

# **Exploring dependencies of multivariate seabird distributions: Linking graphical models to social network analysis**

Matthias Eckardt

*Humboldt-Universität zu Berlin, Berlin, Germany.*

E-mail: Author@emailaddress.com

Earvin Balderama

*Loyola University Chicago, Chicago, IL, USA.*

**Summary.** Graphical modeling of seabird distributions. Simultaneous estimation of conditional spatial interrelation for a subset of 79 seabird species by means of a spatial dependence graph model (SDGM). Linkage to Social network analysis toolbox to detect the most influential species (in term of importance within the estimated SDGM)

**Keywords:** Graphical modeling, Species importance, Marked point process, Network centrality measures, Seabird distribution

## **1. Introduction**

The occurrence of a sea bird species in a particular location is affected (either positively or negatively) by the occurrence of other species in the same location. Thus, external factors that may cause changes to the distribution of a single species will undoubtedly have an effect on the

distribution of other species. Determining these associations between different species has been difficult (CITATIONS), especially when trying to associate many species all at once.

Quantifying the spatial dependence structure between bird species and environmental covariates is important. While studies have related the spatial distribution of one species with that of a prey or predator species, or of environmental variables acting as proxies for climate (Goyert et al. 2014, 2016), there has been relatively few studies that investigate and utilize measures of inter-species dependence.

Community models may combine several species, known to have facilitative interactions with each other, into one model (Goyert et al. 2016; Sollmann et al. 2016). However, these models treat the observed data the same way as if the observations are of only one species.

Studying the degree of interaction between species may help inform ocean planning. Mapping the distribution of rare and endangered avian species is important when planning the placement of offshore wind farms. Such rare species are obviously difficult to monitor, so finding a more commonly occurring species that is highly dependent with the rare species has ecological importance.

Attempts at modeling between-species interactions are often limited to the bivariate case (Andersen 1992; Nightingale et al. 2015). For three or more species, models are usually hindered by computing time due to the estimation of very many interaction parameters (Jalilian et al. 2015).

Ecological data usually contains spatial observations from multiple species of interest.

There is a need for fast and practically applicable methods for analysing multivariate point patterns, and is currently a growing but challenging

topic for researchers (Møller and Waagepetersen 2016).

Information on the distribution of sea birds, especially in the form of maps, is of particular interest to ecologists, environmentalists and policy-makers. Maps conveying the spatial and temporal distribution over the US Mid- and Northeast-Atlantic ocean regions were created by Balderama et al. (2016) for several individual species of marine birds.

Models are usually run on individual species. There is a danger in this in that it is generally known that species distributions are not independent. Maps of the spatial distribution of marine birds undoubtedly have some overlap

However, a multivariate analysis of sea bird distribution would be very useful in determining how bird species affect one another's presence.

This will also help us to categorize observations of unidentified or unknown species to those of identified species.

There are several advantages with this approach:

1. These observations are usually removed before analyzing data at the species level.

Here we include these locations of unknown species and from the results may be able to determine what species they are more likely to be from the resulting network map.

## **2. Data**

Data are point locations of marine bird sightings over the Northeast- and Mid-Atlantic coast regions of the United States, as described in Balderama et al. (2016). The point locations are the longitude and latitude coordinates of the midpoints of line transect segments from boat and aerial surveys between July, 1998 and April, 2014. Species are labelled

by its common name and a four-letter species code. Names that include the word “unidentified” accommodate birds identified to a family but not to a species.

Table 1 shows a summary of the observed data by species code and common name. There are 79 different codes. However, some codes signify an unidentified or partially identified species.

*For our analysis we considered on 128812 locations on marine bird sightings related to 306 different marine birds. Form this data, we pre-selected a sample of 204 species which have have at least been observed at three locations. By this, our analysis covered 128674 different locations.*

The observed planar point patterns for the 20 most frequently recorded bird species is shown in Figure 1.

### Maybe reduce table to most frequent species, eg. top 20 birds

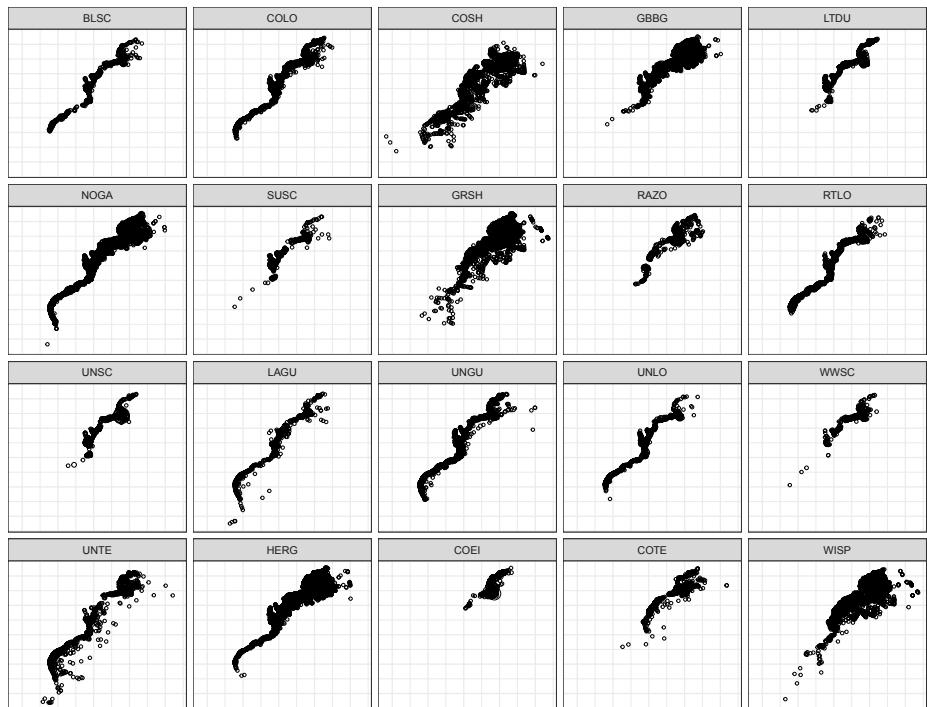
Table 1: Summary of observed data by species code.

Species code	Common name	sightings	average mark			
ABDU	American Black Duck	47	1.25			
ARTE	Arctic Tern	103	0.94			
ATPU	Atlantic Puffin	403	1.17			
AUSH	Audubon's Shearwater	86	1.20			
BRSP	Band-rumped Storm-petrel	23	0.29			
BARS	Barn Swallow	99	0.34			
BCPE	Black-capped Petrel	3	1.56			
BLKI	Black-legged Kittiwake	971	1.45			
BLGU	Black Guillemot	75	0.42			
BLSC	Black Scoter	669	4.31			
BOGU	Bonaparte's Gull	708	0.99			
BRPE	Brown Pelican	92	0.29			
BUFF	Bufflehead	159	1.86			
COEI	Common Eider	528	59.74			
COGO	Common Goldeneye	82	1.25			
COLO	Common Loon	1900	0.51			
COMU	Common Murre	153	0.88			
COTE	Common Tern	982	1.80			
COSH	Cory's Shearwater	1138	2.69			

DASC	Dark Scoter (Black or Surf)	199	2.09
DCCO	Double-crested Cormorant	354	2.37
DOVE	Dovekie	962	5.73
FOTE	Forster's Tern	119	0.52
GBBG	Great Black-backed Gull	3319	2.46
UBBG	Great or Lesser Black-backed Gull	299	0.18
GRSH	Great Shearwater	3732	8.99
GRSK	Great Skua	117	0.61
HERG	Herring Gull	3978	2.71
HOGR	Horned Grebe	65	0.07
LAGU	Laughing Gull	856	0.80
LESP	Leach's Storm-petrel	1005	3.63
LETE	Least Tern	61	0.27
LBBG	Lesser Black-backed Gull	97	0.30
LTDU	Long-tailed Duck	851	8.64
MASH	Manx Shearwater	374	0.92
NOFU	Northern Fulmar	1688	5.25
NOGA	Northern Gannet	3451	2.51
PAJA	Parasitic Jaeger	154	0.37
POJA	Pomarine Jaeger	287	0.70
RAZO	Razorbill	908	1.26
REPH	Red Phalarope	394	8.64
RBME	Red-breasted Merganser	220	0.78
RNGR	Red-necked Grebe	49	0.11
RNPH	Red-necked Phalarope	207	7.65
RTLO	Red-throated Loon	1400	0.59
RBGU	Ring-billed Gull	530	0.71
ROST	Roseate Tern	115	0.88
ROYT	Royal Tern	207	0.22
SOSH	Sooty Shearwater	871	6.69
SPSK	South Polar Skua	169	0.74
SUSC	Surf Scoter	678	4.96
TBMU	Thick-billed Murre	83	1.33
UNAL	Unidentified Alcid	555	0.71
UNBI	Unidentified Bird	543	1.06
UNCO	Unidentified Cormorant	99	0.43
UNDD	Unidentified Diving/Sea Duck	121	0.80
UNGO	Unidentified Goldeneye	34	2.29
UNGR	Unidentified Grebe	63	0.06
UNGU	Unidentified Gull	984	2.98
UNJA	Unidentified Jaeger	78	0.46
UNLA	Unidentified Large Alcid (Razorbill or Murre)	330	0.84
UNLG	Unidentified Large Gull	553	3.51
UNLT	Unidentified Large Tern	91	0.35

UNLO	Unidentified Loon	754	0.64		
UNME	Unidentified Merganser	117	0.97		
UNMU	Unidentified Murre	73	1.98		
UNPA	Unidentified Passerine	97	0.47		
UNPH	Unidentified Phalarope	292	28.47		
SCAU	Unidentified Scaup	52	11.02		
UNSC	Unidentified Scoter	703	26.64		
UNSH	Unidentified Shearwater	364	3.80		
SHOR	Unidentified Shorebird	87	1.96		
UNSK	Unidentified Skua	89	0.67		
UNSG	Unidentified Small Gull	313	0.38		
UNST	Unidentified Small Tern	184	0.18		
UNSP	Unidentified Storm-petrel	379	40.11		
UNTE	Unidentified Tern	619	2.62		
WWSC	White-winged Scoter	522	2.78		
WISP	Wilson's Storm-petrel	2746	6.88		

While some marine bird species such as various types of gulls have been sighted at numerous locations, other species occurred only very rarely. At the same time, as we defined a minimum of at least 50 marine birds per species as inclusion criteria, this limited number of locations equivalently implies that certain marine bird species appeared in groupings rather than as isolated birds or occurred only in a geographically strictly-limited habitat. An example of such only rarely observed species are black-capped petrels whose 50 counted sighting have only been recorded at  $n = 3$  different locations. This reflects our expectations, as black-capped petrels have been classified as endangered species by the IUCN Red List of Threatened Species. Discovering the relevant subset of species whose spatial occurrence is linked to the spatial pattern of any endangered species by means of a SDGM might provide new insights into multivariate interdependencies. This new insights might provide important knowledge for the conservation of endangered species and might assist to understand such phenomena from a global perspective on different natural environments.



**Fig. 1.** Spatial point patterns of the 20 most frequently observed marine bird species.

### 3. Methods

data as multivariate marked spatial point process as defined in Eckardt and Mateu (2016) literature on point process Chiu et al. (2013), Illian et al. (2008) and Stoyan and Stoyan (1994). For a comprehensive treatment of various models and statistics for marks and points we refer the interested reader to Illian et al. (2008), Baddeley (2010) and Wiegand and Moloney (2013)

- We estimate the conditional spatial dependence structure between different seabird species
- that is, structural dependence between two patterns conditional on all remaining patterns
- so not interrelation between points  $i$  and  $j$ , but interrelations between components  $i$  and  $j$  where  $i$  and  $j$  are sets of points within a bounded planar region.
- edges express the partial (pairwise) interrelation between two species conditional on all remaining species
- we omit to implement a formal test statistic as we assume that dependence might vary between species
- we set a threshold indicating weak/ intermediate partial effects
- we combine spatial dependence graph model with importance tools of social network analysis
- info can provide important insights for species conservation
- eg which are the most important species in the overall graph

Primary idea by Eckardt (2016a), extension to multivariate spp with quantitative marks by Eckardt and Mateu (2016)

Analysis was carried out using the `sdgm` R package of Eckardt (2016b).

For an intense description of different aspects of network analysis we refer the interested reader to Carrington et al. (2005), Kolaczyk (2009) and Goldenberg et al. (2010).

Although graphical modelling and network analysis are two distinct fields and are in general treated separately, the conjunction of both fields could offer additional benefits for the analysis of multivariate spatial data. Especially for the analysis of high-dimensional spatial data one might be interested in the structural importance of a distinct node in a given SDGM. That is, how substantial is the impact of a certain node on the observed network structure. Queries of this type are covered by centrality measures which aim to value the importance of a distinct node in the network. Although a rich methodological toolbox for the structural analysis of (social) network data exist, we only we considered four different centrality measures: the degree, the closeness, the betweenness and the eigenvector centrality (cf. Borgatti and Everett (2006); ?; Newman and Girvan (2004)). Although these measure are similar in spirit, they are different in detail and each of these three centrality measures formalizes a different concept of importance from a (social) network perspective.

**meaning** Betweenness centrality measures the number of shortest paths going through a specific vertex

Closeness is the mean geodesic distance between a given node and all other nodes with paths from the given node to the other node. This is close to being the mean shortest path, but geodesic distances give higher

values for more central nodes.

Eigenvector centrality gives greater weight to a node the more it is connected to other highly connected nodes. A node connected to five high-scoring nodes will have higher eigenvector centrality than a node connected to five low-scoring nodes. Thus, it is often interpreted as measuring a node's network

For our analysis we estimated all marked auto- and cross-spectral densities for all 204 species nonparametrically using a discrete Fourier transform of the demeaned mark values. From this, we computed separate spectra density matrices of dimension  $204 \times 204$  for all frequencies. To obtain the mSDGM, we finally inverted and rescaled each matrix such that an edge in the mSDGM is equivalent to non-vanishing absolute rescaled marked inverse spectral value in at least one frequency. To capture variation in strength of spatial interdependencies in our data, we choose two arbitrary thresholds  $\alpha$  for the edges below of which we assume two patterns as conditional uncorrelated. That is, as our data contains a wide range of differently-sized of marine bird species we assume a variation in strength of spatial interrelations between different types of trees. A similar idea has been proposed by Gather et al. (2002) with respect to intensive care monitoring.

computed two different mSDGMs by using two thresholds  $\alpha = 0.3$  and  $\alpha = 0.6$ .

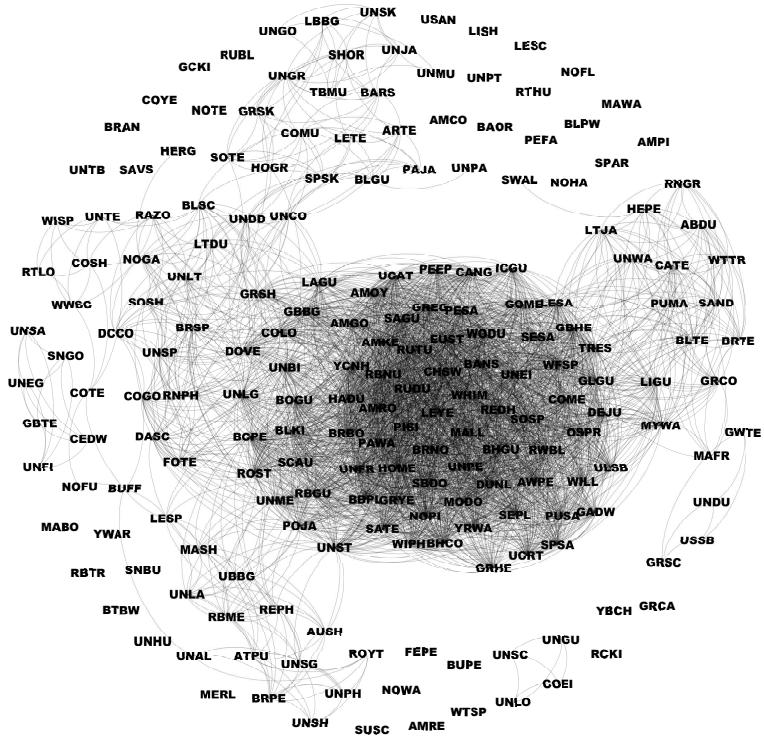
## 4. Results

★ in general: important for species conservation: e.g. black-capped petrels only linked to unidentified goldeneyes, both listed as threatened species by IUCN.

- ★ most important species by means of the degree centrality are unidentified alcids, Arctic terns, barn swallows, red phalaropes, dovekies, buffleheads, brown pelicans, unidentified mergansers and great black-backed gulls.
- ★ these species are most often linked to alternative species (no. adjacent species)
  - ★ buffleheads, royal terns, unidentified alcids, Arctic terns, common murres, barn swallows, greater shearwaters, manx shearwaters, Bonaparte's gulls and Northern gannets are the most important species by means of the betweenness centrality.
  - ★ these species are most often intermediate species, that is most links from a to b path through these species

For our first mSDGM, we considered a threshold  $\alpha = 0.3$  which we interpret as a conditional interrelation of weak effect size. For this, we treated all values of the empirical absolute rescaled marked inverse spectra below  $\alpha = 0.3$  as zero. The resulting mSDGM is depicted in Figure 2.

This SDGM consisted of two 4-node subgraphs, a 6- node subgraph and a 153-node subgraph and of 3400 edges. Besides, we also found 37 isolated species (AMCO, AMPI, AMRE, BAOR, BLPW, BRAN, BTBW, BUPE, COYE, FEPE, GCKI, GRCA, LESC, LISH, MABO, MAWA, MERL, NOFL, NOHA NOTE, NOWA, PEFA, RBTR, RCKI, RTHU, RUBL, SAVS, SNBU, SPAR, Surf Scoter, UNHU, UNPT, UNTB, USAN, WTSP, YBCH, YWAR). These findings imply that non of the 37 species are interrelated to any other species taken into account at threshold  $\alpha = .3$ . This could mean that the isolated nodes tend to represent species whose marked point patterns are different from all remaining marked point patterns taken into account. This is an interesting result as the



**Fig. 2.** Marked spatial dependence graph model for the 204 different marine bird species, and bird counts as quantitative mark for a threshold level of  $\alpha = 0.3$ .

isolated nodes are related to both frequent and endangered species and also differently-sized types of marine birds. One reason for this could be due to our sample scheme. We restricted the dataset to a subset of 204 different marine bird species, so while there probably are interrelations of this 37 aerial species to alternative types of birds, the alternative birds did not appear in our subsample. However, the global interrelations within coastal habitat are very complex and are still not completely understood.

Although several findings could be discussed in detail, we only considered structural interdependies for the marked patterns of Roseate Tern, Least Tern and the endangered species Black-capped Petrel, GBHE, YCNH and SAVS.

We begin our discussion with the structural interrelations for Roseate Tern and Least Tern. While we found 62 conditionally interrelated marked patterns for Roseate Tern, we only observed 10 interdependent species for Least Tern. For Roseate Tern, these species are Dovekie, AMGO, AMKE, AMOY, AMRO, BBPL, BHCO, BHGU, Red-necked Phalarope, Red Phalarope, BRBO, CHSW, DUNL, EUST, Forster's Tern, SBDO, GRYE, HADU, HOME, LEYE, NOPI, MALL, Manx Shearwater, PAWA, PEEP, PESA, PISI, RBNU, REDH, RUDU, RUTU, SAGU, SATE, Unidentified Scaup, Pomarine Jaeger, Red-breasted Merganser, Ring-billed Gull, Great or Lesser Black-backed Gull, UCAT, UNBI, UNFR, UNPE, Unidentified Large Alcid , Unidentified Large Gull, Unidentified Merganser, Unidentified Small Tern, BANS, WHIM, GREG, MODO, Unidentified Storm-petrel, WIPH, WODU, YCNH, YRWA, BRSP, BLKI, Black-capped Petrel, BonapArctic Tern's Gull, BRNO, Common Goldeneye and Dark Scoter. For Least Tern we have edges to Common Murre, Barn Swallow, Arctic Tern, Unidentified Cormorant, Unidentified Shorebird, Uniden-

tified Diving/Sea Duck, South Polar Skua, Unidentified Grebe, Black Guillemot and Parasitic Jaeger.

For GBHE we observed 74 direct interrelations to alternative marine birds, namely AMGO, AMKE, AMOY, AMRO, BBPL, BHCO, BHGU, GRCO, BRBO, CATE, CHSW, COME, DEJU, DUNL, EUST, GADW, GRHE, SBDO, GRYE, HADU, HOME, LESA, LEYE, LIGU, NOPI, HEPE, ICGU, LTJA, MALL, OSPR, PAWA, PEEP, PESA, PISI, PUMA, PUSA, RBNM, REDH, RUDU, RUTU, RWBL, SAGU, SAND, SATE, SEPL, SESA, SOSP, SPSA, TRES, UCAT, ULSB, UNEI, UNFR, UNPE, BANS, UNWA, MYWA, WFSP, WHIM, GLGU, GOME, GREG, MODO, BRTE, WILL, WIPH, WODU, YCNH, YRWA, UCRT, BLTE, BRNO, CANG, and, lastly, AWPE. **These birds are .....**

Similarly, focussing on the interrelation which are present for YCNH, we found 79 links. These interdependent species are AWPE, Common Loon, Dovekie, Great Black-backed Gull, AMGO, AMKE, AMOY, AMRO, BBPL, BHCO, BHGU, Great Shearwater, Roseate Tern, BRBO, CHSW, COME, DEJU, DUNL, EUST, GADW, GRHE, GBHE, SBDO, GRYE, HADU, HOME, LESA, LEYE, NOPI, ICGU, Laughing Gull, MALL, OSPR, PAWA, PEEP, PESA, PISI, PUSA, RBNM, REDH, RUDU, RUTU, RWBL, SAGU, SATE, Unidentified Scaup, SEPL, SESA, SOSP, Pomarine Jaeger, Ring-billed Gull, SPSA, TRES, UCAT, ULSB, UNBI, UNEI, UNFR, UNPE, Unidentified Large Gull, Unidentified Merganser, Unidentified Small Tern, BANS, WFSP, WHIM, GLGU, GOME, GREG, MODO, WILL, WIPH, WODU, YRWA, UCRT, BLKI, Black-capped Petrel, BonapArctic Tern's Gull, BRNO and CANG. **These birds are .....**

For Black-capped Petrel, we found 64 alternative marked point patterns which are directly interrelated to the spatial marked pattern of

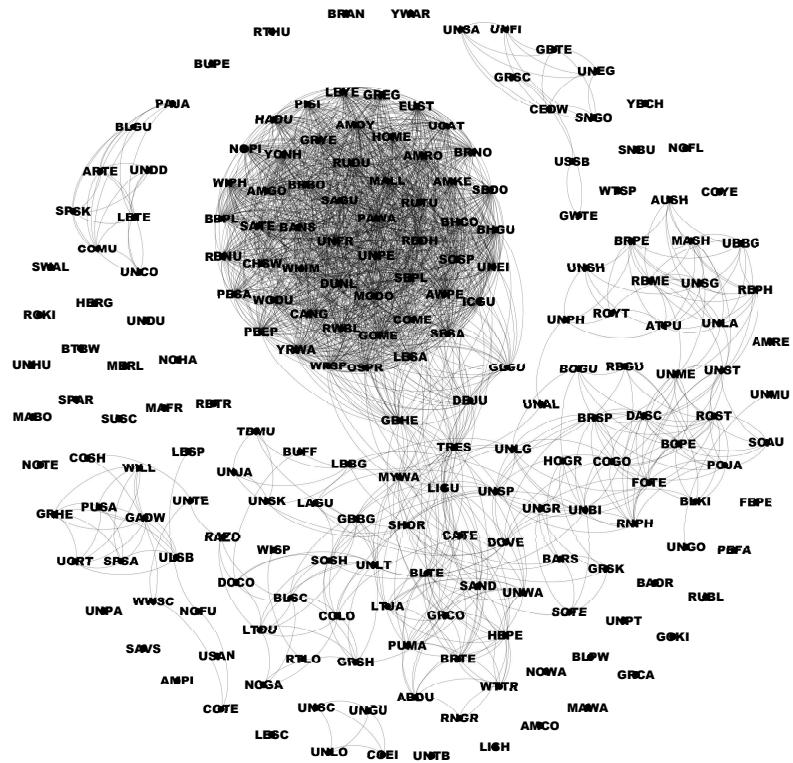
Black-capped Petrel. These species are Dovekie, AMGO, AMKE, AMOY, AMRO, BBPL, BHCO, BHGU, Red-necked Phalarope, Red Phalarope, Roseate Tern, BRBO, CHSW, DUNL, EUST, Forster's Tern, SBDO, GRYE, HADU, HOME, LEYE, NOPI, Horned Grebe, Laughing Gull, MALL, Manx Shearwater, PAWA, PESA, PISI, RBNU, REDH, RUDU, RUTU, SAGU, SATE, Unidentified Scaup, Pomarine Jaeger, Red-breasted Merganser, Ring-billed Gull, Sooty Shearwater, Great or Lesser Black-backed Gull, UCAT, UNBI, UNFR, UNPE, Unidentified Large Alcid , Unidentified Large Gull, Unidentified Merganser, Unidentified Small Tern, BANS, WHIM, GREG, MODO, Unidentified Storm-petrel, WIPH, WODU, YCNH, YRWA, BRSP, BLKI, BonapArctic Tern's Gull, BRNO, Common Goldeneye, and Dark Scoter. **These birds are .....**

### **Interestingly, SAVS is isolated in both SDGMs**

These findings imply the presence of complex conditional interdependencies between the marked spatial pattern of GBHF and also YCNH to a wide range of alternative species whereas we found no spatial interdependencies for SAVS to any alternative species taken into account.

As a second model, we also computed a SDGM for a threshold  $\alpha = .6$ . (we interpret this as interdependencies of intermediate effect size). The resulting mSDGM is depicted in Figure 3.

In this SGDM, we observed two pairs of joined nodes, a 3-node subgraph, a 4-node subgraph, a 6-node subgraph, a 7-node subgraph, a 8-node subgraph, a 10-node subgraph, a 49-node subgraph and a , a 4-node subgraph, a 6-node subgraph, a 71-node subgraph and 1880 edges. In addition, we also found 42 isolated nodes, namely AMCO, AMPI, AMRE, BAOR, BLPW, BRAN, BTBW, BUPE, COYE, FEPE, GCKI, GRCA, Herring Gull, LESC, LISH, MABO, MAFR, MAWA, MERL,



**Fig. 3.** Marked spatial dependence graph model for the 204 different marine bird species, and bird counts as quantitative mark for a threshold level of  $\alpha = 0.3$ .

NOFL, NOHA, NOTE, NOWA, PEFA, RBTR, RCKI, RTHU, RUBL, SAVS, SNBU, SPAR, Surf Scoter, SWAL, UNDU, UNHU, Unidentified Passerine, UNPT, UNTB, USAN, WTSP, YBCH, YWAR. Again, for the isolated nodes, we concluded that non of marked spatial patterns of these species is conditionally interdependent to any alternative marked pattern taken into account at a threshold  $\alpha = .6$ .

As before, we first discuss the spatial interdependencies for Roseate Tern and Least Tern. In contrast to our previous findings, only 13 edges remain for Roseate Tern at a threshold  $\alpha = .6$ , namely Red-necked Phalarope, Forster's Tern, Unidentified Scaup, Pomarine Jaeger, Ring-billed Gull, Unidentified Merganser, Unidentified Small Tern, BRSP, BLKI, Black-capped Petrel, BonapArctic Tern's Gull, Common Golden-eye, and Dark Scoter.

Least Tern is linked to 7 from 204 species, named: Common Murre Arctic Tern Unidentified Cormorant Unidentified Diving/Sea Duck South Polar Skua Black Guillemot Parasitic Jaeger

.....

With respect to the marked spatial pattern of GBHE, the neighborhood consisted of 41 alternative species, namely AWPEBANS, BHCO, BHGU, BLTE, CATE, CANG, CHSW, COME, DEJU, DUNL, GLGU, GOME, GRCO, LESA, LIGU, ICGU, LTJA, MALL, MODO, MYWA, OSPR, PAWA, PEEP, PUMA, REDH, RUTU, RWBL, SAND, SEPL, SESA, SOSP, TRES, UNEI, UNFR, UNPE, UNWA, YRWA, WFSP, WHIM, and WODU.

...

For YCNH we detected 52 interrelated species at a threshold  $\alpha = .6$ . AMGO, AMKE, AMOY, AMRO, BBPL, BHCO, BHGU, BRBO, CHSW,

COME, DUNL, EUST, SBDO, GRYE, HADU, HOME, LESA, LEYE, NOPI, ICGU, MALL, OSPR, PAWA, PEEP, PESA, PISI, RBNU, REDH, RUDU, RUTU, RWBL, SAGU, SATE, SEPL, SESA, SOSP, UCAT, UNEI, UNFR, UNPE, BANS, WFSP, WHIM, GOME, GREG, MODO, WIPH, WODU, YRWA, BRNO, CANG and AWPE.

...

Similarly, only 13 conditional interdependencies remained with respect to the marked pattern of Black-capped Petrel for a threshold  $\alpha = .6$  including the marked point patterns of Red-necked Phalarope, Roseate Tern, Forster's Tern, Unidentified Scaup, Pomarine Jaeger, Ring-billed Gull, Unidentified Merganser, Unidentified Small Tern, BRSP, BLKI, BonapArctic Tern's Gull, Common Goldeneye and also Dark Scoter.

To detect the most influential species within our data, we compute 4 different centrality measures (listed Table 2). The results for the threshold  $\alpha = .3$  are listed below, isolated species excluded.

betweenness centrality is shown in Figure 4

For this plot, we found that BCPE is the most important marine bird species by means of the betweenness centrality measure. Besides BCPE, we observed a high importance of UNST, HOGR as well as GBBG amongst other species.

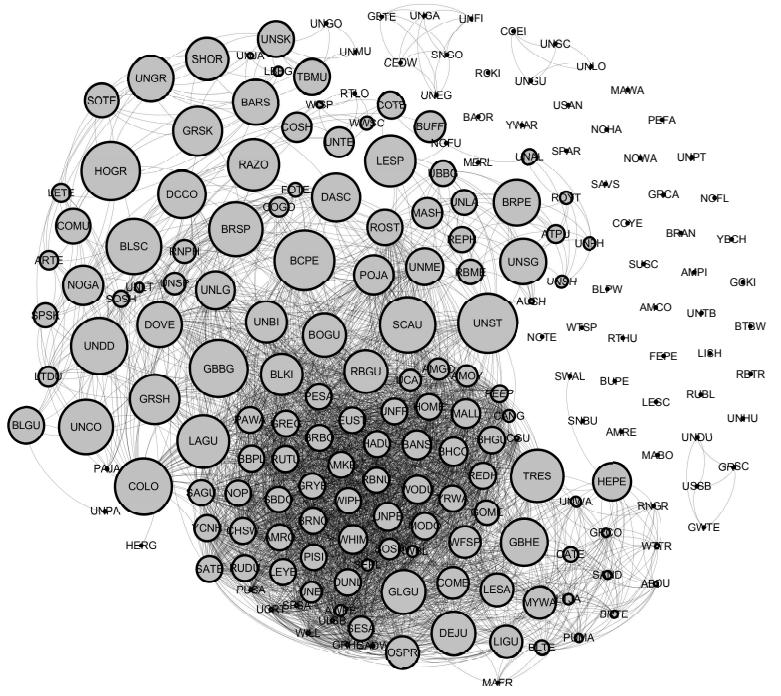
Similar calculations have been performed for the threshold  $\alpha = 0.6$ .

The results are given below, isolated species excluded.

39	COME	58	49.987456	$3.674174 \times 10^{-5}$	$1.000000 \times 10^0$
59	LESA	58	49.987456	$3.674174 \times 10^{-5}$	$1.000000 \times 10^0$
82	OSPR	58	49.987456	$3.674174 \times 10^{-5}$	$1.000000 \times 10^0$
104	SESA	58	49.987456	$3.674174 \times 10^{-5}$	$1.000000 \times 10^0$
155	WFSP	58	49.987456	$3.674174 \times 10^{-5}$	$1.000000 \times 10^0$

**Table 2.** Centrality measures for SDGM for threshold  $\alpha = .3$ . Isolated nodes excluded.

code	degree	betweenness	closeness	eigen
MALL	80	80.370354	$9.37E - 05$	$1.000000e + 00$
BANS	80	80.370354	$9.37E - 05$	$1.000000e + 00$
WHIM	80	80.370354	$9.37E - 05$	$1.000000e + 00$
WODU	80	80.370354	$9.37E - 05$	$1.000000e + 00$
AMKE	79	64.521344	$9.37E - 05$	$9.930130e - 01$
AMRO	79	64.521344	$9.37E - 05$	$9.930130e - 01$
BBPL	79	64.521344	$9.37E - 05$	$9.930130e - 01$
BHCO	79	74.852463	$9.37E - 05$	$9.917427e - 01$
BRBO	79	64.521344	$9.37E - 05$	$9.930130e - 01$
CHSW	79	64.521344	$9.37E - 05$	$9.930130e - 01$
EUST	79	64.521344	$9.37E - 05$	$9.930130e - 01$
SBDO	79	64.521344	$9.37E - 05$	$9.930130e - 01$
GRYE	79	64.521344	$9.37E - 05$	$9.930130e - 01$
HADU	79	64.521344	$9.37E - 05$	$9.930130e - 01$
HOME	79	64.521344	$9.37E - 05$	$9.930130e - 01$
LEYE	79	64.521344	$9.37E - 05$	$9.930130e - 01$
NOPI	79	64.521344	$9.37E - 05$	$9.930130e - 01$
PAWA	79	64.521344	$9.37E - 05$	$9.930130e - 01$
PESA	79	64.521344	$9.37E - 05$	$9.930130e - 01$
PISI	79	64.521344	$9.37E - 05$	$9.930130e - 01$
RBNU	79	64.521344	$9.37E - 05$	$9.930130e - 01$
RUDU	79	64.521344	$9.37E - 05$	$9.930130e - 01$
RUTU	79	64.521344	$9.37E - 05$	$9.930130e - 01$
SAGU	79	64.521344	$9.37E - 05$	$9.930130e - 01$
SATE	79	64.521344	$9.37E - 05$	$9.930130e - 01$
UNFR	79	64.521344	$9.37E - 05$	$9.930130e - 01$
UNPE	79	74.852463	$9.37E - 05$	$9.917427e - 01$
GREG	79	64.521344	$9.37E - 05$	$9.930130e - 01$
WIPH	79	64.521344	$9.37E - 05$	$9.930130e - 01$
YCNH	79	64.521344	$9.37E - 05$	$9.930130e - 01$
BRNO	79	64.521344	$9.37E - 05$	$9.930130e - 01$
BHGU	78	70.510241	$9.37E - 05$	$9.829660e - 01$
DUNL	78	70.510241	$9.37E - 05$	$9.829660e - 01$



**Fig. 4.** Betweenness centrality for the marked spatial dependence graph model for the 204 different marine bird species, and bird counts as quantitative mark for a threshold level of  $\alpha = 0.3$ .

160	GOME	58	49.987456	3.674174e-05	1.000000e+00
74	ICGU	56	19.908538	3.673904e-05	9.943346e-01
97	RWBL	56	19.908538	3.673904e-05	9.943346e-01
103	SEPL	56	19.908538	3.673904e-05	9.943346e-01
107	SOSP	56	19.908538	3.673904e-05	9.943346e-01
123	UNEI	56	19.908538	3.673904e-05	9.943346e-01
203	AWPE	56	19.908538	3.673904e-05	9.943346e-01
23	BHCO	55	8.418041	3.673364e-05	9.894355e-01
24	BHGU	55	8.418041	3.673364e-05	9.894355e-01
42	DUNL	55	8.418041	3.673364e-05	9.894355e-01
93	REDH	55	8.418041	3.673364e-05	9.894355e-01
130	UNPE	55	8.418041	3.673364e-05	9.894355e-01
163	MODO	55	8.418041	3.673364e-05	9.894355e-01
175	YRWA	55	8.418041	3.673364e-05	9.894355e-01
195	CANG	55	8.418041	3.673364e-05	9.894355e-01
38	CHSW	53	4.526542	3.673095e-05	9.742804e-01
79	MALL	53	4.526542	3.673095e-05	9.742804e-01
83	PAWA	53	4.526542	3.673095e-05	9.742804e-01
84	PEEP	53	4.526542	3.673095e-05	9.742804e-01
96	RUTU	53	4.526542	3.673095e-05	9.742804e-01
124	UNFR	53	4.526542	3.673095e-05	9.742804e-01
150	BANS	53	4.526542	3.673095e-05	9.742804e-01
156	WHIM	53	4.526542	3.673095e-05	9.742804e-01
171	WODU	53	4.526542	3.673095e-05	9.742804e-01
14	AMGO	52	0.000000	3.671746e-05	9.636128e-01
15	AMKE	52	0.000000	3.671746e-05	9.636128e-01
16	AMOY	52	0.000000	3.671746e-05	9.636128e-01

19	AMRO	52	0.000000	3.671746 e-05	9.636128 e-01
22	BBPL	52	0.000000	3.671746 e-05	9.636128 e-01
35	BRBO	52	0.000000	3.671746 e-05	9.636128 e-01
43	EUST	52	0.000000	3.671746 e-05	9.636128 e-01
53	SBDO	52	0.000000	3.671746 e-05	9.636128 e-01
54	GRYE	52	0.000000	3.671746 e-05	9.636128 e-01
56	HADU	52	0.000000	3.671746 e-05	9.636128 e-01
57	HOME	52	0.000000	3.671746 e-05	9.636128 e-01
61	LEYE	52	0.000000	3.671746 e-05	9.636128 e-01
69	NOPI	52	0.000000	3.671746 e-05	9.636128 e-01
86	PESA	52	0.000000	3.671746 e-05	9.636128 e-01
87	PISI	52	0.000000	3.671746 e-05	9.636128 e-01
90	RBNU	52	0.000000	3.671746 e-05	9.636128 e-01
95	RUDU	52	0.000000	3.671746 e-05	9.636128 e-01
98	SAGU	52	0.000000	3.671746 e-05	9.636128 e-01
100	SATE	52	0.000000	3.671746 e-05	9.636128 e-01
118	UCAT	52	0.000000	3.671746 e-05	9.636128 e-01
161	GREG	52	0.000000	3.671746 e-05	9.636128 e-01
170	WIPH	52	0.000000	3.671746 e-05	9.636128 e-01
174	YCNH	52	0.000000	3.671746 e-05	9.636128 e-01
193	BRNO	52	0.000000	3.671746 e-05	9.636128 e-01
52	GBHE	41	315.767672	3.672150 e-05	5.731912 e-01
41	DEJU	26	18.848384	3.669994 e-05	4.071560 e-01
116	TRES	26	170.399687	3.670264 e-05	2.632387 e-01
159	GLGU	26	18.848384	3.669994 e-05	4.071560 e-01
62	LIGU	20	75.510551	3.669455 e-05	1.522058 e-01
154	MYWA	20	75.510551	3.669455 e-05	1.522058 e-01

36	CATE	15	23.242211	3.665555e-05	4.061106e-02
146	UNST	15	188.485579	3.148515e-05	1.989399e-16
26	GRCO	14	23.098542	3.665420e-05	2.550392e-02
72	HEPE	14	65.661463	3.663138e-05	1.484379e-02
88	PUMA	14	23.098542	3.665420e-05	2.550392e-02
99	SAND	14	23.098542	3.665420e-05	2.550392e-02
142	UNME	14	137.727271	3.148416e-05	1.492049e-16
191	BLTE	14	23.098542	3.665420e-05	2.550392e-02
6	DOVE	13	111.950982	3.149309e-05	9.946995e-17
29	RNPH	13	63.299561	3.149309e-05	1.492049e-16
32	ROST	13	25.728846	3.147524e-05	4.973498e-17
45	FOTE	13	63.299561	3.149309e-05	9.946995e-17
120	UNBI	13	94.166508	3.149309e-05	4.973498e-17
140	UNLG	13	82.258497	3.149210e-05	0.000000e+00
151	UNWA	13	9.715423	3.665286e-05	2.545595e-02
165	BRTE	13	7.718029	3.663004e-05	1.483630e-02
167	UNSP	13	113.383211	3.149408e-05	0.000000e+00
188	BRSP	13	63.299561	3.149309e-05	9.946995e-17
190	BCPE	13	25.728846	3.147524e-05	4.973498e-17
197	COGO	13	63.299561	3.149309e-05	1.492049e-16
78	LTJA	12	1.513058	3.665152e-05	2.538510e-02
112	SOSH	12	112.611727	3.148813e-05	4.973498e-17
126	UNLT	12	112.611727	3.148813e-05	4.973498e-17
202	DASC	12	45.798378	3.149110e-05	4.973498e-17
108	POJA	11	7.328846	3.147326e-05	0.000000e+00
185	BRPE	11	54.509180	3.144951e-05	9.946995e-17
7	GBBG	10	38.630214	3.148020e-05	1.243374e-16

31	REPH	10	39.426508	3.146138 e-05	7.460246 e-17
80	MASH	10	39.426508	3.146138 e-05	7.460246 e-17
109	RBME	10	39.426508	3.146138 e-05	4.973498 e-17
139	UNLA	10	39.426508	3.146138 e-05	4.973498 e-17
145	UNSG	10	19.096963	3.143666 e-05	9.946995 e-17
148	WTIR	10	6.133804	3.657778 e-05	3.806856 e-03
183	ATPU	10	42.362745	3.144852 e-05	7.460246 e-17
1	BLSC	9	90.311158	3.147029 e-05	4.973498 e-17
2	COLO	9	40.043107	3.147723 e-05	7.460246 e-17
8	LTDU	9	90.311158	3.147029 e-05	1.243374 e-16
117	UBBG	9	19.483694	3.146039 e-05	9.946995 e-17
12	ABDU	8	3.277441	3.657243 e-05	2.577287 e-03
27	GRSH	8	17.044593	3.147425 e-05	4.973498 e-17
114	SHOR	8	11.666667	2.526146 e-05	7.460246 e-17
3	COMU	7	1.000000	2.500563 e-05	7.460246 e-17
25	ARTE	7	1.000000	2.500563 e-05	4.973498 e-17
77	LETE	7	1.000000	2.500563 e-05	0.000000 e+00
133	SPSK	7	1.000000	2.500563 e-05	4.973498 e-17
179	AUSH	7	0.000000	3.143369 e-05	7.460246 e-17
5	DCCO	6	175.595538	3.147524 e-05	7.460246 e-17
21	BARS	6	2.416667	2.526018 e-05	2.486749 e-17
46	GADW	6	0.000000	2.487934 e-05	6.216872 e-17
50	GRHE	6	0.000000	2.487934 e-05	8.703621 e-17
58	LBBG	6	4.000000	2.526018 e-05	4.973498 e-17
75	LAGU	6	0.000000	3.146831 e-05	2.486749 e-17
89	PUSA	6	0.000000	2.487934 e-05	7.460246 e-17
102	SCAU	6	0.000000	3.146534 e-05	2.486749 e-17

110	RBGU	6	3.511946	3.147128e-05	7.460246e-17
115	SPSA	6	0.000000	2.487934e-05	2.486749e-17
119	ULSB	6	0.000000	2.487934e-05	6.216872e-17
137	UNGR	6	2.416667	2.526018e-05	3.730123e-17
169	WILL	6	0.000000	2.487934e-05	6.216872e-17
178	UCRT	6	0.000000	2.487934e-05	4.973498e-17
189	BLKI	6	2.498296	3.146930e-05	4.973498e-17
192	BOGU	6	3.511946	3.147128e-05	4.973498e-17
33	UNCO	5	0.000000	2.500438e-05	4.973498e-17
37	CEDW	5	0.000000	2.475431e-05	6.216872e-17
47	GBTE	5	0.000000	2.475431e-05	6.216872e-17
71	GRSK	5	0.750000	2.525954e-05	6.216872e-17
106	SNGO	5	0.000000	2.475431e-05	4.973498e-17
111	ROYT	5	2.753559	3.142184e-05	4.973498e-17
113	SOTE	5	0.750000	2.525954e-05	4.973498e-17
121	UNDD	5	0.000000	2.500438e-05	7.460246e-17
122	UNEG	5	0.000000	2.475431e-05	3.730123e-17
144	UNSA	5	0.000000	2.475431e-05	4.973498e-17
177	UNFI	5	0.000000	2.475431e-05	3.730123e-17
184	BLGU	5	0.000000	2.500438e-05	6.216872e-17
187	PAJA	5	0.000000	2.500438e-05	3.730123e-17
200	UNPH	5	94.621344	3.143962e-05	4.973498e-17
201	UNSH	5	2.753559	3.142184e-05	3.730123e-17
10	NOGA	4	0.000000	3.144654e-05	3.730123e-17
28	RAZO	4	252.000000	3.144654e-05	3.730123e-17
73	HOGR	4	0.000000	2.525699e-05	3.730123e-17
129	UNJA	4	0.000000	2.525827e-05	3.730123e-17

134	TBMU	4	0.000000	2.525827e-05	0.000000e+00
166	UNSK	4	0.000000	2.525827e-05	2.486749e-17
34	UNSC	3	0.000000	2.450800e-05	3.730123e-17
94	RNGR	3	0.000000	3.654169e-05	4.025636e-04
138	UNGU	3	0.000000	2.450800e-05	4.351810e-17
141	UNLO	3	0.000000	2.450800e-05	4.351810e-17
149	WWSC	3	135.000000	3.137058e-05	2.486749e-17
168	UNTE	3	215.000000	3.140999e-05	4.351810e-17
196	COEI	3	0.000000	2.450800e-05	3.730123e-17
4	COSH	2	0.000000	3.136763e-05	3.108436e-17
9	NOFU	2	47.000000	3.128422e-05	1.243374e-17
51	GRSC	2	0.000000	2.438668e-05	2.486749e-17
55	GWIE	2	0.000000	2.438668e-05	1.865062e-17
135	UNAL	2	92.131464	3.143962e-05	2.486749e-17
153	USSB	2	0.000000	2.438668e-05	1.243374e-17
194	BUFF	2	105.144842	3.145445e-05	1.865062e-17
198	COTE	2	92.000000	3.132832e-05	1.865062e-17
30	RTLO	1	0.000000	2.426654e-05	9.325308e-18
76	LESP	1	0.000000	3.123829e-05	9.325308e-18
125	UNGO	1	0.000000	2.426654e-05	9.325308e-18
143	UNMU	1	0.000000	2.426654e-05	6.216872e-18
199	WISP	1	0.000000	2.426654e-05	6.216872e-18

## 5. Discussion

Methods for studying multivariate species distributions are still not well developed. Future research may focus on niche partitioning and finding

common areas of species overlap.

Identifying ecologically important areas for community assemblages is important in marine spatial planning (Ehler and Douvere 2009), and our study suggests that a diverse set of species may attract (or repel) each other to (or from) feeding areas. We recommend a synthesis of community and ecosystem approaches in applied conservation management, since facilitation and competition fundamentally shape dynamic environmental processes.

### ***Neighbors for $\alpha = 0.3$***

We found the following structure for the threshold  $\alpha = .3$

species BLSC  
is linked to 18 from 204 species , named:  
COLO COMU COSH DCCO DOVE GBBG LTDU NOGA  
GRSH RAZO LAGU SOSH UNBI UNLT SPSK  
UNLG UNSP UNTE

species COLO  
is linked to 60 from 204 species  
BLSC DCCO DOVE GBBG LTDU NOGA AMGO AMKE  
AMOY AMRO BBPL BHCO BHGU GRSH RAZO  
RNPH UNCO BRBO CHSW DUNL EUST FOTE SBDO  
GRYE HADU HOME LEYE NOPI LAGU MALL  
PAWA PEEP PESA PISI RBNU REDH RUDU RUTU  
SAGU SATE SOSH UCAT UNBI UNDD UNFR  
UNLT UNPE UNLG BANS WHIM GREG MODO UNSP  
WIPH WODU YCNH YRWA BRSP BRNO COGO

species COMU

is linked to 13 from 204 species , named:

BLSC BARS ARTE UNCO GRSK HOGR LETE SOTE  
UNDD SPSK UNGR BLGU PAJA

species COSH

is linked to 7 from 204 species , named:

BLSC RAZO RTLO WWSC UNTE COTE WISP

species DCCO

is linked to 18 from 204 species , named:

BLSC COLO DOVE GBBG LTDU NOGA GRSH RAZO  
RNPH FOTE LAGU SOSH UNLT UNLG UNSP  
BRSP BUFF COGO

species DOVE

is linked to 56 from 204 species , named:

BLSC COLO DCCO GBBG LTDU AMGO AMKE AMOY  
AMRO BBPL GRSH RNPH ROST UNCO BRBO  
CHSW EUST FOTE SBDO GRYE HADU HOME LEYE  
NOPI LAGU MALL PAWA PESA PISI RBNU  
RUDU RUTU SAGU SATE POJA RBGU SOSH UCAT  
UNBI UNFR UNLT UNLG BANS WHIM GREG  
UNSP WIPH WODU YCNH BRSP BLKI BCPE BOGU BRNO COGO DASC

species GBBG

is linked to 63 from 204 species , named:

BLSC COLO DCCO DOVE LTDU NOGA AMGO AMKE AMOY  
AMRO BBPL BHCO BHGU GRSH RAZO  
RNPH UNCO BRBO CHSW DUNL EUST FOTE SBDO GRYE  
HADU HOME LEYE NOPI LAGU MALL  
PAWA PEEP PESA PISI RBNU REDH RUDU RUTU SAGU  
SATE SOSP SOSH UCAT UNBI UNDD  
UNEI UNFR UNLT UNPE UNLG BANS WHIM GREG MODO  
UNSP WIPH WODU YCNH YRWA BRSP  
BRNO COGO DASC

species LTDU

is linked to 17 from 204 species , named:

BLSC COLO DCCO DOVE GBBG NOGA GRSH RAZO UNCO  
LAGU SOSH UNBI UNDD UNLT SPSK  
UNLG UNSP

species NOFU

is linked to 2 from 204 species , named:

LESP COTE

species NOGA

is linked to 17 from 204 species , named:

BLSC COLO DCCO GBBG LTDU GRSH RAZO RNPH FOTE LAGU  
SOSH UNDD UNLT UNSP HERG  
BRSP COGO

species SUSC  
is linked to 0 from 204 species

species ABDU  
is linked to 14 from 204 species , named:  
GRCO CATE LIGU HEPE LTJA PUMA RNGR SAND TRES  
WTIR UNWA MYWA BRTE BLTE

species AMCO  
is linked to 0 from 204 species

species AMGO  
is linked to 72 from 204 species , named:  
COLO DOVE GBBG AMKE AMOY AMRO BBPL BHCO BHGU  
GRSH ROST BRBO CHSW COME DEJU  
DUNL EUST GBHE SBDO GRYE HADU HOME LESA LEYE  
NOPI ICGU LAGU MALL OSPR PAWA  
PEEP PESA PISI RBNU REDH RUDU RUTU RWBL SAGU  
SATE SCAU SEPL SESA SOSP POJA  
RBGU TRES UCAT UNBI UNEI UNFR UNPE UNLG UNME  
UNST BANS WFSP WHIM GLGU GOME  
GREG MODO WIPH WODU YCNH YRWA BLKI BCPE BOGU BRNO  
CANG AWPE

species AMKE  
is linked to 79 from 204 species , named:  
COLO DOVE GBBG AMGO AMOY AMRO BBPL BHCO

BHGU GRSH ROST BRBO CHSW COME DEJU  
DUNL EUST GADW GRHE GBHE SBDO GRYE HADU  
HOME LESA LEYE NOPI ICGU LAGU MALL  
OSPR PAWA PEEP PESA PISI PUSA RBNU REDH  
RUDU RUTU RWBL SAGU SATE SCAU SEPL  
SESA SOSP POJA RBGU SPSA TRES UCAT ULSB  
UNBI UNEI UNFR UNPE UNLG UNME UNST  
BANS WFSP WHIM GLGU GOME GREG MODO WILL  
WIPH WODU YCNH YRWA UCRT BLKI BCPE  
BOGU BRNO CANG AWPE

species AMOY

is linked to 72 from 204 species , named:

COLO DOVE GBBG AMGO AMKE AMRO BBPL BHCO  
BHGU GRSH ROST BRBO CHSW COME DEJU  
DUNL EUST GBHE SBDO GRYE HADU HOME LESA  
LEYE NOPI ICGU LAGU MALL OSPR PAWA  
PEEP PESA PISI RBNU REDH RUDU RUTU RWBL  
SAGU SATE SCAU SEPL SESA SOSP POJA  
RBGU TRES UCAT UNBI UNEI UNFR UNPE UNLG  
UNME UNST BANS WFSP WHIM GLGU GOME  
GREG MODO WIPH WODU YCNH YRWA BLKI BCPE  
BOGU BRNO CANG AWPE

species AMPI

is linked to 0 from 204 species

species AMRE  
is linked to 0 from 204 species

species AMRO  
is linked to 79 from 204 species , named:  
COLO DOVE GBBG AMGO AMKE AMOY BBPL BHCO  
BHGU GRSH ROST BRBO CHSW COME DEJU  
DUNL EUST GADW GRHE GBHE SBDO GRYE HADU  
HOME LESA LEYE NOPI ICGU LAGU MALL  
OSPR PAWA PEEP PESA PISI PUSA RBNU REDH  
RUDU RUTU RWBL SAGU SATE SCAU SEPL  
SESA SOSP POJA RBGU SPSA TRES UCAT ULSB  
UNBI UNEI UNFR UNPE UNLG UNME UNST  
BANS WFSP WHIM GLGU GOME GREG MODO WILL  
WIPH WODU YCNH YRWA UCRT BLKI BCPE  
BOGU BRNO CANG AWPE

species BAOR  
is linked to 0 from 204 species

species BARS  
is linked to 12 from 204 species , named:  
COMU ARTE LBBG GRSK HOGR LETE SOTE SHOR  
UNJA TBMU UNGR UNSK

species BBPL  
is linked to 79 from 204 species , named:

COLO DOVE GBBG AMGO AMKE AMOY AMRO BHCO  
BHGU GRSH ROST BRBO CHSW COME DEJU  
DUNL EUST GADW GRHE GBHE SBDO GRYE HADU  
HOME LESA LEYE NOPI ICGU LAGU MALL  
OSPR PAWA PEEP PESA PISI PUSA RBNU REDH  
RUDU RUTU RWBL SAGU SATE SCAU SEPL  
SESA SOSP POJA RBGU SPSA TRES UCAT ULSB  
UNBI UNEI UNFR UNPE UNLG UNME UNST  
BANS WFSP WHIM GLGU GOME GREG MODO WILL  
WIPH WODU YCNH YRWA UCRT BLKI BCPE  
BOGU BRNO CANG AWPE

species BHCO  
is linked to 79 from 204 species , named:  
COLO GBBG AMGO AMKE AMOY AMRO BBPL BHGU  
ROST BRBO CHSW COME DEJU DUNL EUST  
GADW GRHE GBHE SBDO GRYE HADU HOME LESA  
LEYE LIGU NOPI ICGU LAGU MALL OSPR  
PAWA PEEP PESA PISI PUSA RBNU REDH RUDU  
RUTU RWBL SAGU SATE SCAU SEPL SESA  
SOSP POJA RBGU SPSA TRES UCAT ULSB UNBI  
UNEI UNFR UNPE UNLG UNME UNST BANS  
MYWA WFSP WHIM GLGU GOME GREG MODO WILL  
WIPH WODU YCNH YRWA UCRT BLKI BCPE  
BOGU BRNO CANG AWPE

species BHGU

is linked to 78 from 204 species , named:

COLO GBBG AMGO AMKE AMOY AMRO BBPL BHCO  
ROST BRBO CHSW COME DEJU DUNL EUST  
GADW GRHE GBHE SBDO GRYE HADU HOME LESA  
LEYE LIGU NOPI ICGU LAGU MALL OSPR  
PAWA PEEP PESA PISI PUSA RBNU REDH RUDU  
RUTU RWBL SAGU SATE SCAU SEPL SESA  
SOSP POJA RBGU SPSA TRES UCAT ULSB UNBI  
UNEI UNFR UNPE UNME UNST BANS MYWA  
WFSP WHIM GLGU GOME GREG MODO WILL WIPH  
WODU YCNH YRWA UCRT BLKI BCPE BOGU  
BRNO CANG AWPE

species ARTE

is linked to 10 from 204 species

COMU BARS UNCO LETE SHOR UNDD  
SPSK UNGR BLGU PAJA

species GROO

is linked to 22 from 204 species , named:

ABDU CATE COME DEJU GBHE LESA LIGU MAFR  
HEPE LTJA OSPR PUMA RNGR SAND TRES  
WTIR UNWA MYWA WFSP GLGU BRTE BLTE

species GRSH

is linked to 48 from 204 species , named:

BLSC COLO DCCO DOVE GBBG LTDU NOGA AMGO

AMKE AMOY AMRO BBPL RAZO RNPH UNCO  
BRBO CHSW EUST FOTE SBDO GRYE HADU HOME  
LEYE NOPI LAGU PAWA PESA PISI RBNU  
RUDU RUTU SAGU SATE SOSH UCAT UNBI UNDD  
UNFR UNLT UNLG GREG UNSP WIPH YCNH  
BRSP BRNO COGO

species RAZO  
is linked to 13 from 204 species , named:  
BLSC COLO COSH DCCO GBBG LTDU NOGA GRSH  
SOSH UNLT WWSC UNTE WISP

species RNPH  
is linked to 27 from 204 species , named:  
COLO DCCO DOVE GBBG NOGA GRSH ROST UNCO FOTE  
LAGU SCAU POJA RBGU SOSH UNBI  
UNDD UNLT UNLG UNME UNST UNSP BRSP BLKI BCPE  
BOGU COGO DASC

species RTLO  
is linked to 4 from 204 species , named:  
COSH WWSC UNTE WISP

species REPH  
is linked to 15 from 204 species , named:  
ROST LESP MASH SCAU POJA RBME UBBG UNLA UNME  
UNSG UNST AUSH ATPU BRPE BCPE

species ROST

is linked to 62 from 204 species , named:

DOVE AMGO AMKE AMOY AMRO BBPL BHCO BHGU RNPH  
REPH BRBO CHSW DUNL EUST FOTE  
SBDO GRYE HADU HOME LEYE NOPI MALL MASH PAWA  
PEEP PESA PISI RBNU REDH RUDU  
RUTU SAGU SATE SCAU POJA RBME RBGU UBBG UCAT  
UNBI UNFR UNPE UNLA UNLG UNME  
UNST BANS WHIM GREG MODO UNSP WIPH WODU YCNH  
YRWA BRSP BLKI BCPE BOGU BRNO  
COGO DASC

species UNCO

is linked to 19 from 204 species , named:

COLO COMU DOVE GBBG LTDU ARTE GRSH RNPH  
LAGU LETE SCAU SOSH UNDD UNLT SPSK  
UNSP BLGU PAJA BRSP

species UNSC

is linked to 3 from 204 species , named:

UNGU UNLO COEI

species BRBO

is linked to 79 from 204 species , named:

COLO DOVE GBBG AMGO AMKE AMOY AMRO BBPL  
BHCO BHGU GRSH ROST CHSW COME DEJU

DUNL EUST GADW GRHE GBHE SBDO GRYE HADU  
HOME LESA LEYE NOPI ICGU LAGU MALL  
OSPR PAWA PEEP PESA PISI PUSA RBNU REDH  
RUDU RUTU RWBL SAGU SATE SCAU SEPL  
SESA SOSP POJA RBGU SPSA TRES UCAT ULSB  
UNBI UNEI UNFR UNPE UNLG UNME UNST  
BANS WFSP WHIM GLGU GOME GREG MODO WILL  
WIPH WODU YCNH YRWA UCRT BLKI BCPE  
BOGU BRNO CANG AWPE

species CATE  
is linked to 24 from 204 species , named:  
ABDU GRCO COME DEJU GBHE LESA LIGU MAFR  
HEPE LTJA OSPR PUMA RNGR SAND SESA  
TRES WTIR UNWA MYWA WFSP GLGU GOME BRTE BLTE

species CEDW  
is linked to 5 from 204 species , named:  
GBTE SNGO UNEG UNSA UNFI

species CHSW  
is linked to 79 from 204 species , named:  
COLO DOVE GBBG AMGO AMKE AMOY AMRO BBPL  
BHCO BHGU GRSH ROST BRBO COME DEJU  
DUNL EUST GADW GRHE GBHE SBDO GRYE HADU  
HOME LESA LEYE NOPI ICGU LAGU MALL  
OSPR PAWA PEEP PESA PISI PUSA RBNU REDH

RUDU RUTU RWBL SAGU SATE SCAU SEPL  
SESA SOSP POJA RBGU SPSA TRES UCAT ULSB  
UNBI UNEI UNFR UNPE UNLG UNME UNST  
BANS WFSP WHIM GLGU GOME GREG MODO WILL  
WIPH WODU YCNH YRWA UCRT BLKI BCPE  
BOGU BRNO CANG AWPE

species COME  
is linked to 72 from 204 species , named:  
AMGO AMKE AMOY AMRO BBPL BHCO BHGU GRCO  
BRBO CATE CHSW DEJU DUNL EUST GADW  
GRHE GBHE SBDO GRYE HADU HOME LESA LEYE  
LIGU NOPI ICGU LTJA MALL OSPR PAWA  
PEEP PESA PISI PUMA PUSA RBNU REDH RUDU  
RUTU RWBL SAGU SAND SATE SEPL SESA  
SOSP SPSA TRES UCAT ULSB UNEI UNFR UNPE  
BANS UNWA MYWA WFSP WHIM GLGU GOME  
GREG MODO WILL WIPH WODU YCNH YRWA UCRT  
BLTE BRNO CANG AWPE

species COYE  
is linked to 0 from 204 species

species DEJU  
is linked to 74 from 204 species , named:  
AMGO AMKE AMOY AMRO BBPL BHCO BHGU GRCO  
BRBO CATE CHSW COME DUNL EUST GADW

GRHE GBHE SBDO GRYE HADU HOME LESA LEYE  
LIGU MAFR NOPI ICGU LTJA MALL OSPR  
PAWA PEEP PESA PISI PUMA PUSA RBNU REDH  
RUDU RUTU RWBL SAGU SAND SATE SEPL  
SESA SOSP SPSA TRES UCAT ULSB UNEI UNFR  
UNPE BANS UNWA MYWA WFSP WHIM GLGU  
GOME GREG MODO BRTE WILL WIPH WODU YCNH  
YRWA UCRT BLTE BRNO CANG AWPE

species DUNL

is linked to 78 from 204 species , named:

COLO GBBG AMGO AMKE AMOY AMRO BBPL BHCO  
BHGU ROST BRBO CHSW COME DEJU EUST  
GADW GRHE GBHE SBDO GRYE HADU HOME LESA  
LEYE LIGU NOPI ICGU LAGU MALL OSPR  
PAWA PEEP PESA PISI PUSA RBNU REDH RUDU  
RUTU RWBL SAGU SATE SCAU SEPL SESA  
SOSP POJA RBGU SPSA TRES UCAT ULSB UNBI  
UNEI UNFR UNPE UNME UNST BANS MYWA  
WFSP WHIM GLGU GOME GREG MODO WILL WIPH  
WODU YCNH YRWA UCRT BLKI BCPE BOGU  
BRNO CANG AWPE

species EUST

is linked to 79 from 204 species , named:

COLO DOVE GBBG AMGO AMKE AMOY AMRO BBPL  
BHCO BHGU GRSH ROST BRBO CHSW COME

DEJU DUNL GADW GRHE GBHE SBDO GRYE HADU  
HOME LESA LEYE NOPI ICGU LAGU MALL  
OSPR PAWA PEEP PESA PISI PUSA RBNU REDH  
RUDU RUTU RWBL SAGU SATE SCAU SEPL  
SESA SOSP POJA RBGU SPSA TRES UCAT ULSB  
UNBI UNEI UNFR UNPE UNLG UNME UNST  
BANS WFSP WHIM GLGU GOME GREG MODO WILL  
WIPH WODU YCNH YRWA UCRT BLKI BCPE  
BOGU BRNO CANG AWPE

species FEPE  
is linked to 0 from 204 species

species FOTE  
is linked to 24 from 204 species , named:  
COLO DCCO DOVE GBBG NOGA GRSH RNPH ROST  
LAGU SCAU POJA RBGU SOSH UNBI UNLT  
UNLG UNME UNST UNSP BRSP BCPE BOGU COGO  
DASC

species GADW  
is linked to 59 from 204 species , named:  
AMKE AMRO BBPL BHCO BHGU BRBO CHSW COME  
DEJU DUNL EUST GRHE GBHE SBDO GRYE  
HADU HOME LESA LEYE LIGU NOPI MALL OSPR  
PAWA PESA PISI PUSA RBNU REDH RUDU  
RUTU RWBL SAGU SATE SEPL SESA SOSP SPSA

TRES ULSB UNEI UNFR UNPE BANS MYWA  
WFSP WHIM GLGU GOME GREG MODO WILL WIPH  
WODU YCNH YRWA UCRT BRNO AWPE

species GBTE  
is linked to 5 from 204 species , named:  
CEDW SNGO UNEG UNSA UNFI

species GCKI  
is linked to 0 from 204 species

species GRCA  
is linked to 0 from 204 species

species GRHE  
is linked to 59 from 204 species , named:  
AMKE AMRO BBPL BHCO BHGU BRBO CHSW COME  
DEJU DUNL EUST GADW GBHE SBDO GRYE  
HADU HOME LESA LEYE LIGU NOPI MALL OSPR  
PAWA PESA PISI PUSA RBNU REDH RUDU  
RUTU RWBL SAGU SATE SEPL SESA SOSP SPSA  
TRES ULSB UNEI UNFR UNPE BANS MYWA  
WFSP WHIM GLGU GOME GREG MODO WILL WIPH  
WODU YCNH YRWA UCRT BRNO AWPE

species GRSC  
is linked to 3 from 204 species , named:

GWIE UNDU USSB

species GBHE  
is linked to 74 from 204 species , named:  
AMGO AMKE AMOY AMRO BBPL BHCO BHGU GRCO  
BRBO CATE CHSW COME DEJU DUNL EUST  
GADW GRHE SBDO GRYE HADU HOME LESA LEYE  
LIGU NOPI HEPE ICGU LTJA MALL OSPR  
PAWA PEEP PESA PISI PUMA PUSA RBNU REDH  
RUDU RUTU RWBL SAGU SAND SATE SEPL  
SESA SOSP SPSA TRES UCAT ULSB UNEI UNFR  
UNPE BANS UNWA MYWA WFSP WHIM GLGU  
GOME GREG MODO BRTE WILL WIPH WODU YCNH  
YRWA UCRT BLTE BRNO CANG AWPE

species SBDO  
is linked to 79 from 204 species , named:  
COLO DOVE GBBG AMGO AMKE AMOY AMRO BBPL BHCO  
BHGU GRSH ROST BRBO CHSW COME  
DEJU DUNL EUST GADW GRHE GBHE GRYE HADU HOME  
LESA LEYE NOPI ICGU LAGU MALL  
OSPR PAWA PEEP PESA PISI PUSA RBNU REDH RUDU  
RUTU RWBL SAGU SATE SCAU SEPL  
SESA SOSP POJA RBGU SPSA TRES UCAT ULSB UNBI  
UNEI UNFR UNPE UNLG UNME UNST  
BANS WFSP WHIM GLGU GOME GREG MODO WILL WIPH  
WODU YCNH YRWA UCRT BLKI BCPE

BOGU BRNO CANG AWPE

species GRYE

is linked to 79 from 204 species , named:

COLO DOVE GBBG AMGO AMKE AMOY AMRO BBPL BHCO  
BHGU GRSH ROST BRBO CHSW COME  
DEJU DUNL EUST GADW GRHE GBHE SBDO HADU HOME  
LESA LEYE NOPI ICGU LAGU MALL  
OSPR PAWA PEEP PESA PISI PUSA RBNU REDH RUDU  
RUTU RWBL SAGU SATE SCAU SEPL  
SESA SOSP POJA RBGU SPSA TRES UCAT ULSB UNBI  
UNEI UNFR UNPE UNLG UNME UNST  
BANS WFSP WHIM GLGU GOME GREG MODO WILL WIPH  
WODU YCNH YRWA UCRT BLKI BCPE  
BOGU BRNO CANG AWPE

species GWIE

is linked to 3 from 204 species , named:

GRSC UNDU USSB

species HADU

is linked to 79 from 204 species , named:

COLO DOVE GBBG AMGO AMKE AMOY AMRO BBPL BHCO  
BHGU GRSH ROST BRBO CHSW COME  
DEJU DUNL EUST GADW GRHE GBHE SBDO GRYE HOME  
LESA LEYE NOPI ICGU LAGU MALL  
OSPR PAWA PEEP PESA PISI PUSA RBNU REDH RUDU

RUTU RWBL SAGU SATE SCAU SEPL  
SESA SOSP POJA RBGU SPSA TRES UCAT ULSB UNBI  
UNEI UNFR UNPE UNLG UNME UNST  
BANS WFSP WHIM GLGU GOME GREG MODO WILL WIPH  
WODU YCNH YRWA UCRT BLKI BCPE  
BOGU BRNO CANG AWPE

species HOME  
is linked to 79 from 204 species , named:  
COLO DOVE GBBG AMGO AMKE AMOY AMRO BBPL BHCO  
BHGU GRSH ROST BRBO CHSW COME  
DEJU DUNL EUST GADW GRHE GBHE SBDO GRYE HADU  
LESA LEYE NOPI ICGU LAGU MALL  
OSPR PAWA PEEP PESA PISI PUSA RBNU REDH RUDU  
RUTU RWBL SAGU SATE SCAU SEPL  
SESA SOSP POJA RBGU SPSA TRES UCAT ULSB UNBI  
UNEI UNFR UNPE UNLG UNME UNST  
BANS WFSP WHIM GLGU GOME GREG MODO WILL WIPH  
WODU YCNH YRWA UCRT BLKI BCPE  
BOGU BRNO CANG AWPE

species LBBG  
is linked to 8 from 204 species , named:  
BARS GRSK SOTE SHOR UNJA TBMU UNGR UNSK

species LESA  
is linked to 73 from 204 species , named:

AMGO AMKE AMOY AMRO BBPL BHCO BHGU GRCO BRBO  
CATE CHSW COME DEJU DUNL EUST  
GADW GRHE GBHE SBDO GRYE HADU HOME LEYE LIGU  
NOPI ICGU LTJA MALL OSPR PAWA  
PEEP PESA PISI PUMA PUSA RBNU REDH RUDU RUTU  
RWBL SAGU SAND SATE SEPL SESA  
SOSP SPSA TRES UCAT ULSB UNEI UNFR UNPE BANS  
UNWA MYWA WFSP WHIM GLGU GOME  
GREG MODO BRTE WILL WIPH WODU YCNH YRWA UCRT  
BLTE BRNO CANG AWPE

species LESC  
is linked to 0 from 204 species

species LEYE  
is linked to 79 from 204 species , named:  
COLO DOVE GBBG AMGO AMKE AMOY AMRO BBPL BHCO  
BHGU GRSH ROST BRBO CHSW COME  
DEJU DUNL EUST GADW GRHE GBHE SBDO GRYE HADU  
HOME LESA NOPI ICGU LAGU MALL  
OSPR PAWA PEEP PESA PISI PUSA RBNU REDH RUDU  
RUTU RWBL SAGU SATE SCAU SEPL  
SESA SOSP POJA RBGU SPSA TRES UCAT ULSB UNBI  
UNEI UNFR UNPE UNLG UNME UNST  
BANS WFSP WHIM GLGU GOME GREG MODO WILL WIPH  
WODU YCNH YRWA UCRT BLKI BCPE  
BOGU BRNO CANG AWPE

species LIGU  
is linked to 48 from 204 species , named:  
ABDU BHCO BHGU GRCO CATE COME DEJU DUNL GADW  
GRHE GBHE LESA HEPE ICGU LTJA  
MALL OSPR PEEP PUMA PUSA REDH RWBL SAND SEPL  
SESA SOSP SPSA TRES ULSB UNEI  
UNPE WTIR BANS UNWA MYWA WFSP WHIM GLGU GOME  
MODO BRTE WILL WODU YRWA UCRT  
BLTE CANG AWPE

species LISH  
is linked to 0 from 204 species

species MABO  
is linked to 0 from 204 species

species MAFR  
is linked to 8 from 204 species , named:  
GRCO CATE DEJU PUMA SAND GLGU BRTE BLTE

species MAWA  
is linked to 0 from 204 species

species NOFL  
is linked to 0 from 204 species

species NOHA  
is linked to 0 from 204 species

species NOPI  
is linked to 79 from 204 species , named:  
COLO DOVE GBBG AMGO AMKE AMOY AMRO BBPL  
BHCO BHGU GRSH ROST BRBO CHSW COME  
DEJU DUNL EUST GADW GRHE GBHE SBDO GRYE  
HADU HOME LESA LEYE ICGU LAGU MALL  
OSPR PAWA PEEP PESA PISI PUSA RBNU REDH  
RUDU RUTU RWBL SAGU SATE SCAU SEPL  
SESA SOSP POJA RBGU SPSA TRES UCAT ULSB  
UNBI UNEI UNFR UNPE UNLG UNME UNST  
BANS WFSP WHIM GLGU GOME GREG MODO WILL  
WIPH WODU YCNH YRWA UCRT BLKI BCPE  
BOGU BRNO CANG AWPE

species NOTE  
is linked to 0 from 204 species

species GRSK  
is linked to 10 from 204 species  
COMU BARS LBBG HOGR SOTE SHOR UNJA SPSK  
UNGR BRSP

species HEPE  
is linked to 16 from 204 species , named:

ABDU GRCO CATE GBHE LIGU LTJA PUMA RNGR  
SAND TRES SWAL WTIR UNWA MYWA BRTE  
BLTE

species HOGR  
is linked to 9 from 204 species , named:  
COMU BARS GRSK SOTE SHOR UNDD SPSK UNGR BCPE

species ICGU  
is linked to 58 from 204 species , named:  
AMGO AMKE AMOY AMRO BBPL BHCO BHGU BRBO  
CHSW COME DEJU DUNL EUST GBHE SBDO  
GRYE HADU HOME LESA LEYE LIGU NOPI MALL  
OSPR PAWA PEEP PESA PISI RBNU REDH  
RUDU RUTU RWBL SAGU SATE SEPL SESA SOSP  
TRES UCAT UNEI UNFR UNPE BANS MYWA  
WFSP WHIM GLGU GOME GREG MODO WIPH WODU  
YCNH YRWA BRNO CANG AWPE

species LAGU  
is linked to 64 from 204 species , named:  
BLSC COLO DCCO DOVE GBBG LTDU NOGA AMGO  
AMKE AMOY AMRO BBPL BHCO BHGU GRSH  
RNPH UNCO BRBO CHSW DUNL EUST FOTE SBDO  
GRYE HADU HOME LEYE NOPI MALL PAWA  
PEEP PESA PISI RBNU REDH RUDU RUTU SAGU  
SATE SOSP SOSH UCAT UNBI UNDD UNEI

UNFR UNLT UNPE UNLG BANS WHIM GREG MODO  
UNSP WIPH WODU YCNH YRWA BRSP BCPE  
BRNO CANG COGO DASC

species LESP  
is linked to 10 from 204 species  
NOFU REPH MASH RBME RBGU UBBG UNLA BLKI  
BOGU COTE

species LETE  
is linked to 10 from 204 species  
COMU BARS ARTE UNCO SHOR UNDD SPSK UNGR  
BLGU PAJA

species LTJA  
is linked to 23 from 204 species , named:  
ABDU GRCO CATE COME DEJU GBHE LESA LIGU  
HEPE OSPPR PUMA Rngr SAND SESA TRES  
WTTR UNWA MYWA WFSP GLGU GOME BRTE BLTE

species MALL  
is linked to 80 from 204 species  
COLO DOVE GBBG AMGO AMKE AMOY AMRO BBPL  
BHCO BHGU ROST BRBO CHSW COME DEJU  
DUNL EUST GADW GRHE GBHE SBDO GRYE HADU  
HOME LESA LEYE LIGU NOPI ICGU LAGU  
OSPR PAWA PEEP PESA PISI PUSA RBNU REDH

RUDU RUTU RWBL SAGU SATE SCAU SEPL  
SESA SOSP POJA RBGU SPSA TRES UCAT ULSB  
UNBI UNEI UNFR UNPE UNLG UNME UNST  
BANS MYWA WFSP WHIM GLGU GOME GREG MODO  
WILL WIPH WODU YCNH YRWA UCRT BLKI  
BCPE BOGU BRNO CANG AWPE

species MASH  
is linked to 16 from 204 species , named:  
REPH ROST LESP SCAU POJA RBME UBBG UNLA  
UNME UNSG UNST AUSH ATPU BRPE BCPE  
DASC

species NOWA  
is linked to 0 from 204 species

species OSPR  
is linked to 73 from 204 species , named:  
AMGO AMKE AMOY AMRO BBPL BHCO BHGU GRCO  
BRBO CATE CHSW COME DEJU DUNL EUST  
GADW GRHE GBHE SBDO GRYE HADU HOME LESA  
LEYE LIGU NOPI ICGU LTJA MALL PAWA  
PEEP PESA PISI PUMA PUSA RBNU REDH RUDU  
RUTU RWBL SAGU SAND SATE SEPL SESA  
SOSP SPSA TRES UCAT ULSB UNEI UNFR UNPE  
BANS UNWA MYWA WFSP WHIM GLGU GOME  
GREG MODO BRTE WILL WIPH WODU YCNH YRWA

UCRT BLTE BRNO CANG AWPE

species PAWA

is linked to 79 from 204 species , named:

COLO DOVE GBBG AMGO AMKE AMOY AMRO BBPL  
BHC0 BHGU GRSH ROST BRBO CHSW COME  
DEJU DUNL EUST GADW GRHE GBHE SBDO GRYE  
HADU HOME LESA LEYE NOPI ICGU LAGU  
MALL OSPR PEEP PESA PISI PUSA RBNU REDH  
RUDU RUTU RWBL SAGU SATE SCAU SEPL  
SESA SOSP POJA RBGU SPSA TRES UCAT ULSB  
UNBI UNEI UNFR UNPE UNLG UNME UNST  
BANS WFSP WHIM GLGU GOME GREG MODO WILL  
WIPH WODU YCNH YRWA UCRT BLKI BCPE  
BOGU BRNO CANG AWPE

species PEEP

is linked to 69 from 204 species , named:

COLO GBBG AMGO AMKE AMOY AMRO BBPL BHC0  
BHGU ROST BRBO CHSW COME DEJU DUNL  
EUST GBHE SBDO GRYE HADU HOME LESA LEYE  
LIGU NOPI ICGU LAGU MALL OSPR PAWA  
PESA PISI RBNU REDH RUDU RUTU RWBL SAGU  
SATE SCAU SEPL SESA SOSP POJA RBGU  
TRES UCAT UNBI UNEI UNFR UNPE UNME BANS  
MYWA WFSP WHIM GLGU GOME GREG MODO  
WIPH WODU YCNH YRWA BLKI BOGU BRNO CANG

AWPE

species PEFA

is linked to 0 from 204 species

species PESA

is linked to 79 from 204 species , named:

COLO DOVE GBBG AMGO AMKE AMOY AMRO BBPL  
BHCO BHGU GRSH ROST BRBO CHSW COME  
DEJU DUNL EUST GADW GRHE GBHE SBDO GRYE  
HADU HOME LESA LEYE NOPI ICGU LAGU  
MALL OSPR PAWA PEEP PISI PUSA RBNU REDH  
RUDU RUTU RWBL SAGU SATE SCAU SEPL  
SESA SOSP POJA RGBU SPSA TRES UCAT ULSB  
UNBI UNEI UNFR UNPE UNLG UNME UNST  
BANS WFSP WHIM GLGU GOME GREG MODO WILL  
WIPH WODU YCNH YRWA UCRT BLKI BCPE  
BOGU BRNO CANG AWPE

species PISI

is linked to 79 from 204 species , named:

COLO DOVE GBBG AMGO AMKE AMOY AMRO BBPL  
BHCO BHGU GRSH ROST BRBO CHSW COME  
DEJU DUNL EUST GADW GRHE GBHE SBDO GRYE  
HADU HOME LESA LEYE NOPI ICGU LAGU  
MALL OSPR PAWA PEEP PESA PUSA RBNU REDH  
RUDU RUTU RWBL SAGU SATE SCAU SEPL

SESA SOSP POJA RBGU SPSA TRES UCAT ULSB  
UNBI UNEI UNFR UNPE UNLG UNME UNST  
BANS WFSP WHIM GLGU GOME GREG MODO WILL  
WIPH WODU YCNH YRWA UCRT BLKI BCPE  
BOGU BRNO CANG AWPE

species PUMA  
is linked to 22 from 204 species , named:  
ABDU GRCO CATE COME DEJU GBHE LESA LIGU  
MAFR HEPE LTJA OSPR Rngr SAND TRES  
WTIR UNWA MYWA WFSP GLGU BRTE BLTE

species PUSA  
is linked to 59 from 204 species , named:  
AMKE AMRO BBPL BHCO BHGU BRBO CHSW COME  
DEJU DUNL EUST GADW GRHE GBHE SBDO  
GRYE HADU HOME LESA LEYE LIGU NOPI MALL  
OSPR PAWA PESA PISI RBNU REDH RUDU  
RUTU RWBL SAGU SATE SEPL SESA SOSP SPSA  
TRES ULSB UNEI UNFR UNPE BANS MYWA  
WFSP WHIM GLGU GOME GREG MODO WILL WIPH  
WODU YCNH YRWA UCRT BRNO AWPE

species RBNU  
is linked to 79 from 204 species , named:  
COLO DOVE GBBG AMGO AMKE AMOY AMRO BBPL  
BHCO BHGU GRSH ROST BRBO CHSW COME

DEJU DUNL EUST GADW GRHE GBHE SBDO GRYE  
HADU HOME LESA LEYE NOPI ICGU LAGU  
MALL OSRP PAWA PEEP PESA PISI PUSA REDH  
RUDU RUTU RWBL SAGU SATE SCAU SEPL  
SESA SOSP POJA RBGU SPSA TRES UCAT ULSB  
UNBI UNEI UNFR UNPE UNLG UNME UNST  
BANS WFSP WHIM GLGU GOME GREG MODO WILL WIPH  
WODU YCNH YRWA UCRT BLKI BCPE  
BOGU BRNO CANG AWPE

species RBTR  
is linked to 0 from 204 species

species RCKI  
is linked to 0 from 204 species

species REDH  
is linked to 78 from 204 species , named:  
COLO GBBG AMGO AMKE AMOY AMRO BBPL BHCO  
BHGU ROST BRBO CHSW COME DEJU DUNL  
EUST GADW GRHE GBHE SBDO GRYE HADU HOME  
LESA LEYE LIGU NOPI ICGU LAGU MALL  
OSRP PAWA PEEP PESA PISI PUSA RBNU RUDU  
RUTU RWBL SAGU SATE SCAU SEPL SESA  
SOSP POJA RBGU SPSA TRES UCAT ULSB UNBI  
UNEI UNFR UNPE UNME UNST BANS MYWA  
WFSP WHIM GLGU GOME GREG MODO WILL WIPH

WODU YCNH YRWA UCRT BLKI BCPE BOGU  
BRNO CANG AWPE

species RNGR  
is linked to 11 from 204 species , named:  
ABDU GRCO CATE HEPE LTJA PUMA SAND WTIR  
UNWA BRTE BLTE

species RUDU  
is linked to 79 from 204 species , named:  
COLO DOVE GBBG AMGO AMKE AMOY AMRO BBPL  
BHCO BHGU GRSH ROST BRBO CHSW COME  
DEJU DUNL EUST GADW GRHE GBHE SBDO GRYE  
HADU HOME LESA LEYE NOPI ICGU LAGU  
MALL OSPR PAWA PEEP PESA PISI PUSA RBNU  
REDH RUTU RWBL SAGU SATE SCAU SEPL  
SESA SOSP POJA RBGU SPSA TRES UCAT ULSB  
UNBI UNEI UNFR UNPE UNLG UNME UNST  
BANS WFSP WHIM GLGU GOME GREG MODO WILL  
WIPH WODU YCNH YRWA UCRT BLKI BCPE  
BOGU BRNO CANG AWPE

species RUTU  
is linked to 79 from 204 species , named:  
COLO DOVE GBBG AMGO AMKE AMOY AMRO BBPL  
BHCO BHGU GRSH ROST BRBO CHSW COME  
DEJU DUNL EUST GADW GRHE GBHE SBDO GRYE

HADU HOME LESA LEYE NOPI ICGU LAGU  
MALL OSPR PAWA PEEP PESA PISI PUSA RBNU  
REDH RUDU RWBL SAGU SATE SCAU SEPL  
SESA SOSP POJA RBGU SPSA TRES UCAT ULSB  
UNBI UNEI UNFR UNPE UNLG UNME UNST  
BANS WFSP WHIM GLGU GOME GREG MODO WILL  
WIPH WODU YCNH YRWA UCRT BLKI BCPE  
BOGU BRNO CANG AWPE

species RWBL  
is linked to 70 from 204 species  
AMGO AMKE AMOY AMRO BBPL BHCO BHGU BRBO  
CHSW COME DEJU DUNL EUST GADW GRHE  
GBHE SBDO GRYE HADU HOME LESA LEYE LIGU  
NOPI ICGU MALL OSPR PAWA PEEP PESA  
PISI PUSA RBNU REDH RUDU RUTU SAGU SATE  
SCAU SEPL SESA SOSP RBGU SPSA TRES  
UCAT ULSB UNEI UNFR UNPE UNST BANS MYWA  
WFSP WHIM GLGU GOME GREG MODO WILL  
WIPH WODU YCNH YRWA UCRT BLKI BOGU BRNO  
CANG AWPE

species SAGU  
is linked to 79 from 204 species , named:  
COLO DOVE GBBG AMGO AMKE AMOY AMRO BBPL  
BHCO BHGU GRSH ROST BRBO CHSW COME  
DEJU DUNL EUST GADW GRHE GBHE SBDO GRYE

HADU HOME LESA LEYE NOPI ICGU LAGU  
MALL OSPR PAWA PEEP PESA PISI PUSA RBNU  
REDH RUDU RUTU RWBL SATE SCAU SEPL  
SESA SOSP POJA RBGU SPSA TRES UCAT ULSB  
UNBI UNEI UNFR UNPE UNLG UNME UNST  
BANS WFSP WHIM GLGU GOME GREG MODO WILL  
WIPH WODU YCNH YRWA UCRT BLKI BCPE  
BOGU BRNO CANG AWPE

species SAND  
is linked to 22 from 204 species , named:  
ABDU GRCO CATE COME DEJU GBHE LESA LIGU  
MAFR HEPE LTJA OSPR PUMA RNGR TRES  
WTTR UNWA MYWA WFSP GLGU BRTE BLTE

species SATE  
is linked to 79 from 204 species , named:  
COLO DOVE GBBG AMGO AMKE AMOY AMRO BBPL  
BHCO BHGU GRSH ROST BRBO CHSW COME  
DEJU DUNL EUST GADW GRHE GBHE SBDO GRYE  
HADU HOME LESA LEYE NOPI ICGU LAGU  
MALL OSPR PAWA PEEP PESA PISI PUSA RBNU  
REDH RUDU RUTU RWBL SAGU SCAU SEPL  
SESA SOSP POJA RBGU SPSA TRES UCAT ULSB  
UNBI UNEI UNFR UNPE UNLG UNME UNST  
BANS WFSP WHIM GLGU GOME GREG MODO WILL  
WIPH WODU YCNH YRWA UCRT BLKI BCPE

BOGU BRNO CANG AWPE

species SAVS

is linked to 0 from 204 species

species SCAU

is linked to 63 from 204 species , named:

AMGO AMKE AMOY AMRO BBPL BHCO BHGU RNPH  
REPH ROST UNCO BRBO CHSW DUNL EUST  
FOTE SBDO GRYE HADU HOME LEYE NOPI MALL  
MASH PAWA PEEP PESA PISI RBNU REDH  
RUDU RUTU RWBL SAGU SATE SEPL SOSP POJA  
RBME UBBG UCAT UNDD UNEI UNFR UNPE  
UNLA UNME UNST BANS WHIM GREG MODO WIPH  
WODU YCNH YRWA BRSP BCPE BRNO CANG  
COGO DASC AWPE

species SEPL

is linked to 70 from 204 species

AMGO AMKE AMOY AMRO BBPL BHCO BHGU BRBO  
CHSW COME DEJU DUNL EUST GADW GRHE  
GBHE SBDO GRYE HADU HOME LESA LEYE LIGU  
NOPI ICGU MALL OSPR PAWA PEEP PESA  
PISI PUSA RBNU REDH RUDU RUTU RWBL SAGU  
SATE SCAU SESA SOSP RBGU SPSA TRES  
UCAT ULSB UNEI UNFR UNPE UNST BANS MYWA  
WFSP WHIM GLGU GOME GREG MODO WILL

WIPH WODU YCNH YRWA UCRT BLKI BOGU BRNO  
CANG AWPE

species SESA  
is linked to 69 from 204 species , named:  
AMGO AMKE AMOY AMRO BBPL BHCO BHGU BRBO  
CATE CHSW COME DEJU DUNL EUST GADW  
GRHE GBHE SBDO GRYE HADU HOME LESA LEYE  
LIGU NOPI ICGU LTJA MALL OSPR PAWA  
PEEP PESA PISI PUSA RBNU REDH RUDU RUTU  
RWBL SAGU SATE SEPL SOSP SPSA TRES  
UCAT ULSB UNEI UNFR UNPE BANS UNWA MYWA  
WFSP WHIM GLGU GOME GREG MODO WILL  
WIPH WODU YCNH YRWA UCRT BLTE BRNO CANG AWPE

species SNBU  
is linked to 0 from 204 species

species SNGO  
is linked to 5 from 204 species , named:  
CEDW GBTE UNEG UNSA UNFI

species SOSP  
is linked to 75 from 204 species , named:  
GBBG AMGO AMKE AMOY AMRO BBPL BHCO BHGU  
BRBO CHSW COME DEJU DUNL EUST GADW  
GRHE GBHE SBDO GRYE HADU HOME LESA LEYE

LIGU NOPI ICGU LAGU MALL OSPL PAWA  
PEEP PESA PISI PUSA RBNU REDH RUDU RUTU  
RWBL SAGU SATE SCAU SEPL SESA POJA  
RBGU SPSA TRES UCAT ULSB UNBI UNEI UNFR  
UNPE UNME UNST BANS MYWA WFSP WHIM  
GLGU GOME GREG MODO WILL WIPH WODU YCNH  
YRWA UCRT BLKI BOGU BRNO CANG AWPE

species POJA

is linked to 64 from 204 species , named:

DOVE AMGO AMKE AMOY AMRO BBPL BHCO BHGU RNPH  
REPH ROST BRBO CHSW DUNL EUST  
FOTE SBDO GRYE HADU HOME LEYE NOPI MALL MASH  
PAWA PEEP PESA PISI RBNU REDH  
RUDU RUTU SAGU SATE SCAU SOSP RBME RBGU UBBG  
UCAT UNBI UNEI UNFR UNPE UNLA  
UNLG UNME UNST BANS WHIM GREG MODO UNSP WIPH  
WODU YCNH YRWA BRSP BLKI BCPE  
BOGU BRNO COGO DASC

species RBME

is linked to 15 from 204 species , named:

REPH ROST LESP MASH SCAU POJA UBBG UNLA UNME  
UNSG UNST AUSH ATPU BRPE BCPE

species RBGU

is linked to 63 from 204 species , named:

DOVE AMGO AMKE AMOY AMRO BBPL BHCO BHGU RNPH  
ROST BRBO CHSW DUNL EUST FOTE  
SBDO GRYE HADU HOME LEYE NOPI LESP MALL PAWA  
PEEP PESA PISI RBNU REDH RUDU  
RUTU RWBL SAGU SATE SEPL SOSP POJA UCAT UNBI  
UNEI UNFR UNPE UNLG UNME UNST  
BANS WHIM GREG MODO UNSP WIPH WODU YCNH YRWA  
BRSP BLKI BCPE BOGU BRNO CANG  
COGO DASC AWPE

species ROYT  
is linked to 6 from 204 species , named:  
UNAL UNSG ATPU BRPE UNPH UNSH

species SOSH  
is linked to 22 from 204 species , named:  
BLSC COLO DCCO DOVE GBBG LTDU NOGA GRSH RAZO  
RNPH UNCO FOTE LAGU UNBI UNDD  
UNLT UNLG UNSP BRSP BCPE COGO DASC

species SOTE  
is linked to 9 from 204 species , named:  
COMU BARS LBBG GRSK HOGR SHOR SPSK UNGR DASC

species SHOR  
is linked to 11 from 204 species , named:  
BARS ARTE LBBG GRSK HOGR LETE SOTE UNJA TBMU

UNGR UNSK

species SPSA

is linked to 59 from 204 species , named:

AMKE AMRO BBPL BHCO BHGU BRBO CHSW COME DEJU  
DUNL EUST GADW GRHE GBHE SBDO  
GRYE HADU HOME LESA LEYE LIGU NOPI MALL OSPR  
PAWA PESA PISI PUSA RBNU REDH  
RUDU RUTU RWBL SAGU SATE SEPL SESA SOSP TRES  
ULSB UNEI UNFR UNPE BANS MYWA  
WFSP WHIM GLGU GOME GREG MODO WILL WIPH WODU  
YCNH YRWA UCRT BRNO AWPE

species TRES

is linked to 76 from 204 species , named:

ABDU AMGO AMKE AMOY AMRO BBPL BHCO BHGU GRCO  
BRBO CATE CHSW COME DEJU DUNL  
EUST GADW GRHE GBHE SBDO GRYE HADU HOME LESA  
LEYE LIGU NOPI HEPE ICGU LTJA  
MALL OSPR PAWA PEEP PESA PISI PUMA PUSA RBNU  
REDH RUDU RUTU RWBL SAGU SAND  
SATE SEPL SESA SOSP SPSA UCAT ULSB UNEI UNFR  
UNPE WTIR BANS UNWA MYWA WFSP  
WHIM GLGU GOME GREG MODO BRTE WILL WIPH WODU  
YCNH YRWA UCRT BLTE BRNO CANG  
AWPE

species UBBG

is linked to 15 from 204 species , named:

REPH ROST LESP MASH SCAU POJA RBME UNLA UNME  
UNSG UNST AUSH ATPU BRPE BCPE

species UCAT

is linked to 72 from 204 species , named:

COLO DOVE GBBG AMGO AMKE AMOY AMRO BBPL BHCO  
BHGU GRSH ROST BRBO CHSW COME  
DEJU DUNL EUST GBHE SBDO GRYE HADU HOME LESA  
LEYE NOPI ICGU LAGU MALL OSPR  
PAWA PEEP PESA PISI RBNU REDH RUDU RUTU RWBL  
SAGU SATE SCAU SEPL SESA SOSP  
POJA RBGU TRES UNBI UNEI UNFR UNPE UNLG UNME  
UNST BANS WFSP WHIM GLGU GOME  
GREG MODO WIPH WODU YCNH YRWA BLKI BCPE BOGU  
BRNO CANG AWPE

species ULSB

is linked to 59 from 204 species , named:

AMKE AMRO BBPL BHCO BHGU BRBO CHSW COME DEJU  
DUNL EUST GADW GRHE GBHE SBDO  
GRYE HADU HOME LESA LEYE LIGU NOPI MALL OSPR  
PAWA PESA PISI PUSA RBNU REDH  
RUDU RUTU RWBL SAGU SATE SEPL SESA SOSP SPSA  
TRES UNEI UNFR UNPE BANS MYWA  
WFSP WHIM GLGU GOME GREG MODO WILL WIPH WODU

YCNH YRWA UCRT BRNO AWPE

species UNBI

is linked to 65 from 204 species , named:

BLSC COLO DOVE GBBG LTDU AMGO AMKE AMOY AMRO  
BBPL BHCO BHGU GRSH RNPH ROST  
BRBO CHSW DUNL EUST FOTE SBDO GRYE HADU HOME  
LEYE NOPI LAGU MALL PAWA PEEP  
PESA PISI RBNU REDH RUDU RUTU SAGU SATE SOSP  
POJA RBGU SOSH UCAT UNEI UNFR  
UNLT UNPE UNLG UNME BANS WHIM GREG MODO UNSP  
WIPH WODU YCNH YRWA BRSP BLKI  
BCPE BOGU BRNO COGO DASC

species UNDD

is linked to 21 from 204 species , named:

COLO COMU GBBG LTDU NOGA ARTE GRSH RNPH UNCO  
HOGR LAGU LETE SCAU SOSH UNLT  
SPSK UNSP BLGU PAJA BRSP COGO

species UNEG

is linked to 5 from 204 species , named:

CEDW GBTE SNGO UNSA UNFI

species UNEI

is linked to 75 from 204 species , named:

GBBG AMGO AMKE AMOY AMRO BBPL BHCO BHGU BRBO

CHSW COME DEJU DUNL EUST GADW  
GRHE GBHE SBDO GRYE HADU HOME LESA LEYE LIGU  
NOPI ICGU LAGU MALL OSPR PAWA  
PEEP PESA PISI PUSA RBNU REDH RUDU RUTU RWBL  
SAGU SATE SCAU SEPL SESA SOSP  
POJA RBGU SPSA TRES UCAT ULSB UNBI UNFR UNPE  
UNME UNST BANS MYWA WFSP WHIM  
GLGU GOME GREG MODO WILL WIPH WODU YCNH YRWA  
UCRT BLKI BOGU BRNO CANG AWPE

species UNFR

is linked to 79 from 204 species , named:

COLO DOVE GBBG AMGO AMKE AMOY AMRO BBPL BHCO  
BHGU GRSH ROST BRBO CHSW COME  
DEJU DUNL EUST GADW GRHE GBHE SBDO GRYE HADU  
HOME LESA LEYE NOPI ICGU LAGU  
MALL OSPR PAWA PEEP PESA PISI PUSA RBNU REDH  
RUDU RUTU RWBL SAGU SATE SCAU  
SEPL SESA SOSP POJA RBGU SPSA TRES UCAT ULSB  
UNBI UNEI UNPE UNLG UNME UNST  
BANS WFSP WHIM GLGU GOME GREG MODO WILL WIPH  
WODU YCNH YRWA UCRT BLKI BCPE  
BOGU BRNO CANG AWPE

species UNGO

is linked to 3 from 204 species , named:

TBMU UNMU UNSK

species UNLT  
is linked to 21 from 204 species , named:  
BLSC COLO DCCO DOVE GBBG LTDU NOGA GRSH RAZO  
RNPH UNCO FOTE LAGU SOSH UNBI  
UNDD UNLG UNSP BRSP COGO DASC

species UNPA  
is linked to 1/204 vertex , named:  
BLGU

species UNPT  
is linked to 0 from 204 species

species UNJA  
is linked to 7 from 204 species , named:  
BARS LBBG GRSK SHOR TBMU UNGR UNSK

species UNPE  
is linked to 79 from 204 species , named:  
COLO GBBG AMGO AMKE AMOY AMRO BBPL BHCO BHGU  
ROST BRBO CHSW COME DEJU DUNL  
EUST GADW GRHE GBHE SBDO GRYE HADU HOME LESA  
LEYE LIGU NOPI ICGU LAGU MALL  
OSPR PAWA PEEP PESA PISI PUSA RBNU REDH RUDU  
RUTU RWBL SAGU SATE SCAU SEPL  
SESA SOSP POJA RBGU SPSA TRES UCAT ULSB UNBI

UNEI UNFR UNLG UNME UNST BANS  
MYWA WFSP WHIM GLGU GOME GREG MODO WILL WIPH  
WODU YCNH YRWA UCRT BLKI BCPE  
BOGU BRNO CANG AWPE

species SPAR  
is linked to 0 from 204 species

species SWAL  
is linked to 1/204 vertex , named:  
HEPE

species SPSK  
is linked to 12 from 204 species , named:  
BLSC COMU LTDU ARTE UNCO GRSK HOGR LETE SOTE  
UNDD BLGU PAJA

species TBMU  
is linked to 8 from 204 species , named:  
BARS LBBG SHOR UNGO UNJA UNGR UNMU UNSK

species UNAL  
is linked to 4 from 204 species , named:  
ROYT BUFF UNPH UNSH

species UNDU  
is linked to 3 from 204 species , named:

GRSC GWIE USSB

species UNGR  
is linked to 12 from 204 species , named:  
COMU BARS ARTE LBBG GRSK HOGR LETE SOTE SHOR  
UNJA TBMU UNSK

species UNGU  
is linked to 3 from 204 species , named:  
UNSC UNLO COEI

species UNLA  
is linked to 15 from 204 species , named:  
REPH ROST LESP MASH SCAU POJA RBME UBBG UNME  
UNSG UNST AUSH ATPU BRPE BCPE

species UNLG  
is linked to 58 from 204 species , named:  
BLSC COLO DCCO DOVE GBBG LTDU AMGO AMKE AMOY  
AMRO BBPL BHCO GRSH RNPH ROST  
BRBO CHSW EUST FOTE SBDO GRYE HADU HOME LEYE  
NOPI LAGU MALL PAWA PESA PISI  
RBNU RUDU RUTU SAGU SATE POJA RGBU SOSH UCAT  
UNBI UNFR UNLT UNPE UNME BANS  
WHIM GREG UNSP WIPH WODU YCNH BRSP BLKI BCPE  
BOGU BRNO COGO DASC

species UNLO  
is linked to 3 from 204 species , named:  
UNSC UNGU COEI

species UNME  
is linked to 63 from 204 species , named:  
AMGO AMKE AMOY AMRO BBPL BHCO BHGU RNPH REPH  
ROST BRBO CHSW DUNL EUST FOTE  
SBDO GRYE HADU HOME LEYE NOPI MALL MASH PAWA  
PEEP PESA PISI RBNU REDH RUDU  
RUTU SAGU SATE SCAU SOSP POJA RBME RBGU UBBG  
UCAT UNBI UNEI UNFR UNPE UNLA  
UNLG UNST BANS WHIM GREG MODO UNSP WIPH WODU  
YCNH YRWA BRSP BLKI BCPE BOGU  
BRNO COGO DASC

species UNMU  
is linked to 3 from 204 species , named:  
UNGO TBMU UNSK

species UNSA  
is linked to 5 from 204 species , named:  
CEDW GBTE SNGO UNEG UNFI

species UNSG  
is linked to 12 from 204 species , named:  
REPH MASH RBME ROYT UBBG UNLA UNST AUSH

ATPU BRPE UNPH UNSH

species UNST

is linked to 66 from 204 species , named:

AMGO AMKE AMOY AMRO BBPL BHCO BHGU RNPH  
REPH ROST BRBO CHSW DUNL EUST FOTE  
SBDO GRYE HADU HOME LEYE NOPI MALL MASH  
PAWA PESA PISI RBNU REDH RUDU RUTU  
RWBL SAGU SATE SCAU SEPL SOSP POJA RBME  
RBGU UBBG UCAT UNEI UNFR UNPE UNLA  
UNME UNSG BANS WHIM GREG MODO WIPH WODU  
YCNH YRWA AUSH BRPE BRSP BLKI BCPE  
BOGU BRNO CANG COGO DASC AWPE

species UNTB

is linked to 0 from 204 species

species WTIR

is linked to 14 from 204 species , named:

ABDU GRCO CATE LIGU HEPE LTJA PUMA RNGR  
SAND TRES UNWA MYWA BRTE BLTE

species WWSC

is linked to 6 from 204 species , named:

COSH RAZO RTLO UNTE COTE WISP

species BANS

is linked to 80 from 204 species

COLO DOVE GBBG AMGO AMKE AMOY AMRO BBPL  
BHCO BHGU ROST BRBO CHSW COME DEJU  
DUNL EUST GADW GRHE GBHE SBDO GRYE HADU  
HOME LESA LEYE LIGU NOPI ICGU LAGU  
MALL OSPP PAWA PEEP PESA PISI PUSA RBNU  
REDH RUDU RUTU RWBL SAGU SATE SCAU  
SEPL SESA SOSP POJA RBGU SPSA TRES UCAT  
ULSB UNBI UNEI UNFR UNPE UNLG UNME  
UNST MYWA WFSP WHIM GLGU GOME GREG MODO  
WILL WIPH WODU YCNH YRWA UCRT BLKI  
BCPE BOGU BRNO CANG AWPE

species UNWA

is linked to 23 from 204 species , named:

ABDU GRCO CATE COME DEJU GBHE LESA LIGU  
HEPE LTJA OSPP PUMA RNGR SAND SESA  
TRES WTIR MYWA WFSP GLGU GOME BRTE BLTE

species USAN

is linked to 0 from 204 species

species USSB

is linked to 3 from 204 species , named:

GRSC GWIE UNDU

species MYWA

is linked to 48 from 204 species , named:

ABDU BHCO BHGU GRCO CATE COME DEJU DUNL  
GADW GRHE GBHE LESA LIGU HEPE ICGU  
LTJA MALL OSPR PEEP PUMA PUSA REDH RWBL  
SAND SEPL SESA SOSP SPSA TRES ULSB  
UNEI UNPE WTIR BANS UNWA WFSP WHIM GLGU  
GOME MODO BRTE WILL WODU YRWA UCRT  
BLTE CANG AWPE

species WFSP

is linked to 72 from 204 species , named:

AMGO AMKE AMOY AMRO BBPL BHCO BHGU GRCO  
BRBO CATE CHSW COME DEJU DUNL EUST  
GADW GRHE GBHE SBDO GRYE HADU HOME LESA  
LEYE LIGU NOPI ICGU LTJA MALL OSPR  
PAWA PEEP PESA PISI PUMA PUSA RBNU REDH  
RUDU RUTU RWBL SAGU SAND SATE SEPL  
SESA SOSP SPSA TRES UCAT ULSB UNEI UNFR  
UNPE BANS UNWA MYWA WHIM GLGU GOME  
GREG MODO WILL WIPH WODU YCNH YRWA UCRT  
BLTE BRNO CANG AWPE

species WHIM

is linked to 80 from 204 species

COLO DOVE GBBG AMGO AMKE AMOY AMRO BBPL  
BHCO BHGU ROST BRBO CHSW COME DEJU  
DUNL EUST GADW GRHE GBHE SBDO GRYE HADU

HOME LESA LEYE LIGU NOPI ICGU LAGU  
MALL OSRP PAWA PEEP PESA PISI PUSA RBNU  
REDH RUDU RUTU RWBL SAGU SATE SCAU  
SEPL SESA SOSP POJA RBGU SPSA TRES UCAT  
ULSB UNBI UNEI UNFR UNPE UNLG UNME  
UNST BANS MYWA WFSP GLGU GOME GREG MODO  
WILL WIPH WODU YCNH YRWA UCRT BLKI  
BCPE BOGU BRNO CANG AWPE

species BLPW  
is linked to 0 from 204 species

species BTBW  
is linked to 0 from 204 species

species GLGU  
is linked to 74 from 204 species , named:  
AMGO AMKE AMOY AMRO BBPL BHCO BHGU GRCO  
BRBO CATE CHSW COME DEJU DUNL EUST  
GADW GRHE GBHE SBDO GRYE HADU HOME LESA  
LEYE LIGU MAFR NOPI ICGU LTJA MALL  
OSPR PAWA PEEP PESA PISI PUMA PUSA RBNU  
REDH RUDU RUTU RWBL SAGU SAND SATE  
SEPL SESA SOSP SPSA TRES UCAT ULSB UNEI  
UNFR UNPE BANS UNWA MYWA WFSP WHIM  
GOME GREG MODO BRTE WILL WIPH WODU YCNH  
YRWA UCRT BLTE BRNO CANG AWPE

species GOME

is linked to 69 from 204 species , named:

AMGO AMKE AMOY AMRO BBPL BHCO BHGU BRBO  
CATE CHSW COME DEJU DUNL EUST GADW  
GRHE GBHE SBDO GRYE HADU HOME LESA LEYE  
LIGU NOPI ICGU LTJA MALL OSPR PAWA  
PEEP PESA PISI PUSA RBNU REDH RUDU RUTU  
RWBL SAGU SATE SEPL SESA SOSP SPSA  
TRES UCAT ULSB UNEI UNFR UNPE BANS UNWA  
MYWA WFSP WHIM GLGU GREG MODO WILL  
WIPH WODU YCNH YRWA UCRT BLTE BRNO CANG AWPE

species GREG

is linked to 79 from 204 species , named:

COLO DOVE GBBG AMGO AMKE AMOY AMRO BBPL  
BHCO BHGU GRSH ROST BRBO CHSW COME  
DEJU DUNL EUST GADW GRHE GBHE SBDO GRYE  
HADU HOME LESA LEYE NOPI ICGU LAGU  
MALL OSPR PAWA PEEP PESA PISI PUSA RBNU  
REDH RUDU RUTU RWBL SAGU SATE SCAU  
SEPL SESA SOSP POJA RBGU SPSA TRES UCAT  
ULSB UNBI UNEI UNFR UNPE UNLG UNME  
UNST BANS WFSP WHIM GLGU GOME MODO WILL  
WIPH WODU YCNH YRWA UCRT BLKI BCPE  
BOGU BRNO CANG AWPE

species MERL  
is linked to 0 from 204 species

species MODO  
is linked to 78 from 204 species , named:  
COLO GBBG AMGO AMKE AMOY AMRO BBPL BHCO  
BHGU ROST BRBO CHSW COME DEJU DUNL  
EUST GADW GRHE GBHE SBDO GRYE HADU HOME  
LESA LEYE LIGU NOPI ICGU LAGU MALL  
OSPR PAWA PEEP PESA PISI PUSA RBNU REDH  
RUDU RUTU RWBL SAGU SATE SCAU SEPL  
SESA SOSP POJA RBGU SPSA TRES UCAT ULSB  
UNBI UNEI UNFR UNPE UNME UNST BANS  
MYWA WFSP WHIM GLGU GOME GREG WILL WIPH  
WODU YCNH YRWA UCRT BLKI BCPE BOGU  
BRNO CANG AWPE

species RUBL  
is linked to 0 from 204 species

species BRTE  
is linked to 20 from 204 species  
ABDU GRCO CATE DEJU GBHE LESA LIGU MAFR  
HEPE LTJA OSPR PUMA RNGR SAND TRES  
WTIR UNWA MYWA GLGU BLTE

species UNSK

is linked to 8 from 204 species , named:  
BARS LBBG SHOR UNGO UNJA TBMU UNGR UNMU

species UNSP  
is linked to 27 from 204 species , named:  
BLSC COLO DCCO DOVE GBBG LTDU NOGA GRSH  
RNPH ROST UNCO FOTE LAGU POJA RBGU  
SOSH UNBI UNDD UNLT UNLG UNME BRSP BLKI  
BCPE BOGU COGO DASC

species UNTE  
is linked to 7 from 204 species , named:  
BLSC COSH RAZO RTLO WWSC COTE WISP

species WILL  
is linked to 59 from 204 species , named:  
AMKE AMRO BBPL BHCO BHGU BRBO CHSW COME  
DEJU DUNL EUST GADW GRHE GBHE SBDO  
GRYE HADU HOME LESA LEYE LIGU NOPI MALL  
OSPR PAWA PESA PISI PUSA RBNU REDH  
RUDU RUTU RWBL SAGU SATE SEPL SESA SOSP  
SPSA TRES ULSB UNEI UNFR UNPE BANS  
MYWA WFSP WHIM GLGU GOME GREG MODO WIPH  
WODU YCNH YRWA UCRT BRNO AWPE

species WIPH  
is linked to 79 from 204 species , named:

COLO DOVE GBBG AMGO AMKE AMOY AMRO BBPL  
BHO CO BHGU GRSH ROST BRBO CHSW COME  
DEJU DUNL EUST GADW GRHE GBHE SBDO GRYE  
HADU HOME LESA LEYE NOPI ICGU LAGU  
MALL OSPR PAWA PEEP PESA PISI PUSA RBNU  
REDH RUDU RUTU RWBL SAGU SATE SCAU  
SEPL SESA SOSP POJA RBGU SPSA TRES UCAT  
ULSB UNBI UNEI UNFR UNPE UNLG UNME  
UNST BANS WFSP WHIM GLGU GOME GREG MODO  
WILL WODU YCNH YRWA UCRT BLKI BCPE  
BOGU BRNO CANG AWPE

species WODU  
is linked to 80 from 204 species  
COLO DOVE GBBG AMGO AMKE AMOY AMRO BBPL  
BHO CO BHGU ROST BRBO CHSW COME DEJU  
DUNL EUST GADW GRHE GBHE SBDO GRYE HADU  
HOME LESA LEYE LIGU NOPI ICGU LAGU  
MALL OSPR PAWA PEEP PESA PISI PUSA RBNU  
REDH RUDU RUTU RWBL SAGU SATE SCAU  
SEPL SESA SOSP POJA RBGU SPSA TRES UCAT  
ULSB UNBI UNEI UNFR UNPE UNLG UNME  
UNST BANS MYWA WFSP WHIM GLGU GOME GREG  
MODO WILL WIPH YCNH YRWA UCRT BLKI  
BCPE BOGU BRNO CANG AWPE

species WTSP

is linked to 0 from 204 species

species YBCH

is linked to 0 from 204 species

species YCNH

is linked to 79 from 204 species , named:

COLO DOVE GBBG AMGO AMKE AMOY AMRO BBPL  
BHO BHGU GRSH ROST BRBO CHSW COME  
DEJU DUNL EUST GADW GRHE GBHE SBDO GRYE  
HADU HOME LESA LEYE NOPI ICGU LAGU  
MALL OSPP PAWA PEEP PESA PISI PUSA RBNU  
REDH RUDU RUTU RWBL SAGU SATE SCAU  
SEPL SESA SOSP POJA RBGU SPSA TRES UCAT  
ULSB UNBI UNEI UNFR UNPE UNLG UNME  
UNST BANS WFSP WHIM GLGU GOME GREG MODO  
WILL WIPH WODU YRWA UCRT BLKI BCPE  
BOGU BRNO CANG AWPE

species YRWA

is linked to 78 from 204 species , named:

COLO GBBG AMGO AMKE AMOY AMRO BBPL BHO BHGU  
ROST BRBO CHSW COME DEJU DUNL  
EUST GADW GRHE GBHE SBDO GRYE HADU HOME LESA  
LEYE LIGU NOPI ICGU LAGU MALL  
OSPP PAWA PEEP PESA PISI PUSA RBNU REDH RUDU  
RUTU RWBL SAGU SATE SCAU SEPL

SESA SOSP POJA RBGU SPSA TRES UCAT ULSB UNBI  
UNEI UNFR UNPE UNME UNST BANS  
MYWA WFSP WHIM GLGU GOME GREG MODO WILL WIPH  
WODU YCNH UCRT BLKI BCPE BOGU  
BRNO CANG AWPE

species YWAR  
is linked to 0 from 204 species

species UNFI  
is linked to 5 from 204 species , named:  
CEDW GBTE SNGO UNEG UNSA

species UCRT  
is linked to 59 from 204 species , named:  
AMKE AMRO BBPL BHCO BHGU BRBO CHSW COME  
DEJU DUNL EUST GADW GRHE GBHE SBDO  
GRYE HADU HOME LESA LEYE LIGU NOPI MALL  
OSPR PAWA PESA PISI PUSA RBNU REDH  
RUDU RUTU RWBL SAGU SATE SEPL SESA SOSP  
SPSA TRES ULSB UNEI UNFR UNPE BANS  
MYWA WFSP WHIM GLGU GOME GREG MODO WILL  
WIPH WODU YCNH YRWA BRNO AWPE

species AUSH  
is linked to 9 from 204 species , named:  
REPH MASH RBME UBBG UNLA UNSG UNST ATPU

BRPE

species RTHU  
is linked to 0 from 204 species

species BRAN  
is linked to 0 from 204 species

species UNHU  
is linked to 0 from 204 species

species ATPU  
is linked to 11 from 204 species , named:  
REPH MASH RBME ROYT UBBG UNLA UNSG AUSH  
BRPE UNPH UNSH

species BLGU  
is linked to 8 from 204 species , named:  
COMU ARTE UNCO LETE UNDD UNPA SPSK PAJA

species BRPE  
is linked to 12 from 204 species , named:  
REPH MASH RBME ROYT UBBG UNLA UNSG UNST  
AUSH ATPU UNPH UNSH

species HERG  
is linked to 1/204 vertex , named:

NOGA

species PAJA

is linked to 7 from 204 species , named:

COMU ARTE UNCO LETE UNDD SPSK BLGU

species BRSP

is linked to 28 from 204 species , named:

COLO DCCO DOVE GBBG NOGA GRSH RNPH ROST  
UNCO FOTE GRSK LAGU SCAU POJA RBGU  
SOSH UNBI UNDD UNLT UNLG UNME UNST UNSP  
BLKI BCPE BOGU COGO DASC

species BLKI

is linked to 62 from 204 species , named:

DOVE AMGO AMKE AMOY AMRO BBPL BHCO BHGU  
RNPH ROST BRBO CHSW DUNL EUST SBDO  
GRYE HADU HOME LEYE NOPI LESP MALL PAWA  
PEEP PESA PISI RBNU REDH RUDU RUTU  
RWBL SAGU SATE SEPL SOSP POJA RBGU UCAT  
UNBI UNEI UNFR UNPE UNLG UNME UNST  
BANS WHIM GREG MODO UNSP WIPH WODU YCNH  
YRWA BRSP BCPE BOGU BRNO CANG COGO  
DASC AWPE

species BCPE

is linked to 64 from 204 species , named:

DOVE AMGO AMKE AMOY AMRO BBPL BHCO BHGU  
RNPH REPH ROST BRBO CHSW DUNL EUST  
FOTE SBDO GRYE HADU HOME LEYE NOPI HOGR  
LAGU MALL MASH PAWA PESA PISI RBNU  
REDH RUDU RUTU SAGU SATE SCAU POJA RBME  
RBGU SOSH UBBG UCAT UNBI UNFR UNPE  
UNLA UNLG UNME UNST BANS WHIM GREG MODO  
UNSP WIPH WODU YCNH YRWA BRSP BLKI  
BOGU BRNO COGO DASC

species BLTE  
is linked to 24 from 204 species , named:  
ABDU GRCO CATE COME DEJU GBHE LESA LIGU  
MAFR HEPE LTJA OSPR PUMA RNGR SAND  
SESA TRES WTIR UNWA MYWA WFSP GLGU GOME BRTE

species BOGU  
is linked to 63 from 204 species , named:  
DOVE AMGO AMKE AMOY AMRO BBPL BHCO BHGU  
RNPH ROST BRBO CHSW DUNL EUST FOTE  
SBDO GRYE HADU HOME LEYE NOPI LESP MALL  
PAWA PEEP PESA PISI RBNU REDH RUDU  
RUTU RWBL SAGU SATE SEPL SOSP POJA RBGU  
UCAT UNBI UNEI UNFR UNPE UNLG UNME  
UNST BANS WHIM GREG MODO UNSP WIPH WODU  
YCNH YRWA BRSP BLKI BCPE BRNO CANG  
COGO DASC AWPE

species BRNO

is linked to 79 from 204 species , named:

COLO DOVE GBBG AMGO AMKE AMOY AMRO BBPL  
BHO CO BHGU GRSH ROST BRBO CHSW COME  
DEJU DUNL EUST GADW GRHE GBHE SBDO GRYE  
HADU HOME LESA LEYE NOPI ICGU LAGU  
MALL OSPP PAWA PEEP PESA PISI PUSA RBNU  
REDH RUDU RUTU RWBL SAGU SATE SCAU  
SEPL SESA SOSP POJA RBGU SPSA TRES UCAT  
ULSB UNBI UNEI UNFR UNPE UNLG UNME  
UNST BANS WFSP WHIM GLGU GOME GREG MODO  
WILL WIPH WODU YCNH YRWA UCRT BLKI  
BCPE BOGU CANG AWPE

species BUFF

is linked to 2 from 204 species , named:

DCCO UNAL

species CANG

is linked to 64 from 204 species , named:

AMGO AMKE AMOY AMRO BBPL BHO CO BHGU BRBO  
CHSW COME DEJU DUNL EUST GBHE SBDO  
GRYE HADU HOME LESA LEYE LIGU NOPI ICGU  
LAGU MALL OSPP PAWA PEEP PESA PISI  
RBNU REDH RUDU RUTU RWBL SAGU SATE SCAU  
SEPL SESA SOSP RBGU TRES UCAT UNEI

UNFR UNPE UNST BANS MYWA WFSP WHIM GLGU  
GOME GREG MODO WIPH WODU YCNH YRWA  
BLKI BOGU BRNO AWPE

species COEI  
is linked to 3 from 204 species , named:  
UNSC UNGU UNLO

species COGO  
is linked to 26 from 204 species , named:  
COLO DCCO DOVE GBBG NOGA GRSH RNPH ROST  
FOTE LAGU SCAU POJA RBGU SOSH UNBI  
UNDD UNLT UNLG UNME UNST UNSP BRSP BLKI BCPE BOGU DASC

species COTE  
is linked to 5 from 204 species , named:  
COSH NOFU LESP WWSC UNTE

species WISP  
is linked to 5 from 204 species , named:  
COSH RAZO RTLO WWSC UNTE

species UNPH  
is linked to 6 from 204 species , named:  
ROYT UNAL UNSG ATPU BRPE UNSH

species UNSH

is linked to 6 from 204 species , named:

ROYT UNAL UNSG ATPU BRPE UNPH

species DASC

is linked to 23 from 204 species , named:

DOVE GBBG RNPH ROST FOTE LAGU MASH SCAU  
POJA RBGU SOSH SOTE UNBI UNLT UNLG  
UNME UNST UNSP BRSP BLKI BCPE BOGU COGO

species AWPE

is linked to 70 from 204 species

AMGO AMKE AMOY AMRO BBPL BHCO BHGU BRBO  
CHSW COME DEJU DUNL EUST GADW GRHE  
GBHE SBDO GRYE HADU HOME LESA LEYE LIGU  
NOPI ICGU MALL OSPR PAWA PEEP PESA  
PISI PUSA RBNU REDH RUDU RUTU RWBL SAGU  
SATE SCAU SEPL SESA SOSP RBGU SPSA  
TRES UCAT ULSB UNEI UNFR UNPE UNST BANS  
MYWA WFSP WHIM GLGU GOME GREG MODO  
WILL WIPH WODU YCNH YRWA UCRT BLKI BOGU BRNO CANG

species BUPE

is linked to 0 from 204 species

*Neighbors for  $\alpha = 0.6$*

We found the following structure for the threshold  $\alpha = .6$

species BLSC  
is linked to 9 from 204 species , named:  
COLO DCCO GBBG LTDU NOGA GRSH RAZO  
SOSH UNLT

species COLO  
is linked to 9 from 204 species , named:  
BLSC DOVE GBBG LTDU NOGA GRSH SOSH  
UNLT UNSP

species COMU  
is linked to 7 from 204 species , named:  
ARTE UNCO LETE UNDD SPSK BLGU PAJA

species COSH  
is linked to 2 from 204 species , named:  
WWSC UNTE

species DCCO  
is linked to 6 from 204 species , named:  
BLSC LTDU RAZO SOSH UNLT BUFF

species DOVE  
is linked to 13 from 204 species , named:  
COLO GBBG GRSH RNPH FOTE LAGU  
SOSH UNBI UNLT UNLG UNSP BRSP COGO

species GBBG  
is linked to 10 from 204 species , named:  
BLSC COLO DOVE LTDU GRSH LAGU  
SOSH UNLT UNLG UNSP

species LTDU  
is linked to 9 from 204 species , named  
BLSC COLO DCCO GBBG NOGA GRSH  
RAZO SOSH UNLT

species NOFU  
is linked to 2 from 204 species , named:  
LESP COTE

species NOGA  
is linked to 4 from 204 species , named:  
BLSC COLO LTDU GRSH

species SUSC  
is linked to 0 from 204 species , named:

species ABDU  
is linked to 8 from 204 species , named:  
GRCO HEPE PUMA Rngr SAND WTIR  
BRTE BLTE

species AMCO

is linked to 0 from 204 species , named:

species AMGO

is linked to 52 from 204 species , named:

AMKE AMOY AMRO BBPL BHCO BHGU

BRBO CHSW COME DUNL EUST SBDO GRYE

HADU HOME

LESA LEYE NOPI ICGU MALL OSPR

PAWA PEEP PESA PISI RBNU REDH RUDU

RUTU RWBL

SAGU SATE SEPL SESA SOSP UCAT

UNEI UNFR UNPE BANS WFSP WHIM GOME

GREG MODO

WIPH WODU YCNH YRWA BRNO CANG

AWPE

species AMKE

is linked to 52 from 204 species , named:

AMGO AMOY AMRO BBPL BHCO BHGU

BRBO CHSW COME DUNL EUST SBDO

GRYE HADU HOME

LESA LEYE NOPI ICGU MALL OSPR

PAWA PEEP PESA PISI RBNU REDH RUDU RUTU

RWBL

SAGU SATE SEPL SESA SOSP UCAT

UNEI UNFR UNPE BANS WFSP WHIM GOME

GREG MODO

WIPH WODU YCNH YRWA BRNO CANG AWPE

species AMOY

is linked to 52 from 204 species , named:

AMGO AMKE AMRO BBPL BHCO BHGU

BRBO CHSW COME DUNL EUST SBDO GRYE HADU HOME

LESA LEYE NOPI ICGU MALL OSPR

PAWA PEEP PESA PISI RBNU REDH RUDU RUTU RWBL

SAGU SATE SEPL SESA SOSP UCAT

UNEI UNFR UNPE BANS WFSP WHIM GOME GREG MODO

WIPH WODU YCNH YRWA BRNO CANG AWPE

species AMPI

is linked to 0 from 204 species , named:

species AMRE

is linked to 0 from 204 species , named:

species AMRO

is linked to 52 from 204 species , named:

AMGO AMKE AMOY BBPL BHCO BHGU

BRBO CHSW COME DUNL EUST SBDO GRYE HADU HOME

LESA LEYE NOPI ICGU MALL OSPR

PAWA PEEP PESA PISI RBNU REDH RUDU RUTU RWBL

SAGU SATE SEPL SESA SOSP UCAT

UNEI UNFR UNPE BANS WFSP WHIM GOME GREG MODO

WIPH WODU YCNH YRWA BRNO CANG AWPE

species BAOR

is linked to 0 from 204 species , named:

species BARS

is linked to 6 from 204 species , named:

LBBG GRSK HOGR SOTE SHOR UNGR

species BBPL

is linked to 52 from 204 species , named:

AMGO AMKE AMOY AMRO BHCO BHGU BRBO  
CHSW COME DUNL EUST SBDO GRYE HADU HOME  
LESA LEYE NOPI ICGU MALL OSPR PAWA  
PEEP PESA PISI RBNU REDH RUDU RUTU RWBL  
SAGU SATE SEPL SESA SOSP UCAT UNEI  
UNFR UNPE BANS WFSP WHIM GOME GREG MODO  
WIPH WODU YCNH YRWA BRNO CANG AWPE

species BHCO

is linked to 55 from 204 species , named:

AMGO AMKE AMOY AMRO BBPL BHGU BRBO  
CHSW COME DEJU DUNL EUST GBHE SBDO GRYE  
HADU HOME LESA LEYE NOPI ICGU MALL  
OSPR PAWA PEEP PESA PISI RBNU REDH RUDU  
RUTU RWBL SAGU SATE SEPL SESA SOSP  
UCAT UNEI UNFR UNPE BANS WFSP WHIM GLGU  
GOME GREG MODO WIPH WODU YCNH YRWA

BRNO CANG AWPE

species BHGU

is linked to 55 from 204 species , named:

AMGO AMKE AMOY AMRO BBPL BHCO BRBO  
CHSW COME DEJU DUNL EUST GBHE SBDO GRYE  
HADU HOME LESA LEYE NOPI ICGU MALL  
OSPR PAWA PEEP PESA PISI RBNU REDH RUDU  
RUTU RWBL SAGU SATE SEPL SESA SOSP  
UCAT UNEI UNFR UNPE BANS WFSP WHIM GLGU  
GOME GREG MODO WIPH WODU YCNH YRWA  
BRNO CANG AWPE

species ARTE

is linked to 7 from 204 species , named:

COMU UNCO LETE UNDD SPSK BLGU PAJA

species GRCO

is linked to 14 from 204 species , named:

ABDU CATE GBHE LIGU HEPE LTJA PUMA  
SAND TRES WTIR UNWA MYWA BRTE BLTE

species GRSH

is linked to 8 from 204 species , named:

BLSC COLO DOVE GBBG LTDU NOGA SOSH UNLT

species RAZO

is linked to 4 from 204 species , named:

BLSC DCCO LTDU UNTE

species RNPH

is linked to 13 from 204 species , named:

DOVE ROST FOTE POJA UNBI UNLG UNME

UNST UNSP BRSP BCPE COGO DASC

species RTLO

is linked to 1 from 204 vertex , named:

WISP

species REPH

is linked to 10 from 204 species , named:

MASH RBME UBBG UNLA UNME UNSG UNST

AUSH ATPU BRPE

species ROST

is linked to 13 from 204 species , named:

RNPH FOTE SCAU POJA RBGU UNME UNST

BRSP BLKI BCPE BOGU COGO DASC

species UNCO

is linked to 5 from 204 species , named:

COMU ARTE LETE UNDD SPSK

species UNSC

is linked to 3 from 204 species , named:

UNGU UNLO COEI

species BRBO

is linked to 52 from 204 species , named:

AMGO AMKE AMOY AMRO BBPL BHCO BHGU  
CHSW COME DUNL EUST SBDO GRYE HADU HOME  
LESA LEYE NOPI ICGU MALL OSPR PAWA  
PEEP PESA PISI RBNU REDH RUDU RUTU RWBL  
SAGU SATE SEPL SESA SOSP UCAT UNEI  
UNFR UNPE BANS WFSP WHIM GOME GREG MODO  
WIPH WODU YCNH YRWA BRNO CANG AWPE

species CATE

is linked to 15 from 204 species , named:

GRCO DEJU GBHE LIGU HEPE LTJA PUMA  
SAND TRES WTIR UNWA MYWA GLGU BRTE BLTE

species CEDW

is linked to 5 from 204 species , named:

GBTE SNGO UNEG UNSA UNFI

species CHSW

is linked to 53 from 204 species , named:

AMGO AMKE AMOY AMRO BBPL BHCO BHGU  
BRBO COME DUNL EUST GBHE SBDO GRYE HADU  
HOME LESA LEYE NOPI ICGU MALL OSPR

PAWA PEEP PESA PISI RBNU REDH RUDU RUTU  
RWBL SAGU SATE SEPL SESA SOSP UCAT  
UNEI UNFR UNPE BANS WFSP WHIM GOME GREG  
MODO WIPH WODU YCNH YRWA BRNO CANG  
AWPE

species COME  
is linked to 58 from 204 species , named:  
AMGO AMKE AMOY AMRO BBPL BHCO BHGU  
BRBO CHSW DEJU DUNL EUST GBHE SBDO GRYE  
HADU HOME LESA LEYE LIGU NOPI ICGU  
MALL OSPR PAWA PEEP PESA PISI RBNU REDH  
RUDU RUTU RWBL SAGU SATE SEPL SESA  
SOSP TRES UCAT UNEI UNFR UNPE BANS MYWA  
WFSP WHIM GLGU GOME GREG MODO WIPH  
WODU YCNH YRWA BRNO CANG AWPE

species COYE  
is linked to 0 from 204 species , named:

species DEJU  
is linked to 26 from 204 species , named:  
BHCO BHGU CATE COME DUNL GBHE LESA  
LIGU ICGU OSPR REDH RWBL SEPL SESA SOSP  
TRES UNEI UNPE MYWA WFSP GLGU GOME  
MODO YRWA CANG AWPE

species DUNL

is linked to 55 from 204 species , named:

AMGO AMKE AMOY AMRO BBPL BHCO BHGU  
BRBO CHSW COME DEJU EUST GBHE SBDO GRYE  
HADU HOME LESA LEYE NOPI ICGU MALL  
OSPR PAWA PEEP PESA PISI RBNU REDH RUDU  
RUTU RWBL SAGU SATE SEPL SESA SOSP  
UCAT UNEI UNFR UNPE BANS WFSP WHIM GLGU  
GOME GREG MODO WIPH WODU YCNH YRWA  
BRNO CANG AWPE

species EUST

is linked to 52 from 204 species , named:

AMGO AMKE AMOY AMRO BBPL BHCO BHGU  
BRBO CHSW COME DUNL SBDO GRYE HADU HOME  
LESA LEYE NOPI ICGU MALL OSPR PAWA  
PEEP PESA PISI RBNU REDH RUDU RUTU RWBL  
SAGU SATE SEPL SESA SOSP UCAT UNEI  
UNFR UNPE BANS WFSP WHIM GOME GREG MODO  
WIPH WODU YCNH YRWA BRNO CANG AWPE

species FEPE

is linked to 0 from 204 species , named:

species FOTE

is linked to 13 from 204 species , named:

DOVE RNPH ROST POJA UNBI UNLG UNME

UNST UNSP BRSP BCPE COGO DASC

species GADW

is linked to 6 from 204 species , named:

GRHE PUSA SPSA ULSB WILL UCRT

species GBTE

is linked to 5 from 204 species , named:

CEDW SNGO UNEG UNSA UNFI

species GCKI

is linked to 0 from 204 species , named:

species GRCA

is linked to 0 from 204 species , named:

species GRHE

is linked to 6 from 204 species , named:

GADW PUSA SPSA ULSB WILL UCRT

species GRSC

is linked to 2 from 204 species , named:

GWIE USSB

species GBHE

is linked to 41 from 204 species , named:

BHCO BHGU GRCO CATE CHSW COME DEJU

DUNL LESA LIGU ICGU LTJA MALL OSPR PAWA  
PEEP PUMA REDH RUTU RWBL SAND SEPL  
SESA SOSP TRES UNEI UNFR UNPE BANS UNWA  
MYWA WFSP WHIM GLGU GOME MODO WODU  
YRWA BLTE CANG AWPE

species SBDO

is linked to 52 from 204 species, named:

AMGO AMKE AMOY AMRO BBPL BHCO BHGU  
BRBO CHSW COME DUNL EUST GRYE HADU HOME  
LESA LEYE NOPI ICGU MALL OSPR PAWA  
PEEP PESA PISI RBNU REDH RUDU RUTU RWBL  
SAGU SATE SEPL SESA SOSP UCAT UNEI  
UNFR UNPE BANS WFSP WHIM GOME GREG MODO  
WIPH WODU YCNH YRWA BRNO CANG AWPE

species GRYE

is linked to 52 from 204 species, named:

AMGO AMKE AMOY AMRO BBPL BHCO BHGU  
BRBO CHSW COME DUNL EUST SBDO HADU HOME  
LESA LEYE NOPI ICGU MALL OSPR PAWA  
PEEP PESA PISI RBNU REDH RUDU RUTU RWBL  
SAGU SATE SEPL SESA SOSP UCAT UNEI  
UNFR UNPE BANS WFSP WHIM GOME GREG MODO  
WIPH WODU YCNH YRWA BRNO CANG AWPE

species GWIE

is linked to 2 from 204 species , named:

GRSC USSB

species HADU

is linked to 52 from 204 species , named:

AMGO AMKE AMOY AMRO BBPL BHCO BHGU  
BRBO CHSW COME DUNL EUST SBDO GRYE HOME  
LESA LEYE NOPI ICGU MALL OSPR PAWA  
PEEP PESA PISI RBNU REDH RUDU RUTU RWBL  
SAGU SATE SEPL SESA SOSP UCAT UNEI  
UNFR UNPE BANS WFSP WHIM GOME GREG MODO  
WIPH WODU YCNH YRWA BRNO CANG AWPE

species HOME

is linked to 52 from 204 species , named:

AMGO AMKE AMOY AMRO BBPL BHCO BHGU  
BRBO CHSW COME DUNL EUST SBDO GRYE HADU  
LESA LEYE NOPI ICGU MALL OSPR PAWA  
PEEP PESA PISI RBNU REDH RUDU RUTU RWBL  
SAGU SATE SEPL SESA SOSP UCAT UNEI  
UNFR UNPE BANS WFSP WHIM GOME GREG MODO  
WIPH WODU YCNH YRWA BRNO CANG AWPE

species LBBG

is linked to 6 from 204 species , named:

BARS SHOR UNJA TBMU UNGR UNSK

species LESA

is linked to 58 from 204 species , named:

AMGO AMKE AMOY AMRO BBPL BHCO BHGU  
BRBO CHSW COME DEJU DUNL EUST GBHE SBDO  
GRYE HADU HOME LEYE LIGU NOPI ICGU  
MALL OSRP PAWA PEEP PESA PISI RBNU REDH  
RUDU RUTU RWBL SAGU SATE SEPL SESA  
SOSP TRES UCAT UNEI UNFR UNPE BANS MYWA  
WFSP WHIM GLGU GOME GREG MODO WIPH  
WODU YCNH YRWA BRNO CANG AWPE

species LESC

is linked to 0 from 204 species , named:

species LEYE

is linked to 52 from 204 species , named:

AMGO AMKE AMOY AMRO BBPL BHCO BHGU  
BRBO CHSW COME DUNL EUST SBDO GRYE HADU  
HOME LESA NOPI ICGU MALL OSRP PAWA  
PEEP PESA PISI RBNU REDH RUDU RUTU RWBL  
SAGU SATE SEPL SESA SOSP UCAT UNEI  
UNFR UNPE BANS WFSP WHIM GOME GREG MODO  
WIPH WODU YCNH YRWA BRNO CANG AWPE

species LIGU

is linked to 20 from 204 species , named:

GRCO CATE COME DEJU GBHE LESA HEPE

LTJA OSRP PUMA SAND SESA TRES UNWA MYWA  
WFSP GLGU GOME BRTE BLTE

species LISH  
is linked to 0 from 204 species , named:

species MABO  
is linked to 0 from 204 species , named:

species MAFR  
is linked to 0 from 204 species , named:

species MAWA  
is linked to 0 from 204 species , named:

species NOFL  
is linked to 0 from 204 species , named:

species NOHA  
is linked to 0 from 204 species , named:

species NOPI  
is linked to 52 from 204 species , named:  
AMGO AMKE AMOY AMRO BBPL BHCO BHGU  
BRBO CHSW COME DUNL EUST SBDO GRYE HADU  
HOME LESA LEYE ICGU MALL OSRP PAWA  
PEEP PESA PISI RBNU REDH RUDU RUTU RWBL

SAGU SATE SEPL SESA SOSP UCAT UNEI  
UNFR UNPE BANS WFSP WHIM GOME GREG MODO  
WIPH WODU YCNH YRWA BRNO CANG AWPE

species NOTE  
is linked to 0 from 204 species , named:

species GRSK  
is linked to 5 from 204 species , named:  
BARS HOGR SOTE SHOR UNGR

species HEPE  
is linked to 14 from 204 species , named:  
ABDU GRCO CATE LIGU LTJA PUMA Rngr  
SAND TRES WTIR UNWA MYWA BRTE BLTE

species HOGR  
is linked to 4 from 204 species , named:  
BARS GRSK SOTE UNGR

species ICGU  
is linked to 56 from 204 species , named:  
AMGO AMKE AMOY AMRO BBPL BHCO BHGU  
BRBO CHSW COME DEJU DUNL EUST GBHE SBDO  
GRYE HADU HOME LESA LEYE NOPI MALL  
OSPR PAWA PEEP PESA PISI RBNU REDH RUDU  
RUTU RWBL SAGU SATE SEPL SESA SOSP

TRES UCAT UNEI UNFR UNPE BANS WFSP WHIM  
GLGU GOME GREG MODO WIPH WODU YCNH  
YRWA BRNO CANG AWPE

species LAGU  
is linked to 6 from 204 species , named:  
DOVE GBBG SOSH UNLT UNLG UNSP

species LESP  
is linked to 1 from 204 vertex , named:  
NOFU

species LETE  
is linked to 7 from 204 species , named:  
COMU ARTE UNCO UNDD SPSK BLGU PAJA

species LTJA  
is linked to 12 from 204 species , named:  
GRCO CATE GBHE LIGU HEPE PUMA SAND  
TRES UNWA MYWA BRTE BLTE

species MALL  
is linked to 53 from 204 species , named:  
AMGO AMKE AMOY AMRO BBPL BHCO BHGU  
BRBO CHSW COME DUNL EUST GBHE SBDO GRYE  
HADU HOME LESA LEYE NOPI ICGU OSPR  
PAWA PEEP PESA PISI RBNU REDH RUDU RUTU

RWBL SAGU SATE SEPL SESA SOSP UCAT  
UNEI UNFR UNPE BANS WFSP WHIM GOME GREG  
MODO WIPH WODU YCNH YRWA BRNO CANG  
AWPE

species MASH  
is linked to 10 from 204 species , named:  
REPH RBME UBBG UNLA UNME UNSG UNST  
AUSH ATPU BRPE

species NOWA  
is linked to 0 from 204 species , named:

species OSPR  
is linked to 58 from 204 species , named:  
AMGO AMKE AMOY AMRO BBPL BHCO BHGU  
BRBO CHSW COME DEJU DUNL EUST GBHE SBDO  
GRYE HADU HOME LESA LEYE LIGU NOPI  
ICGU MALL PAWA PEEP PESA PISI RBNU REDH  
RUDU RUTU RWBL SAGU SATE SEPL SESA  
SOSP TRES UCAT UNEI UNFR UNPE BANS MYWA  
WFSP WHIM GLGU GOME GREG MODO WIPH  
WODU YCNH YRWA BRNO CANG AWPE

species PAWA  
is linked to 53 from 204 species , named:  
AMGO AMKE AMOY AMRO BBPL BHCO BHGU

BRBO CHSW COME DUNL EUST GBHE SBDO GRYE  
HADU HOME LESA LEYE NOPI ICGU MALL  
OSPR PEEP PESA PISI RBNU REDH RUDU RUTU  
RWBL SAGU SATE SEPL SESA SOSP UCAT  
UNEI UNFR UNPE BANS WFSP WHIM GOME GREG  
MODO WIPH WODU YCNH YRWA BRNO CANG  
AWPE

species PEEP

is linked to 53 from 204 species , named:

AMGO AMKE AMOY AMRO BBPL BHCO BHGU  
BRBO CHSW COME DUNL EUST GBHE SBDO GRYE  
HADU HOME LESA LEYE NOPI ICGU MALL  
OSPR PAWA PESA PISI RBNU REDH RUDU RUTU  
RWBL SAGU SATE SEPL SESA SOSP UCAT  
UNEI UNFR UNPE BANS WFSP WHIM GOME GREG  
MODO WIPH WODU YCNH YRWA BRNO CANG AWPE

species PEFA

is linked to 0 from 204 species , named:

species PESA

is linked to 52 from 204 species , named:

AMGO AMKE AMOY AMRO BBPL BHCO BHGU  
BRBO CHSW COME DUNL EUST SBDO GRYE HADU  
HOME LESA LEYE NOPI ICGU MALL OSPR  
PAWA PEEP PISI RBNU REDH RUDU RUTU RWBL

SAGU SATE SEPL SESA SOSP UCAT UNEI  
UNFR UNPE BANS WFSP WHIM GOME GREG MODO  
WIPH WODU YCNH YRWA BRNO CANG AWPE

species PISI  
is linked to 52 from 204 species , named:  
AMGO AMKE AMOY AMRO BBPL BHCO BHGU  
BRBO CHSW COME DUNL EUST SBDO GRYE HADU  
HOME LESA LEYE NOPI ICGU MALL OSPR  
PAWA PEEP PESA RBNU REDH RUDU RUTU RWBL  
SAGU SATE SEPL SESA SOSP UCAT UNEI  
UNFR UNPE BANS WFSP WHIM GOME GREG MODO  
WIPH WODU YCNH YRWA BRNO CANG AWPE

species PUMA  
is linked to 14 from 204 species , named:  
ABDU GRCO CATE GBHE LIGU HEPE LTJA  
SAND TRES WTIR UNWA MYWA BRTE BLTE

species PUSA  
is linked to 6 from 204 species , named:  
GADW GRHE SPSA ULSB WILL UCRT

species RBNU  
is linked to 52 from 204 species , named:  
AMGO AMKE AMOY AMRO BBPL BHCO BHGU  
BRBO CHSW COME DUNL EUST SBDO GRYE HADU

HOME LESA LEYE NOPI ICGU MALL OSPR  
PAWA PEEP PESA PISI REDH RUDU RUTU RWBL  
SAGU SATE SEPL SESA SOSP UCAT UNEI  
UNFR UNPE BANS WFSP WHIM GOME GREG MODO  
WIPH WODU YCNH YRWA BRNO CANG AWPE

species RBTR  
is linked to 0 from 204 species , named:

species RCKI  
is linked to 0 from 204 species , named:

species REDH  
is linked to 55 from 204 species , named:  
AMGO AMKE AMOY AMRO BBPL BHCO BHGU  
BRBO CHSW COME DEJU DUNL EUST GBHE SBDO  
GRYE HADU HOME LESA LEYE NOPI ICGU  
MALL OSPR PAWA PEEP PESA PISI RBNU RUDU  
RUTU RWBL SAGU SATE SEPL SESA SOSP  
UCAT UNEI UNFR UNPE BANS WFSP WHIM GLGU  
GOME GREG MODO WIPH WODU YCNH YRWA  
BRNO CANG AWPE

species Rngr  
is linked to 3 from 204 species , named:  
ABDU HEPE WTIR

species RUDU

is linked to 52 from 204 species , named:

AMGO AMKE AMOY AMRO BBPL BHCO BHGU  
BRBO CHSW COME DUNL EUST SBDO GRYE HADU  
HOME LESA LEYE NOPI ICGU MALL OSPR  
PAWA PEEP PESA PISI RBNU REDH RUTU RWBL  
SAGU SATE SEPL SESA SOSP UCAT UNEI  
UNFR UNPE BANS WFSP WHIM GOME GREG MODO  
WIPH WODU YCNH YRWA BRNO CANG AWPE

species RUTU

is linked to 53 from 204 species , named:

AMGO AMKE AMOY AMRO BBPL BHCO BHGU  
BRBO CHSW COME DUNL EUST GBHE SBDO GRYE  
HADU HOME LESA LEYE NOPI ICGU MALL  
OSPR PAWA PEEP PESA PISI RBNU REDH RUDU  
RWBL SAGU SATE SEPL SESA SOSP UCAT  
UNEI UNFR UNPE BANS WFSP WHIM GOME GREG  
MODO WIPH WODU YCNH YRWA BRNO CANG AWPE

species RWBL

is linked to 56 from 204 species , named:

AMGO AMKE AMOY AMRO BBPL BHCO BHGU  
BRBO CHSW COME DEJU DUNL EUST GBHE SBDO  
GRYE HADU HOME LESA LEYE NOPI ICGU  
MALL OSPR PAWA PEEP PESA PISI RBNU REDH  
RUDU RUTU SAGU SATE SEPL SESA SOSP

TRES UCAT UNEI UNFR UNPE BANS WFSP WHIM  
GLGU GOME GREG MODO WIPH WODU YCNH  
YRWA BRNO CANG AWPE

species SAGU  
is linked to 52 from 204 species , named:  
AMGO AMKE AMOY AMRO BBPL BHCO BHGU  
BRBO CHSW COME DUNL EUST SBDO GRYE HADU  
HOME LESA LEYE NOPI ICGU MALL OSPR  
PAWA PEEP PESA PISI RBNU REDH RUDU RUTU  
RWBL SATE SEPL SESA SOSP UCAT UNEI  
UNFR UNPE BANS WFSP WHIM GOME GREG MODO  
WIPH WODU YCNH YRWA BRNO CANG AWPE

species SAND  
is linked to 14 from 204 species , named:  
ABDU GRCO CATE GBHE LIGU HEPE LTJA  
PUMA TRES WTIR UNWA MYWA BRTE BLTE

species SATE  
is linked to 52 from 204 species , named:  
AMGO AMKE AMOY AMRO BBPL BHCO BHGU  
BRBO CHSW COME DUNL EUST SBDO GRYE HADU  
HOME LESA LEYE NOPI ICGU MALL OSPR  
PAWA PEEP PESA PISI RBNU REDH RUDU RUTU  
RWBL SAGU SEPL SESA SOSP UCAT UNEI  
UNFR UNPE BANS WFSP WHIM GOME GREG MODO

WIPH WODU YCNH YRWA BRNO CANG AWPE

species SAVS

is linked to 0 from 204 species , named:

species SCAU

is linked to 6 from 204 species , named:

ROST POJA UNME UNST BCPE DASC

species SEPL

is linked to 56 from 204 species , named:

AMGO AMKE AMOY AMRO BBPL BHCO BHGU  
BRBO CHSW COME DEJU DUNL EUST GBHE SBDO  
GRYE HADU HOME LESA LEYE NOPI ICGU  
MALL OSPR PAWA PEEP PESA PISI RBNU REDH  
RUDU RUTU RWBL SAGU SATE SESA SOSP  
TRES UCAT UNEI UNFR UNPE BANS WFSP WHIM  
GLGU GOME GREG MODO WIPH WODU YCNH  
YRWA BRNO CANG AWPE

species SESA

is linked to 58 from 204 species , named:

AMGO AMKE AMOY AMRO BBPL BHCO BHGU  
BRBO CHSW COME DEJU DUNL EUST GBHE SBDO  
GRYE HADU HOME LESA LEYE LIGU NOPI  
ICGU MALL OSPR PAWA PEEP PESA PISI RBNU  
REDH RUDU RUTU RWBL SAGU SATE SEPL

SOSP TRES UCAT UNEI UNFR UNPE BANS MYWA  
WFSP WHIM GLGU GOME GREG MODO WIPH  
WODU YCNH YRWA BRNO CANG AWPE

species SNBU  
is linked to 0 from 204 species , named:

species SNGO  
is linked to 5 from 204 species , named:  
CEDW GBTE UNEG UNSA UNFI

species SOSP  
is linked to 56 from 204 species , named:  
AMGO AMKE AMOY AMRO BBPL BHCO BHGU  
BRBO CHSW COME DEJU DUNL EUST GBHE SBDO  
GRYE HADU HOME LESA LEYE NOPI ICGU  
MALL OSPR PAWA PEEP PESA PISI RBNU REDH  
RUDU RUTU RWBL SAGU SATE SEPL SESA  
TRES UCAT UNEI UNFR UNPE BANS WFSP WHIM  
GLGU GOME GREG MODO WIPH WODU YCNH  
YRWA BRNO CANG AWPE

species POJA  
is linked to 11 from 204 species , named:  
RNPH ROST FOTE SCAU UNME UNST BRSP  
BLKI BCPE COGO DASC

species RBME  
is linked to 10 from 204 species , named:  
REPH MASH UBBG UNLA UNME UNSG UNST  
AUSH ATPU BRPE

species RBGU  
is linked to 6 from 204 species , named:  
ROST UNBI UNLG BLKI BCPE BOGU

species ROYT  
is linked to 5 from 204 species , named:  
UNSG ATPU BRPE UNPH UNSH

species SOSH  
is linked to 12 from 204 species , named:  
BLSC COLO DCCO DOVE GBBG LTDU  
GRSH  
LAGU UNBI UNLT UNLG UNSP

species SOTE  
is linked to 5 from 204 species , named:  
BARS GRSK HOGR SHOR UNGR

species SHOR  
is linked to 8 from 204 species , named:  
BARS LBBG GRSK SOTE UNJA TBMU  
UNG R UNSK

species SPSA  
is linked to 6 from 204 species , named:  
GADW GRHE PUSA ULSB WILL UCRT

species TRES  
is linked to 26 from 204 species , named:  
GRCO CATE COME DEJU GBHE LESA  
LIGU HEPE ICGU LTJA OSPR PUMA RWBL SAND SEPL  
SESA SOSP UNEI UNWA MYWA WFSP  
GLGU GOME BRTE BLTE AWPE

species UBBG  
is linked to 9 from 204 species , named:  
REPH MASH RBME UNLA UNSG UNST  
AUSH ATPU BRPE

species UCAT  
is linked to 52 from 204 species , named:  
AMGO AMKE AMOY AMRO BBPL BHCO  
BHGU BRBO CHSW COME DUNL EUST SBDO GRYE HADU  
HOME LESA LEYE NOPI ICGU MALL  
OSPR PAWA PEEP PESA PISI RBNU REDH RUDU RUTU  
RWBL SAGU SATE SEPL SESA SOSP  
UNEI UNFR UNPE BANS WFSP WHIM GOME GREG MODO  
WIPH WODU YCNH YRWA BRNO CANG  
AWPE

species ULSB  
is linked to 6 from 204 species , named:  
GADW GRHE PUSA SPSA WILL UCRT

species UNBI  
is linked to 13 from 204 species , named:  
DOVE RNPH FOTE RBGU SOSH UNLT  
UNLG UNSP BRSP BLKI BOGU COGO DASC

species UNDD  
is linked to 5 from 204 species , named:  
COMU ARTE UNCO LETE SPSK

species UNEG  
is linked to 5 from 204 species , named:  
CEDW GBTE SNGO UNSA UNFI

species UNEI  
is linked to 56 from 204 species , named:  
AMGO AMKE AMOY AMRO BBPL BHCO  
BHGU BRBO CHSW COME DEJU DUNL EUST GBHE SBDO  
GRYE HADU HOME LESA LEYE NOPI  
ICGU MALL OSPR PAWA PEEP PESA PISI RBNU REDH  
RUDU RUTU RWBL SAGU SATE SEPL  
SESA SOSP TRES UCAT UNFR UNPE BANS WFSP WHIM  
GLGU GOME GREG MODO WIPH WODU

YCNH YRWA BRNO CANG AWPE

species UNFR

is linked to 53 from 204 species , named:

AMGO AMKE AMOY AMRO BBPL BHCO  
BHGU BRBO CHSW COME DUNL EUST GBHE SBDO GRYE  
HADU HOME LESA LEYE NOPI ICGU  
MALL OSPR PAWA PEEP PESA PISI RBNU REDH RUDU  
RUTU RWBL SAGU SATE SEPL SESA  
SOSP UCAT UNEI UNPE BANS WFSP WHIM GOME GREG  
MODO WIPH WODU YCNH YRWA BRNO CANG AWPE

species UNGO

is linked to 1 from 204 vertex , named:

UNMU

species UNLT

is linked to 12 from 204 species , named:

BLSC COLO DCCO DOVE GBBG LTDU  
GRSH LAGU SOSH UNBI UNLG UNSP

species UNPA

is linked to 0 from 204 species , named:

species UNPT

is linked to 0 from 204 species , named:

species UNJA  
is linked to 4 from 204 species , named:  
LBBG SHOR TBMU UNSK

species UNPE  
is linked to 55 from 204 species , named:  
AMGO AMKE AMOY AMRO BBPL BHCO  
BHGU BRBO CHSW COME DEJU DUNL EUST GBHE SBDO  
GRYE HADU HOME LESA LEYE NOPI  
ICGU MALL OSPR PAWA PEEP PESA PISI RBNU REDH  
RUDU RUTU RWBL SAGU SATE SEPL  
SESA SOSP UCAT UNEI UNFR BANS WFSP WHIM GLGU  
GOME GREG MODO WIPH WODU YCNH YRWA BRNO CANG AWPE

species SPAR  
is linked to 0 from 204 species , named:

species SWAL  
is linked to 0 from 204 species , named:

species SPSK  
is linked to 7 from 204 species , named:  
COMU ARTE UNCO LETE UNDD BLGU PAJA

species TBMU  
is linked to 4 from 204 species , named:  
LBBG SHOR UNJA UNSK

species UNAL  
is linked to 2 from 204 species , named:  
BUFF UNPH

species UNDU  
is linked to 0 from 204 species , named:

species UNGR  
is linked to 6 from 204 species , named:  
BARS LBBG GRSK HOGR SOTE SHOR

species UNGU  
is linked to 3 from 204 species , named:  
UNSC UNLO COEI

species UNLA  
is linked to 10 from 204 species , named:  
REPH MASH RBME UBBG UNME UNSG  
UNST AUSH ATPU BRPE

species UNLG  
is linked to 13 from 204 species , named:  
DOVE GBBG RNPH FOTE LAGU RBGU  
SOSH UNBI UNLT UNSP BRSP BOGU COGO

species UNLO

is linked to 3 from 204 species , named:

UNSC UNGU COEI

species UNME

is linked to 14 from 204 species , named:

RNPH REPH ROST FOTE MASH SCAU

POJA RBME UNLA UNST BRSP BCPE COGO DASC

species UNMU

is linked to 1 from 204 vertex , named:

UNGO

species UNSA

is linked to 5 from 204 species , named:

CEDW GBTE SNGO UNEG UNFI

species UNSG

is linked to 10 from 204 species , named:

REPH MASH RBME ROYT UBBG UNLA

AUSH ATPU BRPE UNSH

species UNST

is linked to 15 from 204 species , named:

RNPH REPH ROST FOTE MASH SCAU

POJA RBME UBBG UNLA UNME BRSP BCPE COGO DASC

species UNTB

is linked to 0 from 204 species , named:

species WTIR

is linked to 10 from 204 species , named:

ABDU GRCO CATE HEPE PUMA Rngr

SAND UNWA BRTE BLTE

species WWSC

is linked to 3 from 204 species , named:

COSH UNTE COTE

species BANS

is linked to 53 from 204 species , named:

AMGO AMKE AMOY AMRO BBPL BHCO

BHGU BRBO CHSW COME DUNL EUST GBHE SBDO GRYE

HADU HOME LESA LEYE NOPI ICGU

MALL OSPR PAWA PEEP PESA PISI RBNU REDH RUDU

RUTU RWBL SAGU SATE SEPL SESA

SOSP UCAT UNEI UNFR UNPE WFSP WHIM GOME GREG

MODO WIPH WODU YCNH YRWA BRNO

CANG AWPE

species UNWA

is linked to 13 from 204 species , named:

GRCO CATE GBHE LIGU HEPE LTJA

PUMA SAND TRES WTIR MYWA BRTE BLTE

species USAN  
is linked to 0 from 204 species , named:

species USSB  
is linked to 2 from 204 species , named:  
GRSC GWTE

species MYWA  
is linked to 20 from 204 species , named:  
GRCO CATE COME DEJU GBHE LESA  
LIGU HEPE LTJA OSPR PUMA SAND SESA TRES UNWA  
WFSP GLGU GOME BRTE BLTE

species WFSP  
is linked to 58 from 204 species , named:  
AMGO AMKE AMOY AMRO BBPL BHCO  
BHGU BRBO CHSW COME DEJU DUNL EUST GBHE SBDO  
GRYE HADU HOME LESA LEYE LIGU  
NOPI ICGU MALL OSPR PAWA PEEP PESA PISI RBNU  
REDH RUDU RUTU RWBL SAGU SATE  
SEPL SESA SOSP TRES UCAT UNEI UNFR UNPE BANS  
MYWA WHIM GLGU GOME GREG MODO  
WIPH WODU YCNH YRWA BRNO CANG AWPE

species WHIM  
is linked to 53 from 204 species , named:  
AMGO AMKE AMOY AMRO BBPL BHCO

BHGU BRBO CHSW COME DUNL EUST GBHE SBDO GRYE  
HADU HOME LESA LEYE NOPI ICGU  
MALL OSPR PAWA PEEP PESA PISI RBNU REDH RUDU  
RUTU RWBL SAGU SATE SEPL SESA  
SOSP UCAT UNEI UNFR UNPE BANS WFSP GOME GREG  
MODO WIPH WODU YCNH YRWA BRNO  
CANG AWPE

species BLPW  
is linked to 0 from 204 species , named:

species BIBW  
is linked to 0 from 204 species , named:

species GLGU  
is linked to 26 from 204 species , named:  
BHCO BHGU CATE COME DEJU DUNL  
GBHE LESA LIGU ICGU OSPR REDH RWBL SEPL SESA  
SOSP TRES UNEI UNPE MYWA WFSP  
GOME MODO YRWA CANG AWPE

species GOME  
is linked to 58 from 204 species , named:  
AMGO AMKE AMOY AMRO BBPL BHCO  
BHGU BRBO CHSW COME DEJU DUNL EUST GBHE SBDO  
GRYE HADU HOME LESA LEYE LIGU  
NOPI ICGU MALL OSPR PAWA PEEP PESA PISI RBNU

REDH RUDU RUTU RWBL SAGU SATE  
SEPL SESA SOSP TRES UCAT UNEI UNFR UNPE BANS  
MYWA WFSP WHIM GLGU GREG MODO  
WIPH WODU YCNH YRWA BRNO CANG AWPE

species GREG  
is linked to 52 from 204 species , named:  
AMGO AMKE AMOY AMRO BBPL BHCO  
BHGU BRBO CHSW COME DUNL EUST SBDO GRYE HADU  
HOME LESA LEYE NOPI ICGU MALL  
OSPR PAWA PEEP PESA PISI RBNU REDH RUDU RUTU  
RWBL SAGU SATE SEPL SESA SOSP  
UCAT UNEI UNFR UNPE BANS WFSP WHIM GOME MODO  
WIPH WODU YCNH YRWA BRNO CANG AWPE

species MERL  
is linked to 0 from 204 species , named:

species MODO  
is linked to 55 from 204 species , named:  
AMGO AMKE AMOY AMRO BBPL BHCO  
BHGU BRBO CHSW COME DEJU DUNL EUST GBHE SBDO  
GRYE HADU HOME LESA LEYE NOPI  
ICGU MALL OSPR PAWA PEEP PESA PISI RBNU REDH  
RUDU RUTU RWBL SAGU SATE SEPL  
SESA SOSP UCAT UNEI UNFR UNPE BANS WFSP WHIM  
GLGU GOME GREG WIPH WODU YCNH

YRWA BRNO CANG AWPE

species RUBL

is linked to 0 from 204 species , named:

species BRTE

is linked to 13 from 204 species , named:

ABDU GRCO CATE LIGU HEPE LTJA

PUMA SAND TRES WTIR UNWA MYWA BLTE

species UNSK

is linked to 4 from 204 species , named:

LBBG SHOR UNJA TBMU

species UNSP

is linked to 13 from 204 species , named:

COLO DOVE GBBG RNPH FOTE LAGU

SOSH UNBI UNLT UNLG BRSP COGO DASC

species UNTE

is linked to 3 from 204 species , named:

COSH RAZO WWSM

species WILL

is linked to 6 from 204 species , named:

GADW GRHE PUSA SPSA ULSB UCRT

species WIPH

is linked to 52 from 204 species , named:

AMGO AMKE AMOY AMRO BBPL BHCO  
BHGU BRBO CHSW COME DUNL EUST SBDO GRYE HADU  
HOME LESA LEYE NOPI ICGU MALL  
OSPR PAWA PEEP PESA PISI RBNU REDH RUDU RUTU  
RWBL SAGU SATE SEPL SESA SOSP  
UCAT UNEI UNFR UNPE BANS WFSP WHIM GOME GREG  
MODO WODU YCNH YRWA BRNO CANG AWPE

species WODU

is linked to 53 from 204 species , named:

AMGO AMKE AMOY AMRO BBPL BHCO  
BHGU BRBO CHSW COME DUNL EUST GBHE SBDO GRYE  
HADU HOME LESA LEYE NOPI ICGU  
MALL OSPR PAWA PEEP PESA PISI RBNU REDH RUDU  
RUTU RWBL SAGU SATE SEPL SESA  
SOSP UCAT UNEI UNFR UNPE BANS WFSP WHIM GOME  
GREG MODO WIPH YCNH YRWA BRNO CANG AWPE

species WTSP

is linked to 0 from 204 species , named:

species YBCH

is linked to 0 from 204 species , named:

species YCNH

is linked to 52 from 204 species , named:

AMGO AMKE AMOY AMRO BBPL BHCO  
BHGU BRBO CHSW COME DUNL EUST SBDO GRYE HADU  
HOME LESA LEYE NOPI ICGU MALL  
OSPR PAWA PEEP PESA PISI RBNU REDH RUDU RUTU  
RWBL SAGU SATE SEPL SESA SOSP  
UCAT UNEI UNFR UNPE BANS WFSP WHIM GOME GREG  
MODO WIPH WODU YRWA BRNO CANG AWPE

species YRWA

is linked to 55 from 204 species , named:

AMGO AMKE AMOY AMRO BBPL BHCO  
BHGU BRBO CHSW COME DEJU DUNL EUST GBHE SBDO  
GRYE HADU HOME LESA LEYE NOPI  
ICGU MALL OSPR PAWA PEEP PESA PISI RBNU REDH  
RUDU RUTU RWBL SAGU SATE SEPL  
SESA SOSP UCAT UNEI UNFR UNPE BANS WFSP WHIM  
GLGU GOME GREG MODO WIPH WODU  
YCNH BRNO CANG AWPE

species YWAR

is linked to 0 from 204 species , named:

species UNFI

is linked to 5 from 204 species , named:

CEDW GBTE SNGO UNEG UNSA

species UCRT  
is linked to 6 from 204 species , named:  
GADW GRHE PUSA SPSA ULSB WILL

species AUSH  
is linked to 7 from 204 species , named:  
REPH MASH RBME UBBG UNLA UNSG BRPE

species RTHU  
is linked to 0 from 204 species , named:

species BRAN  
is linked to 0 from 204 species , named:

species UNHU  
is linked to 0 from 204 species , named:

species ATPU  
is linked to 10 from 204 species , named:  
REPH MASH RBME ROYT UBBG  
UNLA UNSG BRPE UNPH UNSH

species BLGU  
is linked to 5 from 204 species , named:  
COMU ARTE LETE SPSK PAJA

species BRPE

is linked to 11 from 204 species , named:

REPH MASH RBME ROYT UBBG

UNLA UNSG AUSH ATPU UNPH UNSH

species HERG

is linked to 0 from 204 species , named:

species PAJA

is linked to 5 from 204 species , named:

COMU ARTE LETE SPSK BLGU

species BRSP

is linked to 13 from 204 species , named:

DOVE RNPH ROST FOTE POJA UNBI

UNLG UNME UNST UNSP BCPE COGO DASC

species BLKI

is linked to 6 from 204 species , named:

ROST POJA RBGU UNBI BCPE BOGU

species BCPE

is linked to 13 from 204 species , named:

RNPH ROST FOTE SCAU POJA RBGU

UNME UNST BRSP BLKI BOGU COGO DASC

species BLTE

is linked to 14 from 204 species , named:

ABDU GRCO CATE GBHE LIGU HEPE  
LTJA PUMA SAND TRES WTIR UNWA MYWA BRTE

species BOGU  
is linked to 6 from 204 species , named:  
ROST RBGU UNBI UNLG BLKI BCPE

species BRNO  
is linked to 52 from 204 species , named:  
AMGO AMKE AMOY AMRO BBPL BHCO  
BHGU BRBO CHSW COME DUNL EUST SBDO GRYE HADU  
HOME LESA LEYE NOPI ICGU MALL  
OSPR PAWA PEEP PESA PISI RBNU REDH RUDU RUTU  
RWBL SAGU SATE SEPL SESA SOSP  
UCAT UNEI UNFR UNPE BANS WFSP WHIM GOME GREG  
MODO WIPH WODU YCNH YRWA CANG AWPE

species BUFF  
is linked to 2 from 204 species , named:  
DCCO UNAL

species CANG  
is linked to 55 from 204 species , named:  
AMGO AMKE AMOY AMRO BBPL BHCO  
BHGU BRBO CHSW COME DEJU DUNL EUST GBHE SBDO  
GRYE HADU HOME LESA LEYE NOPI  
ICGU MALL OSPP PAWA PEEP PESA PISI RBNU REDH

RUDU RUTU RWBL SAGU SATE SEPL  
SESA SOSP UCAT UNEI UNFR UNPE BANS WFSP WHIM  
GLGU GOME GREG MODO WIPH WODU  
YCNH YRWA BRNO AWPE

species COEI  
is linked to 3 from 204 species , named:  
UNSC UNGU UNLO

species COGO  
is linked to 13 from 204 species , named:  
DOVE RNPH ROST FOTE POJA UNBI  
UNLG UNME UNST UNSP BRSP BCPE DASC

species COTE  
is linked to 2 from 204 species , named:  
NOFU WWSC

species WISP  
is linked to 1 from 204 vertex , named:  
RTLO

species UNPH  
is linked to 5 from 204 species , named:  
ROYT UNAL ATPU BRPE UNSH

species UNSH

is linked to 5 from 204 species , named:

ROYT UNSG ATPU BRPE UNPH

species DASC

is linked to 12 from 204 species , named:

RNPH ROST FOTE SCAU POJA UNBI  
UNME UNST UNSP BRSP BCPE COGO

species AWPE

is linked to 56 from 204 species , named:

AMGO AMKE AMOY AMRO BBPL BHCO  
BHGU BRBO CHSW COME DEJU DUNL EUST GBHE SBDO  
GRYE HADU HOME LESA LEYE NOPI  
ICGU MALL OSPPR PAWA PEEP PESA PISI RBNU REDH  
RUDU RUTU RWBL SAGU SATE SEPL  
SESA SOSP TRES UCAT UNEI UNFR UNPE BANS WFSP  
WHIM GLGU GOME GREG MODO WIPH  
WODU YCNH YRWA BRNO CANG

species BUPE

is linked to 0 from 204 species , named:

## References

Andersen, M. (1992) Spatial analysis of two-species interactions. *Oecologia*, **91**, 134–140.

Baddeley, A. (2010) *Handbook of Spatial Statistics*, chap. Multivariate and

Marked Point Processes, 371–402. Chapman & Hall/CRC Handbooks of Modern Statistical Methods. CRC Press.

- Balderama, E., Gardner, B. and Reich, B. J. (2016) A spatial-temporal double-hurdle model for extremely over-dispersed avian count data temporal double-hurdle model for extremely over-dispersed avian count data. *Spatial Statistics*, **18**, 263–275.
- Borgatti, S. P. and Everett, M. G. (2006) A graph-theoretic perspective on centrality. *Social Networks*, **28**, 466 – 484. URL: <http://www.sciencedirect.com/science/article/pii/S0378873305000833>.
- Carrington, P. J., Scott, J. and Wasserman, S. (2005) *Models and methods in social network analysis*. Structural analysis in the social sciences. Cambridge (U.K.), New York (N.Y.): Cambridge University Press.
- Chiu, S. N., Stoyan, D., Kendall, W. S. and Mecke, J. (2013) *Stochastic Geometry and Its Applications*. John Wiley & Sons, third edn.
- Eckardt, M. (2016a) Graphical modelling of multivariate spatial point processes. *ArXiv e-prints* .
- (2016b) *sdgm: Graphical modelling of multivariate spatial point patterns*. R package version 1.0.
- Eckardt, M. and Mateu, J. (2016) Analysing multivariate spatial point processes with continuous marks: A graphical modelling approach. *ArXiv e-prints* .
- Gather, U., Imhoff, M. and Fried, R. (2002) Graphical models for multivariate time series from intensive care monitoring. *Statistics in Medicine*, **21**, 2685–2701.

Goldenberg, A., Zheng, A. X., Fienberg, S. E. and Aioldi, E. M. (2010) A survey of statistical network models. *Foundations and Trends in Machine Learning*, **2**, 129–233. URL: <http://dx.doi.org/10.1561/2200000005>.

Goyert, H. F., Gardner, B., Sollmann, R., Veit, R. R., Gilbert, A. T., Connelly, E. E. and Williams, K. A. (2016) Predicting the offshore distribution and abundance of marine birds with a hierarchical community distance sampling model. *Ecological Applications*, **26**, 1797–1815.

Goyert, H. F., Manne, L. L. and Veit, R. R. (2014) Facilitative interactions among the pelagic community of temperate migratory terns, tunas and dolphins. *Oikos*.

Illian, J., Penttinen, A., Stoyan, H. and Stoyan, D. (2008) *Statistical Analysis and Modelling of Spatial Point Patterns*. John Wiley & Sons, New York.

Jalilian, A., Guan, Y., Mateu, J. and Waagepetersen, R. (2015) Multivariate product-shot-noise Cox point process models. *Biometrics*, **71**, 1022–1033.

Kolaczyk, E. (2009) *Statistical Analysis of Network Data: Methods and Models*. Springer.

Møller, J. and Waagepetersen, R. (2016) Some recent developments in statistics for spatial point patterns. *Annual Review of Statistics and Its Application*.

Newman, M. E. J. and Girvan, M. (2004) Finding and evaluating community structure in networks. *Physical Review E*, **69**, 026113. URL: <http://link.aps.org/doi/10.1103/PhysRevE.69.026113>.

- Nightingale, G. F., Illian, J. B. and King, R. (2015) Pairwise interaction point processes for modelling bivariate spatial point patterns in the presence of interaction uncertainty. *Journal of Environmental Statistics*.
- Sollmann, R., Gardner, B., Williams, K. A., Gilbert, A. T. and Veit, R. R. (2016) A hierarchical distance sampling model to estimate abundance and covariate associations of species and communities. *Methods in Ecology and Evolution*.
- Stoyan, D. and Stoyan, H. (1994) *Fractals, Random Shapes, and Point Fields : Methods of Geometrical Statistics*. Chichester, New York: Wiley.
- Wiegand, T. and Moloney, K. A. (2013) *Handbook of Spatial Point-Pattern Analysis in Ecology*. Chapman and Hall/CRC.