

The Future Possibilities of the
Pulp and Paper Industry
in Southeastern Alaska

by

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Hawk Inlet, Tongass National Forest, Alaska. Dense forests of western hemlock and Sitka spruce pulp timber clothe the lands adjacent to the network of navigable protected waterways in Southeastern Alaska.

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TABLE OF CONTENTS

Acknowledgements	ii
Introduction	1
Geography and Topography	5
Communications	6
Climate	8
Timber Resources	9
Forest Species	13
Western hemlock	13
Mountain hemlock	15
Sitka spruce	15
Quality of Timber	16
Silvicultural Features	17
Water Power Resources	20
Transportation Facilities	21
Logging Methods and Costs	24
Forest Service Policies	25
Reasons for Lack of Pulp and Paper Development in Southeastern Alaska	30
Markets	33
Conclusions	36
Recommendations	38
Pulp and Timber Surveys	39
Bibliography	41

TABLES AND ILLUSTRATIONS

Plate I, Hawk Inlet	i
Map of Portion of Tongass National Forest	4
Table I, Acreage of Main Islands in Tongass National Forest	7
Plate II, Sitka spruce timber	9
Table II, Commercial Timber on the Tongass National Forest	12
Table III, Distances to World Markets	23
Plate III, Mature timber	14
Plate IV, Baranof Island	19

THE FUTURE POSSIBILITIES OF THE PULP AND PAPER
INDUSTRY IN SOUTHEASTERN ALASKA

INTRODUCTION

The primary objective of this thesis is fivefold: (1) to show by statistics what the possibilities of the pulp and paper industry in southeastern Alaska are; (2) the other possible resources of the Tongass National Forest which lies within this region; (3) to indicate the capital and organization necessary for the development of Alaskan pulp and paper mills; (4) to show what data on the timber resources of southeastern Alaska has been and is being collected by the Forest Service; and (5) to give the policies of the Forest Service in regard to purchasing timber on the National Forest.

As early as 1910 the United States manufactured its entire supply of pulp and newsprint, but in the following ten years this condition gradually went out of existence and by 1920 the United States was importing two-thirds of its newsprint from Canada.

It would appear that today, more than at any other time, the time has ripened enough to establish pulp mills within the Tongass National Forest. At present all indications would point to a continuance of the demand at prices which should make possible profitable operations in Alaska. Also the pulp industry today demands that there be an assured permanent supply of raw materials and sufficient water-power resources, and both of these primary

requisites are to be found in the Tongass National Forest in southeastern Alaska. It has always been the policy of the Forest Service in Alaska to sell pulpwood from the National Forest with the necessary provisions to assure future supply as well as to assure the permanence of the industry.

Today, more than at any other time, the eyes of newsprint users in all sections of the United States are focused upon Alaska. To her, it now seems probable, will in the near future be assigned the task of solving one of the most acute problems of the present day--that of paper shortage. Today, Uncle Sam's forestry experts agree that in only one way can the shortage of newsprint be overcome, and that is in the establishment of huge paper mills in Alaska. Although the immediate possibilities of the establishment of such mills in Alaska is not very probable, owing to the fact that recently the southern pine has come into prominence for pulpwood and making into paper. In the National Forests of Alaska there are sufficient pulpwood resources to produce 1,500,000 tons of paper annually in perpetuity, and a huge paper industry in the territory is a certainty of the future. It might be well to mention here that the annual consumption of paper for the United States is approximately 10,500,000 tons.

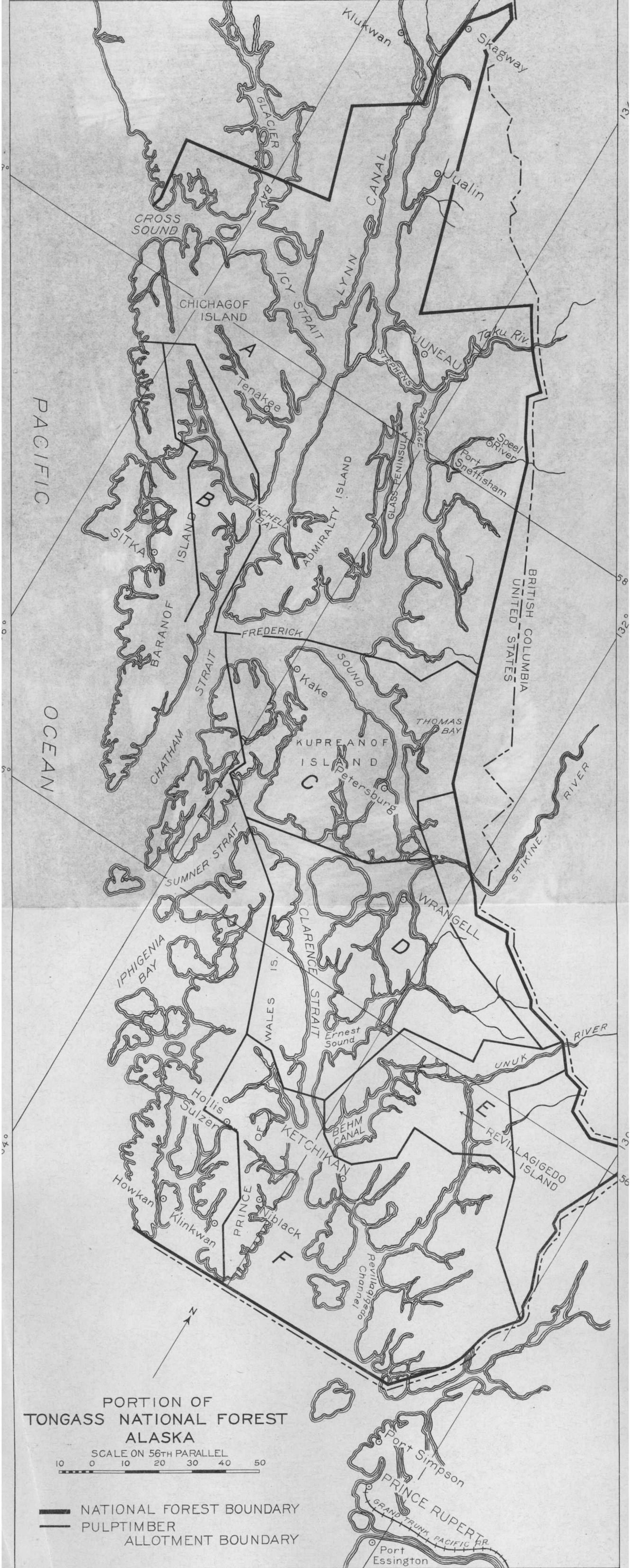
It is the desire of the writer to show by comparisons and descriptions the possibilities of the establishment of pulp and paper plants in Alaska. All conditions and facts

that will be brought forth in this thesis will pertain chiefly to the region of Alaska known as southeastern Alaska, which lies within the Tongass National Forest. The reason for limiting the discussion to this region is that the timber which would be used is situated along the coast and on the large islands of southeastern Alaska.

The southeastern region of Alaska has extensive forests for pulpwood that are managed by the Federal Government for a sustained production of timber, unlimited water-power resources for production uses, excellent tide-water transportation from the woods to the mill and from the mill to the various markets in the United States, unequaled climatic conditions that permit operation the year around, and shipping that is not hindered in any way during the year. With these previous facts in mind it can readily be seen that Alaska offers excellent opportunities towards becoming a large, permanent paper-making region.¹

In order to set up proper, efficient logging methods and pulp mills certain factors have to be taken into consideration, namely: geography and topography of the country, communications, climatic conditions, timber resources, forest species, silvicultural features, policies of the Forest Service on the region in question, general conditions applying to the timber lands, water-power resources, trans-

¹B. Frank Heintzleman, Pulp Timber Resources of Southeastern Alaska, Bulletin issued from Regional Forester's Office, Juneau, Alaska, (May, 1937)

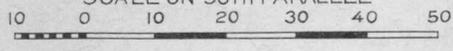


PACIFIC OCEAN

BRITISH COLUMBIA
UNITED STATES

PORTION OF TONGASS NATIONAL FOREST ALASKA

SCALE ON 56TH PARALLEL



- NATIONAL FOREST BOUNDARY
- PULPTIMBER ALLOTMENT BOUNDARY

90
50
90
56

132
58
130
56

Klukwan
 Skagway
 JUALIN
 Taku Riv.
 JUNEAU
 STEPHENS PASSAGE
 GLASS PENINSULA
 Speel River
 Port Snettisham
 ADMIRALTY ISLAND
 Tenaakee
 CHICHAGOF ISLAND
 Icy STRAIT
 LYNN CANAL
 SITKA
 BARANOF ISLAND
 CHATHAM STRAIT
 MITCHELL BAY
 FREDERICK
 Kake
 SOUND
 THOMAS BAY
 KUPREANOF ISLAND
 Petersburg
 STAIRINE RIVER
 SUMNER STRAIT
 CLARENCE STRAIT
 Ernest Sound
 WRANGELL
 UNUK RIVER
 IPHIGENIA BAY
 SALES IS.
 BEHM CANAL
 KETCHIKAN
 Klinkwan
 PRINCE OF WALES ISLAND
 Revillagigedo Channel
 REVILLAGIGEDO ISLAND
 Howkan
 Hollis Sulzer
 PRINCE RUPERT
 Grand Trunk Pacific RR.
 Port Simpson
 Port Essington



portation facilities, logging methods and costs, markets, and finally the existing forest industries.

GEOGRAPHY AND TOPOGRAPHY

The region of southeastern Alaska is composed of a long, narrow strip of mainland, which is surrounded by a network of many small islands. The many islands are easily accessible by a network of navigable narrows, straits, canals, channels, and bays. The total area of southeastern Alaska is about 250 miles long and 120 miles wide. The total shoreline that is easily accessible by water is some 9,000 miles.²

The Tongass National Forest has a very rough topography and might well be compared to that topography found in the Pacific Northwest of the United States. The many islands are chiefly made up of broad ranges not unlike those found on the Coast Range. The mountains of the mainland reach an average height of from 5,000 to 6,000 feet, and those of the islands are from 3,000 to 4,000 feet. The slopes of these mountains are very steep as a general rule, and they drop very rapidly to the shoreline.³

In this region there are only four navigable rivers, the Stikine, Taku, Alsek, and Chilkat.

²Ibid., p. 3.

³Ibid., P. 3.

The total land acreage of this section of Alaska east of the 141 Meridian is approximately 22,738,000 acres, or about 35,527 square miles. This amount is about 6 per cent of the total area of Alaska. In this section will be found the mainland strip which has a total acreage of 13,700,000 acres and the network of islands which comprise approximately 2,500 acres each. Table I shows the 17 major islands of southeastern Alaska that comprise 50,000 acres or more.⁴

The southeastern section of Alaska has always been a very productive timber region and only about 1 per cent of the total region is of any agricultural value. The climatic conditions are so suitable that this proves a very good region for extensive stands of rapidly growing trees. About 73 per cent (16,545,000 acres) of the region, commonly known as the Tongass National Forest, is controlled by the Federal Government. Owing to the present policies of the government, which will be explained later, the opportunities for setting up the wood pulp industry are very desirable for the operator.⁵

COMMUNICATIONS

At the present time southeastern Alaska has no means of motor road or railway transportation system, but is confined entirely to water transportation. The possibilities of a

⁴Ibid., p. 3.

⁵Ibid., p. 3.

Table I.6

Main Islands in the Tongass National Forest
Showing Approximate Acreage

Island	Acreage	Island	Acreage
Prince of Wales	1,427,660	Wrangell	140,612
Chichgof	1,346,465	Mitkof	135,190
Baranof	1,028,605	Kosciusko	119,155
Admiralty	876,330	Zarembo	116,700
Revillagigedo	747,305	Kruzof	110,320
Kupreanof	697,320	Annette (Indian reservation)	86,740
Kuiu	477,670	Gravina	57,550
Stolin	219,740	Douglas	50,060
Dall	162,640		

⁶Ibid., p. 3.

motor road in the future, however, are not far off. At the present time the United States Government is being urged to construct a highway from Seattle via Canada to Fairbanks, Alaska, through the timbered stands of southeastern Alaska. The water transportation is open the year around and regular service is offered by three steamship companies. In the last session of Congress money was appropriated to institute airmail service between Seattle and Juneau, which is to start on the 15th of May of this year. The service will also include passenger service.

The United States Army operates commercial radio to all the principal cities in southeastern Alaska and just recently phone service was inaugurated between Juneau, Alaska, and all the cities of the United States.

CLIMATE

In view of the high latitude, an outstanding climatic feature of this section is the mild winter temperature. The average temperature during the winter months of the various towns in this region is about 29 to 35 degrees Fahrenheit, while in the summer months the mean temperature is about 50 to 55 degrees F.

The average precipitation of southeastern Alaska is approximately 95 inches yearly. This region does not experience as much of a dry season as do the Pacific Coast states. Due to the large amount of rainfall, the operator need not worry about shutdowns on account of heavy snow.



Sitka spruce timber at Bond Bay, Tongass National
Forest, Alaska

In fact, there are very few sections of this region that have to disband operations for a couple of months.

Another vital factor is that because of the heavy rainfall and high relative humidity of this region the forest fire hazard is very low.

TIMBER RESOURCES

It just so happens that this region of southeastern Alaska lies within the "coast forest", which comprises British Columbia, Washington, and Oregon, and therefore has many species found in their ranges, which is timber suitable for pulpwood.

Found in southeastern Alaska are large, mixed stands of western hemlock (*Tsuga heterophylla*), Sitka spruce (*Picea sitchensis*), western red cedar (*Thuja plicata*), and Alaska cedar (*Chamaecyparis nootkatensis*). The forest is also heavily covered with blueberry and devil-club brush.

Because of the steepness of the mountains it is very rare to find commercial stands of timber over five miles from tidewater. It has been estimated by the Forest Service that approximately 75 per cent of the pulpwood lies within two and one-half miles of tidewater.

Practically all of the standing timber of southeastern Alaska lies within the Tongass National Forest, except the timber stands on Annette Island (Indian Reservation) and the Chilkat river valley, which is held by private owners. This amount would not exceed 1,500,000 board feet.

In order to see just how many board feet there are of the more important species I have set down in Table II the volume of commercial timber on the Tongass National Forest. From Table II it has been computed that approximately 3,000,000 acres of the National Forest is of commercial value and this constitutes about 26,000 board feet per acre. In some regions where the timber is much poorer, but that can be used for pulpwood, runs about one million acres in the National Forest. There is also a million acres that is valueless for any purpose. It is not uncommon to find a stand of timber with an average of 40,000 to 50,000 board feet per acre. The greater majority of the merchantable timber has a diameter of from two to four feet and an approximate height of 90 to 140 feet.⁷

The National Forests of Alaska probably contain 100,000,000 cords of timber suitable for the manufacturing of newsprint and other grades of paper. Under careful management it has been estimated that these forests can produce 2,000,000 cords of pulpwood annually for all time, or enough to manufacture at least one-third of the pulp products now consumed in the United States. It is easy to imagine what a tremendous help this would be.⁸

⁷ Ibid., P. 8

⁸ James Anderson, "Paper from Alaska", Scientific American Monthly, vol. 124, pp. 64-65, (January 22, 1921)

Table II⁹

Volume of Commercial Timber on the Tongass
National Forest

Species	Feet-B. M.	Percent
Western hemlock	58,000,000,000	74
Sitka spruce	15,800,000,000	20
Western red cedar	2,350,000,000	3
Alaska cedar	<u>2,350,000,000</u>	<u>3</u>
Total	78,500,000,000	100

⁹B. F. Heintzleman, op. cit., p. 8.

FOREST SPECIES

Western hemlock (*Tsuga heterophylla*)¹⁰

The western hemlock is the most prevalent commercial timber species in southeastern Alaska. The associates of the western hemlock are Sitka spruce, western red cedar, and Alaska cedar. Of the millions of acres in this region the western hemlock comprises about 75 per cent of the entire stand, spruce 20 per cent, and the cedars 5 per cent. This particular species usually extends from tide-water to elevations of 1,000 to 2,000 feet.

The western hemlock in the typical stand reaches a height of 100 to 140 feet and a diameter of from three to four feet. The bole of the tree is slender, straight, and free of low branches, which excludes it from knots.

It will be found that the hemlock is light in color, fairly strong, and almost tasteless and odorless.

Western hemlock has come to be of high value in pulp and paper manufacturing, and this is further evidenced by the mills of Oregon, Washington, and British Columbia that use many cords of it yearly. It has also been found to make very high class grades of pulp, and of these is rayon and cellophane.

The largest per cent of newsprint used in the United States is made from western hemlock. Taken from the Bureau

¹⁰ Ibid., pp.10-11



Mature timber, Tongass National Forest, Alaska. Large Sitka spruce tree, left foreground, 42" diameter, breast high.

of Census on the consumption of pulpwood in Washington and Oregon in 1935, it is found that this region uses 1,148,453 cords of western hemlock yearly for pulpwood.

Mountain hemlock (*Tsuga mertensiana*)

This species has practically the same characteristics as western hemlock. This species is chiefly confined to high altitudes and is therefore of very little commercial value as pulpwood.

Sitka spruce (*Picea sitchensis*)¹¹

We find that Sitka spruce is the next most important species found in southeastern Alaska and is used extensively for pulpwood in Washington and Oregon. The sum total used annually amounts to approximately 152,197 cords.

In the typical forest stands the average volume per acre is approximately 40,000 to 75,000 board feet. This section of southeastern Alaska has a total of about 18,000,000,000 board feet of spruce, which is found mainly in mixed stands with hemlock and cedar. It is sometimes found in separate stands of about 80 acres to each stand.

Sitka spruce is an excellent all-purpose pulpwood. It can easily be compared to that of white spruce, found in the eastern part of the United States. At the present time spruce is not used as commonly as hemlock for pulpwood, because of the competition of the sawmills for spruce logs and also because hemlock is less expensive for the use

¹¹Ibid., pp. 11-12

of most grades of pulpwood manufacturing. There is no doubt in my mind that there will be very little competition between the pulp mill operator and sawmill operators in Alaska when it comes to the use of pulpwood, because hemlock is the most predominant species in Alaska.

Some of the other species found in this region are Northern black cottonwood in very small quantities, muskeg, and sub-alpine.

From both spruce and hemlock the following papers can be made: Manila, cartridge, sheathing, book, label, writing, and related papers. Consequently, these facts show that the two principal species of Alaska timber are both commercially suitable for mechanical and sulfite papers, and the papers that are usually made from them.

QUALITY OF TIMBER

The question naturally arises as to whether the spruce and hemlock found in southeastern Alaska is of the desired quality for making into paper.

Through minute and detailed testings it has been found that the commercial sizes of spruce are as a general rule sound and of good quality. Tests have shown that this is not necessarily true of all commercial size hemlock. The chief defect in hemlock is decay in the butt, known as "black knots", or fluted trunks. As a general rule this condition exists only in the smaller size hemlocks. Hemlock has a tendency, also, to be quite limby near the

ground. Hemlock has never been quite equal to spruce in the making of paper or even in the manufacturing; consequently the present stumpage value of hemlock is approximately half of that of spruce.¹²

It has been estimated that all defects which occur in both hemlock and spruce in the butt rarely exceeds 15 to 20 per cent of the merchantable portion of the pulpwood. This small portion can easily be trimmed before making into pulpwood for an additional cost of \$1 per thousand for hand trimming. This cost can easily be reduced one-third or one-half if proper mechanical means of trimming are employed. Neither fluted trunks nor limbiness in trunks today cause serious handicap in utilization, because new methods of paper making have made it possible to utilize these portions.¹³

Surveys made have shown that practically all spruce and hemlock now considered merchantable saw timber would make excellent or high grade pulpwood regardless of the defects that do exist.

SILVICULTURAL FEATURES

Sitka spruce is the most important species of southeastern Alaska and it is a rapidly growing, light-demanding tree. The best results for further production of this

¹²Clinton G. Smith, "Regional Development of Pulpwood Resources of the Tongass National Forest", U.S.D.A. Bulletin No. 950, Washington, D.C., (June 15, 1921) p. 9.

¹³Ibid., p. 9

species are found when it grows in a mixed stand with other species. The Sitka spruce's close associate is western hemlock. This species has about the same qualities as spruce and is a great shade tree which naturally enables it and the light-demanding spruce to form large, dense mixed stands. The main objective of the modern forester will be to put both species on a productive basis for the future in the manufacturing of pulp and paper.

At present the hemlock and spruce are being clear cut, but with the prospects for the pulpwood industry brightening this present system of cutting could be changed over to selective logging or even to sustained yield with very little trouble. It has been found experimentally by the Forest Service in Alaska that the rotation of the virgin timber is about 75 to 80 years.

It has been estimated that the commercial stand of pulpwood of southeastern Alaska comprises some 80,000,000 board feet, and if put on an eighty year rotation of sustained yield management there would be approximately 1,500,000 cords of pulpwood of 600 board feet each cut annually. This amount of pulpwood would produce about 1,000,000 tons of newsprint annually.

Owing to the high relative humidity and low forest-fire hazard, the pulp mill operator would have little to worry about when it comes to slash disposal, and his expense would be cut down tremendously.



Baranof Island, lakes flowing into Sandy Cove, Tongass National Forest, Alaska. Typical water-power site with hanging lakes located a short distance from tide-water.

WATER-POWER RESOURCES

The Tongass National Forest contains the second chief essential of a paper-manufacturing industry--water power. While no accurate survey of this has been made, known projects have a possible development of over 100,000 horsepower, and it is estimated that a complete exploration of the water power resources in southeastern Alaska will increase their potential power to one-half million.¹⁴

Up to date approximately 600,000 horsepower has been surveyed in detail and there are still thousands of horsepower that will be disclosed when further survey is made of other important areas. At present the largest single unit power plant gives approximately 32,000 horsepower the year around. The Speel River site, which is located at Port Snettisham a distance of 45 miles south of Juneau, Alaska, could support a power plant constructed to yield 50,000 horsepower annually, and the area is even capable of several other power units with a sum total horsepower of 75,000 horsepower annually. Some of the other sites that offer excellent possibilities for power plant operations and which are in the heart of the pulpwood stands are the Bradfield Canal near Wrangell, Alaska, which could easily develop 54,000 horsepower. Another place would be Ketchikan, Alaska, which could erect a power

¹⁴James Anderson, "Paper from Alaska", Scientific American Monthly, vol. 124, pp. 64 and 75, (Jan. 22, 1921)

plant that could displace easily 60,000 horsepower annually.¹⁵

Some of the outstanding factors that make the water power resources of southeastern Alaska so excellent are as follows: high-head development, short conduits, small drainage basins with heavy run-off, good water-storage facilities, easy means of transportation to the projects by navigable waters, and last, the most important, is the opportunity to locate the pulp mill at the water-power sources.¹⁶

During the early fall of 1937 the Forest Service made numerous surveys of water-power development and the surveying engineer estimated that the present water-power set-up could be developed for as little as \$100 per horsepower. The water-power resources are under the direct control of the Federal Power Commission which has as one of its heads the Regional Forester of Alaska.

TRANSPORTATION FACILITIES

At present there are two large steamship companies that operate a year around passenger and freight service to Alaska. These companies are the Alaska Steamship Company and the Northland Transportation Company; also

¹⁵ B. F. Heitzleman, Pulp Timber Resources of Southeastern Alaska, Bulletin issued from the Regional Forester's office, Juneau, Alaska, pp.22-24, (May, 1937)

¹⁶ Ibid., Pp. 22-24

the Canadian Steamship Company has boats plying to Alaska the year around. This latter company handles no American cargo, but confines its business chiefly to mail and passengers. The former two companies have a large number of freighters plying to Alaska the year around that are capable of handling many thousands of tons of paper or pulpwood. During the summer months from June to September there is a boat a day calling at all of the ports of southeastern Alaska and during the winter months the boats run at intervals of three days apart, the reason for this being that passenger traffic is slowed up considerably and the movement of freight is reduced considerably.

Because of the network of navigable straits, channels, canals, and narrows leading up to the pulpwood units and because they are protected to a great degree from storms it would be quite possible to transport the finished pulpwood by means of tug and barge to the principal cities on the Pacific Coast for the manufacturing of paper if paper mills were not constructed in southeastern Alaska. There are also great possibilities of establishing railroad car ferries from the pulpwood sites in southeastern Alaska to Prince Rupert, British Columbia, for rail transportation to the principal pulpwood markets of the eastern states of the United States. The transportation of pulpwood to foreign markets is easily accessible from Alaska. Table III shows the approximate distances from Ketchikan, Alaska, the most southerly Alaskan port, to some important points

Table III¹⁷

Showing Approximate Distances from Ketchikan, Alaska
to Important World Pulp and Paper Markets

Destination	Miles
Minneapolis, via Prince Rupert, B.C., and Canadian National R.R.	2,390
Chicago, via Prince Rupert, B.C., and Canadian National R.R.	2,700
Seattle	660
San Francisco	1,300
Colon	4,638
New Orleans, via Panama Canal	6,084
Savannah, via Panama Canal	6,407
New York, via Panama Canal	6,663
Honolulu	2,450
Yokohama	3,911
New Zealand	6,550
Sydney, Australia	6,850

¹⁷ Ibid., p. 25

of world paper markets.¹⁸

The pulp and paper markets of the Orient and Australia are as readily accessible to Alaska as to the Pacific Coast States and British Columbia. Those of the Gulf States and other sections of the Atlantic seaboard can be reached by water shipments through the Panama Canal.¹⁹

LOGGING METHODS AND COSTS

Machine logging with donkey engines and wire rope is the only practical means of moving logs from the woods in this region, because of the rough topography, the large quantity of debris on the ground, and the large size of many trees. Ground-skidding and high-lead systems are now in use. If one of the pulp mills is started it is quite possible that one of the high-lead systems will be used. The felled timber can be gotten to tidewater by means of donkeys working in tandem, log flumes, short railway spurs, and motor or "cat" roads. The rivers are too swift for river driving to be practicable.²⁰

As a general rule the logs can be handled in full tree lengths and transported to tidewater by one of the systems named in the previous paragraph. There they can be formed into rafts and transported to the pulp mill at a cost of

¹⁸Ibid., pp. 24,25

¹⁹Ibid., p. 25

²⁰Ibid., p. 25

approximately one cent per 1,000 board feet. Another excellent advantage of logging in this section is that logging camps can be built on scows and moved from one locality to the next on the completion of logging a certain unit and can be done so very economically.²¹

The average cost of saw logs, exclusive of stumpage, delivered at the sawmills in 1936 was about \$10 per 1,000 board feet. It is estimated that the total cost of unpeeled pulpwood logs delivered at local mills and including an average stumpage charge of 40 cents per cord will not exceed \$6.00 per cord (equivalent to \$10.00 per 1,000 board feet) during the next ten years, on the basis of labor and equipment costs of 1936.²²

FOREST SERVICE POLICIES

The Tongass National Forest in the Alaskan Panhandle has been divided into pulp timber allotments. Each allotment contains a million acres of forest, more or less, grouped around the water-power sites most logically situated for the manufacture of paper. A period of 85 years has been allowed for reforestation, and the Forest Service has determined the growing capacity of each allotment. Through the joint action of both the Forest Service and Federal Power Commission the timber and water-power

²¹Ibid., p. 25

²²Ibid., p. 26

resources are offered together to the paper manufacturer who submits the most advantageous terms. The timber is sold in quantities sufficient to supply the manufacturing capacity of the power site for a 50 year period. The power rights are secured under Federal license and they also run for a period of 50 years.²³

Rather than try to condense the objectives and policies of the forest-management policy of the Forest Service in Alaska, the following is a verbatim copy of the Forest Service Policies taken from B. F. Heintzleman's bulletin on the Pulp Timber Resources of Southeastern Alaska. They are important to anyone who may desire to establish a paper mill in southeastern Alaska. The objectives and policies are as follows:

OBJECTIVE OF MANAGEMENT

The management of the timber resources of the Tongass National Forest has as its prime objectives:

The development and maintenance of a permanent pulp and paper industry commensurate with the available water power and timber resources.

The furnishing of a permanent and convenient supply of timber for local consumption, with such an additional supply to the local sawmills for the general lumber markets as may be needed to justify efficient milling facilities and provide yearlong operations.

TIMBER USE POLICY

The productive forest land, after examination and careful study, will be divided into pul-timber allotments, local-use allotments, and general-use areas.

²³W. B. Greeley, "Alaska--Uncle Sam's Coming Paper Factory," World's Work, vol. 57, pp.80-87 (November, 1928)

Pulp-timber allotments will be laid out as complementary to definite available water-power sites suitable for use in the manufacture of pulp. Each allotment will include sufficient timberland to supply a sustained annual yield of timber equal to the mill capacity obtainable through a full economic development of the accompanying water-power site or sites.

Local-use allotments will be laid out on the basis of the suitability of the timber for the common local uses and its accessibility to points of consumption. In determining the size of local-use allotments consideration will be given to the probable opportunities for the local users to get material from present or future sales on pulpwood allotments, so that the allotments will not need in all cases to be so large as to supply the entire estimated future local demands. They will, however, be sufficiently large to permit of their being managed on the principle of sustained yield, using one or several allotments as the unit of management. On these allotments timber unsuitable for local use will be disposed of on the stump for pulpwood or other purposes under small, short-term sales.

General-use areas will include all bodies of timber not specifically placed in the two foregoing classifications. They will be available for sale for any product for the general or local market. Sustained-yield management will be practiced so far as possible.

So far as the Forest is able to control the location of pulp mills, they will be so distributed that an adequate timber supply under the management plan will always be available within a reasonable log-towing distance of each plant.

Initial sales within an allotment will ordinarily include those timber units most accessible to tidewater, the more inaccessible units being left for later exploitation.

Other things being equal, preference will be given to such industries and applicants as contemplate the most complete manufacture in Alaska.

Aggressive action will be taken to interest prospective investors in the pulp-timber and water-power resources. Data on location and amount of timber supplies, power resources, plant sites, transportation, labor, markets, construction costs, operating costs, and other governing factors will be gathered and made available to possible timber buyers and other interested parties.

Sawmills established primarily to supply an important local demand which may be insufficient to provide yearlong operations, permit efficient milling methods, and justify first-class equipment, will be encouraged in any efforts they may make toward the placing of the excess lumber cut of the general markets of the United States and foreign countries. The establishment of minor wood-using industries, especially those using western red cedar and Alaska cedar, will also be encouraged.

Sales of timber will not be made when it is anticipated that the wood will be exported from the Territory of Alaska in the form of logs, cordwood, or other raw product necessitating primary manufacture elsewhere. Export of raw material will, however, be allowed in individual cases where this will permit of a more complete utilization of material on areas being logged primarily for local manufacture; prevent serious deterioration of logs unsalable locally because of an unforeseen loss of markets; permit the salvage of timber damaged by wind, fire, insects, or disease; or bring into use a minor species of little importance to local industrial development. No sales, except for purely local use, will be made to aliens or alien corporations.

Small sales will be encouraged so far as is consistent with the investment required and the demands of the industries. Every encouragement will be given to the establishment of a competitive log market.

Additional information on the general conditions applying to timber lands can be gotten by writing to the Regional Forester at Juneau, Alaska.

The Forest Service is not content to await applications for timber from possible manufacturers of pulp and paper who may learn of the opportunities in Alaska. It has been and is pursuing an aggressive policy of bringing these opportunities to the attention of paper makers and users. This is done not only by articles, but also by personal interviews and individual letters. It has been actively assisting interested men in investigating, on the ground, the pulp chances and water power resources in

Alaska. The service has been and is actively pushing, with all the varied means at its disposal, the use of the forests of Alaska to meet the urgent needs of the nation for an increased paper supply and to establish in the territory a large and permanent industry.

EXISTING FOREST INDUSTRIES

The annual cut of timber in this section of southeastern Alaska for the year 1936 was approximately 36,000,000 board feet. About 20 per cent of this annual cut is used for fish traps, wharf piling, and the rest for commercial uses. The operator of a pulp mill could easily dispose of his excess logs to the mills in Juneau or Ketchikan and could find a market for cedar logs both to Alaska and the shingle mills of Washington and Oregon. One of the finest grades of aeroplane stock is grown in Alaska and is known as "Alaska aeroplane Sitka spruce". During the World War many thousands of feet of Alaskan spruce were shipped out of the Territory to the aeroplane construction plants.

At the present time there are no pulp mills operating in southeastern Alaska. About fifteen years ago a pulp mill was in operation at Port Snettisham on the Speel River site. This mill was forced to shut down in 1924 owing to mismanagement and the lack of a market for the pulpwood. The nearest mill is the newsprint plant of the Pacific Mills (ltd.), British Columbia, having a daily capacity of 300 tons daily.

REASONS FOR LACK OF PULP AND PAPER DEVELOPMENT IN
SOUTHEASTERN ALASKA

Since 1920 there have been many criticisms hurled at the Forest Service, because of the statements made by certain individuals, that the restrictions imposed by the Forest Service have prevented development of the pulp and paper industry in Alaska. The following is a condensed statement of factors that are involved in the reasons why the pulp and paper industry has not been developed in southeastern Alaska.

1. The necessity for a careful determination of the possibilities of water-power development. Investigations and measurements over a period of years are required and it has only been in recent years that such water-power surveys have been made.

2. The important markets for pulp and paper products are in the East and Central West. In order to supply these paper markets it has been necessary to establish the pulp and paper plants in as close proximity as practicable in order to keep the costs of transportation down. In the past years the supply of pulp and paper has been met in the West by the supply coming from the above mentioned regions. The market opportunities for a plant in Alaska are in the East, the Middle West, and in the Orient. Prior to the war the transportation cost in reaching these markets in competition with established plants nearer to the markets made the practicability of an Alaskan operation

questionable, so much so, that financiers were unwilling to subject their capital to the hazard . Unlike other types of timber conversion plants, the capital investment needed to operate a pulp and paper plant is much higher. The typical pulp and paper mill of today requires a capital investment of from \$4,000,000 to \$10,000,000 in order to have a well-balanced and efficient plant. Heretofore, capitalists have been unwilling to invest their money in Alaska operated pulp and paper plants, because of uncertain market conditions prevailing in the past.

3. Another factor that has hindered the development of the pulp and paper industry in Alaska is the pioneer conditions that have existed in Alaska in the past. Much misleading advertising, prior to the last few years, has been issued about Alaska, these misleading facts being: (1) a land of severe climate with long, hard winters and perpetual frost; (2) a land far away with many hardships, pictures showing Alaska as a land of snow and icebergs and dog teams. Although some of the information issued is in part true of the interior section of Alaska it is not true of southeastern Alaska, where the best chances for the development of the pulp and paper industry are present. Because of the above attitude of the public in general there has been a tendency on the part of the capitalists to be a bit hesitant in investing their money in Alaskan projects and a lack of interest to investigate these acquisitions. The Forest Service has made

every effort to acquaint the public with the fact that southeastern Alaska is a good field for investment in the pulp and paper business, and numerous inquiries coming in show that capital is becoming interested. Another bad effect on the development of the pulp and paper industry in Alaska has been brought about by the Alaskans themselves. They have never been able to visualize Alaska becoming a place of industrial development, but could only see Alaska's future in the light of mineral development. It has only been in the last 20 years that they could see any timber in Alaska; therefore, always referred in belittling terms to its quality and quantity.

4. The inability to secure through Federal legislation satisfactory tenure for hydro-electric development on the National Forests as well as other public lands has probably discouraged some investors, particularly those with the necessary finances to undertake pulp and paper production.

5. From about 1914 to 1925 there had been a lack of proper transportation facilities; consequently, capital was a bit hesitant about investing their money in a region where the sole means of transportation from the Territory was by water.

6. In considering the criticism directed at the government for the non-development of the pulp industry in Alaska, where the stumpage is nearly all government owned, attention is called to the fact that in Washington and

Oregon, where only about one-fourth of the stumpage is government owned, where immense quantities of suitable species are in private ownership and have been considered a drug on the market, where unlimited water power is available, where the market in regard to manufacture and labor conditions are superior, there has been a negligible development of the industry so far as supplying the general markets is concerned. This fact which suggests some other reason than government restrictions for the lack of development of Alaskan timber.²⁵

Finally, in this particular discussion, if I may, I would like to venture a theory of my own on one reason for the lack of development of the pulp and paper industry in Alaska. From all observations and conversations that I have gotten into with outstanding lumbermen in the state of Oregon, I have finally come to the conclusion that the recent development of the southern pines into suitable pulp and paper, the fast growth of the southern pines, and the low costs of production, has done much to curtail for the time being any possible prospects for the development of the pulp and paper industry in southeastern Alaska.

MARKETS

For the last century or more the United States has been the world's greatest user of newsprint. Statistics

²⁵George H. Ceil, "Alaska Pulpwood Resources to be Developed", Timbermen, (June, 1920)

show that the consumption of newsprint has grown and for the year 1936 the total amount of newsprint used was approximately 3,700,000 tons or about 58 pounds per capita. Because of the present depletion of our timbered areas of pulpwood and also to offset the production losses there has been a tendency for the mills to move farther eastward and upwards into Canada. Our virgin forests that were capable of producing spruce, hemlock, and true fir, which are so important for the mechanical and sulphite processes in paper making, have gradually been depleted to such an extent that the newsprint industry has been forced to move across the border into eastern Canada.²⁶

The establishment of pulp and paper industries in Canada, the region next in accessibility to the large markets, though on foreign soil, was a logical development. At present the most promising areas of pulp timber in Canada have been taken up; therefore, the few areas remaining possess no advantage for the supplying of paper to our eastern markets that could not be offset to a large extent by other advantages that might be possible in the establishment of plants in southeastern Alaska.²⁷

It is quite apparent that the major market for southeastern Alaska's pulp and paper will be the United States.

²⁶Regional Planning Part VII--Alaska, Its Resources and Development, National Resources Committee--Alaska Resources Committee, U.S. Government Printing Office, Washington, D.C., 1938, p. 101

²⁷Ibid., P. 101

Since the United States has in recent years switched from an exporter of pulp and paper to that of importer of the same, it has been necessary to import nearly two-thirds of its needed supply from abroad and this has made it necessary to meet existing restrictions and impositions; consequently, it would be advantageous for paper users to patronize the manufacturers of Alaskan pulpwood. Within the last thirty years British Columbia has successfully operated pulp and paper mills within its region. The conditions existing within British Columbia varies little from those conditions existing in southeastern Alaska. The conditions surrounding the acquirement of timbered areas in British Columbia offer no greater advantages than those that exist in Alaska and there is no reason to believe that there should be such a change.²⁸

Naturally with the establishment of mills in southeastern Alaska there will be established competition between British Columbia and Alaska. Because of the accessibility of timber in southeastern Alaska and the favorable operating conditions that prevail, this competition should easily be met. The competition between British Columbia and Alaska mills should have little effect on each other and much should be gained in the common development of the region.

²⁸Clinton G. Smith, "Regional Development of Pulpwood Resources of the Tongass National Forest", U.S.D.A. Bulletin No. 950, Washington, D.C., p. 9, (June 15, 1921)

The unique advantages in the exploitation of Alaskan timber are the proximity of raw materials to tidewater, natural power sites, and the favorable relation to the world's markets. Obviously a paper plant located in southeastern Alaska has a world-wide choice of markets under independent transportation conditions, either rail or water transportation being available.²⁹

CONCLUSIONS

There is no immediate danger of a paper monopoly in Alaska. There is room and resources on her thousands of miles of coast for six or eight of the largest paper mills that the industry has yet produced. The prospective paper manufacturer should feel no danger of inside deals, because every offering is advertised widely by the Forest Service for competitive bids, with the fullest opportunity for an accurate advance examination of timber and power resources. It is purely a simple, straightforward form of partnership between the public, represented by the Forest Service, and the industry. This method has been developed and tested by twenty years' experience in the administration of the National Forests.³⁰

The following is a verbatim statement issued by the late Chief Forester Ferdinand A. Silcox on Alaska's

²⁹Ibid., p. 9

³⁰W. B. Greely, "Alaska, Uncle Sam's Coming Paper Factory," World's Work, vol. 57, p. 86 (November, 1928)

possibilities of establishing the pulp and paper industry in the near future.³¹

"Even a brief survey of our soft pulpable wood resources in relation to world supplies brings out very clearly the need to conserve and build up our forest resources. Available reserves of such species as spruce, hemlock, and the pines are limited. Producing countries that export heavily, like Norway, Sweden, and Finland, cannot increase their pulpwood production very much without eating into their forest capital. This they are wisely loath to do. Mill capacities in or directly tributary to eastern Canada are beyond the capacity of easily accessible forests to sustain, and immediate supplies are getting more remote. There is practically no commercial supply in the East or in Africa. There is little or none in South America or Australia. The only reserves of soft pulpable woods are in (1) the Union of Soviet Socialist Republics, (2) southeastern United States, and (3) a Northwest that includes British Columbia and Alaska. If, as competent observers believe, the Soviet Union must and will use practically all the wood pulp she can produce for the next two decades, any marked expansion in use elsewhere must come from the last two reserve supplies just mentioned.

"World production of wood pulp was 16,719,000 short tons in 1931; in 1937 it was 26,121,000 short tons. This increase, more than 56 per cent in six years, emphasizes the need for management of pulpable forests in the United States. So does the fact that in addition to 40 or more pulp mills, of which 10 of the largest have been installed during the last five or six years, there are more than 10,000 sawmills and other wood-using industries that also depend on southern forests for raw-material supplies.

"Of our own reserves, Southeast Alaska has enough soft pulpable woods, mainly hemlock and spruce, to provide continuous production for seven mills with a daily capacity of 500 tons each."

I might mention here that Mr. Silcox made an extensive trip to Alaska during the summer of 1939 and at that time he made somewhat of a detailed investigation of the possibilities of establishing pulp and paper mills in southeastern Alaska and the above statement is an outgrowth of this investigation.

³¹"Alaska Pulp Forests Are Vital Supply", Daily Alaska Empire, vol. 15, p. 2, cols. 4-5, (February 12, 1940)

RECOMMENDATIONS

The Alaska plan is purely a partnership affair and is between the public and paper manufacturer. The public owns the forest and the water power, and the paper manufacturer is the agent who must put them to beneficial use. The paper mills required for Alaska's development must be large plants, with daily capacities of 500 tons. Each of them will require an approximate capital investment of \$10,000,000 or more. The security afforded must be in proportion to the investment of private capital. Therefore, contracts of long duration and conveying cutting rights on large areas of forests are essential. The territory should have no Alaskan newsprint without them.³²

Alaskan timber is at present very cheap in comparison with timber of other regions of the United States. It must be cheap for years to come if paper is to be made there and the growth of her forests utilized rather than permitted to rot to the ground. The value of Alaska will enhance in time and the public who own it should receive what it is fairly worth.³³

In conclusion I wish to set forth two very important problems that need further investigation before there can be any hope of carrying on a successful and efficiently

³²W. B. Greely, "Alaska, Uncle Sam's Coming Paper Factory", World's Work, vol. 57, p. 86, (November, 1928)

³³Ibid., p. 86

organized plan of establishments of Alaskan pulp and paper mills.

Pulp and Timber Surveys:³⁴

A carefully planned development of a pulp and paper industry in Alaska commensurate with the growth possibilities of the forest area and the available water power necessitates a careful study of the timber resources. It is essential that a very detailed study and survey be made of the type, condition, and volume of timber and of the topography on each area. Through information gathered a well organized timber management and logging operation plan can be worked out. From about 1920 to 1933, some 900,000 acres was covered by a preliminary survey and the results proved very satisfactory. It is necessary at present to carry on these surveys on a more substantial scale and the best sites should be worked out in greater detail than those not showing any great promise of development. It is through these preliminary surveys that detailed information can be gotten which will in turn promote the establishment of the pulp and paper industry in southeastern Alaska.

Study of Prospects for Pulp and Paper Industry:³⁵

The territory is in need of improvement and it is

³⁴Regional Planning Part VII--Alaska: Its Resources and Development, National Resources Committee--Alaska Resources Committee, U.S. Government Printing Office, Washington, D.C., 1938, p. 104

³⁵Ibid., p. 104

felt by officials in Washington, D. C., and also by a statement issued by B. F. Heintzleman, Regional Forester--District # 10, that the establishment of pulp and paper mills in Alaska offers better prospects for a substantial thrust ahead in Alaska's development in the near future than any other class of enterprise. The significance of such a project in Alaska's development can be better realized by figures that show that over 1,000,000 tons of newsprint can be produced annually from the timber growing on the Tongass National Forest.

Because of past interests shown in the possibilities of the establishment of pulp and paper mills in Alaska before the economic depression of 1929, and the present high prices that newsprint brings, it would seem that the time is now ripe to suppose that consideration of the Alaskan possibilities could be revived at this time.

It has been highly recommended that a competent specialist be employed to investigate the economic and technical problems involved in the extension of the pulp and paper industry in Alaska. This investigation should include a study of the conditions under which water power and timber in Alaska are made available to prospective operators and of the extent and location of possible markets.

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