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# Iceland

June 1973

NATIONAL INTELLIGENCE SURVEY

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Military Geography

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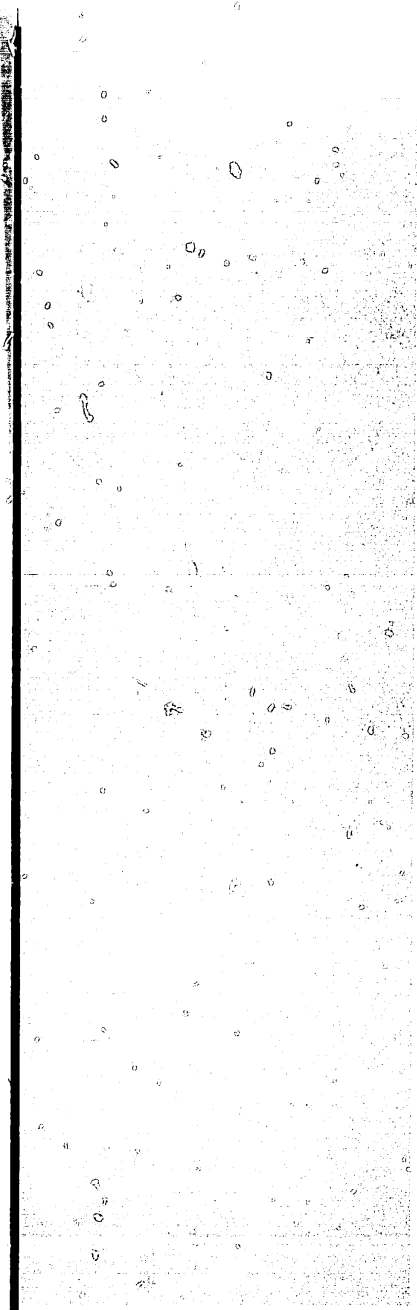
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# ICELAND

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# Military Geography

## A. Location and description (U/O)

Iceland is just south of the Arctic Circle, about 1500 nautical miles southwest of Greenland and within 6000 nautical miles of Scotland and Norway (Figure 1). The northeastern half of the United States and all of Canada are within 5000 nautical miles of Iceland. The rugged peaks around Iceland, a member of the North Atlantic Treaty Organization, has few natural resources but derives operational importance from its strategic position north of the North Atlantic shipping lanes. It would be a significant potential base for anti-submarine warfare in the North Atlantic.

Iceland has an area of approximately 39,500 square miles and a population of about 200,000. Roughly oval in shape, Iceland is approximately the size of Kentucky. Maximum dimensions are about 500 miles east-west and 200 miles north-south.

Distances in miles: 1000 nautical miles, 1000 statute miles, 1000 statute miles, 1000 statute miles.

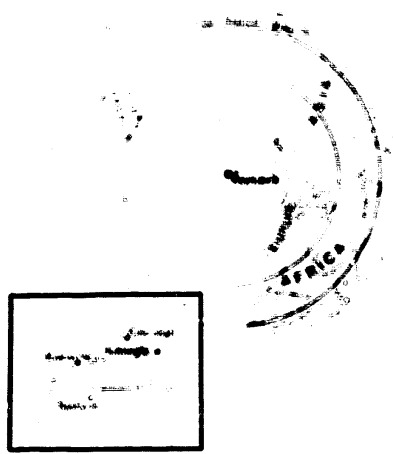


FIGURE 1. Location and comparative areas (U/O)

## 1. Topography

Iceland is a large, rugged plateau surrounded by ice-capped summit areas, volcanic cones, mountains, and hills and indented in many places by high-walled fjords (Figure 2). About 12% of the surface is covered by glaciers (Figure 3) and another 12% by lava flows. Most of the glacier-covered areas are in the southern part of the country. The largest glacier, Vatnajökull, covers about 2,200 square miles. The lava flows and associated volcanoes are mainly in the southern and southwestern parts of the island. Of the 200 volcanoes on Iceland, about 30 have been active in historic times and 150 eruptions have been recorded. In addition, 25% of the plateau surface is covered by sand and gravel deposits. In most places, the plateau rises steeply from the generally narrow, discontinuous coastal lowlands or directly from the sea (Figure 4). The coast is deeply indented by fjords and bays and fringed in many places by numerous small islands.

The plateau is generally between 1,000 and 2,000 feet above sea level; however, several mountain peaks exceed 4,000 feet, and the highest peak, Hvannadalshnukur, is 9,842 feet. Elevations in the coastal plains generally range from sea level to 600 feet. Slopes are commonly less than 2% in the flat to rolling coastal and interior plains, 10% to 30% in the hills, over 30% on the mountains, and over 45% along the plateau edge.

Most of the uplands and parts of the lowlands are either barren or have a sparse growth of grasses, shrubs, or mosses. The remaining parts of the lowlands are covered mainly by grass; in places there are small patches of shrubs and scrub birch forest. Cultivated crops consist mostly of hay and small plots of hardy vegetables on the lowland farms.

Most major streams are perennial, originate in the glaciers on the plateau, and flow in fairly straight course to the sea. Gradients are generally steep, rapids and waterfalls (Figure 5) are common, and there are few tributaries. The lower reaches of most streams

For descriptive or place names, see the list of names on the open side of the strategic area, national route, and approaches map; the map scale, and maps in the text.

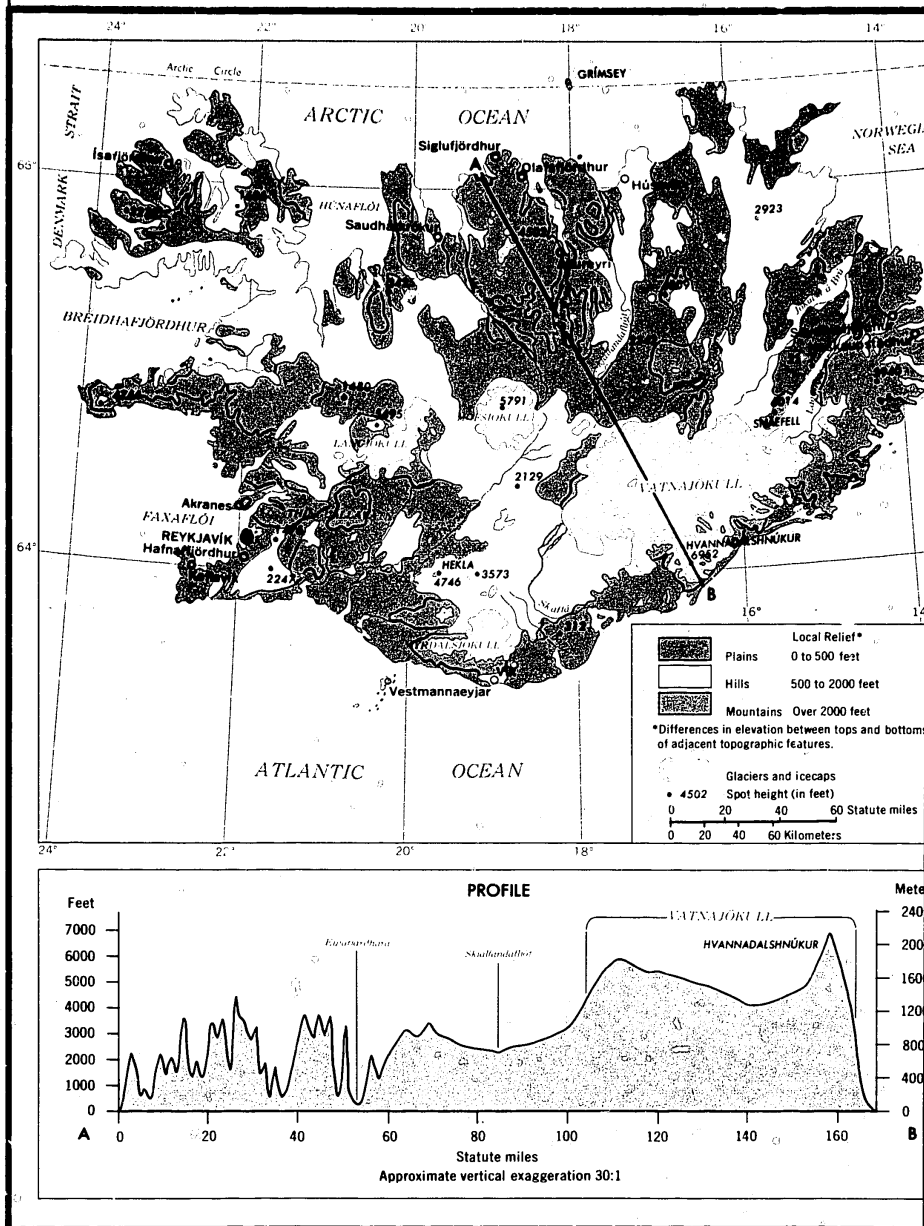


FIGURE 2. Terrain (C)



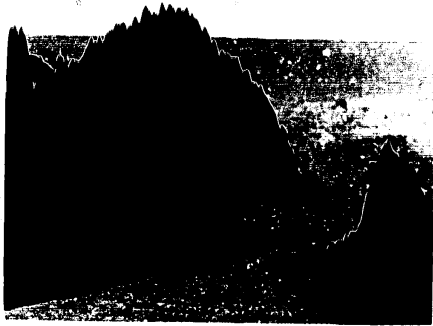


FIGURE 3. Vatnajokull is the largest glacier in Iceland. The central part of the glacier has gently rolling surfaces, but the margins are gashed by great crevasses and the main valleys on the southern and eastern borders are occupied by tongues of ice, such as shown here, which have rugged, corrugated surfaces. (U/OU)

range in width from several hundred feet to over a mile and are generally deep and swift. The high water period generally is between early June and late September, with the highest stage in July when the thawing of snow and ice is greatest. Violent floods, caused by the breaking of ice dams in streams, may occur at any time between June and October and may flood areas 5 or 6 miles wide. On rare occasions floods may result from volcanic eruptions beneath glaciers. Streambanks are commonly low and marshy in the plains; however, in the hills and mountains and along the plateau edge, streams generally flow through deep, steep-walled, rocky gorges. Bottoms are commonly composed of sand, gravel, cobble, and boulders in the upper reaches and of soft mud or quicksand in the lower reaches. Iceland has many small lakes, marshes, hot springs, and geysers.



FIGURE 4. The plain along the southern coast of Iceland is pinched out near Vik by the dissected edge of the plateau, which drops precipitously to the sea (U/OU)



FIGURE 5. Waterfalls mark the points where streams plunge across the steep-sided edges of the rugged interior plateau. In these stretches streambeds are rocky and contain large boulders, and currents are strong. (U/OU)

Culture features are sparse in most of Iceland. The population is restricted almost entirely to the coastal lowlands and valleys, the interior is virtually uninhabited. Farms are generally widely spaced, and farm buildings are ordinarily constructed of lava blocks or concrete. Cultivated fields near the houses are commonly enclosed by walls of turf or stone. The scattered small towns and villages, mainly fishing or local trade centers, are generally located on or near the coast. Buildings in the villages and smaller towns are mostly small wooden structures with corrugated iron roofs; many buildings in the larger towns are of reinforced concrete. The settlements are connected by a sparse network of mainly one-lane gravel-surfaced roads. Most of the few hard-surfaced roads are in or near Reykjavik, the largest town. There are no railroads.

## 2. Climate

Iceland has a predominantly maritime climate. Winters, particularly along the coast, have relatively mild temperatures (Figure 6) and summers are cool. Extensive cloudiness, light precipitation, high humidity, and fairly strong surface winds occur frequently throughout the year.

Mean annual precipitation ranges from less than 20 inches in parts of the north and mountainous interior to over 65 inches at several southern locations. Mean monthly precipitation varies mostly between 1 and 8 inches, and the greatest amounts generally occur in late summer and in autumn in the north and in autumn and winter in the south. Precipitation falls mostly as snow in winter and rain in summer. Snow reaches its greatest depth in November through April, when monthly averages exceed 12 inches in parts of the north but are below 6 inches throughout the south. Thunderstorms are rare, occurring one or two times each year.

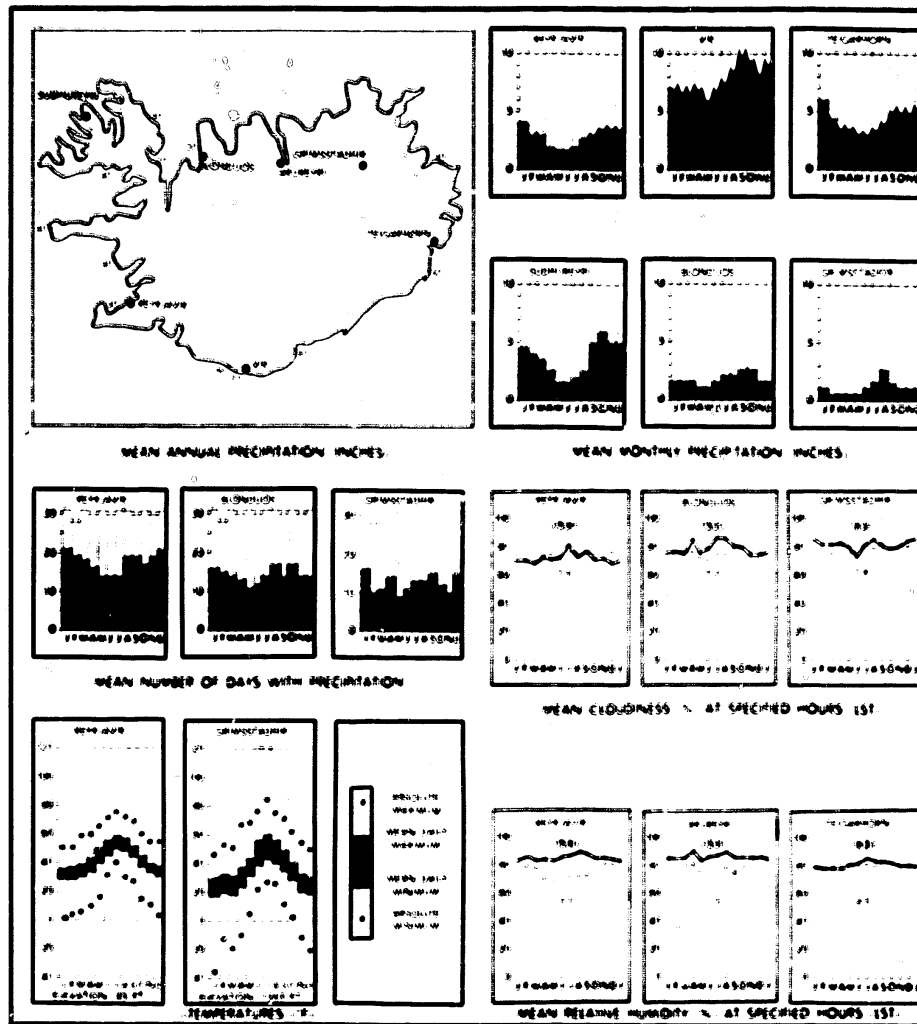


FIGURE 6. Precipitation, cloudiness, temperatures, and relative humidity (U O U)

Cloudiness is abundant in all months, with only small seasonal and diurnal variations. Monthly averages range from about 65% to 80% in the south to 75% to 90% in the north. Most locations have 1 to 7 clear days per month. Ceilings below 1,000 feet and visibilities less than 2.5 miles occur about 30% of the time in the south and 10% to 15% of the time in the north.

Visibility is frequently restricted, particularly in late winter, although very low visibility (less than 1/2 mile) is relatively uncommon. Restrictions, chiefly fog, snow, and rain, are most frequent along the north coast, where visibility less than 2.5 miles occurs about 15% to 25% of the time, and visibility less than 6 miles occurs 25% to 45% of the time.

Temperatures, especially near the coast, are moderated by the surrounding seas. The seasonal range of temperature is largest in the interior. Mean daily maximum temperatures are mostly in the 30s °F in winter and in the 50s in summer. Mean daily minimums are mostly in the 20s in winter and in the 40s in summer. Extreme temperatures as cold as -30°F and as warm as 87°F have been recorded.

Humidities are high throughout the year, monthly averages range from about 75% to 90%. Highest values occur at coastal stations during the early morning in summer or early autumn, and lowest values over the interior during the afternoons in late spring or summer.

Iceland is generally windy, particularly during winter. Surface winds are quite variable, except at exposed locations where they prevail from the southwest. Gale-force winds (25 knots or greater) are observed on 20 to 30 days annually at most coastal locations and 5 to 15 days annually over most of the interior. Gales are most frequent in October through April and often produce blizzard conditions. Winds exceeding 50 knots with gusts over 100 knots have been observed along the coast in winter.

### B. Military geographic region (C)

Iceland comprises one military geographic region. The combination of environmental conditions within the country would have a relatively uniform effect on military operations.

The country is generally unfavorable for conventional ground operations. Cross-country movement would be severely restricted or precluded by steep slopes (Figure 7) in the extensive hills and mountains and would be greatly restricted and channeled on the plains by streams, marshes, boulders, and rough lava fields. Flooding may ground and swollen



FIGURE 7. The mountainous area northeast of Reykjavik is deeply dissected and has numerous steep-sided, barren, rocky ridges that rise like islands above the general level of the interior plateau surface. The mountains generally are snow covered November through April. (C)

streams would be obstacles from early June to late September. Offroad movement would be severely slowed in many places by sharp curves, steep grades, fords, and narrow bridges. In winter, roads may be blocked by snow in the highland areas. Most roads are not capable of sustaining heavy military traffic without frequent and extensive maintenance. Offroad dispersal would be precluded in many places by steep slopes, rough lava fields, and marshy areas. In most of the country, road construction would be severely hindered by the generally rugged terrain. Alignments would be restricted, and much grading, blasting, and bridging would be necessary. Good cover from flat-trajectory fire would be provided by surface irregularities and streambanks. Concealment from air and ground observation would be limited in most of the country. Some concealment would be afforded in summer by scattered patches of birch forest, mostly in the western part of the island. Numerous sites for tunnels having adequate rock cover and short entries are available, mostly in the east, north, and west, within 15 miles of the coast. Most sites are accessible by minor roads. Bunkers could be constructed in many areas on the coastal plains, in several river valleys, and in large areas in the interior, however, materials in these areas are generally poorly consolidated and would require shoring.

Conditions are generally unfavorable for airborne and airborne operations. In most areas, there are few sites suitable for parachute drops and assault aircraft landing because of steep slopes, rugged surfaces, or marshes. Although good sites are available, mainly in the southwest and north, exits, especially in the

northern interior, generally would be difficult. Sites for landing assault-type aircraft are available on airfields at Reykjavik and near Keflavik. There are several landing strips near the small towns around the coast. Unprepared helicopter landing sites are numerous except in the more rugged areas. Airfield construction would be difficult in most places. Air approaches and runway orientations would commonly be restricted by rugged terrain, and much grading and blasting would be necessary. Construction of airfields having long runways and unrestricted approaches would be limited to the small areas of flat to gently rolling plains, mostly in the southwest.

In most of Iceland, conditions are poor for irregular force operations. Concealment from air observation would be almost nonexistent, and sustenance and shelter are lacking in large parts of the country. Only about one-third of the island has an appreciable vegetative cover of short grasses or low shrubs interspersed with small areas of stunted trees; the remainder is either barren or has only scattered plants. What woodland exists is most extensive in the western part of the island and consists mostly of small areas of scrubby birch, willow, and mountain ash. Rarely are the trees more than 30 feet high, and they provide only limited concealment from air observation. Alleviating conditions, however, are abundant cloudiness and, particularly in late winter, restricted visibility because of fog, snow, or rain. Settlements are widely dispersed at irregular intervals along the coast, and food supplies are largely confined to the coastal rim and consist of livestock, mainly sheep and cattle, and fish from the surrounding waters. Crops are limited to potatoes and hardy vegetables. Water is available everywhere except in isolated areas in the interior, the southwestern peninsula, and a few areas along the northern coast. Materials for shelter and fuel are extremely scarce. Supply by air could be effected in extensive areas, and there are many beaches along the coast suitable for supply of irregular forces by sea. Roads are scarce and are confined mostly to the coastal littoral, but forces on foot could move almost everywhere. Concealment from ground observation and cover from flat-trajectory fire would be provided by dissected terrain except on the coastal plains and on the nearly level plateau surfaces in the interior.

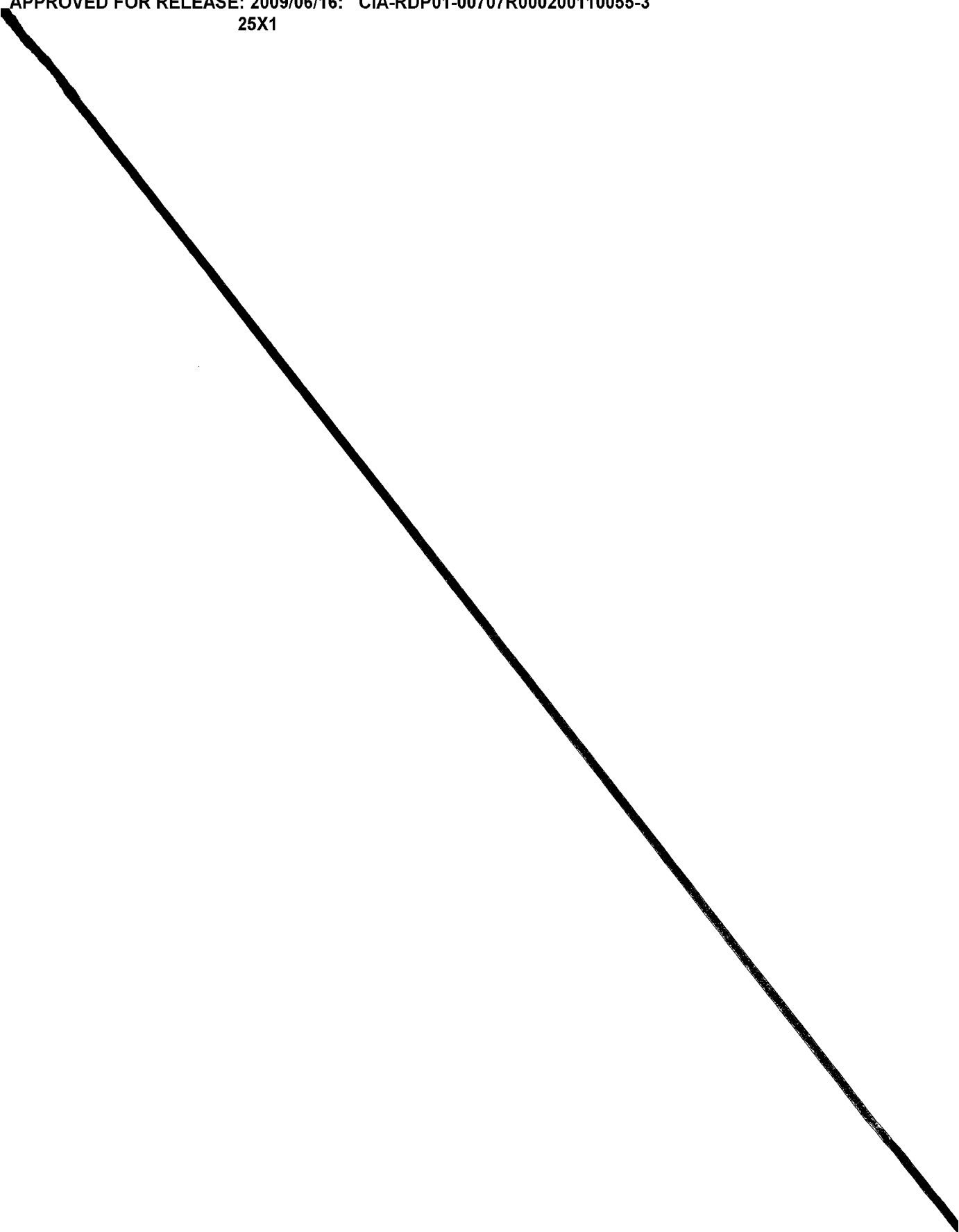
Conditions are generally unsuited for amphibious operations. Although there are many beaches fairly evenly distributed along the coast, approaches shoreward of the 5-fathom curve are severely obstructed, most gradients are too flat for dry-ramp LST landings, and exits would be mainly by tracks and trails or cross-country on unfavorable terrain.

### C. Strategic area (C)

The strategic area (Figures 8 and 11) in Iceland is in the extreme southwestern part of the island and contains Reykjavik (Figure 9), the capital, largest city (population about 81,000), principal seaport, and the industrial, commercial, and cultural center of the country. Reykjavik handles over half of the foreign trade of Iceland and contains over half of the industry. Industrial installations in the strategic area primarily are small and are concerned mainly with food processing and producing light consumer goods. The most important industries in Reykjavik are fish processing, textiles, and fertilizer. A cement factory is located at Akranes (population approximately 4,000), and electrical appliances are produced at Hafnarfjordhur (population approximately 9,000). The largest aluminum smelter in the country (annual capacity about 70,000 tons) is at Straumsvik, a rapidly developing industrial center. Large hydroelectric power installations supply the strategic area, and are located on the Sog and Thjorsa rivers. Over half of the population of the country is in the strategic area, and over 40% is in Reykjavik. Hvalfjordhur, a fjord north of Reykjavik, affords an extensive anchorage area for large oceangoing vessels and was used as an assembly point for convoys during World War II. Of the four airfields with permanent-surface runways in the country, the best and largest is near Keflavik (population about 5,000); it is a joint civil-military airfield used by U.S. military forces and international airlines and is a NATO field. Another permanent-surfaced airfield is the civil field at Reykjavik, an international airport of entry.

Other important areas are Akureyri, Neskaupstadhur, and Vestmannaeyjar. Akureyri (population about 10,000), is the largest town in Iceland outside the Reykjavik area and the most important town and port in the north. It is a commercial and marketing center and fishing port. The most important industries are fish processing and textile manufacturing. It has an airfield that is an international airport of entry. Neskaupstadhur (population about 1,500) is the most important town in eastern Iceland. It is a fishing port, and the major industry is fish processing. Vestmannaeyjar (population about 5,000), located on an island off the southern coast, has the best harbor in southern Iceland and is an important codfishing center. It has a civil airfield, and fish processing is the most important industry.

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FIGURE 10. Amphibious landing areas (C)

LOCATION	APPROACH	BEACH	TERRAIN BEHIND BEACH AND EXIT
Southeast of Ey-rarhakkki.	Seaward of 5-fathom curve mostly clear except for scattered shoals and Vestmanneyjar islands extending 5 to 20 mi. off southeast part; shoreward, partly obstructed by scattered rocks and sandbars near L.W. line. Nearshore bottom fine sand and shell; gradients 1 on 75 to 1 on 175; unsuitable for LST dry-ramp landings. Minimum occurrence of surf 1 foot or higher 28% of time April-June; maximum occurrence 49% Oct., Dec. Tidal range 9.5 ft., springs.	Contains 3 main beaches separated by river Eyrarhakkki, 10 mi. long, all usable; 100 to 150 yards wide at L.W. and 30 to 50 yd. at H.W.; gradients 1 on 20 to 1 on 39 L.W. to H.W. and 1 on 10 in H.W. zone. Material sand. Beach centered 25 mi. southeast of Eyrarhakkki, 7 mi. long, 3 mi. usable; 250 yd. wide at L.W. and 180 yd. at H.W.; gradient 1 on 20 L.W. to H.W. and 1 on 10 in H.W. zone. Material sand. Beach centered 10 1/2 mi. southeast of Eyrarhakkki, 7 mi. long, 3 1/2 mi. usable; 150 yd. wide at L.W. and 30 yd. at H.W.; gradient 1 on 20 to 1 on 40 L.W. to H.W. and 1 on 10 in H.W. zone. Material sand.	Backed by sandy area up to 1.5 mi. wide with dunes up to 40 ft. high; shallow lagoons between dunes. Sandy area backed by level plain containing numerous small lakes, drainage ditches, lagoons, and streams. Exit by cross-country movement to tracks and loose-surfaced roads 1.5 to 3 mi. inland. These roads lead to loose-surfaced coastal road 8 to 14 mi. inland.
Northeast of Thor-lakshofa.	Seaward of 5-fathom curve clear; shoreward, clear but flanked to west by rocks close to shoreline. Nearshore bottom sand and gravel; gradient 1 on 90 to 1 on 110; unsuitable for LST dry-ramp landings. Minimum occurrence of surf 1 ft. or higher 10% of time Jan. Mar.; maximum occurrence 15% Oct., Dec. Tidal range 9.5 ft., springs.	Contains 1 beach 2.6 mi. long, all usable; 50 to 100 yd. wide at L.W. and 30 to 50 yd. at H.W.; gradient 1 on 10 to 1 on 20 L.W. to H.W. and in H.W. zone. Material sand and cobble.	Backed by steep slopes and by dunes up to 30 ft. high on barrier bar extending 100 to 250 yd. inland to shallow lagoon. Exits difficult by cross-country movement to one-lane loose-surfaced road leading inland from left flank, loose-surfaced coastal road about 3 mi. inland.
Sandgerdi.	Seaward of 5-fathom curve clear; shoreward, partly obstructed by reefs, and 2 piers extending from north shore of harbor, flanked to southwest by drying reef extending about 1 n. mi. offshore. Nearshore bottom sand and rock; gradient mild; unsuitable for LST dry-ramp landings. Minimum occurrence of surf 1 ft. or higher 22% of time April-June, maximum occurrence 40% Jan. Mar. Tidal range 12 ft., springs.	Contains 1 beach 800 yd. long, all usable; 100 to 200 yd. wide at L.W. and 30 to 50 yd. at H.W.; gradient 1 on 20 to 1 on 40 L.W. to H.W. and 1 on 5 to 1 on 10 in H.W. zone. Material sand, gravel, and rock.	Backed by sandy strip fronting, rolling plain on peninsula, cultivated fields and village immediately behind beach. Exit by cross-country movement or by trails in left third to streets of village 50 to 500 yd. inland. Loose-surfaced roads lead inland and south along coast.
Northeast of Rey-lakshofa.	Seaward of 5-fathom curve clear but restricted to narrow beach, shoreward, clear but flanked by rocks. Nearshore bottom sand and mud; gradient gentle, suitable for LST dry-ramp landings. Surf 1 ft. or higher infrequent in all months. Tidal range 12 ft., springs.	Contains one beach 600 yd. long, all usable; 170 to 200 yd. wide at L.W. and 130 to 150 yd. at H.W.; gradient 1 on 10 L.W. to H.W. and 1 on 5 in H.W. zone. Material sand.	Backed by flat to rolling plain, flanked by ridges, extending inland about 1 mi. to steep hills. Small lake and drainage ditches on plain. Exit by fair weather road at left flank or by cross-country movement to loose-surfaced coastal road about 1 mi. inland.
Altnes.	Seaward of 5-fathom curve partly obstructed by rocks and shoals, shoreward, mostly clear. Bottom sand and rock; gradient 1 on 20 to 1 on 60, suitable in places for LST dry-ramp landings. Minimum occurrence of surf 1 ft. or higher 16% of time April-June, maximum occurrence 26% Oct., Dec. Tidal range 12.5 ft., springs.	Contains one beach 1,250 yd. long, all usable; 115 to 165 yd. wide at L.W. and 15 to 20 yd. at H.W.; gradient 1 on 25 to 1 on 45 L.W. to H.W. and 1 on 10 to 1 on 15 in H.W. zone. Material sand, in places bedrock.	Backed by steep slopes fronting ridge 10 to 15 ft. high and extending 50 to 70 yd. inland to flat, partly cultivated plain crossed by drainage ditches. Exits by tracks, trails, or by cross-country movement to loose-surfaced roads about 200 yd. inland.

gradients. Beach material is mainly sand, with gravel or shingle in places. All are generally firm in the wetted area and soft where dry. Tanks could move across most beaches, but wheeled vehicles would have to be towed or move on mats. Backing the beaches in many places are flat to rolling plains, lakes, drainage ditches, lagoons, and rivers; steep hills and ridges rise close behind the shore in places. Exits from the beaches would be by cross-country movement or by tracks, trails, and poor roads to streets or the coastal road.

The amphibious landing areas shown on Figure 11 and described in Figure 10 provide access to the Reykjavik strategic area.

## 2. Air (U/OU)

Air approaches to Iceland are mostly over water. The only topographic hazards are in Greenland, about 160 nautical miles to the northwest, and the Faeroe Islands, about 210 nautical miles to the southeast. The

The discussion here for air approaches extends approximately 300 nautical miles beyond the shores of Iceland.

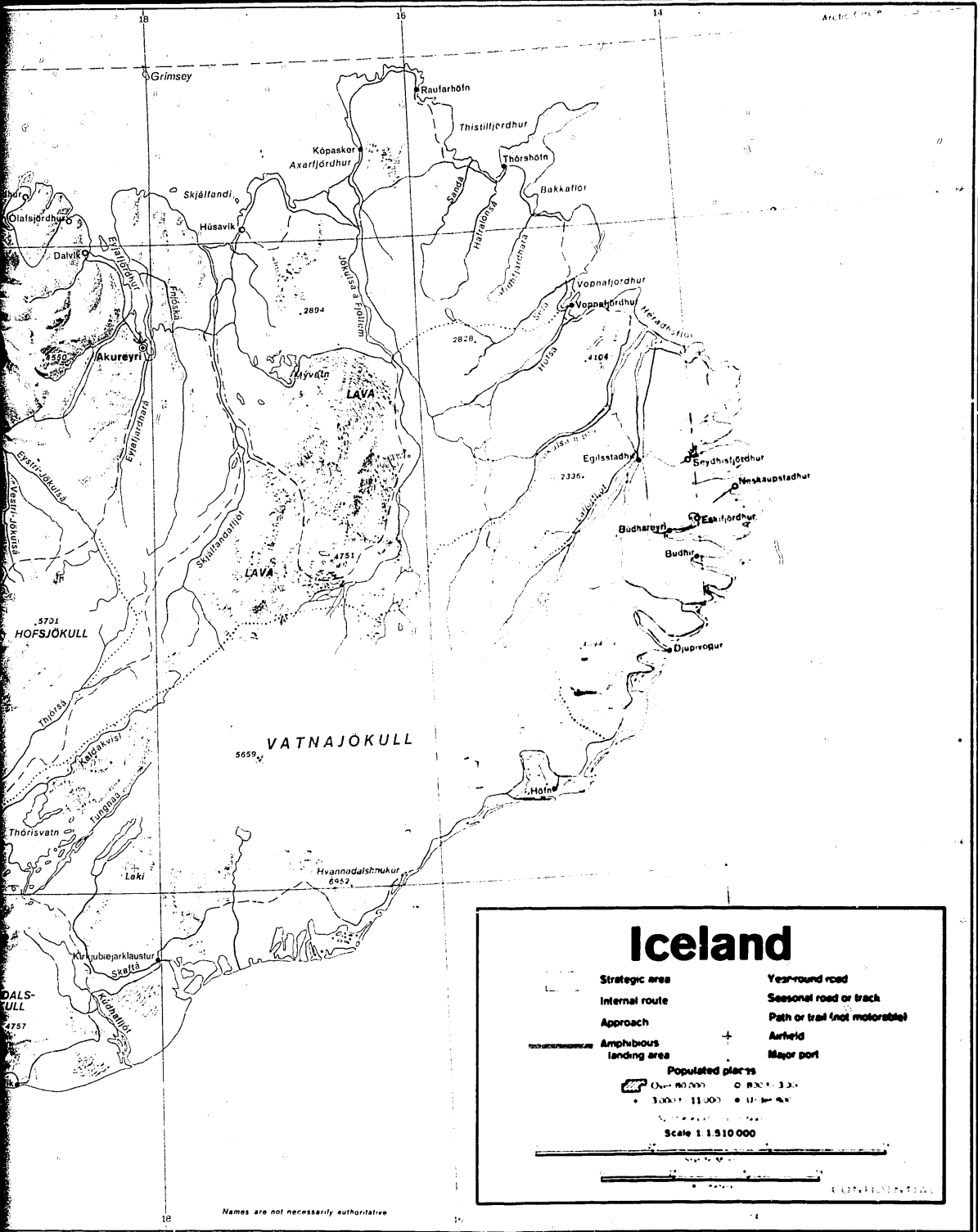
highest peak in Greenland, 12,139 feet above sea level, is about 215 nautical miles northwest of the coast of Iceland. The highest elevation in the Faeroes is 2,891 feet.

Although weather conditions are frequently adverse in air approaches to Iceland, conditions are most favorable during May through August and least favorable in November through April. Widespread cloudiness persists throughout the year, is often multilayered, and frequently extends to 20,000 feet. Maximum turbulence occurs during winter. Low-level turbulent conditions are frequent during winter in the fjords; thunderstorms and associated turbulence are rare. The mean freezing level is at or near the surface in winter and generally is greatest in height, about 6,000 feet, in summer. Aircraft icing is most likely between the surface and 6,000 feet December through March and between 5,000 feet and 12,500 feet June through September. Maximum speeds of upper winds occur near 20,000 feet, averaging about 55 knots in winter and less than 40 knots in summer. Below 55,000 feet, winds prevail from the southwest, except that below 20,000 feet in winter and below 10,000 feet in summer they are variable.





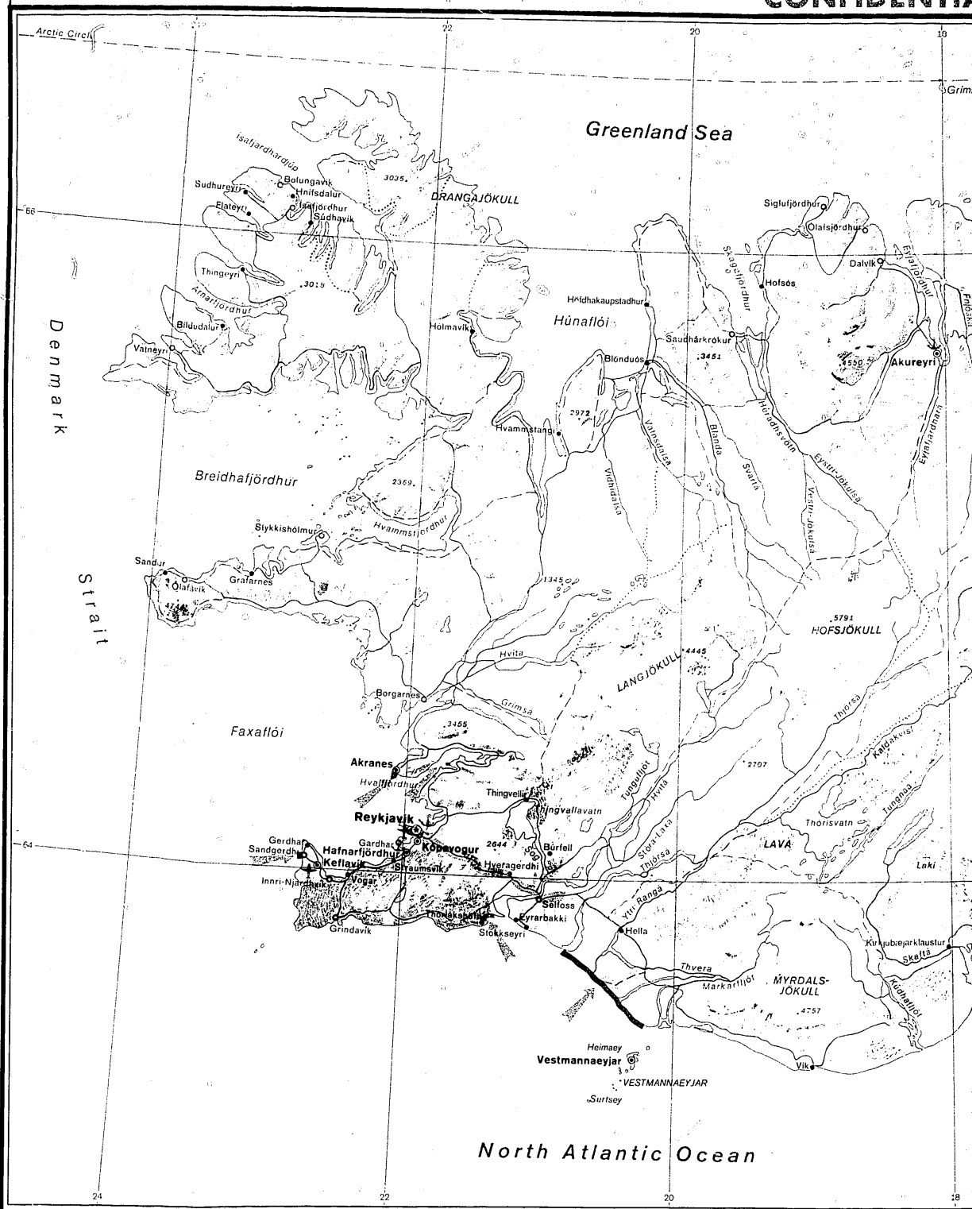
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Terrain and Transportation Figure 11

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