Marine Institute
UNIVERSITY OF PLYMOUTH

Ifremer

Agence des aires marines protégées

PANACHE

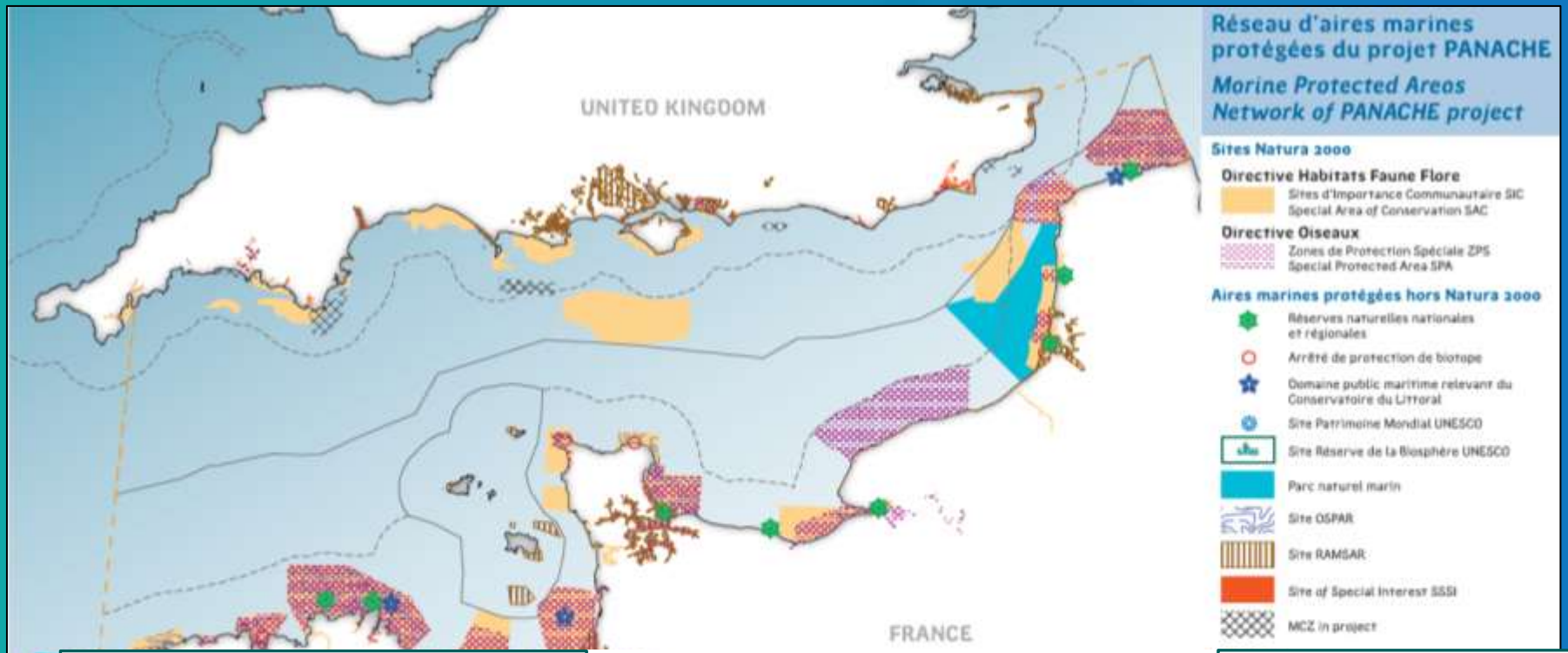
Protected Area Network Across the Channel Ecosystem

Benjamin Ponge

10 juin 2014 - Tables rondes des gestionnaires d'AMP de Manche – Mer du nord

Evaluation de la cohérence écologique du réseau d'AMP en Manche

AMP CONSIDÉRÉES



France

Parcs Naturels Marins **(2)**

Réserves Naturelles **(9)**

Arrêtés préfectoraux de protection du biotope **(4)**

Parties maritimes du domaine relevant du Conservatoire de l'espace littoral et des rivages lacustres **(3)**

Désignations communes

(77) Sites Natura 2000 **(25)** (DO et DHFF)

(17) Sites OSPAR **(13)**

(3) Sites RAMSAR **(10)**

Angleterre

Sites of Special Scientific Interest **(39)**

Marine conservation Zones **(12)**

Environ 220 AMP

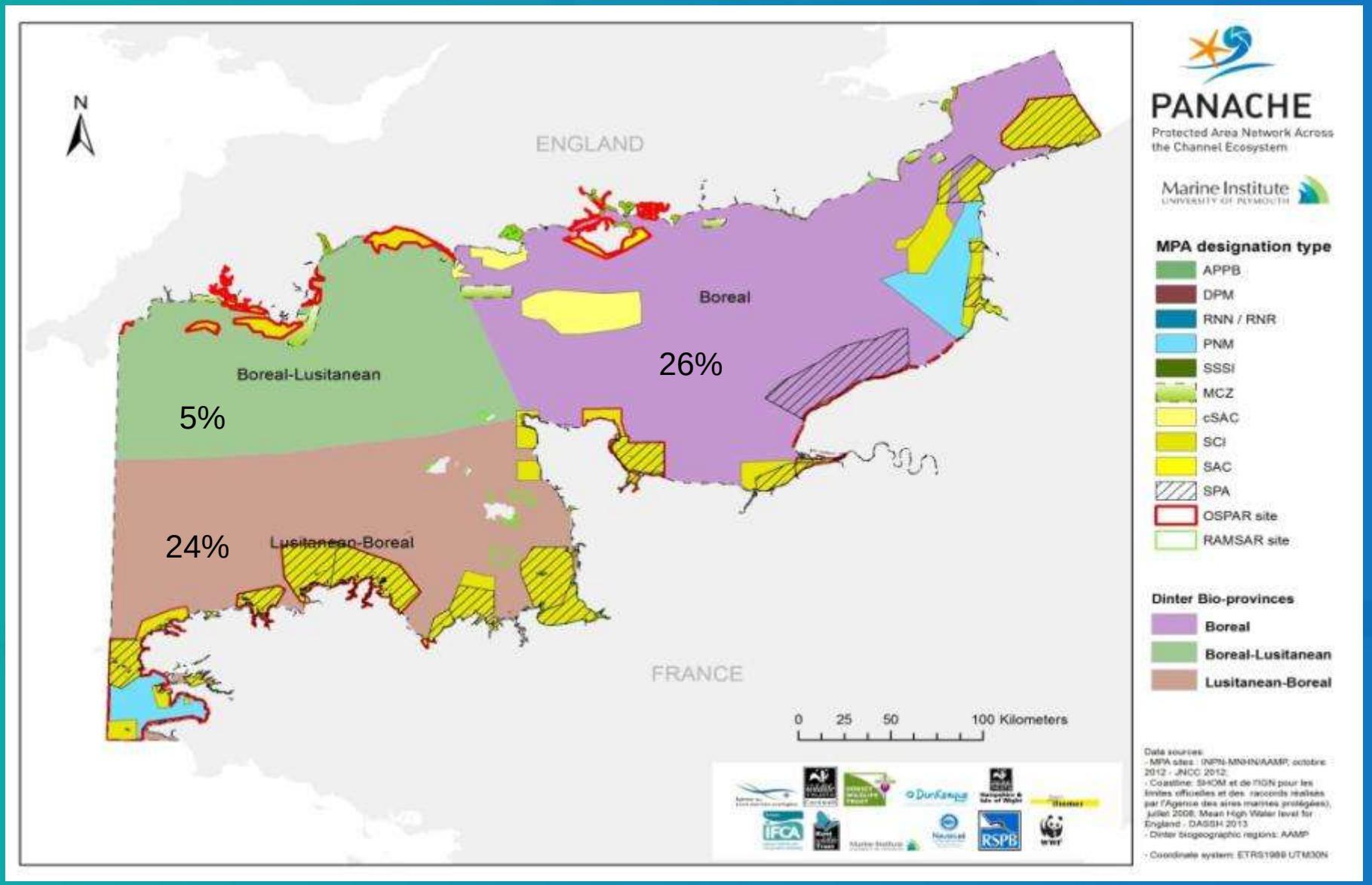
Le réseau d'AMP en Manche
Répartition par pays

Pays	Surface sous juridiction dans la zone PANACHE (km^2)	Surface (et %) des eaux sous juridiction couverte par les AMP (km^2)
Angleterre	35370	3531 (10%)
France	44559	13688 (31%)
Iles anglo-normandes	6210	210 (3%)

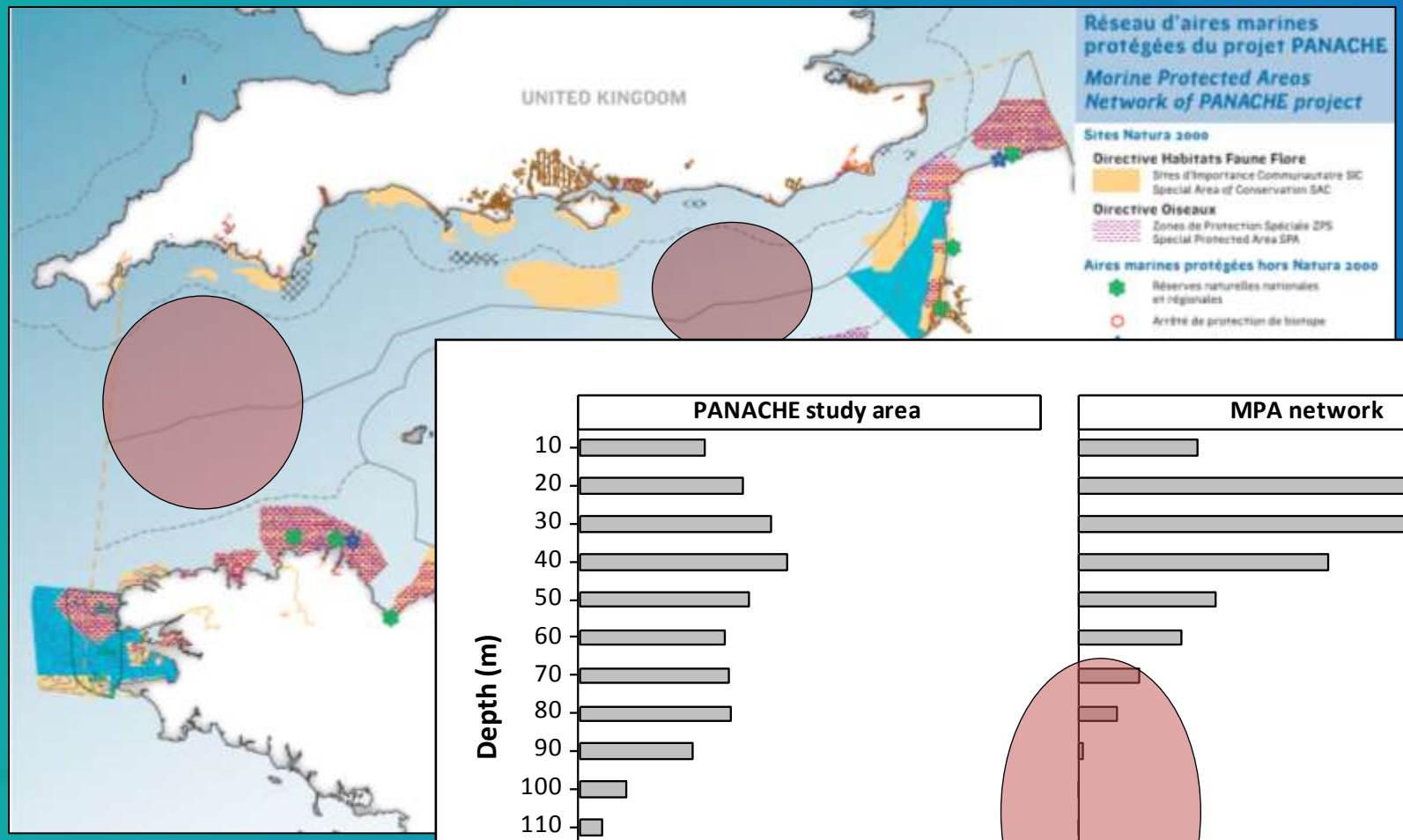
Un réseau cohérent c'est ?

Critères	Un réseau ou …	Evaluation
Représentativité	… chaque enjeu est représenté …	Présence /absence
Réplication	… en plusieurs exemplaires …	Nombre
Adéquation	… en quantité suffisante …	Part de la population / de la surface
Viabilité	… qui seraient viables individuellement …	Taille
Connectivité	… et connectés entres eux.	Liens fonctionnels : sources, puits, relais, éloignement …

REPRÉSENTATION BIOGÉOGRAPHIQUE (DINTER)



REPRÉSENTATION BATHYMÉTRIQUE



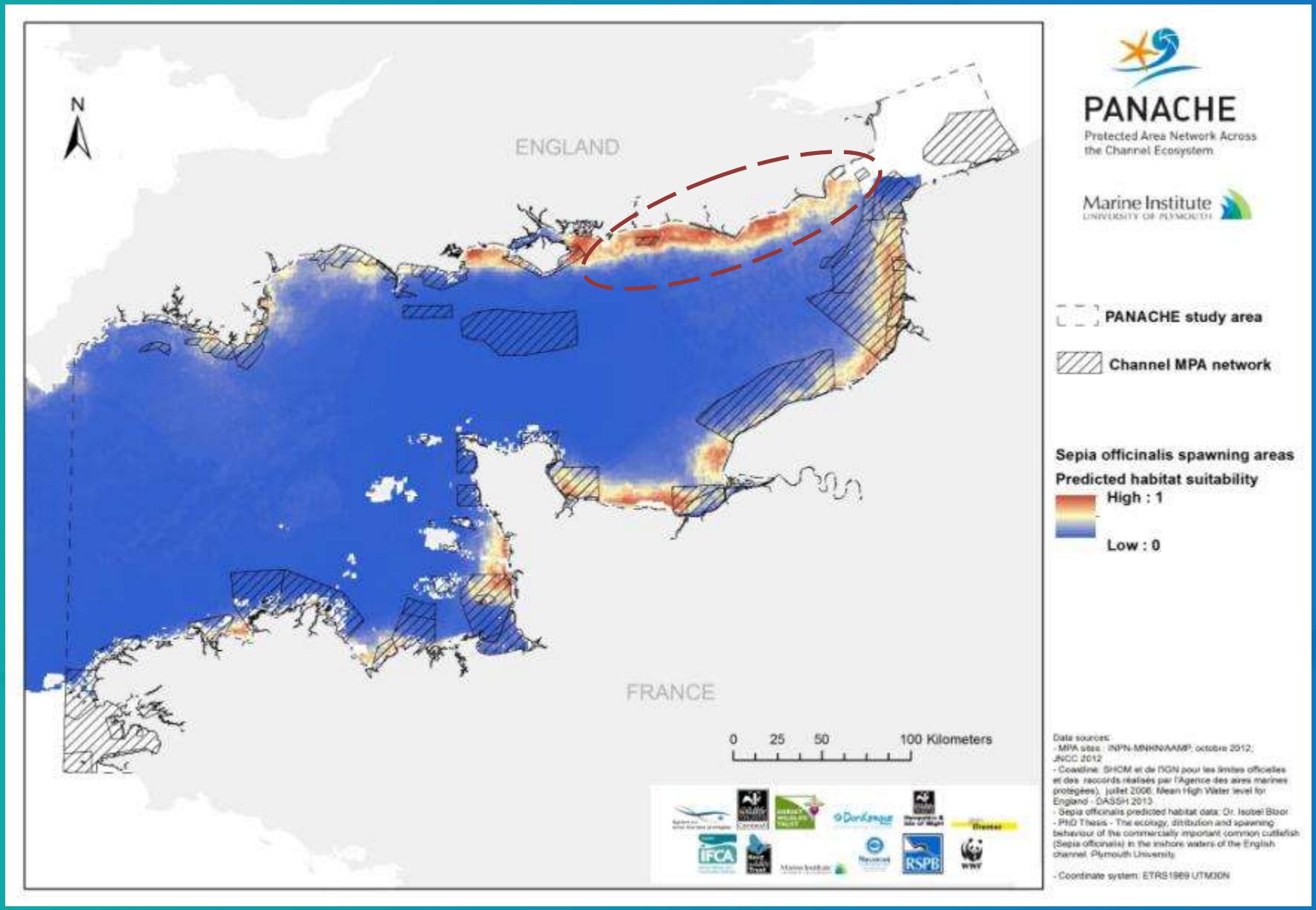
Distribution des strates bathymétriques dans
(i) la zone PANACHE
(ii) le réseau d'AMP

Représentation - réplication catégories d'habitats

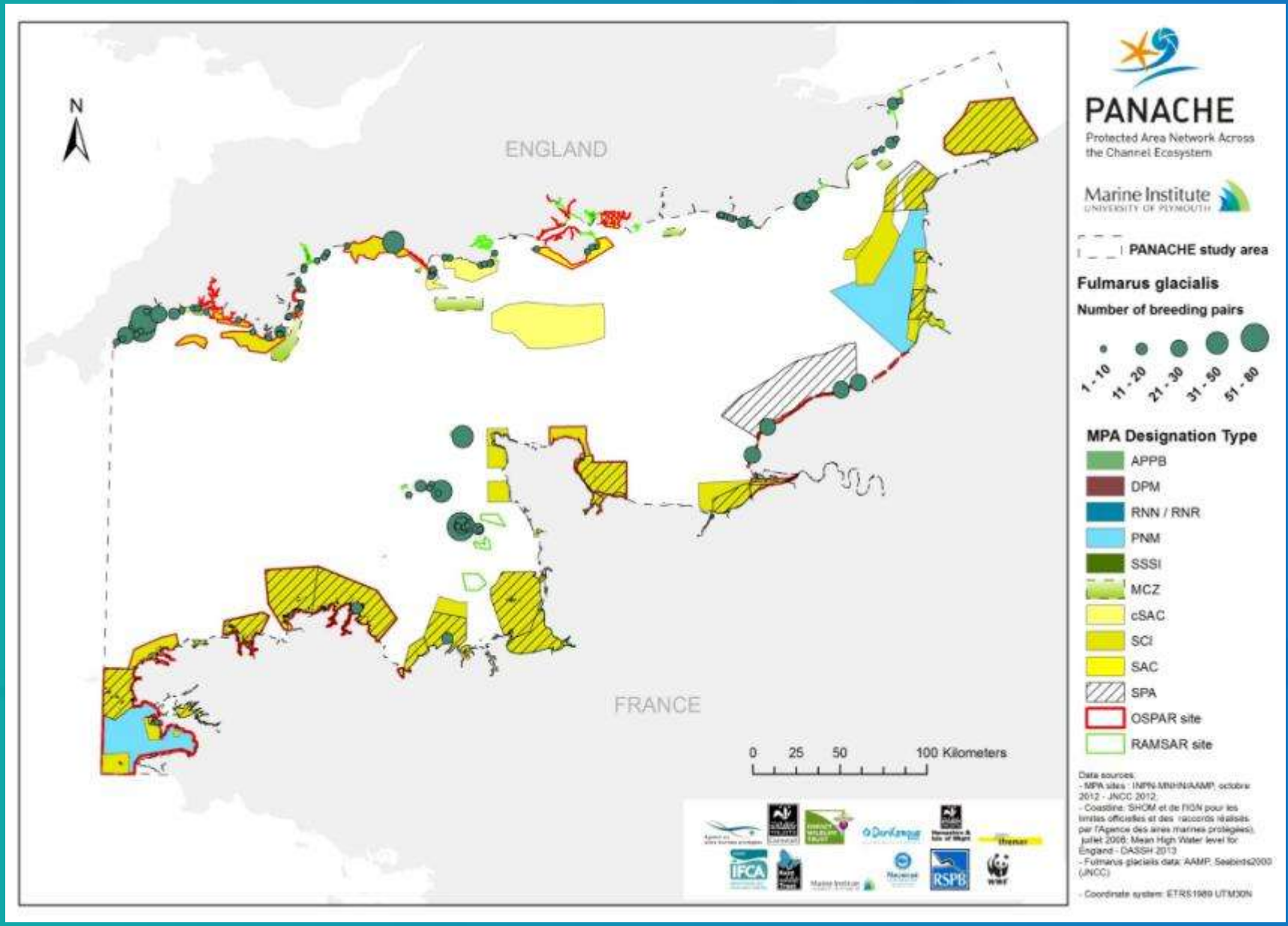
EUSeaMap

EUNIS Level 3 Habitat		Area of habitat in PANACHE study region (km^2)	Number of occurrences in MPAs					Total occurrence in MPAs
			England		France		Channel Islands	
Code	Description		West	East	West	East		
A3.1	High energy infralittoral rock	1993	5	6	13	8	5	**37**
A3.2	Moderate energy infralittoral rock	1055	5	6	10	4	2	**27**
A3.3	Low energy infralittoral rock	10	2		3	1		**6**
A4.1	High energy circalittoral rock	1659	6	7	7	6	2	**28**
A4.2	Moderate energy circalittoral rock	9996	4	7	6	3		**20**
A4.3	Low energy circalittoral rock	601	3			1		**4**
A5.1	Sublittoral coarse sediment	44971	9	13	14	10	5	**51**
A5.2	Sublittoral sand	9652	8	11	17	15	1	**52**
A5.3	Sublittoral mud	1099	5	3	7	3	1	**19**
A5.4	Sublittoral mixed sediments	13079	2	4	14	9	1	**30**

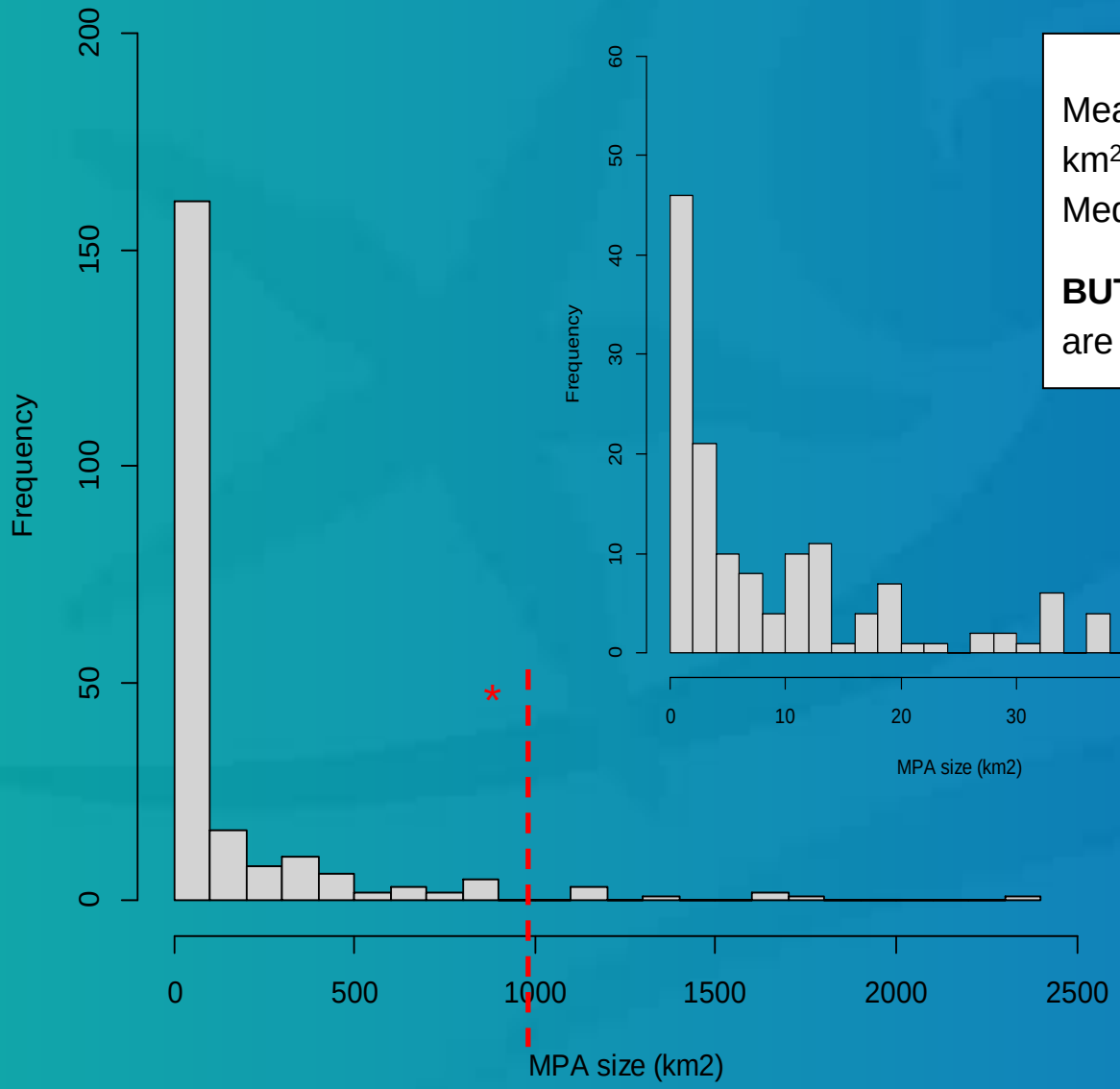
ZONES D'IMPORTANCE ÉCOLOGIQUE : ZONES DE DE FRAI (*SEPIA OFFICINALIS*)



ZONES D'IMPORTANCE ÉCOLOGIQUE : ZONES DE NIDIFICATION DES OISEAUX MARINS



TEST DE VIABILITÉ (ÉVALUATION DE LA DISTRIBUTION DES TAILLES D'AMP)



Mean ± SE = 154.43 ± 22.64 km^2

Median = 15.14 km^2

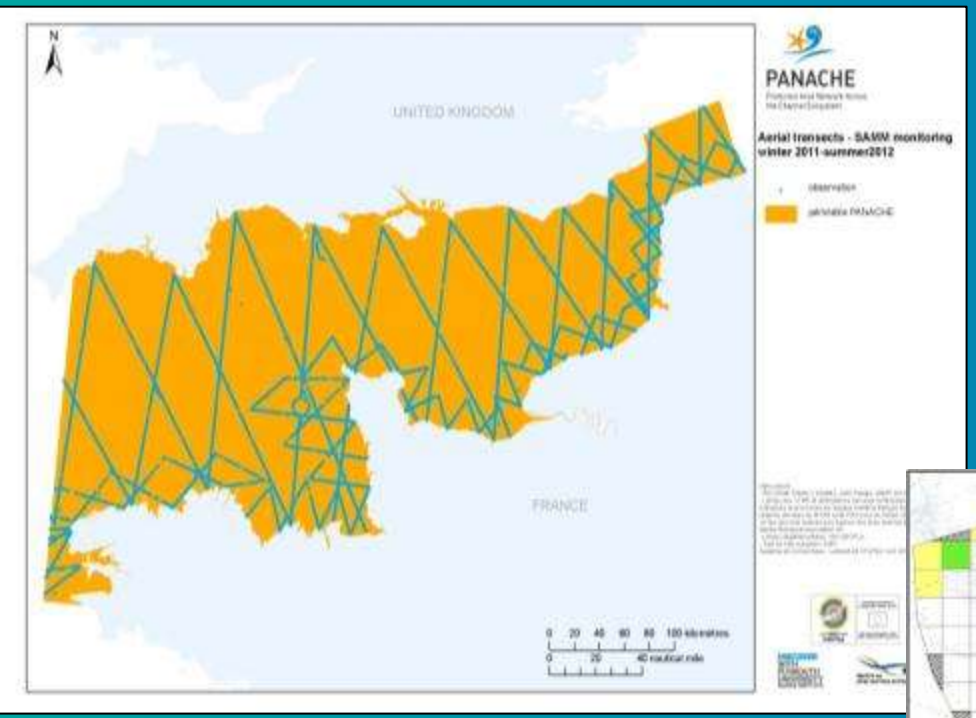
BUT 67 out of 221 MPAs (30%) are smaller than 4 km^2 in size

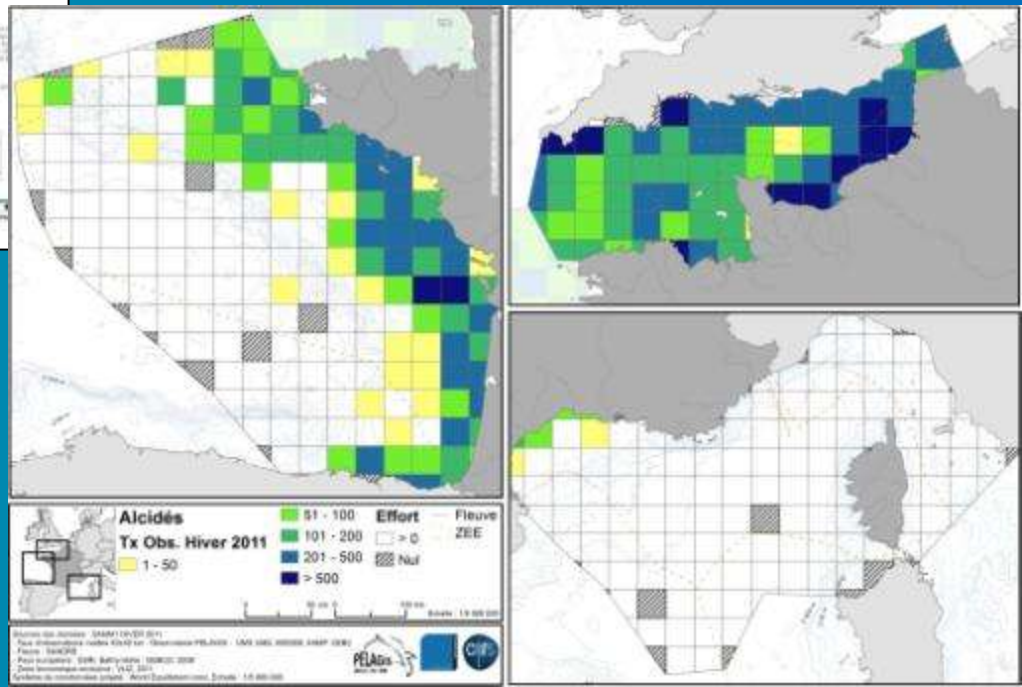
* Hill, J., Pearce, B., Georgiou, L.,Pinnion, J. and Gallyot, J. 2010. *Meeting the MPA Network Principle of Viability: Feature specific recommendations for species and habitats of conservation importance*. Natural England Commissioned Reports, Number 043.

ADÉQUATION : COUVERTURE DE LA DISTRIBUTION DES HABITATS (EUNIS NIVEAU 3) À L'ÉCHELLE DU RÉSEAU D'AMP

Code habitat	Description	Surface de l'habitat dans la région d'étude (km^2)	Surface (et %) de l'habitat dans les AMP (km^2)	Couverture (%) d'habitat recommandée pour le maintien de 80% des espèces associées	Couverture (%) d'habitat recommandée pour le maintien de 80% des espèces associées
A3.1	High energy infralittoral rock	1993	1000 (50%)	31	57
A3.2	Moderate energy infralittoral rock	1055	446 (42%)	32	59
A3.3	Low energy infralittoral rock	10	6 (55%)	32	59
A4.1	High energy circalittoral rock	1659	546 (33%)	25	52
A4.2	Moderate energy circalittoral rock	9996	1389 (14%)	28	55
A4.3	Low energy circalittoral rock	601	1.5 (0.3%)	32	58
A5.1	Sublittoral coarse sediment	44971	5866 (13%)	33	59
A5.2	Sublittoral sand	9652	3583 (37%)	30	57
A5.3	Sublittoral mud	1099	361 (33%)	30	57
A5.4	Sublittoral mixed sediments	13079	3152 (24%)	32	58

PACOMM / SAMM


UNITED KINGDOM
FRANCE
PANACHE
Aerial transects - SAMM monitoring
winter 2011-summer2012

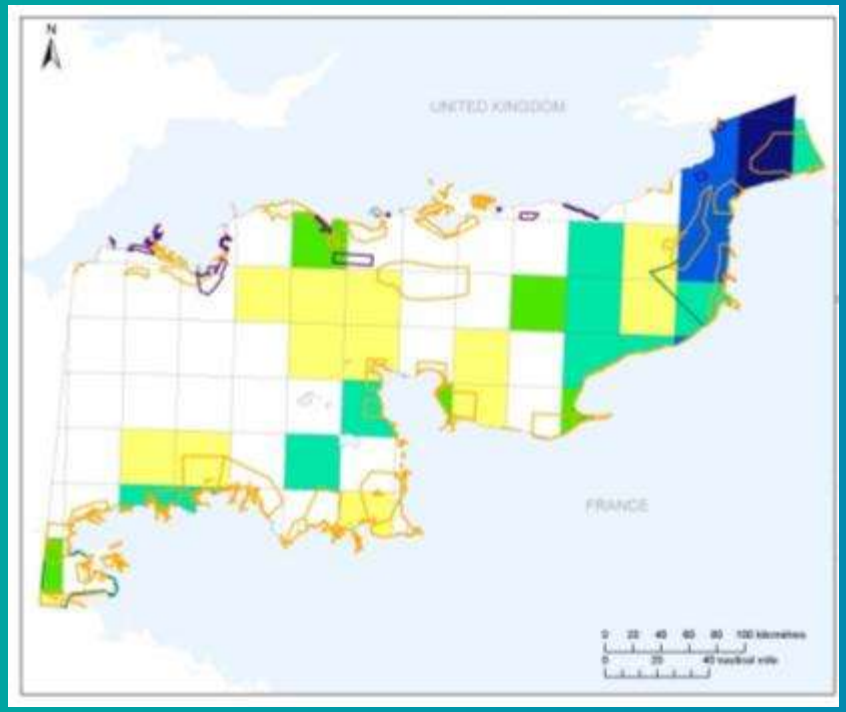

Alcidés
Tx Obs. Hiver 2011
1 - 50
51 - 100
101 - 200
201 - 500
> 500
Effort
> 0
Nul
Fleuve
ZEE

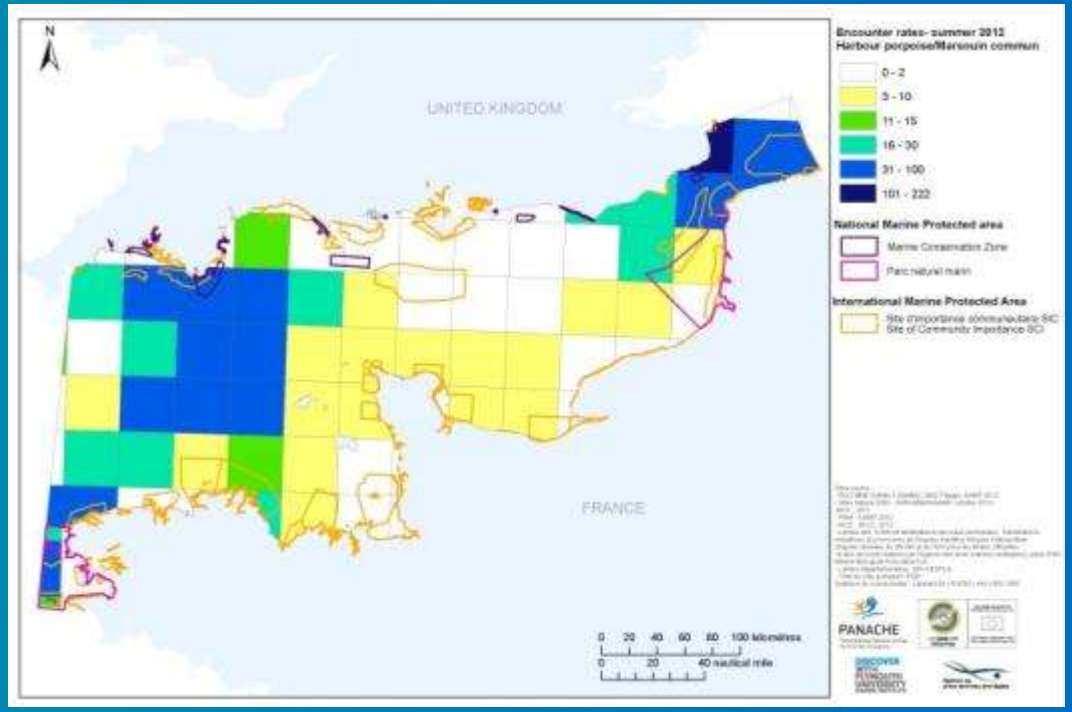
Mammifères marins

	Pourcentage d'indice d'observation en AMP	Total d'indice d'observation en AMP	Total d'indice d'observation
Balénoptéridés	0%	0	8740
Cachalots, kogias, baleines à bec		0	0
Globicéphalinés	13%	3508	27281
Marsouin commun	32%	368308	1156736
Phoques	34%	25443	75785
Petits delphininés	9%	29988	339597
Grand dauphin	5%	2096	42507

	Pourcentage d'indice d'observation en AMP	Total d'indice d'observation en AMP	Total d'indice d'observation
Balénoptéridés	21%	2747	13254
Cachalots, kogias, baleines à bec		0	0
Globicéphalinés	15%	5114	34218
Marsouin commun	13%	184367	1447025
Phoques	18%	19183	106731
Petits delphininés	18%	6531	36012
Grand dauphin	20%	10739	53789

Focus marsouin

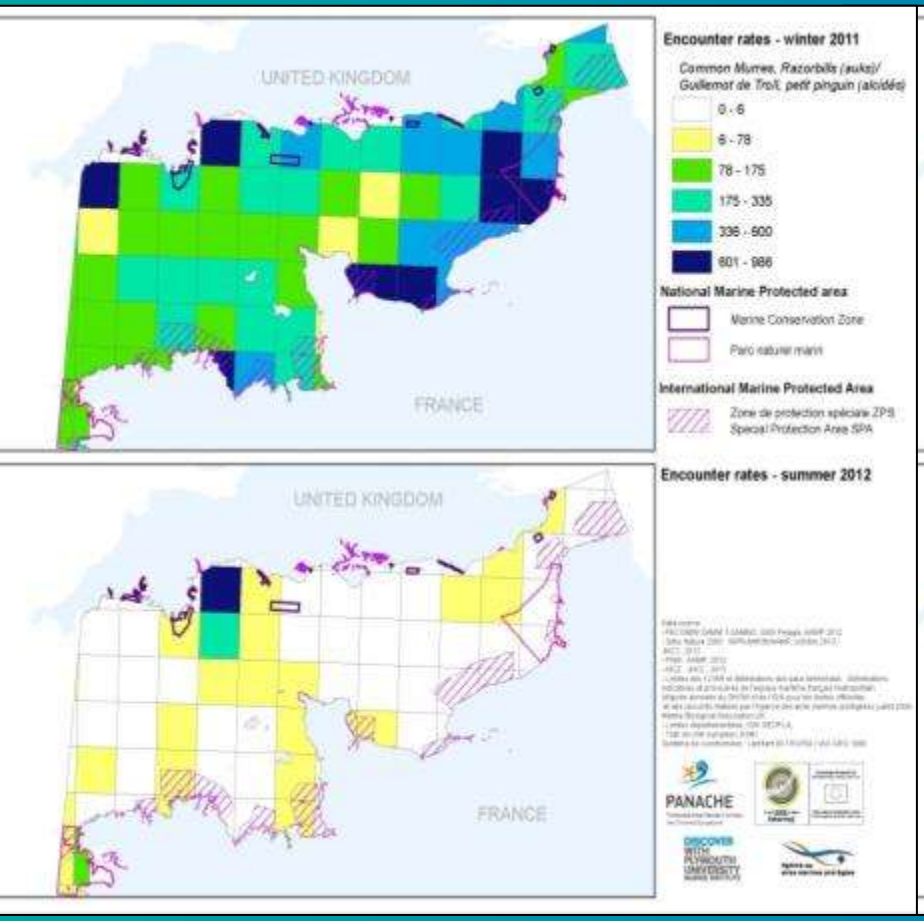


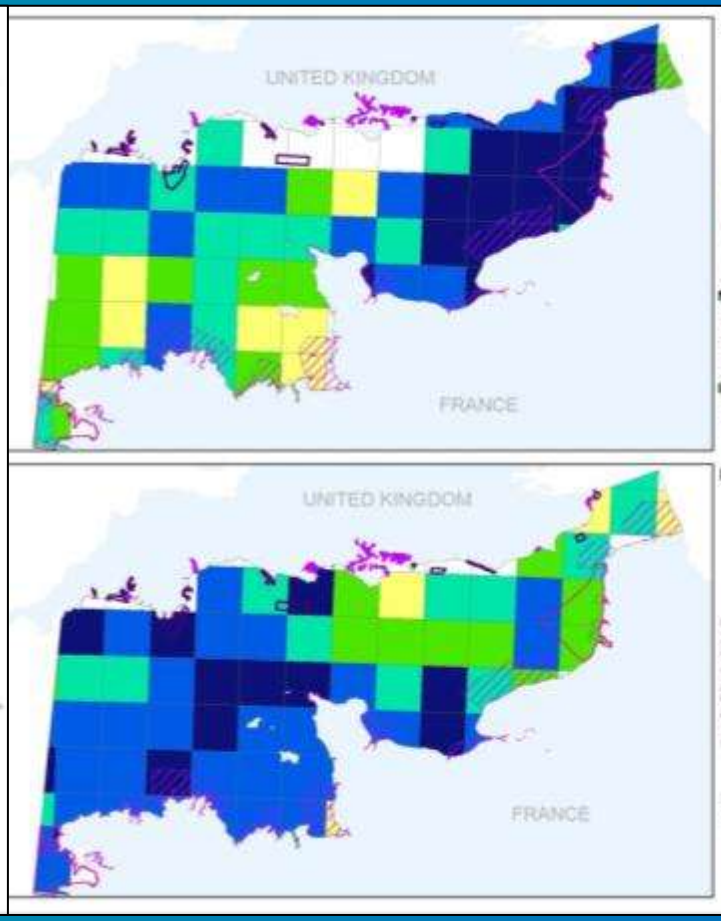


Oiseaux marins

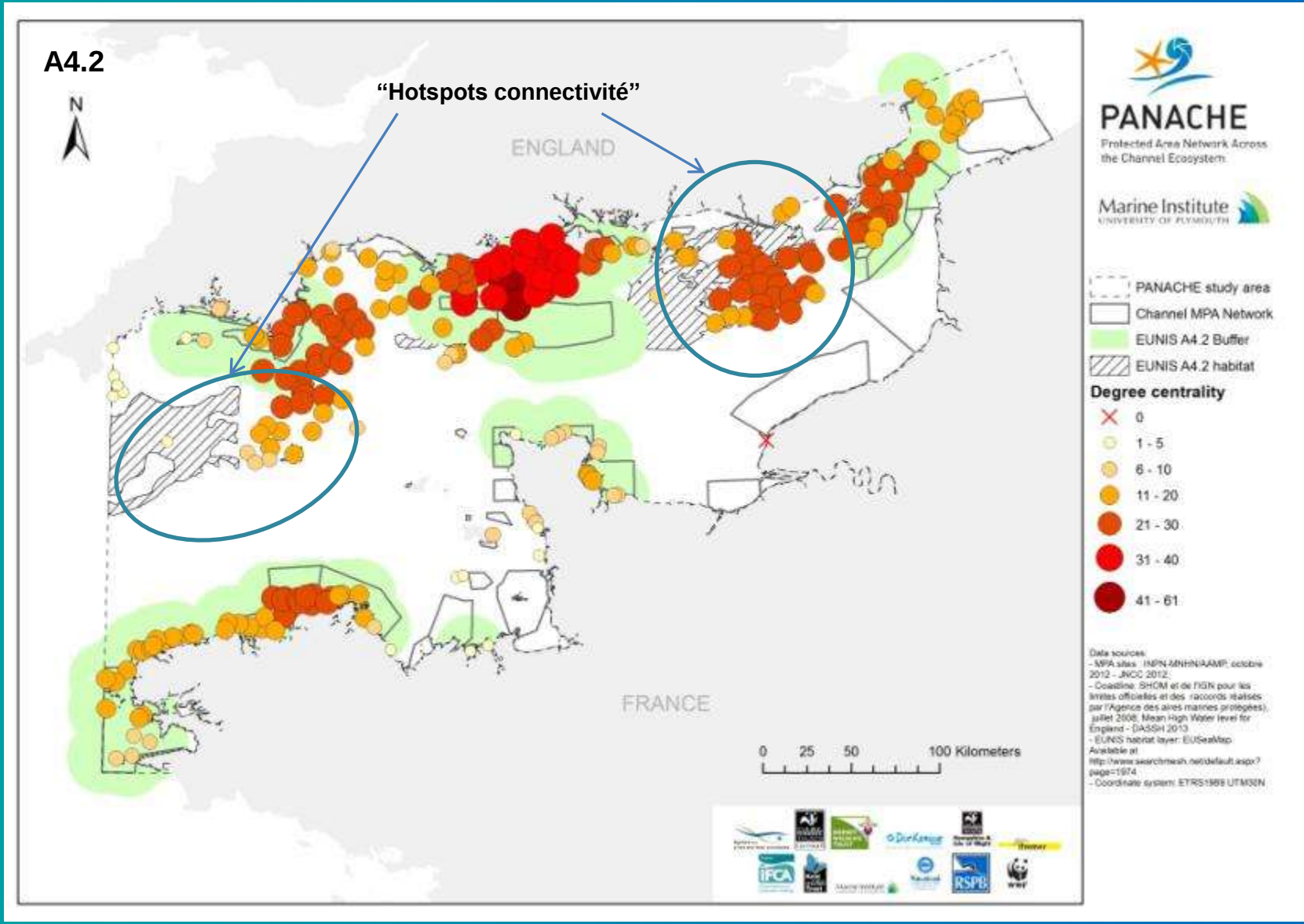
Espèces	Pourcentage d'indice d'observation en AMP		Total d'indice d'observation en AMP		Total d'indice d'observation	
	Hiver	Eté	Hiver	Eté	Hiver	Eté
Alcidés	20%	8%	4867151	146483	24092998	1949361
Mouettes rieuses et mélanocéphales	26%	32%	1424472	471396	5448677	1456961
Grand labbe	18%	24%	59544	30523	336540	126542
Fulmar boréal	11%	30%	204579	95682	1891327	321465
Goélands gris	31%	31%	733478	1573987	2379759	5026447
Goélands noirs	32%	23%	1031067	565222	3175239	2464538
Mouette pygmée	37%	0%	185151	0	499627	14205
Océanites	3%	13%	861	59341	29941	455409
Petits puffins	0%	11%	1	67013	11650	594243
Mouette tridactyle	13%	19%	1126481	66384	8350269	349044
Sternes	35%	41%	16921	936253	48805	2261094
Fou de bassan	25%	15%	2981103	1594801	11731470	10996319

Focus alcidés et fou de bassan

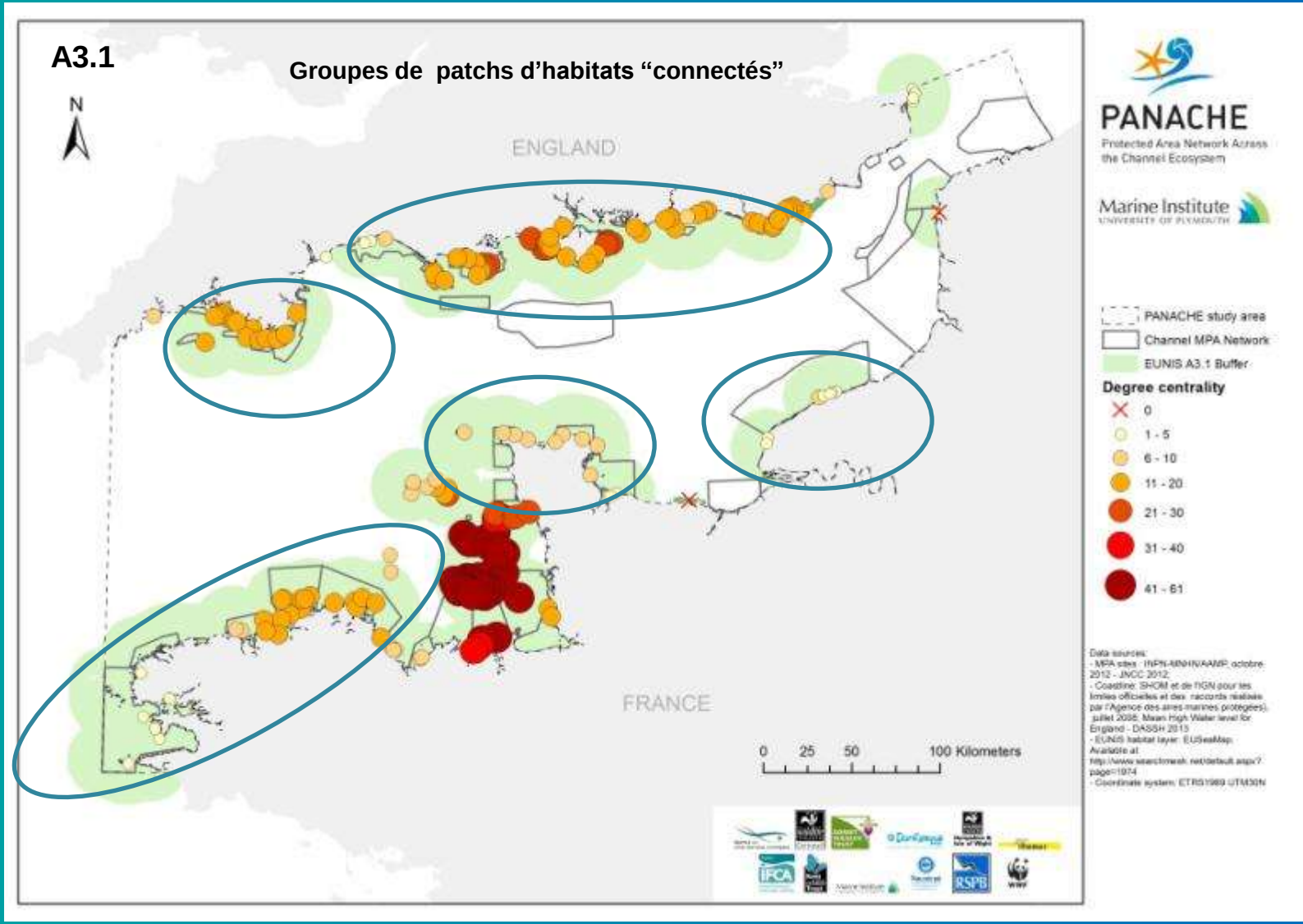




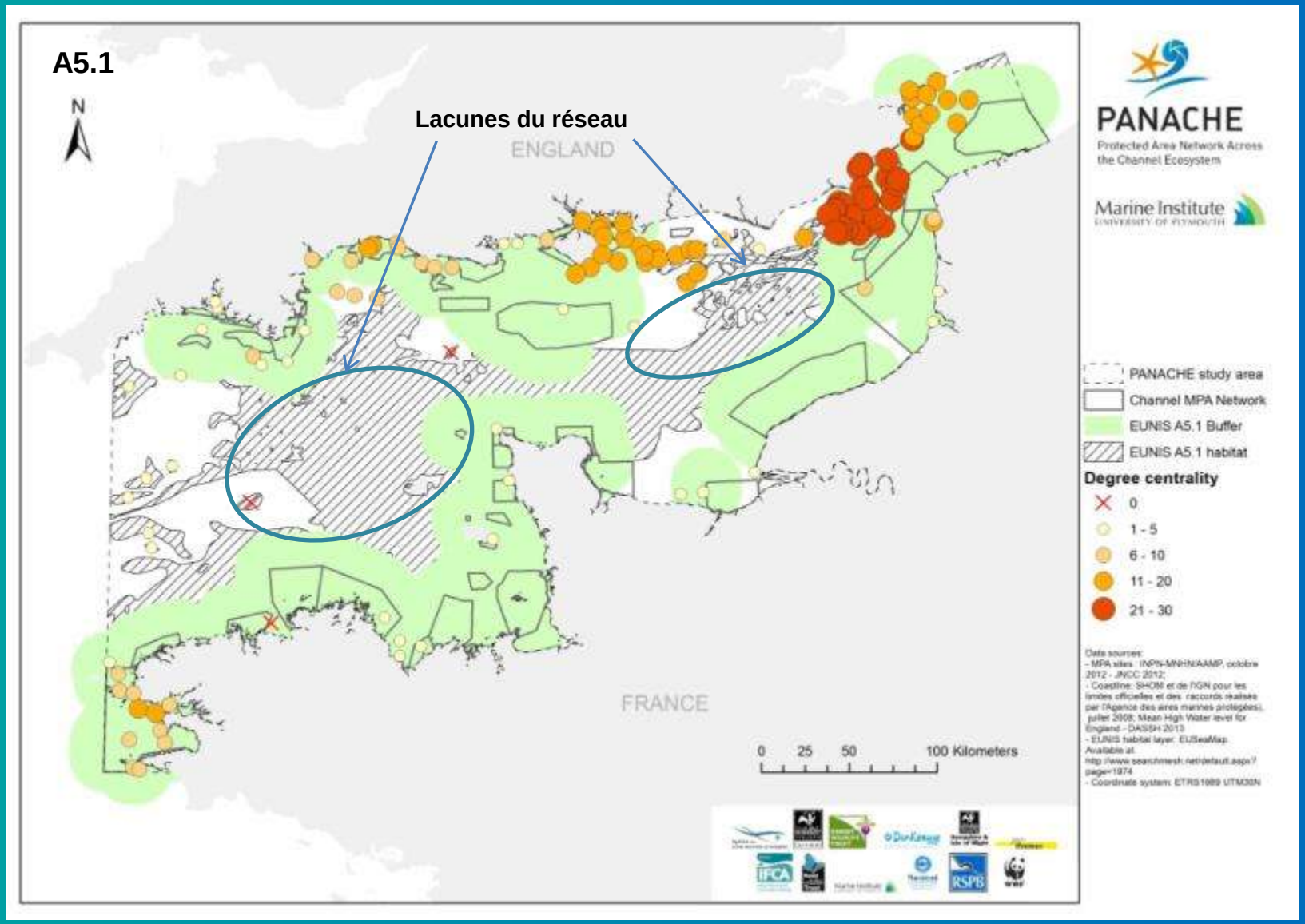
Connectivité « géométrique »



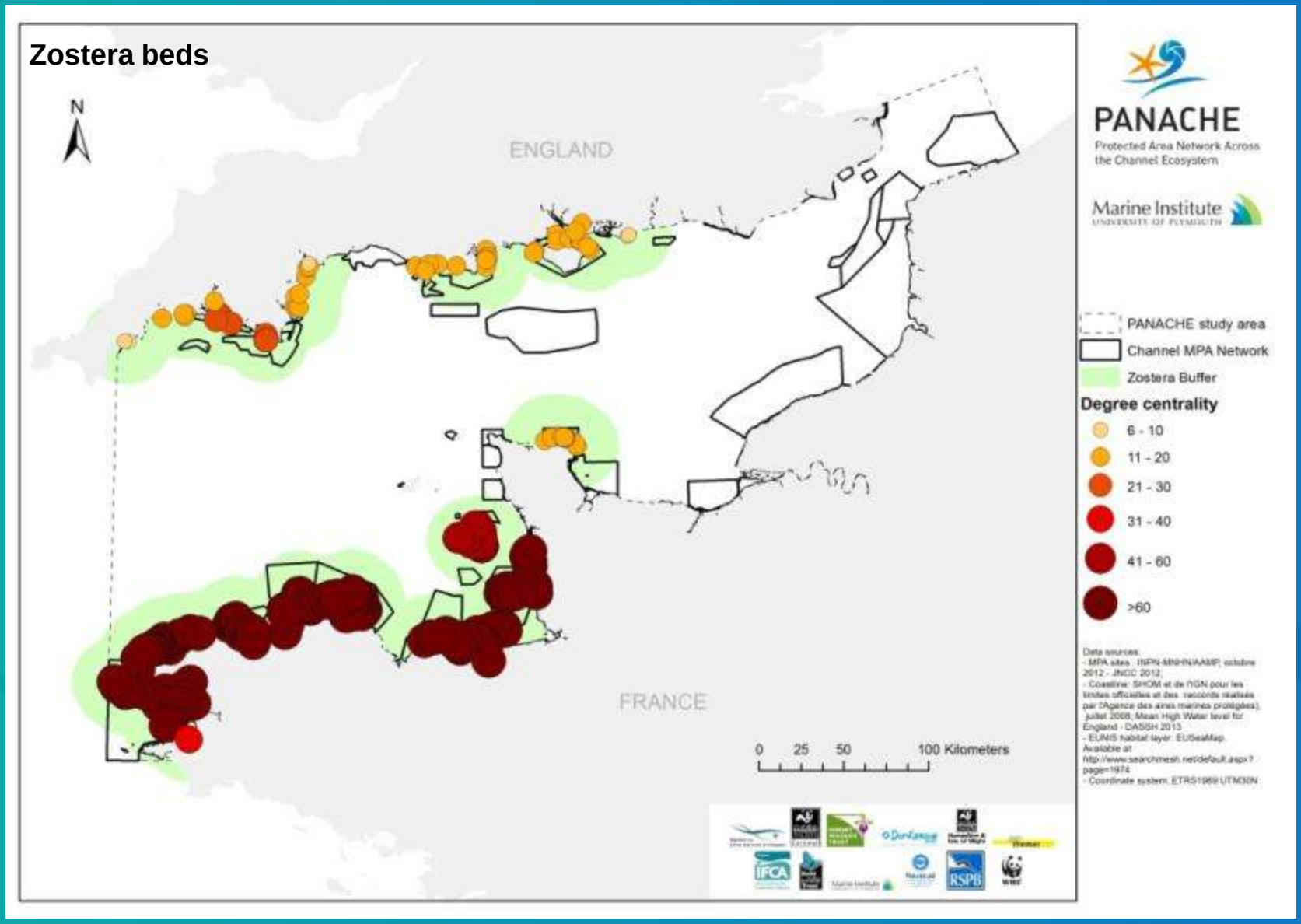
Regroupement d'AMP



Lacunes et biais



Des vrais habitats ?



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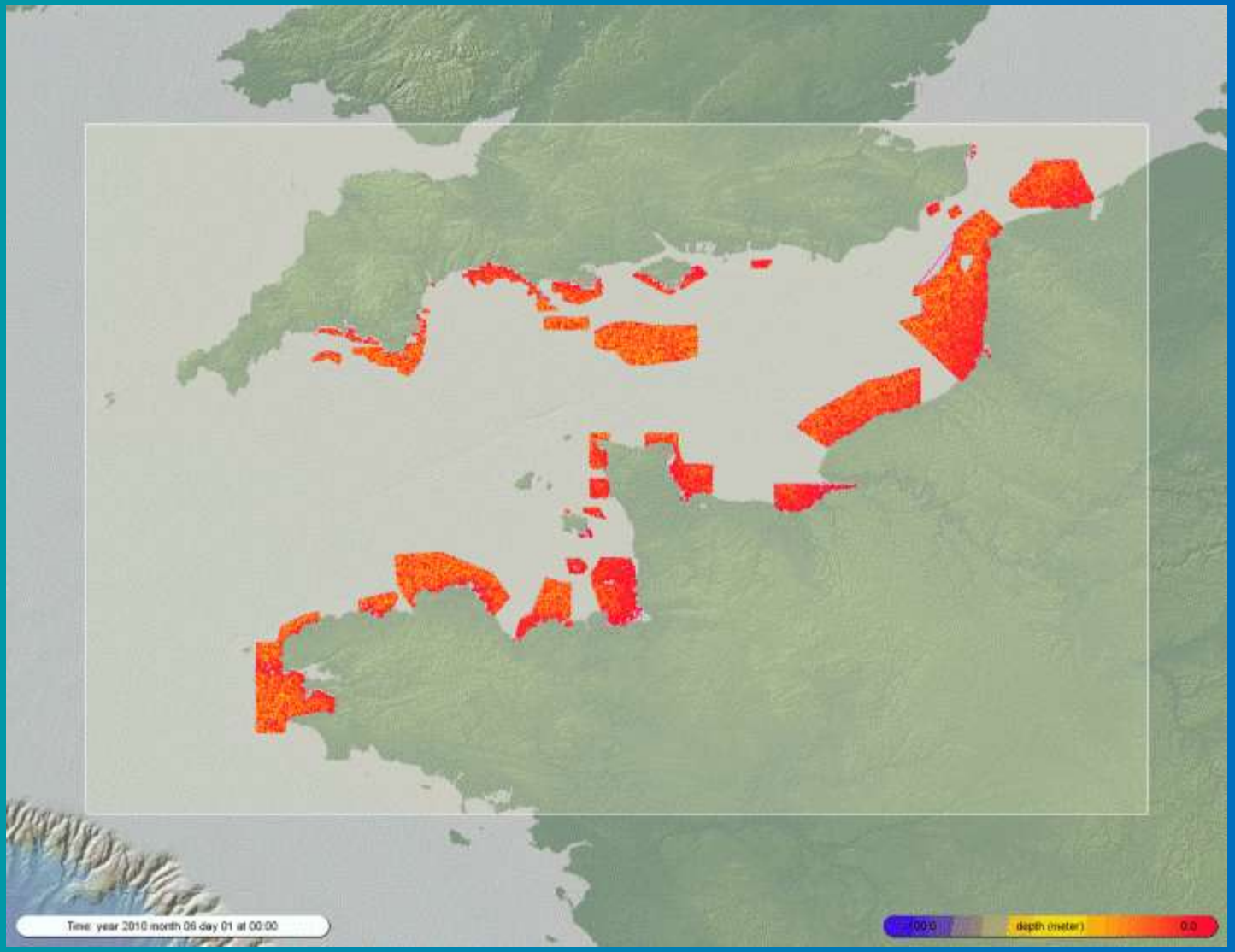
Vraie connectivité : simulation de dérive larvaire

Maquereau

Emission de larves à la surface

26 jours de dérive (passive)



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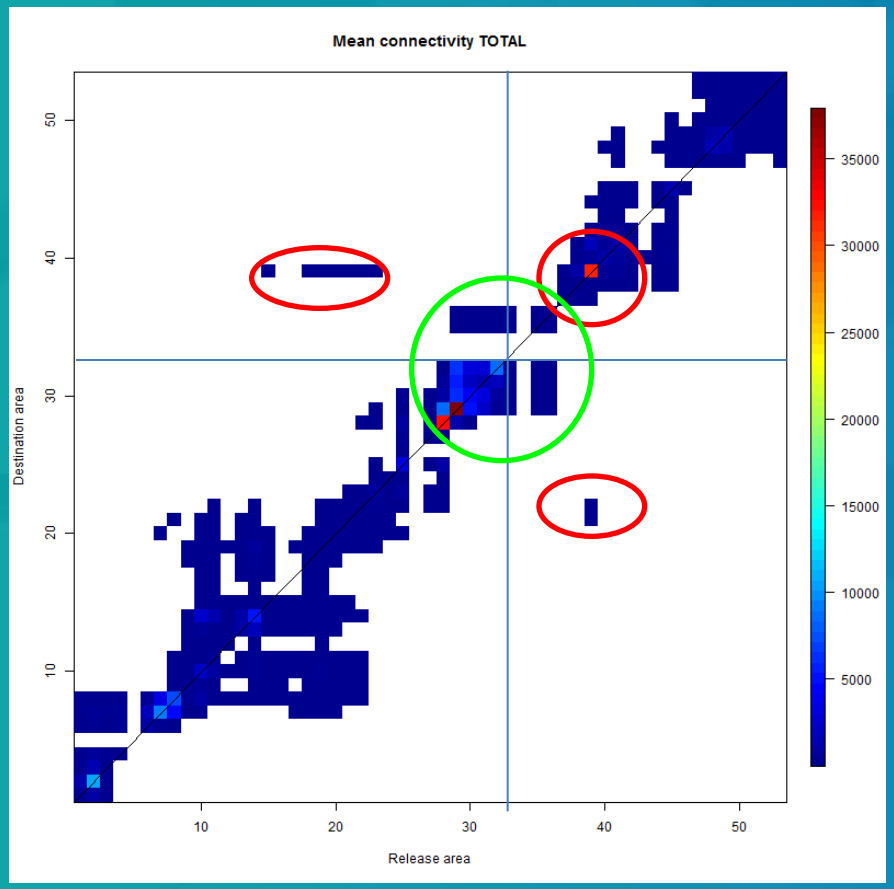
Résultats matrice de connectivité

1. Matrice de connectivité

Connectivité « côtière »

Faible connectivité transfrontalière



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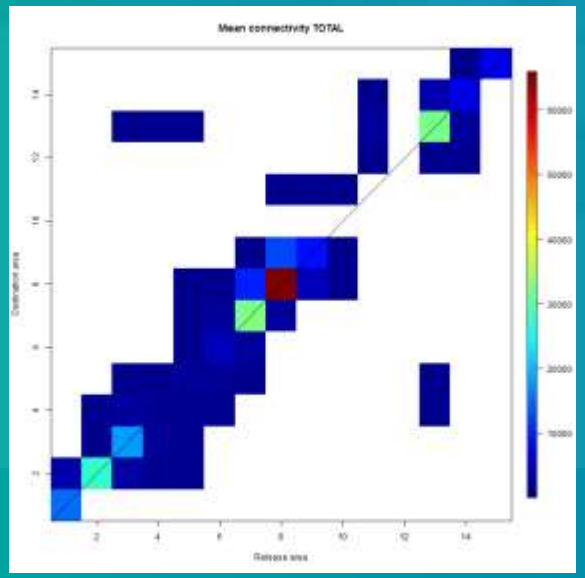
Analyse de regroupements

1. Groupes d'AMP « plus connectées »
2. Possibilités de groupements a priori



Conclusions sur l'évaluation de la cohérence écologique du réseau d'AMP en Manche

Table 20: Summary of the main conclusions of the ecological coherence assessment of the Channel MPA network. Positive results highlighted in green, intermediate results highlighted in yellow and gaps in the network highlighted in red.

Assessment Type & Criteria	Feature	Results
Spatial – representativity	Geographical	• 20% of PANACHE study area within MPA network • 10% of English waters within MPA network • 30% of French waters within MPA network • 3% of Channel Island waters within MPA network • 218 MPAs within 12 nm of shore (inshore) • 4 MPAs beyond 12 nm of shore (offshore) • 16% of western Channel within MPA network • 26% of eastern Channel within MPA network
	Biogeographical	• 24% of Lusitanian-Boreal province within MPA network • 26% of Boreal province within MPA network • 5% of Boreal-Lusitanian province within network • 19% of cool-temperate province within network • 24% of warm-temperate province within network
	Bathymetric	• Only 14% of network occurs in water deeper than 60 m (despite 42% of study area having water deeper than 60 m)
	Marine Mammals and Seabirds	• Gaps in the network were noticeable for offshore or partially offshore species (cetaceans and seabirds with pelagic behaviour)
	Cuttlefish spawning grounds	• Spawning grounds for the cuttlefish well-represented within MPA network along the western Channel and along French coast • Spawning grounds for the cuttlefish poorly-represented within MPAs along the English coastline in the eastern Channel
	Breeding areas for seabirds	• Breeding populations of key bird species adequately represented in French MPAs (with bird specific objectives) • Breeding populations along English coastline occur predominantly outside MPAs or within the boundaries of SACs (no bird specific objectives)
Spatial - replication	EUNIS Level 3 habitats Habitats and species of conservation importance	• Habitats and species occur in 4 to 52 MPAs
Spatial - viability	MPA size Compactness Edge-to-area ratio	• Only 33% of MPAs in the optimal size range of 10-100 km^2 • 40% of MPAs are smaller than 10 km^2 • Only 8 MPAs exceed 1000 km^2 • Network unlikely to support highly mobile or migratory species • Majority of MPAs not circular and have small edge-to-area ratios – less export of individuals
	Size of EUNIS Level 3 habitats	• 79% of habitat patches within the network are 0-10 km^2 in size – only likely to support low mobility species • Just 21% of habitat patches in study area are greater than 10 km^2 – but good proportions of these within network • 67% of 10-100 km^2 patches are within the network and 59% of patches >100km^2 are within the network
Spatial - adequacy	Area of EUNIS Level 3 habitats Area of habitats of conservation importance	• Four habitats have <30% of their area within the MPA network • Six habitats have >30% of their area within the MPA network • 65% of *Zostera* beds occur within the MPA network • 48% of Maerl beds occur within the MPA network
Spatial - connectivity	Connectivity among MPAs Habitat connections Within versus among MPAs Habitats buffers	• MPAs containing the same habitat typically connected to just 2 or 3 other MPAs • Connectivity of habitat patches was found to be greater among MPAs than within MPAs, highlighting potential for replenishment of habitats and species from within the MPA network • Good connectivity among habitats within MPAs along the French and English coasts, respectively • Cross Channel connectivity virtually non-existent

Développements gestion : responsabilité par AMP (SAMM)

AMP	Alcidés	Autres mouettes	Grand labbe	Fulmar boréal	Goélands gris	Goélands noirs	Grands puffins	Mouette pygmée	Océanites	Petits puffins	Mouette tridactyle	Sternes	Fou de Bassan
Estuaires picards : baie de Somme	0.5%	0.2%	0.2%	0.1%	0.5%	0.5%		1.0%	0.0%	0.0%	0.2%	1.5%	0.4%
Estuaire et marais de la basse Seine	0.1%	0.2%	0.2%	0.0%	0.2%	0.2%		0.0%	0.0%	0.0%	0.1%	0.0%	0.1%
Littoral seino-marin	4.4%	5.7%	6.3%	2.9%	4.8%	5.8%		12.2%	0.0%	0.0%	2.2%	2.9%	8.5%
Chausey	0.6%	1.5%	0.2%	0.0%	1.4%	1.2%		0.9%	0.0%	0.0%	0.2%	3.1%	0.1%
Basses vallées du Cotentin et baie	0.1%	0.1%	0.3%	0.1%	0.1%	0.1%		0.1%	0.0%	0.0%	0.1%	0.0%	0.1%
Baie de Seine occidentale	1.2%	1.3%	2.6%	1.3%	1.0%	1.0%		1.1%	0.0%	0.0%	0.9%	0.0%	0.9%
Baie du Mont Saint-Michel	0.2%	1.1%	0.0%	0.0%	0.6%	0.8%		1.8%	0.0%	0.0%	0.1%	0.0%	0.0%
Estuaire de l'Orne	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.1%	0.0%
Falaise du Bessin occidental	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Littoral augeron	0.6%	0.8%	0.7%	0.0%	0.6%	0.5%		0.5%	1.0%	0.0%	0.4%	3.1%	0.4%
Landes et dunes de la Hague	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Hâvre de la Sienne	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Estuaire de la Canche	0.1%	0.1%	0.0%	0.0%	0.1%	0.3%		0.1%	0.0%	0.0%	0.0%	0.0%	0.1%
Platier d'Oye	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Cap Gris-Nez	0.7%	0.9%	0.8%	0.9%	2.5%	4.7%		1.7%	0.0%	0.0%	1.9%	0.0%	3.6%
Bancs des Flandres	1.3%	4.1%	0.0%	0.5%	3.2%	2.9%		5.6%	0.0%	0.0%	2.3%	0.0%	2.4%
Côte de granit - Sept-Iles	0.8%	1.5%	0.6%	0.6%	1.6%	0.3%		0.0%	0.0%	0.0%	0.2%	3.9%	0.9%
Baie de Saint-Brieuc est	0.2%	0.2%	0.0%	0.0%	0.2%	0.1%		0.1%	0.0%	0.0%	0.0%	1.0%	0.0%
Iles de la Colombière, de la Nellière	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.1%	0.0%
Ilôt du Trévors	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Cap Sizun	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Trégor-goëlo	1.1%	2.7%	0.1%	0.1%	1.2%	0.6%		2.0%	0.0%	0.0%	0.2%	0.9%	0.5%
Ouessant-molène	0.2%	0.3%	0.2%	0.3%	1.2%	0.5%		0.1%	0.0%	0.0%	0.1%	1.3%	0.1%
Baie de Morlaix	0.1%	0.5%	0.0%	0.1%	1.0%	0.4%		0.0%	0.0%	0.0%	0.2%	0.0%	0.2%
Cap d'Erquy - cap Fréhel	0.7%	0.7%	0.0%	0.0%	0.6%	0.3%		0.3%	0.0%	0.0%	0.1%	3.0%	0.1%
Baie de Goulven	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Camaret	0.0%	0.0%	0.0%	0.1%	0.1%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Iroise	0.6%	0.7%	0.7%	2.3%	4.8%	1.9%		0.4%	1.1%	0.0%	0.5%	4.1%	0.5%
Estuaires picards et mer d'Opale	6.5%	3.3%	3.9%	1.6%	6.1%	10.8%		10.3%	0.0%	0.0%	3.4%	11.3%	6.8%

Conclusions

- Réseau d'AMP significatif
  - Surtout côtier
  - Obligations communautaires
- Lacunes du réseau (couverture, représentation)
  - Large (espèces pélagiques) -> futures désignations
- Approche transfrontalière
- Développements pour la gestion
  - Liens entre AMP (connectivité – GDR Marco)
  - Responsabilité par AMP
  - Traitements/automatiques bd données (espèces, usages…)