

## **Final Report**

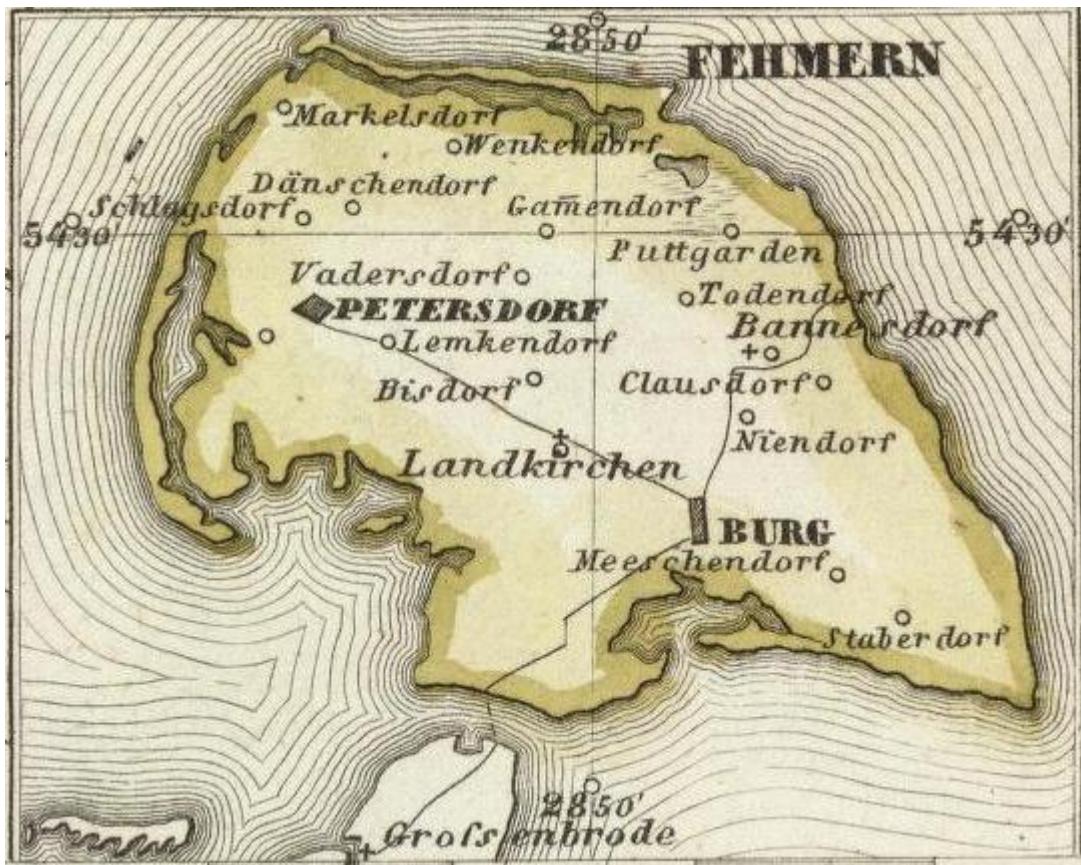
# **FEHMARNBELT FIXED LINK HYDROGRAPHIC SERVICES (FEHY)**

## **Marine Soil - Baseline**

### **Coastal Morphology Along Fehmarn and Lolland**

**E1TR0056 - Volume III**

## **APPENDICES**



*Historical Map of Fehmarn. Meyer's Handatlas 1852, No 138, Herzogthum Schleswig. From David Rumsey Map Collection, [www.davidrumsey.com](http://www.davidrumsey.com)*

**Prepared for: Femern A/S  
By: DHI/IOW Consortium**

in association with LICengineering, Bolding & Burchard and Risø DTU



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**Maps:**

Unless otherwise stated:

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Model software geographic plots: Also data from Farvandsvæsenet and Bundesamt für Seeschifffahrt und Hydrographie

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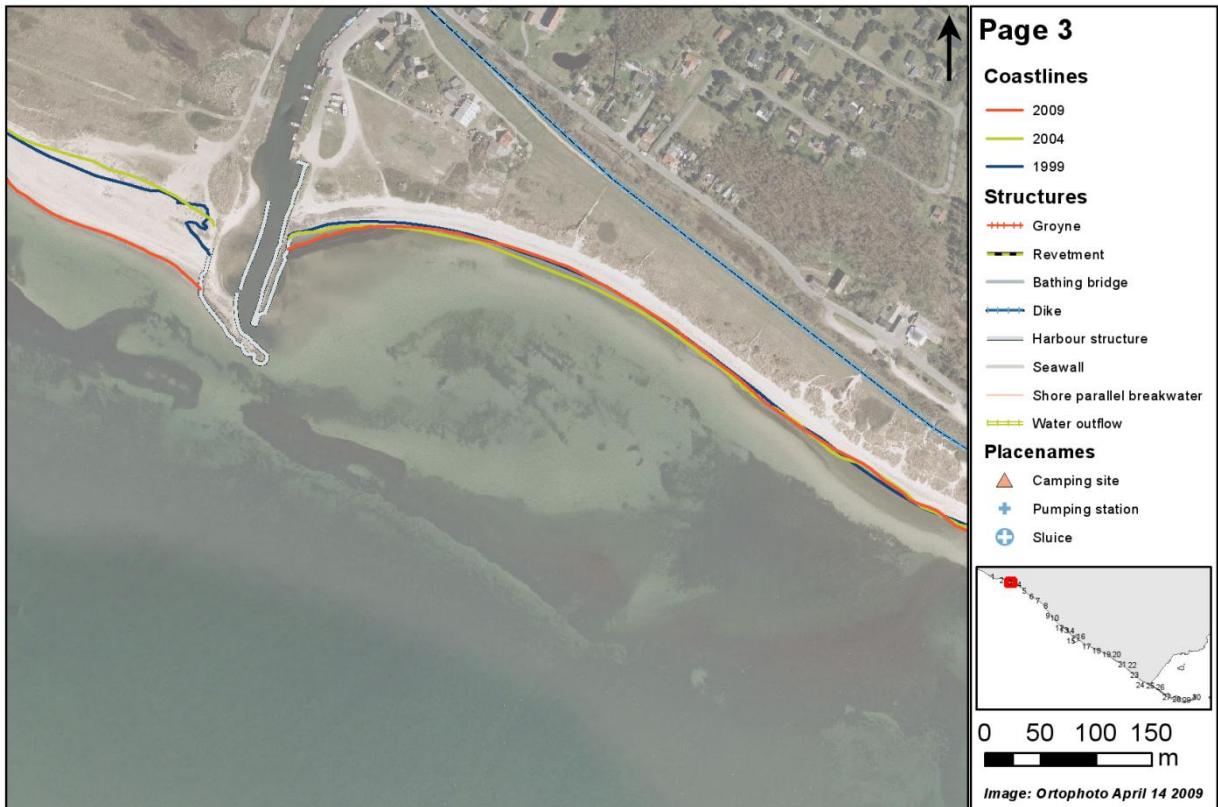
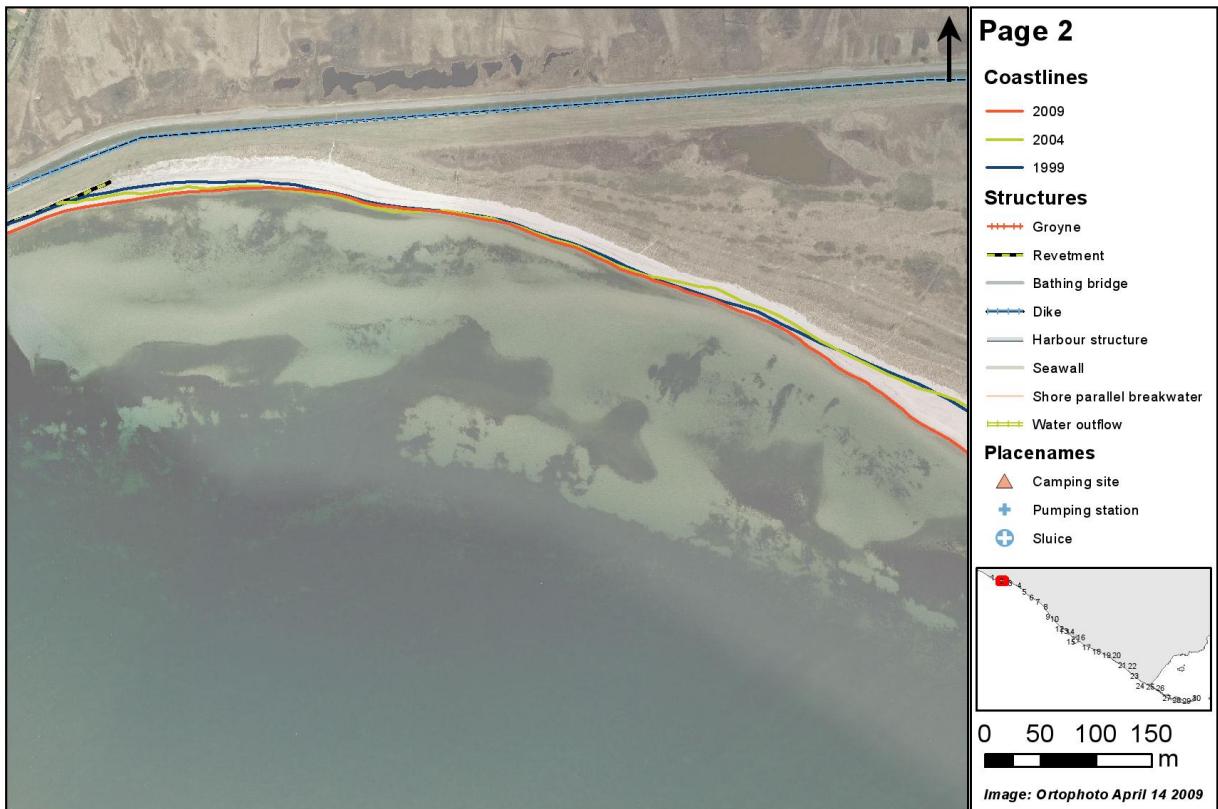
Co-financed by the European Union  
Trans-European Transport Network (TEN-T)

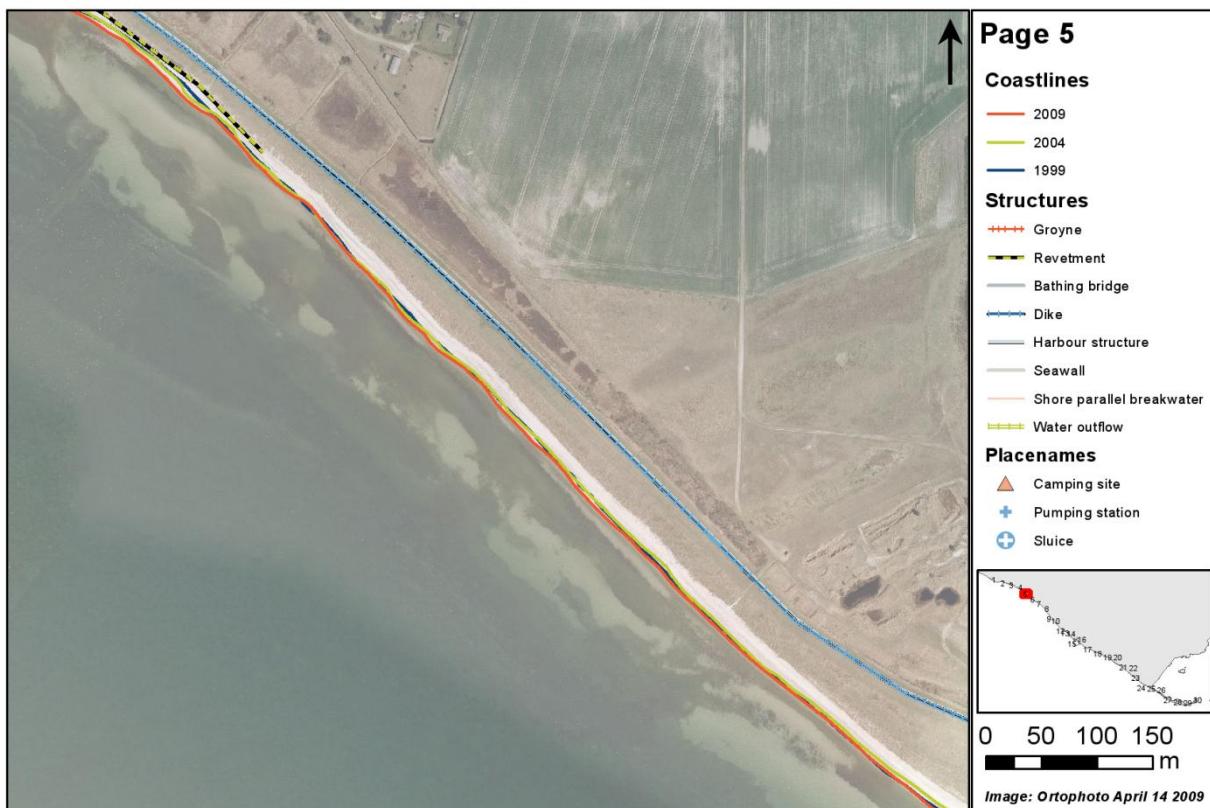


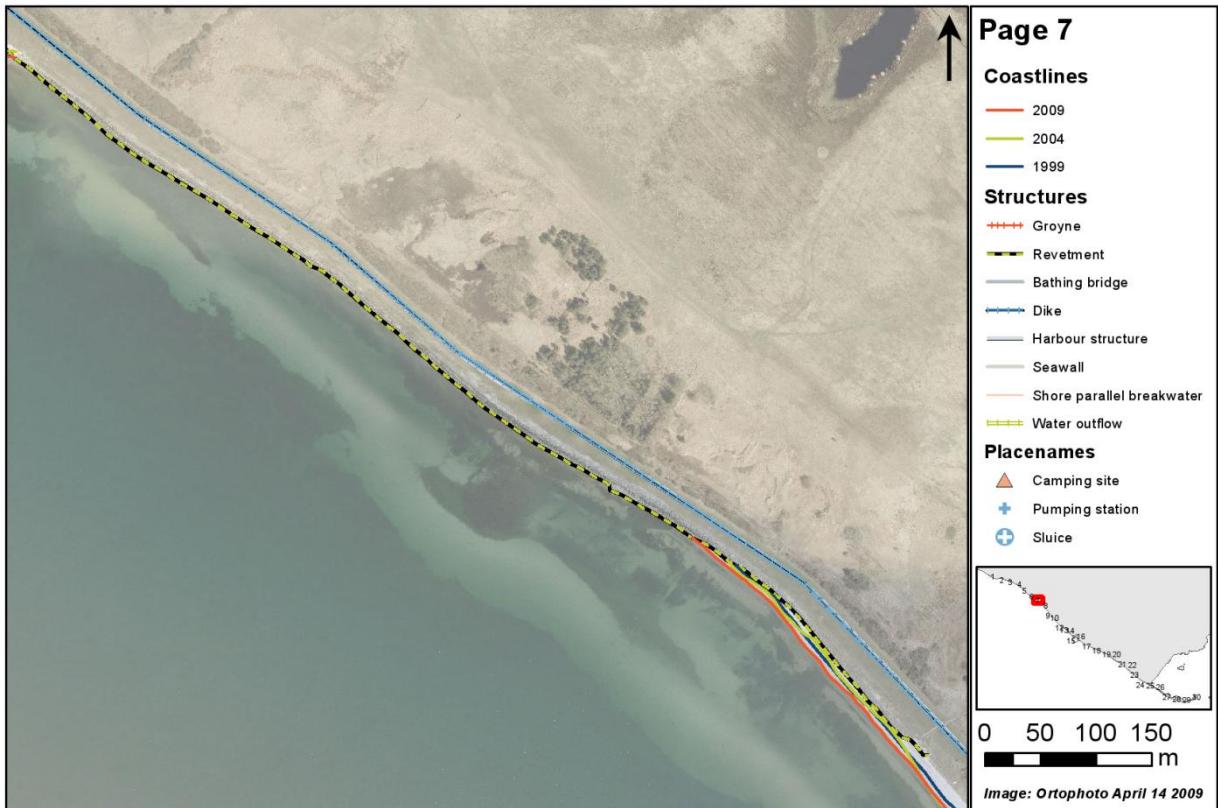
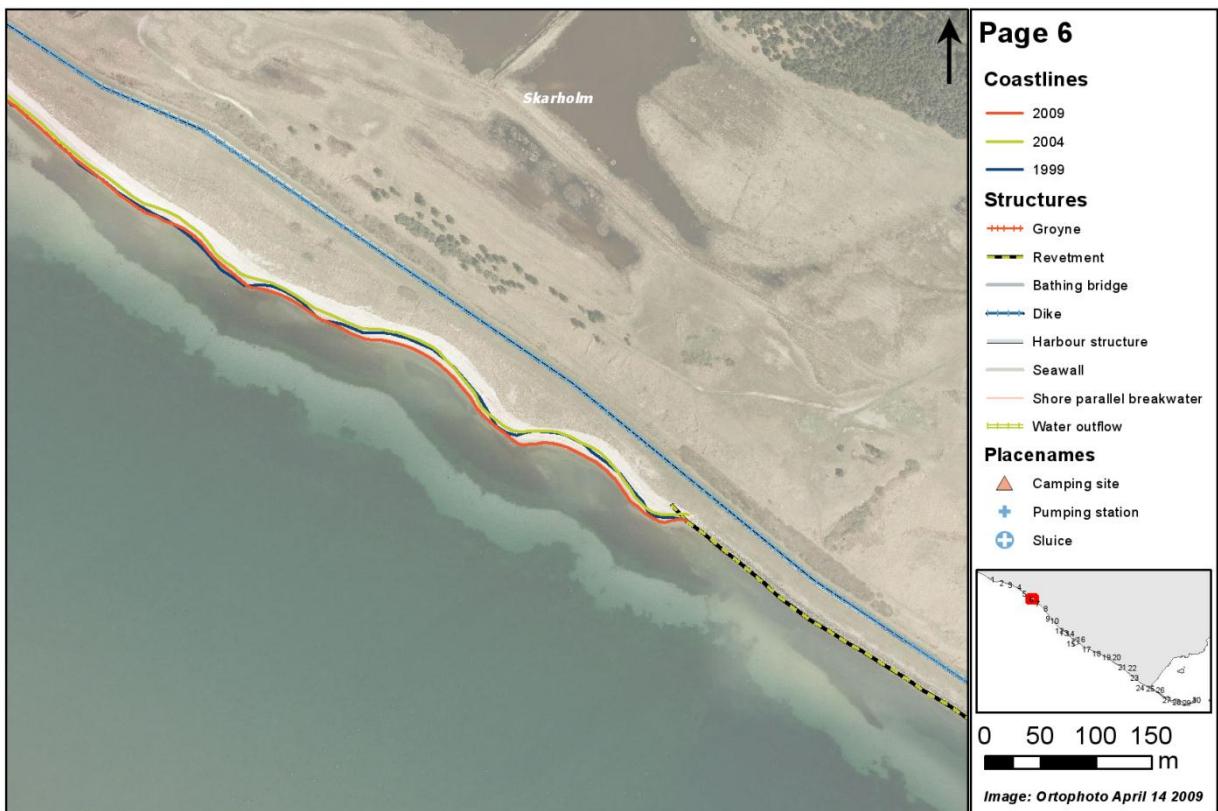
## A P P E N D I X A

***Aerial Photos, South Coast of Lolland***

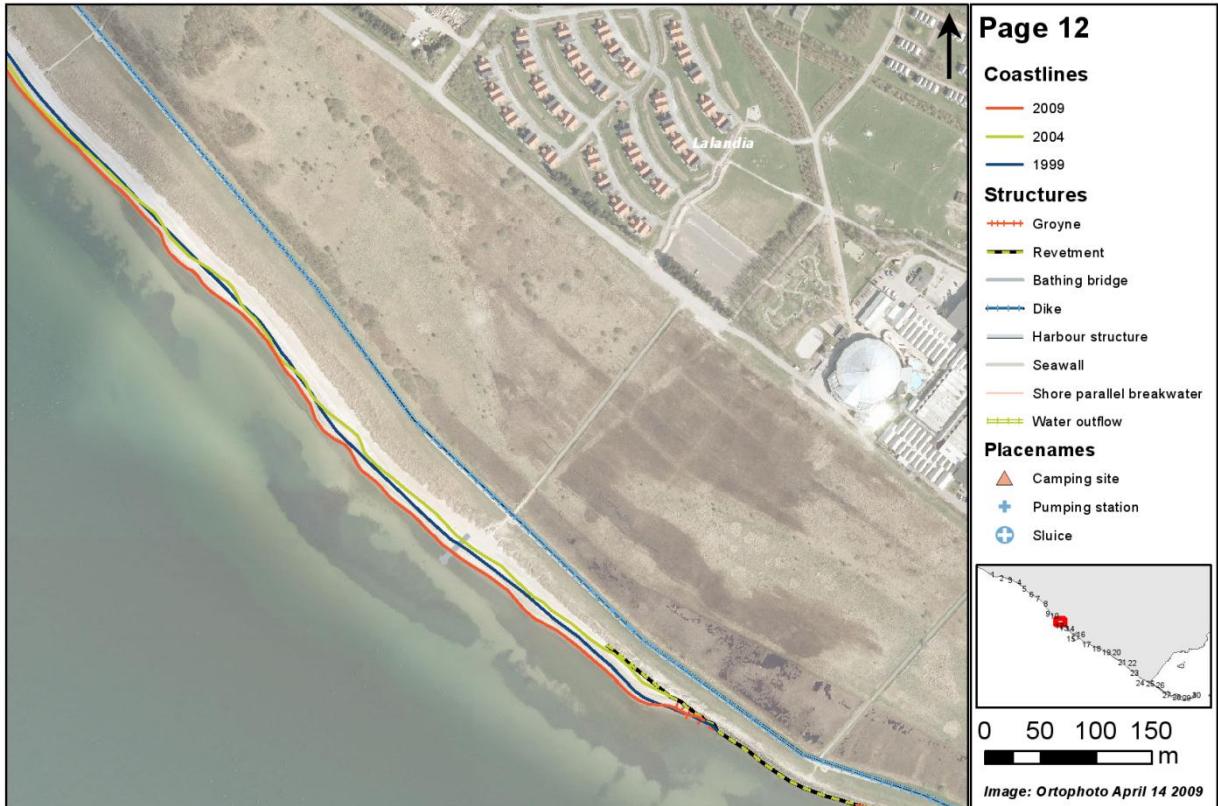


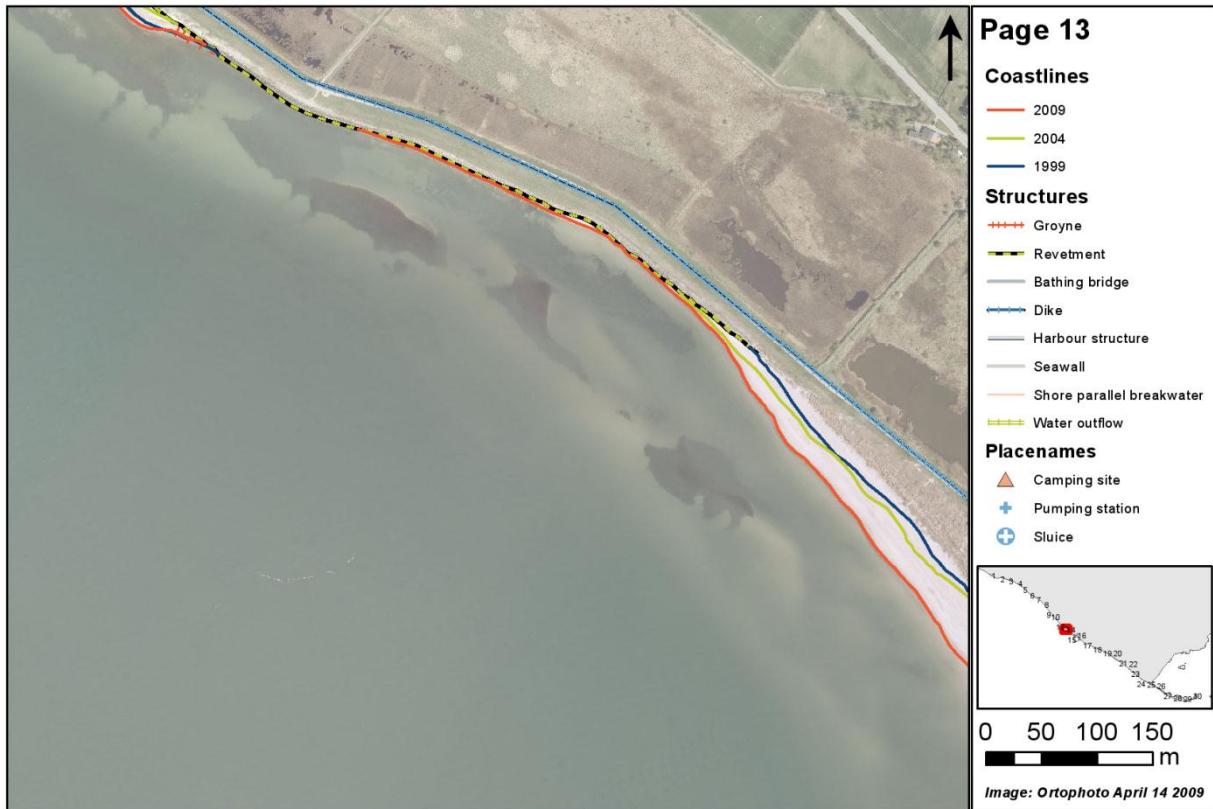


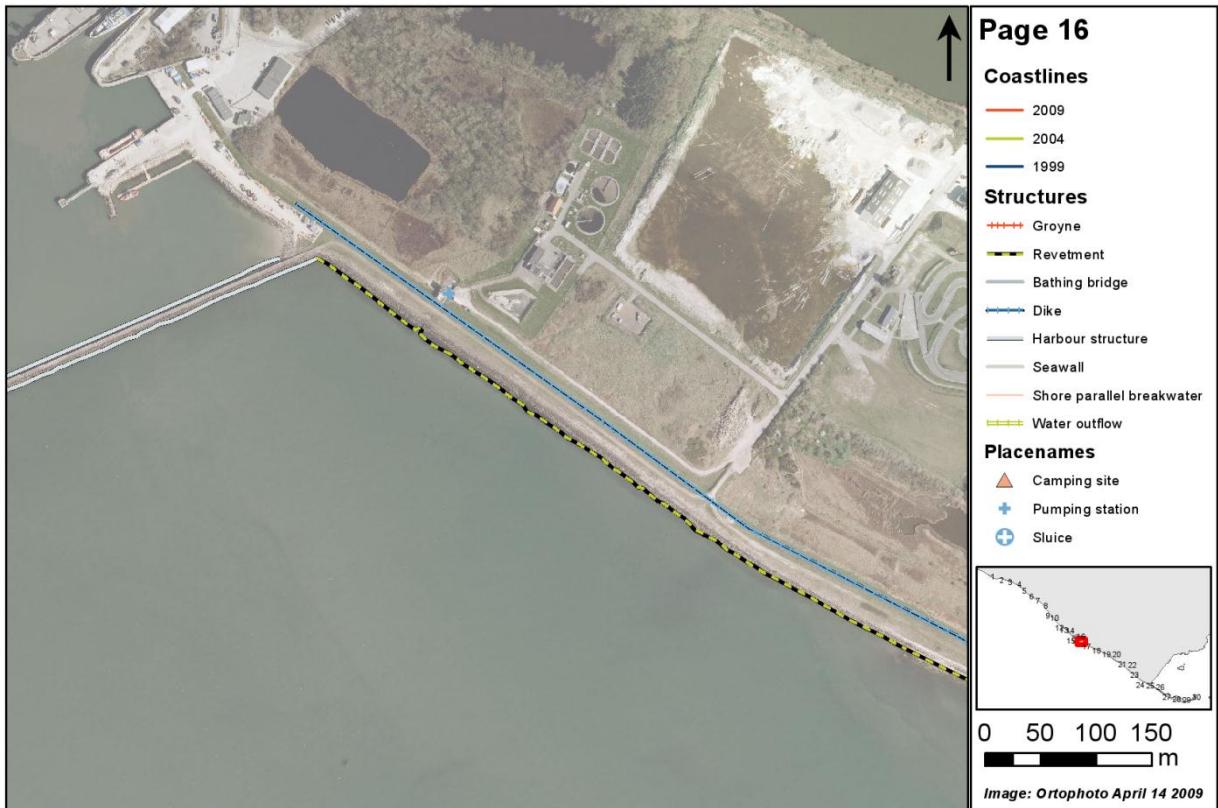
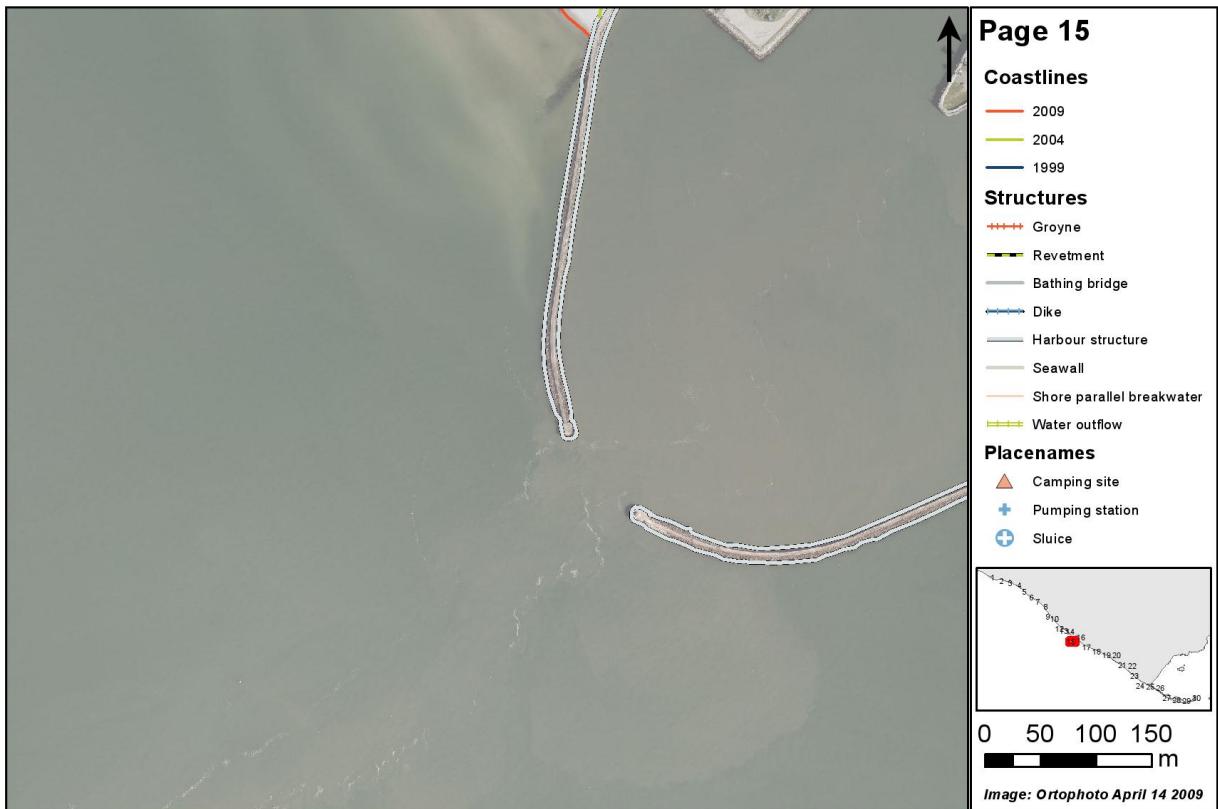


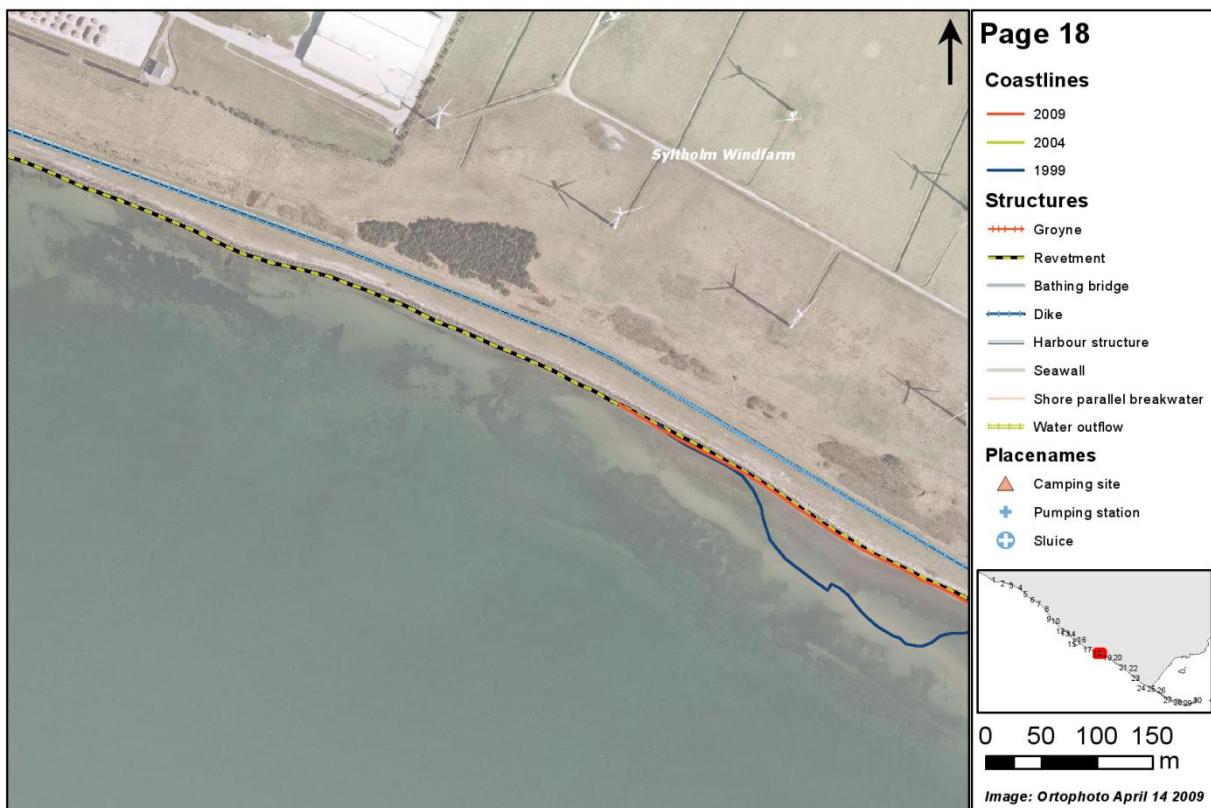
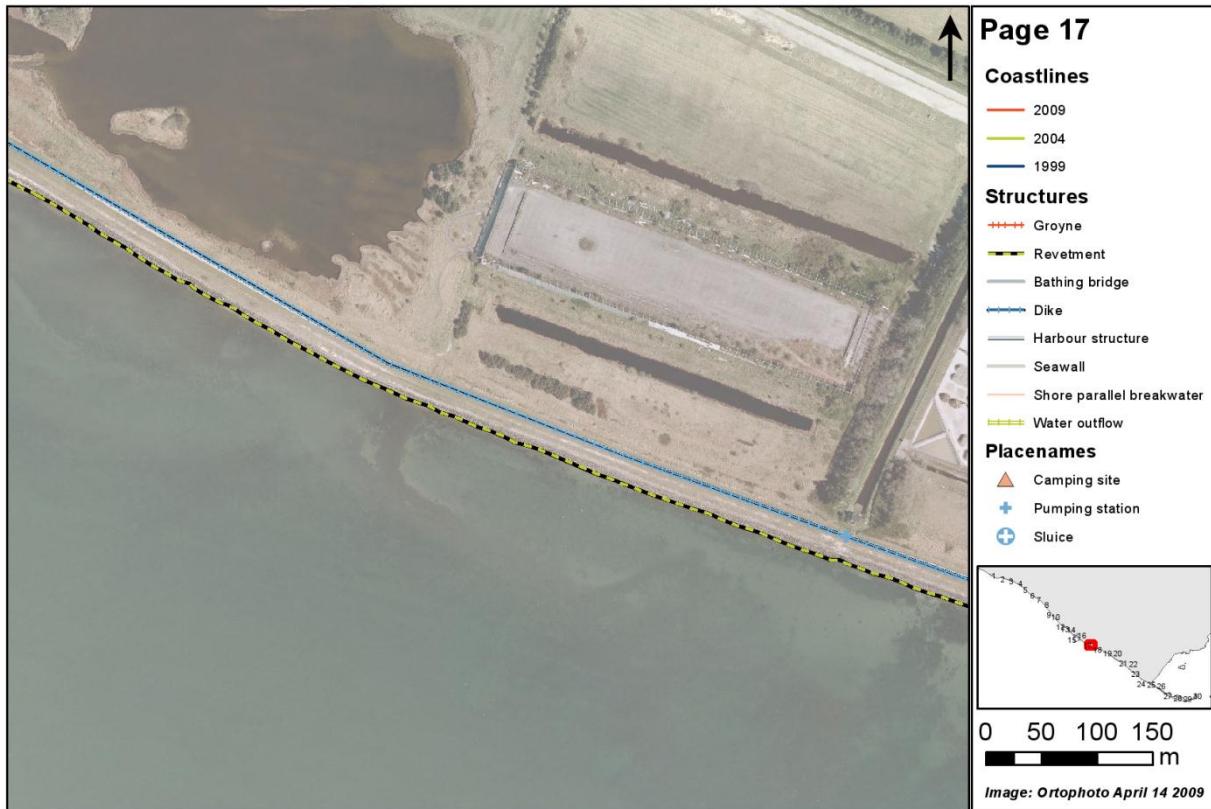


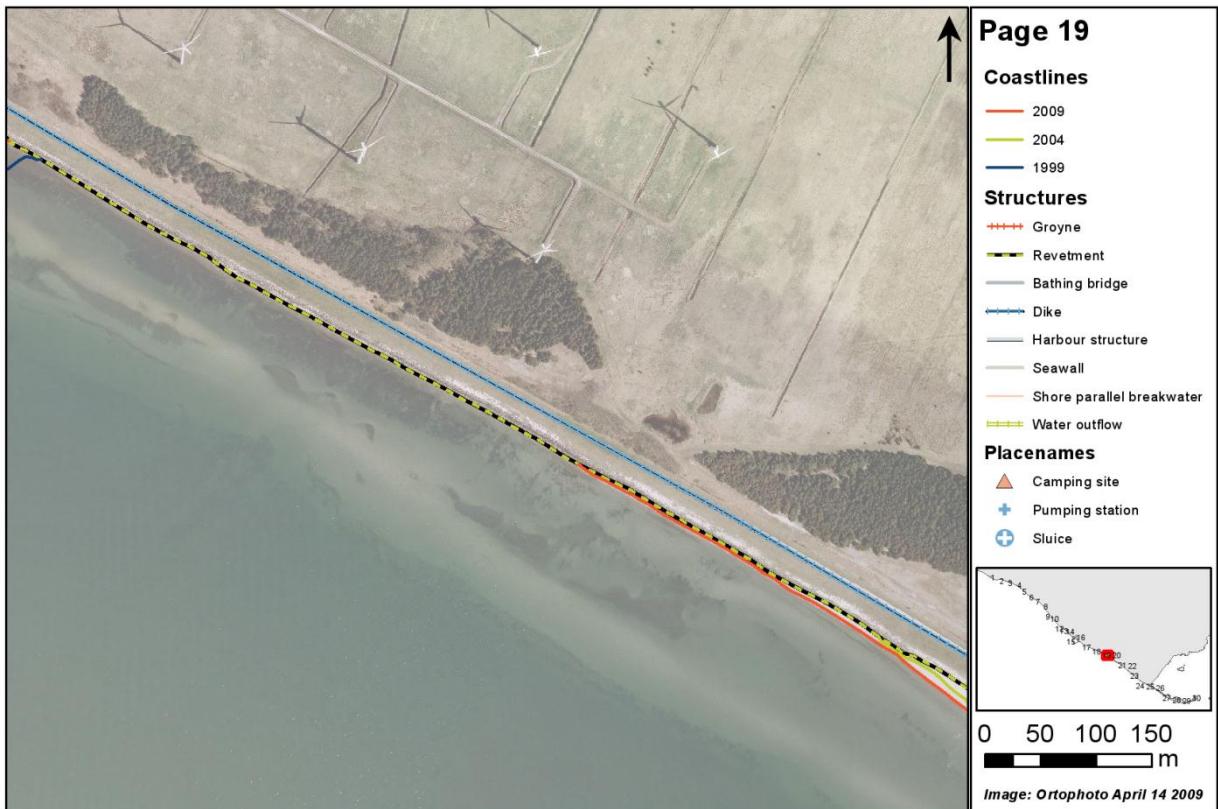


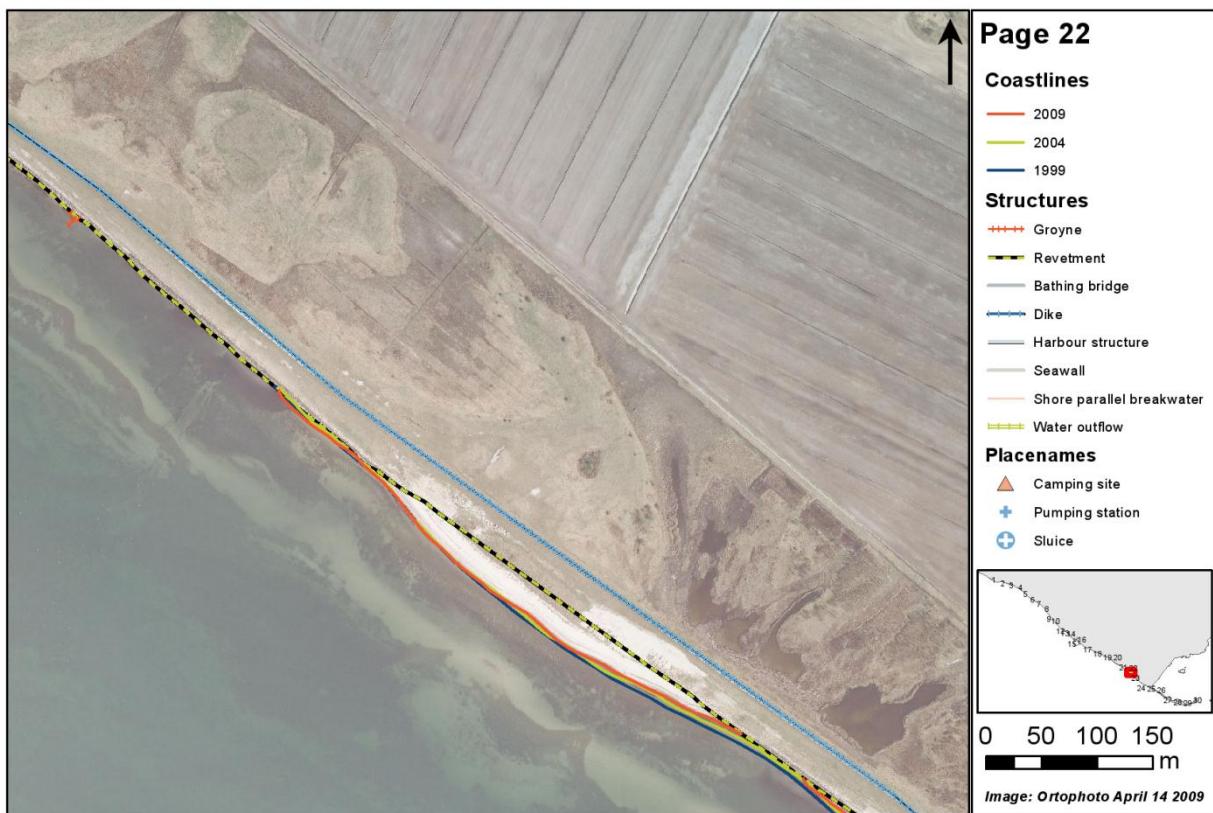
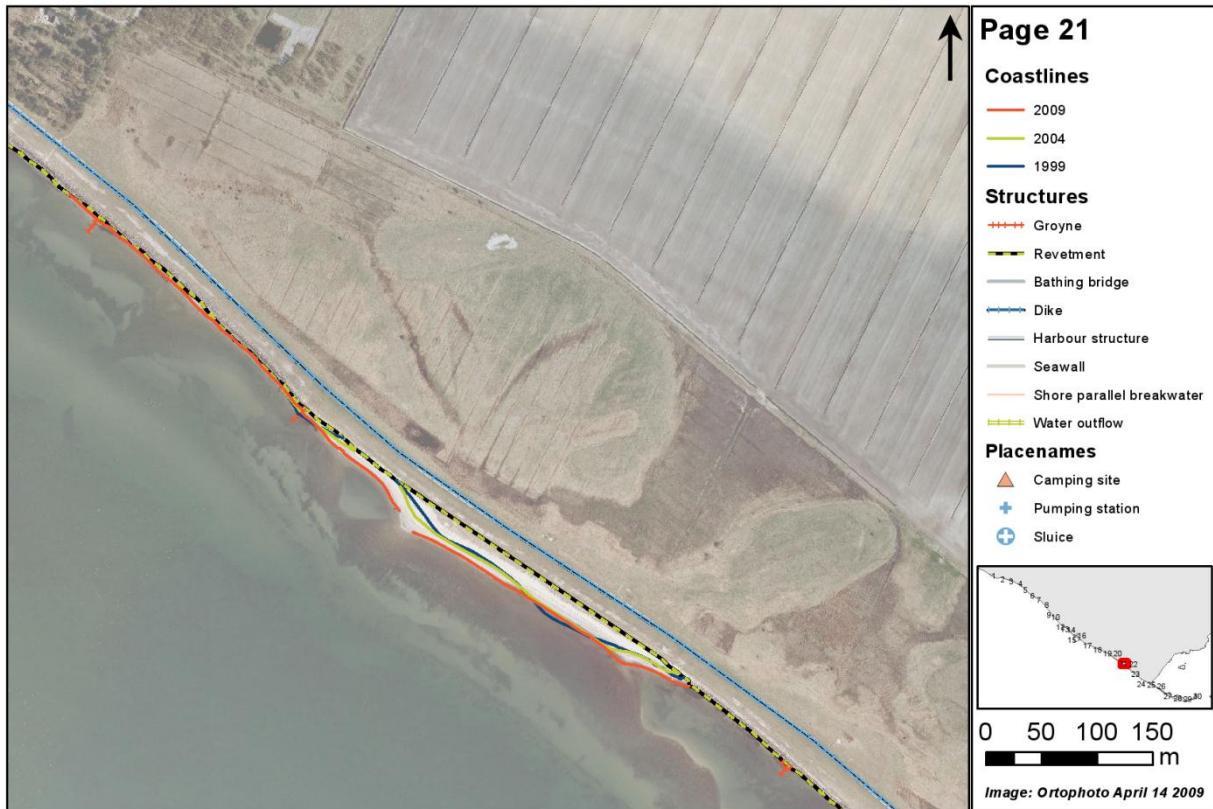


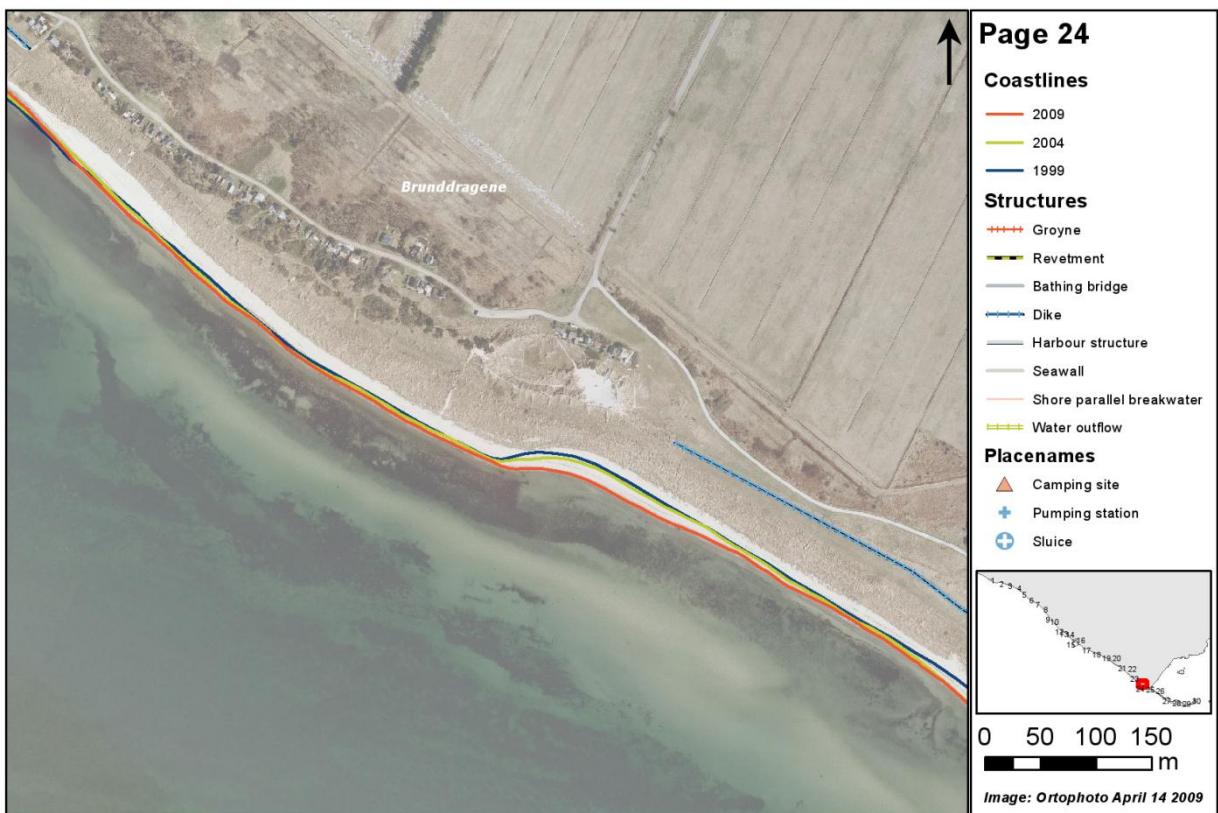
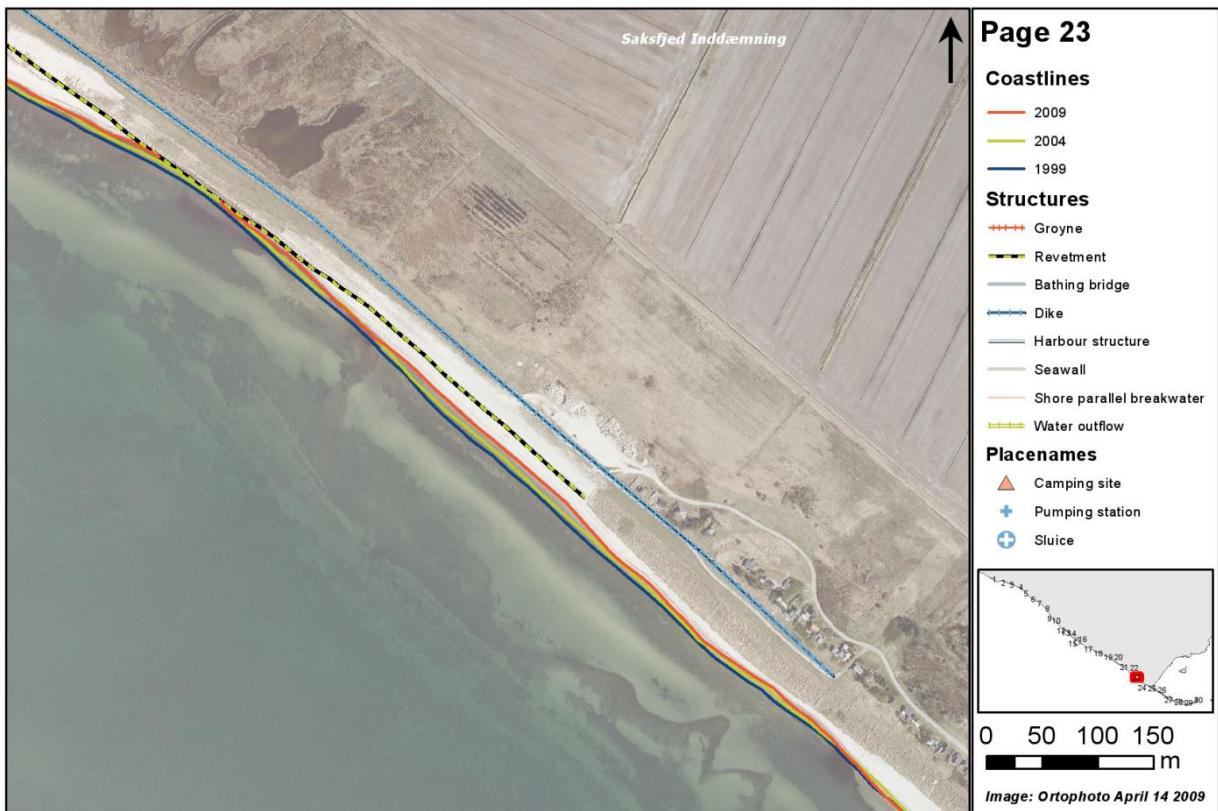


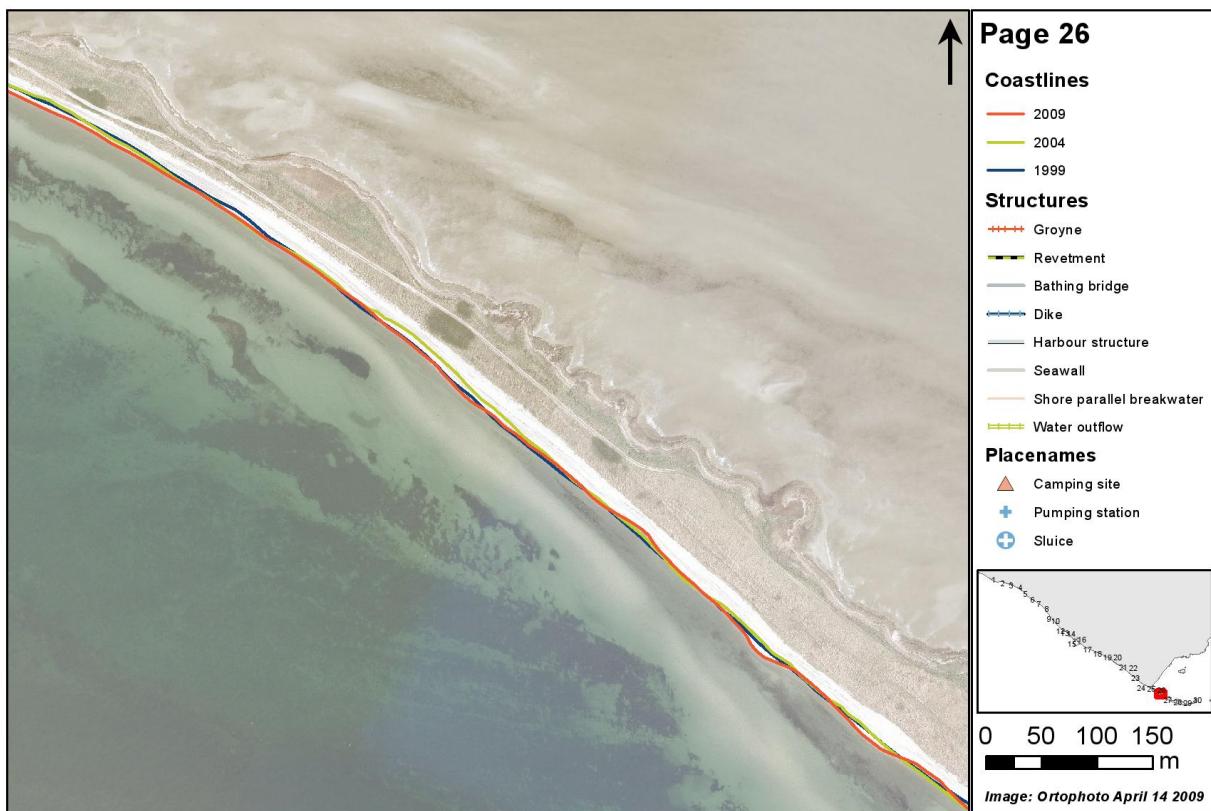


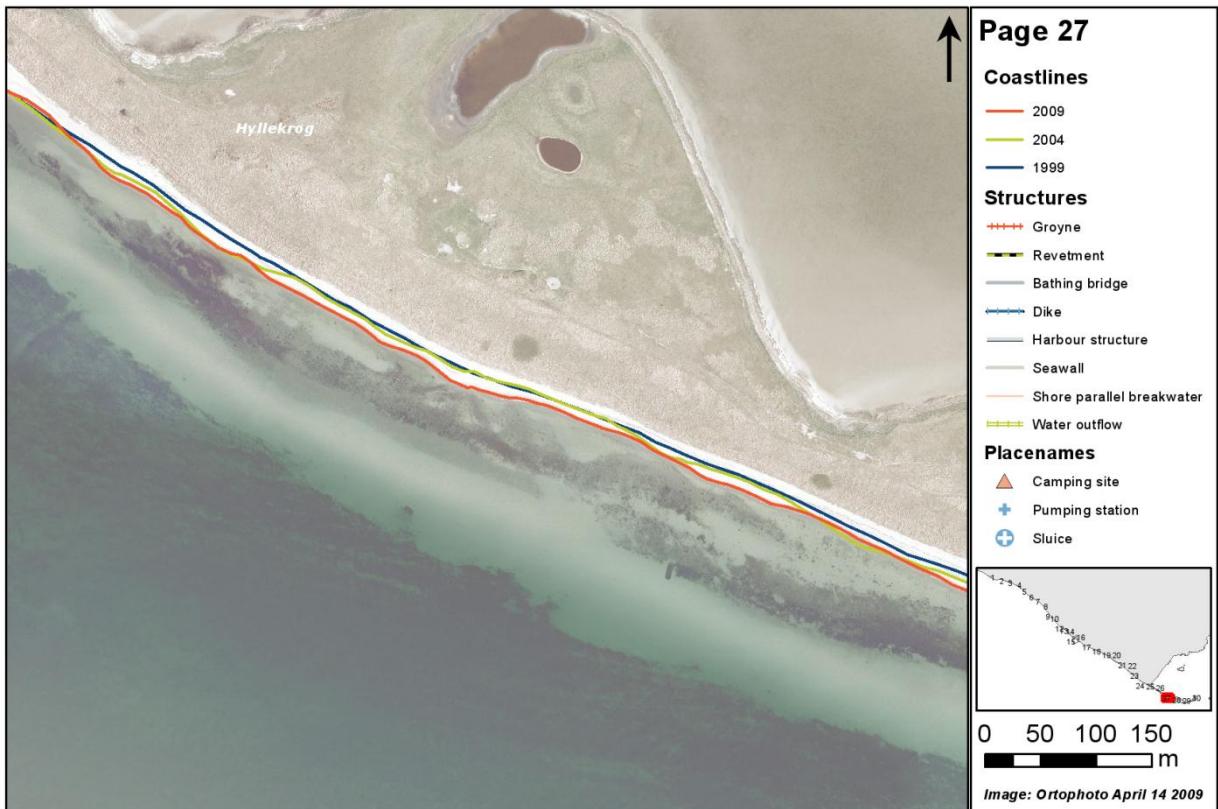


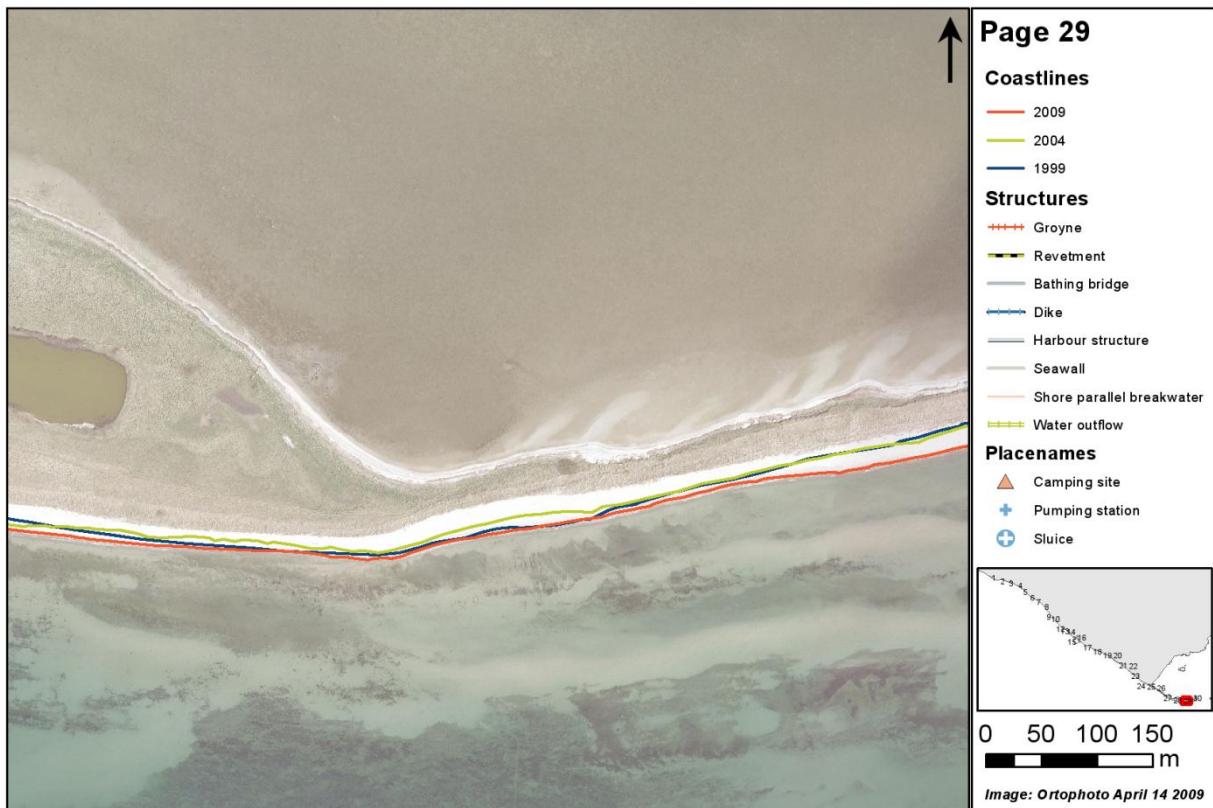












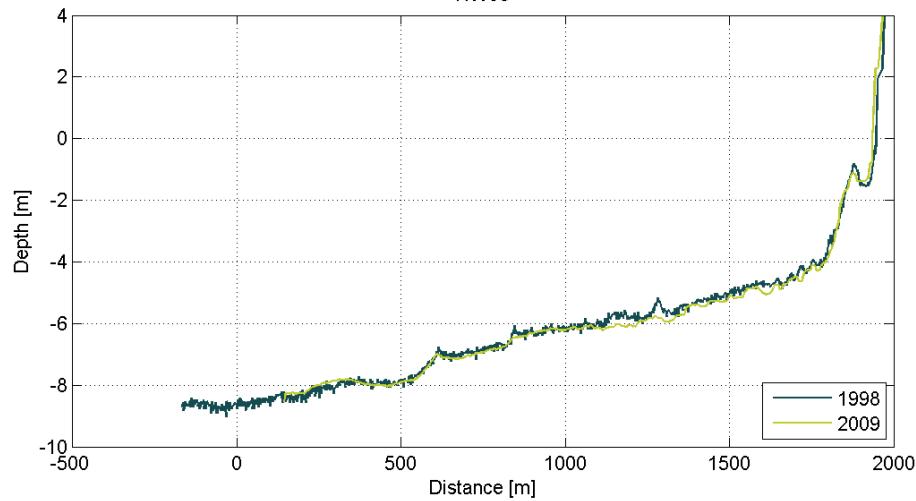


## A P P E N D I X   B

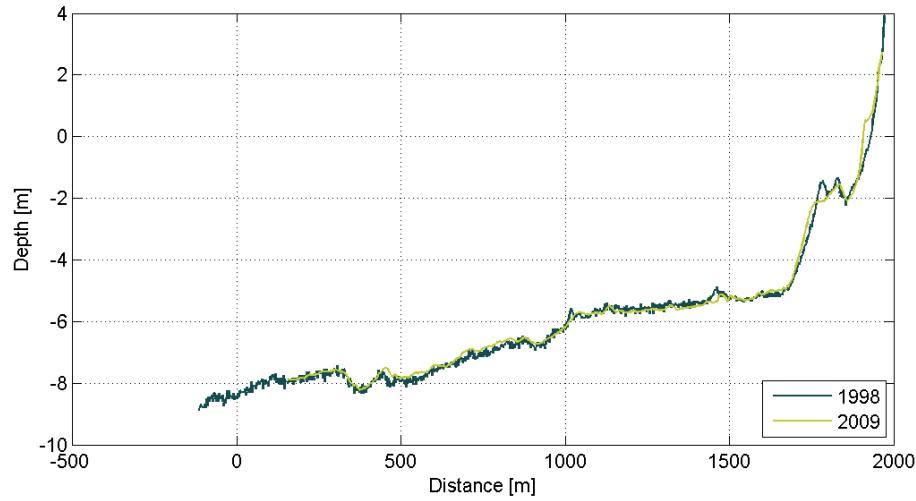
*Coastal Profiles, South Coast of Lolland*



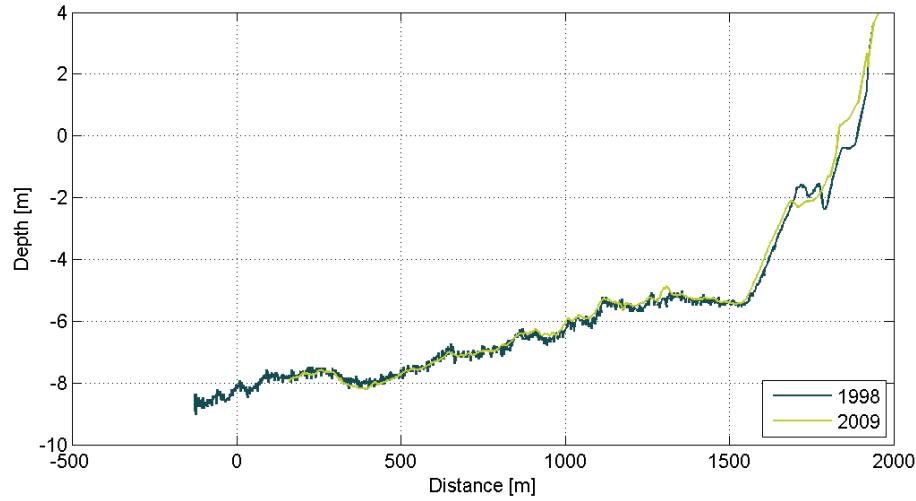
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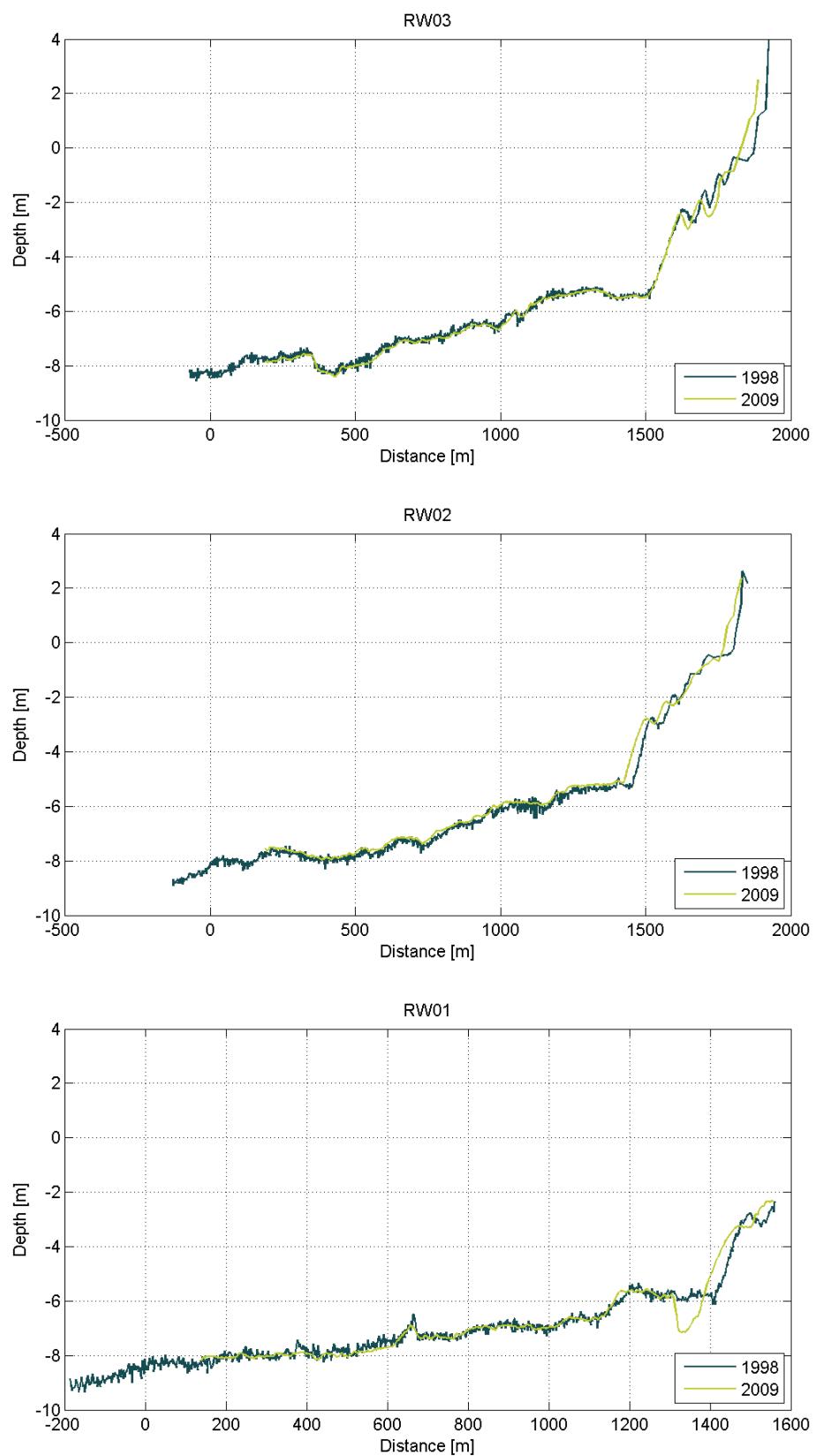


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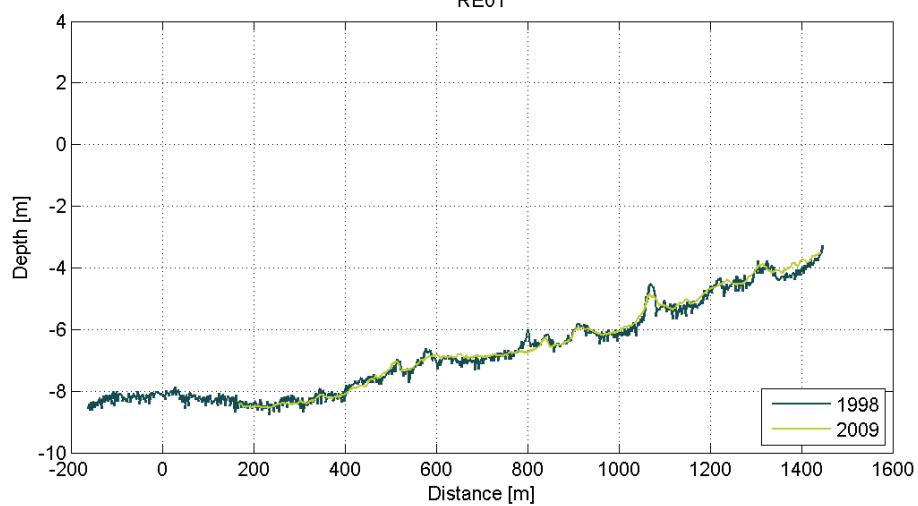
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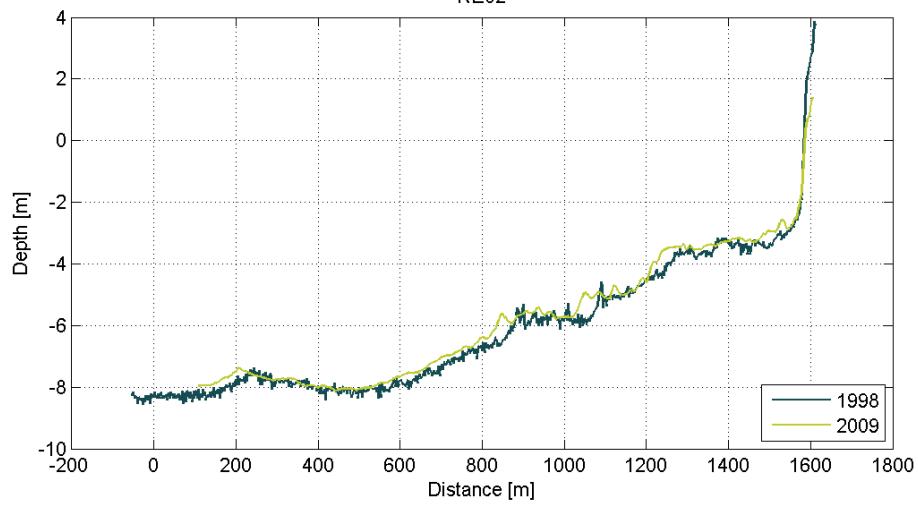




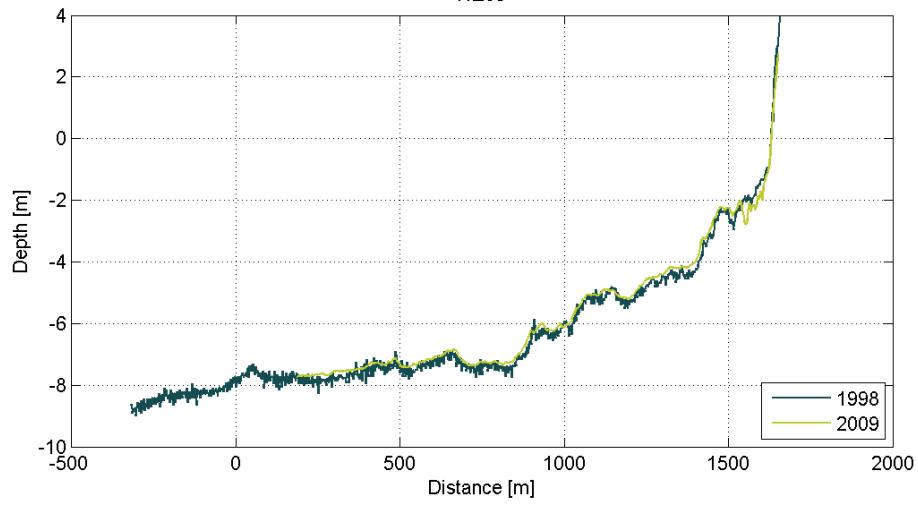
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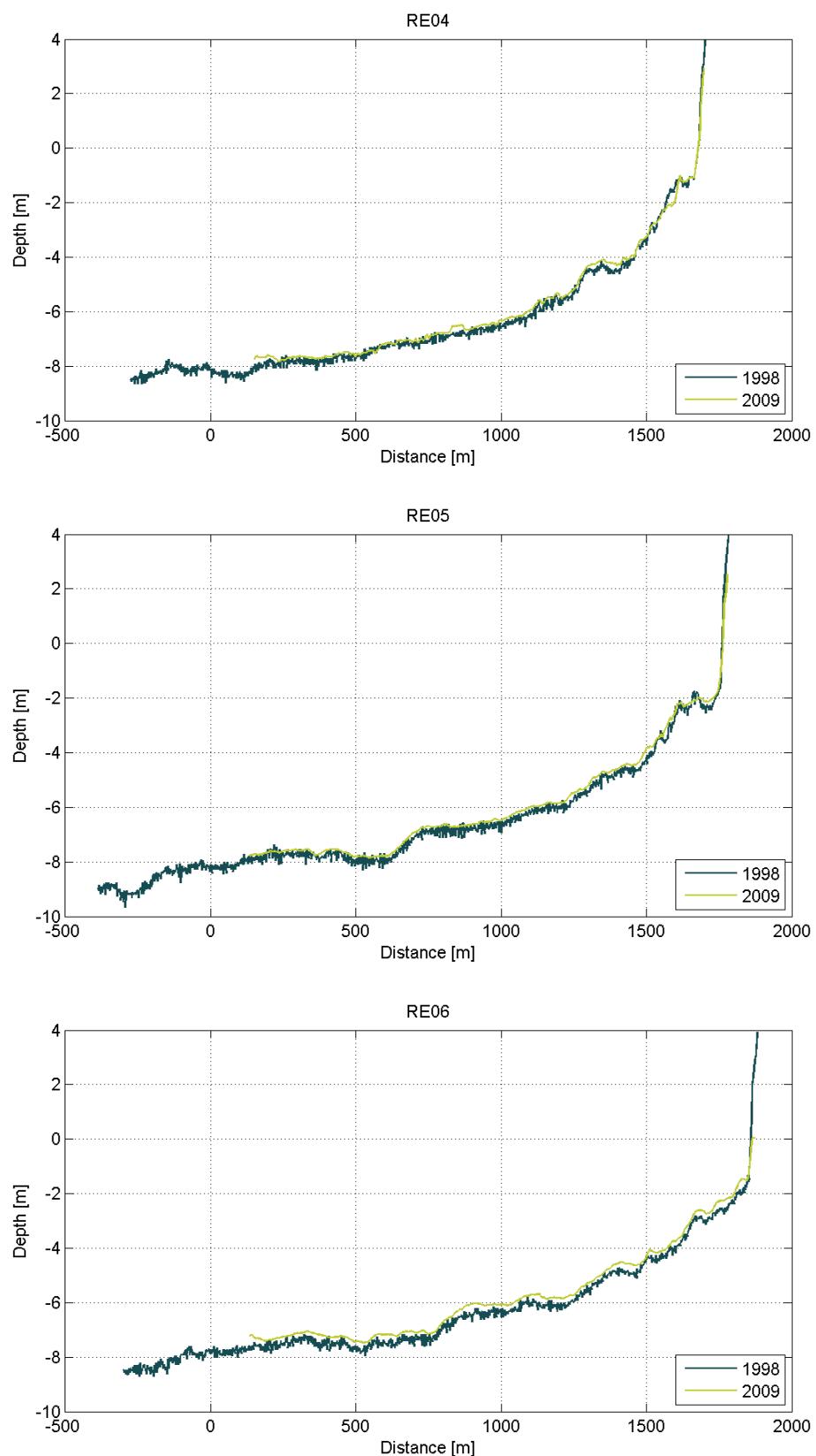
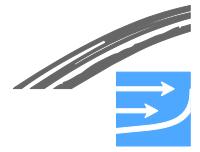


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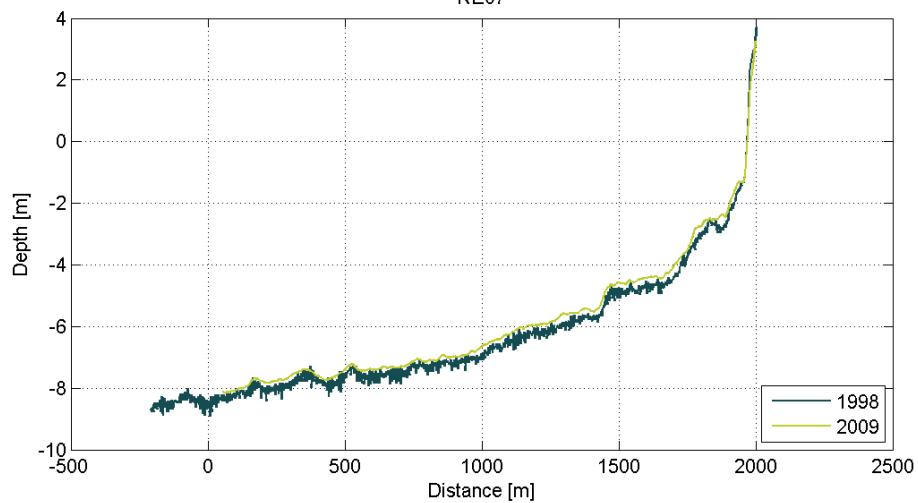
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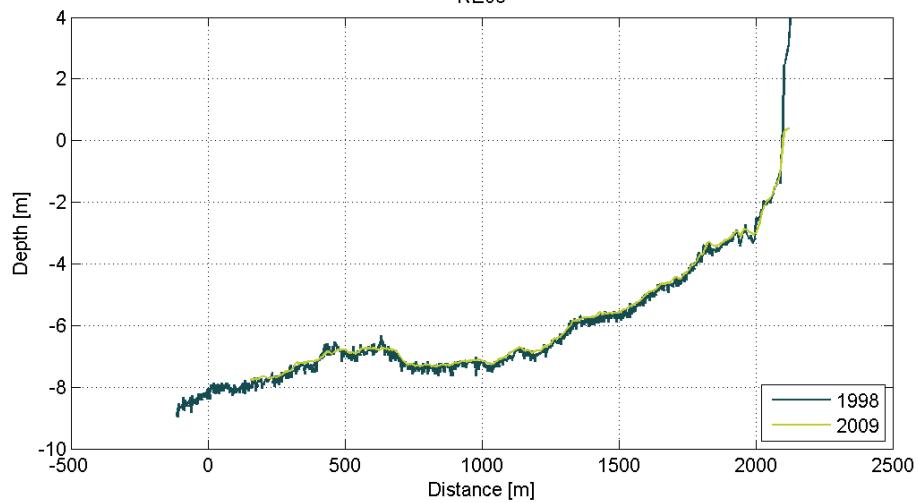




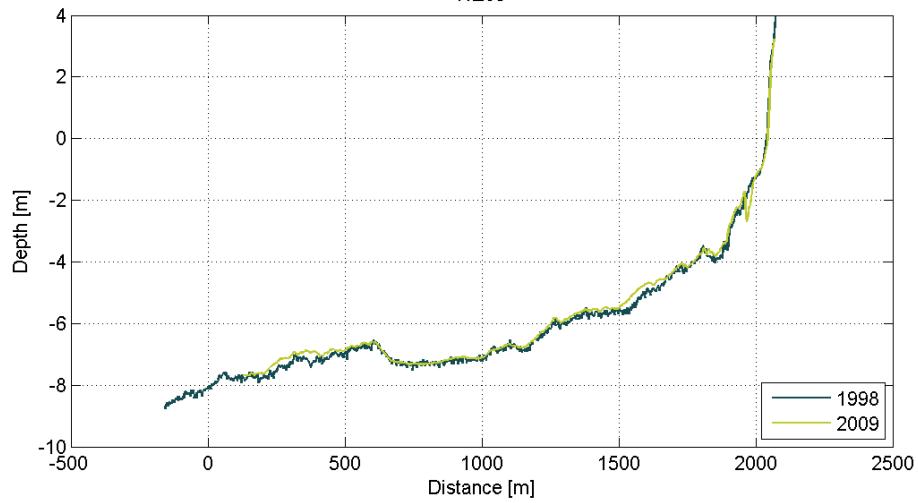
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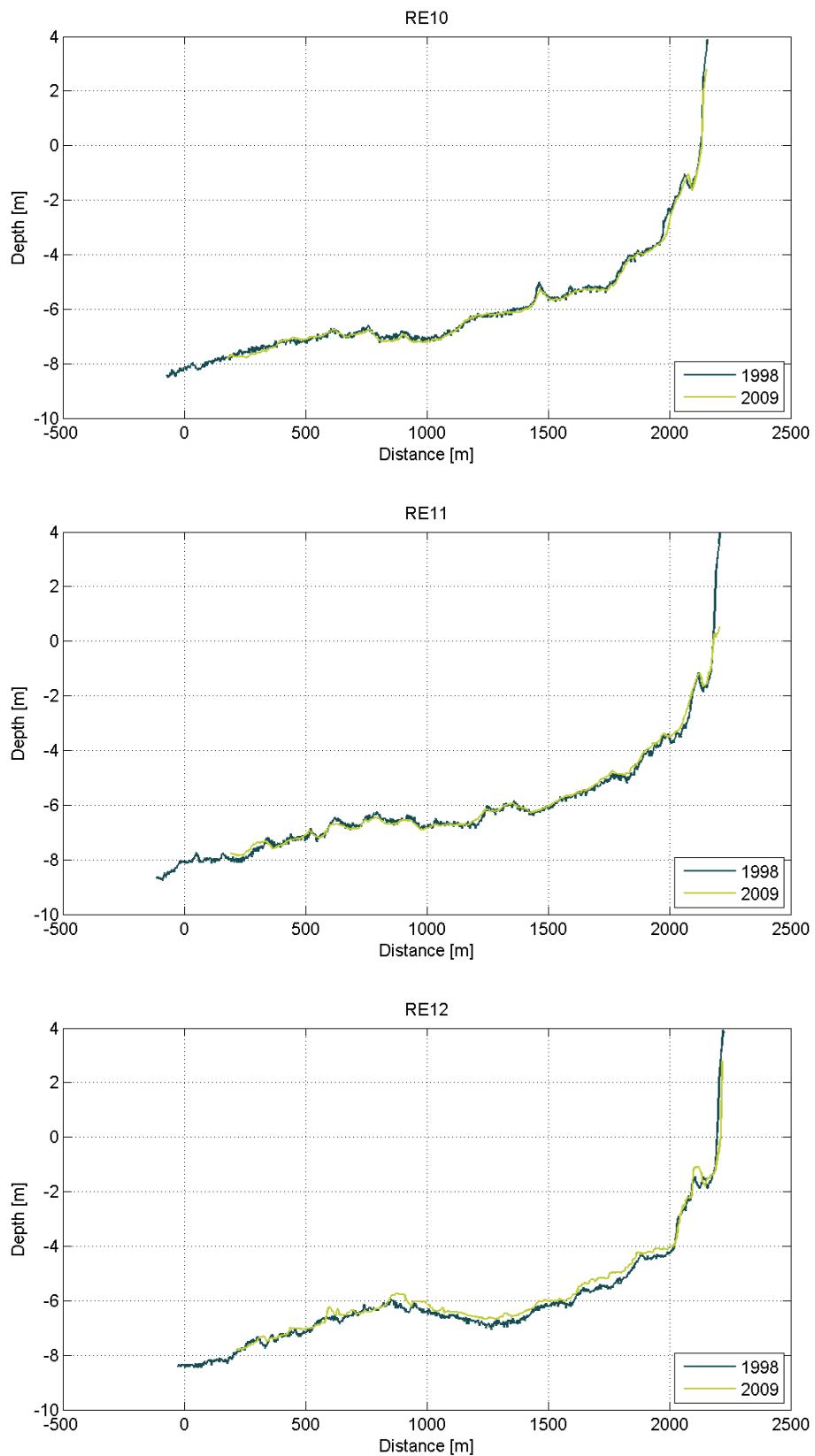
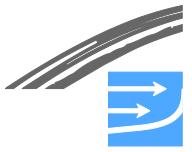


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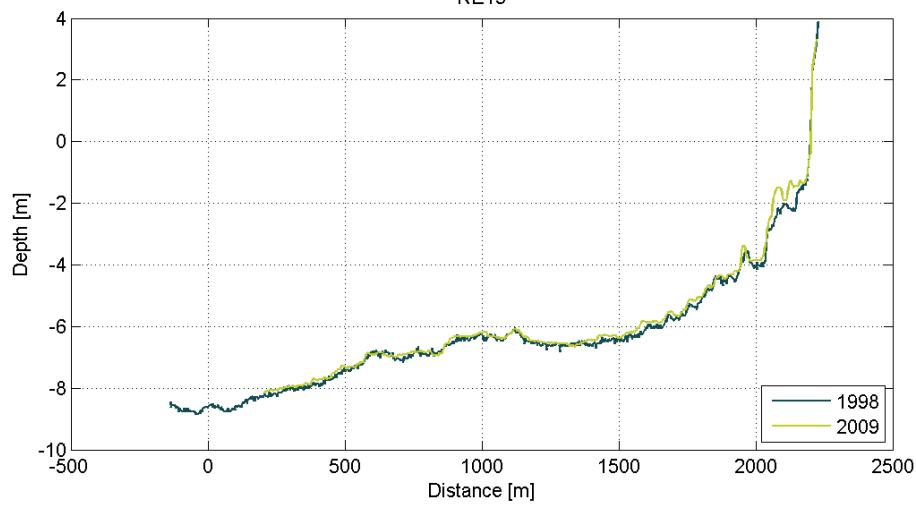
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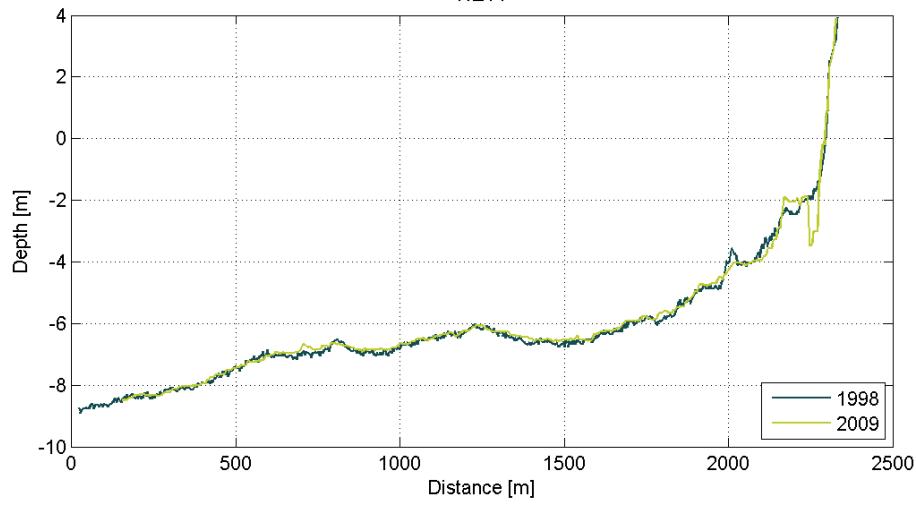




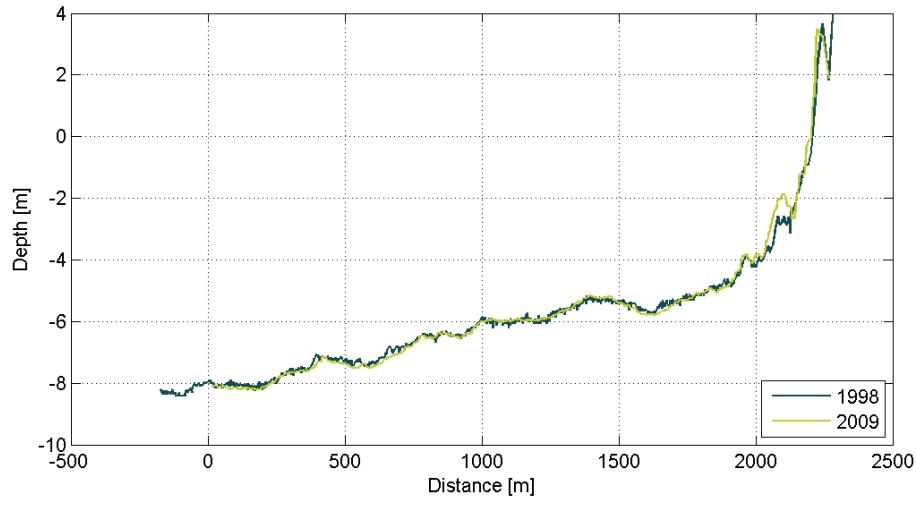
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RE14



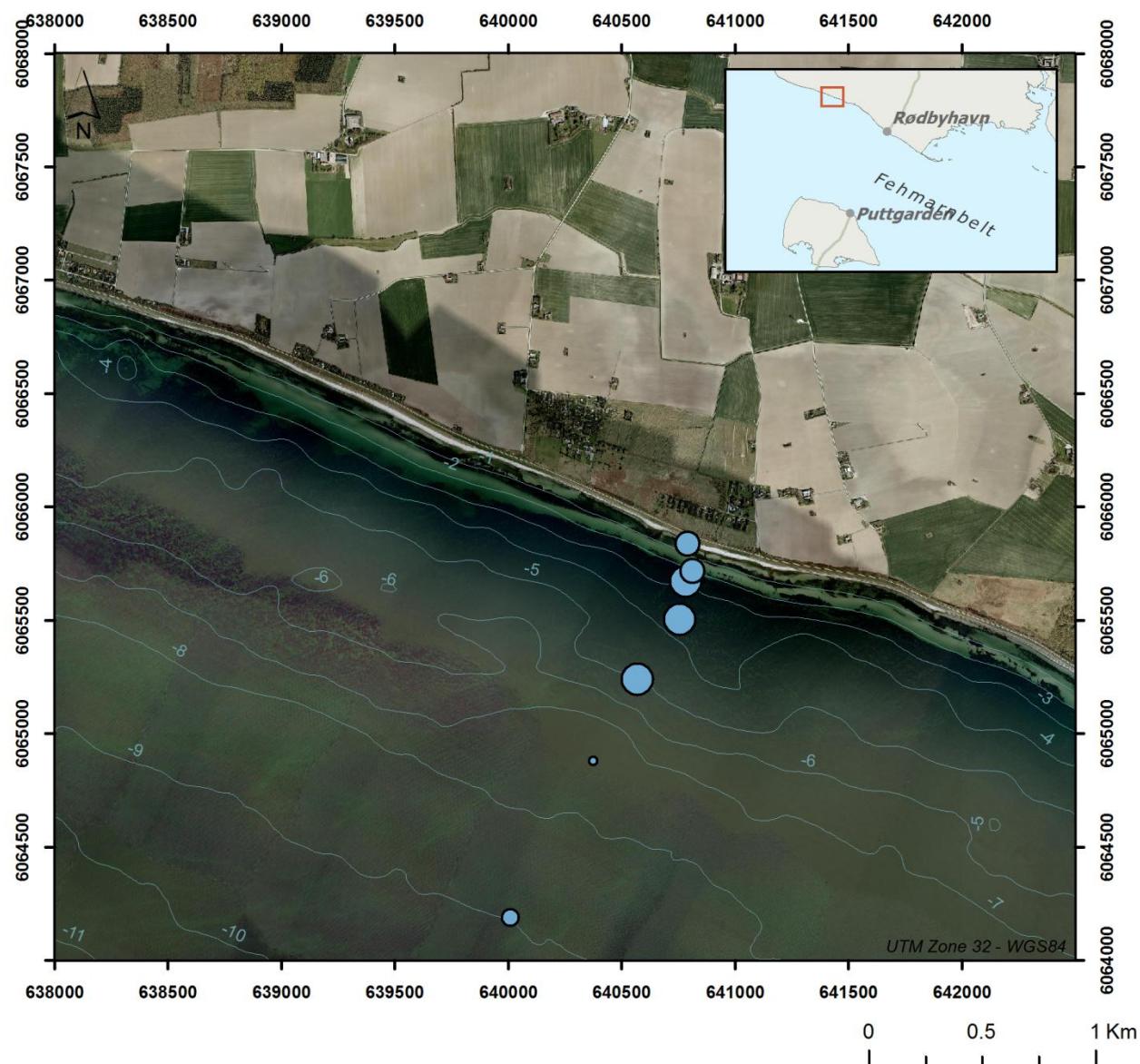
RE16





## A P P E N D I X C

### *Sea Bed Conditions, South Coast of Lolland*



#### Seabed samples 1998 d50 (mm)

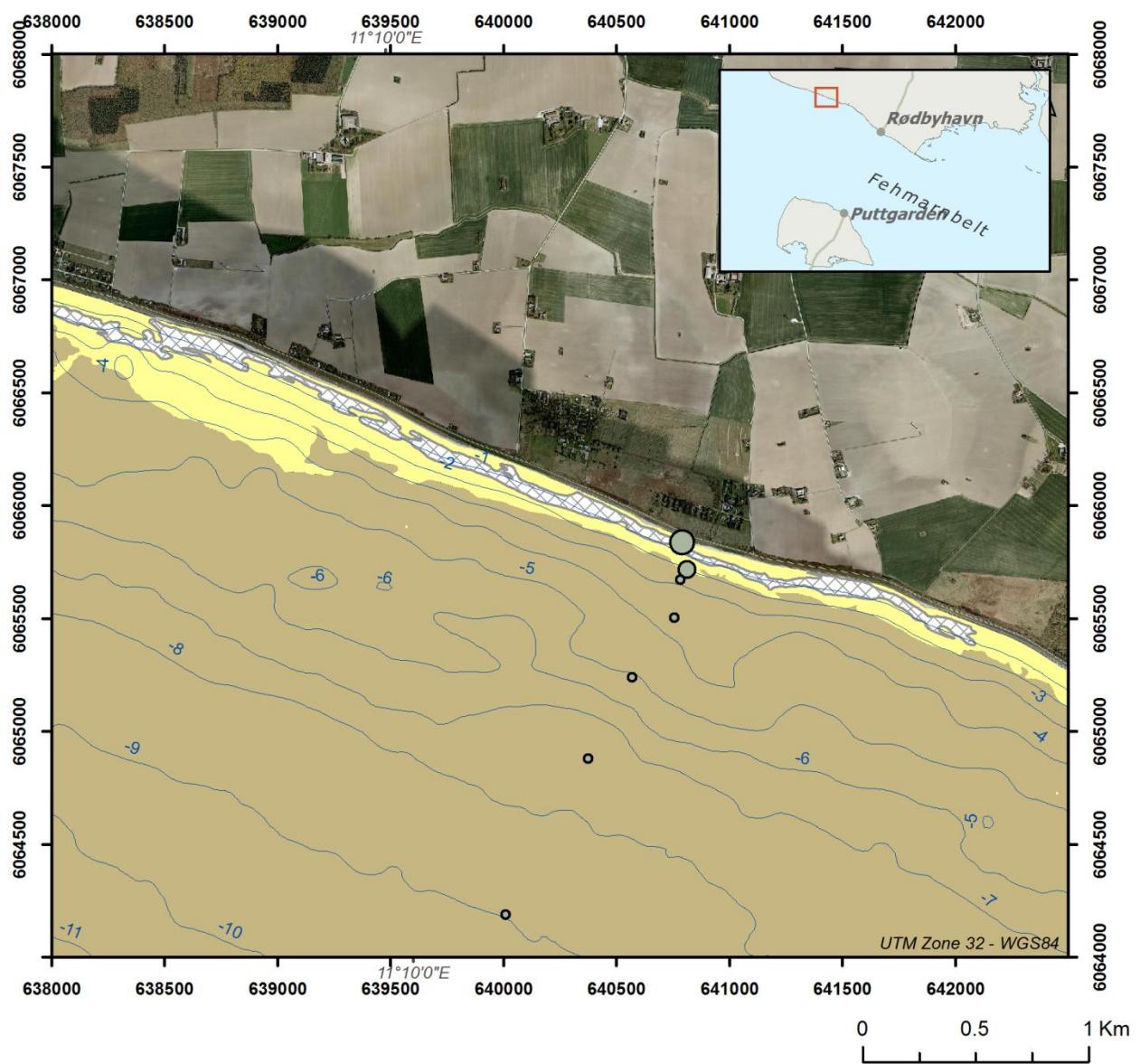
+	0.0 - 0.03 (Medium Silt and smaller)
+	0.04 - 0.06 (Coarse Silt)
+	0.07 - 0.13 (Very Fine Sand)
+	0.14 - 0.25 (Fine Sand)
+	0.26 - 0.50 (Medium Sand)
+	0.51 - 1.00 (Coarse Sand)
+	1.01 - 4.00 (Very Coarse Sand and larger)
+	d50 N/A

#### Suitable substrate for macroalgae cover(%)

●	0 - 20
●	20 - 40
●	40 - 60
●	60 - 80
●	80 - 100

#### Seabed samples 2009 d50 (mm)

●	0.0 - 0.03 (Medium Silt and smaller)
●	0.04 - 0.06 (Coarse Silt)
●	0.07 - 0.13 (Very Fine Sand)
●	0.14 - 0.25 (Fine Sand)
●	0.26 - 0.50 (Medium Sand)
●	0.51 - 1.00 (Coarse Sand)
●	1.01 - 4.00 (Very Coarse Sand and larger)
●	d50 N/A



#### Seabed samples 1998 d50 (mm)

	0.0 - 0.03 (Medium Silt and smaller)
	0.04 - 0.06 (Coarse Silt)
	0.07 - 0.13 (Very Fine Sand)
	0.14 - 0.25 (Fine Sand)
	0.26 - 0.50 (Medium Sand)
	0.51 - 1.00 (Coarse Sand)
	1.01 - 4.00 (Very Coarse Sand and larger)
+	d50 N/A

#### Substrate

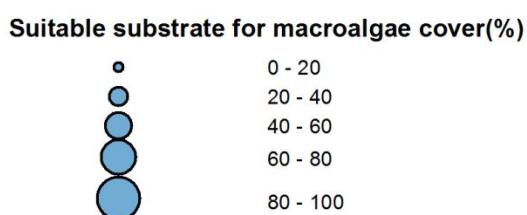
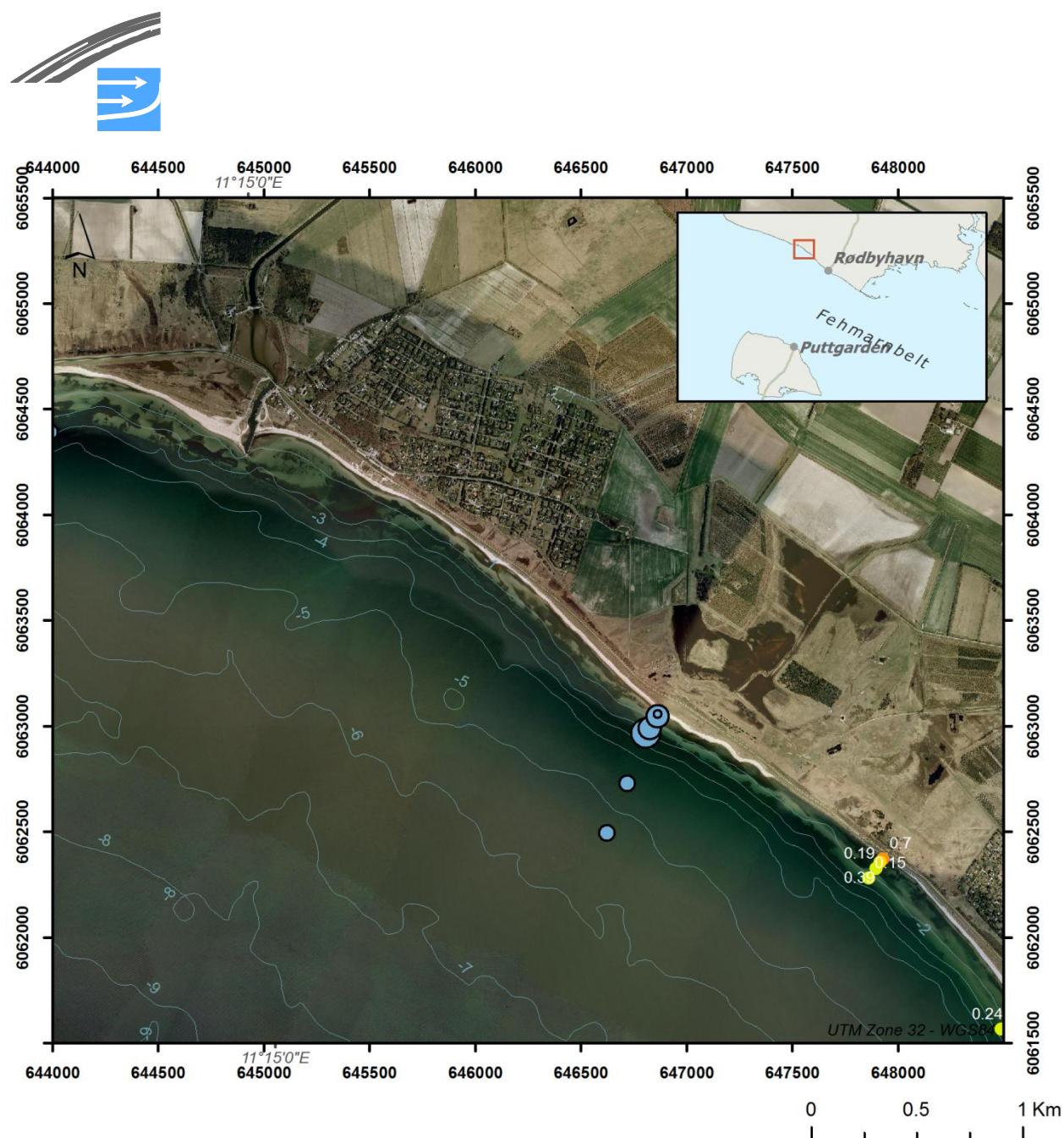
	Coarse sediment/Boulders
	Sand
	Muddy sand
	Sandy mud
	Thin sandy mud
	Mud
	Mixed sediment/Boulders
	Artificial hard substrate
	Unknown
	No information

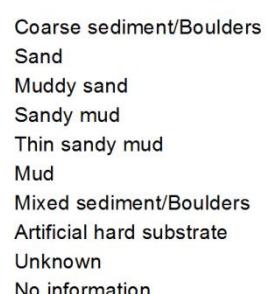
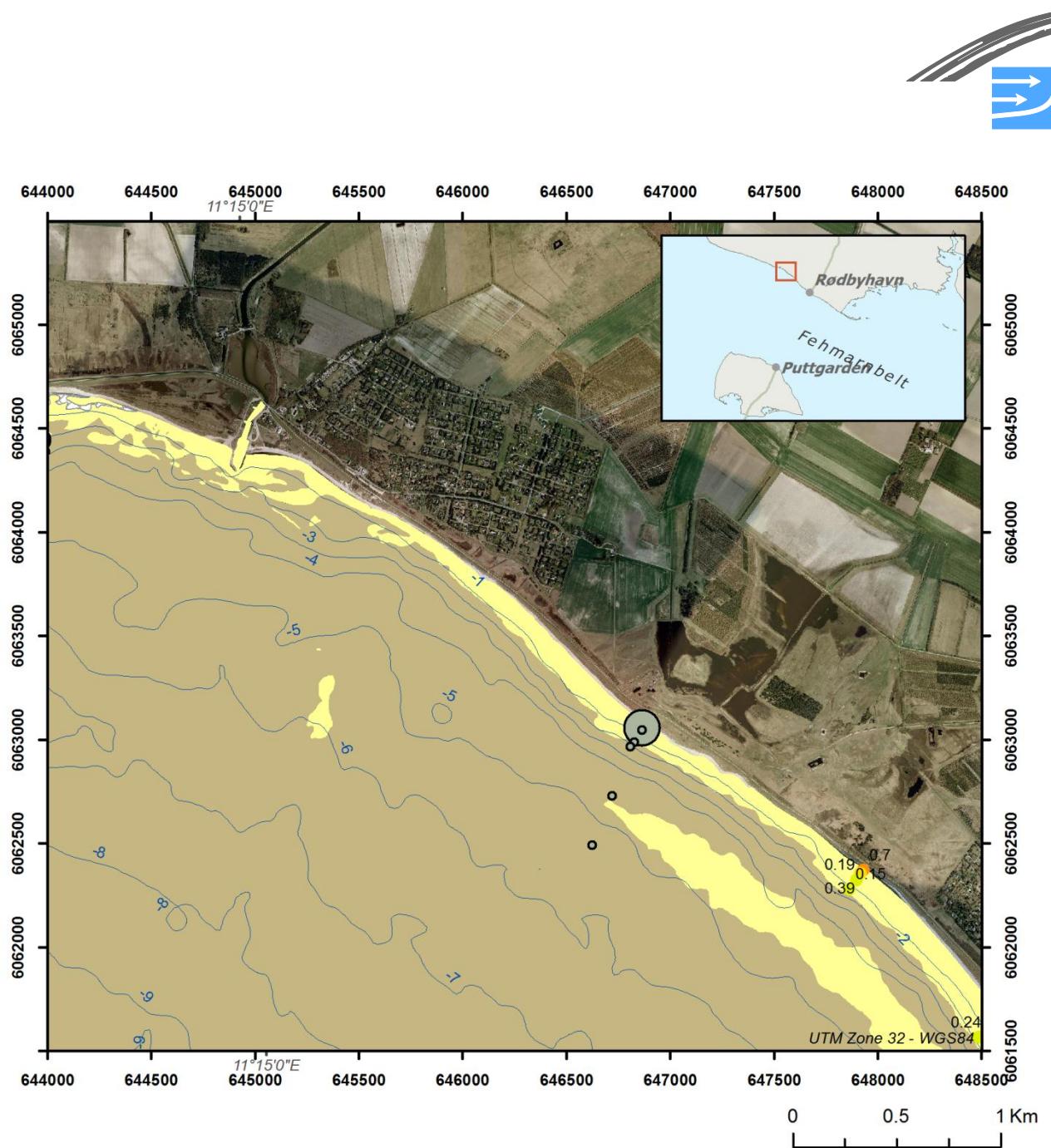
#### Seabed samples 2009 d50 (mm)

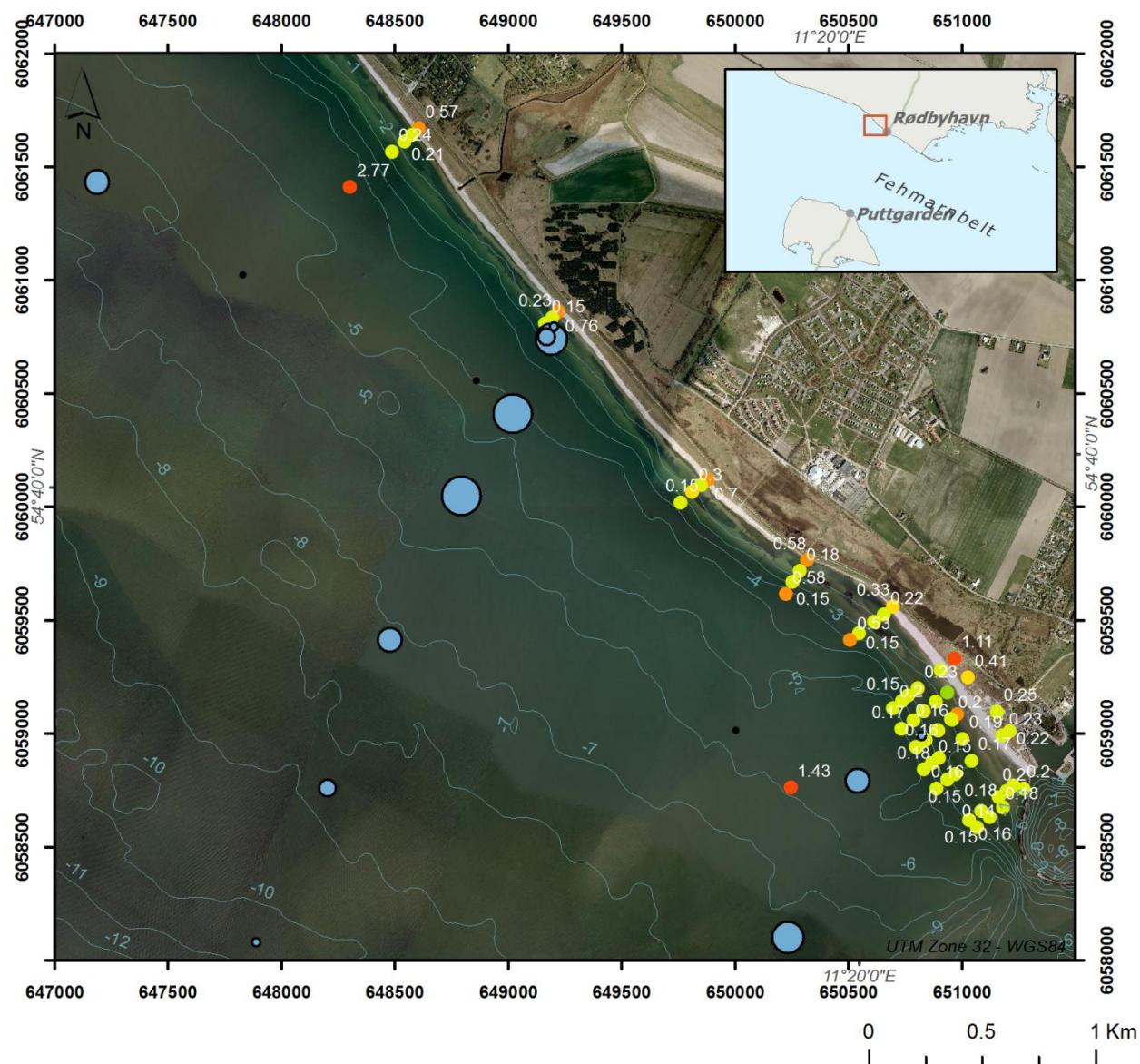
	0.0 - 0.03 (Medium Silt and smaller)
	0.04 - 0.06 (Coarse Silt)
	0.07 - 0.13 (Very Fine Sand)
	0.14 - 0.25 (Fine Sand)
	0.26 - 0.50 (Medium Sand)
	0.51 - 1.00 (Coarse Sand)
	1.01 - 4.00 (Very Coarse Sand and larger)
•	d50 N/A

#### Sand cover (%)

	0 - 20
	20 - 40
	40 - 60
	60 - 80
	80 - 100





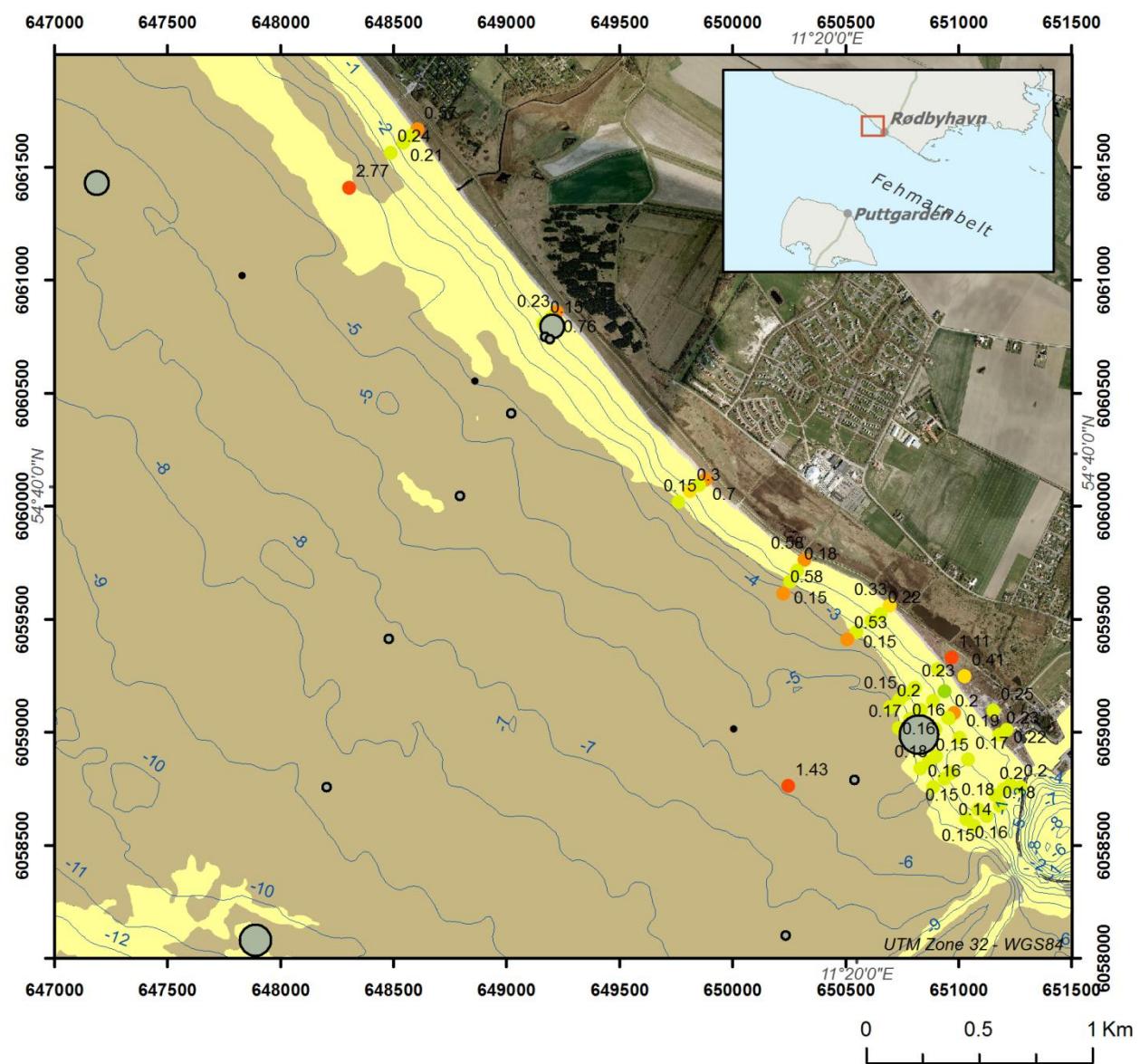
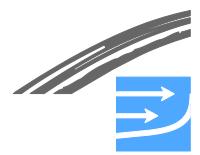


#### Seabed samples 1998 d50 (mm)

- + 0.0 - 0.03 (Medium Silt and smaller)
- + 0.04 - 0.06 (Coarse Silt)
- + 0.07 - 0.13 (Very Fine Sand)
- + 0.14 - 0.25 (Fine Sand)
- + 0.26 - 0.50 (Medium Sand)
- + 0.51 - 1.00 (Coarse Sand)
- + 1.01 - 4.00 (Very Coarse Sand and larger)
- + d50 N/A

#### Seabed samples 2009 d50 (mm)

- 0.0 - 0.03 (Medium Silt and smaller)
- 0.04 - 0.06 (Coarse Silt)
- 0.07 - 0.13 (Very Fine Sand)
- 0.14 - 0.25 (Fine Sand)
- 0.26 - 0.50 (Medium Sand)
- 0.51 - 1.00 (Coarse Sand)
- 1.01 - 4.00 (Very Coarse Sand and larger)
- d50 N/A



#### Seabed samples 1998 d50 (mm)

	0.0 - 0.03 (Medium Silt and smaller)
	0.04 - 0.06 (Coarse Silt)
	0.07 - 0.13 (Very Fine Sand)
	0.14 - 0.25 (Fine Sand)
	0.26 - 0.50 (Medium Sand)
	0.51 - 1.00 (Coarse Sand)
	1.01 - 4.00 (Very Coarse Sand and larger)
+	d50 N/A

#### Substrate

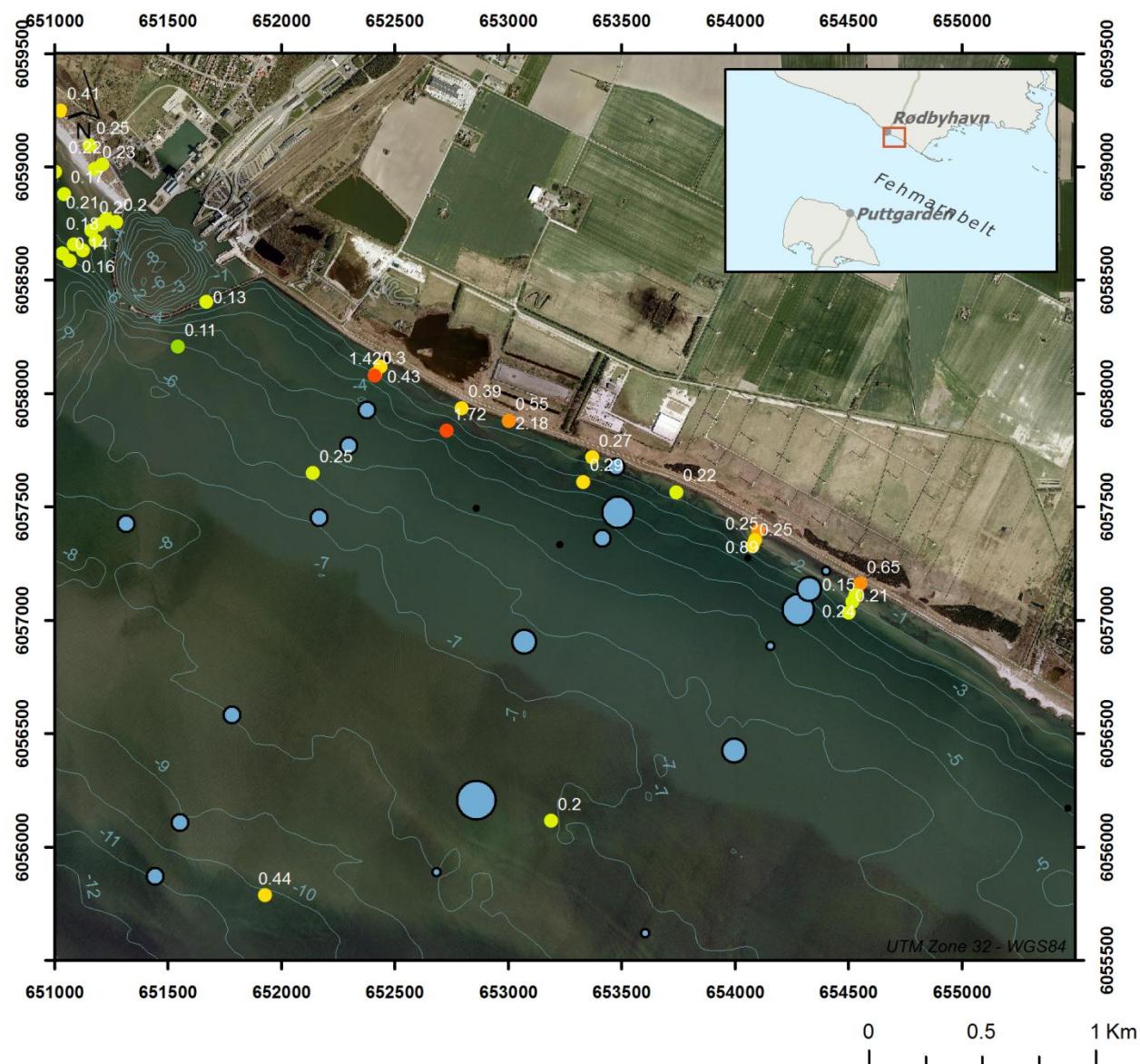
	Coarse sediment/Boulders
	Sand
	Muddy sand
	Sandy mud
	Thin sandy mud
	Mud
	Mixed sediment/Boulders
	Artificial hard substrate
	Unknown
	No information

#### Seabed samples 2009 d50 (mm)

	0.0 - 0.03 (Medium Silt and smaller)
	0.04 - 0.06 (Coarse Silt)
	0.07 - 0.13 (Very Fine Sand)
	0.14 - 0.25 (Fine Sand)
	0.26 - 0.50 (Medium Sand)
	0.51 - 1.00 (Coarse Sand)
	1.01 - 4.00 (Very Coarse Sand and larger)
*	d50 N/A

#### Sand cover (%)

	0 - 20
	20 - 40
	40 - 60
	60 - 80
	80 - 100



#### Seabed samples 1998 d50 (mm)

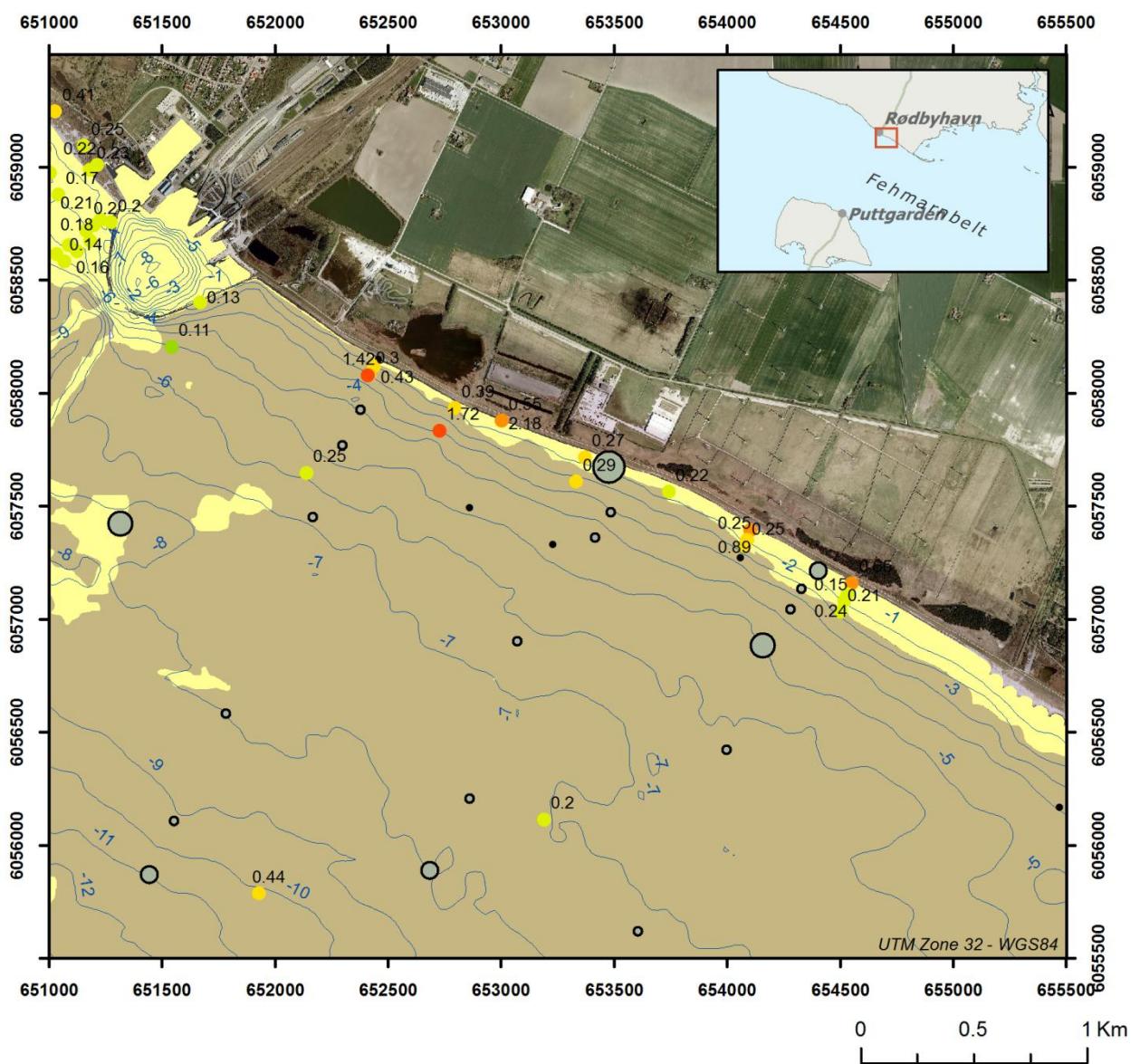
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+	0.04 - 0.06 (Coarse Silt)
+	0.07 - 0.13 (Very Fine Sand)
+	0.14 - 0.25 (Fine Sand)
+	0.26 - 0.50 (Medium Sand)
+	0.51 - 1.00 (Coarse Sand)
+	1.01 - 4.00 (Very Coarse Sand and larger)
+	d50 N/A

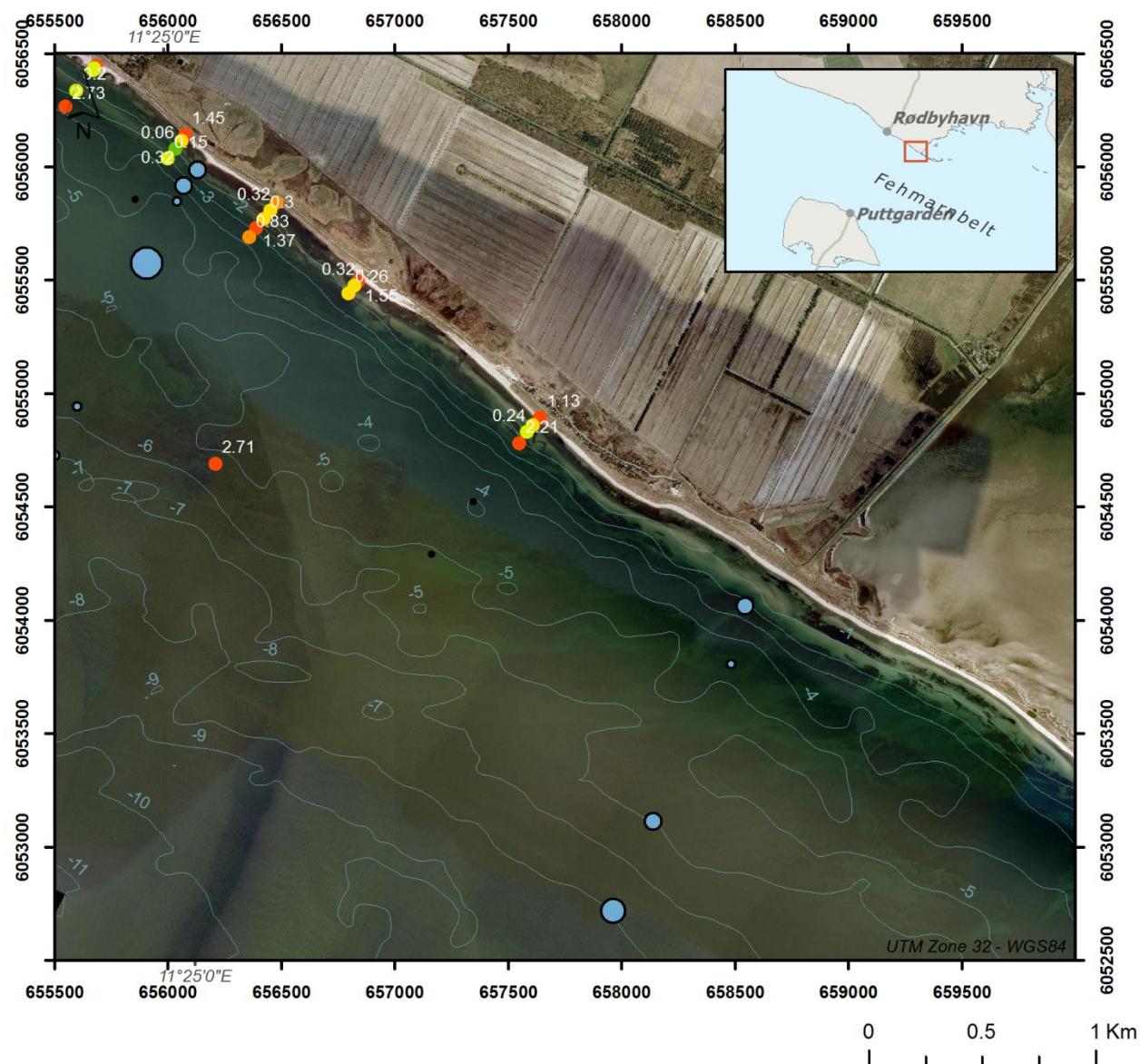
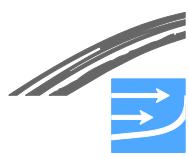
#### Suitable substrate for macroalgae cover(%)

●	0 - 20
●	20 - 40
●	40 - 60
●	60 - 80
●	80 - 100

#### Seabed samples 2009 d50 (mm)

●	0.0 - 0.03 (Medium Silt and smaller)
●	0.04 - 0.06 (Coarse Silt)
●	0.07 - 0.13 (Very Fine Sand)
●	0.14 - 0.25 (Fine Sand)
●	0.26 - 0.50 (Medium Sand)
●	0.51 - 1.00 (Coarse Sand)
●	1.01 - 4.00 (Very Coarse Sand and larger)
●	d50 N/A





#### Seabed samples 1998 d50 (mm)

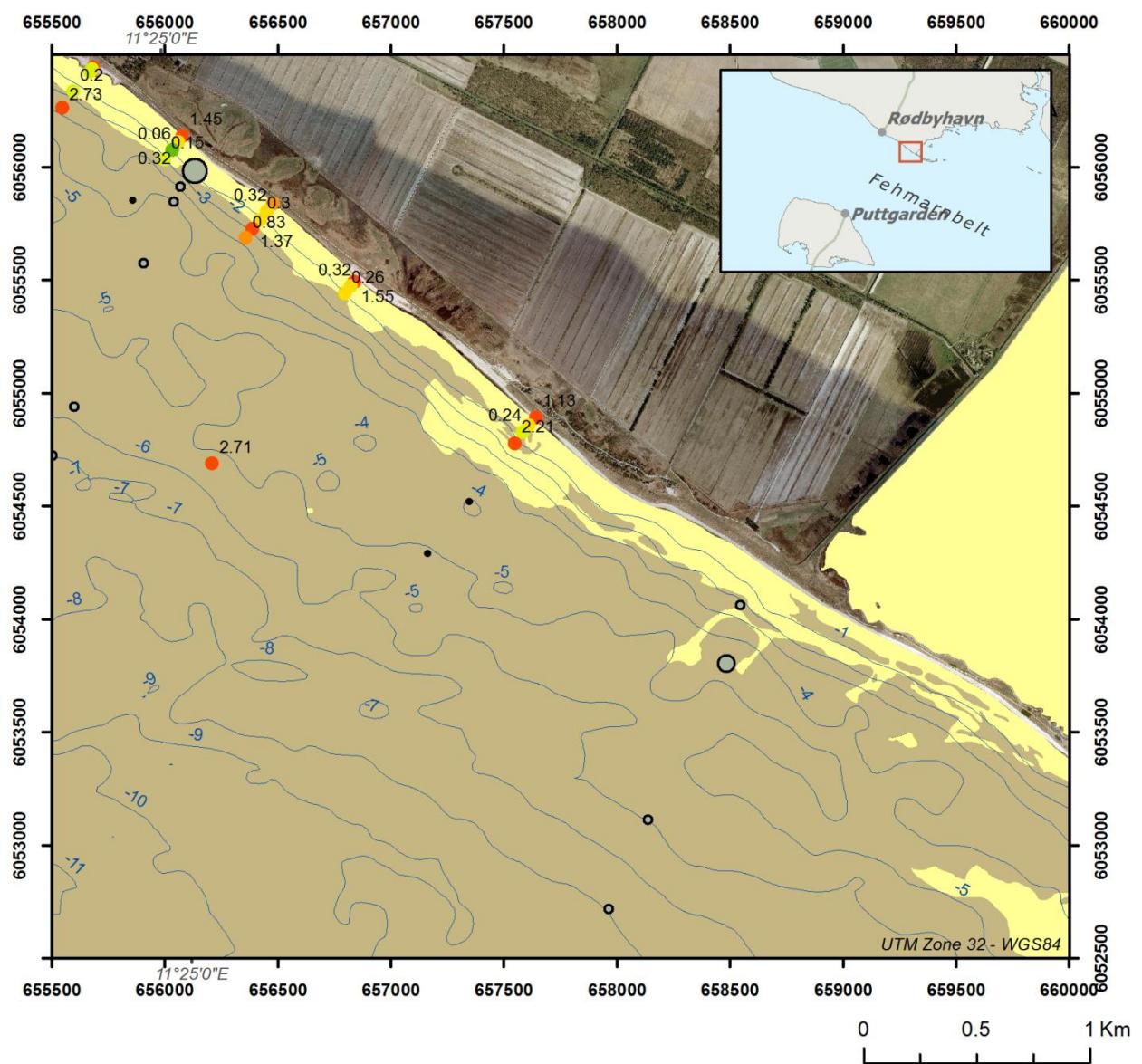
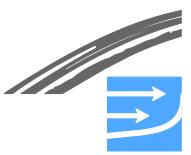
- + 0.0 - 0.03 (Medium Silt and smaller)
- + 0.04 - 0.06 (Coarse Silt)
- + 0.07 - 0.13 (Very Fine Sand)
- + 0.14 - 0.25 (Fine Sand)
- + 0.26 - 0.50 (Medium Sand)
- + 0.51 - 1.00 (Coarse Sand)
- + 1.01 - 4.00 (Very Coarse Sand and larger)
- + d50 N/A

#### Suitable substrate for macroalgae cover(%)

- 0 - 20
- 20 - 40
- 40 - 60
- 60 - 80
- 80 - 100

#### Seabed samples 2009 d50 (mm)

- 0.0 - 0.03 (Medium Silt and smaller)
- 0.04 - 0.06 (Coarse Silt)
- 0.07 - 0.13 (Very Fine Sand)
- 0.14 - 0.25 (Fine Sand)
- 0.26 - 0.50 (Medium Sand)
- 0.51 - 1.00 (Coarse Sand)
- 1.01 - 4.00 (Very Coarse Sand and larger)
- d50 N/A



### Seabed samples 1998 d50 (mm)

+	0.0 - 0.03 (Medium Silt and smaller)
+	0.04 - 0.06 (Coarse Silt)
+	0.07 - 0.13 (Very Fine Sand)
+	0.14 - 0.25 (Fine Sand)
+	0.26 - 0.50 (Medium Sand)
+	0.51 - 1.00 (Coarse Sand)
+	1.01 - 4.00 (Very Coarse Sand and larger)
+	d50 N/A

### Substrate

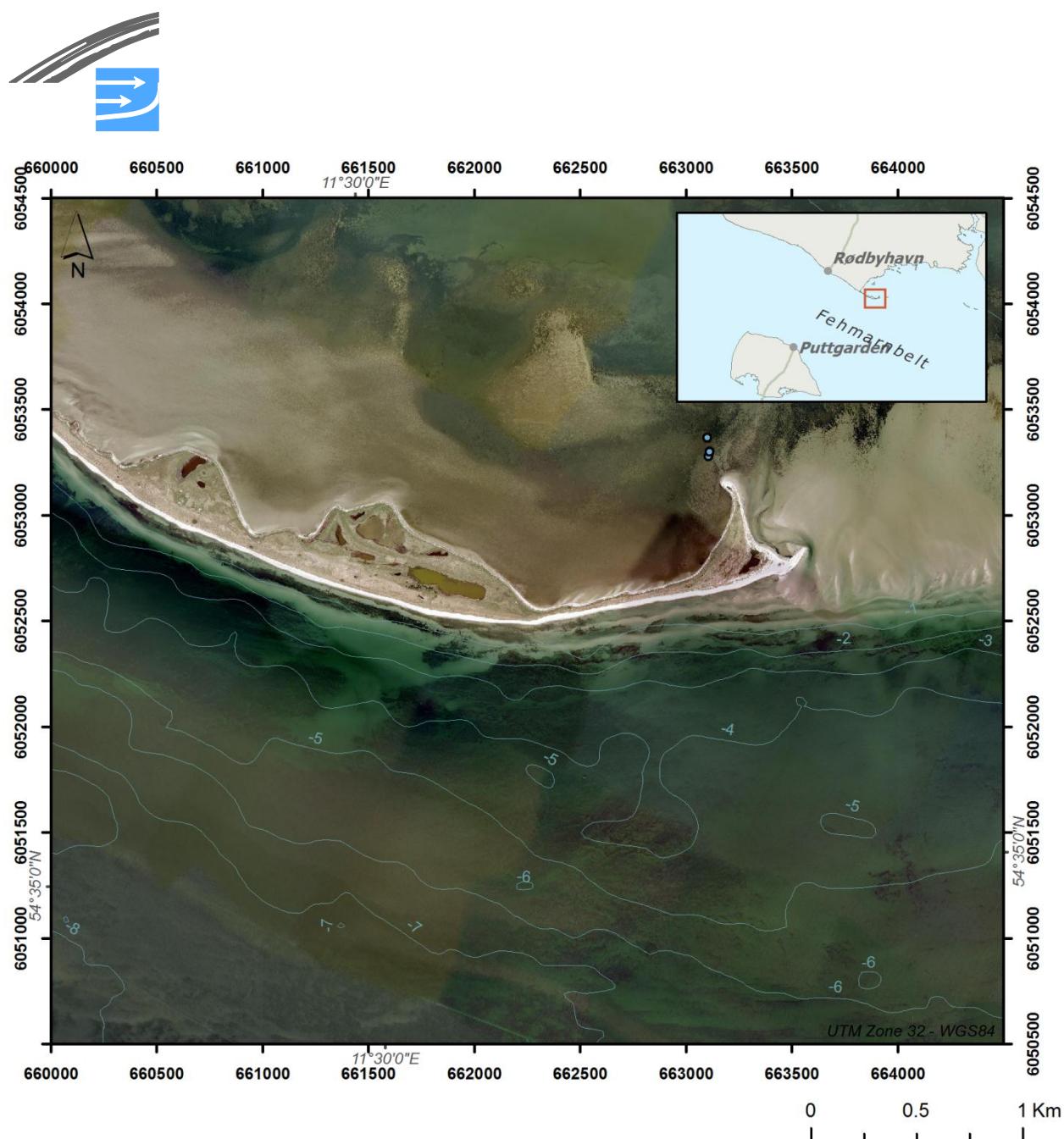
+	Coarse sediment/Boulders
+	Sand
+	Muddy sand
+	Sandy mud
+	Thin sandy mud
+	Mud
+	Mixed sediment/Boulders
+	Artificial hard substrate
+	Unknown
+	No information

### Seabed samples 2009 d50 (mm)

●	0.0 - 0.03 (Medium Silt and smaller)
●	0.04 - 0.06 (Coarse Silt)
●	0.07 - 0.13 (Very Fine Sand)
●	0.14 - 0.25 (Fine Sand)
●	0.26 - 0.50 (Medium Sand)
●	0.51 - 1.00 (Coarse Sand)
●	1.01 - 4.00 (Very Coarse Sand and larger)
●	d50 N/A

### Sand cover (%)

○	0 - 20
○	20 - 40
○	40 - 60
○	60 - 80
○	80 - 100



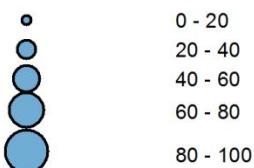
### **Seabed samples 1998 d50 (mm)**

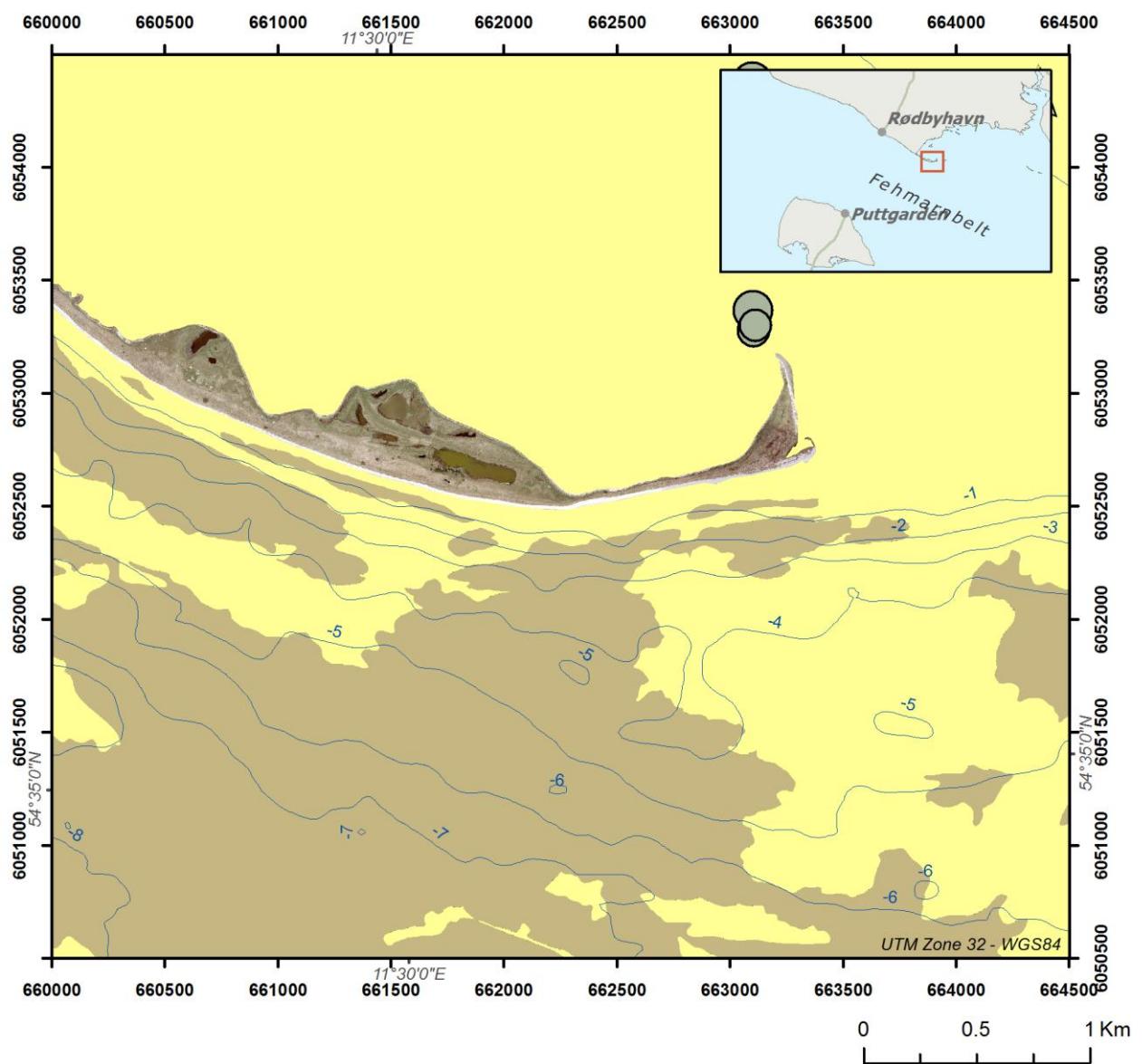


### **Seabed samples 2009 d50 (mm)**



### Suitable substrate for macroalgae cover(%)





### Seabed samples 1998 d50 (mm)

+	0.0 - 0.03 (Medium Silt and smaller)
+	0.04 - 0.06 (Coarse Silt)
+	0.07 - 0.13 (Very Fine Sand)
+	0.14 - 0.25 (Fine Sand)
+	0.26 - 0.50 (Medium Sand)
+	0.51 - 1.00 (Coarse Sand)
+	1.01 - 4.00 (Very Coarse Sand and larger)
+	d50 N/A

### Substrate

Yellow	Coarse sediment/Boulders
Light Green	Sand
Dark Green	Muddy sand
Light Blue	Sandy mud
Dark Blue	Thin sandy mud
Red	Mud
Black	Mixed sediment/Boulders
Grey	Artificial hard substrate
White	Unknown
Grey with dots	No information

### Seabed samples 2009 d50 (mm)

●	0.0 - 0.03 (Medium Silt and smaller)
●	0.04 - 0.06 (Coarse Silt)
●	0.07 - 0.13 (Very Fine Sand)
●	0.14 - 0.25 (Fine Sand)
●	0.26 - 0.50 (Medium Sand)
●	0.51 - 1.00 (Coarse Sand)
●	1.01 - 4.00 (Very Coarse Sand and larger)
●	d50 N/A

### Sand cover (%)

Small circle	0 - 20
Medium circle	20 - 40
Large circle	40 - 60
Very Large circle	60 - 80
Huge circle	80 - 100

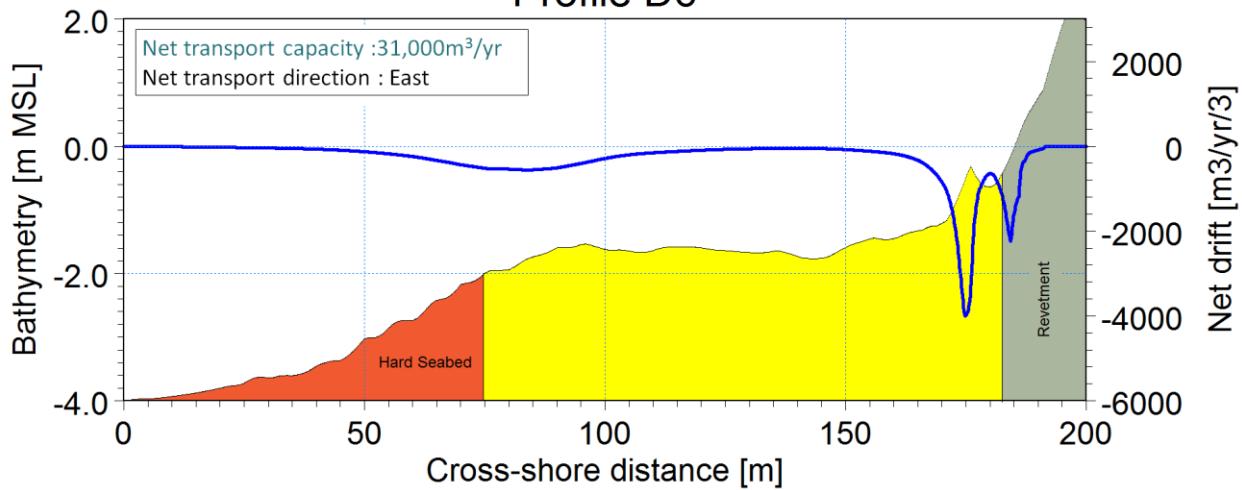


## A P P E N D I X   D

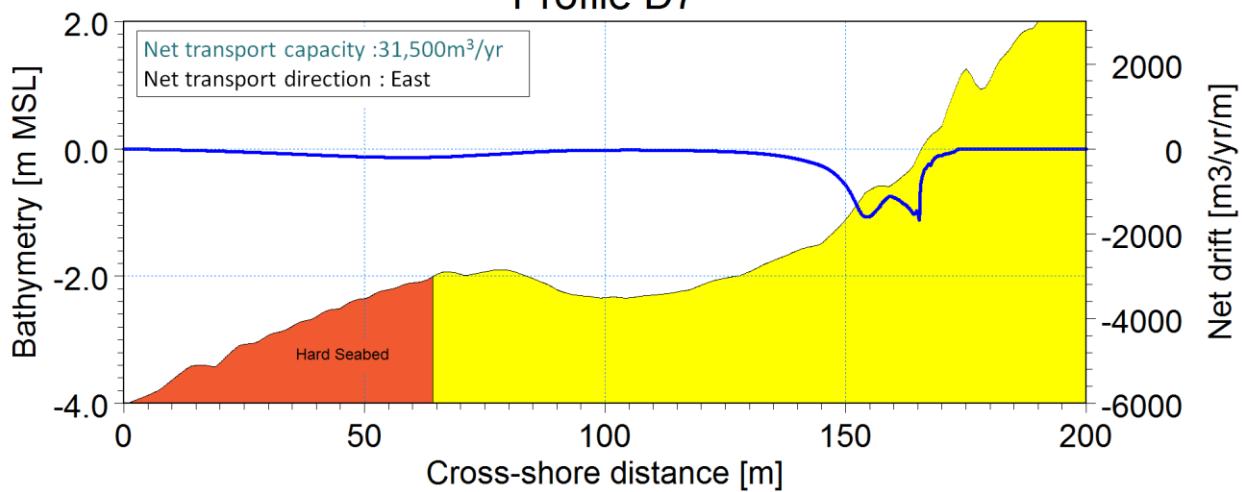
***Distribution of Net Annual Transport in the Coastal Profile,  
South Coast of Lolland***



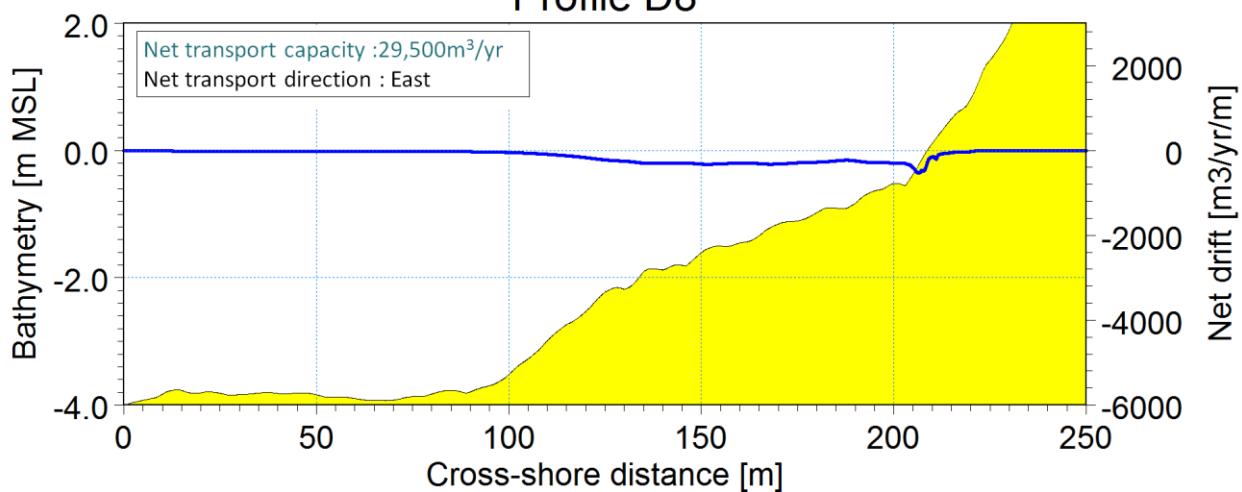
Profile D6



Profile D7

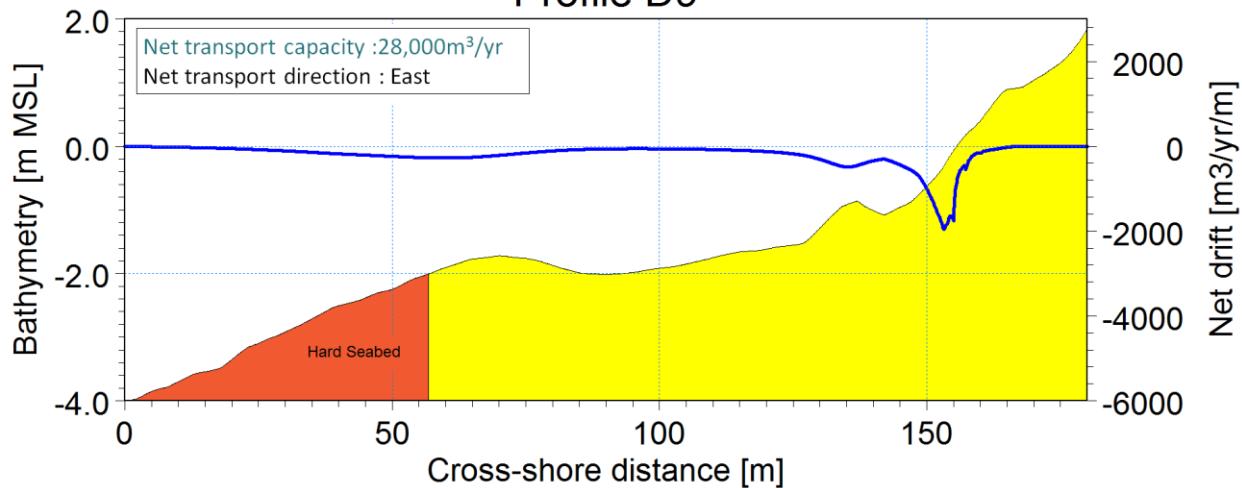


Profile D8

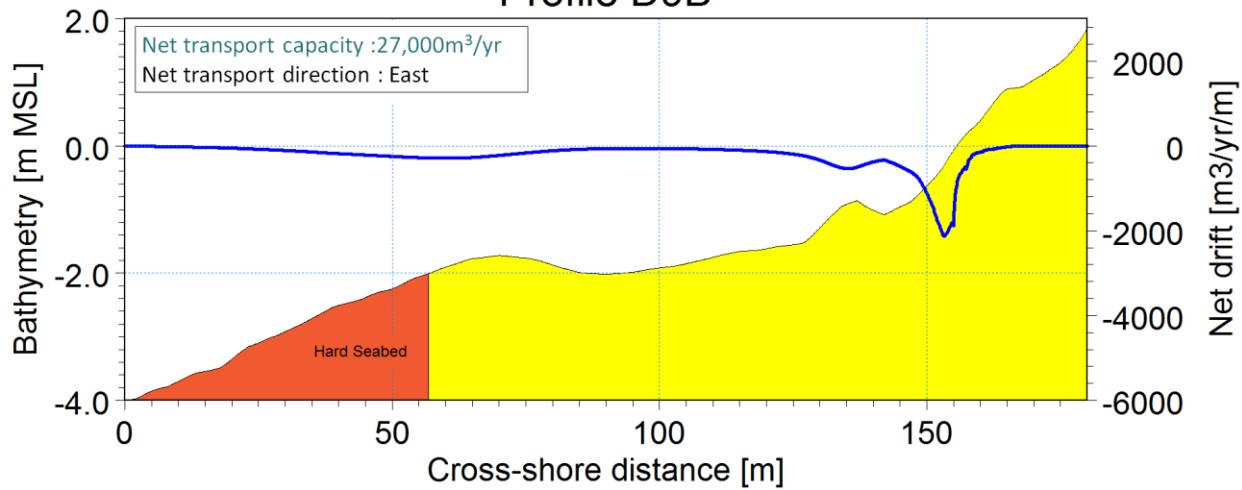




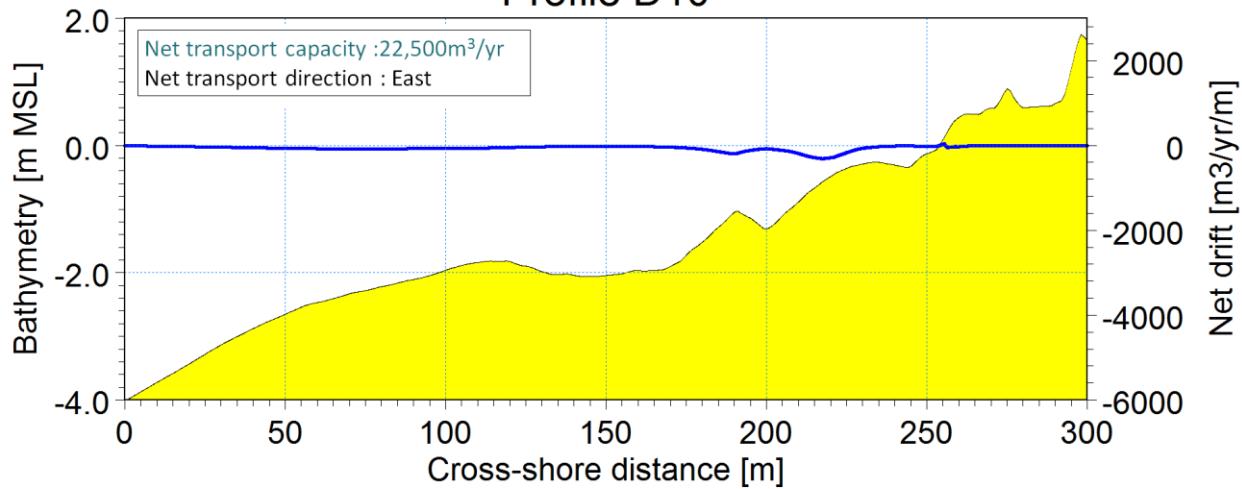
### Profile D9

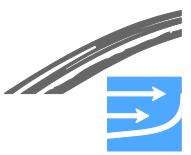


### Profile D9B

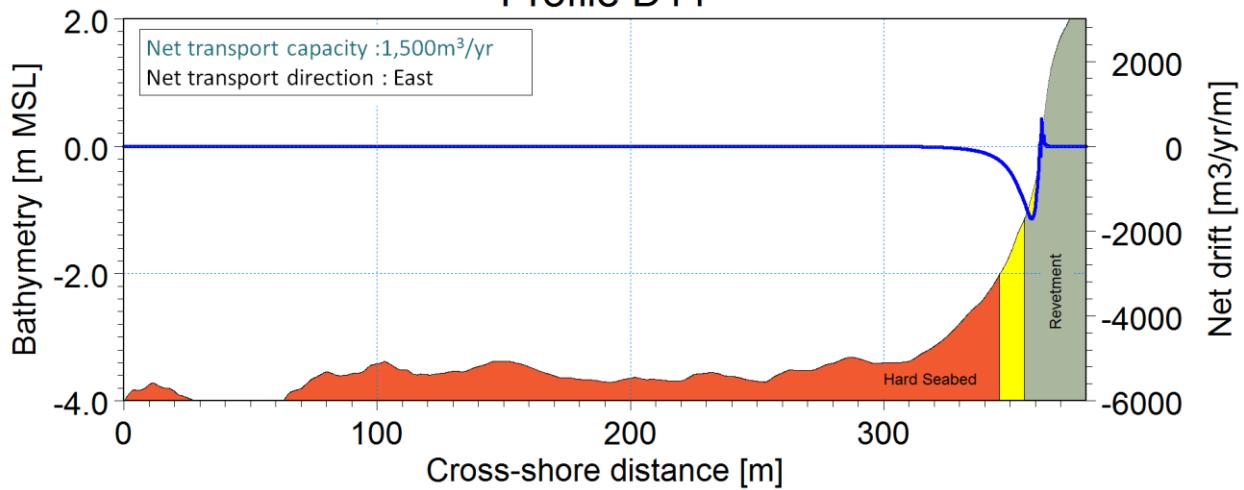


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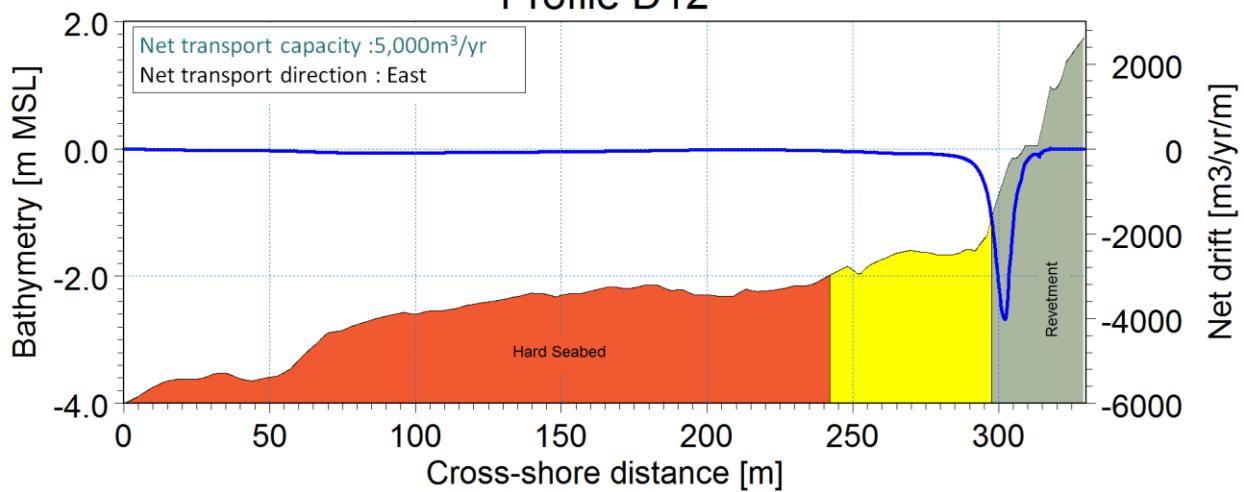




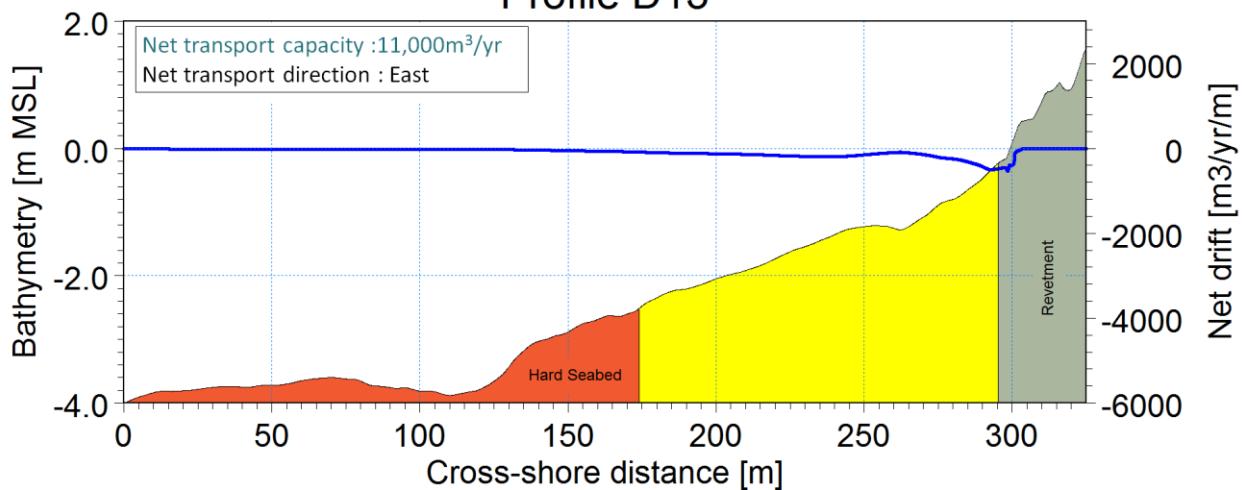
### Profile D11



### Profile D12

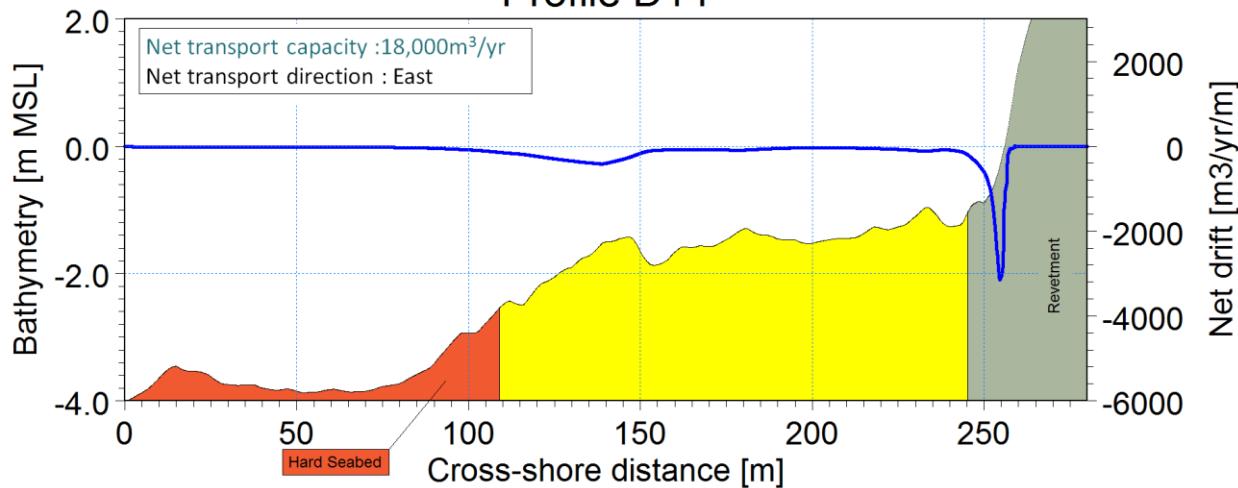


### Profile D13

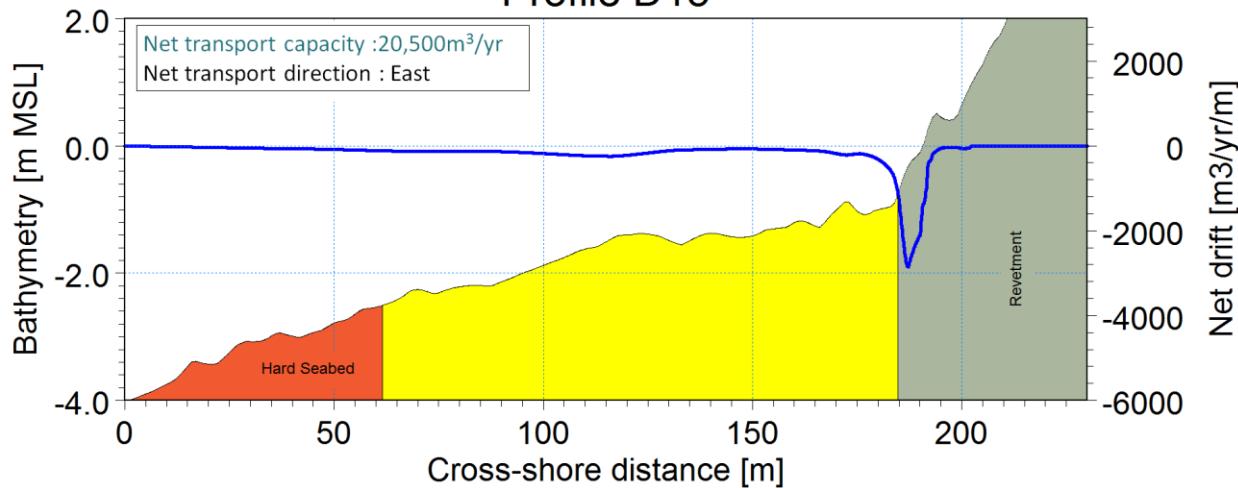




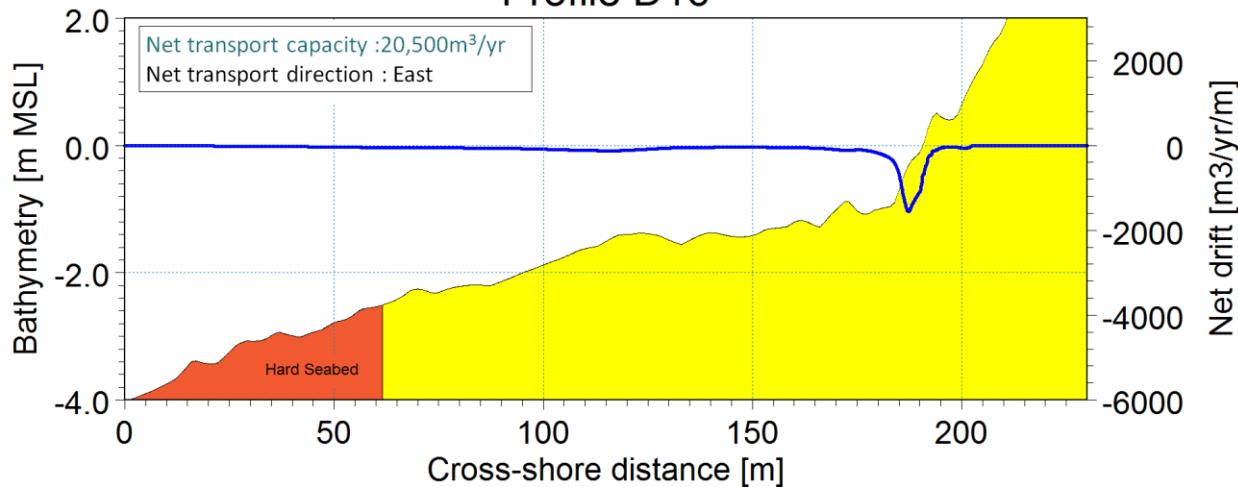
### Profile D14

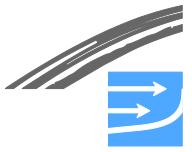


### Profile D15

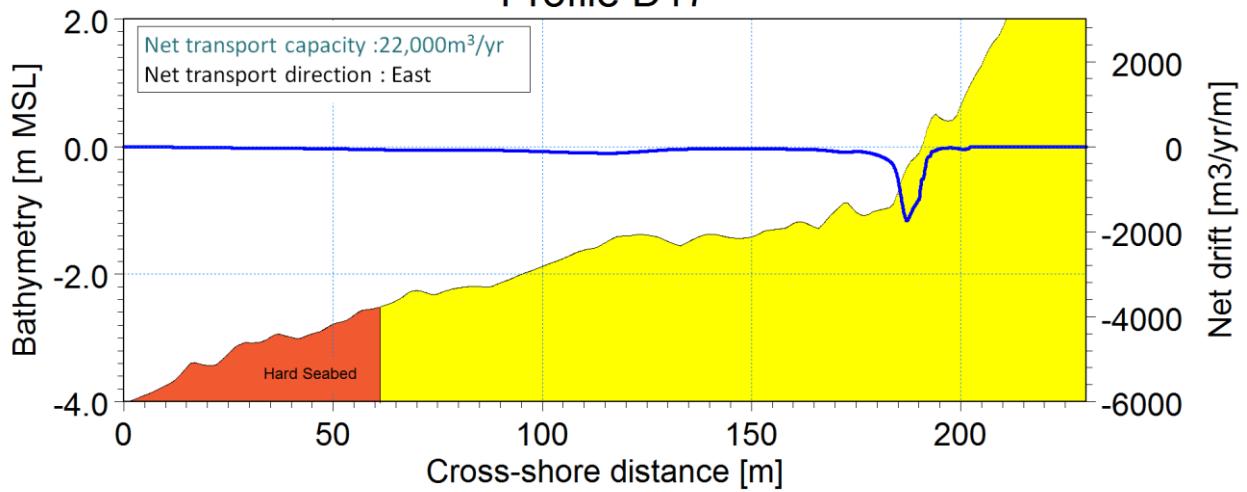


### Profile D16





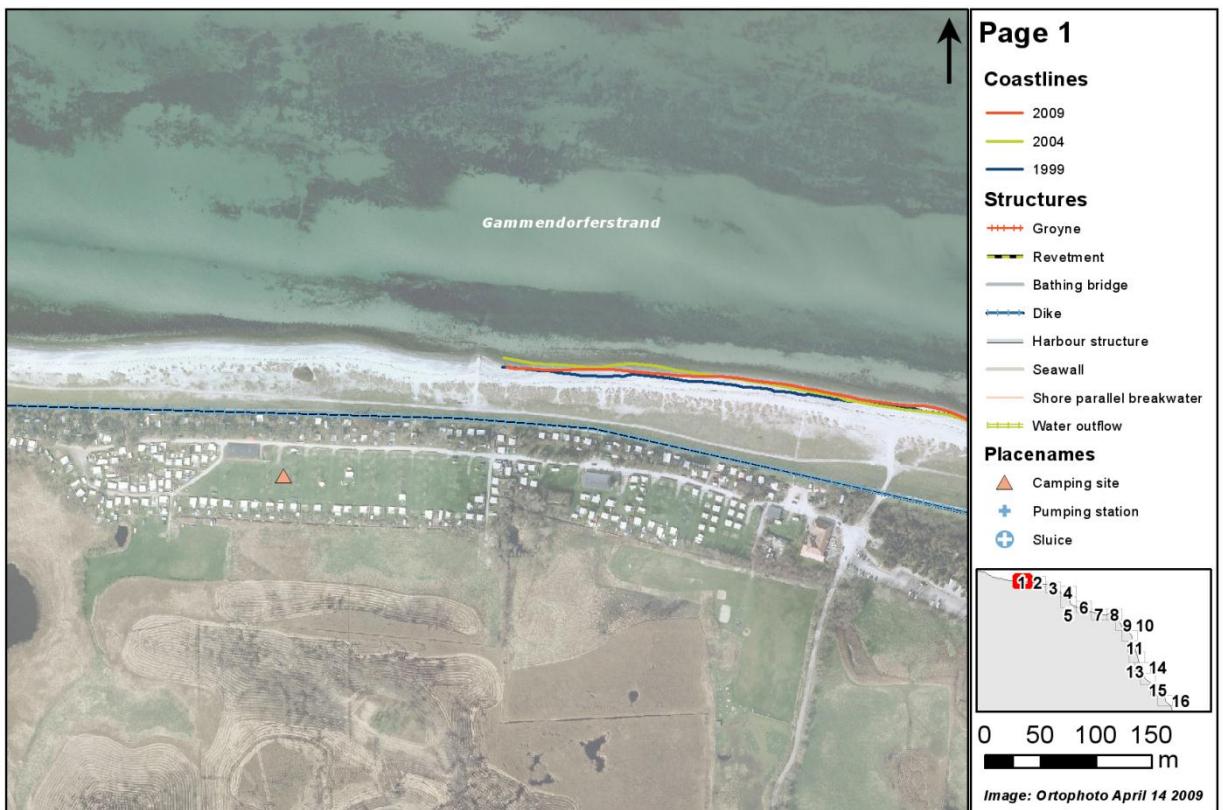
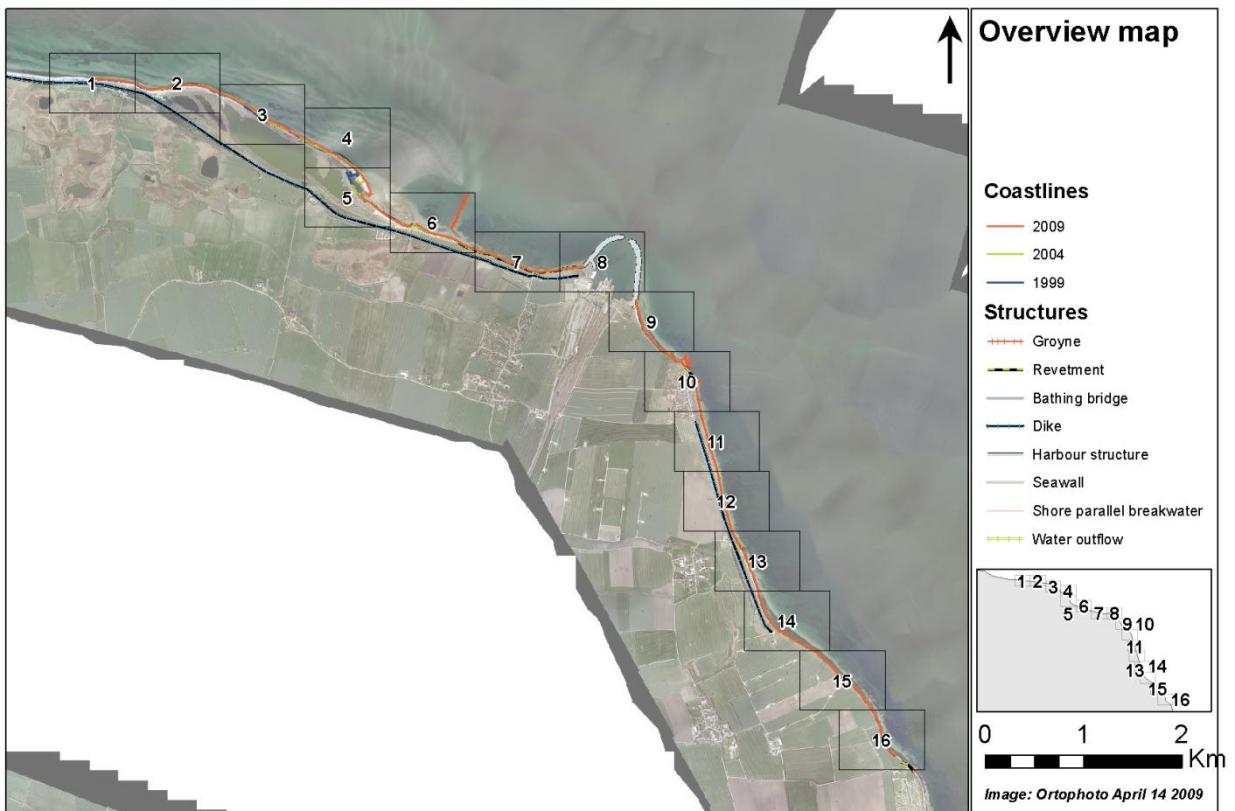
Profile D17

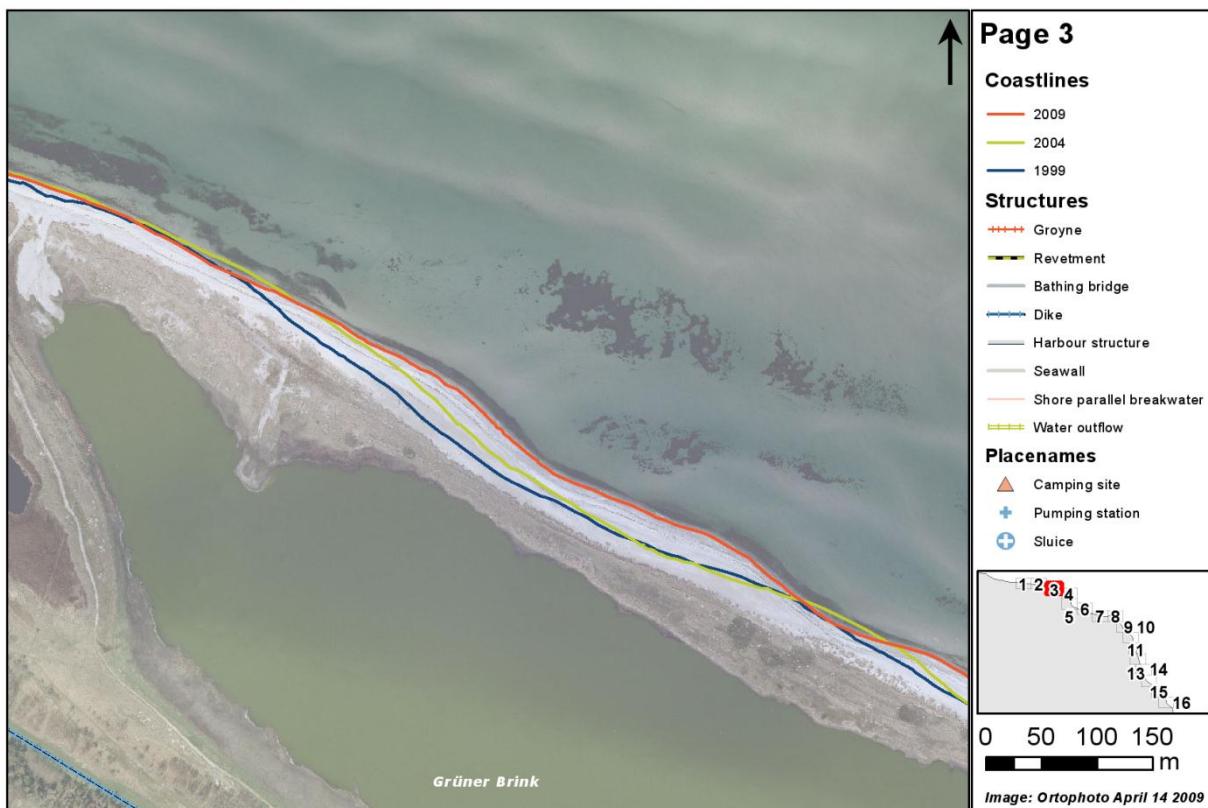
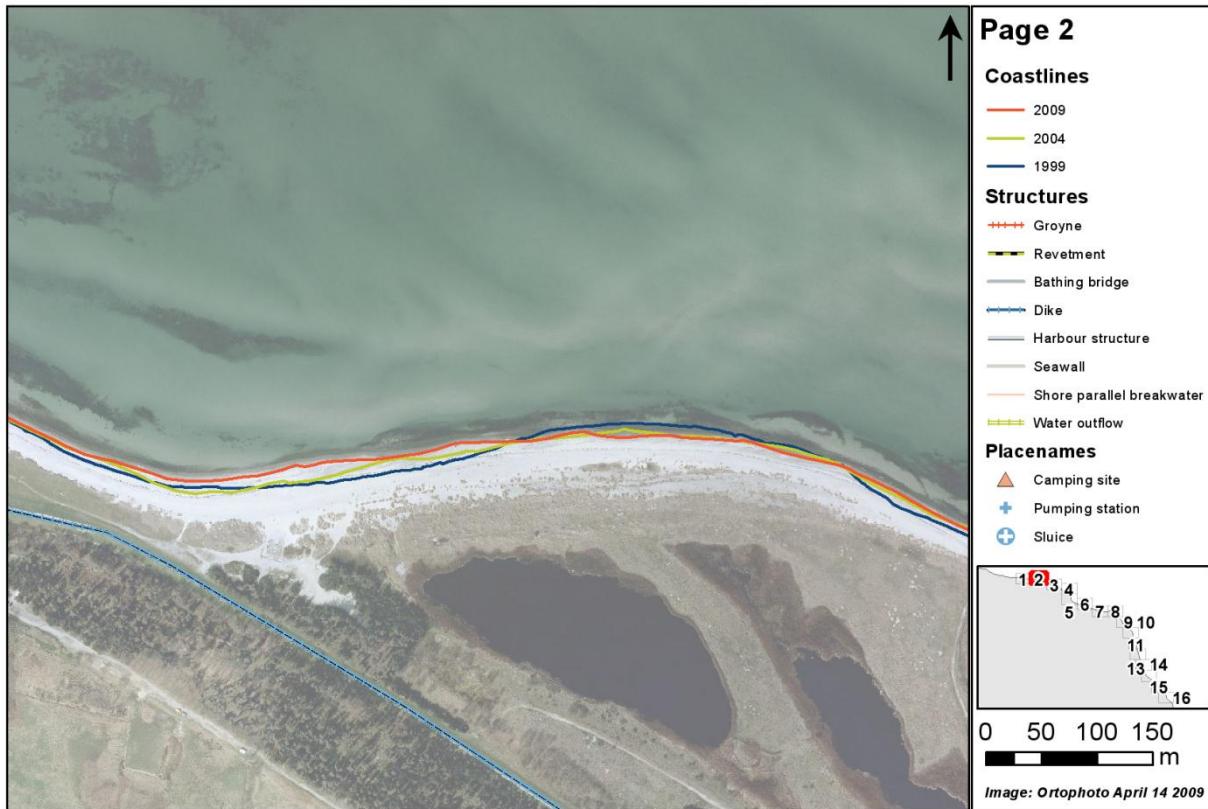


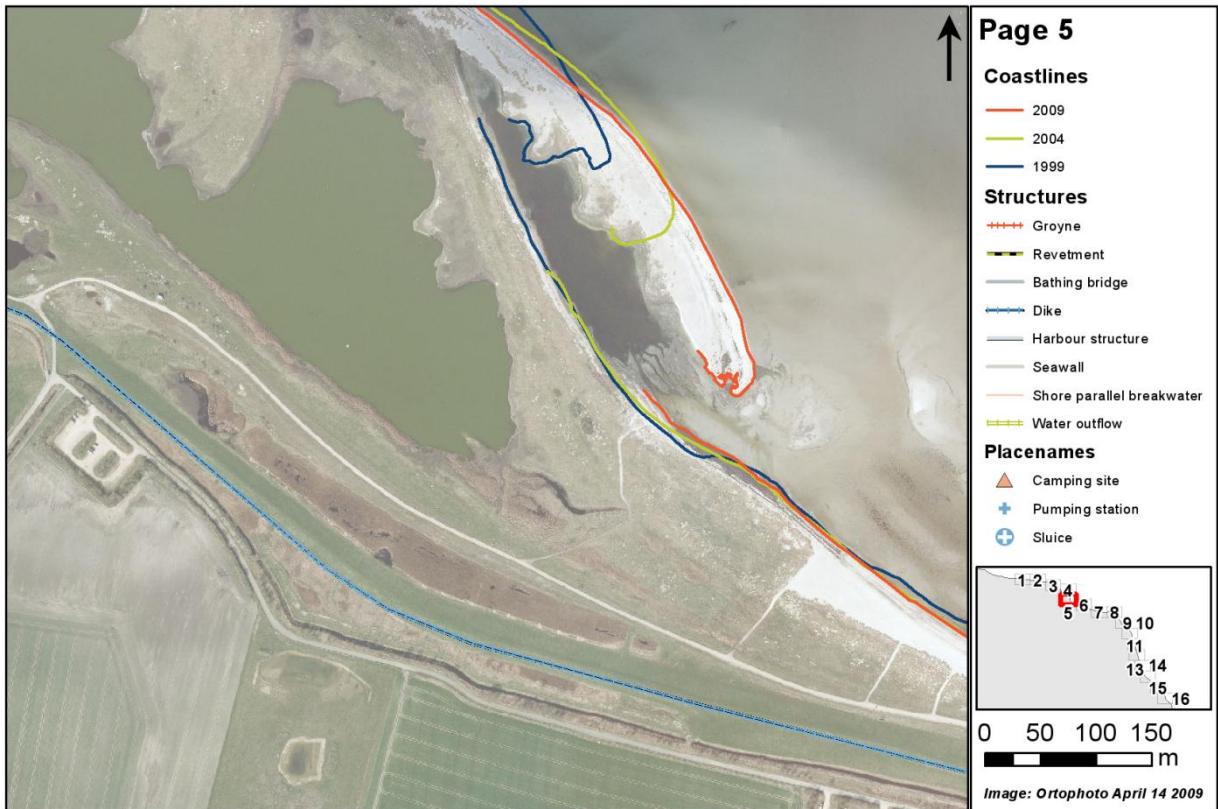
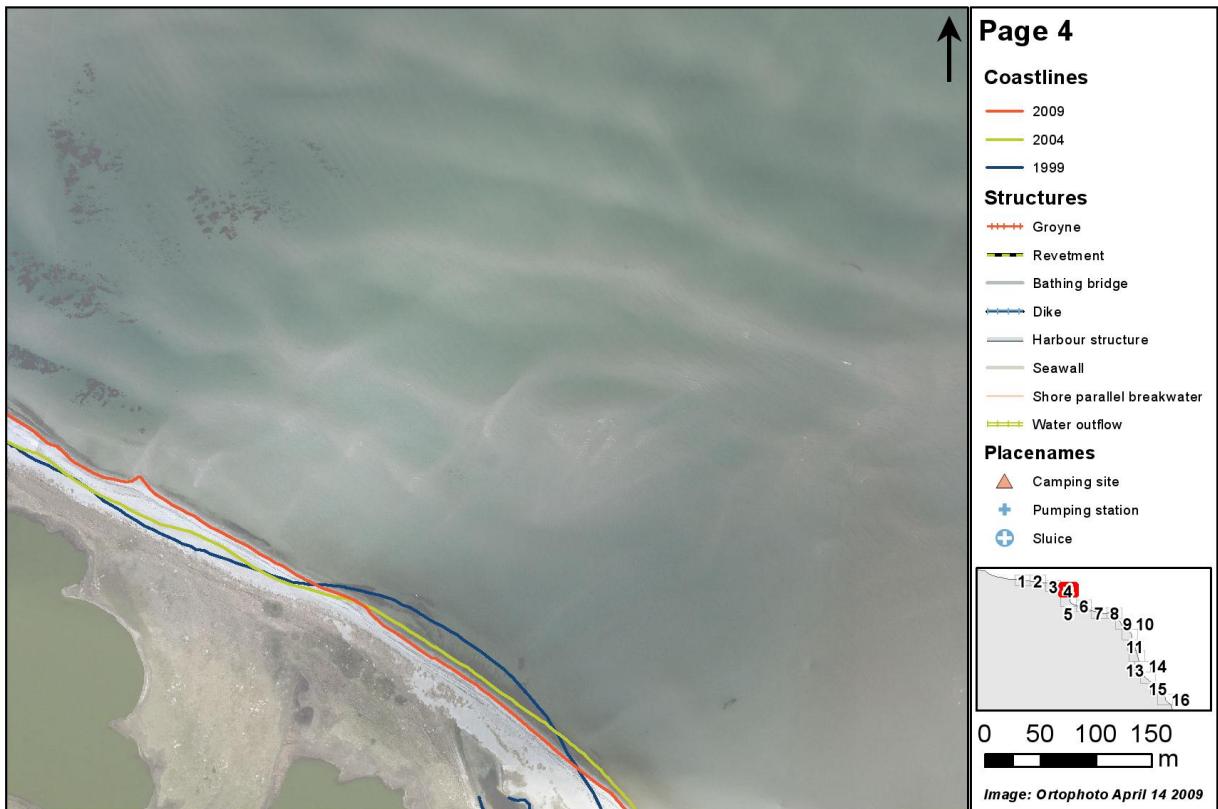


## **A P P E N D I X E**

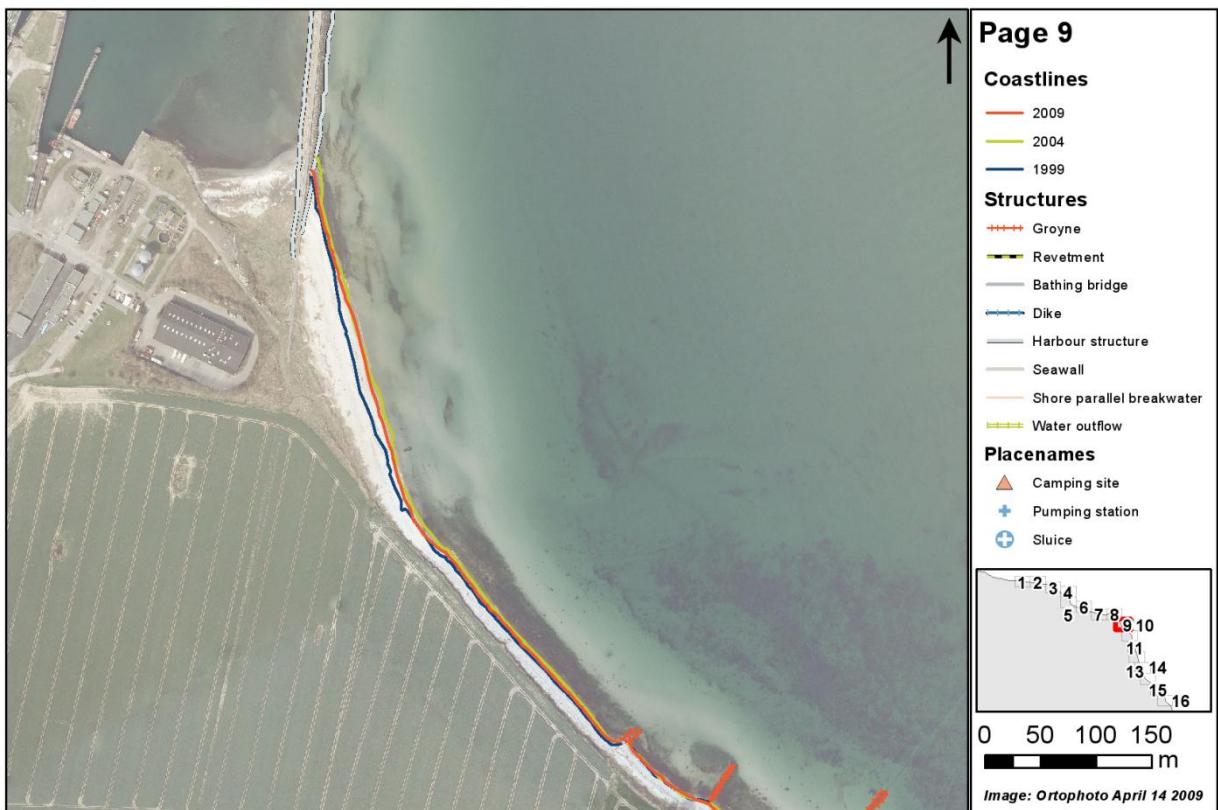
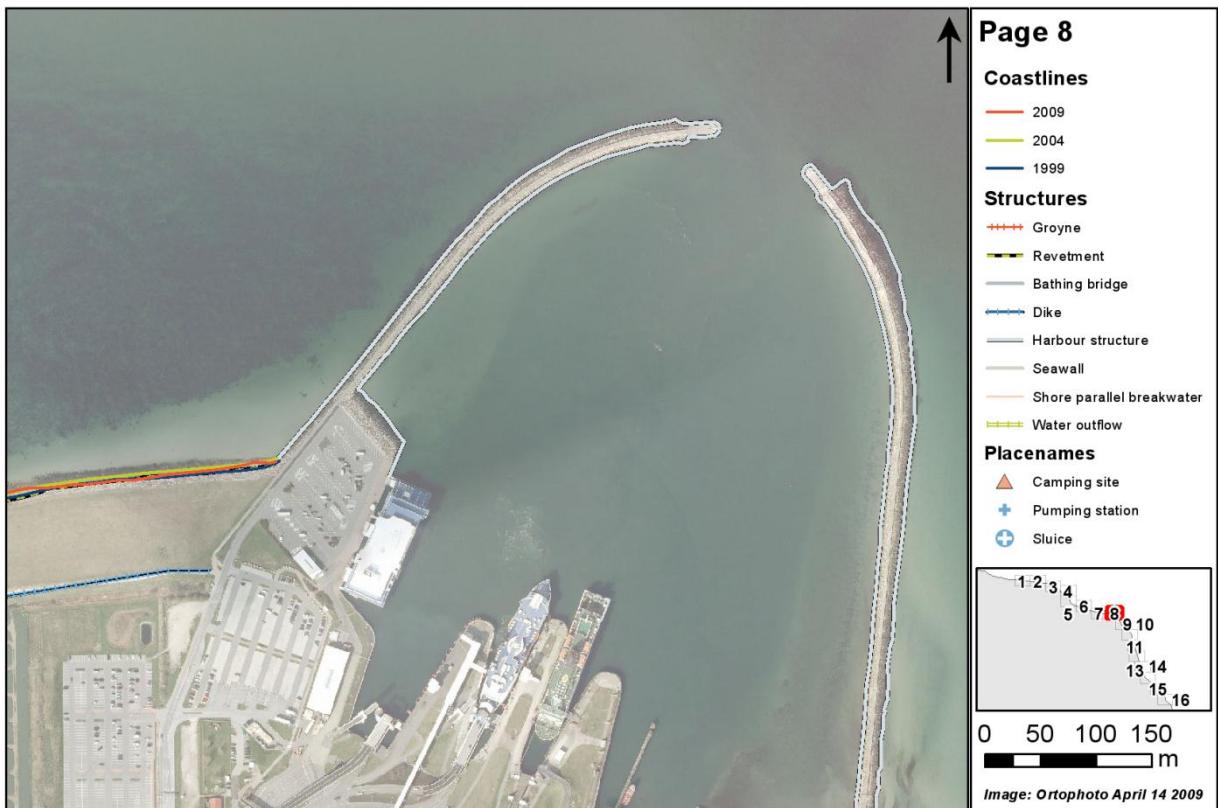
***Aerial Photos, North Coast of Fehmarn***

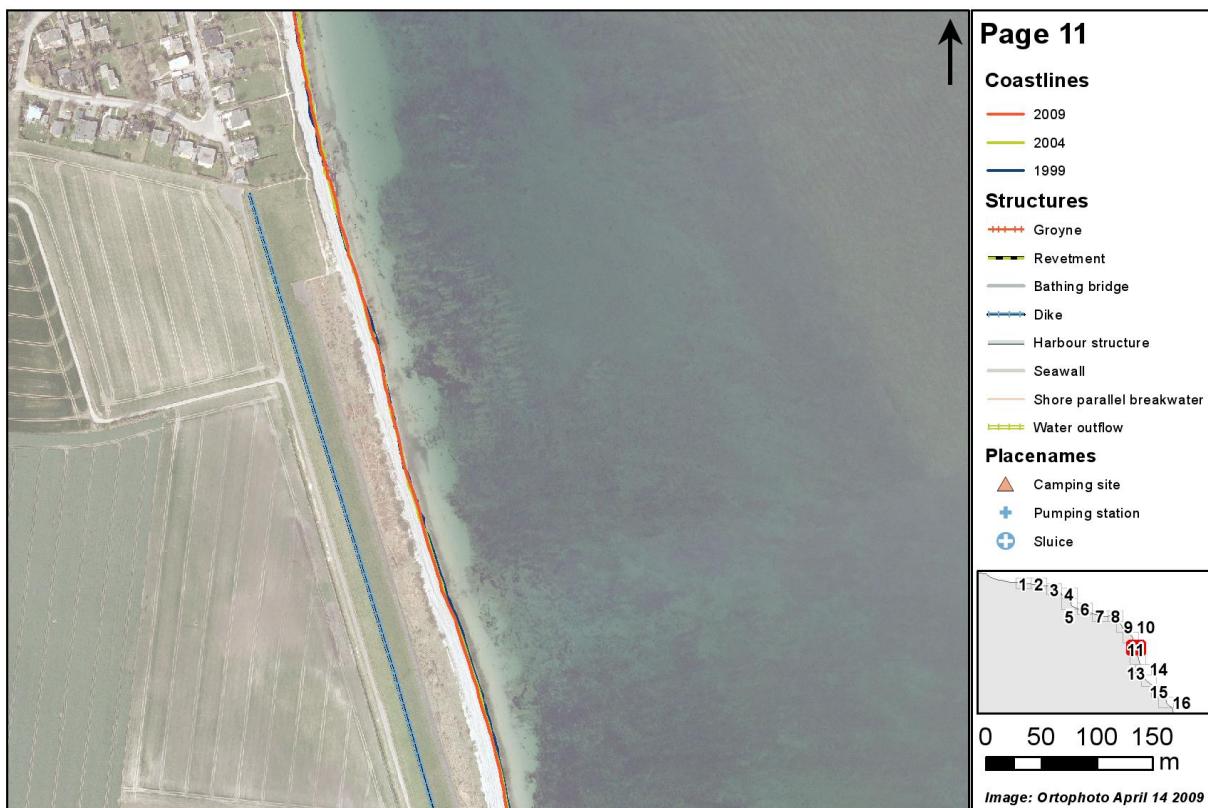


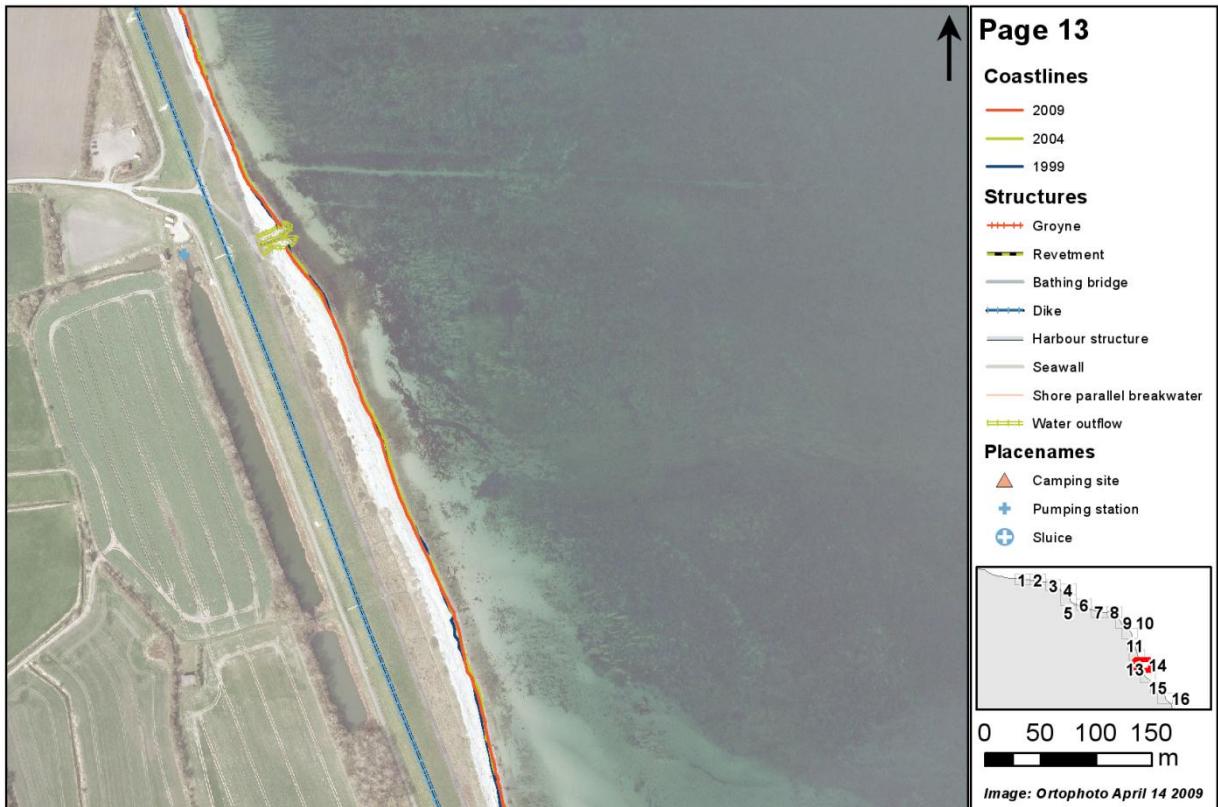
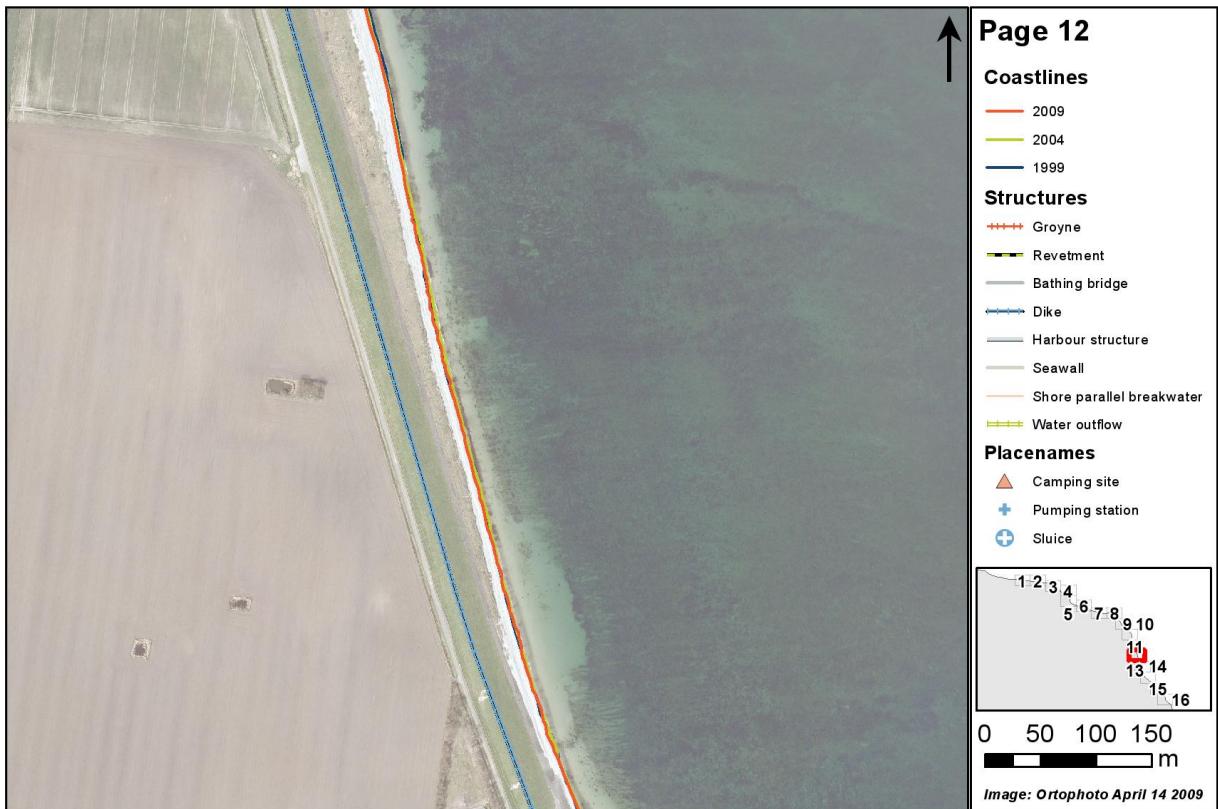


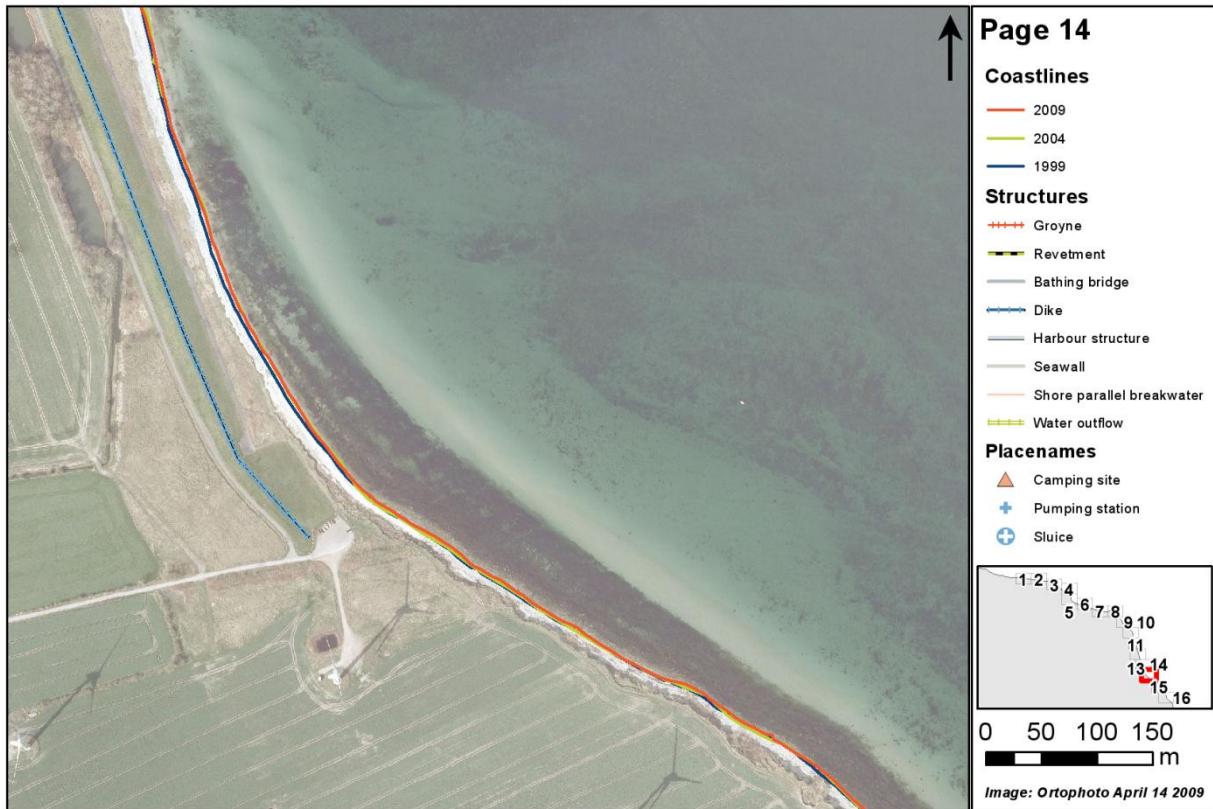










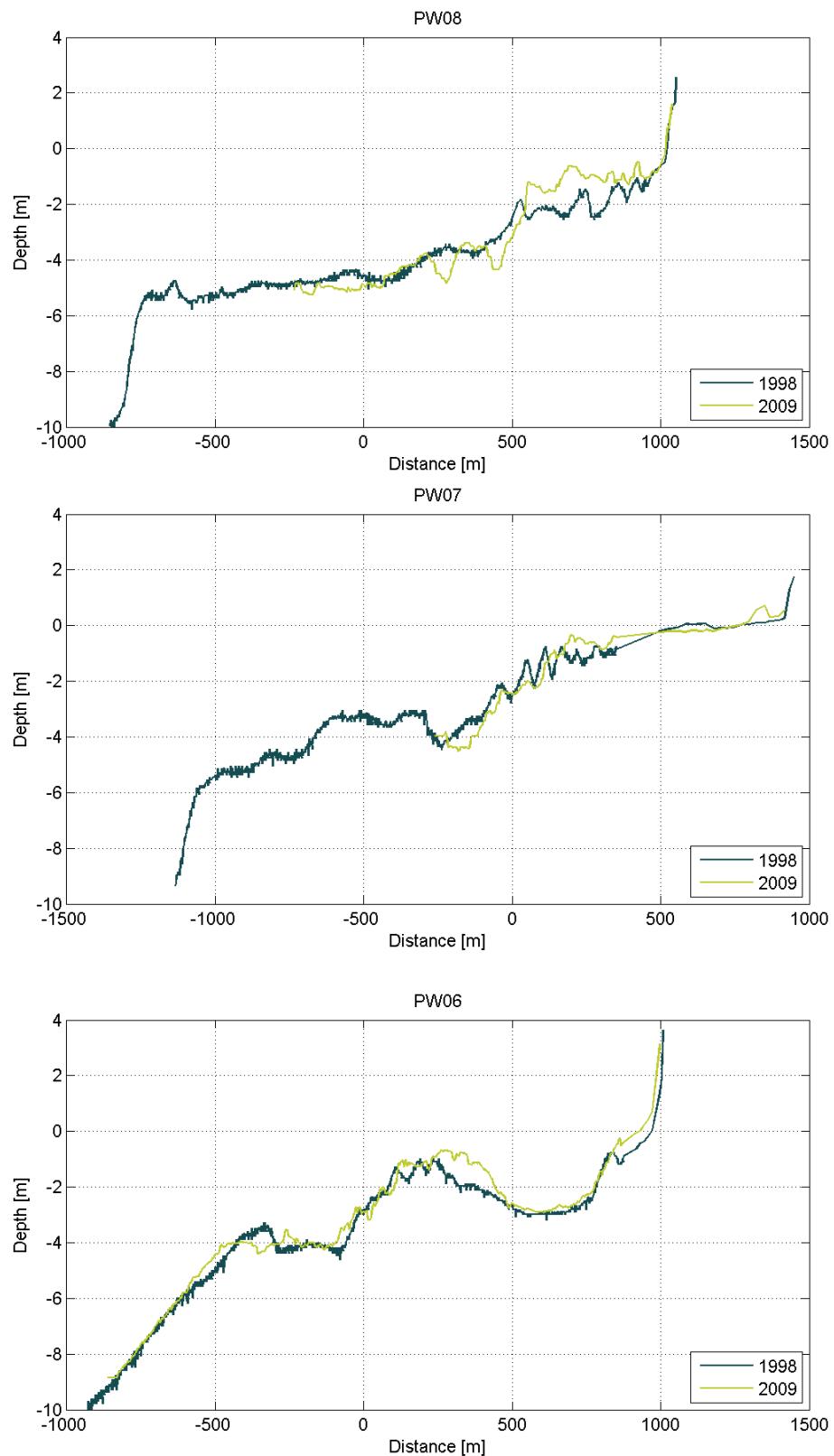


**Page 16**



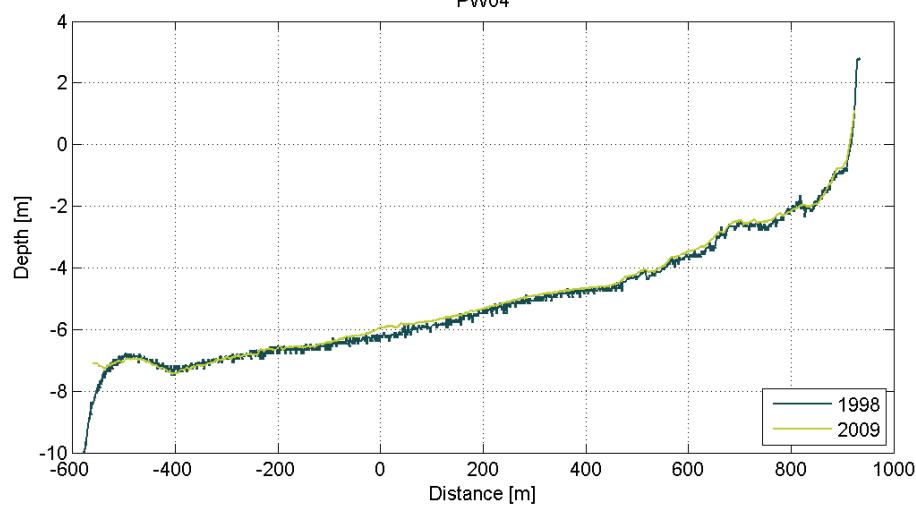
## A P P E N D I X F

***Coastal profiles, North Coast of Fehmarn***

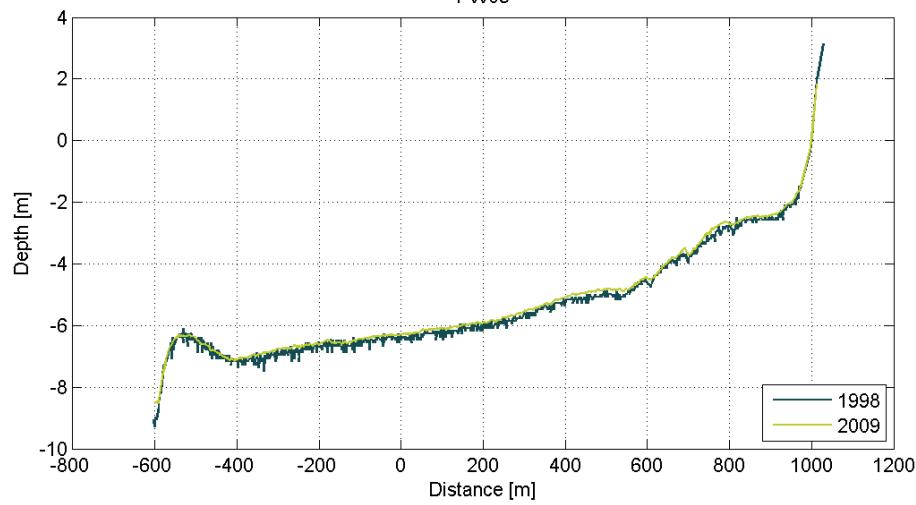




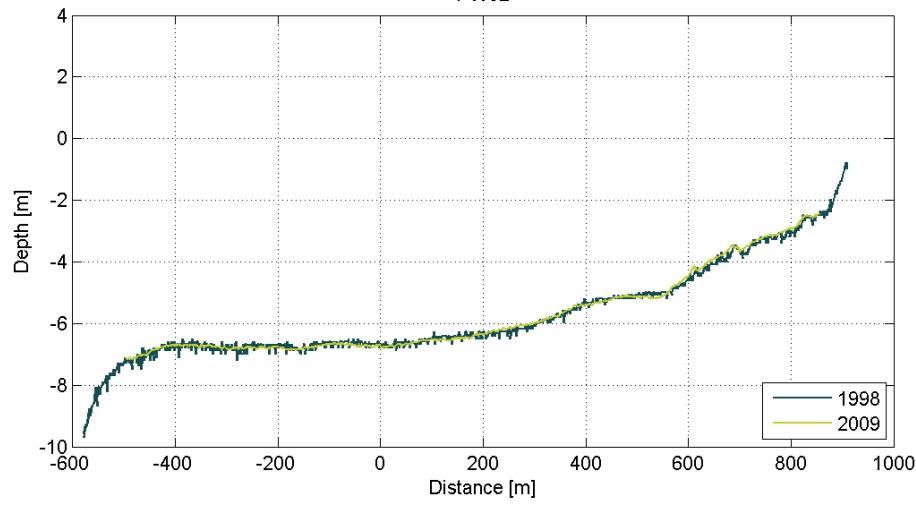
PW04

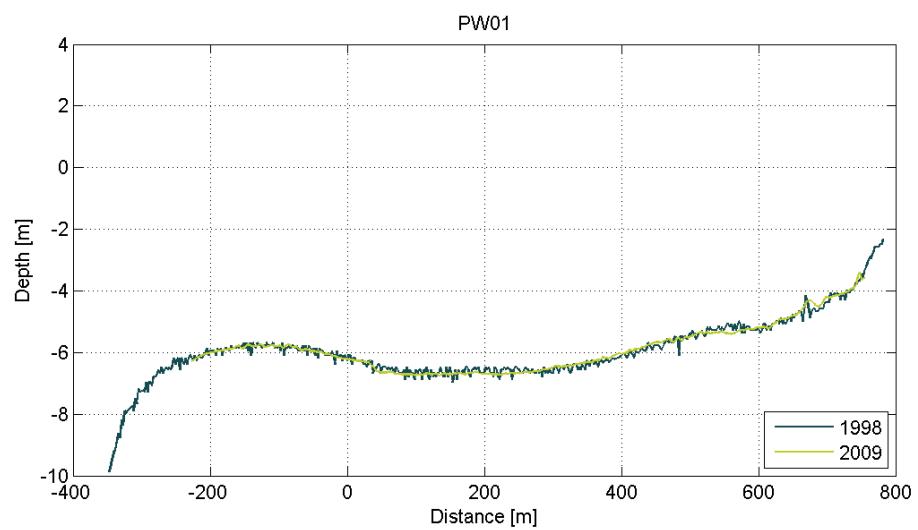
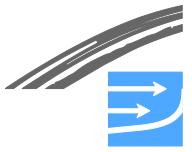


PW03



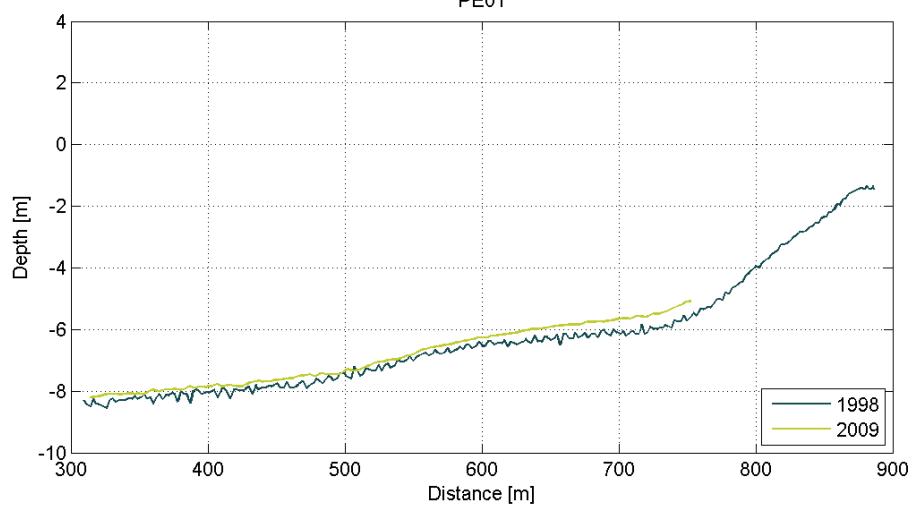
PW02



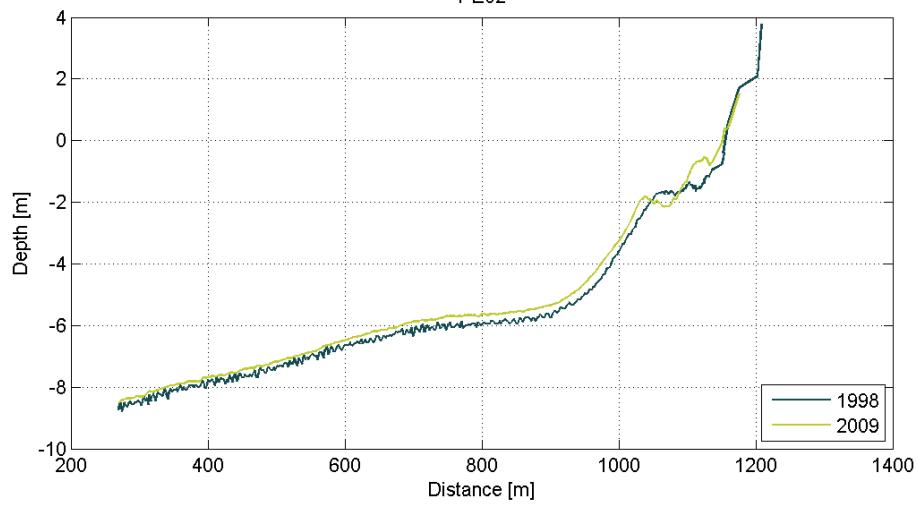




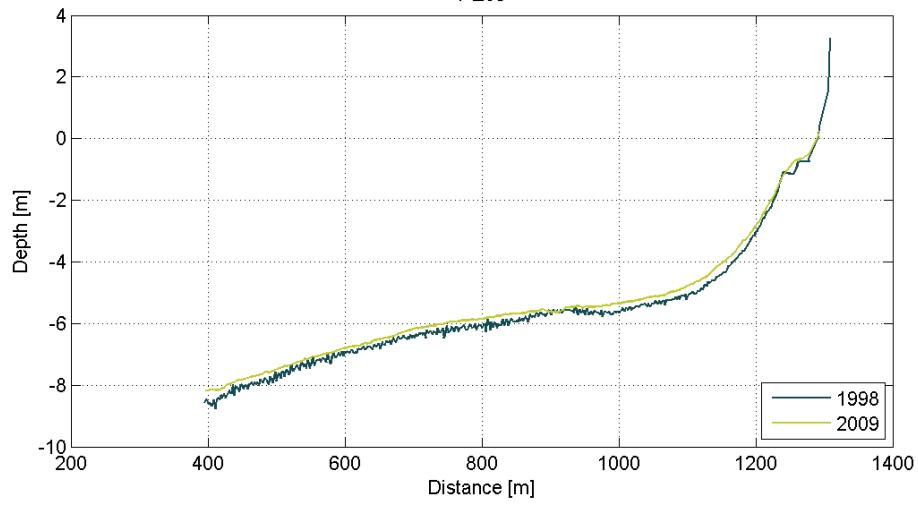
PE01

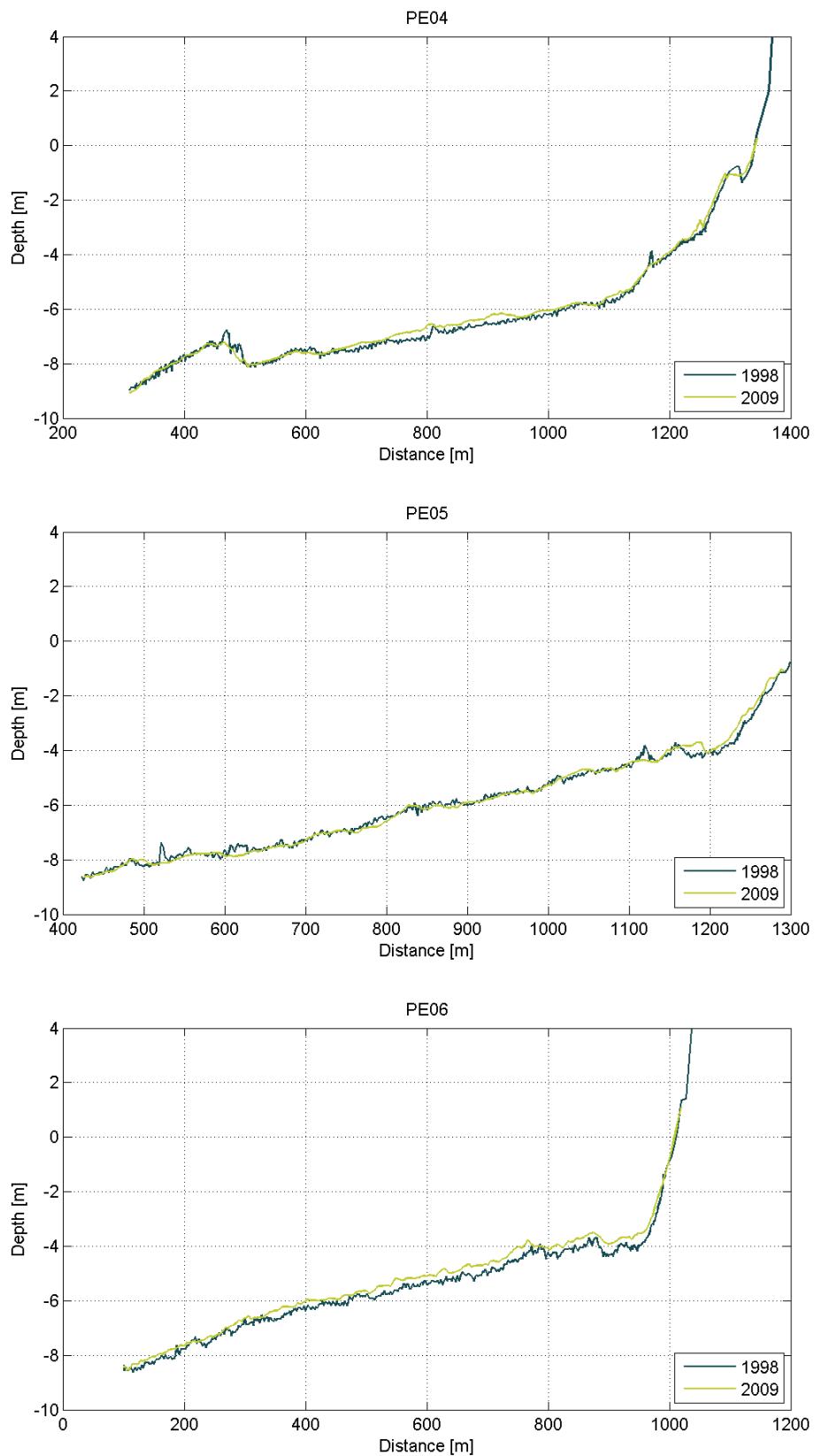


PE02



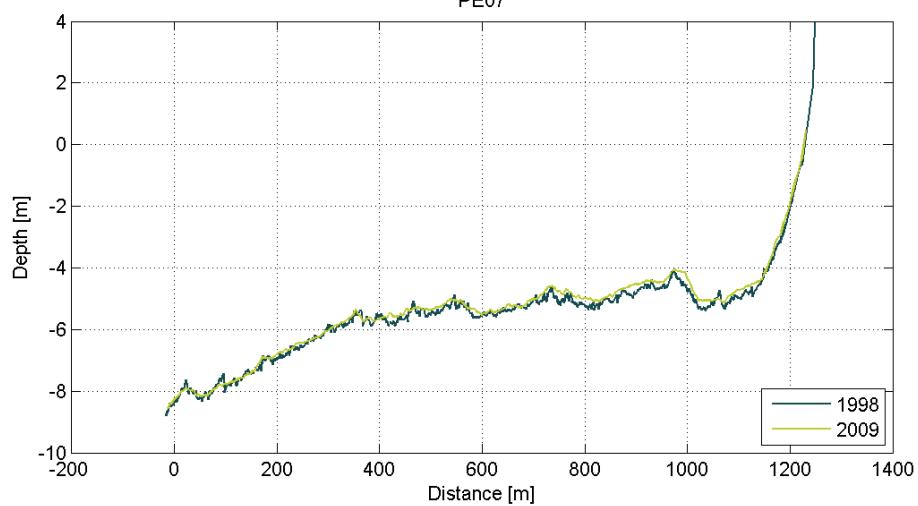
PE03



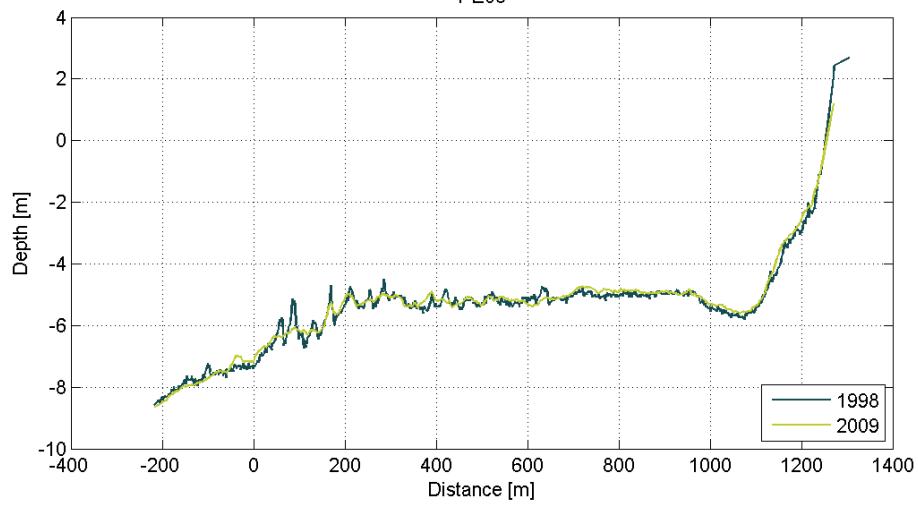




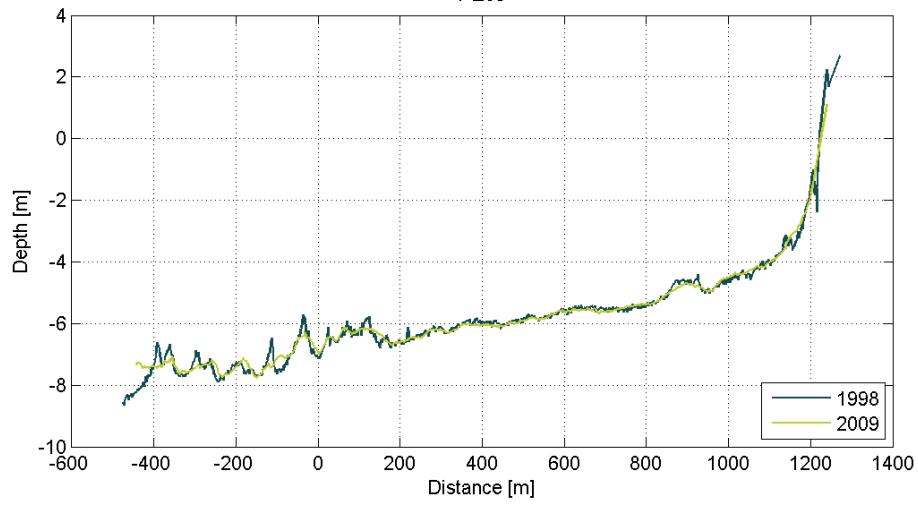
PE07

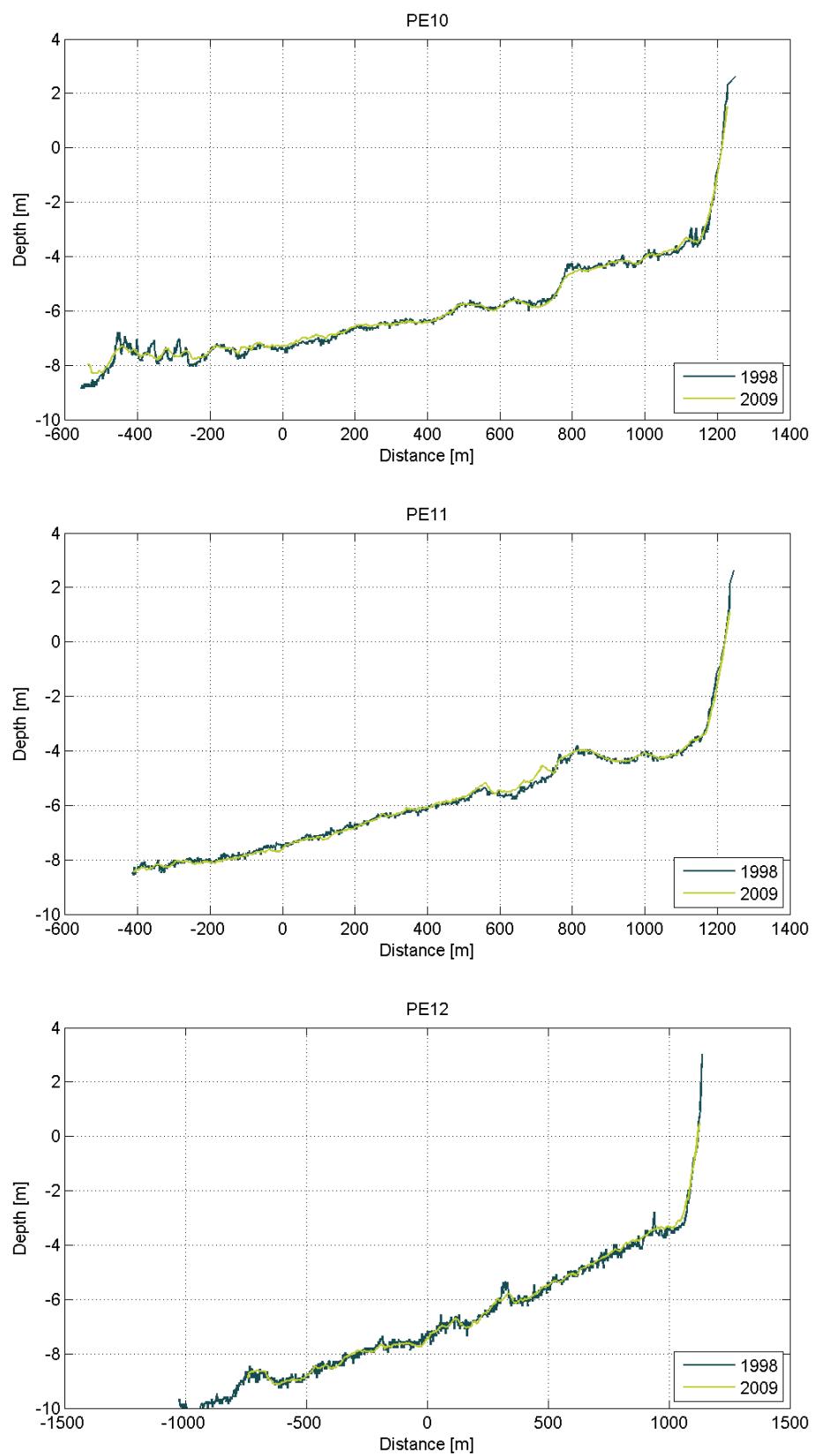


PE08



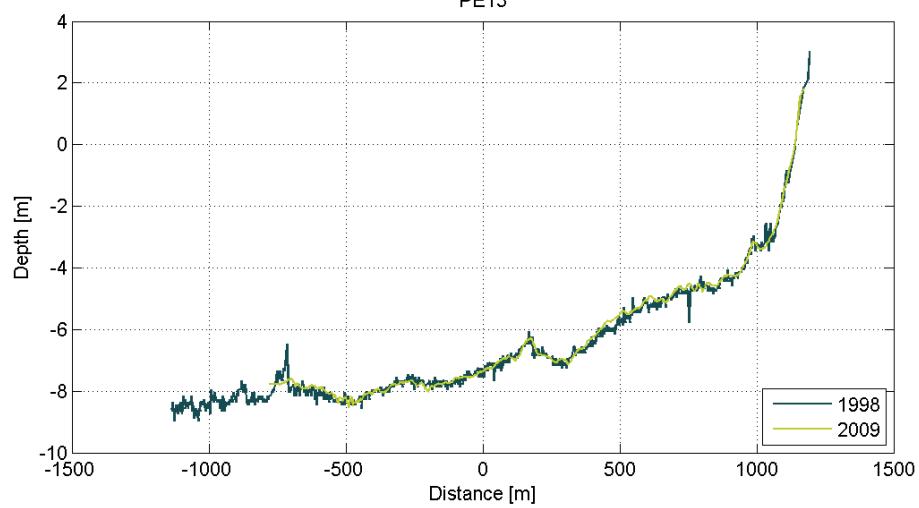
PE09



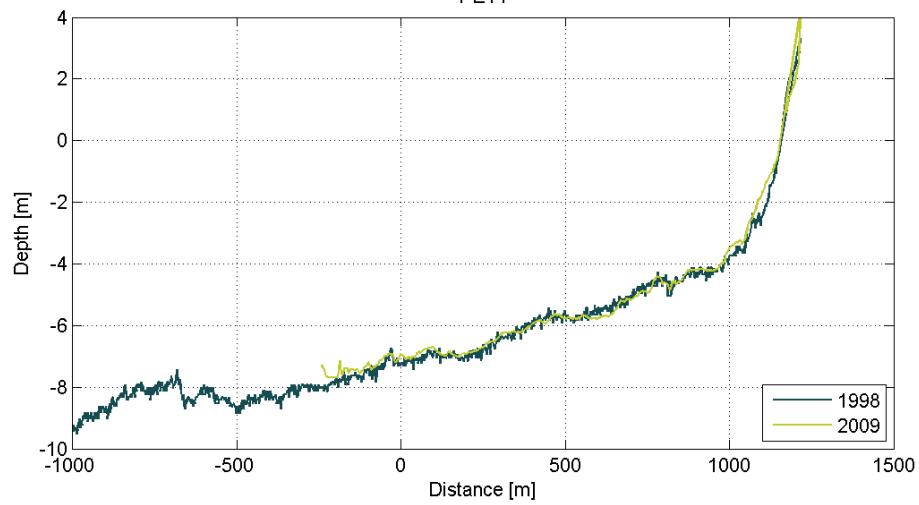




PE13



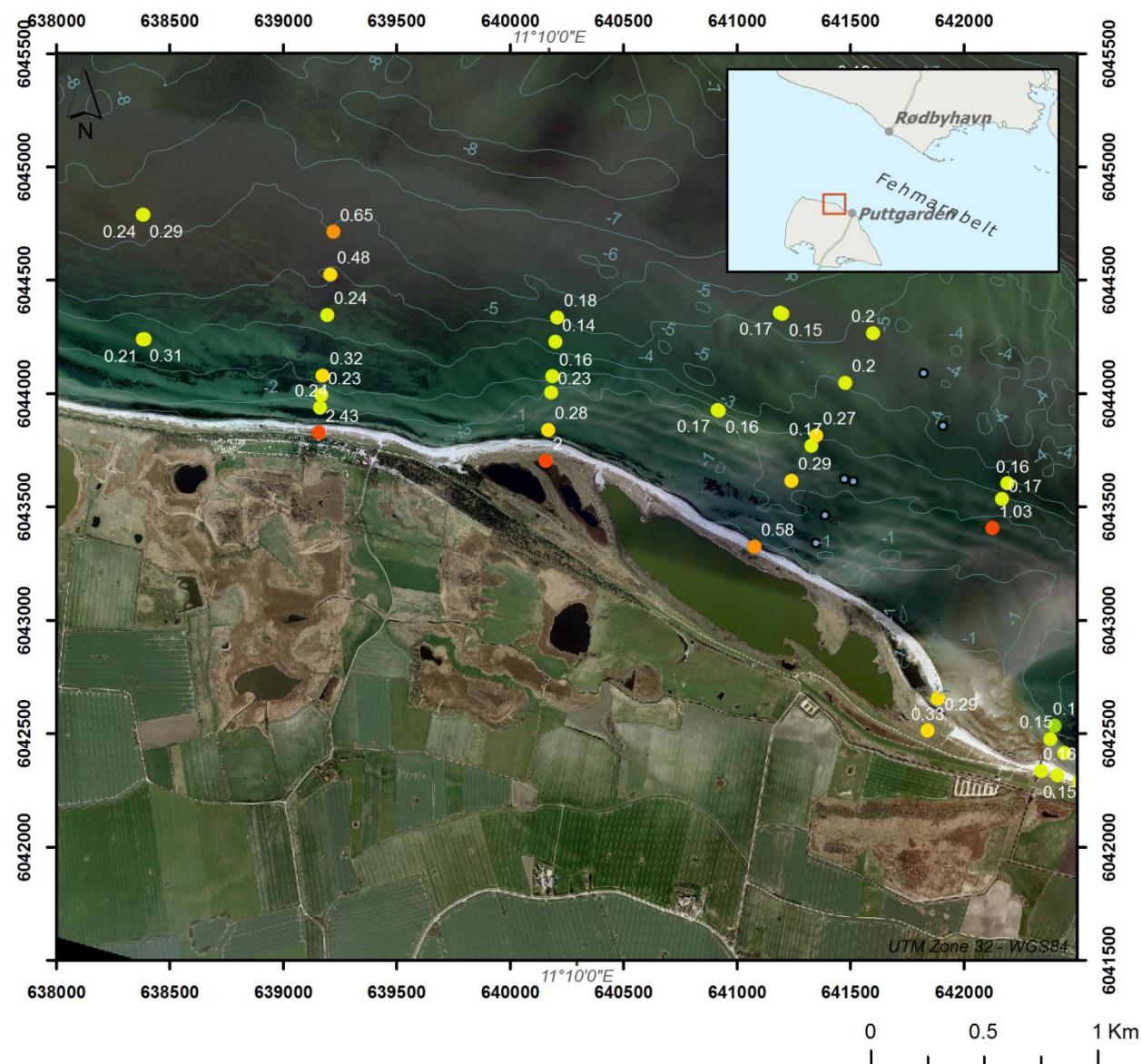
PE14





## **A P P E N D I X   G**

### ***Sea Bed Conditions, North Coast of Fehmarn***

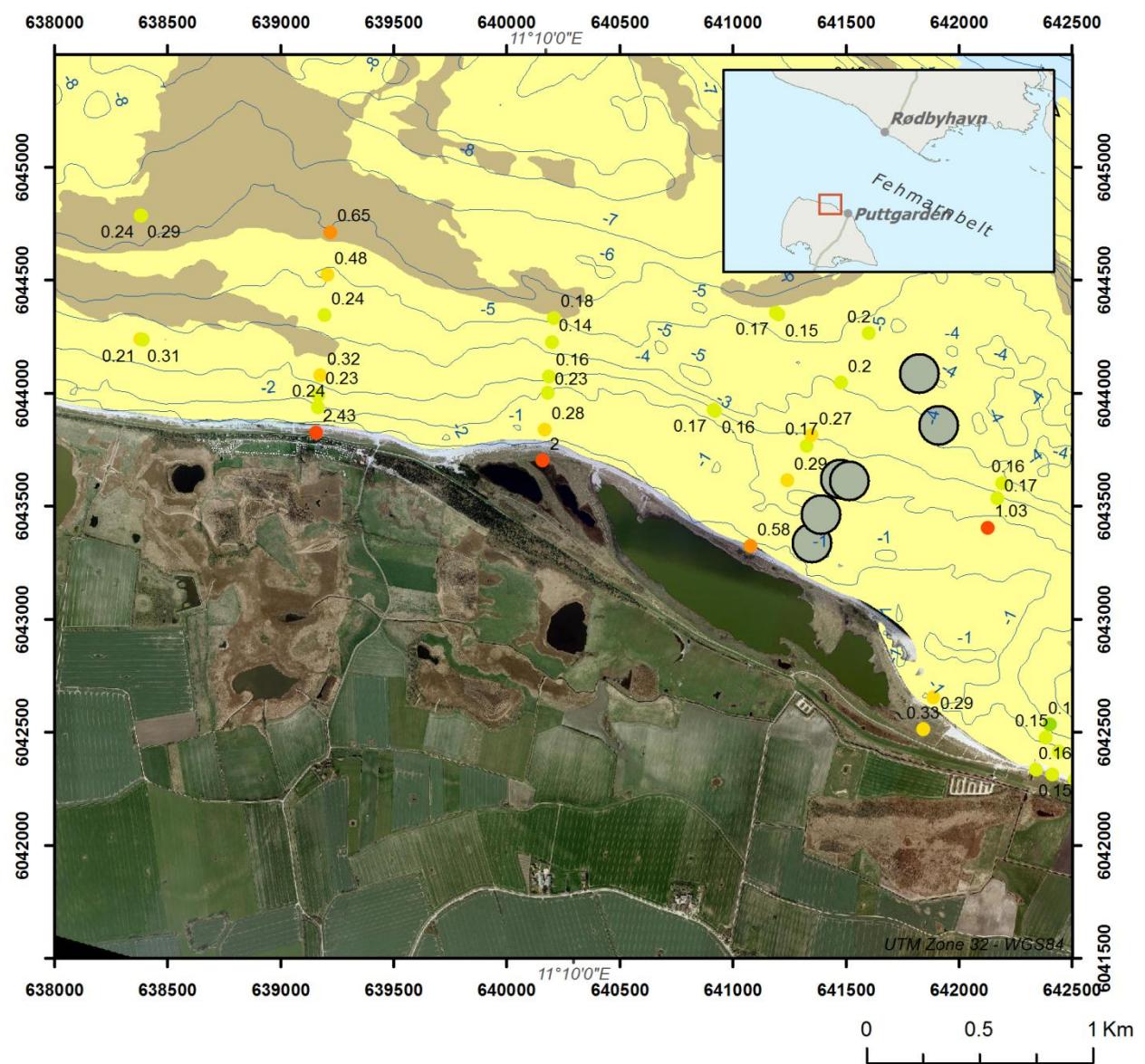
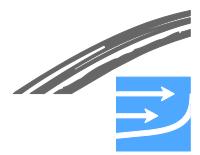


#### Seabed samples 1998 d50 (mm)

+	d50 N/A
Yellow circle	0.0 - 0.03 (Medium Silt and smaller)
Yellow circle	0.04 - 0.06 (Coarse Silt)
Yellow circle	0.07 - 0.13 (Very Fine Sand)
Yellow circle	0.14 - 0.25 (Fine Sand)
Yellow circle	0.26 - 0.50 (Medium Sand)
Yellow circle	0.51 - 1.00 (Coarse Sand)
Red circle	1.01 - 4.00 (Very Coarse Sand and larger)

#### Seabed samples 2009 d50 (mm)

•	d50 N/A
Green circle	0.0 - 0.03 (Medium Silt and smaller)
Green circle	0.04 - 0.06 (Coarse Silt)
Green circle	0.07 - 0.13 (Very Fine Sand)
Green circle	0.14 - 0.25 (Fine Sand)
Green circle	0.26 - 0.50 (Medium Sand)
Orange circle	0.51 - 1.00 (Coarse Sand)
Red circle	1.01 - 4.00 (Very Coarse Sand and larger)



#### Seabed samples 1998 d50 (mm)

+	0.0 - 0.03 (Medium Silt and smaller)
+	0.04 - 0.06 (Coarse Silt)
+	0.07 - 0.13 (Very Fine Sand)
+	0.14 - 0.25 (Fine Sand)
+	0.26 - 0.50 (Medium Sand)
+	0.51 - 1.00 (Coarse Sand)
+	1.01 - 4.00 (Very Coarse Sand and larger)
+	d50 N/A

#### Substrate

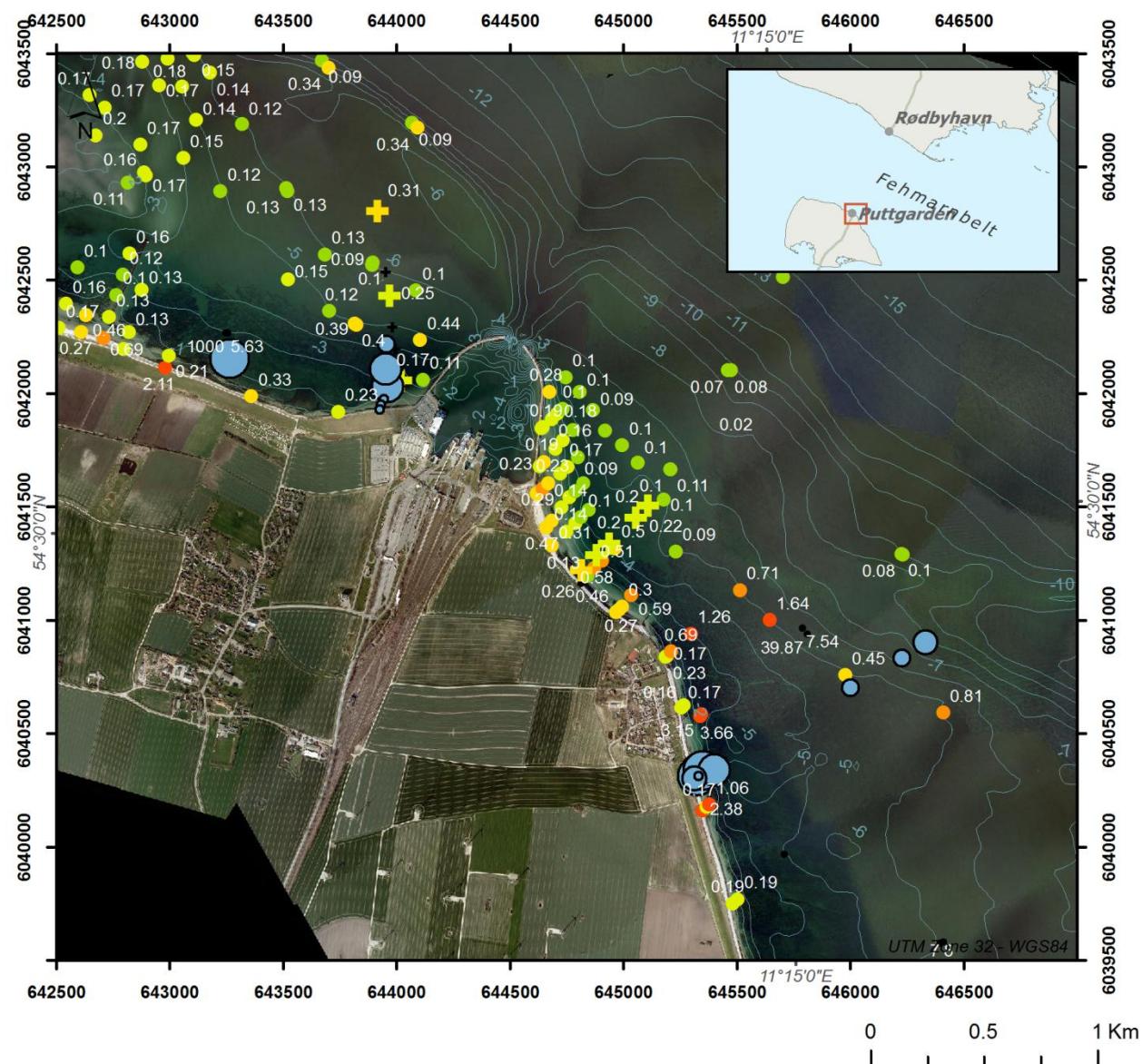
Light brown	Coarse sediment/Boulders
Yellow	Sand
Light green	Muddy sand
Green	Sandy mud
Blue	Thin sandy mud
Dark blue	Mud
Pink	Mixed sediment/Boulders
Black	Artificial hard substrate
Grey	Unknown
White	No information

#### Seabed samples 2009 d50 (mm)

●	0.0 - 0.03 (Medium Silt and smaller)
●	0.04 - 0.06 (Coarse Silt)
●	0.07 - 0.13 (Very Fine Sand)
●	0.14 - 0.25 (Fine Sand)
●	0.26 - 0.50 (Medium Sand)
●	0.51 - 1.00 (Coarse Sand)
●	1.01 - 4.00 (Very Coarse Sand and larger)
●	d50 N/A

#### Sand cover (%)

Small circle	0 - 20
Medium circle	20 - 40
Large circle	40 - 60
Very large circle	60 - 80
Huge circle	80 - 100



#### Seabed samples 1998 d50 (mm)

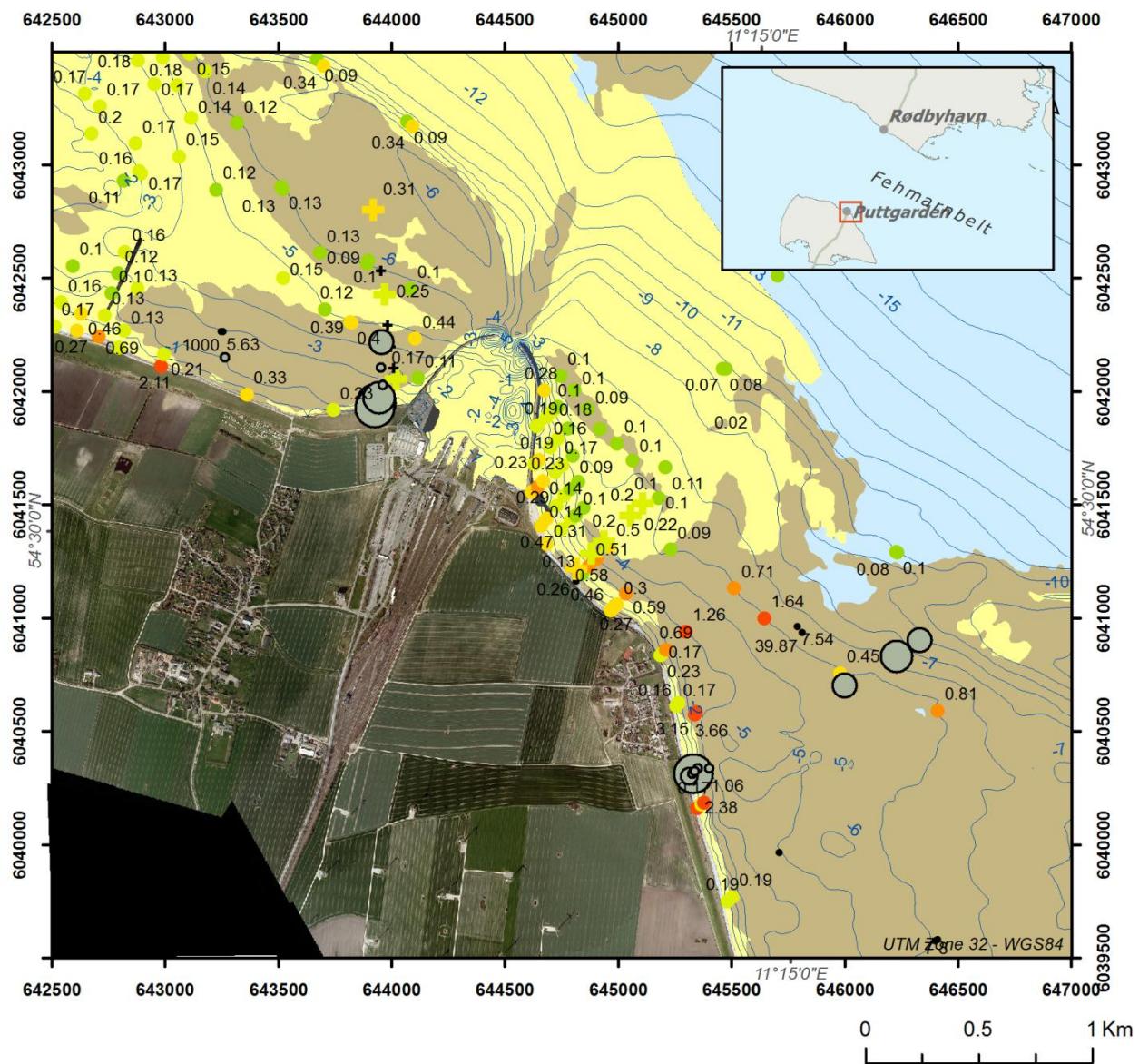
+	0.0 - 0.03 (Medium Silt and smaller)
+	0.04 - 0.06 (Coarse Silt)
+	0.07 - 0.13 (Very Fine Sand)
+	0.14 - 0.25 (Fine Sand)
+	0.26 - 0.50 (Medium Sand)
+	0.51 - 1.00 (Coarse Sand)
+	1.01 - 4.00 (Very Coarse Sand and larger)
+	d50 N/A

#### Suitable substrate for macroalgae cover(%)

●	0 - 20
●	20 - 40
●	40 - 60
●	60 - 80
●	80 - 100

#### Seabed samples 2009 d50 (mm)

●	0.0 - 0.03 (Medium Silt and smaller)
●	0.04 - 0.06 (Coarse Silt)
●	0.07 - 0.13 (Very Fine Sand)
●	0.14 - 0.25 (Fine Sand)
●	0.26 - 0.50 (Medium Sand)
●	0.51 - 1.00 (Coarse Sand)
●	1.01 - 4.00 (Very Coarse Sand and larger)
●	d50 N/A



#### Seabed samples 1998 d50 (mm)



- 0.0 - 0.03 (Medium Silt and smaller)
- 0.04 - 0.06 (Coarse Silt)
- 0.07 - 0.13 (Very Fine Sand)
- 0.14 - 0.25 (Fine Sand)
- 0.26 - 0.50 (Medium Sand)
- 0.51 - 1.00 (Coarse Sand)
- 1.01 - 4.00 (Very Coarse Sand and larger)
- d50 N/A

#### Seabed samples 2009 d50 (mm)



- 0.0 - 0.03 (Medium Silt and smaller)
- 0.04 - 0.06 (Coarse Silt)
- 0.07 - 0.13 (Very Fine Sand)
- 0.14 - 0.25 (Fine Sand)
- 0.26 - 0.50 (Medium Sand)
- 0.51 - 1.00 (Coarse Sand)
- 1.01 - 4.00 (Very Coarse Sand and larger)
- d50 N/A

#### Substrate

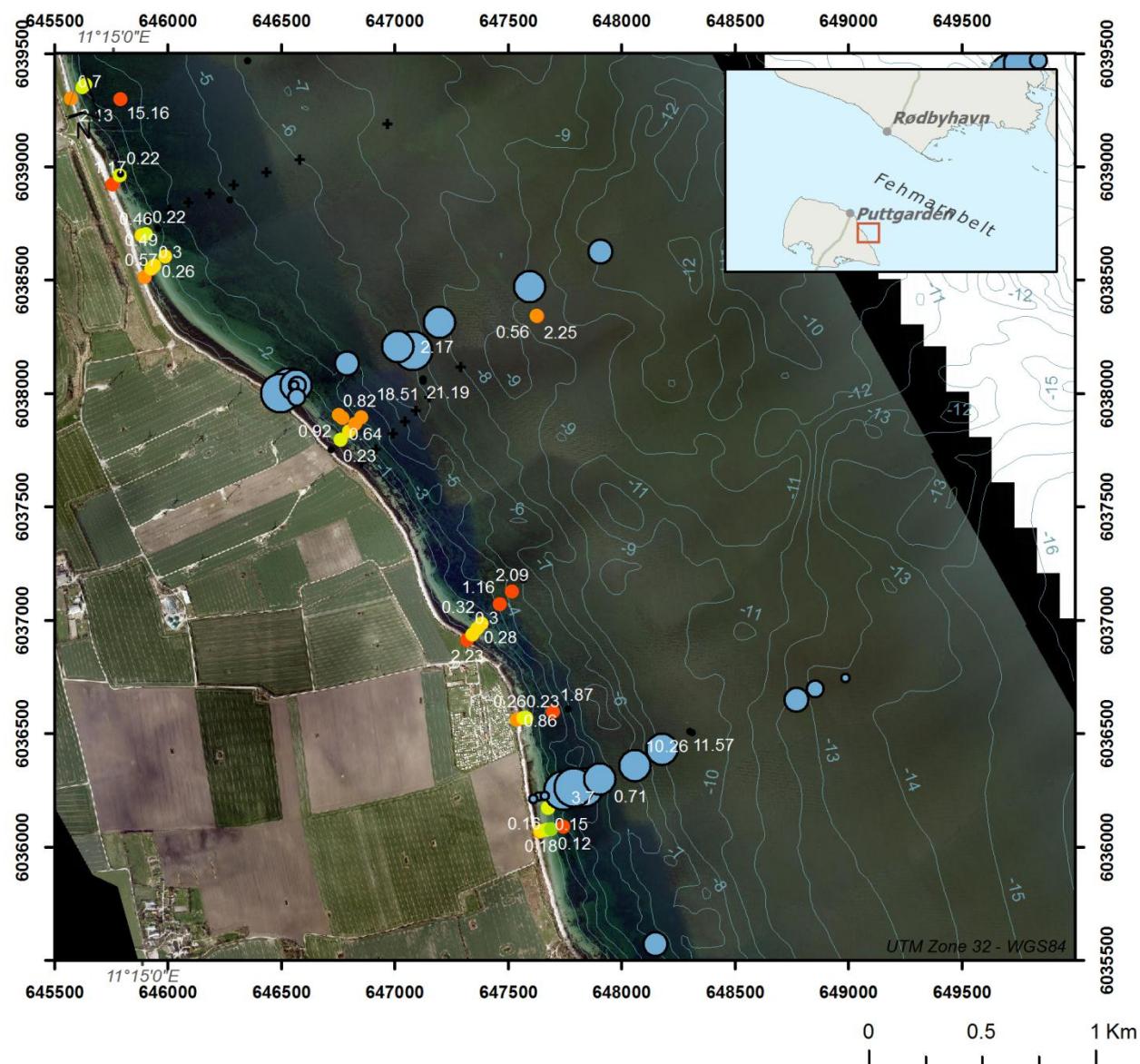


- Coarse sediment/Boulders
- Sand
- Muddy sand
- Sandy mud
- Thin sandy mud
- Mud
- Mixed sediment/Boulders
- Artificial hard substrate
- Unknown
- No information

#### Sand cover (%)



- 0 - 20
- 20 - 40
- 40 - 60
- 60 - 80
- 80 - 100

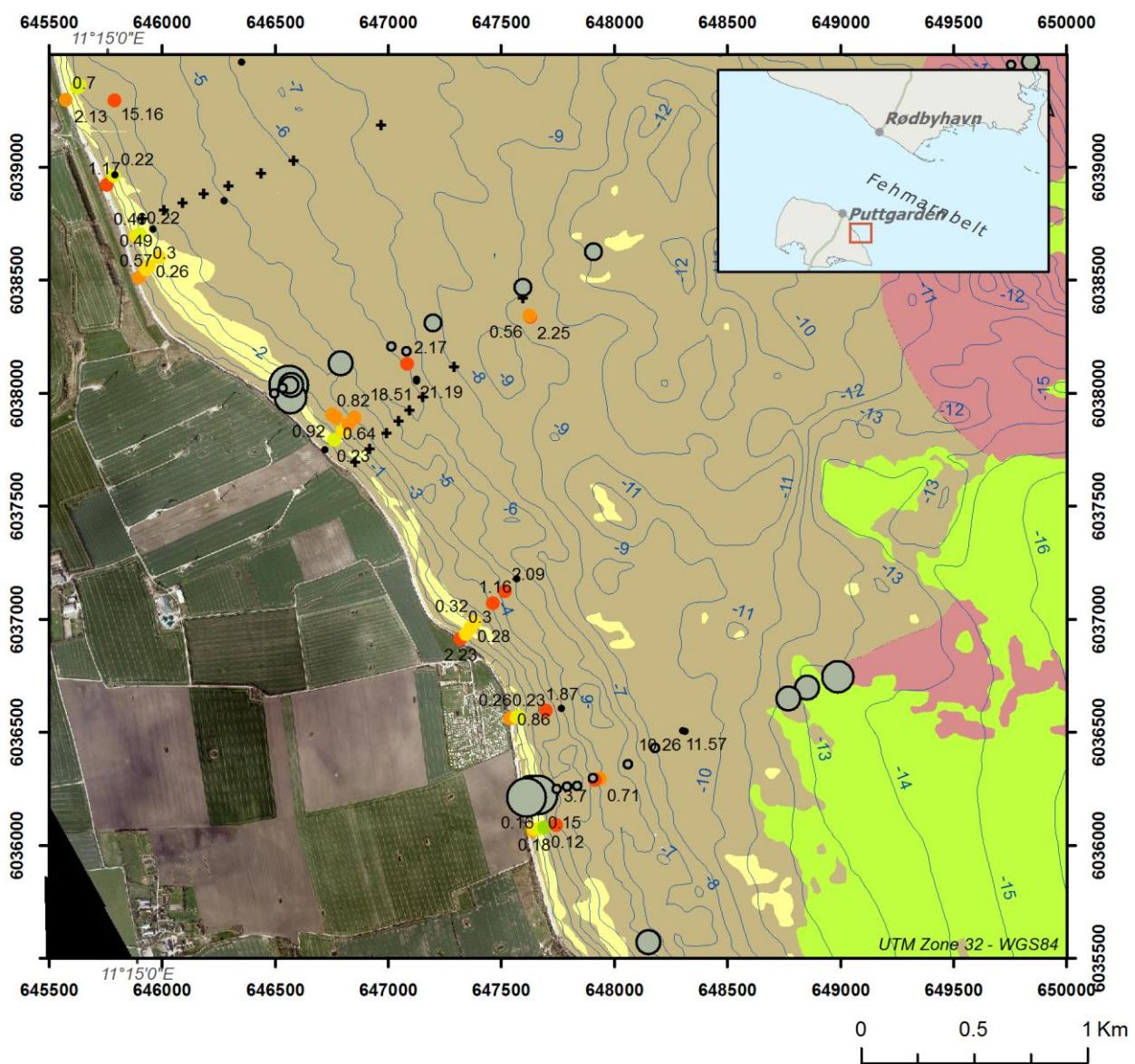


#### Seabed samples 1998 d50 (mm)

+	0.0 - 0.03 (Medium Silt and smaller)
+	0.04 - 0.06 (Coarse Silt)
+	0.07 - 0.13 (Very Fine Sand)
+	0.14 - 0.25 (Fine Sand)
+	0.26 - 0.50 (Medium Sand)
+	0.51 - 1.00 (Coarse Sand)
+	1.01 - 4.00 (Very Coarse Sand and larger)
+	d50 N/A

#### Seabed samples 2009 d50 (mm)

●	0.0 - 0.03 (Medium Silt and smaller)
●	0.04 - 0.06 (Coarse Silt)
●	0.07 - 0.13 (Very Fine Sand)
●	0.14 - 0.25 (Fine Sand)
●	0.26 - 0.50 (Medium Sand)
●	0.51 - 1.00 (Coarse Sand)
●	1.01 - 4.00 (Very Coarse Sand and larger)
●	d50 N/A



### Seabed samples 1998 d50 (mm)

+	0.0 - 0.03 (Medium Silt and smaller)
+	0.04 - 0.06 (Coarse Silt)
+	0.07 - 0.13 (Very Fine Sand)
+	0.14 - 0.25 (Fine Sand)
+	0.26 - 0.50 (Medium Sand)
+	0.51 - 1.00 (Coarse Sand)
+	1.01 - 4.00 (Very Coarse Sand and larger)
+	d50 N/A

### Substrate

+	Coarse sediment/Boulders
+	Sand
+	Muddy sand
+	Sandy mud
+	Thin sandy mud
+	Mud
+	Mixed sediment/Boulders
+	Artificial hard substrate
+	Unknown
+	No information

### Seabed samples 2009 d50 (mm)

●	0.0 - 0.03 (Medium Silt and smaller)
●	0.04 - 0.06 (Coarse Silt)
●	0.07 - 0.13 (Very Fine Sand)
●	0.14 - 0.25 (Fine Sand)
●	0.26 - 0.50 (Medium Sand)
●	0.51 - 1.00 (Coarse Sand)
●	1.01 - 4.00 (Very Coarse Sand and larger)
●	d50 N/A

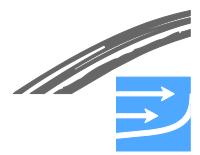
### Sand cover (%)

○	0 - 20
○	20 - 40
○	40 - 60
○	60 - 80
○	80 - 100

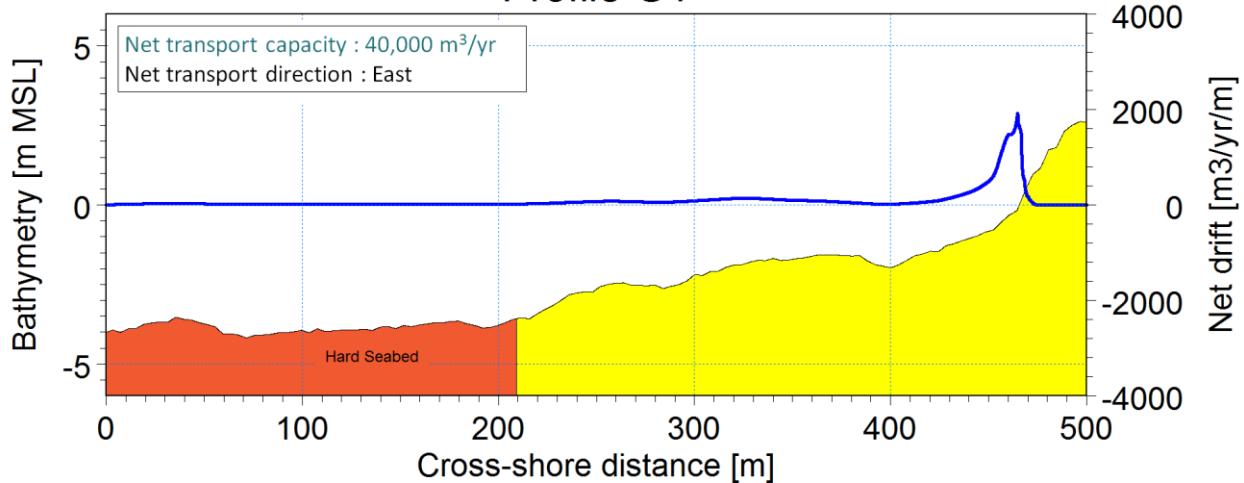


## A P P E N D I X H

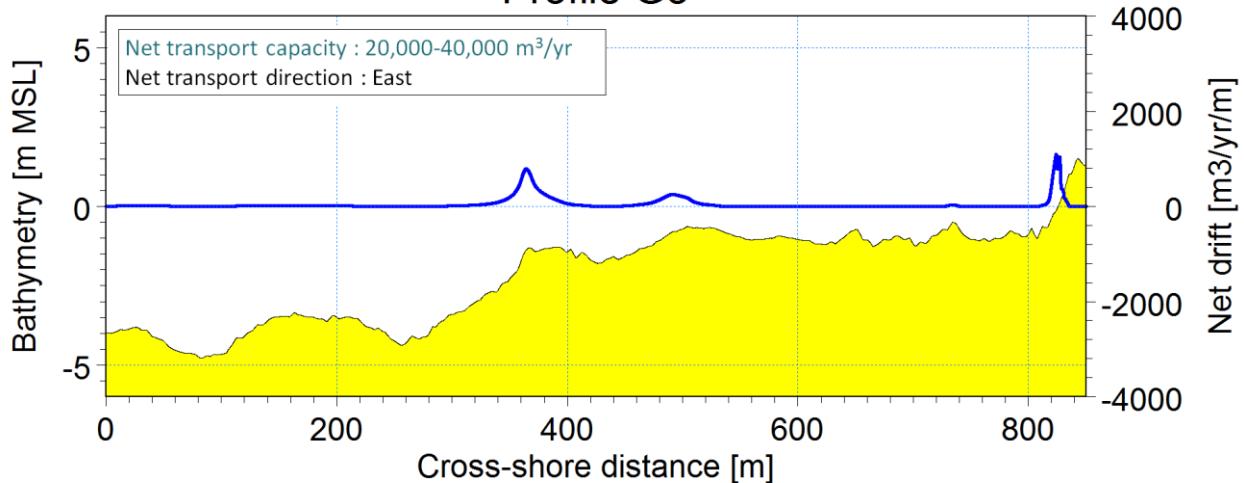
***Distribution of Net Annual Transport in the Coastal profile,  
North Coast of Fehmarn***



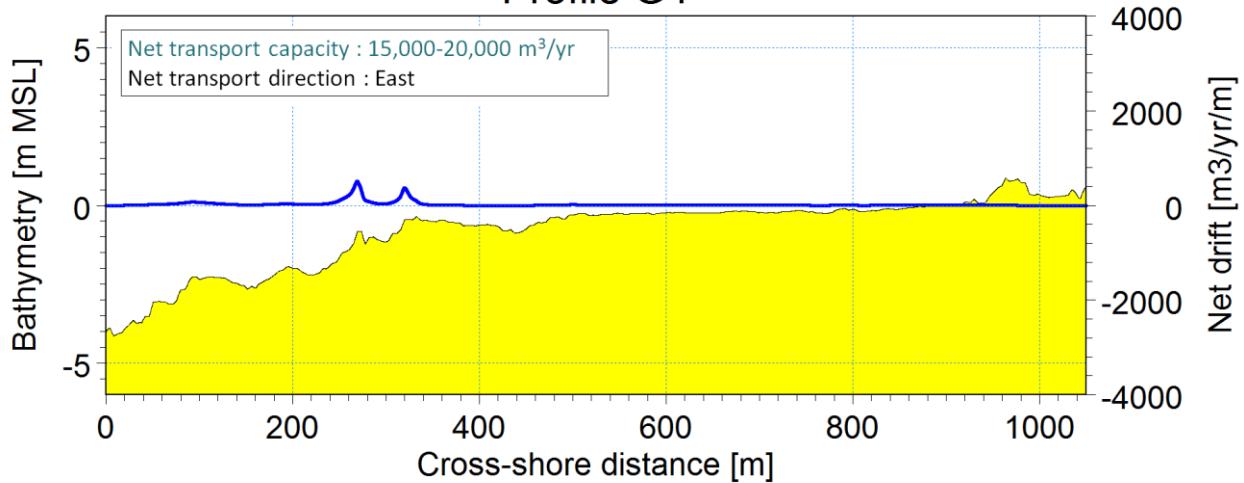
### Profile G1



### Profile G3

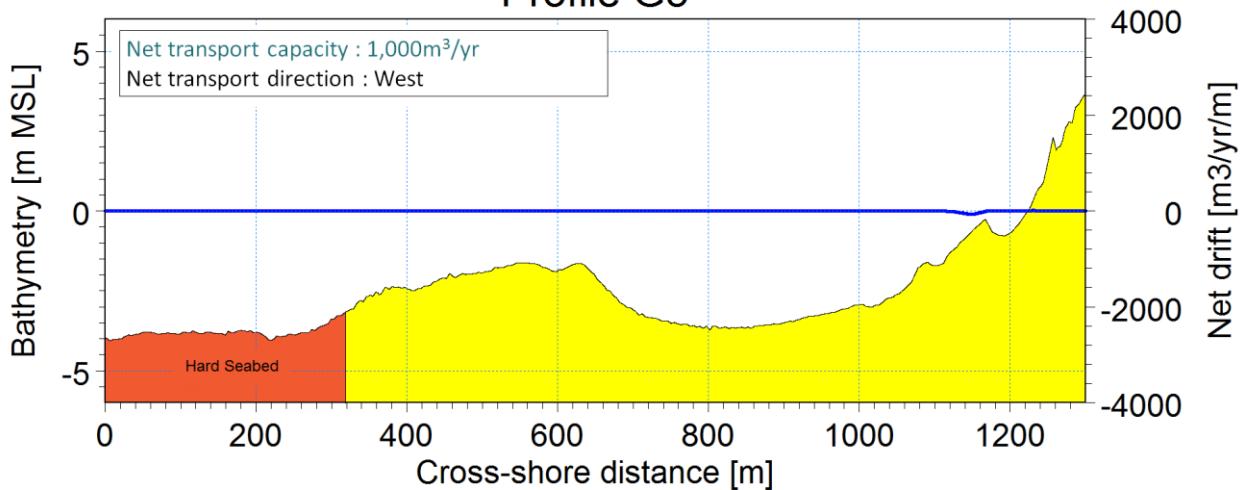


### Profile G4

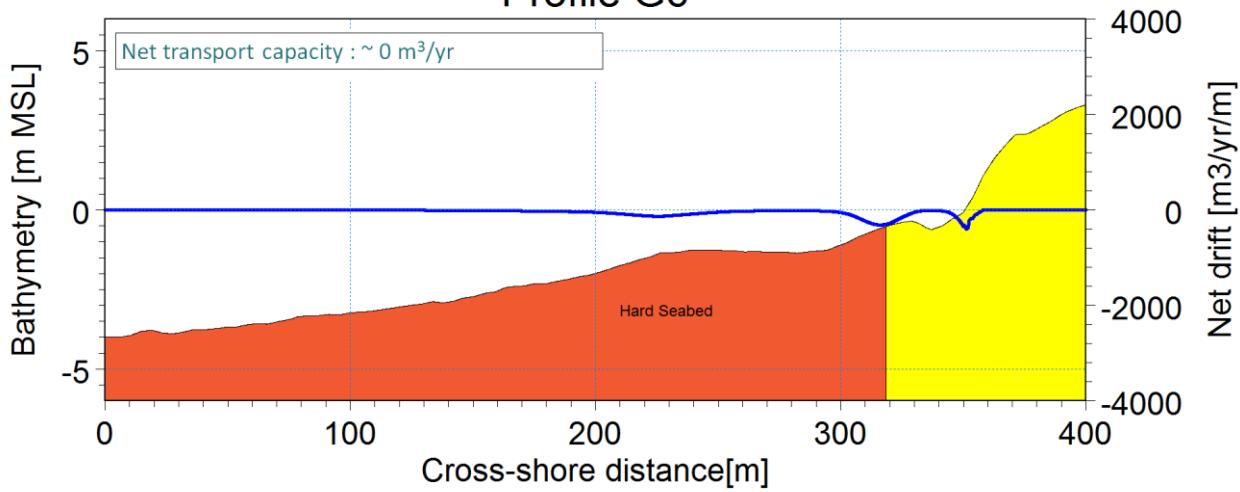




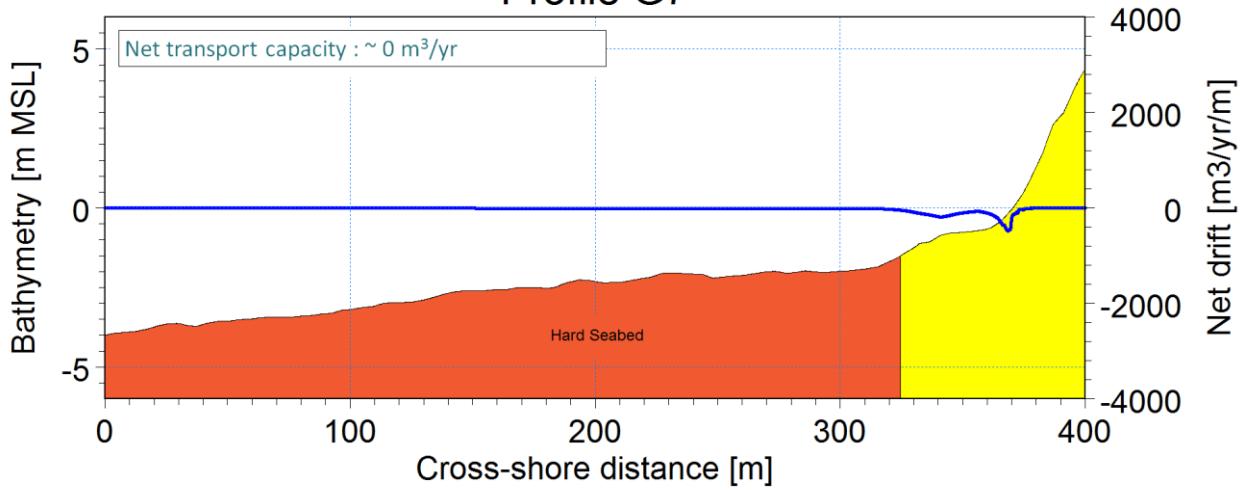
### Profile G5

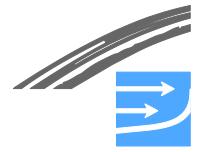


### Profile G6

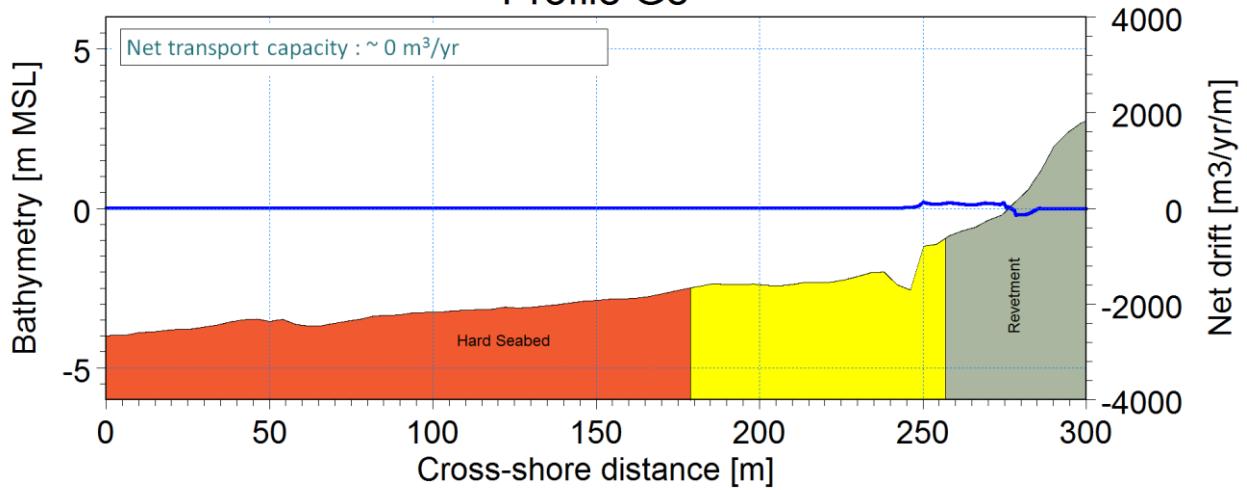


### Profile G7



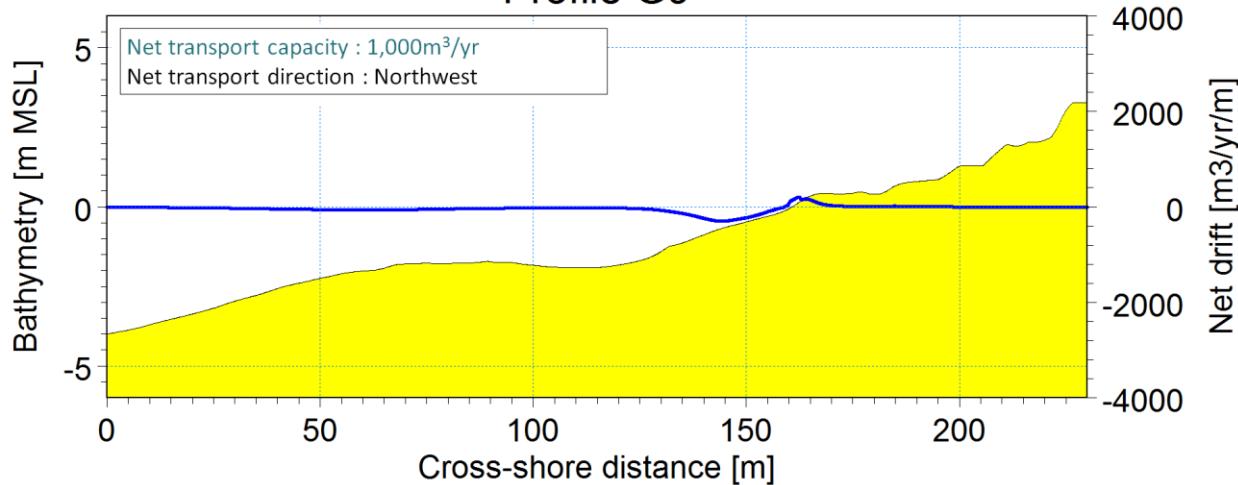


Profile G8

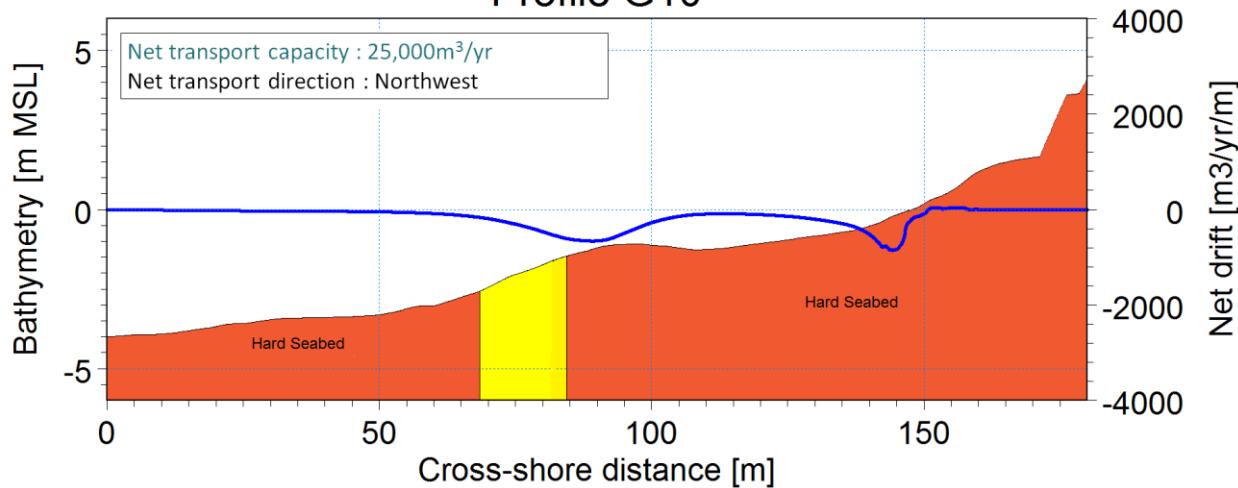




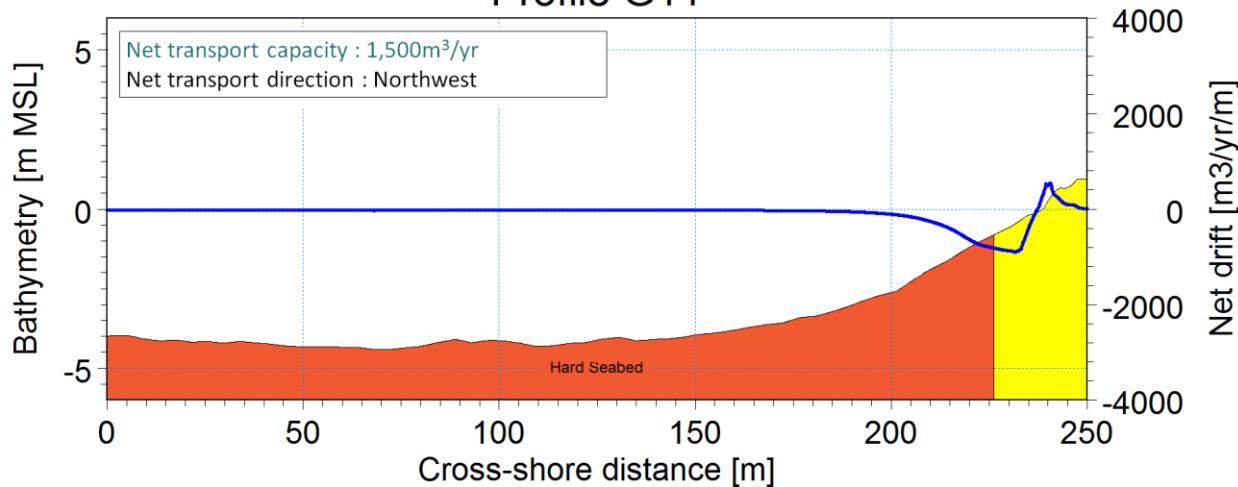
### Profile G9

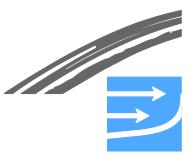


### Profile G10

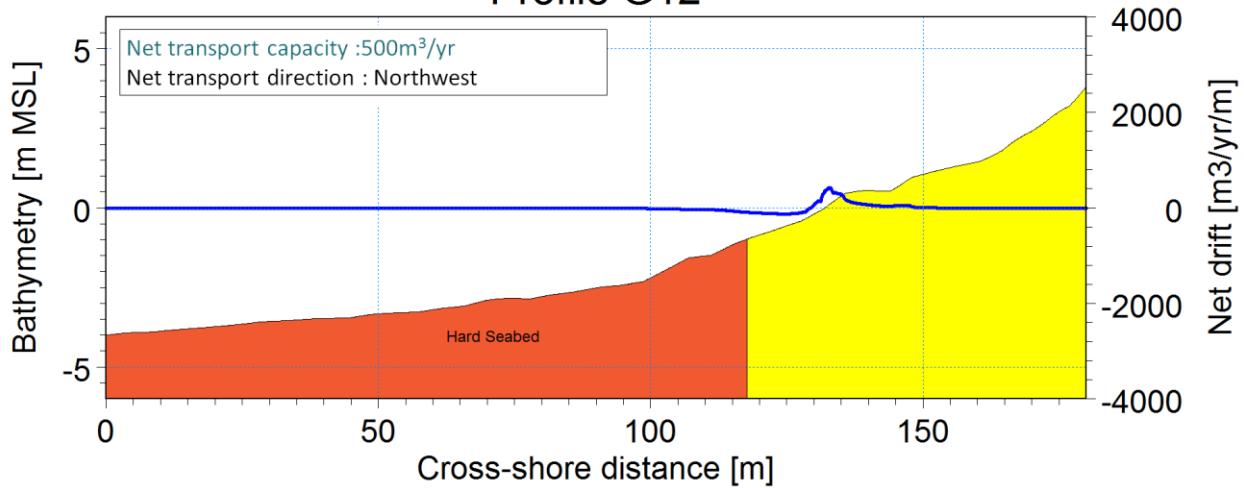


### Profile G11

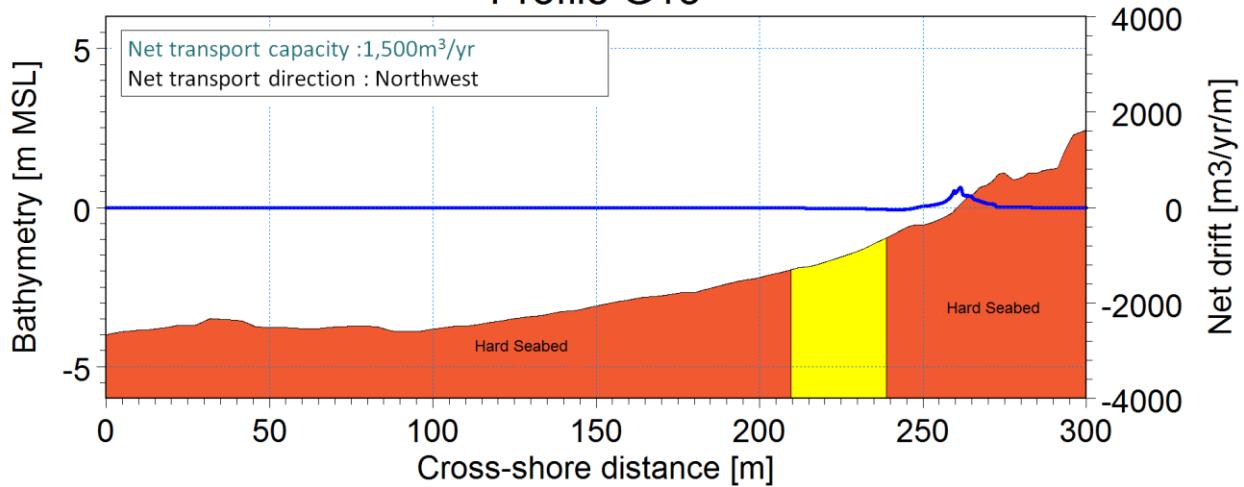




### Profile G12



### Profile G13



### Profile G14

