

Hydro-meteorological fisheries protection in the Polish coastal zone

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Abstract

The paper presents the situation of hydro-meteorological fisheries protection in terms of institutional, formal and law regulations. It presents the most important types and sources of weather information for the needs of fisheries.

Introduction

Hydro-meteorological protection, often called as a weather protection, is an important element to ensure safety of navigation at sea, also in the coastal zone. This protection comes down at the essence of its activity to gather weather information, process it, prepare messages and warnings, and disseminate them to the end user, in this case fishermen [1, 2].

Legal situation of hydro-meteorological protection in the Polish coastal zone

Tasks and scope of hydro-meteorological protection result from the International Convention for the Safety of Life at Sea, SOLAS and, on the national ground, the Water Act (Ustawa Prawo Wodne) [3, 4].

Chapter V (Safety of Navigation), Regulation 5 of the Convention is – Meteorological services and warnings. The most important points of this regulation are that (selected parts):

2. In particular, Contracting Governments undertake to carry out, in cooperation, the following meteorological arrangements:

.1 to warn ships of gales, storms and tropical cyclones by the issue of information in text and, as far as practicable graphic form, using the appropriate shore-based facilities for terrestrial and space radiocommunications services.

.2 to issue, at least twice daily, by terrestrial and space radiocommunication services, as appropriate, weather information suitable for shipping containing data, analyses, warnings and forecasts of weather, waves and ice. Such information shall be transmitted in text and, as far as practicable, graphic form including meteorological analysis and prognosis charts transmitted by facsimile or in digital form for reconstitution on board the ship's data processing system.

.8 to arrange for the reception and transmission of weather messages from and to ships, using the appropriate shore-based facilities for terrestrial and space radiocommunications services.

4. Forecasts, warnings, synoptic and other meteorological data intended for ships shall be issued and disseminated by the national meteorological service in the best position to serve various coastal and high seas areas, in accordance with mutual arrangements made by Contracting Governments, in particular as defined by the World Meteorological Organization's System for the Preparation and Dissemination of Meteorological Forecasts and Warnings for the High Seas under the Global Maritime Distress and Safety System (GMDSS).

The arrangements related to the weather cover in Water Act are contained in Chapter 2, entitled "The state hydrological-meteorological service, the state

hydro-geological service and the state service for the dams security” in the following articles (selected parts):

Art. 102.

1. The state hydrological and meteorological service shall perform the duties of the state in the field of the hydrological and meteorological cover of society, environment, cultural heritage, economy and of the identification of risks of dangerous phenomena occurring in the atmosphere and hydrosphere, and also for the identification and development and protection of water resources of the country.
3. State hydrological and meteorological service is on duty of Institute of Meteorology and Water Management.

Art. 103.

The tasks of state hydrological and meteorological service include:

- 1) hydrological and meteorological measurements and observations;
- 3) the performance of the current analysis and assessment of hydrological and meteorological situation;
- 4) development and transfer of meteorological and hydrological forecasts;
- 6) implementation of tasks resulting from membership in international organizations in relation to meteorology, hydrology and oceanology.

Art. 104.

1. The state hydrological and meteorological service owns and maintains:
 - 1) basic network and special networks of measurements and observations;
 - 2) The system of collection, processing and exchange of data;
 - 3) The meteorological forecasting offices, the hydrological forecasting offices and the centers of modeling flood and drought;
3. Special measurements and observations networks are:
 - 4) measuring points for the Baltic Sea and the coastal zone;
4. Offices of meteorological forecasts and offices of hydrological forecasts:
 - 1) develop and provide short-term and medium-term, general and specific hydrological and meteorological forecasts;
 - 2) provide information about the current hydrological and meteorological conditions;
 - 3) develop and provide a warning before the action of the forces of nature and drought;
 - 4) keep up to date hydrological and meteorological cover for the society and the economy.

SOLAS Convention divides the waters due to the range of means of communication. It introduces four marine areas by specifying minimum radio equipment for ships staying on them.

Area A1 is defined as the area within the radio-telephone coverage by at least one VHF coast station, wherein the continuous alarm communication is provided using the DSC. In practice, the area A1 due to the propagation characteristics of the VHF radio is a sea area with a width of 20–30 nautical miles. Area A1 is not identical to the coastal zone, as not on the all coasts there are coastal stations. Under the Convention this area may be determined by the administration of the given state. The division of the Baltic Sea included different areas shows figure 1. Basically areas relevant to the fishery in the Polish coastal zone are located in the area A1.



Fig. 1. Areas A1 and A2 on the waters of the Baltic Sea [5]

The scope of hydro-meteorological protection in the polish coastal zone

Fisheries weather protection in the Polish zone of the Baltic Sea is performed by the Office of Marine Meteorological Forecast (Biuro Meteorologicznych Prognoz Morskich). It consists of two branches, in Gdynia and Szczecin. They carry out meteorological protection for main areas of the Baltic Sea, i.e. West Baltic, South, South-Eastern, Central, North, and finally for the Polish coastal zone with the Pomeranian Bay, the Gulf of Gdańsk, Szczecin Lagoon and the Vistula Lagoon. Protection is conducted continuously, 24 hours a day.

As part of the hydrological protection corresponds Office of Hydrological Forecast (Biuro Prognoz Hydrologicznych) Marine Department IMGW-PIB in Gdynia. It concerns the coastal areas of the Szczecin Lagoon, the Vistula Lagoon, and the final sections of the rivers flowing into the sea. Office products go to the provincial organs of state administration and maritime administration, maritime offices and ports subjecting to them [1, 6].

The products of meteorological protection available for fishery

Four times a day are prepared short-term marine weather forecasts that cover the period of 24 hours. They contain the following information:

- The strength and direction of the wind;
- The state of the sea;
- Description of the pressure situation;
- Information about the current warning;
- Visibility;
- Air temperature;
- The risk of icing ships;
- The possibility of storms;
- Measurement data from selected coastal stations.

Once daily before midday an approximate 3-day forecast for the South and South-East Baltic wind forecast is developed.

In accordance with the requirements of international cooperation in the field of marine forecasts and warnings twice daily forecast is prepared for the Southern Baltic and South-East Baltic in order to transfer it to the NAVTEX system.

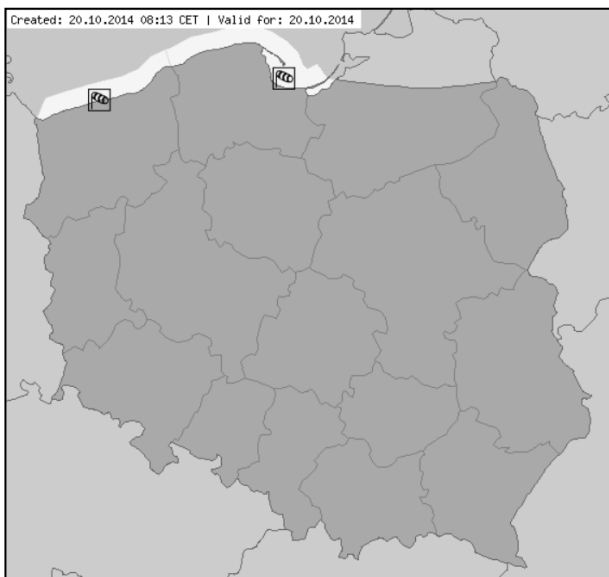


Fig. 2. Warning of dangerous phenomena in the Polish coastal zone on 20.X.2014 [7]

In the case of forecasting dangerous phenomena in the Polish coastal zone, they are, like the warnings of this type for the remaining Polish territory, placed on METEOALARM website (<http://www.meteoalarm.eu/>) [7]. Graphic form of warning is shown in figure 2.

Graphic information is accompanied by a warning text that for the above situation looks as follows:

Weather Warning: Western Pomerania;

Phenomenon: Strong wind;

Course of phenomenon: (coastal zone – west part)
Wind south-west to west 5 to 6 periods gusting 7 on Beaufort scale (8–12 m/s with gusts to 17 m/s);

Weather Warning: Eastern Pomerania;

Phenomenon: Strong wind;

Course of phenomenon: (coastal waters – east part)
Wind south-west to west 5 to 6, gusting to 7 on Beaufort scale (10 to 12 m/s, gusting to 16 m/s)
Possibility of local thunderstorms.

Weather forecasts go to the maritime administrations such as maritime offices, ports administration and maritime department of boundary guard, maritime search and rescue SAR, as well as to the Navigation Security Information Exchange System. They are disseminated by radio of marine offices in Gdynia, Slupsk and Szczecin, maritime radio Witowo Radio Station, Polish Radio and selected commercial radio stations. In addition, they are available on the website www.baltyk.pogodynka.pl. Fishing forecasts can be found under Activities/Meteorology/Prognoza_rybacka and are published only in Polish. These forecasts are available for Southern Baltic and South-Eastern Baltic, area 10 and area 9 of Baltic forecast areas (Fig. 6). Regardless of whether you choose Polish, English or Russian version of the service, forecast text will be displayed in the Polish language. An example of this type of forecast is as follows (Fig. 3).

Products of hydrological protection available for fishery

From the point of view of fishery activities the most important aspects of maritime services are: the matter of hydrological forecasting of storm surges and negative surges that could upset the work of ports and adversely affect navigation in the coastal zone, and also the ice protection in winter. The product of hydrological services describing state of ice situation is Ice Bulletin containing information on navigational restrictions associated with the occurrence of ice, detailed information about the ice conditions in the various areas of the coast and, as supplementary information, the Baltic ice map.

<p>PROGNOZA NA OBSZAR BAŁTYKU POŁUDNIOWEGO I POŁUDNIOWO-WSCHODNIEGO Ważna od godz. 07:00 dnia 20.10.2014 do godz. 19:00 dnia 20.10.2014</p>	<p>FORECAST FOR SOUTHERN AND SOUTH-EASTERN BALTIC Valid from 0700 10/20/2014 to 1900 10/20/2014</p>
<p>SYTUACJA BARYCZNA Z GODZINY 03.00 UTC Rozległa zatoka niżowa znad Wysp Brytyjskich, Morza Północnego oraz Skandynawii pogłębia się i przemieszcza na wschód.</p>	<p>GENERAL SYNOPSIS FOR 0300 UTC Extensive trough from British Isles, North Sea and Scandinavia gets deeper and moves for east.</p>
<p>OSTRZEŻENIE PRZED SZTORMEM NA BAŁTYK POŁUDNIOWY I POŁUDNIOWO-WSCHODNI</p>	<p>STORM WARNING FOR SOUTHERN AND SOUTH-EASTERN BALTIC</p>
<p>Bałtyk Południowy i Południowo-Wschodni: Wiatr południowo-zachodni do zachodniego 7 do 8 w skali B. Stan morza 4 do 5, Zatoki Pomorskiej i Gdańskiej 3 do 4. Temperatura około 14°C. Widzialność dobra, miejscami w przelotnym deszczu umiarkowana. Lokalnie możliwe burze.</p>	<p>Southern and South-Eastern Baltic: Wind south-west to west 7 to 8 on a B scale. Sea state 4 to 5, the Pomeranian Bay and Gdansk Bay 3 to 4. Temperature about 14°C. Visibility good to moderate in showers. Locally thunderstorms.</p>
<p>PROGNOZA ORIENTACYJNA NA NASTĘPNE 12 GODZIN:</p>	<p>OUTLOOK FOR NEXT 12 HOURS:</p>
<p>Bałtyk Południowy: Wiatr zachodni do północno-zachodniego 7 do 8 stopniowo słabnący na 4 do 5 w skali B.</p>	<p>Southern Baltic: Wind west to north-west 7 to 8 gradually declining for 4 to 5 on a B scale.</p>
<p>Bałtyk Południowo-Wschodni: Wiatr zachodni do północno-zachodniego 7 do 8 stopniowo słabnący na 5 do 6 w skali B.</p>	<p>South-Eastern Baltic: Wind west to the north-west 7 to 8 gradually declining for 5 to 6 on a B scale.</p>
<p>PROGNOZA DLA POLSKIEJ STREFY BRZEGOWEJ: OSTRZEŻENIE PRZED SILNYM WIATREM</p>	<p>FORECAST FOR POLISH COASTLINE AREA: STRONG WIND WARNING</p>
<p>Wiatr południowo-zachodni do zachodniego 5 do 6, w porywach 7 w skali B. Stan morza 3 do 4, Zalewu Wiślanego 2 do 3. Widzialność dobra, miejscami w przelotnych opadach deszczu umiarkowana. Lokalnie możliwe burze. Opracował dyżurny synoptyk: Tomasz Krywoszejew Biuro Meteorologicznych Prognoz Morskich IMGW Gdynia, dnia 20.10.2014</p>	<p>Wind south-west to west 5 to 6, with gusts to 7 on a B scale. Sea State 3 to 4, the Vistula Lagoon 2 to 3. Visibility good to moderate in showers. Locally thunderstorms. Forecaster: Tomasz Krywoszejew Marine Meteorological Forecasts Office IMGW Gdynia, on 10/20/2014</p>
<p>PROGNOZA DLA ZALEWU SZCZECIŃSKIEGO I ZESPOŁU PORTÓW</p>	<p>FORECAST FOR SZCZECIN LAGOON AND THE PORTS</p>
<p>Ważna od godz. 07:00 dnia 20.10.2014 do godz. 19:00 dnia 20.10.2014 OSTRZEŻENIE PRZED SILNYM WIATREM! Wiatr południowo-zachodni do zachodniego 4 do 6, początkowo okresami 7 w skali B. Stan Zalewu 2 do 3. Temperatura powietrza około 14°C. Widzialność dobra, w opadach umiarkowana. Przelotne opady deszczu.</p>	<p>Valid from 0700 10/20/2014 to 1900 10/20/2014 STRONG WIND WARNING! Wind south-west to west 4 to 6, initially to 7 on a B scale. State of Lagoon 2 to 3. The air temperature about 14° C. Visibility good, moderate in rains. Showers.</p>
<p>PROGNOZA ORIENTACYJNA NA NASTĘPNE 12 GODZIN:</p>	<p>OUTLOOK FOR NEXT 12 HOURS:</p>
<p>Wiatr południowo-zachodni 4 do 5, początkowo okresami 6 w skali B. Opracował dyżurny synoptyk: Renata Kurowska-Lazarz IMGW-PIB Biuro Meteorologicznych Prognoz Morskich Wydział w Szczecinie, dnia 20.10.2014</p>	<p>Wind south-west 4 to 5, initially to 6 on a B scale. Forecaster: Renata Kurowska-Lazarz IMGW-PIB Marine Meteorological Forecasts Office in Szczecin, on 10/20/2014</p>

Fig. 3. Fishing forecast valid from 0700LT 20.10.2014 to 1900 LT 20.10.2014. These forecast are available only in Polish [8]

The areas covered by observation and reporting on the Polish coast shows figure 4.

According to the accepted principles the areas and fairway sections in the Polish coastal zone are presented in table 1.

An exemplary ice map for the Polish coast is shown in figure 5.

If the ice situation is considerably more difficult for navigation, then the anti-ice action is an-

nounced, which may include coverage of a fragment or a whole Polish coast. The action is coordinated by port authorities in Gdynia and Szczecin.

Radio and phone weather information availability for the purpose of fishery at the Polish Baltic coastline area.

Availability of radio weather reports received in the area of the Polish coast shows table 2. Meteorological areas of the Baltic Sea presents figure 6.

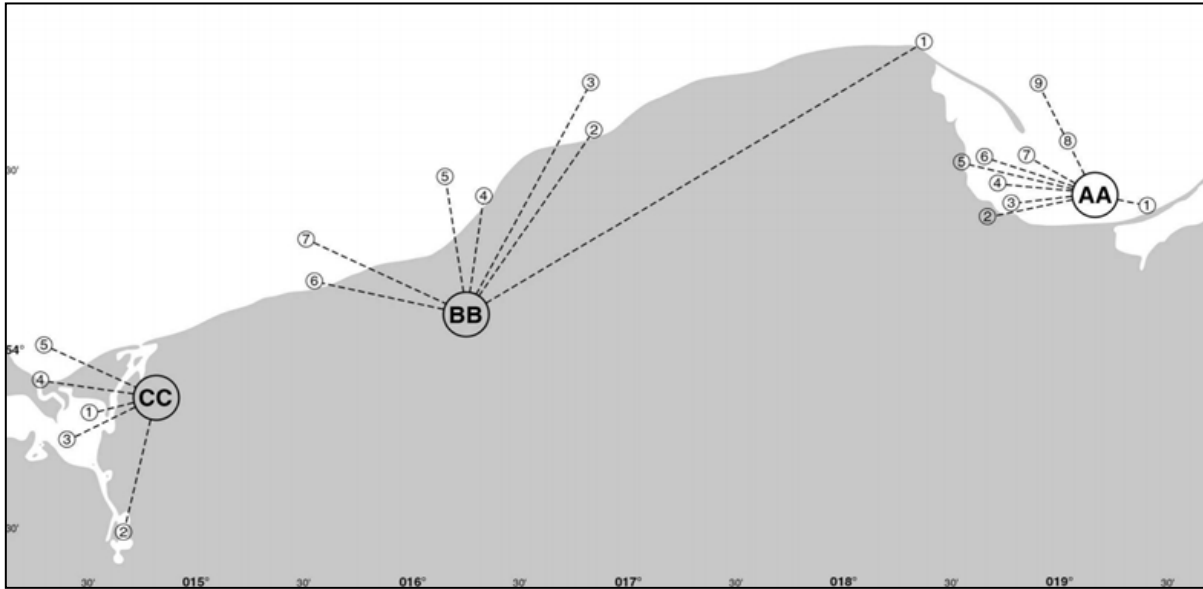
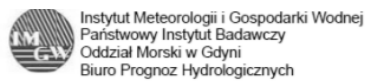


Fig. 4. Areas for ice report and codes on the Polish Baltic coastal zone [9]

Table 1. Fairway sections and areas for ice report on the Polish Baltic coastal zone

Area		Area		Area	
AA	1	Krynica Morska, sea	BB	1	Rozewie lighthouse, sea
	2	Gdańsk, maritime harbour		2	Ustka, harbour
	3	Gdańsk Port Północny		3	Ustka, sea
	4	Gdańsk, sea		4	Darłowo, harbour
	5	Gdynia, harbour		5	Darłowo, sea
	6	Gdynia, sea		6	Kołobrzeg, harbour
	7	Hel lighthouse, sea to south		7	Kołobrzeg, sea
	8	Hel lighthouse, sea to east	CC	1	Zalew Szczeciński
	9	Hel lighthouse, sea to north		2	Szczecin, harbour
		3		Passage Świnoujście – Szczecin	
		4		Świnoujście, harbour	
		5		Świnoujście, sea	



Mapa Zlodzenia Bałtyku
Wybrzeże Rzeczypospolitej Polskiej

Nr 7
Gdynia, 21.02.2014

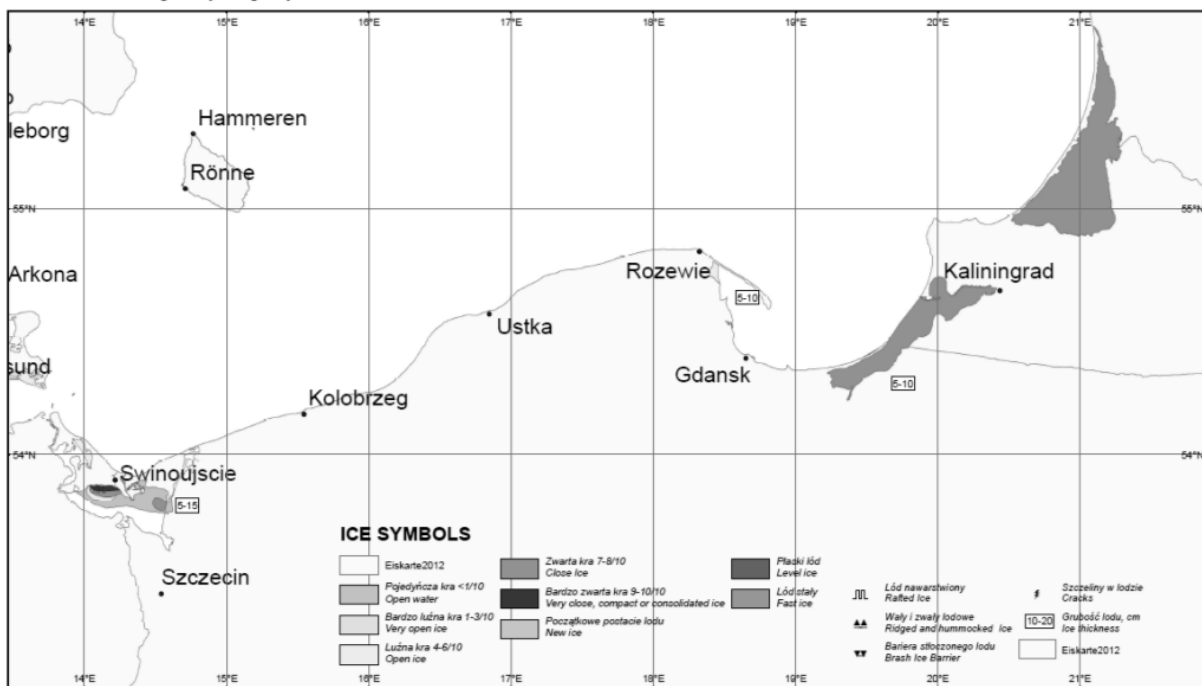


Fig. 5. Map of the South Baltic ice cover on February 21, 2014 [8]

Table 2. Weather forecasts available by radio

Broadcaster	Channel or Frequency	Air time	Comments
Polskie Radio	225 kHz	Mon-Sat.: 00.58, 20.05 Sunday: 00.58LT, after the news	Polish only
Radio Słupsk	Ch 12	0705, 1235, 1835, 2305LT	Fisheries Forecast for areas 9 and 10, Polish only
Witowo Radio	2720 kHz Barzowice Ch 16, 25; Kołobrzeg Ch 16, 24; Krynica Morska Ch 16, 25; Rowokół Ch 16, 26; Świnoujście Ch 16, 25 Grzywacz Ch 16, 26 Kołowo Ch 16, 24 Oksywie Ch 16, 26 Rozewie Ch 16, 24	0135 UTC 0735 UTC 1035 UTC 1335 UTC 1935 UTC	for areas from 7 to 11, the Polish and English



Fig. 6. Baltic Sea forecast areas [10]

Port authorities phone numbers are listed in table 3. Harbour Master Office and Dock Master Office are the administrators of the current weather information and, if needs can provide information on it.

Conclusions

In the Polish zone of Baltic fisheries weather protection is carried out in a satisfactory manner. Scope and sources of weather information allow to

provide basic security in terms of the impact of hydro-meteorological conditions. It should, however, be borne in mind that weather conditions may have a dynamic variability and it is important to make full and regular use of current hydro-meteorological information. It should be pointed out that despite the multilingual weather website of Polish meteorological service, some available information are solely published in Polish.

In general, this paper presents the situation of the availability of weather information from the

Table 3. Port authorities phone numbers [11, 12, 13]

Port authorities	Address	Phone
Bosmanat Portu Darłowo	ul. Zachodnia 2, 76-150 Darłowo	94 3406840
Kapitanat Portu Darłowo	ul. Zachodnia 2, 76-150 Darłowo	94 3406831
Kapitanat Portu Dziwnów	ul. Przymorze 4, 72-420 Dziwnów	91 3813754
Bosmanat Portu Dźwirzyno	ul. Wyzwolenia 1, 78-131 Dźwirzyno	94 3585423
Kapitanat Portu Elbląg	ul. Radomska 23, 82-300 Elbląg	55 2347711
Bosmanat Portu Frombork	ul. Portowa 2, 14-530 Frombork	55 2437219
Kapitanat Portu Gdańsk Nowy Port	ul. Przemysłowa 4, 80-542 Gdańsk	58 3430610
Kapitanat Portu Gdańsk Port Północny	ul. Witolda Poinca 1, 80-561 Gdańsk	58 3431960
Kapitanat Portu Gdynia	ul. Polska 2, 81-339 Gdynia	58 6202853
Bosmanat Portu Górki Zachodnie	ul. Stogi 23, 80-642 Gdańsk	58 3073901
Bosmanat Portu Hel	ul. Kuracyjna 1, 84-150 Hel	58 6750624
Kapitanat Portu Hel	ul. Wiejska 24, 84-150 Hel	58 6750618
Bosmanat Portu Jastarnia	ul. Portowa 26, 84-140 Jastarnia	58 6752013
Bosmanat Portu Kamień Pomorski	ul. Wilków Morskich 2, 72-400 Kamień Pomorski	91 3820110
Bosmanat Portu Kąty Rybackie	ul. Rybacka 66, 82-110 Kąty Rybackie	55 2478719
Bosmanat Portu Kołobrzeg	ul. Morska 8, 78-100 Kołobrzeg	94 3522799
Kapitanat Portu Kołobrzeg	ul. Morska 8, 78-100 Kołobrzeg	94 3522703
Bosmanat Portu Krynica Morska	ul. Górników 2, 82-120 Krynica Morska	55 2476076

Port authorities	Address	Phone
Bosmanat Portu Łeba	ul. Kościuszki 1, 84-360 Łeba	59 8661530
Kapitanat Portu Łeba	ul. Kościuszki 1, 84-360 Łeba	59 8661460
Bosmanat Portu Międzyzdroje	ul. Marii Curie-Skłodowskiej 18, 72-500 Międzyzdroje	91 3282565
Bosmanat Portu Mrzeżyno	ul. Marynarska 1, 72-330 Mrzeżyno	91 3866119
Bosmanat Portu Nowe Warpno	ul. Kilińskiego 5, 72-022 Nowe Warpno	91 3129505
Bosmanat Portu Puck	ul. Żeglarzy 1, 84-100 Puck	58 6732782
Bosmanat Portu Rowy	ul. Portowa 4, 76-212 Rowy	59 8141828
Bosmanat Portu Stepnica	ul. Portowa 6, 72-112 Stepnica	91 4188427
Kapitanat Portu Szczecin	ul. Jana z Kolna 9, 71-603 Szczecin	91 4403596
Kapitanat Portu Świnoujście	ul. Wybrzeże Władysława IV 7, 72-600 Świnoujście	91 3213662
Bosmanat Portu Tolkmicko	ul. Parkowa 1, 82-340 Tolkmicko	55 2316614
Kapitanat Portu Trzebież	ul. Portowa 23, 72-020 Trzebież	91 4241654
Bosmanat Portu Ustka	ul. Marynarki Polskiej 3, 76-270 Ustka	59 8144533
Kapitanat Portu Ustka	ul. Marynarki Polskiej 3, 76-270 Ustka	59 8144430
Kapitanat Portu Władysławowo	ul. Hryniewickiego 2, 84-120 Władysławowo	58 6740486
Bosmanat Portu Władysławowo	ul. Portowa, 84-120 Władysławowo	58 6740264
Bosmanat Portu Wolin	ul. Niedamira 22, 72-510 Wolin	91 3261114

point of view of the fisherman on a fishing boat. In the case of developing forecasts and information by special center dedicated in particular to the goals of fisheries, the scope of used information could be even wider, for example, the forecasts from different hydrodynamic models of the Baltic Sea. However, it goes beyond the range of this study.

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