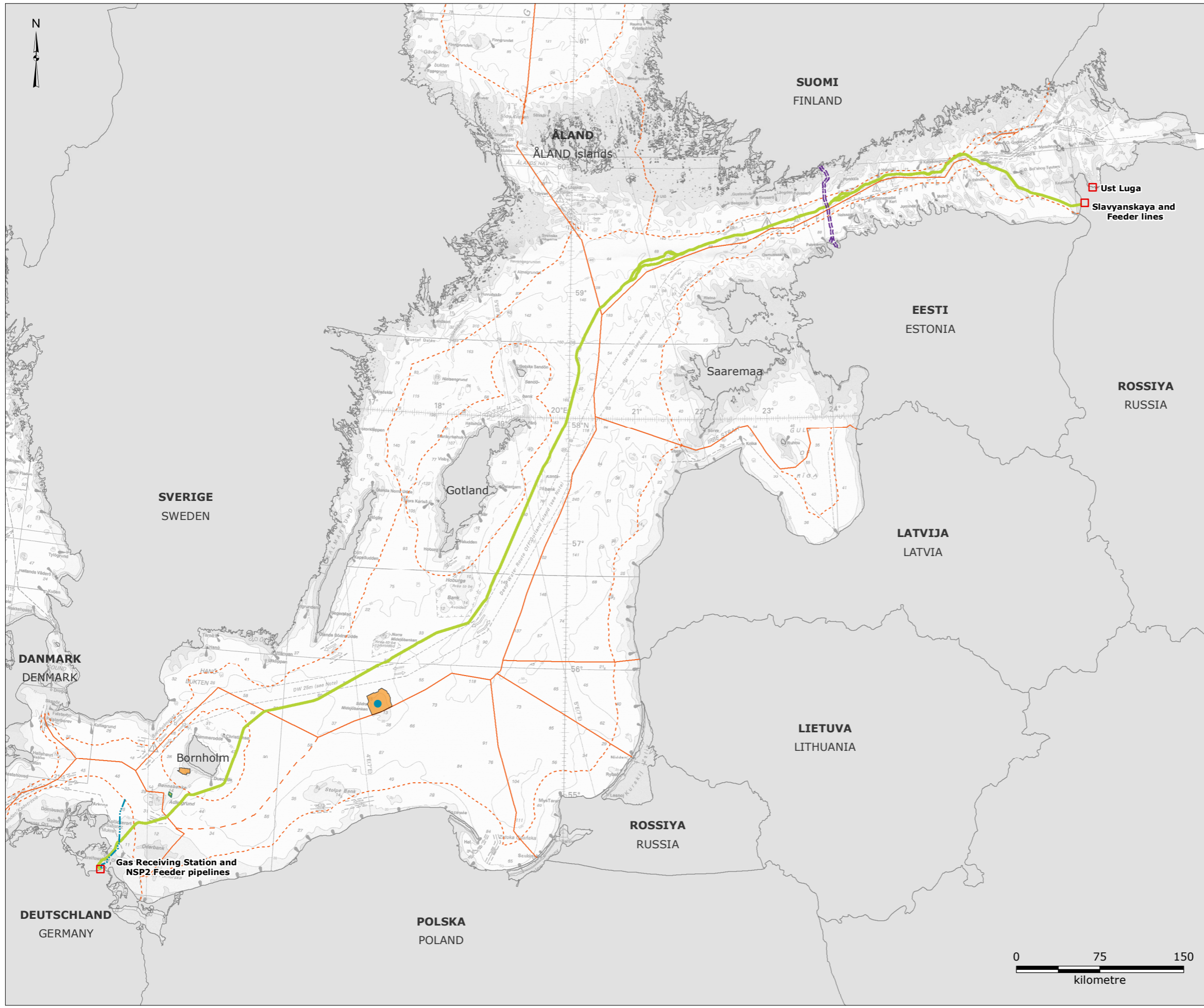


CUMULATIVE IMPACT

PLANNED AND EXISTING PROJECTS



- Legend:**
- NSP2 Route
 - - - Territorial water border
 - EEZ border
 - - - Midline between Denmark and Poland
- Cumulative impacts:
- Planned project site
 - - - - Balticconnector
 - Area of interest for sand and gravel extraction
 - Wind farm - planned
 - Reserved, potential future resource extraction
 - - - - 50Hertz power - planned

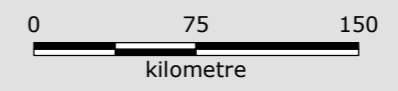
Note:
 - Slavjanskaya compressor station and developments in and around Ust Luga Port

References:
 - 4C Offshore, <http://www.4coffshore.com/offshorewind/>, Date accessed: 2016-08-04 and 2017-02-21
 - Geological Survey of Sweden, 2013, "Begäran om sektorsunderlag till kommande havsplanering", Havs- och Vattenmyndigheten, Göteborg, Sweden
 - Naturstyrelsen, 2016, "Råstofindvinding på havet - Reservationsområder", <http://miljoegis.mim.dk/cbkort?profile=miljoegis-raastofferhavet>, Miljøministeriet, Date accessed: 2016-01-06

Version: 03
 Date: 2017-03-10
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PP-01-Espoo

Cumulative impacts of planned and existing projects

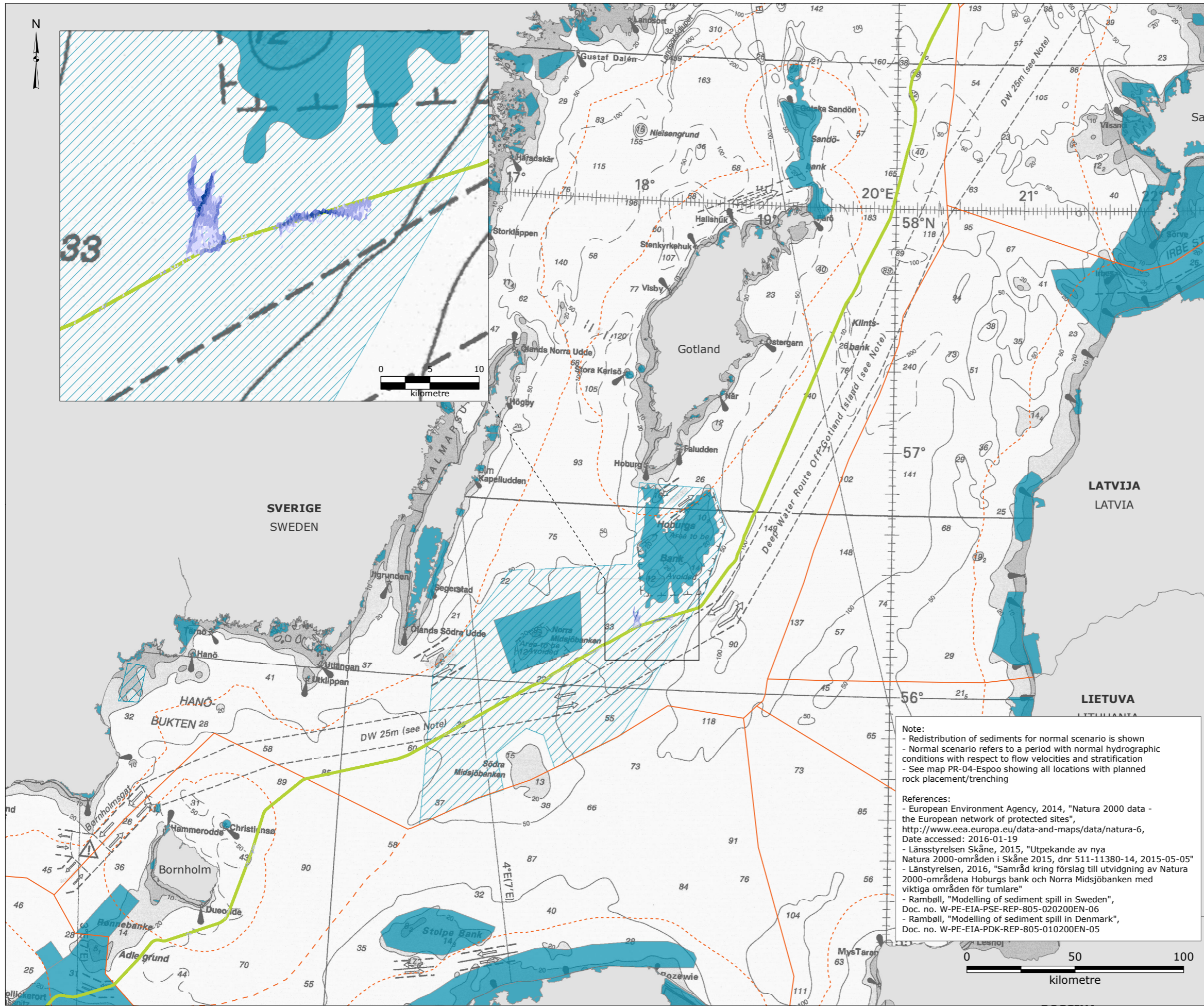


MATHEMATICAL MODELLING

DISPERSION OF SEDIMENT AND CONTAMINANTS

UNDERWATER NOISE

NOISE IN AIR



Legend:

- NSP2 Route
- - - Territorial water border
- EEZ border
- - - Midline between Denmark and Poland
- Natura 2000 site
- Proposed new and extended Natura 2000 site

Rock placement - normal hydrography

Duration of exceeding threshold concentrations (10 mg/l) in hours:

- 0 - 1
- > 1 - 3
- > 3 - 6
- > 6 - 9
- > 9 - 12
- > 12 - 24

Trenching - normal hydrography

Duration of exceeding threshold concentrations (10 mg/l) in hours:

- 0 - 1
- > 1 - 3
- > 3 - 6
- > 6 - 9
- > 9 - 12
- > 12 - 24

Note:
 - Redistribution of sediments for normal scenario is shown
 - Normal scenario refers to a period with normal hydrographic conditions with respect to flow velocities and stratification
 - See map PR-04-Espoo showing all locations with planned rock placement/trenching

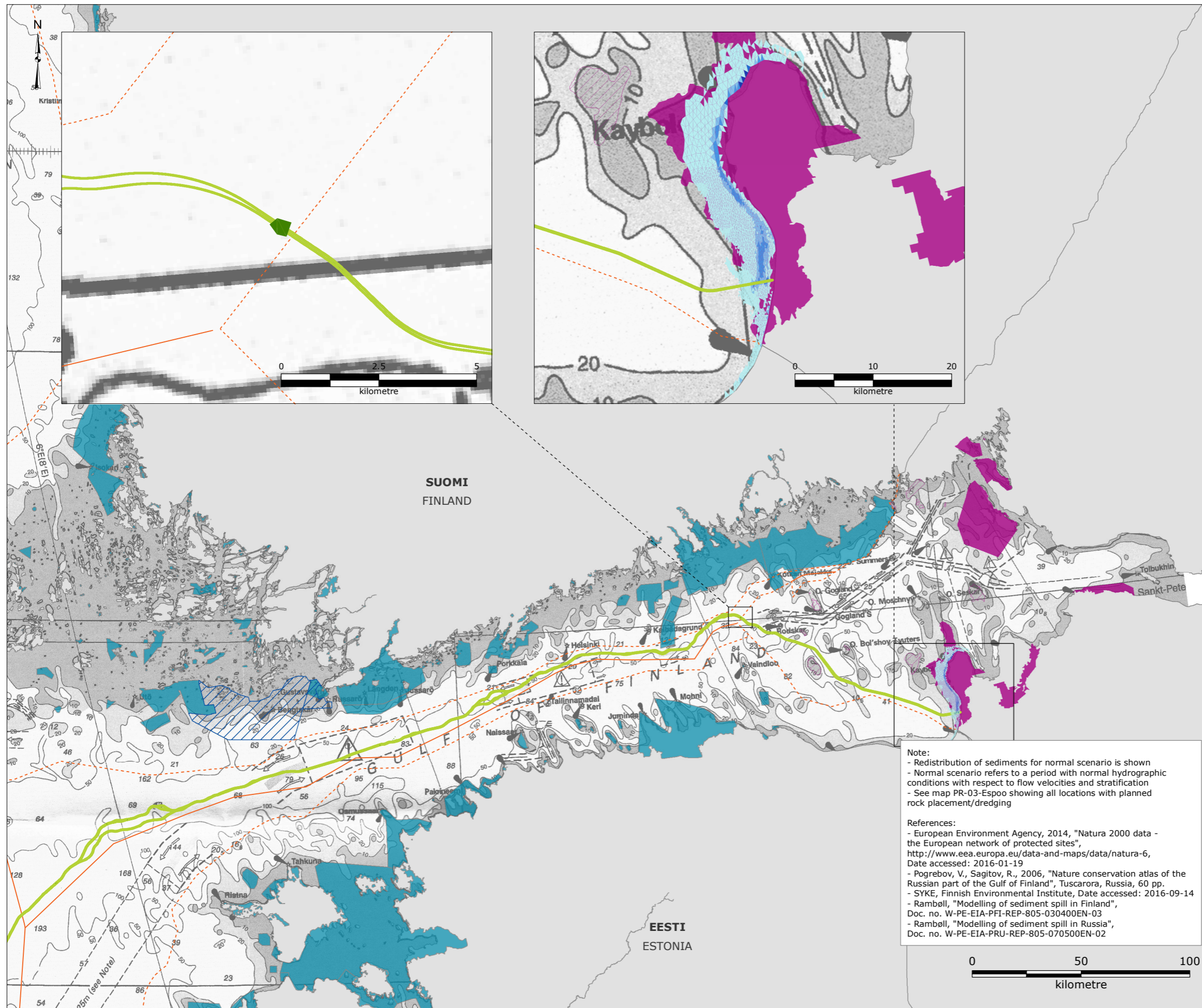
References:
 - European Environment Agency, 2014, "Natura 2000 data - the European network of protected sites", <http://www.eea.europa.eu/data-and-maps/data/natura-6>, Date accessed: 2016-01-19
 - Länsstyrelsen Skåne, 2015, "Utpekande av nya Natura 2000-områden i Skåne 2015, dnr 511-11380-14, 2015-05-05"
 - Länsstyrelsen, 2016, "Samråd kring förslag till utvidgning av Natura 2000-områdena Hobergs bank och Norra Midsjöbanken med viktiga områden för tumlare"
 - Rambøll, "Modelling of sediment spill in Sweden", Doc. no. W-PE-EIA-PSE-REP-805-020200EN-06
 - Rambøll, "Modelling of sediment spill in Denmark", Doc. no. W-PE-EIA-PDK-REP-805-010200EN-05

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 Prepared: MIRS
 Controlled: JLA

MO-01-Espoo

Duration of exceeding 10 mg/l from rock placement and trenching in Swedish and Danish waters





- Legend:**
- NSP2 Route
 - - - Territorial water border
 - EEZ border
 - █ Natura 2000 site
- Protected areas in the Russian part of the Baltic Region:
- █ Protected site in Russia
 - █ Proposed protected site in Russia
- Proposed extended Natura 2000 site in Finland:
- █ Special Protection Areas (SPA) and Special Area of Conservation/ Special Conservation Interests (SAC/SCI)

- Dredging (Micro-tunnelling) - normal hydrography**
Duration of exceeding threshold concentrations (10 mg/l) in hours:
- █ 0 - 50
 - █ > 50 - 100
 - █ > 100 - 200
 - █ > 200 - 300
 - █ > 300 - 400
 - █ > 400 - 550

- Rock placement - normal hydrography**
Duration of exceeding threshold concentrations (10 mg/l) in hours:
- █ 0 - 1
 - █ > 1 - 3
 - █ > 3 - 6
 - █ > 6 - 9
 - █ > 9 - 12
 - █ > 12 - 24

Note:

- Redistribution of sediments for normal scenario is shown
- Normal scenario refers to a period with normal hydrographic conditions with respect to flow velocities and stratification
- See map PR-03-Espoo showing all locations with planned rock placement/dredging

References:

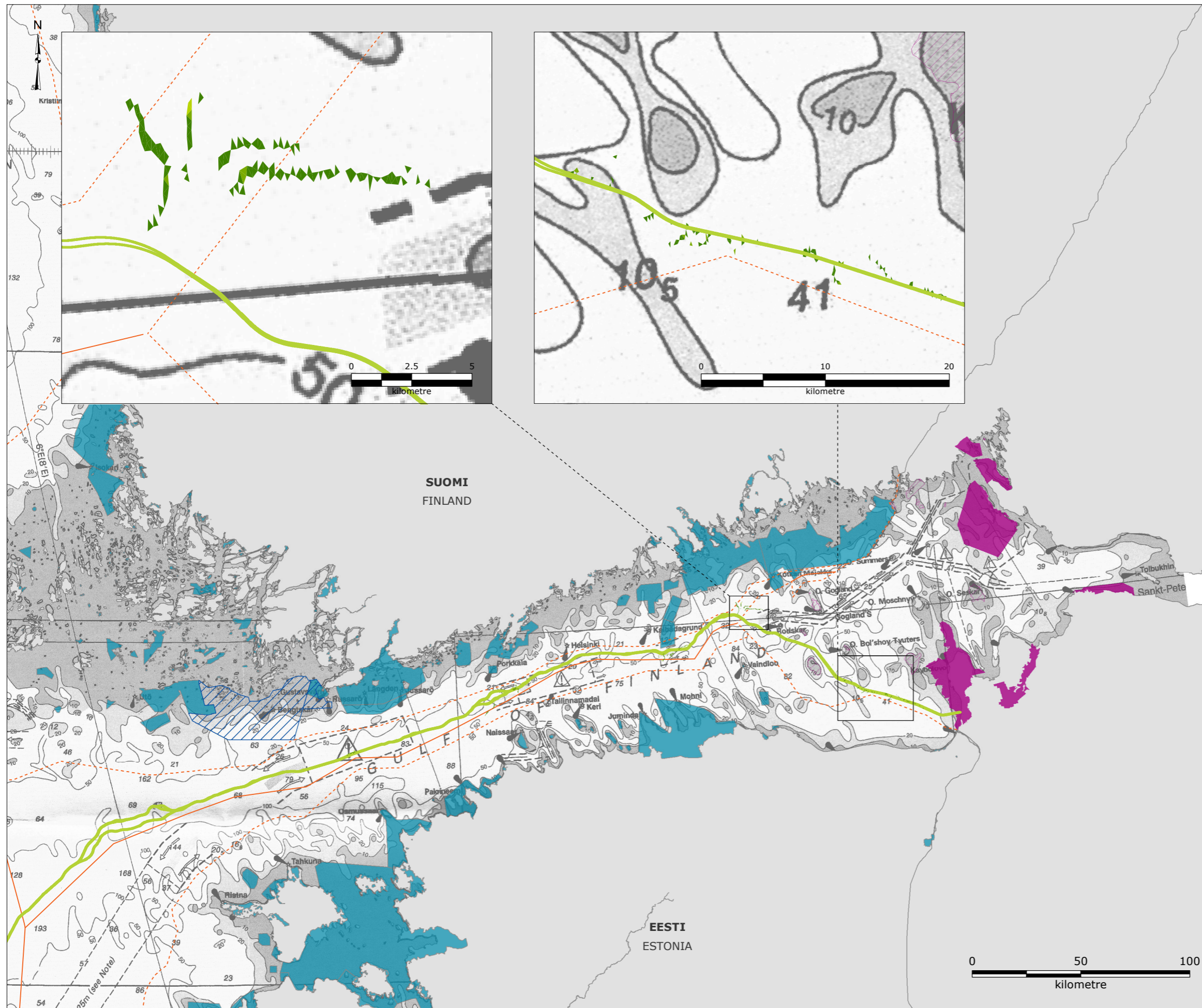
- European Environment Agency, 2014, "Natura 2000 data - the European network of protected sites", <http://www.eea.europa.eu/data-and-maps/data/natura-6>, Date accessed: 2016-01-19
- Pogrebov, V., Sagitov, R., 2006, "Nature conservation atlas of the Russian part of the Gulf of Finland", Tuscarora, Russia, 60 pp.
- SYKE, Finnish Environmental Institute, Date accessed: 2016-09-14
- Rambøll, "Modelling of sediment spill in Finland", Doc. no. W-PE-EIA-PFI-REP-805-030400EN-03
- Rambøll, "Modelling of sediment spill in Russia", Doc. no. W-PE-EIA-PRU-REP-805-070500EN-02

Version: 03
Date: 2017-02-23
Prepared: MIRS
Controlled: JLA

MO-02-Espoo

Duration of exceeding 10 mg/l from rock placement and dredging in Finnish and Russian waters





Legend:

- NSP2 Route
- - - Territorial water border
- EEZ border
- Natura 2000 site
- Protected areas in the Russian part of the Baltic Region:
 - Protected site in Russia
 - ▨ Proposed protected site in Russia
- Proposed extended Natura 2000 site in Finland:
 - ▨ Special Protection Areas (SPA) and Special Area of Conservation/ Special Conservation Interests (SAC/SCI)

Munitions clearance - normal hydrography

Duration of exceeding threshold concentrations (10 mg/l) in hours:

- 0 - 1
- > 1 - 3
- > 3 - 6
- > 6 - 9
- > 9 - 12
- > 12 - 24

Note:
 - Redistribution of sediments for normal scenario is shown
 - Normal scenario refers to a period with normal hydrographic conditions with respect to flow velocities and stratification
 - Zooms show examples of munitions clearance

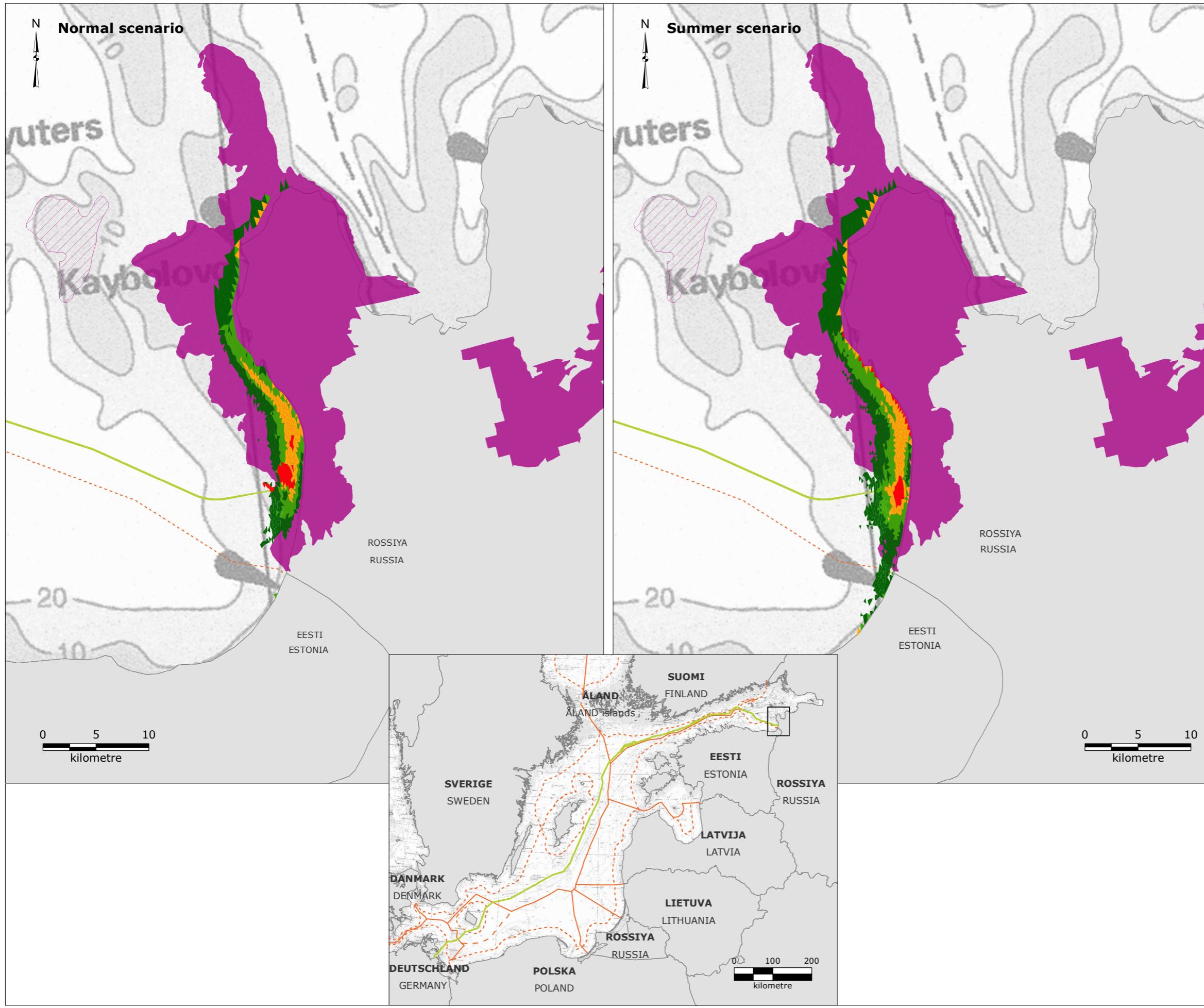
References:
 - European Environment Agency, 2014, "Natura 2000 data - the European network of protected sites", <http://www.eea.europa.eu/data-and-maps/data/natura-6>, Date accessed: 2016-01-19
 - Pogrebov, V., Sagitov, R., 2006, "Nature conservation atlas of the Russian part of the Gulf of Finland", Tuscarora, Russia, 60 pp.
 - SYKE, Finnish Environmental Institute, Date accessed: 2016-09-14
 - Rambøll, "Modelling of sediment spill in Finland", Doc. no. W-PE-EIA-PFI-REP-805-030400EN-03
 - Rambøll, "Modelling of sediment spill in Russia", Doc. no. W-PE-EIA-PRU-REP-805-070500EN-02

Version: 01
 Date: 2017-02-23
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 Controlled: JLA

MO-03-Espoo

Duration of exceeding 10 mg/l from munition clearance in Finnish and Russian waters





Legend:

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

Protected areas in the Russian part of the Baltic Region:

- Protected site in Russia
- Proposed protected site in Russia

Dioxin, Dredging (micro-tunnelling) - normal hydrography

Duration of exceedance of PNEC value in hours:

- 0 - 1
- > 1 - 24
- > 24 - 72
- > 72 - 168
- > 168 - 840

Note:

- Redistribution of sediments for normal and summer scenarios are shown
- Normal and summer scenarios refer to periods with normal or summer hydrographic conditions with respect to flow velocities and stratification

References:

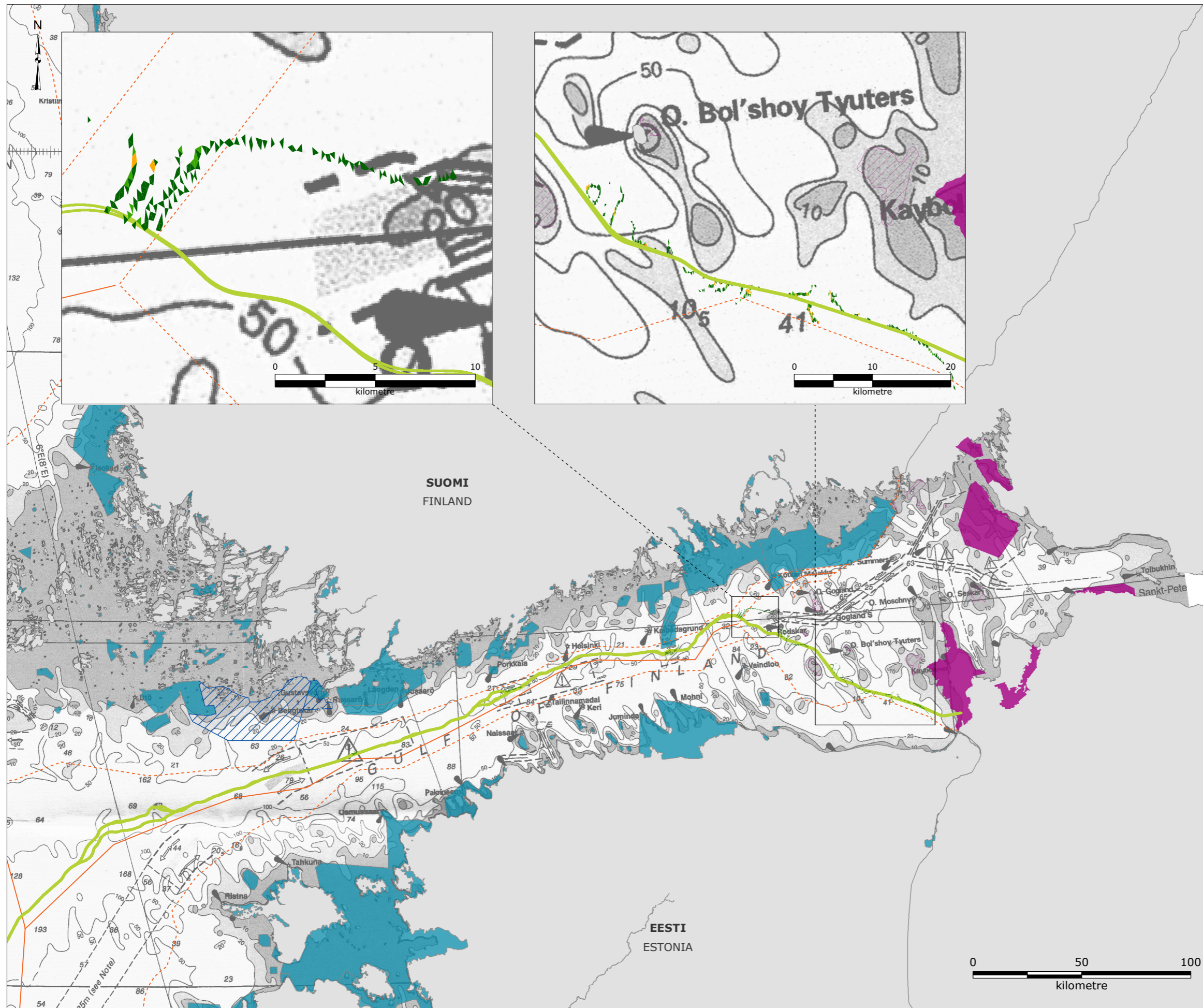
- Pogrebov, V., Sagitov, R., 2006, "Nature conservation atlas of the Russian part of the Gulf of Finland", Tuscarora, Russia, 60 pp.
- Rambøll, "Modelling of sediment spill in Russia", Doc. no. W-PE-EIA-PRU-REP-805-070500EN-02

Version: 02
 Date: 2017-02-23
 Prepared: MIRS
 Controlled: JLA

MO-04-Espoo

Duration of exceeding PNEC for WHO (2005) PCDD/F TEQ upper (Dioxins/Furans) from dredging at Russian landfall





Legend:

- NSP2 Route
 - Territorial water border
 - EEZ border
 - Natura 2000 site
- Protected areas in the Russian part of the Baltic Region:
- Protected site in Russia
 - Proposed protected site in Russia
- Proposed extended Natura 2000 site in Finland:
- Special Protection Areas (SPA) and Special Area of Conservation/ Special Conservation Interests (SAC/SCI)

- Dioxin, munition clearance - normal hydrography**
- Duration of exceedance of PNEC value in hours:
- 0 - 1
 - > 1 - 2
 - > 2 - 6
 - > 6 - 12

Note:

- Redistribution of sediments for normal scenario is shown
- Normal scenario refers to a period with normal hydrographic conditions with respect to flow velocities and stratification
- Zooms showing examples of munition clearance

References:

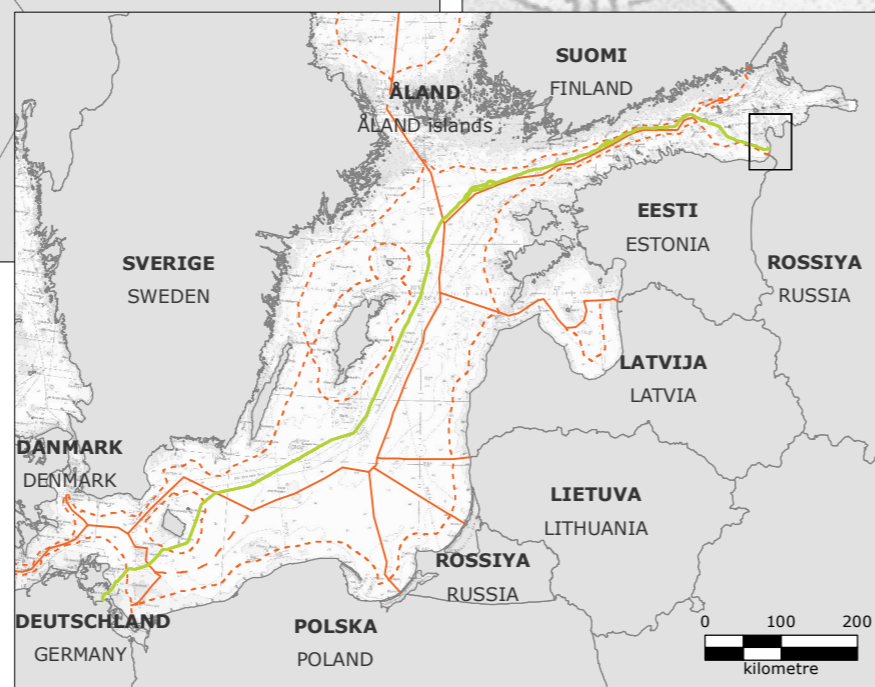
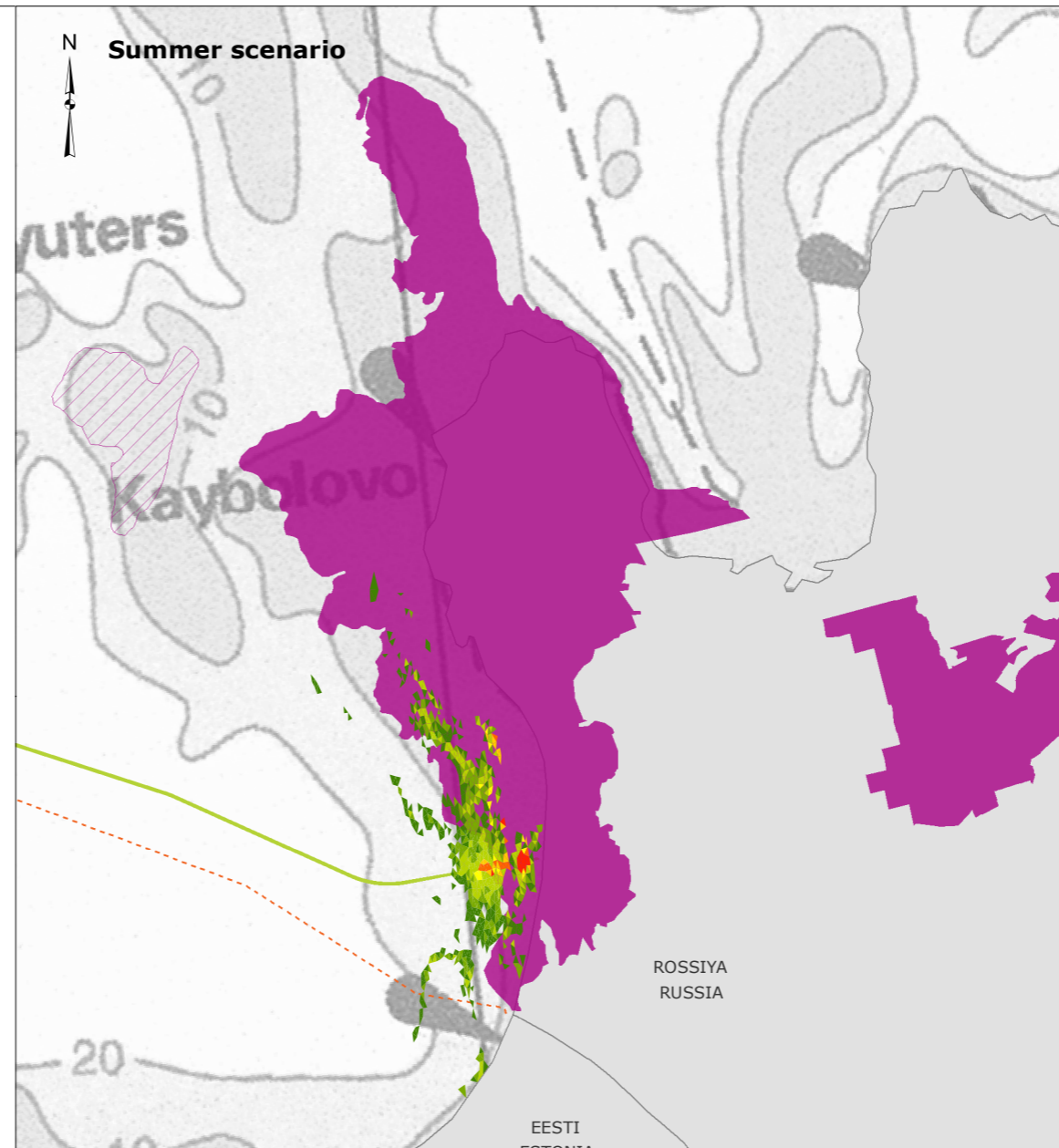
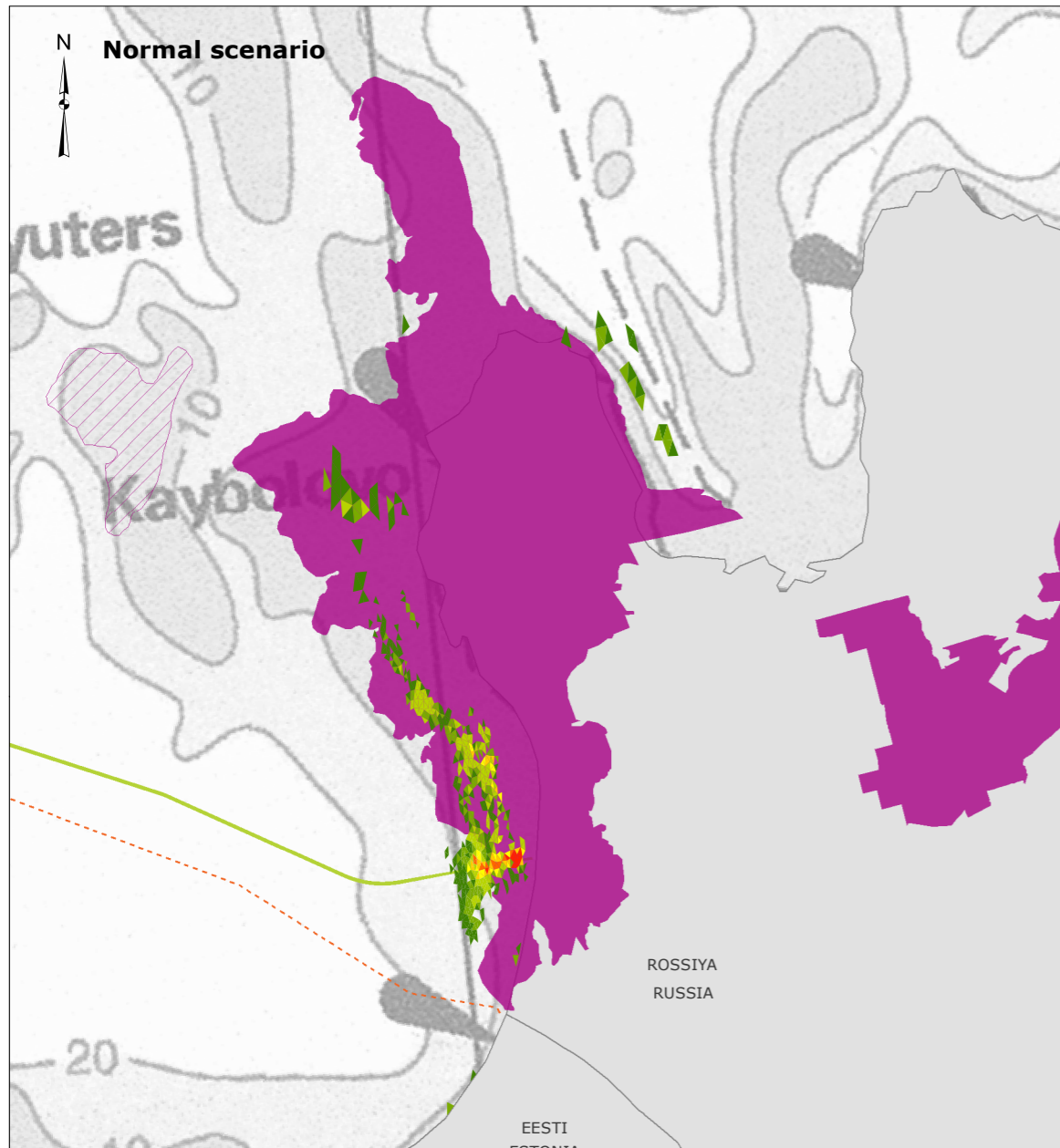
- European Environment Agency, 2014, "Natura 2000 data - the European network of protected sites", <http://www.eea.europa.eu/data-and-maps/data/natura-6>, Date accessed: 2016-01-19
- Pogrebov, V., Sagitov, R., 2006, "Nature conservation atlas of the Russian part of the Gulf of Finland", Tuscarora, Russia, 60 pp.
- SYKE, Finnish Environmental Institute, Date accessed: 2016-09-14
- Rambøll, "Modelling of sediment spill in Finland", Doc. no. W-PE-EIA-PFI-REP-805-030400EN-03
- Rambøll, "Modelling of sediment spill in Russia", Doc. no. W-PE-EIA-PRU-REP-805-070500EN-02

Version: 01
 Date: 2017-02-22
 Prepared: MIRS
 Controlled: JLA

MO-05-Espoo

Duration of exceeding PNEC for WHO (2005) PCDD/F TEQ upper (Dioxins/Furans) from munitions clearance in Finnish and Russian waters





- Legend:**
- NSP2 Route
 - Territorial water border
 - EEZ border
 - Midline between Denmark and Poland
- Protected areas in the Russian part of the Baltic Region:
- Protected site in Russia
 - Proposed protected site in Russia
- Dredging (Micro-tunnelling) - normal hydrography**
- Sedimentation (g/m²):
- 0 - 50
 - > 50 - 100
 - > 100 - 200
 - > 200 - 500
 - > 500 - 1000
 - > 1,000 - 2,000
 - > 2,000 - 5,000
 - > 5,000 - 10,000
 - > 10,000 - 20,000

Note:

- Redistribution of sediments for normal and summer scenarios are shown
- Normal and summer scenarios refer to periods with normal or summer hydrographic conditions with respect to flow velocities and stratification

References:

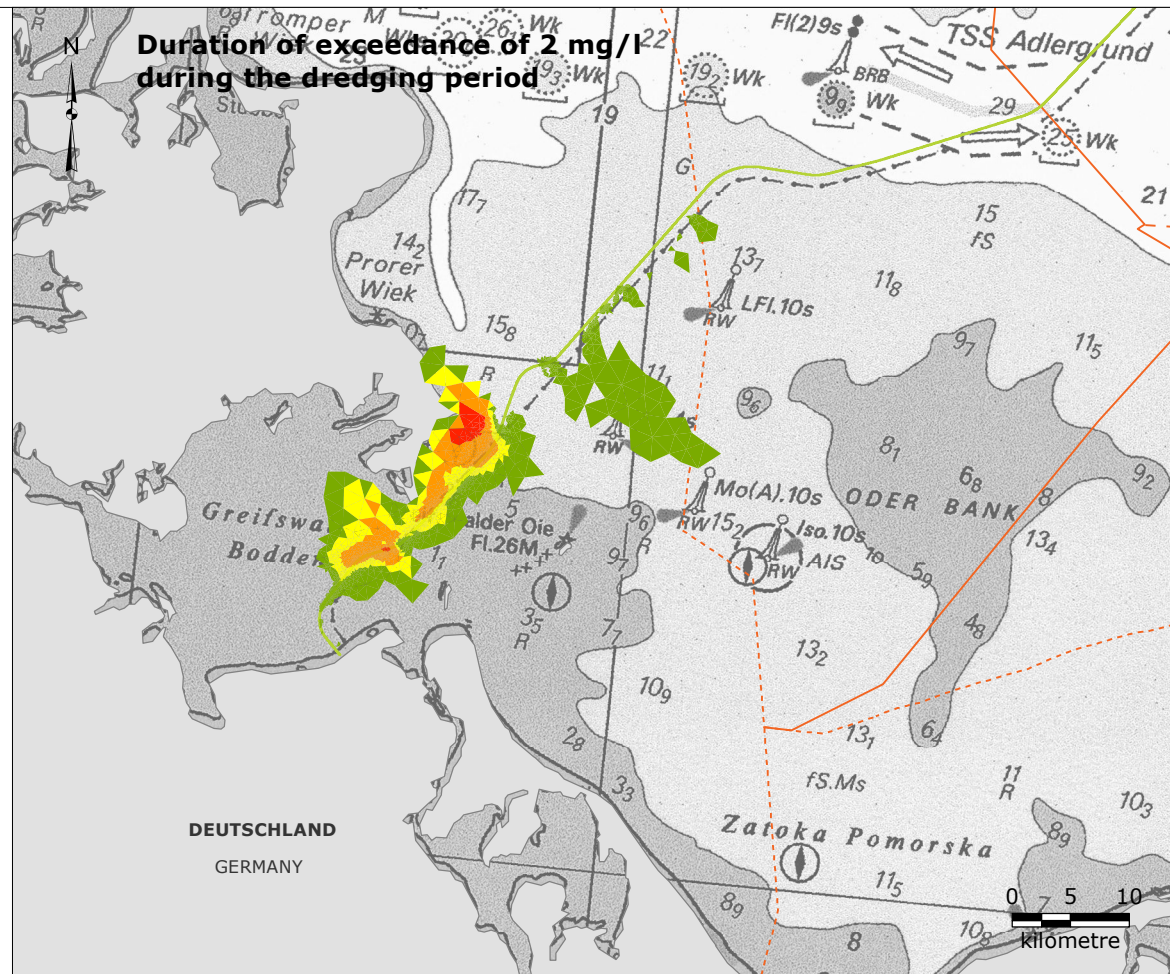
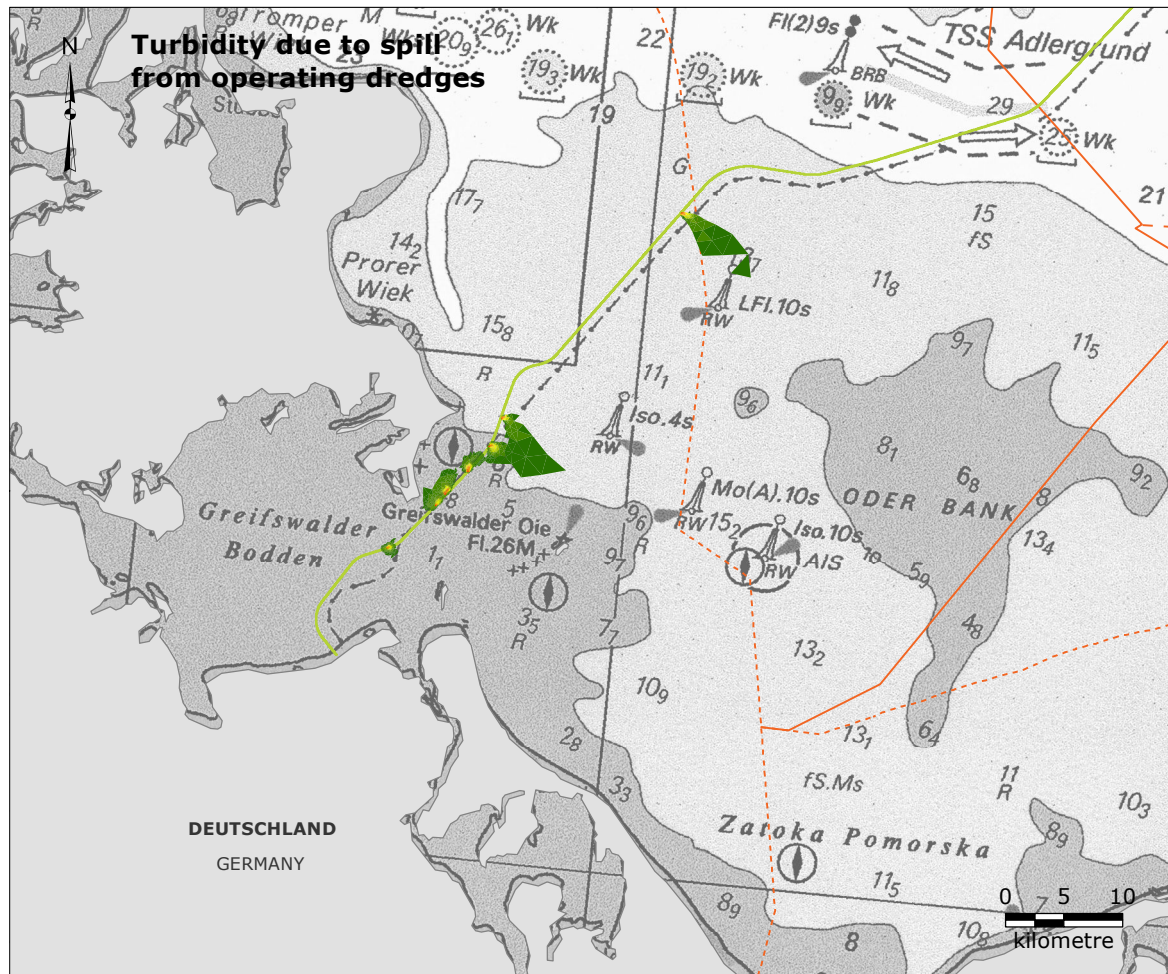
- Pogrebov, V., Sagitov, R., 2006, "Nature conservation atlas of the Russian part of the Gulf of Finland", Tuscarora, Russia, 60 pp.
- Rambøll, "Modelling of sediment spill in Russia", Doc. no. W-PE-EIA-PRU-REP-805-070500EN-02

Version: 02
 Date: 2017-02-22
 Prepared: MIRS
 Controlled: JLA

MO-06-Espoo

Sedimentation from dredging at Russian landfall





Legend:

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

Legend:

Suspended sediment concentration (mg/l):

	0 - 1		> 20 - 25
	> 1 - 2		> 25 - 30
	> 2 - 4		> 30 - 40
	> 4 - 6		> 40 - 50
	> 6 - 8		> 50 - 100
	> 8 - 10		> 100 - 150
	> 10 - 15		> 150 - 200
	> 15 - 20		> 200

Legend:

Duration of exceeding threshold concentration (2 mg/l) in days:

	≤ 2
	> 2 - 5
	> 5 - 10
	> 10 - 20
	> 20

Note:
- The model is set up for a period in autumn 2005. In this specific cast the modelling period was selected as 10-09-2005 - 10-11-2005.

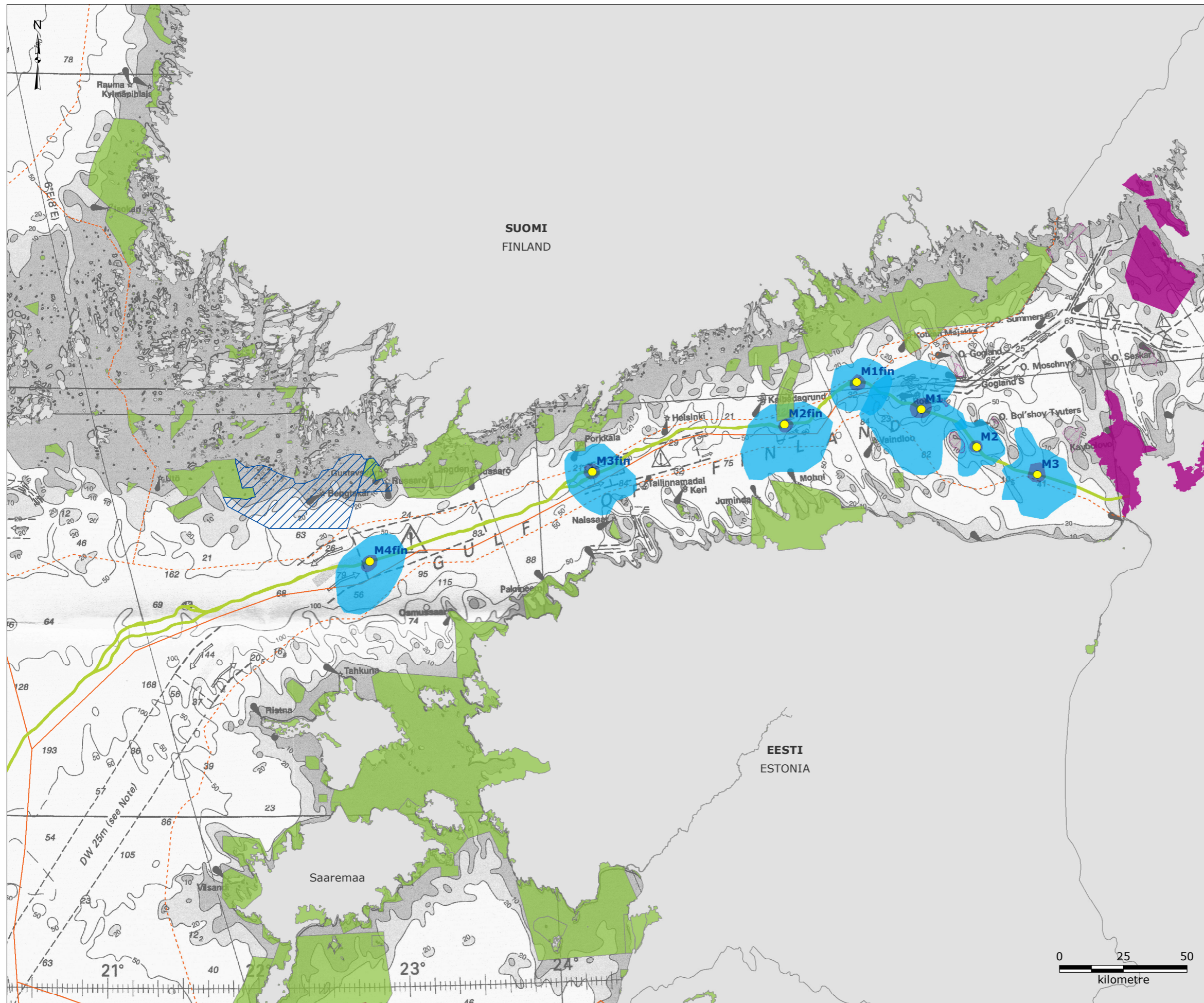
References:
- DHI, 2017 "Nord Stream 2 turbidity modelling", 2nd revision

Version: 02
Date: 2017-03-02
Prepared: MIRS
Controlled: JLA

MO-07-Espoo

**Suspended sediment
- German waters**





Legend:

- NSP2 Route
- - - Territorial water border
- EEZ border
- Natura 2000 site
- Proposed extended Natura 2000 site in Finland
- Protected site in Russia
- Proposed protected site in Russia
- Noise modelling location

Russia & Finland ave., summer

SEL (linear), dB re 1µPa²s

- 164 dB
- 179 dB

References:

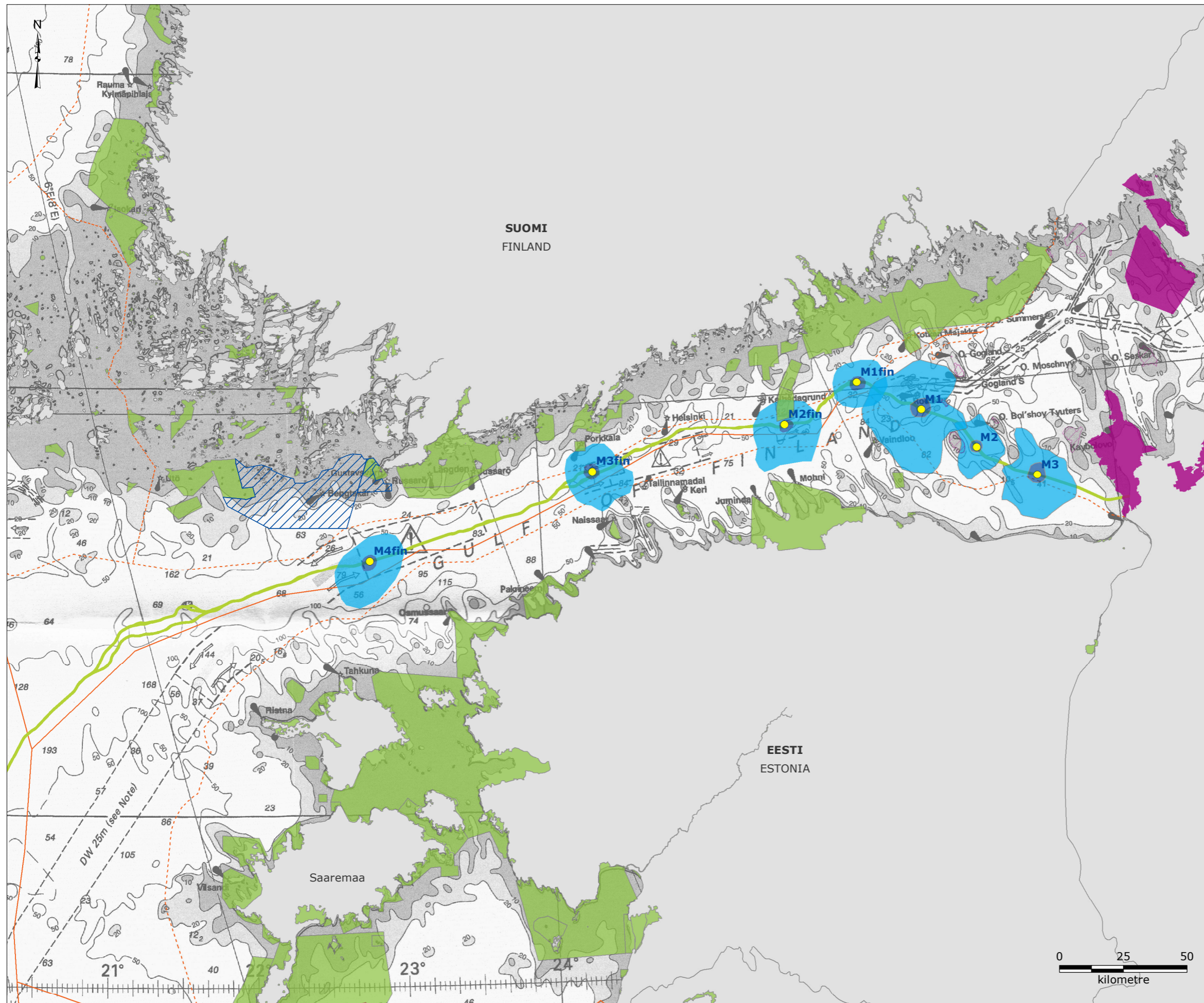
- European Environment Agency, 2014, "Natura 2000 data - the European network of protected sites", <http://www.eea.europa.eu/data-and-maps/data/natura-6>, Date accessed: 2016-01-19
- Pogrebov, V., Sagitov, R., 2006, "Nature conservation atlas of the Russian part of the Gulf of Finland", Tuscarora, Russia, 60 pp.
- SYKE, Finnish Environmental Institute, Date accessed: 2016-09-14
- Rambøll, "Underwater noise report for Finland", Doc. no. W-PE-EIA-PFI-REP-805-030600EN-05
- Rambøll, "Underwater noise report for Russia", Doc. no. W-PE-EIA-OFI-REP-805-070600EN-03

Version: 01
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 Prepared: MIRS
 Controlled: JLA

UN-01-Espoo

Underwater noise (ave.) during munitions clearance (Gulf of Finland) - summer scenario





Legend:

- NSP2 Route
- Territorial water border
- EEZ border
- Natura 2000 site
- Proposed extended Natura 2000 site in Finland
- Protected site in Russia
- Proposed protected site in Russia
- Noise modelling location

Russia & Finland ave., winter

SEL (linear), dB re 1µPa²s

- 164 dB
- 179 dB

References:

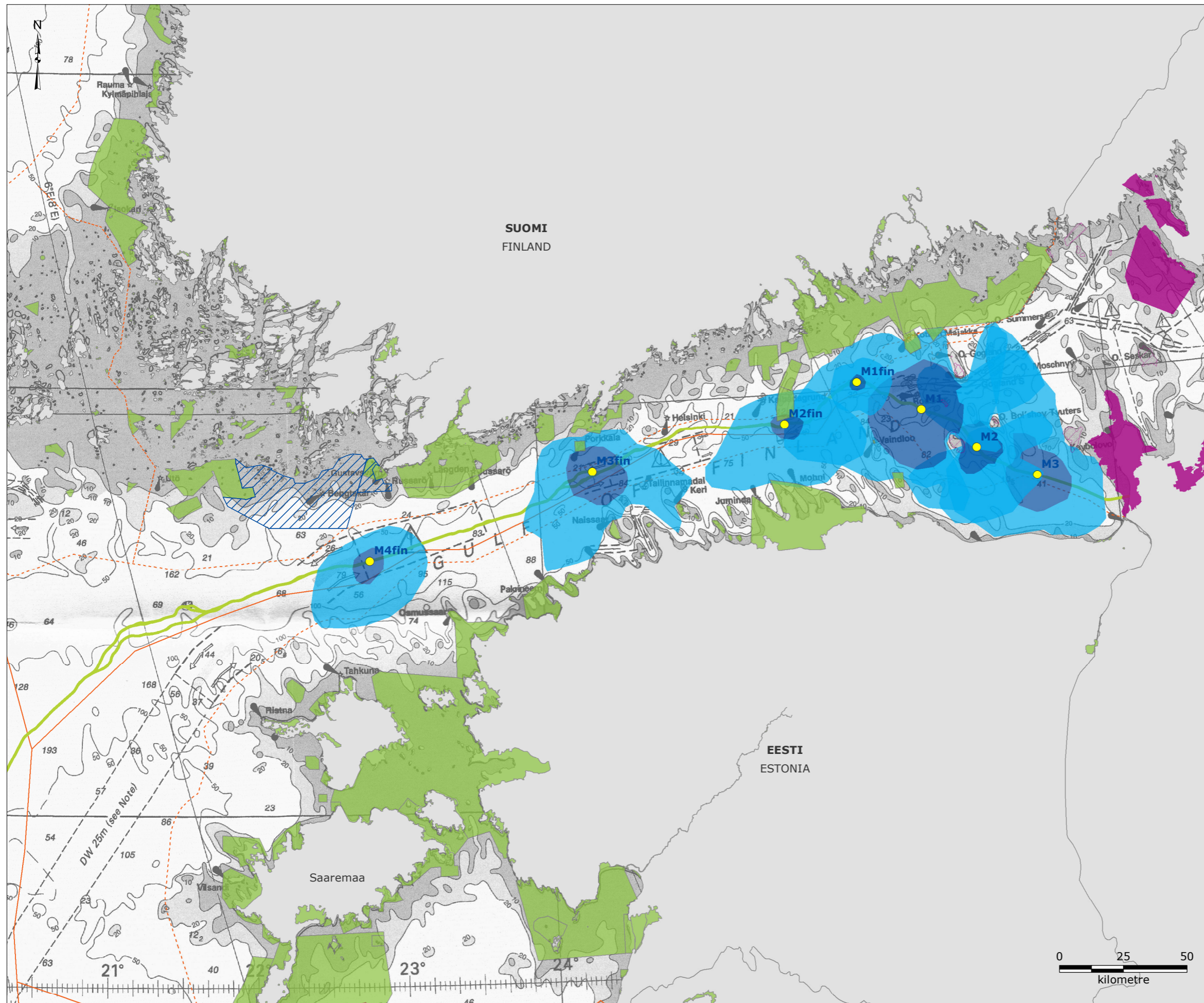
- European Environment Agency, 2014, "Natura 2000 data - the European network of protected sites", <http://www.eea.europa.eu/data-and-maps/data/natura-6>, Date accessed: 2016-01-19
- Pogrebov, V., Sagitov, R., 2006, "Nature conservation atlas of the Russian part of the Gulf of Finland", Tuscarora, Russia, 60 pp.
- SYKE, Finnish Environmental Institute, Date accessed: 2016-09-14
- Rambøll, "Underwater noise report for Finland", Doc. no. W-PE-EIA-PFI-REP-805-030600EN-05
- Rambøll, "Underwater noise report for Russia", Doc. no. W-PE-EIA-OFR-REP-805-070600EN-03

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 Controlled: JLA

UN-02-Espoo

Underwater noise (ave.) during munitions clearance (Gulf of Finland) - winter scenario





Legend:

- NSP2 Route
- - - Territorial water border
- EEZ border
- Natura 2000 site
- Proposed extended Natura 2000 site in Finland
- Protected site in Russia
- Proposed protected site in Russia
- Noise modelling location

Russia & Finland max., summer
SEL (linear), dB re 1µPa²s

- 164 dB
- 179 dB

References:

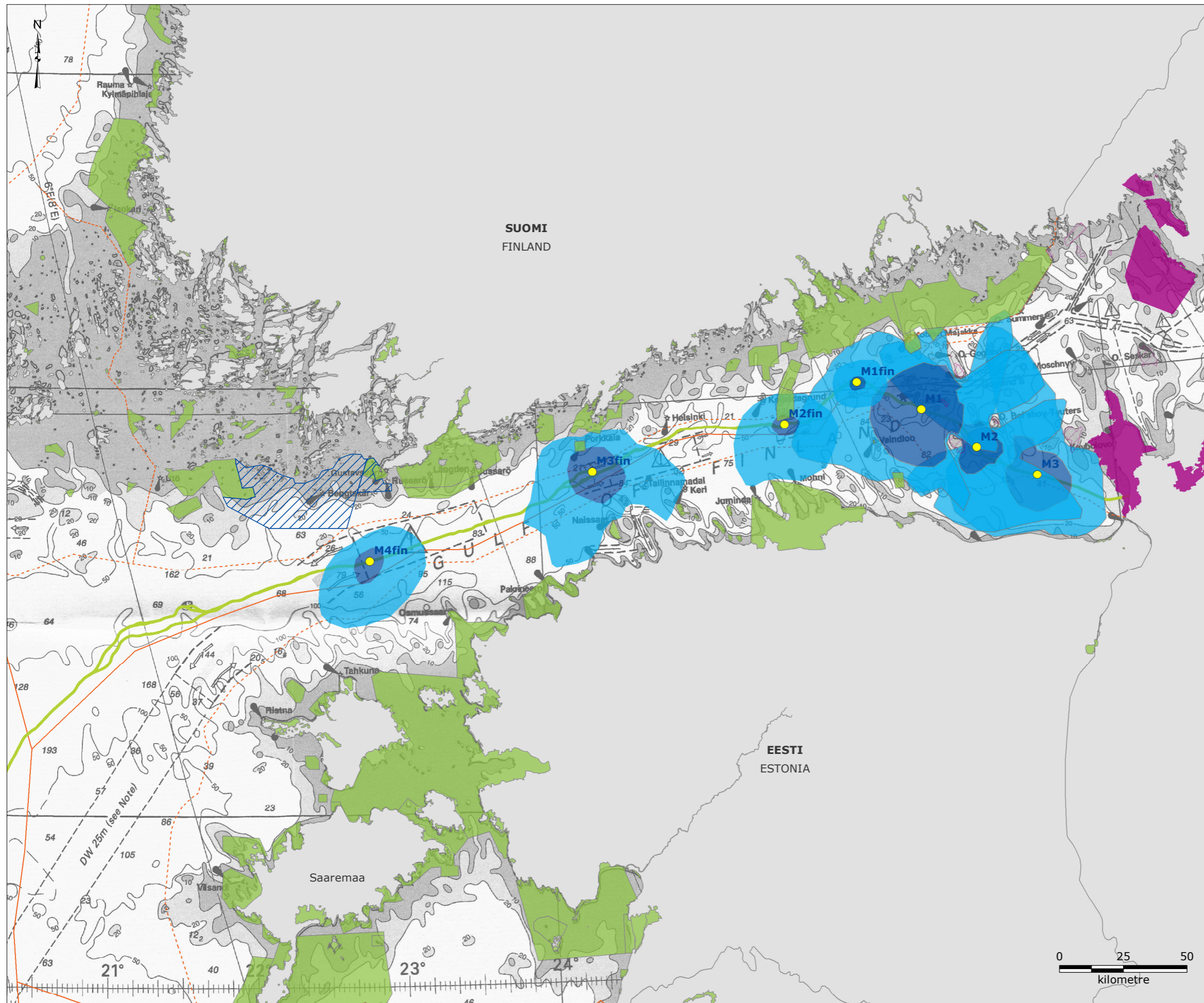
- European Environment Agency, 2014, "Natura 2000 data - the European network of protected sites", <http://www.eea.europa.eu/data-and-maps/data/natura-6>, Date accessed: 2016-01-19
- Pogrebov, V., Sagitov, R., 2006, "Nature conservation atlas of the Russian part of the Gulf of Finland", Tuscarora, Russia, 60 pp.
- SYKE, Finnish Environmental Institute, Date accessed: 2016-09-14
- Rambøll, "Underwater noise report for Finland", Doc. no. W-PE-EIA-PFI-REP-805-030600EN-05
- Rambøll, "Underwater noise report for Russia", Doc. no. W-PE-EIA-OFR-REP-805-070600EN-03

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Prepared: MIRS
Controlled: JLA

UN-03-Espoo

Underwater noise (max.) during munitions clearance (Gulf of Finland) - summer scenario





Legend:

- NSP2 Route
- - - Territorial water border
- EEZ border
- Natura 2000 site
- Proposed extended Natura 2000 site in Finland
- Protected site in Russia
- Proposed protected site in Russia
- Noise modelling location

Russia & Finland max., winter
SEL (linear), dB re 1µPa²s

- 164 dB
- 179 dB

References:

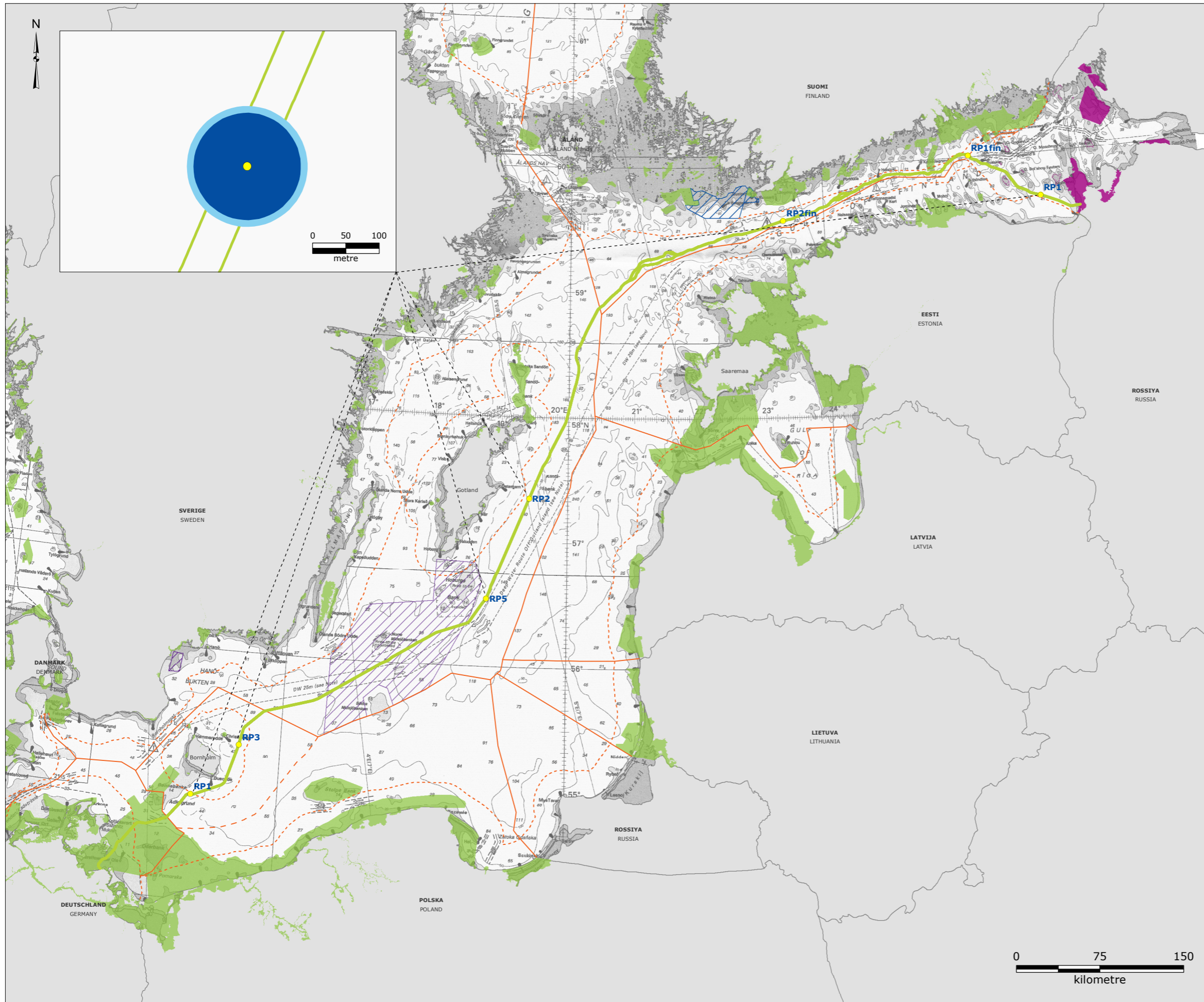
- European Environment Agency, 2014, "Natura 2000 data - the European network of protected sites", <http://www.eea.europa.eu/data-and-maps/data/natura-6>, Date accessed: 2016-01-19
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- SYKE, Finnish Environmental Institute, Date accessed: 2016-09-14
- Rambøll, "Underwater noise report for Finland", Doc. no. W-PE-EIA-PFI-REP-805-030600EN-05
- Rambøll, "Underwater noise report for Russia", Doc. no. W-PE-EIA-OFR-REP-805-070600EN-03

Version: 01
Date: 2017-01-12
Prepared: MIRS
Controlled: JLA

UN-04-Espoo

Underwater noise (max.) during munitions clearance (Gulf of Finland) - winter scenario





Legend:

- NSP2 Route
- Territorial water border
- EEZ border
- Midline between Denmark and Poland
- Natura 2000 site
- Proposed extended Natura 2000 site in Sweden:
 - Proposed new and extended Natura 2000-sites
- Proposed extended Natura 2000 site in Finland:
 - Special Protection Areas (SPA) and Special Area of Conservation/ Special Conservation Interests (SAC/SCI)
- Protected site in Russia
- Proposed protected site in Russia
- Noise modelling location

- Rock placement, winter**
 Cumulative SEL (linear, two-hour), dB re 1µPa²s
- Marine mammals (188 dB - TTS)
 - Fish (186 dB - TTS)

Note:
 - Examples of underwater noise dispersion from rock placement
 - Underwater sound exposure levels. Noise level contour plots to TTS threshold limits
 - TTS (Temporary Threshold Shift) where there is a risk of temporary behavior impacts
 - Underwater continuous noise levels contour plots (db re. 1µPa²s) (winter)

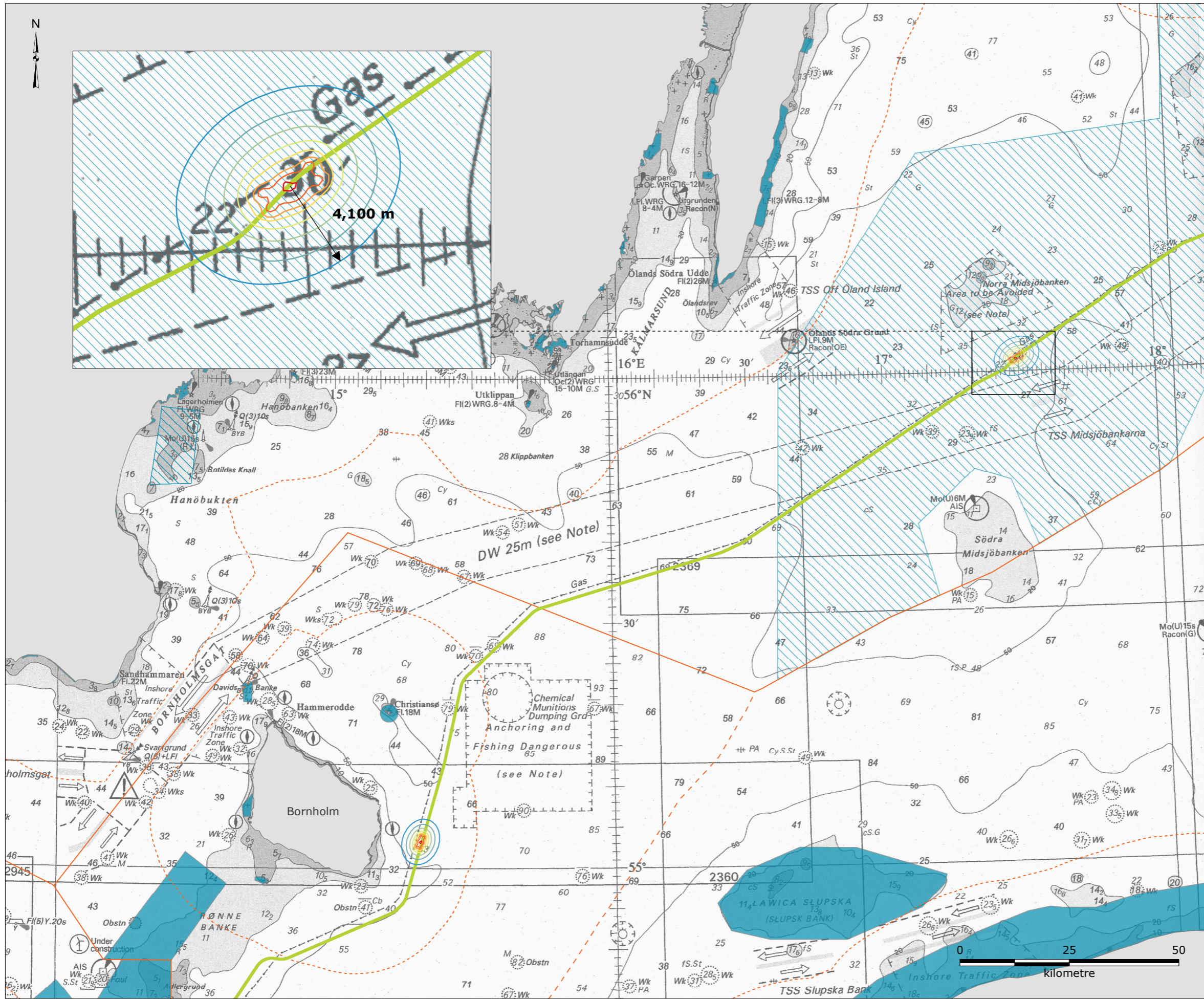
References:
 - European Environment Agency, 2014, "Natura 2000 data - the European network of protected sites", <http://www.eea.europa.eu/data-and-maps/data/natura-6>, Date accessed: 2016-01-19
 - SYKE, Finnish Environmental Institute, Date accessed: 2016-09-14

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 Controlled: JLA

UN-05-Espoo

Underwater noise dispersion from rock placement





Legend

- NSP2 Route
- - - Territorial water border
- - - EEZ border
- - - Midline between Denmark and Poland
- Natura 2000 site
- Proposed new and extended Natura 2000 site in Sweden

Noise distribution (db):

- 33
- 36
- 39
- 42
- 45
- 48
- 51
- 57

Note:
 - Atmospheric noise modelling assuming one anchored pipe-laying vessel, one supply vessel, and four tug vessels

Reference:
 - Calculations according to Miljøstyrelsen, 1993, "Beregning af støj fra virksomheder. Fælles nordisk beregningsmetode", in Vejledning fra Miljøstyrelsen Nr. 5/1993

Version: 02
 Date: 2016-02-17
 Prepared: MIRS
 Controlled: EKMNSE

NA-01-Espoo

Airborne noise propagation during NSP2 pipe laying

