

CLEARING THE FOG ABOUT FERRIES

National Study to Shed New Light

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One of the oldest modes of transportation in the United States is experiencing a renaissance. Before trains, buses, cars, or airplanes, the waterways provided our earliest transportation corridors. Travelers on land often had to find a way to cross rivers, lakes, and harbors. Ferries were the solution. At first, it was a simple craft, often little more than a log raft propelled by poles or pulled across a river by ropes. Later, the vessels evolved, adopting the latest technological advances.

By the end of the 19th century, at the pinnacle of ferry operations, New York City moved more than 200 million passengers a year on 50 different ferry routes; San Francisco ferries carried similar numbers. In 1880, the Brooklyn Bridge opened, followed by the construction of more and more bridges and tunnels during the next few decades. By 1964, the Verrazano Narrows Bridge linked Brooklyn and Staten Island,

spanning one of the last gaps in the system of roads and bridges connecting New York City's five boroughs and New Jersey. The only commuter ferry line still operating was the Staten Island Ferry, between Staten Island and Manhattan—the distance separating the two boroughs was too great to bridge cost-effectively.

What was happening in New York was mirrored in other parts of the country that had relied on ferries. However, just as ferries were dismissed as no longer feasible except if distances were too long or traffic was too light to warrant construction of a bridge, they began a comeback. At first, the shift was too small to detect, but as the momentum increased it could no longer be overlooked.

Staging a Comeback

Why did ferries make a comeback? The three reasons likely having the greatest impact were



Oldest continuously operating ferry service in United States crosses Connecticut River between Rocky Hill and Glastonbury. Service dates back to 1769.



Redeveloped waterfronts, like Rowes Wharf in Boston, make metropolitan ferry service more attractive.

- ◆ Major technological advances, particularly increasing speeds;
- ◆ Rediscovery and redevelopment of harbors and waterfronts; and
- ◆ Increased traffic congestion and the difficulty and cost of constructing major bridge and tunnel projects in an urbanized environment.

First Signs of Recovery

One of the first signs of recovery surfaced in the New York metropolitan area. Ports had been shifting much of their operations away from the central cities to locations with access to interstate highways and

major rail lines. The revolution in containerization also reduced the need for warehousing and other industrial activities that had clustered around seaports. As these vacated waterfront properties deteriorated, opportunities for redevelopment emerged. Efforts to improve water quality also made living on or near a waterfront attractive to many.

Adding to this renewed interest was the availability of premium amenities: scenic views, recreational boating, and jogging or bicycling along waterfront promenades. The New Jersey waterfront across the Hudson River from Manhattan offered all of these. The availability of inexpensive land close to



New York Waterway has operated ferry services across Hudson River from New Jersey points to Manhattan in New York City since the early 1980s, pioneering the renaissance of the ferry.

Fast Ferry in Action Crossing Maine's Gulf by Cat

One of the highlights for vacationers in Maine or Nova Scotia, Canada, is a trip by fast ferry across the Gulf of Maine. There are three ways of getting from Bar Harbor, Maine, to Yarmouth, Nova Scotia:

- ◆ Drive up the coast of Maine, cross into New Brunswick, Canada, and continue along the coast until reaching Nova Scotia. Then drive down the coast of Nova Scotia to Yarmouth. In all, the trip covers more than 600 miles.
- ◆ Drive to Portland, Maine, and take the overnight cruise ferry to Yarmouth.
- ◆ In Bar Harbor, Maine, board *The Cat*, the high-speed ferry, and sail directly across the Gulf—this cuts the trip by about 400 miles, and the crossing takes only 2 hours 45 minutes.

The Cat is a state-of-the-art vessel built in Australia. It carries 900 passengers and 240 vehicles; its speed approaches 50 knots. It is powered by four engines capable of producing 38,000 hp. The engines are water jets, shooting out a tail 20 feet high and 50 feet long at full speed on the Bay of Fundy's open waters.

Before acquiring *The Cat*, Bay Ferries operated a conventional vessel that made the crossing in 6 hours; each vessel could make only one daily round trip. *The Cat* makes two round trips per day, and the number of passengers has doubled since it began operating. The same model of ferry is under consideration for longer coastal routes and for crossing the Great Lakes.



The Cat is North America's first high-speed catamaran, travelling up to 50 knots.

Manhattan soon fueled a real estate boom in apartment and condominium developments. A contemporary joke was that you could pay an exorbitant rent to live in Manhattan and have a view of Hoboken, or you could live in Hoboken for an affordable one-third of the rent and have a clear view of the Manhattan skyline. A developer then added a new amenity to attract customers to the New Jersey side—ferry service to midtown Manhattan.

New York Waterway began operations in the mid-1980s and with its success started to add more and more routes. Three other ferry companies now have begun service, and together all four companies transport more than 30,000 passengers daily on 15 routes serving Brooklyn, Hunters Point, La Guardia Airport, Yankee Stadium, and Shea Stadium in New York; and

Weehawken, Jersey City, Hoboken, and Atlantic Highlands in New Jersey. To accommodate this resurgence in ferry operations, New York City is developing multiuser terminals at several Manhattan locations on both the Hudson and the East Rivers.

Technological Advances

Changes in technology also have played a major role. Advances in designs, materials, navigation systems, and propulsion systems have resulted in ferries that operate at high speeds with relatively small wash and wakes. Many of these advances originated in Australia, after the collapse of a bridge on the island of Tasmania necessitated the introduction of ferry services. Tasmania already had some shipbuilding industry, and the local shipyards began not only to

produce the ferries needed but to improve on their design. Soon companies like Incat and Austal were providing ferries for the worldwide market. Incat's 91-m-long *Tasmania* now holds the speed record for an Atlantic Ocean crossing, averaging more than 40 knots.

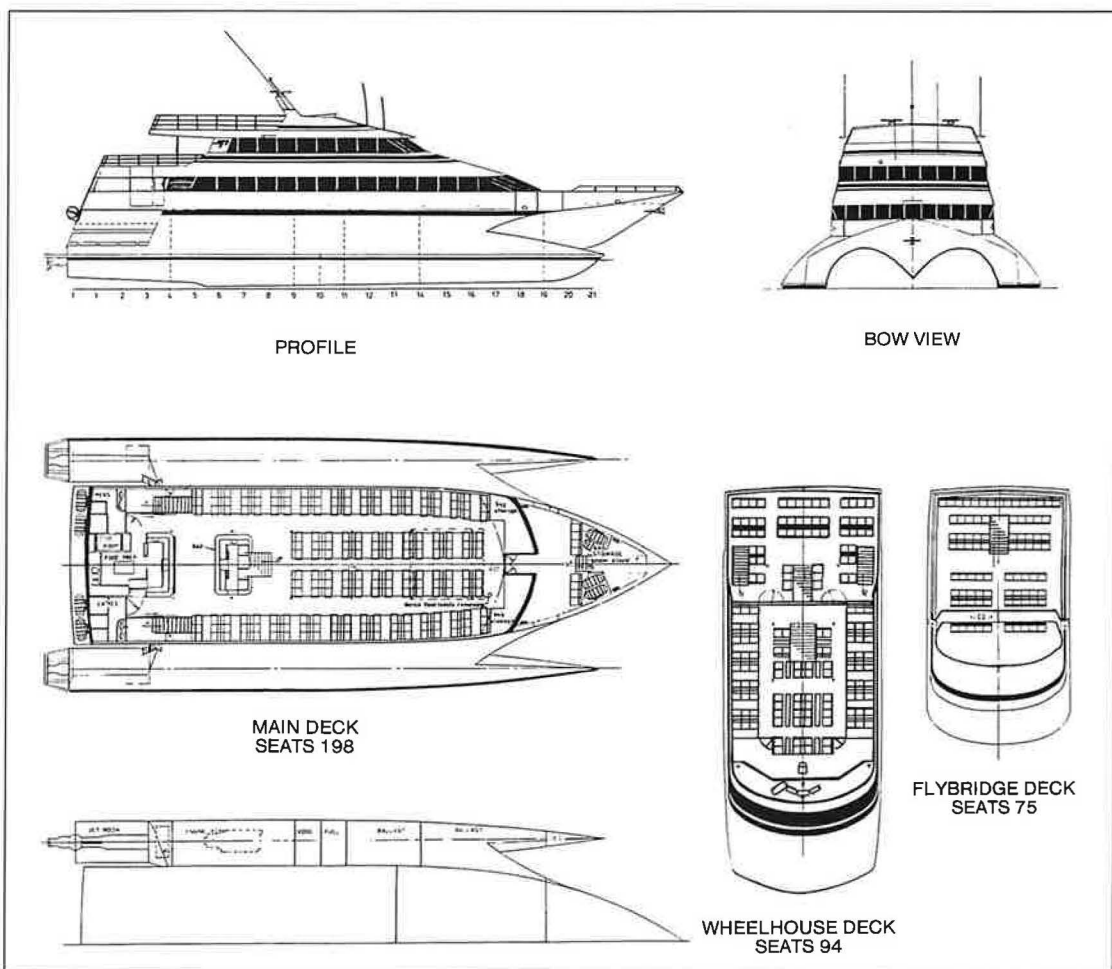
Coping with Growth

Finally, although traffic congestion continues to grow in many of our urban areas, opposition also grows to major new projects like bridges and tunnels. Armed with environmental challenges, citizen groups have halted or delayed large new projects with increasing regularity. In the Washington, D.C., metropolitan area, efforts to replace the Woodrow Wilson Bridge have been tied up in the courts for more than 10 years despite widespread support from Congress, the states of Virginia and Maryland, and most local officials.

The state of California is anticipating an increase in population over the next 20 years that would be the equivalent of the current population of Florida. Since most Californians already live near the coast, areas like San Francisco are going to be challenged as never



Technologically advanced fast ferries like the new TriCat model have contributed to a ferry comeback.



Sketch of the Wave Piercer Catamaran, showing the seating capacity of a high-tech, catamaran-style fast ferry, similar in design to models pioneered by Australian shipbuilders.

NICHOLS BROTHERS BOAT BUILDERS

before to find ways to accommodate growth. The Metropolitan Transportation Commission (MTC) projects a 250 percent increase in Bay Area traffic by 2020. If new bridges or tunnels cannot be built, other solutions are needed. The Bay Area is considering massive investments in ferries as one of the solutions. Interest in the potential of ferries also has increased as a result of their role in transporting people during such recent emergencies as the earthquake and transit strikes.

The Bay Area Water Initiative, a task force created by the California legislature, has proposed a regional plan that would expand ferry service throughout the Bay Area. Phase I of the plan would introduce up to 75 more vessels and 28 new terminals, achieving capacity to move 15 million to 20 million passengers per year (four to five times current levels). In Phase II, up to 125 vessels operating from 35 to 40 terminals would move 25 million to 30 million passengers per year, or 7 to 10 times current levels.

Federal Funding

Several developments at the federal level could support these and other efforts stemming from increased interest in ferry transportation. In 1991, the Intermodal Surface Transportation Efficiency Act (ISTEA) required states to develop transportation plans and

programs for all modes. At the same time, ISTEA provided funding—and the flexibility to use current program funds—for ferries. For example, the new National Highway System (NHS) provided connections to all major intermodal terminals, including 59 ferry terminals. Surface Transportation Program funds could be used for transit purposes including ferries. The Congestion Mitigation and Air Quality program (CMAQ) provides funds for projects that can have a positive impact on improving air quality. ISTEA also allocated funds directly to ferries under a new Ferryboat Discretionary Program.

During the deliberations for the major transportation act succeeding ISTEA, the Transportation Equity Act for the 21st Century (TEA-21), there were several requests for increased funding for ferry projects. But because there was so little information available about this mode of travel, it was difficult for Congress to evaluate the requests. The numbers for ferry operations and passengers were uncertain. This knowledge gap probably was due to the industry's unique structure. State or local public transportation agencies operate some ferry systems, but many others are privately owned and operated. Complicating the picture is that many operators not only provide ferry services but also dinner and sightseeing cruises as well as whale watching and other excursions.

Multimodal Terminal Model Transportation “Big Top”

Ferries have been crossing Long Island Sound for more than 150 years. Legendary circus impresario P.T. Barnum was one of the early investors in the Bridgeport–Port Jefferson Steamship Co., which operated a ferry service between Bridgeport, Connecticut, and Port Jefferson on New York's Long Island.

During the past several years, Bridgeport has undertaken projects to improve its terminal, provide parking, and renovate its waterfront. Using a combination of Ferryboat Discretionary funds, Federal Transportation Enhancement funds, and Surface Transportation Program funds, along with a substantial amount of state and local aid, the city constructed a new terminal and parking garage, along with pedestrian facilities, other dock improvements, and a boardwalk. It also constructed a truck access road to the ferry dock. After completion, there will be a seamless link among ferries, Amtrak, and the bus transit system.



New multimodal terminal is just one of the changes undertaken by Bridgeport, Connecticut, to improve its ferry service.

National Ferry Study

To gain a better perspective, Congress included a provision (Section 1207c) for a National Ferry Study by the U.S. Department of Transportation (U.S. DOT). The study will compile a detailed inventory of all ferry operations. It also will report on the potential for new ferry operations, fast ferry operations, and alternative fuels. This last task—of particular interest to California because of its air quality problems—probably will become more important as the Environmental Protection Agency promulgates emission standards for the marine environment.

Since there are no agencies within U.S. DOT with exclusive responsibility for ferries, the Federal Highway Administration (FHWA)—whose active ferry projects have been obscured by the scope of its other initiatives—was asked to take the lead on this study. FHWA shares jurisdiction over ferries with the Federal Transit Administration (FTA), the Maritime Administration (MARAD), and the U.S. Coast Guard (USCG).

In the past, FHWA always had considered ferries a viable alternative for connecting federal roads when bridge or tunnel construction was too expensive; however, it has expanded that view, as it now administers the Ferryboat Discretionary Program and coordinates the ferry study. In brief, FHWA's study partners have the following involvement with ferries: FTA provides capital and operating funds for ferry operations, particularly in urbanized areas; MARAD helps finance the construction of vessels; and USCG is responsible for marine safety.

After reviewing the information available on ferry systems and defining the parameters of the study, the agencies began work in earnest early this year. U.S. DOT's Volpe National Transportation Systems Center in Cambridge, Massachusetts, contracted to survey the 222 ferry operators identified; completion of the survey is scheduled for July 2000, when analysis of the results will begin.

Concurrently, focus groups of ferry operators and public transportation agency representatives are evaluating the potential for new or fast ferry operations. Preliminary findings have identified a need to coordinate and integrate ferry systems with other modes of transportation. In addition, many of the impediments to new services result from local—rather than state or federal—conditions and regulations. Operators first must resolve the landside issues related to terminal location and to passenger arrivals and departures before making decisions about vessel acquisition and operation.

Fast Ferries

The potential for fast ferries is well established—they have operated throughout the world for the past

The National Ferry Study will compile a detailed inventory of all ferry operations and report on the potential for new ferry operations, fast ferry operations, and alternative fuels.

20 years. Each year, new designs emerge, power plants improve, and speeds increase. At first, the United States lagged behind other nations, but this is changing. American shipyards have obtained licensing agreements from foreign shipbuilders and now are producing state-of-the-art vessels; 14 fast ferries are now under construction in the United States.

But speed comes at a price. Fast ferries cost considerably more to operate than conventional ferries, and the time savings must be considered in the context of the entire trip. Unless passengers can embark and disembark quickly and can transfer to another mode with a minimal wait, the time savings can

Alternative Fuel Pioneer Paddle Wheels and Natural Gas

The Virginia seaport cities of Norfolk and Portsmouth are undergoing major redevelopment of their downtown areas after years of neglect. In each case, the downtown's proximity to the waterfront has been key, and the redevelopment has been extensive—not only removing decaying docks and warehouses, but replacing them with museums, ballparks, shopping malls, condominiums, townhouses, and office buildings.

A ferry system operated by the Hampton Roads Transit Authority (HRTA) links the two cities, separated by the Elizabeth River. The ferries are conventional, but HRTA chose an old-fashioned paddle-wheel design to attract tourists. One of the three ferries operates exclusively on natural gas.

After learning about the local gas company's pilot program to explore the potential for natural gas as a transportation fuel, HRTA considered operating one of its ferries with natural gas. Until then, there were no ferries operating on natural gas exclusively—although some in British Columbia used natural gas, they also relied on diesel fuel.

To be practical as a transportation fuel, natural gas must be either compressed (CNG) or liquified (LNG); it must have large storage tanks, which raises safety concerns. CNG must be kept at high pressure, requiring high-pressure fittings and relief valves; LNG may be the more volatile of the two. Before certifying the HRTA vessel, the Coast Guard carefully reviewed all elements of the design, since industrial standards are still evolving for CNG. The CNG-fueled vessel is now in service daily and has been a success.

evaporate. The advantages of fast ferries become more apparent when the route exceeds 7 miles.

Although fast ferries have proved highly successful, they have critics. The effects of fast ferries' washes and waves on shoreline erosion as well as their impact on wildlife have become issues. Nonetheless, the waves are small, considering the ship speeds; but the waves do have unique energy characteristics, which are the subject of studies under way in the United States and Europe. Another concern is safety. Although ferries have been one of the safest modes of transportation, this could change with increased speeds. USCG is holding hearings to improve the management of marine traffic on congested waterways.

Alternative Fuels

It is difficult to assess the potential for vessels powered by alternative fuels because so few are in operation. The most likely candidates are probably compressed natural gas (CNG) or liquid natural gas (LNG), as well as hydrogen fuel cells. Fuel cells are still experimental, but there are a few vessels operating on natural gas. Moreover, the transit industry is

relying more and more on natural gas. About 20 percent of new buses operate on CNG or LNG, and their performance can be instructive.

Two transit agencies in California, Sacramento Regional Transit District and the SunLine Transit Agency, now rely on natural gas; although their initial investment was considerable, engine performance has improved and less maintenance is needed. After 7 years of operation, the overall cost of the natural-gas-powered buses was less than that of conventional models.

Improved Understanding

Although ferries cannot solve all of the problems of increased traffic and congestion in large metropolitan areas adjacent to rivers, lakes, bays, and coastal areas, they can help. Ferries also can help to revitalize deteriorated waterfront properties that are in transition from port and industry activities into residential and entertainment centers. This will require improved understanding of the potential for ferries as well as improved means for integrating this mode into the transportation system. The National Ferry Study will begin this process.

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