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**REPORT ON EXTENSION OF
NATIONAL SYSTEM OF INTERSTATE AND DEFENSE
HIGHWAYS WITHIN ALASKA AND HAWAII**

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required by Section 105
of the Federal-aid Highway Act of 1959

60-62271



**U.S. DEPARTMENT OF COMMERCE
BUREAU OF PUBLIC ROADS**

January 1960

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LETTER OF TRANSMITTAL

THE SECRETARY OF COMMERCE,
Washington, D. C.

The Honorable Sam Rayburn
Speaker of the House of Representatives, Washington, D. C.

Dear Mr. Speaker:

I am transmitting herewith a report on the extension of the National System of Interstate and Defense Highways within the States of Alaska and Hawaii, prepared pursuant to a direction of the Congress in Section 105 of the Federal-Aid Highway Act of 1959.

This study was undertaken by the Federal Highway Administrator. Recommendations are presented in concise form in the forepart of the report. The data and analysis upon which the recommendations are based, together with other supplementary information, follow in the body of the report.

Sincerely yours,

Frederick H. Mueller
Secretary of Commerce

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REPORT ON EXTENSION OF
NATIONAL SYSTEM OF INTERSTATE AND DEFENSE
HIGHWAYS WITHIN ALASKA AND HAWAII

RECOMMENDATIONS

A study has been made of the potential Interstate routes as identified by the highway departments of Alaska and Hawaii, in a manner similar to that in which the present Interstate System was designated. Based on this study it is recommended that -

1. The Interstate System include 50 miles of primary highways in the State of Hawaii.
2. The inclusion of this mileage in Hawaii be accommodated within the present Interstate System authorization.
3. The two States be encouraged to protect transportation development with legislation necessary to acquire adequate rights-of-way to meet the requirements of future traffic over long-term programs.
4. Section 103(d) of Title 23, U.S. Code be modified with the deletion of "continental."

Neither the present conditions nor anticipated further developments for the next 15-20 years warrant the designation of any Interstate mileage in Alaska. The generally low volumes of traffic usage, and the long routes through sparsely settled areas with relatively small centers of population to be connected, indicate that the standards of low-volume

primary and secondary systems will be adequate. The ratio of unappropriated and unreserved public lands and nontaxable Indian lands to the total area of the State places Alaska in a position of matching 86 cents of Federal-aid funds with 14 cents of State funds on the ABC program as compared with the 90-10 matching ratio for the Interstate program in the non-Public Lands States. (See Appendix A)

INTRODUCTION AND AUTHORIZATION

Alaska and Hawaii have Federal-aid primary and Federal-aid secondary systems in both rural and urban areas (see Appendix B, C-1, C-2 and C-3), but have no authorization for Interstate routes.

Section 105 of the Federal-aid Highway Act of 1959 provided:

The Secretary of Commerce is authorized and directed to make a study of the need for the extension of the National System of Interstate and Defense Highways within the States of Alaska and Hawaii, and report the results of such study to the Congress within ten days subsequent to January 4, 1960. The report shall include recommendations as to the approximate routes and mileages thereof which should be included in such system within those States.

HISTORY OF THE INTERSTATE SYSTEM

Section 7 of the Federal-aid Highway Act of 1944 provided for the designation "within the continental United States of a National System of Interstate Highways not exceeding forty thousand miles in total extent so

located as to connect by routes, as direct as practicable, the principal metropolitan areas, cities, and industrial centers, to serve the national defense, and to connect at suitable border points with routes of continental importance in the Dominion of Canada and the Republic of Mexico."

In compliance with this legislation, general locations of 37,700 miles of city-to-city routes of the Interstate System were officially designated in 1947, and 2,300 miles of routes into, through, and around urban areas were designated in 1955. The Federal-Aid Highway Act of 1956 provided a 1,000-mile increase in the limitation of the Interstate System, bringing its total extent to 41,000 miles. In 1957, routes were selected under this 1,000-mile authorized expansion. At that time, also, an additional 1,102 miles of routes were selected for designation utilizing mileage savings resulting from adoption of more direct locations of routes of the 40,000-mile system previously designated.

Routes in the original Interstate system and subsequent expansions were approved after consideration of recommendations by the State highway departments and after consultations with the Department of Defense. General locations of routes of the Interstate System are shown on the map in Appendix D.

The 50 miles recommended for Hawaii could be designated from additional mileage savings resulting from adoption of more direct locations of routes of the previously designated Interstate System.

CRITERIA FOR ROUTE SELECTIONS

The criteria used by the Bureau of Public Roads in its review of the proposed Interstate System routes for Alaska and Hawaii were essentially the same as used to determine the system recommended in the report "Interregional Highways," House Document No. 379, 78th Congress, 2d Session, and subsequently expanded to the present extent. The factors considered included distribution of population, motor-vehicle ownership, service to cities of manufacturing importance, value of farm products, strategic importance of interregional connections from a defense standpoint, and service to defense plants and principal military establishments. These criteria were set forth in more detail in a statement submitted by the Commissioner of Public Roads to the Subcommittee on Roads of the Committee on Public Works of the U. S. Senate on April 15, 1955 (see Appendix E).

GENERAL CONDITIONS IN ALASKA

Area

The area of Alaska is 586,400 square miles which, roughly, is equal to one-fifth of the area of the 48 continental States. It has a north-south and east-west extent almost as great as these 48 States, considering the peninsulas and other extremities. In such a vast region there are wide differences from place to place in climate, land forms, and soils.

Climate

The interior of Alaska generally has a climate resembling in many respects that of the northern portion of the Central States. Along the coasts and in southeastern Alaska, average annual temperatures are much higher and winters are warmer. On the Arctic slope, the Seward Peninsula, the Bristol Bay area, the Alaska Peninsula, and possibly on the Aleutian Islands the climate is much more rigorous. In these areas there is not yet demonstrated an economy or economy potential sufficient to justify other than the most elemental highway transportation facilities.

Certain areas in southeastern, south central, and interior parts appear to offer the better advantages for development at the present time. It would be in these areas that highway development should be first considered.

Economy

Table 1 shows the relative position of Alaska in comparison with the United States as a whole with respect to such factors as area, population, income, and production, as well as highway statistics.

Southeastern Alaska. - This region comprises the narrow strip of mainland lying between Canada and the sea, and the group of islands, large and small, called the Alexander Archipelago. This region is closest to the 48 continental States and supports about one-fifth of the population, over half of which lives on islands.

The economy is based on fish, minerals, timber, and recreation.

Costs of clearing and preparing land are very high because of the dense cover and rugged topography. For the most part it is extremely mountainous and the coastline is indented with fiord-like waterways. This rugged topography, and lack of appreciable cultivable land and good crop-growing climate, indicate that projection of the economy in this region should be conservative.

There are short stretches of 2-lane roads leading out from some of the cities, and the Haines cutoff connects this area with the Canadian road system and the Alaska Highway. The same factors that make the clearing of land expensive also limit the development of highways, making it impracticable to connect the sparse centers of population in this area by highway. Two-lane roads of primary system standards or less should be adequate to serve the economy of this area for at least the next 15-20 years.

Table 1.--Selected comparative factors for Alaska, Hawaii, and the United States

A - Data

Item	United States	Alaska	Hawaii
<u>Population and area</u>			
Total, 1950 (number in thousands)	151,326	129	500
Rural (thousands)	54,479	94	155
Urban (thousands)	96,847	34	345
Cities over 10,000 (thousands)	73,917	11	275
Total, 1958 (thousands)	174,055	191	632
Civilian, 1958 (thousands)	172,153	156	577
Area, land and water (square miles)	3,615,210	586,400	6,423
<u>Income and production (millions of dollars)</u>			
Personal income, 1958	357,903.0	1/ 421.0	1,154.0
Cash farm income, 1958	36,018.9	3.9	276.6
Manufacturing value added, 1954	117,095.2	40.2	140.3
Mineral production, 1957	18,125.9	28.8	5.9
Retail sales, 1954	170,567.6	174.5	425.3
Wholesale trade, 1954	101,428.0	41.4	285.6
Service industry receipts, 1954	23,572.0	19.8	64.7
<u>Highway statistics</u>			
Road and street mileage, 1958	3,371,493	4,943	3,055
Motor vehicle registrations, 1958	68,562,649	64,726	198,923
Motor fuel consumption, 1958 (1,000 gallons)	53,586,000	45,828	121,940
Highway Trust Fund apportionments, F.Y. 1961 (thsds)	2,640,373	36,769	3,924
Highway Trust Fund revenues, F.Y. 1960 (thousands)	2,513,000	2,334	6,079
Population density, 1958 (persons per square mile)	48.1	0.3	98.4
<u>Income and production</u>			
Personal income, per capita, 1958 2/	2,056	2,204	1/ 1,826
Cash farm income, per acre, 1954	15.57	.01	67.29
Value added by manufacturing, per capita, 1954	723.15	193.44	268.73
Mineral production per square mile, 1957	5,014.08	49.10	923.24
Retail sales per capita, 1954	1,058.17	814.81	839.01
Wholesale trade per capita, 1954	629.24	199.09	547.17
Service industry receipts per capita, 1954	146.24	90.42	124.00
<u>Highway statistics per capita</u>			
Road and street mileage	0.019	0.026	0.005
Motor vehicles registered (number)	0.394	0.339	0.315
Motor fuel consumption (total population)	307.9	239.9	192.9
Motor fuel consumption (civilian population)	311.3	293.8	211.3
Trust Fund apportionments, F.Y. 1961	15.17	192.51	6.21
Trust fund revenues, F.Y. 1960 1/	14.44	12.22	9.62

1/ Estimated by Bureau of Public Roads.

2/ U. S. Department of Commerce data revised according to latest population estimates.

B - Ratios and Rankings

Item	Alaska		Hawaii	
	Percent of U.S. total	State rank <u>2/</u>	Percent of U.S. total	State rank <u>2/</u>
<u>Population and area</u>				
Total, 1950	0.09	51	0.33	45
Rural	0.17	49	0.28	46
Urban	0.04	51	0.36	39
Cities over 10,000	0.01	51	0.37	39
Total, 1958	0.11	51	0.36	46
Area, land and water	16.22	1	0.18	47
<u>Income and production</u>				
Personal income, 1958	0.12	51	0.32	43
Cash farm income, 1958	0.01	50	0.77	36
Manufacturing value added, 1954	0.03	51	0.12	45
Mineral production, 1957	0.16	41	0.03	46
Retail sales, 1954	0.10	51	0.25	47
Wholesale trade, 1954	0.04	51	0.28	40
Service industry receipts, 1954	0.08	51	0.27	44
<u>Highway statistics</u>				
Road and street mileage, 1958	0.15	47	0.09	50
Motor vehicle registrations, 1958	0.09	51	0.29	46
Motor fuel consumption, 1958	0.09	51	0.23	50
Highway Trust Funds apportioned, F.Y. 1961	1.39	24	0.15	51
Highway Trust Fund revenues, F.Y. 1960	0.09	51	0.24	49
<hr/>				
	Percent of U.S. average	State rank	Percent of U.S. average	State rank
Population density, 1958	0.62	51	204.6	14
<u>Income and production <u>1/</u></u>				
Personal income per capita, 1958	107.2	18	88.8	31
Cash farm income per acre	0.1	50	432.2	3
Value added by manufacturing per capita, 1954	26.8	46	37.2	40
Mineral production per square mile, 1957	1.0	51	18.4	38
Retail sales per capita, 1954	80.0	40	77.0	43
Wholesale trade per capita, 1954	32.0	51	87.0	17
Service industry receipts per capita, 1954	61.8	38	84.8	19
<u>Highway statistics (per capita)</u>				
Road and street mileages	136.8		26.3	
1958 motor vehicle registrations, number	86.0		80.0	
1958 motor fuel consumption, total population	77.9		62.7	
1958 motor fuel consumption, civilian population	94.4		67.8	
Trust Fund apportionments F.Y. 1961	1,269.0		40.9	
Trust Fund revenues F.Y. 1960 <u>2/</u>	84.6		66.6	

1/ Alaska dollar measures must be considered in the light that the cost of living ranges on the average from one-third to one-half higher than the rest of the United States.

2/ Includes District of Columbia.

South Central. - This region extends along the Pacific coast, including the Prince William Sound and Cook Inlet sections and the Kenai Peninsula northward to the Alaska Range, as well as the Susitna River drainage area, the Matanuska Valley, and land eastward to Canada. Along the coast the topography, climate, and vegetation somewhat resemble southeastern Alaska.

The South Central area of Alaska has a relatively diversified economy. Through the ports of Valdez and Seward pass much of the merchandise destined for the interior over the Richardson Highway and the Alaska Railroad. The more favored areas for development are parts of the Kenai Peninsula, the area around Anchorage, (the largest city in Alaska), and the Matanuska Valley. South Central Alaska produces significant amounts of minerals. Fish canneries are located on many of the coves and inlets. Lumbering for local use has been developed and agriculture is practiced in the Kenai Peninsula in some favorable localities, around Anchorage, and in the Matanuska Valley. Birch timber stands, the largest west of the Mississippi, and associated cottonwood, offer one of the most promising future industries of the region.

The Anchorage area, located in this region, experienced a remarkable wartime growth. The city itself had a population of about 3,500 in 1939 and was estimated to have a population of 31,000 in 1957. It is a center of government activities and two large military facilities are located adjacent to the city limits. It is the center of commercial airlines, is

served by the Alaska Railroad to Fairbanks, and is the center of motor-vehicle ownership and operation in the State.

With the exception of the roads in the vicinity of Anchorage and Seward, the present economy does not require, nor does a projected economy of several times the present suggest, a system of highways higher than the standards of a 2-lane primary system. Much of the economy will be adequately served for the next 15-20 years with local and secondary type systems.

Interior Alaska. - This region largely comprises the drainage basins of the Yukon, Tanana, Copper, and Kuskokwim Rivers. In places it is mountainous but the area is not characterized generally by especially rough terrain. Mining is one of the principal industries. Mining for gold has been active in many parts of the region and coal is mined for local uses, but the area has not been completely prospected.

The population center of this region is the city of Fairbanks, with an estimated 10,000 persons in comparison with about 3,500 in 1940. It is the northern terminus for the Alaska Railroad and the Richardson and Alaska Highways, with stub highways radiating outward to smaller settlements. Airlines radiate from Fairbanks and two large military airfields located in the vicinity contribute greatly to the local economy.

With the possible exception of a few miles near Fairbanks, the most important of the highway needs of the area appear to be adequately met with standards of 2-lane primary system construction or less.

Motor vehicle registrations and fuel consumption

Registrations and motor-fuel consumption are relatively small for the entire State, each being about 0.1 percent of the U. S. total. Registrations and motor-fuel consumption are the smallest of all the States. (See Table 2)

It is significant to note that motor-fuel consumption has doubled in the eight-year period 1950-1958, that the proportion of commercial vehicles is higher than in the continental United States but this proportion is decreasing, and that total registrations have increased 214 percent, 171 percent for trucks and 234 percent for passenger cars and buses.

Highway mileage

Road and street mileage in Alaska, according to the best information available at the present time, comprises an estimated 4,959 miles, including nearly 800 miles, proposed but unbuilt, that may be in use in some places under primitive conditions. (See Table 3). This amounts to about 0.15 percent of all roads and streets in all States. The District of Columbia and three States, (Delaware, Hawaii, and Rhode Island), have less road and street mileage than Alaska. Appendix F is a map showing highways of Alaska.

Highway travel

Estimates of highway travel for 1958, based on fuel consumption statistics only, indicate about 650 million vehicle-miles of travel

Table 2.--Motor vehicle registrations and fuel consumption
in Alaska.

Motor Vehicle Registrations							Highway motor fuel consumption 1,000 Gallons
Year	Automobiles & Buses		Truck		Total		
	Number	Percent	Number	Percent	Number	Percent	
1950	20,468	67.6	9,813	32.4	30,281	100.0	22,586
1955	42,319	71.9	16,528	28.1	58,847	100.0	37,236
1958	47,966	74.1	16,760	25.9	64,726	100.0	45,828

Table 3.--Alaska road mileage (January 1959)

<u>System</u>	<u>Rural</u>	<u>Urban</u>	<u>Total</u>	<u>Proposed mileage (unbuilt)</u>
Federal-aid Primary	1,591	15	<u>1/1,606</u>	8
Federal-aid Secondary	2,553	6	2,559	686
Class A	1,566	5	1,571	655
Class B	987	1	988	31
Other Rural Roads	-	-	(2/)	-
Local City Streets	-	-	<u>(2/)</u>	-
Total	4,144	21	4,165	794

1/ In addition to the road mileage, there are 346 miles of ferry routes serving the Federal-aid primary system.

2/ Data not available.

annually on all roads and streets, about 0.1 percent of the highway travel in the continental United States.

Low traffic volumes and great distances typify the travel conditions in Alaska. Average daily traffic in 1959 on the Alaska Highway between Fairbanks and the Canadian border, a distance of 296 miles, is estimated to be about 250 vehicles. This varies from a high of about 3,000 vehicles a day near Fairbanks to a low of about 100 vehicles a day near the Canadian Border. On existing routes between Anchorage and Fairbanks, the 1959 average daily traffic is estimated to be not much more than 100 vehicles per day, and this is also characterized by higher volumes near cities and much lower volumes in the more remote sections. These routes represent the more important routes of significant distance, but the travel of vehicles using them is but a small portion of the total. Most of the travel is centered in and around the cities. (See the Traffic Flow Map of Alaska, Appendix G.)

GENERAL CONDITIONS IN HAWAII

Area

Hawaii consists principally of six islands (see Appendix H) strategically located in the middle of the Pacific Ocean serving, in addition to its own important economy, as the crossroads of the Pacific area in transportation between the continents of Asia, Australia, and North America. It is equivalent in area to the combined areas of Connecticut and Rhode Island and exceeds that of Delaware.

Climate

Hawaii is known all over the world for its mild, uniform climate. Weather conditions have been remarkably stable year-in and year-out within the span of its known history. Drastic temperature changes are unknown, and violent weather conditions are rare. The annual average temperature is 75 degrees and the lowest 56 degrees. This is complemented with stable sunshine and rainfall patterns. Rainfall in Honolulu amounts to less than 24 inches a year but on the mountain heights and in deep valleys heavier-than-average rainfall--even on a worldwide basis--is received. Climate is a truly important natural resource. Migration to a large extent is "climate motivated" and a good climate not only tends to attract people from other areas but discourages emigration--an economic stabilizer.

Economy

Hawaii has a population of well over 600,000, generates a "gross territorial product" of about \$1.4 billion, and an aggregate personal

income of about \$1.1 billion. It exceeds in population the States of New Hampshire, Delaware, Vermont, Wyoming, Nevada, and Alaska. Its personal income exceeds that of each of eight States, and the value of its manufacturing exceeds that of six other States. It has a substantial agricultural economy in the production of sugar and pineapples. The tourist industry has developed to be of major significance. Its geographical position and its topography have combined to make it a critical area in the plans for National Defense.

Table 1 shows the relative position of Hawaii in comparison with the United States as a whole for such factors as area, population, income, and production, as well as highway statistics.

The island of Oahu is the dominant area of the State. With less than one-tenth of the land area of the State, Oahu contains almost four-fifths of the population and well over four-fifths of the business. This predominance is based on an interaction of several factors. In addition to producing significant amounts of sugar and pineapples, Oahu encompasses nine-tenths of the manufacturing and tourist trade as well as practically all of the defense installations. It is a major port for shipping, has the international airport, and it is the central point of contact for the entire State with other parts of the world. It is also the center of government, finance, trade, services, communications, utilities, the sugar agencies, and the largest pineapple companies. The other islands contribute to the State's economy, but to a lesser extent.

Table 4 shows percentage of distribution of various economic items among the Islands of Hawaii, Maui, Kauai and Oahu. Similar statistics for other islands are not generally available. The quantities involved are relatively small and would not affect these distributions appreciably.

Although there are 13 places of population concentration, slightly more than half of the entire population, not including the military, is centered in the city of Honolulu (310,000 est.).

Of the 157 urbanized areas in the 1950 U. S. census, Honolulu would be well within the grouping of the first third. There are 12 other cities and towns on the islands which, with the exception of two of 25,000 and 40,000 population, range downward from an estimated 18,000 to 4,000.

Reliable population data and forecasts are fundamental to all planning; population projections have been made in the development of planning for Hawaii. Land-use projections have also been made; these and the population projections must be given careful consideration in transportation planning for the State.

From the best information available, it is expected that the total population will be about 900,000 in 1980, not quite doubling its 500,000 of 1950. Oahu is expected to accumulate a larger share of the State's population by 1980, compared with an estimated 79 percent in 1959 and 70 percent in 1950.

The Honolulu City District represents a comparatively small part of Oahu but accounts for 64 percent of the Island's population. Of the total increase in population anticipated for Hawaii of 275,000 from 1960

to 1980, it is expected that the increase on the island of Oahu will be 255,000 persons and the bulk of this increase will be in the vicinity of Honolulu if not in the city itself.

Since the distances involved on the islands are relatively short, railroad transportation, except for movements of bulk goods such as sugar cane, is of small significance. Highways perform the bulk of the land transportation movements and the economy of the islands is dependent on highway transportation.

Motor vehicle registrations and fuel consumption.

The analysis of motor vehicle registrations (see Table 5) indicates a distribution of vehicles quite comparable to that found in the 48 continental States. The increase in total registrations over the nine-year period of 47 percent is substantially more than that for the continental States but the proportion of trucks is less. The increase in truck registrations of only 5 percent in nine years is considerably less than for the other States.

The 36-percent increase in motor fuel consumption in the 1950-8 period, an average of 4 percent a year, is almost the same as the continental increase.

Highway mileage.

Table 6 is a summary of road mileage for the State of Hawaii. Appendixes I and J are maps showing principal highways of the Islands of Oahu and Hawaii. The Island of Hawaii has the most highway mileage of any

Table 4.--Selected economic items - percentage distribution among four major islands of Hawaii.

<u>Item</u>	<u>Hawaii</u>	<u>Percent of the State total</u>			<u>Total</u>
		<u>Maui</u>	<u>Kauai</u>	<u>Oahu</u>	
Area	62.6	18.2	9.8	9.4	100.0
Population	9.9	6.9	4.4	78.8	100.0
Labor force	10.4	7.6	5.1	76.9	100.0
Sugar	35.6	21.5	22.7	20.2	100.0
Pineapples	-	35.7	9.5	54.8	100.0
Diversified agriculture	36.9	9.8	6.6	46.7	100.0
Retailing	7.0	4.8	3.2	85.0	100.0
Personal income	7.1	5.5	3.9	83.5	100.0

Table 5.--Motor vehicle registrations and fuel consumption in Hawaii.

<u>Motor Vehicle Registrations</u>							Highway motor fuel consumption 1,000 Gallons
<u>Year</u>	<u>Automobiles & Buses</u>		<u>Truck</u>		<u>Total</u>		
	<u>Number</u>	<u>Percent</u>	<u>Number</u>	<u>Percent</u>	<u>Number</u>	<u>Percent</u>	
1950	110,323	81.6	25,020	18.4	135,343	100.0	89,496
1955	152,350	85.9	25,141	14.1	177,491	100.0	112,223
1958	172,583	86.8	26,340	13.2	198,923	100.0	121,940

Table 6.--Summary of road mileage (January, 1958) for Hawaii.

<u>System</u>	<u>Rural</u>	<u>Urban</u>	<u>Total</u>
Federal-aid Primary	494	38	1/ 532
Federal-aid Secondary	640	9	2/ 649
Other local roads	1,293	-	1,293
City streets	-	596	596
National Park and Forest	67	-	67
Total	2,494	643	3,137

1/ Includes 27 miles of proposed (unbuilt) routes.

2/ Includes 56 miles of proposed (unbuilt) routes.

of the islands and it is also the largest. With the exception of Hilo, with a population of about 25,000, there are no large centers of population. The economy of this island is dominantly agricultural. Most of the mileage of city streets is found on the Island of Oahu and in the city of Honolulu.

Highway travel

Appendix K is a traffic flow map of the Island of Oahu. The annual travel on all roads and streets in Hawaii is estimated to be about 1,707 million vehicle-miles. This is based primarily on registration and motor-fuel consumption data. It would amount to an average daily traffic of about 1,530 vehicles on the entire reported mileage of roads and streets in Hawaii. This compares with similar volumes on all roads and streets of 1,570 vehicles in Connecticut, 1,200 in Delaware, 2,030 in Rhode Island and 523 for the entire United States.

ANALYSIS

General Procedures

At the request of the Bureau of Public Roads, the Alaska and Hawaii State highway departments made studies and identified certain routes for consideration for Interstate designation (see Figures 1, 2, and 3). These routes totaled approximately 2,500 miles in Alaska and 235 miles in Hawaii. The Bureau of Public Roads analyzed these routes on the same basis of criteria used in the 1957 expansion of the Interstate System in the 48 continental States. Four basic factors were used in considering the relative merit of routes: (1) national defense, (2) system integration--the value of the route as a connector between centers of population and industry which generate traffic, (3) service to industry by manufacturing, fishing, agriculture, mining, forestry, etc., as measured by value of products or by traffic data, and (4) population.

These routes have been discussed with the Department of Defense and their relative defense significance has been established in consultation with that department.

The composite ratings of routes in each of these two States are shown in Tables 7 and 8.

FIGURE 1

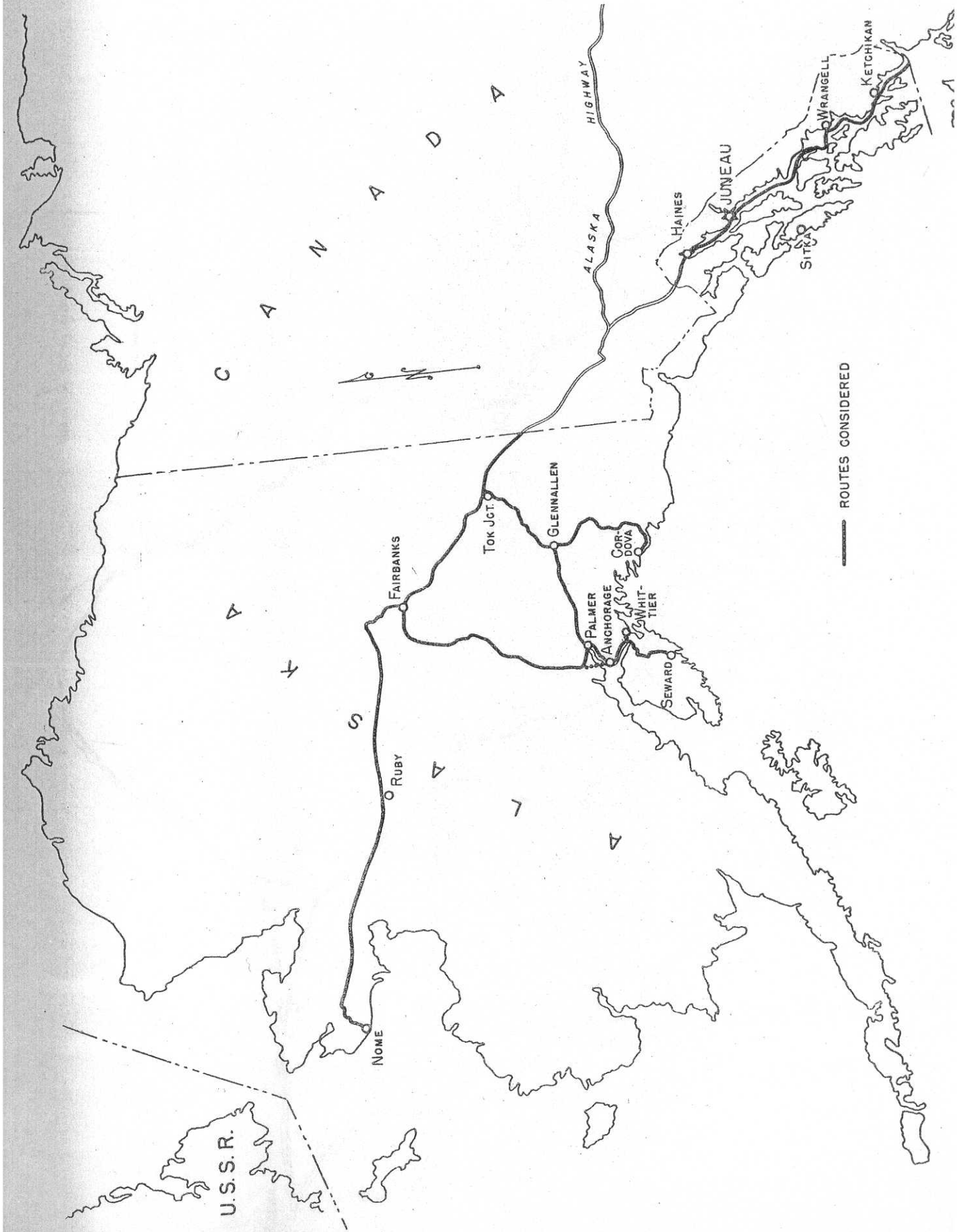


FIGURE 2

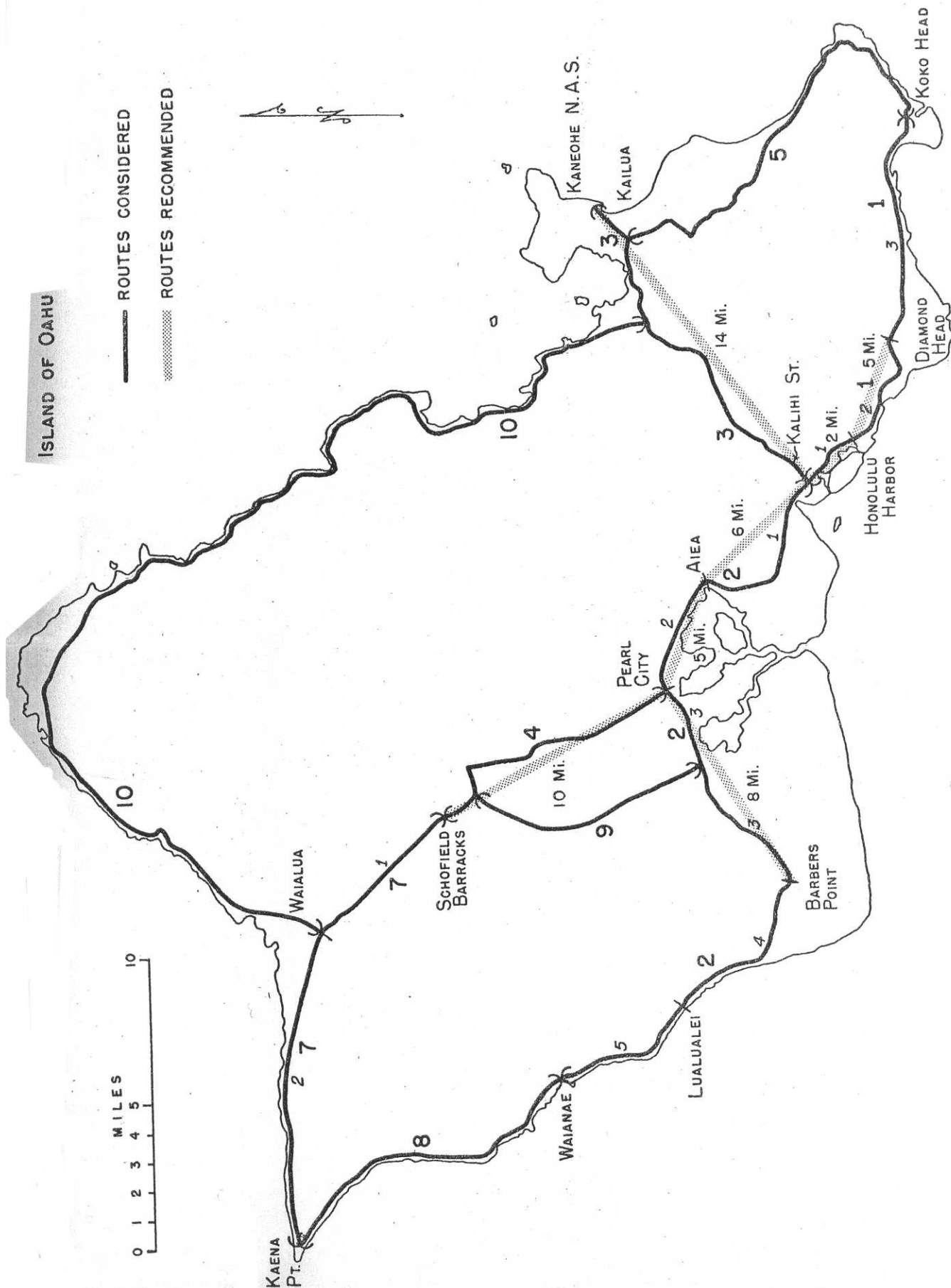


FIGURE 3

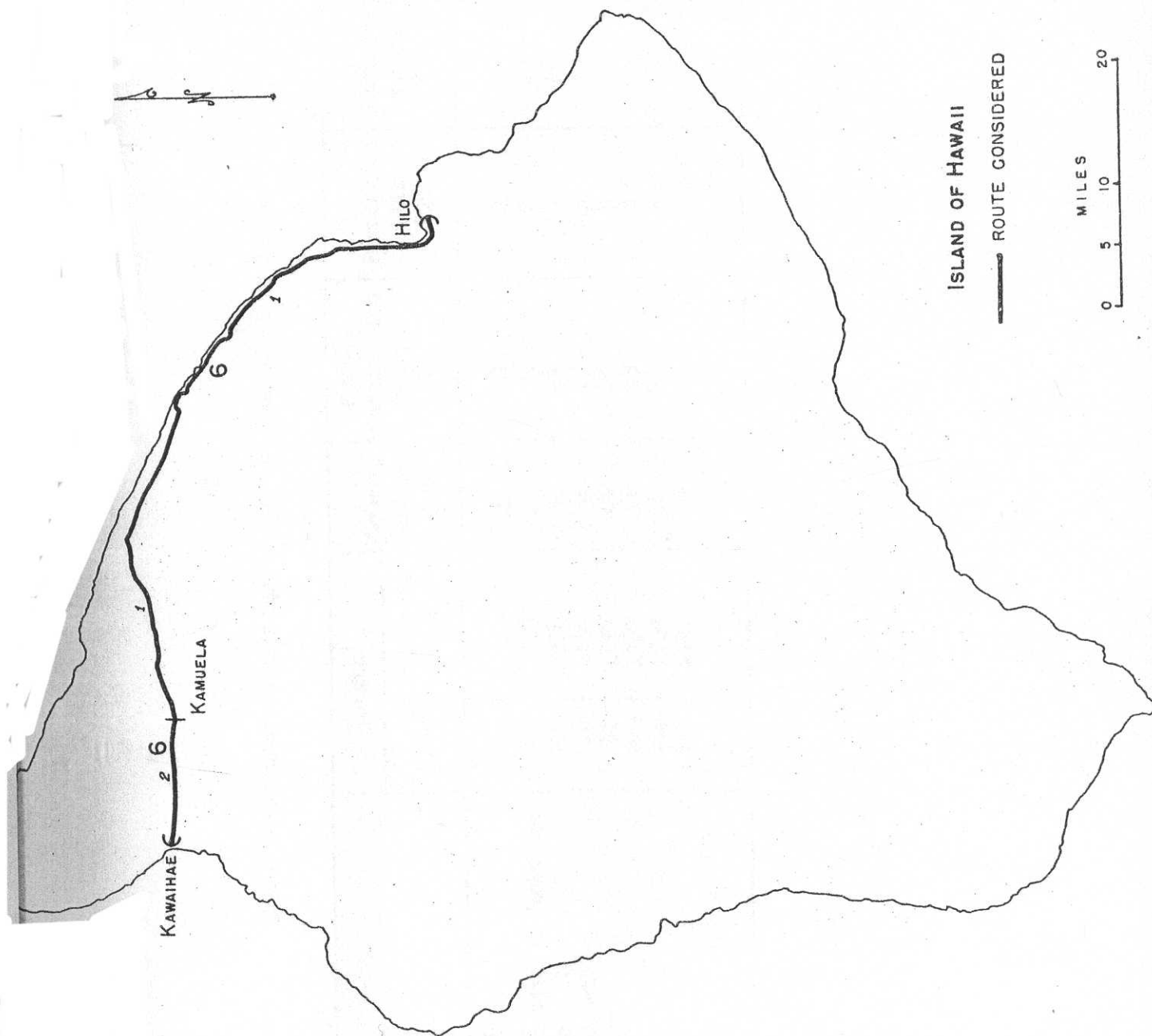


Table 7.--Composite ratings of routes considered in Alaska

Termini	Length		Defense rating 30%	System integration rating 30%	Population rating 20%	Industry rating 20%	Composite rating 100%
	Miles	Cumulative miles					
Anchorage - Fairbanks	376	518	22	28	19	19	88
Seward - Anchorage with spur to Whittier	142	724	14	30	20	20	84
Fairbanks - Tok Junction	206	1134	28	24	16	12	80
Anchorage - Canadian Border	410	1175	28	19	13	15	75
Haines - Canadian Border	41	1367	14	18	8	4	44
Glennallen - Cordova	192	1707	14	15	8	4	41
Fairbanks - Ruby	340	2127	14	6	9	9	38
Ruby - Nome	420		6	6	4	6	22

Table 8.--Composite ratings of routes considered in Hawaii

Route	Termini	Length		Defense rating 30%	System integration rating 30%	Population rating 20%	Traffic rating 20%	Composite rating 100%
		Miles	Cumulative miles					
2, Sec. 1	Kalihi Street - Aiea	5.8	5.8	30	30	20	20	100
2, Sec. 2	Aiea - Pearl City	4.7	10.5	30	30	20	20	100
1, Sec. 1	Kalihi Street - Honolulu Harbor	2.3	12.8	30	30	20	20	100
3	Honolulu - Koneoe	13.7	26.5	30	30	20	20	100
2, Sec. 3	Pearl City - Barbers Point	7.4	33.9	30	29	20	20	99
1, Sec. 2	Honolulu Harbor - Diamond Head	5.3	39.2	24	30	20	20	94
4	Pearl City - Schofield Barracks	10.1	49.3	30	30	16	16	92
1, Sec. 3	Diamond Head - Koko Head	7.5	56.8	24	24	20	20	88
2, Sec. 4	Barbers Point - Lualualei	4.6	61.4	24	24	16	16	80
5	Koko Head - Kailua	15.3	76.7	24	24	16	16	80
2, Sec. 5	Lualualei - Waianae	6.7	83.4	15	24	16	16	67
7, Sec. 1	Schofield Barracks - Waialua	6.5	89.9	24	24	12	12	64
10	North Oahu Loop	43.1	133.0	15	11	8	13	47
6, Sec. 2	Kamuela - Kawaihae	12.0	145.0	15	21	4	4	44
6, Sec. 1	Hilo - Kamuela	58.7	203.7	6	15	13	9	43
7, Sec. 2	Waialua - Kaena Point	11.0	213.7	15	6	5	4	30
8	Waianae - Kaena Point	11.9	226.6	15	6	4	4	29
9	West Loch - Schofield Barracks	8.9	235.5	15	6	4	4	29

Alaska

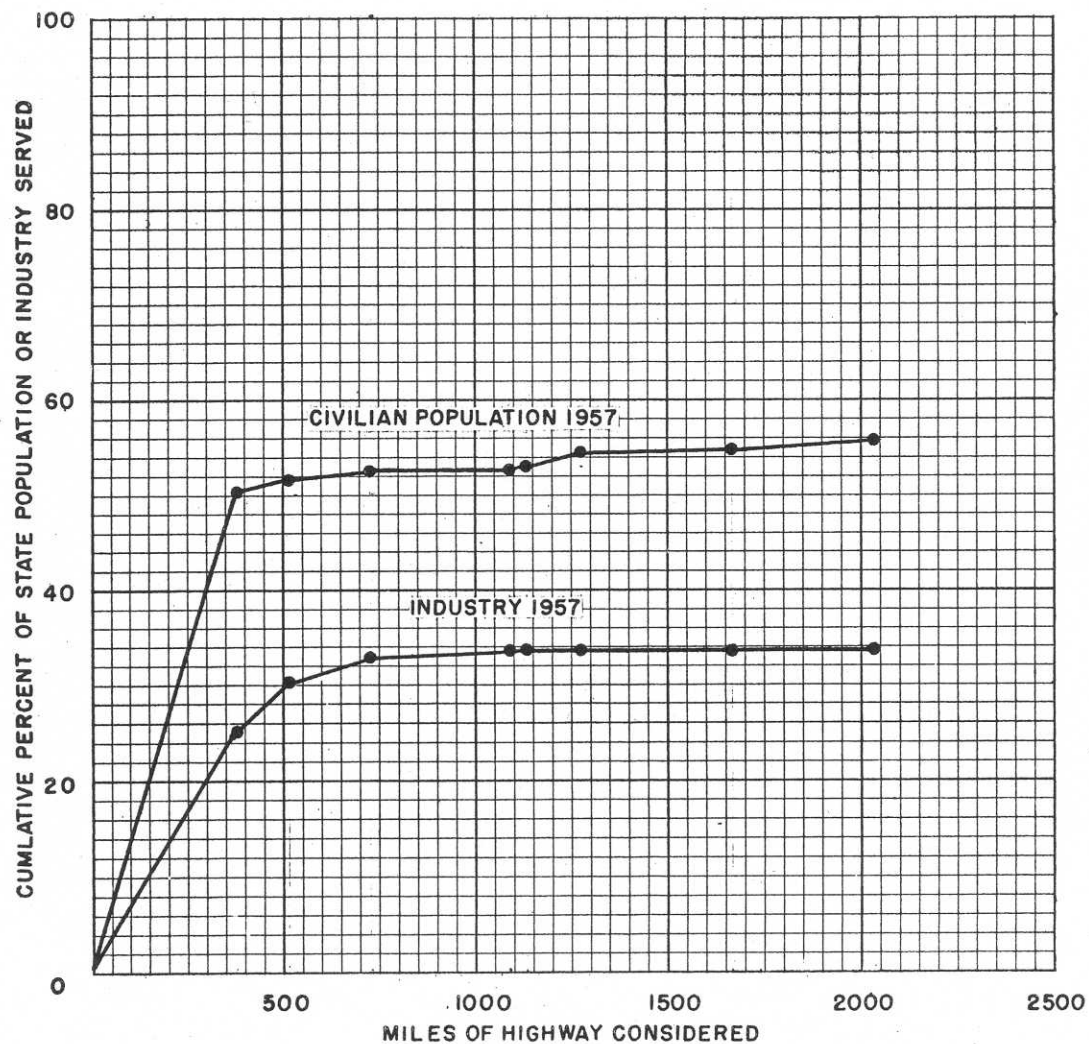
When the mileage of highways considered for the Interstate System in Alaska is analyzed according to the population served (see Figure 4), it is apparent that about 400 miles of highway, less than 10 percent of all roads and streets, serves about 50 percent of the population and that any increment of mileage beyond this point serves a lessening population density.

The relation of industry to the highway systems closely parallels the service to population. The same 400-mile increment of highways serves at the present time about a quarter of the industry with a lessening degree of service to industry with any increase in mileage (Figure 4).

Service in the first 400 miles is in the Anchorage-Fairbanks area of influence--two cities that are already served by air and rail. The two cities are also served by an indirect primary highway, and a direct primary routing is planned for early completion. Although rated highest in the State and providing optimum service to industry and population, a low-volume primary system development would well serve this area. Even with a population projection of several times the present, traffic volumes cannot reasonably be expected to exceed standards of design usually used in 2-lane primary system development.

Routes between Seward and Anchorage, from Anchorage to the Canadian border, from Fairbanks to the Canadian border, and others, are of lesser

ALASKA -- Service to population and industry provided by routes considered for Interstate System designation (Plotted in order of composite rating)



significance in the economy of the State and show lesser ratings of importance. The State also identified for consideration, as an Interstate route, an "Inland Passage" waterway ferry connection of about 400 miles between Haines and Prince Rupert, British Columbia. Consistent with treatment in the other States as based on the Federal legislation, this ferry route has not been included in the detailed analysis.

Hawaii

When the routes considered for Interstate designation in Hawaii are studied in relation to the established criteria for selection, it appears from Figure 5 that routes totaling about 50 miles have factors of service that are definite characteristics of the Interstate System.

A comparison of the Interstate System in the 48 continental States and the District of Columbia, and this 50-mile increment in Hawaii is shown.

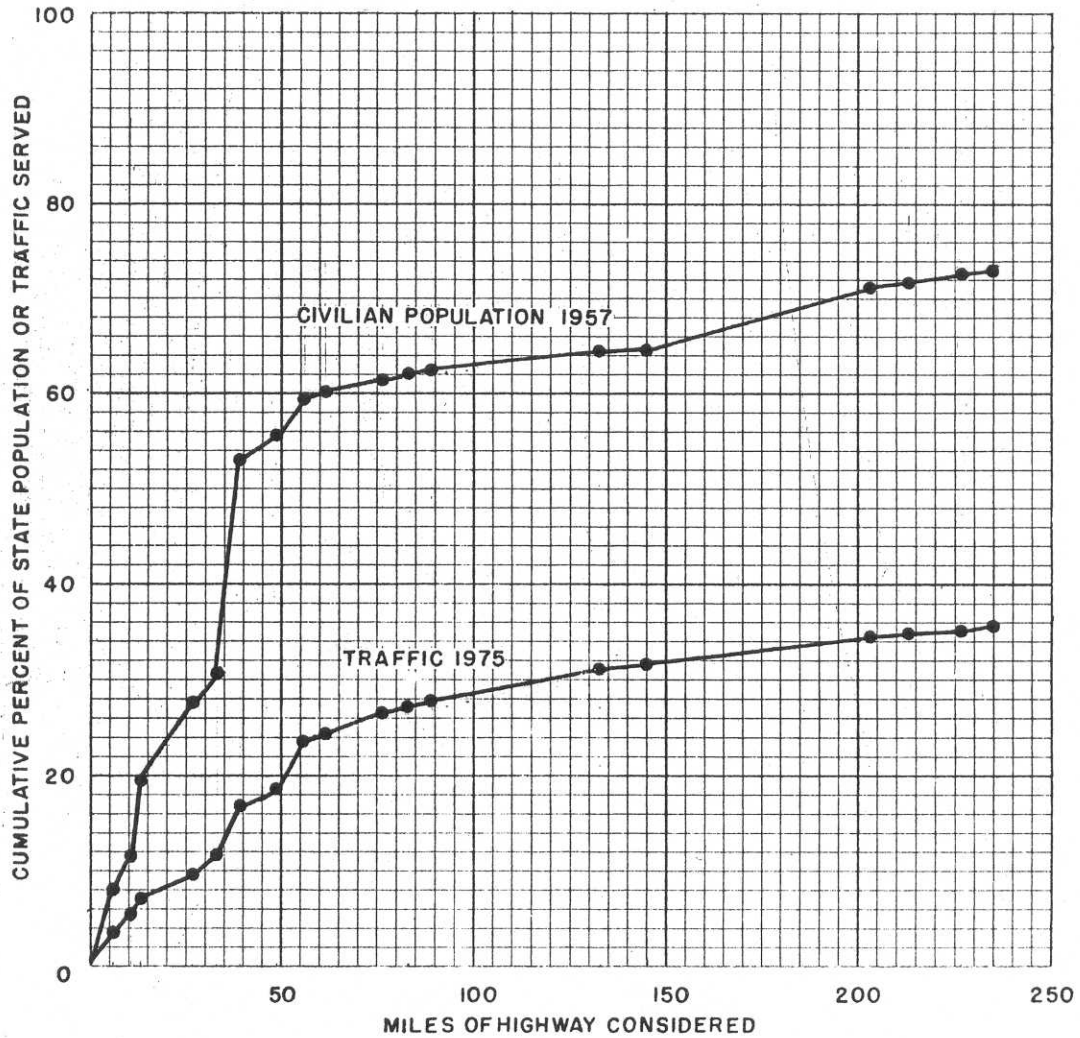
	<u>48 States and D. C.</u>	<u>Hawaii</u>
Interstate System (miles)	41,000	50
Percent of total highway mileage	1.2	1.6
Percent of population served	59	56
Percent of traffic served	14	19

The 1957 average traffic volume on the Interstate System as now designated in the continental United States is estimated to be about 6,500 vehicles per day, varying from a low of 1,600 in Montana to as much as 27,100 in Delaware. The routes now approximating the recommended increment in Hawaii are estimated to serve an average daily traffic of 16,200 vehicles.

The 50-mile increment recommended within the State of Hawaii includes the following routes based upon the ratings made in the analysis:

	<u>Miles</u>
Honolulu westerly to Barbers Point	19
Honolulu southeasterly to Diamond Head	7
Honolulu northeasterly to Kaneohe	14
Naval Air Station	10
Pearl City to Schofield Barracks	10
Total	50

HAWAII -- Service to population and traffic provided by routes considered for Interstate System designation (Plotted in order of composite rating)



The recommended routes are shown on the map (Figure 2) as straight lines, indicating corridors between general control points. Mileages used are approximate.

Sliding Scale Rates of Federal-aid Participation in Public Lands States
(Effective October 1, 1959)

State	Ratio of the area of unappropriated and unre-served public lands and nontaxable Indian lands to the total area of the State <u>1/</u>	Percentage of cost of Federal-aid projects payable by the Federal Government			
		ABC Program		Interstate Program	
		50% Federal 50% State	66 2/3% Federal 33 1/3% State	60% Federal 40% State	90% Federal 10% State
Alaska	.7218	<u>2/</u> 86.09			
Ariz.	.4371	71.86	81.24	77.48	94.37
Calif.	.1602	58.01	72.01	66.41	91.60
Colo.	.1323	56.62	71.08	65.29	91.32
Idaho	.2248	61.24	74.16	68.99	92.25
Mont.	.1250	56.25	70.83	65.00	91.25
Nev.	.6668	83.34	88.89	86.67	<u>3/</u> 95.00
N. Mex.	.2536	62.68	75.12	70.14	92.54
Oreg.	.2336	61.68	74.45	69.34	92.34
S.Dak.	.1063	55.32	70.21	64.25	91.06
Utah	.4900	74.50	83.00	79.60	94.90
Wash.	.0682	53.41	68.94	62.73	90.68
Wyo.	.2874	64.37	76.25	71.50	92.87

1/ Area data as of June 30, 1959, furnished by Department of the Interior.

2/ Applicable only to apportionments for fiscal year 1961 and subsequent years.

3/ Maximum amount.

The 50-percent Federal, 50-percent State rates are applicable to projects financed from Federal-aid primary, secondary, and urban funds. The 66 2/3-percent Federal, 33 1/3-percent State rates are applicable to projects financed from the \$400 million of primary, secondary, and urban funds authorized by Sec. 2(a) of the Federal-Aid Highway Act of 1958. The 60-percent Federal, 40-percent State rates are applicable to projects financed from Interstate (IN) funds authorized by the Federal-Aid Highway Act of 1954. The 90-percent Federal, 10-percent State rates apply to projects financed from Interstate funds authorized by the Federal-Aid Highway Acts of 1956, 1958, and 1959.

The rates apply to the costs of Federal-aid projects financed from the respective funds except for (1) projects on class 1 or class 2 forest highways undertaken pursuant to Section 3(a) of the 1958 Act, and (2) grade crossing projects financed at greater than the regular participating ratio. For all such grade crossing projects the maximum participation of Federal-aid funds is 100 percent for preliminary engineering and construction and 50 percent for rights-of-way.

MILEAGE OF DESIGNATED FEDERAL-AID HIGHWAY SYSTEMS, BY STATE
AS OF DECEMBER 31, 1958

Appendix B

STATE OR TERRITORY	NATIONAL SYSTEM OF INTERSTATE AND DEFENSE HIGHWAYS			FEDERAL-AID PRIMARY HIGHWAY SYSTEM 1/			FEDERAL-AID SECONDARY HIGHWAY SYSTEM		
	TOTAL	RURAL	URBAN	TOTAL	RURAL	URBAN	TOTAL	RURAL	URBAN
	Miles	Miles	Miles	Miles	Miles	Miles	Miles	Miles	Miles
Alabama	873	773	100	6,332	5,667	665	19,226	18,820	406
Arizona	1,161	1,130	31	2,648	2,565	83	3,986	3,829	157
Arkansas	523	482	41	3,922	3,681	241	14,180	13,986	194
California	2,183	1,731	452	7,531	6,345	1,186	11,043	10,361	682
Colorado	964	933	31	4,266	4,135	131	4,083	4,037	46
Connecticut	304	165	139	1,288	888	400	1,151	1,000	151
Delaware	39	35	4	583	535	48	1,417	1,401	16
Florida	1,142	1,028	114	5,384	4,841	543	13,048	12,752	296
Georgia	1,111	969	142	8,767	8,101	666	13,735	13,579	156
Idaho	611	599	12	3,153	3,081	72	5,112	5,069	43
Illinois	1,612	1,401	211	10,656	9,449	1,207	13,221	12,986	235
Indiana	1,097	970	127	4,888	4,251	637	1,097	970	127
Iowa	709	658	51	10,314	9,737	577	33,092	32,856	236
Kansas	803	692	111	7,833	7,401	432	23,195	23,047	148
Kentucky	700	644	56	4,553	4,253	300	15,225	15,076	149
Louisiana	681	590	91	3,330	2,952	378	7,723	7,587	136
Maine	313	293	20	1,931	1,795	136	2,294	2,239	55
Maryland	354	216	138	2,291	1,873	418	6,224	5,947	277
Massachusetts	462	274	188	2,323	1,502	821	2,187	1,646	541
Michigan	1,076	955	121	7,552	6,874	678	3,040	2,976	64
Minnesota	891	763	128	8,788	8,108	680	19,741	19,580	161
Mississippi	673	610	63	5,820	5,577	243	13,651	13,484	167
Missouri	1,102	981	121	9,147	8,620	527	23,266	23,163	103
Montana	1,180	1,168	12	6,246	6,150	96	4,997	4,978	19
Nebraska	488	478	10	5,656	5,500	156	17,749	17,713	36
Nevada	534	524	10	2,196	2,162	34	2,656	2,642	14
New Hampshire	213	194	19	1,205	1,095	110	1,601	1,555	46
New Jersey	368	208	160	2,060	1,279	781	2,074	1,554	520
New Mexico	1,003	978	25	4,027	3,841	186	5,378	5,331	47
New York	1,227	816	411	10,403	8,247	2,156	19,376	17,801	1,575
North Carolina	773	732	41	7,061	6,622	439	24,845	24,551	294
North Dakota	570	560	10	4,197	4,138	59	13,283	13,263	20
Ohio	1,490	1,272	218	9,000	7,749	1,251	17,715	17,209	506
Oklahoma	796	721	75	8,253	7,796	457	12,464	12,326	138
Oregon	732	675	57	4,028	3,800	228	7,442	7,365	77
Pennsylvania	1,527	1,289	238	8,464	7,151	1,313	13,317	12,363	954
Rhode Island	71	32	39	534	289	245	414	276	138
South Carolina	679	662	17	5,336	5,038	298	15,416	15,267	149
South Dakota	679	671	8	6,054	5,967	87	12,092	12,073	19
Tennessee	1,047	927	120	5,496	5,167	329	10,204	10,155	49
Texas	3,028	2,609	419	17,282	15,614	1,668	30,107	29,577	530
Utah	965	922	43	2,312	2,232	80	3,644	3,578	66
Vermont	321	309	12	1,586	1,508	78	1,819	1,796	23
Virginia	1,066	971	95	5,532	5,062	470	18,315	18,127	188
Washington	727	596	131	3,990	3,671	319	10,711	10,456	255
West Virginia	395	375	20	2,767	2,559	208	10,688	10,596	92
Wisconsin	452	420	32	6,352	5,861	491	18,610	18,270	340
Wyoming	931	916	15	3,637	3,581	56	2,183	2,172	11
Dist. of Col.	29	-	29	142	-	142	82	-	82
Alaska	-	-	-	1,960	2/ 1,945	15	3,290	3,284	6
Hawaii	-	-	-	533	495	38	649	639	10
Puerto Rico	-	-	-	561	427	134	1,082	1,041	41
Total	3/ 40,675	35,917	4,758	260,170	237,177	22,993	533,140	522,349	10,791

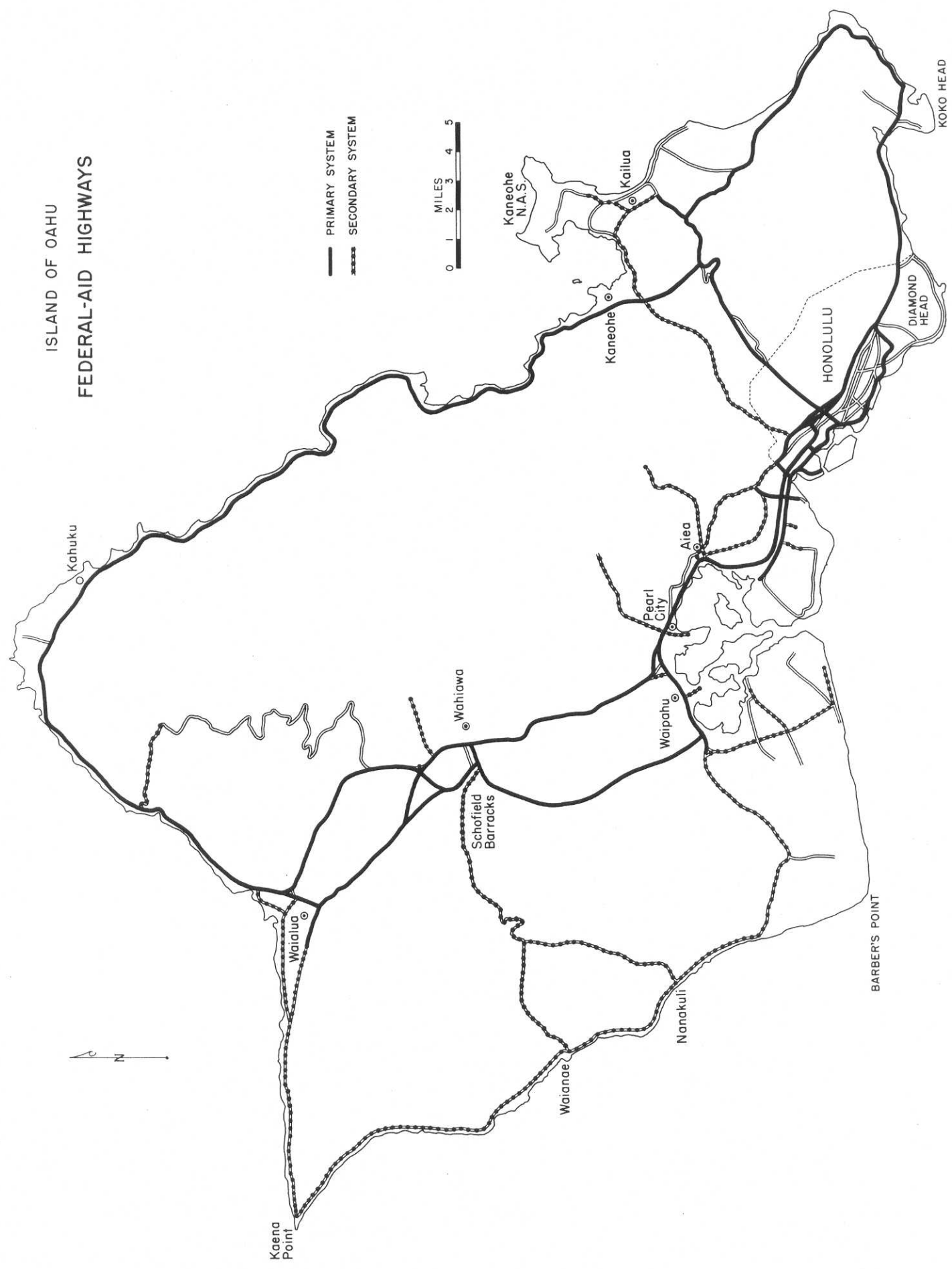
1/ Figures include the mileage of the Interstate system.

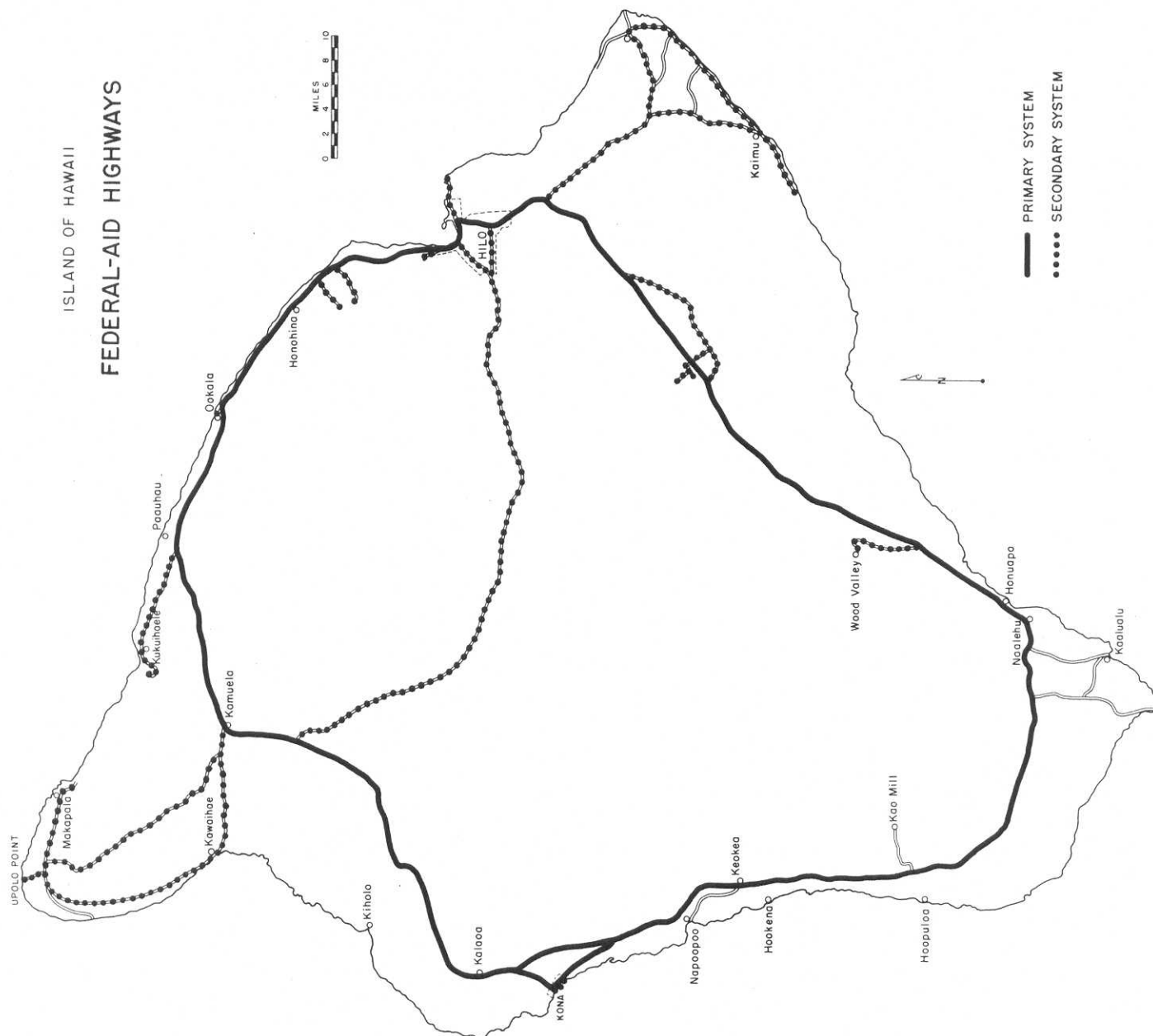
2/ Alaska includes 346 miles of ferry routes.

3/ 325 miles within the 41,000-mile limitation are not assigned to routes, and are held in reserve for adjustments of route lengths as final locations are selected and projects built.

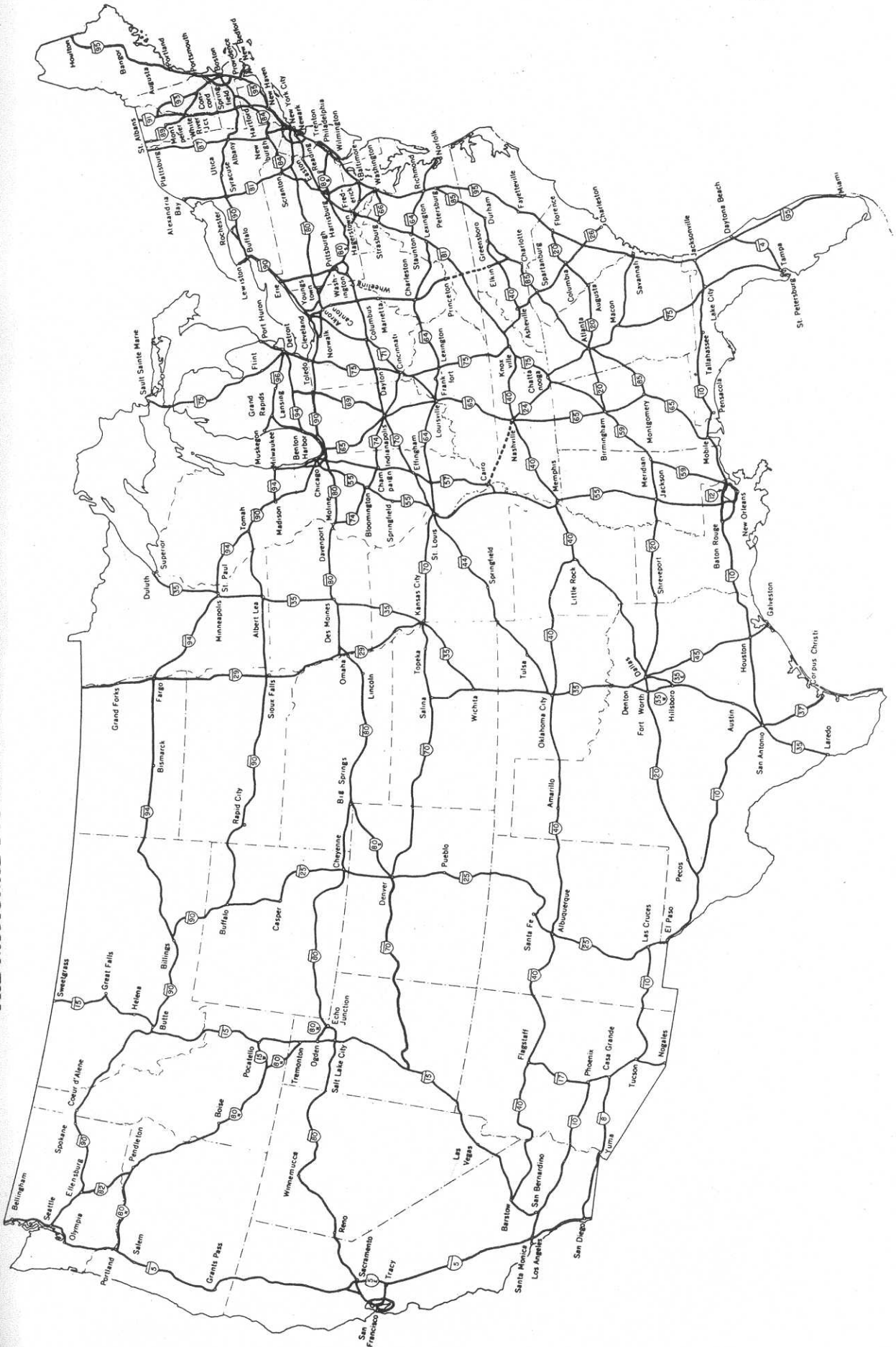


ISLAND OF OAHU
FEDERAL-AID HIGHWAYS





THE NATIONAL SYSTEM OF INTERSTATE AND DEFENSE HIGHWAYS



APPENDIX E

Excerpt from statement on "Criteria for Selection of Interstate System Routes" submitted by the Commissioner of the Bureau of Public Roads to the Subcommittee on Roads of the Committee on Public Works of the United States Senate on April 15, 1955:

The following list of definitive standards constitutes the criteria governing the selection of routes for the National System of Interstate Highways.

1. Service to cities of various population groups

The routes selected should connect as directly as possible the maximum number of cities of various population groups.

2. Service to principal metropolitan areas

The routes selected should provide maximum service to principal metropolitan areas as well as to specific cities.

3. Density of rural population

Routes should traverse the country's most populous bands of rural territory.

4. Distribution of the whole population

Routes should have their principal termini in the larger cities and also pass enroute between these termini through or very close to the denser clusters of population in small towns and populous rural areas.

5. Relation to manufacturing activity

The routes selected should provide transportation facilities for as much as possible of the manufacturing industry of the country. Locations where manufacturing activity exists in greatest volume are the points of origin and destination of large volumes of motor truck traffic for which service should be provided, as well as for passenger car traffic.

6. Relation to agricultural production

Interstate system routes should traverse to the maximum extent possible the areas of high per-acre value in marketed crop production.

7. Relation to concentrations of motor vehicle ownership

Interstate system routes should be selected to traverse to the maximum extent possible areas having a high density of motor vehicle ownership.

8. Relation to routes of strategic importance from the standpoint of national defense

The interstate system should be designated to include the principal traffic routes of military importance.

9. Relation to military and naval establishments and war industry

Routes of the interstate system should be selected to serve the highway movement to and from military and naval establishments and war industries.

10. Relation to routes of highest traffic volume

Interstate system routes should be selected in accord with the highest traffic volumes in the areas traversed, serving a share of the total highway movement greatly exceeding the proportion of the total highway mileage involved.

11. Relation to principal topographic features

Consideration of topographic features is important in the selection of some interstate system routes. Conformation of the land and the courses of principal rivers may influence to some extent the location of certain routes.

12. Cooperation with the Department of Defense

One of the primary functions of the National System of Interstate Highways is to serve the national defense. Under the provisions of the Federal-Aid Highway Act of 1948 the Commissioner of Public Roads was directed, among other things, to invite the cooperation and suggestions of the Secretary of Defense. Such cooperation and suggestions of the national military establishment have been obtained in connection with interstate system routes previously designated. Continuing cooperation and suggestions will be secured in connection with any future designations.

The selection of routes for inclusion in the interstate system within and in the vicinity of cities is to a considerable extent a matter requiring local study and determination. Studies are made

cooperatively by the State highway department and appropriate local planning and highway authorities and officials, utilizing comprehensive surveys of the origin and destination of traffic to the maximum extent feasible. The following criteria apply:

1. Connection with city approach routes

For the service of interstate system traffic and other traffic bound in and out of the city to and from exterior points, the routes selected should provide for convenient collection and delivery. Although the interstate routes must bear a proper relation in location and character to other parts of the street system, they will be the routes of principal service to the interstate system traffic.

2. Penetration of city

At the approaches to cities and particularly the larger cities, a very large part of the traffic on the interstate system originates in or is destined to the city itself. Distributing routes within cities should be provided in addition to circumferential routes which serve to bypass the traffic that is not destined for the city.

3. Location on undeveloped land

To the extent consistent with other requirements, undeveloped land offers the best possible locations for routes entering a city.

4. Circumferential and distributing routes

Routes which avoid the business centers of cities are needed to serve traffic bound to or from points other than the center of the city. Such routes may be so located as to serve both as arteries for through traffic around the city between various approach highways and as distribution routes for the movement of traffic with local origins and destinations to and from the various quarters of the city. The pattern of such routes depends upon the topography and plan of each particular city. At many of the relatively large cities the need is for routes completely encircling the city. In some of the larger cities a belt route near the central business district may be needed in addition to an outer circumferential route.

5. Relation to traffic-generating focal points and transportation terminals

Railway terminals, both passenger and freight, wharves and docks, and airports generate large volumes of street and highway traffic associated with the essential interchanges between the several modes of

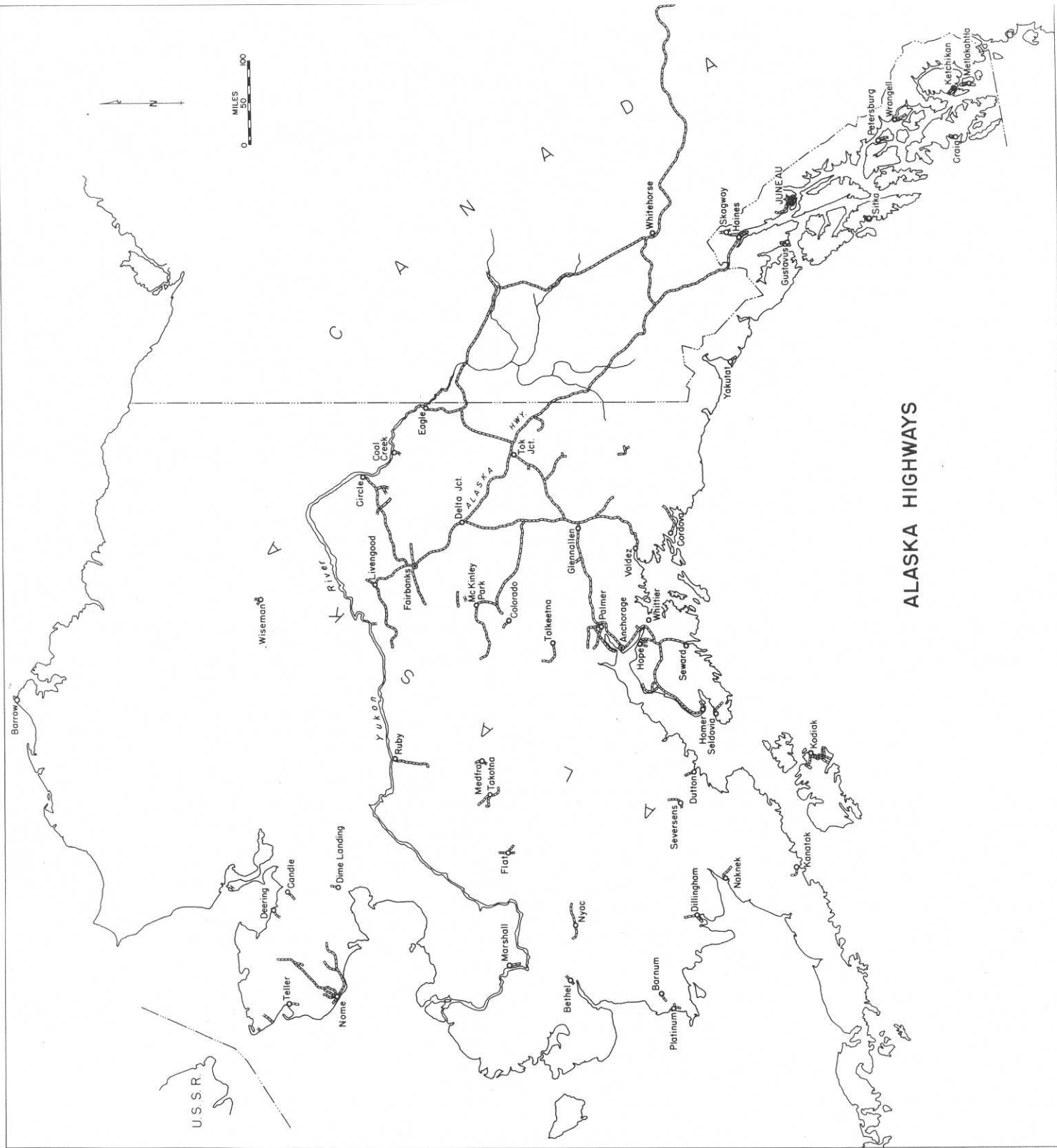
transportation. The location of the interstate system routes at cities should be so placed as to give convenient express service to these various major traffic-generating locations within and in the vicinity of cities and also to the business center of the city and main industrial areas. The location of the interstate system should permit and encourage a desirable coordination of highway transportation with rail, water and air transportation.

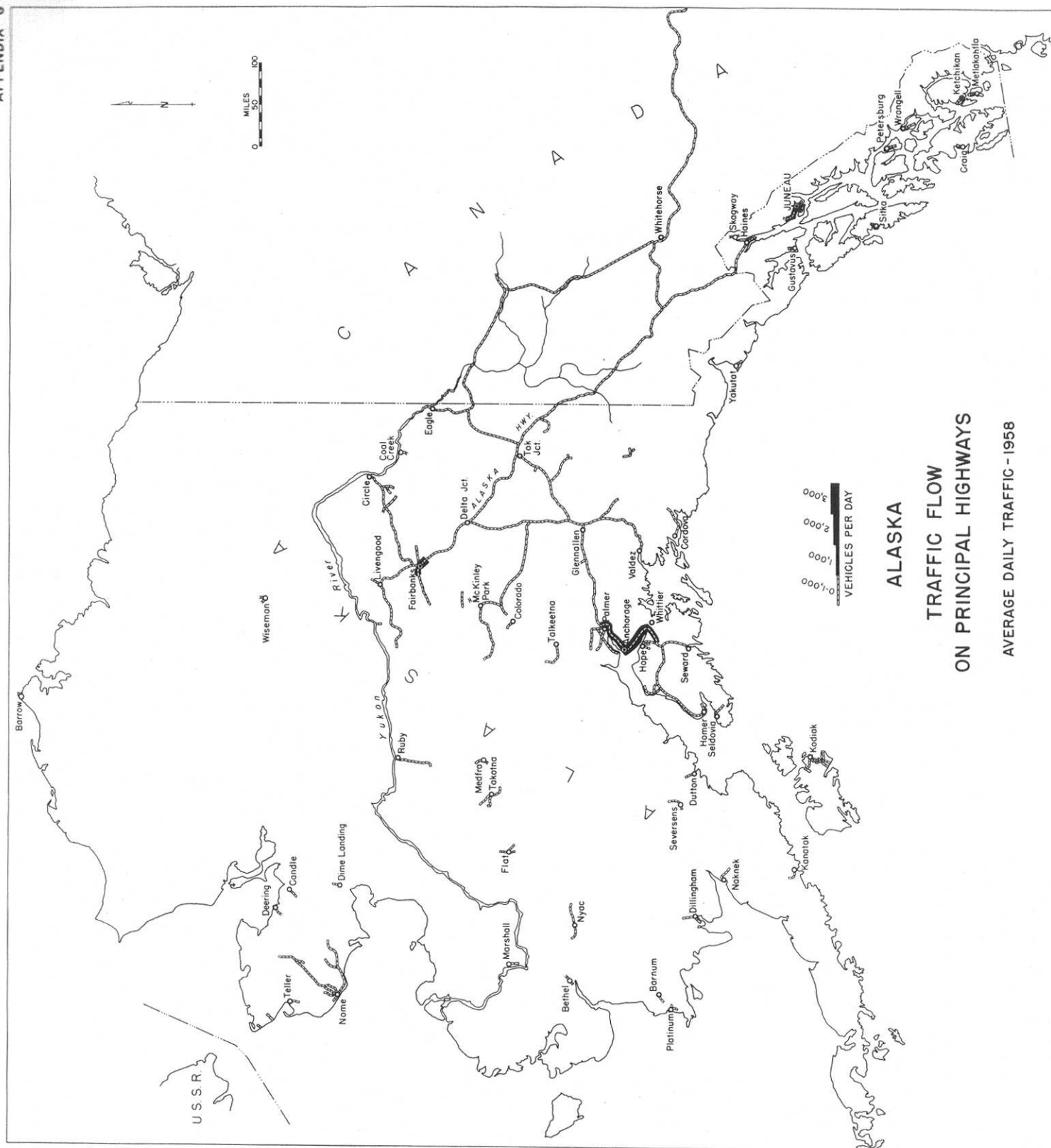
6. Relation to urban planning

Interstate system routes will provide for only a small portion of the movement of traffic in most cities. The routes should be located and designed to be an integral part of the entire urban transportation plan.

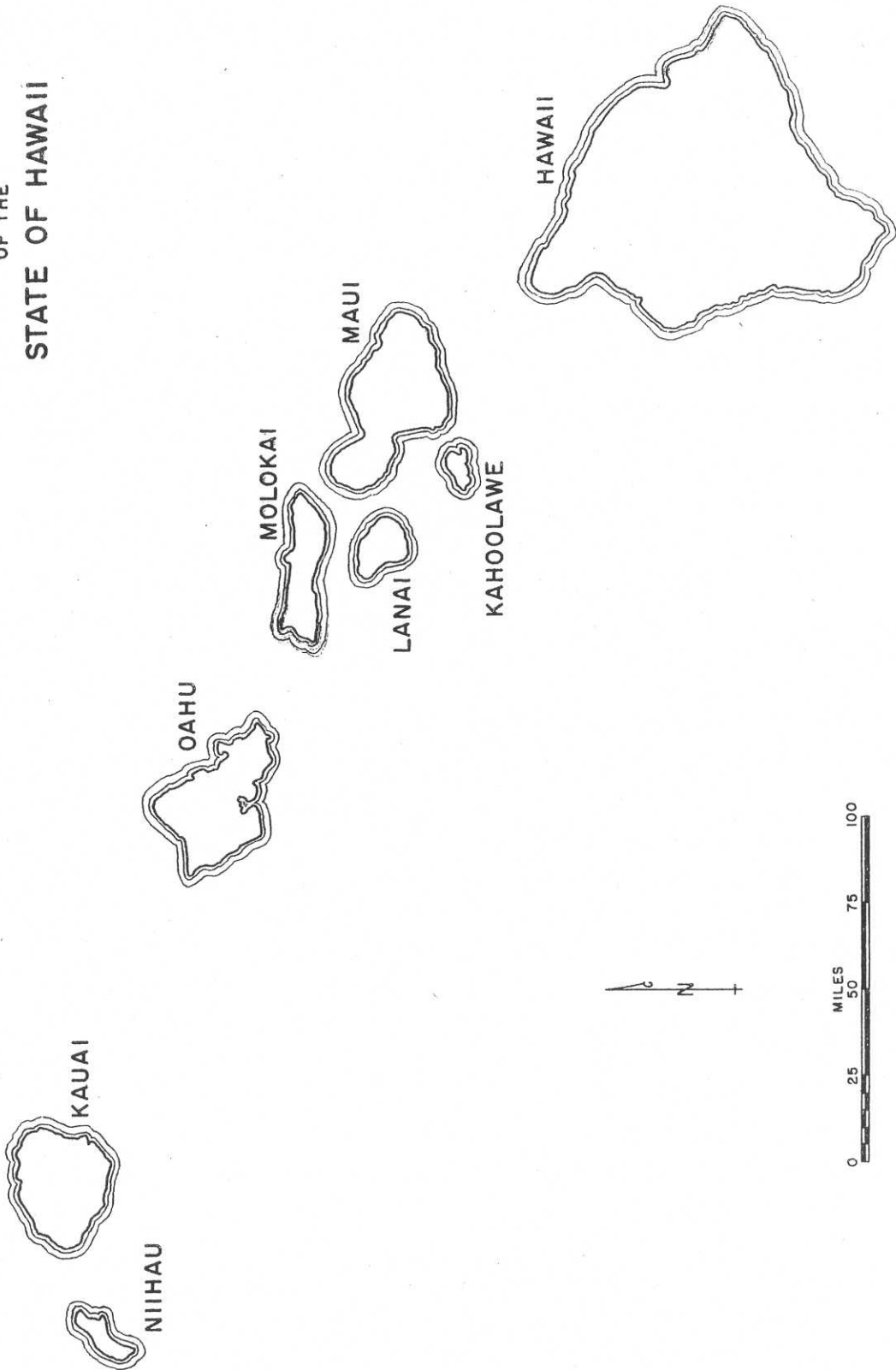
7. Civil defense

The interstate system routes to be provided in and near any city should be carefully studied and integrated with the planning for civilian defense.

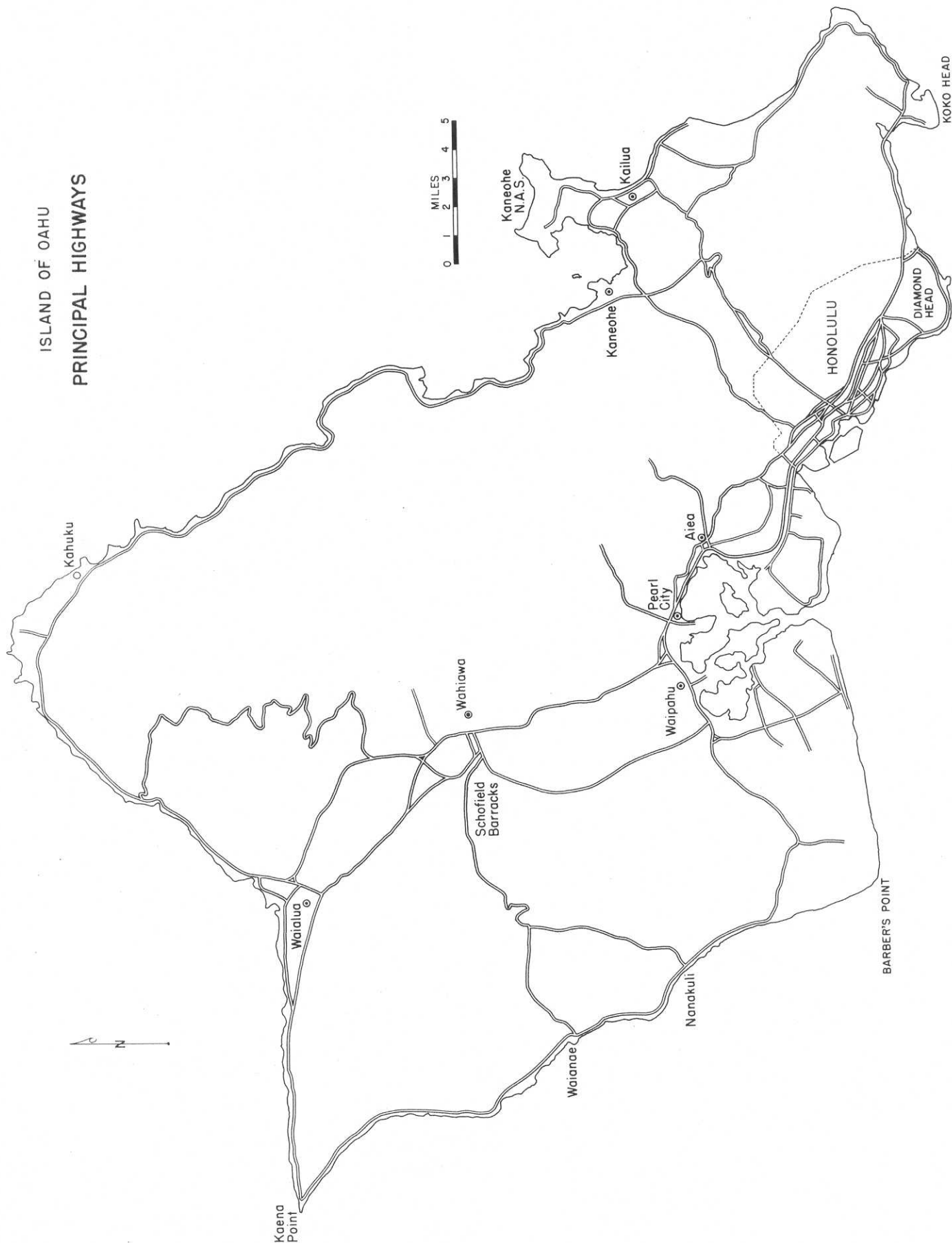




MAJOR ISLANDS
OF THE
STATE OF HAWAII



ISLAND OF OAHU
PRINCIPAL HIGHWAYS





ISLAND OF OAHU
TRAFFIC FLOW
ON PRINCIPAL HIGHWAYS
AVERAGE DAILY TRAFFIC - 1958

