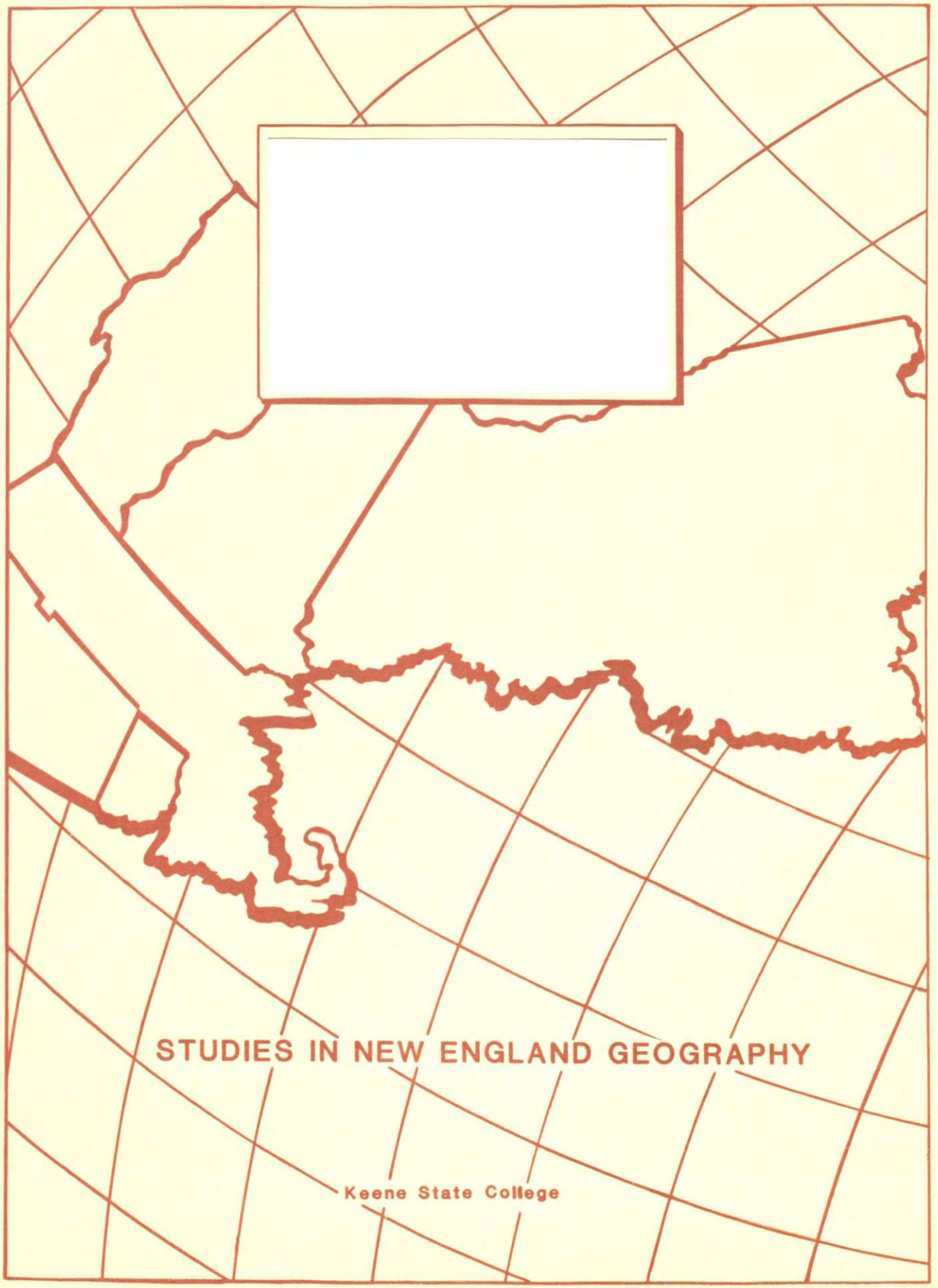


STUDIES IN NEW ENGLAND GEOGRAPHY

Keene State College

THE EFFECTS OF AIRLINE DEREGULATION IN NORTHERN NEW ENGLAND: CHANGES IN ROUTE STRUCTURES AND LEVEL OF SERVICE, 1970-1985

by

Don E. Kiel
East Tennessee State University

STUDIES IN NEW ENGLAND GEOGRAPHY
Number 5
January, 1989

STUDIES IN NEW ENGLAND GEOGRAPHY, Editor, Dr. A. L. Rydant, Department of Geography, Keene State College, Keene, New Hampshire 03431 (603) 352-1909

THE EFFECTS OF AIRLINE DEREGULATION IN NORTHERN NEW ENGLAND: CHANGES IN ROUTE STRUCTURES AND LEVEL OF SERVICE, 1970-1985

INTRODUCTION

The 1978 deregulation of the U.S. domestic airline industry resulted in complex changes in airline route structures and levels of service. More flexibility in routes, carriers, competition, and fares was promoted as a means to end the "public service" function of the airlines and open the industry to more realistic operating practices. The pace of change in the airline industry has continued to accelerate after final phasing out of the Civil Aeronautics Board in 1983. Mergers and bankruptcies are becoming more prevalent, and the nationwide airline network is presently in a state of great instability.

Changes in the spatial makeup of the air transport network and in levels of service can be objectively evaluated by analyzing trends in specific components of the air transport system. Scholarly geographic analyses have measured spatial effects on the number of available nonstop and direct flights and seats, number and types of air carriers, comparisons of nonstop versus monopoly routes, fares, travel times, potential flight connection factors, and network accessibility (Cates, 1978; Hebert and Murphy, 1970; Higgins, 1985; Howrey, 1969; Maraffa and Kiel, 1985; Stanley and Baucom, 1972; Taaffe, 1958; Warren, 1984).

Air transport services have traditionally been important in the northern New England states of Maine, New Hampshire, and Vermont (Figure 1) due to the relative isolation caused by topography and weather. Deregulation of the airline industry has promoted sweeping changes in air

FIGURE 1


NORTHERN NEW ENGLAND AIRPORTS
WITH SCHEDULED SERVICE
1970–1985
SMALL HUBS
NONHUBS
Madawaska/
Fort Kent/
Frenchville
Presque Isle
Houlton
ME.
BANGOR
Waterville
Bar Harbor
Augusta
Rockland
Lewiston/Auburn
Wiscasset
PORTLAND
Newport
Morrisville
BURLINGTON
Berlin
Whitefield
Montpelier/Barre
VT.
Lebanon/
Hanover
White River Junction
North Conway/
Fryeburg
Rutland
Laconia
Springfield
N. H.
Concord
Keene
MANCHESTER
Nashua
SCALE 1:715000
DEK – 7/87

service patterns in the region. This paper will evaluate changes in spatial patterns in northern New England and examine whether the levels of "service" to the consumer have improved, remained the same, or decreased. A systematic study will be made of the number and types of changes in the air service concentrations in the region, the number and types of air carriers providing service, departures and seats available, markets served, and route competition. Changes evident in these factors between the pre-deregulation period of 1970-1977 and the post-deregulation years of 1978-1985 will be discussed and evaluated to determine how deregulation has affected air service in northern New England. Data for these analyses were primarily obtained from October issues of the Official Airline Guide.

The northern New England area retains unique spatial, physical, and cultural characteristics which influence and are influenced by the air transport industry. To preface the main study, the following section provides important background on historical development of the air transport network in the region.

SECTION 1

Historical Evolution of Air Transport Patterns in Northern New England

Because of its compact land area (49,260 square miles), the northern New England region would seem well-suited to support efficient airline service. However, such has not historically proven to be the case. A number of factors have hindered the development of air service in the region:

1. Rugged topography. The mountainous landscape of much of northern New England has impeded growth and restricted access to all types of transportation.

2. Scattered settlement. Because much of northern New England is rural, many areas have remained isolated from convenient air service. Regional population growth less than the national average in recent decades has further discouraged growth in airline service.

3. Market seasonality and adverse weather. Northern New England air service markets have been characterized by seasonality in passengers generated, with travel peaks in the summer months (Davis, 1982). This condition causes problems in equipment utilization and cash flow difficulties for carriers. Severe winter weather conditions and fog also contribute to the problems of air carrier service.

4. Inadequate highway networks. Until the 1960s, rapid automobile travel throughout northern New England was difficult. The establishment of the Interstate system has since helped access significantly. Many areas in the region are not located in proximity to good roads, however, and often are isolated from convenient air service. Weather conditions also can negatively affect highway travel.

5. Air traffic shadowed communities. In a 1972 report, the U.S. Civil Aeronautics Board stated that communities located within one hour's drive of an airport with a greater level of airline service were considered to be in an "air traffic shadow" (U.S. Civil Aeronautics Board, 1972). This concept, initially popularized by Taaffe (1958), recognizes that a significant percentage of air travelers from such communities will often travel to the larger city instead of utilizing local air service. In turn, the level of air service at the smaller community may be less than expected when compared to its population. Many communities in northern New England with scheduled air service meet the definition of being in an air traffic shadow (Table 1). Proximity to larger cities, especially Boston and Hartford, causes many markets in the southern part of Maine, New Hampshire, and Vermont to be underserved.

6. Lack of strong regionally-based air carriers. The main certificated air carrier in northern New England prior to 1970 was Northeast Air Lines, based in Boston. This carrier battled constant financial deficits, however, and was absorbed by Delta in 1972. To fill this void, the CAB authorized creation of the first "local service" certificated carrier, Air New England, in 1974. This new carrier, too, was never consistently profitable, and eventually ceased operations in 1981. The absence of a successful regional carrier with a well-established presence has hurt the region. In addition, many commuter carriers have merged or gone bankrupt over the years.

TABLE 1

AIR TRAFFIC SHADOWED CITIES
NORTHERN NEW ENGLAND

CITY	NEAREST LARGER AIRPORT	MILES
Augusta, ME	Portland, ME	56
Bar Harbor, ME	Bangor, ME	34
Concord, NH	Manchester, NH	20
Keene, NH	Manchester, NH	53
Laconia, NH	Manchester, NH	48
Lewiston/Auburn, ME	Portland, ME	34
Madawaska/Ft. Kent/ Frenchville, ME	Presque Isle, ME	57
Manchester, NH	Boston, MA	54
Montpelier/Barre, VT	Burlington, VT	36
Morrisville/Stowe, VT	Burlington, VT	45
Nashua, NH	Manchester, NH	19
Waterville, ME	Bangor, ME	55
Wiscasset, ME	Portland, ME	46

7. Lack of suitable commuter aircraft. Relatively short air distances from northern New England communities to major cities promote the use of commuter aircraft. Until recently, however, the availability of mid-sized (10 to 50 passenger capacity) commuter aircraft has been limited. Commuter airlines were forced to employ airplanes with excess capacity for markets in the region, making these routes marginally profitable at best (Regulatory Policy Staff, U.S. Department of Transportation, 1977).

Mainly because of these limitations, the Civil Aeronautics Board assumed the most influential role in shaping the structure of the northern New England air transport network. Although air service to many smaller communities in the region has long been supported through federal subsidies, the level of services provided was low and considered unacceptable to regional leaders (Air Transportation for New England, 1956). Where carriers retained a profitable route, however, the CAB severely restricted competition from other carriers. The CAB reasoned that airlines could cross-subsidize their government-supported, unprofitable markets with exclusive, profitable routes. This practice limited competition and undoubtedly led to higher fares in many markets. As debate took place through the early 1970's, many observers felt that deregulation of the air transport industry would have positive effects for the northern New England states. With the implementation of deregulation in 1978, proponents predicted increased levels of air service, lower fares, greater competition from new airlines, new route services, and a stronger overall air transport industry in the region. Others, however, felt that deregulation would cause loss of service to smaller communities, higher fares, and less competition because of mergers and bankruptcies.

The year of 1985 marked eight years since airline deregulation became official. The effects of airline deregulation in northern New England can

be compared in detail to the eight-year period preceding deregulation to determine whether the region has benefited or suffered from the changes in service since 1978. The balance of this paper will consider this question with an analysis of the factors which determine the level of air service in northern New England.

SECTION 2

Northern New England Air Service before Deregulation: 1970-1977

By 1970, air transport patterns in the United States were well-established and not prone to significant change. The regulatory milieu imposed by the Civil Aeronautics Board permitted only minor alterations in route structure, few new carriers, and restricted competition among airlines. Northern New England air service reflected these stable conditions to a large extent, with a few exceptions. These variations were mainly brought on by economic downturns, aviation fuel shortages, and especially mergers and bankruptcies.

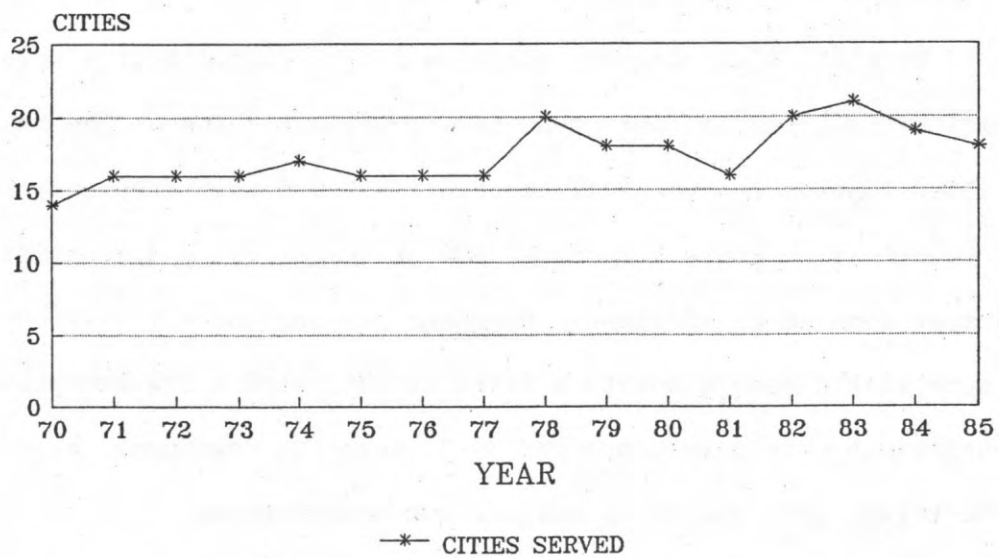
The relative lack of change in the air service sector in northern New England from 1970 to 1977 is evident from examination of relevant data from the period. The following sections provide discussion and analysis of these data from the pre-deregulation portion of this study.

Cities Served (Figure 2; Table 2)

Air service to northern New England communities can be categorized by the size of the community, or "hub," as defined by the Civil Aeronautics

FIGURE 2

CITIES SERVED
NORTHERN NEW ENGLAND, 1970–1985



Source: Official Airline Guide, 1970–85.

TABLE 2

NORTHERN NEW ENGLAND AIRPORTS WITH SCHEDULED AIR SERVICE, 1970-1985

HUB CLASSIF.	3-LETTER INTL. CODE	LOCATION	YEARS WITH SERVICE (AS OF OCT. 15)
N	AUG	Augusta, ME	1970-1985
S	BGR	Bangor, ME	1970-1985
N	BHB	Bar Harbor, ME	1970-1985
N	BML	Berlin, NH	1974, 1976, 1982-1983
S	BTV	Burlington, VT	1970-1985
N	CON	Concord, NH	1978-1980
N	FRY	Fryeburg, ME/North Conway,NH	1978
N	HUL	Houlton, ME	1983-1985
N	EEN	Keene, NH	1970-1985
N	LCI	Laconia, NH	1971-1985
N	LEB	Lebanon/Hanover, NH/ White River Junction, VT	1970-1985
N	LEW	Lewiston/Auburn, ME	1970-1985
N	WFK	Madawaska/Fort Kent/ Frenchville, ME	1972, 1978, 1982-1985
S	MHT	Manchester, NH	1970-1985
N	MPV	Montpelier/Barre, VT	1970-1985
N	MVL	Morrisville, VT	1982, 1984
N	ASH	Nashua, NH	1973, 1979-1980
N	EFK	Newport, VT	1974, 1982-1983
S	PWM	Portland, ME	1970-1985
N	PQI	Presque Isle, ME	1970-1985
N	RKD	Rockland, ME	1970-1985
N	RUT	Rutland, VT	1970-1985
N	VSF	Springfield, VT	1977-1985
N	WVL	Waterville, ME	1970-1985
N	HIE	Whitefield, NH	1971, 1975-1976, 1983
N	ISS	Wiscasset, ME	1978

S = SMALL HUB
N = NONHUB

Source: Official Airline Guide, 1970-1985.

Board (U.S. General Accounting Office, 1985). Although the definitions have changed periodically, the northern New England region generally is served by four "small" hubs -- Bangor, Burlington, Manchester, and Portland (see Figure 1). These largest cities have received continuous air service at the highest levels in the region. All other communities are classified as "nonhubs" and generally receive significantly lesser amounts of service. For the purposes of this paper, this distinction will be included in the analysis to provide a measure of how service has changed for larger versus smaller communities in northern New England.

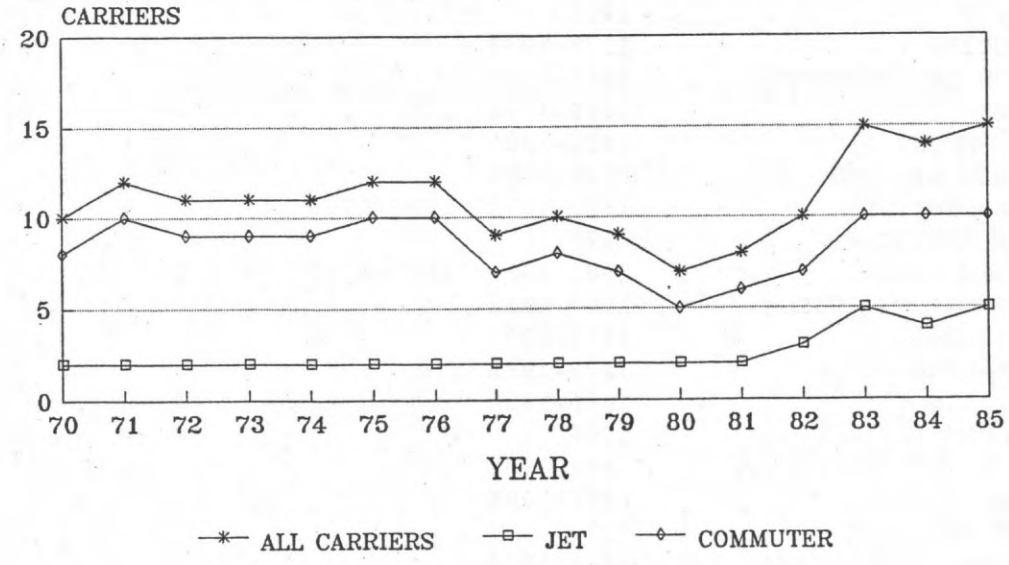
Even though the CAB permitted replacement of certificated carriers as a step toward more realistic service patterns in the region, it is apparent that air service in northern New England in 1970 was woefully inadequate. By October 1970, only eight points in northern New England were receiving service from certificated airlines (Northeast and Mohawk), with five of those cities having jet service. Six other points received air taxi service. From 1970 through 1977, an average of sixteen communitites in northern New England received scheduled air service. Entry of carriers into cities of both hub sizes was infrequent. With the exception of Air New England, the entry of carriers new to the region was also uncommon. The static condition of cities served in northern New England during 1970-1977 did little to better air service to the region.

Air Carriers* (Figure 3; Table 3; Appendix A)

By the late 1960s, most air service to the northern New England region was being provided by CAB-certificated airlines, primarily Northeast Air Lines and Mohawk Airlines. These carriers were federally subsidized to maintain air service to several points in Maine, New

FIGURE 3

AIR CARRIERS
NORTHERN NEW ENGLAND, 1970–1985



Source: Official Airline Guide, 1970–85.

TABLE 3

NEW ENGLAND REGIONAL AIR TRANSPORTATION STUDY
AIR CARRIERS
NORTHERN NEW ENGLAND
1970-1985

(As listed in October 15 Official Airline Guide of each year)

JET CARRIERS	
AL-ALLEGHENY/USAIR	1972-1985
DL-DELTA	1972-1985
MO-MOHAWK	1970-1971
NE-NORTHEAST	1970-1971
PE-PEOPLE EXPRESS	1983-1985
QH-AIR FLORIDA	1982-1983
UA-UNITED	1983-1985
UR-EMPIRE	1985

COMMUTER CARRIERS	
AL-ALLEGHENY COMMUTER	1972-1976
CJ-COLGAN	1975
DD-COMMAND	1970-1971, 1973-1974, 1982-1985
DE-DOWNEAST (XY)	1970-1979
ER-RAINBOW	1973
EX-EXECUTIVE	1970-1973
IL-BANGOR INTERNATIONAL	1983-1985
MO-MOHAWK	1970-1971
MU-AIR VERMONT (3V)	1982-1984
NE-AIR NEW ENGLAND	1974-1981
NO-AIR NORTH (OY)	1970-1972, 1979-1983
ON-NORTH AMERICAN	1970-1971
PM-PILGRIM	1980-1981, 1983-1985
PT-PROVINCETOWN-BOSTON	1984-1985
QK-AROOSTOOK	1970-1972
QO-BAR HARBOR	1970-1985
RP-PRECISION	1976-1985
RZ-RANSOME	1985
SS-CLINTON AERO/BROCKWAY	1981-1985
UR-EMPIRE	1984-1985
VS-GREEN MOUNTAIN	1979
XW-LEBANON AIRPORT DEV. CORP.	1974-1976
YV-AIR ATLANTIC	1977
ZC-ATLANTIC CENTRAL	1974-1976
ZE-MERRIMACK	1975-1978
ZM-WINNEPESAUKEE	1971-1979
2V-VALLEY (VZ)	1978, 1982-1985

Two letter prefix indicates official international air carrier code. Parentheses denote previously used codes.

Allegheny was renamed USAir in 1978.

Air North served as an Allegheny Commuter from 1972 to 1976, and was merged with Clinton Aero to form Brockway in 1984.

Ransome served as a Delta Commuter in 1985.

Source: Official Airline Guide, 1970-1985.

Hampshire, and Vermont. Unfortunately, the equipment in use at this time was not appropriate for this task. Aircraft utilized included small jets (such as the BAC 1-11) and large propeller planes (including the FH-227). Overcapacity was a serious problem for certificated airlines serving northern New England, reflecting patterns throughout the country (Eads, 1972). In short, only very large or very small propeller aircraft were available for commuter service at this time, and certificated carriers' fleets consisted only of larger capacity jets and propeller equipment.

As a result, the certificated airlines began to petition the CAB in the late 1960s to suspend services at many northern New England communities. These carriers held that "air taxi" operators - the equivalent to today's "commuter" airlines - could better provide services to such locations. The CAB agreed, and by late 1970 air taxi operators (especially Executive Airlines) had replaced certificated carriers at twelve points in Maine, New Hampshire, and Vermont (U.S. Civil Aeronautics Board, 1972). These air taxis, however, were almost exclusively operated with very low capacity equipment.

Remaining jet service provided by New England's major certificated jet carriers, Northeast Air Lines and Mohawk Airlines, could never consistently remain profitable. The factors mentioned in Section 1 as impediments to air service in northern New England had combined to place these carriers in a perpetually unstable financial position. Northeast saw its condition eased somewhat when it was awarded a New York-Miami route in 1969 by the CAB (Lewis and Newton, 1979). However, neither airline could quite overcome the lack of passengers in the region during the winter months. A $10.7 million loss for Northeast in 1970, when combined with a $28.8 million deficit in 1969, placed the continued

existence of the carrier in jeopardy. Finally, in May 1971, Delta Air Lines announced plans to purchase the ailing Northeast. The aqcuisition was finalized by the CAB in May 1972, but not before service had been interrupted at several points on the Northeast system.

During the same period, Mohawk also began to experience financial difficulties. The main factor in Mohawk's decline was a five-month strike by its pilots beginning in late 1970. This walkout left the carrier too weak to fight the competition from other airlines and unable to replace aging aircraft. In May 1971 Allegheny Airlines announced plans to acquire Mohawk. This purchase was finalized in May 1972.

Even with these changes, the air service network in northern New England at both small and nonhubs remained essentially unchanged from 1970. Airlines all across the U.S. were operating under a 1970 CAB moratorium on new route awards, and services changed very little. By 1972, however, the services were being provided by two decidedly non-local carriers, Delta and Allegheny. The two airlines professed to be pleased with their new route system in northern New England, but it soon became apparent that neither intended to serve the region with anything but jet aircraft. As a result, Delta petitioned the CAB to suspend service at Lebanon and Keene, New Hampshire, and both carriers took a hard look at continuation of service at points including Burlington, Manchester, and others in southern New England (Lewis and Newton, 1979).

Meanwhile, the Middle Eastern oil embargo of late 1973 and early 1974 caused widespread aviation fuel shortages and higher operating costs for airlines in northern New England, further hampering air service. The protests over inadequate air service in all of New England were heard by the CAB and Congress. The latter body authorized the establishment of Air

New England, the first certificated "local service" carrier in the United States. The carrier began operations in 1974 to fill the void created by elimination of certificated carrier services and to implement a more reliable regional transportation network. Air New England was federally subsidized at the outset by $1.9 million annually, 60% of which was paid during the winter months. Later, the subsidies were increased to $7.1 million as the extent of actual opearting costs became known.

By October 1975, Air New England's route structure was firmly established. Capacities continued to be a problem in the region, however, as the carrier primarily employed 48-seat FH-227 aircraft on their routes, with some 20-seat DeHavilland Twin Otter planes utilized on lower-density routes.

Meanwhile, the Ford administration in Washington began to favor a slow, orderly deregulation of the air transport industry. Partially as a result, the CAB in early 1975 lifted its restriction on new route awards to all airlines (Snow, 1977). Between 1975 and the Congressional approval of deregulation of the airline industry in 1978, regulatory policies were gradually relaxed. Air services in northern New England began to change, with a few new routes and cities beginning to be served.

Even with the establishment of a new regional carrier, the northern New England route network continued to remain relatively stable from 1970 through 1977. Sixteen communities received air service in October 1977, but in contrast to 1970, thirteen were served by a certificated carrier. The same five cities continued to receive jet service as compared to 1970. The region now had commuter air service from six airlines, including an expanding Bar Harbor Airlines, the only commuter carrier

operating continuously from 1970 to the present. Bar Harbor flew to five cities in northern New England and to Boston and Quebec City in 1977.

Flights, Seats, and Markets (Figures 4-9; Appendix A)

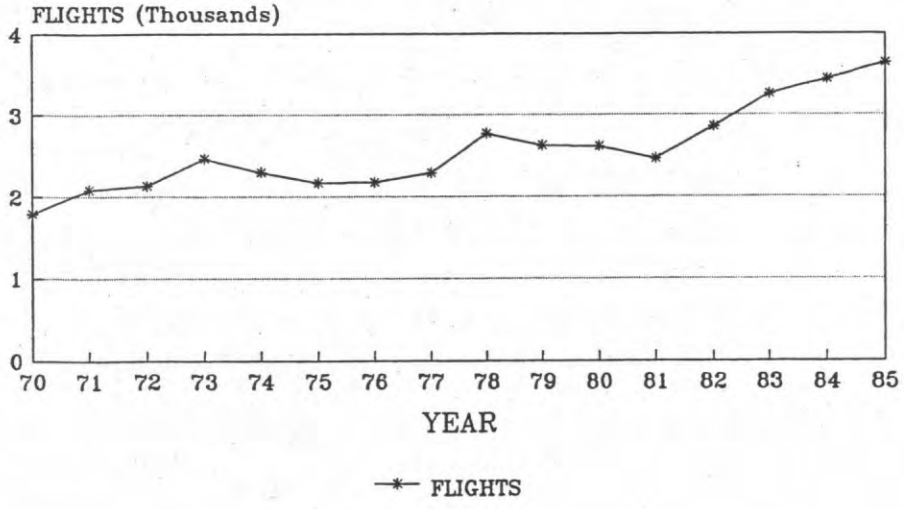
The relative level of airline service at any community or region can be evaluated by comparing the number of flights and seats available during a given time period. A second method for judging level of service is to survey the number of nonstop destinations available from a community or region. During the pre-deregulation portion of the study period, the level of service for northern New England as measured by both methods improved slowly.

Aircraft arrivals and departures per week increased, albeit unsteadily, from 1,792 in 1970 to 2,289 in 1975, an annual average increase of 2.3%. This increase in part reflects the provision of more frequent commuter airline service. Available flights peaked in 1973, with 2,468 flights offered weekly in the region. The subsequent decline in flights can be attributed partly to aviation fuel shortages, but data from 1970 through 1972 suggest that only a modest growth pattern would have occurred even without the fuel restrictions. The average annual increase of 2.3% in flights was concentrated mostly at the four small hub cities. Changes in flight levels at the nonhubs were very minimal during the period.

The problem of larger aircraft with excess capacity was felt throughout the period. A total of 98,526 seats per week were available in northern New England in October 1977, with an average increase of 4.0% annually since 1970. Most of this increase was again found at the four small hubs. From 1973 to 1976, a decline in seats available at nonhubs

FIGURE 4

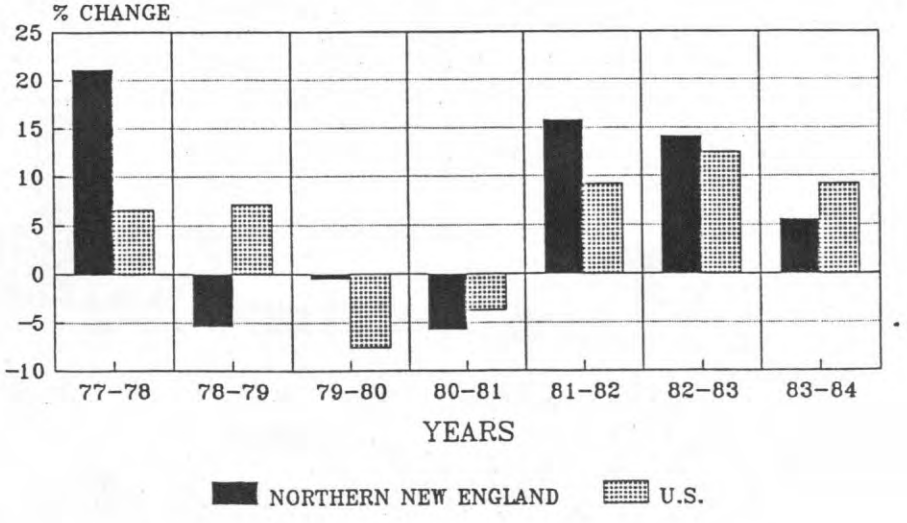
FLIGHTS PER WEEK
NORTHERN NEW ENGLAND, 1970–1985



Source: Official Airline Guide, 1970–85.

FIGURE 5

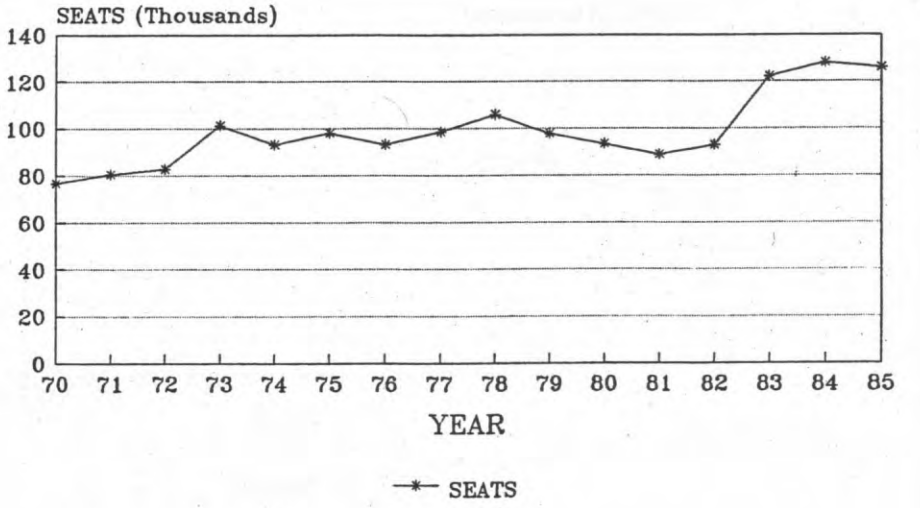
% CHANGE, FLIGHTS PER WEEK, 1977–1984
NORTHERN NEW ENGLAND VS. U.S.



12 MONTHS CHANGE ENDING OCTOBER 1

FIGURE 6

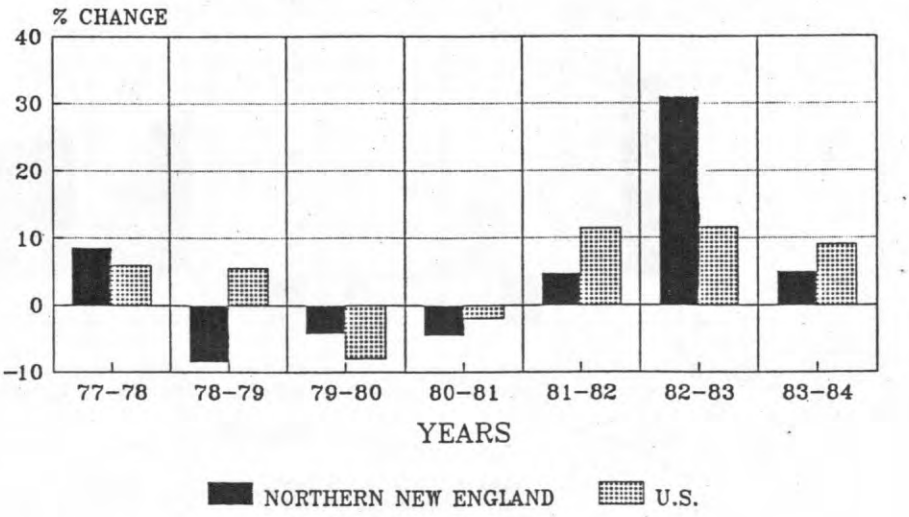
SEATS PER WEEK
NORTHERN NEW ENGLAND, 1970–1985



Official Airline Guide, 1970–85.

FIGURE 7

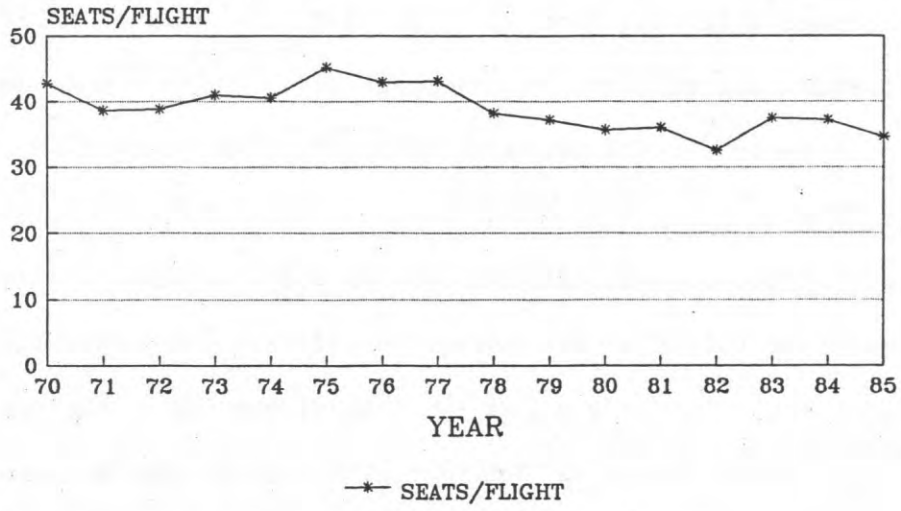
% CHANGE, SEATS PER WEEK, 1977–1984
NORTHERN NEW ENGLAND VS. U.S.



12 MONTHS CHANGE ENDING OCTOBER 1

FIGURE 8

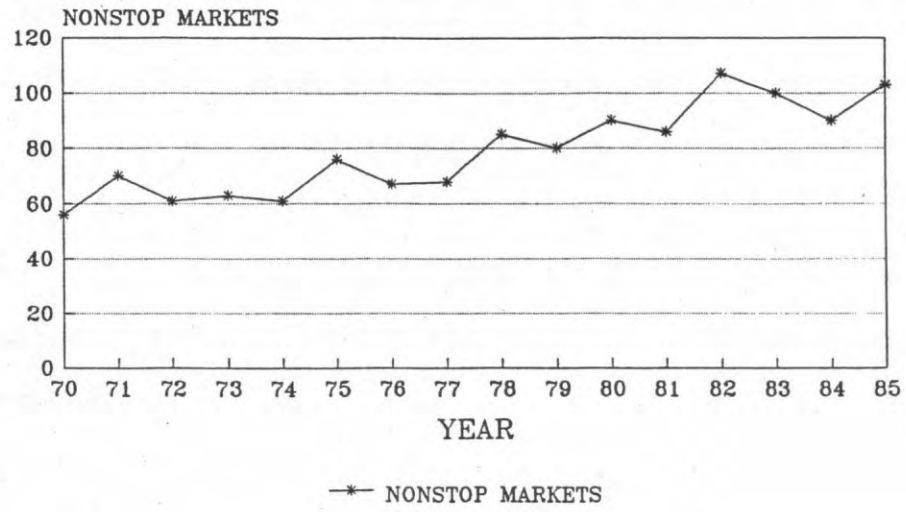
SEATS PER FLIGHT
NORTHERN NEW ENGLAND, 1970–1985



Source: Official Airline Guide, 1970–85.

FIGURE 9

NONSTOP MARKETS
NORTHERN NEW ENGLAND, 1970–1985



Source: Official Airline Guide, 1970–85.

occurred each year. The change in available seats reflects the trend in available aircraft arrivals and departures, and the resulting pattern no doubt was heavily influenced by the fuel shortage period. Seats available remained rather stable between 1974 and 1977. The greater increase in seats as compared to flights caused the available seats per flight to increase slightly, from 42.67 in 1970 to a peak of 45.17 in 1975. However, distribution of the increase in flights and seats was less tied to improved service patterns than to the employment of oversized aircraft on flights between nonhubs with few available connections for travel outside the region. As evidence of this pattern, the average number of seats per flight at Manchester in 1975 was 105, a wasteful distribution for a city with only a few jet flights per day. Many of those flights were to such cities as Burlington, Portland, and Worcester, Massachusetts, where few connections for continuing trips were available. Meanwhile, some smaller communities such as Presque Isle, Rutland, and Manchester had certificated air carrier service provided at insufficient levels.

The number of market destinations in northern New England increased only slightly at both small hubs and nonhubs during the 1970-1977 period, averaging 56 available nonstop city pairs, with fluctuations between 48 and 69 routes. Many of the available jet nonstop flights were actually on "tail-end" flight segments, such as Manchester-Portland and Portland-Bangor. These short flights were linked to service to larger cities like Boston and Detroit because it was felt nonstop service could not be profitable from only one northern New England city.

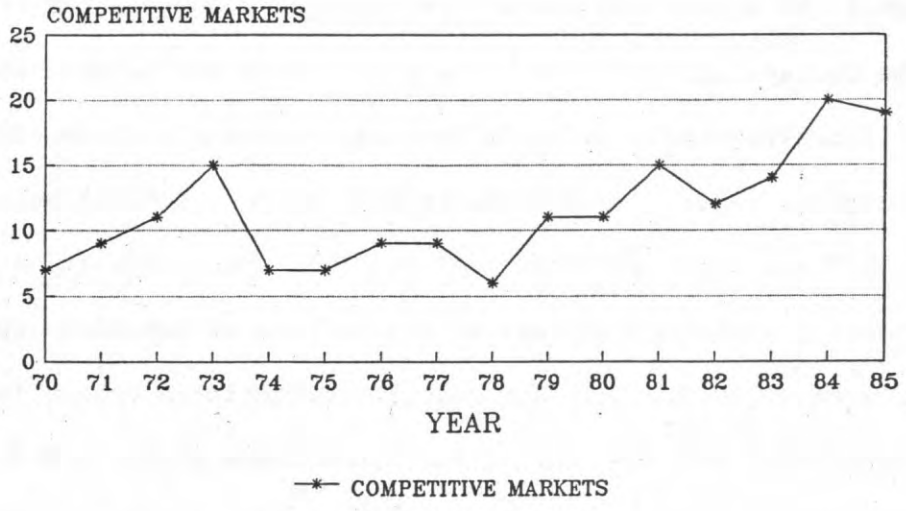
Competition (Figures 10-11; Appendix A)

One of the positions of support for deregulation has been that increased competition would occur, which in turn would provide better service overall and result in lower fares. For this study, competitive and monopoly nonstop route pairs in northern New England were compared. Both the number and overall percentage of competitive routes was found to be decreasing from 1970 through 1977. By the latter year, only 7.5% of all nonstop route pairs in the region were flown competitively by two or more carriers. Air service in the region entered a brief period of increased competition in 1972 and 1973, but competition lessened thereafter mainly because of the pullout of carriers and the new monopoly routes enjoyed by Air New England. Competitive routes in October 1975 in the region numbered only 7 out of 69 route pairs, a 9.2% figure. During the pre-deregulation portion of the study period, an average of 14.4% of nonstop city-pair routes from and between northern New England cities were flown on a competitive basis.

Almost all of the decrease in market competition in northern New England from 1970 through 1977 is attributable to nonhubs. Small hub competitive markets actually increased slightly during the period, but competitive services provided at nonhubs declined dramatically from 1973 through 1976. This pattern was caused by the termination of service by carriers such as Executive Airlines, Aroostook Airlines, and Mohawk Airlines. Filling the void created by these exits, Air New England enjoyed a relative monopoly at the nonhub communities.

FIGURE 10

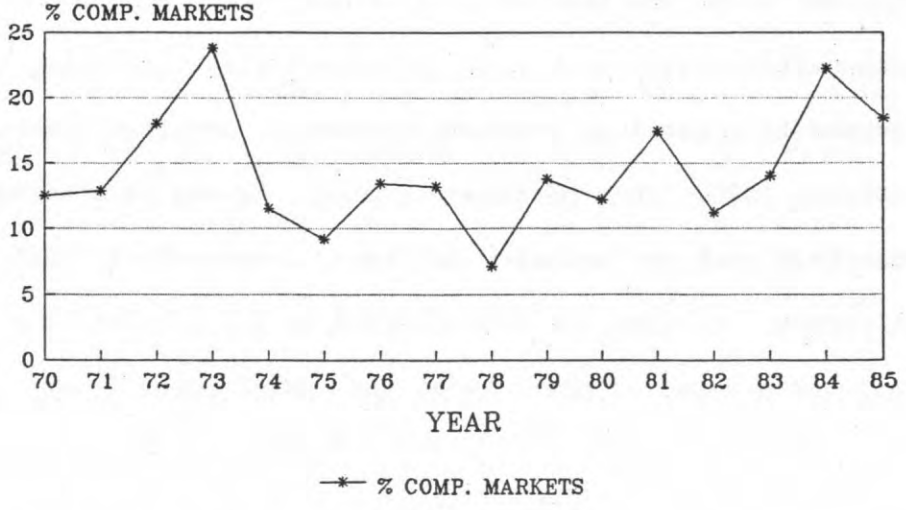
COMPETITIVE MARKETS NORTHERN NEW ENGLAND, 1970–1985



Source: Official Airline Guide, 1970–85.

FIGURE 11

% COMPETITIVE MARKETS NORTHERN NEW ENGLAND, 1970–1985



Source: Official Airline Guide, 1970–85.

SECTION 3

Northern New England Air Service in a Post-Deregulation Environment: 1978-1985

The Airline Deregulation Act took effect on October 1, 1978, effectively ensuring continuing change in the U.S. domestic airline industry. Air carriers have since continued to develop as free-enterprise entities and have been considered less as "public service" providers.

The nature of airline service in northern New England, and indeed all across the United States, has undergone massive change since deregulation. Whether deregulation will ultimately be viewed as successful can only be determined at a later date. What can be evaluated from existing data are the trends and conditions in the years since deregulation became law. Changes in air service patterns in northern New England between 1978 and 1985 are discussed in detail below.

Cities Served (Figure 2; Table 2)

The deregulation of the airline industry promoted the entry of established and newly-created carriers into unserved markets. As compared to the average number of cities served in the pre-deregulation years between 1970 and 1977, deregulation has resulted in service to more cities in Maine, New Hampshire, and Vermont. The number of cities served reached a peak of 22 in 1983, and averaged 19 for the period 1978-1985, as compared to an average of 16 for 1970-1977. Most new service has been provided by commuter airlines such as Air Vermont, Pilgrim Airlines, and

Precision Airlines. Eight nonhub communities received regular, long-term service for the first time during the study period. Service to many of these locations has not proven economically feasible to maintain, but others have proven to be capable of supporting steady airline service.

Air Carriers (Figure 3; Table 3; Appendix A)

The mix of air carriers serving northern New England during the years 1978-1985 reveals distinctive patterns. The decade-long struggle of the certificated air carriers (Delta and Allegheny, which became USAir in 1978) against the continuation of unprofitable, subsidized air service to smaller cities in Maine, New Hampshire, and Vermont was mostly resolved in the years following deregulation. Commuter replacement of certificated airlines was increasingly approved by the CAB. Perhaps more importantly, a wider range of commuter aircraft sizes began to become available as technology caught up with demand. By the early 1980s, newer, more efficiently sized aircraft were entering service on northern New England routes.

This combination of events led to changes in the makeup of air carriers serving the region after deregulation. The larger jet carriers, at last given the latitude to determine their own markets, began to abandon the subsidized routes in search of more profitable markets. In August, 1979, the CAB approved Delta's exit from Presque Isle, Maine, with replacement service provided by Bar Harbor. In 1980 Delta also suspended service at Manchester, leaving jet service in the region only at Bangor, Portland, and Burlington. By 1982, Delta terminated service at Burlington, leaving the remnants of the old Northeast system in place only

at Portland and Bangor. From 1980 to 1984, New Hampshire had no jet service.

Overall, the number of air carriers serving northern New England cities has increased since 1978. The pullout of several airlines and the failure of others caused the number of carriers in the region to decline through 1980, but since that time a steady increase has been evident. The number of air carriers serving the four small hubs has dramatically increased since 1979, but the same figure has decreased and bottomed out at a level lower than pre-deregulation for the nonhubs. This consolidation of carriers serving nonhubs does mean that the choice of carriers available to the air traveler at the smaller communities has not improved since deregulation.

Much of the decline in the number of air carriers, mainly commuters, serving nonhub communities in northern New England and the U.S. was due to recessions in the early 1980s and restrictions imposed by the Air Traffic Controllers union strike in 1981. Nevertheless, commuters built their services up slowly as new larger, longer-range equipment became available. Bar Harbor Airlines continued to be a major commuter carrier in northern New England, serving ten points by 1985 in all three states. The establishment of Precision Airlines in 1977 also aided development of new service in the region. Finally, commuter carrier contracts and working arrangements with major jet carriers provided stability and a solution to connection problems. In 1981, Bar Harbor entered into a ten-year arrangement with Eastern Airlines for joint marketing, ticketing, and fare construction, becoming one of the first carriers nationwide to take advantage of such a link (Davis, 1982, p. 86). Other carriers to

initiate new service to the region between 1978 and 1985 included Air Vermont, Pilgrim, Empire, Valley, and Ransome.

Midway through the study period, major airline profits declined, influenced by a slowdown in the economy in 1981 and increased competition, which was proving to be a deterrant to moving into too many new markets. Jet carriers, therefore, often found that providing new services often did not reap the expected profits. As a result, some carriers began to "rediscover" the northern New England markets as a place to make at least some profit. In 1982, the region began to receive service from additional jet carriers, beginning with flights from Air Florida at Burlington. By 1983, People Express and United initiated service at Burlington and Portland, and by 1985 other jet airlines had begun serving Bangor and Manchester. Most of the these carriers have continued to serve the region.

In a sense, then, patterns of jet carrier service have come full circle since deregulation. But what is found at present is a better overall balance of jet and expanded commuter service in the region, and a more realistic offering of air services.

Flights, Seats, and Markets (Figures 4-9; Appendix A)

Flights per week offered in northern New England during the period 1978-1985 reflected a controlled trend of growth, tempered by several significant complicating events. In 1978, flights per week reached a mid-decade high of 2,775 as commuter carriers began to supplement jet carrier flights. This level was 54.9% higher than the 1970 figure of 1,792 flights per week. However, the lack of new commuter aircraft, the recessed economy, the bankruptcy of Air New England in late 1981, and

flight curtailment caused by the 1981 air traffic controllers' strike all temporarily trimmed back air service to the region, causing the number of flights to decline slightly through 1981. Since 1982 the number of flights per week at northern New England airports has increased steadily, aided by the return of jet carriers to the region. By 1985, airlines were offering 3,635 flights per week, a 31.0% increase over 1978, and more than double the number of flights since 1970. The average annual increase in weekly flights during 1978-1985 was 6.4%, as compared to 2.3% for 1970-1977. These facts strongly support the position that deregulation has resulted in better air service to the region. This improvement in air service, however, was restricted largely to the four small hub cities of Bangor, Burlington, Manchester, and Portland. Annual increases in seats available to the air traveler at nonhubs averaged only 2.0%, while a 9.4% annual rise in available seats at small hubs was recorded.

Rates of increase in available seats per week in northern New England from 1978 through 1985 reflected slower growth than the increase in the number of flights. Seats per week in 1978 totaled 105,908, a high for the decade. A decline in seats per week lasted through 1982 for many of the same reasons which caused the drop in flights per week. The available seats per week bottomed out at 88,876 in 1981. It is significant that the percentage decrease in seats from 1978 to 1981 (16.0%) is greater than that for flights per week for the same period (11.1%). This reflects the discontinuation of jet service and replacement with commuter airline service at several communities during that period. Beginning with 1983, however, when jet carriers began to return to the region in force, available seats per week increased. A high of 128,055 seats per week was reached by 1984, and the higher levels continued into 1985.

As with flight levels, the increases in seats per week were mostly at the small hubs. In fact, the number of seats available at nonhubs actually declined at an annual rate of 2.2%. While this can hardly be interpreted as positive, the move by commuter airlines to smaller, more reasonably sized aircraft is primarily responsible for this pattern. The decreases do seem to have leveled off since 1980, and it is likely that the airlines have reached a more realistic number of seats offered at nonhubs.

Although growth rates in available seats averaged less for 1978-1985 as compared to 1970-1977, much of the reason is due to the artificial CAB-induced overcapacity characteristic of the pre-deregulation era. The increasing emphasis on commuter airline service to the region after deregulation is the major reason for the decrease in growth rates of available seats. Whether service as measured by the rate of increase of available seats actually improved after deregulation is difficult to unequivocally prove. When taken together with the better range of available connections and destinations after 1978, however, it is apparent that the distribution of seats has been more realistic and attractive to the airline traveler.

A short digression at this point is worthwhile to compare seats per flight information during the post-deregulation period. The average number of available seats per flight has decreased over time at both small hubs and nonhubs. A high of 45.17 seats per flight was reached in 1975 with a decline to 29.10 in 1982 (when fewer jet flights were available), and back up to 34.68 in 1985. These data not only indicate the greater reliance on commuter aircraft for service in the region, but also demonstrate the trend toward smaller, more efficient jet and commuter

aircraft. This trend is borne out in the example of seats per flight figures at Manchester, New Hampshire (Figure 12), where overcapacity problems were reduced after deregulation.

Finally, the number of nonstop destination city-pair markets in northern New England has increased since 1978, and has increased significantly over the 1970-1977 period, averaging an additional 27 nonstop route pairs. Increases in available nonstop markets for both small hubs and nonhubs were steady, although less for the latter.

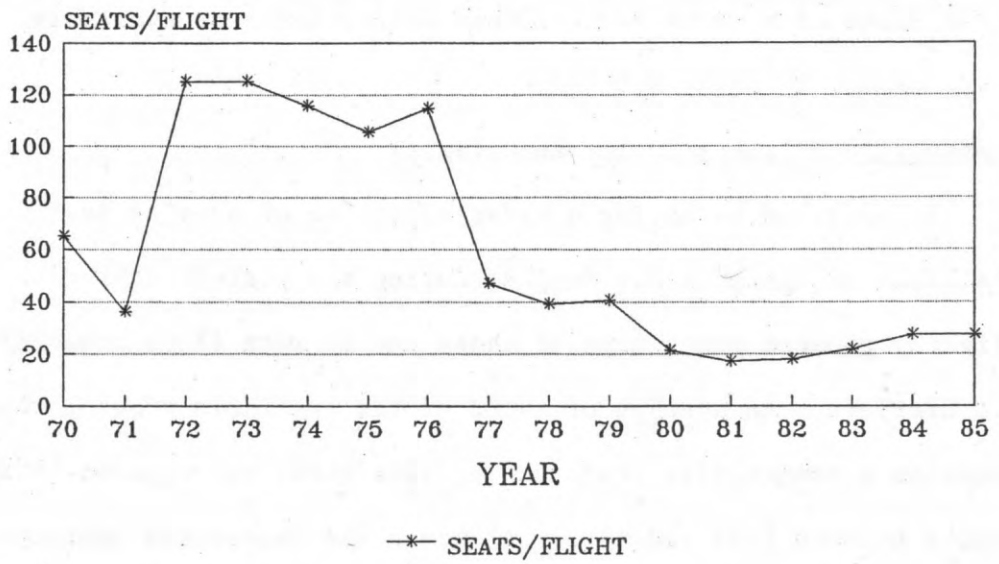
These data reinforce the thesis that air service to northern New England has improved with deregulation from the perspective of having a wider range of nonstop destinations and connections available.

Competition (Figures 10-11; Appendix A)

In addition to having a wider selection of nonstop destinations available in northern New England during the post-deregulation period, a slightly greater percentage of those routes were flown competitively by air carriers. An average of 14.6% of the available nonstop routes were flown on a competitive basis during 1978-1985, as compared to a 14.4% figure between 1970 and 1977. Although the percentage increase is small, this represents a net increase of approximately four additional nonstop competitive routes. In addition, the trend leading up to 1985 indicates that competition is increasing at a faster rate. By 1981, the competitive route pair percentage had increased to 17.4%, but the bankruptcy of Air New England caused competition to lessen temporarily through 1982. By 1984 the proportion of competitive routes rose to 22.2%. Analysis of these trends would suggest that at both small hubs and nonhubs, increased

FIGURE 12

SEATS PER FLIGHT
MANCHESTER, N.H., 1970–1985



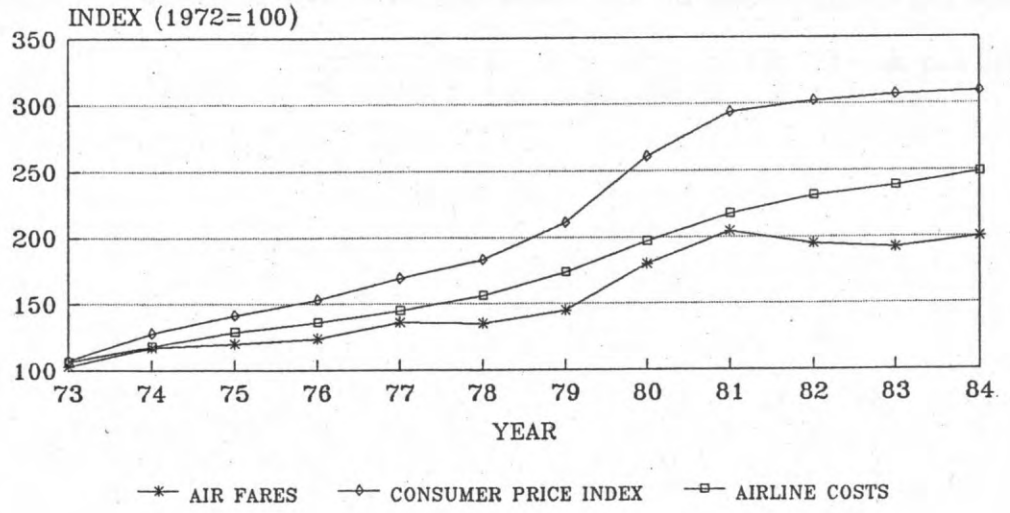
Source: Official Airline Guide, 1970–85.

levels of competitive air service since deregulation have provided benefits to the northern New England region.

Because of the proliferation of air fares available to the consumer, it was decided not to attempt fare analyses in this study. It has been shown in at least one other instance, however, that one airline's average coach fares declined relative to inflation in the period 1978-1980 (Maraffa and Kiel, 1985), and that fares have increased at a lesser rate that inflation (see Figure 13) as measured by the Consumer Price Index (U.S. General Accounting Office, 1985). It is likely, given the pre-deregulation pricing structure influenced by the CAB, that a wider, more realistic range of air fares has been available to the northern New England air traveler because of deregulation.

FIGURE 13

AIRLINE FARES, COSTS VS. CONSUMER PRICES
U.S., 1973-1984



Source: Deregulation: Increased Competition is Making Airlines More Efficient and Responsive to Consumers, 1985.

SECTION 4

Summary and Conclusions

This study has focused on the nature of airline service to northern New England from 1970 to 1985. Summary results of the study are presented in Table 4. Comparisons of air service in the region before deregulation (1970-1977) with that provided since deregulation (1978-1985) reveal that changes since deregulation have resulted in:

1. Greater numbers of air carriers and a more realistic mix of jet and commuter airlines serving the region;

2. More cities and communities in northern New England receiving regularly scheduled air service;

3. A significantly higher level of air service, as measured by available flights, seats, and nonstop destinations;

4. A higher level of route competition among northern New England air carriers, thus helping to promote lower passenger fares; and

5. Increased benefits since deregulation at the four larger cities classified as small hubs (Burlington, Bangor, Manchester, and Portland) as compared to the smaller, nonhub communities.

The improvement to air service in the larger cities has been significant in all respects, positively affecting large numbers of air travelers throughout the region. The benefits to smaller communities have not been as evident. The average number of air carriers and the changes in available seats and flights per week at nonhubs have been less favorable under deregulation. Improvement has been noted, however, in the number of nonhub communities served, the number of nonstop markets

TABLE 4

NEW ENGLAND REGIONAL AIR TRANSPORTATION STUDY
SUMMARY DATA
NORTHERN NEW ENGLAND
1970-1985

	AVG. NO. OF CITIES SERVED	AVG. NO. OF AIR CARRIERS	AVG. NO. OF N/S DESTINATIONS	AVG. ANNUAL CHANGE IN SEATS/WEEK	AVG. ANNUAL CHANGE IN FLIGHTS/WEEK	AVG. NO. OF SEATS/FLIGHT	AVG. NO. OF COMPETITIVE ROUTES
TOTALS							
1970-1977	16.0	11.0	65.3	+4.0	+3.9	41.59	9.3
1978-1985	18.9	11.0	92.6	+3.7	+6.4	36.12	13.5
SMALL HUBS							
1970-1977	4.0	8.1	37.3	+4.3	+4.0	62.83	6.1
1978-1985	4.0	9.6	54.9	+5.8	+9.4	52.74	10.1
NONHUBS							
1970-1977	12.0	7.9	37.1	+4.1	+4.1	22.31	3.1
1978-1985	14.9	5.4	51.4	-2.2	+2.0	17.18	3.4

Source: Official Airline Guide, 1970-1985.

available, and in competitive markets flown. While the results for nonhub communities are mixed, the proximity of many of these places to the four small hub cities does offer positive alternatives to those located in air traffic shadow areas. In addition, a strong argument can be made that many of the negative trends in air service to nonhub communities have been adjustments to more realistic, cost-effective service patterns by air carriers rather than a retrenchment or cutback in essential service. Finally, many of the negative patterns and factors under deregulation have resulted from outside factors such as the air traffic controller strike and recessions.

To conclude, then, there is cause for continued concern and need for additional study regarding these topics. How air service will be affected in the region will be shaped by several factors. These include:

1. What will be the relative health of the economy in the region?

2. What will happen to air service in Maine, New Hampshire, and Vermont if the federal essential air service and subsidy programs end or are redefined as scheduled in 1988?

3. How will continued mergers affect air service, competition, and fares in the region?

4. Will the availability of new jet and commuter aircraft continue the trend of more realistic service patterns in the region?

5. Will the major jet carriers continue to exist in a financially healthy manner in northern New England?

These and other concerns will influence air service patterns in the future in the region, which has historically suffered from transportation problems. Hopefully, the gains realized in air transportation service in northern New England since deregulation will be enhanced in the future to further benefit its residents.

REFERENCES

Air Transportation for New England (1956) (Boston: New England Governors' Committee on Public Transportation), 56 pp.

Aviation Week and Space Technology (1970-1985), Vols. 103-119.

Basic Statistics: Income and Trade (1971-1986) (New York: Standard and Poor's).

Cates, D. Brooks (1978), "Short-Run Structural Change in an Airline Network of Declining Connectivity," The Professional Geographer, 30:1, 9-13.

Davis, Lou (1982), "Eastern Pact Boosts Bar Harbor's Fortunes," Air Transport World, 19:9, 84+.

Eads, George W. (1972), The Local Service Airline Experiment (Washington, D.C.: Brookings Institution), 223 pp.

Federal Aviation Administration, Statistical Handbook of Aviation (1971-1986) (Washington, D.C.: FAA).

Hebert, Budd, and Elaine Murphy (1970), "Evolution of an Accessibility Surface: The Case of the United States Air Transportation Network," Proceedings of the Association of American Geographers, 3, 75-80.

Higgins, Richard G. (1985), "The Impact of Hub and Spoke Network Centralization and Route Monopoly on Domestic Airline Profitability," Transportation Journal, 24:3, 16-27.

Howrey, E. Philip (1969), "On the Choice of Forecasting Models for Air Travel," Journal of Regional Science, 9:2, 215-224.

Lewis, W. David and Wesley P. Newton (1979), Delta: The History of an Airline (Athens, Ga.: University of Georgia Press), 503 pp.

Maraffa, Thomas A. and Don Kiel (1985), "Air Service to Cities Abandoned by Piedmont Aviation since Deregulation," Southeastern Geographer, 25:1, 16-29.

Official Airline Guide (1970-1985) (Oak Brook, Ill.: Official Airline Guide, Inc.).

Regulatory Policy Staff, U.S. DOT (1977), "Air Service to Small Communities," Regulation of Passenger Fares and Competition among the Airlines (Washington, D.C.: American Enterprise Institute for Public Policy Research), pp. 81-106.

Snow, John W. (1977), "The Problems of Airline Regulation and the Ford Administration Proposal for Reform," Regulation of Passenger Fares and Competition among the Airlines (Washington, D.C.: American Enterprise Institute for Public Policy Research), pp. 3-37.

Stanley, William R., and Thomas F. Baucom (1972), "Some Spatial Components of Regional Air Service Demand in the Southeast," Southeastern Geographer, 12:2, 145-154.

Taaffe, Edward J. (1958), "A Map Analysis of United States Airline Competition, Part 1: The Development of Competition," Journal of Air Law and Commerce, 25:2, 121-147.

U.S. Civil Aeronautics Board (1972), Service to Small Communities, Part 2: Small Aircraft and Small Communities. . . A History and Economic Analysis (Washington, D.C.: CAB).

U.S. General Accounting Office (1985), Deregulation: Increased Competition is Making Airlines More Efficient and Responsive to Consumers, (Washington, D.C.: GPO), 86 pp.

Warren, William D. (1984), "Changing Air Transportation Services for Smaller Metropolitan Regions," Transportation Quarterly, 38:2, 245-266.

APPENDIX A

Data Tables

NEW ENGLAND REGIONAL AIR TRANSPORTATION STUDY
WEEKLY ARRIVALS/DEPARTURES - NORTHERN NEW ENGLAND
1970-1985

CITY	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
AUG	186	208	266	285	217	160	287	203	210	206	202	203	121	100	152	166
BGR	143	143	272	225	262	283	285	286	313	299	298	266	377	351	421	408
BHB	22	34	41	38	102	35	61	58	60	58	50	58	72	76	62	71
BML	-	-	-	-	21	-	18	-	-	-	-	-	48	50	-	-
BTV	337	352	291	351	322	338	227	312	332	357	280	348	423	676	666	680
CON	-	-	-	-	-	-	-	-	80	50	50	-	-	-	-	-
FRY	-	-	-	-	-	-	-	-	34	-	-	-	-	-	-	-
HUL	-	-	-	-	-	-	-	-	-	-	-	-	-	20	20	12
EEN	195	130	98	115	62	149	172	172	161	138	138	153	178	176	176	234
LCI	-	48	35	46	85	51	44	52	122	98	64	77	76	76	62	41
LEB	157	148	146	266	155	207	181	166	177	128	152	210	206	283	285	334
LEW	112	94	62	68	74	73	26	38	48	60	60	62	45	50	45	58
WFK	-	-	39	-	-	-	-	-	38	-	-	-	20	20	30	30
MHT	106	180	75	84	80	91	114	216	268	269	329	294	325	351	407	438
MPV	67	180	120	224	202	154	76	86	74	82	36	48	70	48	37	24
MVL	-	-	-	-	-	-	-	-	-	-	-	-	23	-	24	-
ASH	-	-	-	22	-	-	-	-	-	130	115	-	-	-	-	-
EFK	-	-	-	-	10	-	-	-	-	-	-	-	48	36	-	-
PWM	285	276	357	442	462	375	383	316	459	385	326	341	367	500	584	690
PQI	60	74	134	58	61	51	80	92	115	112	92	60	94	125	140	142
RKD	38	50	90	50	54	57	79	52	65	52	102	89	146	78	88	93
RUT	30	48	26	60	36	42	84	78	83	96	96	76	76	86	87	82
VSF	-	-	-	-	-	-	-	68	85	79	72	76	76	97	97	88
WVL	54	106	83	134	94	80	94	94	12	30	156	107	66	40	59	44
HIE	-	12	-	-	-	24	-	-	-	-	-	-	-	20	-	-
ISS	-	-	-	-	-	-	-	-	39	-	-	-	-	-	-	-
TOTALS	1792	2085	2135	2468	2299	2170	2175	2289	2775	2629	2618	2468	2857	3259	3442	3635
SMALL HUBS	871	951	995	1102	1126	1087	1009	1130	1372	1310	1233	1249	1492	1878	2078	2216
NON-HUBS	921	1134	1140	1366	1173	1083	1166	1189	1403	1319	1385	1219	1365	1381	1364	1419

Source: Official Airline Guide, 1970-1985.

NEW ENGLAND REGIONAL AIR TRANSPORTATION STUDY
SEATS/WEEK AVAILABLE - NORTHERN NEW ENGLAND
1970-1985

CITY	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
AUG	2489	5428	3236	5645	4370	2960	4310	5960	3610	2820	2680	2620	1625	1095	1705	1890
BGR	12675	11293	12029	16110	15390	16630	14590	18250	17695	15217	14592	13852	20295	16221	20497	16650
BHB	220	204	510	440	1500	610	860	1200	900	580	500	590	812	858	644	752
BML	-	-	-	-	126	-	108	-	-	-	-	-	336	350	-	-
BTV	13734	16335	18960	16284	15732	19672	16883	19547	20286	22807	22667	21473	18777	34317	37937	38642
CON	-	-	-	-	-	-	-	-	560	350	350	-	-	-	-	-
FRY	-	-	-	-	-	-	-	-	238	-	-	-	-	-	-	-
HUL	-	-	-	-	-	-	-	-	-	-	-	-	-	120	120	84
EEN	5992	3676	3738	5110	4174	4064	3684	3879	3997	3480	3180	3540	4176	3520	2640	3510
LCI	-	288	210	230	510	306	264	364	854	686	1280	539	847	815	1240	328
LEB	4856	3744	3648	5508	4212	4599	5090	5504	6396	5264	5896	6936	4780	6780	5467	7110
LEW	2240	1880	1240	1360	1480	1460	520	760	960	1200	1200	740	450	660	675	810
WFK	-	-	264	-	-	-	-	-	304	-	-	-	120	120	180	180
MHT	6932	6500	9375	10500	9250	9590	13070	10211	10490	10911	7104	5042	5846	7731	11190	11978
MPV	2680	3360	2400	3860	3545	2980	1520	1720	1480	1172	720	678	1400	960	555	360
MVL	-	-	-	-	-	-	-	-	-	-	-	-	161	-	168	-
ASH	-	-	-	220	-	-	-	-	-	1040	770	-	-	-	-	-
EFK	-	-	-	-	60	-	-	-	-	-	-	-	336	252	-	-
PWM	20589	19875	20821	28635	25825	27725	24335	22852	29905	27080	25912	25380	24782	39491	37469	36486
PQI	2026	3538	3898	3570	3860	4615	4280	5020	4919	2960	2760	1956	2528	3382	2958	3028
RKD	228	300	540	300	324	342	474	364	1144	364	1020	1080	1390	1170	1000	1180
RUT	720	768	520	600	720	720	1200	669	1023	672	672	1520	1520	1720	1305	1230
VSF	-	-	-	-	-	-	-	616	595	553	504	1520	1520	1920	1455	1320
WVL	1080	3334	1480	2840	2070	1600	1880	1880	240	600	1560	1410	1095	531	850	510
HIE	-	72	-	-	-	144	144	-	-	-	-	-	-	140	-	-
ISS	-	-	-	-	-	-	-	-	312	-	-	-	-	-	-	-
TOT.	76641	80595	82869	101212	93148	98017	93212	98526	105908	97756	93367	88876	92976	122153	128055	126048
SMALL HUBS	53930	54003	61185	71529	66197	73617	68878	70860	78376	76015	70215	65747	69700	97760	107093	103756
NON-HUBS	22711	26592	21684	29683	26951	24400	24334	27666	27532	21741	23092	23129	23096	24393	20962	22292

Source: Official Airline Guide, 1970-1985.

NEW ENGLAND AIR TRANSPORTATION STUDY
SEATS/FLIGHT - NORTHERN NEW ENGLAND
1970-1985

CITY	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
AUG	13.38	26.10	12.17	19.81	20.14	18.50	15.02	28.03	17.19	13.69	13.27	12.91	13.43	10.95	11.22	11.39
BGR	95.63	77.88	44.22	71.60	58.74	58.76	51.19	63.81	56.53	50.89	48.97	52.08	58.83	46.21	46.99	40.81
BHB	10.00	6.00	12.44	11.58	14.71	17.43	14.10	20.69	15.00	10.00	10.00	10.17	11.28	11.29	10.39	10.59
BML	-	-	-	-	6.00	-	6.00	-	-	-	-	-	7.00	7.00	-	-
BTV	40.75	46.41	65.15	46.39	48.86	58.20	74.37	62.65	61.10	63.89	80.95	61.70	44.39	50.76	56.96	56.83
CON	-	-	-	-	-	-	-	-	7.00	7.00	7.00	-	-	-	-	-
FRY	-	-	-	-	-	-	-	-	7.00	-	-	-	-	-	-	-
HUL	-	-	-	-	-	-	-	-	-	-	-	-	-	6.00	6.00	7.00
EEN	30.73	28.28	38.14	44.43	67.32	27.28	21.42	22.55	24.83	25.22	23.04	23.14	27.29	20.00	15.00	15.00
LCI	-	6.00	6.00	5.00	6.00	6.00	6.00	7.00	7.00	7.00	20.00	7.00	11.14	10.72	20.00	8.00
LEB	30.93	25.30	24.99	20.71	27.17	22.22	28.12	33.16	36.14	41.13	38.79	33.03	23.20	23.96	19.18	21.29
LEW	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	11.94	10.00	13.20	15.00	13.97
WFK	-	-	6.77	-	-	-	-	-	8.00	-	-	-	6.00	6.00	6.00	6.00
MHT	65.40	36.11	125.00	125.00	115.63	105.38	114.65	47.27	39.14	40.56	21.59	17.15	17.99	22.03	27.49	27.35
MPV	40.00	18.67	20.00	17.23	17.55	19.35	20.00	20.00	20.00	14.29	20.00	14.13	20.00	20.00	15.00	15.00
MVL	-	-	-	-	-	-	-	-	-	-	-	-	7.00	-	7.00	-
ASH	-	-	-	10.00	-	-	-	-	-	8.00	6.70	-	-	-	-	-
EFK	-	-	-	-	6.00	-	-	-	-	-	-	-	-	7.00	-	-
PWM	72.24	72.01	58.32	64.79	55.90	73.93	63.54	72.32	65.15	70.34	79.48	74.43	67.53	78.98	64.16	52.88
PQI	33.77	47.81	29.09	61.55	63.28	90.49	53.50	54.57	42.77	26.43	30.00	32.60	26.89	27.06	21.13	21.32
RKD	6.00	6.00	6.00	6.00	6.00	6.00	6.00	7.00	17.60	7.00	10.00	12.13	9.52	15.00	11.36	12.69
RUT	24.00	16.00	20.00	10.00	20.00	17.14	14.29	8.58	12.33	7.00	7.00	20.00	20.00	20.00	15.00	15.00
VSF	-	-	-	-	-	-	-	9.06	7.00	7.00	7.00	20.00	20.00	19.79	15.00	15.00
WVL	20.00	31.45	17.83	21.19	22.02	20.00	20.00	20.00	20.00	20.00	10.00	13.18	16.59	13.28	14.41	11.59
HIE	-	6.00	-	-	-	6.00	6.00	-	-	-	-	-	-	7.00	-	-
ISS	-	-	-	-	-	-	-	-	8.00	-	-	-	-	-	-	-
AVG.	42.67	38.65	38.81	41.01	40.52	45.17	42.86	43.04	38.17	37.18	35.66	36.01	32.54	37.48	37.20	34.68
SMALL HUBS	61.92	56.79	61.49	64.91	58.79	67.72	68.28	62.71	57.13	58.03	57.00	52.64	46.72	52.06	51.54	46.82
NON-HUBS	24.66	23.45	19.02	21.73	22.98	22.53	20.87	23.27	19.62	16.48	16.67	18.97	16.92	17.66	15.37	15.71

Source: Official Airline Guide, 1970-1985.

NEW ENGLAND REGIONAL AIR TRANSPORTATION STUDY
TOTAL, COMPETITIVE, AND MONOPOLY CITY PAIR MARKETS
NORTHERN NEW ENGLAND, 1970-1985

CITY	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
AUG	1/3	2/3	3/2	2/2	0/4	1/4	1/4	1/4	1/4	1/4	1/3	1/5	1/4	1/3	2/2	2/5
BGR	0/5	0/6	2/4	2/2	2/3	2/8	2/5	2/4	2/8	2/6	3/5	3/7	2/10	3/11	5/8	3/13
BHB	0/1	0/1	0/2	0/2	0/3	0/3	0/3	0/3	0/3	0/4	0/3	0/3	0/3	1/2	1/1	1/3
BML	-	-	-	-	0/2	-	0/2	-	-	-	-	-	0/2	0/2	-	-
BTV	2/12	2/11	0/10	2/10	1/11	1/13	2/10	1/11	1/13	2/11	2/9	2/11	3/12	3/14	3/14	4/13
CON	-	-	-	-	-	-	-	-	0/2	0/3	0/3	-	-	-	-	-
FRY	-	-	-	-	-	-	-	-	0/2	-	-	-	-	-	-	-
HUL	-	-	-	-	-	-	-	-	-	-	-	-	-	0/1	0/1	0/1
EEN	1/5	0/6	0/6	1/4	0/3	0/6	0/4	1/4	0/5	0/5	0/7	1/5	0/6	0/4	0/5	0/4
LCI	-	0/2	0/1	0/1	0/2	0/2	0/1	0/1	0/2	1/1	0/1	0/1	0/2	0/2	0/2	0/1
LEB	1/3	0/4	0/4	2/4	1/3	0/6	0/5	0/4	0/4	0/4	0/5	1/4	2/5	1/6	1/4	1/4
LEW	0/3	0/4	0/3	0/4	0/3	0/3	0/1	0/2	0/3	0/2	0/2	0/5	0/5	0/4	0/4	0/4
WFK	-	-	0/1	-	-	-	-	-	0/1	-	-	-	0/1	0/1	0/1	0/1
MHT	0/4	1/4	0/5	0/4	0/4	1/4	2/2	2/5	0/5	2/2	2/6	3/5	1/9	1/8	2/5	4/4
MPV	0/3	0/4	0/3	2/1	0/3	0/4	0/3	0/3	0/3	1/3	0/2	0/2	0/3	0/1	0/1	0/1
MVL	-	-	-	-	-	-	-	-	-	-	-	-	0/2	-	0/1	-
ASH	-	-	-	0/1	-	-	-	-	-	0/4	0/4	-	-	-	-	-
EFK	-	-	-	-	0/1	-	-	-	-	-	-	-	0/3	0/2	-	-
PWM	1/5	3/4	4/3	3/6	3/5	2/8	2/6	2/7	2/8	2/6	3/5	3/7	2/10	3/11	5/8	3/13
PQI	1/1	1/3	1/2	0/2	0/3	0/3	0/3	0/3	0/5	0/4	0/3	0/3	1/3	1/3	1/3	1/4
RKD	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/2	0/1	0/6	0/5	0/6	0/3	0/2	0/5
RUT	0/2	0/4	0/2	0/3	0/2	0/2	0/4	0/4	0/4	0/5	0/6	0/2	0/2	0/2	0/2	0/2
VSF	-	-	-	-	-	-	-	0/2	0/2	0/3	0/3	0/2	0/2	0/2	0/2	0/2
WVL	0/1	0/3	1/1	1/1	0/1	0/1	0/1	0/1	0/1	0/1	0/6	1/4	0/5	0/4	0/4	0/4
HIE	-	0/1	-	-	-	0/1	0/3	-	-	-	-	-	-	0/1	-	-
ISS	-	-	-	-	-	-	-	-	0/2	-	-	-	-	-	-	-
TOT.	7/49	9/61	11/50	15/48	7/54	7/69	9/58	9/59	6/79	11/69	11/79	15/71	12/95	14/86	20/70	19/84
COMP.(%)	12.5	12.9	18.0	23.8	11.5	9.2	13.4	13.2	7.1	13.8	12.2	17.4	11.2	14.0	22.2	18.4
MONO.(%)	87.5	87.3	82.0	76.2	88.5	90.8	86.6	86.8	92.9	86.2	87.8	82.6	88.8	86.0	77.8	83.6
SM. HUBS	3/29	6/31	6/28	7/29	6/29	6/39	8/31	7/34	5/39	8/33	10/35	11/41	8/49	10/54	15/50	14/57
COMP.(%)	10.3	19.4	21.4	24.1	20.7	15.4	25.8	20.6	12.8	24.2	28.6	26.8	16.3	18.5	30.0	24.6
MONO.(%)	89.7	80.6	78.6	75.9	79.3	84.6	74.2	79.4	87.2	75.8	71.5	73.2	83.7	81.5	70.0	75.4
NONHUBS	4/27	3/39	5/33	8/34	1/32	1/37	1/36	2/34	1/46	3/47	1/55	4/45	4/58	4/46	5/40	5/46
COMP.(%)	14.8	7.7	15.2	23.6	3.1	2.7	2.8	5.9	2.2	6.4	1.8	8.9	6.9	8.7	21.7	10.9
MONO.(%)	85.2	92.3	84.8	76.4	96.9	97.4	97.2	94.1	97.8	93.6	98.2	91.1	93.1	91.3	78.3	89.1

Source: Official Airline Guide, 1970-1985.

NEW ENGLAND REGIONAL AIR TRANSPORTATION STUDY
JET/COMMUTER CARRIERS BY HUB SIZE
NORTHERN NEW ENGLAND
1970-1985

	JET/COMMUTER CARRIERS															
	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
TOTALS	10	12	11	11	11	12	12	9	10	9	7	8	10	15	14	15
JET	2	2	2	2	2	2	2	2	2	2	2	2	3	5	4	5
COMMUTER	8	10	9	9	9	10	10	7	8	7	5	6	7	10	10	10
SMALL HUBS																
TOTALS	8	10	8	7	7	9	8	8	7	6	7	8	10	14	12	13
JET	2	2	2	2	2	2	2	2	2	2	2	2	3	5	4	5
COMMUTER	6	8	6	5	5	7	6	6	5	4	5	6	7	9	8	8
NONHUBS																
TOTALS	6	9	9	9	7	7	8	8	8	6	3	4	6	6	5	5
JET	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
COMMUTER	5	8	8	8	6	6	7	7	7	6	3	4	6	6	5	5

Source: Official Airline Guide, 1970-1985.