

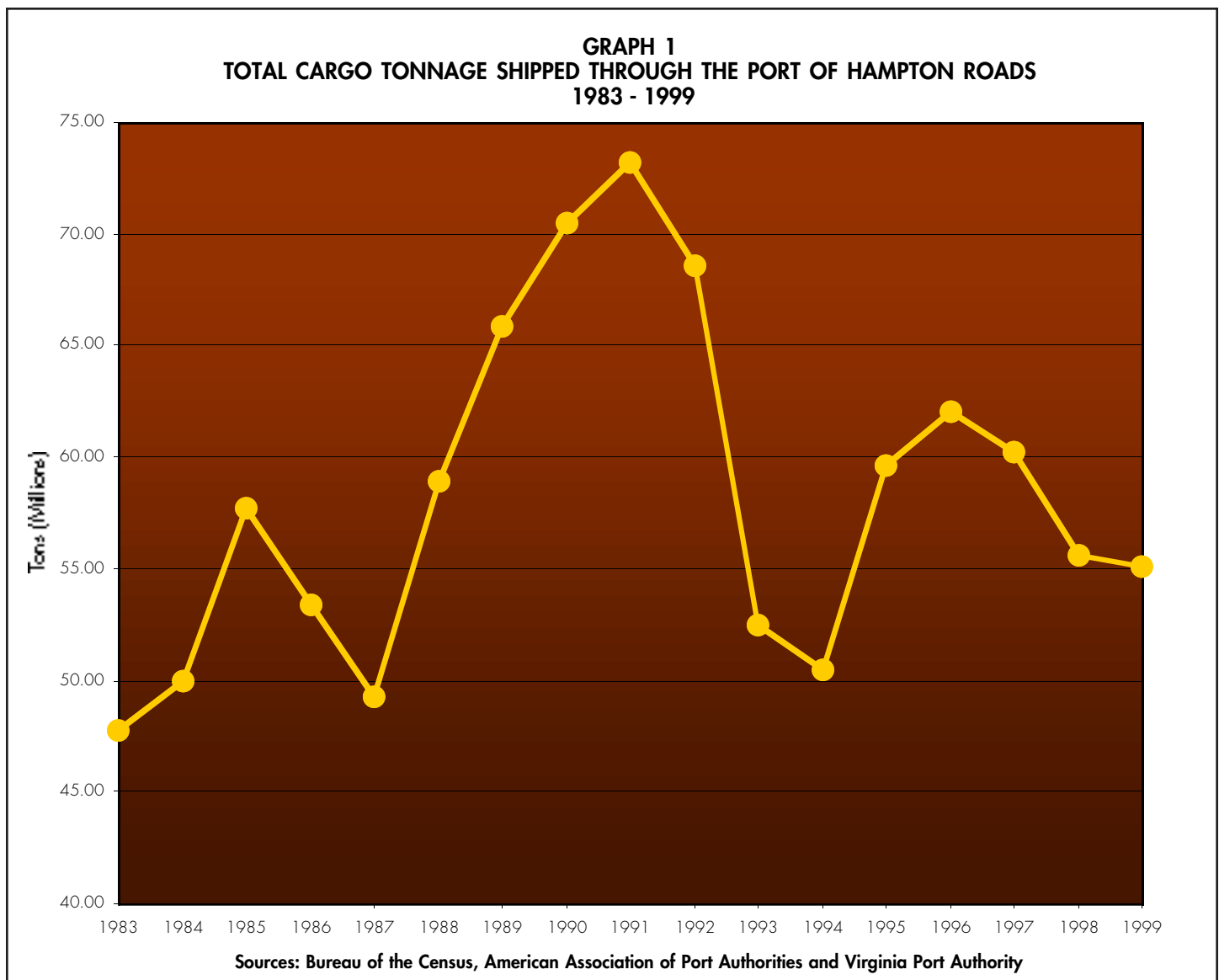


THE PORT OF HAMPTON ROADS

The Decline of Coal and the Rise of Deep-Draft Ships: The Future of the Port

The Port of Hampton Roads is no small fry. It is, in fact, among the largest cargo ports in the United States. Based on the 1999 tonnage statistics of the American Association of Port Authorities, Hampton Roads, with 55.1 million short tons of cargo, ranked 10th in the country behind Long Beach, Calif. Further, in 1998, the latest year for which world tonnage data are available, Hampton Roads ranked 33rd in the world, ahead of such major ports as London, Amsterdam and Genoa.

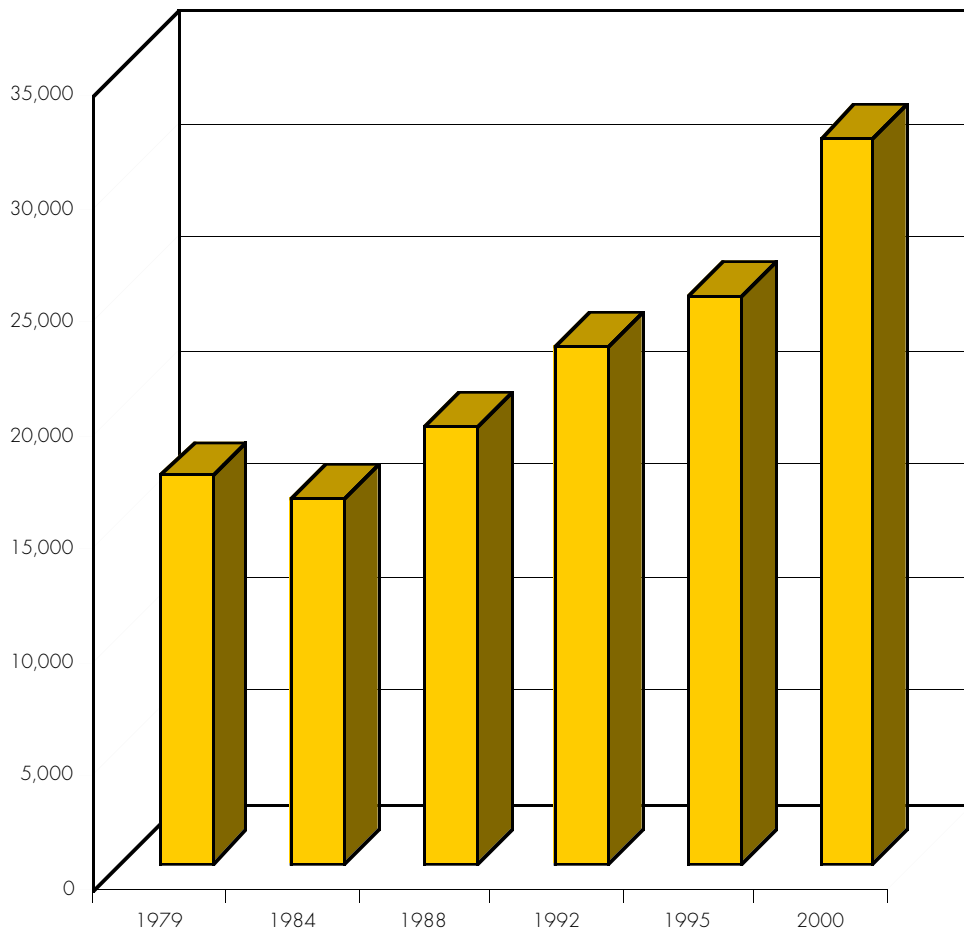
Despite its relative importance in the world's transportation network and its huge importance to Hampton Roads, the Port, as seen in Graph 1, has experienced a downward trend in total tonnage since reaching a peak in 1991. The cargo level handled by the Port in 1999 was roughly similar to that of 1985. Judged strictly on the basis of tonnage, then, it would seem that the Port is a contracting sector of the Hampton Roads economy and therefore a declining contributor to the economic development of the community. Just the opposite is true, however. When we measure growth in jobs and income due to the Port, a very different picture appears. Port-related employment, which can be defined as the sum of those jobs associated with the movement of cargo, plus jobs associated with firms using the Port, increased at an impressive rate, approaching 5 percent per



year from 1988 to 2000. As displayed in Graph 2, although the number of Port-related jobs grew slowly from 1979 to 1988, nearly 13,000 Port-related jobs were created in Hampton Roads from 1988 to 2000. **Viewed in this light, the Port exerted a dynamic, expansionary influence on the Hampton Roads economy over the past decade.**

How do we explain the apparent contradiction between declining Port tonnage and rising Port-related employment? Will the Port continue to grow in terms of employment? Is the Port an economic development tool for the larger community? Can government play a role in assisting Port development? Does the Port only affect the economies of those cities within Hampton Roads in which Port facilities are located? The keys to answering these questions lie in understanding the changing cargo mix between general and bulk cargo, the major cargo types arriving at the Port and in the basic economics of the shipping industry. That is the focus of this chapter.

**GRAPH 2
PORT-RELATED EMPLOYMENT IN HAMPTON ROADS
1979-2000**



Source: Old Dominion University Forecasting Project

General Cargo

The Port handles two major types of cargo. One is general cargo, 95 percent of which arrives in containers, and the other is bulk cargo, which arrives in the holds of ships. General cargo might include items ranging from television sets to clothing. The major bulk cargo item is coal.

EMPLOYMENT AND TONNAGE

With the exception of a very small operation at Lambert's Point, the facilities used for unloading container vessels in Hampton Roads are owned by the Commonwealth of Virginia, and are located in Portsmouth, elsewhere in Norfolk and in Newport News. According to 1999 data from the American Association of Port Authorities, Hampton Roads ranks 34th in the world in container shipping and, as shown in Table 1, eighth in the United States behind Charleston, S.C.

TABLE 1
U.S. Port Ranking

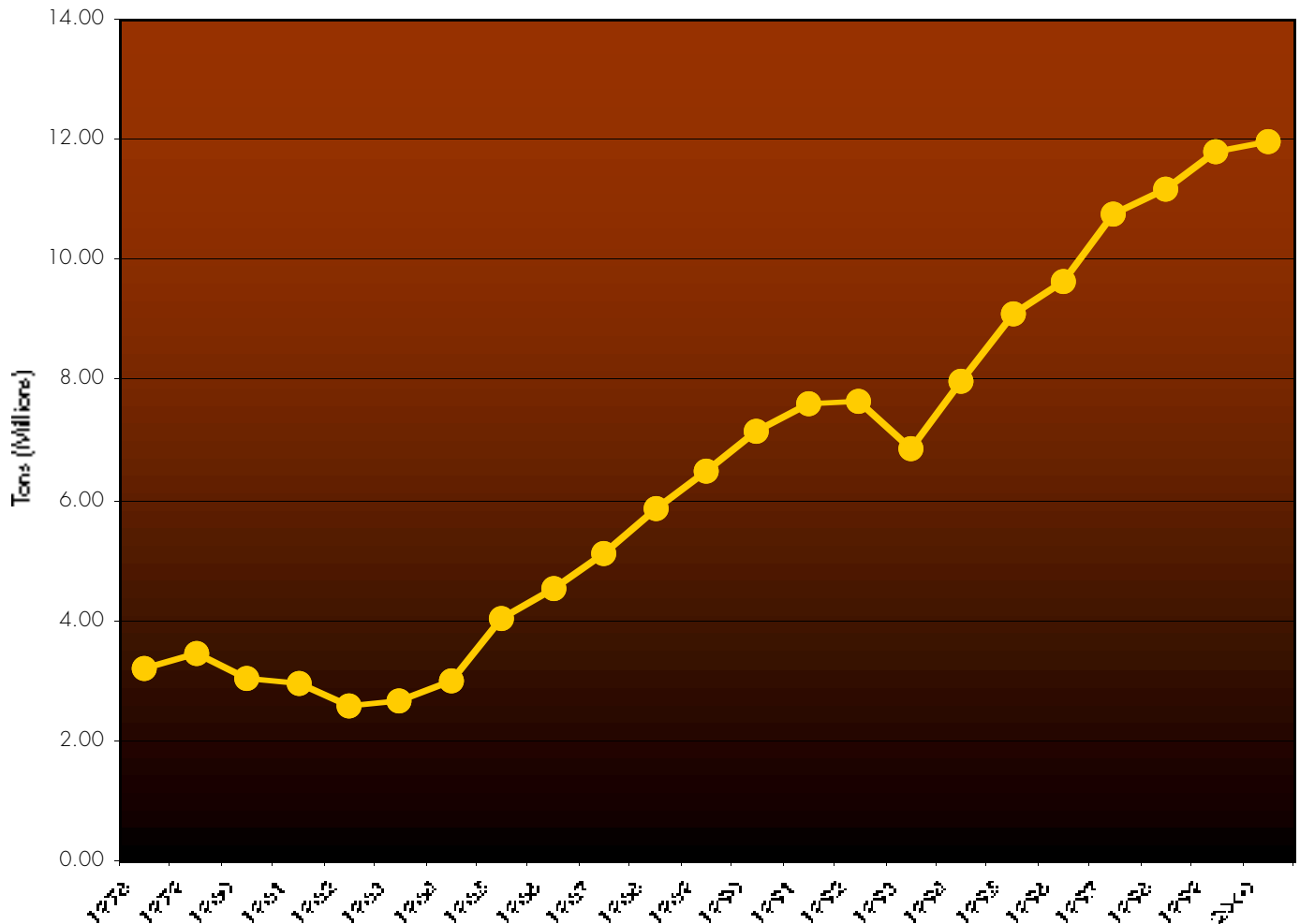
Port	Containers (1,000's)
	1999
Long Beach	4408
Los Angeles	3829
New York / New Jersey	2829
San Juan	2085
Oakland	1664
Seattle	1490
Charleston	1483
Hampton Roads	1307
Tacoma	1271
Houston	1001
Savannah	793
Miami	778
Jacksonville	772
Port Everglades	716
Baltimore	498

General cargo tonnage arriving at the Port since 1978 is displayed in Graph 3. Unlike total Port tonnage, which includes both general and bulk cargo, general cargo tonnage has risen fairly steadily over time. Its volume in 2000 was nearly six times that of 1979. Over the same time span, the Old Dominion University Economic Forecasting Project estimates that Hampton Roads employment directly related to general cargo facilities rose steadily from 10,600 jobs in 1979 to 27,500 jobs in 2000. **In the case of general cargo, both tonnage and employment have been steadily increasing at the Port. Further, given general cargo's proportional dominance of the employment data and rising cargo tonnage, general cargo has been the source of overall employment growth in Port-related jobs and is not the source of the decline in overall tonnage.**

This drop is due solely to declining bulk cargo shipments. The drop in bulk cargo, however, has had a minimal effect on overall Port-related employment, because general cargo job creation has more than offset the decline in year-to-year employment in bulk cargo movement. The reason for this is that general cargo is much more labor-intensive than bulk cargo in both its movement and its ability to attract other industries to the

region. In 2000, general cargo, on average, created a job in Hampton Roads for every 435 tons of cargo shipped through the Port, while roughly 9,000 tons of bulk cargo were required to create a job in Hampton Roads. It takes many hands to deal with general cargo, but relatively few hands to deal with bulk cargo such as coal.

**GRAPH 3
HAMPTON ROADS GENERAL CARGO
1978 - 2000**



Source: Virginia Port Authority

Given the significant growth in jobs connected to the Port’s general cargo traffic, it is worthwhile to examine more closely precisely where and how this is occurring. Employment related to the Port’s cargo operations can be subdivided into two categories: (1) jobs dedicated to cargo movement and (2) jobs resulting from firm location decisions. Cargo movement employment is concentrated in occupations such as stevedores, tugboat crews, truck drivers and ship service workers. However, still other Port employment results from firms that decide to locate or expand in Hampton Roads because of the direct access they obtain to import and/or export cargo arriving/departing through the Port. Examples of this type of employment include import- and export-related jobs generated by firms such as Siemens, Canon, Lillian Vernon and Dollar Tree.

General cargo tonnage has almost quadrupled over the past 20 years. Nonetheless, as Table 2 indicates, employment in general cargo movement has risen only about 22 percent, from 7,300 in 1979 to slightly less than 8,900 in 2000. A major

TABLE 2
Hampton Roads General Cargo Employment

Year	General Cargo Movement Employment	Firm Location Employment	Total General Cargo Related Employment
1979	7315	3307	10622
1984	5570	3399	8969
1988	6085	6623	12708
1992	7434	9295	16729
1995	7927	11244	19171
2000	8877	18677	27554

Source: Old Dominion University Economic Forecasting Project

reason for the relatively slow employment growth relative to cargo tonnage is the increase in efficiency or productivity in the movement of container cargo at the Port. Table 3 shows that stevedore productivity per hour tripled between 1980 and 2000. This is a remarkable increase in labor productivity and reflects in particular the huge investments the Port and firms connected to the Port have made in equipment that makes each worker far more efficient than before.

Since employment in the movement of cargo has not produced large gains over the past two decades, this means the lion's share of Port employment growth in Hampton Roads has come from firms that locate or expand within the region because of their access to container facilities. As Table 2 illustrates, this kind of employment rose from about 3,300 in 1979 to just over 18,600 in 2000, roughly a six-fold increase over the period. If the Port is a growth engine, then this is the major source of that growth. The firms generating these jobs are engaged primarily in light manufacturing and product distribution.

TABLE 3
Stevedoring Productivity in Hampton Roads

Year	Tons per Worker per Hour
1980	1.15
1988	2.52
2000	3.54

Source: Old Dominion University Economic Forecasting Project

Since 1995, product distribution and warehouse facilities for such firms as Wal-Mart, Sysco and Dollar Tree have been instrumental in the growth of import cargo tonnage. However, exports from Hampton Roads have grown as well. Table 4 shows that in 1999 about 3.4 percent of the Gross Regional Product (GRP) was exported to other countries. Many people find this surprisingly low, because both Virginia as a state and the United States as a whole are more heavily involved in export activity. **The good news is that during the past decade, the growth in merchandise exports from Hampton Roads far outstripped that of both Virginia and the United States. Thus, we have the anomaly that most individuals inside Hampton Roads think of the region as being very heavily involved in export trade. The truth is somewhat different. Hampton Roads exports a smaller proportion of its GRP than the typical region in the country, though its export traffic is expanding rapidly.**

Although employment growth in the cargo movement firms has been relatively small, it is vitally important to the economic health and future of the region because the slow growth reflects the rising efficiency in cargo movement in Hampton Roads. This rising efficiency confers cost savings on shippers and is one of the reasons export traffic is growing so rapidly. The Port of Hampton Roads is an efficient operation. The cost savings realized are central to the ability to attract both distribution and light manufacturing industries to the region. This is one of the reasons why the Port has assumed the role of the mid-Atlantic load center.

TABLE 4
Merchandise Exports for Hampton Roads, Virginia and the U.S. (Selected Data)

	Gross Product 1999 (Billions \$)	Merchandise Exports, 1999 (Billions \$)	Exports as a Percent of Gross Product	Percent Change 1993-99
Hampton Roads	41.70	1.40	3.40%	105.30%
Virginia	246.80	10.70	4.30%	32.10%
U.S.	9299.20	696.00	7.50%	49.60%

Hampton Roads export receiving countries: Canada, Mexico, France, Germany, UK, Brazil, Netherlands, Japan, Australia, South Korea

Sources: U.S. Department of Commerce and the Old Dominion University Forecasting Project

THE MID-ATLANTIC LOAD CENTER

The relatively large general cargo tonnage increase at the Port has created a “marketing critical mass” and agglomeration economies which have helped to make Hampton Roads the nation’s mid-Atlantic load center for container shipping lines. Load center container ports are analogous to hub airports in that shipping lines designate a port to which cargo shipment is directed. The effect is bi-directional. The concentration of cargo at the Port of Hampton Roads has allowed for more frequent and more pre-scheduled vessel arrivals that serve to reduce shipping costs and uncertainty. And, the more cargo the Port handles, the more efficient it has the opportunity to become.

In addition to the economic and marketing advantages created by the large general cargo flow through the Port, the accessibility of the Port has been critical to its development as a load center. The Port has excellent rail communications via Norfolk Southern and CSX railroads with mid-Atlantic and midwestern shippers, and possesses economic road links to the interstate highway system. But, most important, the Port of Hampton Roads is the deepest accessible natural port on the East Coast.

The channel depth into and out of the Hampton Roads harbor is naturally deep and, with appropriate dredging and care, enables the Port to handle ships that other ports must reject unless they spend hundreds of millions of dollars to make themselves accessible. The deep-water nature of the Port has been critical to its growth and will become even more important in the future as shipping lines attempt to take advantage of the economies of scale offered by larger and deeper draft container vessels.

The evolution of the Port into the mid-Atlantic load center, over ports such as Baltimore and Charleston, has created its own challenges. The Port’s current container facilities are approaching their physical capacity. With the addition of the Phase I and Phase II piers at Norfolk International Terminal, the existing Commonwealth-owned port facilities apparently will have reached their maximum expansion capability. How this capacity challenge is met is one of the crucial issues for the future economic viability of the Port of Hampton Roads. Port capacity is not a glamorous issue that appears on the radar screen of most of the region’s citizens, and it is of even less concern to Virginians as a whole, especially legislators who reside outside Hampton Roads. Nonetheless, it is an issue that is critical to the regional economy.

THE FUTURE OF THE MID-ATLANTIC LOAD CENTER

Although container traffic at all East Coast container ports is expected to increase in the future, the current leading load center ports of New York/New Jersey, Charleston and Hampton Roads are expected to handle an increasing share of container traffic. However, continued expansion of general cargo tonnage at the Port will depend on the following key issues:

- Growth of international trade
- Expansion of current facility capacity
- Channel and turning basin depths
- Rail and highway access to the Port.

With respect to the growth of international trade, waterborne container trade in the United States is expected to increase substantially over the next three years. The U.S. Industry & Trade Outlook 2000, published by the DRI-WEFA economic consulting organization, anticipates growth of import and export container trade to rise by an average of 7 percent per year, and 5 percent per year, respectively, through 2004. A recently commissioned study by the Virginia Port Authority forecasts a container cargo average growth of 4.3 percent per year over the next 30 years. If these predictions prove to be accurate, then container traffic at the Port would quadruple over the next 30 years. This is not pie in the sky, for these estimates are consistent with a number of other studies that project strong yearly growth in American and Hampton Roads container commerce over the foreseeable future. **In short, the chances are good that, despite occasional cyclical downturns, the long-term international trade market will remain strong. The question is: Will the region seize the initiative and take advantage of this burgeoning market?**

If the projected trade levels do come to pass, then the Port will begin to approach its physical limit to move containers around 2010. Thus, to take advantage of the future international trade market and its potential to create jobs and income in the region, the physical capacity of the Port will have to be increased substantially. Currently, the Virginia Port Authority has plans to develop Craney Island into an entirely new container facility that would roughly double current and planned capacity at the existing facilities. The timely development of the Craney Island facility is dependent upon citizen reactions, satisfying environmental requirements and (of course) Commonwealth financial support. One potential event that could significantly ease the Port's looming capacity problem is the near-term development of a privately funded container facility by Maersk Sealand in Portsmouth. Eventually, the Maersk Sealand facility could expand the Port's capacity by more than 75 percent. This project also could enhance the company's ability to better serve its regional customers, especially distribution warehouses.

Channel depth is a critical issue to the growth of container ports throughout the world. The reason is that shipping lines stand to benefit from the significant unit cost reductions achievable from the scale economies created by larger and deeper draft container ships. The Port of Hampton Roads, with an inbound channel depth of 45 feet and an outbound depth of 50 feet, currently is the deepest accessible port on the East Coast. Still, the Regina Maersk, the largest container ship ever to call at Hampton Roads, draws 47.5 feet of water fully loaded and is, therefore, unable to enter the port at full capacity. Further, the number of such large container ships worldwide is rising. For example, Orient Overseas Container Lines has placed an order for six ships that are 20 percent larger than the Regina Maersk. And, the China Shipping Group has announced plans to build container vessels 40 percent larger than the Regina Maersk! To accommodate this next generation of vessels, the Port will need deeper channels. The Virginia General Assembly has allocated an initial \$17.7 million for a 55-foot channel dredging project; however, several hundred million dollars will be required to complete the dredging of the channel and the turning basin area. At this point, it is unclear what the extent of the federal government's financial participation will be in the project, although traditionally it has exhibited at least some interest in channel depth because of the presence of Naval Base Norfolk. What is clear is that state and local governments, along with the private sector, will have to provide significantly greater financial support to harbor dredging than in the past if the Port is to take advantage of this basic economic force which drives shipping costs. Economies of scale are driving shipyards to build much larger ships and it remains to be seen whether Hampton Roads will be one of the international ports capable of serving such ships.

The question of intermodal transfer of ship cargoes to rail cars or trucks is complicated. The most successful ports boast cost-effective land transport, whether by rail or highway. Shippers who might utilize a port either to import or export are interested in the total package price. This includes whatever rail or highway transportation is necessary. The overall intermodal price and quality

combination is essential to the viability of the Port of Hampton Roads. About 75 percent of containers shipped through Hampton Roads arrive via trucks. Highway congestion into Hampton Roads is increasing, especially at the “choke points” caused by water barriers and tunnels, and the delays caused by this congestion add time, and subsequent cost, to container shipment. The expected growth in container traffic obviously will contribute further to this congestion. Since most of the planned container facility expansion will take place at Craney Island and at the new Maersk Sealand project site, both of which are on the south side of the James River, significant improvements in highway access to port facilities will be necessary if the Peninsula is not to become isolated. The proposed “third crossing” would assist in this regard. Further, turning either Route 58 or Route 10 into access-limited four-lane highways connected to Interstate 95 would dramatically improve traffic flow into the southern part of Hampton Roads. An important advantage of these routes south of the James River is they are not constrained by long bridge crossings.

Recently, container traffic at the Port has been adversely affected by the difficulty of integrating Conrail into the operations of Norfolk Southern and CSX. Scheduling problems with some midwestern shippers has caused the diversion of containers through Canada to the port of Halifax. It appears that many of the merger problems have been overcome; however, the jury is still out on this matter. Memories of the problems shippers have encountered over the past year or two may have latent effects that could diminish future container shipments, especially from midwestern firms.

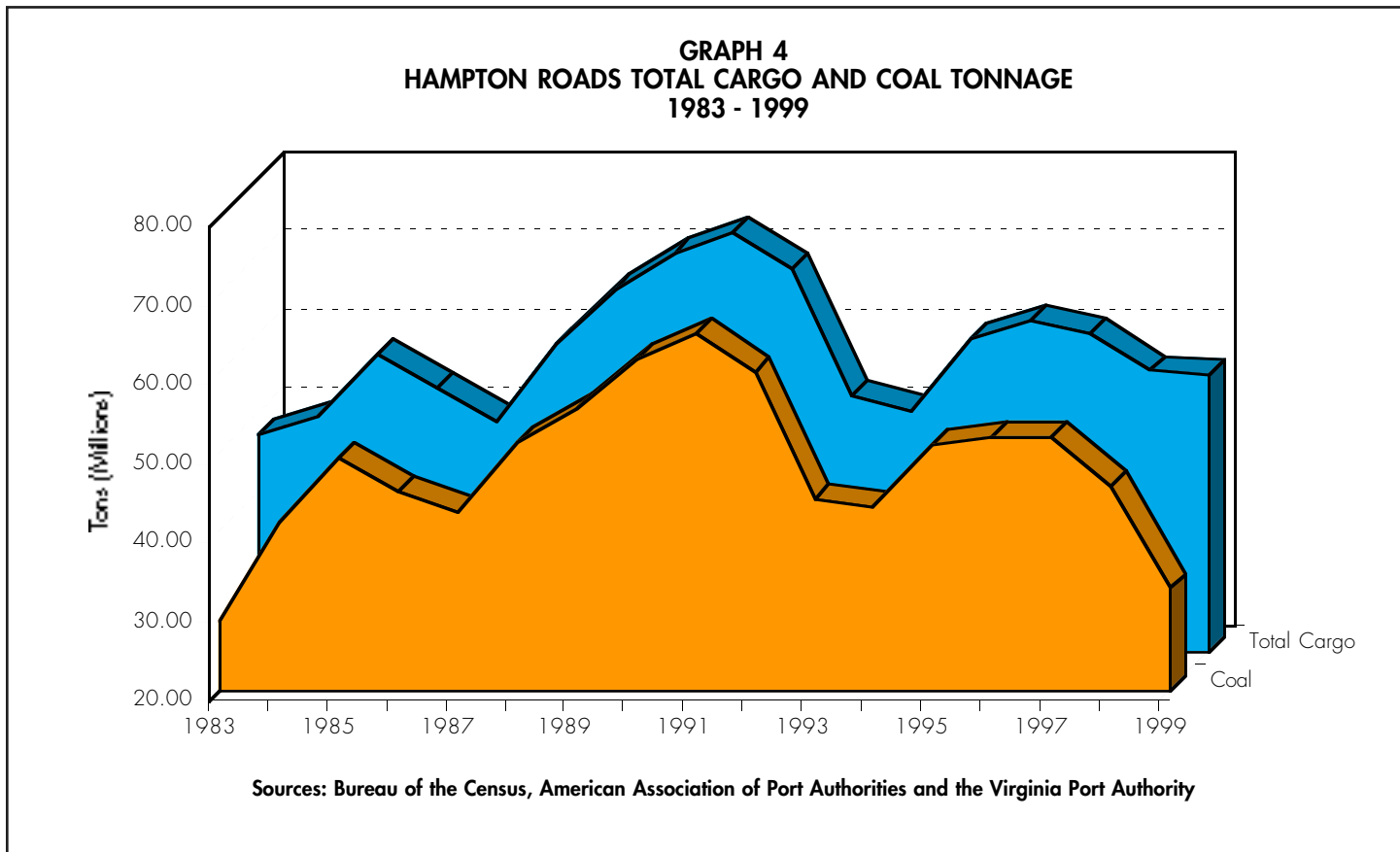
In summary, the future of the mid-Atlantic load center is particularly dependent on advanced planning and cooperation between the private and public sectors. Such planning needs to be sharply focused on the Port’s infrastructure requirements that include facility capacity expansion, channel deepening and highway access.

Bulk Cargo

Despite its much smaller impact on regional employment, bulk cargo still created an estimated 4,500 jobs in Hampton Roads in 2000. This was approximately 14 percent of all employment related to the Port. At the same time, bulk cargo represented an estimated 78 percent of the Port’s tonnage. For the last 20 years, coal has accounted for more than 90 percent of the yearly bulk cargo shipped through the Port, with petroleum, grain and cement constituting most of the remainder.

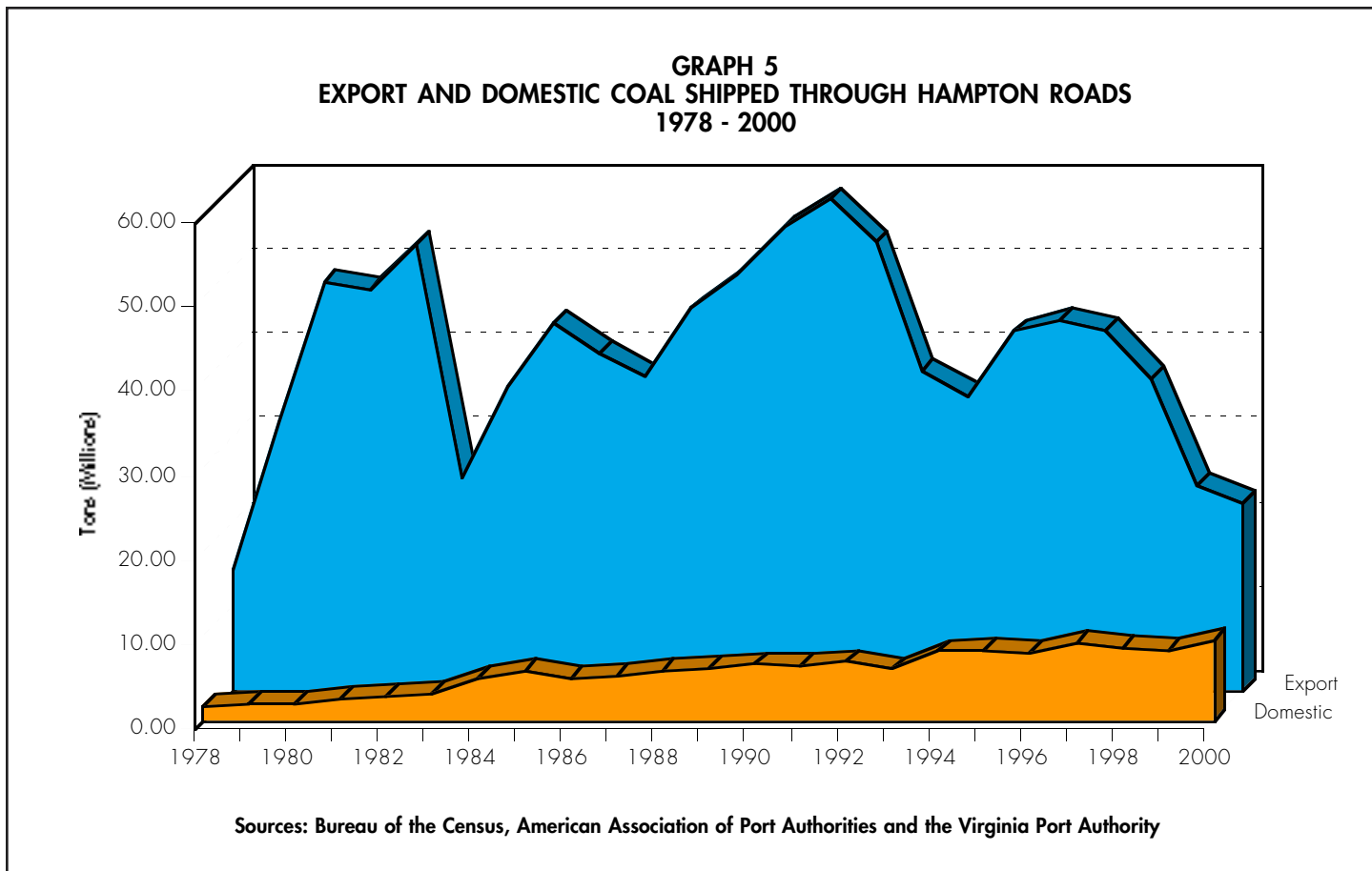
In 2000, Hampton Roads was the largest coal-exporting port in the United States, accounting for more than 40 percent of total American coal exports. In fact, Hampton Roads is among the largest coal-exporting ports in the entire world. It is a “natural” when it comes to coal exports. Hampton Roads holds three important advantages over all other American ports. First, it is located close to the Pocahontas coalfields in western Virginia, southern West Virginia and eastern Kentucky. These fields contain some of the highest quality coal in the world which, until the advent of recent technological advances in steel production, conferred near monopoly power on those producing it. Second, coal is shipped to the Port of Hampton Roads only by rail. The rail lines that connect the Port with the Pocahontas fields run downhill, significantly reducing fuel costs, which are a major over-land component of shipping costs. Third, Hampton Roads has the deepest channel on the East Coast. These are impressive advantages. Still, many colliers calling at the Port cannot be fully loaded because the Hampton Roads shipping channels are not deep enough for them to transit with a full load. Channel depth, then, is an important factor in the bulk cargo arena as well with respect to container cargo.

Coal shipments vary considerably from year to year, as Graph 4 indicates. Because of coal's domination of Port tonnage data, it is clear that variations in coal tonnage drive the level of and changes in the Port's bulk cargo tonnage as well as its total cargo tonnage. Nonetheless, as previously noted, bulk cargoes have not had strong effects upon regional employment. **The decade-long decline in coal tonnage has been more than offset by the large increase in much more labor-intensive general cargo.** Still, given the number of regional jobs dependent on the movement of bulk cargo, it is legitimate to ask why coal tonnage volumes in the Port vary so much from year to year.



VARIATIONS IN COAL SHIPMENTS: SELLING COAL IN THE UNITED STATES

Coal shipped through Hampton Roads either is exported, or is sent to other parts of the United States for consumption in electric power plants. The New England states are particularly large domestic customers. As can be seen in Graph 5, the decline in coal export tonnage moving through Hampton Roads since 1991 is almost solely due to a decline in the amount of coal being mined. By contrast, the trend in domestic coal shipments has been consistently upward. Indeed, domestic coal shipments are approximately five times larger than they were in 1979. Obviously, domestic coal business is not the reason why coal shipments through Hampton Roads have declined so much since 1991.



THE VARIATION IN COAL SHIPMENTS: EXPORT COAL

Both metallurgical coal, which is used in steel production, and steam coal, which is used in the production of electricity, are exported through Hampton Roads. As demonstrated in Graph 5, since reaching its peak in 1991, export coal tonnage has fluctuated from year to year, but has experienced a downward trend over the decade. This fluctuation in export coal tonnage is the major reason behind the Port's flagging total cargo tonnage during this period. And, this negative trend has had adverse effects upon other Hampton Roads firms, notably Norfolk Southern, which traditionally has been heavily involved in bringing coal to the Port of Hampton Roads. There is simply less business for Norfolk Southern than there used to be.

The economics of exporting coal actually tends to be somewhat complicated, primarily because of the many different heat-producing and purity grades of coal. It is not as simple a business as it might first seem. There are three major reasons for the downward trend in coal exports Hampton Roads has experienced over the past 10 years. First, the continually rising strength of the dollar, as measured against the Federal Reserve's broad index of U.S. major trading partners, has been a major disadvantage to coal-exporting firms. Since 1991, the value of the dollar has risen by almost 74 percent. Since 1997, this dollar appreciation has been particularly pronounced with respect to Hampton Roads' major coal export competitors in Indonesia, South Africa, Poland, Australia and Columbia. For example, between 1997 and 2000 the dollar appreciated by 66 percent and 34 percent against the South African rand and the Australian dollar, respectively. Further, several of these countries, notably Indonesia, have suffered from political upheavals and internal instability, and no longer purchase as much coal as in the past.

Second, since 1997, the rapid spread of new steel-making technology, especially in Europe, which can utilize much lower quality coal, has eroded the strong relative advantage of coal from the Pocahontas coal seam exported through the Port. The substitution of lower quality (and lower priced) Australian coal for that shipped through Hampton Roads has also caused the closing of a number of metallurgical coal mines in the Pocahontas fields.

Third, the recent adaptation of long-wall mining and other new production technology to the mining of Australian coal has significantly reduced its production costs and subsequently the relative price of Australian coal, even taking into account the depreciation of the Australian dollar relative to the American dollar. According to the U.S. Department of Energy, this large relative price reduction has caused a reduction in the amount of coal shipped through Hampton Roads, as well as other American ports. In particular, the Port's former Japanese, Korean and Brazilian customers now purchase much more coal from Australia.

In the absence of major labor strikes, such as those experienced in South Africa and Poland in the early 1980s, or a steep decline in the dollar's value, it seems unlikely that coal exports from the Port of Hampton Roads will attain levels experienced in the early 1990s. To be sure, rising natural gas and oil prices will help coal exports at the Port in 2001, as will reductions in coal inventories in the spot markets for coal. Unfortunately, however, these increases likely will be small compared to those experienced in the last 20 years. Further, the long-term view is not especially favorable. China's commitment to increased coal exports, the Kyoto protocol and the climate action plans of many European countries pose potentially serious challenges to Hampton Roads coal exports. According to the Department of Energy, environmental plans adopted by European nations "pointing toward a stabilization or reduction in carbon dioxide emissions by the year 2010, are relying partly on a reduction in coal use to meet their goals. If implemented, they could negatively impact both current and future markets for U.S. steam coal exports."

The Impact of the Ports on Individual Cities in Hampton Roads

Table 5 shows the cities in which people whose jobs are related to the Port work. Norfolk, with nearly 13,000 jobs, leads the region's cities in jobs related to the Port, followed by Newport News with close to 6,000 jobs.

Table 6 reports the cities in which people with jobs related to the Port reside. In addition, Table 6 displays the estimated taxes and total payroll generated within each of the major Hampton Roads cities. Commuting workers obviously dramatically

City	Employment
Chesapeake	4150.73
Hampton	352.88
Norfolk	12969.11
Newport News	5886.79
Portsmouth	2015.76
Virginia Beach	3277.39
Subtotal	28652.65
Other Cities	3401.31
Total	32053.96

Source: Old Dominion University Economic Forecasting Project

rearrange the economic impact of the Port among the region's cities as compared to that of the work site. **The majority of Port employees work in Norfolk, but that is not necessarily where they live. To the surprise of some, Virginia Beach is the regional city that leads in jobs, payroll and taxes generated by Port activity in Hampton Roads.** Newport News, similarly, is a major beneficiary. Another benefactor of Port activity without a large presence of on-site employment is the City of Hampton. Hampton's case is particularly interesting since it does not have a large presence of on-site employment.

An important lesson to be drawn from Tables 5 and 6 is the recognition of the high degree of economic interaction between Hampton Roads cities insofar as the Port is concerned. The Port affects all cities in the region. In fact, when one is considering any employer in Hampton Roads, the fact that the employer is

located in a particular city does not mean that city will derive all the economic benefits generated by that employer. This clearly applies to the Port, which is mostly located in Norfolk, but whose economic benefits are widely dispersed among the cities of

TABLE 6
Port-Related Employment, Payroll and Taxes by City of Residence

City of Residence	Total Jobs	Total Payroll (Millions \$)	Total Taxes (Millions \$)
Chesapeake	4408.01	181.16	10.86
Hampton	1736.06	57.83	3.42
Norfolk	3860.40	115.07	6.96
Newport News	7056.36	209.60	12.63
Portsmouth	1797.43	52.05	3.07
Virginia Beach	7810.50	312.99	18.77
Subtotal	26668.75	928.69	55.70
Other Cities	5385.21	161.69	9.68
Total	32053.96	1090.38	65.38

Source: Old Dominion University Economic Forecasting Project

Hampton Roads. Table 7 underscores this point. A most important implication of the data presented in Table 7 is that economic development, as seen from the perspective of the Port, is a unifying regional issue. Employment brought to a particular city by the Port benefits the entire region. **Thus, when the City of Norfolk in particular seeks compensation from the Commonwealth for the large amount of tax-free property within its boundaries (the Port being but one example), this is an issue all of the cities in Hampton Roads should understand and support. Norfolk may have the most Port jobs, but it does not reap the most economic benefits from the Port (Virginia Beach does).** Yet, it is Norfolk and not Virginia Beach that finds itself unable to reap significant tax benefits from the largely tax-exempt facilities of the Port of Hampton Roads.

TABLE 7
Distribution of Port-Related Employees by Work Site and City of Residence

Residence	Work Site							Total
	Chesapeake	Hampton	Norfolk	Newport News	Portsmouth	Virginia Beach	Other Cities	
Chesapeake	2139.68	2.36	1429.21	81.43	421.33	214.79	119.20	4408.01
Hampton	16.52	198.27	276.16	1097.58	68.45	16.52	62.55	1736.06
Norfolk	351.70	7.08	5892.69	136.90	329.27	292.69	46.03	7056.36
Newport News	16.52	74.35	264.36	3206.58	97.96	14.16	186.47	3860.40
Portsmouth	393.00	1.18	604.26	71.99	572.39	49.57	105.04	1797.43
Virginia Beach	935.89	9.44	3744.74	141.62	299.77	2583.44	95.60	7810.50
Subtotal	3853.32	292.69	12211.43	4736.10	1789.17	3171.17	614.88	26668.75
Other Cities	297.41	60.19	757.68	1150.69	226.60	106.22	2786.43	5385.21
Total	4150.73	352.88	12969.11	5886.79	2015.76	3277.39	3401.31	32053.96

Source: Old Dominion University Economic Forecasting Project

Lessons

Among the most important things to consider when examining the future of the Port of Hampton Roads are:

- Total tonnage handled by the Port peaked in 1991 and has trended downward since then. However, for a variety of reasons, the economic impact of the Port has increased significantly during the same time period.
- Total employment in Hampton Roads due to the Port increased about 5 percent per year during the 1990s. This employment growth occurred primarily among firms doing import and export business and those that serve the Port.
- Container tonnage handled in the Port is expanding rapidly, while bulk tonnage (primarily coal) is declining. It does not seem likely these trends are going to be reversed in the foreseeable future.
- The productivity of Port personnel, such as stevedores, has increased dramatically over the past two decades and is profoundly influenced by the quality of the equipment they utilize.
- Tremendous economies of scale are causing international shipbuilding firms to construct much larger, deep-draft ships. The newest and largest of these ships cannot enter the Port of Hampton Roads, and hence dredging the Port to provide such ships with clearance is a must. But, it will be very expensive.
- The competitiveness of the Port of Hampton Roads also depends critically upon the quality of intermodal transportation – railroads and highways. Improvements such as the “third crossing” are essential if the Port is to remain competitive.
- Not surprisingly, most Port employees work in the City of Norfolk. However, the City of Virginia Beach gains more economic benefit from the Port than any other Hampton Roads city. Norfolk is second and Newport News is third.
- The Port is a regional asset that affects all of the cities and counties in the region.

