

GAO

Briefing Report to the Chairman,
Subcommittee on Surface
Transportation and Merchant Marine,
Committee on Commerce, Science and
Transportation, U.S. Senate

April 1995

AMTRAK'S NORTHEAST CORRIDOR

Information on the Status and Cost of Needed Improvements





United States
General Accounting Office
Washington, D.C. 20548

**Resources, Community, and
Economic Development Division**

B-260935

April 13, 1995

The Honorable Trent Lott
Chairman, Subcommittee on Surface
Transportation and Merchant Marine
Committee on Commerce, Science and
Transportation
United States Senate

Dear Mr. Chairman:

The Northeast Corridor—from Washington, D.C., to Boston, Massachusetts—serves more than 100 million passengers per year and is the most heavily used passenger train corridor in the United States. The corridor is used by the National Railroad Passenger Corporation (Amtrak), eight commuter railroads, and four freight railroads. Since 1976, the federal government has invested more than \$3 billion to provide high-speed passenger service throughout the corridor.

Amtrak acquired ownership of most of the right-of-way along the Northeast Corridor from the bankrupt Penn Central Railroad through the Regional Rail Reorganization Act of 1973 and the Railroad Revitalization and Regulatory Reform Act of 1976. As part of the 1976 act, the Congress established the Northeast Corridor Improvement Project (NECIP) and set a goal of achieving scheduled passenger rail service in 3 hours or less between New York City and Boston, and in 2 hours and 40 minutes between New York City and Washington.¹ Although Amtrak began offering service in 2 hours and 40 minutes in 1983, it has continued to improve the south end of the corridor. Amtrak is now improving the north end—in particular, installing an electric traction system—so that it can offer service in less than 3 hours by 1999. Amtrak recently created a Northeast Corridor Strategic Business Unit and made it responsible for completing the construction of and operating the corridor.

This briefing report responds to your request that we provide you with interim information on the status of Amtrak's Northeast Corridor improvements to facilitate high-speed operations in the north end of the corridor and on capital investment needs throughout the corridor. Specifically, we are providing information on (1) the ownership and usage of, and operations over, the corridor; (2) the projects and costs associated

¹Since 1976, Amtrak has received a separate appropriation, in addition to an appropriation for general capital projects, for this project.

with improvements to allow high-speed operations on the north end of the corridor; and (3) the capital investment needed in the south end of the corridor. This report summarizes the information we provided to your staff during a briefing on April 6, 1995.

In summary, we found the following:

- Although Amtrak owns about 85 percent of the right-of-way along the Northeast Corridor between Washington and Boston,² it is a relatively small user of the corridor. Three state commuter rail authorities own the remaining portion. Seven commuter railroads operate about 91 percent of the passenger trains that use the corridor each year.³ However, these users' operations are generally very localized, whereas Amtrak uses the corridor in its entirety.
- By 1999, Amtrak will invest about \$1.6 billion in improvements to the north end of the corridor to implement high-speed service (in less than 3 hours) between New York and Boston. This investment includes about \$360 million to electrify the track, \$600 million to purchase and maintain high-speed trainsets, and \$640 million to install high-speed features on components of the right-of-way, such as interlockings, signals, and ballasted and/or movable bridges. In addition, according to the Federal Railroad Administration (FRA), to minimize the impact of the new high-speed service on commuter and freight railroads, Amtrak will need to invest about \$600 million after 1999 to improve the capacity of the right-of-way by constructing additional track and/or sidings. It will also need another \$1 billion after 1999 to replace and/or rehabilitate aging components of the right-of-way, such as bridges, tunnels, track, and facilities.
- Amtrak now estimates that it needs at least \$2.5 billion to rehabilitate the south end of the corridor, which has been used for high-speed operations since 1983. The infrastructure on this portion of the corridor has deteriorated; major capital needs include replacing the electric traction system, installing concrete ties and replacing and/or installing continuous welded rail, replacing worn and outdated interlockings, replacing bridges, and replacing highly specialized maintenance-of-way equipment. Amtrak has allocated \$115 million of its \$200 million NECIP appropriation for fiscal year 1995 toward meeting these needs.

²This percentage includes the Amtrak-owned "nonspine" segments of the corridor from Philadelphia to Harrisburg, Pennsylvania, and from New Haven, Connecticut, to Springfield, Massachusetts.

³An eighth railroad—not included in the 91 percent—operates over one bridge owned by Amtrak.

Section 1 of this briefing report provides more detailed information on the ownership and usage of the Northeast Corridor. Section 2 provides information on the status and funding needs of the NECIP (to implement high-speed service) and information on the capital investment needed to return the corridor to a state of good repair.

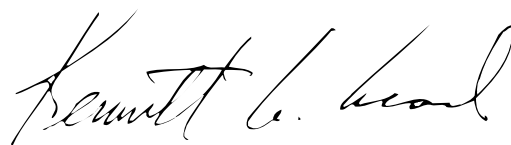
We collected data and interviewed officials from Amtrak's Northeast Corridor Strategic Business Unit in Philadelphia, Pennsylvania, and Amtrak's Northeast Corridor High-Speed Rail Improvement Project (NHRIP) Office in Old Saybrook, Connecticut; FRA; and the Federal Transit Administration. We also interviewed officials of the following commuter and freight railroad users of the Northeast Corridor: the Massachusetts Bay Transportation Authority (MBTA), Connecticut Department of Transportation (CDOT), Metropolitan Transportation Authority of New York (MTA), Metro North Commuter Railroad (Metro North), Long Island Railroad (LIRR), Port Authority Trans Hudson Corporation (PATH), New Jersey Transit (NJT), Southeastern Pennsylvania Transportation Authority (SEPTA), and Maryland Rail Commuter Service (MARC). We performed our work between October 1994 and April 1995 in accordance with generally accepted government auditing standards.

We discussed a draft of this briefing report with officials in Amtrak's Northeast Corridor Strategic Business Unit, including the Chief Executive Officer, Vice President of Finance, and Chief Engineer. We also discussed the report with the Chief of FRA's Passenger Service Division. These officials generally concurred with the information presented in the briefing report but provided revised data on the number of track and route miles owned by Amtrak and other commuter railroads, as well as on the number of trains operated over the corridor's right-of-way. We revised the report to respond to their comments as appropriate.

We are sending copies of this report to the Secretary of Transportation, the Administrator of FRA, and the President of Amtrak. We will make copies available to others on request.

Please contact me at (202) 512-2834 if you or your staff have any questions. Major contributors to this briefing report are listed in appendix I.

Sincerely yours,

A handwritten signature in black ink, reading "Kenneth M. Mead". The signature is written in a cursive style with a large, stylized "K" and "M".

Kenneth M. Mead
Director, Transportation Issues

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Abbreviations

CDOT	Connecticut Department of Transportation
CETC	Centralized Electric Traffic Control system
FRA	Federal Railroad Administration
LIRR	Long Island Railroad
MARC	Maryland Rail Commuter Service
MBTA	Massachusetts Bay Transportation Authority
MTA	Metropolitan Transportation Authority of New York
NECIP	Northeast Corridor Improvement Project
NHRIP	Northeast High-Speed Rail Improvement Project
NJT	New Jersey Transit
PATH	Port Authority Trans Hudson Corporation
SEPTA	Southeastern Pennsylvania Transportation Authority
SBU	Strategic Business Unit
SLE	Shore Line East

Ownership and Usage of the Northeast Corridor

GAO History of Amtrak's Role in the Northeast Corridor

- Public Law 89-220, September 1965
 - Regional Rail Reorganization Act of 1973
 - Railroad Revitalization and Regulatory Reform Act of 1976 (4R Act)
-

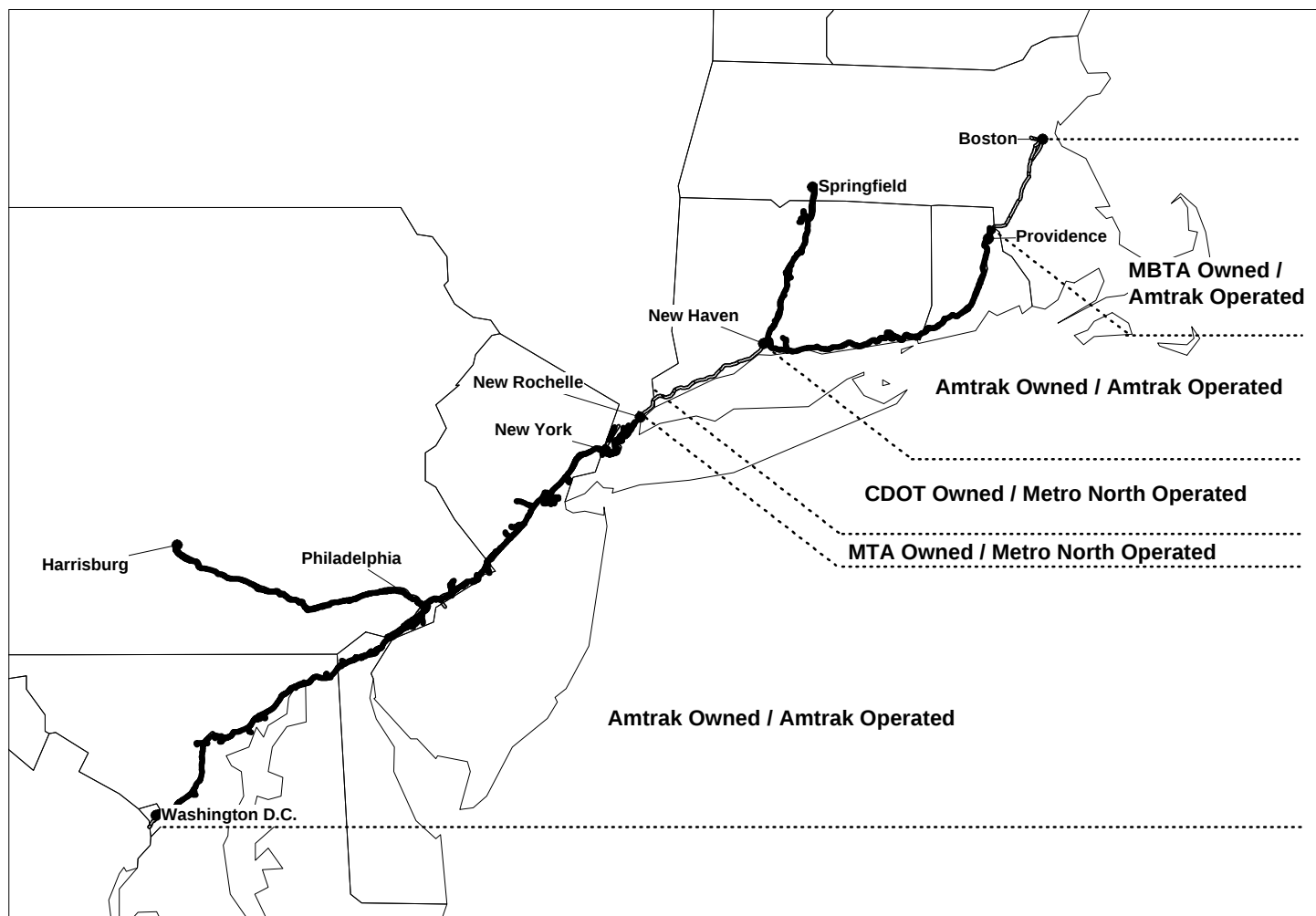
Under Public Law 89-220, the Congress in 1965 authorized the Secretary of Commerce to contract for demonstrations to determine how high-speed ground transportation could contribute to making intercity transportation systems more efficient and economical. According to the Federal Railroad Administration (FRA), these demonstrations occurred between New York City and Boston and between New York City and Washington, D.C., and led to the introduction of the first Metroliner service in the late 1960s.

At that time, however, the rail industry was rapidly failing. Under the Regional Rail Reorganization Act of 1973, the Congress found that essential rail service in the northeast region of the United States was insolvent and that this problem could be resolved only with substantial federal action. The act provided for the identification of a rail service system and set goals such that, among other things, the system would be adequate to meet the needs of the northeast region and high-speed rail passenger service would be improved in the Northeast Corridor. This second goal was to be accomplished by transferring the Northeast Corridor rail properties owned by railroads then in bankruptcy (primarily the Penn Central Railroad) to Amtrak.

The Congress more clearly defined Amtrak's role in the Northeast Corridor when it passed the Railroad Revitalization and Regulatory Reform Act of 1976 (the 4R Act). As a result, Amtrak became the primary owner of the railroad rights-of-way in the Northeast Corridor. The act also created the Northeast Corridor Improvement Project (NECIP). NECIP's goal was to achieve regular high-speed passenger rail service on the Northeast Corridor between Washington, D.C., and Boston, Massachusetts. The act authorized \$2.5 billion in federal funding for this purpose. The responsibility for implementing NECIP initially rested with FRA, but the responsibility for managing the project was transferred to Amtrak in 1985.

Briefing Section 1
Ownership and Usage of the Northeast
Corridor

Definition of the Northeast Corridor



Although definitions of the Northeast Corridor vary, we have defined it for this briefing report as the main line rail right-of-way between Washington, D.C., and Boston, Massachusetts,⁴ that is owned and/or operated by Amtrak and others, as well as the branch lines from Philadelphia to Harrisburg, Pennsylvania, and from New Haven, Connecticut, to Springfield, Massachusetts, that are owned by Amtrak. These are commonly referred to, respectively, as the “spine” and “nonspine” segments of the corridor. Under the 4R Act, as amended, these segments make up the passenger rail corridor to be improved under NECIP.

The 4R Act mentions the route between New York City and Albany, New York. However, because Amtrak owns only 10.8 miles on this route and does not operate the right-of-way, we have not defined the Albany extension of the spine as part of the corridor in this report. Similarly, although the 4R Act was amended to include the branch line from Philadelphia, Pennsylvania, to Atlantic City, New Jersey, this track is not owned by Amtrak and, as of April 1995, will have no Amtrak service.

Since Amtrak’s recent reorganization into strategic business units (SBU), the Northeast Corridor SBU manages all Amtrak service on the corridor and includes service from Washington, D.C., to Richmond, Virginia. We have not included the service operating south from Washington, D.C., in this report because the service (1) operates primarily in Virginia, which is not included in the 4R Act’s definition of the Northeast Corridor; (2) uses only two facilities that are on the corridor (Union Station and the Ivy City maintenance facility in Washington, D.C.); and (3) operates primarily over freight-owned rights-of-way that will not be improved to meet the goals of NECIP.

⁴As discussed in following pages, a small segment of the main line right-of-way is not owned by Amtrak.

Briefing Section 1
Ownership and Usage of the Northeast
Corridor

Amtrak and Commuter Rail Operations in the Corridor

User of right-of-way ^a	Operating area		Route miles owned	Route miles operated	Total daily train movements
	From	To			
Amtrak	Washington, DC	Boston, MA	362	456	
	Philadelphia, PA	Harrisburg, PA	104	104	
	New Haven, CT	Springfield, MA	62	62	
Total Amtrak			528	622	149
SEPTA	Wilmington, DE	Trenton, NJ	0	56	
	Philadelphia, PA	Parkesburg, PA	0	44	
Total SEPTA			0	160	246
NJT	Trenton, NJ	New York, NY	0	58	
	Philadelphia, PA	Philadelphia, PA ^b	0	6	
Total NJT			0	64	242
LIRR	New York, NY	Sunnyside, NY	0	4	560
MARC	Washington, DC	Perryville, MD	0	76	86
Metro North	New Rochelle, NY	New Haven, CT	56 ^c	56	204
SLE	New Haven, CT	Old Saybrook, CT	0	33	28
MBTA	Providence, RI	Boston, MA	38	44	212
Total			622	999	1,727

^aThe Port Authority Trans Hudson Corporation (PATH) operates over one Amtrak-owned bridge on the corridor but otherwise uses its own right-of-way. The PATH trains are not included in this table.

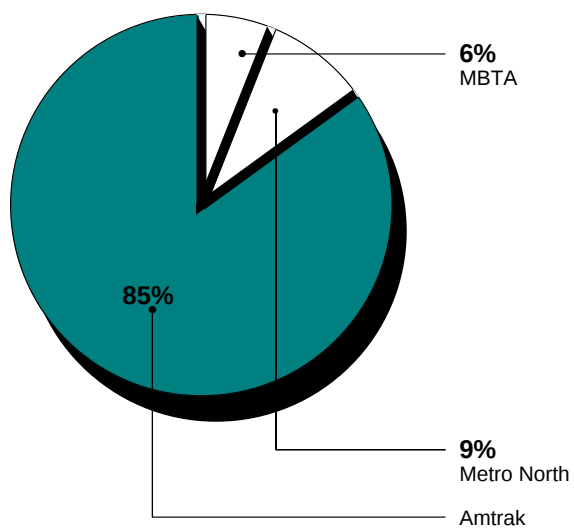
^bNew Jersey Transit (NJT) trains operating from Philadelphia to Atlantic City use about 6 miles of Amtrak's right-of-way in Philadelphia. The NJT trains in this service are included in this table.

^cMetro North operates and maintains track owned by the Metropolitan Transportation Authority of New York and the Connecticut Department of Transportation.

Amtrak shares the Northeast Corridor with eight commuter railroads: Massachusetts Bay Transportation Authority (MBTA), Shore Line East (SLE), Metro North Commuter Railroad (Metro North), Long Island Railroad (LIRR), Port Authority Trans Hudson Corporation (PATH), New Jersey Transit (NJT), Southeastern Pennsylvania Transportation Authority (SEPTA), and Maryland Rail Commuter Service (MARC). While Amtrak operates trains on the entire length of the corridor, the commuter railroads operate only on limited segments, generally within their respective states. For example, LIRR operates over only 4 miles of Amtrak's right-of-way that lead into New York's Penn Station. However, this track is critical to LIRR because it operates more than 500 trains per day at this location. Also, although PATH uses only one bridge belonging to Amtrak, about 300 of its trains traverse this bridge, and without such access, they could not operate. In total, commuter railroads operate trains over 371 of the 622 route miles on the corridor.

In addition, the Virginia Railway Express commuter railroad, which operates primarily in northern Virginia, uses Amtrak's Union Station and Ivy City facilities. As stated previously, however, we did not include this railroad's activities in this briefing report.

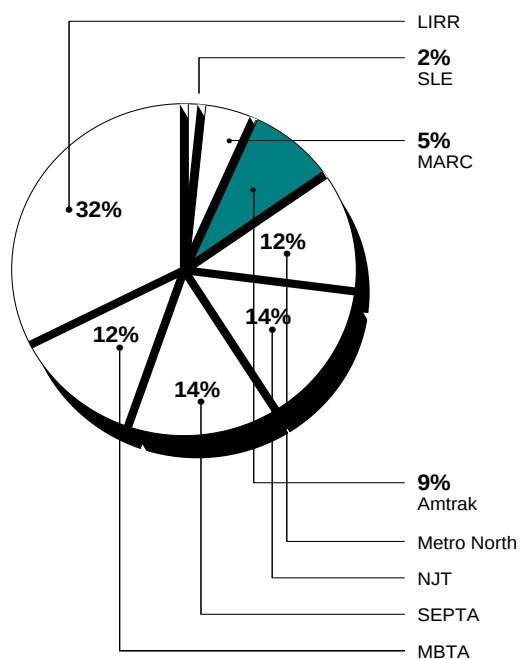
GAO Ownership of the Northeast Corridor



Amtrak is the primary owner of the Northeast Corridor and has responsibility for operating and maintaining it. Amtrak owns about 85 percent of the right-of-way on the corridor (528 out of 622 route miles), while three other entities— MBTA, the Connecticut Department of Transportation (CDOT), and the Metropolitan Transportation Authority of New York (MTA)—own the remaining 15 percent.⁵

⁵According to Amtrak's Chief Engineer, route-mile ownership reflects the proportion of Northeast Corridor ownership among Amtrak and others but does not reflect the costs inherent in this ownership. Many of Amtrak's route miles have multiple tracks; Amtrak also owns and maintains several yards along the corridor. In total, Amtrak owns and maintains 1,550 miles of track, or 83 percent of the 1,861 total miles of track on the corridor as we define it.

GAO Usage of the Northeast Corridor



Note: Usage is calculated as a percentage of the total number of passenger trains operated in the corridor each day. This total includes nonspine operations, which could not easily be segregated from spine operations.

Although Amtrak's trains operate over the entire length of the Northeast Corridor, they represent only 9 percent of the train movements that occur over the corridor's tracks each day. In contrast, the commuter railroads are responsible for more than 90 percent of the train movements that are scheduled each day, including nonrevenue train movements (e.g., between stations and yards).⁶ However, the commuter railroads provide very localized service, limited to certain segments of the corridor. For example, between Trenton, New Jersey, and Wilmington, Delaware, SEPTA operates 246 trains per day, while Amtrak operates only 104 trains per day.⁷

⁶Freight trains do not operate on a regular schedule, as do passenger trains. We were therefore not able to include freight operations in this analysis.

⁷We were not able to obtain train-mile information for the various users of the Northeast Corridor. We plan to develop this information as we continue our work at Amtrak.

GAO Commuter Railroads' Payments to Amtrak, Fiscal Year 1994

User	Amount paid to Amtrak
MARC	\$ 4,371,993
SEPTA	17,364,928
NJT	23,958,700
LIRR	4,865,385
Metro North	0
SLE	1,275,448
MBTA	8,423,852
Total	\$ 60,260,306

Amtrak physically operates most of the Northeast Corridor by providing dispatching services for trains as well as maintaining the track, roadbed, bridges, signals, fencing, and electric traction system (where installed) that make up the right-of-way. The commuter railroads pay Amtrak for the use of its tracks through negotiated trackage-rights agreements.

In addition, the commuter railroads share responsibility for operating the right-of-way with Amtrak along certain segments of the corridor. At New York's Penn Station, responsibility for dispatching alternates semiannually between LIRR and Amtrak. LIRR maintains the track it uses and therefore does not pay Amtrak for operation and maintenance services. Also, Metro North operates and maintains the 56 miles of the corridor's right-of-way that it owns or leases from CDOT between New Rochelle, New York, and New Haven, Connecticut. Amtrak paid Metro North \$5.3 million for the use of its tracks in fiscal year 1994.

The only other portion of the corridor's spine that is not owned by Amtrak is the 38-mile segment from the Rhode Island-Massachusetts state line to Boston. Owned by MBTA, this segment is operated by Amtrak under a contract that includes the (1) operation of MBTA's commuter trains, (2) operation and maintenance of the track, and (3) cost of Amtrak's trains using the track.

In addition, the commuter railroads or their associated states fund capital improvements on their segments of the right-of-way that will benefit both themselves and Amtrak. For example, the state of Connecticut will spend about \$250 million to upgrade the catenary⁸ between the New York state line and New Haven, Connecticut.

⁸The overhead wire system that delivers electricity to the locomotive for traction, or movement.

GAO Freight Railroads' Payments to
Amtrak, Fiscal Year 1994

User	Amount paid to Amtrak
Conrail	\$ 14,661,314
Providence and Worcester	129,490
Springfield Terminal Railway Company	135,145
Delaware and Hudson	2,093,091
Total	\$ 17,019,040

Briefing Section 1
Ownership and Usage of the Northeast
Corridor

In addition to the commuter railroads, four freight railroads operated trains in fiscal year 1994 over segments of the Northeast Corridor owned by Amtrak: Conrail, Providence and Worcester, Springfield Terminal Railway Company, and Delaware and Hudson. These railroads paid Amtrak over \$17 million for the use of its tracks.

Investments Needed to Extend High-Speed Service and Achieve a State of Good Repair

GAO Initial Goals for NECIP

- Service between Washington, D.C., and New York City in 2 hours and 40 minutes
 - Service between Boston and New York City in 3 hours and 40 minutes
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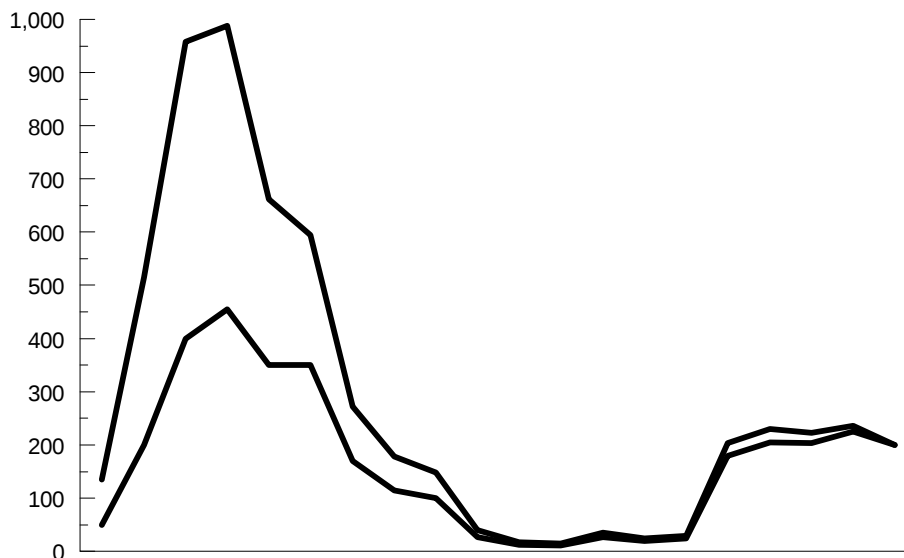
NECIP sets goals for improvements to be made along the Northeast Corridor so that Amtrak can achieve regularly scheduled and dependable high-speed rail service, defined as service between

- New York and Washington, D.C. (south end), in 2 hours and 40 minutes and
- Boston and New York (north end) in 3 hours and 40 minutes.

NECIP also provided for improvements at stations and facilities along the corridor and its branches.

GAO Appropriations for NECIP, Fiscal Years 1976-95

Dollars in Millions



Fiscal Year	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
Real 95 \$	135	515	958	988	662	594	272	178	148	40	17	15	35	24	29	204	230	223	236	200
Nominal \$	50	200	400	455	350	350	170	115	100	27	12	11	27	19	24	179	205	203	225	200

Since the Congress established NECIP in 1976, it has appropriated \$3.32 billion for the project. Half of this amount (\$1.67 billion) has been spent on improvements to the south end, and half (\$1.65 billion) has been obligated or spent on the north end. The improvements along the south end were designed to allow Amtrak to operate trains at speeds of 125 miles per hour and to make the trip between Washington and New York in less than 3 hours.

GAO Progress in Meeting Goals for NECIP

- Time goals for service from New York City to Washington, D.C., were achieved by 1983
 - Time goals for service from Boston to New York City have not yet been achieved
-

The goals for NECIP have only partially been met. Amtrak achieved its goal of service between New York City and Washington, D.C., in 2 hours and 40 minutes in 1983. However, Amtrak is still working to achieve its goal for service between New York City and Boston. Its normal trip time between New York and Boston is currently about 4-1/2 hours. Projects are under way or planned to meet the goal within the next 5 years.

GAO Management of NECIP

- FRA managed NECIP from 1976 to 1985
 - Amtrak has managed NECIP since 1985
 - Since 1991, emphasis of NECIP has been on the Northeast High-Speed Rail Improvement Project (NHRIP)
-

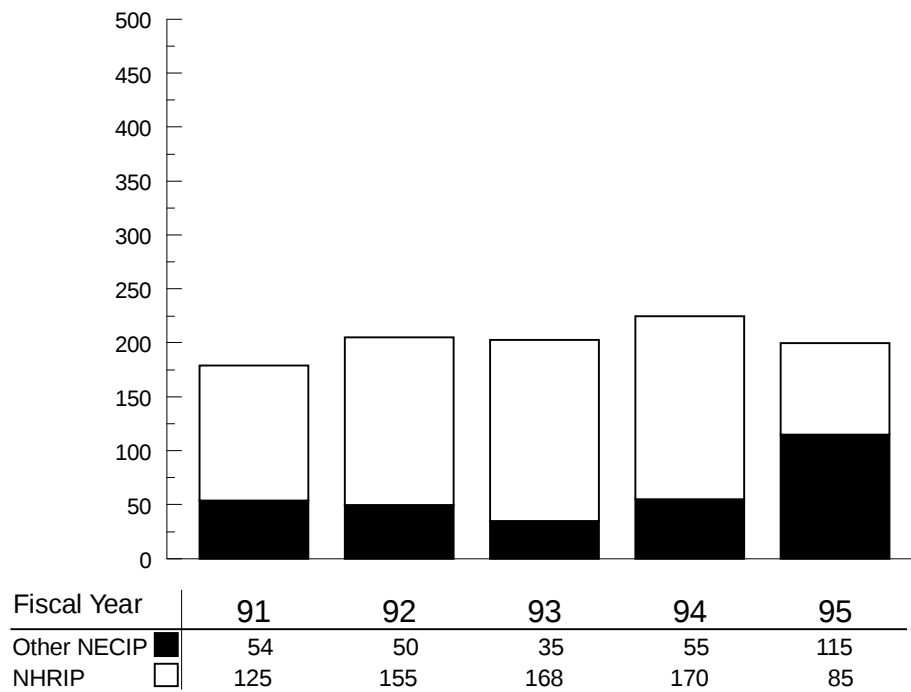
From 1976 to 1985, FRA managed NECIP and Amtrak operated as a contractor. In many cases, organizations other than Amtrak were awarded contracts for improving the corridor's infrastructure. However, the management of NECIP was turned over to Amtrak in 1985.

Since 1991, the emphasis of the NECIP program has been on high-speed improvements on the north end of the corridor between New York and Boston.⁹ Amtrak now refers to its program to improve the north end of the corridor as the Northeast High-Speed Rail Improvement Project (NHRIP).

⁹In fiscal year 1995, Amtrak spent the majority of its NECIP funds on projects to correct deteriorated conditions on the south end of the corridor. See p. 51 for further information.

GAO Allocation of Appropriations for NECIP, Fiscal Years 1991-95

Nominal Dollars in Millions



Although there has always been a single federal appropriation for NECIP improvements, Amtrak allocated the bulk of these funds to its NHRIP (north end) program from fiscal years 1991 through 1995. During this 5-year period, Amtrak received \$1.012 billion in NECIP appropriations; of this total, it allocated \$703 million to NHRIP and \$309 million to other NECIP projects.

GAO Revised Goal for Service on North End
of Corridor

- Goal for service between New York and Boston was reduced to 3 hours or less by the Amtrak Authorization and Development Act of 1992
- Funding for NECIP was significantly increased starting in fiscal year 1991

As part of the Amtrak Authorization and Development Act, the Congress in 1992 established a new goal for high-speed service between New York City and Boston. Specifically, the act directed the Secretary of Transportation and other railroad users between New York City and Boston to develop a master plan for a program of infrastructure improvements that will permit regular and dependable service between these cities in 3 hours or less. Also, in fiscal year 1991, the NECIP appropriation increased to \$179 million from the previous year's \$24 million, and it has exceeded \$200 million in each year since. With the revised goal and increased funding, Amtrak plans to achieve high-speed service on the north end of the corridor by 1999.

GAO Funding to Achieve High-Speed
Service on North End

- The total cost of NHRIP (1991 to 1999) is estimated at \$1.6 billion
 - \$700 million has already been appropriated
 - \$900 million more is needed to achieve limited high-speed service
-

The NHRIP project has two primary components: (1) rail infrastructure improvements, including electrification of the line between New Haven and Boston, and (2) acquisition of new high-speed passenger equipment capable of traveling 150 miles per hour.

To complete NHRIP, Amtrak estimates that it needs \$900 million in addition to the funds it has already received, or a total of \$1.6 billion, to achieve the goal of a 3-hour trip by 1999. However, this \$1.6 billion expenditure would not address capacity-related issues and capital investment needs that are critical to the success of the NHRIP program.

GAO NHRIP Projects Completed

- Installed concrete ties and welded rail
 - Converted 23 bridges to ballasted deck
 - Realigned track on 65 curves
 - Installed 150 miles of reverse signaling
 - Design for electrification 90 percent complete
-

Meeting the NHRIP goal of reducing the travel time between Boston and New York to 3 hours or less requires many improvements beyond electrifying the track between New Haven and Boston. Amtrak has

- installed 163,000 concrete railroad ties and 76 miles of new continuous welded rail;
- converted 23 bridges to ballasted-deck bridges¹⁰;
- realigned 65 right-of-way curves and completed feasibility studies and design work on the remaining curve realignments;
- installed all 150 miles of reverse signaling¹¹, buried the pole-strung signal cables, and extended the Centralized Electric Traffic Control system (CETC) along most of the rail;
- installed three high-speed cross-overs and completed the design and fabrication work on the remaining two interlockings;
- solicited bids for 26 high-speed trainsets and associated maintenance facilities from three prequalified consortia; and
- completed 90 percent of the design work needed for the construction of the electrification system.

¹⁰Amtrak is converting its open-deck bridges (where tracks are attached directly to steel bridge beams) to ballasted-deck bridges (where the tracks rest on a ballast-covered, solid bridge deck). Ballasted-deck bridges significantly improve ride quality and reduce maintenance costs.

¹¹Reverse signaling allows trains to operate on either of the two tracks at high speeds in either direction. It is essential to maximize the rail line's capacity.

GAO NHRIP Projects Still Needed

- Construct electrification system for north end
 - Increase bridge clearances
 - Modernize signal system
 - Install 2 high-speed interlockings
 - Convert 10 bridges to ballasted deck
 - Improve capacity to relieve congestion
-

In addition to the work completed on the north end, several projects remain to be done before Amtrak can initiate high-speed service on the north end of the corridor.

- The construction of an electrification system between Boston and New Haven will begin in the fall of 1995. The electrification system includes 25 electric traction facilities and a constant tension electrical catenary system with over 12,000 catenary supports spaced 75 to 225 feet apart.
- Clearances for 60 bridges will have to be increased to accommodate the electric catenary system. Nineteen of these will have to be raised or replaced. In some cases, Amtrak can increase clearances by installing specialized hangers to hold the electric catenary wire under the bridge, thereby reducing the number of bridges that have to be raised. In other cases, Amtrak will undercut or lower the track.
- The signal system governing the speed at which trains can operate will need to be modernized. The improved signal system along the rail line between New Haven and Boston will include a CETC in Boston that will allow dispatchers to track the precise location of all trains operating on the rail line.
- Two more high-speed interlockings—which permit track changes at 80 miles per hour—will be installed on the New Haven-Boston line, bringing the total number of high-speed interlockings to five.
- Approximately 30 bridges will be converted from open-deck to ballasted-deck bridges.
- Various projects are under way to upgrade the rail line to permit high-speed operations, including the continued installation of concrete ties and continuous welded rail.
- A number of projects need to be completed to relieve congestion and create the capacity needed for Amtrak to reliably meet trip time goals. These projects for relieving congestion are located on track and property owned by the state commuter authorities, including MBTA, CDOT, and MTA.

GAO Improvements by Others Also Needed

- Connecticut Department of Transportation (CDOT)
- Metro North

For NHRIP to be fully successful, capital improvements also need to be made on portions of the corridor that Amtrak does not own. For example, Connecticut plans to spend nearly \$90 million dollars per year over the next 5 years on capital improvement projects along the 47-mile stretch of the corridor that it owns. The state also expects to spend \$250 million to upgrade the electric catenary system on the Northeast Corridor between New Haven and the New York border by 1999.

Metro North is also in the process of replacing anchor bridge substations at a critical bottleneck on the corridor between New Haven, Connecticut, and Port Chester, New York. The existing substations, dating to 1907, are functionally obsolete. This \$5 million project began in 1994 and is scheduled for completion in August 1996.

GAO Additional Funds Needed for North
End Beyond 1999

- FRA estimates that another \$1.6 billion (2000 to 2010) will be needed on the north end to
 - improve capacity
 - rehabilitate/replace aging infrastructure
-

FRA estimates that, in addition to the \$900 million needed to complete high-speed improvements on the north end of the corridor, \$1.6 billion more will be required by Amtrak and others to improve capacity and meet capital investment needs on the north end of the corridor. In total, according to FRA, an investment of \$2.5 billion will be needed to achieve regular and reliable high-speed service between New York and Boston by the year 2010. Without these improvements, Amtrak will not be able to provide service at its anticipated rate of 16 high-speed round trips a day, and it will not meet its goal of acquiring 45 percent of the rail/air travel market between New York and Boston—a gain in ridership of 2.6 million passengers per year.

GAO State Approvals Needed to Complete
NHRIP

- Before construction on the electrification system can begin, the project must be approved by
 - Massachusetts
 - Rhode Island
 - Connecticut

The construction of the electrification project between New Haven, Connecticut, and Boston, Massachusetts, can move forward only after Amtrak has obtained certifications and approvals from Massachusetts, Rhode Island, and Connecticut. These approvals require that the project be consistent with environmental, wildlife, historic preservation, and land-use laws and regulations. Amtrak's electrification contractor—a joint venture consisting of the Morrison Knudsen Corporation, L.K. Comstock & Co., and the Spie Group, Inc.—is responsible for obtaining permits from the appropriate state agencies.

GAO Capital Investment of at Least \$2.5
Billion Needed for South End

Amtrak needs to return south end to a
"state of good repair" through
projects to rehabilitate or replace

- the electric traction system
 - the Baltimore and Potomac tunnel
 - bridges
 - track structure and interlockings
 - signal system components, including
track circuits, signal cable, and switch
heaters
-

Much of the NECIP money allocated to the corridor's south end between 1976 and 1985 was spent on improving rather than replacing the existing infrastructure to accommodate high-speed rail. Consequently, the infrastructure has continued to age and now needs major renovation. Amtrak recognizes that a substantial portion of the funds for NECIP must be shifted to the south end. Amtrak estimates that it will need between \$2.5 billion and \$3.5 billion to return the south end of the corridor to a "state of good repair,"—that is, to a condition requiring only cyclical maintenance.

Capital projects needed to achieve a state of good repair include

- rehabilitating the electric traction system,
- rehabilitating the Baltimore and Potomac tunnel,
- rehabilitating or replacing bridges,
- selectively rehabilitating the track structure and interlockings, and
- rehabilitating components of the signal system, including track circuits, signal cable, and switch heaters.

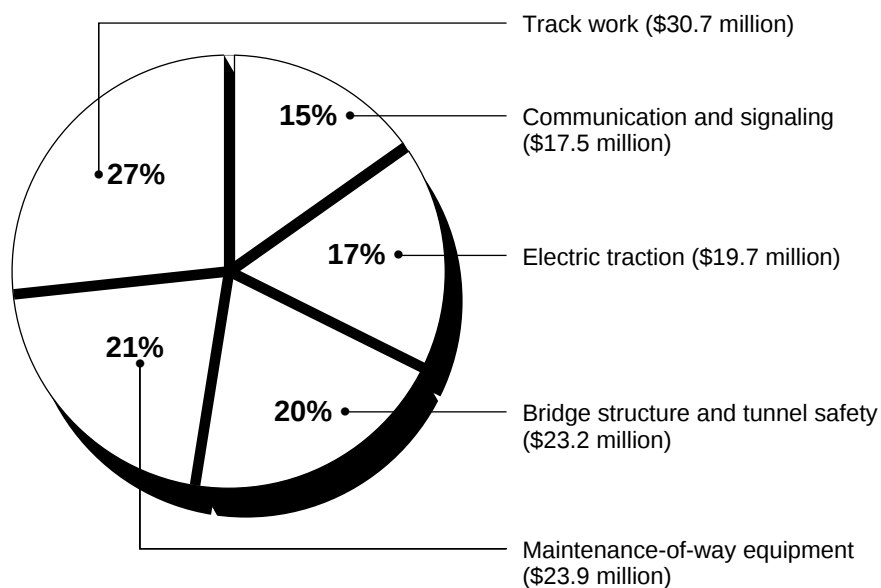
Amtrak has expressed concern that the deterioration of its infrastructure will affect ride quality and lengthen trip times, resulting in losses in ridership and revenues from its most heavily used market.

GAO Projects Planned to Achieve a State of Good Repair Over Time

- Amtrak is formulating a plan for doing work over 15 years
- Initial estimates show a need for between \$250 million and \$350 million per year

According to Amtrak officials, the south end's infrastructure reinvestment needs are immediate and have been deferred for a long time. However, the work would have to be scheduled carefully to keep from seriously interrupting Amtrak's regular train service. Under the best of circumstances, it would take many years to complete this work. The officials told us that they are now formulating a plan for doing the work over a 10- to 15-year period, assuming the availability of funding. This plan would require between \$250 million and \$350 million per year.

GAO Fiscal Year 1995 NECIP Appropriation Allocated to South End Projects



Note: The total amount allocated to the south end was \$115 million.

Amtrak plans to use \$115 million of its \$200 million fiscal year 1995 NECIP appropriation for capital improvements on the south end of the corridor. According to Amtrak, this is only the beginning of an effort to bring this portion of the corridor into a “state of good repair”. Amtrak has allocated the fiscal year 1995 funds among major projects as follows:

- Track work (\$30.7 million)
- Maintenance-of-way equipment (\$23.9 million)
- Bridge structure and tunnel safety (\$23.2 million)
- Electric traction (\$19.7 million)
- Communication and signaling (\$17.5 million)

GAO Consequences of Not Addressing State of Good Repair Problem

If deteriorated conditions are not corrected, several consequences are expected to occur

- Greatly increased operating costs
 - Reduced speeds
 - Increased frequency and duration of failures
 - Negative impact on other railroads
 - Reduced ridership and revenues
-

The Chief Executive Officer of Amtrak's Northeast Corridor Strategic Business Unit told us that the deterioration of the south end of the corridor may be the most critical problem facing Amtrak today. Unless this problem is addressed, Amtrak can expect to experience the following consequences:

- Costs to operate and maintain the corridor will escalate dramatically.
- Failures along the line will increase in frequency and duration. Such failures cause serious backups of all trains, including those operated by commuter railroads.
- Train speeds will have to be reduced to ensure safe operation over deteriorated track structures. This will lead to longer trip times for many Amtrak trains.
- With lower speeds, capacity on the corridor will be reduced. This will also seriously affect the commuter railroads.
- If the track structures are allowed to deteriorate further, Amtrak passengers will experience a lower-quality ride. Less comfortable, longer trips will significantly reduce ridership and revenues.

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