UN environment programme

CMS

CONVENTION ON MIGRATORY SPECIES

UNEP/CMS/COP15/Inf.28.2a

20 November 2025

Original: English

15th MEETING OF THE CONFERENCE OF THE PARTIES
Campo Grande, Brazil, 23 – 29 March 2026
Agenda Item 28.2

# ANALYSIS OF THE CMS SURVEY ON ECOLOGICAL CONNECTIVITY

*(Prepared by the Secretariat)*

Summary:

This document contains the analysis of the Survey on Ecological Connectivity and Infrastructure, developed by the CMS Secretariat in implementation of Decision 14.203(c). It complements document UNEP/CNS/COP15/Doc.28.2 *Ecological Connectivity*.

# ANALYSIS OF THE CMS SURVEY ON ECOLOGICAL CONNECTIVITY

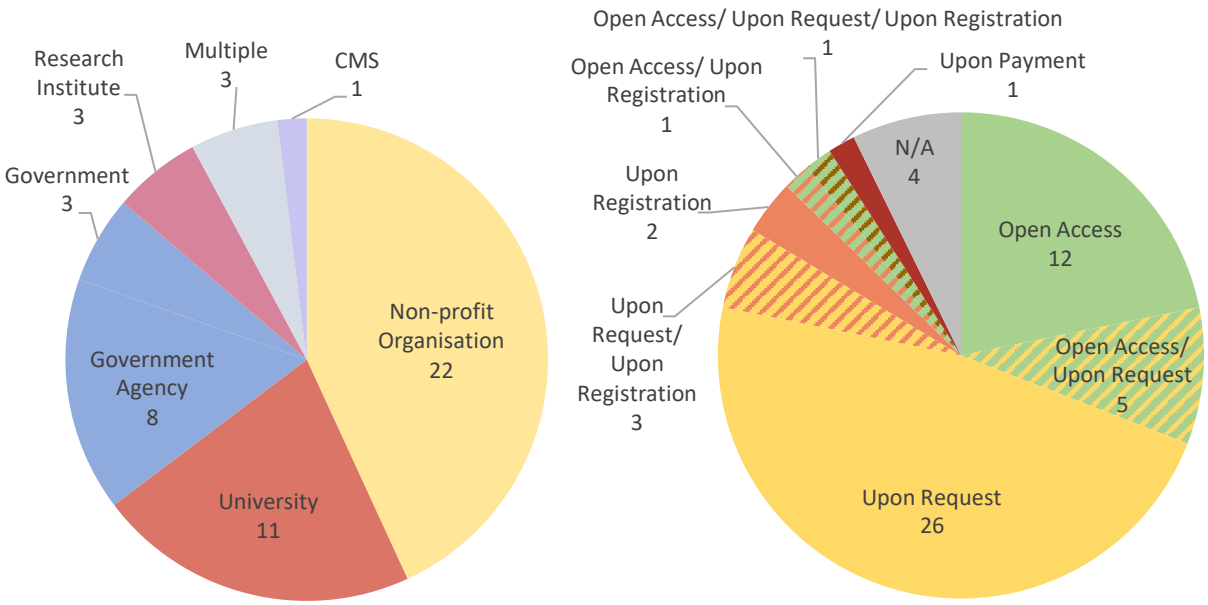
The following is an overview of the information received in response to the survey on Ecological Connectivity and Infrastructure, developed by the Secretariat of the Convention on the Conservation of Migratory Species of Wild Animals (CMS). The survey's aim was to collect information on existing databases of data relevant for animal movement, as outlined in the document UNEP/CMS/COP14/Doc.30.2.1.2 (Ecological Connectivity – Technical Aspects) and Decision 14.203(c). The survey has been shared with CMS Parties and stakeholders through Notification. We have also reached out directly to several dozens of data holders.

This Analysis refers only to the part on ecological connectivity, excluding the part on linear infrastructure (section 5). It includes all responses that were received by 1st July 2025.

## 1. Overview of Responses

A total of 55 responses were received by 1st July 2025, and are integrated into the following analysis. Two additional incomplete responses were excluded from the analysis because they lacked critical information. The following chart gives an overview of responding institutions and accessibility of their data.

**Figure 1: a)** Data/ information held by: **b)** Accessibility of the Data




**Note**: Figure **1a)** shows by which type of institution the data is held. Respondents were to choose from existing categories (see chart above, except "Multiple" and "CMS"), but could add free text under the option "other". The category "private company" was available as well but was not chosen by any respondent. Figure **1b)** shows how the data can be accessed. Some responses mentioned multiple types of access (e.g. when some parts of the data are open access while other parts are only available upon request). Those are depicted in striped patterns. N/A refers to the cases where no response to this question was given.

Figure 1 shows that out of 55 responses, for 22 data is held by non-profit organizations, and for 11 each by universities and by governments or government agencies. For 3 responses data is held by research institutes. Also 3 responses stated that the data is held by multiple institutions and one response was given for data held by CMS. In 4 cases no response was given to this question. This chart shows that the response rate by CMS Parties was low, as only 11 responses were given by governments or government agencies.

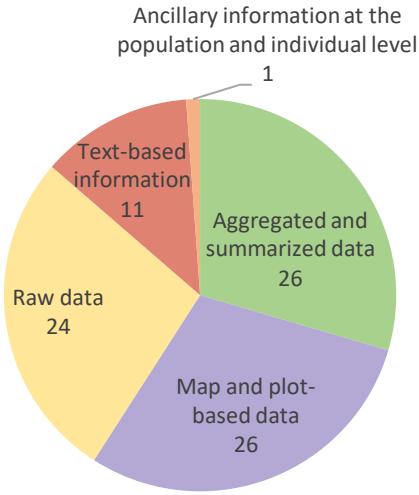
Regarding the access to the data, Figure 1b) shows that open access or access upon request (or a combination of both; 12, 26 and 5 out of 55 responses, respectively) were the most common types of access. Some databases require registration for at least part of their data (6 in total) and for one response the data would only be accessible upon payment. In 4 cases there was no response given to this question.

### 2. Type of Data and Information

The following charts give an overview of the type of data and information that is held.

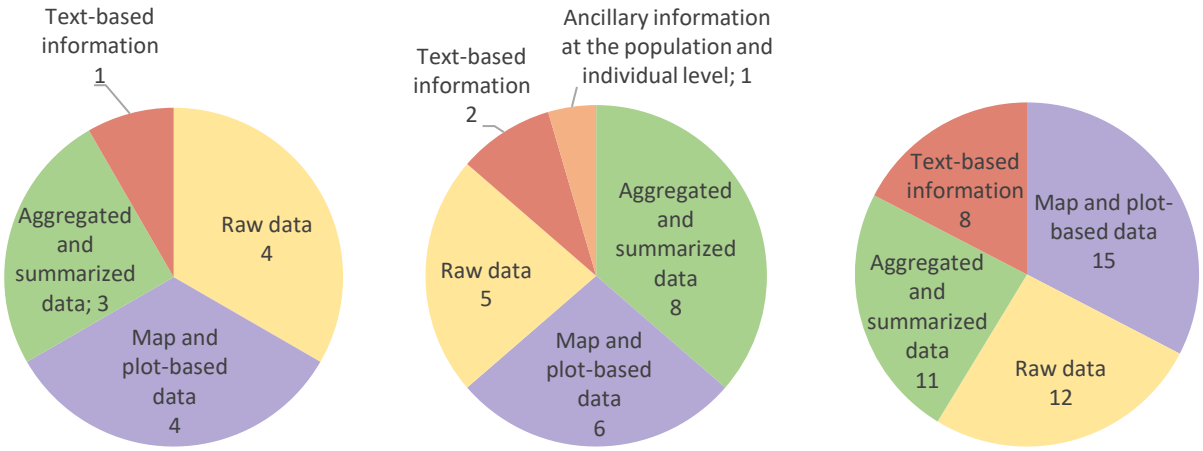
**Figure 2:** Type of Data and Information

**a)** Overall:




**b)** held by…

**i)** Governments/ Gov. Agencies **ii)** Universities/ Research Institutes **iii)** Non-Profit Organizations




**Note**: Figure **2a)** shows the type of data and information that is available. Figure **2b)** shows which types of data and information is held by i) governments and government agencies, ii) universities and research institutes and iii) non-profit organizations. Note that multiple types of data could be chosen per response to the survey as data holders may hold different types of data in their databases (and some may also not have given any response to this question). Therefore, the sum of the different categories does not reflect the number of responses given to the survey.

As can be seen in Figure 2a), the most common types of data are aggregated and summarized data as well as map- and plot-based data, each with 26 out of 55 responses having these in their databases. Following shortly after are raw data with 24 out of 55 responses, followed by text-based information, available in 11 out of 55 responses. One response contained ancillary information at the

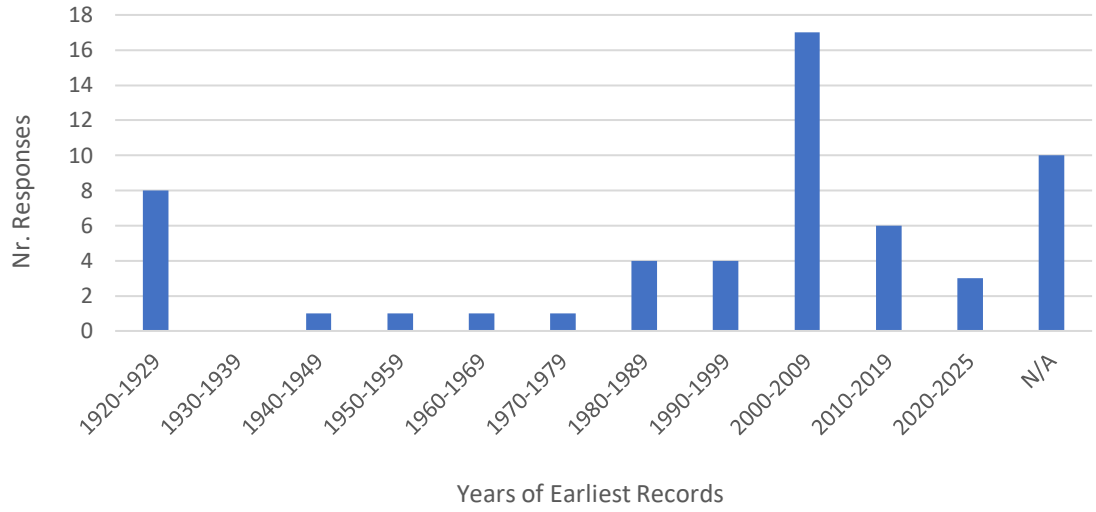
population and individual level. Figure 2b) shows a similar picture for all three categories of data holders, with raw data, aggregated and summarized data, and map- and plot-based data being the most abundant categories but appearing in different orders for the different types of data holders.

**3. Time of Records of the Data**

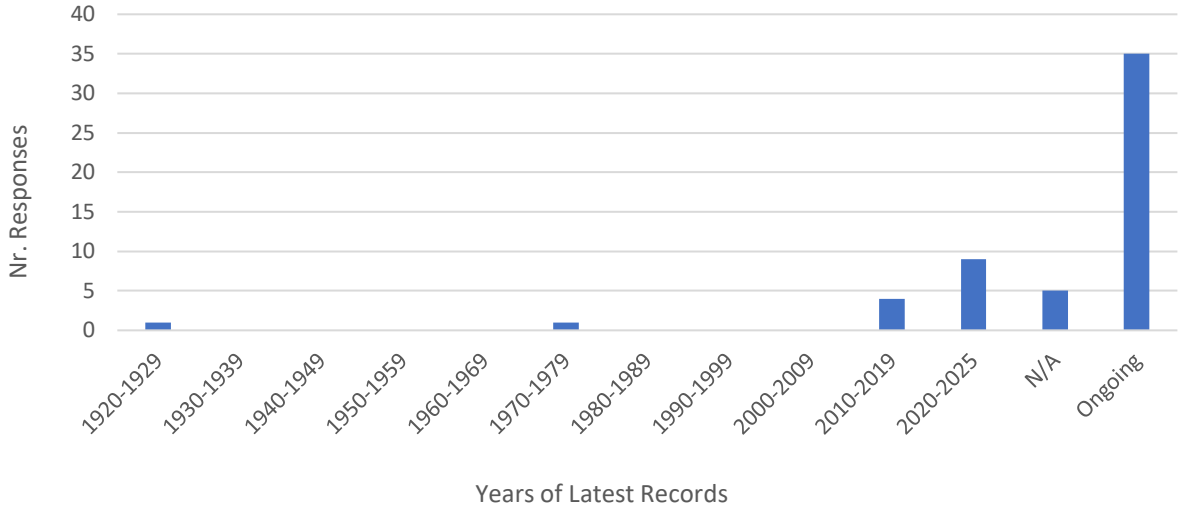
The following graphs show the times of the earliest records, i.e. the earliest period for which the respondent has data, and latest, i.e. the most recent period for which the respondent has records of the data.

**Figure 3:** Time of Earliest and Latest Records of the Data

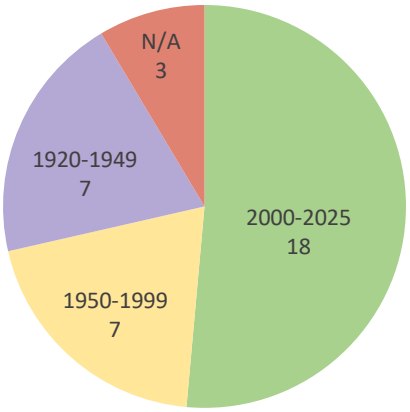
**a)** Earliest Records




**b)** Latest Records



**c)** Earliest Records for Ongoing Databases




**Note:** Figure 3 shows the number of responses for each 10-year period of **a)** earliest and **b)** latest records of the data. N/A refers to cases where no response was given to the question, Ongoing refers to responses where data is continued to be recorded. Note that 1920 was the earliest year that could be chosen, and some respondents added in comments that data actually dates back earlier than that. Figure **3c)** shows the time of earliest records for all the 35 cases where data collection is ongoing. Here, earliest records are depicted in 50 year periods. The earliest period is from 1920 to 1949 (instead of 1900), because 1920 was the earliest year to choose.

Figure 3a) shows that earliest records are distributed over the whole period from the 1920s to the 2020s (with one exception being the period of 1930 to 1939). Although some database records date back to as early as the 1920s (8 out of 55 responses), there is a steep increase in data records in the 2000s, (17 responses for the 2000-2009 period), with earliest records decreasing again post 2010 (6 between 2010 and 2019, and 3 between 2020 and 2025). Few or single data bases each have earliest records in the time periods between 1940 and 1999 (12 in total). 10 cases did not give a response regarding earliest records.
Figure 3b) shows that most of the responses have data with either ongoing records (35 out of 55), or rather recent times of latest records (9 for 2020-2025 and 4 for 2010-2019). Only one case has latest records from the 1920s and one case from the 1970s. In 5 cases no response was given on latest records.

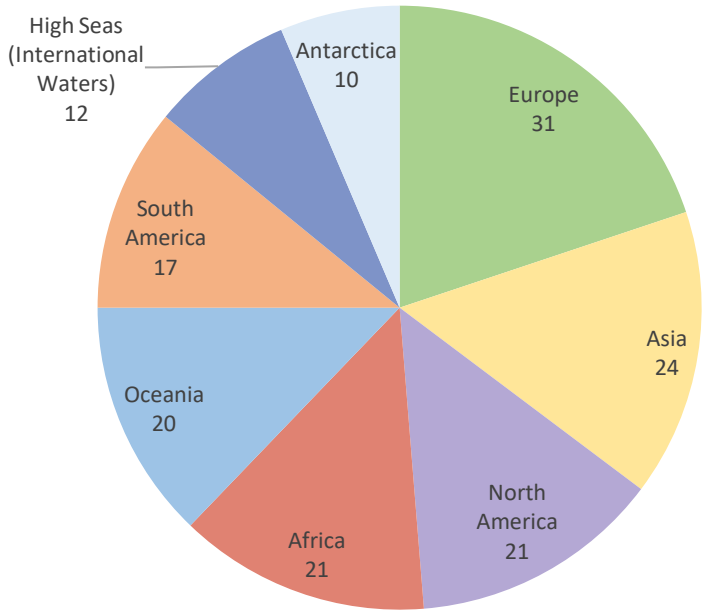
Figure 3c) shows that the majority of databases that are still ongoing have their earliest records in the period between 2000 and 2025 (18 out of 35). 7 of the ongoing databases each have earliest records in the periods of 1920 to 1949 and 1950 to 1999. 3 did not report their earliest records. This gives an impression of the overall time spans covered by databases, however, it has to be noted that here only those are depicted that are ongoing.

Regarding the steep increase of records in the 2000s, the question arose if this could be linked to the introduction of Natura 2000 in Europe. Comparing the times of earliest records with the geographical scope of the data revealed that out of 12 respondents who only held data from Europe, 6 had their earliest records in the period of 2000-2009, while 2 had earliest records from 1920-1929, 1 each from 1940-1949 and 1990-1999, and 1 from 2010-2019. From the 22 responses that did not include Europe in their geographical scope, 4 cases from Asia have their earliest records in 2000-2009 and one case each from North and South America. This relatively high increase in records in the 2000s particularly in Europe could be an effect of the implementation of Natura 2000.

## 4. Geographical Scope of the Data

The following chart gives an overview over the amount of databases available from the different continents.

**Figure 4**: Geographical Scope of the Data by Continent



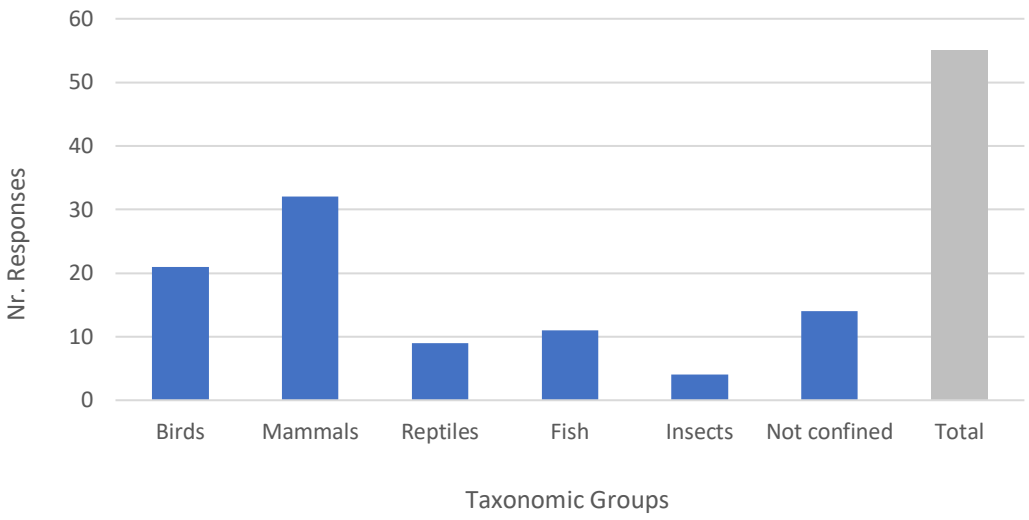

**Note**: The Chart shows the number of responses that contain data from each continent. If data is available only for specific countries, the respective continent to which the country belongs is included here. Note that responses may have listed multiple or all continents, while others may not have responded to this question at all, so the numbers do not correspond to the number of responses given.

Figure 4 shows that the geographical scope is quite variable, and data is available for all continents. Most (31 out of 55) responses include data from Europe, followed by Asia in the second place (24 out of 55 responses), and by North America and Africa in the third place, with 21 responses each. 20 respondents have data from Oceania, 17 from South America and 12 from high seas (international waters). The continent included in the least number of databases is Antarctica with 10 responses.

## 5. Data on Different Taxonomic Groups

The following charts give an overview of data that is available for the different groups of taxa.

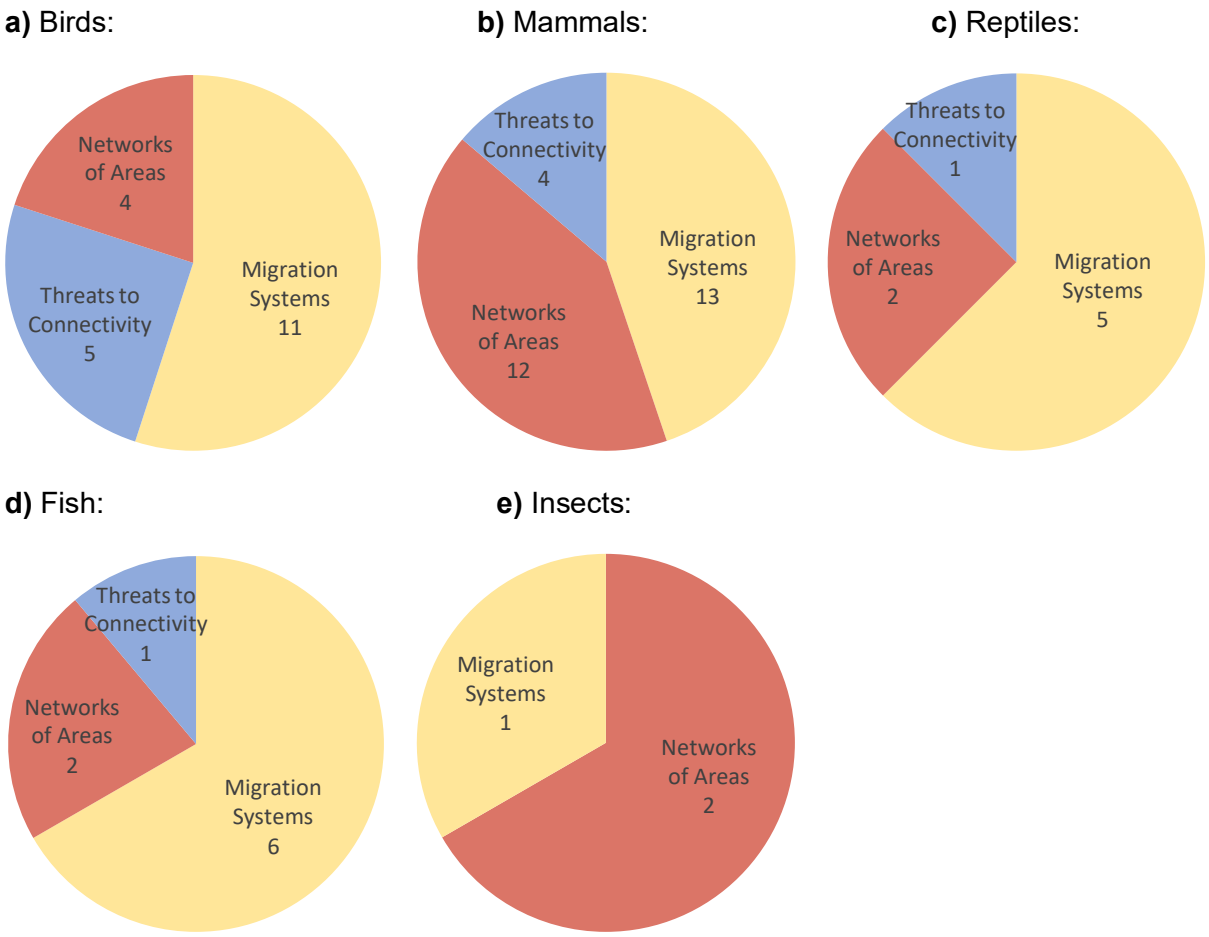
**Figure 5**: Data Associated with the Different Taxonomic Groups



**Note**: The bar chart shows the number of respondents that answered with "yes" to the question whether their data is associated with the respective taxonomic group (or whether not confined to any taxonomic group). The grey bar shows the total number of responses to the survey. Note that the answer "yes" may have been given to multiple taxa groups per survey response, as well as no answer to any of these may have been given. Thus, the sum of the responses for the different categories does not correspond to the total number of survey responses.

As can be seen in Figure 5, data is available for all taxonomic groups, though very limited for insects. Data associated with mammals is the most abundant (32 out of 55 responses), followed by data on birds (21 responses). 14 respondents reported that their data is not confined to a specific taxonomic group, 11 reported to have data associated with fish, and 9 with reptiles. Only 4 responses contained data associated with insects.

**Figure 6**: Data Relevant to Migration Systems/ Networks of Areas/ Threats to Connectivity



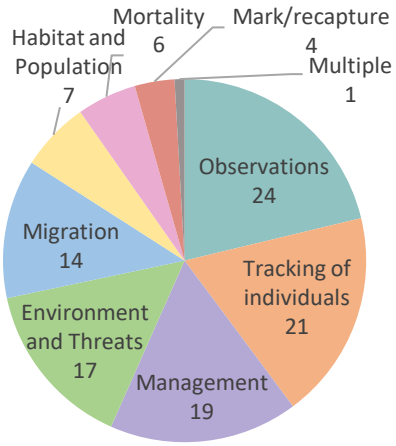

**Note**: Figure 6 shows whether the data on the different taxa groups (**a)** to **e)**) is relevant to migration systems, networks of areas or threats to connectivity. Here, only one option from these 3 categories was selected per survey response. So for a) for example, out of the 21 respondents that reported to have data on birds (see Figure 5), 11 had data that is relevant to migration systems, 5 had data relevant to threats to connectivity, 4 had data relevant to networks of areas, and the remaining 1 did not respond to this question. Thus, the total numbers for each pie chart reflect the number of cases in which a response was given to this question (out of the number of cases that reported to have data associated with the respective taxa group).

Figure 6 shows that data on all of the three categories is available for all taxonomic groups, except for insects, for which data is only available for networks of areas and migration systems. Numbers of responses for the different categories vary between taxonomic groups, as do also the number of responses that have data on each taxonomic group in the first place. Overall, it can be seen that the

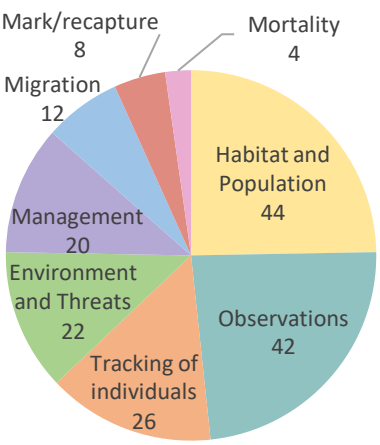
largest share of the data is relevant to migration systems (36 out of 55 survey responses over all taxonomic groups), which is the largest category in all taxa groups except insects. Networks of areas is the second-largest category with a total of 22 out of 55 responses containing data relevant to this category. Threats to Connectivity is the smallest category with a total of 11 responses over all taxonomic groups. However, only 1 response for reptiles and fish each contains data relevant to this category and for insects there are no data available that is relevant to threats to connectivity. It has to be noted that for insects there are generally few data available (only 4 responsdents of which 3 gave an answer to this question at all).

**Figure 7:** Type of Data and Information Associated with the Different Taxonomic Groups

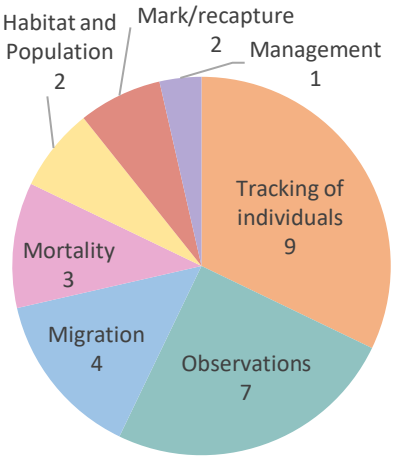
**a)** Birds (21):



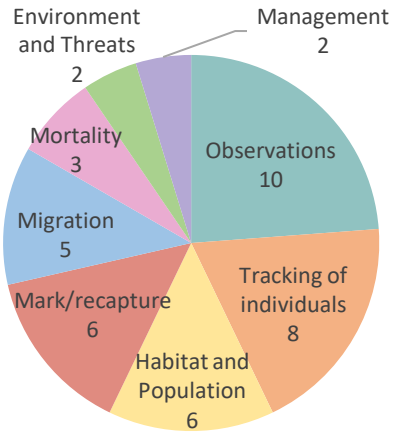

**b)** Mammals (32):



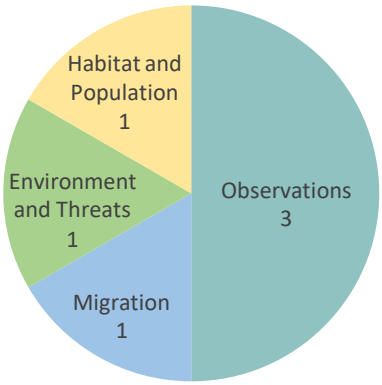

**c)** Reptiles (9):




**d)** Fish (11):




**e)** Insects (4):




**Note**: Figure 7 shows the type of data and information that is available for the different groups of taxa (**a) - e)**). The number in brackets behind the taxonomic group shows the number of responses that included data on that group. Here, responses that could be chosen from were grouped into categories, and these categories are displayed in the pie charts. Per survey response multiple types of data and information could be chosen for each taxonomic group, and some respondents may have not given any answer to this question for 1 or more taxonomic groups. Additionally, respondents may have listed multiple types of data for the same group that belonged to the same broader category (as depicted above), so multiple counts of one category may come from the same survey response. Thus, the total numbers for each pie chart do not reflect the numbers of survey responses for each group (in brackets).

Figure 7 shows that, overall, a large variety of types of data and information are available. Observational data are the highest reported type of data across taxonomic groups. Individual animal tracking data, although not available for insects, are also among the most common type of data

recorded across taxonomic groups. Migration data are also available but relatively rare for mammals and insects. A high number of respondents reported the availability of data on animals' environments and threats for birds and mammals specifically, but such data are largely absent for reptiles and rare in fish and insects. Respondents also indicated the availability of data on populations and habitats for mammals and fish specifically, whereas many reported data on management for birds, and to a lesser extent for mammals. Overall, it has to be taken into account that there are limited data available on insects, followed by reptiles and fish, with the most abundant data available for birds and mammals. Thus, amounts of data accounting for proportions within the pie charts are not very comparable between taxa groups.

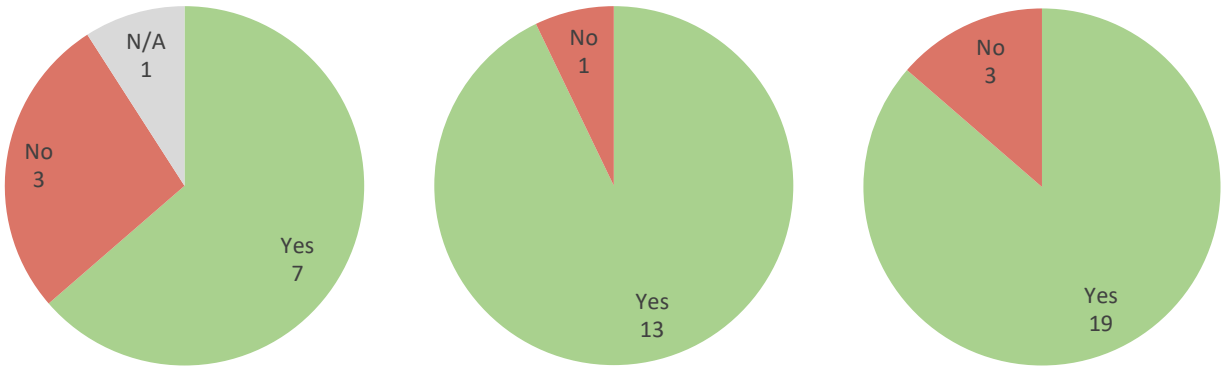
### 6. Further Questions of Interest

The following charts show the responses to a few specific questions that were considered valuable/of interest for the purpose of the survey.

**Figure 8:** Responses to Further Questions of Interest

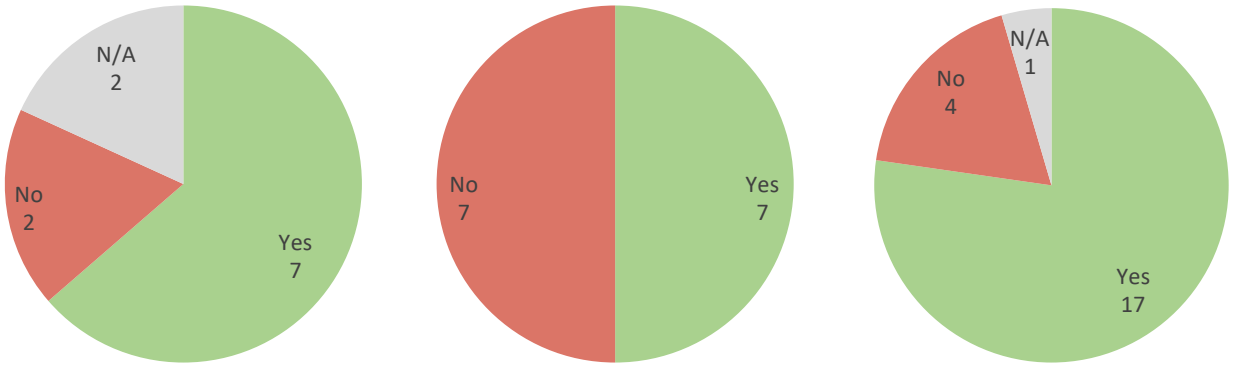
**a)** *Have you done/ do you do any analysis (including mapping, informing indicators, etc.) using these data?*

**i)** Governments/ Gov. Agencies **ii)** Universities/ Research Institutes **iii)** Non-Profit Organizations



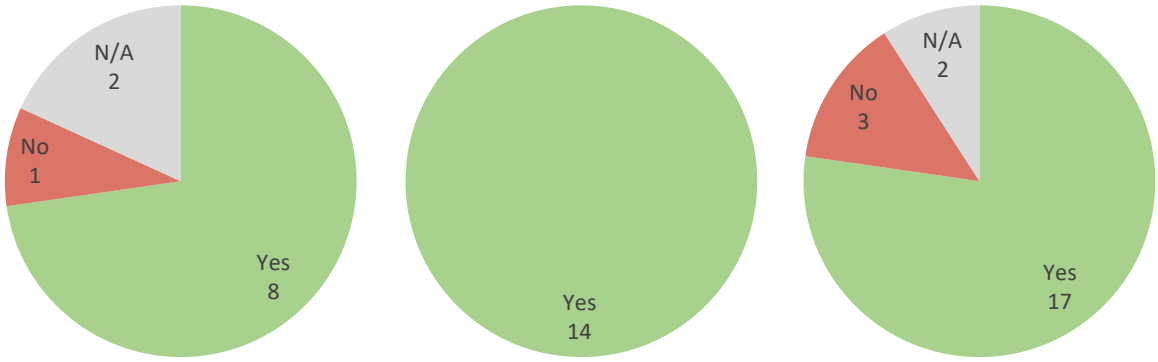

**b)** *Are the results of these analyses directly applied in practice to the shaping or implementation of spatial planning or migratory species conservation policies in your country/ area?*

**i)** Governments/ Gov. Agencies **ii)** Universities/ Research Institutes **iii)** Non-Profit Organizations



**c)** *Are there opportunities for enhanced collaboration (e.g. pooling data sets, undertaking joint analyses) towards improved understanding of connectivity issues relating to migratory species?*

**i)** Governments/ Gov. Agencies **ii)** Universities/ Research Institutes **iii)** Non-Profit Organizations




**Note**: The charts show the responses that were given to the three questions (**a)** to **c)**) – "yes" or "no". N/A refers to the cases in which no response to the respective question was given. Charts **i)** refer to the responses for data held by governments or government agencies, **ii)** contain the answers for data held by universities or research institutes, and **iii)** refers to data held by non-profit organizations. Note that 8 responses are not depicted in the charts as their type of data holder was not indicated or was categorized as "other" or "CMS". Thus, the total numbers of the three charts for each question do not represent the total number of 55 responses given to the survey.

As shown in Figure 8a), the clear majority of respondents across all types of data holders have used their data for analyses (45 out of 55 in total, including the 8 cases not depicted in the charts), while only 7 in total have not done any analyses and 3 did not respond to this question.

Figure 8b) shows that also the majority of respondents (33 out of 55 in total) report that their results are directly applied for spatial planning or migratory species conservation policies (although only 50 per cent among universities and research institutes). 15 in total report that their results are not directly applied and 7 did not answer to this question. This seems to be an encouraging result as it indicates that a majority of data sets is already used for the implementation of migratory species conservation efforts.

As Figure 8c) shows, also a clear majority of respondents stated that there are opportunities for enhanced collaboration towards improved understanding of connectivity issues to migratory species. In total, 42 out of 55 respondents see opportunities for enhanced collaboration, while 5 do not and 8 did not answer this question. Again, this seems to be an encouraging result regarding the role of CMS in international conservation efforts towards migratory species, and regarding the goal of this survey.