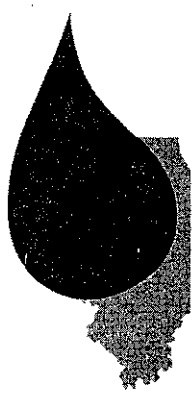

INLAND WATERWAY AND DEEP DRAFT NAVIGATION

INFORMATION PAPER NO. 2
OF THE
ILLINOIS STATE WATER PLAN TASK FORCE

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PREFACE

The State Water Plan Task Force, through the conduct of advisory group meetings and statewide hearings, has received various questions regarding activities and interests within Illinois concerning inland waterway and deep draft navigation. In response to these questions, the Division of Water Resources has prepared for the information of the State Water Plan Task Force, its Advisory Groups and general public an information paper on the subjects of inland waterway and deep draft navigation in the State of Illinois.

For further information on this subject or additional copies of this paper contact Bruce Barker, Illinois Division of Water Resources, Springfield, Illinois.

INFORMATION PAPER ON
INLAND WATERWAY NAVIGATION

WATERWAY SYSTEM

Illinois has 1200 miles of waterways suitable for barge transportation. These consist of the canalized Illinois and Upper Mississippi Rivers, the open channel Middle Mississippi River, the canalized Ohio River, Kaskaskia River, and the Chicago waterway system. The inland waterway system is connected with deep draft shipping at Lake Michigan ports via Illinois Waterway and at Baton Rouge-New Orleans via the Lower Mississippi River.

Throughout this system prevailing channel depths permit barges to be loaded to nine feet draft. At this draft the standard dry cargo, hopper barge will haul 1500 tons of cargo. Tankers, which are longer and wider, will haul 3000 tons of liquid cargo.

Lock dimensions and channels on Illinois Waterway and the Upper Mississippi River limit tows to 15 hopper barges. This tow, carrying 22,500 tons of cargo, is pushed by a 3000-5000 horsepower towboat at 7-8 miles per hour. The Middle and Lower Mississippi and Ohio Rivers can accommodate 25 barge, or larger, tows with proportionately larger towboats.

WATERWAY COMMERCE

Barge transportation is especially suited to high volume, long haul, transportation of liquid or dry bulk cargoes. Major commodities include: grain, coal, minerals, petroleum distillates, crude petroleum, and chemicals. All recent projections of traffic demand show continuing substantial growth on the order of 3% per year. Petroleum is the only major commodity projected to decline.

The inland towing industry consists of numerous small firms in competition for traffic. Some large shippers own and operate towboats and barges. But most traffic moves under contracts between the barge line and shipper. Common carrier service at regulated rates is also available to small shippers. These small shipments only account for 15% of all traffic.

Truck/barge movements compete with unit trains 50-100 miles from river docks. In Illinois this hinterland embraces about two-thirds of all corn and soybeans destined for export at Gulf ports. Fertilizers are a major backhaul to the same region. Competition is similar for coal destined to powerplants or Gulf export.

As a result, waterway traffic equals or exceeds the most heavily used trunkline railroads. Traffic in millions of ton-miles per mile for 1979 was:

Mississippi River, Cairo to Gulf	84.7
Mississippi River, Missouri River to Cairo	70.0
Ohio River, Pittsburg to Cairo	44.2
Illinois River, Lockport to Grafton	24.0
Mississippi River, Missouri River to Minneapolis	20.0
Kaskaskia River	1.4

FEDERAL INVOLVEMENT

The inland waterways were improved and are exclusively operated by the Federal Government. All expenses have been paid by appropriations from the General Fund; since tolls were abolished in 1884. Recently, a diesel fuel tax was levied to defray part (about 10%) of the expense.

The Corps of Engineers plans and constructs all capacity improvements and operates and maintains channels, locks, and dams. The Coast Guard provides and maintains navigation lights and channel buoys.

Each navigation project and any major expansion measures thereafter must be specifically authorized by Congress. In recent years, because of heightened controversy, Congress has determined to decide even the size of locks. Extensive detailed studies and an Environmental Impact Statement are required for each authorization.

The study-authorization-construction process averages about 20 years. This is because it is highly political and controversial. Authorization bills are not feasible unless there are projects satisfying all regions. Every waterway project is intensely opposed by railroads, sometimes with environmental allies. A single lock now costs $100-200 million. While the Illinois Waterway project cost only $30 million in 1933.

While states are consulted in planning studies, they have no structured role in decisionmaking. However, state governors have had a defacto veto power. The local congressional delegation can oppose a project or fail to support it. So far, Congress has retained the final say and have even reduced the discretionary authority of the Corps of Engineers.

There has never been a national, waterways system plan. As a result, Congressional authorizations and appropriations are based primarily on subjective assessments of system needs. Currently, other than Lock and Dam 26, the entire capital budget is being spent on only three waterways -- Tennessee-Tombigbee Waterway, Red River and Ouachita River.

A first national assessment, the National Waterways Study (NWS), is nearing completion. NWS found a need for 18 new locks in the next 15 years to meet traffic projections on the major waterway segments. None has been authorized and only a few have authorized studies underway.

NWS projected funding needs over the next 30 years at about $30 billion. Yet the Corps of Engineers navigation budget, which had been $850 million per year, is declining rapidly.

Financing has rapidly become the overriding problem on the inland waterways. The budget is inadequate even if all spending is directed by rigorous priorities.

UMRS MASTER PLAN

The Upper Mississippi River System (UMRS) Master Plan was a much more detailed analysis of waterway improvement needs than the National Waterways Study. Locks are the principal capacity constraints on the Illinois River and the Upper Mississippi River. Using conservative demand projections and sophisticated system models, the Master Plan found economic justification for 13 new locks in the next 30 years. They would cost about $2.5 billion.

The first needed is a second lock at Alton. This lock should be online in 1990. The lock would have to be authorized now to allow sufficient time for design and construction to meet the deadline. A capacity expansion program could then continue upstream at Locks 25 through 20 and LaGrange through Lockport.

Both the Federal authorization process and Federal navigation budget are incapable of meeting these needs. As a result, congestion will become increasingly intolerable, causing the waterway hinterlands to shrink as traffic is diverted to railroads. System traffic will top out at about 130,000,000 tons after 1990. By 2010, over 48 million tons of new traffic will be moving on rail that would have moved on the waterways.

INLAND WATERWAY PROBLEMS

While financing is now the overriding problem for the future of waterway transportation, it is not the only problem. Until recently, political, environmental, economic, and technological problems were the major issues. For the most part, they are not resolved but only overshadowed by the declining navigation budget.

Every waterway improvement project is controversial. And, every controversy has political, environmental, economic, and technolgoical elements. The elements are interrelated, so any attempt to categorize and resolve the separate elements may not be satisfactory.

Historically, the most consistent and implacable opponents of waterway improvement projects have been the competing railroads. They do not want waterway competition. The key arguments are:

1. Federal subsidy of waterway projects is unfair competition
2. Economic evalution of Federal waterway projects is wrongly done to their detriment
3. Federal investment costs are excessive for the purpose

More recently, opposition has been augmented by environmental interests composed of fish and wildlife and recreational users and natural areas preservationists. They, too, compete with water transportation. Not for traffic, but for use of the channels, backwaters, wetlands, and shorelands. The key arguments are:

1. Environmental impact analyses are poorly done to their detriment
2. Careless or wanton destruction of fish and wildlife habitats
3. Lack of mitigation of environmental degradation
4. Biased analyses favoring economic interests over environmental interests.

Then there is the inherent opposition of the Office of Management and Budget. OMB opposes the ever growing demand on the budget for waterway projects. At the same time, there are demands on the budget to aid bankrupt railroads. Inevitably, discretionary spending must yield to entitlement programs or defense needs -- the fiscal problem.

Finally, there is substantial Congressional opposition. Many members are persuaded by the potency of railroad and environmental arguments. Many are not satisfied with the allocation of Federal public works spending among regions. Others are dissatisfied with the lack of a plan, objectives, and priorities. Almost all recognize that budget shortages must fall heaviest on discretionary spending of which public works is a large and visible part.

SOLUTIONS

Solutions, or the path to solutions, are known for all the resolvable problems.

Unfair Subsidy. The railroad charge of unfair subsidy may be eliminated by cost recovery user charges. The Section 205 user charge study indicates the trunkline waterways can fully recover costs only losing that marginal traffic they hold as a result of subsidy. Waterway competition will not be eliminated; hence railroad opposition will not be eliminated. But the argument of unfair competition will be gone.

Numerous bills have been introduced in Congress by members and the Administration. Serious discussion is likely and action is possible this session.

Economic Evaluation. The main theoretical issues have been resolved for some time. Evaluation procedures were thoroughly revised by the Water Resources Council in 1979. Methodologies are nearly complete in the form of system models and mode share models. Data collection and evaluation problems will probably be resolved with experience.

The methological and data problems would have been refined if the UMRS Master Plan study had been given a time extension and if the Section 205 study had been fully funded. This must now await a future study.

Excessive investment. Current lock costs seem high in relation to their capacity performance. Corps of Engineers design is little different than that used forty years ago. Numerous advances in the state-of-the-art are untested. Major improvements in performance, known in theory, are not pursued. There is no research and development program on this matter.

Numerous non-structural improvements in the performance of existing locks have been recently identified. But few have been implemented; and, again, there is no research and development program.

Corps plans and designs include features which do not contribute to navigation capacity. A recent Corps cost accounting review determined that as much as 35% of the costs of some navigation projects have nothing to do with commercial waterway transportation.

Environmental impact analyses. Theories and methodologies hardly existed at the advent of NEPA. But the pressure of controversy and lawsuits has caused rapid advances. The impacts of navigation structures, dredging and dredged material disposal are pretty well understood. The impacts of traffic are just beginning to be investigated. A major advance would have been made in the UMRS Master Plan had the study time been extended.

Further advances must await future studies.

Habitat destruction. Destruction of fish and wildlife habitats has been primarily associated with dredged material disposal. The next most important activity has been construction of open channel regulating works.

This is one of the few problems which is receiving considerable research at the Waterways Experiment Station. It is also one of the few waterway problems where states have been the principal complainants. As a result, the Congress subjected Corps of Engineers dredged material disposal to state regulation.

The GREAT studies have contributed greatly to the resolution of these problems. The UMRS Master Plan, building on GREAT, develop improved evaluation methodologies and criteria.

Mitigation of navigation impacts. Work on this problem was to be a major feature of the UMRS Master Plan. Advances in this area nessarily must lag behind better understanding of the cause and effect relations of waterway traffic.

The Master Plan identified backwater sedimentation as the major causitive agent of habitat deterioration. Methods were developed to reduce the effects of sedimentation. Traffic appears to be a minor contributor on Upper Mississippi River but quite significant on Illinois River.

Field testing is the next phase in developing solutions. This is a major recommendation of the UMRS Master Plan.

Econmomic v. environmental values. Ultimately, the tradeoff between the economic value of a waterway improvement and the unavoidable environmental impacts is a legislative question to be decided by Congress. The problem is to provide unbiased information. While economic information can be reduced to dollar quantities, environmental values must be described in other terms.

The WRC and its member agencies have put considerable effort into this problem. Methods, criteria, and information displays have been revised several times. Generally, analysts believe the information is as good and unbiased as they can provide. But no one knows whether decisionmakers use or understand the information.

The record indicates decisionmakers usually favor economic values. Quite possibly they would choose the same no matter how much better or unbiased the information presented. The argument whether the decision is biased or erroneously based on biased information seems insoluable.

Financing. The amount of the General Fund which can be allocated to waterways is already inadequate. Additional waterway construction could require abandoning numerous marginal projects. Even then construction could fall far short of projected needs. The waterway budget has already declined below that level and is projected to decline much farther.

The answer is to take the waterway budget away from the General Fund and establish a method of revenue financing from user charges. This has already been discussed under "Unfair Subsidy."

Authorization. The final problem is to overcome the incredibly long and involved way in which Congress decides what waterway improvement will be undertaken. Authorizations would certainly be easier, faster, and better if all the problems which were discussed above were solved before the proposal came to Congress.

But many key members and staff despair that this is enough. Each authorization will still confront railroad and environmental opposition though disarmed of potent arguments. The Congressional perception of regional equity will remain though diminished if General Funds are not used. Especially, they despair of Congress' ever setting objective priorities.

The priority problem seems to be the main, and perhaps only, reason there is so much Congressional interest in deep-draft port user charges. The favored solution is to transfer the decision problem to the local port authority. This solution has not been suggested for inland waterways.

The solution seems to be to delegate improvement decisionmaking to the Secretary of the Army or Corps of Engineers. In other words, provide the Corps with a standing authority to maintain and improve the existing waterway system with user charge revenues. This is the same approach used for the Tennessee Valley Authority, the Federal Highway Administration, the Federal Aviation Administration, the EPA construction grants program, and many others.

Although they have never done so, the Corps can conceivably develop and maintain a national waterway system plan. And, consulting with commercial waterway users, they can set objectives and priorities. And, as long as these users are willing to pay, why isn't this enough?

STATE ROLE

While states may have opinions on inland waterway issues, they have no formal role. The waterways are Federal waterways. All decisions are made by Congress.

Illinois will suffer from the collapse of the Federal waterway program which has already started. Likewise, Illinois will benefit if the program can be restored and needed improvements resumed. The solutions which Illinois should encourage the Congress and Corps of Engineers to undertake have been presented.

INFORMATION PAPER ON
DEEP DRAFT NAVIGATION

DEEP DRAFT COMMERCE

Among the states, Illinois is always a leading agricultural producer, a leading manufacturer, and a leading exporter. All three leadership positions depend on deep draft commerce. This is the commerce conducted by ships on the oceans and Great Lakes.

Corn and soybeans are the major crops of Illinois. Two-thirds of the production is exported to world markets through the lower Mississippi ports of Baton Rouge and New Orleans. Thus, New Orleans is one of Illinois' most important ports.

Primary iron and steel production and manufacturing depending on steel are specialties of the lower Great Lakes region from Chicago to Cleveland. The largest concentration of steel production in the world is here, because of abundant sources of iron ore, coal, and limestone plus, low cost shipping of the raw materials to lakeside blast furnaces with Great Lakes bulk carriers. The bulk carriers are equally efficient in moving coal to lakeside powerplants, portland cement and the raw materials for making cement.

Interlake bulk material commerce is the principal business of Waukegan, Chicago and Calumet Harbors on Lake Michigan. Steel mills are concentrated at Calumet Harbor and the Indiana ports at Indiana, Gary and Burns Harbor. All have access to foreign markets via the St. Lawrence Seaway but the volume of general cargo is much smaller than bulk materials.

Most Illinois exports and imports of general cargo move through oceanside ports. Montreal and Quebec handle a large part of Illinois container movements. For American ports, exports move primarily through ports in the New York custom district with the remainder equally divided among ports in the Baltimore, New Orleans and San Francisco districts. While imports arrive primarily at Chicago with the remainder equally divided among the New York, Baltimore, New Orleans and Los Angeles custom districts.

GENERAL PROBLEMS

Port capacity is ample at New Orleans for Illinois grain exports. General cargo capacity at American and Canadian coastal ports is generally excessive. This has resulted in intense competition which generally benefits Illinois trade. But one consequence is that very little foreign trade now moves through Chicago or any other Great Lakes ports.

Meanwhile, primary iron and steel production on the Great Lakes is stagnating. And, steel dependent industries such as automobiles and shipbuilding have declined dramatically. The weaknesses of interlake bulk commerce and seaway foreign trade are essentially economic in terms of national and international markets and competition.

Steel furnaces and mills are so old and inefficient that products have lost all foreign markets and are now losing domestic markets. In 1979, Great Lakes mills produced about 64 million tons of iron and steel; yet there was also a net importation of 3 million tons of foreign steel into the lakes by ship. The obsolescence hurts related industries, such as automobiles, which are also confronting intense foreign competition.

So deep draft navigation issues for Illinois mainly concern the Great Lakes and St. Lawrence Seaway and the region's weakening industrial base.

For the navigation sector, the only help that can be given is to further improve transport efficiency to lower transportation costs. But this is very difficult, because Great Lakes bulk cargo movement is already one of the most efficient systems in the world. And, scale economies in Seaway shipping are limited by the Seaway locks and channel depths.

GREAT LAKES ISSUES

The variety of economic, distributional, and navigation issues can be seen from the following list assigned to committees of the Great Lakes Commission.

- o Seaway debt and tolls
- o Season extension, winter navigation
- o Port development
- o Great lakes container feeder study
- o Inland transportation (rail and truck)
- o Port dredging and dredged material disposal
- o Port and vessel user charges
- o Pilotage
- o U.S. Flag vessel service
- o Vessel construction and operating subsidies
- o System-wide marketing
- o Government preference cargoes
- o Foreign embargoes
- o Trigger price mechanism

Only a few of these can potentially reduce the real economic cost of transportation. On the landside, better terminal facilities and intermodal connections can speed cargo throughput. On the waterside, winter season extension and container feeder service can lower navigation costs. Also important, are system-wide marketing, lock congestion and vessel modernization. These navigation issues will be discussed briefly.

SYSTEM-WIDE MARKETING

International waterborne commerce via the Great Lakes/St. Lawrence Seaway System has been on the decline for the past decade, but a new cooperative venture on the part of the Great Lakes maritime industry is occurring in an effort to revitalize oversea shipping. Specifically, ports, states, port labor groups, shippers and vessel operators are combining their resources in the creation of the Great Lakes Cargo Marketing Corporation (GLCMC).

The Great Lakes were designed by Congress as the Nation's "Fourth Seacoast" in the 1970 amendments to the Merchant Marine Act. While the Great Lakes were afforded official recognition along with the East, West and Gulf coasts, the Great Lakes maritime industry has experienced a severe reduction in the number of vessel sailings and in the tonnage handled at the Great Lakes ports since the passage of the Act. Overseas shipping on the Great Lakes has declined to the point where in 1981, of a total of 1,400 U.S. flag vessel sailings to and from U.S. ports, only six or less than one-half of one percent originated or terminated at Great Lakes ports. One of the primary factors which has caused the decline has been the diversion of high value container shipments from the Great Lakes ports to ports on other coasts.

Recognizing that the marketing efforts of individual ports or states have not been successful in reversing this decline, a system-wide marketing organization is proposed as a means to better utilize available resources to promote and improve the entire Great Lakes navigation system. The start-up of the GLCMC is scheduled for January 1, 1983.

SEASON EXTENSION

While some iron ore is imported from Laborador via the Seaway, most still originates at the head of Lake Superior. This ore must pass through the locks at Sault Ste. Marie on its way to lower lakes blast furnaces.

Hematite ore is wet and cannot be shipped beyond mid-December because of freezing problems. Historically, the Sault has been closed on December 15 and re-opened in April. Oreboats are laid up for the winter and steel mills must maintain huge stockpiles of ore to carry them through the winter.

Nowadays, most ore is dry, concentrated taconite. This can be shipped year-round if there is a mild winter. In normal winters shipping must stop by late January unless there is icebreaker assistance. So another 4 to 6 weeks of shipping is possible at very little additional government cost.

Modest investments in icebreakers and shore works can gain some more time. But year-round navigation in severe winters is prohibitively expensive.

The cost savings from season extension arise from: 1) more payloads per ship, 2) lower stockpiling requirements and inventory costs, and 3) reduced lock congestion.

CONTAINER FEEDER SERVICE

The largest container ships cannot enter the Great Lakes because of Seaway size restrictions. And, seaway-size container ships have had difficulty maintaining scheduled service and securing enough containers.

A potential solution is to feed containers to Montreal or Quebec with frequently scheduled smaller vessels. Containers would then be transhipped to large, oceangoing vessels. Hopefully, this service would attract enough customers to institute direct service with Seaway class vessels.

Large volumes of containers already move from the midwest through Montreal and Quebec via a truck-rail service. A ship service should be able to compete and capture some of these containers as well as those moving through Atlantic ports.

This is especially important to Illinois where the state and the Chicago Regional Port District have invested in a modern container terminal on Lake Michigan at the mouth of the Calumet River.

LOCK CONGESTION

The Welland Canal locks are operating near capacity causing high delay costs. The Canadian government is studying the costs to construct additional larger locks.

Meanwhile, throughput can be increased by increasing tonnage per lockage. This can be achieved by using lock-size vessels, full loads, and attracting backhauls. For example, empty oreboats returning to Laborador might be loaded with outbound grain or coal or a deckload of containers.

Season extension also increases effective capacity.

SHIP MODERNIZATION

Until the new Poe Lock was opened at Sault Ste. Marie, the largest bulk carriers were 730 footers with a capacity of 26,000 tons. Now, a new class of 1000 footers is being built with twice the capacity. In addition to the big gain in scale economy, these new ships have the following features:

- o Hull reinforcing for ice navigation
- o Modified bow for lower wavemaking resistance
- o Ducted propellers for greater thrust efficiency
- o Diesel power for lower operation and maintenance costs
- o Bow and stern thrusters for faster maneuvering at docks and locks and in confined channels
- o Self-unloading equipment for faster turnaround and lower terminal costs
- o High capacity ballast pumps for faster loading

Together these features mean greater loads per trip and more trips per year with a lower crew cost and less fuel per ton-mile.

GREAT LAKES COMMISSION

Illinois' concerns in the Lakes and Seaway are addressed by direct involvement in the Great Lakes Commission. The Commission and its standing committees work closely with shippers, port authorities, and government agencies. The Commission is effective in presenting a unified state view to Congress. The Commission also promotes a regional view on such distributional issues as Seaway financing, user charges, preference cargoes, and ship subsidies.

TABLE I

PORT OF CHICAGO - TONNAGE STATISTICS

1975 - 1979

(In short tons of 2,000 pounds)

	FOREIGN		DOMESTIC		
YEAR	CANADA	OVERSEAS	LAKES	INLAND RIVER (Barge)	TOTAL
1975	2,446,351	2,173,873	14,197,686	23,771,148	42,589,058
1976	4,078,384	2,785,369	12,862,506	20,848,265	40,574,524
1977	2,958,152	3,185,922	11,005,591	18,986,483	36,136,148
1978	4,025,770	3,613,225	14,916,972	17,134,755	39,690,722
1979	5,188,041	3,327,543	12,959,162	17,218,242	38,692,988

Source: U.S. Army Corps of Engineers, Waterborne Commerce of the Unied Sttaes, Part 3, Waterways and Harbors Great Lakes, calendar years, 1975, 1976, 1977, 1978 and 1979

NOTE: It should be noted that despite the increase in overseas tonnage from 1975-1979, there has been a marked decrease since then as a result of downturn in world economy, imposition of trigger price mechanism, and grain embargo on USSR.