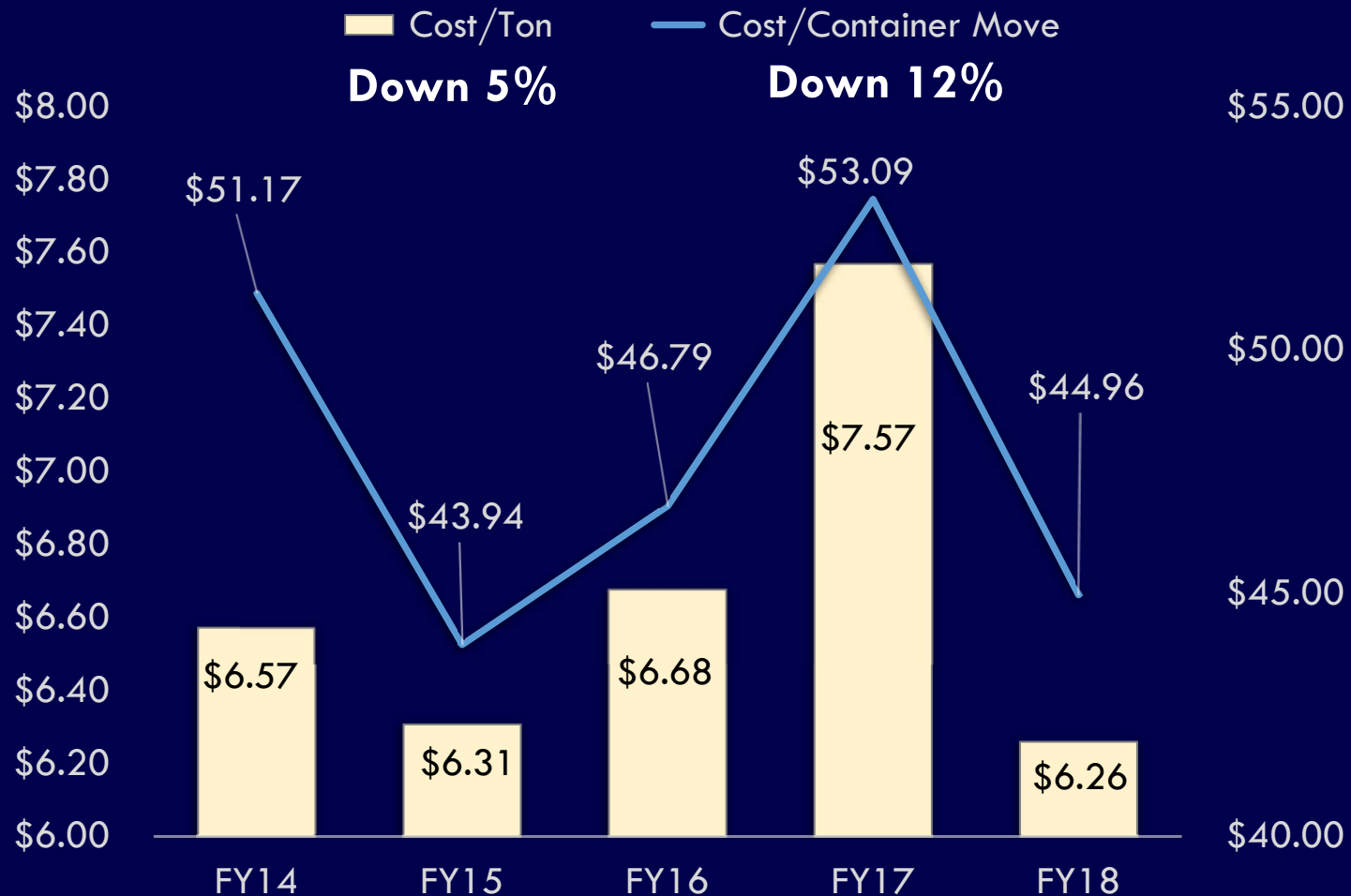




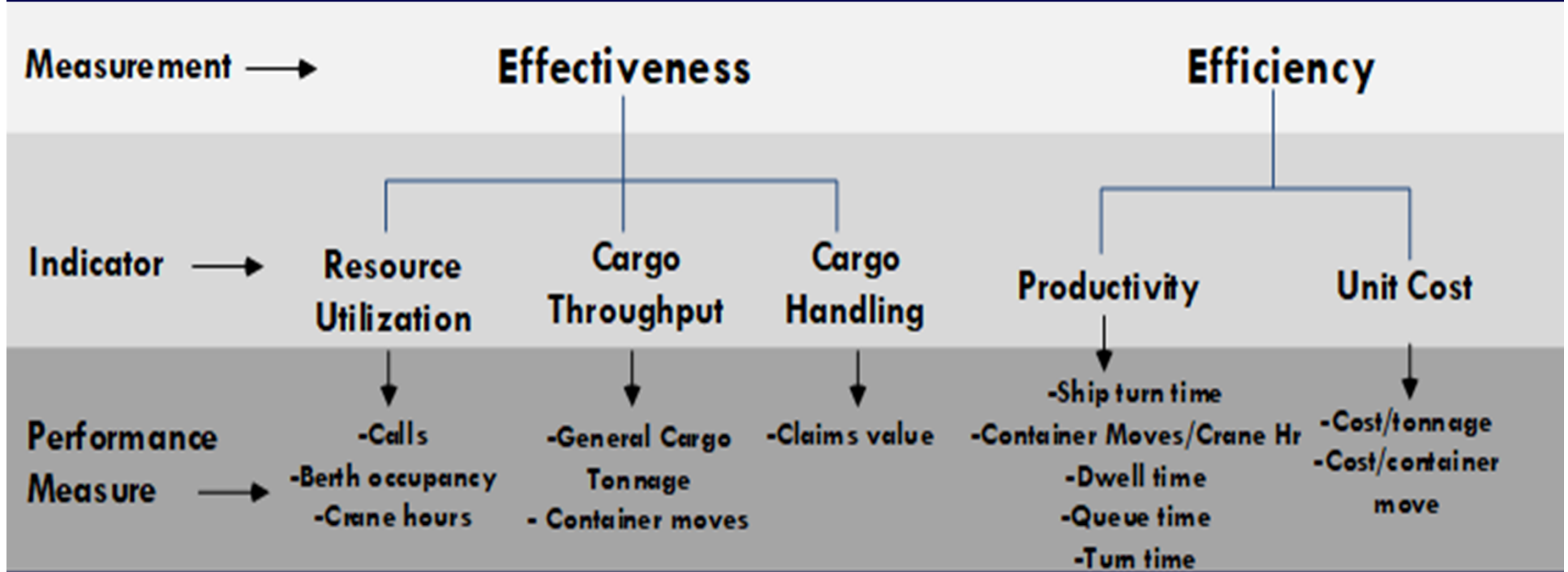
# Overall Port Throughput Shows Positive Growth



# Costs to Process Containerized and General Cargo Have Decreased



# Determining Individual Port Performance Requires More Analysis



**Application of Performance Measures Depends on Individual Port Operations**



## Finding 2

Operations at the Port of Wilmington are effective and efficient due to growth in port utilization and throughput, improved cargo handling and productivity, and reduced unit costs over time

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# Wilmington Has Achieved Improvements Across Nearly All Performance Measures

Indicator	Performance Measure	Trend Over Time
<b>Effectiveness</b>		
<b>Utilization</b>	Calls	↑ +
	Crane Hours	↔ NA
	Berth Occupancy Rate	↑ +
<b>Throughput</b>	Container Moves	↑ +
	General Cargo Tonnage	↑ +
<b>Cargo Handling</b>	Value of Claims Per Call	↔ NA
↑ = Increase greater than 25%      ↓ = Decrease greater than 25%      ↗ = Increase of 5% to 25%      ↘ = Decrease of 5% to 25%      ↔ = Less than 5% increase or decrease		

Note: (+) represents a positive performance outcome. (-) indicates a negative performance outcome. (NA) indicates the performance measure remained stable.



# Wilmington Has Achieved Improvements Across Nearly All Performance Measures

Indicator	Performance Measure	Trend Over Time
<b>Efficiency</b>		
<b>Productivity</b>	Ship Turn Time	+
	Container Moves/Hour	-
	Dwell Time	-
	Queue Time	+
	Turn Time	+
<b>Unit Costing</b>	Cost/Tonnage	NA
	Cost/Container Move	+

= Increase greater than 25%

= Decrease greater than 25%

= Increase of 5% to 25%

= Decrease of 5% to 25%

= Less than 5% increase or decrease

Note: (+) represents a positive performance outcome. (-) indicates a negative performance outcome. (NA) indicates the performance measure remained stable.



## Finding 3

Despite falling utilization rates, decreased throughput, and diminished productivity, the Port of Morehead City has made bottom-line efficiency gains

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# Effectiveness Measures for the Port of Morehead Show Mixed Results but Bottom-Line Efficiency Gains

Indicator	Performance Measure	Trend Over Time
<b>Effectiveness</b>		
<b>Utilization</b>	Calls	↓ -
	Crane Hours	↘ -
<b>Throughput</b>	General Cargo Tonnage	↘ -
<b>Cargo Handling</b>	Value of Claims Per Call	↓ +
↑ = Increase greater than 25%      ↓ = Decrease greater than 25%      ↗ = Increase of 5% to 25%      ↘ = Decrease of 5% to 25%      ↔ = Less than 5% increase or decrease		









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# Effectiveness Measures for the Port of Morehead

## Show Mixed Results but Bottom-Line Efficiency Gains

Indicator	Performance Measure	Trend Over Time
<b>Efficiency</b>		
<b>Productivity</b>	Ship Turn Time	 -
	Turn Time	 -
<b>Unit Costing</b>	Cost/Tonnage	 <b>NA</b>
 = Increase greater than 25%  = Decrease greater than 25%  = Increase of 5% to 25%  = Decrease of 5% to 25%  = Less than 5% increase or decrease		

Note: (+) represents a positive performance outcome. (-) indicates a negative performance outcome. (NA) indicates the performance measure remained stable.



# Finding 4

Improved performance at the Port of Wilmington is linked to early implementation of capital expansion projects

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# Port Capital Improvements

- Port capital improvements are necessary to maintain and expand the Authority's access to the shipping market
- General Assembly has appropriated \$160 million to fund port capital expansion projects
  - Terminal Infrastructure
  - Channel Enhancements
  - Improved Truck Mobility

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# Appropriations Have Helped the Authority Achieve its Intended Mission

	Quantity Change	Percentage Change
<b>Berth Occupancy Rate</b>	+10.3 percentage points	+53%
<b>Container Moves</b>	+4,400 per month	+19%
<b>Ship Calls</b>	+6 per month	+16%

Note: Statistically significant differences were found at  $p < 0.000$ .

## Rates of growth in Container and General Cargo Throughput Outpace Economic Indicators

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# Finding 5

The Authority operates two distinct maritime port terminals that are not duplicative

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# Operating Two Ports Is Not Duplicative

- Operating multiple ports or terminals is not an administrative or organizational feature unique to North Carolina's ports
- Although there is some overlap of activities performed at the ports, it is reasonable and justified
- The Authority's two port terminals process different types of cargo

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## Finding 6

Statute requires the Authority to conduct containerized cargo shipping operations at both ports, yet the Port of Morehead City does not perform this function

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# Finding 7

**The Authority does not adequately monitor service quality from its customers**

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# Past Efforts to Systemically Monitor Customer Feedback Were Flawed

Service Quality Dimension	Measured by Survey?
<b>Process:</b> professionalism, quick response, knowledge of customer needs and requirements	●
<b>Resources:</b> equipment and facilities are modern and functioning; strong financial stability; excellent shipment track and trace capability	○
<b>Outcome:</b> fast, reliable, consistent service; ship/shipments are safe and secure; error-free invoices; competitive prices	◐
<b>Management:</b> comprehensive information and communication technologies; management is knowledgeable, competent, and responsive to needs; feedback is collected; processes are continuously improved	◐
<b>Image and Social Responsibility:</b> good relationships with other service providers; record of reliability and safety; demonstrates social responsibility to employees and stakeholders; environmentally responsible	○
● = Dimension Fully Addressed      ◐ = Dimension Partially Addressed      ○ = Dimension Not Addressed	



# Finding 8

The Authority has not established an environmental management system, thereby jeopardizing sustainable operations

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# Environmental Management System

- Maritime ports must contend with numerous environmental challenges that pose risks to operations and sustainability
- An environmental management system (EMS) can address this risk
- The Authority has not developed or implemented a formalized EMS but is in the process of doing so

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# Recommendations



# Recommendation 1

The General Assembly should direct the North Carolina State Ports Authority to establish operational objectives, including modifying its strategic plan, in order to improve performance at the Port of Morehead City

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## Recommendation 2

The General Assembly should modify the statute pertaining to containerized shipping to align with current practice

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# Recommendation 3

The General Assembly should direct the North Carolina State Ports Authority to improve service quality measurement

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# Recommendation 4

The General Assembly should direct the Authority to provide updates on the development and implementation of its environmental management system (EMS)

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1. Generally, operations of the ports are efficient and effective, largely due to performance of the Port of Wilmington
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Report available online at  
[www.ncleg.net/PED/Reports/reports.html](http://www.ncleg.net/PED/Reports/reports.html)

