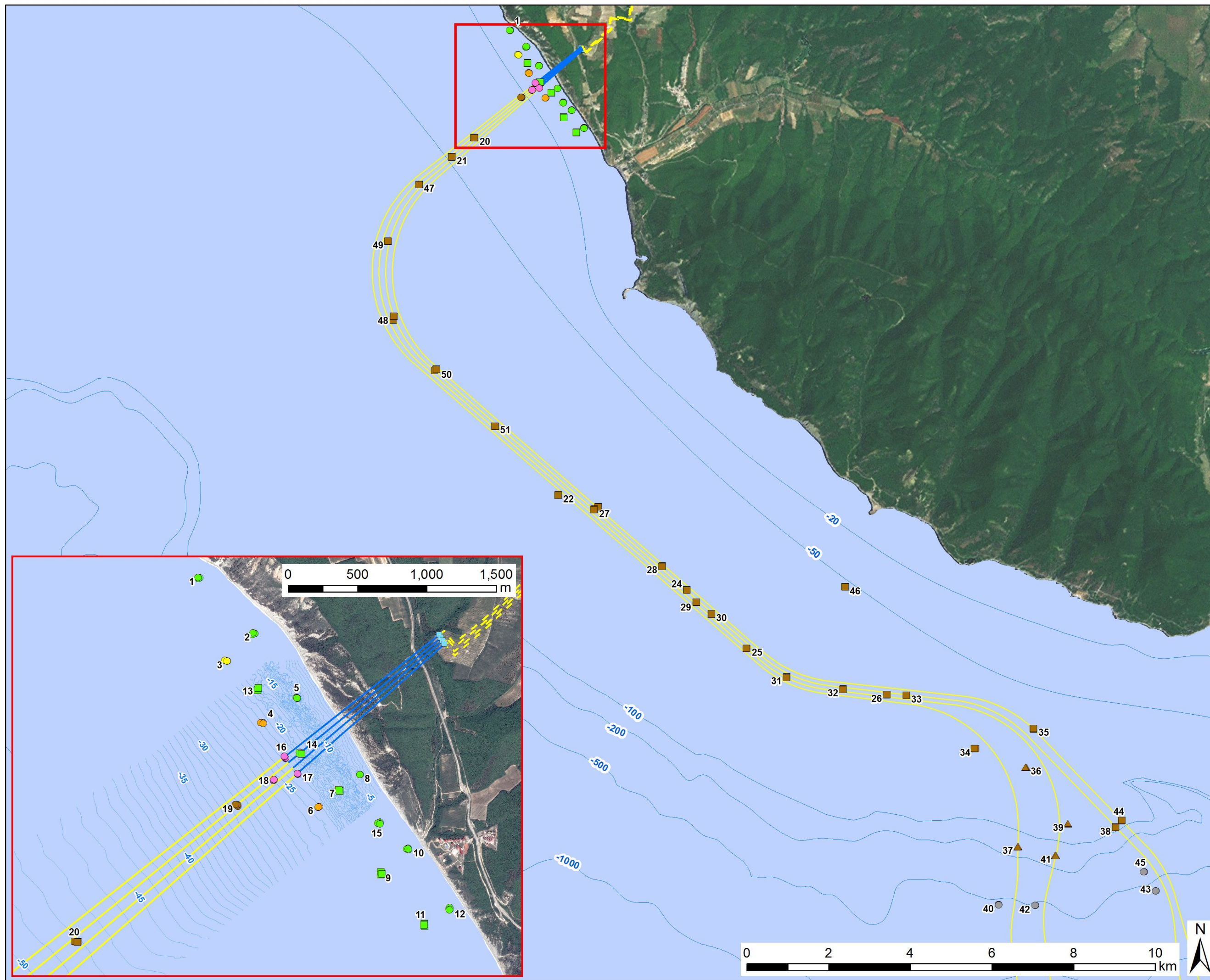


Plot Date: 05 Mar 2014
 File Name: I:\5004 - Information Systems\46369082_South_Stream\MXD\Report Maps - Russian\Russian ES IA v2\Chapter 12 Offshore Sampling\Figure A12.1 Distribution of Benthic Communities.mxd



LEGEND

Community Groups

- Bedrock and boulders with dense algal communities dominated by *Cystoseira* spp. with *Mytilaster lineatus* and *Bittium reticulatum*
- Bedrock and boulders with moderate algal cover, primarily *Codium vermilara*, with *Mytilaster lineatus* and *Bittium reticulatum*
- Coarse sediment (gravel) and sand with burrowing bivalves (particularly *Gouldia minima*)
- Sand with burrowing bivalves (particularly *Chamelea gallina*)
- Mud with burrowing bivalves (*Pitar rudis* and *Chamelea gallina*)
- Mud with infaunal polychaetes and burrowing bivalves (*Terebellides stroemii* and *Parvicardium simile*)
- ▲ Mud with burrowing bivalves and anemones (*Modiolula phaseolina* and *Pachycerianthus solitarius*)
- Anoxic deep sea mud with high levels of hydrogen sulphide and devoid of fauna
- Mixed sediment with burrowing bivalves (particularly *Gouldia minima*)
- Mixed sediment with infaunal polychaetes (particularly *Spio filicornis*)

Russian Sector of South Stream Offshore Pipeline

- Proposed landfall section pipelines
- Proposed microtunnels
- Proposed offshore pipelines
- Microtunnel entry shaft
- Isobaths

Projection: Lambert Conformal Conic

Revision Details				By	Check	Date	Suffix
Purpose of Issue				For Information			
Client							
South Stream		Offshore Pipeline					
Project Title							
SOUTH STREAM OFFSHORE PIPELINE							
Drawing Title							
DISTRIBUTION OF BENTHIC COMMUNITIES							
Drawn	Checked	Approved	Date				
DH	RW	MW	05 Mar 2014				
URS Internal Project No.		Scale @ A3					
46369082		1:85,000					
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Drawing Number							Rev
Figure A12.1							



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1.3.2 The Coastal Zone

The coastal zone is not a clearly demarked area but for the purposes of this assessment, a DMU can be considered as that part of the marine environment with depths of less than 30 m along the coastal margin, in an arc from the eastern entrance to the Straits of Kerch (excluding the straits themselves and the Sea of Azov) southeast to the Georgian border. This is distinct in the benthos that it supports, comprising sand and gravel substrates and areas of seaweed growth. This zone is also one where considerable influence (directly and indirectly) may be exerted by terrestrial processes. This distinction is important for a range of marine organisms, first and foremost seabirds that roost on land and whose habitat range is considerably limited compared to cetaceans and/or pelagic fish.

1.3.3 The Shelf Zone

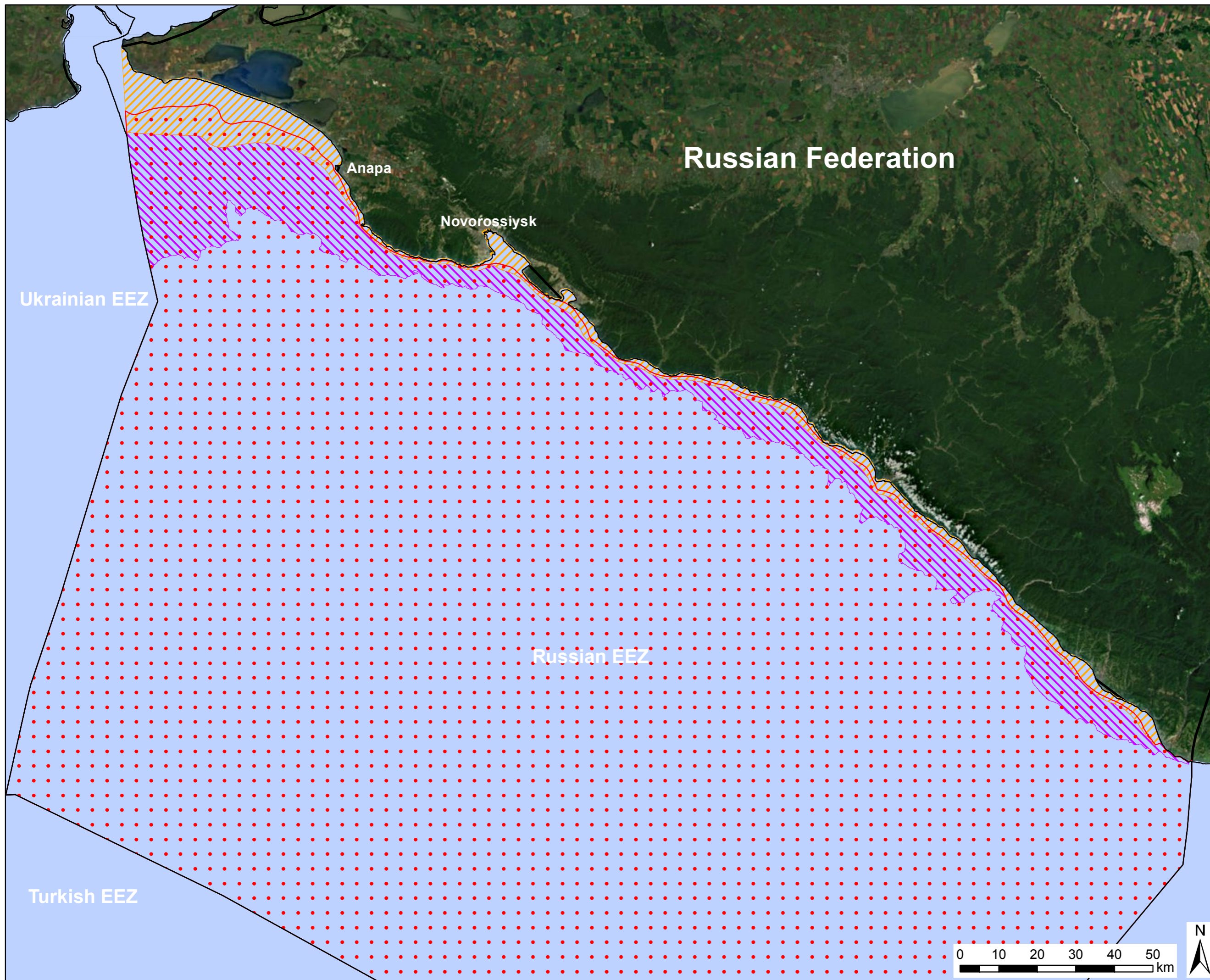
Taking into account the ecological processes that define a DMU, it is appropriate that for a distinction is made between the shelf zone and the immediate coastal zone. The shelf zone can be defined between approximately 30 m and 200 m water depth, characterised by muddy substrates with a variety of bivalve, polychaete and burrowing anemone dominated communities.

1.3.4 The Open Sea

GN64 of IFC's Guidance Note 6 emphasises that "*relatively broad ... seascape units might qualify as critical habitat. The scale of the critical habitat assessment therefore depends on the biodiversity attributes particular to the habitat in question and the ecological processes required to maintain them. A critical habitat assessment therefore must not solely focus on the project site.*"

In the case of the open waters of the Black Sea, where uniform conditions extend over a wide area and species are correspondingly widely dispersed (e.g. cetaceans and some fish species), the DMU is very large and has both ecological and political boundaries. It can encompass the Russian sector of the marine basin in a similar arc to that described above. This DMU overlaps with the other DMUs, but comprises the water column rather than the seabed.

Plot Date: 05 Mar 2014
File Name: I:\5004 - Information Systems\46369082_South_Stream\MXDs\Report Maps - Russia\Russian_EEA\Chapter 12\Figure A12.2\Discrete Management Units.mxd



LEGEND

- Coastal area DMU
- Shelf zone DMU
- Open sea DMU
- Exclusive Economic Zone boundary
- Country boundary

Projection: Lambert Conformal Conic

Revision Details		By	Check	Date	Suffix

Purpose of Issue: For Information

Client: **South Stream**
Offshore Pipeline ENERGISING EUROPE

Project Title: SOUTH STREAM OFFSHORE PIPELINE

Drawing Title: DISCRETE MANAGEMENT UNITS

Drawn	Checked	Approved	Date
DH	RW	MW	05 Mar 2014

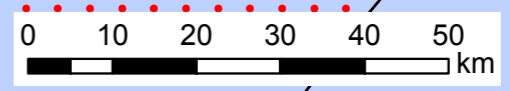
URS Internal Project No. 46369082
Scale @ A3 1:900,000

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Drawing Number	Rev
Figure A12.2	



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2 Methodology

2.1 Criterion 1: Critically Endangered and/or Endangered Species

Footnote 11 of the IFC Performance Standards 6 defines Critically Endangered and/or Endangered Species as species either:

- a) Listed on the International Union for the Conservation of Nature (IUCN) Red List of Threatened Species. The determination of critical habitat based on other listings is as follows: (i) If the species is listed nationally / regionally⁵ as critically endangered or endangered, in countries that have adhered to IUCN guidance, the critical habitat determination will be made on a project by project basis in consultation with competent professionals; and
- b) In instances where nationally or regionally listed species' categorizations do not correspond well to those of the IUCN (e.g., some countries more generally list species as "protected" or "restricted"), an assessment will be conducted to determine the rationale and purpose of the listing. In this case, the critical habitat determination will be based on such an assessment.

Chapter 12 of the Project ESIA identifies globally, nationally and regionally Critically Endangered and Endangered species present within study area. This has been completed with reference to the following:

- IUCN Red List of Threatened Species⁶;
- Bucharest Convention;
- Red Data Book of the Russian Federation (RDBRF)⁷; and
- Red Data Book of the Krasnodar Krai region (RDBKK)⁸.

Both the RDBRF and RDBKK use criteria that correspond well to those of the IUCN, although the resulting classifications use a slightly different nomenclature. Table 2 details the alignment of the three sets of classification. For the purposes of screening for critical habitat, species listed as either endangered (1) on the RDBRF, or Critically Endangered – (1A), Endangered – (1B) on the RDBKK have been included in the assessment.

⁵ According to the IUCN "the word *regional* is used here to indicate any subglobal geographically defined area, such as a continent, country, state, or province."

⁶ Available on-line: <http://www.iucnredlist.org>

⁷ Available on-line: <http://biodat.ru/index.htm>

⁸ Available on-line: <http://www.dprgek.ru/redbook/index-1.htm>

Table A12.2 Comparison of Conservation Status

IUCN*	RDBRF	RDBKK
Extinct in the Wild (EW)	Probably extinct (0)	Probably extinct in the region (0)
Critically Endangered (CR): Facing an extremely high risk of extinction in the wild	Endangered (1)	Disappearing in the wild (1) Critically Endangered – (1A) Endangered – (1B)
Endangered (EN): Facing a very high risk of extinction in the wild		
Vulnerable (VU) Facing a high risk of extinction in the wild	Dwindling in numbers (2)	Vulnerable – (2)
Near Threatened (NT) Close to qualifying for or is likely to qualify for a threatened category in the near future	Rare (3)	Rare (3)
Data Deficient (DD) Inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status.	Uncertain (4)	Requires Further Study (5)
Least Concern (LC) Widespread and abundant taxa are included in this category	Rehabilitated and Recovering (5)	Recoverable (4)

* IUCN. (2012). IUCN Red List Categories and Criteria: Version 3.1. Second edition. Gland, Switzerland and Cambridge, UK: IUCN. iv + 32pp

2.2 Criterion 2: Endemic and/or restricted-range species

IFC’s Performance Guidelines 6 provides the following definitions for Endemic and restricted-range species:

- Endemic species: defined as one that has ≥ 95 percent of its global range inside the country or region of analysis; and

- For marine systems, restricted-range species are provisionally being considered those with an extent of occurrence of 100,000 km² or less.

Species listed in Chapter 12 of the ESIA were screened to identify whether they meet the definition of either endemic or range-restricted species.

2.3 Criterion 3 Migratory and Congregatory Species

IFC Performance Standards 6 Guidance Note defines Migratory and congregatory species in the following way:

- Migratory species:
 - Any species of which a significant proportion of its members cyclically and predictably move from one geographical area to another (including within the same ecosystem).
- Congregatory species:
 - Species whose individuals gather in large groups on a cyclical or otherwise regular and/or predictable basis;
 - Species that form colonies;
 - Species that form colonies for breeding purposes and/or where large numbers of individuals of a species gather at the same time for non-breeding purposes (e.g., foraging, roosting);
 - Species that move through bottleneck sites where significant numbers of individuals of a species pass over a concentrated period of time (e.g., during migration);
 - Species with large but clumped distributions where a large number of individuals may be concentrated in a single or a few sites while the rest of the species is largely dispersed (e.g., wildebeest distributions); and
 - Source populations where certain sites hold populations of species that make an inordinate contribution to recruitment of the species elsewhere (especially important for marine species).

In the marine context, there are several species of fish, birds and cetaceans in the Russian sector of the Black Sea which are known to occur in the Project area and meet one or more of the above criteria.

2.4 Criterion 4 Highly Threatened and/or Unique Ecosystems

IFC Performance Standards 6 Guidance Note defines highly threatened or unique ecosystems as:

- At risk of significantly decreasing in area or quality;
- With a small spatial extent; and/or
- Containing unique assemblages of species including assemblages or concentrations of biome-restricted species.

In the absence of a standardised ecosystem map for the region (as is usual with marine basins) GN93 states that “*depending on the nature and scale of the project type, the client could also use expert opinion to determine the significance, uniqueness and/or rarity of the ecosystem in question with respect to the national, regional and/or international scale*”.

2.5 Criterion 5: Key Evolutionary Processes

Evolutionary processes are often strongly influenced by structural attributes of a region, in the case of the Black Sea, factors such as its isolation and hydrography and climate over a period of time. IFC Performance Standard 6 Guidance Note suggests that this criterion be defined by:

- The physical features of a landscape (or in this case, seascape) that might be associated with particular evolutionary processes; and/or
- Sub-populations of species that are phylogenetically or morphogenetically distinct and may be of special conservation concern given their distinct evolutionary history.

For the purposes of this assessment the Project Area has been screened against the following factors:

- Level of isolation;
- Extent of endemism (Areas of high endemism often contain flora and/or fauna with unique evolutionary histories);
- Spatial heterogeneity;
- Presence of environmental gradients (*ecotones* produce transitional habitat which has been associated with the process of speciation and high species and genetic diversity)⁹;
- *Connectivity* between habitats (e.g., biological corridors); and
- Sites of demonstrated importance to climate change adaptation for either species or ecosystems are also included within this criterion.

GN97 states that “*The significance of structural attributes in a landscape that may influence evolutionary processes will be determined on a case-by-case basis, and determination of habitat that triggers this criterion will be heavily reliant on scientific knowledge. In the majority of cases, this criterion will be triggered in areas that have been previously investigated and that are already known or suspected to be associated with unique evolutionary processes*”. As with Criterion 4, Criterion 5 is usually considered at a relatively fine scale thus the most appropriate unit of analysis is that which may potentially experience direct, primary impacts from the project.

⁹ The black sea basin has oscillated between being freshwater and marine through its geological history. It also has major river inputs as well as shallow brackish enclosed embayments (the Sea of Azov, specifically). Unlike many other seas, it this features several ecotones.

3 Determination

3.1 Criterion 1

The notable species identified by the ESIA as present within the Project Area have been screened to determine whether they are classified as either critically endangered or endangered globally, nationally or regionally. Relatively few species present in the Project Area qualify, as shown below.

Table A12.3 Endangered Species

Species	IUCN	RDBRF	RDBKK
<i>Fish</i>			
Beluga (<i>Huso huso</i>)	CR	1	1A
Russian sturgeon (<i>Acipenser guldenstaedtii</i>)	CR	Not listed	Not listed
Stellate sturgeon (<i>A. stellatus</i>)	CR	Not listed	Not listed
Black Sea salmon (<i>Salmo labrax</i>)	LC	1	7 (Specially Controlled)
<i>Mammals</i>			
Black Sea bottlenose dolphin (<i>Tursiops truncatus ponticus</i>)	EN	3	3
Black Sea harbour porpoise (<i>Phocoena phocoena relicta</i>)	EN	3	2

3.1.1 Sturgeons

The beluga is one of the largest fish in the world, attaining a length of 6 m and a tonne in weight. It is a long-lived species (over 100 years) and slow to mature. Males typically mature at 14-16 years; most females at 19-22 years. It has drastically declined in numbers over most of its range due to habitat loss and poaching. The last sizeable population is in the Caspian Sea, though a small number still occur in the Black Sea.

Russian sturgeon is a very large, slow growing anadromous fish, generally taking ten or more years to mature to a size that may exceed 2 m and 100 kg. The Russian sturgeon is now very rare in the Black Sea basin where almost all of the species' spawning sites have been lost due to dam construction, except in the lower Danube where some spawning still exists but individuals are rare. It is estimated that the species' wild native population has undergone a massive population decline of over 90% in the past few decades.

Stellate sturgeon is a smaller species, generally only less than 10 kg though 50 kg specimens are known (Ref. 12.25). It is less benthic in habit than other sturgeon species and may be encountered at the surface on occasion, though it is by no means an open sea species. It too, has suffered drastic population declines across its range, due to a combination of habitat loss, overfishing and poaching.

Beluga, Russian and stellate sturgeon have been reported on a few single occasions in the Project Area during surveys. There is a lack of published data on sturgeon distribution along the Caucasian coast, but available information suggests that it is unlikely that globally significant populations of these species regularly occur¹⁰ although single individuals probably do; the coastal zone, as defined above therefore qualifies as Tier 2 critical habitat for these species based on criterion 1 (= *supports the regular occurrence of a single individual of a CR species*).

3.1.2 Black Sea salmon

Black Sea salmon spawns in all large mountain rivers all along the Caucasus coast. Because of dams on most of the Black Sea basin's rivers, most returning adults are unable to reach spawning sites and the anadromous population is now rare. The marine phase of the lifecycle is not well understood; the biology of the freshwater form has been more extensively researched. As a result of dam construction (mostly more than three generations ago), it has now what is considered a stable, albeit rare, population and does not qualify for IUCN Threatened or Near Threatened status despite its scarcity. A restocking programme is currently in operation.

This species has been observed in fixed stations in four commercial observation stations near the Project Area. Despite it being listed as endangered in the RDBRF, the scarcity of anadromous specimens makes it unlikely that this area is of regional or national importance (given the larger freshwater population of this species); the coastal and shelf zones, as defined above, do not therefore qualify as a critical habitat for Black Sea salmon. They do not occur in the open / deep sea.

3.1.3 Cetaceans

Black Sea bottlenose dolphins have historically been subject to extensive commercial exploitation for the manufacture of oils, paint, glue, varnish, foodstuffs, medicine, soap, cosmetics, leather, "fish" meal and bone fertilizer. The total number of animals killed is unknown but it is acknowledged by the International Whaling Commission that all Black Sea cetacean populations, including bottlenose dolphins, were greatly reduced by the dolphin fishery. At present, incidental mortality in fishing gear is probably one of the main threats to Black Sea bottlenose dolphin. They are known to be susceptible to capture in a variety of fishing nets, including bottom-set gillnets for turbot, spiny dogfish, sturgeon and sole, purse seines for mullet and anchovy, trammel nets and trap nets. However, only bottom-set gillnets are thought to take significant numbers, especially during the turbot fishing season.

¹⁰ The majority of the world's population of these species resides in the Caspian basin.

Black Sea harbour porpoises inhabit mainly shallow waters (0 to 200 m deep) over the continental shelf around the entire perimeter of the Sea, although they also occur quite far offshore in deep water. Until 1983, unregulated catch was the primary threat and the directed fishery for the porpoise drastically reduced populations. At present, incidental mortality in fishing nets is the most serious threat.

Both these subspecies have been regularly observed in the Project area and it is likely that both the shelf zone and open sea are Tier 2 critical habitat for these species, based on criterion 1 (*Habitat of significant importance to CR or EN species that are wide-ranging and/or whose population distribution is not well understood and where the loss of such a habitat could potentially impact the long-term survivability of the species; habitat containing nationally/regionally important concentrations of an EN, CR or equivalent national/regional listing*) and possibly criterion 2 (*Habitat known to sustain ≥ 1 percent but < 95 percent of the global population of an endemic or restricted-range species where that habitat could be considered a discrete management unit for that species, where data are available and/or based on expert judgment.*).

3.2 Criterion 2 Endemic and/or restricted-range species

Species listed in Chapter 12 of the ESIA were screened to identify whether they meet the definition of either endemic or range-restricted species. No such species were identified (though all Black Sea cetaceans and some pelagic fish belong to Black Sea subspecies, they are catholic across the basin and not endemic to the DMUs or even the wider Russian EEZ). The black sea is approximately 436,400 km² in size and therefore larger than the 100,000 km² guideline definition for range restricted species. This criterion is therefore not considered further in this evaluation.

3.3 Criterion 3 Migratory and Congregatory Species

3.3.1 Fish

Several migratory fish stocks occur in the Project area at various times of the year.

Sprat (*Sprattus sprattus*) stocks spawn in the upper layers of the open waters of the Black Sea off the coast of Russia in water depths between 100-150 m. After spawning, the adults move inshore to their feeding grounds where they form aggregated shoals over the shelf in waters of 20-80 m depth. Major concentrations are found over these feeding grounds on the shelf of the Kerch-Taman region down to Utrish-Anapa and also between Novorossiysk and Arkhipo-Osipovka.

The Azov subspecies of anchovy (*Engraulis encrasicolus maeotica*) feed and spawn in the Sea of Azov during the summer although some remain outside to spawn on the shelf. During autumn they migrate to their wintering grounds, passing down the Caucasian coast to winter in the south near Georgian waters.

Mediterranean horse mackerel (*Trachurus mediterraneus*) spawn and feed in shallow water in the Northern Black Sea during the summer and then move south, overwintering in the area around Sochi and the Georgian shelf. One of their main summer feeding grounds is the shelf around Anapa.

The Black Sea turbot (*Scophthalmus maeoticus*) moves from deeper water in the winter into the shallower zones to spawn and feed during April to September. Protection of this particular stock was one reason for the designation of the Anapa Bank fishery protected area.

It is reasonable to suppose that both the shelf zone and open sea areas qualify as Tier 2 critical habitat based on criterion 3 for these species (*Habitat known to sustain, on a cyclical or otherwise regular basis, ≥ 1 percent but < 95 percent of the global population of a migratory or congregatory species at any point of the species' lifecycle and where that habitat could be considered a discrete management unit for that species, where adequate data are available and/or based on expert judgment.*)

3.3.2 Seabirds

The Black Sea lies within the Mediterranean / Black Sea Flyway and the Caucasian coast forms an important migration route (the Trans-Caucasian Flyway) within this larger zone. Owing to its geographic location and varied landscape, the wider region is ornithologically important. The most significant seabird habitats in the Black Sea are found on the north Coast from the Danube Delta in Romania to the Kerch Strait (north of Anapa).

Mediterranean shearwaters (*Puffinus yelkouan*), cormorants (*Phalacrocorax carbo*), Arctic skua (*Stercorarius parasiticus*) and several species of gull overwinter along the Caucasian coast, but there are no known large permanent colonies of seabirds in the Project area. Other birds known to winter in the area of the North Caucasian coast of the Black Sea include loons and grebes. In general, there is no large grouping of seabirds on the sea surface in the winter (Ref. 12.1).

Several migratory seabird species were recorded during field surveys in the Project area (Table A12.4). While some were relatively abundant, none of the species recorded were observed at significant densities. With the exception of the Mediterranean shearwater, all the species listed are assessed by the IUCN as being of Least Concern, and none are likely to occur in the coastal or open sea DMUs in numbers exceeding 1% of their global populations.

Mediterranean shearwaters, which are listed as Vulnerable by IUCN, are found at the edge of their distribution range along the Caucasian coast and thus are also unlikely to be present in large numbers; the available data suggest that the Western Black Sea is more important with large numbers of non-breeding birds being sighted passing through the Bosphorus¹¹.

¹¹ BirdLife International 2013 <http://www.birdlife.org/datazone/speciesfactsheet.php?id=3937>

Table A12.4 Notable Migratory Seabirds

Species	IUCN	RDBRF	RDBKK
Black-throated loon <i>Gavia arctica</i>	LC	2	Not listed
Mediterranean shearwater <i>Puffinus yelkouan</i>	VU	Not listed	Not listed
Slender-billed gull <i>Chroicocephalus genei</i> (=Larus genei)	LC	Not listed	3
Gull-billed tern <i>Gelochelidon nilotica</i>	LC	2	2
Little tern <i>Sterna albifrons</i>	LC	2	2

Seabird occurrence in the project area is highly variable. A summary of recent survey data is presented below to illustrate this. The data suggest that the occurrence of birds is patchy and generally relatively low level, though dense flocks are observed on occasion.

Table A12.5 Birds Observed During Project Surveys

Species	Ecological Status in NE Black Sea	Density (birds/km ²)		
		Nov 2010	April 2011	July 2013
Black-throated loon <i>Gavia arctica</i>	Wintering	0.13	5.2	0
Mediterranean shearwater <i>Puffinus yelkouan</i>	Wintering	3.67	12.6	11.5
Mediterranean gull <i>Larus melanocephalus</i>	Breeding and wintering ¹²	0.09	2.1	0
Little gull <i>Larus minutus</i>	Wintering	0.98	23.4	0
Black-headed gull <i>Larus ridibundus</i>	Wintering	2.07	3.6	<0.1
Caspian Gull <i>Larus cacchianans</i>	Wintering	4.56	9.1	6.9
Lesser black-backed gull <i>Larus fuscus</i>	Wintering	0	1.6	0
Arctic skua <i>Stercorarius parasiticus</i>	Wintering (occasional)	0	1.0	<0.1

Continued...

¹² Some of the Black sea population winters locally, though mostly in the Mediterranean.

Species	Ecological Status in NE Black Sea	Density (birds/km ²)		
		Nov 2010	April 2011	July 2013
Sandwich tern <i>Sterna sandvicensis</i>	Nesting and wintering ¹² Resident sub-adults	0.07	16.2	<0.1
Great-crested grebe <i>Podiceps cristatus</i>	Migratory and wintering	0	138.2	<0.1
Red-necked grebe <i>Podiceps grisegena</i>	Migratory and resident	0	15.9	0
Black-necked grebe <i>Podiceps nigricollis</i>	Migratory and wintering	0	9.1	0
Common cormorant <i>Phalacrocorax carbo</i>	Breeding and wintering	0	63.7	<0.1
Widgeon <i>Anas penelope</i>	Wintering	0	3.5	0
Garganey <i>Anas querquedula</i>	Wintering	0	2.6	0
Total:		11.57	307.8	18.70

Complete.

Because the area under consideration cannot be considered a "site" per se, application of IBA and Ramsar criteria is problematic.

If the project area is considered, data suggest that it does not meet the 1% global or biogeographic population criteria, and those small dense flocks of birds are occasionally observed, it is unlikely to exceed the 20,000 bird threshold specified in IBA's criterion A4iii (*Site known or thought to hold, on a regular basis, 20,000 waterbirds or 10,000 pairs of seabirds of one or more species*). However, the very large scale of the DMUs in this case means that it is reasonable to suppose that these numbers might be exceeded for the entire coastal area and thus there is the potential for it to qualify as Critical Habitat under IFC Criterion 3. It should nonetheless be stressed that this is an artefact of the size of the DMU, rather than a real reflection of the conservation importance of the area to birds per se.

IBA / Ramsar sites do exist in the vicinity, though outside the marine DMUs. These are discussed separately in Chapter 12 of the ESIA and the associated terrestrial critical habitats evaluation.

3.3.3 Cetaceans

The migration patterns of Black sea cetaceans are poorly understood and it is therefore not possible at this stage to assign critical habitat under this criterion; however, as previously stated the shelf zone and open sea DMUs qualify under criteria 1 and 2 for these species.

3.4 Criterion 4 Highly Threatened and/or Unique Ecosystems

As described in Chapter 12 of the ESIA, the marine habitats and communities identified in the marine surveys are:

- In shallow waters, where hard substrates are present (rock, cobbles or pebbles) macroalgal communities are found. There is a distinct zonation of algal communities in the Survey Area, with distinct low, mid and lower macrophytal communities at different depth ranges;
- In water depths between 19 and 27 m a variety of sediment types are found including sand, mixed and coarse sediments. The communities in these areas are dominated by infaunal organisms, predominantly burrowing bivalves such as *Gouldia minima* and *Chamelea gallina* and infaunal polychaetes including *Spio filicornis*;
- Beyond 33 m water depth the seabed consists of muddy sediments which support communities of burrowing bivalves and infaunal polychaetes; and
- Muddy sediments were also found at stations in much deeper water, (below 365 m), but at these depths the sediments are completely devoid of fauna.

These habitats are widespread and typical of the Black Sea (and similar, though less diverse, to some found in other European seas) thus do not meet the requirements for Criterion 4 in the Project area of influence.

3.5 Criterion 5: Key Evolutionary Processes

The Black Sea basin is of significant interest in terms of evolutionary processes. It supports several endemic marine species and subspecies that have evolved in semi-isolation since its connection to the Mediterranean (the Black Sea has been, variously in its history, a valley, a freshwater lake and a sea). It is also of interest from a palaeo-ecological perspective, as the evolution of plankton communities and their record in marine sediments is of considerable value to climate change research¹³.

In terms of marine biodiversity, the key features of interest in the Black Sea basin in this context include:

- Deep sea microbial chimneys found in the North-western region;
- Extensive dense fields of Phyllophora as exemplified, particularly "Zhernov's field" in the Ukraine;
- Brackish biota and communities associated with major river inflows, particularly the Danube and its delta and the Sea of Azov; and

¹³ Coolen M. J. L., Orsi W. D., Balkema C., Quince C., Harris K., Sylva S. P., Filipova-Marinova M., Giosan L. (2013) Evolution of the plankton paleome in the Black Sea from the Deglacial to Anthropocene *Proceedings of the National Academy of Sciences*. 2013 May 6; **110(21)**: 8609-8614.

- The presence of wide ranging subspecies of pelagic fish and cetaceans as previously described.

However, at a local scale, the marine habitats identified are widespread and do not represent particular ecotones, corridors or "oases" that exemplify or are exceptionally important to evolutionary processes (see section 1.3.1 and ESIA chapter 13) and hence do not qualify as critical habitat under this criterion.

4 Conclusion

1. Because the project footprint has been shown to intersect critical habitats, the IFC requires that the following be demonstrated (as stated in Paragraph 17 of PS6): *No other viable alternatives within the region exist for development of the project on modified or natural habitats that are not critical.* Because of the scale of the project and the wide distribution range of species such as dolphins and porpoises, any pipeline in the Black Sea would intersect critical habitat and thus there is no alternative available;
2. *The project does not lead to measurable adverse impacts on those biodiversity values for which the critical habitat was designated, and on the ecological processes supporting those biodiversity values.* The EISA demonstrates that marine ecological impacts are likely to be moderate at worst, with no reduction in biodiversity (beyond very localised and temporary impacts and not to critical habitat features) or any substantial change to ecological processes;
3. *The project does not lead to a net reduction in the global and/or national/regional population of any Critically Endangered or Endangered species over a reasonable period of time.* The EISA demonstrates no population level impact to protected or rare species; and
4. *A robust, appropriately designed, and long-term biodiversity monitoring and evaluation program is integrated into the client's management program.* The project has committed to a programme of comprehensive ecological monitoring that will include the features pertinent to critical habitats. Given that the potential impacts of the project to mammals and birds are low (see **Chapter 13 Marine Ecology**) then implementation of monitoring represents a biodiversity benefit, by strengthening the scientific basis on which conservation programmes may be based, thereby enhancing their value. This meets the expectation that *the project's mitigation strategy will be described in a Biodiversity Action Plan and will be designed to achieve net gains¹⁴ of those biodiversity values for which the critical habitat was designated.*

¹⁴ PS6 states that "Net gains are additional conservation outcomes that can be achieved for the biodiversity values for which the critical habitat was designated".