South Stream
Offshore Pipeline
ENERGISING EUROPE

Appendix 11.1: Critical Habitat Determination

Table of Contents

Tables

Figures

1 Introduction

This Appendix provides an assessment of Critical Habitat applicable to the Russian Landfall Section of the South Stream Project and is based on the baseline information provided by **Chapter 11 Terrestrial Ecology.** The ESIA Report was informed by stakeholder engagement, an extensive literature review and in-field data collection. This process has completed the first two steps of Critical Habitat determination, as specified in paragraphs GN67 and GN68 of the International Finance Corporation (IFC) Guidance Note 6[1]. Therefore, the scope of this report is limited to step 3 as defined in paragraph GN79 Critical Habitat Determination.

Critical Habitat determination relating to marine habitats is covered within **Chapter 12 Marine Ecology**.

1.1 Definition of Critical Habitat

Critical Habitat is defined in Paragraphs 16 of the 2012 version of IFC Performance Standard 6 (PS6)[2] as areas with high biodiversity value. This includes areas that meet one or more of following criteria:

1. Criterion 1: Critically Endangered (CR) and/or Endangered (EN) species;
2. Criterion 2: Endemic and/or restricted-range species;
3. Criterion 3: Migratory and/or congregatory species;
4. Criterion 4: Highly threatened and/or unique ecosystems; and
5. Criterion 5: Key evolutionary processes.

However, as specified by paragraph GN56 of IFC Guidance Note 6, the determination of Critical Habitat can include other recognised high biodiversity values which are to be evaluated on a case-by-case basis. Paragraph GN56 provides the following seven examples:

- Areas required for the reintroduction of CR and EN species and refuge sites for these species (habitat used during periods of stress (e.g., flood, drought or fire));
- Ecosystems of known special significance to EN or CR species for climate adaptation purposes;
- Concentrations of Vulnerable (VU) species in cases where there is uncertainty regarding the listing, and the actual status of the species may be EN or CR;
- Areas of primary/old-growth/pristine forests and/or other areas with especially high levels of species diversity;
- Landscape and ecological processes (e.g., water catchments, areas critical to erosion control, disturbance regimes (e.g., fire, flood)) required for maintaining critical habitat;

[1] IFC (2012) Guidance Note 6 Biodiversity Conservation and Sustainable Management of Living Natural Resources

[2] IFC (2012) Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources

- Habitat necessary for the survival of keystone species; and
- Areas of high scientific value such as those containing concentrations of species new and/or little known to science.

1.2 Gradient of Critical Habitat

IFC Guidance Note 6 recognises that there are gradients of Critical Habitat based on relative vulnerability (degree of threat) and irreplaceability (rarity or uniqueness). For Criteria 1-3 listed in Section 1.1, quantitative thresholds are provided to assign Critical Habitat into either Tier 1 or Tier 2. Table 1 details the relevant thresholds.

Table 1 Quantitative thresholds for Tiers 1 and 2 of Critical Habitat Criteria 1 - 3

Criteria	Tier 1	Tier 2
1. Critically Endangered (CR)/ Endangered (EN) Species	(a) Habitat required to sustain ≥10% of the global population of a CR or EN species/subspecies where there are known, regular occurrences of the species and where that habitat could be considered a discrete management unit for that species. (b) Habitat with known, regular occurrences of CR or EN species where that habitat is one of 10 or fewer discrete management sites globally for that species.	(c) Habitat that supports the regular occurrence of a single individual of a CR species and/or habitat containing regionally- important concentrations of a Red-listed EN species where that habitat could be considered a discrete management unit for that species/ subspecies. (d) 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. (e) As appropriate, habitat containing nationally/regionally important concentrations of an EN, CR or equivalent national/regional listing.
2. Endemic/ Restricted Range Species	(a) Habitat known to sustain ≥95% of the global population of an endemic or restricted-range species where that habitat could be considered a discrete management unit for that species (e.g., a single-site endemic).	(b) Habitat known to sustain ≥1% but <95% 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.

Continued…

Criteria	Tier 1	Tier 2
3. Migratory/ Congregatory Species	(a) Habitat known to sustain, on a cyclical or otherwise regular basis, ≥95% of the global population of a migratory or congregatory species at any point of the species' lifecycle where that habitat could be considered a discrete management unit for that species.	(b) Habitat known to sustain, on a cyclical or otherwise regular basis, ≥1% but <95% 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. (c) For birds, habitat that meets BirdLife International's Criterion A4 for congregations and/or Ramsar Criteria 5 or 6 for Identifying Wetlands of International Importance. (d) For species with large but clumped distributions, a provisional threshold is set at ≥5% of the global population for both terrestrial and marine species. (e) Source sites that contribute ≥1% of the global population of recruits.

Complete.

Where estimates for a species population are not available, the analysis of Critical Habitat is based on the concept of Area of Occupancy (AOO). This is defined by the International Union for Conservation of Nature (IUCN) as the area within its 'extent of occurrence', which is occupied by a taxon, excluding cases of vagrancy[3]. It is recognised as a useful proxy for population size, because there is generally a positive correlation between AOO and population size. AOO is calculated by multiplying number of occupied tetrads in a uniform grid that covers the entire range of a taxon by the size of the tetrad.

AOO = no. occupied tetrad x area of an individual tetrad.

Neither IFC Performance Standards nor Guidance Note 6 define what constitutes a nationally / regionally important concentration. However, as Tier 1 Critical Habitat under Criterion 1 is defined by ≥10% of the global population of a CR or EN species, Tier 2 Critical Habitat has been defined by ≥10% of the national/regional population of a CR or EN species.

[3] IUCN Standards and Petitions Subcommittee. 2013. Guidelines for Using the IUCN Red List Categories and Criteria. Version 10. Prepared by the Standards and Petitions Subcommittee.

For the majority of species, the main source of information used to obtain AOO has been the Red Data Book of Krasnodar Krai (RDBKK)[4]. This has mapped the known distribution within Krasnodar Krai on a 10 km grid.

1.3 Unit of Analysis

The scale at which the Critical Habitat determination takes places depends on underlying ecological processes for the habitat in question and is not limited to the footprint of the project. Paragraph GN65 of IFC's Guidance Note 6 states that for Criteria 1-3, the determination of Critical Habitat should be based on a discrete management unit (DMU) which is an area that has a definable boundary within which the biological communities have more in common with each other than they do with those outside the boundary. Paragraph GN65 goes on to provide the following additional guidance on the selection of the DMU:

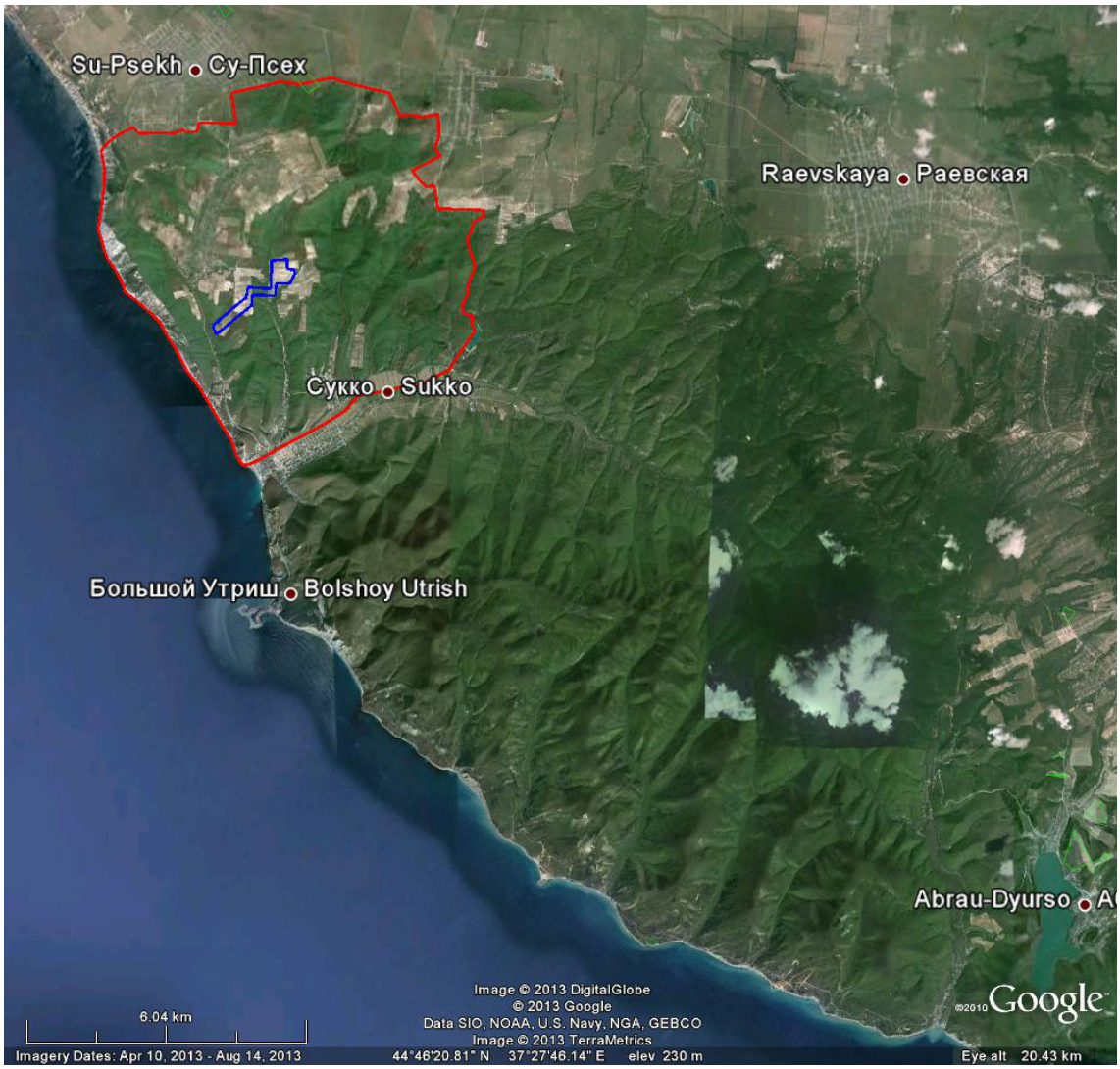
'A discrete management unit may or may not have an actual management boundary (e.g., legally protected areas, World Heritage sites, KBAs, IBAs, community reserves) but could also be defined by some other sensible ecologically definable boundary (e.g., watershed, interfluvial zone, intact forest patch within patchy modified habitat, seagrass habitat, coral reef, concentrated upwelling area, etc.). The delineation of the management unit will depend on the species (and, at times, subspecies) of concern'.

Figure 3 shows the results of habitat mapping completed by the World Wildlife Fund (WWF) (Williams et al., 2006)[5]. It shows that the low-mountain landscapes with oak and pine forests and juniper open woodlands on the Abrau Peninsula are isolated from tracts of similar habitat located to the east. This can also be seen from aerial photographs (Figure 1) where woodland forms a largely continuous block on the Abrau Peninsula, becoming fragmented around the periphery by agricultural and urban land uses within the surrounding lowlands. The Russian Landfall Section is situated between the settlements of Anapa and Sukko, in an area of highly fragmented natural habitats, modified agricultural habitats and former agricultural land that has reverted to a semi-natural state (Figure 1). These habitats form a complex matrix, which are not easy to separate for the purposes of Critical Habitat determination, especially as many of the relevant species are found in more than one habitat type. The area is largely separated from the main block of intact woodland habitats on the Abrau Peninsula by the town of Sukko, as well as associated roads and farmed areas. The area includes a number of small watersheds of tributary streams of the Sukko River. The landfall section falls outside the Utrish State Nature Reserve boundary, which includes a large area of intact woodland that covers much of the Abrau peninsula. Therefore the boundary of the Landfall DMU includes a reasonably well defined block of fragmented woodland, bounded by the town of Sukko to the south and lowland agricultural habitats to the north. The sea forms the western boundary and a steep river valley the eastern boundary (Figure 1). The DMU covers 43.5 km^2.

[4] Available online: http://www.dprgek.ru/redbook/index-1.htm

[5] Williams, L., Zazanashvili, N., Sanadiradze, G. and Kandaurov A. (2006) An Ecoregional Conservation Plan. WWF Caucasus Programme Office

Figure 1 Aerial Photograph of the Abrau Peninsula (Blue line = Russian Landfall, red line = DMU)



2 Methodology

2.1 Criterion 1: Critically Endangered and/or Endangered Species

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

1. Listed on the 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 / regionally[6] 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
2. 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 11 Terrestrial Ecology identifies globally, nationally and regionally Critically Endangered and Endangered species that are likely to be present within the Project's Study Area. This has been completed with reference to the following:

- IUCN Red List of Threatened Species;[7]
- Red Data Book of the Russian Federation (RDBRF);[8] and
- Red Data Book of Krasnodar Krai (RDBKK)

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) and Endangered (1B) on the RDBKK have been included in the assessment.

[6] According to the IUCN "the word *regional* is used here to indicate any sub-global geographically defined area, such as a continent, country, state, or province." IUCN. (2012). Guidelines for Application of IUCN Red List Criteria at Regional and National Levels: Version 4.0. Gland, Switzerland and Cambridge, UK: IUCN. iii + 41pp

[7] Available online: http://www.iucnredlist.org

[8] Available online: http://biodat.ru/index.htm

Table 2 IUCN, RDBRF and RDBKK classification

IUCN*	RDBRF	RDBKK
Extinct in the Wild (EXW)	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.	Undefined by status (4)	Lack of data (5)
Least Concern (LC) Widespread and abundant taxa are included in this category	Recovers and restores (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 Guidance Note 6 provides the following definitions for Endemic and restricted-range species:

- Endemic species: defined as one that has ≥ 95% of its global range inside the country or region of analysis;
- Restricted-range species:
    - *For terrestrial vertebrates, a restricted-range species is defined as those species which have an extent of occurrence of 50,000 km^2 or less;*
    - *For marine systems, restricted-range species are provisionally being considered those with an extent of occurrence of 100,000 km^2 or less;*
    - *For freshwater systems, standardized thresholds have not been set at the global level. However an IUCN study of African freshwater biodiversity applied thresholds of 20,000 km2 for crabs, fish, and mollusks and 50,000 km^2 for odonates (dragonflies and damselflies). These can be taken as approximate guidance, although the extent to which they are applicable to other taxa and in other regions is not yet known; and*
    - *For plants, restricted-range species may be listed as part of national legislation. Plants are more commonly referred to as "endemic" and the definition provided in paragraph GN79 would apply.*

Species listed in **Chapter 11 Terrestrial Ecology** were screened to identify whether they meet the definition of either endemic and / or range-restricted species. This was completed with reference to published sources and in liaison with experts.

Criterion 1 and 2 are addressed at the same time in Section 3 of this Report.

2.3 Criterion 3: Migratory and Congregatory Species

IFC Guidance Note 6 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); or
- 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).

For birds, habitat that meets BirdLife International's Criterion A4 for congregations and/or Ramsar Criteria 5 or 6 for Identifying Wetlands of International Importance meet the Tier 2 classification for Critical Habitat.

Chapter 11 Terrestrial Ecology identifies a number of migratory bird species that have been recorded within the Study Area.

2.4 Criterion 4: Highly Threatened and/or Unique Ecosystems

IFC Guidance Note 6 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.*

A working group has been established by the IUCN to develop a system of quantitative categories and criteria, analogous to those used for species, for assigning levels of threat to ecosystems at local, regional, and global levels (Rodriguez et al., 2011)[9]. Full details of the proposed system are set out in Annex A. In summary they are based on four main criteria:

A: Short-term decline in distribution or function (over 50 years);

B: Long-term decline in distribution or function (over 500 years);

C: Small current distribution and decline (in distribution or ecological function) or very few locations; and

D: Very small current distribution.

Due to lack of evidence of ecological change, the very long time frame involved and the inherent large amount of uncertainty resulting from this, it is not practical to estimate changes over the last 500 years. Therefore, only criteria A, C and D have been used for the assessment of Critical Habitat. Ecosystems that fall within the Study Area and meet the definition of EN or CR according to Rodriguez *et al.,* 2011 are assumed to meet Criterion 4 for Critical Habitat. For some habitat types, data on distribution and quality are lacking. In these instances estimates

[9] Rodriguez, J.P., K. M. Rodriguez-Clark, J.e.M. Baillie, N. Ash, J. Benson, T. Boucher, C. Brown, N.D. Burgess, B. Collen, M. Jennings, D.A. Keith, E. Nicholson, C. Revenga, B. Reyers, M. Rouget, T. Smith, M. Spalding, A. Taber, M. Walpole, I. Zager, and T. Zamin. 2011. Establishing IUCN red list criteria for threatened ecosystem. Conservation Biology 25:21-29.

have been made based on available evidence and levels of protection (e.g. habitats specifically protected by law, or proportion of habitat types occurring within protected areas).

2.5 Criterion 5: Key Evolutionary Processes

Evolutionary processes are often strongly influenced by structural attributes of a region, such as its topography, geology, soil and climate over period of time. IFC Guidance Note 6 suggests that this criterion is defined by:

- *The physical features of a landscape 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.*

Guidance Note 6 also provides the following examples of spatial features that are associated with evolutionary processes:

- *Level of isolation (e.g., islands, mountaintops, lakes are associated with populations that are phylogenetically distinct.);*
- *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);*
- *Edaphic interfaces; and*
- *Connectivity between habitats (e.g., biological corridors).*

The Project Area is situated on the western tip of the Greater Caucasus Range which extends from the Black Sea almost to the Caspian.[10] The Caucasus is among 34 biodiversity hotspots in the world which has been identified by Conservation International as collectively supporting 50% of the world's plant species and 42% of all terrestrial vertebrate species.[11] Therefore, the Caucasus as a whole can be considered to be a key area for evolutionary processes. The Caucasus hotspot cover 580,000 km^2 including all of Armenia, Azerbaijan and Georgia, the North Caucasus portion of the Russian Federation, north-eastern Turkey and part of north-western Iran. The Caucasus biodiversity hotspot supports 1,600 endemic plant species, two threatened endemic mammal species and two threatened amphibian species.[12]

[10] Andrew W. Tordoff, Nugzar Zazanashvili, Maka Bitsadz2, Karen Manvelyan, Elshad Askerov, Vladimir Krever, Sedat Kalem, Başak Avcıoğlu, Siranush Galstyan and Roman Mnatsekanov CEPF Investment in the Caucasus Hotspot.

[11] Mittermeier, R.A., P. Robles-Gil, M. Hoffmann, J. Pilgrim, T. Brooks, C.G. Mittermeier, J. Lamoreaux & G.A.B. da Fonseca (eds.) (2004). Hotspots Revisited: Earth's Biologically Richest and Most Endangered Terrestrial Ecoregions. CEMEX, Monterrey; Conservation International, Washington D.C.; and Agrupación Sierra Madre, Mexico, pp390.

[12] http://www.conservation.org/where/priority_areas/hotspots/europe_central_asia/Caucasus/Pages/default.aspx.

The Critical Ecosystem Partnership Fund (CEPF) has completed an extensive GIS based study on the distribution of endemic and threatened species to identify 205 priority sites with the hotspot (Williams, 2003[13]). A secondary analysis was completed, which identified ten priority corridors that were based on intact rivers and landscapes, natural mountain passes, known migratory corridors and areas with spatial heterogeneity that could serve as stepping stones for many species. Due to the broad scope and detail included in the CEPF analysis, it has been included as part of the determination of Critical Habitat under Criterion 5. Criterion 5 is usually considered at a relatively fine scale[14] and thus the most appropriate unit of analysis is that which may potentially experience direct, primary impacts from the project. Therefore, the site-specific characteristics within the Project Area are also taken into account.

[13] Williams, L. (Ed) (2003) Ecosystem Profile: Caucasus Biodiversity Hotspot.

[14] The Biodiversity Consultancy Ltd. (2010) IFC Performance Standard 6 Critical Habitat Assessment of the Rio Tinto Simandou Project (Mine Component). Unpublished document of: quoted in ESIA Appendix 2 Oyu Tolgoi Project Critical Habitat Assessment: IFC Performance Standard 6/ EBRD Performance Requirement 6 (2012).

3 Critical Habitat Determination

3.1 Criteria 1 and 2

Species identified by Chapter 11 of the ESIA as being likely to be present within the Study Area have been screened to identify species that are classified as either Critically Endangered or Endangered globally, nationally or regionally. Table 3 lists the species identified along with their IUCN, RDRF, and RDBKK assessment. The species' status as being either endemic or range restricted is also shown.

Table 3 Landfall Endangered Species

Species	IUCN	RDBRF	RDBKK	Endemic	Restricted Range
Plants					
Fern-leaved speedwell *Veronica filifolia*	Not assessed	1	1B	Yes	Yes
Etruscan honeysuckle *Lonicera etrusca*	Not assessed	3	1B	No	No
Stinking juniper *Juniperus foetidissima*	LC	2	1B	No	No
Greek juniper *Juniperus excelsa*	LC	2	1B	No	No
Rindera tetraspis	Not assessed	Not assessed	1	No	No
Mt. Atlas mastic tree *Pistacia mutica*	Not assessed	3	1	No	No
Invertebrates					
Weevil sp. *Lixus canescens*	Not assessed	Not listed	1B	No	No
Yellow-banded skipper *Pyrgus sidae*	Not assessed	Not listed	1B	No	No
Levantine skipper *Thymelicus hyrax*	Not assessed	Not listed	1B	No	Possibly
Moth sp. *Zygaena laeta*	Not assessed	Not listed	1A	No	No

Continued…

Species	IUCN	RDBRF	RDBKK	Endemic	Restricted Range
Moth sp. *Jordanita chloros*	Not assessed	Not listed	1B	No	No
Moth sp. *Lemonia ballioni*	Not assessed	Not listed	1B	No	No
Reptiles					
Nikolski's tortoise *Testudo graeca nikolskii*	CR	1	1B	No	Yes
Glass lizard *Pseudopus apodus*	Not assessed	Not listed	1B	No	No
Birds					
Short-toed snake eagle *Circaetus gallicus*	LC	2	1A	No	No
Booted eagle *Aquila pennata*	LC	Not listed	1B	No	No
Woodlark *Lullula arborea*	LC	Not listed	1B	No	No

Complete.

3.1.1 Fern-leaved speedwell *Veronica filifolia*

Fern-leaved speedwell *Veronica filifolia* has been classified as Endangered in both the RDBKK and RDBRF. The species has not been assessed by the IUCN. Fern-leaved speedwell is endemic to Krasnodar Krai and not found elsewhere in the world. Its known distribution occurs within the Abrau Peninsula and within the coastal mountains to the east. According to the RDBKK, it has been recorded within eight 10 km tetrads, giving an AOO of 800 km^2.

The species can grow on strongly eroded soils in rocky habitats. It is found in association with a number of vegetation types including mountain-steppe communities, juniper and oak-juniper woodlands, 'shiblyak' and on coastal cliffs. The DMU (43.5 km^2) represents approximately 5% of the species' global AOO. The DMU is unlikely to support more than 5% of the global population of this species, as it is situated on the edge of the core distribution of suitable habitat within the Abrau Peninsula and includes approximately 25% unsuitable modified habitat (e.g. vineyards). The DMU could however support >1% of the global population of this endemic species.

Therefore, DMU qualifies as Tier 2 Critical Habitat under Criterion 2 for *Veronica filifolia* as it could support >1% of the global population of this endemic species.

3.1.2 Etruscan honeysuckle *Lonicera etrusca*

Etruscan honeysuckle *Lonicera etrusca* has been assessed as Endangered by the RDBKK and Rare by the RDBRF. The IUCN has not assessed the species. Globally it has a wide distribution including central and Eastern Europe, North Africa and South-West Asia. Therefore, the species is neither endemic nor range restricted. In Russia, the species is limited to Krasnodar Krai, where Etruscan honeysuckle has a similar distribution as fern-leaved speedwell, with half its known distribution occurring on the Abrau Peninsula. According to the RDBKK, it has been recorded within seven 10 km tetrads, giving an AOO of 700 km^2.

The species forms part of the shrub layer in a range of vegetation communities including juniper, pistachio-juniper, and juniper-oak open woodlands. It has been found in pistachio communities; *Pinus pityusa, Quercus pubescens* forests; on maritime precipices, in 'shiblyak' and does not avoid secondary habitats. The DMU (43.5 km^2) represents approximately 6% of the species' AOO within Krasnodar Krai.

The DMU does not qualify as Critical Habitat under Criteria 1 or 2 for *Lonicera etrusca*.

3.1.3 Stinking Juniper Juniperus foetidissima

Stinking juniper *Juniperus foetidissima* has been assessed as Endangered by the RDBKK, Vulnerable by the RDBRF and of Least Concern by the IUCN. The plant species is found in Southern and South-East Europe, South-West Asia (Turkey, Lebanon, North, Northwest of Iran) and the Caucasus (Georgia, Armenia). Therefore, the species is neither endemic nor range restricted. In Russia, the species is found both within Krasnodar Krai and Dagestan. Within Krasnodar Krai is it found within the Abrau Peninsula and neighbouring coastal areas to the southeast. According to the RDBKK, it has been recorded within eleven 10 km tetrads, giving an AOO of 1,100 km^2.

It grows on dry rocky slopes, on limestone outcrops, and strongly eroded brown soils. It often grows in association with other *Juniperus* species, although usually at lower densities. For the Black Sea coast of the Caucasus, the general ratio of *Juniperus foetidissima* to *Juniperus excelsa* in numbers is approximately 1:7. The DMU (43.5 km^2) represents approximately 4% of the species' AOO within Krasnodar Krai.

The DMU does not qualify as Critical Habitat under Criteria 1 or 2 for *Juniperus foetidissima*.

3.1.4 Greek Juniper Juniperus excelsa

Greek juniper *Juniperus excelsa* has been assessed as Endangered by the RDBKK, Vulnerable by the RDBRF and of Least concern by the IUCN. The plant species is found in Southern and South-Eastern Europe, the Mediterranean and South-West Asia (Turkey, Western Syria, Lebanon). Therefore, the species is neither endemic nor range restricted. In Russia the species is found in Krasnodar Krai and Dagestan. Within Krasnodar Krai, *Juniperus excelsa* has a very similar distribution to *Juniperus foetidissima* with which it often grows. According to the RDBKK, it has been recorded within ten 10 km tetrads, giving an AOO of 1,000 km^2. The DMU (43.5 km^2) represents approximately 4% of the species' AOO within Krasnodar Krai. Therefore, DMU does not qualify as Critical Habitat under Criteria 1 or 2 for *Juniperus excelsa*.

3.1.5 Rindera tetraspis

Rindera tetraspis has been classified as Endangered by the RDBKK. The species has not been assessed by either the RDBRF or IUCN. The species occurs in Eastern Europe, Central Asia and the Caucasus. The species is widespread in Russia, including its European part, Western Siberia; Altai Krai and Altai Republic and the North Caucasus. Therefore, the species is neither endemic nor range restricted. Within Krasnodar Krai, the species has a limited distribution including Lysaya Mountain, near Varvarovka, the vicinity of Supsekh village, between Anapa and Sukko and the Maliy Utrish. According to the RDBKK, it has been recorded a single 10 km tetrad, giving an AOO of 100 km^2.

The species can grow on a range of soil types and in association with a range of vegetation types. The DMU (43.5 km^2) represents 43.5% of the species' AOO within Krasnodar Krai. Therefore, DMU qualifies as Tier 2 Critical Habitat under Criterion 1 for *Rindera tetraspis* as habitat containing regionally important concentrations of an EN or equivalent regional listing.

3.1.6 Mt. Atlas mastic tree *Pistacia mutica*

Mt. Atlas mastic tree *Pistacia mutica* has been assessed as Endangered by the RDBKK and Rare by the RDBRF. The IUCN has not assessed the species. Globally the species is found in the Eastern Mediterranean, South-West Asia (Iran, Turkey), Eastern Europe (Crimea) and the Caucasus (Armenia, Azerbaijan). Therefore, the species is neither endemic nor range restricted. In Russia, the species is only found within Krasnodar Krai. According to the RDBKK, it has been recorded within seven 10 km tetrads, giving an AOO of 700 km^2.

Pistacia mutica is a long lived species, possibly up to 1,000 years. The species is drought-resistant and grows on dry marl calcareous southern slopes up to height 100-150 m above sea level. Mt. Atlas mastic tree plant communities are considered to be a transitional link between shiblyak and maquis vegetation. The DMU (43.5 km^2) represents approximately 6% of the species' AOO within Krasnodar Krai. Therefore, the DMU does not qualify as Critical Habitat under Criteria 1 or 2 for *Pistacia mutica*.

3.1.7 Weevil sp. Lixus canescens

The weevil species *Lixus canescens* has been assessed as Endangered by the RDBKK. It has not been assessed by the RDBRF or by the IUCN. Globally, the species is found in southern Ukraine and the North Caucasus, as well as Moldova and northern Romania (Volonik, 2007[15]). Within Russia, the species is found within the Volgograd Province, Orenburg, Dagestan and the Stavropol Territory. Therefore, the species is not endemic and unlikely to be range restricted. Within Krasnodar Krai, the species is limited to a narrow strip of the Black Sea coast. According to the RDBKK, it has been recorded within six 10 km tetrads, giving an AOO of 600 km^2.

Both of the adults and larvae feed on *Crambe* and other Brassicaceae species of plant (Volonik, 2007). The DMU (43.5 km^2) represents approximately 7% of the species' AOO within Krasnodar

[15] Volonik, S.V. (2007) On distribution and ecology of some species of cleonines (Coleoptera, Curculionidae): IV. Genus Lixus F., subgenus Eulixus Reitt. Entomological Review November 2007, Volume 87, Issue 7, pp 840-847

Krai. Therefore, the DMU does not qualify as Critical Habitat under Criteria 1 or 2 for *Lixus canescens*.

3.1.8 Yellow-banded Skipper *Pyrgus sidae*

Yellow-banded skipper *Pyrgus sidae* has been assessed as Endangered by the RDBKK. It has not been assessed by the RDBRF or by the IUCN. Globally, the species is found in southern and Eastern Europe including France Italy, Bulgaria, Greece and Romania. The species is also found in Central Asia and Kazakhstan. In Russia the species is found in Volgograd, Saratov, Ulyanovsk, areas of Bashkiria and Kabardino-Balkaria. Therefore, the species is not endemic and unlikely to be range restricted. According to the RDBKK, it has been recorded within nine 10 km tetrads, giving an AOO of 900 km^2.

The species is found in the glades in xeromorphic forests and *Juniperus* woodland where larval food plants (Malvaceae and Rosaceae) occur. The DMU (43.5 km^2) represents approximately 5% of the species' AOO within Krasnodar Krai. Therefore, the DMU does not qualify as Critical Habitat under Criteria 1 or 2 for *Pyrgus sidae.*

3.1.9 Levantine Skipper *Thymelicus hyrax*

Levantine skipper *Thymelicus hyrax* has been assessed as Endangered by the RDBKK. It has not been assessed by the RDBRF or by the IUCN. The global distribution of the species includes Lebanon, the Balkans and the Caucasus. It has recently been discovered in Russia, where it is isolated from the core distribution, with the nearest other population in Turkey. Within Russia it is confined to the Abrau Peninsula. According to the RDBKK it has been recorded within four 10 km tetrads, giving an AOO of 400 km^2.

The species is found in the glades in xeromorphic forests and *Juniperus* woodland. The larvae feed on grasses and are associated with *Achnatherum bromoides*. The DMU (43.5 km^2) represents approximately 11% of the species' AOO within Krasnodar Krai. Therefore, the DMU qualifies as Tier 2 Critical Habitat under Criterion 1 for *Thymelicus hyrax* as it supports regionally important concentrations of an EN species where that habitat could be considered a discrete management unit for that species.

Although the species has a relatively small global range, it is unlikely that the DMU supports in excess of 1% of the species' global population and therefore does not qualify as Tier 2 Critical Habitat under Criterion 2.

3.1.10 Moth sp. Jordanita chloros

The moth species *Jordanita chloros* has been assessed as Endangered by the RDBKK. It has not been assessed by the RDBRF or by the IUCN. The global distribution of the species includes South West and Eastern Europe (including the Balkans and Crimea), Asia Minor, the Eastern Mediterranean, Transcaucasia and Eastern Kazakhstan. In Russia, it is known from the Povolzhya and Altai. Therefore, the species is not endemic and unlikely to be range restricted. Within Krasnodar Krai, the species occurs relatively widely on the Taman Peninsula, the Abrau Peninsula and also further south on the Black sea coastline. According to the RDBKK, it has been recorded within fifteen 10 km tetrads, giving an AOO of 1,500 km^2.

The species occurs in xerophytic grassland within glades and edges of woodland. Caterpillars mine leaves of large Asteraceae, mostly cornflower *Centaurea.* The DMU (43.5 km^2) represents approximately 3% of the species' AOO within Krasnodar Krai. Therefore, the DMU does not qualify as Critical Habitat under Criteria 1 or 2 for *Jordanita chloros*.

3.1.11 Moth sp. Lemonia ballioni

The moth species *Lemonia ballioni* has been assessed as Endangered by the RDBKK. It has not been assessed by the RDBRF or by the IUCN. Globally the species occurs in the Crimea, the North-West Caucasus, Armenia, Azerbaijan and Asia Minor. Therefore, the species is not endemic and unlikely to be range restricted. Within Russia, the species is only found along the Black Sea coast of Krasnodar Krai. According to the RDBKK, it has been recorded within eleven 10 km tetrads, giving an AOO of 1,100 km^2.

The larval food plants are Compositae (Asteraceae), especially *Scorzonera mollis*. The DMU (43.5 km^2) represents approximately 4% of the species' AOO within Krasnodar Krai. Therefore, the DMU does not qualify as Critical Habitat under Criteria 1 or 2 for *Lemonia ballioni*.

3.1.12 Nikolski's Tortoise Testudo graeca nikolskii

Nikolski's tortoise *Testudo graeca nikolskii* is assessed as Endangered by the RDBKK and the RDBRF. The IUCN currently assesses Nikolski's tortoise as a Critically Endangered sub-species. Globally, Nikolski's tortoise only occurs along the Black Sea shore of Krasnodar Krai and western Georgia, with a total range of less than 8,500 km^2. Therefore, the species is not endemic solely to Russia, but it is range-restricted. Within Krasnodar Krai the species is found on the Taman Peninsula, from Anapa, Novorossiysk, Tuapse, Sochi and father to the south to the Pitsunda Reserve. Mazanaeva et al., (2009)[16] provide 29 known locations based on published literature and field research (Figure 2). The two most important areas with the most favourable conditions are associated with mountains (the Navagir Ridge, Mounts Doob, Tkhachegochuk and Mikhailovka, and coastal mountains from the Pshada River to the Jubka).

A recent study modelled the distribution and densities of Nikolski's tortoise within the Abrau Peninsula based on suitable habitat and micro-climate (Leontyeva *et al.,* 2012[17]). This produced an estimate of 5000-6000 adults (assumed to be in excess of 10 years of age). However, more recent surveys recorded over 7000 adults and therefore the total population is likely be significantly higher than this (O. Leontieva 2013, pers. comm.).

Pestov and Leontyeva[18] (2011) calculated a range of population densities for different habitat types based on over 300 km of transects completed from 2007-2011 on the Abrau Peninsula:

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[16] Mazanaeva, L.F., Orlova, V.F., Iljina, E.V. and. Starkov, V.G. (2009) Distribution and Status of Mediterranean Tortoise (*Testudo graeca* Linnaeus, 1758) in Russia. Published in Zazanashvili, N. and Mallon, D. (Editors) 2009. Status and Protection of Globally Threatened Species in the Caucasus. Tbilisi: CEPF, WWF. Contour Ltd., 232 pp.

[17] Leontyava, O.A., Pereshkolnik, S.L., Pestov, M.V. and Sichevskij, Je. A. (2012) Status and problems of protection of *Testudo graeca Nikolskii* at the Abrau Peninsula

[18] Pestov, MA and Leontyeva, O. (2011). Evaluation of the current population state of *Testudo graeca nikolskii* in the State Nature Reserve Utrish

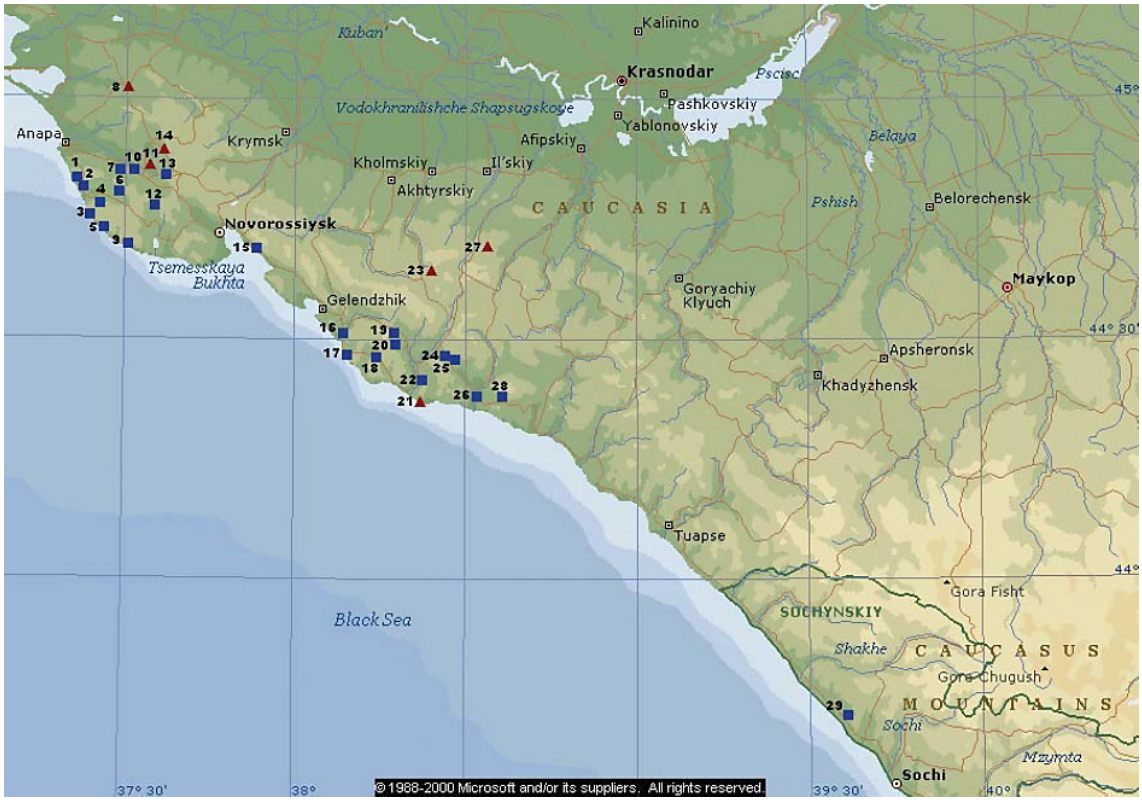
- *Juniperus* woodland – 1.95 – 2.85 individuals/ha;
- Open steppe – 2.2 individuals/ha; and
- Shiblyak / mesophilic forest – 0.1 – 1.6 individuals/ha.

The species shows a strong preference for partially open areas that have low slopes (less than 20^{o} slope) with south or south westerly aspects, up to 100 m above sea level. These areas are selected for egg-laying where the high temperatures promote development. Similar habitat is selected for hibernation where they are less likely to suffer cold temperatures. However, during the hottest period in the summer (July/August) the tortoises undergo aestivation where they seek the cooler denser areas of woodland. During the spring following hibernation the tortoises will venture into adjacent cultivated areas (vineyards) to bask and feed on herbaceous weeds. Following disturbance from cultivations and removal of weed cover, these areas are then avoided.

The Abrau Peninsula potentially supports 20-30% of the global population of *Testudo graeca nikolskii* (O. Leontieva et al., 2013). The DMU contains a range of habitat types that are likely to support differing densities of tortoises. However, it would be reasonable to assume that the population of tortoises within the DMU exceeds 0.1 individuals/ha, or a total of 435. Based, on existing global population estimates, this could represent between 6-8% of the global population. The DMU represents approximately 17% of the total area of 255 km^2 of potentially suitable habitat on the Abrau Peninsula. Assuming that the DMU includes habitat of similar suitability to the rest of the Abrau Peninsula, this would provide an estimate of between 3-5% of the global population.

Based on these estimates, the DMU qualifies as Tier 2 Critical Habitat for *Testudo graeca nikolskii* under Criterion 1 as it supports the regular occurrence of a single individual of a CR species (but probably less than 10% of the global population). The DMU also qualifies as Tier 2 Critical Habitat for *Testudo graeca nikolskii* under Criterion 2 and the habitat known to sustain ≥1% of the global population of a restricted-range species where that habitat could be considered a discrete management unit for that species.

Figure 2 Distribution of Nikolski's tortoise in Russia



(Source: Mazanaeva et al., 2009)

3.1.13 Glass lizard Pseudopus apodus

Glass lizard *Pseudopus apodus* has been assessed as Endangered by the RDBKK. It has not been assessed by the RDBRF or by the IUCN. Its global range covers the Eastern Mediterranean, the Crimea, the Caucasus, Middle Asia, the Near East and Asia Minor. In Russia the species is found in the Krasnodar Krai, Chechnya, Kalmykia and Dagestan. Therefore, the species is not endemic and unlikely to be range restricted. Within Krasnodar Krai, the species is found along much of the Black Sea coast. According to the RDBKK, it has been recorded within twelve 10 km tetrads, giving an AOO of 1,200 km^2.

The DMU supports a small proportion of the Russian and approximately 3.5% of the AOO within the Krasnodar Krai. Therefore, the DMU does not qualify as Critical Habitat for *Pseudopus apodus* under Criteria 1 or 2.

3.1.14 Short-toed Snake Eagle *Circaetus gallicus*

Short-toed snake eagle *Circaetus gallicus* is assessed as Critically Endangered by the RDBKK, Vulnerable by the RDBRF and of Least Concern by the IUCN. The species has a very large

breeding range including much of Europe, Morocco and Algeria in North Africa, the Middle East and Central Asia. The species migrates to sub-Saharan Africa and India for winter[19]. Therefore, the species is neither endemic nor range restricted. The species has a wide, albeit fragmented distribution within Krasnodar Krai. There is evidence to suggest that the Krasnodar Krai breeding population has increased in recent years. In 2002, the Krasnodar Krai breeding population was estimated to be 6-8 pairs (Mnatsekanov and Tilba, 2002[20]). The species colonised the Abrau Peninsula during the 1990s. Belik and Babkin (undated) first recorded the species in the lower Ozereyka river area in 1998. The species is now relatively frequent on the Abrau Peninsula with between 5-7 pairs recorded in the Sukko Valley during 2009. According to the RDBKK, it has been recorded within thirty eight 10 km tetrads, giving an AOO of 3,800 km^2.

A study from similar habitats in Greece (Bakaloudis *et al.,* 2008[21]), showed that short-toed eagles often use southern slopes for nesting and nest-sites are often located on the upper third of each slope. Nest trees also tend to be located close to rain water gullies, to the boundary of a different habitat type, and to the nearest forest opening greater than 0.5 ha. Nest-sites tend to be located in large trees, areas away from human disturbance.

The DMU (43.5 km^2) represents approximately 1% of the species' AOO within Krasnodar Krai. Therefore, the DMU does not qualify as Critical Habitat under Criteria 1 or 2 for *Circaetus gallicus.*

3.1.15 Booted Eagle Aquila pennata

Booted eagle *Aquila pennata* is assessed as Endangered by the RDBKK and of Least Concern by the IUCN. It has not been listed by the RDBRF. The species has a large global breeding distribution including North Africa, Southern and Eastern Europe and Asia. Booted Eagle migrates to Africa and the Indian sub-continent to winter[22]. Therefore, the species is neither endemic nor range restricted. The species has a relatively scattered distribution within Krasnodar Krai. According to the RDBKK, it has been recorded within twenty 10 km tetrads, giving an AOO of 2,000 km^2. The species colonised the Abrau Peninsula during the 20th century. However, by 2006-2009, the species was recorded regularly and small numbers of pairs are thought to breed (Belik and Babkin, undated). These are likely to be located within the Utrish State Nature Reserve to the south of the DMU. The DMU (43.5 km^2) represents approximately 2% of the species' AOO within Krasnodar Krai. Therefore, the DMU does not qualify as Critical Habitat under Criteria 1 or 2 for *Aquila pennata.*

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[19] BirdLife International 2012. *Circaetus gallicus*. In: IUCN 2013. IUCN Red List of Threatened Species. Version 2013.1. <www.iucnredlist.org>. Downloaded on 04 August 2013.

[20] Мнацеканов Р.А., Тильба П.А. Змееяд (Circaetus gallicus) в Краснодарском крае // Биол. разноо-бразие Кавказа: Труды II регион. конф. - Сухум, 2002. - С.153-162.

[21] Bakaloudis, D., C. Vlachos, N. Papageorgiou & G. Holloway. 2001. Nest site habitat selected by Short-toed Eagle (Circaetus gallicus) in Dadia-Lefkimi-Soufli forest complex, North-eastern Greece. Ibis, 143, 391-401.

[22] BirdLife International 2012. *Hieraaetus pennatus*. In: IUCN 2013. IUCN Red List of Threatened Species. Version 2013.1. <www.iucnredlist.org>. Downloaded on 04 August 2013.

3.1.16 Woodlark Lullula arborea

Woodlark *Lullula arborea* is assessed as Endangered by the RDBKK and of Least Concern by the IUCN. It has not been listed by the RDBRF. The species has a large global range including Europe, the Middle East and North Africa[23]. Therefore, the species is neither endemic nor range restricted. In European Russia the breeding population is estimated at 100-250 million pairs, and in the southern region 30-70 thousand pairs. According to the RDBKK, it has been recorded within twelve 10 km tetrads, giving an AOO of 1,200 km^2

The DMU (43.5 km^2) represents approximately 3.5% of the species' AOO within Krasnodar Krai. Therefore, the DMU does not qualify as Critical Habitat under Criteria 1 or 2 for *Lullula arborea.*

3.2 Criterion 3: Migratory and Congregatory Species

Chapter 11 of the ESIA provides a list of notable non-breeding migratory bird species recorded flying over the Study Area during field surveys (Table 4). Of these, both squacco heron *Ardeola ralloides* and common crane *Grus grus* are assessed by the IUCN as being of Least Concern and therefore unlikely to occur in the DMU in numbers exceeding 1% of their global populations.

Egyptian vulture *Neophron percnopterus* is assessed as Endangered by the IUCN and by the RDBKK. However, the species has a very large global range which includes migratory breeding population in Europe (Spain, France, Italy, the Balkans and the Caucuses) the Middle East and Central Asia[24]. Resident populations also occur in Africa, the Middle East and India. The IUCN assessment of Endangered is due to very steep declines in recent years. The global population is likely to be somewhere between 21,900-30,000 pairs, whilst the European population is estimated to be 3,300-5,050 pairs (of which 40% are in Spain). Breeding population estimates for Russia vary between 65-70 pairs and 70-120 for European Russia and 70-100 in the southern region. Within Krasnodar Krai, the RDBKK estimates that the breeding population numbers just 4-6 pairs. These are all located in mountainous areas in the east of the region. The species also breeds in the Crimea. Therefore, the individual observed lying over the Landfall is likely to be a vagrant migrant. As there are no significant breeding populations to the north of Krasnodar Krai, the DMU is very unlikely to support in excess of 1% (219-300) of the global population of Egyptian vulture during migration.

Red-footed falcon *Falco vespertinus* is assessed as Near-threatened by the IUCN. It has a large breeding range from Eastern Europe across to Mongolia, wintering in southern Africa, from South Africa northwards to southern Kenya. It has a large global population estimated to be 300,000-800,000 individuals[25]. The DMU is very unlikely to support in excess of 1% (3,000-8,000) of the global population of red-footed falcon during migration.

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[23] BirdLife International 2012. Lullula arborea. In: IUCN 2013. IUCN Red List of Threatened Species. Version 2013.1. <www.iucnredlist.org>. Downloaded on 24 September 2013

[24] BirdLife International 2012. Neophron percnopterus. In: IUCN 2013. IUCN Red List of Threatened Species. Version 2013.1. <www.iucnredlist.org>. Downloaded on 24 September 2013.

[25] BirdLife International 2012. *Falco vespertinus*. In: IUCN 2013. IUCN Red List of Threatened Species. Version 2013.1. <www.iucnredlist.org>. Downloaded on 04 August 2013

Little bustard *Tetrax tetrax* is assessed as Near-threatened by the IUCN. It has a fragmented breeding distribution through Europe, North Africa, the Middle East and Central Asia. The global population has been estimated to be approximately 240,000 individuals[26]. The DMU is located on the edge of its Russian range and therefore it is highly unlikely that it could support in excess of 1% (2,400) individuals during migration.

Table 4 Notable Migratory Bird Species Recorded in the Study Area

Species	Habitat	Conservation Status		
		IUCN RDL	RDBRF	RDBKK
Squacco heron	Non Breeding Migrant	LC	App 2	App 2
Egyptian vulture	Non Breeding Migrant	EN	3	1B
Red-footed falcon	Non Breeding Migrant	NT	App 2	App 3
Common crane	Non Breeding Migrant	LC	3	3
Little bustard	Non Breeding Migrant	NT	2	3

The wintering bird assemblage supported by the terrestrial habitats of the Study Area consists of widespread and ubiquitous species of passerine birds. The terrestrial habitats of the Landfall DMU do not offer suitable foraging or roosting opportunities for large aggregations of wintering birds. The DMU of the Russian Landfall does not include the designations of either Important Bird Area (IBA) or Ramsar site. In conclusion, the Landfall DMU does not qualify as Critical Habitat under Criterion 3.

3.3 Criterion 4: Highly Threatened and/or Unique Ecosystems

A number of natural habitats were recorded within the Study Area. These included xerophilous shrub woodland, mesophilic forest, *Juniperus* woodland, mesophilic meadow, Tomillyar, and coastal shingle. Detailed habitat descriptions of these habitats are provided in the Chapter 11 of the ESIA.

According to Seregin and Suslova (2007)[27], the Abrau Peninsula supports relic arid sub-Mediterranean vegetation and is the only occurrence of Mediterranean vegetation in Russia. Vegetation mapping completed by Williams *et al.*, (2006) combines the three woodland types recorded into a single classification of Crimea-Novorossiysk low-mountain oak and pine forests

[26] BirdLife International 2012. *Tetrax tetrax*. In: IUCN 2013. IUCN Red List of Threatened Species. Version 2013.1. <www.iucnredlist.org>. Downloaded on 04 August 2013

[27] Seregin, A.P. and Suslova, E.G. (2007) Contribution to the vascular plant flora of the Utrish area, a relic sub-Mediterranean ecosystem of the Russian Black Sea Coast. Willdenowia 37 – 2007

and juniper open woodlands. Their results show that this Mediterranean woodland type does not occur elsewhere within the Caucasus (Figure 3). The vegetation types show closer associations with flora and vegetation communities present in Eastern Europe and the southern coast of Crimea. Table 5 shows the relationship between the vegetation types recorded in the Study Area and European classification systems. The assessment of Critical Habitat against Criterion 4 Highly threatened and/or unique ecosystems, is provided in Table 6.

Table 5 Habitat Classification Associations

Habitat	European Nature Information System (Eunis) Habitat Description*	European Habitats Directive Annex I	Williams et al., (2006)
Xerophilous shrub woodland with *Quercus pubescens / Carpinus orientalis* ("shiblyak")	G1.7C23 Anatolio-Caucasian oriental hornbeam woods. [*Carpinus orientalis*]-dominated facies of thermophilous woods of the Caucasus, the foothills of the Pontic Range, the Taurus, the Amanus and Alaouites.	n/a	Crimea-Novorossiysk low-mountain oak and pine forests and juniper open woodlands.
Juniperus woodland	F5.133 [*Juniperus excelsa*] and [*Juniperus foetidissima*] arborescent matorrals.	5210 Arborescent matorral with *Juniperus* spp.	
Mesophilic forest	G1.21 Riverine [*Fraxinus*] - [*Alnus*] woodland, wet at high but not at low water.	91E0 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*).	
Mesophilic meadow	E2.32 Ponto-Caucasian hay meadows. Meadows of the montane and subalpine levels of the Caucasus and the Pontic mountains of northern Anatolia.	n/a	North Caucasian lowland and hilly plain landscapes with mixed herb-grass steppes and semi-humid meadow-steppes.

Continued…

Habitat	European Nature Information System (Eunis) Habitat Description*	European Habitats Directive Annex I	Williams et al., (2006)
Tomillyar	F7.344 *Salvia triloba* and *Satureja thymbra* bathas [Sage bathas]. Cushion formations of the Levant dominated by labiates, in particular, *Salvia triloba* or *Satureja thymbra*, typically developed on calcareous rocky substrates and red soils.	n/a	

* http://eunis.eea.europa.eu/index.jsp

Complete.

Table 6 Critical Habitat Determination

Habitat	Critical Habitat Criteria			Critical Habitat
	At risk of significantly decreasing in area or quality	**Small spatial extent**	**Contains unique assemblages of species**	
Xerophilous shrub woodland with *Quercus pubescens / Carpinus orientalis* ("shiblyak")	Distribution and status of habitat in Europe and Russia uncertain. However, there are 229 km^2 of woodland within the Abrau-Dyurso priority conservation area‡, much of which is protected within the Utrish State Nature Reserve. Therefore, current distribution and status within Krasnodar Krai unlikely to reduce by 50% in next 50 years.		No unique assemblages of species including biome-restricted species within Study Area.	No
Juniperus woodland	98.25% of Mediterranean distribution protected by Natura 2000[1], which is reported to be in Favourable condition**. Within Russia juniper woodland is protected. Therefore, current distribution and status unlikely to reduce by 50% in next 50 years.	At least 3745 km^2 in Europe which are protected in Natura 2000 sites*.	No unique assemblages of species including biome-restricted species within Study Area.	No

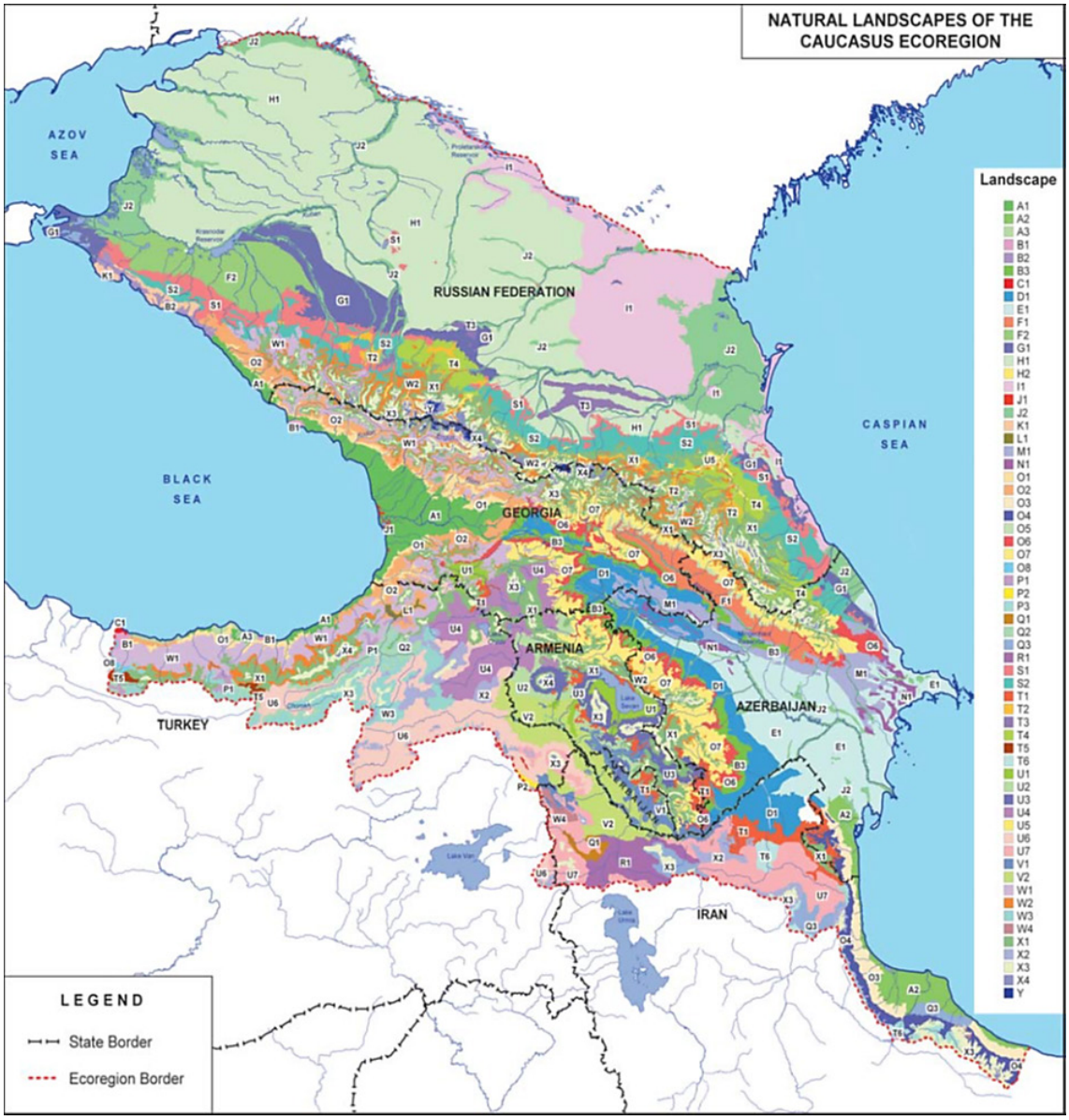
Continued…

Habitat	Critical Habitat Criteria			Critical Habitat
	At risk of significantly decreasing in area or quality	Small spatial extent	Contains unique assemblages of species	
Mesophilic forest	In excess of 8,800 km^2 distributed across Europe[3]. Habitat listed on Annex 1 of European Habitats Directive which provides conservation protection for this habitat type across much of its range. Distribution and status in Russia unknown. However ecosystem structure and function unfavourable in approximately 80% of European range†.		No unique assemblages of species including biome-restricted species within Study Area.	Yes
Mesophilic meadow	No distribution or condition data available.		No unique assemblages of species including biome-restricted species within Study Area.	Undefined
Tomillyar	No distribution or condition data available. Habitat restricted to cliff tops within Study Area, likely to reflect distribution along Black Sea. Coastal region largely un-protected and under pressure from tourism and therefore at risk of significant reduction in distribution within next 50 years.		No unique assemblages of species including biome-restricted species within Study Area.	Yes

* Calaciura B. & Spinelli O. 2008. Management of Natura 2000 habitats. 5210 Arborescent matorral with *Juniperus spp*. European Commission
** http://forum.eionet.europa.eu/x_habitat-art17report/library/datasheets/habitats/sclerophyllous_scrub/sclerophyllous_scrub/5210-arborescent
† http://forum.eionet.europa.eu/x_habitat-art17report/library/datasheets/habitats/forests/forests/91e0-alluvial_excelsiorp
‡ Williams et al., (2006)

Complete.

Figure 3 Natural Landscapes in the Caucasus Ecoregion



(Source: from Williams et al., 2006)

3.4 Criterion 5: Key Evolutionary Processes

The Study Area is situated at the western most end of the Greater Caucasus range of mountains. The Study Area is not included in any of the 205 priority sites and 10 priority corridors identified by the CEPF within the Caucuses biodiversity hotspot (Williams, 2003). It also falls outside the Abrau-Dyurso priority conservation area identified by Williams *et al.* (2006), which does include much of the remainder of the Abrau Peninsula. This suggests that the Study Area does not support key evolutionary processes. The Study Area occurs outside the

core Navagir range of mountains on the edge of the Abrau Peninsula. Therefore, it does not share the same level of isolation, spatial heterogeneity and wealth of environmental gradients. It also has been subject to much higher levels of habitat loss and fragmentation. With the exception of Nikolski's tortoise and fern-leaved speedwell, the Study Area does support many of the endemic species found within the Abrau Peninsula or Caucuses as a whole.

4 Summary

This report provides an assessment of Critical Habitat applicable to the Russian Landfall of the South Stream Project. Critical Habitat is defined by IFC Performance Standard 6 (PS6)[28] as areas with high biodiversity value. This includes areas that meet one or more of following criteria:

- Criterion 1: Critically Endangered (CR) and/or Endangered (EN) species;
- Criterion 2: Endemic and/or restricted-range species;
- Criterion 3: Migratory and/or congregatory species;
- Criterion 4: Highly threatened and/or unique ecosystems; and
- Criterion 5: Key evolutionary processes.

The Project's Study Area has been assessed against these criterions in accordance with PS6 and associated guidance notes. The Project's Study Area triggers Critical Habitat under Criteria 1 and 2 due to the presence of four endangered and endemic species: *Rindera tetraspis,* fern-leaved speedwell, Levantine skipper and Nikolski's tortoise. The presence of two specific habitat types also triggers Critical Habitat under Criterion 4 (Mesophilic forest and Tomillyar). A Critical Habitat summary is provided in Table 7.

Table 7 Critical Habitat Summary

Criterion	Feature	Rationale	Critical Habitat
Criterion 1: Critically Endangered (CR) and/or Endangered (EN) species	*Rindera tetraspis*	DMU represents >10% of the species' AOO within Krasnodar Krai	Yes - Tier 2
Criterion 1: Critically Endangered (CR) and/or Endangered (EN) species	Levantine Skipper *Thymelicus hyrax*	DMU represents >10% of the species' AOO within Krasnodar Krai	Yes - Tier 2
Criterion 1: Critically Endangered (CR) and/or Endangered (EN) species	Nikolski's tortoise *Testudo graeca nikolskii*	DMU supports the regular occurrence of a single individual of a CR species	Yes - Tier 2
Criterion 2: Endemic and/or restricted-range species	Fern-leaved speedwell *Veronica filifolia*	DMU supports >1% of the global population of this endemic species	Yes - Tier 2

Continued…

[28] IFC (2012) Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources

Criterion	Feature	Rationale	Critical Habitat
Criterion 2: Endemic and/or restricted-range species	Nikolski's tortoise *Testudo graeca nikolskii*	DMU supports ≥ 1% of the global population of a restricted-range species.	Yes - Tier 2
Criterion 4: Highly threatened and/or unique ecosystems	Mesophilic forest	Ecosystem structure and function unfavourable in approximately 80% of European range.	Yes
Criterion 4: Highly threatened and/or unique ecosystems	Tomillyar	Coastal region un-protected and under pressure from tourism and therefore at risk of significant reduction in next 50 years.	Yes

Complete.

Figure 4 Caucuses Hotspot Priority Sites (Source Williams et al., 2003)

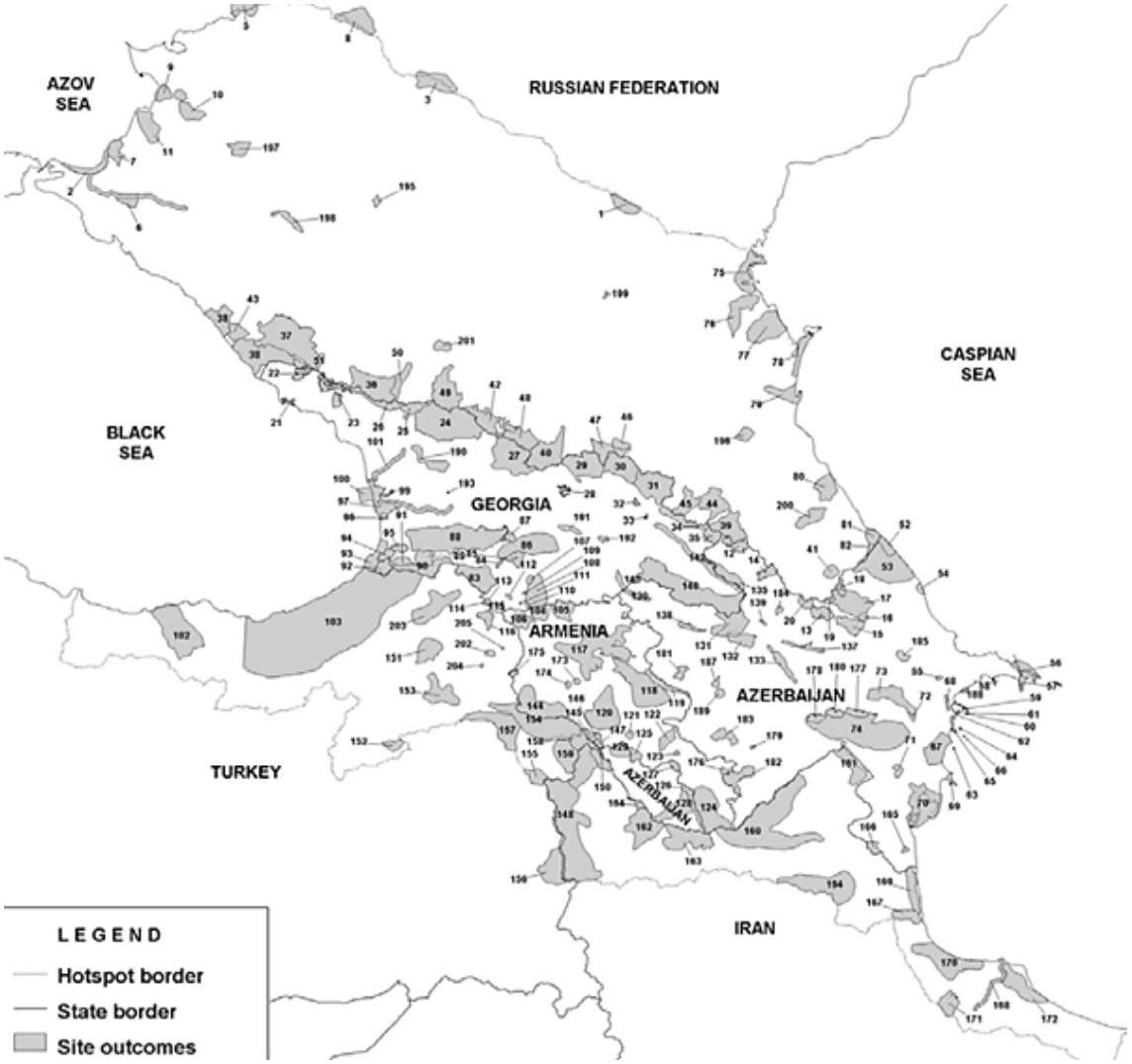


Figure 5 Caucuses Hotspot Priority Corridors (Source Williams et al., 2003)

Annex A

Possible categories and criteria for use in developing a red list of ecosystems (source: Rodriguez *et al.,* 2011	
A: Short-term decline (in distribution or ecological function) on the basis of any sub-criterion	
1. observed, estimated, inferred or suspected decline in distribution of	
≥80%,	CR
≥50%, or	EN
≥30%	VU
over the last 50 years	
2. projected or suspected decline in distribution of	
≥80%,	CR
≥50%, or	EN
≥30%	VU
within the next 50 years	
3. observed, estimated, inferred, projected, or suspected decline in distribution of	
≥80%,	CR
≥50%, or	EN
≥30%	VU
over any 50-year period, where the period must include both the past and the future	
4. relative to a reference state appropriate to the ecosystem, a reduction or likely reduction of ecological function that is	
(a) very severe, in at least one major ecological process, throughout ≥80% of its extant distribution within the last or next 50 years;	CR
(b1) very severe, throughout ≥50% of its distribution within the last or next 50 years;	EN
(b2) severe, in at least one major ecological process, throughout ≥80% of its distribution within the last or next 50 years;	EN

Continued…

Possible categories and criteria for use in developing a red list of ecosystems (source: Rodriguez *et al.,* 2011	
(c1) very severe, in at least one major ecological process, throughout ≥30% of its distribution within the last or next 50 years;	VU
(c2) severe, in at least one major ecological process, throughout ≥50% of its distribution within the last or next 50 years.	VU
(c3) moderately severe, in at least one major ecological process, throughout ≥80% of its distribution within the last or next 50 years	VU
B: Historical decline (in distribution or ecological function) on the basis of either subcriterion 1 or 2	
1. estimated, inferred, or suspected decline in distribution of	
≥90%,	CR
≥70%, or	EN
≥50%	VU
in the last 500 years	
2. relative to a reference state appropriate to the ecosystem, a very severe reduction in at least one major ecological function over	
≥90%,	CR
≥70%, or	EN
≥50% of its distribution in the last 500 years	VU
C: Small current distribution and decline (in distribution or ecological function) or very few locations on the basis of either subcriterion 1 or 2	
1. extent of occurrence estimated to be	
≤100 km^2,	CR
≤5,000 km^2, or	EN
≤20,000 km^2	VU
and at least one of the following:	
(a) observed, estimated, inferred, or suspected continuing decline in distribution,	

Continued…

Possible categories and criteria for use in developing a red list of ecosystems (source: Rodriguez *et al.,* 2011	
(b) observed, estimated, inferred, or suspected severe reduction in at least one major ecological process,	
(c) ecosystem exists at only one location, five or fewer locations, or 10 or fewer locations.	
1	CR
5	EN
10	VU
or	
2. area of occupancy estimated to be	
≤10 km^2,	CR
≤500 km^2, or	EN
≤2000 km^2 and at least one of the following:	VU
(a) observed, estimated, inferred, or suspected continuing decline in distribution,	
(b) observed, estimated, inferred, or suspected severe reduction in at least one major ecological process,	
(c) ecosystem exists at only one location, five or fewer locations, or 10 or fewer locations	
1	CR
5	EN
10	VU
D: Very small current distribution, estimated to be	
≤5 km^2,	CR
≤50 km^2, or	EN
≤100 km^2,	VU
and serious plausible threats, but not necessarily evidence of past or current decline in area or function.	

Complete.