**Domain 1 MPA Baseline data metadata**

Data files and metadata were compiled by Andrea Capurro, Argentina. All files have been projected into the South Pole Lambert Azimuthal Equal Area projection. In all cases, files have been ‘clipped’ to the extent of MPA Planning Domain 1 (suffix ‘\_poly’); and in some cases, files have additionally been ‘cut’ at a spatial resolution of 100 km2 (suffix ‘\_hexa’). All baseline data files contain the same metadata information: Description, Data Sources, Methods, Fields, References; and are based on previous D1MPA Data Forms.

**Basemap**

**MPA Domain 1**

This file includes the boundary of MPA Planning Domain 1, and was downloaded from https://gis.ccamlr.org/

**Antarctic\_Peninsula**

This file depicts the coastline of the Antarctic Peninsula region. The medium resolution Antarctic coastline was downloaded from <https://www.add.scar.org/> and later ‘cut’ to show only the study area.

**Domain1\_mgds\_bathy** and **Domain1\_500m\_bathy-contours**

These two layers are derived from a bathymetry raster downloaded from <https://www.gmrt.org/GMRTMapTool/> and ‘clipped’ to the extent of Domain 1.

The contours were calculated at 500m intervals using QGIS Toolbox Raster Extraction/Contour.

Reference: Ryan, W.B.F., S.M. Carbotte, J.O. Coplan, S. O'Hara, A. Melkonian, R. Arko, R.A. Weissel, V. Ferrini, A. Goodwillie, F. Nitsche, J. Bonczkowski, and R. Zemsky (2009), Global Multi-Resolution Topography synthesis, Geochem. Geophys. Geosyst., 10, Q03014, doi: 10.1029/2008GC002332

**Hexagon\_grid**

This file contains a hexagon grid for Domain 1 that was used to run all spatial analyses, generated using QGIS Toolbox ‘Create Grid’. Each hexagon is uniquely numbered (Hexa\_ID) and its area calculated after the file has been ‘cut’ by the coastline (Hexa\_Area).

**Baseline data metadata**

﻿**Dom1\_OBJ1\_1-3-Benthic-ecoregion\_poly**

﻿﻿﻿

[Description] Domain 1 Marine Protected Area (West Antarctic Peninsula and South Scotia Arc, D1MPA). Conservation Objective 1: Representative examples of Benthic Habitats. Ecoregions.

[Data sources] Benthic habitat classification was extracted from Douglass et al. (2014).

[Methods] Benthic ecoregions were defined according to depth, geomorphic features (O'Brien et al. 2009), seabed temperature, sea ice concentration and Chlorophyll-a concentration; methods are further described in Douglass et al. (2011). Data was cut to the spatial resolution of Domain 1. CRS: EPSG:102020 - South\_Pole\_Lambert\_Azimuthal\_Equal\_Area.

[Fields] Name: Ecoregions as identified in first workshop; Feat\_Area: surface (km2) of each ecoregion; IDSP: unique numeric code for each feature needed for running Marxan

[References] Douglass LL, Turner J, Grantham HS, Kaiser S, Constable A, Nicoll R, Raymond B, Post A, Brandt A, Beaver D. 2011. A hierarchical classification of benthic biodiversity and assessment of protected areas in the Southern Ocean.Submitted to the CCAMLR Marine Protected Area workshop held in Brest, France in 2011.WS-MPA-11/23.

Douglass L, Beaver D, Turner J, Kaiser S, Constable A, Raymond B, Post A, Brandt A, Grantham H, Nicoll R. 2014 (updated 2014). Southern Ocean Benthic Classification (SOBC) - ecoregions, bathomes and environmental types Australian Antarctic Data Centre - doi: http://dx.doi.org/10.4225/15/53A3760D4AFAA.

O'Brien PE, Post AL, Romeyn R. 2009. Antarctic-wide Geomorphology as an aid to habitat mapping and locating vulnerable marine ecosystems. Submitted to the Science Committee to the Commission of Antarctic Marine Living Resources (SC-CAMLR-XXVIII/10) Workshop on Vulnerable Marine Ecosystems held in La Jolla, CA, USA 3-7th August 2009. Document number WS-VME-09/10. Canberra, Australia: GeoScience Australia.

**Dom1\_OBJ1\_4-5-Seafloor-temp\_poly**

[Description] Domain 1 Marine Protected Area (West Antarctic Peninsula and South Scotia Arc, D1MPA). Conservation Objective 1: Representative examples of Benthic Habitats. Sea floor temperature.

[Data sources] Average sea floor temperature was derived from the World Ocean Atlas (http://www.nodc.noaa.gov/OC5/indprod.html, C. Reiss and C. Jones NOAA U.S. AMLR Program).

[Methods] Seafloor temperature was defined according to mean bottom temperature in a one-degree longitude/latitude grid using the 0°C isotherm as a proxy to the identification of benthic communities (above 0 °C to represent communities dominated by echinoderms and below 0 °C communities dominated by sponges, Clarke et al. 2009). Data was cut to the spatial resolution of Domain 1. CRS: EPSG:102020 - South\_Pole\_Lambert\_Azimuthal\_Equal\_Area.

[Fields] Name: name of the feature based on average seafloor temperature above and below 0 °C; Feat\_Area: surface (km2) of the feature; IDSP: unique numeric code for each feature needed for running Marxan.

[References] Clarke A, Griffiths H, Barnes D, Meredith M, Grant S. 2009. Spatial variation in seabed temperatures in the Southern Ocean: Implications for benthic ecology and biogeography. Journal of Geophysical Research 114: G03003.

**Dom1\_OBJ1\_6-113-Benthic-habitats\_poly**

[Description] Domain 1 Marine Protected Area (West Antarctic Peninsula and South Scotia Arc, D1MPA). Conservation Objective 1: Representative examples of Benthic Habitats. Benthic habitats.

[Data sources] Benthic habitat classification was extracted from Douglass et al. (2014).

[Methods] Benthic ecoregions were defined according to depth, geomorphic features (O'Brien et al. 2009), seabed temperature, sea ice concentration and Chlorophyll-a concentration; methods are further described in Douglass et al. (2011). Data was cut to the spatial resolution of Domain 1. CRS: EPSG:102020 - South\_Pole\_Lambert\_Azimuthal\_Equal\_Area.

[Fields] EcoID: code representing the Ecoregion; Ecoregion: each ecoregion identified in the Southern Ocean benthic bioregionalization process; Geomorph2: geomorphological feature, according to O’Brien et al. (2009). There are 18 geomorph classes identified; Bathome2: group class indicating the depth range of the object. There are 9 depth classes or bathomes: 0-100 m, 100-200 m, 200-500 m, 500-1000 m, 1000-1500 m, 1500-2000 m, 2000-3000 m, 3000-4500 m, +4500 m, and ‘Not applicable’; BathID: numerical ID of Bathome2; EcoGeo: combination of Ecoregion and Geomorph2; Name: unique name combination of Ecoregion and Geomorph2 and Bathome2; Feat\_Area: surface (km2) of each feature; IDSP: unique numeric code for each feature needed for running Marxan

[References] Douglass LL, Turner J, Grantham HS, Kaiser S, Constable A, Nicoll R, Raymond B, Post A, Brandt A, Beaver D. 2011. A hierarchical classification of benthic biodiversity and assessment of protected areas in the Southern Ocean.Submitted to the CCAMLR Marine Protected Area workshop held in Brest, France in 2011.WS-MPA-11/23.

Douglass L, Beaver D, Turner J, Kaiser S, Constable A, Raymond B, Post A, Brandt A, Grantham H, Nicoll R. 2014 (updated 2014). Southern Ocean Benthic Classification (SOBC) - ecoregions, bathomes and environmental types Australian Antarctic Data Centre - doi: http://dx.doi.org/10.4225/15/53A3760D4AFAA.

O'Brien PE, Post AL, Romeyn R. 2009. Antarctic-wide Geomorphology as an aid to habitat mapping and locating vulnerable marine ecosystems. Submitted to the Science Committee to the Commission of Antarctic Marine Living Resources (SC-CAMLR-XXVIII/10) Workshop on Vulnerable Marine Ecosystems held in La Jolla, CA, USA 3-7th August 2009. Document number WS-VME-09/10. Canberra, Australia: GeoScience Australia.

**Dom1\_OBJ2\_114-129-bioreg-pelagic\_poly**

[Description] Domain 1 Marine Protected Area (West Antarctic Peninsula and South Scotia Arc, D1MPA). Conservation Objective 2: Representative examples of Pelagic Habitats. Benthic bioregions.

[Data sources] Pelagic habitat classification extracted from Raymond (2011).

[Methods] Pelagic bioregionalisation were defined according to sea surface temperature (SST, Feldman and McClain 2010), depth (Smith and Sandwell 1997), and sea ice cover (Spreen et al. 2008). A non‐hierarchical clustering algorithm was used to reduce the full set of grid cells to 250 clusters. These 250 clusters were then further refined using a hierarchical (UPGMA) clustering algorithm. A total of 20 classes were defined, of which only 16 are present in the Domain 1 (Raymond 2011). Data was cut to the spatial resolution of Domain 1. CRS: EPSG:102020 - South\_Pole\_Lambert\_Azimuthal\_Equal\_Area.

[Fields] Name: correspond to the 16 pelagic bioregions identified by Raymond (2011) (Table 2); Location: group class indicates the ecoregion where the feature is located. The ecoregions are the same as in the benthic bioeregionalization and correspond to: South Orkneys, Western Antarctic Peninsula and Pacific basin; Feat\_Area: surface (km2) of each feature; IDSP: unique numeric code for each feature needed for running Marxan.

[References] Raymond B. 2011. A circumpolar pelagic regionalisation of the Southern Ocean.WS-MPA-11/6.

Smith WHF, Sandwell DT. 1997. Global seafloor topography from satellite altimetry and ship depth soundings. Science 277:1957‐1962.

Spreen G, Kaleschke L, Heygster G. 2008. Sea ice remote sensing using AMSR‐E 89 GHz channels. Journal of Geophysical Research - doi: http://dx.doi.org/10.1029/2005JC003384.

**Dom1\_OBJ3\_130-Iceshelves\_poly**

[Description] Domain 1 Marine Protected Area (West Antarctic Peninsula and South Scotia Arc, D1MPA). Conservation Objective 3: Important benthic ecosystem processes. Benthic areas under iceshelves.

[Data sources] Iceshelves extracted from Trathan and Grant (2011) and Trathan et al. (2012).

[Methods] Ice shelf locations were obtained from the SCAR Antarctic Digital Database, version 6.0 (ADD, 2012) (www.add.scar.org). Polygons were selected from the ADD cst00\_polygon shapefile and cut to the spatial resolution of Domain 1. RS: EPSG:102020 - South\_Pole\_Lambert\_Azimuthal\_Equal\_Area.

[Fields] Name: name of the feature; Grid: unique identifier for each iceshelf; cst00\_poly: for a full metadata description see www.add.scar.org; Perimeter: lineal distance (km) of the contour; Feat\_Area: surface (Km2) of each feature; IDSP: unique numeric code for each feature needed for running Marxan.

[References] Trathan PN, Grant SM.2011. Climate change and precautionary spatial protection: ice shelves. WS-MPA-11/17. 2011.

Trathan PN, Grant SM, Siegel V, Kock K-H. 2012. Precautionary spatial protection to facilitate the scientific study of habitats and communities under ice shelves in the context of recent, rapid, regional climate change. WG-EMM-12/34.

ADD, 2012. Antarctic Digital Database, version 6.0. Scientific Committee on Antarctic Research. www. add.scar.org.

**Dom1\_OBJ3\_131-132-Canyons\_poly**

[Description] Domain 1 Marine Protected Area (West Antarctic Peninsula and South Scotia Arc, D1MPA). Conservation Objective 3: Important benthic ecosystem processes. Canyons.

[Data sources] Global seafloor geomorphic feature map was download from bluehabitats.org and bathymetry data describing submarine canyons (blind and shelf-incising) was used according to

Harris et al. 2014.

[Methods] The canyon geomorphic feature mapping was based on a combination of automated and expert interpretation of the SRTM30 plus v7 global bathymetry model (Harris et al. 2014). Polygons were cut to the spatial resolution of Domain 1. RS: EPSG:102020 - South\_Pole\_Lambert\_Azimuthal\_Equal\_Area.

[Fields] Name: type of canyons; Ocean: location of the canyons; Geomorphic: type of geomorph (canyon); Type: shelf incising and blind canyons; Canyon \_ID: individual classification of canyons with respect to type; TypeCanyon: unique combination of Name and canyon\_ID; Feat\_Area: surface (km2) of each canyon; Mean\_Depth: average depth of each canyon; Length: length of each canyon; Width: width of each canyon; IDSP: unique numeric code for each feature needed for running Marxan.

[References] Harris PT, Macmillan-Lawler M, Rupp J, Baker EK. 2014.Geomorphology of the Oceans. Marine Geology 352: 4-24.

**Dom1\_OBJ4\_133-135-ACCf-zones\_poly**

[Description] Domain 1 Marine Protected Area (West Antarctic Peninsula and South Scotia Arc, D1MPA). Conservation Objective 4: Large-scale pelagic ecosystem processes. Frontal features.

[Data sources] Position of the Southern Antarctic Circumpolar Current Front (sACCf) was obtained from Orsi et al. (1995).

[Methods] The ACC frontal zone was further divided into 3 sectors, based on expert opinions about the different ecosystems east‐west of the 50°W meridian and north‐south the Anvers Island (Ducklow et al. 2007, Raymond 2011, Lynch et al. 2012, Terauds et al. 2012), and a 30 km buffer applied to all its extension. Polygons were cut to the spatial resolution of Domain 1. RS: EPSG:102020 - South\_Pole\_Lambert\_Azimuthal\_Equal\_Area.

[Fields] Name: unique name of the feature; Zone: a number indicating the zone represented; Feat\_Area: surface area (km2) of each feature; IDSP: unique numeric code for each feature needed for running Marxan.

[References] Ducklow HW, Baker K, Martinson DG, Quetin LB, Ross RM, Smith RC, Stammerjohn CE, Vernet M, Fraser W. 2007. Marine pelagic ecosystems: the West Antarctic Peninsula. Philosophical Transactions of the Royal Society B 362: 67-94.

Lynch HJ, Naveen R, Trathan PN, Fagan WF. 2012. Spatially integrated assessment reveals widespread changes in penguin populations on the Antarctic Peninsula. Ecology 93(6): 1367-1377.

Orsi AH, Whitworth III T, NowlinJr WD. 1995. On the meridional extent and fronts of the Antarctic circumpolar current. Deep-Sea Research Part I-Oceanographic Research Papers 42(5): 641-673.

Raymond B. 2011. A circumpolar pelagic regionalisation of the Southern Ocean. WS-MPA-11/6.

Terauds A, Chown SL, Morgan F, Peat HJ, Watts DJ, Keys H, Convey P, Bergstrom DM. 2012. Conservation biogeography of the Antarctic. Diversity and Distributions: 1-16.

**Dom1\_OBJ4\_136-HighChla\_poly**

[Description] Domain 1 Marine Protected Area (West Antarctic Peninsula and South Scotia Arc, D1MPA). Conservation Objective 4: Large-scale pelagic ecosystem processes. Predictable highly productive surface areas.

[Data sources] Areas with persistent high Chl-a concentration values were derived from the SeaWiFS database after Feldman and McClain 2010.

[Methods] All areas with values greater or equal than 0.11 mg/m2 during the austral summer season (20th December to 20th March) were extracted, and sea-surface chlorophyll-a data was analyzed after Douglas et al. (2011). For each available season t, the mean summer concentration in each grid cell i (Xit) was transformed to an anomaly Ait by subtracting the seasonal mean for the entire study area (using log-transformed values):

Ait = log10(Xit) - log10(Xt)

These anomalies were further transformed to give an index p of the consistency of productivity from season to season:pi = μi |μi| / σi. Where μi and σi are the mean and standard deviation of Ait calculated over all available seasons. Finally, raster data was transform into two classes: ‘0’ for data values <0.11 mg/m2 and ‘1’ for data values >0.1 mg/m2. Polygons were then cut to the spatial resolution of Domain 1. CRS: EPSG:102020 South\_Pole\_Lambert\_Azimuthal\_Equal\_Area.

[Fields] Name: name of the feature; Feat\_Area: surface (km2) of all pixels having persistently high (>0.1 mg/m2) mean Chl-a value for the period analysed; IDSP: unique numeric code for each feature needed for running Marxan.

[References] Douglass LL, Turner J, Grantham HS, Kaiser S, Constable A, Nicoll R, Raymond B, Post A, Brandt A, Beaver D. 2011. A hierarchical classification of benthic biodiversity and assessment of protected areas in the Southern Ocean. Submitted to the CCAMLR Marine Protected Area workshop held in Brest, France 2011. WS-MPA-11/23.

Feldman GC, McClain CR, editors. 2010. SeaWiFS Reprocessing: NASA Goddard Space Flight Center. Available online http://oceancolor.gsfc.nasa.gov/.

**Dom1\_OBJ4\_137-138-SeaIceExtent\_poly**

[Description] Domain 1 Marine Protected Area (West Antarctic Peninsula and South Scotia Arc, D1MPA). Conservation Objective 4: Large-scale pelagic ecosystem processes. Marginal ice zone.

[Data sources] Climatological sea-ice extent data for February was downloaded from

ftp://sidads.colorado.edu/DATASETS/NOAA/G02135/shapefiles/Feb/shp\_median/median\_S\_08\_1981\_2010\_polyline.zip, and for August from ftp://sidads.colorado.edu/DATASETS/NOAA/G02135/shapefiles/Aug/shp\_median/median\_S\_08\_1981\_2010\_polyline.zip

[Methods] Climatological ice extent data for all months were visually examined to identify the month(s) with the minimum and maximum sea-ice extent. Note that selection of a single month is not unequivocal (e.g., climatological sea-ice extent in September is similar to that in August). A 30 km buffer was applied to all its extension and polygons were cut to the spatial resolution of Domain 1. CRS: EPSG:102020 - South\_Pole\_Lambert\_Azimuthal\_Equal\_Area. Spatial and temporal resolution of the original data is 25 km2 and daily, respectively. Descriptions of the data and processing by the NSIDC are available on the Internet at http://nsidc.org/data/docs/noaa/g02135\_seaice\_index/index.html and http://nsidc.org/data/docs/noaa/g02135\_seaice\_index/index.html#monthly\_extent\_image.

[Fields] Name: name of the feature; INDEX: Unique value indicating separate line segments in the original polyline shapefile; BUFF\_DIST: buffer distance (km); Feat\_Area: surface (km2) of the feature; IDSP: unique numeric code for each feature needed for running Marxan.

[References] Fetterer, F., K. Knowles, W. N. Meier, M. Savoie, and A. K. Windnagel. 2017, updated daily. Sea Ice Index, Version 3. [G02135]. Boulder, Colorado USA. NSIDC: National Snow and Ice Data Center. doi: [https://doi.org/10.7265/N5K072F8](https://www.google.com/url?q=https://doi.org/10.7265/N5K072F8&sa=D&ust=1608003262809000&usg=AOvVaw3lNiWqD0amS5VGYp-ipw3T)

WG-EMM-12/69. 2012. Report of the First Workshop on the Identification of Priority Areas for MPA Designation within Domain No. 1 (CCAMLR). Valparaiso 2012. WG-EMM-12.

WG-EMM-14/40. 2014. Progress report on the development of MPAs in Domain 1. WG-EMM-14.

WG EMM 15/42. Report of the Second International Workshop for identifying Marine Protected Areas (MPAs) in Domain 1 of CCAMLR. Buenos Aires, Argentina 2015.

﻿**Dom1\_OBJ4\_139-Polynyas\_poly**

[Description] Domain 1 Marine Protected Area (West Antarctic Peninsula and South Scotia Arc, D1MPA). Conservation Objective 4: Large-scale pelagic ecosystem processes. Polynyas.

[Data sources] Daily data for 2002 to 2007 were downloaded from Universität Hamburg2, 3 which compiles information on polynyas using Special Sensor Microwave / Imager (SSM/I) imagery (Kern 2012). Data is classified into: 0= Open water; 30= Thin ice (<10-20 cm); 90-100= Thick ice; 180= Land; 220= Missing and flagged data.

[Methods] Only pixels corresponding to category ‘0’ (open water) were considered. These pixels were transformed into a single data layer for each year analysed, using the ArcToolbox Make NetCDF Raster Layer.

In addition, during the Valparaiso Workshop (2012) two polynyas were identified and included in this conservation objective (FID ‘0’ and ‘1’). Polygons were cut to the spatial resolution of Domain 1. CRS: EPSG:102020 - South\_Pole\_Lambert\_Azimuthal\_Equal\_Area. Period and temporal resolution: mean estimates for July of 2002-2007. Spatial resolution: 5 km x 5 km; polar-stereographic grid, tangential plane at 70°S.

[Fields] Name: name of the feature; FID\_Polyny: unique identifier for each feature; Feat\_Area: surface area (km2) of each feature; Year: year when the polynya was present; Source: data source; IDSP: unique numeric code for each feature needed for running Marxan.

[References] Kern S. 2012. Antarctic daily winter-time polynya distribution from SSM/I brightness temperature data, http://icdc.zmaw.de/polynya\_ant.html, (years used), Integrated Climate Data Center (ICDC), CEN, University of Hamburg, Hamburg, Germany, Digital Media.

WG-EMM-12/69. Report of the First Workshop on the Identification of Priority Areas for MPA Designation within Domain No. 1 (CCAMLR). Valparaiso 2012.

For files named:

﻿**Dom1\_OBJ5a\_140-142-Adelie-breeding\_poly**

**﻿Dom1\_OBJ5a\_143-145-Chinstrap-breeding\_poly**

**﻿Dom1\_OBJ5a\_146-148-Papua-breeding\_poly**

**﻿Dom1\_OBJ5a\_149-150-Emperor-breeding\_poly**

**﻿Dom1\_OBJ5a\_152-Furseals-breeding\_poly**

[Description] Domain 1 Marine Protected Area (West Antarctic Peninsula and South Scotia Arc, D1MPA). Conservation Objective 5a: Important areas for mammals and bird’s life-histories - Foraging distribution of central-place foragers during breeding season. Penguins and fur seals.

[Data sources] Colony locations and number of breeding pairs for pygoscelids penguins (Adelie penguin (*Pygoscelis adeliae*), chinstrap (*P. antarctica*), and gentoo penguins (*P. papua*) are based on datasets from the British Antarctic Survey (BAS, Phil Trathan), US-AMLR Program (George Watters, Jefferson Hinke), and Instituto Antártico Argentino (Mercedes Santos). Colony locations and population for emperor penguins (*Aptenodytes forsteri*) were obtained from Fretwell et al (2014) and Libertelli and Coria (2014). Antarctic Fur seals (*Arctocephalus gazella*) colonies were updated from the last US-AMLR census (2007/2008) based on Goebel et al. 2008. For pygoscelids penguins and fur seals, only colonies with at least 10 breeding pairs and 1 pup were included, respectively, for the last census at the time of data recollection (2013). Penguins colony locations and population numbers are based on data published in MAPPPD (Mapping Application for Penguin Populations and Projected Dynamics, accessible at <http://www.penguinmap.com/>); and updates for population dynamics were include in latter stages of the D1MPA process (for instance, see CCAMLR-38/BG/22).

[Methods] The foraging range for each species during the breeding season was derived from satellite tracking, and correspond to the inflection point in the cumulative frequency distribution of individuals tagged with satellite transmitters during guard and crèche periods (for penguins) and during lactation (for female Antarctic fur seal), and represented by the 75% cumulative distribution of the maximum foraging range of all trips by individuals tagged at each location. The resulting foraging area for each colony (circular buffer around central point) was then based on the species' foraging range and location, as follows: for Adelie penguins in SSI: 50 km, in SOI: 100 km; for Chinstrap penguins in SSI: 25 km, in SOI: 45 km; for Gentoo penguins in SSI: 25km, in SOI: 45km; for Emperor penguins: 100 km (based on colonies elsewhere according to Ratcliffe and Trathan 2011, Kirkwood and Robertson 1997; Wienecke et al. 1997); for Antarctic fur seals: 75 km (SSI: South Shetland Islands, SOI: South Orkney Islands). The foraging area for each colony was then restricted to the perpendicular line of the main axis of the island where they are located (Feat\_Area), as these species do not search for food randomly in a circle around their colony but travel mainly perpendicular to the coastline towards their foraging ground (SC-CAMLR-XXVIII/14, Kokubun et al. 2010, Santos et al. 2014, Hinke et al., unpublished data, Trathan et al. unpublished data). For fur seals, colonies located in the corner of the islands or for which direction of foraging could not be easily assigned, were left with the entire foraging range (buffer circle around the colony) and were not restricted to the perpendicular line of the main axis of the island. The intensity of use for a given area was calculated considering the population size and effective foraging range for each colony, summed up at the spatial resolution area for running the spatial analyses (100 km2). Polygons were cut to the spatial resolution of Domain 1. CRS: EPSG:102020 - South\_Pole\_Lambert\_Azimuthal\_Equal\_Area.

[Fields] Name: unique combination of feature name; SiteName: name of the colony; Region: name of the area where the colony is located; RegionCod: unique number for region on which the colonies had being grouped (1: South Orkneys, 2: Northern Antarctic Peninsula, 3: Southern Antarctic Peninsula); Latitude: geographic latitude of the colony; Longitude: geographic latitude of the colony; SpeciesCod: code for each species (PYD: Pygoscelis adeliae, PYN: Pygoscelis antarctica, PYP: Pygoscelis papua, EMP: Aptenodytes forsteri, FUR: Arctocephalus gazella); CountYear: year of the last census data; SourceComm: data source; BufferDist: foraging range (km) used for building the foraging area around the colony; Population: number of breeding pairs for penguins, and pup production for fur seals during the most recent count; Feat\_Area: total surface (km2) of the foraging area for that colony; IDSP: unique numeric code for each feature needed for running Marxan

[References] Arata J., Gaymer C., Squeo F., Marschoff E., Barrera-Oro E., and M. Santos. 2014. Progress report on the development of MPAs in Domain 1. WG-EMM-14/40.

Barlow KE and Croxall JP (2002). Seasonal and interannual variation in foraging range and habitat of macaroni penguins at South Georgia. Marine Ecology Progress Series 232: 291-304.

CCAMLR-38/BG/22. Domain 1 MPA Proposal CM 91-XXrev1: Rationale of the changes for the Proposal for the Establishment of a Marine Protected Area in the Western Antarctic Peninsula – South Scotia Arc. Delegations of Argentina and Chile. CCAMLR, Hobart, Australia, 2018.

Fretwell PT, LaRue MA, Morin P, Kooyman GL, Wienecke B, Ratcliffe N, Fox AJ, Fleming AH, Porter C and Trathan PN. 2012. An Emperor Penguin Population Estimate: The First Global, Synoptic Survey of a Species from Space. Plos One 7(4): 10.1371

Goebel ME, De Torres C, Miller A, Santora J, Costa Dand P Diaz. 2008. Antarctic fur seal pup production and population trends in the south shetland islands with special reference to sources of error in pup production estimates.WG-EMM-PSW-08/14

Kirkwood R and G Robertson 1997.The foraging ecology of female emperor penguins in winter. Ecological Monographs 67, 155-176. doi: 10.2307/2963511

Kokubun N., Takahashi A., Mori Y., Watanabe S. and H-C. Shin. 2010. Comparison of diving behavior and foraging habitat use between chinstrap and gentoo penguins breeding in the South Shetland Islands, Antarctica. Marine Biology 157:811-825.

Libertelli MM and Coria NR. 2014. Censuses in the northernmost colony of Emperor penguin (Aptenodytes forsteri) in the tip of the Antarctic Peninsula at Snow Hill Island, Weddell Sea, Antarctica. WG-EMM-14/56.

Ratcliffe N and Trathan P (2011). A review of the diet and at-sea distribution of penguins breeding within the CAMLR Convention Area. CCAMLR Science, Vol. 18: 75-114

Santos MM, Trathan PN, Thanassekos S, Rombolá EF, Juáres MA, Reid K and JT Hinke. 2014. Breeding and post-breeding foraging locations of Adélie penguins at Hope Bay/Esperanza, Antarctic Peninsula. WG-EMM-14/42.

Trathan PN, Tanton JL, Lynnes AS, Jessopp MJ, Peat H, Reid K and JP Croxall. 2002. Spatial and temporal variability in foraging patterns of krill predators at Signy Island and South Georgia. WG-EMM-02/33.

Trathan PN, Murphy EJ, Croxall JP, Everson I (1998). Use of at-sea distribution data to derive

potential foraging ranges of macaroni penguins during the breeding season. Marine

Ecology Progress Series 169, 263-275

WG EMM 15/42. Report of the Second International Workshop for identifying Marine Protected Areas (MPAs) in Domain 1 of CCAMLR. Buenos Aires, Argentina 2015.

Wienecke BC and Robertson G. (1997). Foraging space of emperor penguins Aptenodytes forsteri in Antarctic shelf waters in winter. Marine Ecology Progress Series, 159, 249-263WG-EMM-12/69. 2012. Report of the First Workshop on the Identification of Priority Areas for MPA Designation within Domain No. 1 (CCAMLR). Valparaiso 2012. WG-EMM-12/69.

Zimmer I, Wilson RP, Gilbert C, Beaulieu M, Ancel A, Plötz J. (2008). Foraging movements of emperor penguins at Pointe Géologie, Antarctica. Polar Biology, 31(2), 229-243.

For files named:

**Dom1\_OBJ5b\_171-prey-crystalKrill\_hexa**

**Dom1\_OBJ5b\_172-prey-Esup\_hexa**

**Dom1\_OBJ5b\_173-prey-salps\_hexa**

**Dom1\_OBJ5b\_174-prey-Tmacrura\_hexa**

[Description] Domain 1 Marine Protected Area (West Antarctic Peninsula and South Scotia Arc, D1MPA). Conservation Objective 5b: Important areas for mammals and birds life-histories - Prey distribution.

[Data sources] Zooplankton density estimates for crystal krill (*E. crystallarophias*), T. macrura, and salps (*S. thompsoni*) were obtained from data by U.S. AMLR Program and PAL LTER during net tow surveys (1993-2011), and German Zooplankton Cruise (2011). Adult Antarctic krill (*Euphausia superba*) data was compiled from the KRILLBASE (Atkinson et al. 2017) using the standardized density (method described in Atkinson et al. 2008) for the same period (1993-2011).

[Methods] Polygon layers were created from a diffusion interpolation (25 km bandwidth) of log density for each species, categorized in 10 percentiles where density 10 represents the top 10% of raster grid cells with the highest density and density 1 represents raster grid cells with the lowest density. Data for Domain 1 was cut at the spatial resolution area for running the spatial analyses (100 km2). CRS: EPSG:102020 - South\_Pole\_Lambert\_Azimuthal\_Equal\_Area Polygons were then cut

[Fields] Name: Name of prey species; Hexa\_ID: identifier of each hexagon; Feat\_rDENS: prey density grouped in percentiles; IDSP: unique numeric code for each feature needed for running Marxan

[References] Atkinson A, Hill SL, Pakhomov E, Siegel V, Anadon R, Chiba S, Daly KL, Downie R, Fielding S, Fretwell P, Gerrish L, Hosie GW, Jessopp MJ, Kawaguchi S, Krafft BA, Loeb V, Nishikawa J, Peat HJ, Reiss CS, Ross RM, Quetin LB, Schmidt K, Steinberg DK, Subramaniam RC, Tarling GA, Ward P. 2017. KRILLBASE: a circumpolar database of Antarctic krill and salp numerical densities, 1926–2016. Earth Syst. Sci. Data, 9: 193-2107.

Atkinson A, Siegel V, Pakhomov EA, Rothery P, Loeb V, Ross RM, Quetin LB, Fretwell P, Schmidt K, Tarling GA, Murphy EJ, Fleming A. 2008. Oceanic circumpolar habitats of Antarctic krill. Marine Ecology Progress Series 362: 1-23.

Nordhausen W. 1994. Winter abundance and distribution of Euphausia superba, E. crystallorophias, and Thysanoessa macrura in Gerlache Strait and Crystal Sound, Antarctica. Marine Ecology Progress Series 109: 131-131.

Siegel V, Reiss CS, Dietrich KS, Haraldsson M, Rohardt G. 2013. Distribution and abundance of Antarctic krill (Euphausia superba) along the Antarctic Peninsula. Deep Sea Research Part I: Oceanographic Research Papers 77: 63-74.

For files named:

**Dom1\_OBJ5c\_153-Adelia-non-breeding-SSI\_hexa**

**Dom1\_OBJ5c\_154-Adelia-non-breeding-SOI\_hexa**

**Dom1\_OBJ5c\_155-Papua-non-breeding\_hexa**

**Dom1\_OBJ5c\_156-Chinstrap-non-breeding-SSI\_hexa**

**Dom1\_OBJ5c\_157-Chinstrap-non-breeding-SOI\_hexa**

**Dom1\_OBJ5c\_158-Furseal-non-breeding\_hexa**

**Dom1\_OBJ5c\_159-Leopard-seal-non-breeding\_hexa**

**Dom1\_OBJ5c\_160-Weddell-seal-non-breeding\_hexa**

**Dom1\_OBJ5c\_162-Elephant-seal-non-breeding\_hexa**

**Dom1\_OBJ5c\_164-Minke-whale-non-breeding\_hexa**

**Dom1\_OBJ5c\_165-Humpback-whale-non-breeding\_hexa**

**Dom1\_OBJ5c\_168-Killer-whaleA-non-breeding\_hexa**

**Dom1\_OBJ5c\_169-Killer-whaleB1-non-breeding\_hexa**

**Dom1\_OBJ5c\_170-Killer-whaleB2-non-breeding\_hexa**

[Description] Domain 1 Marine Protected Area (West Antarctic Peninsula and South Scotia Arc, D1MPA). Conservation Objective 5c: Important areas for mammals and bird’s life-histories – Non breeding feeding grounds of top predators. Penguins, seals and whales.

[Data sources] Distribution of penguins and marine mammal during the non-breeding season were obtained either through satellite transmitters (PTT) or GPS tagging of individual at their breeding colonies (in the case of penguins and fur seal) and monitored several months after the end of the breeding season. Tracking datasets were obtained from US-AMLR Program/University of California-Santa Cruz (Admiralty Bay for Adelie, Chinstrap and Gentoo penguins; Cape Shirreff for Chinstrap and Gentoo penguins; Antarctic fur seals; Weddell, leopard and southern elephant seals; Humpback, Minke and killer whales types A, B1 and B2); British Antarctic Survey (South Orkney Islands for Adelie and Chinstrap penguins); Alfred Wegener Institute (Potter Peninsula for southern elephant seals); and Instituto Antártico Argentino (Hope Bay for Adelie penguins; Potter Peninsula for southern elephant seals)

[Methods] Estimations for habitat use during non-breeding distribution of top predators followed a five-step procedure. First, raw data – lat/long positions – for each species was state-space modelled to fit a smooth, even-space time track, to produce six-hour estimates of probable location (resample 100 times based on location error), according to methods described in Hinke et al. 2012 and 2015. Then, the number of points within each hexagon was counted (Feat\_count); and an estimation of the area density (Density) was calculated dividing Feat\_count by the area of each hexagon (Hexa\_Area). Fourth, a filter for the upper 25% of the density distribution was applied, assuming selection of likely foraging habitats. Finally, the density distribution was categorized in 100 percentiles in the 0-100 range for Marxan analysis.

[Fields] *Name:* unique name for each feature; *Hexa\_ID*: identifier of each hexagon; *Hexa\_Area*: size (km2) of each hexagon; *Feat\_Count:* number of points or locations in each hexagon; *Density*: density of points in each hexagon considering its area (Feat\_Count/Hexa\_Area); *Centile*: categorization of Density in the 0-100 range. This parameter is used for running Marxan; *IDSP*: unique numeric code for each feature needed for running Marxan.

[References] Carlini AR, Coria NR, Santos MM, Negrete J, Juáres MA, Daneri GA. 2009. Responses of Pygoscelis adeliae and P. Papua populations to environmental changes at Isla 25 de Mayo (King George Island). Polar Biology 32: 142-1433.

Costa DP, Klinck JM, Hofmann EE, Dinniman MS, Burns JM. 2008. Upper ocean variability in west Antarctic Peninsula continental shelf waters as measured using instrumented seals. Deep Sea Research Part II: Topical Studies in Oceanography 55(3): 323-337.

Costa DP, Huckstadt LA, Crocker DE, McDonald BI, Goebel ME, Fedak MA. 2010. Approaches to studying climatic change and its role on the habitat selection of Antarctic pinnipeds. Integrative and Comparative Biology p.icq054.

de Bruyn PJN, Reisinger RR, Bester MN, Tosh CA, Carlini AR, Platz J, Bornemann H. 2014. At surface behaviour at location on spot of southern elephant seal from King George Island. doi:10.1594/PANGAEA.749698.

Friedlaender AS, Johnston DW, Fraser WR, Burns J, Costa DP. 2011. Ecological niche modeling of sympatric krill predators around Marguerite Bay, Western Antarctic Peninsula. Deep Sea Research Part II: Topical Studies in Oceanography 58(13): 1729-1740.

Hinke JT, Salwicka K, Trivelpiece SG, Watters GM, Trivelpiece WZ. 2007. Divergent responses in Pygoscelis penguins reveal a common environmental driver. Oecologia 153: 845-855.

Hinke J, Watters G, Trivelpiece W, Goebel M. 2012. Synopsis of data from satellite telemetry of foraging trips and migration routes of penguins and pinnipeds from the South Shetland Islands, 1997/98 to present. WG-EMM-12/37.

Hinke JT, Polito MJ, Goebel ME, Jarvis S, Reiss CS, Thorrold SR, Trivelpiece WZ, Watters GM. 2015. Spatial and isotopic niche partitioning during winter in chinstrap and Adélie penguins from the South Shetland Islands. Ecosphere 6(7): 125. http://dx.doi.org/10.1890/ES14-00287.1

Hinke JT, Cossio AM, Goebel ME, Reiss CS, Trivelpiece WZ, Watters GM. 2017. Identifying Risk: Concurrent Overlap of the Antarctic Krill Fishery with Krill-Dependent Predators in the Scotia Sea. PLoS ONE 12(1): e0170132. doi:10.1371/ journal.pone.0170132

Huctstadt LA, Burns JM, Koch PL, McDonald BI, Crocker DE, Costa DP. 2012. Diet of a specialist in a changing environment: the crabeater seal along the western Antarctic Peninsula. Burns JM, Costa DP, Fedak MA, Hindell MA, Bradshaw CJ, Gales NJ, McDonald B, Trumble SJ, Crocker DE. 2004. Winter habitat use and foraging behavior of crabeater seals along the Western Antarctic Peninsula. Deep Sea Research Part II: Topical Studies in Oceanography, 51(17): 2279-2303.

Forcada J. 2007.The impact of climate change on Antarctic megafauna. In: Impacts of global warming on polar ecosystems. Duarte CM (ed.). Fundación BBVA. Madrid. pp. 85-110.

Lockyer CH, Brown SG. 1981. The migration of whales. In: Animal migration. Aidley DJ (ed.). Cambridge University Press, Cambridge.

Nicol S, Worby A, Leaper R. 2008. Changes in the Antarctic sea ice ecosystem: Potential effects on krill and baleen whales. Mar. Freshw. Res. 59: 361-382.

Nowacek DP, Friedlaender AS, Halpin PN, Hazen EL, Johnston DW, Read AJ, Espinasse B, Zhou M, Zhu Y. 2011. Super-aggregations of krill and humpback whales in Wilhelmina bay, Antarctic Peninsula. PLoS One 6: 2-6.

Pitman RL, Durban JW. 2010. Killer whale predation on penguins in Antarctica. Polar Biology 33: 1589-1594.

Trivelpiece WZ, Hinke JT, Miller AK, Reiss CS, Trivelpiece SG, Watters GM. 2011. Variability in krill biomass links harvesting and climate warming to penguin population changes in Antarctica. Proceedings of the National Academy of Sciences 108: 7625-7628.

Visser IN, Smith TG, Bullock ID, Green GD, Carlsson OGL, Imberti S. 2008. Antarctic Peninsula killer whales (Orcinus orca) hunt seals and a penguin on floating ice. Mar Mamm Sci 24: 225-234.

Weinstein BG, Double M, Gales N, Johnston DW, Friedlaender AS. 2017. Identifying overlap between humpback whale foraging grounds and the Antarctic krill fishery Biological Conservation 210: 184-191.

**Dom1\_OBJ6\_175-178-fishes-bathy-500m\_poly**

[Description] Domain 1 Marine Protected Area (West Antarctic Peninsula and South Scotia Arc, D1MPA). Conservation Objective 6: Important areas for fish life cycles. Spawning/recruitment areas of commercially exploited notothenioid species (0-150 m) / Occurrence areas of historically commercially exploited fish populations (150-500 m).

[Data Sources] Bathymetry data obtained from the ETOPO1 project (Amante et al. 2009).

[Methods] Extraction of bathymetry data in the 0-500m depth range and cut to the spatial resolution of Domain 1. CRS: EPSG:102020 - South\_Pole\_Lambert\_Azimuthal\_Equal\_Area.

[Fields] Name: unique name for each feature; Region: position relative to 64°S for each feature; Bathymetry: depth (km) of each feature; Feat\_Area: surface (km2) of each feature; IDSP: unique numeric code for each feature needed for running Marxan.

[References] Amante C and Eakins BW. 2009. ETOPO1 1 Arc-Minute Global Relief Model: Procedures, Data Sources and Analysis. NOAA Technical Memorandum NESDIS NGDC-24. National Geophysical Data Center, NOAA. doi:10.7289/V5C8276M [access date].

**Dom1\_OBJ7\_179-180-Bellingshausen-nursery\_poly**

[Description] Domain 1 Marine Protected Area (West Antarctic Peninsula and South Scotia Arc, D1MPA). Conservation Objective 7: Important areas for zooplankton life cycles. Krill spawning/recruitment areas.

[Data sources] Krill density data was compiled from US AMLR surveys, 2011 German cruise, and Argentine surveys.

[Methods] Krill density polygons were drawn by eye based on krill density data and extensive literature (see [References]). For the Bellingshausen nursery, the inshore boundaries of both polygons were drawn to occur approximately between the 200 and 500 m isobaths, which is an approximate minimum depth of CDW. The offshore boundaries of the polygons were drawn to approximately encompass the fitted surface to log (larval krill density) from combined German 2011 and US AMLR survey data. Polygons were cut to the spatial resolution of Domain 1. CRS: EPSG:102020 - South\_Pole\_Lambert\_Azimuthal\_Equal\_Area.

[Fields] Name: unique name for each feature; Region: location of each feature; IDSP: unique numeric code for each feature needed for running Marxan.

[References] Frazer TK, Quetin LB, Ross RM. 2002. Abundance, sizes and developmental stages of larval krill, Euphausia superba, during winter in ice-covered seas west of the Antarctic Peninsula. Journal of Plankton Research 24(10): 1067-1077.

Siegel V, Reiss CS, Dietrich KS, Haraldsson M, Rohardt G. 2013. Distribution and abundance of Antarctic krill (Euphausia superba) along the Antarctic Peninsula. Deep Sea Research Part I: Oceanographic Research Papers 77: 63-74.

Wiebe PH, Ashjian CJ, Lawson GL, Piñones A, Copley NJ. 2011. Horizontal and vertical distribution of euphausiid species on the Western Antarctic Peninsula US GLOBEC Southern Ocean study site. Deep Sea Research Part II: Topical Studies in Oceanography 58(13): 1630-1651.

Ashjian CJ, Davis CS, Gallager SM, Wiebe PH, Lawson GL. 2008. Distribution of larval krill and zooplankton in association with hydrography in Marguerite Bay, Antarctic Peninsula, in austral fall and winter 2001 described using the Video Plankton Recorder. Deep Sea Research Part II: Topical Studies in Oceanography 55(3): 455-471.

Pakhomov EA, Atkinson A, Meyer B, Oettl B, Bathmann U. 2004. Daily rations and growth of larval krill Euphausia superba in the Eastern Bellingshausen Sea during austral autumn. Deep Sea Research Part II: Topical Studies in Oceanography 51(17): 2185-2198.

Siegel V. 1989. Winter and spring distribution and status of the krill stock in Antarctic Peninsula waters. Arch Fisch-wiss 39: 45-72.

Makarov R, Menshenina L, Spiridonov V. 1990. Distributional ecology of euphausiid larvae in the Antarctic Peninsula region and adjacent waters (Eleventh Symposium on Polar Biology). In Proceedings of the NIPR Symposium on Polar Biology (Vol. 3: 23-35).

Marrari et al. 2008. Spatial and temporal variability of Sea WiFS chlorophyll a distributions west of the Antarctic Peninsula: Implications for krill production. Deep Sea Research Part II: Topical Studies in Oceanography 55(3): 377-392.

**Dom1\_OBJ7\_181-Gerlache-nursery\_poly**

[Description] Domain 1 Marine Protected Area (West Antarctic Peninsula and South Scotia Arc, D1MPA). Conservation Objective 7: Important areas for zooplankton life cycles. Krill spawning/recruitment areas.

[Data sources] Krill density data was compiled from US AMLR surveys, 2011 German cruise, and Argentine surveys.

[Methods] Krill density polygons were drawn by eye based on krill density data and extensive literature (see [References]). For the Gerlache Strait nursery, the polygon was drawn considering maps provided in the literature including observations of high larval density. Larvae are often transported onto the shelf where there are intrusions of CDW and into areas where CDW crosses from the ACC into the Bransfield Strait. These latter two pathways are considered possible sources of krill larvae in the Gerlache Strait, but production within the Strait itself is also thought to occur. Polygons were cut to the spatial resolution of Domain 1. CRS: EPSG:102020 - South\_Pole\_Lambert\_Azimuthal\_Equal\_Area.

[Fields] Name: unique name for each feature; Region: location of each feature; IDSP: unique numeric code for each feature needed for running Marxan.

[References] Huntley M, Brinton E. 1991. Mesoscale variation in growth and early development of Euphausia superba Dana in the western Bransfield Strait region. Deep Sea Research Part A. Oceanographic Research Papers 38(8): 1213-1240.

Brinton E. 1991. Distribution and population structures of immature and adult Euphausia superba in the western Bransfield Strait region during the 1986-87 summer. Deep Sea Research Part A. Oceanographic Research Papers 38(8): 1169-1193.

Brinton E, Huntley M, Townsend AW. 1986. Larvae of Euphausia superba in the Scotia Sea and Bransfield Strait in March 1984—development and abundance compared with 1981 larvae. Polar Biology 5(4): 221-234.

Capella JE, Quetin LB, Hofmann EE, Ross RM. 1992. Models of the early life history of Euphausia superba—Part II. Lagrangian calculations. Deep Sea Research Part A. Oceanographic Research Papers 39(7): 1201-1220.

**Dom1\_OBJ7\_182-Weddell-nursery\_poly**

[Description] Domain 1 Marine Protected Area (West Antarctic Peninsula and South Scotia Arc, D1MPA). Conservation Objective 7: Important areas for zooplankton life cycles. Krill spawning/recruitment areas.

[Data sources] Krill density data was compiled from US AMLR surveys, 2011 German cruise, and Argentine surveys.

[Methods] Krill density polygons were drawn by eye based on krill density data and extensive literature (see [References]). For the Weddell Sea nursery, the polygon encompassed stations where the U.S. AMLR Program and Argentina have observed krill larvae to be relatively abundant. The inshore and offshore boundaries are consistent with the depths used to define the other nurseries, e.g. approximately between the 200 and 500 m isobaths, which is an approximate minimum depth of CDW. Polygons were cut to the spatial resolution of Domain 1. CRS: EPSG:102020 - South\_Pole\_Lambert\_Azimuthal\_Equal\_Area.

[Fields] Name: unique name for each feature; Region: location of each feature; IDSP: unique numeric code for each feature needed for running Marxan.

[References] Capella JE, Quetin LB, Hofmann EE, Ross RM. 1992. Models of the early life history of Euphausia superba—Part II. Lagrangian calculations. Deep Sea Research Part A. Oceanographic Research Papers 39(7): 1201-1220.

Siegel V, Bergström B, Mühlenhardt-Siegel U, Thomasson M. 2002. Demography of krill in the Elephant Island area during summer 2001 and its significance for stock recruitment. Antarctic Science 14(02): 162-170.

Melnikov IA, Spiridonov VA. 1996. Antarctic krill under perennial sea ice in the western Weddell Sea. Antarctic Science 8(04): 323-329.

Rakusa-Suszczewski S. 1984. Krill larvae in the Atlantic sector of the Southern Ocean during FIBEX 1981. Polar Biology 3(3): 141-147.

**Dom1\_OBJ7\_183-184-Scotia-nursery\_poly**

[Description] Domain 1 Marine Protected Area (West Antarctic Peninsula and South Scotia Arc, D1MPA). Conservation Objective 7: Important areas for zooplankton life cycles. Krill spawning/recruitment areas.

[Data sources] Krill density data was compiled from US AMLR surveys, 2011 German cruise, and Argentine surveys.

[Methods] Krill density polygons were drawn by eye based on krill density data and extensive literature (see [References]). For the Scotia Sea nursery, the inshore boundary of the westernmost polygon was drawn to occur approximately between the 200 and 500 m isobaths, which is an approximate minimum depth of CDW -- the depth of this boundary is consistent with the inshore boundaries of the polygons for other the nurseries. The offshore boundary of the western polygon was drawn to approximately encompass the fitted surface to log (larval krill density) from combined German 2011 and US AMLR survey data. The western and eastern boundaries of the western polygon were drawn to encompass the U.S. AMLR survey area, which provided the bulk of the density data for this area. The boundaries of the eastern polygon were drawn to encompass observations of larval krill made by Argentina (data provided in SC-CAMLR-XXXIII/BG/41). Note that these boundaries overlap a small hotspot of krill larvae also identified by the US AMLR. The inshore boundary of this eastern polygon was also drawn to occur approximately between the 200 and 500 m isobaths. Polygons were cut to the spatial resolution of Domain 1. CRS: EPSG:102020 - South\_Pole\_Lambert\_Azimuthal\_Equal\_Area.

[Fields] Name: unique name for each feature; Region: location of each feature; IDSP: unique numeric code for each feature needed for running Marxan.

[References] Daly KL. 1990. Overwintering development, growth, and feeding of larval Euphausia superba in the Antarctic marginal ice zone. Limnology and Oceanography 35(7): 1564-1576.

Rong W. 1989. Distribution and abundance of eggs and larvae of antarctic krill (Enphausua superba Dana) in Antarctic Peninsula area. Chinese Journal of Oceanology and Limnology 7(2): 97-104.

Siegel V. 1989. Winter and spring distribution and status of the krill stock in Antarctic Peninsula waters. Arch Fisch-wiss 39: 45–72.

Makarov R, MensheninaL, Spiridonov V. 1990. Distributional ecology of euphausiid larvae in the Antarctic Peninsula region and adjacent waters (Eleventh Symposium on Polar Biology). In Proceedings of the NIPR Symposium on Polar Biology (Vol. 3, pp. 23-35).

Makarov RR, Menshenina LL. 1989. On the distribution of euphausiid larvae in the Antarctic waters. Okeanologiya 29(5): 825-831 (or Oceanology 29(5): 623-627).

Brinton E. 1991. Distribution and population structures of immature and adult Euphausia superba in the western Bransfield Strait region during the 1986-87 summer. Deep Sea Research Part A. Oceanographic Research Papers 38(8): 1169-1193.

Brinton E, Huntley M, Townsend AW. 1986. Larvae of Euphausia superba in the Scotia Sea and Bransfield Strait in March 1984—development and abundance compared with 1981 larvae. Polar Biology 5(4): 221-234.

Capella JE, Quetin LB, Hofmann EE, Ross RM. 1992. Models of the early life history of Euphausia superba—Part II. Lagrangian calculations. Deep Sea Research Part A. Oceanographic Research Papers 39(7): 1201-1220.

Rakusa-Suszczewski S. 1984. Krill larvae in the Atlantic sector of the Southern Ocean during FIBEX 1981. Polar Biology 3(3): 141-147.

SC-CAMLR-XXXIII/BG/41. 2014. Relative densities of early Euphausiid larvae in the Weddell-Scotia Confluence - Delegation of Argentina.

**Dom1\_OBJ7\_185-186-CDW\_poly**

[Description] Domain 1 Marine Protected Area (West Antarctic Peninsula and South Scotia Arc, D1MPA). Conservation Objective 7: Important areas for zooplankton life cycles. Krill spawning/recruitment areas.

[Data sources] Krill density data was compiled from US AMLR surveys, 2011 German cruise, and Argentine surveys.

[Methods] Polygons were visually defined identifying areas where Circumpolar Deep Water (CDW) intrudes onto the continental shelf or into the Bransfield Strait and area immediately south of Elephant Island. For the SW continental shelf: In general, the offshore edges of these polygons were drawn by considering the 500 m isobath and identifying locations where that isobath intersected the continental slope or was very close to the slope (thus allowing CDW to spill over the top of any sills). The polygons were then largely drawn to follow the 500 m isobaths inshore. Note that the 500 m isobath is generally not continuous on the shelf (e.g., there are basins on the shelf like the Palmer Deep), but CDW can spill across these discontinuities if the intervening depths are not too shallow. Thus, the polygons extend past such discontinuities as well. In general, the offshore edges of these polygons were drawn by considering the 500 m isobath and identifying locations where that isobath intersected the continental slope or was very close to the slope on the ACC side of the South Shetland Islands. The polygons were then largely drawn to follow the 500 m isobaths and curve eastward (as per Coriolis forcing). The polygons were "validated" by comparison with observations of larval krill (e.g. Figure 8 from Siegel 1989). Polygons were cut to the spatial resolution of Domain 1. CRS: EPSG:102020 - South\_Pole\_Lambert\_Azimuthal\_Equal\_Area.

[Fields] Name: unique name for each feature; Process: circumpolar deep water process; CDW\_ID: unique code for each circumpolar deep water current; IDSP: unique numeric code for each feature needed for running Marxan.

[References] Dinniman MS, Klinck JM. 2004. A model study of circulation and cross-shelf exchange on the west Antarctic Peninsula continental shelf. Deep Sea Research Part II: Topical Studies in Oceanography 51(17): 2003-2022.

Dinniman MS, Klinck JM, Smith WO. 2011. A model study of Circumpolar Deep Water on the West Antarctic Peninsula and Ross Sea continental shelves. Deep Sea Research Part II: Topical Studies in Oceanography 58(13): 1508-1523. (supplementary material available at http://www.ccpo.odu.edu/~msd/DSRpaper/ ).

Martinson DG, Stammerjohn SE, Iannuzzi RA, Smith RC, Vernet M. 2008. Western Antarctic Peninsula physical oceanography and spatio–temporal variability. Deep Sea Research Part II: Topical Studies in Oceanography 55(18): 1964-1987.

Martinson DG, McKee DC. 2012. Transport of warm Upper Circumpolar Deep Water onto the western Antarctic Peninsula continental shelf. Ocean Science: 8(4): 433.

Piñones A, Hofmann EE, Dinniman MS, Klinck JM. 2011. Lagrangian simulation of transport pathways and residence times along the western Antarctic Peninsula. Deep Sea Research Part II: Topical Studies in Oceanography 58(13): 1524-1539.

Piñones A, Hofmann EE, Daly KL, Dinniman MS, Klinck JM. 2013. Modeling the remote and local connectivity of Antarctic krill populations along the western Antarctic Peninsula. Marine Ecology Progress Series 481: 69-92.

Prézelin BB, Hofmann EE, Mengelt C, Klinck JM. 2000. The linkage between Upper Circumpolar Deep Water (UCDW) and phytoplankton assemblages on the west Antarctic Peninsula continental shelf. Journal of Marine Research 58(2): 165-202.

Siegel V. 1989. Winter and spring distribution and status of the krill stock in Antarctic Peninsula waters. Arch Fisch-wiss 39: 45-72.

**Dom1\_OBJ8\_187-189-rare-unique-habitats-seamounts\_poly**

[Description] Domain 1 Marine Protected Area (West Antarctic Peninsula and South Scotia Arc, D1MPA). Conservation Objective 8: Rare or unique habitats/features. Seamounts.

[Data sources] The seamounts layer was generated using geomorphic data from the Global Seafloor Geomorphology dataset (publicly available from www. bluehabitats.org, and described in Harris et al. 2014). Additional features from O’Brien et al. (2009) are also incorporated.

[Methods] Seamounts were classified into three categories, according to depth (bathome, Smith and Sandwell 1997), geomorphology (O’Brien et al. 2009, Harris et al. 2014) and geographic location (ecoregion), using the Douglass et al. 2014 environment types:

1) Seamounts and seamount ridges shallower than 2000m depth (occurring in all ecoregions),

2) Seamounts and seamount ridges deeper than 2000m depth occurring in the South Orkney Islands,

3) Seamounts and seamount ridges deeper than 2000m depth occurring in the Antarctic Peninsula.

Polygons were cut to the spatial resolution of Domain 1. CRS: EPSG:102020 - South\_Pole\_Lambert\_Azimuthal\_Equal\_Area.

[Fields] Name: depth (m) range of each region (>2000m, >2000m AP, >2000m SOI); Geomorphic: type of geomorphic (seamount or seamount ridges); SeamountID: unique alphanumeric code for each seamount; SM\_Area: surface (km2) of each unique seamount/seamount ridges; Height: height (m) of each seamount/seamount ridges; Peak\_Depth: maximum depth of each seamount/seamount ridges; Ecoregion: two of the ecoregion identified in the Southern Ocean benthic bioregionalization process (Antarctic Peninsula and South Orkney Islands); EcoID: short code representing the Ecoregion (AP: Antarctic Peninsula, SOI: South Orkney Islands); Geomorph: geomorphological feature, according to O’Brien et al. (2009). There are 18 geomorph classes identified; Bathome: group class indicating the depth range of the object. There are 8 depth classes or bathomes; BathID: unique numeric code for each Bathome; EcoGeo: combination of Ecoregion and Geomorph; EnvTyp: combination of Ecoregion and Geomorphand Bathome; EnvTypArea: surface (km2) of each EnvTyp combination; Source: data source

[References] Harris PT, MacMillan-Lawler M, Rupp J, Baker EK. 2014. Geomorphology of the oceans. Marine Geology 352, 4-24.

O'Brien PE, Post AL, Romeyn R. 2009.Antarctic-wide Geomorphology as an aid to habitat mapping and locating vulnerable marine ecosystems. Submitted to the Science Committee to the Commission of Antarctic Marine Living Resources (SC-CAMLR-XXVIII/10) Workshop on Vulnerable Marine Ecosystems held in La Jolla, CA, USA 3-7th August 2009. Document number WS-VME-09/10.Canberra, Australia: GeoScience Australia.

Smith W, Sandwell D. 1997.Global sea floor topography from satellite altimetry and ship depth soundings. Science 277: 1956.

Douglass L, Beaver D, Turner J, Kaiser S, Constable A, Raymond B, Post A, Brandt A, Grantham H, Nicoll R. 2014 (updated 2014). Southern Ocean Benthic Classification (SOBC) - ecoregions, bathomes and environmental types Australian Antarctic Data Centre - doi: http://dx.doi.org/10.4225/15/53A3760D4AFAA.