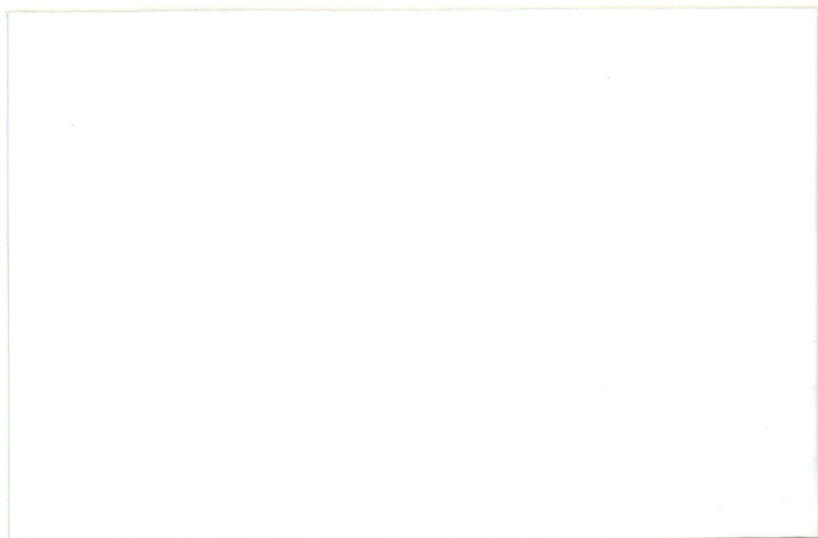


THE UNIVERSITY OF WISCONSIN—MILWAUKEE

CENTER
FOR
GREAT LAKES STUDIES



MILWAUKEE, WISCONSIN 53201 U.S.A.



SPECIAL REPORT NO. 10

Overseas Shipping at Great Lakes Ports:
Projections for the Future

by

ERIC SCHENKER

Professor of Economics
and
Associate Director, Center for Great Lakes Studies

and

JAMES KOCHAN
Project Associate

Center for Great Lakes Studies
University of Wisconsin-Milwaukee
Milwaukee, Wisconsin 53201

January, 1970

ACKNOWLEDGEMENTS

This publication was supported by the research phase of the University of Wisconsin Sea Grant Program under a grant from the National Science Foundation. The authors gratefully acknowledge the financial aid provided by this program.

Many persons have freely and generously supplied much of the information incorporated in the text. Invaluable was the assistance of Mr. Harry C. Brockel, Lecturer at the Center for Great Lakes Studies, University of Wisconsin-Milwaukee, and former Port Director of the Port of Milwaukee. To him and all others, a word of thanks.

Special thanks are due to Mrs. Faye Levner and Miss Marian Pierce, whose patience and sacrifice in typing this manuscript will never be forgotten. Our gratitude also goes to our project assistant, Mr. Michael Bunamo, for his contribution.

TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENT	ii
LIST OF TABLES	v
CHAPTERS	
I. OVERSEAS SHIPPING AT GREAT LAKES PORTS: PROJECTIONS FOR THE FUTURE	1
A. Introduction	
B. Summary of Chapters II through VI	
II. SEAWAY TRAFFIC ANALYSIS	9
A. Introduction	
B. Wheat	
C. Other Grains	
D. Iron Ore	
E. Coal and Limestone	
F. General Cargo	
III. COMPETITIVE ISSUES	25
A. Introduction	
B. Tolls	
C. Federal Government Policies	
D. Competition from Alternative Routes	
IV. THE ST. LAWRENCE SEAWAY SYSTEM	43
A. Seaway Expansion	
B. Season Extension	
C. Public Investment	

	Page
V. ST. LAWRENCE SEAWAY TRAFFIC PROJECTIONS . . .	55
A. Future Traffic	
VI. PRESENT AND FUTURE INCOME AND EMPLOYMENT GENERATED BY THE ST. LAWRENCE SEAWAY	61
A. Present Income and Employment Generated by the St. Lawrence Seaway	
B. Future Income Estimates of the St. Lawrence Seaway	
VII. CONCLUSION	71
BIBLIOGRAPHY	73

LIST OF TABLES

Table	Page
1. Total Seaway Tonnage, 1959-1968	9
2. Relative Share of Major U.S. Export Grain Shipments, 1959 and 1967	12
3. U. S. Wheat Exports through the St. Lawrence Seaway, Fiscal 1966/67	13
4. Grain Traffic at Major U.S. Great Lakes Ports, 1967	14
5. Per Cent of Total U.S. Soybean Exports Shipped Through the Great Lakes-St. Lawrence System, Fiscal 1964-1967	16
6. Iron Ore Traffic Received at Major U.S. Ports	18
7. Trend in Production of Superior District Ore	19
8. U. S. Imports of Steel Mill Products by Region of Entry, 1957-1967	21
9. Steel Imports at Major U.S. Great Lakes Ports, 1967	22
10. U.S. General Cargo Exports and Imports via the Seaway System, 1966	23
11. Repayment Summary from Calendar Year 1959 to Calendar Year 1967	27
12. Comparison of Distribution Costs via Alternative Routes for Movement of Wheat from Selected Origin Areas to Rotterdam	32
13. Comparison of Distribution Costs via Alternative Routes for Movement of Corn and Soybeans from Selected Origin Areas to Rotterdam	33
14. Route Distribution of Commercial Hard, Red Spring and Durum Wheat Shipped to Selected Foreign Destinations from July 1, 1966, through June 30, 1967	34

Table	Page
15. Route Distribution of Wheat, Corn, Soybeans and Barley and Rye Shipped between May 1, 1966 and November 30, 1966	35
16. Typical Railroad Freight Rate Differentials on Grain in Favor of the Seaway System over Coastal Ports	36
17. Rate Differentials on Corn and Soybeans for Movement from Country Elevators to Port Terminals	37
18. Estimated Cost of Lock Pairing	43
19. Channel Dimensions Associated with Alternative Lock Dimensions	44
20. Estimated Cost of Enlarging Total Seaway System Dimensions	44
21. Present and Predicted Charges on Moving Coarse Grains on the Seaway System with Enlarged Dimensions	46
22. Estimated Economic Benefits from Improvement Alternatives	47
23. Estimated Cost of Extending the Sailing Season of the Present Seaway System	52
24. United States Great Lakes Port Development Expenditures, 1946-1970	54
25. Prospective Direct Great Lakes - Overseas General Cargo Traffic	56
26. Summary of Projected Seaway Cargo Tonnage, 1980	57
27. 1980 Traffic Forecasts for the St. Lawrence Seaway	58
28. EBS Projections of Seaway Traffic for Major U.S. Great Lakes Ports - 1980	59
29. Increase in Seaway Traffic with Season Extension, Present System, 1980	60

Table	Page
30. Seaway Traffic Handled at Major U.S. Ports of the Great Lakes, 1968	63
31. Direct Income Generated by Major U.S. Port Seaway Traffic, 1968	63
32. Estimated Income Multipliers for the Great Lakes States	64
33. Direct and Secondary Income Generated by Seaway Traffic in the Great Lakes States, 1968	64
34. Estimated Employment Generated by U.S. Seaway Traffic, 1968	65
35. Traffic Projections for Major U.S. Great Lakes Ports, 1980	66
36. Estimates of Direct Future Income Generated by Seaway Cargo, 1980	68
37. Estimated Total Direct and Secondary Income Generated by Projected Seaway Cargo at the Major U.S. Great Lakes Ports, 1980	69
38. Projected Direct and Total Income Lost Due to Traffic Diversion	69

CHAPTER I

OVERSEAS SHIPPING AT GREAT LAKES PORTS: PROJECTIONS FOR THE FUTURE

A. INTRODUCTION

In its first ten years of operation the St. Lawrence Seaway has transformed at least a half-dozen Great Lakes harbors from relatively quiet places, accustomed to servicing lake vessels and an occasional ocean ship, into true ocean ports working at full capacity servicing ocean vessels from every area of the globe. These ports, which ten years ago were almost exclusively bulk cargo ports handling only iron ore, grain or coal, now enjoy a rich diversity in their traffic – ranging from dried milk to wines, from X-ray machinery to jeeps. Expanding apace with the volume and diversity of port traffic has been the earnings of the stevedores, freight forwarders, marine insurers and others employed in port-related activities. Through this steady expansion of employment and incomes, the Seaway ports have made significant contributions to the economic growth of their communities and the Great Lakes region.

The Seaway's influence upon the growth of its hinterland extends beyond the port-related income it has generated. Completion of this low cost, deep water transportation route has made the agricultural and industrial products of the Midcontinent more accessible and more economical to overseas customers. At the same time the Seaway permits the Midwestern firm and consumer the same access to foreign raw materials and consumer goods as his counterpart situated near a coastal port. Hence, through its effect upon the cost of transporting its hinterland's commerce and the port activity its traffic has generated, the St. Lawrence Seaway has made a significant and pervasive impact upon the economic growth of the Midcontinent.

This study attempts to quantify a portion of that impact – that portion stemming from port activity – and to estimate the economic benefits the Seaway will produce in the future. In preparing these estimates, extensive use has been made of the traffic projections and the background information contained in the report An Economic Analysis of Improvement Alternatives to the St. Lawrence Seaway System, which is an exhaustive study of present and expected future traffic on the Seaway System prepared for the U.S. Department of Transportation by EBS Management Consultants Incorporated (hereafter referred to as the EBS

Report). While one may question some of the assumptions, and therefore some of the conclusions, of the EBS Report, there is little doubt that it is the most complete analysis of the Seaway System and its traffic potential to appear since the Seaway was opened. As such, it will be an invaluable reference to all those interested in the continued development of the Seaway and in the evolution of an efficient transportation network to serve the Great Lakes region. It is hoped that the following study will also be a contribution toward these ends.

B. SUMMARY OF CHAPTERS II THROUGH VI

Chapter II: Seaway Traffic Analysis

Total cargo tonnage moving on the Seaway system has shown an upward trend since its opening in 1959. A record 49.2 million tons was reached in 1966.

The Seaway is the low cost route for the transportation of such bulk cargoes as grain, coal and iron ore. These account for approximately 80 per cent of its traffic; the total bulk tonnage has more than doubled since 1959.

The Seaway system is the least cost shipping channel for the Midcontinent region. Yet U. S. shippers do not take full advantage of the economies the Seaway system offers. While 65 per cent of the free world's wheat exports are grown in the Midcontinent region, only 6.3 per cent of total U. S. wheat exports moved via the Seaway. On the other hand, 60 per cent of Canadian wheat was shipped over the Seaway. The Seaway's success in capturing Canadian wheat traffic is due to: (1) different marketing arrangements in Canada; and (2) greater comparative success from alternative means of transport in the United States.

This also applies to other agricultural exports grown within its hinterland. The U. S. Cornbelt is situated within the Seaway's hinterland, yet only 20 per cent of corn exports are shipped via the Seaway. Gulf ports handle most of this traffic. While 50 per cent of the soybean crop is grown in the Midwest, the Seaway's share of these exports range only from 20 to 24 per cent. The Seaway handles less of these agricultural exports grown within its hinterland than the Gulf ports, although it is the least cost overseas shipping route.

Iron ore is the highest volume commodity handled at the lake ports and over the Seaway. Most of the ore is mined in the Lake Superior ore region and is captive to the Seaway. Coal and limestone are two other raw materials handled in large volumes; they are mostly lakewide traffic.

General cargo tonnage has trebled since 1959. This high value cargo generates four times the income per ton for port communities than does bulk cargo. The growth of general cargo, with its attending income, employment and social benefits, is one of the most important contributions the Seaway has made to the economic growth of its hinterland.

Iron and steel products accounted for 31 per cent of the Seaway's total general cargo traffic in 1966 and more than 50 per cent of its imports. These products originate in Europe and Japan and are destined for the Midwest steel producing complexes (especially Detroit). The direct, low cost route the Seaway provides such important has been an important factor in the expansion of steel imports.

Although the lake ports handle significant amounts of general cargo in addition to iron and steel imports, these totally represent only a fraction of the overseas general cargo traffic generated within the Great Lakes region.

Chapter III: Competitive Issues

The Seaway has been a significant stimulus to the economic growth of mid-America through the expansion of foreign trade. However, a number of long range constraints hinder Seaway shipping and development.

The Seaway is the only federal navigation route required to be self-supporting and fully amortized from tolls collected. Revenues during the first ten years of operation have fallen short of the level required to repay its bonded debt within the 50-year period, due to relatively low traffic volume during the start-up years. While revenues are adequate to cover operating expenses, they have been insufficient to meet the annual interest payments.

Proposed toll increases are designed to eliminate annual deficits and gradually reduce the Corporation's cumulative deficit. In this fashion, a higher transportation price would increase total revenues, assuming the demand for Seaway services is inelastic. It has been shown that only iron ore and Canadian wheat traffic are captive to the Seaway; corn, soybeans and general cargo are not. For non-captive

cargoes there are many alternatives to shipping via Seaway; hence the demand for the Seaway's services is not relatively unresponsive to price change.

Lowering or eliminating tolls would induce allocative efficiency and stimulate economic growth. Efficiency norms are violated as long as traffic on the Seaway pays tolls while traffic on competitive routes moves at below marginal social cost due to indirect subsidization. Eliminating tolls would attract more traffic to the Seaway, thus increasing the value of its overseas trade. This would mean that the federal government would have to take over the responsibility of the Seaway's bonded debt.

Further, the Department of Defense military cargoes and Department of Agriculture relief cargoes constitute a significant portion of U.S. overseas export. While shipments of foodstuffs have been increasingly favorable to the Seaway relative to other coastal ports, the Department of Defense until recently has bypassed the Great Lakes' ports. This has meant failure to utilize the economies of the Seaway and has effectively deprived lake ports of their hinterland's exports.

Cargo-preference laws prohibit defense cargo from moving in foreign vessels when an American flagship is available within the same administrative district. The Seaway is under the same administrative jurisdiction as the Port of New York, and no American ship will enter the lakes if it can pick up the same cargo at an Atlantic port. This, in turn, contributes to a lack of sailings from lake ports.

In addition, although the Seaway is the least cost route for grain and general cargo traffic originating in Illinois, Indiana, Iowa, Michigan, Ohio and Wisconsin, lake ports handle less than one-half of the coarse grain and less than one-fifth of general cargo exports generated within its hinterland. The Seaway is prevented from handling more of the wheat exported from its hinterland because of its limited shipping season. By extending the shipping season the Seaway would capture more of this traffic.

The ability of the Atlantic and Gulf ports to retain their share of grain exports is due to favorable rate reductions by the eastern railroads. Where the Seaway has an insurmountable cost advantage in transporting grain, railroad rates are at the pre-Seaway levels. Selective rate cuts have kept the Seaway's participation in wheat exports of Ohio very low although the system can transport the grain at the lowest social cost. Similarly, in Indiana, where the Seaway's cost advantage is not decisive in hauling corn and soybean traffic, the railrate differential shrinks by more than four times. Recent reductions on rail shipments of soybeans

to the Gulf ports make the rates from central Illinois higher to Chicago than to New Orleans. The lake ports have petitioned the I.C.C. for equal access to inland traffic and extension of new improved rail services to the lake ports.

The lake ports also face the same problems of discriminatory rates and unequal rail services for the transportation of general cargo. In some cases it costs more to rail-ship general cargo to a closer Seaway port than to a more distant coastal port. While absolute costs are lower, costs per mile are greater. The line-haul rate best exemplifies such price discrimination. These rates cover handling charges at coastal ports while excluding similar services for lake ports.

Containerization creates other problems for the Seaway ports. Presently there are not adequate, specialized terminal facilities to efficiently handle containers and allow the ship to make a quick turnabout. Therefore a great deal of the container traffic is shipped to the coasts. Continued diversion of this high value traffic would mean, according to EBS estimates, a loss of 3.4 million tons of cargo by 1980. Since general cargo traffic is vital to the financial health of the lake ports and the Seaway, it is recommended: (1) to establish two modern load centers – one to serve Milwaukee and Chicago on Lake Michigan, the other on Lake Erie to serve eastern lake ports; and (2) to construct berths capable of servicing the new combination break-bulk container vessels.

Chapter IV: The St. Lawrence Seaway System

Expansion and development of the Seaway system must be undertaken to improve the existing port facilities and provide better transportation services. Seaway traffic may be approaching the capacity of its existing facilities; the maximum capacity may be reached in the 1970's. Current interest in expansion is focused on the Welland Canal and St. Lawrence River sections.

Improvement of these lock systems by either pairing or twinning would allow new larger and automated lake and ocean vessels to traverse the Seaway and to load and unload at the principal lake ports. Efficient vessels able to make a quick turnabout at port would mean considerable rate reductions. The EBS report, however, advises against expansion. The report concludes that reduced transportation costs plus the other benefits would be less than the cost of improvements. The basis for this conclusion is questionable since the report overestimates the amount of grain and general cargo to be diverted from the Seaway, and misconstrues the nature of the benefits to the U.S. from iron ore shipments over an expanded system.

Currently the Seaway is closed from approximately mid-December to the beginning of April. Ice-control techniques would allow a six week extension of the shipping season. The extension would mean reduced transportation and inventory costs, increased tonnage at the lake ports and lower social costs in terms of idle men and equipment. Moreover, much overseas traffic which moves via other modes during the winter months could be captured by the Seaway. Increased wheat and coarse grain traffic would generate over \$10 million. Similarly, increased general cargo traffic would save between \$10 and \$12 million in transportation costs while adding \$12.5 to \$17.5 million to port income. Extension of the season would mean a capital outlay of \$49.7 million and annual outlays of \$11.7. Using a 10 per cent discount rate, the capital outlay would be paid off in the ninth year, while increased revenues would be more than adequate to cover the extra annual expenses.

The success of Seaway development depends on government investment. Proposed port development expenditures for the Great Lakes region by all levels of government for the 1966-70 period are the lowest in the postwar years. These figures are much smaller than those for the development of coastal ports. Moreover, they do not include any plans for building fully integrated container facilities.

Chapter V: Future Traffic

There have been three major studies in the U.S. of future traffic estimates for the St. Lawrence Seaway: one by the Army Corps of Engineers, another by the Stanford Research Institute, the most recent and exhaustive by EBS. All studies show an upward trend in tonnage moving via the Seaway system.

EBS prepared two sets of projections: (1) estimated traffic if the Seaway maintains its present competitive position; and (2) estimated traffic assuming cargo diversion, especially corn, soybeans and general cargo. EBS estimates total traffic in 1980 at 58 million short tons, and, after expected diversions, at 54 millions. These figures are near the lower and middle SRI range of 52.4 to 65.9 millions of short tons. The general cargo estimates of EBS exceed the estimates of the other two studies.

The EBS study does not consider an increase in the Seaway's participation in its hinterland's general cargo overseas traffic will take place. Assuming no improvements or an extension of the season, there are significant differences in the two sets of general cargo entries prepared for major lake ports. Milwaukee and Chicago best illustrate the magnitude of the problem. If predicted diversion occurs, Chicago will lost nearly 40 per cent of its general cargo traffic, while Milwaukee will

lose over 60 per cent. The total Great Lakes diversion is estimated to be 1,650,000 tons, over 35 per cent of the projected general cargo traffic, assuming the current competitive position.

EBS admits the possibility of the Seaway's increasing its share of the Midcontinent's overseas traffic if the season is extended. They predict an additional 1,615,000 tons of bulk cargo and 367,000 tons of general cargo would be captured by the Seaway. Most of the wheat traffic would be U.S. traffic, all corn and soybeans would be U.S. exports, as would all of the general cargo.

Chapter VI: Present and Future Income and Employment Generated by the St. Lawrence Seaway

The St. Lawrence Seaway produces two types of economic benefits: (1) it reduces transportation costs, and (2) it generates increased economic activity at the Great Lakes ports.

Direct income generated by Seaway traffic includes wharfage and terminal charges, payment for supplies, labor and auxiliary services, and so on. It is possible through the application of regional multipliers to estimate the total income and employment effects. Using \$5 and \$24 as the average direct income per ton produced from servicing bulk and general cargo at lakes ports, it is estimated that, in 1968, Seaway shipping produced approximately \$283 millions of primary income and nearly \$643 millions of total income. The Seaway accounts for approximately one per cent of the total income of the six Great Lakes states. Moreover, using \$7500 as an approximate 1968 median income, Seaway cargo provides direct employment for 37,770 families; adding secondary income produces total employment for 85,710 families.

The opening of this low cost transportation route, plus the rail-rate reductions it has caused, as a consequence, have opened new export markets for Midwestern agricultural and manufactured goods.

It is possible to make a rough approximation of the income Seaway traffic will generate at major lakes ports in 1980 by using the EBS traffic projection and the techniques employed in the previous section. Still using \$5 and \$24 as the average income produced by servicing a ton of bulk and general cargo, respectively, it is estimated that direct income, assuming the present competitive position, will total \$388,419,000, while with expected diversions the total will be \$345,884,000. Total income will contribute nearly \$.9 billion to the six states' economies, assuming that no diversions take place.

Direct income lost due to traffic diversion will equal \$42.4 millions, while total income lost will equal \$103.8 millions. These estimates are substantial for the region as a whole, and devastating for such ports as Chicago, Milwaukee and Toledo. Milwaukee, for example, will lose over one-third of its potential port income in 1980.

Ports must be ready to provide the services and facilities for general cargo traffic to retain this cargo and its related income. Construction of container facilities would aid the Seaway in capturing a substantial portion of the 3.4 million tons of container traffic expected by EBS to be diverted. This would mean more than \$160 millions addition to annual total income. Also, a six week extension of the shipping season would add more than \$70 millions in total income to the regional economies. If we add the income generated by projected Canadian traffic which will total approximately 11 million tons of bulk cargo and 1.68 million tons of general cargo by 1980, the Seaway traffic would add a total of \$1.2 billions to the income of the Midcontinent region, and these income effects are only part of the total impact which the Seaway has upon the economy of its hinterland. As the study indicates, perhaps the Seaway generates even greater benefits by providing a low cost route for transporting the overseas commerce of the Midcontinent.

CHAPTER II

SEAWAY TRAFFIC ANALYSIS

A. INTRODUCTION

As Table 1 indicates, traffic volume on the St. Lawrence Seaway has grown steadily since the opening in 1959, reaching a record 49.2 million tons in 1966. The decline in total cargo during the 1967 season resulted from a Canadian seamen's strike and a reduction in world demand for grain. Total cargo rebounded nicely during the 1968 season due to a sharp increase in general cargo shipments while grain traffic remained relatively low. If this rebound continues, the 1970 season should be the most successful in the short history of the Seaway.

TABLE 1
TOTAL SEAWAY TONNAGE, 1959-1968

Year	General Cargo (millions of tons)	Bulk Cargo (millions of tons)	Total Cargo (millions of tons)
1959	2.0	18.6	20.6
1960	2.3	18.1	20.3
1961	2.1	21.3	23.4
1962	2.5	23.1	25.6
1963	2.9	28.0	30.9
1964	3.7	35.6	39.3
1965	5.6	37.8	43.4
1966	5.5	43.7	49.2
1967	5.9	38.1	44.0
1968	8.0	39.9	47.9

SOURCE: Annual Reports of the St. Lawrence Seaway Development Corporation.

The recent growth of general cargo traffic is most encouraging since this high-value traffic produces more income at the port than the

relatively low-value bulk cargo. In addition, the growth in general cargo indicates that more midcontinent shippers are becoming aware of the economic advantages the Seaway system offers.

While general cargo traffic has shown remarkable growth in recent years, the Seaway remains principally a low cost route for the transportation of bulk cargos, chiefly grain, iron ore and coal. Bulk cargo still accounts for over 80 per cent of the total Seaway traffic. In this section we shall examine this traffic, with special emphasis upon those commodities which constitute the major share of Seaway tonnage.

B. WHEAT

The midcontinent region of North America is the world's largest supplier of wheat, producing over 65 per cent of the Free World's wheat exports. In 1966 the United States exported 23.6 million tons while Canada's exports were 15.3 million tons. Of the total exports of 38.9 million tons, 10.2 million tons moved through the Seaway.¹ Since a large portion of this region lies within the service area of the Great Lakes ports and the Seaway, it is not surprising that a substantial share of its wheat exports are shipped via the Seaway. Virtually all Canadian wheat exports is shipped over the Seaway. Of the 15.3 million tons Canada exported, 8.8 million tons, or nearly 60 per cent, were shipped through the Seaway in 1966. In contrast, only about 6.3 per cent of total U. S. exports of wheat during 1967 moved via the Seaway.² The Seaway's greater success in capturing Canadian wheat traffic is due to different marketing arrangements, and in the U.S. alternative means of transportation successfully compete for the Seaway wheat traffic.

All wheat grown in western Canada is purchased and marketed by the Canadian Wheat Board which determines how the wheat is to be transported to overseas destinations. Since Canada has mainly its ports on the Pacific coast as an alternative to the Seaway, the Board has shipped most of its wheat exports destined for Europe, North Africa, the Near East

¹EBS Management Consultants, Inc., An Economic Analysis of Improvement Alternatives to the St. Lawrence Seaway System, final report submitted to U.S. Department of Transportation, January, 1969, Appendix A, pp. IA-6 and IA-7.

²Ibid., p. IV-11.

Latin America and even parts of Southern Asia via the Seaway.³ The wheat grown in Alberta province and in western Saskatchewan and exported to Asia and the Far East is shipped by rail to the Pacific Coast ports for export. However, for the majority of Canadian wheat the Seaway is the least cost transportation route.

Most Canadian wheat shipped over the Seaway is loaded on "lakers" —the large bulk cargo vessels which specialize in hauling ore and grain on the Great Lakes —at the twin ports of Port Arthur/Fort Williams for shipment to Montreal or other ports on the lower St. Lawrence River where it is reloaded into ocean vessels for the final leg of its journey overseas. Of the roughly 10.2 million tons loaded at U.S. and Canadian lakehead ports in 1966, less than one million tons moved directly overseas.

The practice of transshipping grain became popular after the development of the Quebec-Labrador iron ore field. The grain shipments from the western Lakes to the lower St. Lawrence provide a return haul for the lakers which bring back Labrador ore from ports on the St. Lawrence River to the steel mills along Lake Erie. The availability of a return haul permits substantial reductions in the unit cost of the lake vessels. Efficient utilization of these vessels is a major factor in keeping the Seaway the least cost transportation route for most of Canada's wheat exports and for the wheat consumed in her Eastern provinces.

While the Seaway is the low cost route for nearly all shipments of Canadian wheat, U.S. wheat can move to its final destination — foreign or domestic — over a number of alternative routes. Rather than a government board controlling the transportation of grain, wheat transportation decisions in the U.S. are made primarily by private grain merchants and millers. These private firms will search for the least cost combination of transport modes for moving their grain from the country elevator to its final market. Transportation systems which compete with the Seaway have, since 1959, lowered rates and improved services for hauling grain from the Midwest to coastal ports in order to avoid losing this traffic to the Seaway. Railroads have employed unit trains and hopper cars as well as rate reductions to the Atlantic and Gulf ports as a consequence of competition from the Seaway.

The railroads haven't been able to retain all of their pre-Seaway wheat traffic since even with the reduced rail rates, the Seaway is clearly

³Two other alternatives, a port on Hudson Bay and the ports in the Maritime Provinces, handle some grain but are not serious alternatives to the Seaway.

the least cost distribution channel for wheat shipments originating in Montana, the Dakotas, Minnesota, Michigan and Ohio and destined for export to Northern and Southern Europe. However, unlike Canada where the Seaway is the only economically viable route for shipping wheat for export, in the U.S. two other potentially competitive routes exist:

- (1) Rail movement to Minneapolis and then rail or barge to Gulf ports; or
- (2) Unit train movement to Atlantic or Pacific Coast ports.

Rail and barge shipment of wheat and other grains to the Gulf ports represents the most effective competition to the Seaway. As Table 2 shows, the Gulf ports have increased their share of grain shipments since the Seaway opened. While most of this new traffic has been diverted from Atlantic Coast ports, not from Seaway ports, these data indicate that the Great Lakes ports have a strong and successful competitor for grain traffic.

TABLE 2
RELATIVE SHARE OF MAJOR U.S. EXPORT
GRAIN SHIPMENTS, 1959 & 1967

Commodity	Year	Seaway System (%)	Atlantic Coast (%)	Gulf Coast (%)	Pacific Coast (%)
Wheat	1959	3.6	24.7	46.0	25.7
	1967	6.3	9.8	48.1	35.8
Corn	1959	19.4	23.2	57.3	0.1
	1967	17.1	12.5	70.1	0.3
Soybeans	1959	14.8	15.9	69.1	0.0
	1967	16.6	8.3	75.1	0.0
Barley and Rye	1959	22.0	2.3	21.5	54.2
	1967	37.6	8.2	3.6	50.6
Total, Four Grains	1959	12.2	19.8	49.0	19.0
	1967	12.8	10.4	59.0	17.4

SOURCE: EBS Management Consultants, Inc., An Economic Analysis of Improvement Alternatives to the St. Lawrence Seaway System, 1969, Table IV-2, p. IV-11.

The Seaway's share of U.S. wheat exports is quite small given that much of the exportable wheat is grown within its hinterland. This small share is in part explained by the fact that a major portion of U.S. wheat exports are to Asian countries which can be served more economically from Gulf or Pacific Coast ports. However, as Table 3 shows, much of the wheat destined for areas most accessible from the mouth of the Bay of St. Lawrence is not exported over the Seaway. This diversion of wheat and other grain traffic away from the Lake ports is considered in more detail in Section III.

TABLE 3
U.S. WHEAT EXPORTS THROUGH THE ST. LAWRENCE
SEAWAY, FISCAL 1966/67

Destination Area	Tonnage (1000 short tons)	Seaway Share Total U.S. Traffic (%)
Northern Europe	539	20.7
Southern Europe	135	35.5
Eastern Europe	38	8.5
North Africa	306	14.5
Other destination areas	400	3.4
TOTAL	1,418	7.2

SOURCE: EBS Management Consultants, Inc., An Economic Analysis of Improvement Alternatives to the St. Lawrence Seaway System, 1969, Appendix A, p. IA-5.

Most U.S. wheat exports that move over the Seaway are loaded at the twin ports of Duluth-Superior. Toledo also handles a substantial volume of wheat exports, with Chicago and Milwaukee shipping relatively small amounts. As with Canadian wheat, most U.S. wheat exports are transferred from lakers to elevators and then to ocean vessels at ports along the lower St. Lawrence. Table 4 shows the volume of wheat and other grains shipped from the major U.S. Great Lakes ports.

TABLE 4
GRAIN TRAFFIC AT MAJOR U.S. GREAT LAKES
PORTS, 1967 (short tons)*

Port	Wheat	Corn	Soybeans	Barley and Rye
Duluth-Superior	2,001,737	681,569	141,886	503,841
Chicago	8,393	1,112,170	491,099	----
Milwaukee	2,327	153,980	8,254	211,072
Toledo	<u>259,731</u>	<u>641,916</u>	<u>648,729</u>	----
TOTAL	2,272,188	2,589,635	1,289,968	---

*Table includes Lake as well as Seaway traffic.

SOURCE: U.S. Army Corps of Engineers, Waterborne Commerce of the United States, Part 3, 1967.

C. OTHER GRAINS

1. Corn

Corn exports from the United States have been growing rapidly in recent years. The 17.1 million tons exported in 1966 was double the amount exported in 1961. The Seaway system has shared in this growth with corn traffic increasing from 1.8 million tons in 1961 to 3.6 million tons in 1966.⁴ Most of this corn is exported to the industrialized nations of Western Europe, where a steady increase in the demand for meat has led to an increase in the demand for feed grains, particularly corn. European meat and poultry producers, unable to raise enough feed to meet the growing demand for their products, have been rapidly increasing their purchases of American corn. As the demand for meat continues to grow with the growth of per capita income in Europe, U.S. corn exports should continue to increase.

Nearly all corn exports originate in the U.S., since the shorter growing season makes most of Canada unsuited for growing corn. U.S.

⁴EBS Report, p. III-16.

corn production is centered in the "corn belt" which runs from western Ohio through Indiana, Illinois, Iowa and parts of Nebraska. Since virtually all of this area is within the hinterland of the Great Lakes ports it is surprising that only about 20 per cent of the corn exports are shipped via the Seaway. Gulf Coast ports handle most of this traffic. Of the Seaway ports, Chicago, which is situated in the middle of the corn belt, is the leading loading point, with Toledo and Duluth-Superior also handling significant quantities.

Canada imports a small amount of U.S. corn; 250,000 tons in 1966 or approximately 7 per cent of the total Seaway corn traffic for that year.⁵ In addition to the corn which is imported for consumption in Canada, almost one-half of the corn loaded at the lakehead is unloaded at Canadian ports along the lower St. Lawrence for transfer to ocean vessels similar to the transshipped wheat. While most corn exports are currently loaded directly onto ocean vessels at the Lake ports, in the future almost all corn is expected to be transshipped.

2. Soybeans

Soybean exports are similar in many respects to corn. They have doubled between 1961 and 1967, making soybeans one of the fastest growing export products. They require the same relatively warm climate as corn and they are grown primarily in the U.S. corn belt. Almost none are grown in Canada. Almost all of the soybeans exported via the Seaway are shipped from the same three ports that ship most of the corn, with Toledo rather than Chicago being the principal port of export.

The future prospects for soybean exports are quite bright. Principal buyers of soybeans are the high income countries in Europe and Japan where consumption of meat, poultry and vegetable oils is growing steadily. Soybeans are processed either in the U.S. or in the importing country to yield oil – a high-quality vegetable oil – and soybean meal, which is widely used to feed livestock, particularly poultry. As per capita income rises in Europe and Japan so will the demand for meat and therefore for soybean meal. These prospects are most encouraging for the U.S. since soybeans are a relatively high-value bulk commodity. Although total soybean exports in 1966 ranked behind wheat and corn in tonnage terms, the greater value of soybeans per ton makes it the leading dollar earner among U.S. agricultural exports.⁶

Table 5 shows that the Seaway's share of U.S. soybean exports has been relatively stable around 20 to 24 per cent in recent years. This is

⁵ EBS Report, p. III-19.

⁶ Ibid., Appendix A, p. ID-7.

quite low, since the states bordering the Great Lakes produce nearly one-half of the nation's soybeans. The majority of U.S. soybean exports are shipped via the Gulf ports.

TABLE 5

Per Cent of Total U.S. Soybean Exports Shipped Through the Great Lakes - St. Lawrence System, Fiscal 1964-1967

Destination Area	1964/65	1965/66	1966/67	Average 1964/67
Northern Europe	20.7	21.2	10.6	17.2
Southern Europe	15.4	15.1	15.0	15.1
Eastern Europe	0	0	0	0
Japan	8.8	18.7	23.6	17.5
Canada	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>
TOTAL	21.8	23.8	18.7	21.4

SOURCE: EBS Management Consultants, Inc., An Economic Analysis of Improvement Alternatives to the St. Lawrence Seaway System, 1969, Appendix A, p. ID-13.

Most soybean exports are loaded directly onto ocean vessels at the Lake ports, with some "topped off" at Montreal. The surprisingly large Seaway share of soybean exports to Japan is due to the fact that soybeans provide a return haul for ships coming into the Lakes with Japanese steel. Except for these Japanese exports, we might expect future soybean exports to follow wheat and corn and be transshipped at the lower St. Lawrence.

3. Barley and Rye

Barley and rye traffic has been relatively light since the Seaway opened (roughly 1.5 million tons in 1966) and there appears to be little prospect for future growth. In recent years these grains have been

declining in importance as U.S. export grains. Most of the overseas traffic in these grains is Canadian barley exports to Europe. These exports aren't expected to grow significantly in future years since the Europeans grow substantial amounts of barley with imports serving as a "back up" to home production.

Of the U.S. lake ports, only Duluth and Milwaukee had significant amounts of barley and rye traffic in 1967 and only Duluth had significant overseas exports (295,741 tons). The remainder was barley imported from Canada (35,320 tons) and shipments to other lake ports (172,780). At Milwaukee, most of the traffic was barley imported from Canada for malting (97,487 tons) and shipments of barley to other lake ports (85,332 tons). Only 23,463 tons were exported overseas. Similarly, the relatively small tonnages at Chicago, Detroit, and Buffalo (all below 50,000 tons) represent barley unloaded for use in the production of malt.⁷

D. IRON ORE

Iron ore is by far the highest volume commodity handled at the lake ports and over the Seaway. In 1966, 70.1 million tons were loaded in the Lake Superior region alone. The ore moves in both directions on the Seaway system, downbound from Lake Superior and upbound from the lower St. Lawrence River to destinations on Lake Erie and at the base of Lake Michigan. The principal U.S. ports that share this traffic are listed in Table 6.

The U.S. ore unloaded at these ports is mined from the Lake Superior ore region, which includes mines in Minnesota, Wisconsin, and Upper Michigan. Most of this ore is taken from the Mesabi Range mines in Minnesota and loaded at the twin ports of Duluth-Superior - 28.5 million tons in 1967. The ore is carried from the Lake Superior region in huge ore carriers through the locks at Sault Ste. Marie and then either through the Straits of Mackinac into Lake Michigan or, for most shipments, down Lake Huron and the St. Clair River to the steel-producing centers along Lake Erie.

The upbound ore is taken from the Quebec-Laborador mines in Eastern Canada and shipped from Canadian ports along the Gulf of St. Lawrence through the Seaway to ports along Lake Erie. A relatively small amount of this ore is shipped all the way to the base of Lake Michigan. The U.S. steel mills began using steadily increasing quantities of

⁷ U.S. Army Corps of Engineers, Waterborne Commerce of the United States (Washington: Government Printing Office, 1967), Part 3.

TABLE 6

IRON ORE TRAFFIC RECEIVED AT MAJOR U.S. PORTS,
1967 (1000 short tons)

Port	U.S. Ore	Canadian Ore
Chicago	7,527	444
Indiana Harbor (Gary)	7,831	3,011
Detroit	8,645	1,855
Toledo	4,788	230
Cleveland	11,829	3,196
Ashtabula	4,325	877
Conneaut	3,349	3,526
Buffalo	7,858	1,211
TOTAL	56,152	14,350

SOURCE: U.S. Army Corps of Engineers, Waterborne Commerce of the United States, Part 3, 1967.

Labrador ore after the opening of the deep water Seaway lowered transportation costs enough to make it competitive with ore from the Mesabi Range. In recent years the growth of Labrador ore traffic on the Seaway has slowed somewhat with total tonnage increasing from 15.5 million tons in 1966 to 16.4 million tons in 1967 and 17.9 million tons in 1968.⁸

The slower growth of Labrador ore traffic is due to the rapidly expanding production of high grade Taconite pellets from the relatively low grade Superior district ore. As Table 7 illustrates, the development of the Taconite process has rejuvenated the Mesabi mining region by halting and reversing the production decline of the early 1960's.

Since there exists no economically viable alternative to the Seaway for carrying Lake Superior and Labrador ores to the Lake Erie and Lake Michigan steel producing complexes, this traffic is, in effect, captive to the Seaway. Although some ore produced in mines removed from the lakehead, e.g., near Black River Falls in west central Wisconsin, is moved directly to mills with unit trains, the

⁸St. Lawrence Seaway Authority and the St. Lawrence Development Corporation, Traffic Report of the St. Lawrence Seaway (Ottawa, Canada: Queen's Printer and Controller of Stationery), 1966-68.

TABLE 7
TREND IN PRODUCTION OF SUPERIOR DISTRICT ORE

Year	Usable Total Production (1000 long tons)	Per Cent Pelletized
1960	71,792	19.98
1961	53,208	27.51
1962	55,557	31.08
1963	56,132	37.47
1964	63,107	39.88
1965	66,432	40.25
1966	68,602	44.50
1967	64,229	54.36

SOURCE: EBS Management Consultants, Inc., An Economic Analysis of Improvement Alternatives to the St. Lawrence Seaway System, 1969, Table IV-11, p. IV-23.

amount of ore produced at these mines is relatively insignificant. About 95 to 98 per cent of the ore used by the steel mills along the Great Lakes moves over the Great Lakes - Seaway system and will continue to do so in the foreseeable future.

E. COAL AND LIMESTONE

Coal and limestone are considered together because, although both are handled in large volumes at several Great Lakes ports, this traffic is almost all lakewide shipping - virtually no coal or limestone is shipped overseas through the Seaway. Indeed, most of this traffic is strictly lake traffic utilizing only the Welland Canal or Sault Ste. Marie portions of the Seaway system.

Limestone tonnage at Great Lakes ports in U.S. and Canada totalled 34.2 million (short) tons in 1966. Ninety per cent of this traffic originated at ports in Upper and northern Lower Michigan and most was unloaded at ports near steel mills on Lake Erie and Lake Michigan^a

^a EBS Report, p. III-47.

(Detroit, Gary, Chicago and Cleveland). Thus almost all of the limestone traffic did not use any lock facilities of the Seaway and could not truly be classified as "Seaway" traffic.

Coal traffic is also large in volume – 56.6 million tons in 1966 – and also confined mostly to Lakes Erie, Huron, and Michigan. Almost all of this coal is loaded at ports along Lake Erie with Toledo accounting for 34 million tons in 1966. About 7.7 million tons moved from Lake Erie through the Welland Canal to the Lake Ontario ports of Toronto and Hamilton with less than 500,000 tons continuing down the Seaway to the Lower St. Lawrence. Eleven and six-tenths million tons of the coal was destined for western Lake Erie ports and along the Detroit River. About 22.6 million tons moved up the St. Clair River to cities in Michigan and along Lake Superior.¹⁰ In addition, some coal is loaded at Chicago bound for electrical utilities in Milwaukee and other cities along Lake Michigan.

Electrical utilities are the major buyers of the coal shipped on the Lakes, with the steel plants in Canada and those U.S. plants located along the lakes also consuming substantial amounts. As with limestone, relatively little of the Great Lakes coal traffic is "Seaway traffic," only 1.2 million in 1968, and none is overseas traffic. Thus, this traffic is of limited interest for this study.

F. GENERAL CARGO

Seaway proponents view the vigorous growth of its general cargo traffic as one of the most important contributions the Seaway has made to the economic growth of its hinterland. The category "general cargo" includes those commodities which are handled by individual unit – crate, bag, barrel – and which are subject to individual mark or count. This includes commodities as diverse as dried milk, fruits, newsprint, motor vehicles and glass products. This is the high value traffic most prized by the individual ports, since a ton of general cargo generates about four times the income that bulk cargo creates in the port community. In addition to requiring more labor, general cargo also generates more wharfage and terminal fees and more income to such port-related businesses as terminal operators, freight forwarders and insurance agencies. These important income effects explain why competition between ports for this traffic is so keen and why Seaway supporters are heartened by the fact that the System's general cargo traffic has nearly tripled since 1959.

¹⁰ EBS Report, p. III-47.

A large part of this rapid growth is due to a single commodity, iron and steel products. This commodity group accounted for 31 per cent of the Seaway's total general cargo traffic in 1966 and for more than one-half of general cargo imports. The dominant position of iron and steel in general cargo traffic warrants closer examination.

1. Iron and Steel Traffic

As Table 8 indicates, there has been a spectacular increase in imports of iron and steel products into the Great Lakes region of the U.S. since 1957. These customs district data include steel delivered by rail; however, these quantities are not large. Most of the steel imported into the Lakes region arrives through the Seaway. Of the 3,563,000 tons imported in 1966, 2,808,000 tons, or 80 per cent, came via the Seaway.¹¹

TABLE 8

U.S. Imports of Steel Mill Products by Region of Entry, 1957-67
(Thousands of short tons and percentages of total imports)

Year	Great Lakes Region		Other Regions		Total Imports
	Tons	%	Tons	%	Tons
1957	73	6.3	1082	93.7	1,155
1958	128	7.5	1579	92.5	1,707
1959	824	18.8	3572	81.2	4,396
1960	460	13.7	2899	86.3	3,359
1961	560	17.7	2603	82.3	3,163
1962	745	18.2	3355	81.8	4,100
1963	1170	21.5	4276	78.5	5,446
1964	1655	25.7	4785	74.3	6,440
1965	3307	31.9	7076	68.1	10,383
1966	3563	33.3	7190	66.7	10,753
1967	3897	34.0	7558	66.0	11,455

SOURCE: EBS Management Consultants, Inc., An Economic Analysis of Improvement Alternatives to the St. Lawrence Seaway System, 1969, Appendix A, p. IIA-14.

¹¹ EBS Report, p. III-39.

The Seaway's role in the expansion of steel imports has been very important. In 1959, the first year of Seaway operation, steel imports were six times those of the previous year. A good part of this dramatic increase was due to the 1959 steel strike, and in 1960 steel imports fell back to a less spectacular, although still quite high, level. Spectacular growth resumed in 1963 and continued through 1967. During this period, the Great Lakes region nearly doubled its share of total steel imports. With the threat of a steel strike in 1968, total U.S. imports jumped 67 per cent to over 19 million tons, with over five million tons imported via the Seaway.¹²

Almost all of the imported steel traffic originates in Europe and Japan. In 1967, Britain plus the Common Market countries produced 49 per cent of the U.S. imports, while Japan produced 40 per cent. Table 9 shows the destination of these imports. The principal destination is Detroit, where cold rolled steel is used for automobiles, while the Chicago area is a close second.

TABLE 9
STEEL IMPORTS AT MAJOR U.S. GREAT LAKES PORTS,
1967 (short tons)

Port	Foreign Steel Unloaded *	Total General Cargo	Steel Imports as % of Total
Duluth-Superior	34,735	136,282	25
Milwaukee	74,340	260,520	28
Chicago	1,070,338	1,851,460	58
Detroit	1,340,189	1,523,782	88
Toledo	144,625	331,086	44
Cleveland	427,876	619,724	69
TOTAL	3,092,103	4,722,854	65

*Includes Commodity Codes 3314 to 3319 inclusive.

SOURCE: U.S. Army Corps of Engineers, Waterborne Commerce of the United States, Part 3, 1967.

¹²Traffic Report of the St. Lawrence Seaway, p. 29.

2. Other General Cargo

With 65 per cent of the total general cargo accounted for by iron and steel imports, the tonnage totals for the remaining general cargo commodities will be relatively small. These totals for major general cargo commodities other than steel products are given in Table 10.

TABLE 10
U.S. GENERAL CARGO EXPORTS AND IMPORTS
VIA THE SEAWAY SYSTEM, 1966 (1000 short tons)

Exports		Imports	
Commodity	Volume	Commodity	Volume
Dried Milk	53.3	Motor Vehicles	78.5
Wheat Flour & Semolina	109.0	Liquors & Wines	74.0
Other Grain Mill Products	758.1	Glass & Glass Products	47.9
Prepared Animal Feeds	146.3	Crude Rubber	61.4
Meat, Meat Products, Fresh	49.0	Wood Pulp	45.2
Other Animal Products	261.5	Wood Products	40.5
Vegetables & Preparations	99.6	Machinery, excl. Electrical	58.9
Motor Vehicles & Parts	66.9	Fruits & Prep, excl. bananas	39.9
Machinery, excl. electrical	44.1	Chemicals & chem. products	27.5
Chemicals & chem. products	35.9	Nonmetallic Minerals & Manf. n. e. c.	91.0
TOTAL Major Groups	1623.7	TOTAL Major Groups	564.8
GRAND TOTALS*	1988.0	GRAND TOTALS*	895.1

*Excluding steel products and soybean meal.

SOURCE: EBS Management Consultants, Inc., An Economic Analysis of Improvement Alternatives to the St. Lawrence Seaway System, 1969, Appendix A, Table IV-5 and Table IV-6, p. IV-15 and IV-21.

Although the lake ports are currently handling significant amounts of general cargo in addition to iron and steel imports, these totals are only a fraction of the total overseas general cargo traffic generated within the Great Lakes region. It has been estimated that the port of Milwaukee, which has been enjoying rapid growth of its general cargo traffic in recent years, handles only 11 per cent of the State of Wisconsin's general cargo

exports.¹³ While this is a necessarily rough estimate, it is probably not too far from the actual participation of the lake ports in the non-iron and steel general cargo traffic generated within their hinterland. The lake ports face strong competition for this traffic from coastal ports. The nature of this competition and the recent changes in transportation technology that have intensified it are discussed in the next section.

¹³Eric Schenker, The Port of Milwaukee, An Economic Review (Madison, Wisconsin: The University of Wisconsin Press, 1967), p. 63.

CHAPTER III

COMPETITIVE ISSUES

A. INTRODUCTION

The St. Lawrence Seaway – Great Lakes navigation route has been a significant stimulant to the economic growth of mid-America through the expansion of the foreign trade discussed in the previous section. In recent years the Seaway system has begun to fulfill the expectations its supporters held for it in 1959. Traffic over the Seaway is now growing at a rate that exceeds original estimates. Perhaps even more important is the fact that this traffic is becoming more diversified, with the volume of the higher value grains and general cargo growing more rapidly than the traditional wheat, iron ore and coal traffic. As a result of this diversification, the value of overseas trade moving via the Seaway has been increasing more rapidly than overseas tonnage.

Despite this continued growth, a number of long range constraints continue to plague Seaway shipping and development. Some of these have stirred turmoil from the outset; others have come to the surface only in recent years. All of these constraints, in one way or another, bear a significant influence on the future development of Seaway traffic and, as a consequence, emerge as primary factors affecting the economic health of mid-America. These issues, briefly outlined below, are of paramount importance to the development of the St. Lawrence Seaway – Great Lakes navigation route.

A measure of the negative effect these constraints have on the midcontinent's economy is the differential between the actual trade values versus the potential value of unconstrained lakeport overseas trade. The current value of overseas trade at the lake ports exceeds \$1.6 billion, which is around 5 per cent of the total U. S. foreign trade. However, \$1.6 billion constitutes only 18 per cent of the foreign trade of the Seaway's hinterland. Lake port trade values could be doubled if the ports drew just one-third of this trade and could be tripled if they drew one-half of their hinterland's trade.¹ Thus the stakes are

¹John L. Hazard, "The Second Decade of the Seaway," an address to the Council of Lake Erie Ports, reprinted in the Congressional Record, May 1, 1969, p. S4381.

quite high in the competition among ports for the higher value cargos. Factors which impair the lakeports' ability to compete for this cargo produce a serious negative impact upon the economic growth of the mid-continent. A number of such factors are considered in this section.

B. TOLLS

The St. Lawrence Seaway is the only federal navigation project that is required to be "self-supporting" and fully amortized from tolls collected. While it may be desirable from a fiscal viewpoint to have a transportation system pay for itself, economic efficiency requires that goods be transported at lowest social cost. This efficiency criterion will be violated as long as tolls are charged on the Seaway traffic while traffic on competing routes moves at below marginal social cost due to indirect subsidization of competing modes or price discriminatory policies.² Moreover, when one considers that the Seaway's primary purpose is the development and encouragement of midcontinent commerce, the question becomes whether the imposition of tolls is not, in fact, self-defeating.

U. S. and Canadian government authorities, interested primarily in the financial health of the Seaway Corporation, seem to consider present tolls as modest and are considering increasing them. Yet, these tolls add significantly to the cost of transporting commodities through the Seaway. For example, a fully loaded bulk carrier pays more than \$12,400 in cargo and ship tolls when it travels between Lake Ontario and Montreal. The same amount of general cargo is charged \$18,000 plus 4 cents a ton on the gross tonnage of the vessel. In addition to these tolls, the Canadian government collects lockage charges on the Welland Canal. These charges, which are designed to cover maintenance and operating costs, will be \$20 per lock by 1971, resulting eventually in a charge of \$800 for a full transit by a loaded vessel.

Although these tolls are substantial, Seaway revenues during the first ten years of operations have fallen short of the level required to enable the Seaway Corporation to repay its bonded debt within the prescribed fifty years. Seaway traffic exceeded the estimated break-even level of 48 million tons in 1966 and has been near that level since then.

²The costs which private industry shifts to society are called social costs. Imperfections in the price system or government rules and regulations may enable firms or industries to shift some of their costs to society as a whole. This may create a bias in favor of one mode of transportation in which significant social costs are involved. Economic resources are misallocated accordingly.

However, during the earlier start-up years tonnage was relatively low and toll revenue inadequate to meet operating expenses plus annual interest payments on the debt. As a result, the Seaway Development Corporation has a cumulative deficit of about \$27 millions.

As Table 11 shows, this deficit and the annual losses incurred by the Seaway Corporation result from interest expenses rather than operating expenses. Revenues have exceeded operating expenses by a substantial margin during every year of Seaway operation. In recent years the Seaway has reduced its annual deficit, 1967 being an exception because of the strike by Canadian seamen. The deficit problem, then, is largely the product of the relatively low traffic volume in the early years of operation while the Seaway was still experiencing its "start-up" problems.

TABLE 11
REPAYMENT SUMMARY FROM CALENDAR YEAR 1959
TO CALENDAR YEAR 1967 (millions of dollars)

	1959	1960	1961	1962	1963	1964	1965	1966	1967
Revenues	3.2	3.1	3.4	3.7	4.5	5.6	6.4	7.1	6.1
Operating expenses (incl. replacements)	1.0	1.2	1.3	1.5	1.6	1.7	1.8	1.9	2.0
Net revenues, avail- able for repayment	2.2	1.9	2.1	2.2	2.9	3.9	4.6	5.2	4.1
Interest expense	2.6	4.1	4.4	4.5	4.7	4.8	4.9	5.0	5.1
Interest deferred during operations	0.6	2.2	2.3	2.3	1.8	0.9	0.3	-0.2	1.0
Total bond and interest debt	123.8	128.9	132.5	135.5	138.6	140.4	141.7	142.0	143.3

SOURCE: Annual Reports of the St. Lawrence Seaway Development Corporation.

The proposed toll increases are designed to eliminate the annual deficits and allow the gradual reduction of the Corporation's cumulative deficit. These results will obtain only if the demand for Seaway services is sufficiently inelastic. It has been suggested by supporters of increased tolls that most of the traffic is captive to the Seaway, i. e., that no

economically viable alternative exists. While this may be true for the majority of the tonnage moving over the Seaway, it is certainly not the case for the higher value cargo which generates most of the income for the Seaway and its hinterland. As we have seen in Section II, iron ore and most of the Canadian wheat traffic can be considered captive to the Seaway, but the corn, soybeans and general cargo traffic is not. Only a relatively small fraction of this traffic originating within the Seaway's hinterland is shipped via the lake ports. The Seaway faces active and successful competitors for this traffic. No one knows exactly how elastic the demand for Seaway services is, but it is certain that increased tolls will not help the lake ports capture traffic that is currently diverted to coastal ports.

If the Seaway is to be self-supporting, the current proposal to increase tolls by twenty to forty per cent across the board is an ill-advised plan for raising additional revenues. An across the board increase of 20 per cent would increase general cargo tolls by 18 cents per ton and bulk cargo tolls by 8 cents per ton. The rationale for higher tolls on general cargo traffic is that since transportation charges are a relatively small fraction of the delivered price of this high value cargo, it can absorb higher tolls without a serious reduction in the quantity demanded. While this argument may be valid for general cargo commodities, it is a serious non sequitur to apply it to the service of transporting general cargo. The Seaway and lake ports are selling general cargo transportation, not general cargo. We have seen that there exist ample alternatives to the Seaway for shipping general cargo, which means it is unlikely that the demand for the Seaway's general cargo services is as inelastic as those who advocate toll increases seem to believe.³

Every major port on the Great Lakes is presently working hard at attracting more of its hinterland's general cargo traffic. An increase in general cargo tolls would make this effort even more difficult and might jeopardize current income and the growth potential at the general cargo ports. If tolls are to be levied and even raised, it would seem advisable to increase tolls on the traffic that is indeed captive to the Seaway. This would mean relatively higher tolls on some bulk cargo than at present and relatively lower tolls on general cargo. Tolls would then conform to the classical theory of price discrimination which advises charging the higher price in the market where demand is most inelastic.

³Economists measure how responsive consumers are to changes in the price of a product by the concept of elasticity: the demand for some product is such that consumers are relatively unresponsive to price change; that is, price changes result in modest changes in the amount purchased. The demand for such a product is said to be inelastic.

It can be argued, however, that the social costs of transporting the midcontinent's commerce would be minimized if the Seaway tolls were lowered or even eliminated. The marginal cost of transporting much of the midcontinent's overseas commerce over the Seaway system is significantly lower than over competing routes, yet most of this traffic moves over the competing routes.⁴ Tolls well above marginal cost aggravate this misallocation of resources. Even tolls which reflect the marginal cost of the traffic will induce some resource misallocation as long as competing navigation routes, such as the Ohio and Mississippi River systems, are toll free and as long as railroads, airlines and trucking companies receive direct or indirect government subsidies.

If the U.S. and Canadian governments are concerned with allocative efficiency and with the primary goal of the Seaway, which is to stimulate the economic growth of the midcontinent, they should seriously consider lowering or even eliminating general cargo tolls and lowering the tolls on bulk cargo. While such action would mean that the Seaway would no longer be self-supporting and the governments would have to take over the responsibility of the Seaway's bonded debt, the social benefits in the form of a more rational allocation of transportation resources would easily exceed the costs.

C. FEDERAL GOVERNMENT POLICIES

The federal government continues to be the world's largest shipper of overseas cargos. The combination of military and related cargos controlled by the Department of Defense and the Department of Agriculture's relief shipments constitutes a significant portion of United States overseas exports. Because of the tonnage involved, the federal government's decision to utilize or to ignore a port when choosing its shipping routes will have an important impact upon that port's traffic volume. Until quite recently the federal government has virtually ignored the lake ports, thus depriving them of much of their hinterland's exports and passing up the economies of the Seaway. Within the past two or three years, however, the federal government has finally begun to realize that goods originating in the Midwest can be shipped at lowest cost over the Seaway.

⁴Marginal cost is the extra, or additional, cost of transporting one more unit of product.

In recent years the allocation of Department of Agriculture shipments of foodstuffs has been increasingly favorable to the Great Lakes relative to the other coastal areas. Lake ports enjoy an increasing share of this allocation due to a greater number of sailings as well as improved port efficiency. In 1967 the shares of U.S.D.A. shipments from the four seabords were as follows: Gulf Coast, 43.32 %; Great Lakes, 31.35%; Pacific Coast, 16.86%; Atlantic Coast, 8.47%. Whereas in 1966 the total coastal ports were given 2.4 billion pounds of such traffic, in 1967 they were given 2.5 billion pounds. During the same two-year period, the proportion of shipments through Great Lakes ports rose from 23.69 to 31.35 per cent of those annual shares. The Great Lakes position ahead of both the Atlantic and Pacific Coasts in this respect is noteworthy.

In addition to these U.S.D.A. shipments of foodstuffs, the Department of Defense began sending military cargo from the Midwest to Northern Europe over the Seaway on a trial basis during the 1969 Seaway season. Two Military Sea Transport Service charter ships have been operating between the lakes and North Sea ports and their performance, in terms of voyage time and cargo carried, has demonstrated that the Seaway is the fast, economical way to ship defense cargos generated in the Great Lakes area. Thus it would seem that the lake ports, after many years of effort, are finally beginning to receive some of the federal government overseas shipments originating within their hinterland.

The lake ports have been bypassed by government cargos because of some of the federal government's peculiar and uneconomic transport regulations. In particular, the Defense Department's cargo-preference restrictions, Section 22 of the Interstate Commerce Act, and restrictions on ships flying foreign flags are detrimental to lake ports.

The cargo-preference laws prohibit Defense Department shipments from moving in foreign-flag vessels when an American flag ship is available at any port within the same administrative district. Because the Great Lakes area is under the same administrative jurisdiction as the Port of New York and other North Atlantic ports, foreign ships are excluded from transporting defense cargo produced in the Great Lakes area. Instead, this cargo must be shipped overland to the Atlantic Coast, where it can be loaded aboard an American vessel. These laws contribute to the lack of sailings from lake ports, since no American ship will enter the lakes if it can pick up the same cargo at an Atlantic port. Early in 1969 the Secretary of Defense directed that military charter vessels utilize the Seaway system if it is the lowest cost route for military cargo, thereby originating the trial shipments discussed above. Based upon the apparent success of these trials, we might expect the lake ports to participate in a greater share of defense cargo in the future.

D. COMPETITION FROM ALTERNATIVE ROUTES

We have seen that few commodities are truly captive to the Seaway system. In general, commodities currently moving over the Seaway do so because the Seaway is the lowest cost route; however, the Seaway's cost advantage is not so great as to eliminate the possible movement of these commodities over competing routes. Indeed, as we have seen in Section II, the majority of these non-captive commodities do not move over the Seaway even though the Seaway is probably the low cost route. Because the factors which contribute to this diversion of traffic are different for bulk cargo than for general cargo, these two types of cargo will be discussed separately.

1. Bulk cargo

Competitors to the Seaway for the carriage of bulk cargo include mine to mill unit trains for iron ore and limestone, unit trains for coal, unit trains to the Gulf coast and barge shipment to the Gulf Coast for grains.

Unit train replacement of lake vessels in the carriage of iron ore and limestone is at best a remote possibility. Most of the vessels carrying this traffic are owned by the steel companies, who would not be interested in having them remain idle while railroads haul their raw materials. Also, with the opening of the Poe lock, the railroads simply won't be able to compete with the new, larger lake vessels that will haul ore in the future. Thus we can assume, as EBS did, that the iron ore and limestone traffic is truly captive to the Seaway.⁵

It is possible that much of the lake coal traffic may be captured by unit trains in the future. Indeed, EBS concludes that much of this traffic will move via unit trains by 1980. However, since this is not truly Seaway traffic and not overseas traffic, we shall not consider this possible diversion in any detail.

Most midcontinent grain exports are by no means captive to the Seaway; much is currently diverted to other coasts and the possibility exists that in the future even more will be diverted. In 1967 only 6.3 per cent of the wheat, 17.1 per cent of the corn, and 16.6 per cent of the soybeans exported from the U.S. were shipped through the lake ports. This diversion of the lake ports' most valuable bulk cargo is a serious problem and must be reversed if these ports are ever to capture a substantial share of their hinterland's overseas traffic.

⁵EBS Report, Chapter IV.

In their analysis of Seaway grain traffic, EBS computed the costs of shipping grain from various origin areas to Europe via alternative routes. These cost data provide some insights into the problems the lake ports face in attracting grain exports.

As Table 12 shows, the Seaway is clearly the least cost distribution channel for export wheat grown in Montana, the Dakotas, Minnesota, Wisconsin, Michigan and Ohio. However, Table 14 indicates that just over one-half of the wheat exported from these states moved through Gulf and Atlantic ports. A month by month analysis of these wheat flows reveals that most of the non-Seaway exports were shipped during the period from December to April when the Seaway is closed to navigation. Since the Seaway handles 85 per cent of the wheat exported from its hinterland while the system is open, it would seem that seasonal channel capacity is the constraint that is preventing the Seaway from participating in nearly 100 per cent of this export traffic. This constraint could be removed either by extending the Seaway shipping season or through the provision of additional wheat storage facilities at the lake ports.

TABLE 12

Comparison of Distribution Costs Via Alternative Routes for Movement of Wheat from Selected Origin Areas to Rotterdam

Route	Cost per Short Ton from:		
	Oaks, North Dakota	Concordia, Kansas	Defiance, Ohio
Seaway System - Direct	\$ 16.35	\$ 22.45	\$ 11.10
Seaway System - Trans- shipped	16.00	22.10	11.20
Gulf Coast Ports	19.15	20.35	**
Atlantic Coast Ports	24.10	**	12.10
Seaway System Differential	3.15	(1.75)	1.00

**Non-competitive.

SOURCE: EBS Management Consultants, Inc., An Economic Analysis of Improvement Alternatives to the St. Lawrence Seaway System, 1969, Appendix A, Table IV-7, p. IV-29.

TABLE 13

Comparison of Distribution Costs Via Alternative Routes for Movement of Corn and Soybeans from Selected Origin Areas to Rotterdam

Route	Cost per Short Ton from:			
	Decatur, Indiana	Champaign Illinois	Decatur, Illinois	Council Bluffs Iowa
Seaway System Direct	\$ 11.65	\$ 12.95	\$ 15.15	\$ 14.60
Seaway System Transshipped	11.75	12.60	14.80	14.25
Gulf Coast Ports	**	15.65	15.10	12.50
Atlantic Coast Ports	11.70	12.10	17.30	**
Seaway System Differential	.05	(.50)	.30	(1.75)

**Non-competitive

SOURCE: EBS Management Consultants, Inc., An Economic Analysis of Improvement Alternatives to the St. Lawrence Seaway System, 1969, Appendix A, Table IV-8, p. IV-31.

While data are not available on exports through the Gulf and Atlantic ports of wheat other than the hard, red spring and durum varieties, we know from Table 12 that these coastal ports ship large amounts of the exported soft winter wheats and other varieties, since, in total, they ship a larger share of U.S. wheat exports than the lake ports. The Atlantic coast ports' ability to retain their present share of this traffic in the face of competition from such low cost routes as the Seaway and barge shipments to the Gulf is due mostly to rate reductions by the eastern railroads. The railroads serving the Eastern ports cut their rates on wheat and corn drastically after the Seaway opened in an attempt to retain their grain traffic. Table 16 illustrates some of the results of this selective rate cutting. Where the Seaway has an insurmountable cost advantage in shipping grain, rail rates are generally at the pre-Seaway levels. However, in an area such as Defiance, Ohio, where the Seaway's cost advantage is not as great, the rate differential on wheat in favor of the Seaway is less than one-third the differential at

TABLE 14

Route Distribution of Commercial Hard, Red Spring and Durum
Wheat Shipped to Selected Foreign Destinations from
July 1, 1966, through June 30, 1967
in per cent

Route	Destination			Total
	Northern Europe	Southern Europe	North Africa	
Seaway System Direct	33.0	57.5	49.1	38.5
Seaway System Transshipped	12.1	10.5	0.0	9.9
Atlantic Coast Ports	26.8	3.1	50.9	28.2
Gulf Coast Ports	27.1	28.9	0.0	22.7
Pacific Coast Ports	1.0	0.0	0.0	0.7
TOTAL (per cent)	100.0	100.0	100.0	100.0

SOURCE: EBS Management Consultants, Inc., An Economic Analysis of Improvement Alternatives to the St. Lawrence Seaway System, 1969, Table IV-9, p. IV-19.

TABLE 15

Route Distribution of Wheat, Corn, Soybeans and Barley and Rye Shipped between May 1, 1966, and November 30, 1966 (in per cent)

Route	Wheat*	Corn	Soybeans	Barley & Rye
Seaway System	85.5	42.8	18.9	85.0
Atlantic Coast Ports	3.8	4.6	4.4	1.2
Gulf Coast Ports	9.0	52.6	76.7	2.6
Pacific Coast Ports	1.7	0.0	0.0	11.2
TOTAL (per cent)	100.0	100.0	100.0	100.0

*Commercial hard, red spring and durum wheat only.

SOURCE: EBS Management Consultants, Inc., An Economic Analysis of Improvement Alternatives to the St. Lawrence Seaway System, 1969, Table IV-10, p. IV-20.

Angus, Minnesota. Surely such a difference can't be explained on the basis of costs. These selective rate cuts have kept the Seaway's participation in the wheat exports of Ohio very low even though it can transport the grain grown in this area at lowest social cost.

These same discriminatory rate practices are employed by the railroads in hauling corn and soybeans to the Atlantic and Gulf Coasts. In areas where barge shipment to the Gulf or shipment via the Seaway has a huge cost advantage, such as at Council Bluffs and Des Moines, the Seaway enjoys a substantial rate differential over Atlantic ports. However, in Indiana, where the Seaway's cost advantage is not clearly overwhelming, the rail rate differential shrinks by more than four times. Again, such a generous differential in rates cannot be explained by cost factors. These rates are an example of the discriminatory rate practices which keep transportation costs for the midcontinent's exports, measured in real resources, higher than they need be. These rates are clearly designed to divert midwestern grain traffic away from its least cost distribution channel, the St. Lawrence Seaway.

Railroads serving the Gulf ports employ similar rate discrimination; however, they and the Seaway are also faced with competition from the combination of truck-barge shipment via the Mississippi

TABLE 16

Typical Railroad Freight Rate Differentials on Grain in Favor of
the Seaway System over Coastal Ports

Origin Areas	Rate Differentials per Short Ton in Favor of Great Lakes Ports over:	
	Atlantic Coast Ports	Gulf Coast Ports
Wheat		
Oaks, North Dakota	\$ 9.00	\$ 8.40
Angus, Minnesota	10.20	9.60
Defiance, Ohio	3.25	*
Corn and Soybeans		
Decatur, Indiana	2.30	*
Schneider, Indiana	2.50	*
Champaign, Illinois	2.40	6.40
Decatur, Illinois	5.40	5.40
Council Bluffs, Iowa	*	4.80
Des Moines, Iowa	10.30	6.00

*Non-competitive route for indicated origin.

SOURCE: EBS Management Consultants, Inc., An Economic Analysis of Improvement Alternatives to the St. Lawrence Seaway System, 1969, Table IV-4, p. IV-13.

River. Some rate reductions on grain have been initiated by railroads serving the Gulf ports in an attempt to meet barge line competition. However, the results as far as the lake ports are concerned are the same as the rate discrimination practiced by the eastern railroads; e.g., the recent reductions on soybeans to the Gulf ports make the rates from central Illinois higher to Chicago than to New Orleans.

The Seaway would participate in more of its hinterland's corn and soybean traffic if it had only to compete with the barge lines for this cargo. Table 17 gives the rate differentials in favor of Chicago over barge shipment to the Gulf. These differentials indicate that while barge shipment is the least cost route from cities along and near the Mississippi, it would not be cheaper than the Seaway from areas such as Champaign, Decatur and Des Moines.

Even allowing for the fact that barge traffic on the Mississippi pays no tolls while tolls are charged on the Seaway, the Mississippi River — Gulf Ports system is probably the least cost export route for grain (and general cargo) traffic originating near the river in Illinois, southern Iowa, and Missouri. Rail shipment to Gulf ports is probably the least cost route for traffic originating in extreme southern Illinois, Missouri and Kansas. This leaves the Seaway as the least cost alternative for grain and general cargo traffic originating in most of Iowa, Indiana and Illinois and all of Minnesota, Wisconsin, Michigan and Ohio. However, we know that the lake ports handle less than one-half of the coarse grain and less than one-fifth of the general cargo exports generated within this area.

TABLE 17

Rate Differentials on Corn and Soybeans for Movement from
Country Elevators to Port Terminals

Origin Areas	Rate Differential per Short Ton in Favor of Chicago*
<hr/>	
<u>Truck-Barge Combinations</u>	\$
Champaign, Illinois	3.94
Decatur, Illinois	2.01
Council Bluffs, Iowa	1.13
Des Moines, Iowa	6.00
<hr/>	
<u>Direct Barge</u>	
Alton, Illinois	.88
Cairo, Illinois	.08
Burlington, Iowa	1.22
Davenport, Iowa	.72
Omaha, Nebraska	1.13

*Based on lowest rate to Chicago, whether rail, truck-barge or barge.

SOURCE: EBS Management Consultants, Inc., An Economic Analysis of Improvement Alternatives to the St. Lawrence Seaway System, 1969, Table IV-5, p. IV-14.

The Seaway ports have been concerned with the issue of equality of inland access for many years. They have opposed the rate discrimination before the I.C.C. a countless number of times. Instead of opposing rate reductions and service improvements to other gateways, the lake ports have requested equal application of rates and services. Equality of services is extremely important, for even if equitable rates are attained there is no assurance that the railroads will extend new, improved services to the lake ports. Without equal access to inland traffic which is controlled by a potential competitor, the lake ports' waterborne trade can be in jeopardy.

The problem of inland access to the lake ports is certain to become more acute in the near future as the railroads' preference for long haul traffic leads them to introduce new service options to the Atlantic and Gulf coasts such as container trains, rental trains and unit trains. Unit trains are a potential threat to the Seaway grain traffic. It has been estimated that a rate of about \$4.00 per ton could be achieved for unit train shipments from Minneapolis to the Gulf, a substantial reduction from the existing rail rate of \$9.00 per ton.⁶

While these unit trains would probably not divert much wheat traffic from the Seaway (since the \$4.00 rate is only 65 cents less than the current barge rate from Minneapolis to the Gulf) they are already a threat to Seaway corn and soybean traffic. The Illinois Central Railroad has recently introduced rent-a-trains to corn and soybean terminals in central Illinois. Two large corn and soybean terminals have been constructed at Gibson City and Champaign, Illinois, to take advantage of rent-a-train service of the Illinois Central or Penn Central railroads. Three similar operations are anticipated at Decatur, Illinois; Decatur, Indiana; and Council Bluffs, Iowa.⁷ The Illinois and Iowa sites are within 200 miles of Chicago, while Decatur, Indiana, is approximately 110 miles from Toledo. Thus these terminals are within the Seaway's hinterland. However, since these two railroads serve the Gulf and Atlantic ports, there is no doubt that the rent-a-train service is not designed to haul grain to the lake ports.

The EBS study concludes that widespread application of rent-a-trains could severely reduce the corn and soybean hinterland of Chicago and Toledo. EBS estimates that, by 1980, 1,725,000 tons of corn and soybeans could be transported to Gulf ports from terminals at Decatur, Illinois, Gibson City, Illinois, and Decatur, Indiana.⁸

⁶EBS Report, p. V-11.

⁷Ibid., p. V-14.

⁸Ibid., p. V-17.

These projections are based upon the assumption that the lake ports are unsuccessful in their attempts to obtain equality of service from the railroads. While we cannot dismiss this possibility in view of the I. C. C.'s current disregard for the efficient allocation of the nation's transportation resources, we are sure that the lake ports will continue to petition the I. C. C. and to use every persuasive tactic at their disposal in an attempt to obtain equal treatment from inland carriers. If the federal regulatory agencies ever become seriously interested in an economically efficient transportation system for the midcontinent, perhaps these efforts will be successful.

2. General Cargo

The lake ports face the same problems of discriminatory rates and unequal rail service with the inland carriage of general cargo as they face with grain traffic. In many instances it costs a Midwestern manufacturer more to move his industrial goods to a closer Great Lakes port than to the more distant coastal port. In other cases, rail charges to the lake port may be lower absolutely but the shipper must pay more dollars per mile to ship his goods to a lake port than to a coastal port.

The Seaway ports' disadvantage in respect to inland access is further compounded by the practice of most railroads of absorbing certain coastal port charges on export-import cargo without offering similar service at the lake ports. The line haul rate, commonly called export-import rates, to all coastal ports includes certain port handling charges. These rates are highly discriminatory since shippers close to the coastal ports, who have no alternative routing choice, are denied the export-import rates. These rates are also not offered to shippers using the lake ports – another manifestation of the railroads' desire to attract long haul rather than short haul traffic.

Analogous to the unit or rent-a-train concept for grain cargo is the proposed container train for hauling general cargo from the Midwest to the Atlantic coast. The containers hauled on these trains are rapidly revolutionizing much of the world's general cargo trade. A container in U. S. practice is a 10, 20, or 40 foot box which can be loaded at the exporter's plant, sealed, placed on a truck trailer or flatcar, hauled to the port and loaded by crane onto an ocean vessel. Since no additional packing or handling is required at the port, the container can reduce the costs at the port by as much as 75 per cent. In addition, the mechanical loading and unloading allows a new containership, at a modern berth, to turn around within 24 hours. This rapid turnaround can, by itself, cut the cost of an ocean shipment by 25 per cent. The cost-saving

potential of containers has made them the most publicized and possibly the most successful transportation innovation in many years.

Two factors associated with containerization which create special problems for the lake ports are the loading and unloading facilities containers require and the absence of a true "load center" on the Great Lakes. To achieve the most efficient use of containers and containerships requires a specialized terminal facility with an open quay, a large apron, and an open marshalling area of ten to twelve acres. Such a berth would currently cost nearly \$5 millions. While it is true that conventional ships and conventional general cargo facilities can handle some of the smaller containers, much of the efficiency and the resulting cost reduction are lost.

Since much of the efficiency of the containership is due to its rapid turnaround, these expensive vessels cannot afford to stop at many ports to take on cargo. Thus the new containership is essentially a "load center" device - it will operate only at large ports and over heavily tonnage routes. At present there are seven container "load centers" established at Montreal, New York, Baltimore, Norfolk, New Orleans, Los Angeles and Seattle. These ports have made or are planning extensive investments in container handling facilities. The Port of New York, which already has extensive container facilities, is currently completing a \$25.5 million dollar expansion program at its Elizabeth container terminal.

To smaller ports, including those on the Great Lakes, containerization poses a serious problem - whether to continue their present operations and handle only a few containers, while much of their hinterland's container traffic moves to other ports, or to invest in facilities to handle container traffic. Container berths are very expensive, and only a few ports can generate enough traffic to justify their construction. The dilemma of the smaller ports was expressed nicely by the director of the Maryland Port Authority: "We are in a position of walking a tightrope between developing too few berths and losing potential cargo to our competitors or developing too many berths and losing financial stability." ⁹

In an earlier study we made a necessarily rough approximation of the portion of current Great Lakes general cargo traffic that is container suitable.¹⁰ On the basis of this analysis we projected that, by 1985,

⁹Joseph L. Stanton, "Effects of Containerization of U. S. Ports," World Ports, May, 1967, p. 16.

¹⁰Eric Schenker, The Effects of Containerization on Great Lakes Ports, Center for Great Lakes Studies, University of Wisconsin-Milwaukee, Special Report No. 2, February, 1968.

24.5 per cent of the lake ports' general cargo traffic would be container suitable. Applying this ratio to the EBS 1980 projection of general cargo traffic would give 3.8 million tons of potential containerized traffic. Thus the opinion of EBS¹¹ that 3.4 million tons of general cargo traffic would be diverted from the Seaway because of containerization seems to be in line with our estimates assuming, as EBS does, that "nearly all prime 'containerizable' traffic generated in the Seaway Region is expected to move through coastal gateways, and about 50 percent of the traffic 'suitable' to containerization is likewise expected to be diverted."¹²

It is difficult to accept the assumption that the Seaway ports will make no attempts to expand their participation in their hinterland's general cargo traffic, or that these attempts, if made, will be totally unsuccessful. This seems to be what EBS is assuming. General cargo traffic is vital to the financial health of both the lake ports and the Seaway. Port and Seaway officials, as well as midcontinent political and business leaders, are currently attempting to decide upon the best methods of meeting the threatened diversion of the Seaway's general cargo traffic.

In our earlier study, we recommended that the individual lake ports with relatively small general cargo traffic seriously consider the construction of berths capable of efficiently servicing the new combination break bulk container vessels. These are the vessels which will probably play the dominant role in future container traffic on the lakes. In addition, the Great Lakes ports as a unit should consider the construction of two modern, fully integrated container facilities, one at the southern end of Lake Michigan to serve Chicago and Milwaukee, and one on Lake Erie to service the eastern lake ports. This would seem to be the best way the lake ports can prevent losing both their general cargo traffic to coastal ports and their financial stability.

Of course the provision of container facilities does not guarantee that Midwestern shippers will route their container traffic through the Seaway ports. Here again, a lot depends upon the services provided the lake ports by the railroads and trucking lines. This problem of inland access is so important to the future development of the Seaway system that we should like to end this section of this special report with a quote from a thoughtful address given recently by Professor John L. Hazard of Michigan State University. In his address, he listed the problem areas facing the Seaway system and presented some recommendations toward alleviating some of them, including the problem of inland access:

¹¹EBS Report, p. I-5.

¹²Ibid.

The whole complex system of distance scales, class ratings and exceptions, and import-export rates applies differently to seaboard and lake ports.

Alternative approaches to achieving equal access for the lake ports are many.

(a) A Knott-Todd type of agreement ruling from the I.C.C. offering lake ports parity access to Midcontinent imports and exports with seaboard ports, already covered.

(b) Designation of the major lake ports as ocean ports under the Merchant Marine Act of 1936, according similar treatment and service alternatives.

(c) Applications for relief under the Interstate Commerce Act (Sec. I(6)) prohibition of unjust discrimination (Sec. 500 and Sec. 142) to promote and develop water transportation, and (Sec. 15) which requires the establishment of through routes and reasonable joint rates with water carriers.

(d) Amend the minimum rule of rate making (Sec. 15a, Transportation Act of 1958) to require Commission consideration of the effect of rates "lower than a reasonable minimum" on other modes of transportation.

(e) Alter the subsidy system to provide incentives for U. S. flag service to the route, or elimination of preferences if they do not.

(f) Require closer scrutiny of government agency use of circuitous or uneconomic routes.

(g) Consider removal of Section 22 rates and agreed rates to governmental agencies.

(h) Institute a Midwestern Governor's request for examination of the import-export class rate structure before the I.C.C., as the southern governors did in the 1930's, with a view to evidencing the degree of lake port discrimination and seeking a uniform application of distance scales, class and exceptions ratings, and rates to all ports.¹³

¹³Hazard, op. cit.

CHAPTER IV

THE ST. LAWRENCE SEAWAY SYSTEM

A. SEAWAY EXPANSION

There exists general agreement among Seaway officials in the U.S. and Canada that Seaway traffic may be rapidly approaching the capacity of its existing facilities. The estimated capacity of 65 million tons will probably be reached in the 1970's. With the recent completion of the Poe Lock, expansion discussion shifts to the Welland Canal and the St. Lawrence River sections of the system. Current interest is focused on the Welland where both the U.S. and Canada are considering building a new canal to bypass the Niagara escarpment.

There are sixteen locks along the Seaway system, seven on the upper St. Lawrence, eight on the Welland Canal and one at Sault Ste. Marie. Any expansion of the Seaway capacity would involve pairing the existing locks at the Welland Canal and along the St. Lawrence River. Although these locks would be paired with locks of larger dimensions, unless the dimensions of the connecting channels were also increased, larger ships could still not use the Seaway. Twinning the locks would permit a greater number of vessels to traverse the Seaway immediately and enable the new, larger vessels to use the system in the future after channel improvements had been completed.

Tables 18, 19, and 20 contain relevant size and cost data for three alternative improvement programs considered in the EBS Report.

TABLE 18

ESTIMATED COST OF LOCK PAIRING

	Lock Size	Capital Costs* (millions of dollars)
Alternative No. 1	1200'x110'x33'	1,697
Alternative No. 2	1400'x125'x34'	1,838
Alternative No. 3	1600'x140'x36'	1,933

*Not including interest charges during construction

SOURCE: U.S. Coast Guard, Report of Technical Subgroup--St. Lawrence Seaway Task Force, 1968, as quoted in EBS Management Consultants, Inc. Report, Table VI-2, p. VI-4.

TABLE 19

CHANNEL DIMENSIONS ASSOCIATED WITH ALTERNATIVE
LOCK DIMENSIONS

	Channel Depth	Channel Width
Alternative No. 1	31 '	600 '
Alternative No. 2	32 '	700 '
Alternative No. 3	34 '	800 '

SOURCE: U.S. Coast Guard, Report of Technical Subgroup--St. Lawrence Seaway Task Force, 1968, as quoted in EBS Management Consultants, Inc., An Economic Analysis of Improvement Alternatives to the St. Lawrence Seaway System, 1969, Table VI-3, p. VI-5.

TABLE 20

ESTIMATED COST OF ENLARGING TOTAL SEAWAY
SYSTEM DIMENSIONS

Capital Cost (millions of dollars)			
Element	Channel Depth		
	31ft	32 ft	34 ft
Locks, Channels	2,950	3,307	4,402
Ports and Harbors	<u>343</u>	<u>413</u>	<u>544</u>
Total	3,293	3,720	4,946
Annual Costs (millions of dollars)			
	Channel Depth		
	31 ft	32 ft	34 ft
Total	145.0	159.0	184.0

SOURCE: U.S. Coast Guard, Report of Technical Subgroup--St. Lawrence Seaway Task Force, 1968, as quoted in EBS Management Consultants, Inc., An Economic Analysis of Improvement Alternatives to the St. Lawrence Seaway System, 1969, Table VI-5, p. VI-7.

The current dimensions of the Seaway allow passage of vessels up to 730 feet long by 75 ft. in beam. Alternative No. 1 is the size of the Poe Lock, which can handle the 1000 ft. vessels currently being built to haul iron ore from the Lake Superior mines. These are the minimum dimensions that the Coast Guard would consider in an expansion program. At these dimensions the Seaway could handle every cargo ship currently operating except the new deep-sea oil tankers. However, since the trend in ocean ships and lake vessels is clearly toward vessels of 1000 ft and longer, and because any Seaway expansion would set the limit on vessel size for perhaps the next fifty years, Alternatives 2 or 3 would be a more likely choice for the expanded Seaway dimensions.

These improvements would permit the new, larger lake and foreseeable ocean vessels to traverse the entire Seaway and to load and unload at the principal lake ports. These new vessels when fully automated can achieve substantial reductions in the cost of transporting a ton of cargo. EBS has estimated the rates these vessels would have to charge in 1980 in order to earn a reasonable rate of return to their owners under the three improvement alternatives. Their estimates illustrate the savings these improvements could affect – some rates would be reduced to one-half their current level, as shown in Table 21.

Despite these dramatic cost reductions made possible by an improved Seaway system, EBS concludes that such a project would be inadvisable. In their opinion the costs of the improvements would outweigh the value of the future benefits using either a 25 or 50 yr. payoff period.¹ EBS correctly defines the benefits from a Seaway improvement program as the transportation costs saved on Seaway traffic plus port income generated by increased traffic at the lake ports due to the improvements. However, because of their conclusions regarding diversion of coarse grain and general cargo traffic from the lake ports, EBS almost certainly underestimates the cost savings and port income. Their estimates are reproduced in Table 22.

EBS is probably correct in assuming that an improved Seaway (Alternative B) will lower the cost of exporting U.S. and Canadian wheat but will produce no appreciable diversion of this traffic to the Seaway. The Seaway currently handles nearly all of this traffic originating within its hinterland. Hence the principal benefits from Seaway expansion would be in the form of transportation cost reductions.

According to EBS even an expanded Seaway would not succeed in capturing more than a minor share of its hinterland's corn and soybean exports. In the previous section, we discussed the EBS projection of 1,725,000 tons of coarse grain traffic to be shipped by rent-a-train to the Gulf Coast, of which 720,000 tons would be diverted from

¹ EBS Report, Table VIII-2, p. VII-17 compares costs and benefits. All of Chapter VIII of the Report discusses the costs and benefits of Seaway improvements.

TABLE 21
Present and Predicted Charges on Moving Coarse Grains on the
Seaway System with Enlarged Dimensions
 (in dollars)

Commodity	O & D Movement	Cost Item	1966		1980		
			Rate Structure	Present System	Altern. #1	Enlarged Dimensions Altern. #2	Altern. #3
Wheat	Lakehead to lower St. Law.	Vessel	4.10	4.56	2.43	2.23	1.95
Corn	Chicago to lower St. Law.	Vessel	4.75	5.31	2.76	2.52	2.32
Soybeans	Chicago to lower St. Law.	Vessel	7.77	8.73	4.39	3.99	3.45
Corn	Toledo to lower St. Law.	Vessel	2.42	2.98	1.08	1.05	1.02
Soybeans	Toledo to lower St. Law.	Vessel	3.81	4.77	1.73	1.67	1.61

SOURCE: EBS Management Consultants, Inc., An Economic Analysis of Improvement Alternatives to the St. Lawrence Seaway System, 1969, Table VII -9, p. VII-21.

TABLE 22

ESTIMATED ECONOMIC BENEFITS FROM IMPROVEMENT ALTERNATIVES
(Millions of Dollars)

	Alternative A		Alternative B		Alternative C		Alternative D	
	1966	1980	1966	1980	1966	1980	1966	1980
Transportation Cost Savings	\$ 23.2	\$ 22.9	\$ 25.2	\$ 24.8	\$ 1.6	\$ 1.5	\$ 25.6	\$ 25.1
Existing Traffic								
Wheat	17.3	25.2	18.6	27.2	1.2	1.7	18.7	27.2
Coarse Grain	29.3	33.7	51.1	58.7	13.2	15.2	60.5	69.6
Iron Ore	9.5	7.4	16.2	12.7	4.7	3.6	19.5	15.2
Coal	4.4	4.8	7.6	8.3	1.8	1.9	9.3	10.2
Subtotal	83.7	94.0	118.7	131.7	22.5	23.9	133.6	147.3
Diverted Traffic								
Wheat	--	--	--	--	.6	.9	1.1	1.7
Coarse Grain	--	.2	--	.2	.8	1.4	1.5	2.6
Iron Ore	--	--	--	--	--	.4	--	.8
General Cargo	--	--	--	--	19.4	11.6	19.4	11.6
Subtotal	--	.2	--	.2	20.8	14.3	22.0	16.7
Port Impact - Diverted Traffic								
Wheat	--	--	--	--	1.3	1.9	1.3	1.9
Coarse Grain	--	2.2	--	2.2	3.1	5.9	3.1	5.9
Iron Ore	--	--	--	--	--	.4	--	.4
General Cargo	--	--	--	--	19.6	14.9	19.6	14.9
Subtotal	--	2.2	--	2.2	24.0	23.1	24.0	23.1
TOTAL	\$ 83.7	\$ 96.4	\$ 118.7	\$ 134.1	\$ 67.3	\$ 61.3	\$ 179.6	\$ 187.1

NOTE: Alternative A - Lock size of 1200' x 110' x 33'; channel dimensions of 31' x 600'.

Alternative B - Lock size of 1400' x 125' x 34'; channel dimensions of 32' x 700'.

Alternative C - Present system with four week extension of the sailing season.

Alternative D - Alternative B with four week extension of the sailing season.

SOURCE: EBS Management Consultants, Inc., An Economic Analysis of Improvement Alternatives to the St. Lawrence Seaway System, 1969, Table VIII-1, p. VIII-4.

the Seaway system. If improvement alternative B were completed, the cost of transporting corn from Chicago to Rotterdam could be reduced by \$2.00 per short ton and by \$1.20 per short ton for corn and soybeans from Toledo to Rotterdam.² EBS estimates that such reductions would result in only 190,000 tons of corn and 98,750 tons of soybeans being rerouted through the Seaway.

While these estimates may be correct, they do not accurately reflect the potential social benefits that could result from a Seaway improvement program. As was emphasized in the previous section, the diversion of these 1.7 million tons would be the result of an economically irrational, discriminatory rate structure employed by the railroads serving the Gulf and Atlantic ports. Thus these rail rates should not be used as the least cost alternative to the Seaway in estimating traffic flows. Ideally, the true social benefits of a Seaway expansion project would be measured as the differential between the actual out of pocket costs of rail shipment of grain to a coastal port and then overseas, and the marginal cost of shipping via the Seaway. Lacking reasonable estimates of marginal costs, one could simply calculate the cost differential between shipping grain by train to the Gulf and then overseas, and shipping the grain by train to a Seaway port at the same rent-a-train rates as charged to the Gulf ports, thence via an improved Seaway to the overseas destination. This differential, not the difference between costs based upon current rail rates, should then be applied to all grain traffic that could move at lowest cost via the Seaway if rail rates were applied equally to lake and coastal port terminals.

Similar oversights led EBS to estimate no future benefits from general cargo traffic moving over an improved Seaway. The Report concludes that improving the Seaway would have virtually no impact on either the cost or volume of general cargo traffic on the Seaway in 1980.³ This conclusion follows from their assumption that future general cargo vessels serving the Seaway ports are not likely to be large enough to require an enlarged Seaway. Therefore an improved Seaway will not lower transportation costs except that it may allow ships to load to a greater draft than they now can. Cost savings due to the greater draft would be quite small. Since, according to EBS, the major cost factor on the Seaway system for general cargo vessels, the multitude of port calls required to fill a ship's hold, would not be eliminated, costs would not be much affected.

²EBS Report, p. VII-30.

³Ibid., p. VII-35.

Again EBS assumes that the lake ports will not be able to eliminate the causes of their low participation in the Midwest's general cargo traffic. These would include Midwestern shippers' inexperience with the Seaway, insufficient sailings to some overseas areas and the problems of inland access discussed above. Also, EBS forecasts virtually no container traffic and no containership service at the lake ports. While this is a very real possibility with the present Seaway dimensions, an expanded Seaway system would permit a number of alternatives to complete diversion of Midwestern container traffic to Atlantic ports, e.g., containership service to modern container ports on the lakes since the large containerships could traverse the expanded Seaway, or possibly the introduction of specialized lake vessels hauling containers to a container "load center" at Montreal. However container traffic evolves on the lakes, it will be affected by the dimensions of the Seaway. It is misleading to apply conclusions regarding container traffic formed in the light of the present system to an improved Seaway.

These considerations would suggest that EBS has underestimated the benefits resulting from expansion of the Seaway. If the Seaway ports were served by inland carriers on an equal basis with coastal ports, the category Coarse Grain, Diverted Traffic under Alternative B, 1980, in Table 22 would greatly exceed \$.2 millions. Also the port impact of this traffic would be well above the \$2.2 millions estimated. Although general cargo is more difficult to forecast, it should be quite evident that improvement of the Seaway could result in much of the 3.4 million tons of containerizable general cargo EBS expects to be diverted to Atlantic ports being rerouted back to the lake ports. Such a redirection would increase the benefits of Seaway expansion considerably, especially its income-employment impact upon the lake ports.

While they do not contribute to an underestimation of the potential benefits of an improved Seaway, the EBS conclusions regarding the benefits to the U.S. from iron ore shipments over an expanded Seaway are also questionable. EBS estimates that the larger Poe Lock combined with the existing Seaway will give the Superior District ore a sufficient cost advantage over the Labrador ore to cause production of the Superior ore to increase by nearly 5 million tons over what it might have been if the Poe Lock had not been built.⁴ Expansion of the Seaway's dimensions, however, would allow the new jumbo lakers to transport Labrador ore as well as Superior ore to the lower lakes, thereby wiping out the cost advantage of the Mesabi ore and eliminating (a) the 5 million ton production boost, (b) \$50 millions of economic activity, and (c) approximately 900 jobs in an area of the U.S. now labeled economically depressed. "Essentially then, enlargement of the entire Seaway System . . . will tend to transfer some of the economic benefits associated with

⁴ EBS Report, p. VIII-7 and VIII-8.

iron ore production and movement from U.S. interests to Canadian interests." ⁵

These "disbenefits", estimated at \$50 millions, "would most significantly offset benefits from enlargement of the Seaway System." ⁶ This possible rebalancing of the ore traffic to its current proportions plus the fact that most of the grain shipped at lower cost over an expanded Seaway would be Canadian wheat causes EBS to conclude that most of the benefits of an improved Seaway system would accrue to Canadian interests. They conclude that enlargement of the Seaway would transfer a significant benefit from the U.S. to Canada. ⁷

A number of factors, apparently not considered by EBS would seem to refute their conclusion:

(1) Most of the Labrador ore is shipped to U.S. steel mills. It would be in their interest and the interest of their customers, who are primarily U.S. firms, to have these ores available at the lowest cost possible.

(2) In the absence of an expanded Seaway, the U.S. owners of the Labrador mines may choose to ship the ore to mills by unit train, or more likely, by jumbo ore carriers to an Atlantic Coast port and then by train to their mills.

(3) Rather than being a depressed area, the economic outlook for the Mesabi Range area of northern Minnesota is encouraging as steel companies continue to expand their taconite facilities. The truly depressed mining areas of Michigan and Wisconsin would probably not suffer additional economic losses if the Seaway were expanded.

(4) If the "transfer" of \$50 millions of benefit from the U.S. to Canada actually were to occur, the results would not be as serious as EBS implies. Since the U.S. and Canadian economies are so closely integrated, any projects which benefits one will have positive effects upon the other. Hence the effects of any boost to the Canadian economy would soon be felt in the U.S. as the Canadians began increasing their purchases of U.S. goods and services.

Finally, EBS cites the possible increase in steel imports into the U.S. as another disbenefit that an expanded Seaway could produce.

⁵ EBS Report, p. VIII-8.

⁶ Ibid.

⁷ Ibid., p. I-7.

However, since the time of Adam Smith, economic theory has recognized that foreign trade produces economic benefits, not disbenefits, to both trading partners. If this doctrine seems questionable today, one can reaffirm it by simply asking a consumer of the cheaper foreign steel whether he believes steel imports produce disbenefits.

It may turn out that the considerations suggested here would not change the conclusion of the EBS analysis. The cost of expanding the Seaway may still exceed the direct benefits of such an investment. Inclusion of these factors would, however, have produced a comprehensive analysis and a judgment based on sound economic reasoning rather than a study that is somewhat incomplete and conclusions that are, in part, misleading.

B. SEASON EXTENSION

In Table 22, Alternative C is a four-week extension of the sailing season on the Seaway system. Currently the system is closed to shipping from December 15 to April 1 with some variation around either date depending upon weather conditions. The winter closedown increases costs of operation on the Seaway. Ships must be redeployed or laid up for one-third of the year. Investment in lake vessels and port facilities must be allocated over eight rather than twelve months. Many employees in port-related occupations must be idled, relocated or supported through the winter. Recruiting and retraining of employees, re-selling shipping services, preparing ships for winter idleness and for re-use in spring and other annual start-up and close-down costs can be quite substantial.

Recently serious consideration has been given to extending the Seaway shipping season through the application of ice control techniques to the system's locks and connecting channels. The Coast Guard has studied the feasibility of keeping the Seaway open during the winter and has concluded that currently available ice-control techniques would allow a six-week extension of the shipping season. The costs of extending the season up to six weeks are estimated in Table 23.

After estimating the capital costs, EBS made annual cost estimates (assuming a 4.6 per cent rate of interest) and projected the annual benefits that would accrue from a four week extension of the Seaway season. They found that when the estimated benefits were discounted at a 4.6 per cent rate of interest the project would pay for itself within seven years. Using a 10 per cent rate, the breakeven point would come in the ninth year.⁶ Hence EBS concluded that an extension of the shipping season would be justified.

⁶ EBS Report, p. VIII-18.

TABLE 23

**ESTIMATED COST OF EXTENDING THE SAILING SEASON
OF THE PRESENT SEAWAY SYSTEM**

Length of Season Extension	Capital Costs (millions of dollars)		
	Total	Icebreaking	Locks, A/N, Other
2 weeks	259.0	246.0	13.0
4 weeks	343.0	299.0	44.0
6 weeks	494.0	358.0	136.0
	Annual Costs (millions of dollars)		
2 weeks	7.04	6.17	0.87
4 weeks	8.29	6.97	1.32
6 weeks	11.17	9.79	1.38

SOURCE: U. S. Coast Guard, Report of Technical Subgroup—St. Lawrence Seaway Task Force, 1968.

The benefits created by an extension of the Seaway season would take the form of lower transportation costs for existing traffic, lower costs for commodities moving via other modes during the winter months and increased tonnage at the lake ports. Traffic in bulk commodities such as iron ore, limestone and coal would probably not increase if the season were extended. Instead the present volume of traffic would be spread over ten rather than eight months. With the longer season, winter stockpiles of these materials could be reduced, thereby reducing inventory costs for the producers and users of these materials.

Much of the midcontinent's overseas traffic which currently moves via other modes during the winter months could be captured by the lake ports if the season were lengthened. As mentioned earlier, nearly all the region's exports of wheat would move via the Seaway if it were open all year. Much of the region's coarse grain exports are also shipped after the Seaway has closed for the winter. An extension of the season would allow more of this grain traffic to utilize the low cost Seaway route to overseas destinations. The EBS estimate in Table 22, Alternative C, is that by 1980 the increased grain traffic due to an extended season will generate over ten million dollars in direct benefits: \$2.3 millions of transportation costs savings and \$7.8 millions of additional port income.

The major benefits from an extended Seaway season would result from the increased general cargo traffic such an extension would generate. EBS estimated that a four week extension would cause an increase in general cargo traffic of approximately 840,000 tons per year by 1980. To obtain this estimate, they simply assumed that a 11.6 per cent increase in the length of the season would produce a proportionate increase in general cargo traffic. The cost savings on this cargo are impressive: \$22.50 to \$27.50 per ton on the additional overseas traffic (estimated at 340,000 tons) and \$5.00 to \$7.50 per ton on domestic traffic (500,000 tons). These total savings of approximately 10.2 to 12.2 million dollars plus the 12.5 to 17.5 million dollars added to port income by the additional general cargo add up to substantial economic benefits to the Seaway area if the season were extended.⁹

Year-round operation of the Seaway would have great attractiveness for exporters of general cargo traffic. If, instead of extending the season by four or six weeks, the Seaway could be open to traffic all year, general cargo traffic would be expected to increase by well over the 33 per cent one would forecast by applying the Seaway's present share of general cargo traffic over twelve months. If shippers could count on a 12 month Seaway season, they would undoubtedly change the routing of much of the midcontinent's general cargo traffic. Currently exporters and importers must deal with two shipping services if they ship via a lake port in the summer and a coastal port in winter. Since they may receive better and cheaper service if they concentrate all of their business with one forwarder, they may bypass the Seaway altogether. A 12 month Seaway season would eliminate the need for these dual relationships and would greatly strengthen the Seaway's competitive position in attracting a reasonable share of its hinterland's general cargo traffic.

C. PUBLIC INVESTMENT

Governments at every level play an important role in the success of the Seaway system and in any future improvements. The federal government financed the U. S. portion of the Seaway and would finance any future improvements. Local governments, too, have invested millions of dollars in port facilities to serve and attract overseas traffic. Port development expenditures since 1946 are summarized in Table 24.

Proposed port development expenditures for the 1966-70 period are the lowest (in terms of average annual expenditure) for the Great Lakes since World War II. They are much smaller than the proposed expenditures for the development of competing ports on the Atlantic, Pacific, and Gulf coasts. While nearly all major ports are either planning or expanding

⁹EBS Report, p. VIII-5.

TABLE 24

UNITED STATES GREAT LAKES PORT DEVELOPMENT
EXPENDITURES 1946-1970 (thousands of dollars)

Year	Grand Total Outlays	Average Annual Outlay	Outlays for General Cargo Facilities	Average Annual Out- lay for General Cargo Facilities	Outlays for Special Purpose Facilities	Average Annual Outlay for Special Purpose Facilities
1946-55	97,840	9,784	10,840	1,084	87,000	8,700
1956-57	49,196	24,598	15,474	7,737	33,722	16,861
1958-60	50,089	20,036	27,965	11,186	22,124	8,850
1961-62	17,622	7,049	13,296	5,318	4,326	1,730
1963-65	35,891	11,964	14,541	4,847	21,140	7,147
Projected 1966-70	11,500	2,300	---	---	---	---

SOURCE: American Association of Port Authorities, Port Development Expenditure Survey, Washington, D. C., 1968, Table III, p. 10A.

existing container facilities, no fully integrated container facilities exist on the Great Lakes nor are any planned. Furthermore, promotional expenditures by the lake ports are minimal, in sharp contrast to their coastal competitors. The Port of New York annually spends more on promotional activities than do all of the Great Lakes ports put together.

The Great Lakes ports must recognize that they are competing not with each other as much as with the coastal ports. It would therefore behoove the lake ports to engage in a unified promotional campaign and to begin coordinating their port development programs. Each port cannot afford to build modern container facilities, but with coordinated action the Great Lakes ports could offer adequate container services. Some sort of regional port planning is essential if government funds are not to be under-employed.

Certainly the Great Lakes ports cannot continue to reduce their investments in port facilities. Atlantic, Gulf, and Pacific coast ports continue to improve their port facilities at a rate far greater than that of Great Lakes ports. If the decline in public investment that we now observe is merely a momentary pause in the flow of investment funds, then it is possible that the potential of the Great Lakes may yet be reached. If the decline in investment improvements in Great Lakes ports' facilities is not soon arrested and reversed, the outlook for Great Lakes-overseas transportation will indeed be bleak.

CHAPTER V

ST. LAWRENCE SEAWAY TRAFFIC PROJECTIONS

A. FUTURE TRAFFIC

Within the past five years, a host of studies have appeared which attempt to estimate future Seaway traffic. Two of the best are an analysis of future general cargo traffic produced by the U. S. Army Corps of Engineers¹ and a study prepared for the U. S. Department of Commerce by the Stanford Research Institute.² The most recent and most exhaustive is the EBS Report. In the remainder of this study, we shall utilize the EBS projections since they appear to be the most carefully researched.

Tables 25 through 27 contain the projections from these three studies. EBS made two sets of traffic projections, as seen in Table 27, one assuming the Seaway would maintain its present competitive position vis-à-vis competitive modes, and the other – the "expected competitive position" – assuming diversion of some cargos to competitive modes. The commodities expected to be diverted in significant quantities are corn, soybeans and general cargo. The EBS projection of total traffic for 1980 after estimated diversions to competing modes falls near the lower SRI projection, while the projection for the unchanged competitive position is near the middle of the SRI range. For the important general cargo category, however, both EBS projections exceed the higher figure of SRI and the Corps' estimate for 1985. To make the EBS general cargo projection comparable to the SRI and the Corps of Engineers estimates, it is necessary to add the EBS iron and steel estimates to the general cargo figures, since both SRI and the Corps of Engineers include iron and steel imports in their general cargo projections. When this is done, the EBS "general cargo" estimates would be 14.2 million tons which is much greater than the other estimates.

¹ U. S. Army Engineer Division, North Central Corps of Engineers, Great Lakes – Overseas General Cargo Traffic Analysis to Accompany Great Lakes Harbors Study, Chicago, Illinois, 1967.

² Stanford Research Institute, Economic Analysis of St. Lawrence Seaway Cargo Movements and Forecasts of Future Cargo Tonnage, final report submitted to U. S. Department of Transportation, 1965.

TABLE 25

PROSPECTIVE DIRECT GREAT LAKES – OVERSEAS
GENERAL CARGO TRAFFIC (1000 short tons)[†]

Ports and Harbors	1975	1985	1995	2005	2015
All Harbors	5600	6700	7600	8450	9200
Some Selected Harbors					
Oswego, N. Y.	65	80	95	108	120
Rochester, N. Y.	35	50	60	65	70
Port of Buffalo, N. Y.	305	355	395	435	475
Erie, Pa.	130	160	183	204	224
Ashtabula, Ohio	100	120	125	130	130
Cleveland, Ohio	565	720	825	930	1035
Rouge River, Mich.	310	345	380	410	440
Saginaw River, Mich.	95	15	130	145	160
Muskegon, Mich.	86	99	111	122	133
Burns, Indiana	165	240	285	330	370
Port of Chicago, Ill. [‡]	2080	2330	2520	2710	2900
Kenosha, Wis.	61	68	73	77	80
Milwaukee, Wis.	615	715	805	885	960
Manitowoc, Wis.	5	6	7	7	8
Green Bay, Wis.	152	185	198	207	215
Other Harbors	831	1112	1408	1685	1880

[†] Excluding iron and steel scrap.

[‡] Including Calumet Harbor and River, Lake Calumet, and Chicago Harbor

SOURCE: U.S. Army Corps of Engineers, North Central Corps of Engineers, Great Lakes – Overseas General Cargo Traffic Analysis, Chicago, Illinois 1967, p. 133.

This differential is due to the inclusion in the EBS projections of a large amount of domestic general cargo traffic, which may travel over only one segment of the system, such as the Welland Canal. Such traffic would not be included as Seaway traffic in the Corps of Engineers and SRI studies and is not counted as Seaway traffic by the Corps of Engineers or the Seaway Development Corporation when these agencies report annual Seaway traffic data. Seaway traffic usually refers to cargo moving through the Seaway proper, i. e., through the locks along the St. Lawrence River.

TABLE 26

SUMMARY OF PROJECTED SEAWAY CARGO TONNAGE
1980 (millions of short tons)

Major Commodities	High	Low
Iron Ore	24.0	20.0
Coal and Coke	1.6	1.2
Petroleum Products	2.7	2.1
Wheat, Coarse Grains and Soybeans	21.2	16.7
Minor Bulk Commodities	<u>8.8</u>	<u>6.8</u>
<u>Total Bulk Commodities</u>	58.3	46.8
General Cargo	<u>7.6</u>	<u>5.6</u>
<u>Total All Commodities</u>	65.9	52.4

SOURCE: Stanford Research Institute, *Economic Analysis of St. Lawrence Seaway Cargo Movements and Forecasts of Future Cargo Tonnage*, 1965, p. 7.

In order to deflate the EBS projections, only U. S. overseas general cargo traffic should be included. The EBS projection would then total approximately 8.8 million tons (including steel imports). If the projected 1.68 million tons of Canadian overseas general cargo traffic are added, the total of 10.5 million tons becomes comparable to the SRI projections. Even when comparing projections of the same traffic, EBS estimates substantially more general cargo traffic than SRI or the Corps of Engineers. Since Seaway general cargo traffic has already reached the 8 million ton level (see Table 1), of which 6.8 million tons was U.S. traffic (see Table 30), it would seem that the higher EBS estimates are the most realistic.

EBS has broken down their projections of total Seaway traffic for 1980 into traffic estimates for each of the principal Seaway ports. These estimates of future traffic at the major U. S. lake ports are listed in Table 28. The two entries for each commodity-port combination correspond to the two traffic estimates made by EBS. Each top entry is the projected traffic assuming an unchanged competitive position for the lake ports while the bottom entry is the projection made after allowing for expected diversions to competitive modes. Both projections assume no Seaway improvements and no extension of the shipping season.

TABLE 27

1980 TRAFFIC FORECASTS FOR THE ST. LAWRENCE SEAWAY
(Thousands of short tons)

Major Commodities	1966 (actual) Base Year	1980 (estimate)			
		Present System			Enlarged System
		Unchanged competitive Position	Expected competitive Position	4 - Week Extension	
Wheat	11,191	10,335	11,160	11,445	11,160
Corn	3,388	7,070	6,535	6,785	6,725
Barley & Rye	1,495	1,765	1,765	1,840	1,765
Soybeans	1,230	2,325	2,140	2,655	2,239
Minor Grains & Oilseeds	1,280	815	740	740	740
Iron Ore	15,506	14,500	14,500	14,620	14,500
Coal	1,225	1,350	1,350	1,350	1,350
Fuel Oil	2,085	3,150	3,150	3,150	3,150
Other Bulk Cargo	966	2,445	2,445	2,445	2,445
Iron and Steel	3,422	4,945	4,606	4,606	4,606
General Cargo	7,462	9,300	5,676	6,337	5,676
TOTAL	49,250	58,000	54,067	55,973	54,356

SOURCE: Eric Schenker, "The Future of U. S. Great Lakes Transportation with Particular Reference to Containerization and General Cargo," reprinted in the Congressional Record, June 2, 1969, S5899-S5903.

Especially noteworthy in Table 28 is the difference in the two general cargo entries for each port and, in particular, at the ports of Chicago and Milwaukee. The magnitude of the problem confronting the lake ports is dramatically illustrated by the estimates for these Lake Michigan ports. If the predicted diversion occurs, Chicago will lose nearly 40 per cent of its general cargo traffic while over 60 per cent of Milwaukee's general cargo traffic will move through coastal ports! Most of the diverted traffic would be general cargo exports – the traffic most likely to be containerized. Chicago is expected to have 710,000 tons of these exports diverted while the loss to the Port of Milwaukee is projected to be 345,000 tons in 1980. The total general cargo traffic expected to be diverted from all the major lake ports is 1,650,000 tons, or over 35 per cent of the projected general cargo traffic, assuming the current competitive position. The EBS report does not consider an increase in the Seaway's participation in its hinterland's general cargo overseas traffic.

TABLE 28

**EBS PROJECTIONS OF SEAWAY TRAFFIC FOR MAJOR
U.S. GREAT LAKES PORTS - 1980**
(1000 short tons)

Port	Iron Ore*	Wheat	Corn	Soy-beans	Other grains	Other cargo	Other bulk products	Steel products	General cargo	TOTALS
Duluth-Superior	---	3435 [†] 3570 [‡]	1900 1900	580 580	1180 1165	215 215	50 50	575 450	7,935 7,930	
Chicago	850 850	190 225	3215 2755	785 670	88 88	390 390	1373 1373	1830 1120	8,721 7,471	
Gary	1455 1455	---	---	---	---	30 30	---	---	1,485 1,485	
Milwaukee	---	15 15	810 810	50 50	283 283	5 5	177 177	560 215	1,900 1,555	
Detroit	2600 2600	85 85	---	---	5 5	600 600	1658 1658	750 565	5,698 5,513	
Toledo	200 200	335 335	1360 1285	1380 1310	---	220 220	312 312	580 420	4,387 4,082	
Cleveland	4400 4400	80 80	---	---	15 ---	25 25	576 576	500 405	5,596 5,486	
Other Ports	6850 6850	80 80	105 105	---	183 175	---	---	160 130	7,378 7,340	
TOTALS	16,355 16,355	4220 4390	7390 6855	2795 2610	1754 1731	1485 1485	4146 4146	4955 3305	43,100 40,877	

*Includes only iron ore that moves through the Seaway.

[†]Unchanged competitive position; [‡] competitive position after expected diversions.
SOURCE: EBS Management Consultants, Inc., An Economic Analysis of Improvement Alternatives to the St. Lawrence Seaway System, 1969, compiled from the appendices.

EBS does admit to the possibility of the Seaway increasing its share of the midcontinent's traffic if the Seaway season were extended. Their estimates of the increased traffic due to an extension are listed in Table 29. Most of the increased wheat traffic would be U.S. wheat, and nearly all of the corn and soybeans would be U.S. exports and all of the general cargo listed in Table 29 is U.S. traffic. Thus, if the season were extended six weeks, EBS estimates an increase of 1,615,000 tons of bulk cargo and 367,000 tons of general cargo traffic from the lake ports.

TABLE 29
INCREASE IN SEAWAY TRAFFIC WITH SEASON EXTENSION,
PRESENT SYSTEM, 1980 (1000 tons)

Commodity	Two Weeks	Four Weeks	Six Weeks
Wheat	165	285	410
Barley & Rye	75	75	75
Corn	50	250	455
Soybeans	360	515	675
Total Grain Increase	<u>650</u>	<u>1125</u>	<u>1615</u>
<u>U. S. General Cargo</u>			
Exports	88	176	264
Imports	34	68	103
Total General Cargo Increase	<u>122</u>	<u>244</u>	<u>367</u>

SOURCE: EBS Management Consultants, Inc., An Economic Analysis of Improvement Alternatives to the St. Lawrence Seaway System, 1969, Table VII-15 and Table VII-16, p. VII-3 and VII-36.

CHAPTER VI

PRESENT AND FUTURE INCOME AND EMPLOYMENT GENERATED BY THE ST. LAWRENCE SEAWAY

A. PRESENT INCOME AND EMPLOYMENT GENERATED BY THE ST. LAWRENCE SEAWAY

The St. Lawrence Seaway produces economic benefits in two ways: by reducing the cost of transporting its hinterland's commerce, and by generating increased activity at the ports along the Seaway. In the remainder of this study, we shall be interested in the direct and secondary economic benefits produced by the Seaway traffic at the U.S. lake ports.

Estimation of the total income and employment effects of Seaway traffic is made possible through the application of regional multipliers developed in a previous study.¹ The familiar multiplier concept states, in brief, that an increase in the exports of a region will lead to an increase in regional employment and therefore to an increase in regional income. This increased income will, in turn, be spent and induce a second round of increased regional employment and income which will also be spent to induce more income, and so on, to a finite limit. The calculated regional multiplier is an estimate of that finite limit, i. e. , it is an estimate of the total amount of income generated by an injection of one dollar of new income into the region.

In this study, the income injected into the economies of the Great Lakes states is the port-related income due to Seaway traffic. The direct income generated by Seaway traffic includes wharfage and terminal charges, payments for supplies, for labor services and auxiliary services, rail and trucking charges, etc. Numerous reports prepared for various port agencies estimated that these charges ranged from \$18 - \$30 for an

¹ Eric Schenker, An Estimation of Income and Employment Generated by the St. Lawrence Seaway at Six Great Lakes States, unpublished, 1968. For a discussion of the regional multiplier concept, see Schenker, Eric, The Port of Milwaukee, An Economic Review, University of Wisconsin Press, 1967.

average ton of general cargo and from \$1 – \$8 for a ton of bulk cargo.² Given these estimates and a generally rising level of prices, the income estimates developed here employ \$5 and \$24 per ton as the average direct income per ton produced from servicing bulk and general cargo, respectively, at the Great Lakes ports.

Table 30 lists the total Seaway traffic moving through the ports of the six Great Lakes states. The average direct port income per ton is applied to these totals to obtain the direct income generated by Seaway traffic in each state (Table 31). The regional income multipliers (listed in Table 32) are then applied to this direct income to produce an estimate of the total dollar impact of Seaway traffic upon the economy of the Great Lakes region (Table 33). It is estimated that, in 1968, Seaway shipping accounted for approximately \$283 millions of primary income and, with the addition of the secondary income, for nearly \$643 millions of total income for the Great Lakes states. The total personal income of the Great Lakes region in 1967 was \$144 billions. Since the \$643 millions is probably a conservative estimate, it would not be an overstatement to estimate that the Seaway accounts for approximately one per cent of the total income of the six Great Lakes states.

Another measure of the impact of the Seaway is the employment generated by the Seaway traffic. Median family income in the North Central region of the United States was \$7,267 in 1965, the latest year for which these data are available.³ Using \$7,500 as an approximation of the 1968 median income, Seaway cargo directly provided income for 37,770 families in the Great Lakes region. Adding the secondary income produces a total of approximately 85,710 families employed either directly or indirectly because of the existence of the St. Lawrence Seaway (see Table 34).

These income and employment estimates are rough approximations of only part of the Seaway's economic impact—the portion attributable to the Seaway-induced port activity. Of perhaps greater significance has been the effect which the Seaway has had upon the cost of transporting the

²Norman E. Weir and Stuart W. McFarland, The Impact of the Port of Jacksonville on the Economy of the Community, report submitted to the Jacksonville Port Authority, 1965; Maritime Administration, The Economic Impact of United States Ocean Ports, Washington, D. C., Department of Commerce, 1966; Stanley J. Hille and James E. Suelflow, The Economic Impact of the Port of Baltimore on Maryland, College Park, Maryland, University of Maryland, 1969.

³Bureau of the Census, Statistical Abstract of the United States, 1967, Washington, D. C., Department of Commerce, 1968, p. 336.

TABLE 30
SEAWAY TRAFFIC HANDLED AT MAJOR U.S. PORTS
OF THE GREAT LAKES, 1968
(1000 tons)

State	Bulk Cargo ^a	General Cargo ^b
Minnesota*	4,634	148
Wisconsin*	401	445
Illinois	2,984	2,549
Michigan	1,806	2,279
Ohio	<u>13,800</u>	<u>1,459</u>
Totals**	23,625	6,880

*Duluth-Superior cargo is included in Minnesota figures.

**Indiana's general cargo and much of its bulk cargo move through Illinois and Ohio ports.

^aIncludes wheat, corn, soybeans, barley and rye, and both shipments and receipts of iron ore.

^bIncludes iron and steel imports.

SOURCE: St. Lawrence Seaway Authority and the St. Lawrence Development Corporation, Traffic Report of the St. Lawrence Seaway, Ottawa, Ontario: Queen's Printer, 1968, p. 8.

TABLE 31
DIRECT INCOME GENERATED BY MAJOR U.S. PORT
SEAWAY TRAFFIC, 1968 (1000 dollars)

State	Bulk Cargo	General Cargo	Total
Minnesota	23,170	3,552	26,722
Wisconsin	2,005	10,680	12,685
Illinois	14,920	61,176	76,096
Michigan	9,030	54,696	63,726
Ohio	<u>69,000</u>	<u>35,016</u>	<u>104,016</u>
Totals	\$ 118,125	\$ 165,120	\$ 283,245

SOURCE: Compiled from Table 30 above.

TABLE 32

ESTIMATED INCOME MULTIPLIERS FOR THE GREAT LAKES STATES

State	Estimate of Multiplier
Wisconsin	2.5738
Michigan	1.9962
Illinois	2.6380
Ohio	2.2323
Minnesota	1.8993

SOURCE: Eric Schenker, An Estimation of Income and Employment Generated by the St. Lawrence Seaway at the Six Great Lakes States, unpublished, 1968, p. 44.

TABLE 33

DIRECT AND SECONDARY INCOME GENERATED BY SEAWAY
TRAFFIC IN THE GREAT LAKES STATES, 1968
(\$1000)

State	Direct Income	Income Multiplier	Total Income
Minnesota	26,722	1.89	50,505
Wisconsin	12,685	2.57	32,600
Illinois	76,096	2.64	200,893
Michigan	63,726	1.99	126,815
Ohio	104,016	2.23	231,955
Total	\$ 283,245		\$ 642,768

SOURCE: Compiled from Table 32 above.

Midwest's commerce. The introduction of this low cost transportation route, plus the substantial rate reductions instituted by the eastern and southern railroads as a consequence of the new competition which the Seaway represented, have opened new export markets for Midwestern agricultural and manufactured goods. The resulting growth in exports from the Great Lakes states means increased "export" income, which is multiplied into an even greater expansion of the region's total income. This income growth has never been estimated, but it is surely many times greater than the port-related income estimated in this study.

TABLE 34
ESTIMATED EMPLOYMENT GENERATED BY U.S.
SEAWAY TRAFFIC, 1968 (families)

State	Direct Employment	Total Employment
Minnesota	3,560	6,730
Wisconsin	1,690	4,350
Illinois	10,150	26,790
Michigan	8,500	16,910
Ohio	13,870	30,930
Totals	37,770	85,710

SOURCE: Compiled from Table 33 above.

**B. FUTURE INCOME ESTIMATES OF THE
ST. LAWRENCE SEAWAY**

Using the EBS traffic projections and the techniques employed in the previous section, we can make some very rough approximations of the income which Seaway traffic will generate at the major Great Lakes ports in 1980. We have collected the EBS projections for the major commodities shipped over the Seaway in Table 28. The grain and iron ore projections are summed to give the Bulk Cargo, while the Steel Products plus General Cargo projections are included under General Cargo in Table 35.

TABLE 35

**TRAFFIC PROJECTIONS FOR MAJOR U.S. GREAT LAKES
PORTS, 1980 (1000 short tons)**

Port	Present Competitive Position		Expected Competitive Position	
	Bulk Cargo	General Cargo	Bulk Cargo	General Cargo
Duluth- Superior	7,310	625	7,430	500
Chicago	5,518	3,203	4,978	2,493
Gary	1,485	---	1,485	---
Milwaukee	1,163	737	1,163	392
Detroit	3,290	2,408	3,290	2,223
Toledo	3,495	892	3,350	732
Cleveland	4,520	1,076	4,505	981
Other U.S. Ports *	<u>7,218</u>	<u>160</u>	<u>7,211</u>	<u>130</u>
Totals	33,999	9,101	33,412	7,451

*Principally Ohio ports which handle large amounts of Labrador iron ore.

SOURCE: Compiled from Table 28 above.

Before these traffic data can be converted into income projections, the amount of income a ton of cargo will generate in 1980 must be estimated. Such an estimate is difficult since the two principal factors influencing this income – the costs of port services and changes in cargo handling technology – will tend to push the income per cargo ton in opposite directions. While rising costs for labor, land, etc., will tend to increase the cost of servicing a ton of cargo, technological improvements such as self-unloading bulk vessels and automated containerships will reduce port costs. We shall continue to use \$24 and \$5 as the average income produced,

respectively, by a ton of general cargo and a ton of bulk cargo. We realize that income estimates thus calculated will be very rough approximations at best. These estimates are listed in Table 36. Application of the income multipliers to the direct income yields the total incomes in Table 37.

If the Seaway can maintain its present competitive position vis-à-vis alternative routes, by 1980 it will be contributing almost \$.9 billions per year to the economies of the six state area. If, however, the diversion of general cargo and coarse grain traffic that EBS predicts actually occurs, the lake port communities will lose substantial amounts of potential income. These losses are estimated in Table 38.

While these losses would be substantial for the region as a whole, for the major general cargo ports of Chicago, Milwaukee and Toledo, they would be devastating. If general cargo is diverted as EBS predicts, Milwaukee will lose over one-third of its potential port income in 1980. It seems quite clear that if the lake ports hope to retain this traffic and the income which it generates, they must be ready to offer the services and facilities required for general cargo traffic in 1980. The estimates presented here provide some idea of the losses which the communities can expect if they lag in their port development.

Although EBS expects an expanded Seaway system to generate virtually no new traffic, we have argued above that an improved Seaway would allow the lake ports to participate in a greater share of their hinterland's traffic, especially the container traffic. If the Seaway could handle the next generation of general cargo vessels, much if not all of the 3.4 million tons of Midwestern containerizable cargo that EBS expects will move through coastal ports might be retained by the Seaway ports. This container traffic would generate approximately \$82 millions per year in direct port related income and more than \$160 millions in total annual income in the Great Lakes region. These income effects are relevant to the debate over proposed Seaway improvement programs and would seem to justify the consideration of the container facilities at the lake ports suggested in Chapter III.

EBS estimates that a six-week extension of the Seaway season would mean an increase in Seaway traffic of 1.6 million tons of bulk cargo and 367,000 tons of general cargo by 1980. Such an increase would add approximately \$35 millions in direct income and over \$70 millions in total income to the region's economy. If the total income produced by the increase in traffic which we expect to result from Seaway expansion and an extended shipping season is added to total income from Table 37 (present competitive position), the total annual income generated by U. S. Seaway traffic would exceed \$1 billion by 1980. If we also add the income generated by projected Canadian traffic which will total approximately 11 million tons of

TABLE 36

ESTIMATES OF DIRECT FUTURE INCOME GENERATED BY
SEAWAY CARGO, 1980 (\$1000)

Port	Present Competitive Position		Expected Competitive Position	
	Bulk Cargo	Income from General Cargo	Bulk Cargo	Income from General Cargo
		Total		Total
Duluth-Superior	36,550	15,000	37,150	12,000
Chicago	27,590	76,872	24,890	59,832
Gary	7,425	---	7,425	---
Milwaukee	5,815	17,688	5,815	9,408
Detroit	16,450	57,792	16,450	53,352
Toledo	17,475	21,408	16,750	17,568
Cleveland	22,600	25,824	22,525	23,544
Other U.S. Ports	36,090	3,840	36,055	3,120
TOTALS	169,995	218,424	167,060	178,824
		388,419		345,884

SOURCE: Compiled from Table 35 above.

TABLE 37

Estimated Total Direct and Secondary Income Generated by
Projected Seaway Cargo at the Major U.S. Great Lakes
Ports, 1980 (\$1000)

Port	Present Competitive Position	Expected Competitive Position
Duluth-Superior	97,400	92,900
Chicago	275,800	223,700
Gary	14,900	14,900
Milwaukee	60,400	39,100
Detroit	147,700	138,900
Toledo	86,700	76,500
Cleveland	107,900	102,700
Other U.S. Ports	89,000	87,300
Total	879,800	776,000

SOURCE: Compiled from Table 36, above.

TABLE 38

Projected Direct and Total Income Lost Due to Traffic Diversion
(Millions of dollars)

Port	Direct Income Lost	Total Income Lost
Duluth-Superior	2.4	4.5
Chicago	19.7	52.1
Gary	0	0
Milwaukee	8.3	21.3
Detroit	4.4	8.8
Toledo	4.6	10.2
Cleveland	2.3	5.2
Other U.S. Ports	.7	1.7
Total	42.4	103.8

SOURCE: Compiled from Table 36 and Table 37, above.

bulk cargo and 1.68 million tons of general cargo by 1980, the Seaway traffic would add a total of \$1.2 billions to the income of the midcontinent region.

These income effects are only part of the total impact which the Seaway has upon the economy of its hinterland. As mentioned earlier, perhaps the Seaway generates even greater benefits by providing a low cost route for transporting the overseas commerce of the midcontinent. Though the magnitude of these future benefits may be impossible to estimate, the size of the potential income effects alone would seem to be ample incentive for the residents of the midcontinent region to insist upon continued expansion and improvement of the Seaway system.

CHAPTER VII

CONCLUSION

In this study we have estimated that St. Lawrence Seaway traffic adds nearly 643 million dollars to the income of the residents of the six Great Lakes states. If the lake ports can simply maintain their present competitive position, this figure may reach 900 million dollars by 1980. If somehow the lake ports could increase their participation in the overseas trade of their hinterland to anywhere close to the level achieved by the Atlantic and Gulf Coast ports, the economic benefits accruing to the Great Lakes region would at least double.

The problems that must be overcome before the Seaway can increase its participation in its hinterland's traffic fall into two general areas, both of which involve government policies. These are the problems of (1) unequal inland access to the Seaway ports, and (2) lagging expenditures for Seaway and lake port development. It is imperative that Midwestern leaders prevail upon the ICC to review the rate schedules and the quality of service offered by the railroads and trucking lines serving the lake ports, with a view to creating some degree of order and equality from the irrational jumble of discriminatory rates and services that currently prevails. If these discriminatory practices are not eliminated soon, the wholesale diversion of Midwestern general cargo and grain traffic that has been predicted will be a reality by 1980.

Governments, at the federal, state, and municipal level, are responsible for the maintenance and expansion of Seaway and lake port facilities. State and municipal governments, faced with unprecedented demands for increased services, have shown increased reluctance to invest in modern port facilities. They must realize, however, that the lake ports are currently at a crucial phase in their development and that failure to continue to improve facilities may mean the irretrievable loss of much of their most valuable traffic to the coastal ports. As our income data indicate, such losses would have serious negative effects upon the economic growth of the port communities.

The federal government is also reluctant to invest in the expansion and improvement of the Seaway system. Atlantic and Gulf Coast interests insisted that the Seaway be self-supporting from tolls even though every other federally financed navigation route is toll free. As a result of abnormally low traffic volumes during the start-up years, the Seaway has been unable to meet the interest charges on its bonded

BIBLIOGRAPHY

- American Association of Port Authorities, Inc. Port Development Expenditure Survey. Washington, D.C.: The American Association of Port Authorities, 1968.
- EBS Management Consultants, Inc. An Economic Analysis of Improvement Alternatives to the St. Lawrence Seaway System. A final report submitted to the U.S. Department of Transportation, January, 1969.
- Hazard, John L. "The Second Decade of the Seaway," reprinted in the Congressional Record, May 1, 1969. (Original paper read before the Council of Lake Erie Ports, Washington, D.C., April, 1969.)
- Hille, Stanley J. and James E. Suelflow. The Economic Impact of the Port of Baltimore on Maryland. College Park, Md.: University of Maryland, 1969.
- Schenker, Eric. Effects of Containerization on Great Lakes Ports. Center for Great Lakes Studies, University of Wisconsin-Milwaukee, Special Report No. 2, February, 1968.
- . Estimation of Income and Employment Generated by the St. Lawrence Seaway at Six Great Lakes States. Unpublished monograph, 1968.
- . The Port of Milwaukee, An Economic Review. Madison, Wisconsin: University of Wisconsin Press, 1967.
- . "The Future of U.S. Great Lakes Transportation with Particular Reference to Containerization and General Cargo," reprinted in the Congressional Record, June 2, 1969.
- St. Lawrence Seaway Authority and the St. Lawrence Development Corporation. Traffic Report of the St. Lawrence Seaway. Ottawa, Ontario, Canada: Queen's Printer and Controller of Stationery, 1966-68.

St. Lawrence Seaway Development Corporation. Annual Reports. Ottawa, Ontario, Canada: Queen's Printer and Controller of Stationery.

Stanford Research Institute. Economic Analysis of St. Lawrence Seaway Cargo Movements and Forecasts of Future Cargo Tonnage. A final report submitted to U.S. Department of Transportation, 1965.

Stanton, Joseph L. "Effects of Containerization on U.S. Ports," World Ports, May, 1967.

U.S. Army, Corps of Engineers. Waterborne Commerce of the United States. Washington, D. C.: Government Printing Office, 1967.

_____, Engineer Division, North Central Corps of Engineers. Great Lakes-Overseas General Cargo Traffic Analysis to Accompany Great Lakes Harbors Study. Chicago, Ill: U.S. Army Corps of Engineers, 1967.

U.S. Department of Commerce. Bureau of the Census. Statistical Abstract of the United States, 1967. Washington, D.C.: Department of Commerce, 1968.

_____. Maritime Administration. The Economic Impact of United States Ocean Ports. Washington, D. C.: Department of Commerce, 1966.

Weir, Norman E. and Stuart W. McFarland. The Impact of the Port of Jacksonville on the Economy of the Community. A report prepared for the Jacksonville Port Authority, 1965.

