

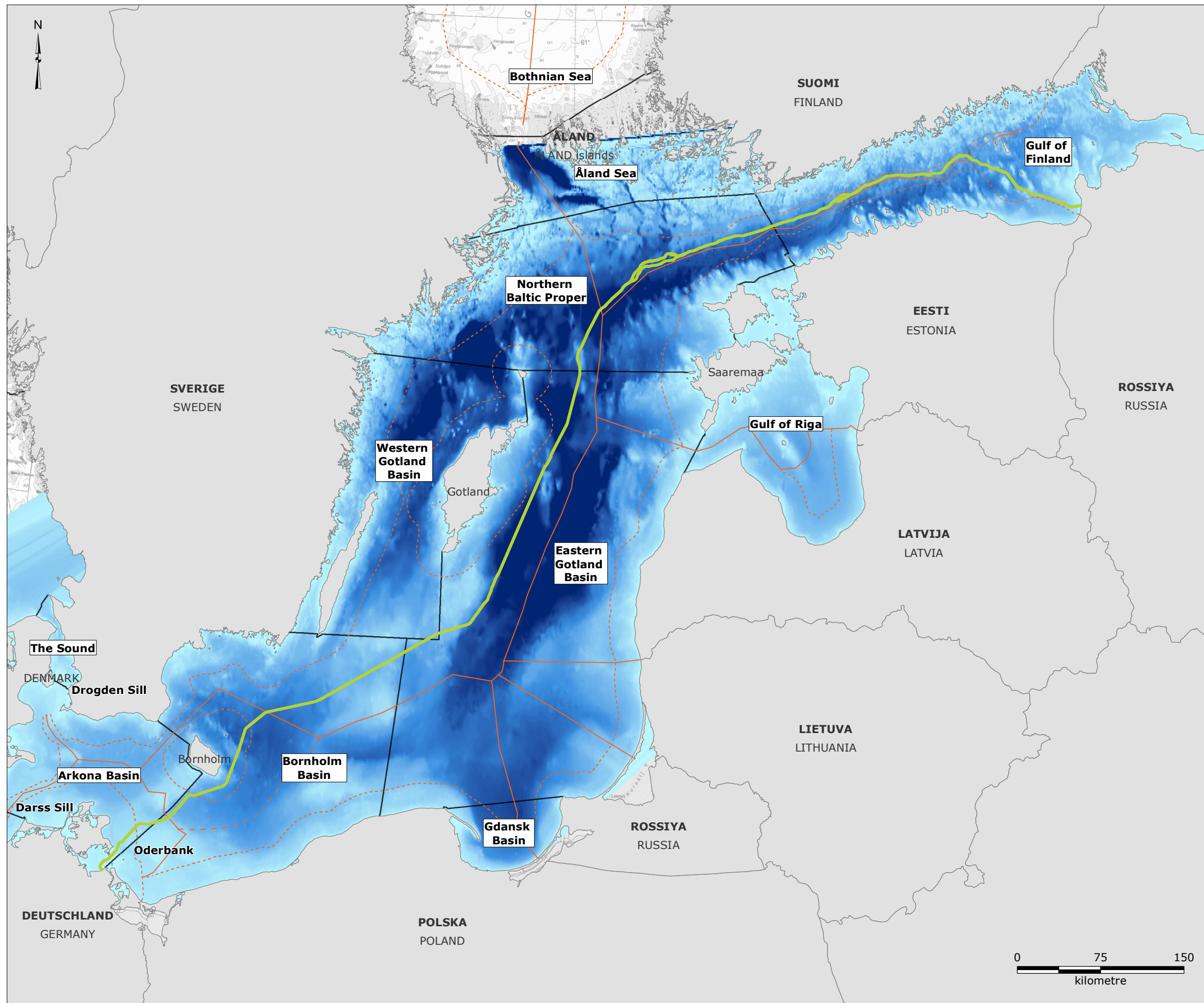
PHYSICAL-CHEMICAL ENVIRONMENT

BATHYMETRY AND HYDROGRAPHY

GEOLOGY AND SEABED

WATER QUALITY

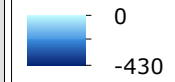
CLIMATE



Legend:

- NSP2 Route
- Territorial water border
- EEZ border
- Midline between Denmark and Poland
- Sub-basins

Bathymetry (depth (m)):



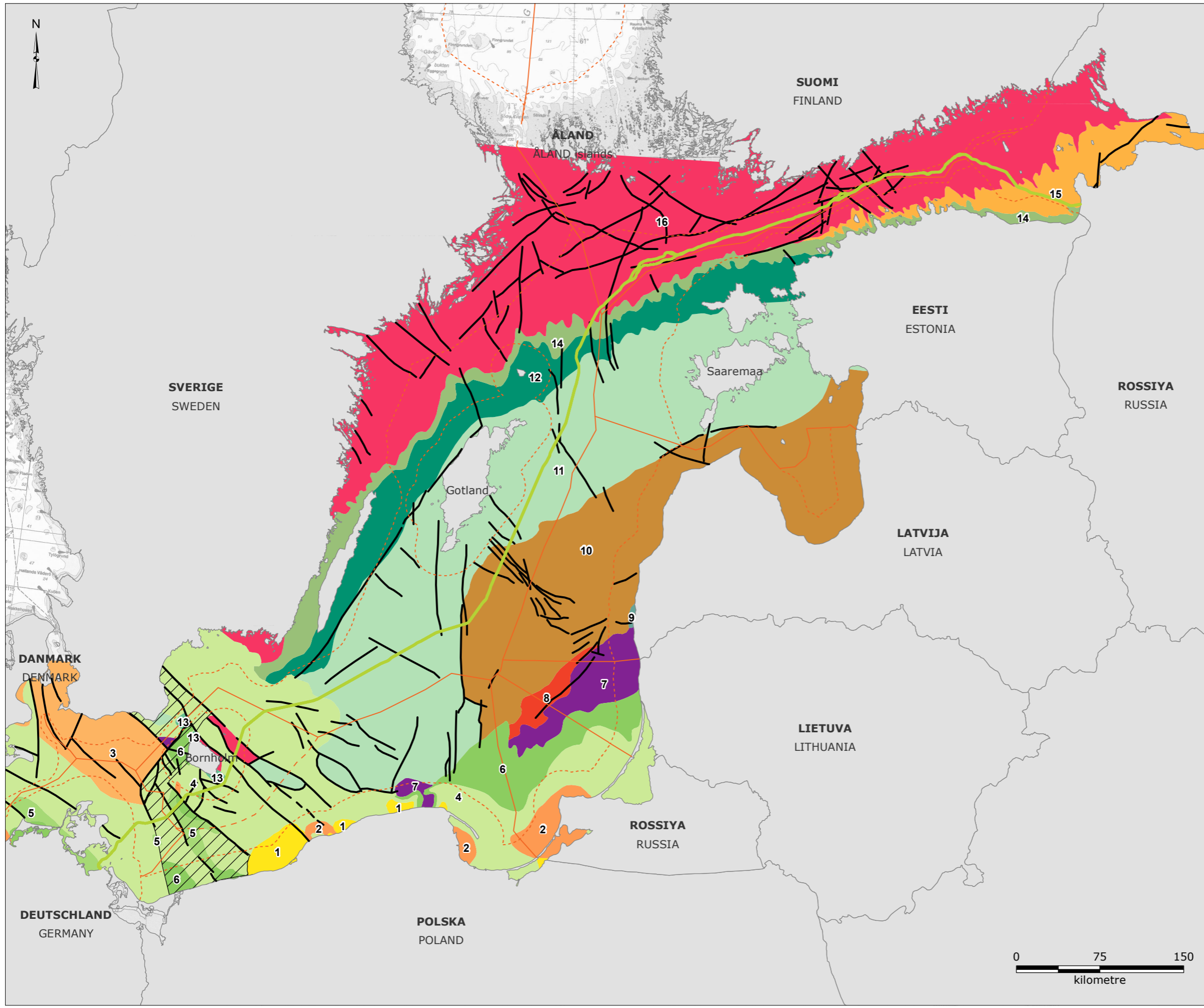
References:
 - HELCOM, 2013, "HELCOM subbasins",
<http://maps.helcom.fi/website/mapservice/index.html>,
 Data accessed: 2016-3-30
 - MIKE C-map database, February 2012

Version: 07
 Date: 2017-01-24
 Prepared: MSTB
 Controlled: JRV

BA-01-Espoo

**Bathymetry and sub-basins
 in the Baltic Sea**





- Legend:**
- NSP2 Route
 - Territorial water border
 - EEZ border
 - Midline between Denmark and Poland
 - Faults
 - Tornquist zone
- Geology:**
- (1) Neogene
 - (2) Paleogene
 - (3) Danian limestones
 - (4) Cretaceous chalk and limestones
 - (5) Cretaceous mudstones and sandstones
 - (6) Cretaceous; mainly sandstones and mudstones
 - (7) Triassic; mainly mudstones and sandstones
 - (8) Permian
 - (9) Carboniferous
 - (10) Devonian; sandstones, mudstones and limestones
 - (11) Silurian; mainly limestones, marls, mudstones and shales
 - (12) Ordovician limestones and shales
 - (13) Cambrian-Ordovician
 - (14) Cambrian sandstones, shales and conglomerates
 - (15) Vendian (Neoproterozoic) sedimentary rocks
 - (16) Precambrian crystalline basement

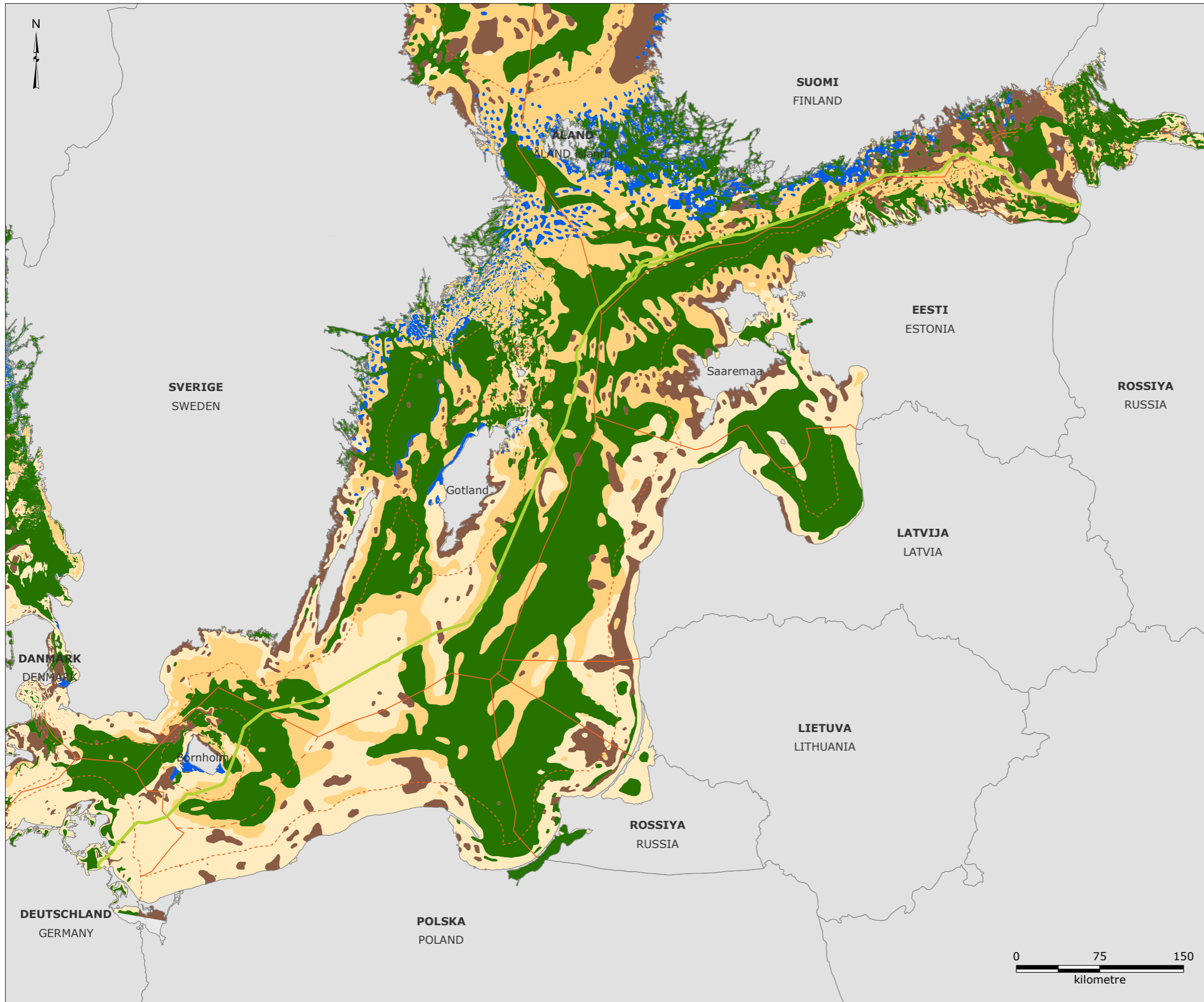
References:
 Digitized from the following references:
 - Per Ahlberg, 1986: "Den svenske kontinentalsockelns berggrund". Geological Survey of Sweden, Rapport och meddelanden nr. 47.
 - Curt Fredén (editor), 1994. "Berg och jord". Sveriges Nationalatlas, SNA Förlag, Stockholm, 208 pp.
 - Tapio Koistinen (editor), 1994. "Precambrian basement of the Gulf of Finland and surrounding area". 1:1 mill. Geological Survey of Finland, Espoo

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GE-01-Espoo

Geology of the Baltic Sea





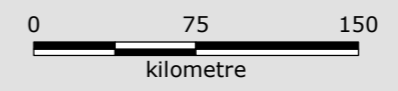
- Legend:**
- NSP2 Route
 - Territorial water border
 - EEZ border
 - Midline between Denmark and Poland
- Seabed sediment types:
- Bedrock
 - Hard bottom complex
 - Hard clay
 - Mud
 - Sand

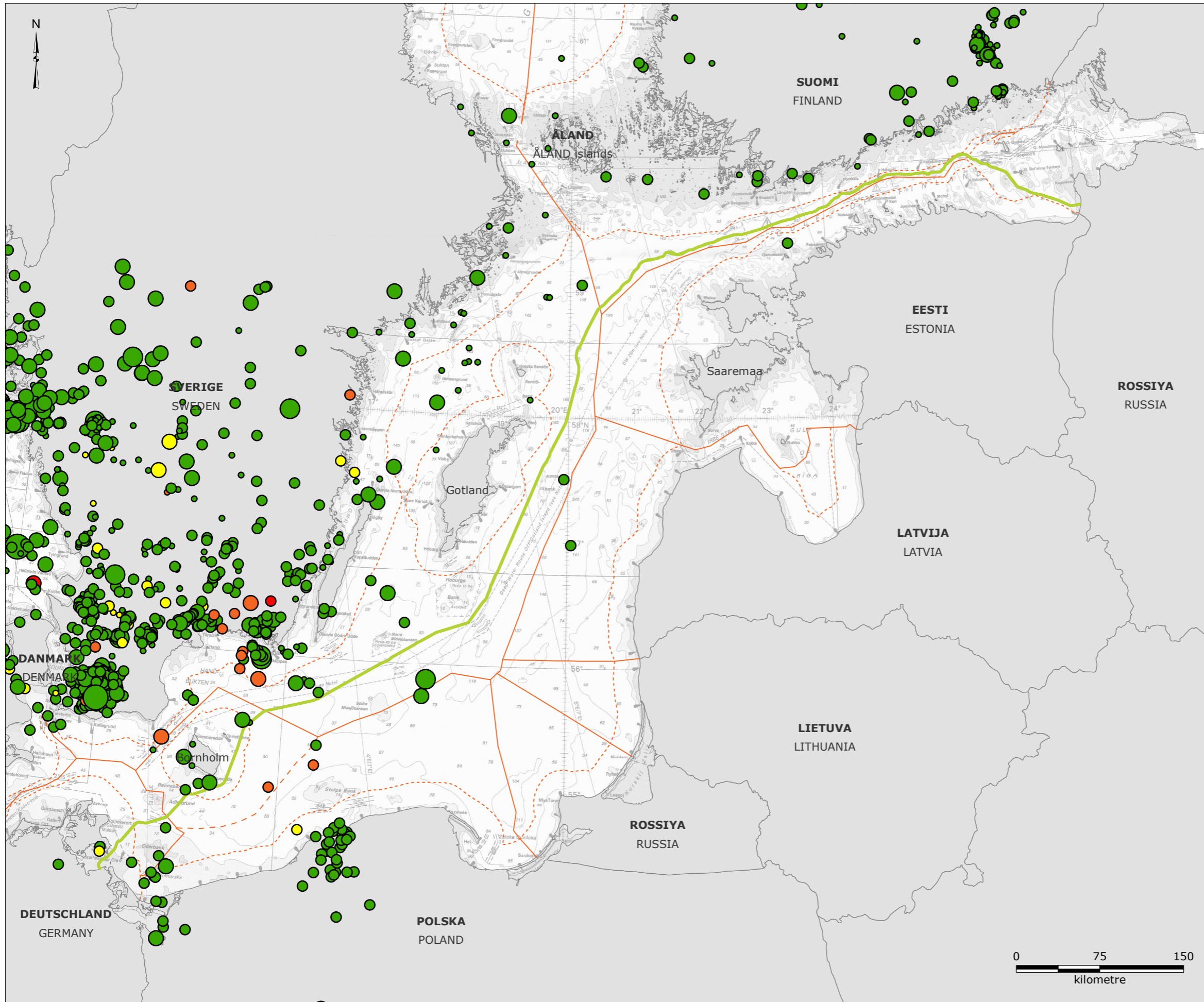
Reference:
 - "Balance" project within the Baltic Sea Region (BSR)
 INTERREG III B Neighbourhood Program.

Version: 05
 Date: 2017-01-24
 Prepared: MSTB
 Controlled: JRV

GE-02-Espoo

Seabed sediments of the Baltic Sea





- Legend:**
- NSP2 Route
 - - - Territorial water border
 - EEZ border
 - - - Midline between Denmark and Poland
- Magnitude of earthquakes (Richter scale):
- 0 - 1
 - > 1 - 2
 - > 2 - 3
 - > 3 - 4
 - > 4 - 5
- Depth of earthquakes (km):
- 0 - 35
 - > 35 - 70
 - > 70 - 150
 - > 150 - 300

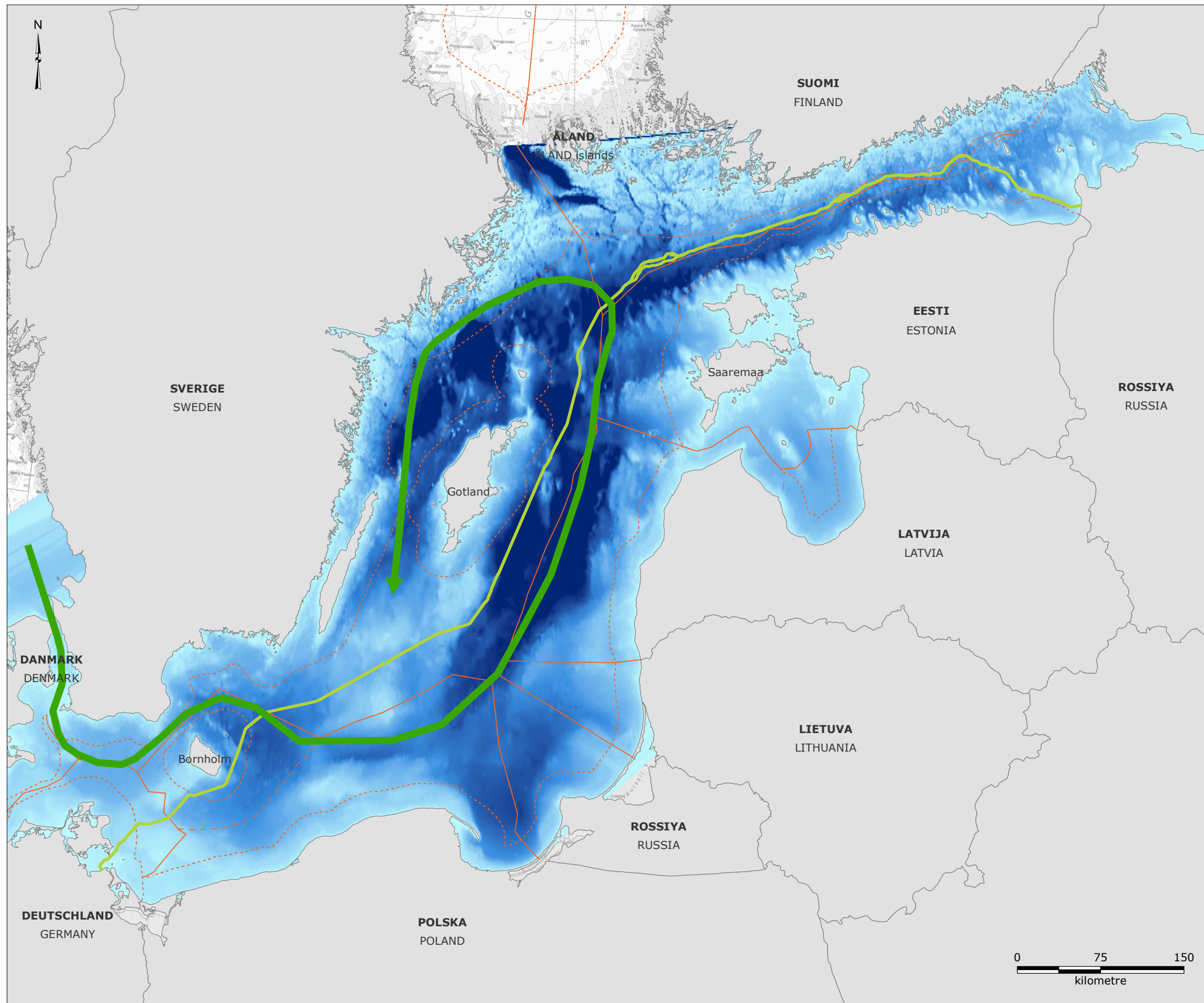
References:
 - GEUS, 2016, "Registrerede jordskælvs", Date accessed: 2016-03-21
 - Institute of Seismology, 2016, "Seismic bulletins", University of Helsinki, Data accessed: 2016-04-25
 - Ramboll, 2016, "Reynir Bóðvarsson, The Swedish National Seismic Network, Sweden", Received: 2016-05-19

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GE-03-Espoo

**Seismic activity measured
 2002-2015 by Finland,
 Sweden and Denmark**

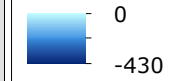




Legend:

- NSP2 Route
- Territorial water border
- EEZ border
- Midline between Denmark and Poland
- Inflow of oxygen-rich water

Bathymetry [depth (m)]:



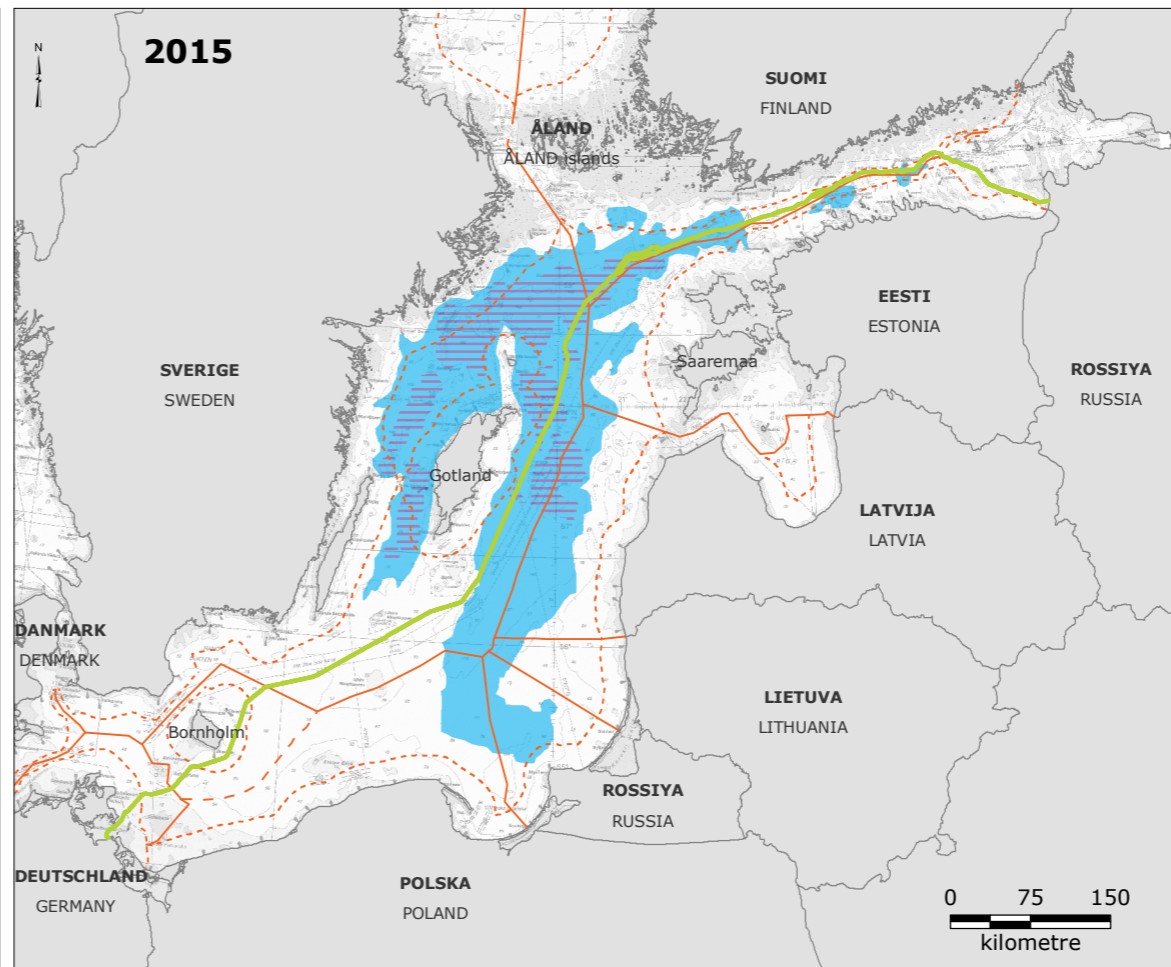
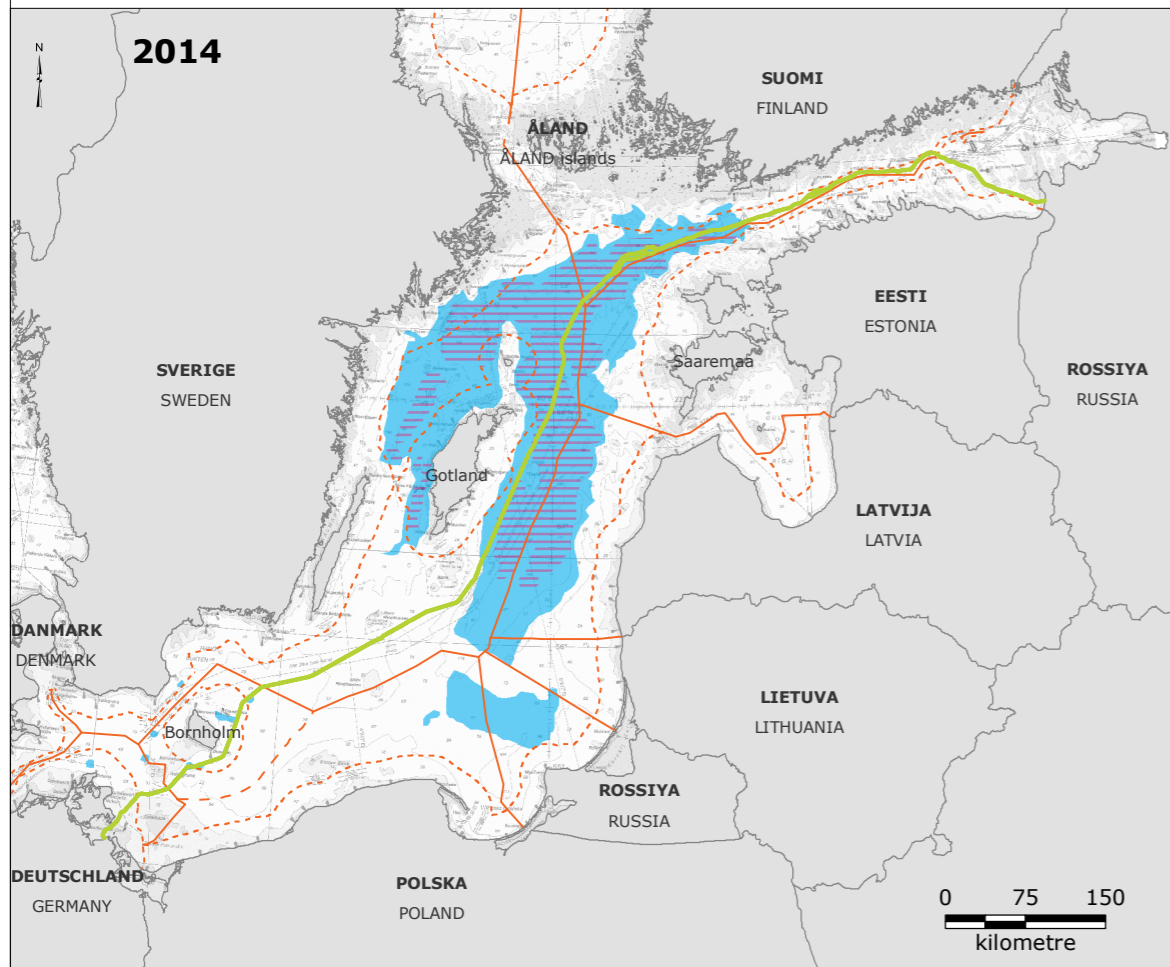
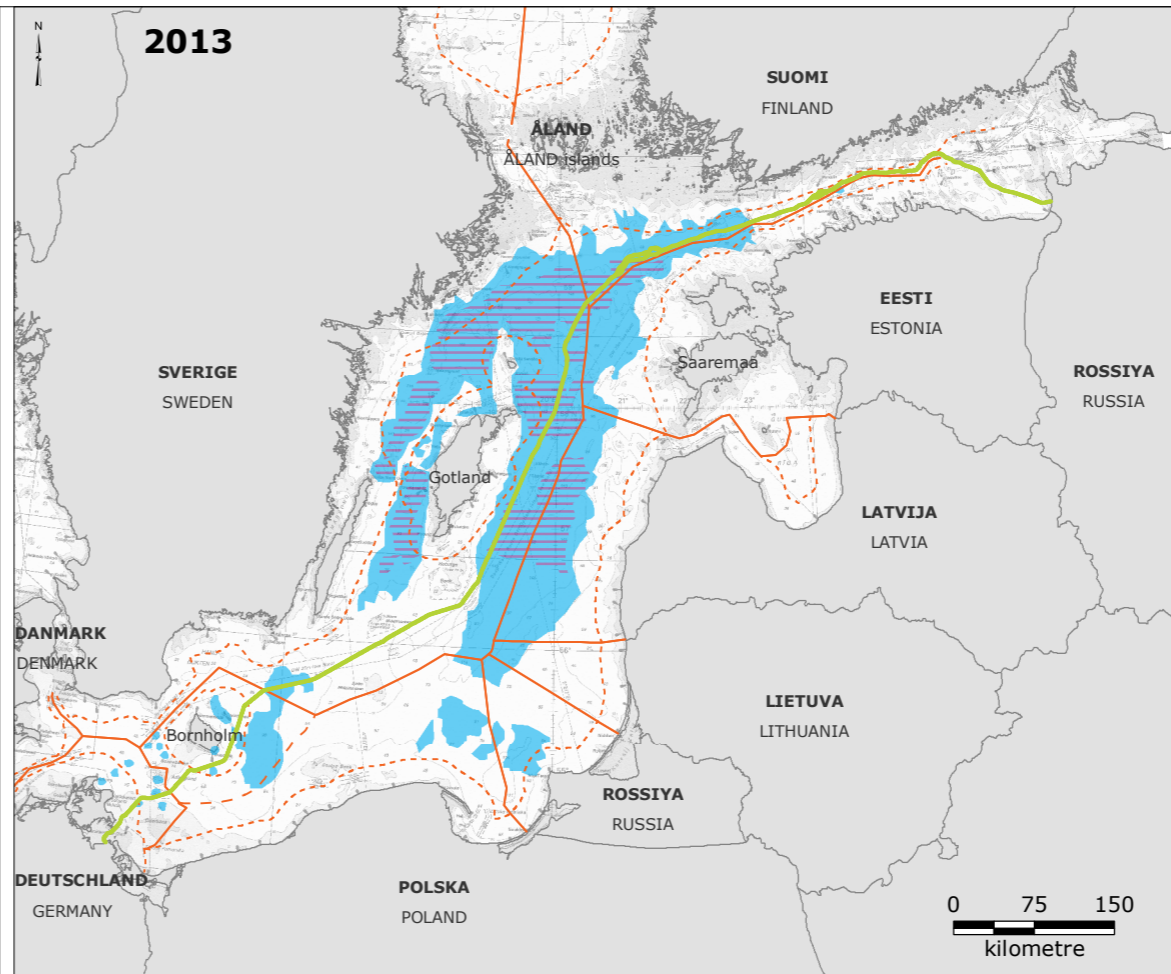
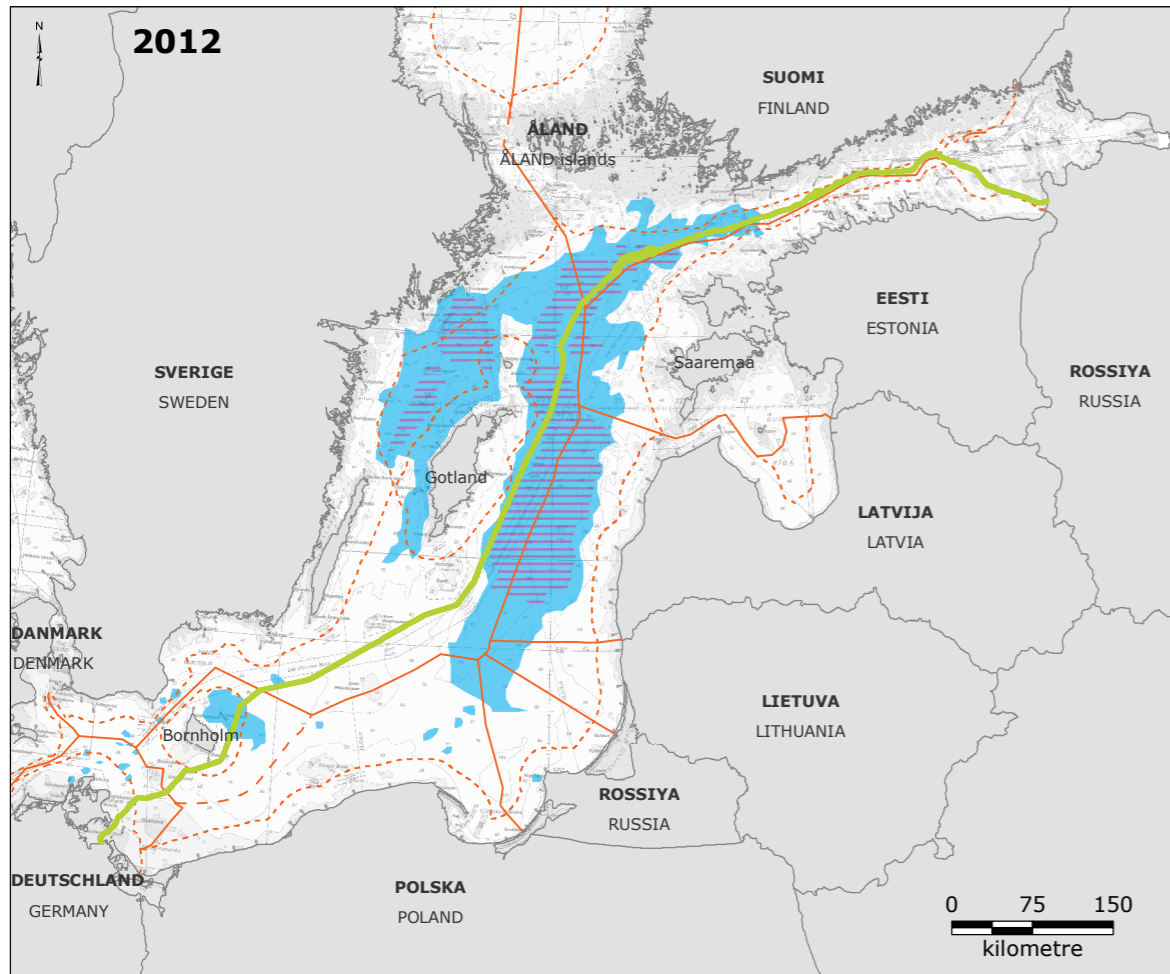
References:
 - Bernes, C., 2005, "Förändringar under ytan, Monitor 19, Sveriges havsmiljö granskad på djupet", Naturvårdsverket, pp. 192
 - MIKE C-map database, February 2012

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 Controlled: JRV

WA-01-Espoo

Inflow of oxygen-rich water to the Baltic Sea in 2003





- Legend:**
- NSP2 Route
 - - - Territorial water border
 - EEZ border
 - - - Midline between Denmark and Poland
 - Hypoxic (oxygen content ≤ 2 mg/l)
 - ▨ Anoxic (oxygen content = 0 mg/l)

Note:
 - Anoxic and hypoxic areas in the Baltic Sea, Autumn 2012, 2013, 2014 and 2015

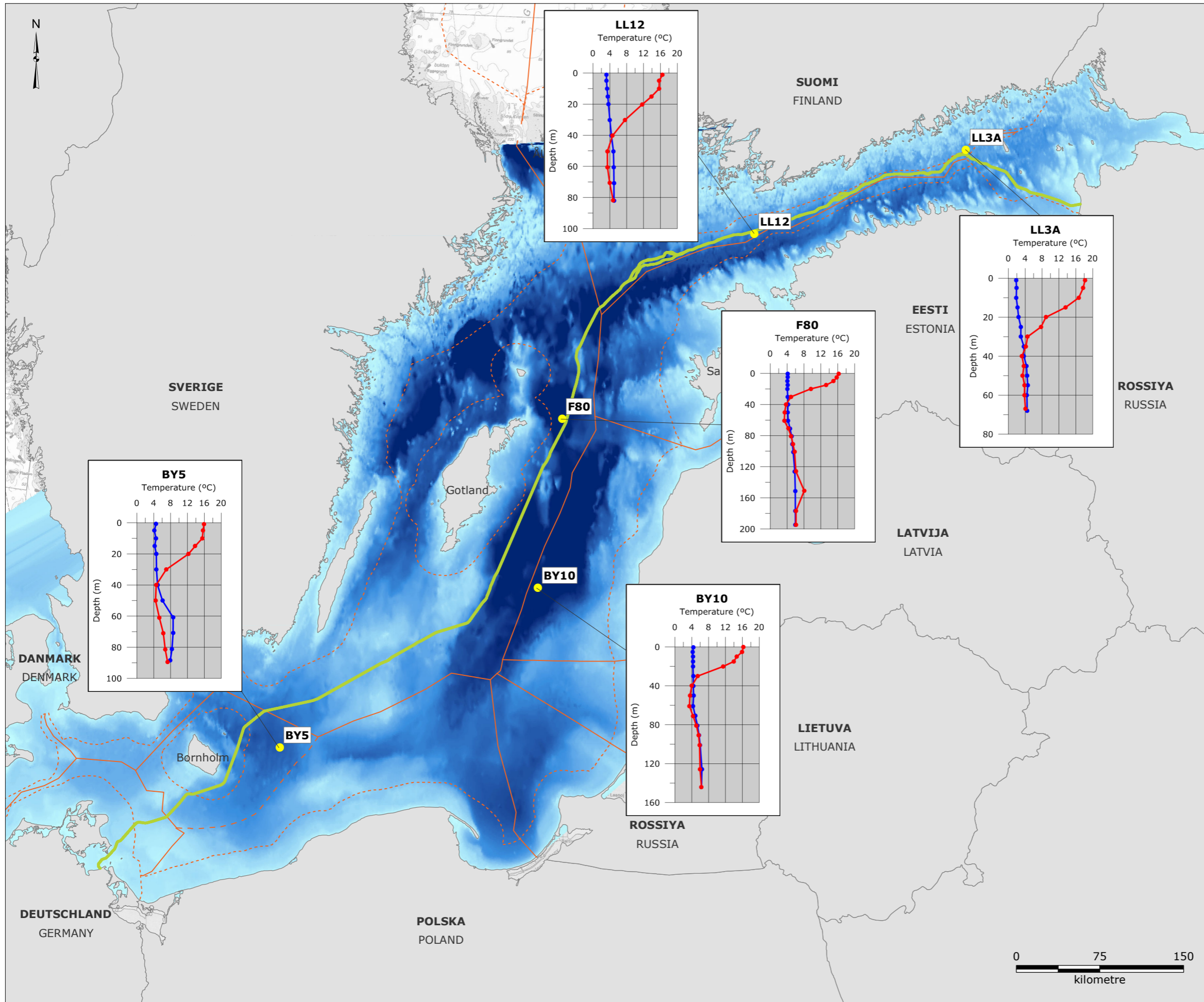
References:
 - SMHI, 2013, "Oxygen Survey in the Baltic Sea, 2013 - Extent of Anoxia and Hypoxia, 1960-2013". SMHI Report Oceanography No. 49
 - SMHI, 2015, "Oxygen Survey in the Baltic Sea, 2015 - Extent of Anoxia and Hypoxia, 1960-2015". SMHI Report Oceanography No. 53

Version: 07
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WA-02-Espoo

Anoxic and hypoxic areas





- Legend:**
- NSP2 Route
 - Territorial water border
 - EEZ border
 - Midline between Denmark and Poland
 - HELCOM monitoring station
- Bathymetry (depth (m)):**
- -0
 - -430
- Winter profile (December-February)
 - Summer profile (June-August)

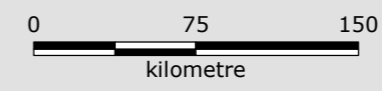
Note:
- Average measured values for the period 2000-2015

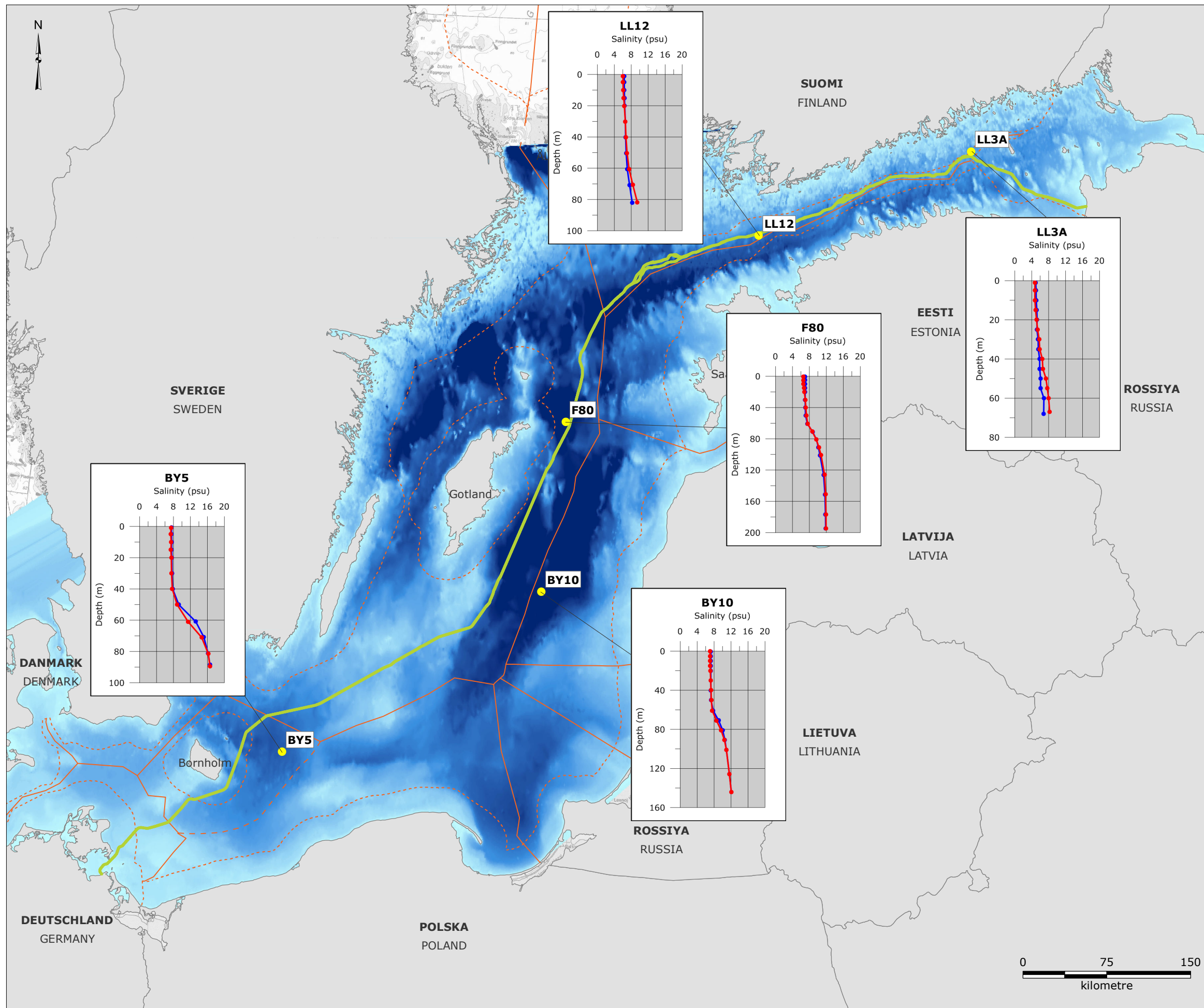
References:
- ICES, 2016, "Baltic Sea (HELCOM) monitoring data", <http://ocean.ices.dk/Helcom/Helcom.aspx?Mode=1>, Date accessed: LL3A: 2016-06-08, LL12: 2016-07-11, F80: 2016-09-04, BY5 and BY10: 2016-09-11
-MIKE C-map database, February 2012

Version: 02
Date: 2017-01-27
Prepared: MSTB
Controlled: JRV

WA-03-Espoo

Average water temperature summer/winter in the Baltic Sea





Legend:

- NSP2 Route
- Territorial water border
- EEZ border
- Midline between Denmark and Poland
- HELCOM monitoring station

Bathymetry (depth (m)):

0

-430

—●— Winter profile (December-February)

—●— Summer profile (June-August)

Note:
 - Average measured values for the period 2000-2015

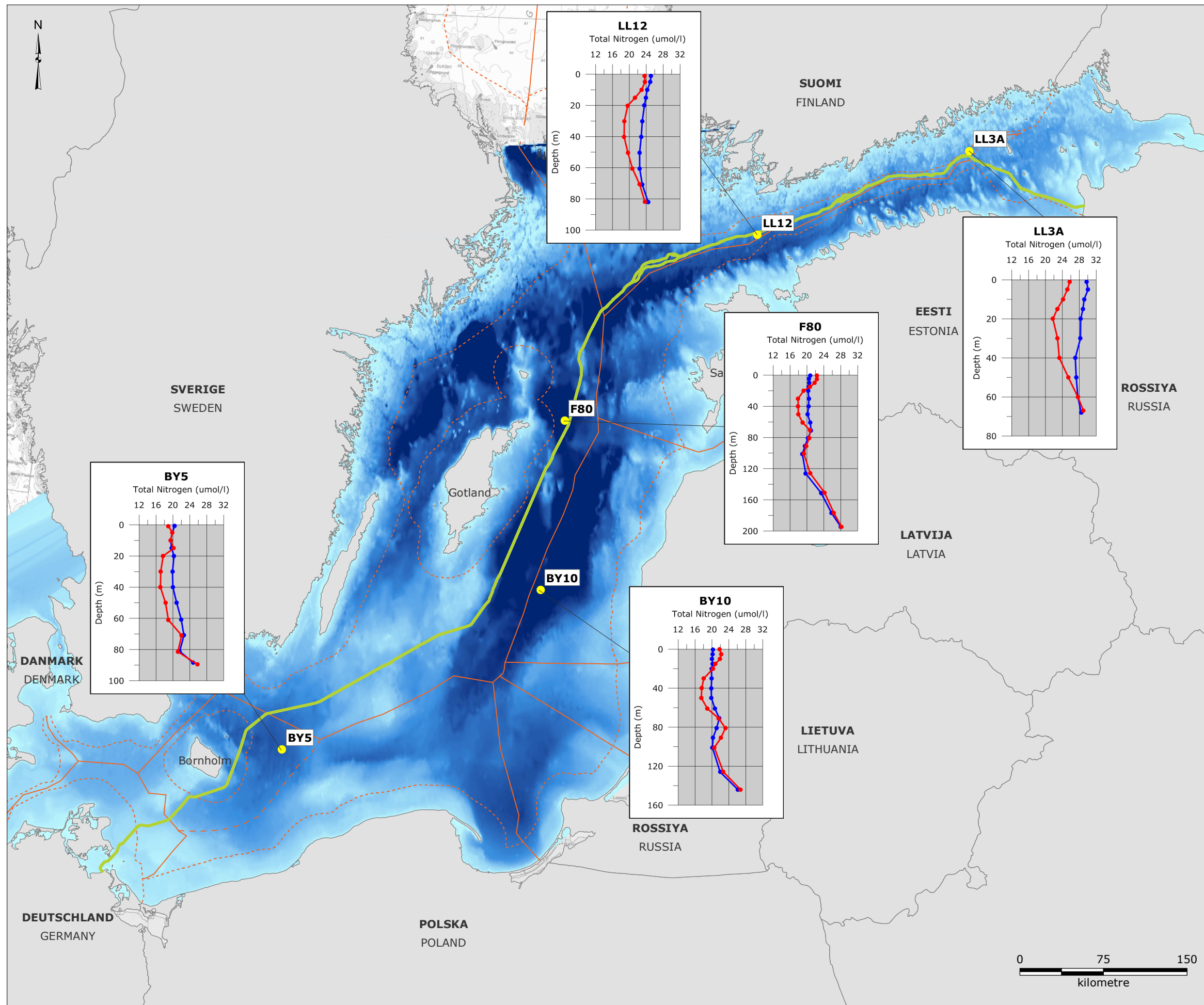
References:
 - ICES, 2016, "Baltic Sea (HELCOM) monitoring data", <http://ocean.ices.dk/Helcom/Helcom.aspx?Mode=1>, Date accessed: LL3A: 2016-06-08, LL12: 2016-07-11, F80: 2016-09-04, BY5 and BY10: 2016-09-11
 -MIKE C-map database, February 2012

Version: 02
 Date: 2017-01-27
 Prepared: MSTB
 Controlled: JRV

WA-04-Espoo

**Average salinity
 summer/winter in the
 Baltic Sea**





Legend:

- NSP2 Route
- Territorial water border
- EEZ border
- Midline between Denmark and Poland
- HELCOM monitoring station

Bathymetry (depth (m)):

- 0
- 430

— Winter profile (December-February)

— Summer profile (June-August)

Note:
 - Average measured values for the period 2000-2015

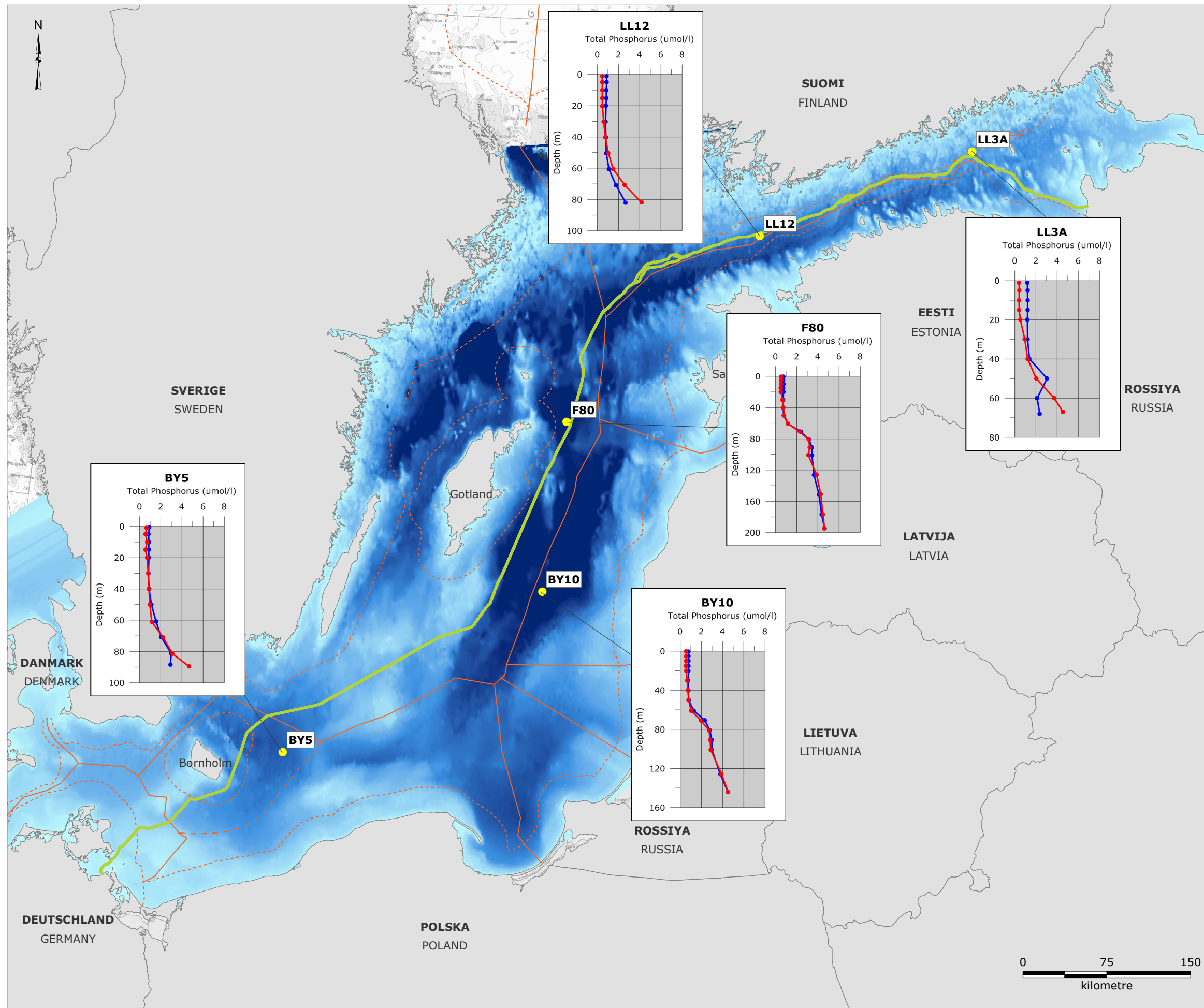
References:
 - ICES, 2016, "Baltic Sea (HELCOM) monitoring data", <http://ocean.ices.dk/Helcom/Helcom.aspx?Mode=1>, Date accessed: LL3A: 2016-06-08, LL12: 2016-07-11, F80: 2016-09-04, BY5 and BY10: 2016-09-11
 -MIKE C-map database, February 2012

Version: 02
 Date: 2017-01-27
 Prepared: MSTB
 Controlled: JRV

WA-05-Espoo

Average total nitrogen concentration summer/winter in the Baltic Sea





Legend:

- NSP2 Route
- Territorial water border
- EEZ border
- Midline between Denmark and Poland
- HELCOM monitoring station

Bathymetry (depth (m)):

0

-430

- Winter profile (December-February)
- Summer profile (June-August)

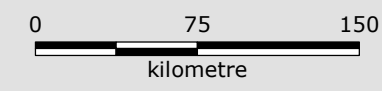
Note:
 - Average measured values for the period 2000-2015

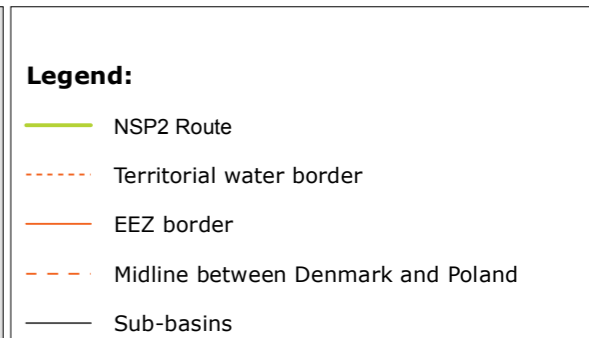
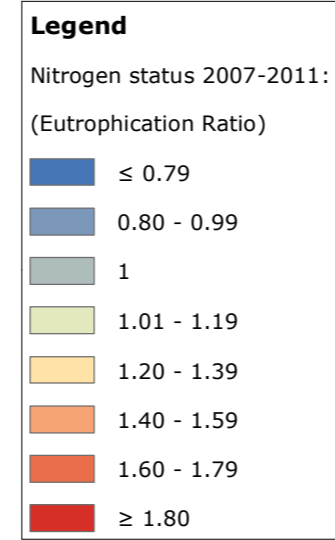
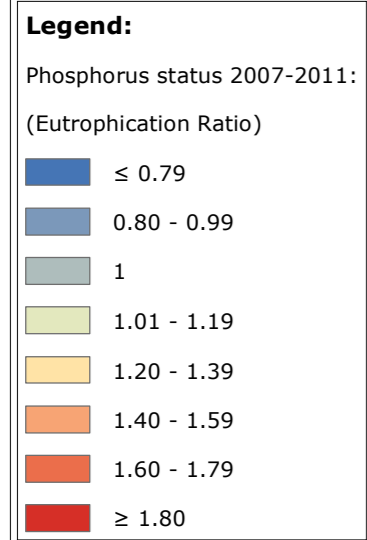
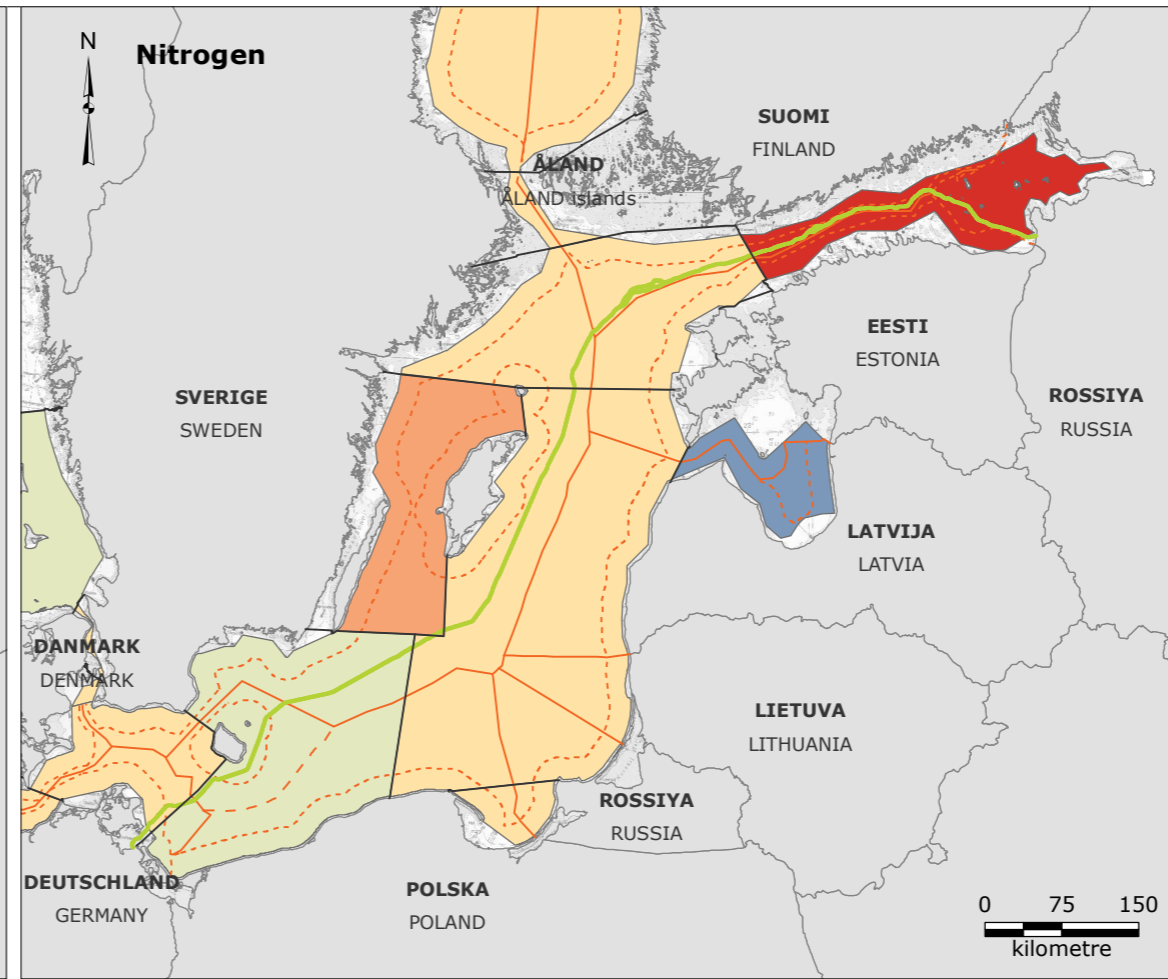
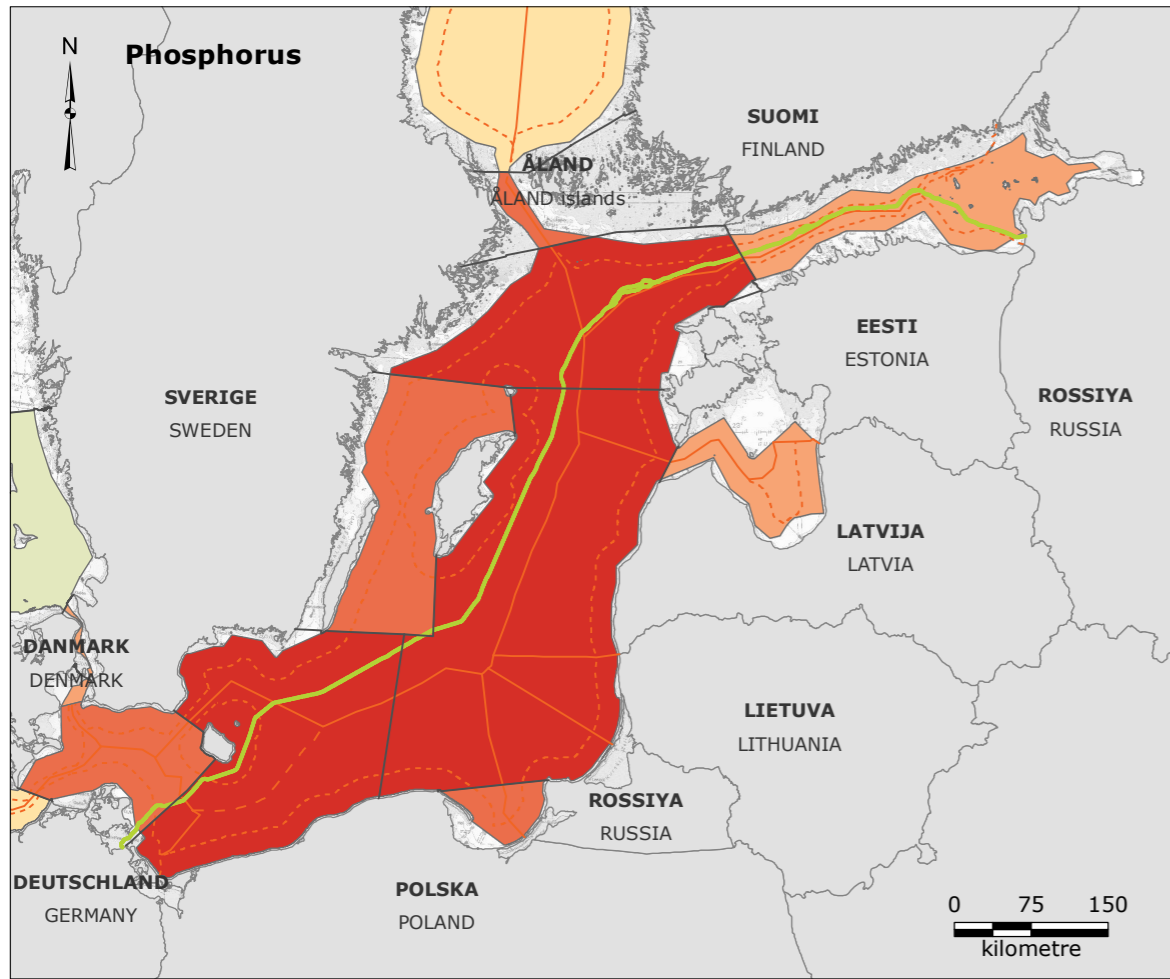
References:
 - ICES, 2016, "Baltic Sea (HELCOM) monitoring data", <http://ocean.ices.dk/Helcom/Helcom.aspx?Mode=1>, Date accessed: LL3A: 2016-06-08, LL12: 2016-07-11, F80: 2016-09-04, BY5 and BY10: 2016-09-11
 - MIKE C-map database, February 2012

Version: 02
 Date: 2017-01-27
 Prepared: MSTB
 Controlled: JRV

WA-06-Espoo

Average total phosphorus concentration summer/winter in the Baltic Sea





Note:

- The eutrophication status of seventeen open sea sub-basins (at least one nautical mile from the baseline) defined according to the HELCOM division of the Baltic Sea has been assessed
- Target values for Good Environmental Status (GES) have been set by HELCOM for the various parts of the Baltic Sea, based on relation to scientifically based and commonly agreed knowledge.
- Left: Eutrophication Ratio: Concentration of Dissolved Inorganic Phosphorus (DIP) in surface water (0-10 m) as winter average 2007-2011, relative to target concentration of GES. The GES-boundary is set at ER ≤ 1.00.
- Right: Eutrophication Ratio: Concentration of Dissolved Inorganic Nitrogen (DIN) in surface water (0-10 m) as winter average 2007-2011, relative to target concentration of GES. The GES-boundary is set at ER ≤ 1.00.

References:

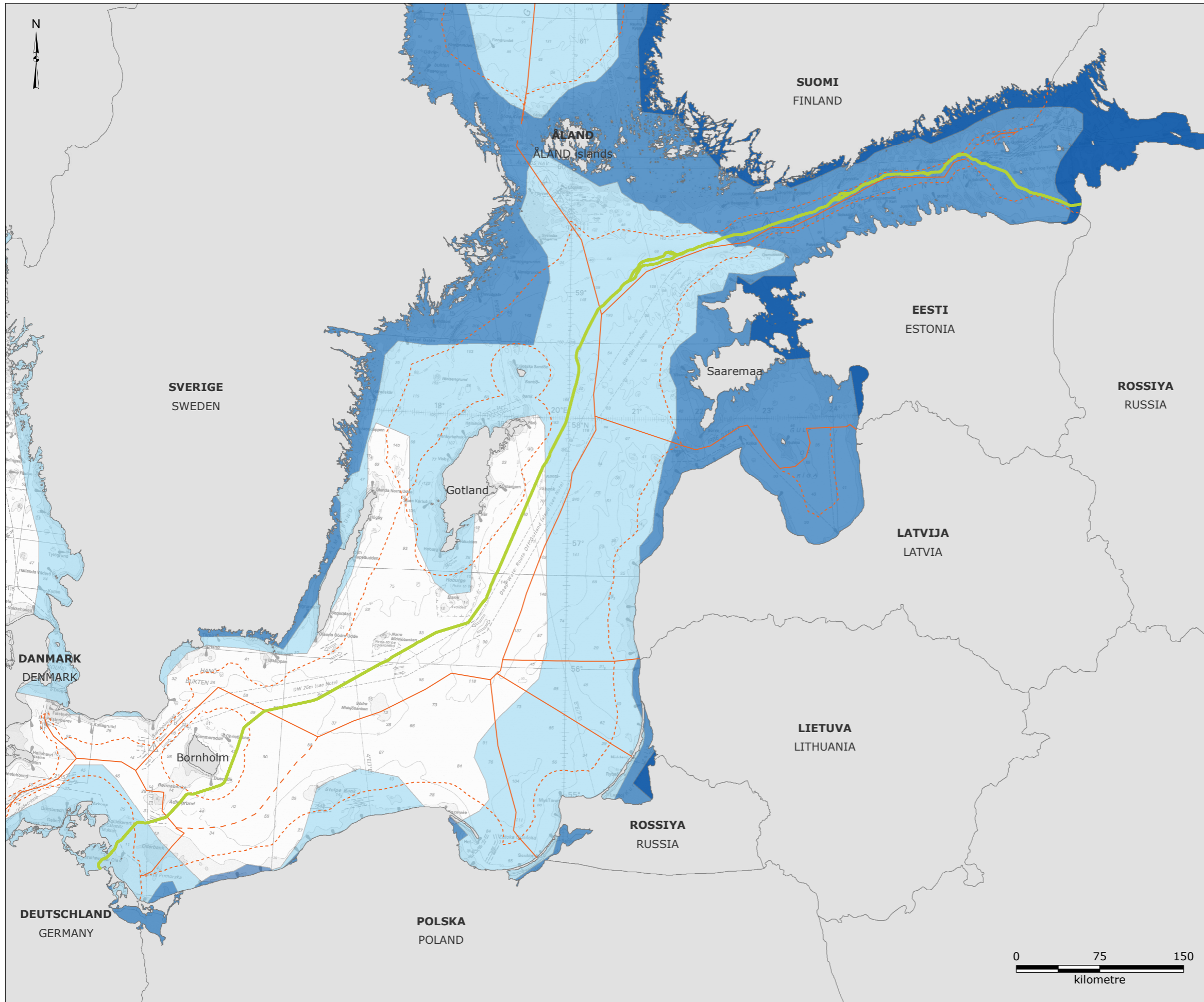
- HELCOM, 2013, "HELCOM subbasins", <http://maps.helcom.fi/website/mapservice/index.html>, Date accessed: 2016-3-30
- HELCOM, 2013, "Phosphorus status distance to target 2007-2011", <http://maps.helcom.fi/website/mapservice/index.html>, Date accessed: 2016-05-30
- HELCOM, 2013, "Nitrogen status distance to target 2007-2011", <http://maps.helcom.fi/website/mapservice/index.html>, Date accessed: 2016-05-30

Version: 03
Date: 2017-01-27
Prepared: MSTB
Controlled: JVR

WA-07-Espoo

Eutrophication status





- Legend:**
- NSP2 Route
 - Territorial water border
 - EEZ border
 - Midline between Denmark and Poland
 - Ice cover in 2014-2015 (mild winter)
 - Ice cover in 2012-2013 (average winter)
 - Ice cover in 2010-2011 (severe winter)

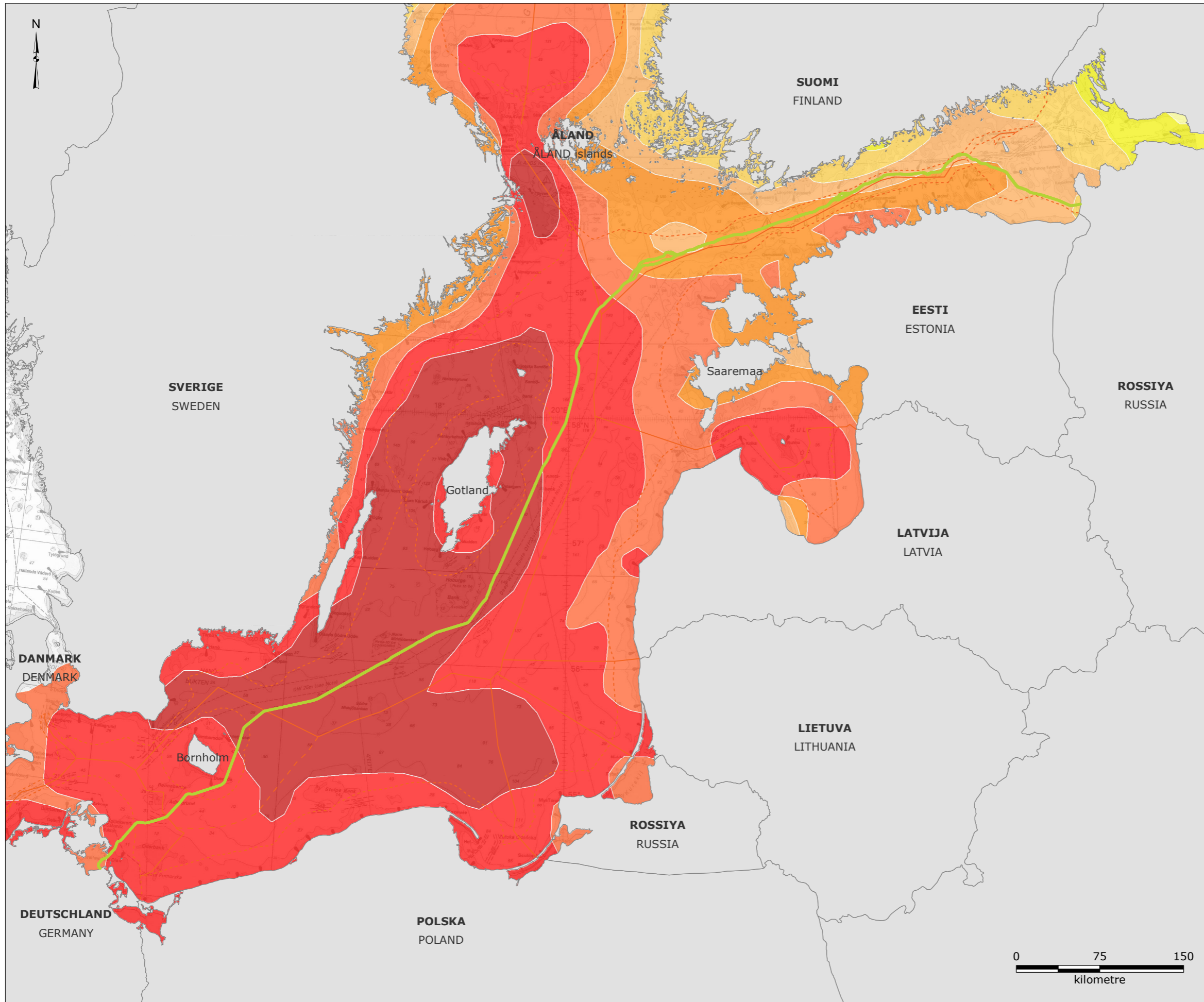
Reference:
 - Finnish Meteorological Institute (FMI),
<http://ilmatieteenlaitos.fi/jaatalvet>, Date accessed: 2016-04-14.

Version: 06
 Date: 2017-01-30
 Prepared: MIRS
 Controlled: JRV

CL-01-Espoo

Maximum ice cover during mild, average and severe winters





Legend:

- NSP2 Route
- - - Territorial water border
- EEZ border
- - - Midline between Denmark and Poland

Possible warming of the Baltic Sea surface water between year 2000 - 2100:

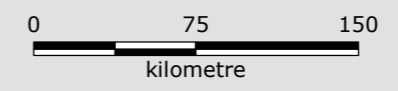
- 2.4 - 2.6 °C
- > 2.6 - 2.8 °C
- > 2.8 - 3.0 °C
- > 3.0 - 3.2 °C
- > 3.2 - 3.4 °C
- > 3.4 - 3.6 °C
- > 3.6 - 3.8 °C
- > 3.8 °C

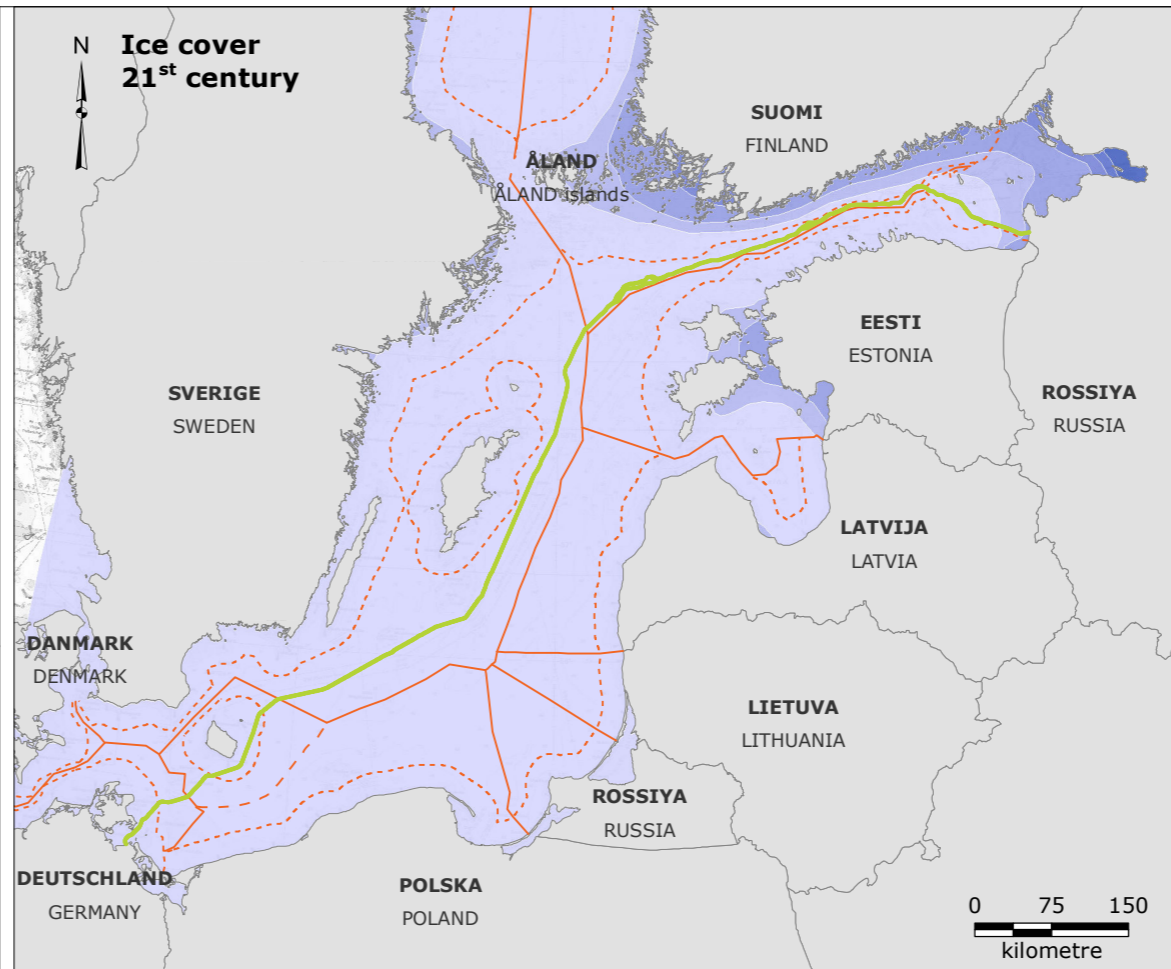
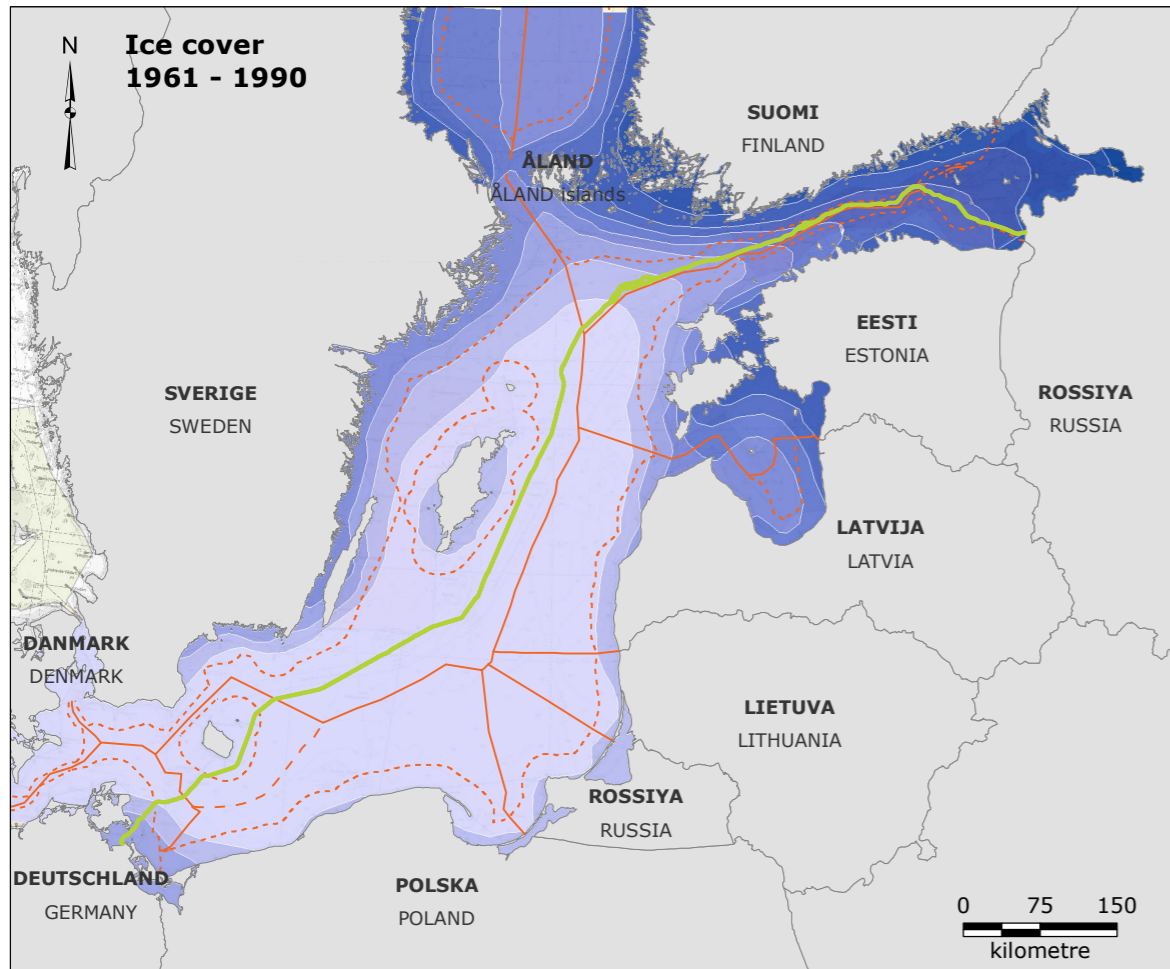
Reference:
 - Berner, C., 2005, "Change Beneath the Surface, Monitor 19: An In-Depth Look at Sweden's Marine Environment". Naturvårdsverket, 192 pages, ISBN: 91-620-1246-0

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 Date: 2017-01-24
 Prepared: MSTB
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CL-02-Espoo

Possible warming of the Baltic Sea surface water during the 21st century















Legend:

-  NSP2 Route
-  Territorial water border
-  EEZ border
-  Midline between Denmark and Poland

Duration of ice cover in the Baltic Sea:

-  <= 10 days
-  > 10 - 20 days
-  > 20 - 40 days
-  > 40 - 60 days
-  > 60 - 80 days
-  > 80 - 100 days
-  > 100 - 120 days
-  > 120 - 140 days
-  > 140 - 160 days
-  > 160 - 180 days

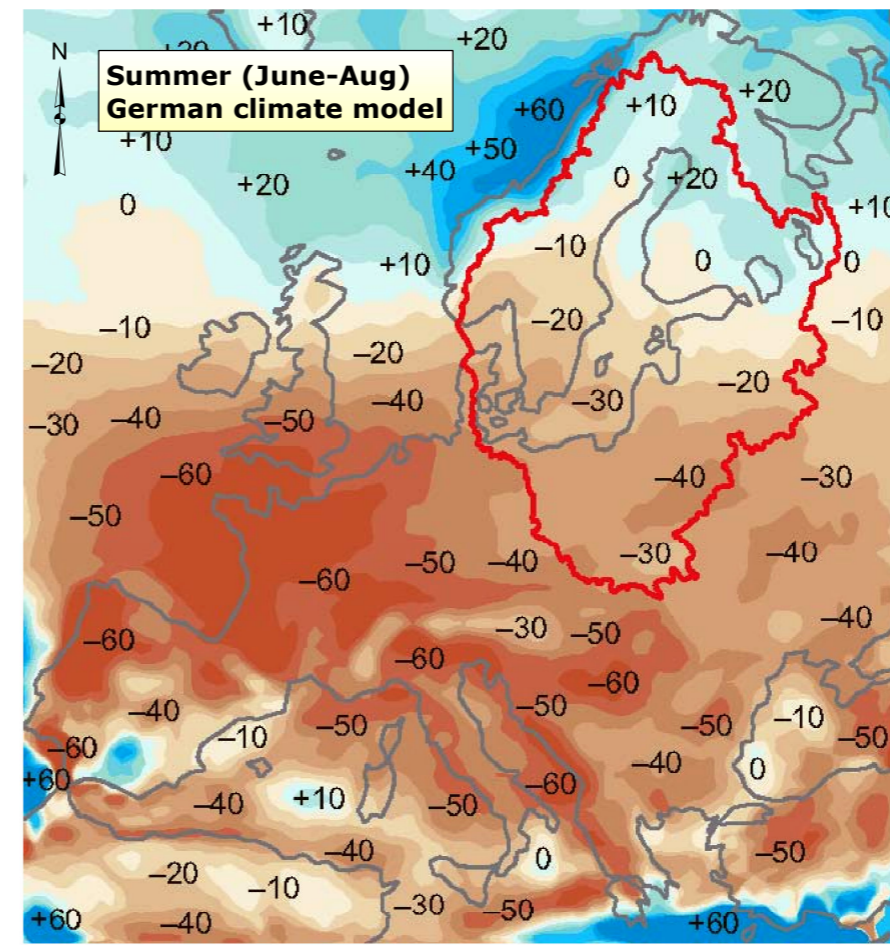
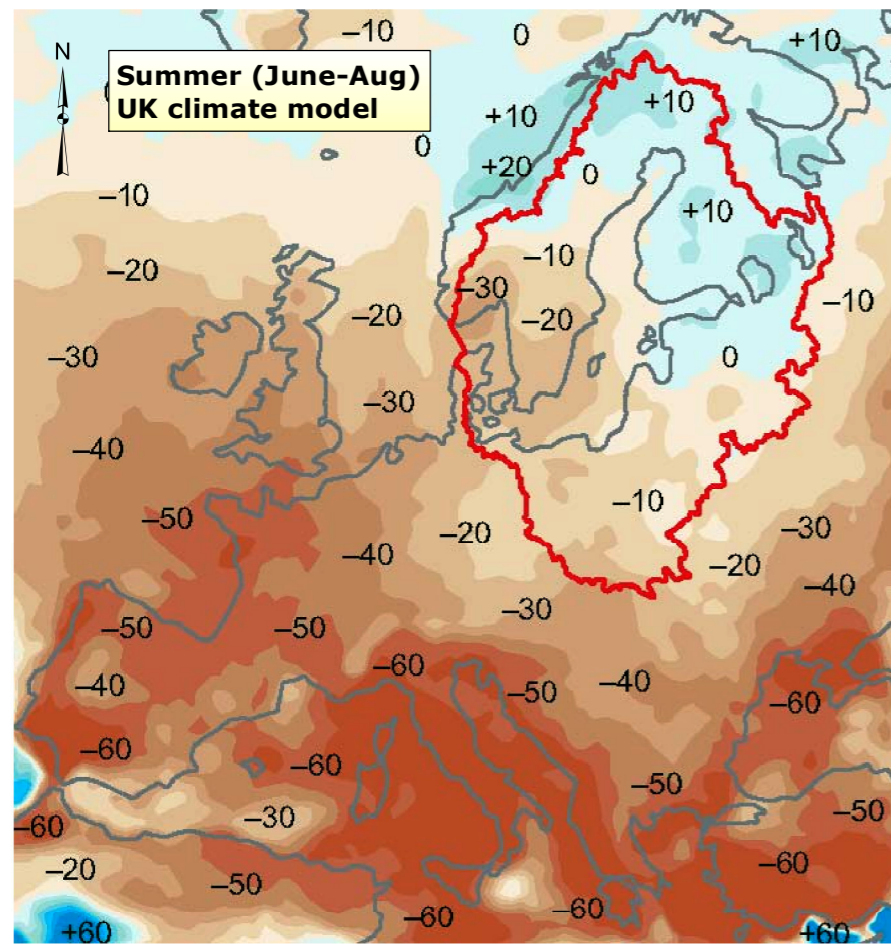
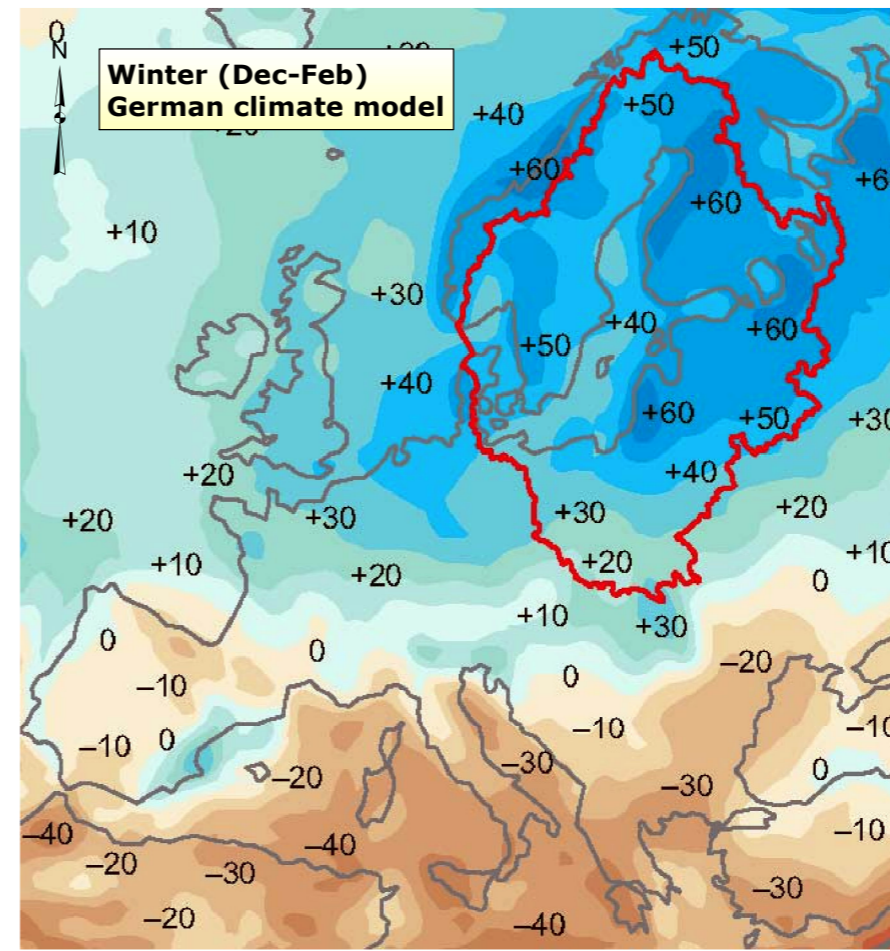
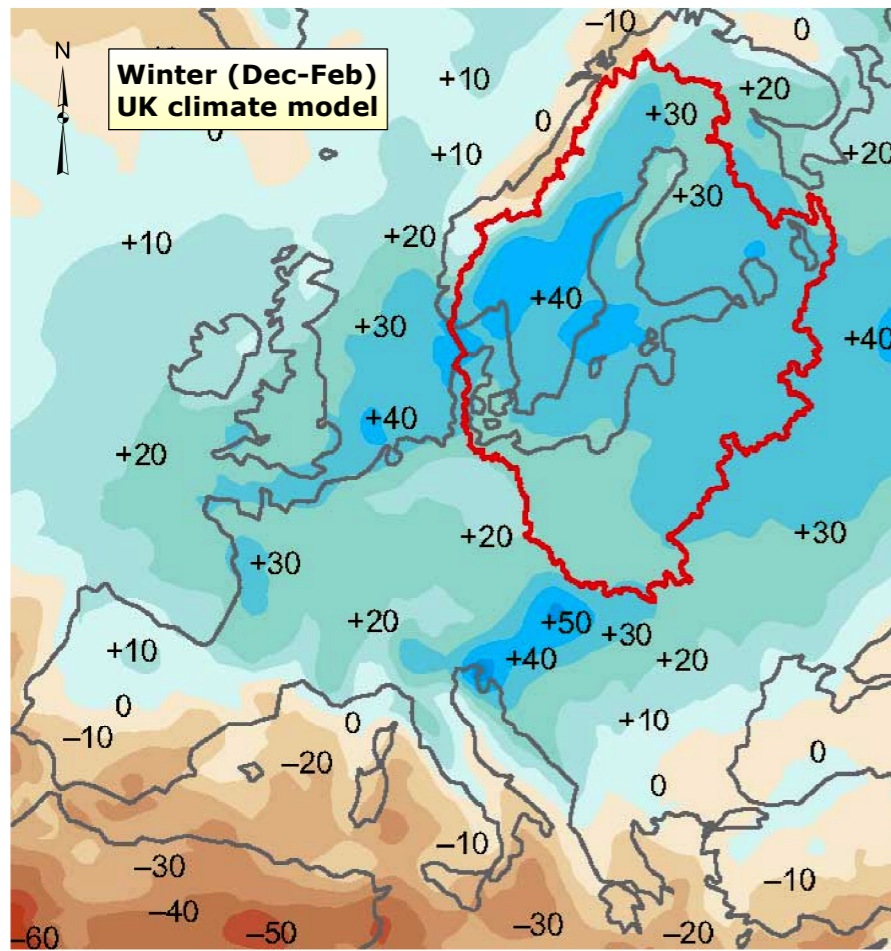
Reference:
 - Berner, C., 2005, "Change Beneath the Surface, Monitor 19: An In-Depth Look at Sweden's Marine Environment". Naturvårdsverket, 192 pages, ISBN: 91-620-1246-0

Version: 07
 Date: 2017-01-30
 Prepared: MSTB
 Controlled: JRV

CL-03-Espoo

Annual average duration of ice cover between 1961-1990 and possible duration of predicted ice cover at the end of the 21st century





Legend:

Changes in winter and summer precipitation (%):

- Catchment area
- < (-60)
- > (-60) - (-50)
- > (-50) - (-40)
- > (-40) - (-30)
- > (-30) - (-20)
- > (-20) - (-10)
- > (-10) - 0
- > 0 - 10
- > 10 - 20
- > 20 - 30
- > 30 - 40
- > 40 - 50
- > 50 - 60
- > 60

Note:
 - Winter and summer precipitation is shown in order to illustrate the fact that in particular the winter precipitation increases as a consequence of the climate change caused by global warming
 - The results of both the UK and the German climate model are shown, to illustrate the fact that the results from different models show the same overall tendencies
 - For choice of models used, reference is given to Berner, 2005, in which more details are available

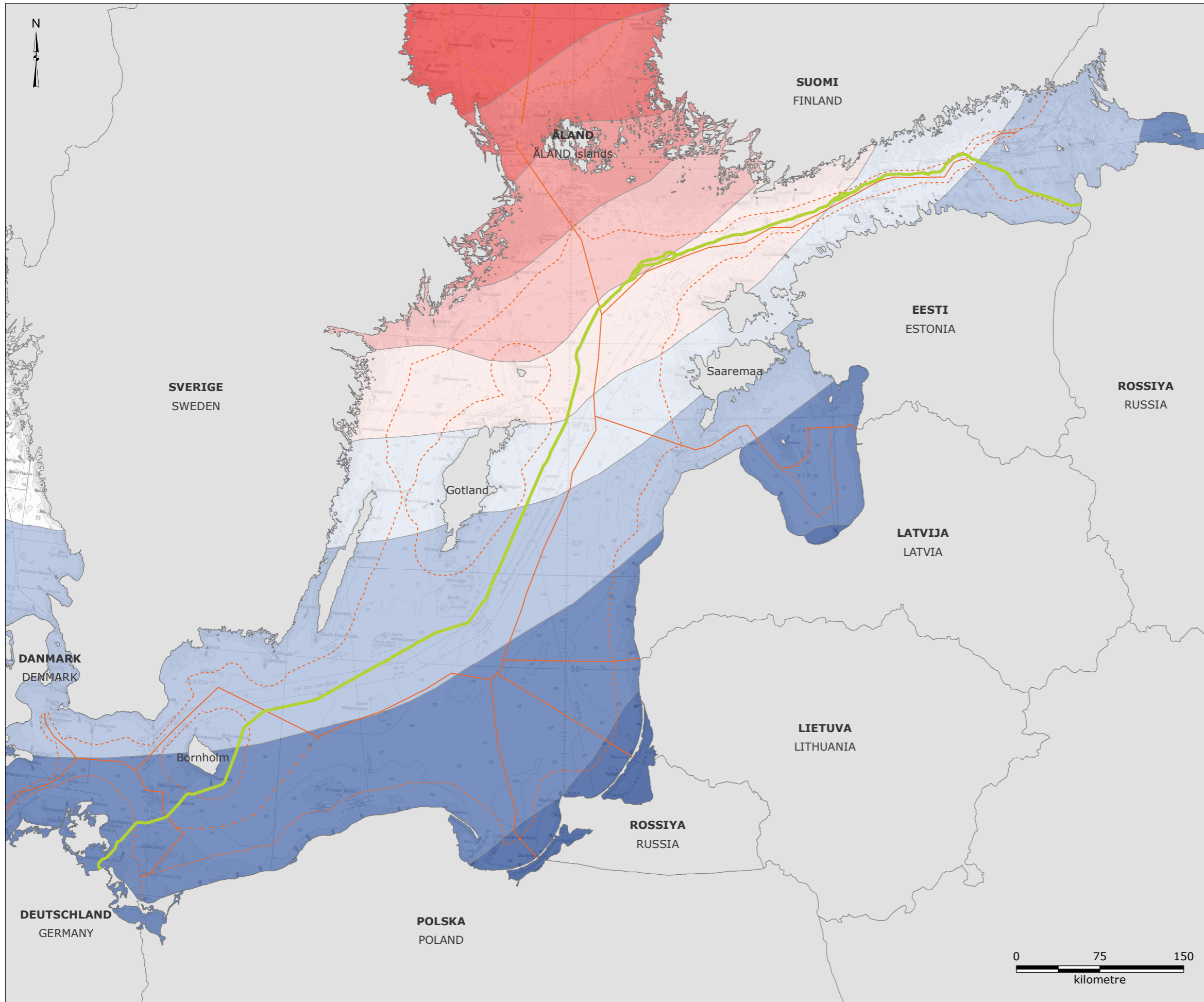
Reference:
 - Berner, C., 2005, "Change Beneath the Surface, Monitor 19: An In-Depth Look at Sweden's Marine Environment". Naturvårdsverket, 192 pages, ISBN: 91-620-1246-0

Version: 03
 Date: 2017-01-30
 Prepared: MSTB
 Controlled: JRV

CL-04-Espoo

Possible changes in winter and summer precipitation during the 21st century





Legend:

- NSP2 Route
- Territorial water border
- EEZ border
- Midline between Denmark and Poland

Possible changes in local sea level (cm):

- > 50
- > 40 - 50
- > 30 - 40
- > 20 - 30
- > 10 - 20
- > 0 - 10
- > (-10) - 0
- > (-20) - (-10)
- > (-30) - (-20)
- (-40) - (-30)

Reference:
 - Berner, C., 2005, "Change Beneath the Surface, Monitor 19: An In-Depth Look at Sweden's Marine Environment". Naturvårdsverket, 192 pages, ISBN: 91-620-1246-0

Version: 04
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 Prepared: MSTB
 Controlled: JRV

CL-05-Espoo

Possible changes in the local sea level during the 21st century

