East Anglia
Offshore Wind

VATTENFALL

SCOTTISHPOWER RENEWABLES

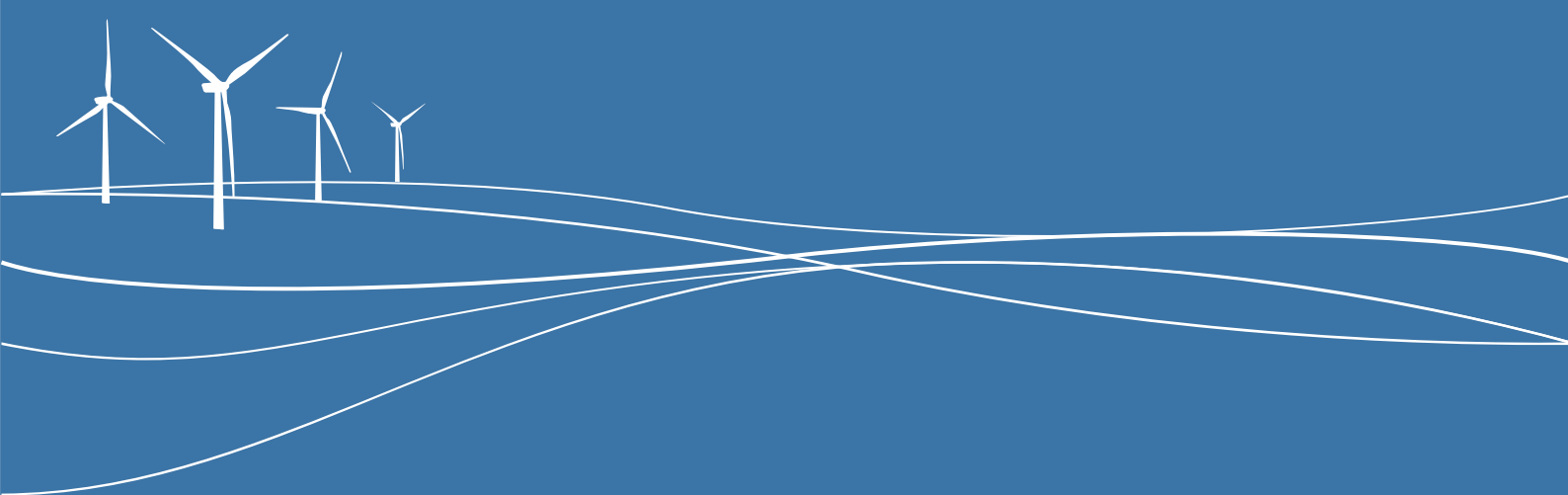
East Anglia THREE

Chapter 11

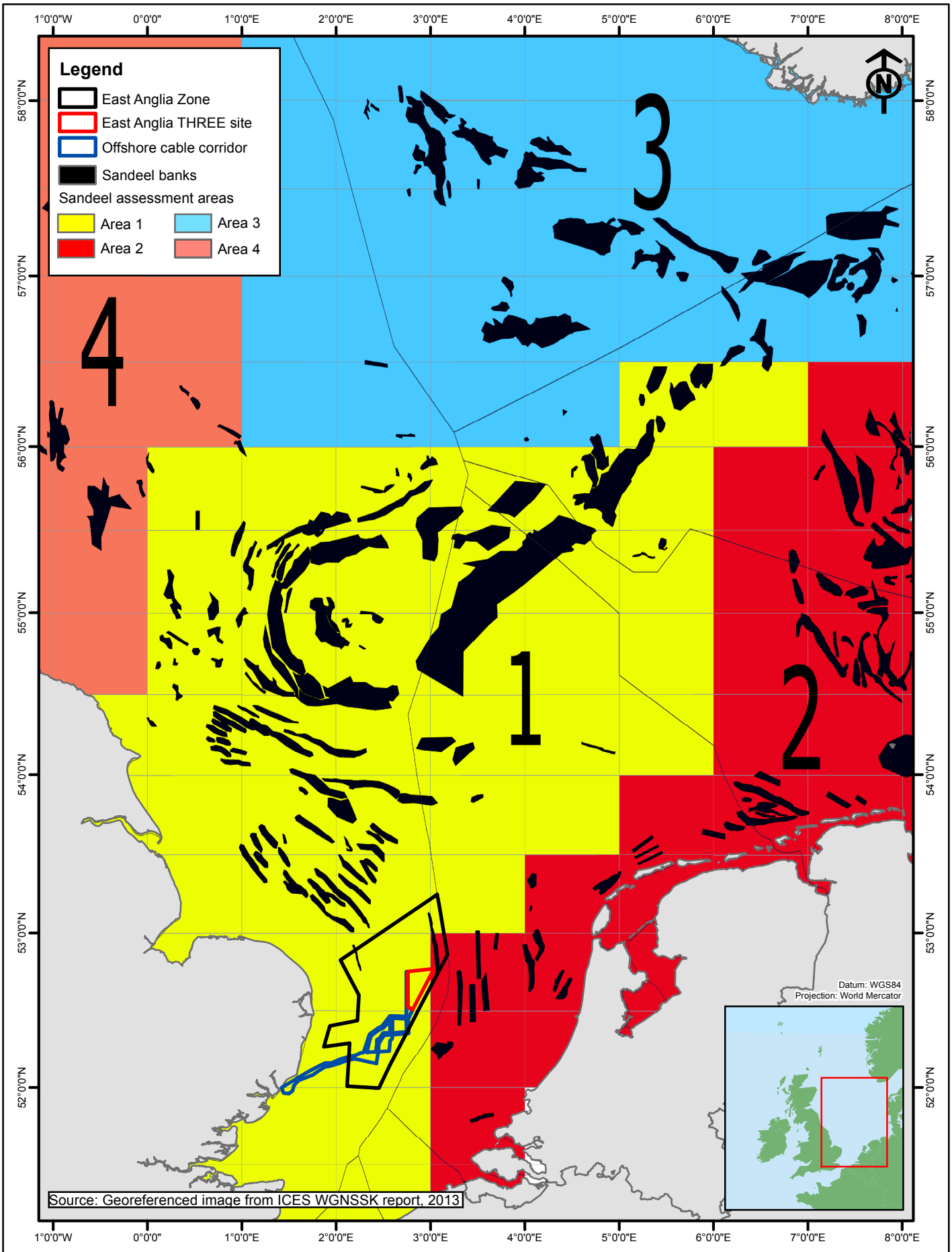
Fish and Shellfish Ecology Figures

Environmental Statement
Volume 2
Document Reference – 6.2.11(b)

Author – Brown and May Marine
East Anglia THREE Limited
Date – November 2015
Revision History – Revision A



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VATTENFALL

SCOTTISHPOWER RENEWABLES

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Sandeel fishing areas

Rev	Date	By	Comment
D	14/10/15	SF	Fourth Issue. Post review
C	12/05/15	SF	Third Issue. Update EA3 export cable corridor
B	30/04/14	RP	Second Issue. Update cable corridor to V20

Original A4 Plot Scale 1:6,000,000

0 20 40 60 km

0 10 20 30 nm

Volume 2	Figure 11.34

Layout	Date	Rev	Dwg No.
N/A	14/10/2015	D	EA3-530-PB-576-D

Ref:

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10°0'0"W 9°0'0"W 8°0'0"W 7°0'0"W 6°0'0"W 5°0'0"W 4°0'0"W 3°0'0"W 2°0'0"W 1°0'0"W 0°0'0" 1°0'0"E 2°0'0"E 3°0'0"E 4°0'0"E 5°0'0"E 6°0'0"E 7°0'0"E 8°0'0"E 9°0'0"E 10°0'0"E 11°0'0"E 12°0'0"E

60°0'0"N 59°0'0"N 58°0'0"N 57°0'0"N 56°0'0"N 55°0'0"N 54°0'0"N 53°0'0"N 52°0'0"N 51°0'0"N 50°0'0"N

N

Legend

- East Anglia zone
- East Anglia THREE site
- Offshore cable corridor
- ICES rectangle

IBTS CPUE 2003 - 2012 (10 year avg.)

- 0
- >0 - 14
- >14 - 50
- >50 - 135
- >135 - 500
- >500 - 2000
- >2000

Souce: DATRAS

Datum: WGS84
Projection: World Mercator

Rev	Date	By	Comment
D	14/10/15	SF	Fourth Issue. Post Review
C	13/05/15	SF	Third Issue. Update EA3 export cable corridor
B	30/04/14	RP	Second Issue. Update cable corridor to V20

Original A3 Plot Scale 1:9,000,000

0 50 100 km 0 50 100 nm

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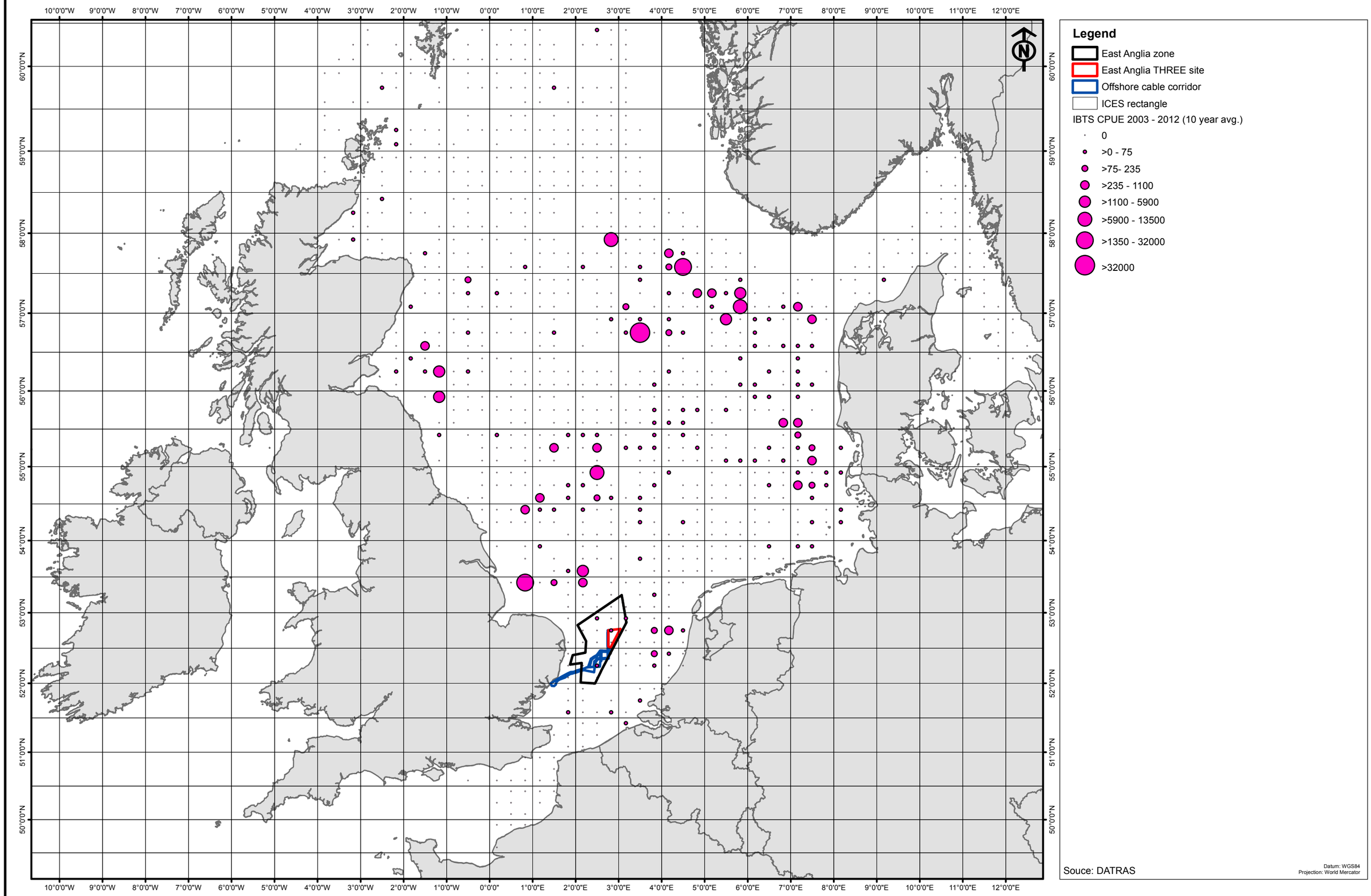
Small sandeel - CPUE 2003 - 2012 (10 year avg.)

Drg No	EA3-530-PB-577-D
Rev	D
Date	14/10/2015
Layout	N/A

Volume 2

Figure 11.35

Ref:



Rev	Date	By	Comment
D	14/10/15	SF	Fourth Issue. Post Review
C	12/05/15	SF	Third Issue. Update EA3 export cable corridor
B	01/05/14	RP	Second Issue. Update cable corridor to V20

Original A3 Plot Scale 1:9,000,000

0 50 100 km

0 50 100 nm

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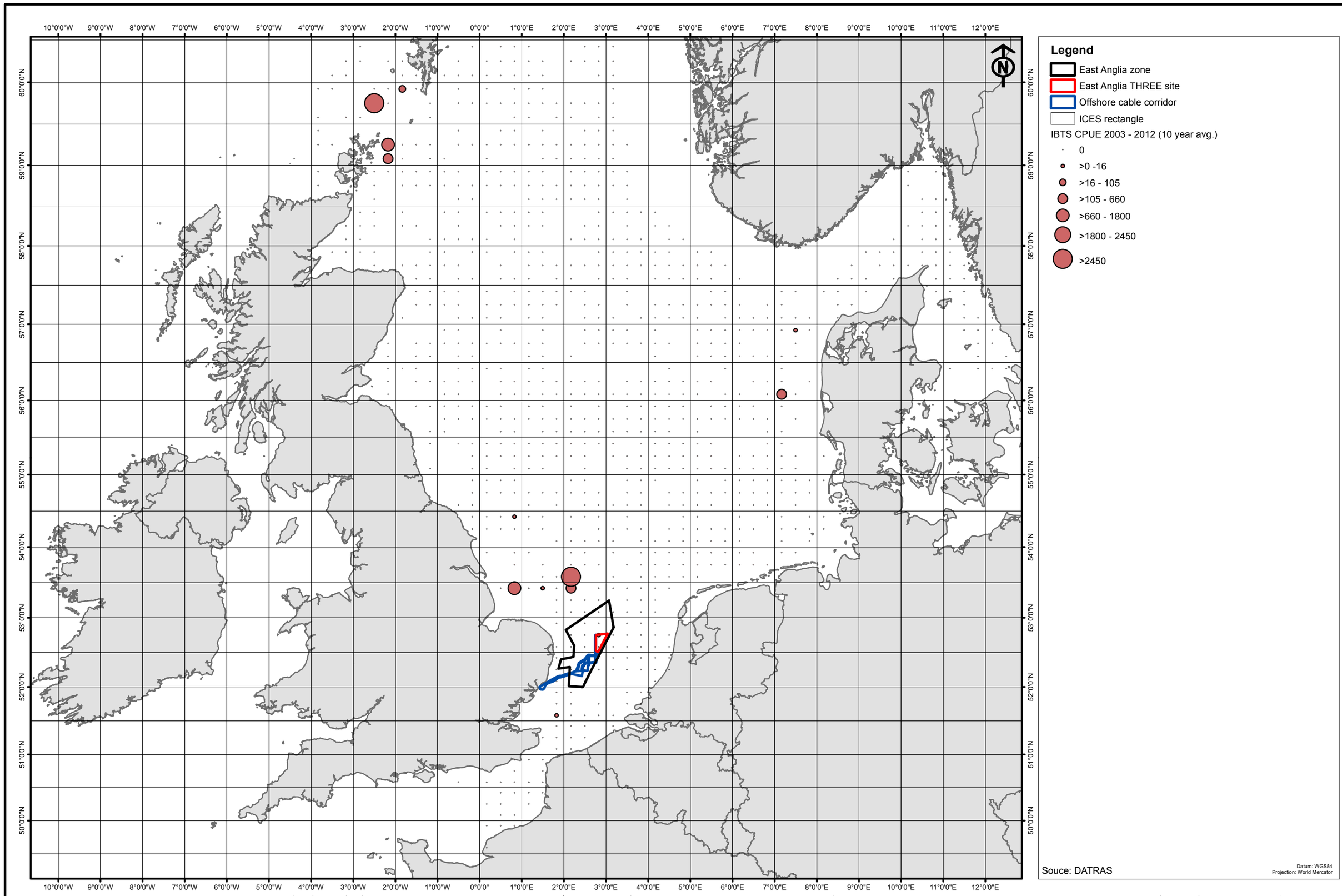
Lesser sandeel - CPUE 2003 - 2012 (10 year avg.)

Drg No	EA3-530-PB-578-D
Rev	D
Date	14/10/2015
Layout	N/A

Volume 2

Figure 11.36

Ref:



Rev	Date	By	Comment
D	14/10/15	SF	Fourth Issue. Post Review
C	12/05/15	SF	Third Issue. Update EA3 export cable corridor
B	30/04/14	RP	Second Issue. Update cable corridor to V20

Original A3 Plot Scale 1:9,000,000

0 50 100 km 0 50 100 nm

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Smooth sandeel - CPUE 2003 - 2012 (10 year avg.)

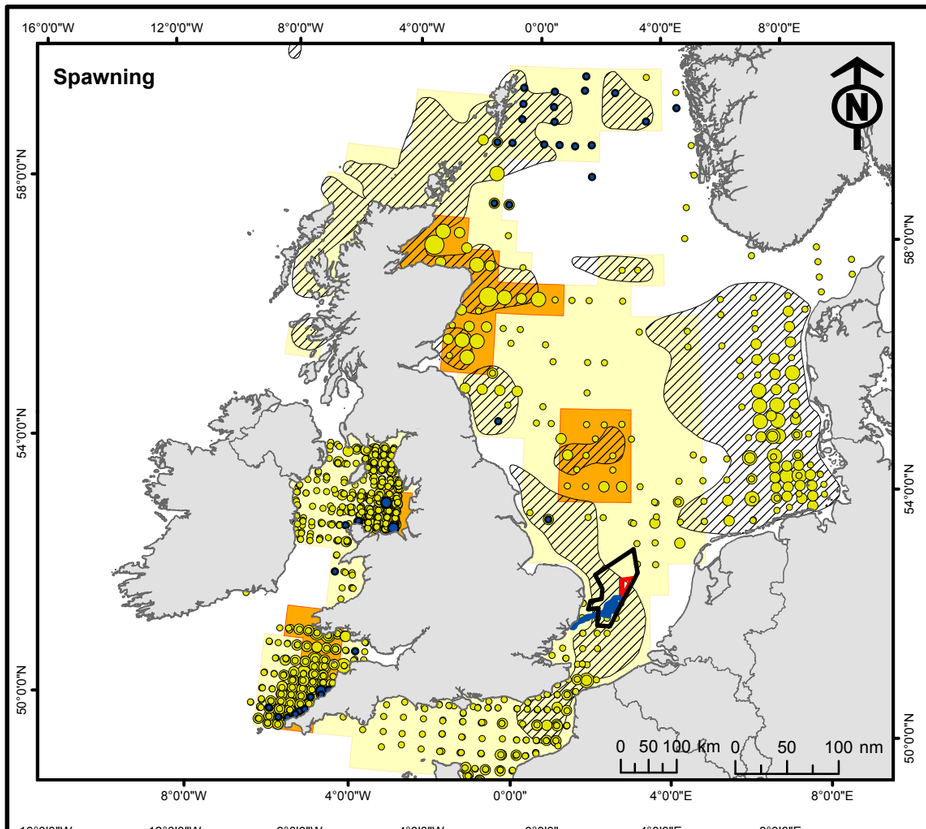
Drg No	EA3-530-PB-579-D
Rev	D
Date	14/10/2015
Layout	N/A

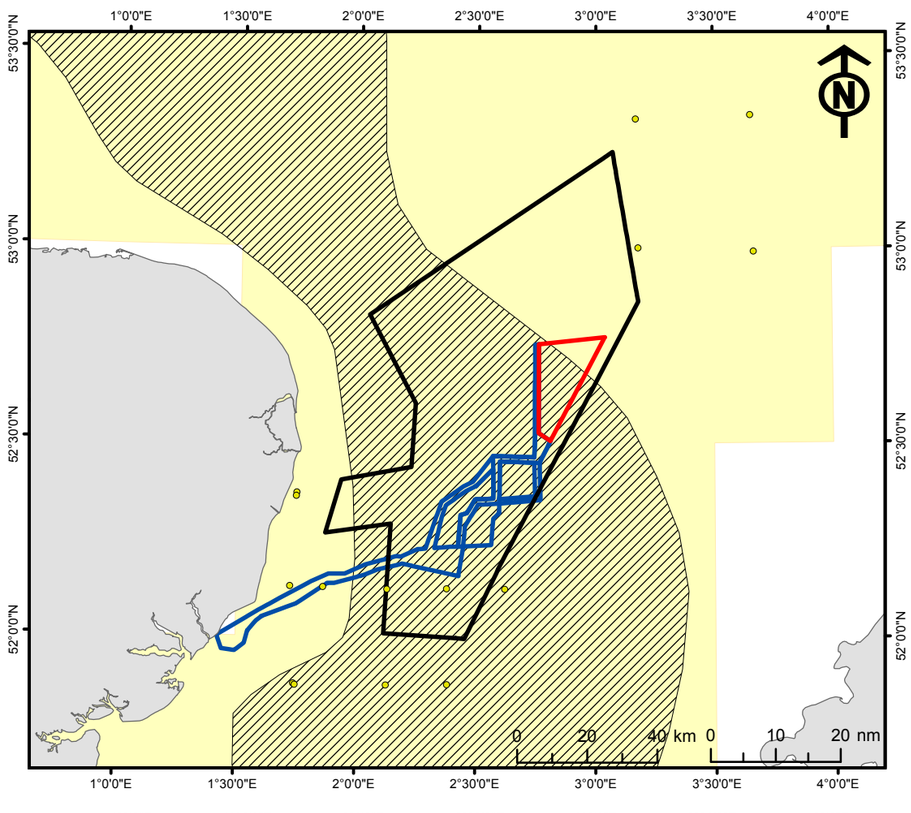
Volume 2

Figure 11.37

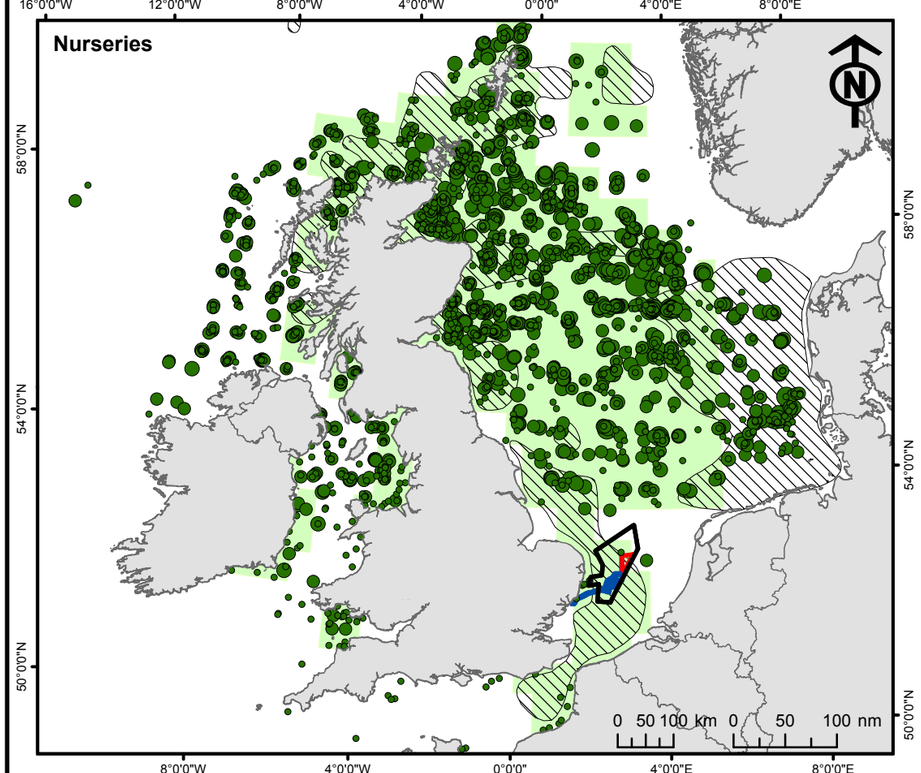
Ref:

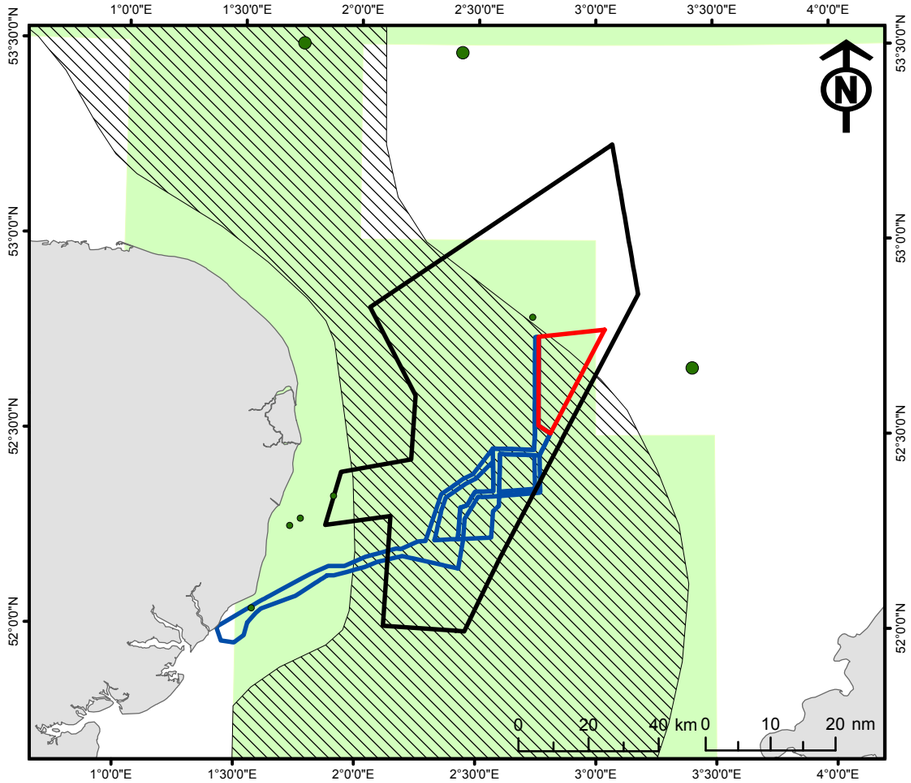
Spawning





Nurseries





Legend

- East Anglia Zone
- East Anglia THREE site
- Offshore cable corridor

Sandeel spawning grounds

Eggs (n/m^2)
- 0 - 10
- 11 - 100
- 101 - 1,000
- 1,001 - 10,000
- 10,001 +

Larvae (n/m^2)
- 1 - 10
- 11 - 100
- 101 - 1,000
- 1,001 - 10,000
- 10,001 +

Coull et al. 1998 spawning grounds
- Sandeel

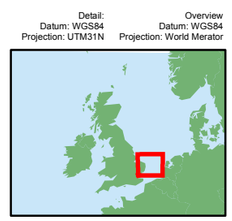
Ellis et al. 2010
- High intensity
- Low intensity

Sandeel nursery grounds

Maximum juvenile catch rate
- 1 - 10
- 11 - 100
- 101 - 1,000
- 1,001 - 10,000
- 10,001 +

Coull et al. 1998 nursery grounds
- Sand Eel

Ellis et al. 2010
- High intensity
- Low intensity



Source: Coull *et al.* 1998 and Ellis *et al.* 2010

Rev	Date	By	Comment
D	14/10/15	SF	Fourth Issue. Post review
C	12/05/15	SF	Third Issue. Update EA3 export cable corridor
B	01/05/14	RP	Second Issue. Update cable corridor to V20

Original A3 Plot Scale

Overview: 1:11,000,000

Detail 1:1,750,000

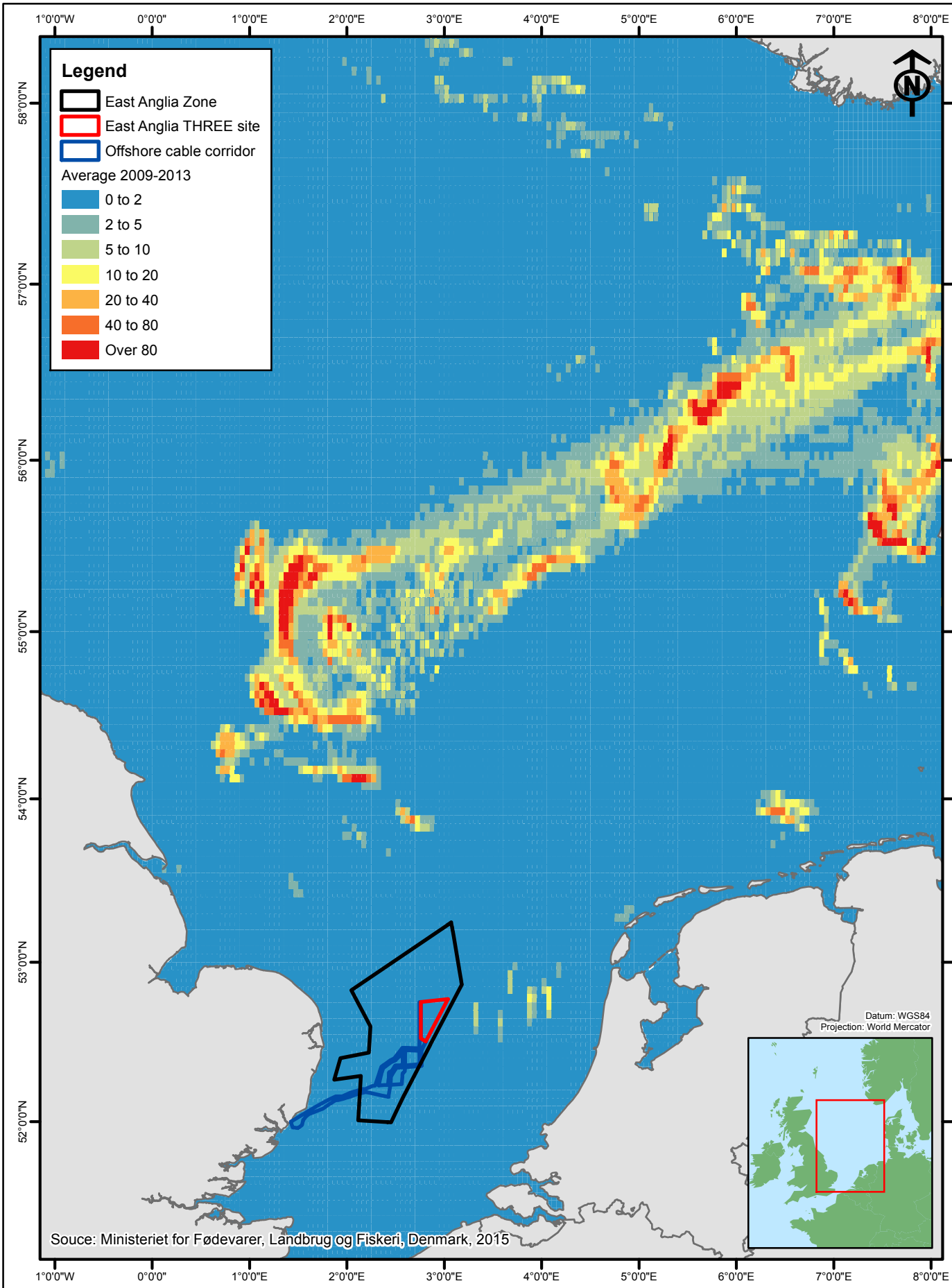
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Sandeel spawning and nursery grounds

Drg No	EA3-530-PB-580-D	Volume 2
Rev	D	
Date	14/10/2015	Figure 11.38
Layout	N/A	

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Danish sandeel satellite (VMS) density per 0.05°x0.05° average 2009 - 2013

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E	15/10/15	SF	Fourth Issue. Post review
C	13/05/15	SF	Third Issue. Update VMS data & cable corridor
B	01/05/14	RP	Second Issue. Update cable corridor to V20

Original A4 Plot Scale 1:6,000,000

0 20 40 60 km

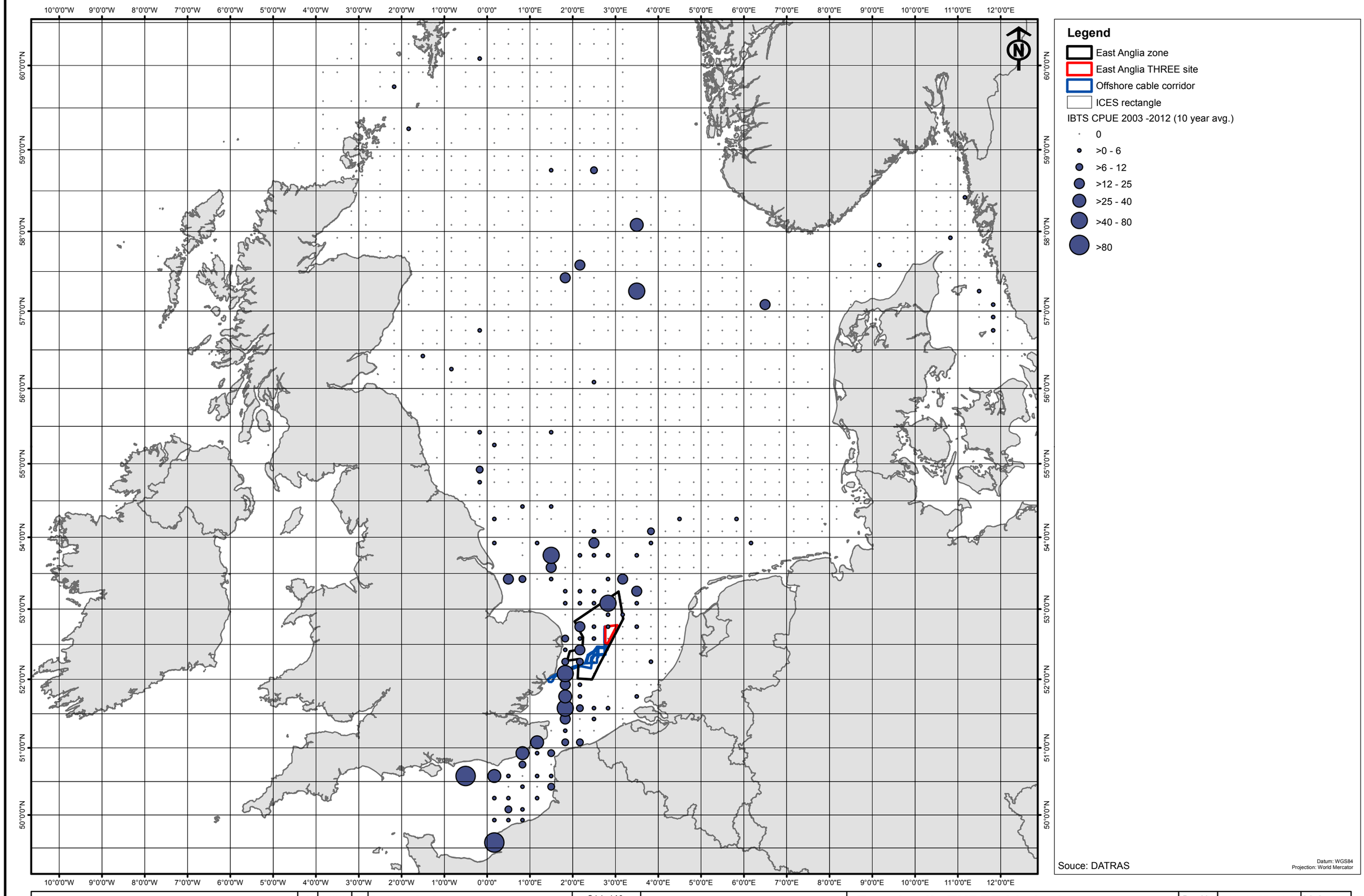
0 10 20 30 nm

Volume 2 | **Figure 11.39**

Layout	Date	Rev	Dwg No.
N/A	14/10/2015	D	EA3-530-PB-581-D

Ref:

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Rev	Date	By	Comment
D	14/10/15	SF	Fourth Issue. Post Review
C	12/05/15	SF	Third Issue. Update EA3 export cable corridor
B	30/04/14	RP	Second Issue. Update cable corridor to V20

Original A3 Plot Scale 1:9,000,000

0 50 100 km

0 50 100 nm

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Thornback ray - CPUE
2003 - 2012 (10 year avg.)

Drg No	EA3-530-PB-582-D
Rev	D
Date	14/10/2015
Layout	N/A

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Figure 11.40

Ref:

Tope nursery grounds

Thornback ray nursery grounds

16°0'0"W 12°0'0"W 8°0'0"W 4°0'0"W 0°0'0" 4°0'0"E 8°0'0"E

58°0'0"N 54°0'0"N 50°0'0"N

0 50 100 km 0 50 100 nm

1°0'0"E 1°30'0"E 2°0'0"E 2°30'0"E 3°0'0"E 3°30'0"E 4°0'0"E

53°30'0"N 53°0'0"N 52°30'0"N 52°0'0"N

0 20 40 km 0 10 20 nm

Legend

- East Anglia Zone
- East Anglia THREE site
- Offshore cable corridor

Tope nursery grounds

Maximum juvenile catch rate

- 1 - 10
- 11 - 100
- 101 - 1,000
- 1,001 - 10,000
- 10,001 +

Ellis et al. 2010

- Hight Intensity
- Low intensity

Thornback ray nursery grounds

Maximum juvenile catch rate

- 1 - 10
- 11 - 100
- 101 - 1,000
- 1,001 - 10,000
- 10,001 +

Ellis et al. 2010

- Hight Intensity
- Low intensity

Source: Coull *et al.* 1998 and Ellis *et al.* 2010

Detail: Datum: WGS84 Projection: UTM31N

Overview Datum: WGS84 Projection: World Merator

SCOTTISHPOWER RENEWABLES VATTENFALL

Rev	Date	By	Comment
D	15/10/15	SF	Fourth Issue. Post review
C	12/05/15	SF	Third Issue. Update EA3 export cable corridor
B	01/05/14	RP	Second Issue. Update cable corridor to V20

Original A3 Plot Scale

Overview: 1:11,000,000

Detail 1:1,750,000

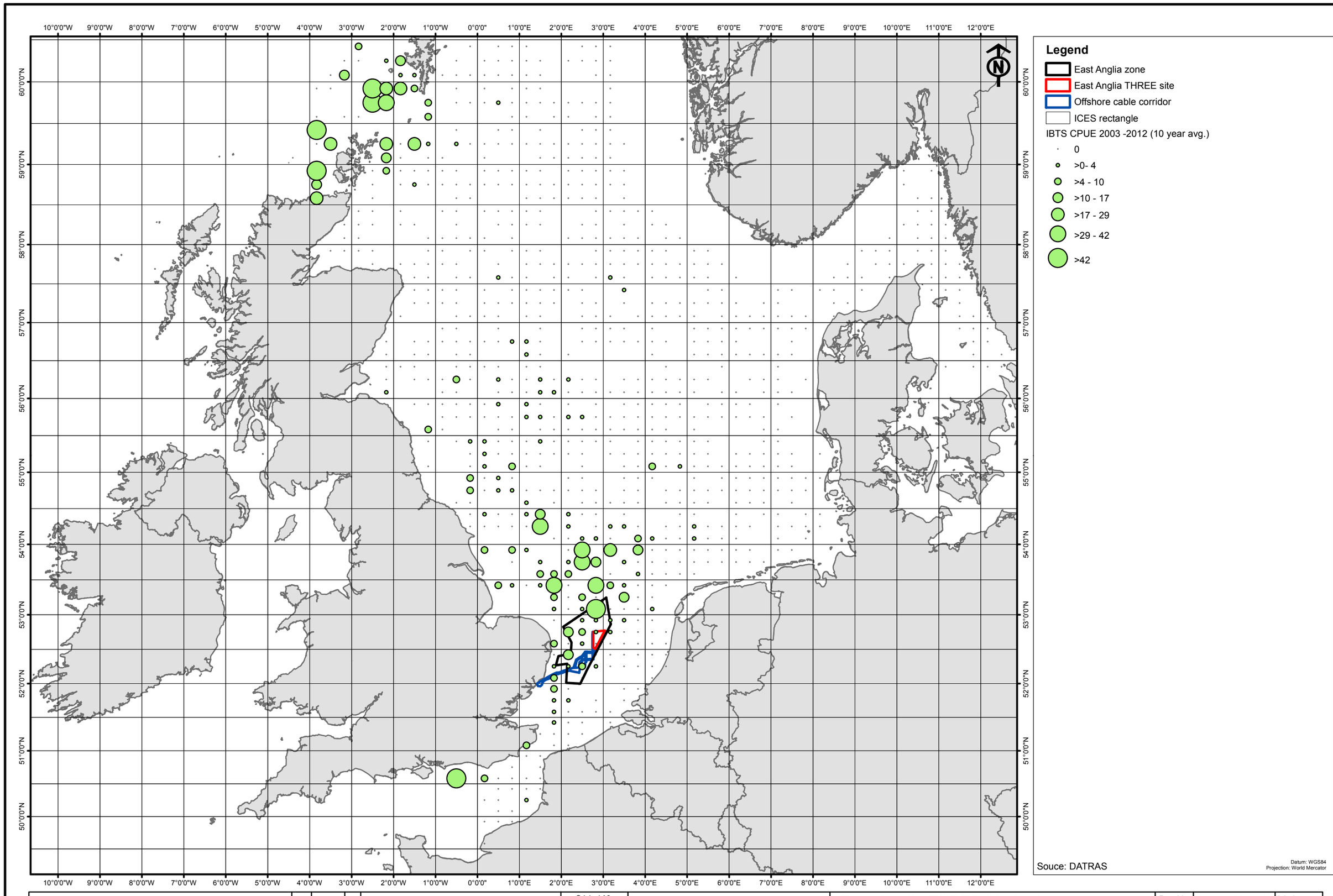
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Tope and thornback ray nursery grounds

Drg No	EA3-530-PB-583-D	Volume	2
Rev	D	Figure	11.41
Date	15/10/2015		
Layout	N/A		

Ref:



Rev	Date	By	Comment
D	14/10/15	SF	Fourth Issue. Post Review
C	12/05/15	SF	Third Issue. Update EA3 export cable corridor
B	01/05/14	RP	Second Issue. Update cable corridor to V20

Original A3 Plot Scale 1:9,000,000

0 50 100 km

0 50 100 nm

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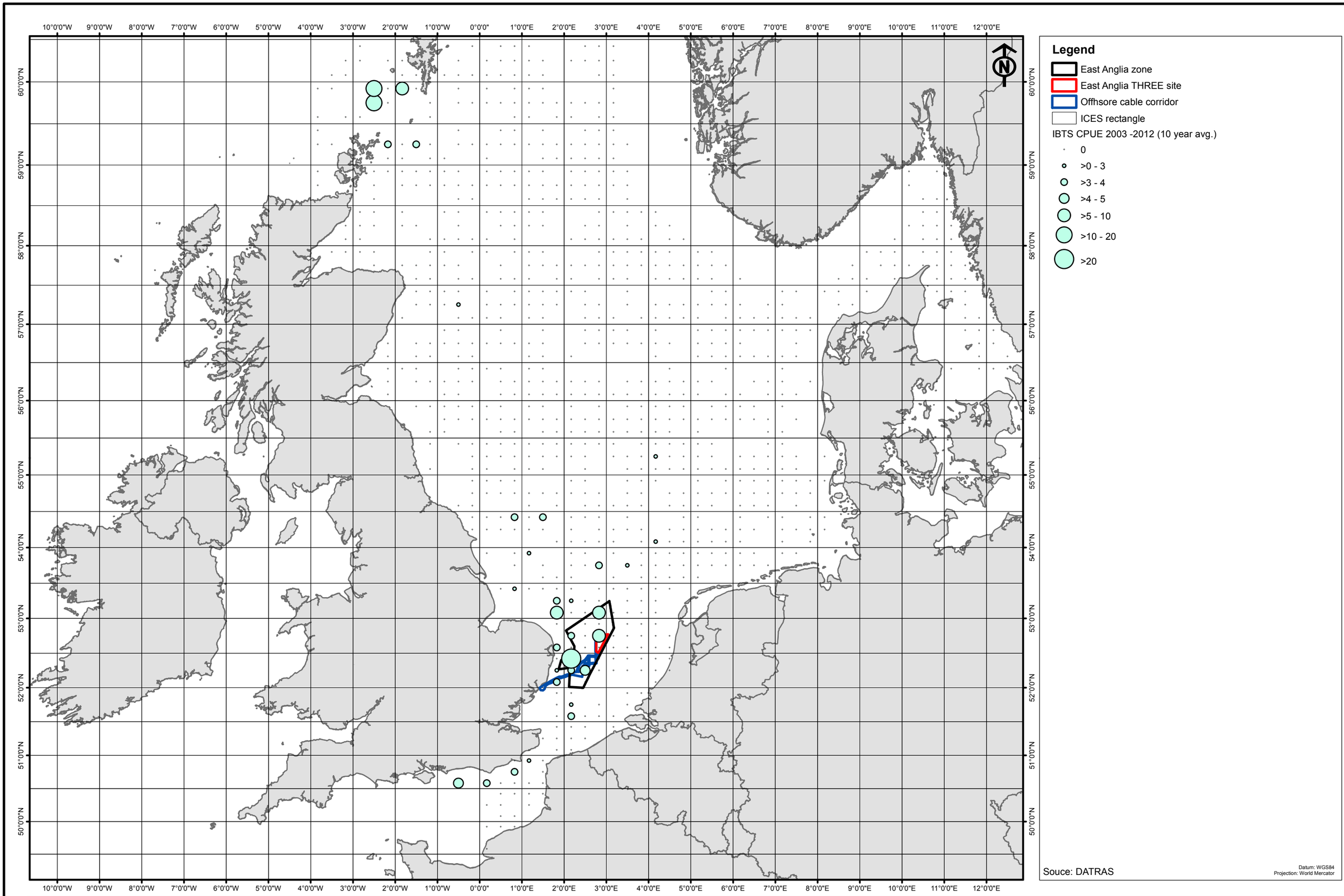
Spotted ray - CPUE 2003 - 2012 (10 year avg.)

Drg No	EA3-530-PB-584-D
Rev	D
Date	15/10/2015
Layout	N/A

Volume 2

Figure 11.42

Ref:



SCOTTISHPOWER RENEWABLES VATTENFALL

Rev	Date	By	Comment
D	15/10/15	SF	Fourth Issue. Post Review
C	13/05/15	SF	Third Issue. Update EA3 export cable corridor
B	30/04/14	RP	Second Issue. Update cable corridor to V20

Original A3 Plot Scale 1:9,000,000

0 50 100 km 0 50 100 nm

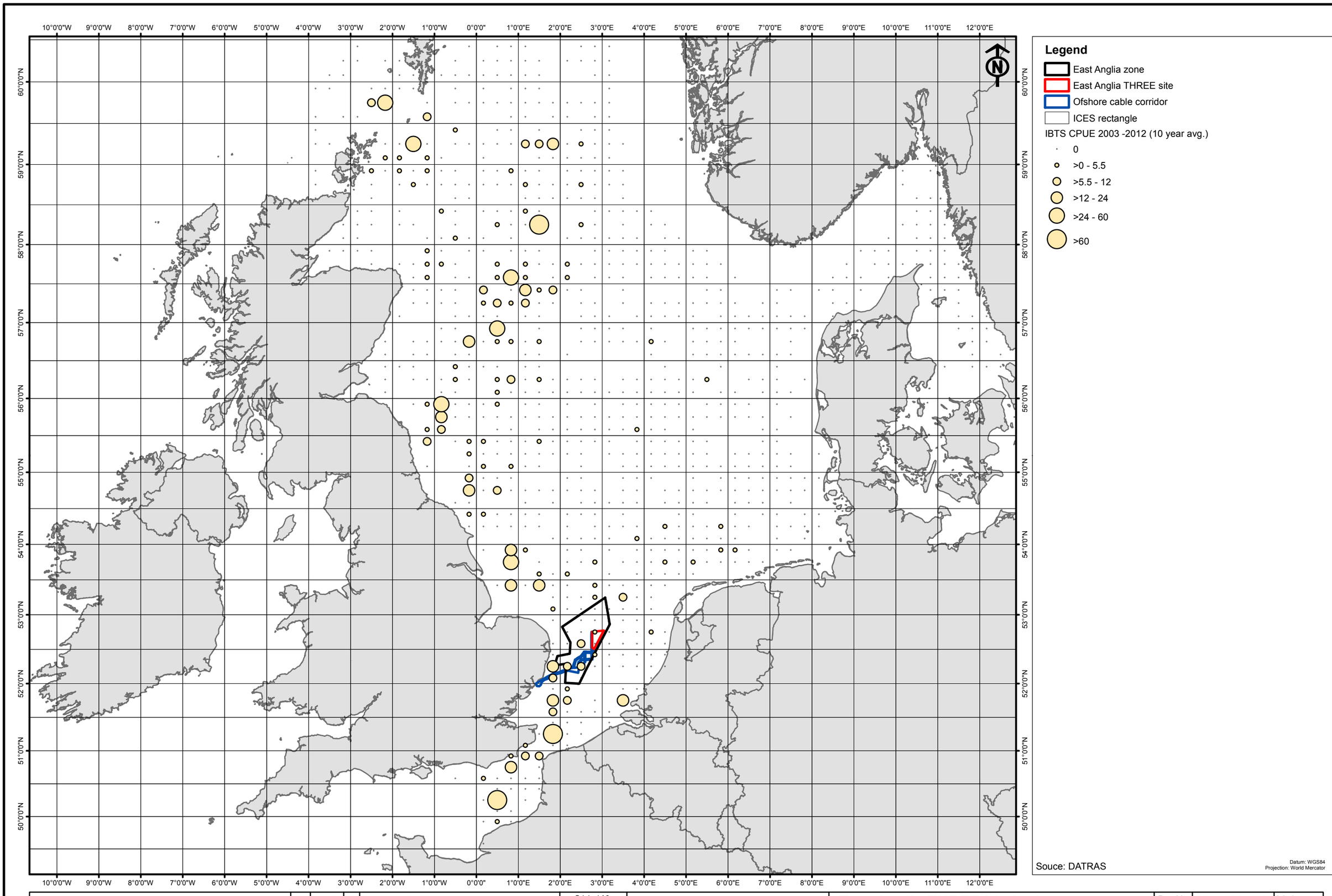
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Blonde rays - CPUE 2003 - 2012 (10 year avg.)

Drg No	EA3-530-PB-585-D	Volume 2
Rev	D	
Date	15/10/2015	Figure 11.43
Layout	N/A	

Ref:



SCOTTISHPOWER RENEWABLES VATTENFALL

Rev	Date	By	Comment
D	15/10/15	SF	Fourth Issue. Post Review
C	13/05/15	SF	Third Issue. Update EA3 export cable corridor
B	30/04/14	RP	Second Issue. Update cable corridor to V20

Original A3 Plot Scale 1:9,000,000

0 50 100 km 0 50 100 nm

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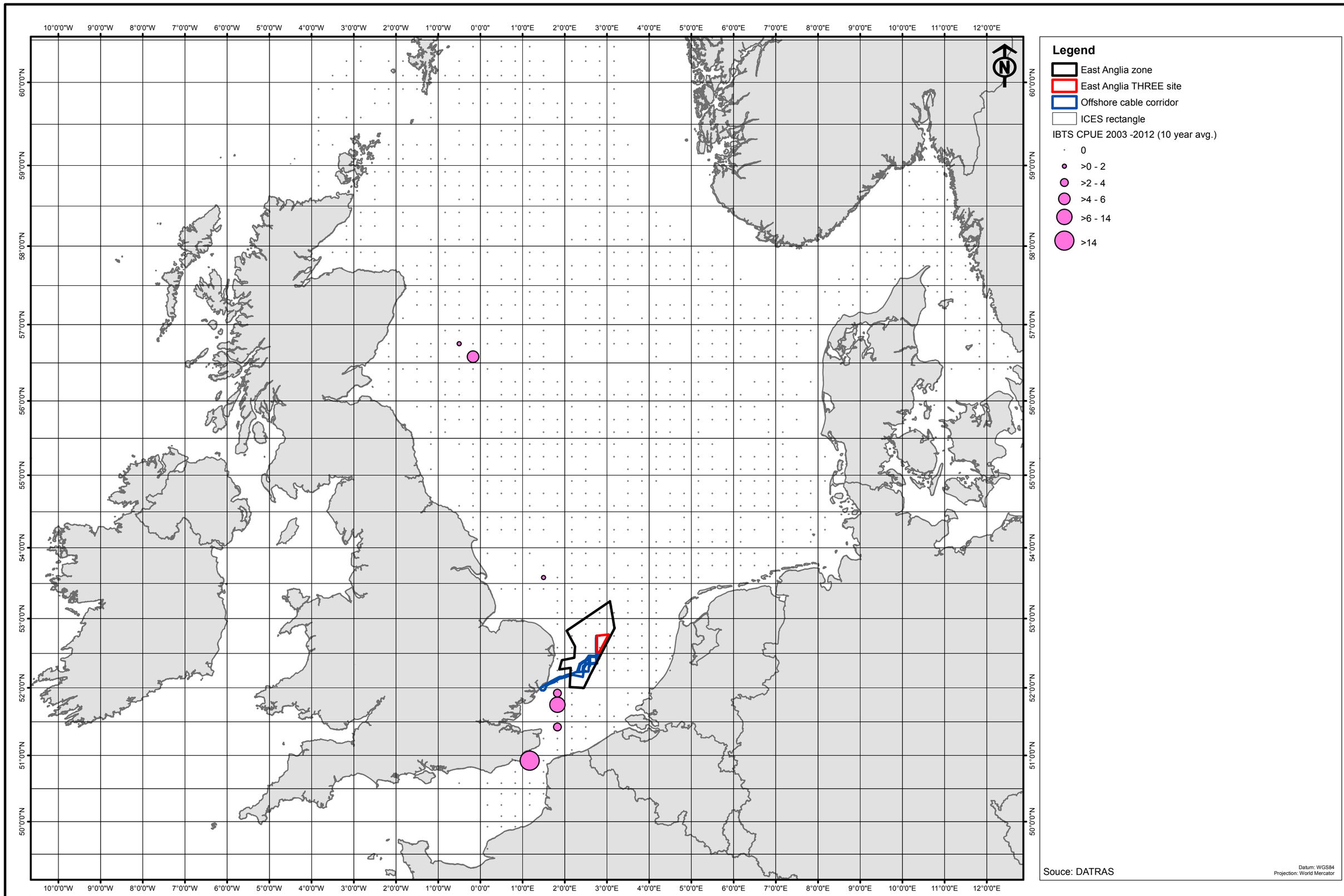
Starry smoothhound - CPUE
2003 - 2012 (10 year avg.)

Drg No	EA3-530-PB-586-D
Rev	D
Date	15/10/2015
Layout	N/A

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Figure 11.44

Ref:



Rev	Date	By	Comment
D	15/10/15	SF	Fourth Issue. Post Review
C	13/05/15	SF	Third Issue. Update EA3 export cable corridor
B	30/04/14	RP	Second Issue. Update cable corridor to V20

Original A3 Plot Scale 1:9,000,000

0 50 100 km 0 50 100 nm

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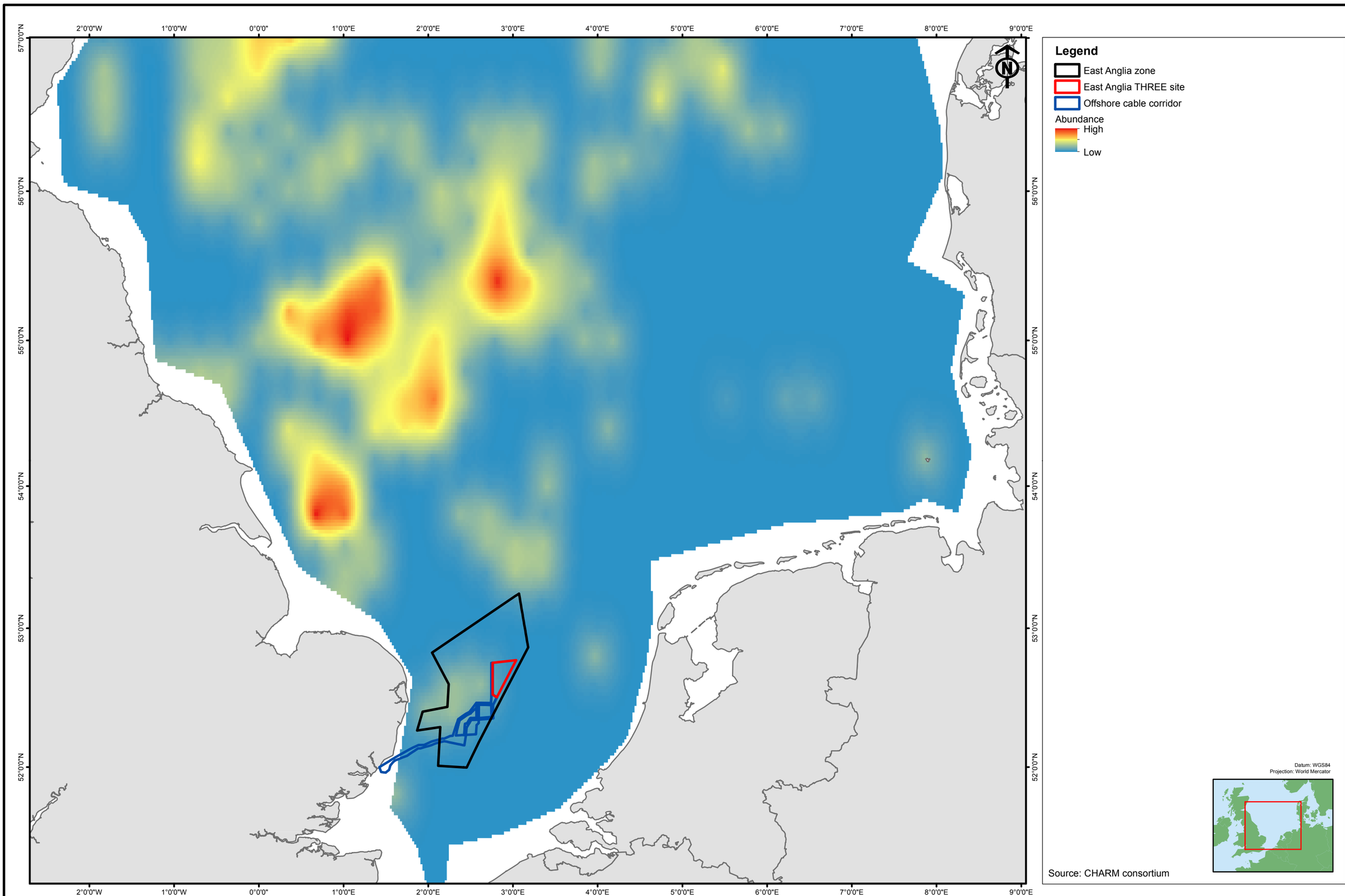
Smoothhound - CPUE 2003 - 2012 (10 year avg.)

Drg No	EA3-530-PB-587-D
Rev	D
Date	15/10/2015
Layout	N/A

Volume 2

Figure 11.45

Ref:



Rev	Date	By	Comment
D	14/10/15	SF	Fourth Issue. Post Review
C	13/05/15	SF	Third Issue. Update EA3 export cable corridor
B	30/04/14	RP	Second Issue. Update cable corridor to V20

Original A3
Plot Scale
1:4,500,000

0 20 40 km
0 20 40 nm

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Squalus acanthias (All ages) IBTS
Presence probability in summer (1991-2010)

Drg No	EA3-530-PB-588-D
Rev	D
Date	15/10/2015
Layout	N/A

Volume 2
Figure 11.46

Ref:

10°0'0"W 9°0'0"W 8°0'0"W 7°0'0"W 6°0'0"W 5°0'0"W 4°0'0"W 3°0'0"W 2°0'0"W 1°0'0"W 0°0'0" 1°0'0"E 2°0'0"E 3°0'0"E 4°0'0"E 5°0'0"E 6°0'0"E 7°0'0"E 8°0'0"E 9°0'0"E 10°0'0"E 11°0'0"E 12°0'0"E

60°0'0"N 59°0'0"N 58°0'0"N 57°0'0"N 56°0'0"N 55°0'0"N 54°0'0"N 53°0'0"N 52°0'0"N 51°0'0"N 50°0'0"N

N

Legend

- East Anglia zone
- East Anglia THREE site
- Offshore cable corridor
- ICES rectangle

IBTS CPUE 2003 -2012 (10 year avg.)

- 0
- >0 - 6
- >6 - 15
- >15 - 34
- >34 - 90
- >90 - 440
- >440

Souce: DATRAS

Datum: WGS84
Projection: World Mercator

Rev	Date	By	Comment
D	15/10/15	SF	Fourth Issue. Post Review
C	13/05/15	SF	Third Issue. Update EA3 export cable corridor
B	30/04/14	RP	Second Issue. Update cable corridor to V20

Original A3 Plot Scale 1:9,000,000

0 50 100 km 0 50 100 nm

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Spurdog - CPUE 2003 - 2012 (10 year avg.)

Drg No	EA3-530-PB-589-D
Rev	D
Date	15/10/2015
Layout	N/A

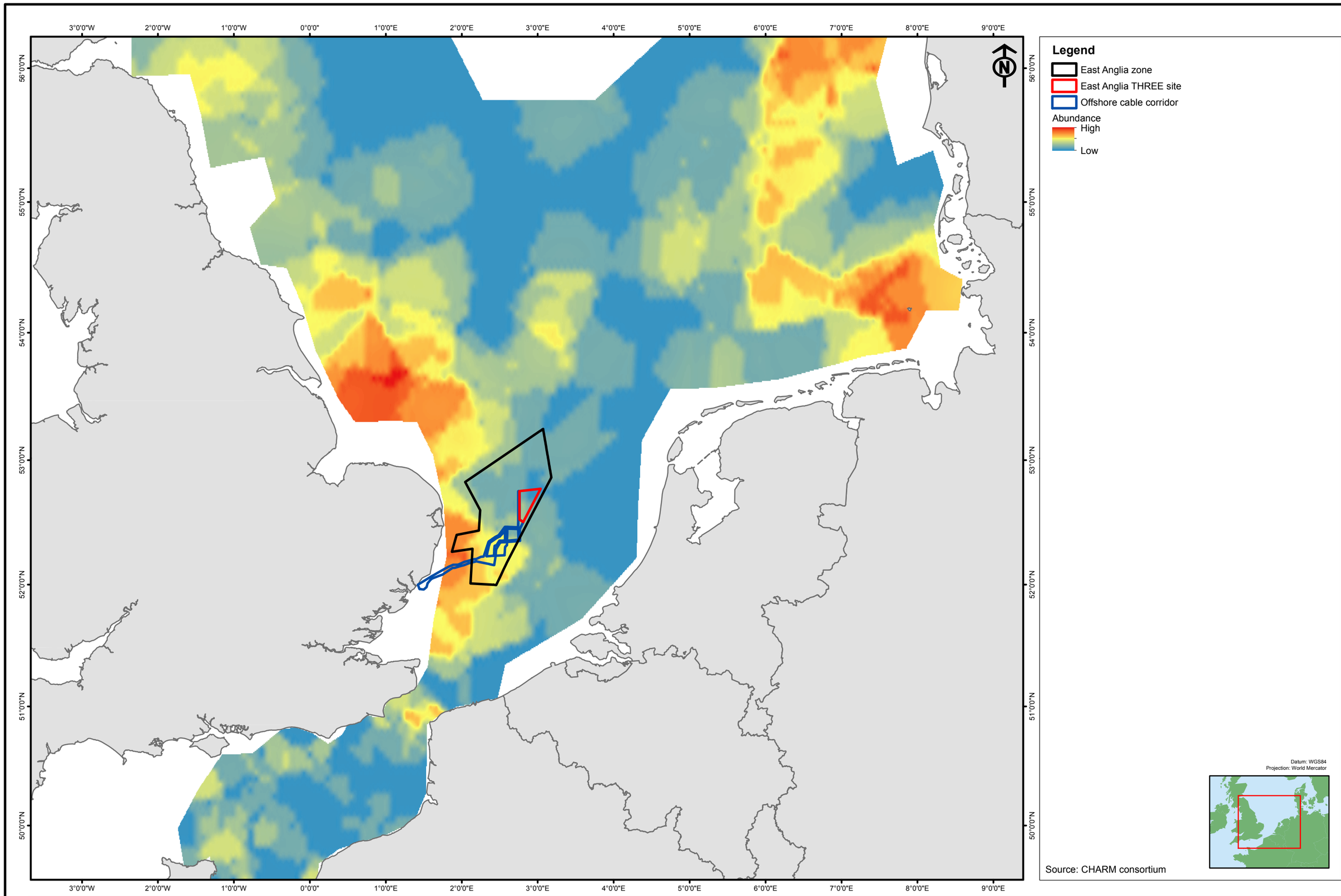
Volume 2

Figure 11.47

Ref:

Figures 11.48 to 11.50 intentionally removed and data presented as a diagram in Appendix 11.2

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Rev	Date	By	Comment
D	15/10/15	SF	Fourth Issue. Post Review
C	13/05/15	SF	Third Issue. Update EA3 export cable corridor
B	30/04/14	RP	Second Issue. Update cable corridor to V20

Original A3 Plot Scale 1:5,000,000

0 50 100 km 0 20 40 nm

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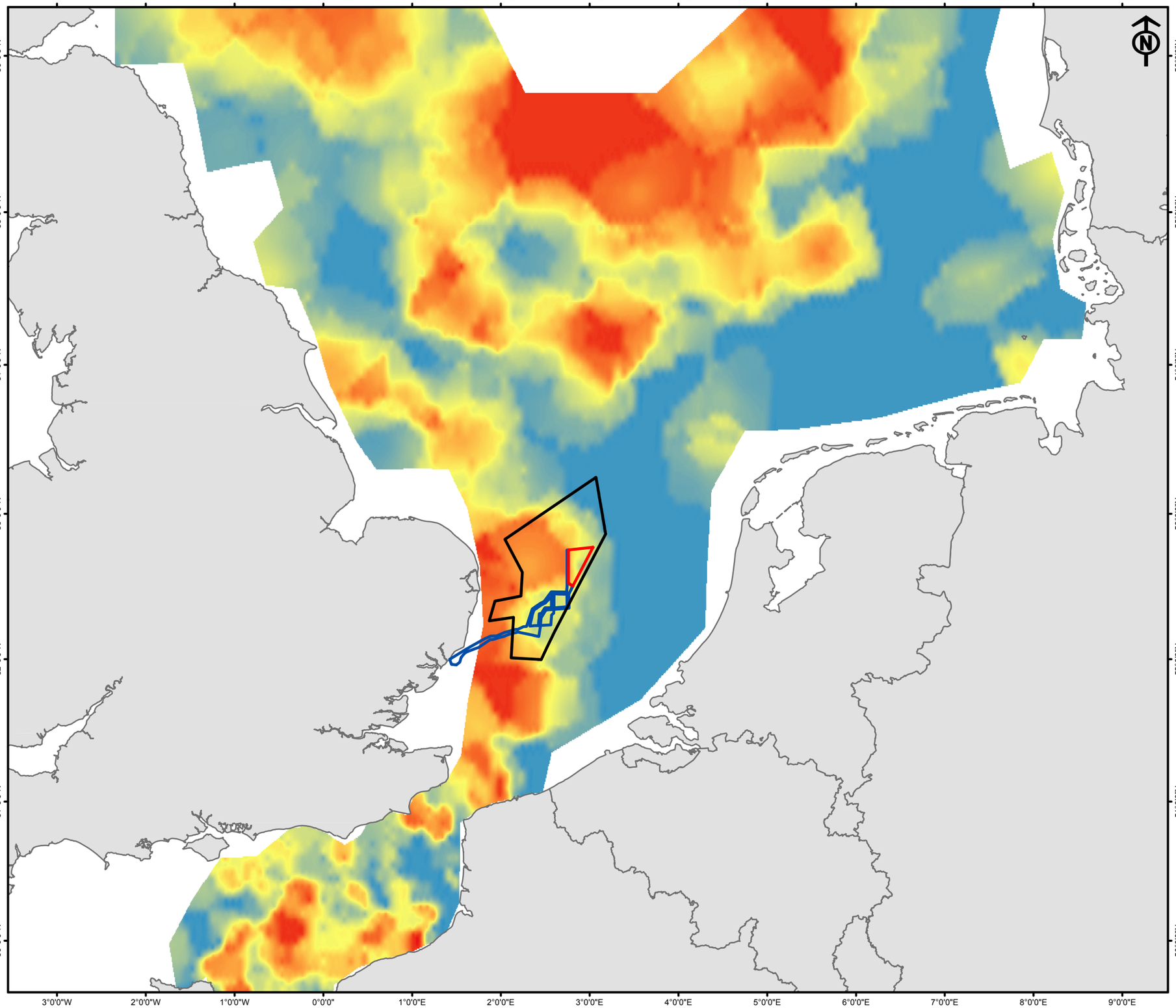
Cancer pagurus - presence probability (2006-2012)

Drg No	EA3-530-PB-590-D
Rev	D
Date	15/10/2015
Layout	N/A

Volume 2

Figure 11.51

Ref:



Legend

- East Anglia zone
- East Anglia THREE site
- Offshore cable corridor

Abundance
- High
- Low

Datum: WGS84
Projection: World Mercator



Source: CHARM consortium

Rev	Date	By	Comment
D	15/10/15	SF	Fourth Issue. Post Review
C	13/05/15	SF	Third Issue. Update EA3 export cable corridor
B	01/05/14	RP	Second Issue. Update cable corridor to V20

Original A3 Plot Scale 1:5,000,000

0 50 100 km 0 20 40 nm

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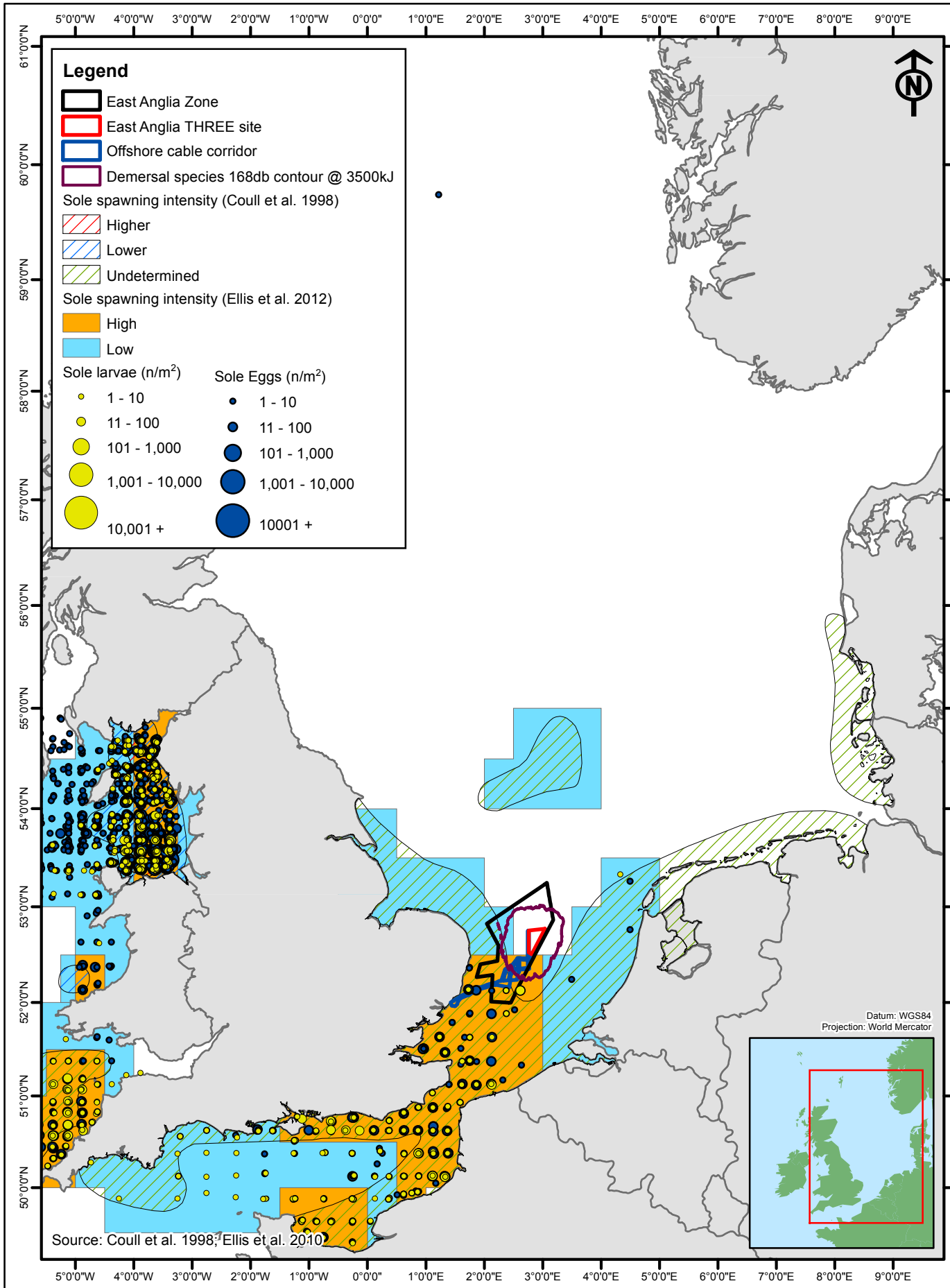
Buccinum undatum - Presence probability (2006-2012)

Drg No	EA3-530-PB-591-D
Rev	D
Date	15/10/2015
Layout	N/A

Volume 2

Figure 11.52

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Sole spawning area &
168db demersal noise contour @ 3500kJ

Rev	Date	By	Comment
D	15/10/15	PM	Fourth Issue. After review
C	13/05/15	SF	Third Issue. Update EA3 export cable corridor
B	01/05/14	RP	Second Issue. Update cable corridor to V20

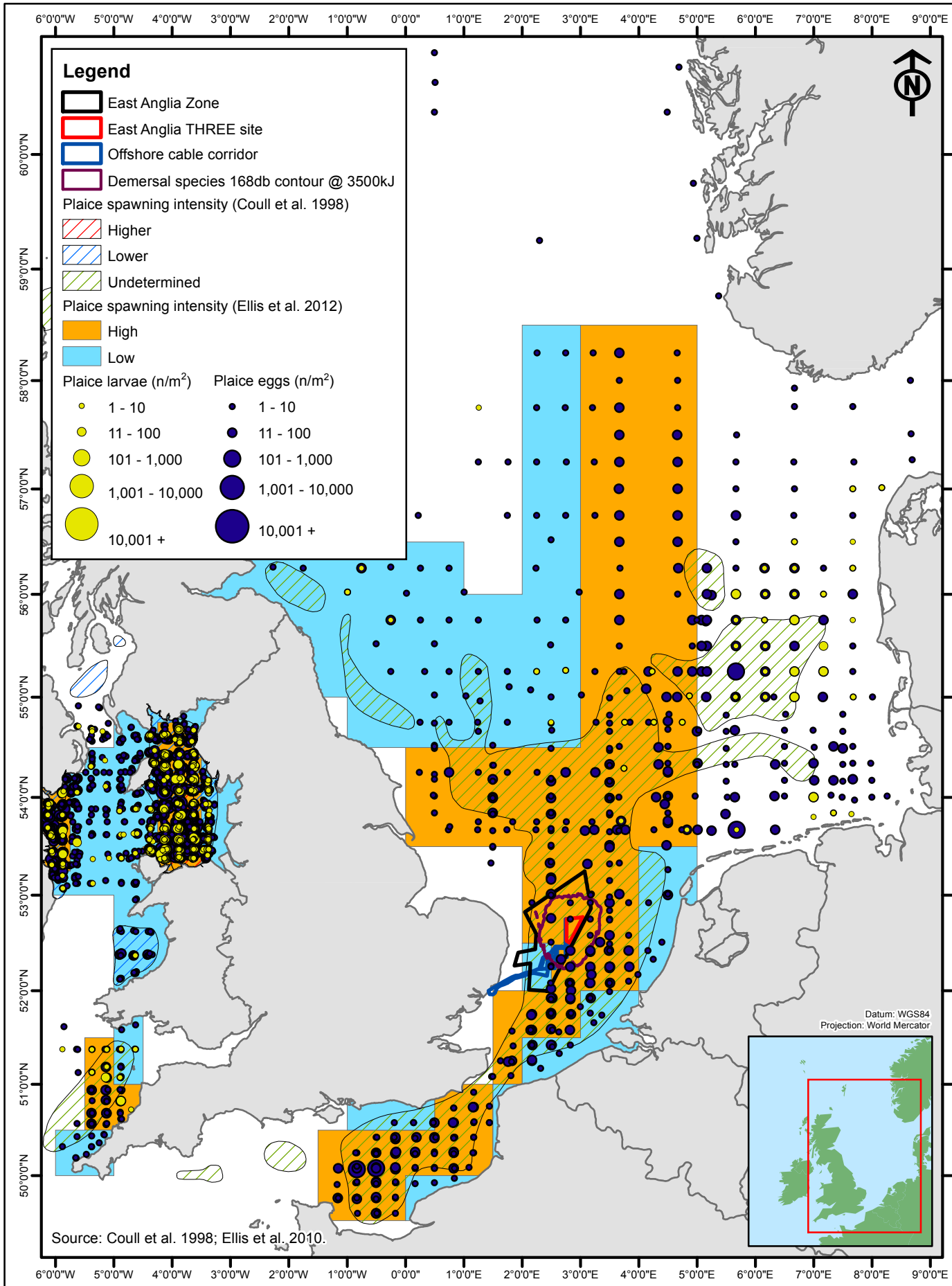
Original A4 Plot Scale 1:10,000,000

0 40 80 120 160 km
0 20 40 60 80 nm

Volume 2 | **Figure 11.53**

Layout	Date	Rev	Dwg No.
N/A	15/10/2015	D	EA3-530-PB-595-D

Ref:



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Plaice spawning area &
168db demersal noise contour @ 3500kJ

Rev	Date	By	Comment
D	15/10/15	PM	Fourth Issue. After review
C	13/05/15	SF	Third Issue. Update EA3 export cable corridor
B	01/05/14	RP	Second Issue. Update cable corridor to V20

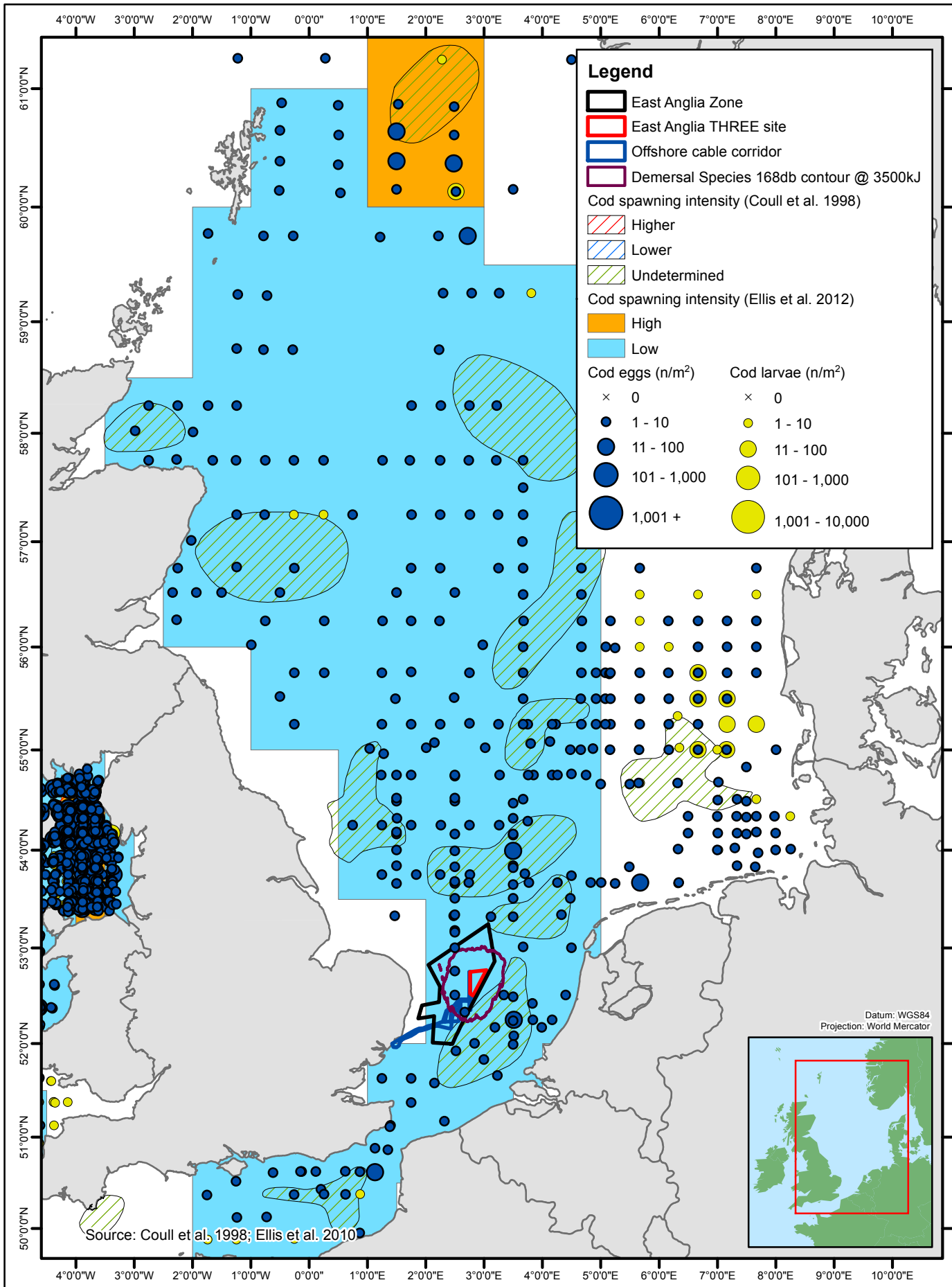
Original A4
Plot Scale 1:10,000,000

0 40 80 120 160 km
0 20 40 60 80 nm

Volume 2 | **Figure 11.54**

Layout	Date	Rev	Dwg No.
N/A	15/10/2015	D	EA3-530-PB-596-D

Ref:



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Cod spawning and nursery grounds & 168db demersal noise contour @ 3500kJ

Rev	Date	By	Comment
D	15/10/15	PM	Fourth Issue. After review
C	13/05/15	SF	Third Issue. Update EA3 export cable corridor
B	01/05/14	RP	Second Issue, inc. summary of changes

Original A4 Plot Scale 1:10,000,000

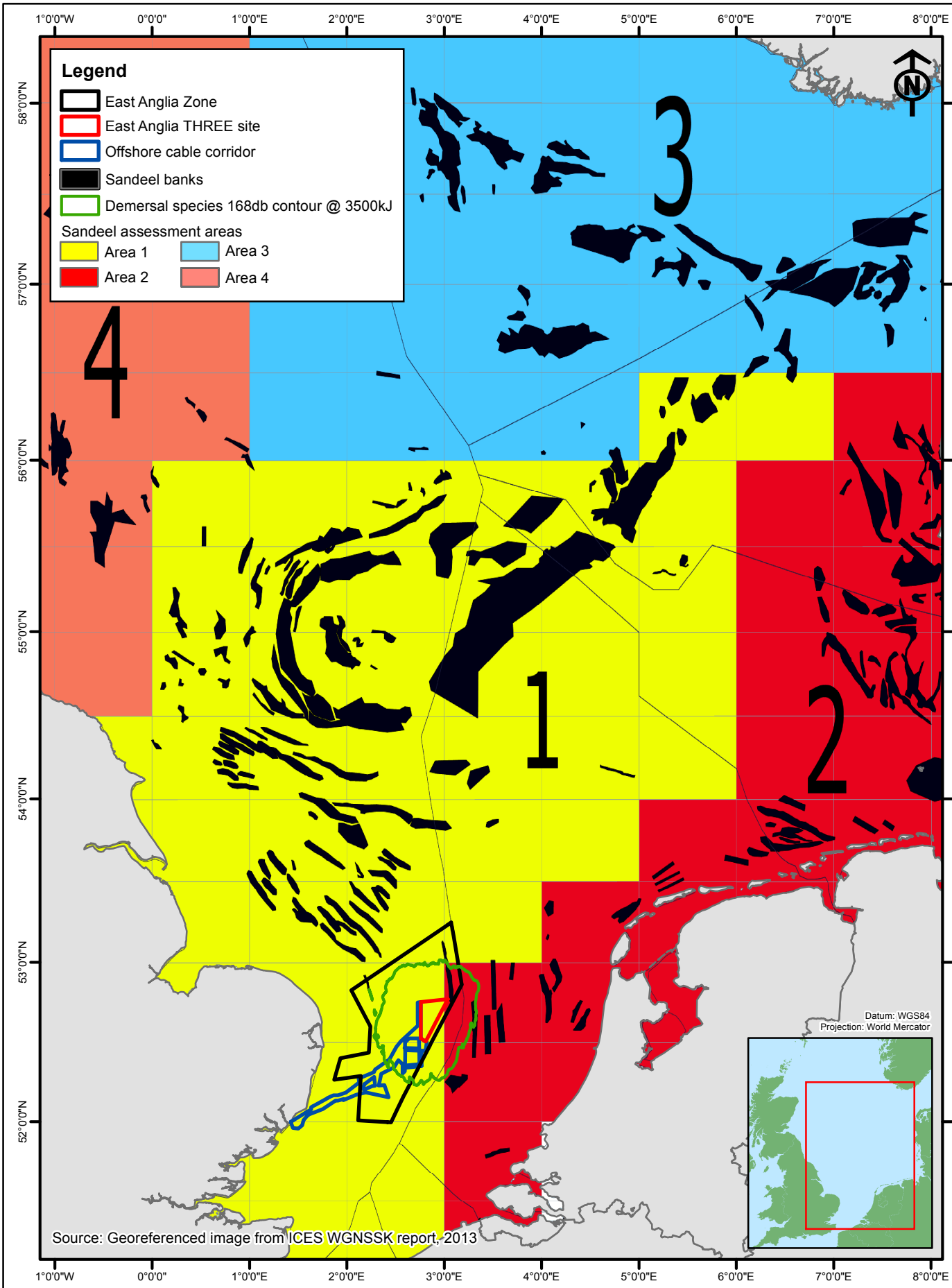
0 50 100 150 km

0 20 40 60 80 nm

Volume 2 | **Figure 11.55**

Layout	Date	Rev	Dwg No.
N/A	15/10/2015	D	EA3-530-PB-597-D

Ref:



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Sandeel fishing areas
168db demersal noise contour @ 3500kJ

Rev	Date	By	Comment
D	15/10/15	PM	Fourth Issue. Post review
C	13/05/15	SF	Third Issue. Update EA3 export cable corridor
B	01/05/14	RP	Second Issue. Update cable corridor to V20

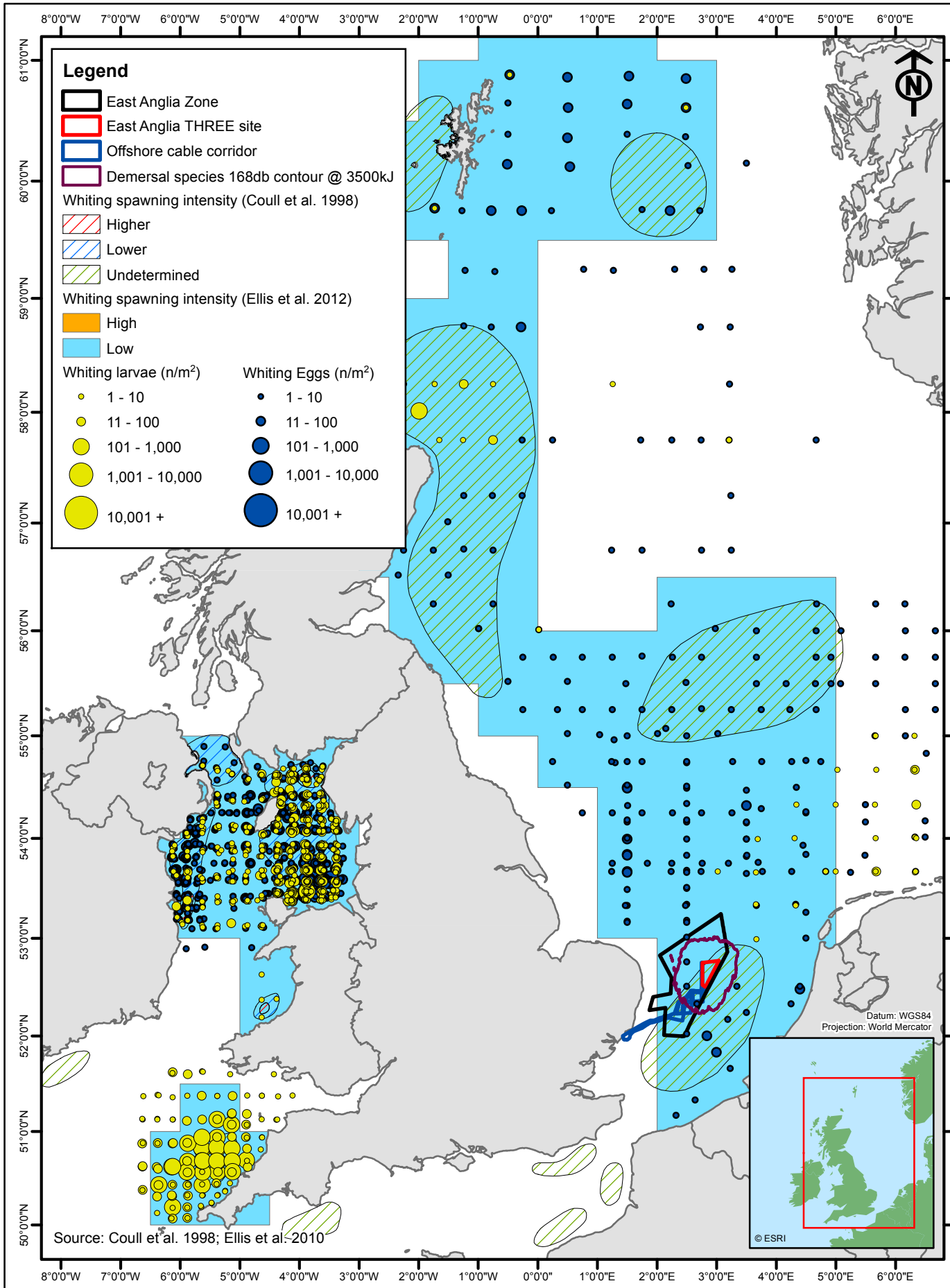
Original A4 Plot Scale 1:6,000,000

0 50 100 km
0 20 40 60 nm

Volume 2 | **Figure 11.56**

Layout	Date	Rev	Dwg No.
N/A	15/10/2015	D	EA3-530-PB-598-D

Ref:



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Whiting spawning area &168db demersal noise contour @ 3500kJ

Rev	Date	By	Comment
D	15/10/15	PM	Fourth Issue. After review
C	13/05/15	SF	Third Issue. Update EA3 export cable corridor
B	01/05/14	RP	Second Issue. Update cable corridor to V20

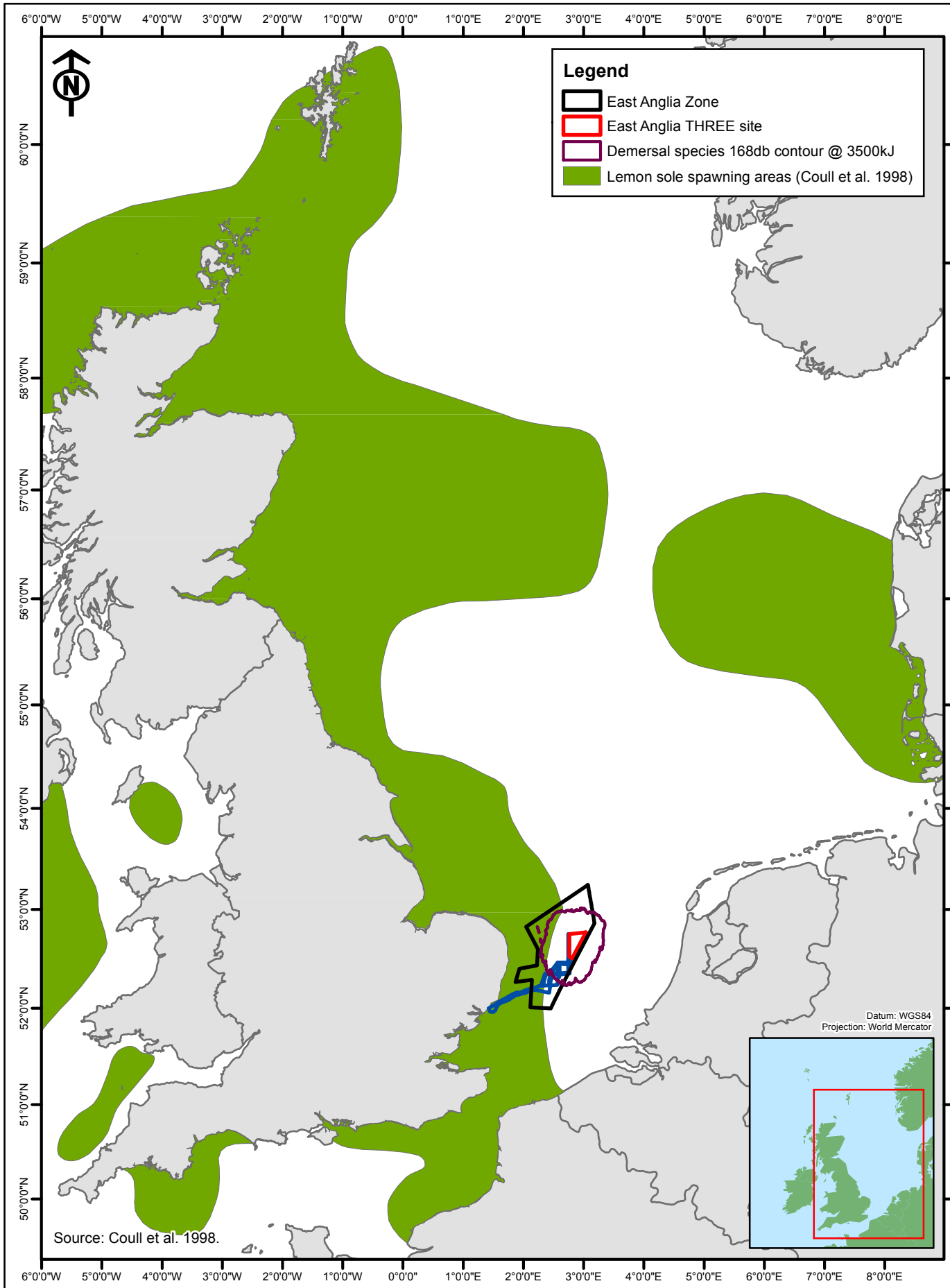
Original A4 Plot Scale 1:9,800,000

0 50 100 150 km
0 20 40 60 80 nm

Volume 2 | **Figure 11.57**

Layout	Date	Rev	Dwg No.
N/A	15/10/2015	D	EA3-530-PB-599-D

Ref:



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Lemon sole spawning area & 168db demersal noise contour @ 3500kJ

Rev	Date	By	Comment
D	15/10/15	PM	Fourth Issue. After review
C	13/05/15	SF	Third Issue. Update EA3 export cable corridor
B	01/05/14	RP	Second Issue. Update cable corridor to V20

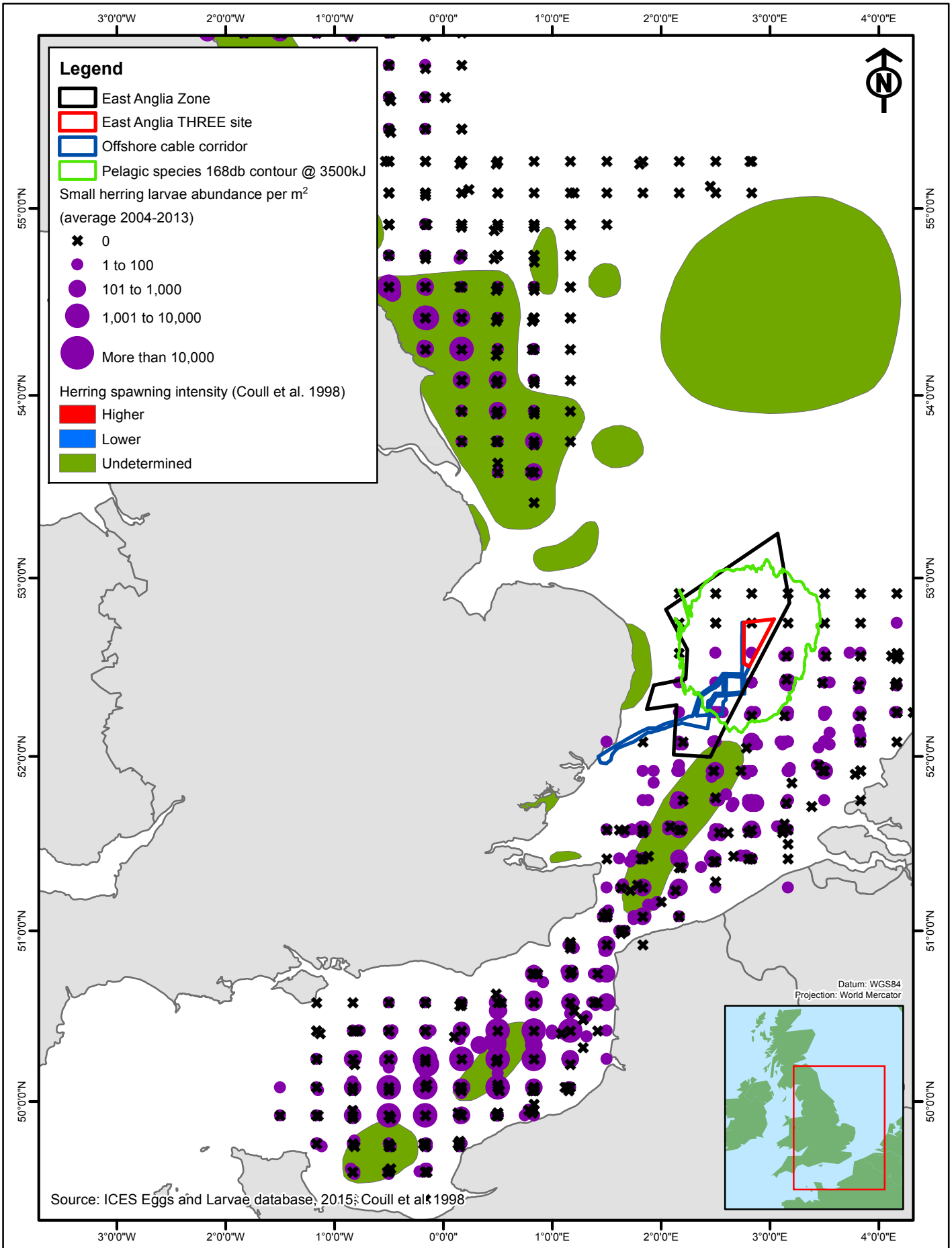
Original A4 Plot Scale 1:9,700,000

0 50 100 150 km
0 20 40 60 80 nm

Volume 2 | **Figure 11.58**

Layout	Date	Rev	Dwg No.
N/A	15/10/2015	D	EA3-530-PB-600-D

Ref:



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Herring spawning area & IHLS herring small larvae abundance (avg. 2004-2013) 168db pelagic noise contour @ 3500kJ

Rev	Date	By	Comment
D	15/10/15	PM	Fourth Issue. After review
C	13/05/15	SF	Third Issue. Update EA3 export cable corridor
B	01/05/14	RP	Second Issue. Update cable corridor to V20

Original A4 Plot Scale 1:5,200,000

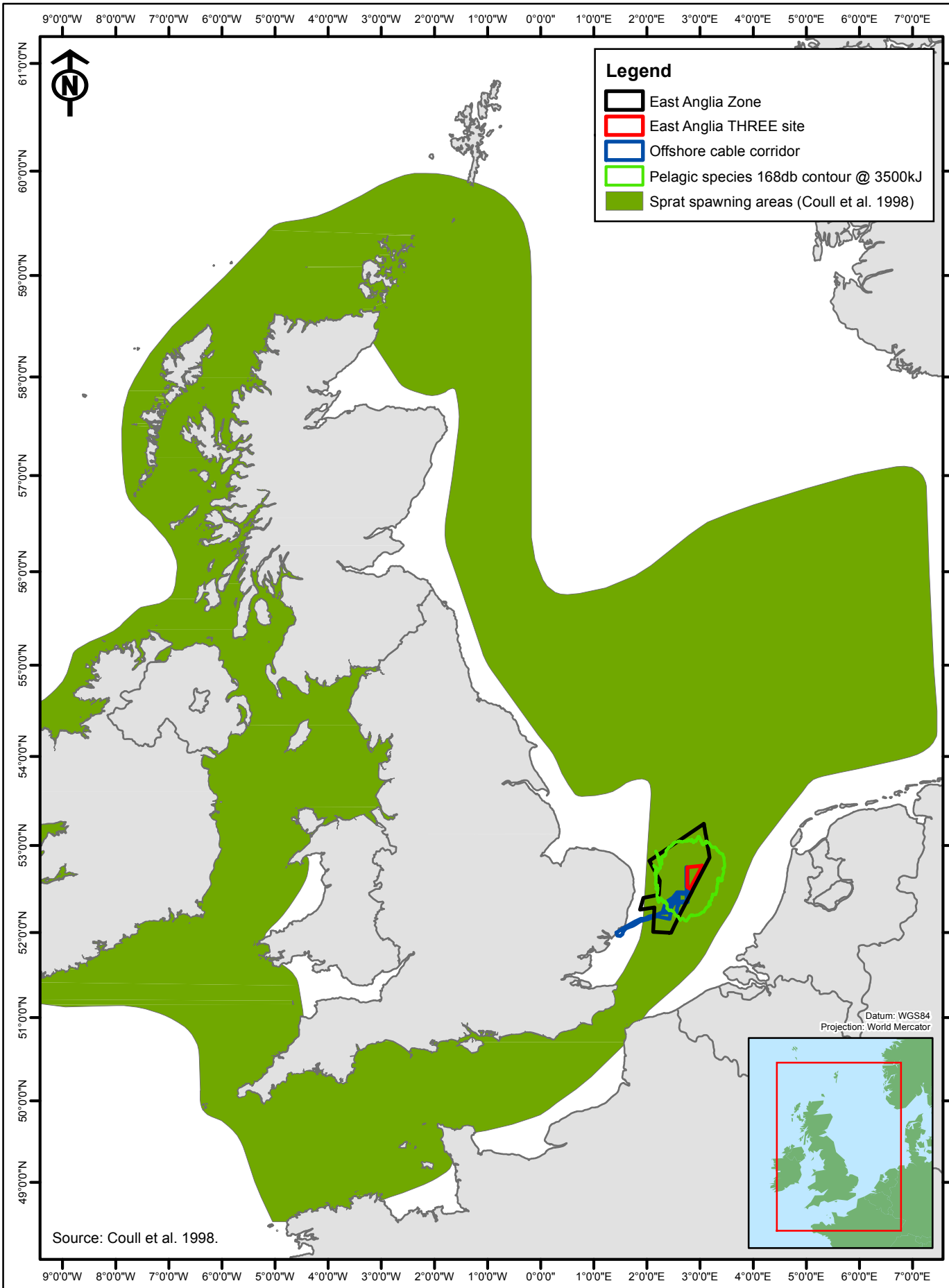
0 20 40 60 80 100 km

0 10 20 30 40 50 nm

Volume 2 | **Figure 11.59**

Layout	Date	Rev	Dwg No.
N/A	15/10/2015	D	EA3-530-PB-601-D

Ref:



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Sprat spawning area & 168db pelagic noise contour @ 3500kJ

Rev	Date	By	Comment
D	15/10/15	PM	Fourth Issue. After review
C	13/05/15	SF	Third Issue. Update EA3 export cable corridor
B	01/05/14	RP	Second Issue. Update cable corridor to V20

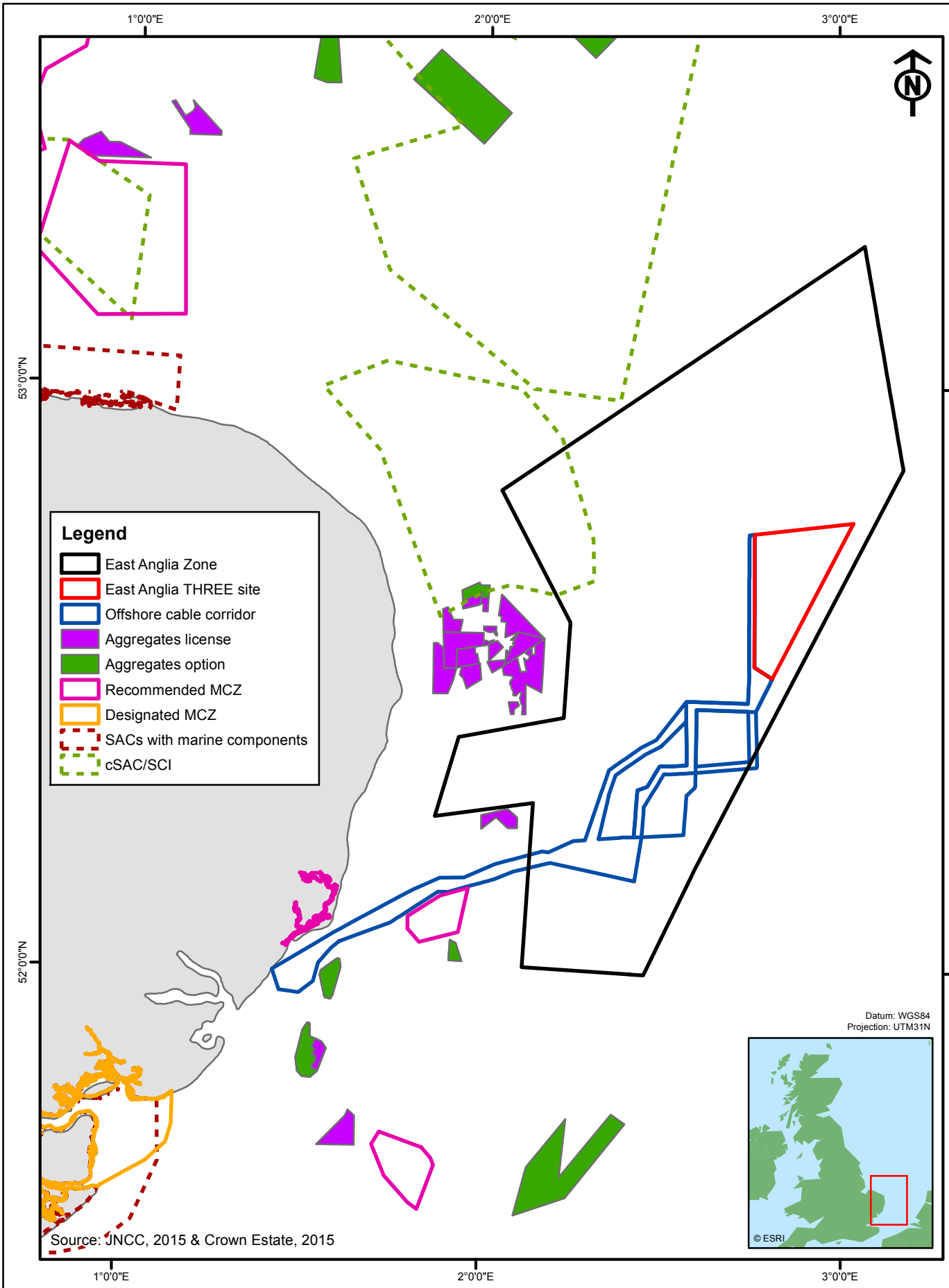
Original A4 Plot Scale 1:11,000,000

0 50 100 150 km
0 20 40 60 80 nm

Volume 2 | **Figure 11.60**

Layout	Date	Rev	Dwg No.
N/A	15/10/2015	D	EA3-530-PB-602-D

Ref:



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Marine aggregates & marine conservation designations

Rev	Date	By	Comment
D	15/10/15	PM	Fourth Issue. After review
C	15/05/15	SF	Third Issue. Update cable corridor & data
B	01/05/14	RP	Second Issue. Update cable corridor to V20

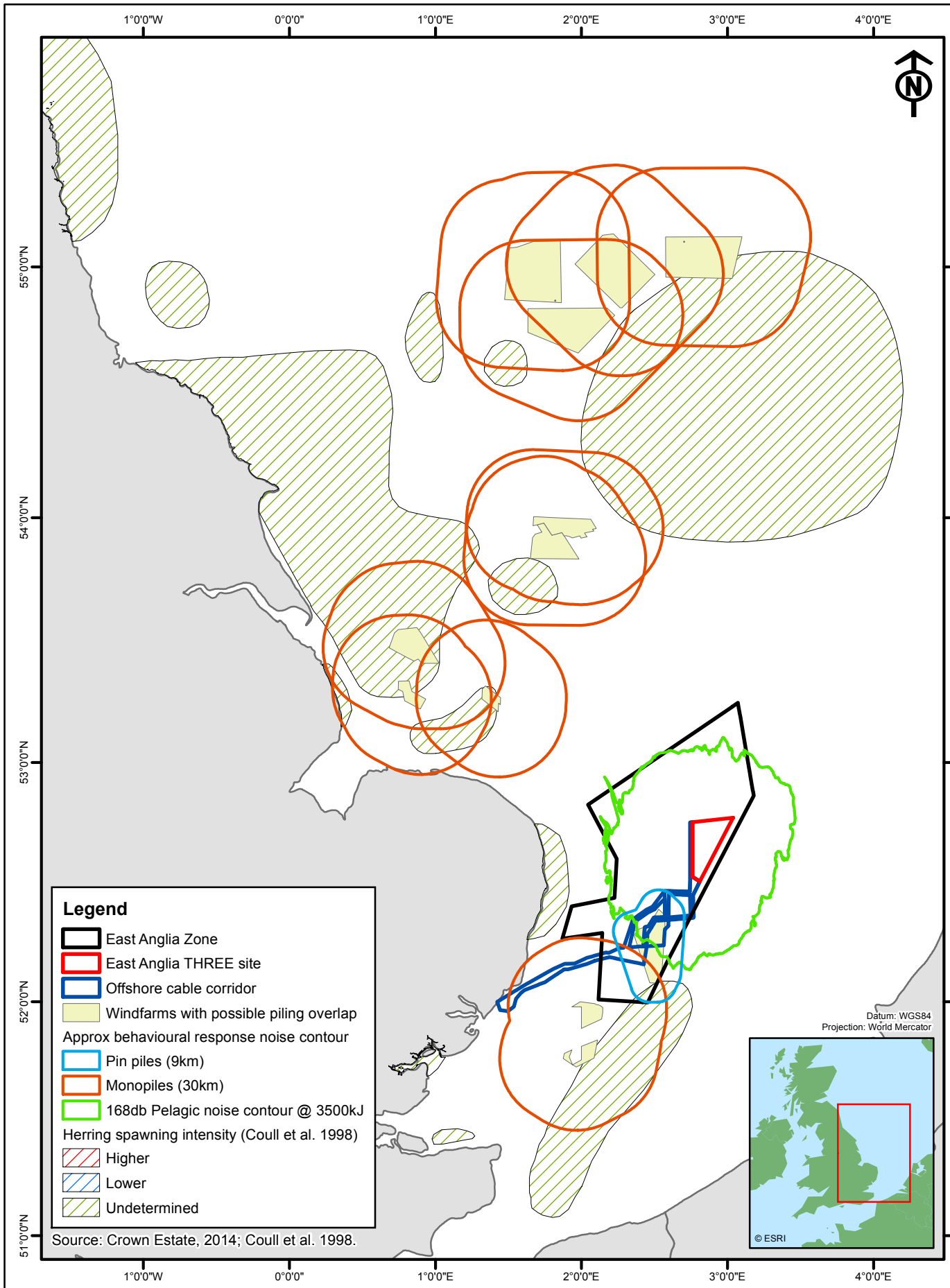
Original A4 Plot Scale 1:1,000,000

0 10 20 km

0 5 10 nm

Volume 2	Figure 11.61		
Layout	Date	Rev	Dwg No.
N/A	15/10/2015	D	EA3-530-PB-603-D

Ref:



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Herring spawning area (Coull et al. 1998) & noise contours for cumulative piling.

Rev	Date	By	Comment
D	15/10/15	PM	Fourth Issue. After review
C	13/05/15	SF	Third Issue. Update EA3 export cable corridor
B	01/05/14	RP	Second Issue. Update cable corridor to V20

Original A4 Plot Scale 1:4,000,000

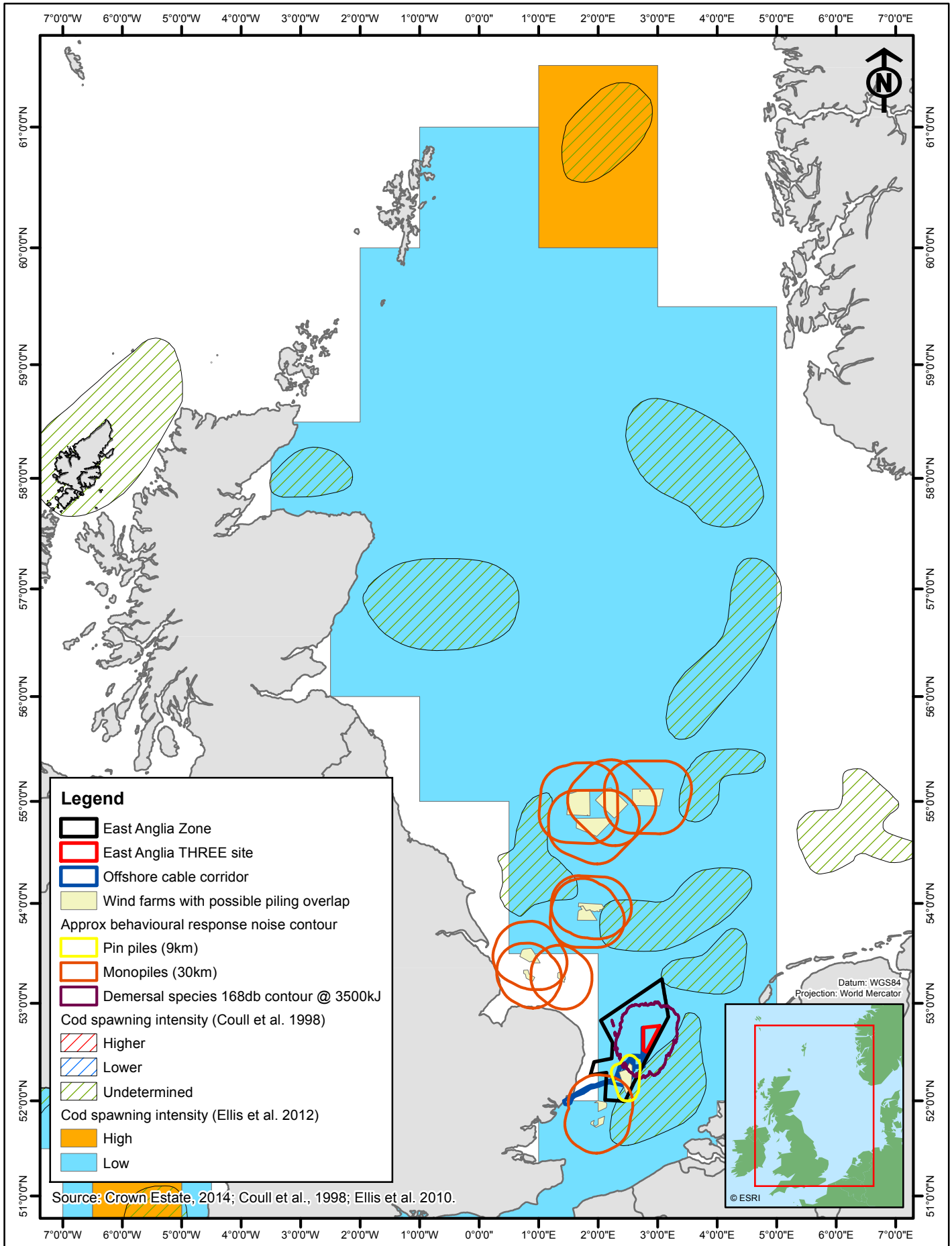
0 40 80 km

0 20 40 nm

Volume 2 | **Figure 11.62**

Layout	Date	Rev	Dwg No.
N/A	15/10/2015	D	EA3-530-PB-604-D

Ref:



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Cod spawning area & noise contours for cumulative piling.

Rev	Date	By	Comment
D	15/10/15	PM	Fourth Issue. After review
C	13/05/15	SF	Third Issue. Update EA3 export cable corridor
B	01/05/14	RP	Second Issue. Update cable corridor to V20

Original A4 Plot Scale 1:9,500,000

0 50 100 150 km

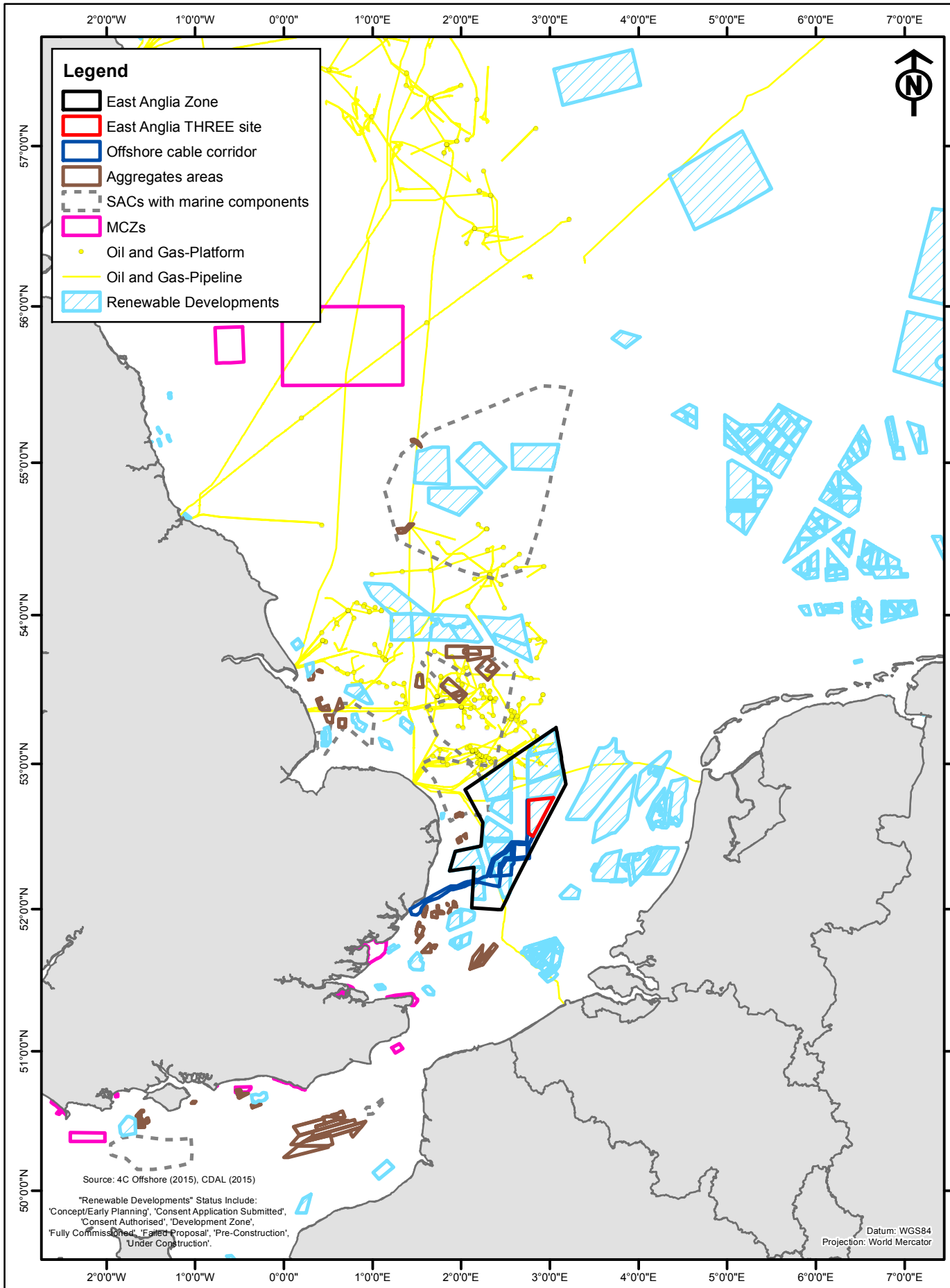
0 50 100 nm

Volume 2

Figure 11.63

Layout	Date	Rev	Dwg No.
N/A	15/10/2015	D	EA3-530-PB-605-D

Ref:



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Other marine users

Rev	Date	By	Comment
D	15/10/15	PM	Fourth Issue. After review
C	27/05/14	SF	Third Issue. Update EA3 cable corridor & data
B	01/05/14	RP	Second Issue. Update cable corridor to V20

Original A4 Plot Scale 1:6,589,831

0 50 100 km
0 20 40 60 nm

Volume 2	Figure 11.64

Layout	Date	Rev	Dwg No.
N/A	15/10/2015	D	EA3-530-PB-606-D

Ref.

Chapter 11(b) Figures End Here