Chapter 1

Introduction

1.1. Purpose of the Study

The term "Kowan" is the Japanese translation of "Ports and Harbors", and this term is assumed to have come to be used after the Meiji era. "Port" has a transportation geographical meaning and "Harbor" has a natural geographical meaning. That is, port indicates a traffic node which links the sea traffic and the inland traffic. And it includes the land space and the water space around a pier and anchorage. While harbor originally indicates the natural anchorage where ships can moor safely. Because harbor came to contain an artificial anchorage later, it is interpreted as an anchorage where ships can moor safely (Yamaguchi, 1980). Kowan is interpreted as "Port" in this study, because kowan is considered in relation to the hinterland.

Ports have been studied in various fields such as geography, economics, history, and engineering. And in geography, some studies are seen in transportation geography, urban geography, commercial geography, historical geography, and industrial geography. As for the port study, it is possible to approach it from various fields like this.

In foreign countries, geographers like Morgan (1952), Bird (1963)

(1971), and Taaffe (1973) systematized the port study or built a diagram of a port. And they produced big influences on the studies of other areas. In Japan there are a lot of geographical studies about ports, but systematic study is not seen except for Yamaguchi. This means that geographical studies on ports have great possibilities in Japan.

It is not preferable for geographical studies on ports, as Yamaguchi indicates, to target a port itself and study only its shape or classification of the port. It is necessary to clarify a regional structure through ports. It is assumed to be a purpose of this study to elucidate (1) characteristics and regulated factors on hinterland, (2) relations between hinterland and port space, through the process of the formation of port hinterland.

In this study port hinterland is defined as an area which has a port influence, that is, an area which has some cargoes connected with a port. And port space means port district (anchorage and wharf) and its surroundings.

1.2. Past Studies and Problems

As for the geographical study on port, some results are chiefly produced in transportation geography and urban geography. Port is often interpreted as a node on a transport network in transportation geography and as one of the elements composing an urban district in urban geography. In transportation geography, some important studies were produced from the 1960s to the 1970s in Europe and the U.S.A., but

recently there are few. In Japan there are many individual case studies, but they are not systematized. On the other hand, there is not much urban geographical study in Europe, the U.S.A., and Japan. In the following study, geographical study is introduced separately for the formation process of hinterland, sphere of hinterland, and port space.

Pioneering study about the formation process of hinterland was produced by Taaffe, E.J., Morrill, R.L., and Gould, P.R. in 1963. Taaffe and others showed the development process of the transport network in port hinterland at six stages and attempted the verification of their diagram in a case study of Ghana and Nigeria. After that, some studies influenced by Taaffe and others appeared. Rimmer constructed the development diagram of port and attempted to verify it in New Zealand and Australia. However, its diagram followed Taaffe and others'.

The study of Taaffe and others offers some themes. Relational analysis with a port and traffic behind a port is one of the most important themes. A lot of studies about this have appeared, such as Konno (1966), Sanami (1990), Tani (1994), Matsushita (1996), and Shinada (1997), etc. And Sumi (1997) caught the development of ports in relation to the sea routes. In these studies, it was clarified that the development of transport networks linked with a port has brought about the development of the port and the port city. Change in port location is one of the important themes and this theme has been studied from old. For example, Pound (1947), Bird (1965), Pred (1966), and Rimmer (1967) studied in Northwest Europe, Australia, American Atlantic Ocean shore, and New Zealand and Australia. In Japan Taniuchi

(1980) took a general view about the change of the port distribution of Hokkaido before World War II and clarified that around 1920 there was the conversion period from port decentralization to port concentration and this was deeply related with the rail network. Nagano (1972) and Tani (1995) studied it by taking the case of the Sendai Bay and the Ise Bay. It is necessary to analyze the location of ports in relation to not only traffic behind the port but also the industrial structure. The locational study of the industrial port is a good example and Masaki (1958) did pioneering study about it. Nagano and Kumabe (1972) clarified that ports have strong relations with industrial and economic factors of hinterland.

As seen above, study on the formation process of port hinterland is often analyzed in relation to the traffic expanding from the port. It is necessary to consider a port from a synthetic viewpoint such as industrial structure in hinterland, port policy of the government and local government, change of sea route and ships, domestic and international situations, and development of engineering technology.

There are a lot of studies about the sphere of hinterland and its determining factors. Morgan (1952) took up inland waterways, railways, and national policy as determining factors of port hinterland. He studied it taking the case of the central part of Europe. Weigend (1958) analyzed the hinterland of the Hamburg port paying attention to the expressway network and regional characteristics, and he also referred to foreland. Patton (1958) clarified hinterlands based on the export and the import cargoes of four ports in the United States and also attempted

the analysis of hinterland from port facilities and transportation cost. Rimmer (1967) and Kenyon (1970) also referred to transportation cost in their studies. Especially Kenyon clarified that cargoes concentrated on large-scale ports and because of this, port hinterland could not be explained only by transportation cost. And Rodgers (1958) analyzed the relations between port and hinterland by clarifying the sphere of port hinterland for each cargo. Bird (1963) discussed the difference of the sphere of hinterland for each cargo, too.

A lot of studies about the sphere and determining factors of hinterland have been done for individual cargoes. Konno (1967), Shiokawa (1971), Kitahara (1982), and Asaka (1990) clarified the actual conditions and the change of distribution in port hinterland taking the case of imported food, oil products, imported wheat, and foreign trade container. Konno (1970) and Endo (1981) considered distribution in a port hinterland through the port function. Endo clarified that overlapping hinterland existed for container cargo. Asaka (1990) and Mine (1995) also referred about overlapping hinterland. Mine (1996) discussed the distribution system from the relation between hinterland and foreland. In a lot of studies in Japan, flow of cargo in hinterland was a study object and factor to decide the sphere of hinterland which was one of the main themes in foreign study that was not referred to much. It is remarkable that Kumashiro (1990) analyzed about determining factors of the sphere of hinterland from the viewpoint of the productivity of service.

There are a lot of studies about port space in foreign countries.

Hance (1956) (1957) (1958) did a series of pioneering research taking the case of developing countries. Land use of port, hinterland of export cargo, and transportation between port and hinterland were clarified in each study, but he did not refer to the interrelation of them. And Kenyon (1966) made a thorough investigation of land use in a port and its neighborhood district, and then clarified the structure of port space. Forward (1967) (1969) expanded port space into the waterfront and discussed the characteristics of a waterfront. He took up the improvement of transportation as a factor to bring the change of port space in his study. Wallace (1975) paid attention to container transport and referred to the influence of containerization for a port.

Bird (1963) and Wrenn (1983) paid attention to the development of port space. Bird investigated the estuary port in Britain and classified the development of the estuary port into six stages. In his study, he clarified that city and port separated gradually according to the port development. Scott (1959) also referred to the relation between city and port in Australia. Some supporting studies on port space were seen in foreign countries in the past. But this kind of study is not seen much in geography, though ports have been greatly transformed in recent years.

In Japan Masaki (1968), Kawachi (1974), Konno (1983), Endo (1986), Ito (1995), and Shibata (1998) studied about port space. But these studies were about general consideration and rather referred to port function. Though Okudaira (1966) (1967) and Watanabe (1971) studied port space with an actual survey, there is little study of port space

in relation to hinterland in Japan.

1.3. Study Methods and Analysis Materials

1.3.1. Study Methods

In chapter 2, the formation process of port hinterland and port space before World War II are clarified. The formation process of port hinterland is discussed by various documents, with reference to the diagram of the transport development process of Taaffe and others. As this diagram does not refer to the qualitative aspect in network and industry in hinterland, this chapter is referred to these aspects. The formation process of port space is clarified by making the land use map based on the old maps.

In chapter 3, hinterland and port space in the era of rail dominance are clarified, in chapter 4 those in the era of truck dominance are clarified. The 1960s and 1990s are taken up in this study for each case. This is because transportation means and industrial structure in hinterland of the Kushiro port have changed greatly. That is, the main transportation means has changed from rail to truck and cargo has changed from an excess of exports to an excess of imports. The sphere of port hinterland was based on " Research Data of Port Hinterland " in 1966 and 1993 and " Research Data of Cargo Hinterland " in 1993. Port space was based on the residential quarter chart, the port plan chart issued by Kushiro Port

Bureau, and the land use survey.

In chapter 5, characteristics and determining factors of port hinterland, and the relation between port hinterland and port space are discussed based on the results in chapter 2, 3, 4, and diagrams of hinterland and the transport network were made. The diagram of port development by Wrenn was referred to in the discussion of port space. Relations between the industrial structure in hinterland and port space are not referred to in Wrenn's diagram, this aspect is discussed.

Kushiro port was selected as a study area for the following reasons. (1) Because Hokkaido is enclosed by the sea, an economical, cultural exchange with another region has been done through ports. (2) It is easy to clarify the formation process of port hinterland and port space of the Kushiro port, because the history of the Kushiro port started at the end of Edo era. (3) It is possible to analyze in a time series, because the Kushiro port has been the base port in the eastern part of Hokkaido since the pioneering period.

In this study the eastern part of Hokkaido means the Kushiro district, Tokachi district, Nemuro district, and Abashiri district. And the central part of Hokkaido means Ishikari district, Sorachi district, Iburi district, and Hiyama district[1].

1.3.2. Analysis Materials

"Research Data of Port Hinterland" which the Ministry of Transport investigated is used for cargo flow between port and

hinterland. This was investigated in 1966, 1978, 1988, 1993. A port in the investigation is a specific important port and important port[2] located in Hokkaido. The investigation period was June 1-30 in 1966, October 1-31 in 1978, 1988, 1993. Ship articles and cargoes transported by railway ferry or ferry are not included in this investigation. Only the first flow of cargo is the object of this investigation.

The investigation in 1966 is used as a case of the era of rail dominance and the investigation in 1993 is used as a case in the era of truck dominance. Seven ports (Hakodate, Otaru, Muroran, Tomakomai, Rumoi, Wakkanai, Kushiro) are investigation objects from 1966. And twelve ports (Ishikari Bay New, Tokachi, Nemuro, Abashiri, Monbetsu port, and the seven ports in 1966) are investigation objects from 1993. The arrival and departure place of cargo is shown in a district scale in 1966 and in a municipality scale in 1993 (Figure 1).

As ferry cargo is not included in "Research Data of Port Hinterland", flow data of ferry cargo is supplemented with "Research Data of Ferry Cargo" from the Hokkaido Public Government Office. Six ports (Hakodate, Muroran, Tomakomai, Iwanai, Otaru, Kushiro) which have a ferry sea route with Honshu are investigation objects. And the investigation period is two weeks, October 18 to October 31 in 1993. The arrival and departure of the cargo is shown in each district. Neither traveler vehicles such as passenger cars and buses nor special vehicles are included in the investigation object.

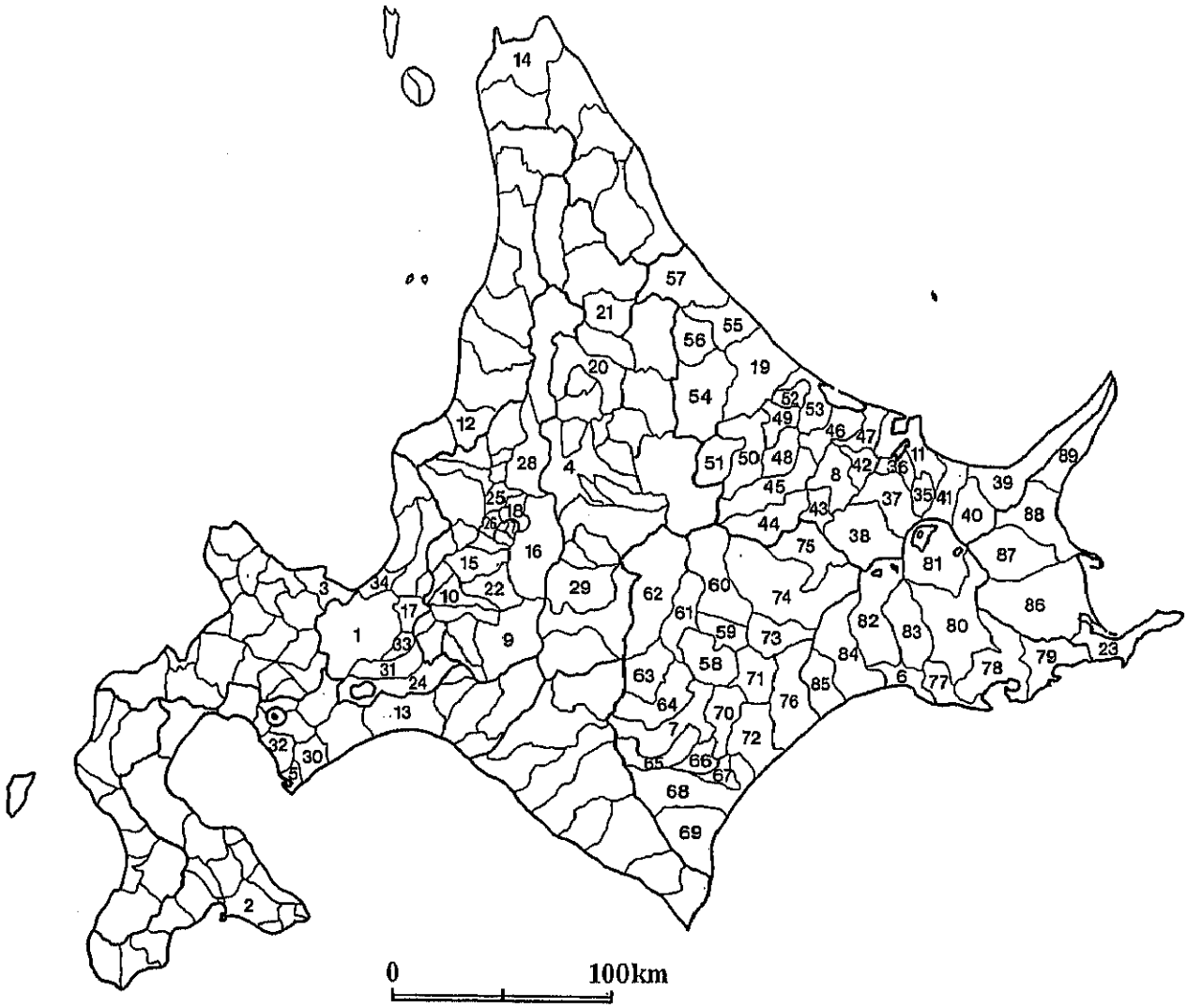

Figure 1 Location of Cities in Hokkaido and Towns and Villages in the Eastern Part of Hokkaido

1.Sapporo City 2.Hakodate City 3.Otaru City 4.Asahikwa City 5.Muroran City 6.Kushiro City 7.Obihiro City 8.Kitami City 9.Yubari City 10.Iwamizawa City 11.Abashiri City 12.Rumoi City 13.Tomakomai City 14.Wakkanai City 15.Bibai City 16.Ashibetsu City 17.Ebetsu City 18.Akabira City 19.Monbetsu City 20.Shibetsu City 21.Nayoro City 22.Mikasa City 23.Nemuro City 24.Chitose City 25.Takikawa City 26.Sunagawa City 27.Utashinai City 28.Fukagawa City 29.Furano City 30.Noboribetsu City 31.Eniwa City 32.Date City 33.Kitahiroshima City 34.Ishikari City
35.Higashimokoto Village 36.Memanbetsu Town 37.Biei Town 38.Tsubetsu Town 39.Shari Town 40.Kiyosato Town 41.Koshimizu Town 42.Tanno Town 43.Kunneppu Town 44.Oketo Town 45.Rubeshibe Town 46.Saroma Town 47.Tokoro Town 48.Ikutawara Town 49.Engaru Town 50.Maruseppu Town 51.Shirataki Village 52.Kamiyubetsu Town 53.Yubetsu Town 54.Takinoue Town 55.Okoppe Town 56.Nishiokoppe Town 57.Oumu Town 58.Otofuke Town 59.Shihoro Town 60.Kamishihoro Town 61.Shikaoi Town 62.Shintoku Town 63.Shimizu Town 64.Memuro Town 65.Nakasatsunai Village 66.Sarabetsu Village 67.Churui Village 68.Taiki Town 69.Hiroo Town 70.Makubetsu Town 71.Ikeda Town 72.Toyokoro Town 73.Honbetsu Town 74.Ashoro Town 75.Rikubetsu Town 76.Urahoro Town 77.Kushiro Town 78.Akkeshi Town 79.Hamanaka Town 80.Shibecha Town 81.Teshikaga Town 82.Akan Town 83.Tsurui Village 84.Shiranuka Town 85.Onbetsu Town 86.Betsukai Town 87.Nakashibetsu Town 88.Shibetsu Town 89.Rausu Town

1.3.3. Outline of Region

There are two specific important ports, eleven important ports, and twenty-three local ports in Hokkaido from 1993 (Figure 2). Specific important ports and important ports are located at equal intervals along the coast. The amount of cargo is large in ports on the Pacific Ocean side and small in ports on the Sea of Japan side and the Okhotsk side. Especially the Tomakomai port and the Muroran port specified for a specific important ports on the Pacific Ocean side have a large amount of cargo. The Tomakomai port accounts for 38.1% of total cargo in Hokkaido and the Muroran port accounts for 27.9%. The Muroran port was developed as a coal export port and was specified for an important port in 1950 when port law was enacted, then as a specific important port in 1965. In the present Muroran port, the roles as the industrial port and the ferry port are large. The Tomakomai port is a comparatively new port in Hokkaido. It was specified for an important port in 1963 and a specific important port in 1981. The Tomakomai port is the first large-scaled port with a dock in Japan and it has been developed as a nuclear port in the coastal industrial region. The present Tomakomai port is the greatest distribution base port in Hokkaido.

The Kushiro port is the largest port in the eastern part of Hokkaido and was specified for an important port in 1950. The main cargoes of the Kushiro port are coal, paper, pulp, oil products, heavy oil, wood chips, material wood, and cereals.

The Kushiro port consists of an East Port and West Port (Figure

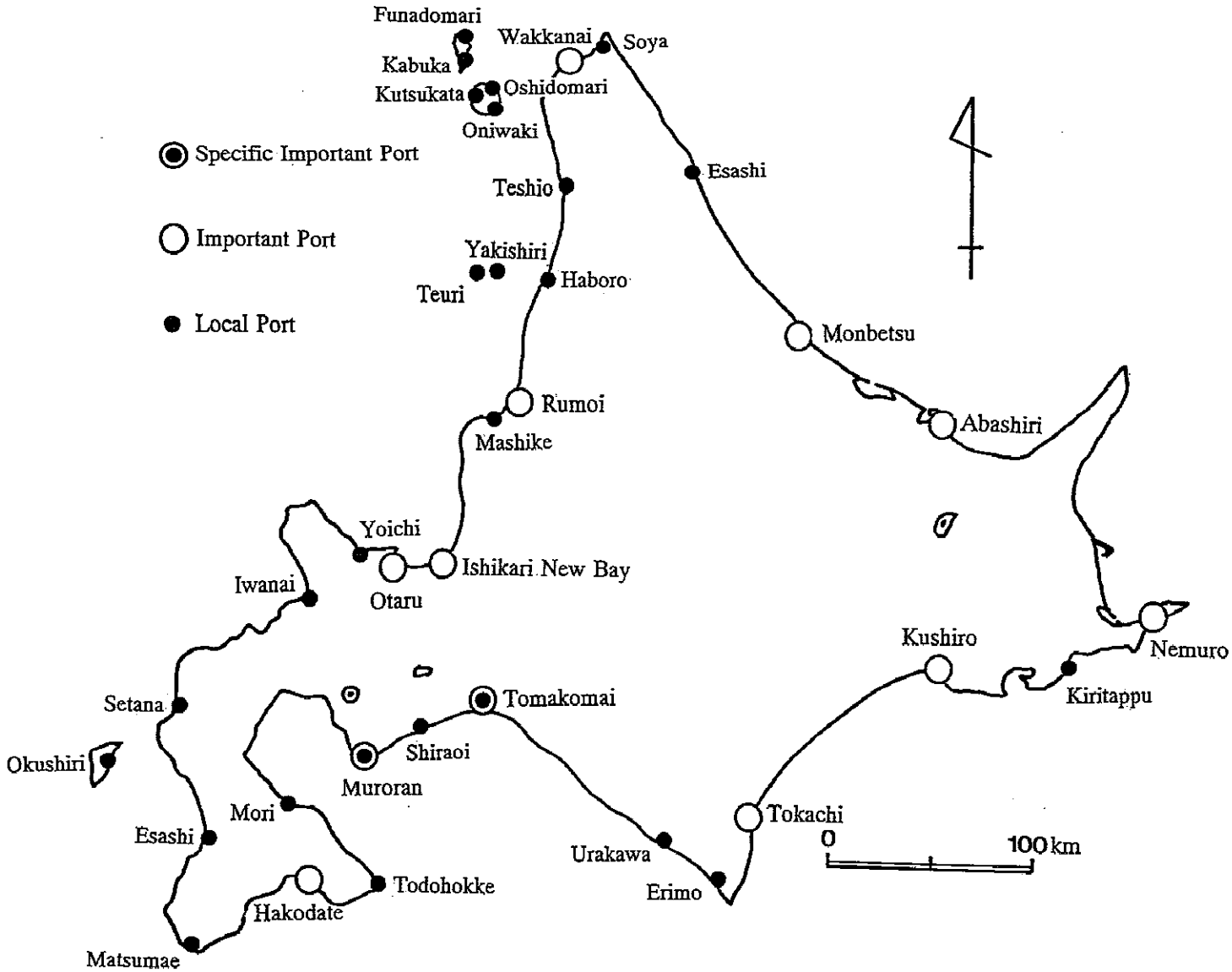

Figure 2 Distribution of Major Ports in Hokkaido in 1999

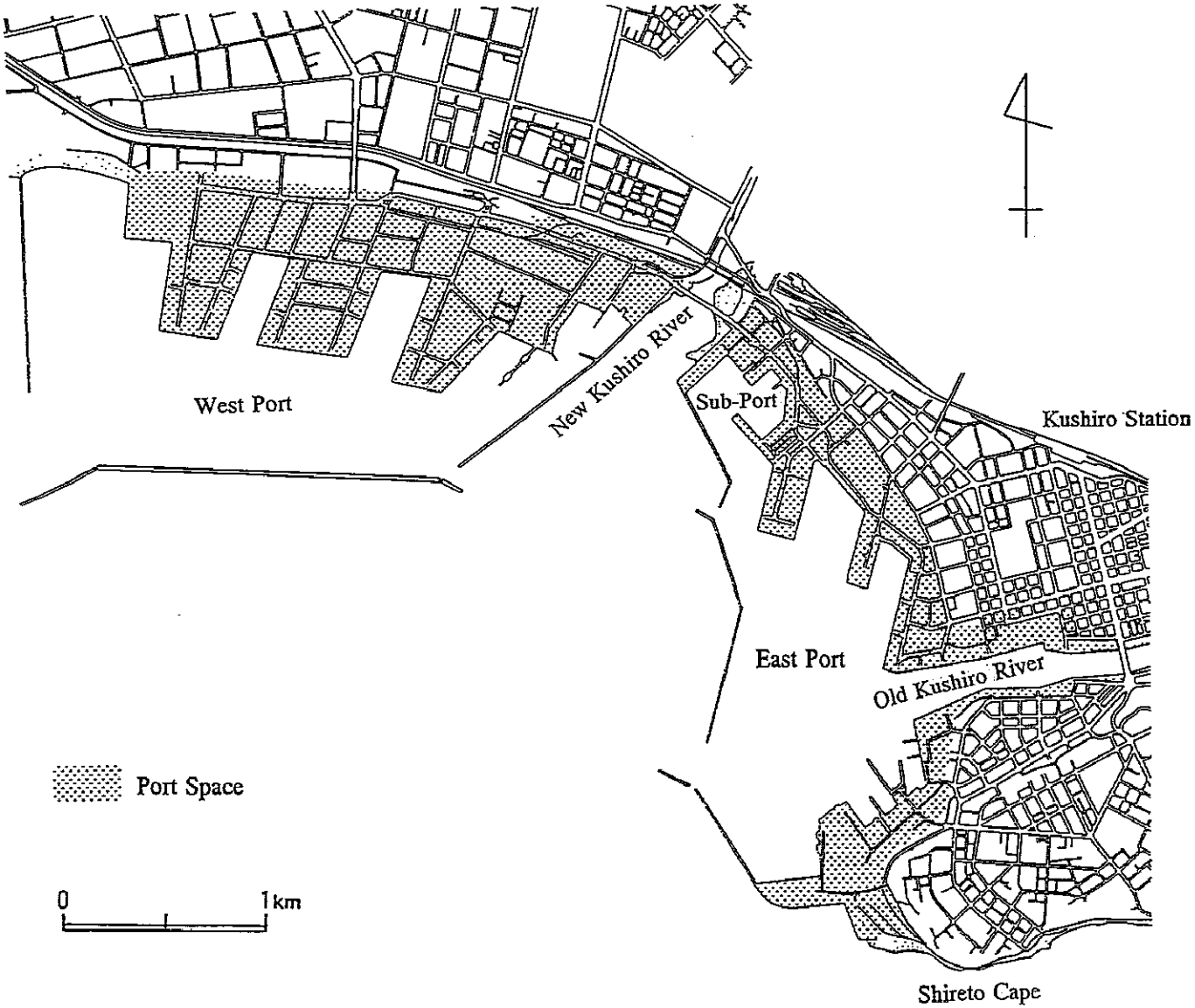

Figure 3 Map of the Kushiro Port in 1999

3). The port area of the East Port is from the Shirito Cape to the New Kushiro River[3]. The port area of the Kushiro port had been limited to this East Port area before the construction of the West Port. East Port consists of five wharves, one quay, and one fishing port in 1993. The relative position of the East Port has lowered because of the construction of West Port. The amount of fish landing in the fishing port had been the top in Japan from 1979 to 1991. But it fell to sixth place in 1997 because of the decrease of landing fish such as sardine and mackerel pike. West Port, located in the western part of East Port, started its operation in the oil pier in 1974. West Port has three wharves and their extension becomes 3,960m. The construction of two wharves is scheduled in the western part of West Port in 1998.

Kushiro city, where the Kushiro port is located, had a population of about 199,000 in 1995 and is the economic, cultural, and political center for the eastern part of Hokkaido. Kushiro city has developed because of the coal industry, paper manufacturing industry, and fishery. But in recent years, Kushiro city has had various problems like the continuing problems of coal mining companies, the reorganization problems of paper manufacturing companies, and the decrease of the fishing quota of fish such as sardine, mackerel pike, and mackerel.