NAVAL AIR STATION, BRUNSWICK
A REGIONAL AIRPORT
FOR
SOUTHWESTERN MAINE

A REPORT

of the

AIR TRANSPORTATION COMMITTEE

of the

BATH AND BRUNSWICK, MAINE

CHAMBERS OF COMMERCE

March, 1963

THE BRUNSWICK AREA CHAMBER OF COMMERCE
59 PLEASANT STREET BRUNSWICK, MAINE

PAUL TIEMER
GENERAL MANAGER
AREA CODE 207
725-8797

April 8, 1963

Miss Edith Hary
Legislative Reference Librarian
State House
Augusta, Maine

Dear Miss Hary:

As you are probably aware, an Air Transportation Committee of the Bath and Brunswick Chambers of Commerce has been studying the possibilities of commercial use of the facilities of Naval Air Station, Brunswick. Enclosed is a copy of the report of the Committee. Among other things, the Committee has concluded that proper consideration of the use of NASB can only be made within the context of a thorough study of the entire air transportation needs of the state. It is our hope that this report will be of some help in instituting such an investigation.

We hope you will find the report interesting and will welcome any comments or suggestions you might have to make.

Sincerely,

James A. Storer

James A. Storer, Chairman
Air Transportation Committee.

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FOREWORD

This report constitutes the findings of the Committee on Air Transportation formed by the Bath and Brunswick Chambers of Commerce.

The Committee consists of Mr. Richard Armstrong, and Mr. Jack Stelling from Bath, and Mr. Robert Morrell, Mr. Donald Parks, Prof. Paul Darling, Mr. Paul Burbank, and Prof. James Storer of the Brunswick Chamber of Commerce. The Report was prepared by a subcommittee that included Prof. Darling, Mr. Burbank, Mr. Morrell, and Prof. Storer. Mr. Steven Weiss, a student at Bowdoin College, assisted in the preparation of the statistical material in Part III.

The Committee would like to express its appreciation to all those who have assisted in this effort. In particular, the Committee is grateful for the cooperation that has been extended by the U. S. Navy, including the local command at Naval Air Station, Brunswick.

James A. Storer,
Chairman

PART I

INTRODUCTION

This report concerns the possible use of the Naval Air Station at Brunswick, Maine, by a scheduled commercial airline, establishing there a regional airport serving southwestern Maine.

Citizens of the area have been interested for several years in the potentialities of joint use of the excellent facilities at NASB. Somewhat of a precedent for this was established after World War II when the base, then inactive, was used by a scheduled air carrier as well as for other private aviation activities. More recently, the concern for the air transportation needs of the state have increased the interest in NASB for scheduled commercial use. In particular, this concern has been focused upon the necessity of centralizing air carrier service at a limited number of airports in the state rather than scattering service inefficiently at eight or ten airports each serving a small geographical area. A significant impetus for the concept of regional airports in Maine and New England was provided by the report on this subject prepared by the Thompson and Lichtner Company for the New England Council in 1961. [1]

While every city may wish to have its own airport with trunk line service, this is impractical in Maine. The eventual use of medium sized jet airplanes for service in Maine would not appear to make this any more practical; rather it will tend to force even more the consolidation of airports. Cities which do not have trunk line service will have to use a shuttle or feeder type of air service, or use highways to get to the major regional airport. This may seem to be discriminatory for those cities without the regional airport, but all communities in the state will clearly benefit if, with a few well-located airports, frequent, dependable, and adequate air service can be maintained for Maine.

It is within the context of the NASB serving as a regional airport that the present committee, appointed by the Chambers of Commerce of Bath and Brunswick, has operated. This report constitutes the recommendations and conclusions of the committee together with the information and evidence that support them.

Two factors have made scheduled air carrier service at NASB particularly feasible. These are the existence at the base of exceptional physical facilities that lend themselves to joint civilian/military use. Equally important is the location of the base in relation to the population and pattern of air traffic use in Maine.

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[1] A Master Plan for Regional Airports to Serve Scheduled Air Transportation Needs of New England, prepared by the Thompson and Lichtner Company for the New England Council, 1961.

Facilities at NASB

The facilities at the Base that are of significance to scheduled commercial air service are the two 8,000 foot runways (running north and south), together with the taxiways, runway lighting, Ground Controlled Approach system, and the facilities housed in the operations building and control tower. These facilities, which could be used by the scheduled carrier, have a value of approximately six and a half million dollars (valued at cost at time of construction or installation). Use by a scheduled commercial air carrier is made especially convenient because of the existence of a third runway running east and west which is not used by the Navy. This runway would provide taxiways and parking areas for the commercial airplanes. Adjoining the northern side of the runway near the eastern end, a terminal could be built in what is an unused section of the base located very near Route #24, formerly Route #1. Only a short road from Route #24 would be necessary, therefore, to provide separate access to the commercial terminal and parking area. These could be easily fenced off from the rest of the Base.

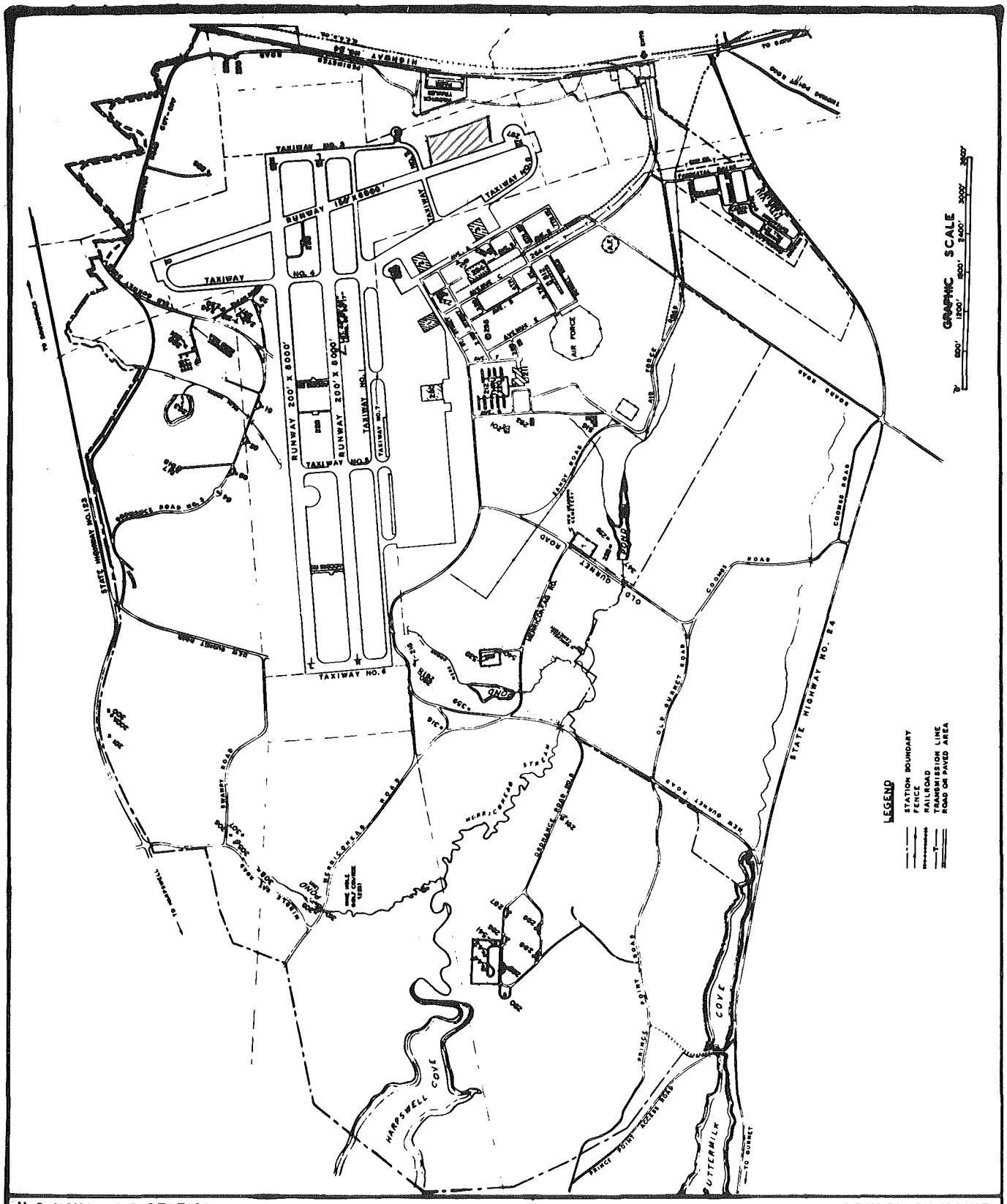
An expenditure of funds would be required, of course, for the terminal, parking space, the road, etc. that would have to be built. From an operations point of view, the most important item would be the installation of an Instrument Landing System (I. L. S.). However, all of these aspects could be provided for an investment of approximately $1,250,000. This is a remarkably low figure in comparison to the total value of the facilities available, or in comparison to the cost of constructing alternative facilities elsewhere.

There is an important second element in the financial feasibility of joint use of NASB. The operating and maintenance costs of the Base would be shared by the Navy and the civilian operators. Since the Navy would still account for the majority of total flights, they would, therefore, pay for the major portion of the shared operating and maintenance costs. Further details about the facilities at NASB and other costs data are provided in Part II of the report.

Location of NASB

The extent of the facilities and services available at NASB would be of little significance to Maine's air transportation needs if the location of the Base did not make sense in terms of the population, the economic structure of Maine and the pattern of air passenger traffic in the state.

A preliminary investigation of this important matter has been made, the results of which are presented in Part III along with its appendices. The evidence indicates that the population to be served by scheduled air carrier service from Brunswick compares favorably to other existing or proposed area airports in southwestern Maine.



Suggested general location of civilian facilities.

Estimates of both resident and summer visitor air traffic produces a total "population" for Brunswick of 745, 649 and a total for Portland of 692, 543. The proposed Sidney site would serve a much smaller population and would only tend to dilute the traffic and, therefore, the service provided from either Portland or Brunswick as well as Bangor.

It is clear, however, that a complete and satisfactory answer to the matter of location of a major regional airport in this part of Maine cannot be provided without a very thorough analysis of the population, the economic characteristics of the state, together with a survey of the destination and origin of passengers at various air terminals, particularly during the summer tourist season.

With respect to the possible use of NASB as a regional airport site, the recent and projected program of highway improvement in the area is of great importance. Of special significance is the completion of the latest link of Interstate Highway #95 which bypasses Brunswick and provides a connection to Route #24 near the point where the road from Route #24 would lead to the passenger terminal and parking areas within NASB.

Position of the Navy

Of course, neither the existence of excellent facilities nor the central location would be of any practical importance if the Navy did not wish to consider joint use of the Base. At an early date contact was made with the local command at the Base and the committee's inquiry was sent to the Chief of Naval Operations. The answer of the Acting Deputy Chief of Naval Operations (Air) indicates the willingness of the Navy to negotiate an agreement of joint use of NASB. (The letter is included in Appendix A of this section of the Report.) The terms stated in the letter are reasonable and understandable.. It is regrettable, however, that the Navy is not able to allow general aviation use of the facilities. This, too, is understandable but it does present real problems in terms of the relationship of other federal agencies and in view of the present rapid growth of general aviation. It is true that in the past operators of private planes upon occasion have received permission from the local command of the base to land there.

It must also be noted that under joint use of the base priority would be given to the military in the event of any emergency. However, the nature of operations at the Base and the information received by the committee, lead to the belief that joint use could be effectively and efficiently carried out.

Conclusions

The committee concludes that the use of NASB as a regional or area airport has much to recommend it in terms of a) the very limited investment needed to bring it into commercial operation, b) its location in Maine, and c) the favorable position taken by the Navy. The committee is also aware of the problems involved in this matter, but feels that these should be compared with the possibilities and problems of other sites throughout the state.

It appears to the committee that an adequate and effective program of regional airports for Maine can only be implemented through active leadership and initiative at the state level, together with the cooperation and assistance of the various federal agencies. However, as has already been indicated, the committee feels that action with respect to any specific airport would be premature before a comprehensive study has been made of Maine's air transportation needs. Only through such an investigation can all the factors be properly considered and a suitable decision made with respect to the several airport sites that have been proposed. The committee recommends that the state government take appropriate action to institute this study as a first step towards an integrated and effective policy and program of regional airports in Maine.

PART I
Appendix A

C O P Y

DEPARTMENT OF THE NAVY
Office of the Chief of Naval Operations
Washington 25, D. C.

C O P Y

In reply refer to:
Op-505C/avg
Ser 5082P50
1 Oct 1962

Dear Mr. Storer:

Your letter of 21 August 1962 requested information concerning possible joint civil/military use of the Naval Air Station, Brunswick, Maine, and a specific indication that arrangements could be made to accommodate such use. Your letter of 17 September 1962 further requested that general aviation requirements as well as scheduled air transport requirements be considered in this connection. The following is intended as a combined reply to your two letters.

Of necessity, the primary Navy consideration in evaluating a request for joint use of its facilities must be the retention of full capability by the Navy units involved to perform their mission. Any proposed use which may reduce or impair this capability must be denied. Further, the Navy must insure that its approval of plans for joint civil use does not place it in a position of competition with operators of private, municipal, State, Federal or other government-owned facilities.

Accordingly, I regret that your request for use of NAS Brunswick for general aviation cannot be approved. Experience at other locations has indicated that unrestricted use by civilian aircraft and simultaneous operational use by Fleet aircraft are, in general, incompatible. The possibilities of mutual interference and the hazards to flight safety inherent in combined operations of this type have been found unacceptably high.

I am glad to inform you, however, that suitable arrangements for joint use of NAS Brunswick by scheduled commercial airlines could be made provided certain conditions were met:

1. The need for such use is certified by the Federal Aviation Agency at your request.

2. Joint use were limited to runways, taxiways, control tower and aerological services, Ground Controlled Approach and other existing

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navigational aids, and such parking areas on portions of the closed runway 9-27 as may be agreed upon.

3. Construction and satisfactory maintenance, at no expense to the Navy, of all buildings, structures, and facilities which might be required for civilian use. A limited amount of land for this construction would be available in the area adjacent to the closed runway as referred to in your letter of 21 August. Siting of structures, access roads and parking areas as well as their design and construction would be subject to Navy approval.

4. While scheduled commercial airline operations would normally be accorded equal operating priority with naval aircraft, civil operators must agree to accept such deviations as may be required by military necessity.

5. Satisfactory conclusion of specific contractual agreements determining responsibility for pro rata sharing of expenses of normal runway and taxiway maintenance, snow removal therefrom, structural fire and crash rescue protection and other items of this general nature.

Please be assured that the Navy desires to cooperate with your group in its efforts to satisfy the aviation requirements of the civilian community surrounding the Naval Air Station, Brunswick. Your interest in the Navy, and your generous support of the Naval Air Station and its personnel are sincerely appreciated.

If I can be of further assistance to you, please do not hesitate to call upon me.

Sincerely,

/s/ W. E. Ellis

W. E. Ellis
Acting Deputy Chief of Naval Operations
(Air)

Mr. James A. Storer, Chairman
Air Transportation Committee
Chamber of Commerce
Brunswick, Maine

PART II

COST ESTIMATES -- N. A. S. B.

The first items to be discussed in determining from a cost point of view, the practicality of scheduled air carrier use of the Naval Air Station, Brunswick (N. A. S. B.) are the existing facilities and their value.

According to data furnished by the Navy the following facilities would be used by a scheduled air carrier:

> The Operation Building - Control Tower Cost, $515,000.; Approach lighting, $76,000; Runway lighting, $217,000; Runways and taxiways, $5,096,000; and Ground Controlled Approach (G. C. A.), $500,000.

These all total to an original cost of $6,404,000 and presumably at current prices would have a significantly higher value. (Further details are to be found in Appendix A of this part of the Report).

In addition to the above existing investment, there are other items which would have considerable value such as: a first rate, fully trained and equipped, crash and rescue facility and crews; complete airfield maintenance equipment and crews; a large investment in the land the airfield occupies, etc.

In order for N. A. S. B. to be used by a scheduled air carrier certain additional facilities would have to be provided in addition to the existing facilities which would be made available by the Navy. The major new facilities needed would be: airport terminal, roads, parking, fencing, paving of aircraft parking area, and instrument landing system. In addition to these, refueling equipment, hangers, etc., might be needed, but presumably would be furnished by the commercial users.

Estimated Costs

1. Terminal

Since general aviation would not be allowed use of NASB, it seems that terminal requirements would be somewhat less than the one mentioned in the Buckley Report for the proposed Sidney site (ultimate cost estimated to be $500,000.) It is understood that this is also the figure used as an estimate for the cost of a new terminal in the master plan for expansion of the Portland Municipal Airport.

Cost: A fair rough estimate would be $500,000.

2. Roads

From a map of NASB it appears that a roadway of approximately 1400 feet would be adequate to reach a possible terminal site on the east-west runway from U. S. Route #1. The roadway figured on a 24 foot paved width should cost about $15.00 per linear foot including lighting and water.

Cost: Estimated Cost - $21,000

3. Parking Space

Assuming parking space for 300 cars, at 35 square yards per vehicle, a total of 10,500 square yards of parking area would be needed. This figure allows for ample roadways within the parking area. At a cost of $5.00 per square yard, which should include lighting, a total cost of about $52,000 is indicated.

Cost: Estimated Cost - $52,000

4. Fencing

In order to enclose both sides of the 1400 foot roadway plus all four sides of the parking area (which might be about 250' x 400') 4000 linear feet of fencing would be required at $2.00 per linear foot.

Cost: Estimated Cost - $8,000

5. Paving of Aircraft Parking Area

Since it might be possible to build a terminal at the very edge of the existing east-west runway, very little might be needed to provide for this item.

Cost: An estimate of $10,000 would seem ample.

6. Instrument Landing System

The FAA District Office in Portland indicated that the figure of $400,000, plus or minus, is sometimes used as an estimated cost for I. L. S.

Cost: Estimated Cost - $400,000

From the preceding figures it appears that commercial use of NASB might be possible for as little as $1,250,000, and possibly less. This figure includes a 15% contingency item plus 10% for engineering and administration costs.

Two other current possibilities for a Regional Airport in southwestern Maine are the proposed Sidney site, and espansion of the existing Portland Municipal Airport.

From the Buckley Report, the ultimate cost of the Sidney Airport (including Instrument Landing System) appears to be $7,606,000.

In Appendix B of this section of the Report of estimated costs for a possible expansion of the Portland Municipal Airport are listed. It must be remembered that these costs, which total almost $1,500,000, do not include the cost of building a complete new Boys School in a different location from the existing one. It is understood that the Boys School which is now located near the end of one of the runways would have to be relocated before FAA would approve such expansion. The relocation and reconstruction of a new Boys School has been estimated to cost $5,000,000, and this cost should be considered a part of the cost of expanding the Portland Airport since a new school presumably would not have to be built if the airport were not expanded.

It should be pointed out that the figures for the Sidney and Portland Airports included a number of items not included in the NASB figures; i.e., state hangers (Sidney only), cross wind runways, base operations hangers, a number of unit hangers (Sidney only), etc.

On the other hand, NASB has a number of existing features that neither Sidney nor Portland Airports would have. NASB has two parallel 8000' runways, whereas Sidney's main single runway would be 6000' and Portland's single main runwayswhen lengthened would be 7000'. NASB has crash and rescue facilities and crews of far greater capability than Sidney or Portland could hope to have. Also NASB has a level of airfield maintenance, including snow removal, that is higher than that usually found at civilian fields.

The added safety factor, for passengers and crews of commercial planes flying in and out of NASB afforded by the longer runways, superior crash and rescue facilities, etc., are also significant.

A final point in this cost analysis is that the cost of maintenance of the joint facilities at NASB would be shared by the Navy with the air carrier and/or the civilian administration and the terminal. This would reduce the operating costs of such a regional airport.

Some people feel that general aviation is now, and will be for a considerable time in the future, well and adequately served by existing airports. If so, NASB (which could not be used by general aviation) in view of the much lower costs of developing it into a fully useable (and in some ways far superior) commercial airfield appears to be the most economical solution to the problem of a regional airport for southeastern Maine.

It is assumed that the civilian operators would only have to pay maintenance costs in the percentage that commercial use was of the total use of the airfield. The Navy would still be making many times more landings and takeoffs per day than a scheduled air carrier and would therefore be paying the major share of the maintenance costs. (See letter of the Acting Deputy Chief of Naval Operations (Air), Appendix A, Part I and Appendix A, Part II of this report.)

PART II

Appendix A

NASB Airfield Data

Average Number of Take-Offs and Landings Per Day 134/Day

Weather: 0.7% of time 00 weather

2.3% of time below 100' and 1/2 mile

Cost of

Operations Building - Control Tower	$515,000
Approach Lighting	76,000
Runway Lighting	217,000
Runways/Taxiways	5,096,000
G.C.A.	500,000
	$6,404,000

Cost of field maintenance by type operation cannot be determined without extensive cost study; however, the sum of costs of routine airfield maintenance, maintenance of communications and navigational aids, crash facilities, snow removal, etc., is estimated to be about $300,000 per year. (Note: these data supplied by NASB)

PART II

Appendix B

Estimated Costs for Expanding Portland Municipal Airport

New Terminal Building	$ 500,000
Expansion of Loading Areas and Parking	150,000
Taxiway System and Lighting	350,000
Raising Level of N/S Runway and Repairs	185,000
Extension of E/W Runway (From 5000' to 7000')	300,000
	$1,485,000

PART III

BRUNSWICK OR PORTLAND?

The Population Factor Affecting the Location of the Southwestern Maine Regional Airport *

Introduction

It is now generally agreed that air carrier service into the State of Maine must be centralized at a limited number of regional airports rather than scattered among six, seven, eight or ten separate airports serving each of the larger cities in the State. The airport plan for the State will have to evolve as a compromise between two considerations: first, enough centralization into regional airports so that a scheduled air carrier can count on sufficient traffic to generate profits; and two, not so much centralization that air travelers must spend an undue amount of time getting to a "hub" or "regional" airport. As the first part of this report emphasizes, no comprehensive statewide study of this problem has ever been made. Such a study is a prerequisite to the preparation of a rational plan for the state.

It is certain, however, that the major regional airport for the state will have to be located in the southwestern part of the state where over 50 percent of the state's population reside. Accordingly, the principal question to which this section of the report is addressed is as follows:

On the basis of population served by the airport, is the case for locating the southwestern Maine regional airport in Portland a conclusive one? Or, does an analysis of population indicate that a regional airport located at the Brunswick Naval Air Station in Brunswick would serve southwestern Maine as well?

Evidence will be given below to show that a regional airport located at Brunswick would serve as large a population, if not somewhat larger, than the population presently being served by the Portland location. Both resident population and vacationers' air traffic are taken into consideration in reaching this conclusion.

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* Research work for the following section of the report, Part III was done by Steven J. Weiss, under the direction of Professor Paul G. Darling of Bowdoin College. Acknowledgement is also gratefully made to Mr. Weiss for the preparation of Appendix A to this section of the report.

A second subsidiary question to which this report is addressed concerns the building of a regional airport at Sidney. This bears on the first question because an airport at Sidney would affect the number of air travelers who would travel via Portland or via Brunswick. It will be shown below that an airport built at Sidney would be unjustified for two principal reasons. First, in view of the location of a major airport to the northeast, Dow Air Force Base in Bangor, and a second to the southwest, either at Brunswick or Portland, the residential population which would be served by the Sidney airport would be uneconomically small. Secondly, an airport at Sidney would reduce substantially the population area serviced by Brunswick or Portland, and contribute to a deterioration of air carrier service at either of the latter locations.

Should the Southwest Maine Regional Airport be Located in Portland or Brunswick?

The method which has been followed to determine the numbers of population which an airport would serve is relatively simple. [1] For any given airport location, we identify the "competing" airports, and then draw on a map a "cutoff" line between the given airport and each competing airport which separates the population which would use each airport. For example, in Figure 1 consider the given airport to be the Portland Municipal Airport as shown on the map. Assuming that the next regional airport to the northeast is at Bangor a line has been drawn between the two airports which may be called a "cutoff contour". This means that anyone residing on this line is indifferent as to which of the two airports he might wish to use to fly out of state. Anyone to the northeast of this line will travel via Bangor, anyone to the southwest will travel via Portland.

We have employed two criteria to establish the location of a cutoff contour. The first and probably the most important factor is the time of travel. If this were the only factor involved then clearly the cutoff contour would locate points from which it would take an equal amount of time to travel to an out-of-state destination (assumed to be New York City here) whether one traveled via Bangor or whether one traveled via Portland. However, a second criteria, the cost of travel, has also been introduced. For the sake of simplicity, this "cost of travel" factor has been limited to the differential cost of a first class air ticket from the given airport to New York City, as contrasted with the first-class ticket cost from the competing airport. The full methodology in applying these criteria to locate cutoff contours is explained in Appendix A at the end of this report.

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1 See Appendix A for detailed explanation of the method and exhibits showing the calculations employed.

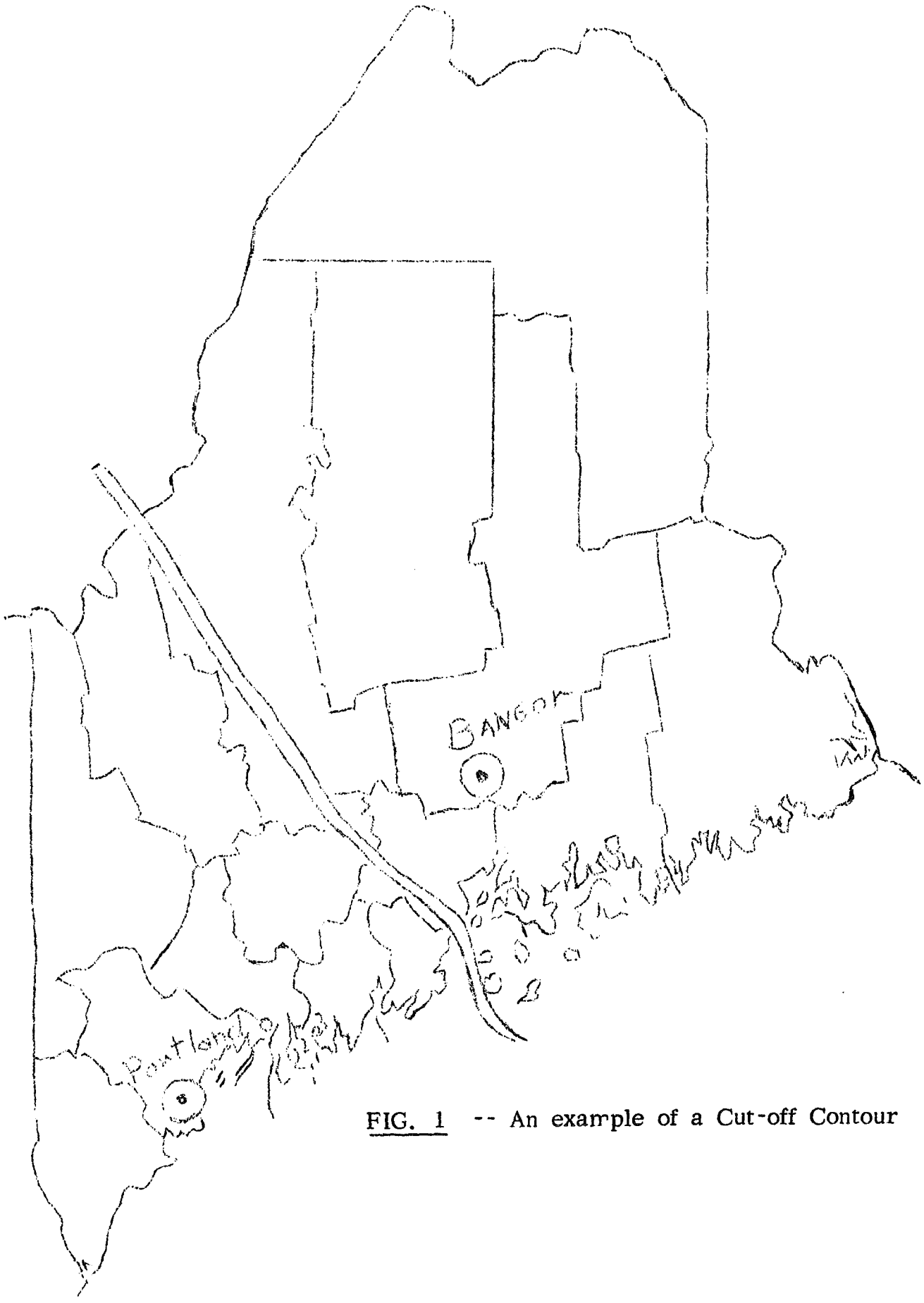

FIG. 1 -- An example of a Cut-off Contour

Cutoff contour lines have been established for a regional airport location in Portland, and alternatively for a regional airport located in Brunswick. First the Portland case. The principal competing airport to the southwest of Portland is, of course, Logan Airport at Boston. Based on travel time and the cost of first class air tickets to New York City, a contour line, shown in black on Figure 2, was established southwest of Portland. Where it crosses the Maine Turnpike this cutoff contour is 27 miles southwest of Portland, meaning that a person living in this region will drive 27 miles northeast in order to fly southwest, but no farther. The slight "bump" shown in this contour is to take account of the higher speed that is possible along the Turnpike than along secondary roads (and this feature is true of the other contours discussed below). To the northeast of Portland the major competing airport, assuming that no regional airport is constructed at Sidney, is the Dow Air Force Base at Bangor. Accordingly, another cutoff contour is established separating Portland from Bangor shown in black in Figure 2.

Now we suppose the southwestern Maine regional airport were to be located at Brunswick rather than Portland. Again a contour line is established separating Brunswick from Logan shown in red in Figure 2, this line lying 33 miles southwest of Brunswick. On the other side of Brunswick, a second red contour line is established separating Brunswick from Bangor.

Thus, we have established the boundaries for the population which will travel to Portland (in black) or to Brunswick (in red) rather than drive either to Logan or to Bangor in order to fly to New York City.

Count of Resident Population

Based on the 1960 census data, a count was then made of the population lying between the two sets of contour lines shown in Figure 2. The results of this population count are tabulated in Table 1, with the actual count by minor-civil division tabulated in Appendix B.

It will be seen that if the regional airport is located at Portland a total of 587, 385 resident population would be served. If, on the other hand, the airport were located at Brunswick a total of 541, 531 resident population would be served. Thus, with respect to resident population, an airport located at Brunswick would serve very close to the same number of persons that an airport at Portland would serve. The difference between the two locations is 45, 854 resident population, a difference of only 7.8 percent.

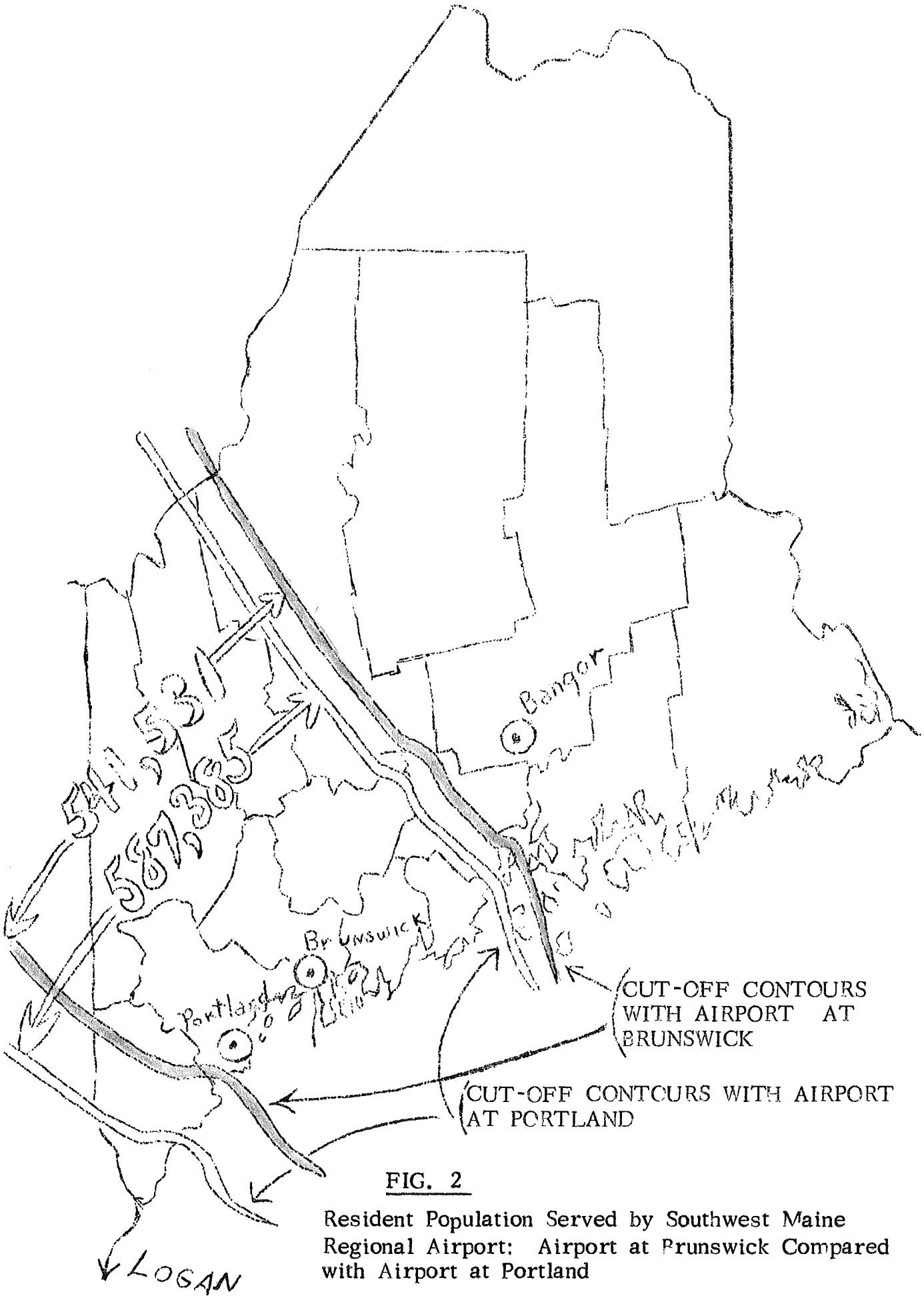

FIG. 2

Resident Population Served by Southwest Maine Regional Airport: Airport at Brunswick Compared with Airport at Portland

TABLE 1

Resident Population Served by Portland Location for Southwestern Maine Regional Airport as Compared with that served by Brunswick

(Based on 1960 Census Data)

Airport Location	Resident Population Served
Portland	537, 385
Brunswick	541, 531
Difference	45, 854
Percent Difference (Relative to Portland)	7.8%

Count of Summer Tourist Traffic

So much for the factor of resident population. We now consider the summer tourist factor. A recent Department of Economic Development study, prepared by Raphaelson, Sedlick and Coupe of the University of Maine, estimated that the total number of vacationers coming into Maine from out-of-state during the summer of 1959 was 1,700,000. [2] On the basis of a questionnaire survey this same study estimates that 3.3 percent of all summer visitors traveled via air carrier. This would mean that a total of 56,100 passenger enplanements took place in 1959, Although this figure seems a little too high it is nevertheless a certainty that a substantial part of the use of air carrier is accounted for by summer vacationers coming from out-of-state.

Our purpose now is to make an estimate of the number of summer vacationers who come to Maine from out-of-state who would prefer an airport situated in Brunswick as contrasted with those who would prefer the location of the southwestern Maine airport at Portland. It should be clear that we do not have at our command the resources to investigate this question thoroughly. No research has ever been done which will provide an exact answer to this sort of question. However, it is possible to make some reasonable estimates based upon conservative assumptions:

1. We assume that the total number of out-of-state summer visitors who use air carrier as a mode of travel number 40,000 each year. [3] This figure seems a very conservative one when compared with the 56,100 estimated by the aforementioned DED study of the vacation industry in Maine.

2. We assume that summer visitors using air carrier as a mode of travel have, as their destination in Maine, places which are distributed among the various regions of Maine in proportion to the estimated market value of seasonal residences in Maine owned by Non-New-England residents. [4] The report known as "Recreational Property Inventory" published by the Department

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2 A. H. Raphaelson, T. A. Siedlick, and J. D. Coupe, A Study of the Vacation Industry in Maine, The University of Maine, April 1961, p. 118.

3 Analysis of the seasonal pattern of Portland air enplanements, suggests that about 35-40% of yearly traffic derives from vacation travel. This range of percentages applied to total Northeast Airlines enplanements in the state of Maine indicates that about 40,000 to 45,000 of these enplanements are by vacationers.

4 This is not to be taken as an assumption that vacationers traveling to Maine by air are more likely to own than rent their vacation residences; rather, it is an assumption that those who do travel by air are more likely to come from more distant states and will tend to visit the same Maine regions as owners of Maine summer residences living outside of New England.

of Economic Development in July, 1960, shows that such recreational property owned by non-New England residents is distributed among the eleven recreational regions identified in the report as shown in Table 2.

3. Finally, we consider for the sake of simplicity the "Recreational Regions" known as Region I, Region II, and Region III, which are coastal regions as shown in Figure 3. . . From Table 2 it will be seen that 36.3 percent of the seasonal residences in Maine owned by non-New-England residents lie in these three regions. Thus, we may reasonably assume that of the 40,000 summer visitors traveling by air approximately 36.3 percent, or 14,520 had destinations lying within regions I through III.

Now of these 14,520 we wish to estimate how many had destinations within the three regions which were closer to Brunswick than to Portland, and alternatively how many had destinations closer to Portland than to Brunswick. The basis for making this estimate is the market value of recreational property owned by out-of-state residents within these regions[5], but excluding those properties which lie southwest of the cutoff contour separating the Portland and Logan airports and excluding also properties northeast of the contour line separating the Brunswick airport location from that at Bangor also shown in Figure 3. We draw a line equidistant between Portland and Brunswick as shown in Figure 3. The destinations of summer visitors coming by air which are closer to Portland than to Brunswick are marked as Area A in Figure 3; those which are closer to the Brunswick airport location are shown as Area B in Figure 3. Tabulations were then prepared of the market value of recreational property owned by out-of-state residents in these two areas and the results are shown as Table 3.[6] It will be seen that 34 percent of the total market value of such property lies in Area A and 66 percent lies in Area B.

The 14,520 summer visitors traveling by air into these two areas are next distributed to Area A and to Area B in proportion to the percentage distribution of recreational property owned by out-of-state residents, namely 34 percent in Area A and 66 in Area B. As shown in Table 4, this means that 4,937 of these summer visitors have destinations in Area A, and therefore would prefer an airport location at Portland, whereas 9,583 of these persons have destinations in Area B and clearly would prefer Brunswick as the location for the southwestern Maine airport.

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5 The DED "Recreational Property Inventory" does not show seasonal residences (owned by non-New England residents) distributed by minor civil divisions or by towns. The distribution published is only for total recreational property and only by Maine and out-of-state ownership, and we have, therefore, had to settle for this basis for allocating air travelers within the three regions.

6 See Appendix C for actual tabulations.

TABLE 2

Maine Seasonal Residences Owned by Residents of Non-New-England States by Recreational Region*

	Market Value of Property	% of Total
Recreational Region I	$4,846.	10.8
Recreational Region II	5,908	13.2
Recreational Region III	5,503	12.3
(Subtotal)	($16,257)	(36.3)
Recreational Region IV	19,814	44.1
Recreational Region V	230	.5
Recreational Region VI	2,170	4.8
Recreational Region VII	2,718	6.1
Recreational Region VIII	650	1.4
Recreational Region IX	2,358	5.3
Recreational Region X	627	1.4
Recreational Region XI	81	.1
Total	$44,905	100.0%

*Source: Recreational Property Inventory, Department of Economic Development, State of Maine, 1960.

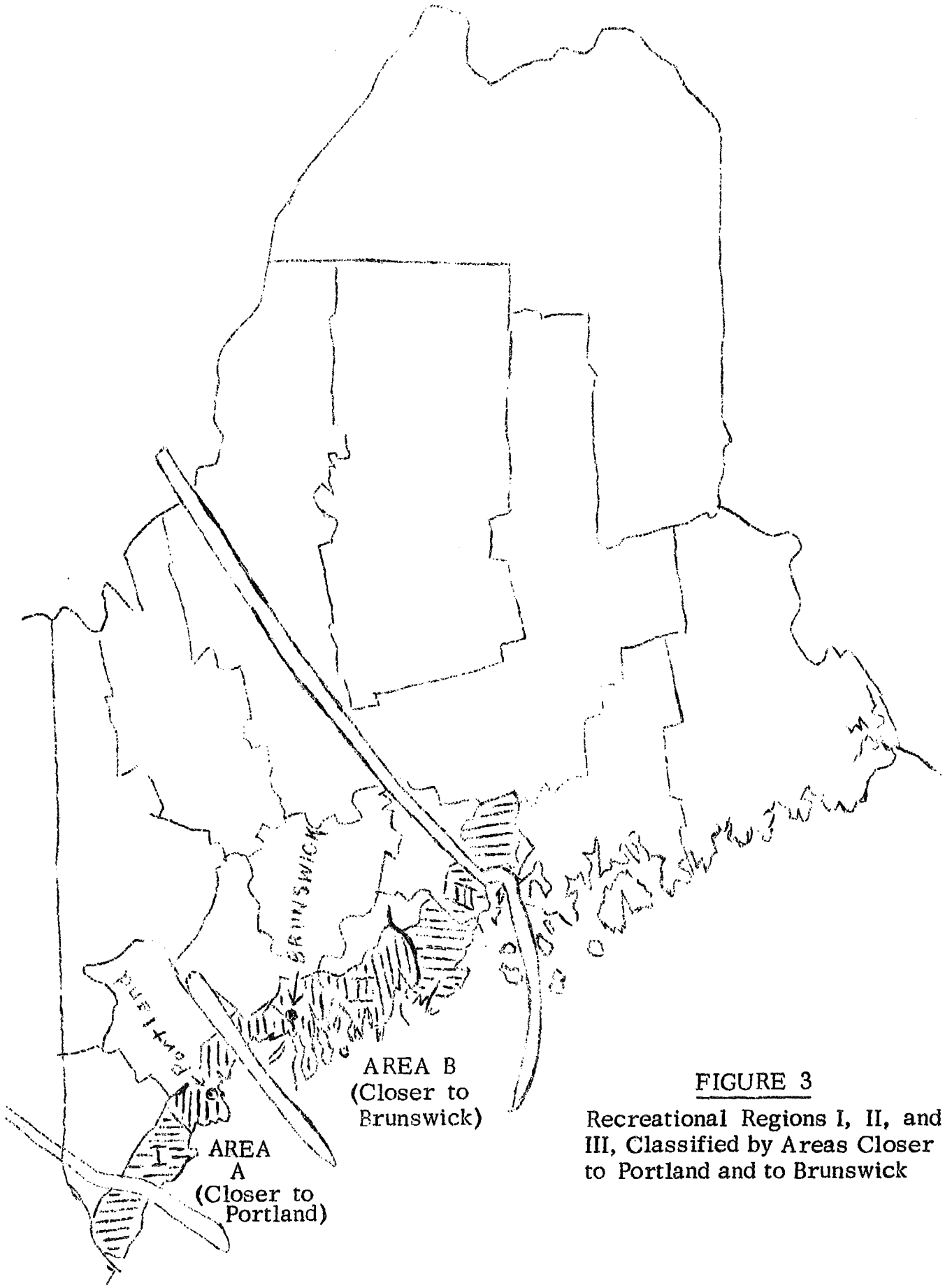

FIGURE 3

Recreational Regions I, II, and III, Classified by Areas Closer to Portland and to Brunswick

TABLE 3.

Recreational Property Owned by
Out-Of-State Residents, Recreational Areas A and B

Location	Market Value	%
Area A	$13, 316, 000	34%
Area B	25, 636, 000	66
	38, 952, 000	100%

TABLE 4

Number of Summer Visitors Using Air Carrier
Classified by Area and Resident Population Equivalents

Area	Percent Distribution of Recreational Property Owned by Out-Of-State Residents	No. of Summer Visitors Having Destinations in Area	Resident Population Equivalents [1]
A (Closer to Portland)	34%	4,937	105,158
B (Closer to Brunswick)	66	9,583	204,118
	100%	14,520	309,276

1 Based on following data: Portland has carrier enplanement data for 1962 (eliminating the estimated summer visitor component) which show a total of 27,579 persons. Since the population served by Portland (see text above) is 587,385, this yields the air traffic generation factor of 21.3 persons of resident population for each enplanement from the resident population. The "resident population equivalents" above are, therefore, 105,158 for Area A (4937 x 21.3) and 204,118 for Area B (9583 x 21.3).

We next ask what the "residential population equivalents" would be for these summer visitors coming by air. By "residential population equivalents," we mean the number of resident population that would be needed to generate an equivalent amount of air traffic. As explained in a footnote to Table 4, based on experience at the Portland airport it took 21.3 persons of residential population to generate each non-vacationist air carrier enplanement during the year 1962. On this basis the summer visitor air traffic coming into Area A is equivalent to a residential population of 105,158; the residential population equivalent for Area B is 204,118 resident persons. These comparisons are shown in Table 4. In other words, Area B contains almost twice as many resident population equivalents as Area A, meaning that insofar as these three recreational regions are concerned, Brunswick as the location for the southwestern Maine regional airport would be the preferred location, as compared with Portland.

The final results of the population study may now be summarized. As shown in Table 5 an airport located in Portland would serve a resident population of 587,385 plus the residential population equivalent of summer visitor air traffic, which would prefer the airport at Portland because of closer proximity, amounting to 105,158, making a grand total of "population" served by Portland of 692,543.

We turn now to Brunswick as a potential location for a southwestern Maine regional airport. As shown in Table 5, the residential population served by an airport located at Brunswick would be 541,531 plus a total of 204,118 of resident population equivalents for summer visitor air traffic whose destination would make Brunswick a preferred location, making a grand total of population served of 745,649. The comparison favors Brunswick by 53,106 persons.

Based on these estimates, in short, a southwestern Maine regional airport located at Brunswick would serve a larger number of people than would an airport located at Portland. Certain comments and qualifications are needed.

1. The factor of summer visitor air traffic has been studied only for recreation Regions I, II, and III. A more comprehensive study would include all recreational regions, but it is doubted that the foregoing results would be materially changed, insofar as the relative population served by the two locations is concerned. It should be added that a superior method of allocating visitors traveling by air carrier to the regions closer to Portland and to Brunswick, as compared with the indirect procedures we have been forced to adopt, would consist of a polling of air carrier passengers arriving and departing from Portland. A comprehensive state-wide study of Maine's regional airport problem should use this procedure.

TABLE 5

Summary of Population Served
By Alternative Locations for Southwestern
Maine Regional Airport

Airport Location	Resident Population Served by Airport Location	Resident Population Equivalent of Summer Visitor Air Traffic, Situated Closer to Airport Named *	Total Persons
Portland	587, 385	105, 158	692, 543
Brunswick	541, 531	204, 118	745, 649
Difference in favor of Brunswick			53, 106

* In "Recreational Regions" I, II, and III only.

2. Two additional factors which should be incorporated in a comprehensive state study would be the location of the particular organizations and establishments known to have a high air-traffic generating potential, e.g., the location of the larger industrial firms in the state, the location of Maine's colleges, the location of companies likely to need air-cargo service, etc. The resources at the disposal of this group made it impossible to make a study of all these locational factors.

3. The comprehensive survey of the state's air travel problem which is now needed should also take into consideration the factor of population growth and industrial growth. Which regions of the state are expanding most swiftly? What will be the status of population and industry served by the two airport locations ten years from now?

In spite of the obvious limitations of the current study, it is believed that sufficient evidence has been presented to indicate that, insofar as population is concerned, the location of the southwestern Maine regional airport at Brunswick would probably be preferred as compared with the location at Portland. The case is certainly strong enough to justify a comprehensive state study of the regional airport problem in southwestern Maine, before precipitate action is taken.

Should a Regional Airport Be Built in Sidney?

At the time of this writing (February, 1963), the Maine Legislature is considering the appropriation of funds to construct a "regional" airport at Sidney, which is approximately half-way between Augusta and Waterville. It has been asserted by the proponents of this legislation that two independent research organizations have recommended the construction of such an airport: the reports cited are "A Report on an Airport in the Augusta-Waterville Area" prepared by Northeastern Research Foundation, Inc., dated July 1, 1960; and the so-called "Buckley Report" published near the end of 1962.

The rather remarkable fact about this proposal and the cited reports is that neither the Buckley organization nor NRF has done the research that must be done to determine whether a regional airport should be built in Sidney. The Northeastern Research Foundation report had a very limited frame of reference. It was, in effect, the following question: "If a regional airport is to be provided for the Augusta-Waterville region, which would be the best alternative: to enlarge the present airports at Augusta or at Waterville, or to construct a new airport, and if so, where?" A careful reading of the

Buckley Report indicates that its frame of reference was the same. In other words, both reports take as given, without study, the proposition that an area airport is to be provided for the Augusta-Waterville region.[7]

What is clearly needed is an over-all study of Maine's air transportation problem to ascertain whether there should indeed be a regional airport placed in the Augusta-Waterville region. No such study has ever been made. And the evidence readily available for the present study strongly suggests that a regional airport for the Augusta-Waterville region would be economically unjustified.

That such a regional airport, e.g. one constructed at Sidney, would be economically unjustified may be shown by the following facts. Taking as given the present location of the southwestern Maine regional airport at Portland, and taking into consideration the existence of an airport now being served by the air carrier at Bangor (Dow Air Force Base), the placing of a third regional airport at Sidney would fragment the traffic at both Portland and Dow, thereby reducing them to an uneconomically low level of traffic. This location would provide for the Sidney airport itself too small a traffic potential to justify the expenditure of these funds.

The location of the three airports is shown in Figure 4. Using methods similar to those discussed earlier in this report, cutoff contours have been drawn on the map of Figure 4 to show the separation of resident population that would be served by the three airports. The cutoff contour southwest of Portland is the same as shown in the similar map of Figure 2.

---

7 The statement found on page 39 of the NRF report, that "An Augusta-Waterville airport located at Sidney. . . would be properly located with relation to other small hubs (i.e. hub airports) and would help provide a sound workable framework for the long range growth of air transportation in Maine", is entirely unjustified. The writer of the present section of this report, P. G. Darling, was a consultant for the NRF study and knows, as a fact, that the research underlying the report in no way encompassed the air transportation problem of the state as a whole. He abstained from signing the NRF report on the grounds that the report did not clearly state the limited nature of its scope, i.e. that its research and findings were restricted to the problem of where to locate an airport for the Augusta-Waterville region, assuming that such an airport was to be built.

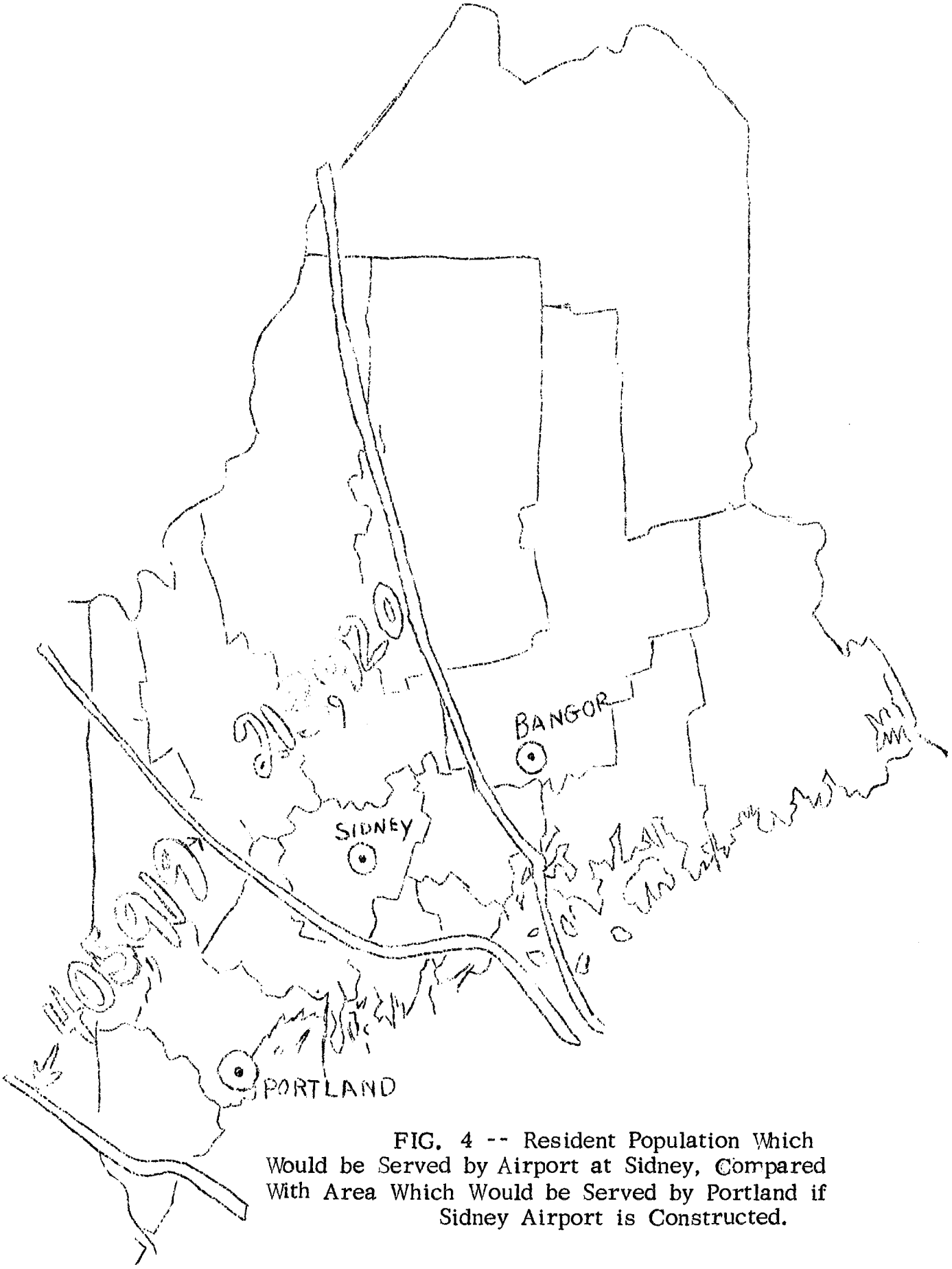

FIG. 4 -- Resident Population Which Would be Served by Airport at Sidney, Compared With Area Which Would be Served by Portland if Sidney Airport is Constructed.

The contour line separating Sidney and Portland divides passengers who reside to the northeast and who will travel to the Sidney airport from those living to the southwest of the contour line who will travel to the Portland airport. Similar considerations define the contour line separating Sidney from Dow Air Force Base at Bangor.[8]

A count of the resident population lying between the cutoff contours shown in Figure 4 has been made. As shown in Table 6 where the results are tabulated with a regional airport at Sidney competing with a second regional airport at Portland, a total of only 213,920 resident population would be served by the Sidney airport. Under these circumstances, too, the number of resident population served by the Portland regional airport would be 405,919 persons.[9]

Two important consequences flow from this analysis. It is probable that the very limited resident population that would be served by a Sidney airport (given two other competing regional airports, one at Portland and the other at Bangor) would fail to generate sufficient passenger traffic at the airport to support the operations of the air carrier, especially if three, four, five or six scheduled departures each day are expected by people living in the area. A very rough calculation indicates that a population of 213,920 the amount to be expected who would travel to Sidney, would generate annually only 10,043 passenger enplanements per year as shown in Table 6. It is extremely doubtful whether such a number, even though it were expected to grow moderately in a period of years, would support anywhere near an adequate level of service.

A second consequence of equal significance would be the loss to Portland of a considerable portion of resident population served because of the competition of another airport at Sidney. We have previously shown that an airport at Portland, competing only against a regional airport at Bangor would serve a population of 587,385. As shown in Table 6, if the Sidney airport were built, Portland would lose a resident population of 181,466 persons. A rough estimate of what this means in terms of passenger enplanements indicates that this would subtract over 8,500 passenger enplanements from the present Portland situation (see Table 6). Thus, insofar as a private air carrier's ability to support its operations is concerned, the building of a Sidney airport would result in a deterioration of service at Portland.[10]

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8 See Appendix A for calculations underlying these contour lines.

9 See Appendix D for these population tabulations.

10 A comparison of Figures 2 and 4 shows that the construction of a regional airport at Sidney would also make some inroads into the resident population served by Bangor, thereby contributing to a deterioration of air carrier service at the latter airport.

TABLE 6

Resident Population Which Would Be Served and Annual Passenger Enplanements with Regional Airports at Dow, Sidney and Portland Compared With a Single Southwestern Maine Regional Airport at Portland

		Resident Population Served	Estimated No. Passenger Inplanements Generated *
Case I:	With Airports at Dow, Sidney and Portland:		
	Sidney.	213, 920	10, 043
	Portland.	405, 919	19, 057
Case II:	With Single Southwestern Regional Airport at Portland:		
	Portland	587, 385	27, 579
Difference:	Loss to Portland, if Sidney Airport is Built:	181, 466	8, 522

* Note: Based on passenger generation factor at Portland of one enplanement per year per 21.3 of resident population served by airport.

The foregoing argument concerning the Sidney airport is applicable also to the case where the location of the southwestern regional airport is at Brunswick. The dilution of traffic which would occur with Brunswick and Sidney sharing the potential of the whole area would cause a deterioration of service at both airports.

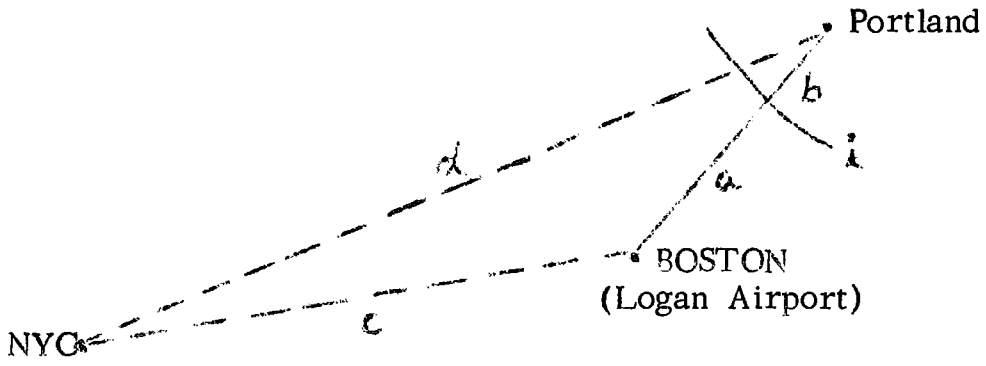
The State of Maine must, in other words, decide between two alternatives: first, shall central-southwestern Maine be served by two regional airports, both able to support reasonably satisfactory air carrier service? Or, second, by adding a regional airport at Sidney, shall the state provide three regional airports in the light of the reasonable expectation that none of the three will generate sufficient traffic to assure decent service? Choosing the first alternative will mean, of course, that residents of the Augusta-Waterville area will have to drive about 80 miles to a regional airport at Portland, or, if the southwestern regional airport is located in Brunswick, about 50 miles. In a state as sparsely settled as Maine, may not such an inconvenience simply be the necessary cost of decent air service for the state considered as a whole?

PART III

APPENDIX A

METHOD AND ASSUMPTIONS USED IN DETERMINING THE LOCATIONS OF CUTOFF CONTOURS

Explanation of the method employed in locating the cutoff contour lines will be facilitated by the use of an example. Consider the cutoff contour line between Portland and Boston. First, we ASSUME that our hypothetical travelers are bound for New York City and that there are direct flights for NYC from any of the Maine locations considered in this study as possible sites for a regional airport (i.e. Portland, Brunswick, and Sidney). The situation may be diagrammed as follows:



Anyone living on the cutoff contour, i, would be equally satisfied either to drive north to Portland and then fly to NYC or to drive a greater distance south to Logan Airport in Boston for a shorter and cheaper flight to NYC. Of course, the typical case is not on the line.

a and b are travel times by road.

c and d are flight times, ASSUMING Viscount equipment and direct flights.

Thus, if time were the travelers' only consideration, the position of the indifference line would be determinable by the equation:

$$b + d = a + c$$

However, cost of travel must also be taken into consideration. Let c' and d' equal the costs of first class air tickets for the respective flights. In order to express the ticket costs in terms of time, we assume an hour of the traveler's time to be worth \$15.00; thus we have a conversion factor: $W = \frac{60 \text{ min.}}{\$15}$

The equation for the location of the cutoff contour can now include terms to account for different ticket costs.* The following equation will balance for all points on the cutoff line:

via Portland		via Boston
b + d + W(d')	=	a + c + W(c')

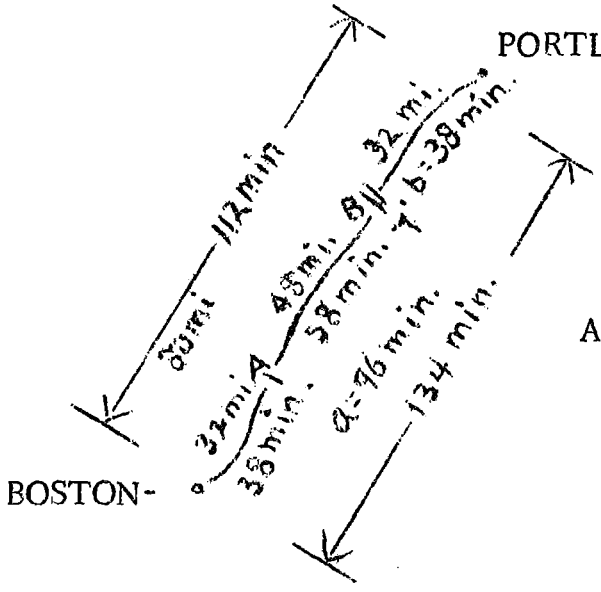
Transposing terms we obtain

$$(a - b) = (d - c) + W(d' - c')$$

The terms (d - c) and W(d' -c') can be calculated from the data available** and we can solve for (a - b). The term (a - b) equals the driving time differential, i.e. how much longer the traveler will be willing to drive south rather than north to fly south to NYC. In our example, (a - b) = 58 min. :

$$(a - b) = (85 - 61) + \frac{60}{\$15} \cdot (\$24.36 - \$16.23) = 58 \text{ min.}$$

This driving time differential may be used to find the "cutoff" points on the major road connecting Portland and Boston. Assuming an average speed of 50mph, the driving (a + b) is 134 minutes. The driving time differential favors Boston, and the indifference line can be located on a map as diagrammed below, by converting the times into distances (at 50 mph).



AB = driving time differential

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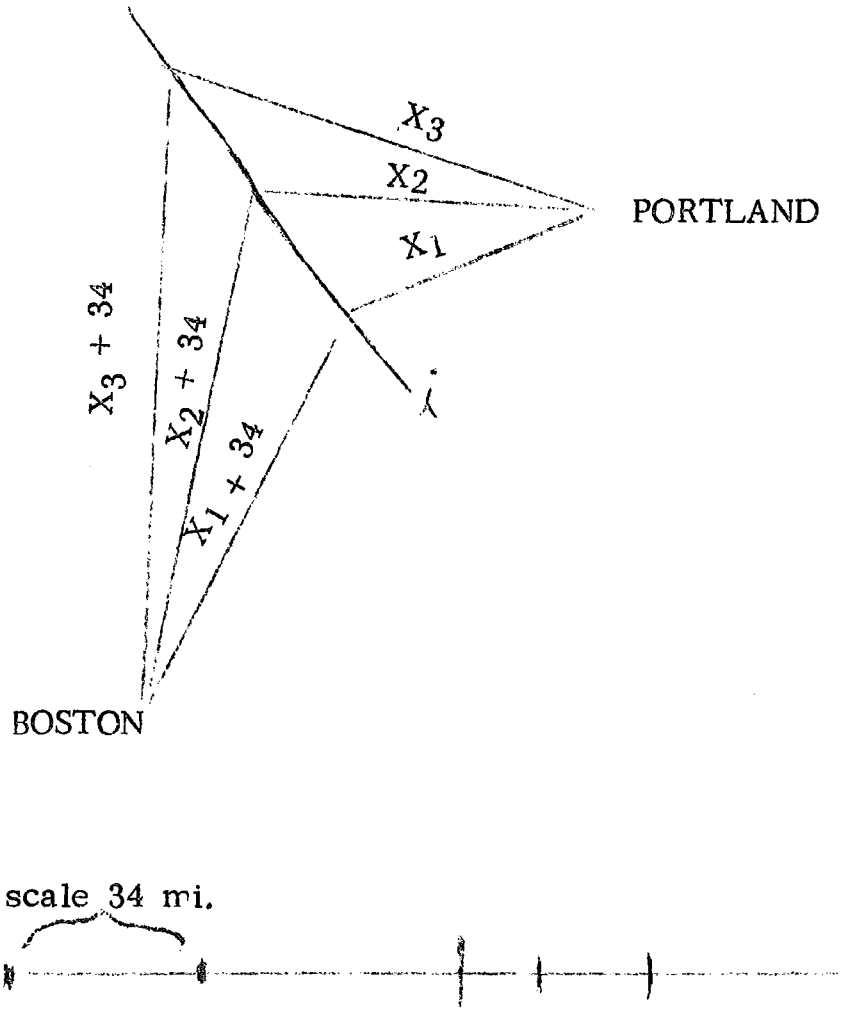
* There will also be a slight cost differential because of different road distances traveled; but for the sake of simplicity we assume that the differential car expense is offset by a psychological aversion to driving north to fly south.

**Some of the flight times and ticket costs were, of necessity, estimates. See Exhibits I and II on pages 37 and 38.

The driving time differential can also be used to locate cutoff points off the major roads. We assume for simplicity that driving times from points off the major roads are equal to the air distances times 35 mph. We can now convert the driving time differential into an air distance differential, e.g. the driving time differential in our example is tantamount to an air distance differential of 34 miles, assuming 35 mph x air distance = driving time:

$$\frac{35 \text{ mi.}}{\text{hr.}} \times 58 \text{ min.} = 34 \text{ mi.} = \text{air distance differential}$$

The air distance from any cutoff point to Boston will be 34 mi. greater than the air distance from that cutoff point to Portland. Drawing the indifference line is now a matter of geometry. Measuring distances to scale on a map, an arc of scale length (X) miles circumscribed from Portland will intersect an arc of scale length (X + 34) miles circumscribed from Boston--the point of intersection lies on the indifference line. A series of such points determine the line:



The reader should note that several other factors which might affect a traveller's choice between "competing" airports have not been studied in this report. A comprehensive state-wide study of Maine's regional airport problem, the sort of research which is imperative at this time, would undoubtedly consider these other factors. For examples: To what degree will the number of scheduled air carrier flights per day at two given airports influence the traveller's choice between them? To what extent will a difference in the reliability of air carrier service at two given airports affect a choice? The availability of time and financial resources were insufficient to permit us to investigate these matters.

The data employed for the determination of all cutoff contours shown in this report are given in the exhibits which follow:

EXHIBIT 1

FLIGHT TIMES (minutes)

(All times are for Viscount equipment; all are direct flights)

	BOSTON (Logan)	PORTLAND	BRUNSWICK	SIDNEY	BANGOR
N. Y. (LaGuardia)	61*	85[e]	92[e]	101[e]	111[e]
BOSTON (Logan)		34*	43[e]	54[e]	63*
PORTLAND			17[e]	27[e]	42*
BRUNSWICK				20[e]	33[e]
SIDNEY					24[e]

*Source: Northeast Airlines Schedule, Oct. 28, 1962, pp. 6-9.

[e]Estimated times are all based upon the known time for the Boston-LaGuardia flight (61 mins.). It is assumed that in each flight 10 minutes is taken up on the runway, in landing and in take-off, 5 min. at each airport. Thus 10 minutes is subtracted from the base time of 61 minutes to give 51 minutes of actual flying time. A ratio of air distances of other flights over the air distance Boston-LaGuardia is multiplied by 51 minutes to compute the estimated flying time for each flight, and then 10 minutes is added to each estimate in accordance with the above assumption.

EXHIBIT 2

TICKET PRICES*

FLIGHT	ONE WAY		ROUND TRIP	
	FIRST CLASS	2nd CLASS	FIRST CLASS	2nd CLASS
BOSTON - N. Y.	$16.23	$14.18	$32.45	$28.35
PORTLAND - N. Y.	24.36	N/A	48.72	N/A
BANGOR - N. Y.	34.13	N/A	68.25	N/A
BOSTON-PORTLAND	10.35	N/A	20.74	N/A
BOSTON - BANGOR	20.16	N/A	40.32	N/A
PORTLAND-BANGOR	12.03	N/A	24.05	N/A

ESTIMATED PRICES**

BRUNSWICK - N. Y.	$26.11	N/A
SIDNEY - N. Y.	29.06	N/A

* N/A means "not available," i.e. these flights are exclusively first class. Price information supplied by Stowe Travel Agency, Brunswick.

** These estimates are based upon an assumption that ticket price is proportional to air distance covered between airports. This relation proved accurate in the cases of Boston-N.Y., Bangor-N.Y., and Portland-N.Y., where the prices are known.

EXHIBIT 3

DRIVING TIMES (minutes)
(assume 50 m.p.h. avr. speed)

PORTLAND - BOSTON	134
BRUNSWICK - BOSTON	160
PORTLAND - BANGOR	154
BRUNSWICK - BANGOR	115
PORTLAND - SIDNEY	80
BRUNSWICK - SIDNEY	49
SIDNEY - BANGOR	79
PORTLAND - BRUNSWICK	32

Driving Distances obtained from Mobil road map of Northern New England.

PART III

APPENDIX B

COUNT OF RESIDENT POPULATION SERVED BY BRUNSWICK LOCATION FOR SOUTHWESTERN MAINE REGIONAL AIRPORT AS COMPARED WITH PORTLAND LOCATION (1960 CENSUS DATA)

MINOR CIVIL DIVISION	POPULATION WITHIN BRUNSWICK CUTOFF CONTOURS OF FIG. 2	POPULATION WITHIN PORTLAND CUTOFF CONTOURS OF FIG. 2
YORK COUNTY		
N. Berwick	none	1,844
Kennebunk	none	4,551
Kennebunkport	none	1,851
Sanford	none	14,962
Lebanon	none	1,534
Old Orchard Beach	none	4,580
Saco	none	10,515
Biddeford	none	19,255
Acton	none	501
Alfred	none	1,201
Waterboro	1,059	1,059
Shapleigh	none	515
Newfield		319
Buxton	2,339	2,339
Hollis	1,195	1,195
Limerick	907	907
Limington	839	839
Parsonsfield	869	869
CUMBERLAND CO.	182,751	182,751
SAGADAHOC CO.	22,793	22,793
LINCOLN COUNTY	18,497	18,497
KENNEBEC CO.	89,150	89,150
ANDROSCOGGIN CO.	86,312	86,312
FRANKLIN CO.	20,069	20,069
OXFORD COUNTY	44,345	44,345
KNOX COUNTY	28,573	28,573
WALDO COUNTY		
Palermo	528	528
Liberty	458	458
Montville	366	366
Searsmont	628	628
Lincolnville	867	867
Belfast	6,140	none
Northport	648	none

PART III

APPENDIX B
(continued)

MINOR CIVIL DIVISION	POPULATION WITHIN BRUNSWICK CUTOFF CONTOURS OF FIG. 2	POPULATION WITHIN PORTLAND CUTOFF CONTOURS OF FIG. 2
WALDO CO. (cont'd)		
Belmont	295	none
Morrill	355	none
Freedom	406	none
Thorndike	457	none
Knox	439	none
Unity	983	none
Burnham	755	none
SOMERSET CO.		
Skowhegan	7, 661	7, 661
Madison	3, 935	3, 935
Anson	2, 252	2, 252
Norridgewock	1, 634	1, 634
Mercer	272	272
Smithfield	382	382
Fairfield	5, 829	5, 829
Starks	306	306
New Portland	620	620
Embden	321	321
Canaan	800	none
Cornville	585	none
Athens	602	none
Solon	669	none
Bingham	1, 308	none
Caratunk Plantation	90	none
The Forks Plantation	53	none
Jackman	984	none
Moose River	205	none
GRAND TOTALS	541, 531	587, 385

PART III

APPENDIX C

RECREATIONAL PROPERTY, OWNED BY OUT-OF-STATE PERSONS, SITUATED IN AREA A AND AREA B OF RECREATIONAL REGIONS I - III

MINOR CIVIL DIVISION	EST. MARKET VALUE (000's)	% OWNED OUT-OF-STATE	EST. MKT. VALUE OF OUT-OF-STATE OWNERSHIP (000's)
AREA A			
Biddeford	$5,289	54.6	$2,888
Kennebunk	2,800	44.7	1,251
Kennebunkport	4,707	72.9	3,431
Old Orchard Beach	12,125	18.0	2,183
Saco	3,272	20.7	677
Cape Elizabeth	1,582	24.8	392
Cumberland	1,119	75.2	841
Falmouth	1,124	11.9	134
Portland	11,451	9.0	1,031
Scarborough	6,742	41.0	276
So. Portland	842	4.7	40
Westbrook	101	0	0
Yarmouth	819	21.0	172
TOTAL, AREA A			$13,316
AREA B			
Arrowsic	120	61.1	73
Bath	376	5.3	20
Boothbay	3,044	56.7	1,726
Boothbay Harbor	4,729	55.1	2,606
Bowdoinham	170	15.7	27
Bremen	673	75.5	508
Bristol	3,436	57.7	1,983
Brunswick	968	15.3	148
Damariscotta	379	7.9	30
Dresden	151	70.6	107
Edgecomb	491	56.3	276
Freeport	715	3.4	24
Georgetown	901	69.3	624
Harpswell	2,811	44.6	1,254
Newcastle	250	41.0	103

PART III

APPENDIX C
(continued)

MINOR CIVIL DIVISION	EST. MARKET VALUE	%OWNED OUT-OF-STATE	EST. MKT. VALUE OF OUT-OF-STATE OWNERSHIP
AREA B (continued)			
Nobleboro	302	39.0	118
Phippsburg	1,882	46.5	875
So. Bristol	1,511	88.3	1,334
Southport	3,670	80.4	2,951
Topsham	179	8.9	16
Waldoboro	234	57.7	135
West Bath	807	17.8	144
Westport	366	60.3	221
Wiscasset	205	4.6	9
Woolwich	248	57.0	141
Belfast	864	21.9	189
Camden	2,452	43.2	1,059
Cushing	420	62.3	262
Friendship	796	71.0	565
Islesboro	1,747	84.5	1,476
Lincolnville	759	56.4	428
Northhaven	2,079	96.2	2,000
Northport	1,190	42.5	506
Owls Head	1,180	48.8	576
Rockland	740	30.9	229
Rockport	2,240	56.7	1,270
So. Thomaston	356	36.2	129
St. George	984	73.7	725
Thomaston	235	21.9	51
Vinalhaven	1,132	53.6	607
Warren	231	48.1	111
TOTAL, AREA B			$25,636

Source: "Recreational Property Inventory," Department of Economic Development, State of Maine, July 1960

PART III

APPENDIX D

RESIDENT POPULATION SERVED BY SIDNEY AIRPORT COMPETING AGAINST A REGIONAL AIRPORT AT PORTLAND

MINOR CIVIL DIVISION	POPULATION WITHIN PORTLAND CUTOFF CONTOURS OF FIG. 4	POPULATION WITHIN SIDNEY CUTOFF CONTOURS OF FIG. 4
YORK COUNTY		
North Berwick	1,844	
Kennebunk	4,551	
Kennebunkport	1,851	
Sanford	14,962	
Lebanon	1,534	
Old Orchard Beach	4,580	
Saco	10,515	
Biddeford	19,255	
Acton	501	
Alfred	1,201	
Waterboro	1,059	
Shapleigh	515	
Newfield	319	
Buxton	2,339	
Hollis	1,195	
Limerick	907	
Limington	839	
Parsonsfield	869	
CUMBERLAND COUNTY	182,751	
SAGADAHOC COUNTY	22,793	
KNOX COUNTY		
Rockland	8,769	
S. Thomaston	732	
St. George	1,588	
Cushing	479	
Thomaston	2,780	
Warren	1,678	
Friendship	806	
Washington		636
Appleton		672
Hope		525
Union		1,196
Camden		3,988
Rockport		1,893

PART III

APPENDIX D
(continued)

MINOR CIVIL DIVISION	POPULATION WITHIN PORTLAND CUTOFF CONTOURS OF FIG. 4	POPULATION WITHIN SIDNEY CUTOFF CONTOURS OF FIG. 4
LINCOLN COUNTY		
Boothbay	1, 617	
Boothbay Harbor	2, 252	
Southport	416	
Edgecomb	453	
Bristol	1, 441	
Damariscotta	1, 093	
Westport	133	
Newcastle	1, 101	
Waldoboro	2, 882	
Dresden		766
Alna		347
Jefferson		1, 048
Whitefield		1, 068
Somerville Plant.		254
KENNEBEC COUNTY		
Monmouth	1, 884	
Litchfield	1, 011	
Rest of County		86, 255
ANDROSCOGGIN COUNTY		
Lewiston	40, 804	
Auburn	24, 449	
Lisbon	5, 042	
Webster	1, 302	
Durham	1, 086	
Poland	1, 537	
Minot	780	
Mechanic Falls	2, 195	
Turner	1, 890	
Greene	1, 226	
Livermore Falls		3, 343
Livermore		1, 363
Leeds		807

PART III

APPENDIX D
(continued)

MINOR CIVIL DIVISION	POPULATION WITHIN PORTLAND CUTOFF CONTOURS OF FIG. 4	POPULATION WITHIN SIDNEY CUTOFF CONTOURS OF FIG. 4
OXFORD COUNTY		
Bethel	2,408	
Waterford	834	
Norway	3,733	
Paris	3,601	
Woodstock	930	
Sumner	481	
Byron		108
Roxbury		344
Rumford		10,005
Mexico		5,043
Dixfield		2,323
Peru		1,229
Canton		728
West Paris		1,050
Buckfield	982	
Hartford	325	
Hebron	465	
Sweden	119	
Fryeburg	1,874	
Denmark	376	
Brownfield	538	
Hiram	699	
Lovell	588	
Stow	108	
Stoneham	18	
Greenwood	601	
Gilead	136	
Hanover	240	
Newry	260	
Andover	762	
Upton	35	
Unorganized Terr.		620
SOMERSET COUNTY		39,749
PISCATAQUIS COUNTY		
Greenville		2,025
Shirley Mills		214
Munson		852
Guilford		1,880

PART III

APPENDIX D
(continued)

MINOR CIVIL DIVISION	POPULATION WITHIN PORTLAND CUTOFF CONTOURS OF FIG. 4	POPULATION WITHIN SIDNEY CUTOFF CONTOURS OF FIG. 4
PISCATAQUIS COUNTY (continued)		
Abbot		404
Parkman		530
Wellington		231
Kingsbury		1,372
Blanchard		57
PENOBSCOT COUNTY		
Newport		2,322
Plymouth		494
Dixmont		551
WALDO COUNTY		
Troy		469
Burnham		755
Thorndike		497
Brooks		758
Freedom		406
Knox		439
Waldo		395
Belmont		295
Palermo		528
Liberty		458
Montville		366
Searsmont		628
Morrill		355
Lincolnville		867
Northport		648
Belfast		6,140
Swanville		514
Jackson		220
Unity		983
Searsport		1,838
FRANKLIN COUNTY		20,069
GRAND TOTALS	405,919	213,920