Supplemental Materials for: "Monitoring status and trends in genetic diversity for the Convention on Biological Diversity: an ongoing assessment of genetic indicators in nine countries"

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Webinars on genetic diversity indicators

September 14, 2020. European Union. 37 participants. 13 EU countries + 11 non EU countries

October 7, 2020. The Americas. 28 registrants. 11 countries

October 21, 2020. Africa. 29 participants

November 5, 2020. Asia. 43 participants.

April 7, 2021. Americas. 26 registrants. 11 countries

April 8, 2021. European Union. 31 registrants. 21 countries

April 15, 2021. Africa. 21 participants

April 22, 2021. Asia. 47 participants

July 21, 2021. Global. GEO BON webinar "*GEO BON Webinars on Supporting Implementation of Post-2020 Global Biodiversity Framework- genetic diversity*"

March 3, 2022. Global. CBD webinar "*Monitoring Framework: Proposed Headline Indicators.*"

Related CBD documents discussing the indicators

- *SBSTTA-24 Non-paper on item 3.* 17 December 2021. Proposed Monitoring Framework For The Post-2020 Global Biodiversity Framework.
- See "Appendix 1 Proposed Headline Indicators For The Post-2020 Global Biodiversity Framework" and "Appendix 2 Proposed Headline, Component And Complementary Indicators For The Post-2020 Global Biodiversity Framework"
- A.0.4 termed "Near ready"
- A.8.1 included
- Co-chairs' text on item 3 Annex "Scientific And Technical Advice On Updated Goals And Targets, And Related Indicators And Baselines, Of The Updated Zero Draft Of The Post-2020 Global Biodiversity Framework"

Guidance for genetic diversity indicator data collection

Guidance document

In 2020, Laikre, Hoban and colleagues outlined an approach to assess genetic diversity status and trends *without requiring any genetic data (e.g. DNA sequence)* , using 'genetic indicators'. The indicators were developed in response to a recognized gap in reporting to the U.N. Convention on Biological Diversity (CBD). There was a need for tools to report on 'genetic erosion' and 'safeguarding' or 'maintaining' genetic diversity, within and among populations of species. The indicators allow a fairly standardized and rapid way to assess *whether a species is likely to be losing or has lost genetic diversity* by quantifying critical aspects of demography that generally correlate to genetic diversity: (1) the size of each population (number of adult individuals), and (2) the geographic range or number of populations relative to historic conditions. (A third indicator on genetic knowledge/ genetic studies has also been proposed, and will be discussed below).

The logic behind these indicators is simple. (1) Small populations lose genetic diversity, and very small populations lose genetic diversity very quickly (Frankham 2021). (2) Loss of populations can result in loss of unique genetic adaptations (Exposito Alonso et al 2022). So, measuring population size and loss of populations is a fairly good proxy or summary of genetic diversity status, without ever measuring the DNA diversity itself.

	Indicator 1. Populations large enough to maintain genetic diversity	Indicator 2. Populations still exist (not lost)
2020	1 of 3	3 of 4

Fig 1: Illustration of genetic diversity indicators, for four populations in Illinois, USA, measured in the year 2020. One tree = 1000 plants. Colors show genetic diversity. In 2020, one population is extinct, and 2 of 3 are too small.

The indicators should be applied to a *curated, representative set of species* - 100 to several thousand species per country, depending on a country's biodiversity, data capacity, and resources for CBD reporting. Approximately 100 species is likely a minimum to represent diverse habitats, taxonomic groups, commonness/ rarity, and threat status. However, if 100 cannot be collected, any amount of data is important.

The two genetic diversity indicators are:

The first indicator is based on comparing **the effective population size of each population Ne to a critical threshold** (e.g. Ne = 500). For many species, it is sufficient and appropriate to use the **census size Nc (the number of living adults) as a proxy for Ne, and a threshold of Nc = 5000** mature individuals. Below this threshold, a population rapidly loses genetic diversity, can become inbred, and starts to lose ability to adapt to environmental change.

The second indicator is based on comparing **the current number of populations that exist to a prior/ historic assessment of the number of populations** . This reflects **loss of populations** to human-induced changes, with 50-200 years ago as a baseline (depending on the country). If counts of populations existing and lost are not available, a proportion (or percentage) of the species' range are lost is an acceptable substitute. Lastly, if this is not available, some estimate of overall decline is acceptable (details will be explained below).

The primary undertaking is to gather the data on populations for each species. This is a challenge because there is no global, standard database of population census size (The Living Planet Index for example does not measure full population census, and not all Red List species have census size for each population). But the census size of many populations of many species is available in different reports and databases, in more or less easy ways to extract. **This guidance document will explain how to gather and use the necessary data, from diverse sources, in a standard way.**

As noted above, a third indicator exists, which is to count the number of genetic studies available for that species, if any. Although this does not directly relate to maintenance of genetic diversity or preventing genetic erosion, performing genetic studies and collecting genetic data correlates to management actions designed to manage genetic diversity- such studies help understand needed management actions and to guide them. So we will also collect information on whether genetic studies exist for species, for reporting on indicator 3. However, this project will *not use genetic datasets to calculate the Ne or Nc*because reanalysis of data is time prohibitive- we are not downloading and analyzing genetic data.

The Project Purpose This project was planned in 2021 and initiated in 2022 to test the indicators in a small number of countries. The project goal is for each country team to evaluate >100 species (per country) to determine (a) how many species have the required data, (b) to extract the data when possible for indicator calculation, and (c) to identify barriers encountered so that this guidance document and indicator calculation can be improved for larger scale use by more countries to inform the CBD framework. The project will also highlight species and regions where data is deficient, or where there is high uncertainty in the estimates.

Getting started- how many species, which species?

Creating species lists

Each country team first will make a list of at least 100 candidate species for which there is likely some data for indicator 1 and/or 2.'*Likely* to have some data' means that the species are *not*recently discovered/ poorly known/ very hard to document population size (e.g. they are countable by observation, camera trap, etc.), do not have taxonomic disputes, etc. This is the list of species to *try* to collect data for.

Following are two ways to make this list of 100 species, though other approaches or a blend of approaches is fine.

First, compose a list of *species* at the country level that a national biodiversity expert or panel of experts thinks might have data. Then, 'cross check' this list against relevant sources of data to narrow it down (e.g. removing species for which there are no published reports, articles, websites, databases, or experts available). This approach could lead to over-representation of well-known, flagship, or economically important species.

Choose one or two prominent data sources (e.g. recovery plans or similar), list all species in that data source, and pick species from this list in a stratified random fashion to cover taxonomy, habitat, etc.. For example, this might involve going through recovery plans for all federally listed Endangered Species, the national Red List, or other lists of conservation concern (e.g. Annex II, IV and V species of the EU Habitats Directive- a defined list of policy importance). This could lead to overrepresentation of species of conservation concern/ underrepresentation of common or "least concern" species. Many countries have Red Lists for various taxonomic groups. These lists would be one way to select tens to hundreds of species per country across taxonomic groups and ensure each national RL status is represented (Endangered, Least Concern, etc). Note: many LC IUCN species are nevertheless of local or regional conservation concern, and are declining rapidly, etc. so should not be ignored.

It is vital to document how the list is developed in order to identify any biases (e.g. mostly common species). In this project, and in the first use of the indicators by a country for National Reporting,**it is acceptable to have some biases** , but as data quality and collection efforts improve, biases should decrease. Surveying multiple data sources may be needed (for example: scope the Red List to see what species have data available, then consult with experts on other data sources).

It is not necessary for all chosen species to have high quality data across their range. While indicators would be more accurate if all species have data for all populations, complete population data may only be available rarely. *It is ok if data are available for only one of the two indicators or for only some populations of a species* (as explained below). Moreover, upon investigation, species initially deemed likely to have some data, may actually have insufficient data to calculate either indicator. Species should not be removed from the list after the initial list is made. We will calculate the indicators with and without various types and levels of missing data.

There are some species where it will be particularly hard or impossible to quantify Indicators 1 and 2, and they should be excluded from the species list. For example, evaluation of the Ne>500 criterion will be hard to implement in species where natural subpopulations are typically very large and/or hard to measure, such as microcrustaceans, many insects, some fungi, highly clonal organisms, some plants with deep soil seed banks (where all 'individuals' cannot be counted). Populations of such species can also grow in a short amount of time to very large numbers and have large levels of standing genetic variation (Chaturvedi et al. 2021). *We advise not attempting to include such species in a country's first evaluation of these indicators due to difficulty in finding and interpreting data.*

How to choose a diversity of species

As noted above, candidates for the list of 'selected, representative species' might be species with management or recovery plans, species that have been Red List assessed, species of known ecological or economic importance, species of national concern, or species monitored by a national biodiversity entity or citizen scientists. They should be representative (e.g. able to provide a representative picture of what other species are experiencing for the indicators). This may include species of commercial interest, but should not be limited to commercially important species. If possible, the species should represent a diversity of at least some of:

- Ecosystems / biomes within the country (e.g. temperate forests, rainforest, etc)
- Taxonomic groups (e.g. mammals, invertebrates, herpetofauna, plants, birds, fish)
- Terrestrial and aquatic
- Range size and commonness (see Kobo form for descriptions of terms)
- Threatened status (threatened or not)

If possible, also include a range of:

Value (economic, ecological, social)

Traits (body size, lifespan/ generation time, dispersal)

The ability to fully include all of these areas will vary by country, due to native levels of biodiversity and capacity/ data availability. Further discussion of categories of species can be found in*Hollingsworth et al 2020*, page 22-24. Full taxonomic and ecological diversity will be hard, or impossible, for the first application of an indicator. Bias, including focus on some taxonomic groups e.g. initiated with trees, amphibians, birds, medicinal plants, etc., is ok, as bias will be noted in reporting. Even a first attempt helps a country set up the infrastructure and methods of data analysis. We have created a 'species selection matrix' as a guide to help countries visualize and document the types of species chosen.

For wild species, usually the species considered should usually be native (e.g. non-introduced, non-invasive). Note however, that this indicator can also be applied to crops, domesticated animals, and crop wild relatives, and in such cases non-native species would be ok.

Keep the same species list while collecting data It is important to fill in the Kobo form for every species on the 100+ species list- even if there is little data available, and even if the indicator cannot be calculated. In other words, we expect some proportion of this list to have no useful data and that is ok (see Fig 2). Knowing how much data is missing will provide valuable insight into challenges countries will face in assessing species for these indicators and where data are lacking. However, if missing data is extensive (say, >50% of the species list), country teams may revisit their original species list and continue to add more species.

Figure 2: Conceptual illustration of the fact that each country will evaluate >100 species, and that some proportion of species evaluated will have insufficient data for calculation of the indicators. The proportion

of X/(X+Y) may (possibly, but not necessarily) suggest some groups or countries that consistently have limited data for calculating indicators.

Collecting data- where and how

Collection of data will proceed with slight variations for each country and potentially for taxonomic groups and data sources within each country.

The goal for indicator 1 is to extract a current census size (and/or, if available, effective size) for each population for each species. It is also important to record associated data such as year, reliability/ uncertainty, population names or geographic information, reference information, and other information of the species. This is why we have created a Kobo form and Kobo guide.

Note: Nc represents the number of adults present in the population. For birds, estimates of numbers of breeding pairs (if available) can be used, which represents 0.5*Nc. Thus, multiply the number of breeding pairs by 2 to get the Nc.

The goal for indicator 2 is to extract a count of the number of populations existing today, and which existed at a historic time point. To allow maximum use of each country's data and flexibility, we do not define 'historic time point' specifically but we offer guidance below.

Collection of data may be very straightforward or fairly laborious, depending on the country and data source. Some countries may have a centralized database of many species (across taxonomic groups and levels of rarity) from which population sizes and counts can be extracted directly and quickly. This may be especially the case for plants, long lived organisms and those of high economic, ecological or cultural value. Extracting data directly from computer files or tables would be very straightforward and it can be entered in the data collection form easily. For more countries we anticipate that data will need to be extracted manually by humans by reading reports, websites, planning documents, and/or expert consultation. Often it may be necessary to consult more than one resource. Options include

- Endangered or declining species management reports. Some countries have mechanisms to publish recovery plans, status, or other information about selected species. These reports often list current population sizes and current and sometimes historic range or population occurrence.
- IUCN Red List or NatureServe. More than 100,000 species have been assessed by the IUCN Red List at global or national levels. These reports sometimes list current population sizes and current and sometimes historic range or population occurrence.
- Literature or internet searches. Scientific journal articles sometimes present census size and current and historic range information in the Introduction, Methods or Discussion sections. This may be especially useful for species with old, outdated Red List assessments or where population level information is not otherwise available. Wikipedia, NatureServe, WWF, taxon specific NGOs, and other respected websites may also have relevant information.
- Expert consultation. For some taxonomic groups it may be feasible and indeed most efficient to present the list of species to a panel of taxonomic experts (e.g. amphibians, trees, etc.) who would have up to date and possibly unpublished knowledge and can also provide measures of uncertainty. This can be an efficient way to gather data on dozens of species in a short period of time. Convening a workshop (virtually or in person with a goal of discussion and consensus) of experts might be considered as well for gathering information.
- Occurrence points from GBIF or citizen science. In some cases this can help define populations, define habitat area, and possibly even define lost populations if these points have high reliability. They should be interpreted with caution, because (i) not every occurrence is a population (as mentioned above) and (ii) such occurrence points might mix occurrences from different years, so spatial and temporal

occurrences can be conflated (e.g. a GBIF map shows an extant population in a place because of old occurrences, but the population is actually extinct). As with all data interpretation, use caution.

If doing manual data extraction, each data source should be read thoroughly. Many Red List assessments and management plans might be 1 to 20 pages long (sometimes longer). The text might clearly state the size of each population, sometimes in text and sometimes in a table, and sometimes with a map. However, data may be incomplete, such as listing the size of only the largest or smallest populations. As noted above, it is ok to submit species for which some information is missing. The time necessary to gather data from individual sources (and/or consult experts) may range from 15 minutes (for clear, short reports), to several hours.

Data may be recorded directly on the Kobo form, or on printed paper, or other means, and then transferred to the Kobo form.

Calculations and reporting

The assessors will not do any direct calculation of indicators. They will fill in a Kobo form for each species with information on Ne and/or Nc, populations maintained, numerous other characteristics, references, maps, etc. For most species the Nc, census size, will be the main data collected, rather than Ne. If Ne is estimated in the report or publication it should be reported, of course. **However, assessors should not calculate Ne from Nc manually at this point-** it will be calculated as follows after all data collection is complete.

After all species and populations are reported for a country, for all cases in which Nc was recorded, the colleagues involved in data analysis (see project roles spreadsheet) will then apply at least two Ne/Nc ratios to all populations in order to obtain Ne estimates from Nc- the 0.1 as a conservative default for all species, and a taxon specific one (either from that species or from a general taxa such as 0.3 for plants). We will do this in multiple ways to generate confidence bounds for reporting in the National Reports (a low and a high estimate of Ne). This will be done also in the case of multiple estimates of Nc for a population of a given species. This would result in, for example, potentially four values: low and high Nc estimates and low and high Ne/Nc ratio assumptions.

Then all Ne values (directly extracted, and calculated from Nc) will be compared to Ne 500. Every species will receive a ratio of populations above Ne 500. This will be reported as a proportion, but the original ratio (including total number of populations) can also be retained.

The country indicator value is the mean across species (a median could be used for skewed distributions). If taxonomic groups are not represented evenly (as is likely), the indicator value is the mean of each taxonomic group's means, which would downweight taxonomic groups that are overly represented, e.g. mammals or birds. Optionally, each species can be weighted by the proportion of its geographic range in the country, from 0 to 1, to reflect national responsibility, with full weight for endemic species (REF).

The indicator is easily disaggregated to different taxonomic groups by only including species in that taxonomic category. The same can be done for different habitats, species commonness, etc.

How to define populations

This is one of the most important concepts to agree on before searching for data. The definition of a population does differ depending on the species (e.g. the spatial extent for a tree population and a salamander may not be the same) but here follows some general guidance.

Briefly, 'population' refers to a genetically distinct group of individuals. **Within populations the individuals are capable of interbreeding. Genetic distinction of populations is usually due to no or very low gene flow (movement of genes e.g. by movement of offspring) and/or significant adaptive differences,** such as due to occurring in different environments (high/ low altitude, different soil types, differences in precipitation or temperature). Not every occurrence is a population! The word 'subpopulation' may describe clusters of organisms across a landscape (including family units) which are near enough to exchange gene flow. Usually several 'subpopulations' are considered together as a population (which can also be called a 'metapopulation'). When the potential for gene flow is large, e.g., viable tree pollen that can travel tens of kilometers, 'populations' can range across large distances, sometimes hundreds of km.

Some published reports will clearly define what a population is based on the knowledge of biodiversity and taxonomic experts. Some judgment may be required in interpreting population designation in a report, but in general the designation of a population by experts should be considered strongly. In other cases, the reports or database may not clearly designate population boundaries and will require interpretation. Visual examination of maps may result (correctly) in 'merging' occurrences that are likely to experience extensive gene flow- 'likely to experience extensive gene flow' may be defined on spatial proximity e.g. close geographic distance and lack of clear barrier (mountain, fence, etc.).

The distance between subpopulations (or discrete habitat patches where the species occurs) can be used as a proxy to evaluate to what extent subpopulations are likely functionally connected. When the edge of a subpopulation is within a reasonable dispersal distance (for that particular species, a distance within which some 75-90% of realized dispersal distances occur- expert discretion is fine here) of another subpopulation edge, and there are no known physical barriers impeding dispersal, the subpopulations can be considered as part of the same metapopulation. Designation of populations should consider human induced gene flow e.g. genetic rescue, translocations etc. Experts in the species type (e.g. amphibians) and/or text from the data source can help identify populations.

Some examples may help. A population may consist of a cluster of individuals in a discrete location like an island, lake, river catchment or forest preserve, separate from other discrete locations by some tens of kilometers. A population may constitute a metapopulation consisting of subpopulations (ponds, prairies, etc.) that are separate but not very far (hundreds of meters to several kilometers), thus capable of exchanging at least 1 migrant (one reproductive adult moving between patches) on average per generation with each other. Well connected subpopulations are sufficiently close for the metapopulation to be called a population, and the population size should be considered the sum of the subpopulations, which may cover tens or hundreds of kilometers.

Genetic data can help define populations, but should be used with some caution. Whether genetic data can detect genetic differences can be a consequence of the type of genetic marker- new, genomic level markers can detect very fine genetic divisions, including between subpopulations. Not every genetic distinction according to DNA markers is a population. The threshold should still be considered roughly less than 1 migrant per generation (on average). Older genetic markers such as chloroplast and mitochondrial DNA sequence are often useful in identifying highly genetically distinct populations.

Populations of common species with large continuous spatial distributions that are much larger than the dispersal capacity of a single individual (e.g. less than 1 migrant per generation across the extent) are also considered as metapopulations. This applies to common, abundant species. Many populations of common species will be either nearly continuous or occur over very large areas. When very large continuous populations exist, e.g. hundreds of kilometers, then somewhat arbitrary population boundaries should be instituted, based on ecological changes such as *ecoregions*.

Metapopulations should represent stable spatial and temporal units. Many species have ephemeral subpopulations in dynamic source-sink metapopulations- a sink is a spatial location receiving high immigration from adjacent areas and which would not persist on its own without immigration. Sinks are not distinct populations. The conglomerate of connected subpopulations that should be evaluated as a population.

For freshwater fish, the riverscape structure can help define populations or units that can be assimilated to populations/metapopulations with a little GIS work. Individuals inhabiting lakes can be considered as populations, especially for lakes that are disconnected from the hydrographical network. Riverscape (meta)populations can also be defined through their level of connection/disconnection e.g. belonging to different river basins, hydrographical systems, river stretches separated by huge dams, etc.

For trees, the pollination mode and commonness is important. Trees which are wind-pollinated can have continuous populations extend over tens of kilometers, and farther. Trees which are insect pollinated generally but not always, have less gene flow. For common trees, a distinct population may not be easily apparent (e.g. trees that extend across much of a continent in a continuous fashion). In such cases, a “population” may be considered at approximately the level of a state, country, or ecoregion (hundreds of kilometers across).

On the definition of subspecies, and issues of taxonomy

Generally, we are assessing indicators at the species level. However, there are frequent revisions of taxonomy (lumping and splitting of species) and some species groups are better studied and thus more finely examined than others. Consequently, what may be considered a subspecies by some experts, may be considered a species by others. In such situations, assessors may include subspecies if the entity is an important unit for that country (e.g., it has separate reports or protection or Red List status.

Screenshots of species selection matrix

Species selection South Africa

	A	B	C	D	E	F	G	H	I	J	K	L
1											Life History Traits	
2	Species	Scientific Name	Realm	IUCN Habitat Classification	Taxonomic Group	National Endemic	If transboundary, what proportion of the species range exists in the	Species range	Global Red List category	Regional/National Red List category	Longevity (years)	Fecundity (Number of Offspring per year)
3	1	Capensibufo rosei	Multiple	Multiple	Amphibian	Yes		Restricted	Critically Endang	Critically Endang	6 to 10	
4	2	Bradypodion thamnobates	Terrestrial	Forest & Woodlar	Reptile	Yes		Restricted	Endangered	Endangered	6 to 10	
5	3	Spheniscus demersus	Multiple	Multiple	Bird	No	50-75%	Wide-ranging	Endangered	Endangered	11 to 25	
6	4	Clanwilliam sandfish	Freshwater	Wetlands	Fish	Yes		Rare	Endangered	Endangered	Unknown	Unknown
7	5	Encephalartos latifrons	Terrestrial	Grassland	Gymnosperm	Yes		Restricted	Critically Endang	Critically Endang	More than 100	
8	6	Equus zebra zebra	Terrestrial	Multiple	Mammal	Yes		Restricted	Least Concern	Least Concern	26 to 50	
9	7	Pelargonium sidoides	Terrestrial	Multiple	Angiosperm	Yes		Wide-ranging	Not Evaluated	Not Evaluated	Unknown	Unknown
10	8	Damaliscus pygargus pygargus	Terrestrial	Shrubland	Mammal	Yes		Wide-ranging	Not Evaluated	Vulnerable	26 to 50	
11	9	Diceros bicornis	Terrestrial	Savanna	Mammal	No	50-75%	Wide-ranging	Critically Endang	Critically Endang	26 to 50	
12	10	Dira swanepoeli isolata	Terrestrial	Rocky Areas	Invertebrate	Yes		Restricted	Vulnerable	Vulnerable	Unknown	Unknown
13	11	Panthera leo	Terrestrial	Multiple	Mammal	No		Wide-ranging	Vulnerable	Least Concern	11 to 25	
14	12	Hyperolius pickersgilli	Multiple	Multiple	Amphibian	Yes		Restricted	Endangered	Endangered	Unknown	
15	13	Sclerophrys pantherina	Multiple	Multiple	Amphibian	Yes		Restricted	Endangered	Endangered	6 to 10	
16	14	Carcharodon carcharias	Marine	Marine-Oceanic	Fish	No		Wide-ranging	Vulnerable	Endangered	51 to 100	
17	15	Hippocampus capensis	Marine	Marine-Neritic	Fish	Yes		Restricted	Endangered	Endangered	Unknown	
18	16	Papilio ophidicephalus zuluens	Terrestrial	Forest & Woodlar	Invertebrate	Yes		Rare	Not Evaluated		Unknown	Unknown
19	17	Antidorcas marsupialis	Terrestrial	Multiple	Mammal	No	10-25%	Wide-ranging	Least Concern	Least Concern	6 to 10	
20	18	Bitis armata	Terrestrial	Shrubland	Reptile	Yes		Restricted	Vulnerable	Vulnerable	11 to 25	Unknown
21	19	Bitis albanica	Terrestrial	Shrubland	Reptile	Yes		Restricted	Endangered	Endangered	6 to 10	
22	20	Mimetes stokoei	Terrestrial	Shrubland	Angiosperm	Yes		Restricted	Critically Endang	Critically Endang	11 to 25	Unknown
23	21	Arthroleptella rugosa	Terrestrial	Multiple	Amphibian	Yes		Restricted	Critically Endang	Critically Endang	Unknown	
24	22	Zostera capensis	Estuarine	Marine-Neritic	Angiosperm	No	75-95%	Restricted	Vulnerable	Endangered	Unknown	Unknown
25	23	Clinus spatulatus	Estuarine	Marine-Neritic	Fish	Yes		Restricted	Endangered		2 to 5	
26	24	Clinus cottoides	Marine	Marine-Neritic	Fish	Yes		Wide-ranging	Not Evaluated		2 to 5	
27	25	Clinus superciliosus	Marine	Marine-Neritic	Fish	No	75-95%	Wide-ranging	Not Evaluated		2 to 5	

Species selection Mexico

											Life History Traits	
Species	Scientific Name	Realm	IUCN Habitat Classification	Additional habitat information	Taxonomic Group	National Ender	If transboundary, what proportion of the species range exists in the	Species range	Global Red List category	Other Assessment	Longevity (years)	Fecundity (Number of Offspring per year)
1	*Lontra longicaudis*	Freshwater	Wetlands		Mammal	No	10-25%	Wide-ranging	Near Threatenec	Threatened	6 to 10	Less than 1
2	*Panthera onca*	Terrestrial	Multiple		Mammal	No	10-25%	Wide-ranging	Near Threatenec	Endangered	6 to 10	Less than 1
3	*Alouatta palliata*	Terrestrial	Forest & Woodlar		Mammal	No	10-25%	Wide-ranging	Vulnerable	Endangered	6 to 10	Less than 1
4	*Zoogoneticus purhepechus*	Freshwater	Wetlands		Fish	Yes		Restricted	Vulnerable	NA	2 to 5	Unknown
5	*Pseudoeurycea lineola*	Terrestrial	Forest & Woodlar		Amphibian	Yes		Restricted	Endangered	Special protection	Unknown	Unknown
6	*Ambystoma altamirani*	Freshwater	Wetlands		Amphibian	Yes		Restricted	Endangered	Endangered	Unknown	1 to 2
7	*Trogon mexicanus*	Terrestrial	Forest & Woodlar		Bird	No	50-75%	Wide-ranging	Least Concern	NA	Unknown	Less than 1
8	*Lampornis clemenciae*	Terrestrial	Forest & Woodlar		Bird	No	75-95%	Wide-ranging	Least Concern	NA	2 to 5	Less than 1
9	*Poeciliopsis infans*	Freshwater	Wetlands		Fish	Yes		Wide-ranging	Least Concern	NA	Unknown	Unknown
10	*Sceloporus torquatus*	Terrestrial	Forest & Woodlar		Reptile	Yes		Wide-ranging	Least Concern	NA	Unknown	Less than 1
11	*Chirostoma humboldtianum*	Freshwater	Wetlands		Fish	Yes		Restricted	Vulnerable	NA	2 to 5	2 to 5
12	*Gossypium hirsutum*	Terrestrial	Marine-Coastal/S		Angiosperm	No	75-95%	Wide-ranging	Vulnerable		11 to 25	10s
13	*Phaseolus coccineous*	Terrestrial	Shrubland		Angiosperm	No	75-95%	Wide-ranging	Least Concern		2 to 5	100s
14	*Capsicum annuum var. glabr*	Terrestrial	Shrubland		Angiosperm	No	75-95%	Wide-ranging	Least Concern		2 to 5	10s
15	*Cucurbita radicans*	Terrestrial	Shrubland		Angiosperm	Yes		Restricted	Endangered		Unknown	
16	*Persea longipes*	Terrestrial	Forest & Woodlar		Angiosperm	Yes		Restricted	Endangered		11 to 25	10s
17	*Physalis minuta*	Terrestrial	Marine-Coastal/S		Angiosperm	No	50-75%	Wide-ranging	Least Concern		Unknown	
18	*Solanum ehrenbergii*	Terrestrial	Forest & Woodlar		Angiosperm	Yes		Restricted	Least Concern		Unknown	
19	*Vainilla odorata*	Terrestrial	Forest & Woodlar	rainforest	Angiosperm	No	50-75%	Wide-ranging	Endangered		Unknown	2 to 5
20	*Zea mays ssp parviglumis*	Terrestrial	Forest & Woodlar		Angiosperm	Yes		Wide-ranging	Least Concern		Less than 1	100s
21	Psidium guajava	Terrestrial	Forest & Woodlar	Savanana, also distu	Angiosperm	No	10-25%	Wide-ranging	Least Concern		26 to 50	10 000s
22	Carica papaya	Terrestrial	Forest & Woodlar		Angiosperm	No	50-75%	Wide-ranging	Data Deficient	Populations decreasing	6 to 10	1 000s
23	Ceiba aesculifolia	Terrestrial	Forest & Woodlar		Angiosperm	No			Least Concern	Populations Severely Fr		
24	Crescentia cujete	Terrestrial	Savanna	forest, homegarden	Angiosperm	No	10-25%	Wide-ranging	Least Concern			
25	Agave inaequidens	Terrestrial	Forest & Woodlar		Angiosperm	Yes	75-95%	Restricted	Least Concern		11 to 25	

										Life History Traits	
Species	Scientific Name	Realm	IUCN Habitat Classification	Taxonomic Group	National Endemic	If transboundary, what proportion of the species range exists in the	Species range	Global Red List category	Regional/National Red List category	Longevity (years)	Fecundity (Number of Offspring per year)
1	Ruppia maritima	Terrestrial	Wetlands	Angiosperm	No	Unknown	Wide-ranging	Least Concern	Near Threatenec	10-20	Unknown
2	Utricularia uliginosa	Terrestrial	Wetlands	Angiosperm	No	Less than 10%	Wide-ranging	Least Concern	Near Threatenec	10-20	Unknown
3	Maytenus diversifolia	Terrestrial		Angiosperm	No	Less than 10%	Restricted	Not Evaluated	Near Threatenec	50-100	Unknown
4	Eriocaulon japonicum	Terrestrial	Wetlands	Angiosperm	Yes	Unknown	Unknown	Not Evaluated	Vulnerable	Unknown	Unknown
5	Nymphoides indica	Terrestrial	Wetlands	Angiosperm	No	Less than 10%	Wide-ranging	Least Concern	Near Threatenec	10-20	Unknown
6	Thalictrum simplex var.	Terrestrial		Angiosperm	No	10-25%	Wide-ranging	Not Evaluated	Vulnerable	10-20	Unknown
7	Zeuxine agyokuana	Terrestrial	Forest & Woodlar	Angiosperm	No	Unknown	Unknown	Not Evaluated	Near Threatenec	Unknown	Unknown
8	Utricularia aurea	Terrestrial	Wetlands	Angiosperm	No	10-25%	Wide-ranging	Least Concern	Vulnerable	1-5	Unknown
9	Isoetes asiatica	Terrestrial	Wetlands	Angiosperm	No	10-25%	Rare	Not Evaluated	Near Threatenec	Unknown	Unknown
10	Potamogeton pectinatu	Terrestrial	Wetlands	Angiosperm	No	Unknown	Unknown	Not Evaluated	Near Threatenec	Unknown	Unknown
11	Ranunculus grandis var.	Terrestrial		Angiosperm	No	10-25%	Unknown	Not Evaluated	Near Threatenec	Unknown	Unknown
12	Eriocaulon kiusianum	Terrestrial	Wetlands	Angiosperm	No	Unknown	Wide-ranging	Not Evaluated	Vulnerable	Unknown	Unknown
13	Triglochin asiatica	Terrestrial		Angiosperm	No	Unknown	Wide-ranging	Not Evaluated	Near Threatenec	10-20	Unknown
14	Azolla imbricata	Terrestrial	Wetlands	Angiosperm	No	Less than 10%	Wide-ranging	Not Evaluated	Endangered	Unknown	Unknown
15	Euphorbia adenochlora	Terrestrial		Angiosperm	Yes	Unknown	Wide-ranging	Not Evaluated	Near Threatenec	10-20	Unknown
16	Salvinia natans	Terrestrial		Angiosperm	No	Less than 10%	Wide-ranging	Least Concern	Vulnerable	1-5	Unknown
17	Adonis ramosa	Terrestrial	Forest & Woodlar	Angiosperm	Yes	Unknown	Unknown	Not Evaluated		Unknown	Unknown
18	Aster dimorphophyllus	Terrestrial	Forest & Woodlar	Angiosperm	Yes	Unknown	Restricted	Not Evaluated	Near Threatenec	10-20	Unknown
19	Sparganium glomeratur	Terrestrial	Wetlands	Angiosperm	No	Unknown	Unknown	Least Concern	Near Threatenec	Unknown	Unknown
20	Carex viridula	Terrestrial	Wetlands	Angiosperm	No	Unknown	Unknown	Not Evaluated	Near Threatenec	Unknown	Unknown

Species selection Japan

Screenshots of Kobo Data collection form

Section 3: Indicator 2

QUESTIONS IN THIS SECTION DIRECTLY HELP IN QUANTIFYING INDICATOR 2, AND WILL INFORM THE SECTION ON INDICATOR 1 BY STIPULATING THE NUMBER OF POPULATIONS YOU WILL BE ASKED TO COMPLETE WITH RESPECT TO POPULATION NAME AND SIZE.

TOTAL NUMBER OF KNOWN POPULATIONS (EXTINCT AND EXTANT) WITHIN THE COUNTRY OF ASSESSMENT *
Type -1 if unknown

5

WHAT YEAR OR TIME PERIOD IS THIS POPULATION STRUCTURE BASED ON? *

COULD OTHER POPULATIONS EXIST IN THE COUNTRY OF ASSESSMENT?
I.e., Does the number of known populations cover the entire range of the species within the country of assessment?

- ○ It is highly likely that no other populations exists in the country (e.g., extensive surveys have been conducted and/or habitat expected to be unsuitable)
- ○ It is possible that other populations exist but these have not been clearly defined
- ○ Unknown

NUMBER OF EXTANT (KNOWN) POPULATIONS WITHIN THE COUNTRY OF ASSESMENT *
Type -1 if unknown

5

BROADLY, WHICH OF THE FOLLOWING CATEGORIES BETTER DEFINES HOW POPULATIONS ARE DEFINED FOR THIS SPECIES? *
Refer to Guidance Document and Kobo User Manual for examples of each option.

- ☐ Genetic clusters/clades
- ☐ Geographic boundaries
- ☐ Ecological or Biogeographic proxies
- ☐ Traits (e.g., behavioural, morphological, physiological)
- ☐ Management Units (demography/ migration)
- ☐ Other

PLEASE PROVIDE A BRIEF BUT CLEAR EXPLANATION (METHOD) ON HOW POPULATIONS WERE DEFINED.
For example if a buffer zone among occurrence points was used, specify the source of the occurrence points and the size of the buffer: or if geographic layers (e.g. basins, biogeographic regions, etc) were used to crop the distribution range, please explain how was this done: or if it was based on expert consultation, please explain how (e.g. workshop, interview) and provide name of expert(s).

IF A MAP ILLUSTRATING THE EXTANT POPULATIONS EXISTS, PLEASE UPLOAD IT HERE, ENSURING THAT EACH POPULATION IS CLEARLY MARKED. A MULTIPAGE DOCUMENT (EG PDF) CAN BE INCLUDED TO "ZOOM IN" INTO DIFFERENT POPULATIONS, IF REQUIRED..
Accepted files: pdf, png, jpg. Please be reasonable with file size.

Click here to upload file. (< 10MB)

IF AVAILABLE, PLEASE RECORD THE OVERALL DECLINE IN SPECIES' HABITAT AREA.
This information may act as a proxy for population loss and hence genetic diversity, should the number of historical population be unknown. This decline may be approximated by the Species Habitat Index (an estimate of the loss of a species suitable habitat

SOURCE OF SPECIES POPULATION INFORMATION (LITERATURE REFERENCE, WEBSITE LINK, EXPERT CONSULTATION) *
Please list all relevant sources used in acquiring the species information separated by a semicolon (;) and upload all documents to a species specific folder in your countries folder within the Data Collection folder of the Google Drive. If information was based on expert consultation, please provide name of expert(s).

Section 4: Preface to Indicator 1

IS THERE ANY DATA ON POPULATION SIZES (E.G. NE, NC) FOR AT LEAST ONE POPULATION FOR THIS SPECIES? *

- ◉ Yes
- ○ No, but Census size data does exist for the species as a whole.
- ○ No, the species has insufficient data.

EFFECTIVE SIZE - ARE THERE POPULATION SIZE ESTIMATES (FOR AT LEAST ONE OF THE EXTANT POPULATIONS) BASED ON EFFECTIVE POPULATION SIZE [NE]? *

- ◉ Yes
- ○ No, but other genetic diversity information does exist (e.g., allelic richness, heterozygosity, inbreeding)
- ○ No

CENSUS SIZE - ARE THERE POPULATION SIZE ESTIMATES (FOR AT LEAST ONE OF THE EXTANT POPULATIONS) BASED ON CENSUS DATA (NC)? *

- ◉ Yes
- ○ No

IS THERE A KNOWN EFFECTIVE POPULATION SIZE TO CENSUS SIZE (NE/NC) RATIO FOR THIS SPECIES OR A HIGHLY SIMILAR/CLOSELY RELATED SPECIES (E.G. WITHIN THE SAME GENUS AND HAVING THE SAME LIFE HISTORY TRAITS)? *
Try conducting a quick Google Search (or similar) using the search terms "Ne" AND "effective population size" AND [the genus name].

- ○ Yes, a ratio exists for this species.
- ◉ Yes, a ratio exists for a highly similar species.
- ○ No

WHAT CLOSELY RELATED/HIGHLY SIMILAR SPECIES IS THE RATIO BASED ON?
Please write the scientific name.

ANY ADDITIONAL COMMENTS OR NOTES REGARDING THE INFORMATION THAT HAS BEEN PROVIDED ABOVE.

Section 5: Indicator 1 (per population)

QUESTIONS IN THIS SECTION ARE DIRECTLY ASSOCIATED WITH CALCULATING INDICATOR 1. IF THERE ARE KNOWN POPULATIONS THAT ARE NOW EXTINCT, ONLY RECORD THEIR NAME HERE. THE NUMBER OF POPULATIONS YOU WILL BE REQUIRED TO ANSWER QUESTIONS IS DIRECTLY RELATED TO THE NUMBER OF EXTANT AND EXTINCT POPULATIONS THAT WERE ENTERED IN SECTION 3. DATA FOR NO MORE THAN 100 POPULATIONS CAN BE ENTERED.

» Population 1

POPULATION 1 NAME *
If a name has not been assigned to this population in literature, please provide your own unique name here.

DOES POPULATION 1 CURRENTLY EXISTS? *

- (•) yes (extant)
- ( ) no (extint)

WHAT IS THE ORIGIN OF POPULATION 1?

- ( ) introduced
- ( ) translocated
- (•) historically natural

WHAT IS THE EFFECTIVE POPULATION SIZE (NE) FOR POPULATION 1? (POINT ESTIMATE) *
If you have a confidence interval include it in next questions. If Ne is not known for this population, leave it blank.

IF THERE IS A CENSUS POPULATION SIZE (NC) AVAILABLE, IS THIS A RANGE OR POINT ESTIMATE? *

- (•) quantitative range (e.g. "1,000 to 2,000" or "expert says aroung 3,000")
- ( ) point estimate (quantitative data with or without confidence intervals)

WHATS THE RANGE OF THE NC FOR POPULATION 1? *

- ( ) < 5,000 by much
- ( ) < 5,000 but not by much (tens or a few hundred more)
- ( ) > 5,000 but not by much (tens or a few hundred more)
- ( ) > 5,000 by much
- ( ) estimate is a range including both less and greather than 5,000 (e.g. "3,000 to 10,000")

PLEASE LIST ALL RELEVANT SOURCES OF CENSUS SIZE INFORMATION (LITERATURE REFERENCE, WEBSITE LINK, EXPERT CONSULTATION) FOR THIS POPULATION *
Please separate sources using a semicolon (;)

ANY ADDITIONAL COMMENTS OR NOTES REGARDING THE INFORMATION THAT HAS BEEN PROVIDED OR WHY IT COULD NOT BE FOR POPULATION 1?

» Population 2

POPULATION 2 NAME *
If a name has not been assigned to this population in literature, please provide your own unique name here.

DOES POPULATION 2 CURRENTLY EXISTS? *

- (•) yes (extant)
- ( ) no (extint)

WHAT IS THE ORIGIN OF POPULATION 2? *

- ( ) introduced
- ( ) translocated
- ( ) historically natural

WHAT IS THE EFFECTIVE POPULATION SIZE (NE) FOR POPULATION 2? (POINT ESTIMATE) *
If you have a confidence interval include it in next questions.

IF THERE IS A CENSUS POPULATION SIZE (NC) AVAILABLE, IS THIS A RANGE OR POINT ESTIMATE? *

- ( ) quantitative range (e.g. "1,000 to 2,000" or "expert says aroung 3,000")
- (•) point estimate (quantitative data with or without confidence intervals)

IF KNOWN, WHAT IS THE CENSUS POPULATION SIZE (NC) FOR POPULATION 2? (POINT ESTIMATE) *
If you have a confidence interval include it in next questions.

PLEASE LIST ALL RELEVANT SOURCES OF CENSUS SIZE INFORMATION (LITERATURE REFERENCE, WEBSITE LINK, EXPERT CONSULTATION) FOR THIS POPULATION *

ANY ADDITIONAL COMMENTS OR NOTES REGARDING THE INFORMATION THAT HAS BEEN PROVIDED OR WHY IT COULD NOT BE FOR POPULATION 2?

» Population 3

POPULATION 3 NAME *
If a name has not been assigned to this population in literature, please provide your own unique name here.

DOES POPULATION 3 CURRENTLY EXISTS? *

- (●) yes (extant)
- ( ) no (extint)

WHAT IS THE ORIGIN OF POPULATION 3? *

- ( ) introduced
- ( ) translocated
- ( ) historically natural

WHAT IS THE EFFECTIVE POPULATION SIZE (NE) FOR POPULATION 3? (POINT ESTIMATE) *
If you have a confidence interval include it in next questions.

IF THERE IS A CENSUS POPULATION SIZE (NC) AVAILABLE, IS THIS A RANGE OR POINT ESTIMATE? *

- ( ) quantitative range (e.g. "1,000 to 2,000" or "expert says aroung 3,000")
- (●) point estimate (quantitative data with or without confidence intervals)

IF KNOWN, WHAT IS THE CENSUS POPULATION SIZE (NC) FOR POPULATION 3? (POINT ESTIMATE) *
If you have a confidence interval include it in next questions.

PLEASE LIST ALL RELEVANT SOURCES OF CENSUS SIZE INFORMATION (LITERATURE REFERENCE, WEBSITE LINK, EXPERT CONSULTATION) FOR THIS POPULATION *

ANY ADDITIONAL COMMENTS OR NOTES REGARDING THE INFORMATION THAT HAS BEEN PROVIDED OR WHY IT COULD NOT BE FOR POPULATION 3?

» Population 4

POPULATION 4 NAME *
If a name has not been assigned to this population in literature, please provide your own unique name here.

DOES POPULATION 4 CURRENTLY EXISTS? *

- ( ) yes (extant)
- (●) no (extint)

WHAT IS THE ORIGIN OF POPULATION 4? *

- ( ) introduced
- ( ) translocated
- ( ) historically natural

PLEASE LIST ALL RELEVANT SOURCES OF CENSUS SIZE INFORMATION (LITERATURE REFERENCE, WEBSITE LINK, EXPERT CONSULTATION) FOR THIS POPULATION *

ANY ADDITIONAL COMMENTS OR NOTES REGARDING THE INFORMATION THAT HAS BEEN PROVIDED OR WHY IT COULD NOT BE FOR POPULATION 4?

» Population 5

POPULATION 5 NAME *
If a name has not been assigned to this population in literature, please provide your own unique name here.

DOES POPULATION 5 CURRENTLY EXISTS? *

- ( ) yes (extant)
- (●) no (extint)

WHAT IS THE ORIGIN OF POPULATION 5? *

- ( ) introduced
- ( ) translocated
- ( ) historically natural

PLEASE LIST ALL RELEVANT SOURCES OF CENSUS SIZE INFORMATION (LITERATURE REFERENCE, WEBSITE LINK, EXPERT CONSULTATION) FOR THIS POPULATION *

ANY ADDITIONAL COMMENTS OR NOTES REGARDING THE INFORMATION THAT HAS BEEN PROVIDED OR WHY IT COULD NOT BE FOR POPULATION 5?

Section 7: Indicator 3

QUESTIONS IN THIS SECTION WILL CONTRIBUTE TOWARDS QUANTIFYING INDICATOR 3 - NUMBER OF SPECIES AND POPULATIONS IN WHICH GENETIC DIVERSITY IS BEING MONITORED USING DNA BASED METHODS

HAVE GENETIC STUDIES BEEN CONDUCTED INVOLVING THE SPECIES? *

- ○ Yes, but only phylogenetic/phylogeographic studies.
- ○ Yes, but only population-level studies.
- ◉ Yes, both phylogenetic and population studies.
- ○ No

HAS TEMPORAL GENETIC MONITORING BEEN CONDUCTED FOR ONE OR MORE POPULATIONS OF THIS SPECIES? *
A temporal comparison using at least two time points of various genetic diversity metrics for the species.

- ◉ Yes
- ○ No
- ○ Unknown

IF YES, WHAT YEARS DID THIS TAKE PLACE? *

PLEASE CITE ALL DATA SOURCES FOR THE GENETIC STUDIES (LITERATURE REFERENCE, WEBSITE LINK, EXPERT CONSULTATION) SEPARATED BY A SEMI-COLON (;) AND UPLOAD ALL AVAILABLE DOCUMENTS IN A SPECIES SPECIFIC FOLDER IN THE PROJECT GOOGLE DRIVE (IN THE DATA COLLECTION FOLDER). *

Section 8: Other Species Information

WHILE THE ANSWERS TO THE QUESTIONS IN THIS SECTION WILL NOT DIRECTLY CONTRIBUTE TO QUANTIFYING ANY OF THE GENETIC DIVERSITY INDICATORS BEING INVESTIGATED, THEY WILL HELP REFINE METRICS, SUCH AS THE NE:NC RATIO, AND PROVIDE CONTEXTUAL INFORMATION ON THE TYPE OF SPECIES BEING ASSESSED (E.G., THREATENED STATUS, LIFE HISTORY CLASSIFICATIONS) WHICH COULD BE INFORMATIVE TO COUNTRIES IN THEIR NATIONAL REPORTING. THESE DATA CAN ALSO HELP DEVELOP NEW AND REFINE EXISTING NE:NC RATIOS FOR SPECIES. AS SUCH THESE VAST MAJORITY OF THE QUESTIONS IN THIS SECTION ARE MANDATORY. IF THE REQUIRED INFORMATION IS NOT AVAILABLE DURING THE TIME OF ASSESSMENT, FOR WHATEVER REASON, PLEASE MARK THE QUESTIONS AS UNKNOWN, BUT PLEASE ENSURE THESE ARE FOLLOWED UP TO ALLOW FOR FUTURE DOWNSTREAM ANALYSES

REALM *
Select all that apply

- ☐ Marine
- ☐ Estuarine
- ☐ Freshwater
- ☐ Terrestrial

IUCN HABITAT CLASSIFICATION *
IUCN (2012) IUCN Habitat Classification Scheme. https://www.iucnredlist.org/resources/habitat-classification-scheme. Select all that apply.

- ☐ Forest & Woodland
- ☑ Savanna
- ☑ Shrubland
- ☐ Grassland
- ☐ Wetland
- ☐ Rocky Area
- ☐ Caves & Subterranean habitat
- ☐ Desert
- ☐ Marine-Neritic
- ☐ Marine-Oceanic
- ☐ Marine-Deep Ocean Floor
- ☐ Marine-Intertidal
- ☐ Marine-Coastal/Supratidal
- ☐ Unknown/Other

OTHER HABITAT DATA
Please feel free to elaborate further on the habitat (sub-types) of the species. E.g., Wetland may be broken down further into streams/rivers, and lakes,. Beaches fall under Marine Intertidal.

IS THIS SPECIES A NATIONAL ENDEMIC? *

- ○ Yes
- ○ No

SPECIES RANGE *

Wide-ranging: an EOO greater than 20 000 km2 (based on IUCN Criterion B1) or present in more than one-third of a country's 20-km grid squares (following Katayama et al. 2014 PLoSOne study). Restricted: an EOO < 20 000 km2 or an AOO < 2 000 km2. A list of restricted species compiled using KBA criteria (i.e.IUCN Criteria B2) can be found online from https://www.keybiodiversityareas.org/working-with-kbas/proposing-updating/criteria-tools; however, it is recognized that not all restricted species will be included in this list.

- ○ Wide-ranging
- ○ Restricted (i.e., narrow)
- ○ Unknown

IS THE SPECIES RARE? *

Rare: Low densities of individuals: Species always occurs as single individuals or very small subpopulations (typically fewer than 50 mature individuals) scattered over a wide area

- ○ Yes - naturally rare
- ○ Yes - recently rare (anthropogenic effect)
- ○ No

EXTENT OF OCCURRENCE

If a point estimate is not available, please enter a range value.

AREA OF OCCURRENCE

If a point estimate is not available, please enter a range value.

LEVEL OF POPULATION FRAGMENTATION *

As per IUCN definition, severely fragmented means that more than half of the species' total AOO is in habitat patches that are (1) smaller than would be required to support a viable population, and (2) separated from other habitat patches by a large distance. Moderately fragmented refers to a species with less than half of its AOO in habitat patches.

- ○ Severely fragmented
- ◉ Moderately fragmented
- ○ None (continuous population)
- ○ Unknown

ADDITIONAL INFORMATION ON SPECIES RANGE.

Feel free to include other specific information on the range of the species.

GLOBAL RED LIST CATEGORY (IUCN) *

For transboundary species, this will assessment will cover the entire known range of the species, not just the country of assessment.

- ○ Critically Endangered (CR)
- ○ Endangered (EN)
- ○ Vulnerable (VU)
- ○ Near Threatened (NT)
- ○ Least Concern (LC)
- ○ Data Deficient (DD)
- ○ Not assessed
- ○ Unknown

NATIONAL RED LIST CATEGORY *

- ◯ Critically Endangered (CR)
- ◯ Endangered (EN)
- ◯ Vulnerable (VU)
- ◯ Near Threatened (NT)
- ◯ Least Concern (LC)
- ◯ Data Deficient (DD)
- ◯ Not assessed
- ◯ Unknown

OTHER SPECIES STATUS ASSESSMENT(S)

Please write the species conservation status as recognized by all other assessments or the status range in instances where different classifications are provided for different regions, states, provinces or a country. Please separate all entries with a semicolon (;).

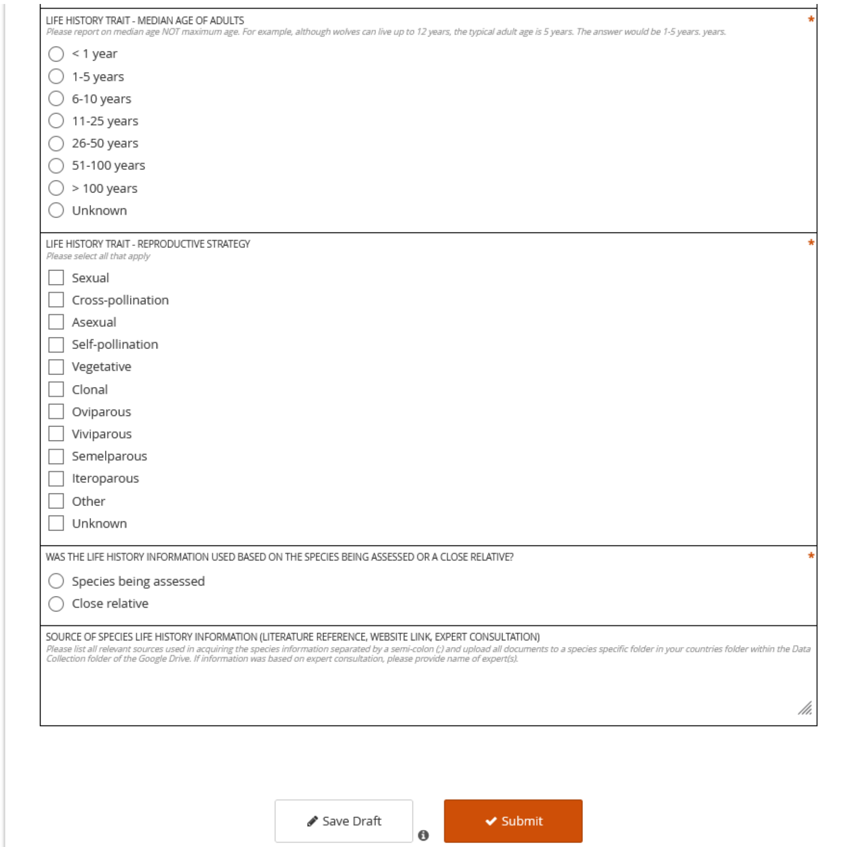
SOURCE OF SPECIES STATUS AND DISTRIBUTION (LITERATURE REFERENCE, WEBSITE LINK, EXPERT CONSULTATION) *

Please list all relevant sources used in acquiring the species information separated by a semicolon (;) and upload all documents to a species specific folder in your countries folder within the Data Collection folder of the Google Drive. If information was based on expert consultation, please provide name of expert(s).

LIFE HISTORY TRAITS - THE NEXT FEW QUESTIONS RELATE TO LIFE HISTORY TRAITS WHICH CAN BE USED TO INFORM AND REFINE NE:NC RATIOS. IF LIFE HISTORY DATA DOES NOT EXIST FOR THE SPECIES BEING ASSESSED, BUT DOES EXIST FOR A CLOSELY RELATED SPECIES BELIEVED OR KNOWN TO HAVE A SIMILAR LIFESTYLE, PLEASE ANSWER THE LIFE HISTORY QUESTIONS FOR THE CLOSE RELATIVE AND SPECIFY THIS BELOW..

LIFE HISTORY TRAIT - FECUNDITY (NUMBER OF OFFSPRING PER YEAR) *

- ◯ < 1
- ◯ 1-2
- ◯ 3-5
- ◯ 6-10
- ◯ 10s
- ◯ 100s
- ◯ 1 000s
- ◯ 10 000s
- ◯ 100 000s
- ◯ >100 000s
- ◯ Unknown
- ◯ Not applicable (e.g., semelparous)


LIFE HISTORY TRAIT - MEDIAN AGE OF ADULTS *

Please report on median age NOT maximum age. For example, although wolves can live up to 12 years, the typical adult age is 5 years. The answer would be 1-5 years. years.

- < 1 year
- 1-5 years
- 6-10 years
- 11-25 years
- 26-50 years
- 51-100 years
- > 100 years
- Unknown

LIFE HISTORY TRAIT - REPRODUCTIVE STRATEGY *

Please select all that apply

- Sexual
- Cross-pollination
- Asexual
- Self-pollination
- Vegetative
- Clonal
- Oviparous
- Viviparous
- Semelparous
- Iteroparous
- Other
- Unknown

WAS THE LIFE HISTORY INFORMATION USED BASED ON THE SPECIES BEING ASSESSED OR A CLOSE RELATIVE? *

- Species being assessed
- Close relative

SOURCE OF SPECIES LIFE HISTORY INFORMATION (LITERATURE REFERENCE, WEBSITE LINK, EXPERT CONSULTATION)

Please list all relevant sources used in acquiring the species information separated by a semi-colon (;) and upload all documents to a species specific folder in your countries folder within the Data Collection folder of the Google Drive. If information was based on expert consultation, please provide name of expert(s).

Save Draft

Submit

Kobo Manual

Genetic Diversity Indicator Testing Kobo v3.0 Manual

This guide will help you work through the *Kobo Form* for the Genetic Indicator Testing project. *Kobo Toolbox* was chosen as the platform for the manual data collecting as it provided a way to build such a complex form, allows the form to be shared widely, and allows the user to collect data both *online* and *offline* .

This manual will provide detailed advice on how to answer each question, with examples if necessary. Along with the overall *Project Guidance document*, you should have all the information necessary to complete a species assessment.

In the Kobo Form, questions are presented sequentially with some explanatory text and without numbering, but in this document, we numbered the questions and provide, to the left of each question, a code regarding the format of the expected answer, whether it is mandatory, and if it is linked to another question (Table 1). Should you wish to carry out an assessment using a pdf or word document, these codes help identify the questions and answers that are being asked. **NOTE** : in general **when entering multiple values** to answer a given question, **use semicolons (;) for separation** , not commas!

Table 1. Codes used to qualify questions in the Kobo Form. For each question, sequentially numbered codes provide information on the format of the expected answers, whether a response is mandatory and whether the question is linked to another question.

Text (T)	Year (Y)
Number (N)	File upload (F)
Decimal number (D)	Mandatory (M)
Select One (S1)	Optional (O)
Select Many (S+)	Linked to another question (-[#])

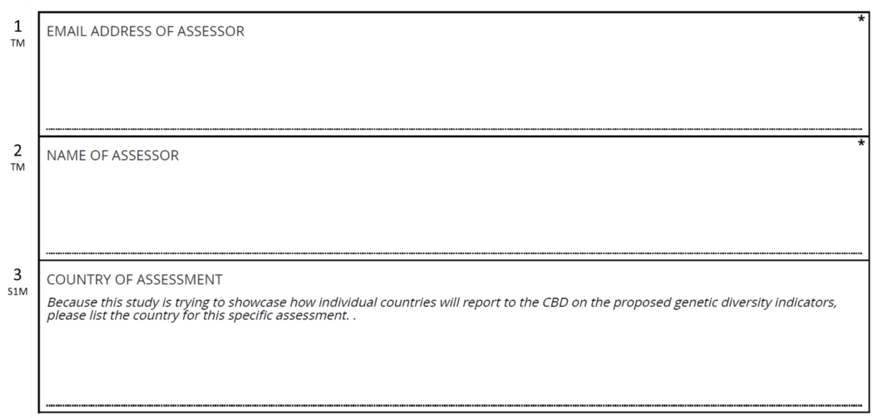
For example:

	refers to Question 3; only one answer can be chosen from the list provided, and it is mandatory
	refers to Question 4; the answer to the question requires text, and it is mandatory.
	refers to Question 14; one answer will be selected from the list provided, it is mandatory, and is linked to Question 13 (i.

Section 1: Assessor & Country Information (Questions 1-3)

This section records the assessor's name and contact details, and the country of assessment (should clarification be needed on the species in question, and to help track the number of assessments completed by an assessor so that proper credit can be provided).

Although some species may be distributed across more than one country, this study aims to test the feasibility of individual countries in reporting to the CBD on the proposed genetic diversity indicators. *As such, species assessments must be completed at the country level, focusing only on the populations/geographic range within the country in question* .


1 TM EMAIL ADDRESS OF ASSESSOR *

2 TM NAME OF ASSESSOR *

3 S1M COUNTRY OF ASSESSMENT

Because this study is trying to showcase how individual countries will report to the CBD on the proposed genetic diversity indicators, please list the country for this specific assessment. .

Section 2: Species Taxonomy (Questions 4-9)

Except for question 6 (Q6), all questions within this section are Mandatory. Q6 allows the user to specify subspecies or variety. While assessments are intended to be conducted at the species level, it is recognized that there are revisions of taxonomy (lumping and splitting of species), and what may be considered a subspecies or variety by some experts, may be considered a species by others. Also, distinctions at infraspecies levels may be of special importance for some taxa, like some crop wild relatives. Assessors may thus include subspecies or variety if the entity is an important unit for that country (e.g., it has separate management reports, protection level or Red List status or a wild relative of a crop). To prevent ambiguity, the Taxonomic Authority must be reported. If it is unknown, type "Unknown".

4 TM — GENUS *

5 TM — SPECIES *

Only type the epithet, e.g. "sapiens" instead of "Homo sapiens". Do NOT include Taxonomic Authority or year of description. That will be provided below.

6 TO — SUBSPECIES OR VARIETY

Only type the infraspecific epithet. Leave blank if the assessment is not being done below the species level.

7 TM — TAXONOMIC AUTHORITY *

Please include the Taxonomic Authority and year for the species (or subspecies/variety) being assessed. E.g., For Mellivora capensis, type (Schreber, 1776)

For Q8, please provide the most widely used common name(s) for the species, followed by the language in brackets. *For example* , the common names for *Taxus baccata* are Common yew in English and If commun in French. These can be written as Common yew (EN); If commun (FR). When entering multiple common names, please ensure they are separated by a semicolon (;).

8 TM — COMMON NAME *

9 S1M — TAXONOMIC GROUP *

- Angiosperm
- Gymnosperm
- Pteridophytes (e.g., ferns)
- Bryophyte
- Fungus
- Invertebrate
- Fish
- Amphibian
- Reptile
- Bird
- Mammal
- Other

Section 3: Indicator 2 (Questions 10-18)

Questions in this section are for quantifying Indicator 2, and will inform the section on Indicator 1 by stipulating the number of populations you will be asked to complete with respect to population name and size.

Q10 is asking about the number of known extinct populations within the country! In other words, the total number of known historic populations in the country! Ideally, the assessor will find details of extinct populations in the reports, databases, or experts s/he is consulting. This may come in the form of a list or map(s). An integer count (e.g., 1, 2) can therefore be reported. If the number of extinct populations is**Unknown** , please type **-999** .

Given that we are assessing human-induced changes in species' genetic diversity and structure, 50-200 years ago can be used as the historic/prior baseline for which to compare population numbers. This timeline reflects the industrial era and rapid habitat change in many countries. However, it is acknowledged that baselines might vary by country depending on human impact/ growth and even depending on species type (e.g. earlier hunting of large mammals). As such, it is the choice of the in-country assessor as to what is appropriate, and is somewhat dependent on the data available in records. Please record the date of the baseline/historic structure that you are referring to when counting populations (Q11). This could allow for interesting temporal comparisons during downstream analyses (e.g., 'pre industrial' [1700s], 'great acceleration' [1950s], initiation of the CBD [1993], the start of this decade [2020]).

10
NM
NUMBER OF EXTINT (KNOWN) POPULATIONS WITHIN THE COUNTRY OF ASSESMENT *
Type -999 if unknown

11
TM-10
TYPE THE NAME OR REGION OF THE EXTINT POPULATIONS, SEPARATED BY A SEMICOLON (";")

Q12 asks for the number of known extant (current) populations. Please consult the*Guidance document* on how populations can be defined. Examples for particular taxonomic groups are provided. In there, you will also find information on metapopulations and how to quantify recently fragmented populations.

IMPORTANT: the number of populations entered in Q12 will influence how many specific population sections appear in Section 5 (e.g. for entering Ne or Nc information), with the limit on the Kobo Form set to 100 populations. However, if more than 100 populations exist, an option will be provided to upload their information using a tab delimited file **(QX)** .

12
NM
NUMBER OF EXTANT (KNOWN) POPULATIONS WITHIN THE COUNTRY OF ASSESMENT *
Type -999 if unknown

For some species, not all populations may be 'known', possibly due to the lack of surveys on the species within certain areas. However, there may still be a possibility of additional populations of the species existing, for example, due to available but unexplored habitat. If there is a reasonable idea that there may be other populations in existence, click the second option in (Q13) and provide some clarifying text explaining why this option was chosen (Q14)

13
S1M
COULD OTHER POPULATIONS EXIST IN THE COUNTRY OF ASSESSMENT?
I.e., Does the number of known populations cover the entire range of the species within the country of assessment?
- ◯ It is highly likely that no other populations exists in the country (e.g., extensive surveys have been conducted and/or habitat expected to be unsuitable)
- ◯ It is possible that other populations exist but these have not been clearly defined
- ◯ Unknown

14
TM-13

PLEASE PROVIDE AN EXPLANATION AS TO WHY THIS OPTION WAS CHOSEN. *

Please report on all methods used in quantifying populations for this species (Q15) and provide a brief explanation (Q16), as well as an optional map (or series of maps) depicting the population structure (current and historical), if available (Q17). *If only partial information on populations is available, it is* ***highly recommended*** *that assessors denote this information on the map(s) by indicating which populations are being assessed* . Because only ONE file can be uploaded in Q17, if you have multiple maps we recommend pasting them into a single document (e.g., Word Doc [.docx], PDF). The maps may be rough sketches, drawn digitally, or taken as screenshots from publications.

15
S+M

BROADLY, WHICH OF THE FOLLOWING CATEGORIES BETTER DEFINES HOW POPULATIONS ARE DEFINED FOR THIS SPECIES? *

Refer to Guidance Document and Kobo User Manual for examples of each option.

- [ ] Genetic clusters/clades
- [ ] Geographic boundaries
- [ ] Ecological or Biogeographic proxies
- [ ] Traits (e.g., behavioural, morphological, physiological)
- [ ] Management Units (demography/ migration)
- [ ] Other

16
TM

PLEASE PROVIDE A BRIEF BUT CLEAR EXPLANATION (METHOD) ON HOW POPULATIONS WERE DEFINED.

For example if a buffer zone among occurrence points was used, specify the source of the occurrence points and the size of the buffer: or if geographic layers (e.g. basins, biogeographic regions, etc) were used to crop the distribution range, please explain how was this done: or if it was based on expert consultation, please explain how (e.g. workshop, interview) and provide name of expert(s).

17
FO

IF A MAP ILLUSTRATING THE EXTANT POPULATIONS EXISTS, PLEASE UPLOAD IT HERE, ENSURING THAT EACH POPULATION IS CLEARLY MARKED. A MULTIPAGE DOCUMENT (EG PDF) CAN BE INCLUDED TO "ZOOM IN" INTO DIFFERENT POPULATIONS, IF REQUIRED..

Accepted files: pdf, png, jpg. Please be reasonable with file size.

Click here to upload file. (< 5MB)

It may be more frequent to find a report on 'overall decline' in species habitat area in the country. If this is discovered, please report it here. Note: the Overall Decline should be a whole number between 1 and 99 (a percent). A decline (or loss) of 99% of habitat would mean 1% of habitat remains. Many assessments may simply report "the species has declined by X%". This is where you can record this information.

18
TO

IF AVAILABLE, PLEASE RECORD THE OVERALL DECLINE IN SPECIES' HABITAT AREA.

This information may act as a proxy for population loss and hence genetic diversity, should the number of historical population be unknown. This decline may be approximated by the Species Habitat Index (an estimate of the loss of a species suitable habitat

19
TM

SOURCE OF SPECIES POPULATION INFORMATION (LITERATURE REFERENCE, WEBSITE LINK, EXPERT CONSULTATION) *

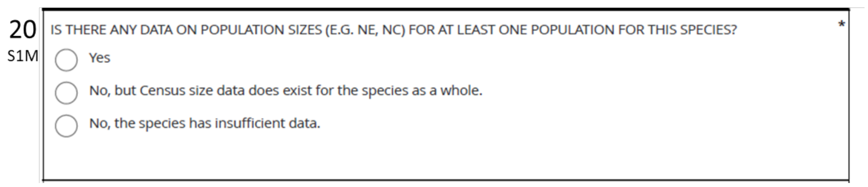
Please list all relevant sources used in acquiring the species information separated by a semicolon (;) and upload all documents to a species specific folder in your countries folder within the Data Collection folder of the Google Drive. If information was based on expert consultation, please provide name of expert(s).

Please list all relevant sources for the population information (Q10-18). This may be in the form

of, but not limited to scientific literature, government reports, websites, or expert consultation. Please separate each source using a semicolon. To enter each source on a different line, click CTRL+Enter at the end of one reference to move the cursor to the next line. If citing scientific literature or reports, the preferred format is *Harvard*style, but *any standard format will suffice* . If available, please record the DOI as well (as in "DOI: 10.1111/eva.12590").

Section 4: Preface to Indicator 1 (Questions 20-28)

These next questions will help quantify what population size data exists for populations of the species, and in doing so filter out unnecessary questions in Section 5.


20
S1M
IS THERE ANY DATA ON POPULATION SIZES (E.G. NE, NC) FOR AT LEAST ONE POPULATION FOR THIS SPECIES? *
Yes
No, but Census size data does exist for the species as a whole.
No, the species has insufficient data.

In Q20, 'ANY DATA' not only refers to quantitative data, but also qualitative and approximate/ imprecise data. All data on population size can be useful and interpretable, even if only available for some populations.

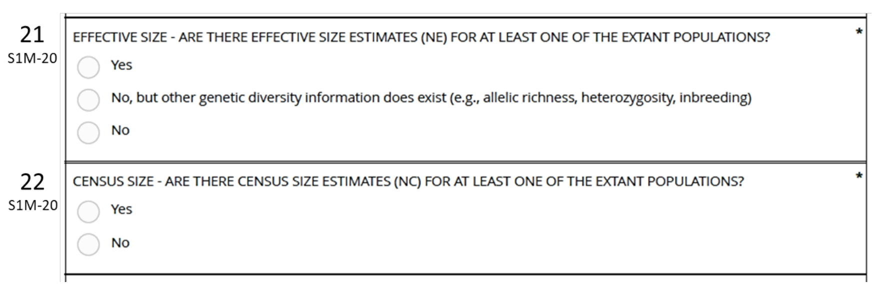
If the answer is Yes, a series of questions will appear asking about effective size, then census size data.

If the answer to Q20 is 'No, but Census size data does exist for the species as a whole' the user will be directed to *Section 6: Modified Indicator 1 for the Entire Species within the Country of Assessment* , skipping Section 5 entirely.

If the answer to Q20 is 'No, the species has insufficient data', the form will skip to *Section 7: Indicator 3* .

Questions 21 and 22 are asking about the kind of population size data that might exist for the species. If 'Yes' is answered for either question, more detailed information related to effective population size and census size will be asked in Section 5: Indicator 1. If 'No' is answered for either question, follow-up population size questions in Section 5 will not be presented.

If 'No, but other genetic diversity information does exist" is selected for Q21, then no effective population size questions will be presented in Section 5.


21
S1M-20
EFFECTIVE SIZE - ARE THERE EFFECTIVE SIZE ESTIMATES (NE) FOR AT LEAST ONE OF THE EXTANT POPULATIONS? *
Yes
No, but other genetic diversity information does exist (e.g., allelic richness, heterozygosity, inbreeding)
No
22
S1M-20
CENSUS SIZE - ARE THERE CENSUS SIZE ESTIMATES (NC) FOR AT LEAST ONE OF THE EXTANT POPULATIONS? *
Yes
No

If 'Yes' is selected for Q22, Q23 will appear asking for whether a ratio of effective population size to census size exists. If one is not immediately known from literature already examined, it is recommended that a Google Search (or similar) be conducted using the following search terms: ("Ne" OR "effective population size") AND ("Nc" OR "census size) AND ratio AND *the genus name for the species* . However, an unreasonable amount of time should not be expended trying to find this information (more than skimming a few papers).

23 S1M-22

IS THERE A KNOWN EFFECTIVE POPULATION SIZE TO CENSUS SIZE (NE/NC) RATIO FOR THIS SPECIES OR A HIGHLY SIMILAR/CLOSELY RELATED SPECIES (E.G. WITHIN THE SAME GENUS AND HAVING THE SAME LIFE HISTORY TRAITS)? *

Try conducting a quick Google Search (or similar) using the search terms "Ne" AND "effective population size" AND [the genus name].

- Yes, a ratio exists for this species.
- Yes, a ratio exists for a highly similar species.
- No

24 TM-23

WHAT CLOSELY RELATED/HIGHLY SIMILAR SPECIES IS THE RATIO BASED ON?

Please write the scientific name.

It is possible that a ratio does not exist for the species being assessed, but might exist for a closely related or highly similar (e.g. sharing many life history traits) species. If so, please note which species the ratio exists for (Q24) and to note the ratio (Q25).

25 TM-23

IF YES (AT THE SPECIES LEVEL), PLEASE PROVIDE THE RATIO.

Use decimals (".") instead of "/". NOTE: A single value per species is recommended; however, if there is some uncertainty in this ratio, a range may be provided.

Q25 is specifically asking for an Ne:Nc ratio at the species level, assuming this should not differ between populations. However, there might be some instances in the literature where different ratios are reported for different populations. This may be the result of different methods or sampling, and as such would be indicative of uncertainty within the ratio. In these instances, please report each value reported, *separated by a semicolon* . Similarly, please report the year(s) that the ratio was established (Q26).

26 TM-23

IN WHAT YEAR WAS THE RATIO ESTABLISHED (SAMPLING, NOT PUBLICATION)? *

Please record all sources for the ratio information. This may be in the form of, but not limited to scientific literature, government reports, websites, or expert consultation. Please separate each source using a semicolon. To enter each source on a different line, click CTRL+Enter at the end of one reference to move the cursor to the next line. If citing scientific literature or reports, the preferred format is *Harvard*style, but any standard format will suffice. If available, please record the DOI as well.

27 TM-22

SOURCE OF RATIO DATA (LITERATURE REFERENCE, WEBSITE LINK, EXPERT CONSULTATION)

Please list all relevant sources used in determining the conversion ratio and provide further information if needed. If it was based on expert consultation, please provide name of expert(s).

28 TO

ANY ADDITIONAL COMMENTS OR NOTES REGARDING THE INFORMATION THAT HAS BEEN PROVIDED ABOVE.

The final question for Section 4 is optional allowing the assessor to provide any further information or clarification on what has been answered between Q20-Q26.

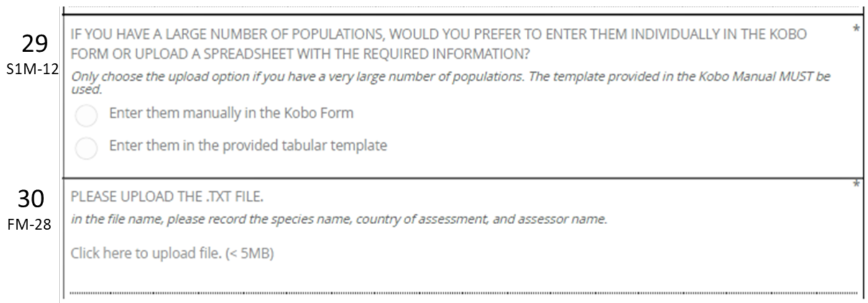
Section 5: Indicator 1 (per population) (Questions 28-49)

The purpose of this section is to provide specific details on population sizes (Ne and Nc) for the number of populations that were indicated in Q12 (Section 3).

If more than 20 extant populations were indicated in Q12, Q29 will appear giving the user the option to either enter individual population information using the Kobo Form (option 1) or submit a tab-delimited document with all required information (option 2). If option 2 is selected, Q29 will allow the user to upload their completed population document. Q31-Q50 will not be presented. In the file name, please record the species name, country of assessment, and assessore name (e.g., Encephalartos-latifrons-bicornis_South-Africa_Jessica-daSilva.txt). After uploading the document the user will be directed to the next Section. *The **template** for this document can be found here.*

NOTE: the document must be saved as tab-delimited (.txt) to assist with downstream processing. .csv and .xls files are not permitted.

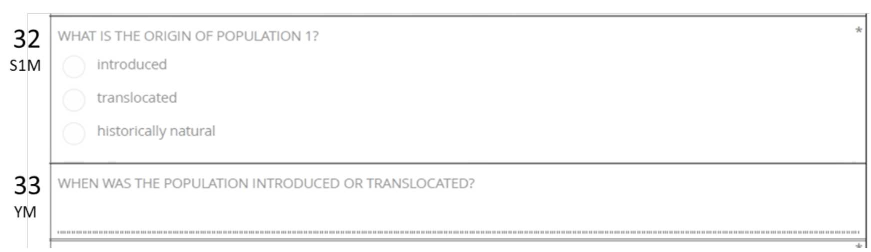
For species with more than 100 populations, Q29 will not be asked; only Q30 will appear allowing you to upload the population document.



If the species has less than or equal to 20 populations OR the user selected option 1 if there are greater than 20 populations, Questions 31-50 may be presented.

While the form allows for up to 100 populations to be assessed, the example of only one population will be provided here. If population names are not known, use a reasonable name based on local governance, landmarks, grid cells, and other such identifying features.

The origin of populations is of importance as it will provide insight into the genetic composition for the species as a whole. It will also help inform Indicator 2 (Section 3) on the number of populations maintained.



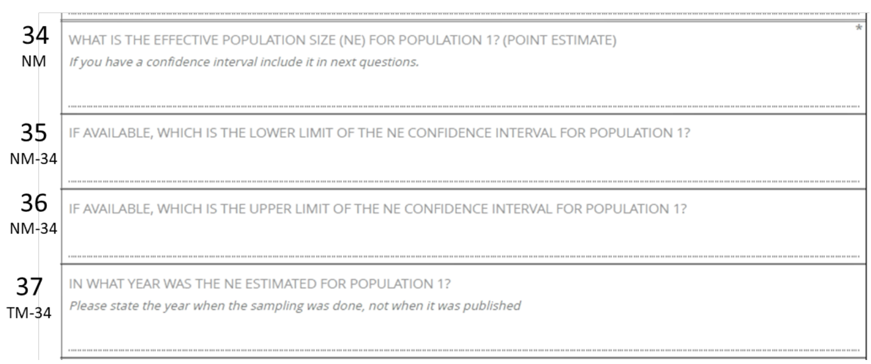
While guidance on scenarios involving introduced and translocated populations are provided in *the Guidance Document*, a few aspects will be discussed here as it may affect how you quantify the number of extant populations for the species. Specifically, in the case of introductions, an assessor must make the determination as to whether a population represents its own 'native' gene pool (e.g. the gene pool that existed prior to the introduction) or whether the population is made of individuals from another population (and/or may have been through bottlenecks, translocations and mixing from other populations). In the latter case, the 'population' is being created in space/ geography, but the original genetic lineage of that space (population A) no longer exists. We consider that in such cases, the genetic composition now at population A's location would not represent the original population A. Thus, the individuals now at location A should be considered as an expanded Nc of the lineage that it is being translocated from (e.g., Population B). This information should be factored into the details of Population B and NOT provided as a separate population or part of Population A. Population A should be considered extirpated as its original genetic composition is not restored. On the other hand, restoration may be taking place with individuals originally obtained from population A and kept ex situ and then used for restoration. In this instance, this population may be considered a translocated Population A. Please clarify these details in Q48.

If multiple estimates of Ne or Nc exist for a given population, and the assessor, to the best of their knowledge, cannot determine which would be the most appropriate or accurate to report on, then the assessor will need to complete the entire Kobo form for the same species again noting these alternative population size estimates. A specific note**MUST** be made on both forms explaining the situation so that evaluators can be made aware and review the records together. The evaluator may then average the available population sizes for that population as a final estimate.

Effective population size

The next questions (Q34-Q41) are related to the effective population (Ne) size data and will only appear if 'Yes' was selected in Q21. Please note that Ne should be provided only as a *point estimate* , with upper and lower confidence limits provided, if available. If Ne is only known for some, but not all populations, please enter **-999** in Q34 for the populations **where Ne is unknown** .

NOTE: The confidence intervals mentioned in Q35 and Q36 are assumed to be the 95% confidence intervals often provided with Ne calculations. However, if a different confidence interval was used, please make note of it in the Additional Comments question at the end of the Section (Q50) (e.g. write "upper and lower confidence intervals were 90%").


34 NM WHAT IS THE EFFECTIVE POPULATION SIZE (NE) FOR POPULATION 1? (POINT ESTIMATE) *
If you have a confidence interval include it in next questions.

35 NM-34 IF AVAILABLE, WHICH IS THE LOWER LIMIT OF THE NE CONFIDENCE INTERVAL FOR POPULATION 1?

36 NM-34 IF AVAILABLE, WHICH IS THE UPPER LIMIT OF THE NE CONFIDENCE INTERVAL FOR POPULATION 1?

37 TM-34 IN WHAT YEAR WAS THE NE ESTIMATED FOR POPULATION 1?
Please state the year when the sampling was done, not when it was published

For Q37, please type the year the sampling was done NOT the year of the publication.

Because Ne can vary depending on the type of marker and analysis used to estimate it, it is important to capture this information (Q38-Q40). It could also help in refining Ne:Nc ratios later on.

38
S1M-34
WHAT GENETIC MARKERS WERE USED TO ESTIMATE NE FOR THIS POPULATION? *
- Whole Genome Sequence data
- SNPs (single nucleotide polymorphisms)
- Microsatellites
- Chloroplast/Mitodondrial DNA
- Other

39
TM-38
IF 'OTHER', PLEASE EXPLAIN.

40
S1M-34
WHAT METHOD WAS USED IN CALCULATING NE FOR THIS POPULATION? *
- Linkage disequilibrium (e.g., LDNE, NeEstimator, SNeP)
- Heterozygosity excess (e.g., NeEstimator)
- Temporal changes in allele frequency (e.g., MLNE, NeEstimator, TempoFS)
- Genetic relatedness [sibship/parentage] (e.g., Colony, NeEstimator)
- Approximate Bayesian Computation (e.g., ONESAMP)

Previously when asked what methods were used to calculate Ne, the assessor had the option of selecting all that applied. However, in this instance it is assumed the Ne being reported for the specific population was calculated using a single method. Hence, in Q40, only one answer is permitted.

41
TM
PLEASE LIST ALL RELEVANT SOURCES REPORTING ON EFFECTIVE POPULATION SIZE FOR THIS POPULATION *
Please separate each source using a semicolon (;).

Please list all sources of information provided for Q34-Q40, separated by a semicolon. To enter sources on separate lines, please click CTRL+Enter at the end of one reference to move the cursor to the next line.

Census size

The next questions (Q42-Q49) are related to population census size (Nc) data. They will only appear if 'Yes' was selected in Q21. It is assumed that the Nc estimates are from visual/expert estimates based on counts of individuals (or models from such counts); however, this might not always be the case. There may in stances, for example, that Nc is based on available habitat and estimates inferred from other known densities, and not actual count data. Please make note of this in Q50 (any additional comments or notes on this population).

Nc can be provided as a range OR point estimate, and there may be instances where Nc is only known for some, but not all populations of a species. *For populations with unknown Nc, select 'point estimate' in Q42, and enter -999 in Q46.*

42
S1M
IF THERE IS A CENSUS POPULATION SIZE (NC) AVAILABLE, IS THIS A RANGE OR POINT ESTIMATE? *
- quantitative range (e.g. "1,000 to 2,000" or "expert says aroung 3,000")
- point estimate (quantitative data with or without confidence intervals)

43
TM-42
IN WHAT YEAR WAS THE NC ESTIMATED FOR POPULATION 1?
Please state the year when the sampling was done, not when it was published

If a quantitative range for Nc was selected in Q42, please select from the options presented in Q44.

44
S1M-42
WHATS THE RANGE OF THE NC FOR POPULATION 1? *

- < 5,000 by much
- < 5,000 but not by much (tens or a few hundred more)
- > 5,000 but not by much (tens or a few hundred more)
- > 5,000 by much
- estimate is a range including both less and greather than 5,000 (e.g. "3,000 to 10,000")

For Indicator 1, interpretation of qualitative or range data is important. The threshold census value is 5000, below which a population is deemed at risk. Information indicating the potential extent below 5000 could be valuable; hence we have provided two options below 5000. The option '<5,000 by much' could indicate severe risk for the population. While both options would classify the population as Nc<5000 for calculating the Indicator 1 metric, this information could be used to assess potential imminent risk. Similarly, for populations with a census size greater than 5000, it would be informative to know if the population is just above 5000 or well above 5000.

The last option (a range that includes a population estimate both greater than and less than 5000) will create difficulty in assigning the population to a side for calculating Indicator 1, but such examples do exist. Record this as XX-XX (e.g. 3000-6000). In such instances, downstream analyses will classify the population as greater than and less than in two different calculations and an average metric using both scenarios will be quantified.

Q45 allows users to enter the specific range referred to in any of the options within Q42. While this question is optional, it is highly recommended that it be completed if a clear range is reported.

43
TO-42
IF A MORE DETAILED RANGE IS AVAILABLE PLEASE ENTER IT HERE.

If a point estimate for Nc is provided, please enter this value, and the upper and lower confidence intervals if available. The confidence intervals are assumed to be the 95% limits; however if a different confidence interval was used, please make a note of it in the Comments question at the end of this Section (Q50).

46
S1M-42
IF KNOWN, WHAT IS THE CENSUS POPULATION SIZE (NC) FOR POPULATION 1? (POINT ESTIMATE) *
If you have a confidence interval include it in next questions.

47
NO-46
IF AVAILABLE, WHICH IS THE LOWER LIMIT OF THE NC CONFIDENCE INTERVAL FOR POPULATION 1?
This should be the lower value of the 95% Confidence Interval. If that is unavailable, please record the confidence interval used (e.g. 90%) in the 'ANY ADDITIONAL COMMENTS OR NOTES' question at the end of the Section.

48
NO-46
IF AVAILABLE, WHICH IS THE UPPER LIMIT OF THE NC CONFIDENCE INTERVAL FOR POPULATION 1?
This should be the upper value of the 95% Confidence Interval. If that is unavailable, please record the confidence interval used (e.g. 90%) in the 'ANY ADDITIONAL COMMENTS OR NOTES' question at the end of the Section.

Please list all sources of information provided for Q42-Q48, separated by a semicolon. To enter sources on separate lines, please click CTRL+Enter at the end of one reference to move the cursor to the next line.

49
TM
PLEASE LIST ALL RELEVANT SOURCES OF CENSUS SIZE INFORMATION (LITERATURE REFERENCE, WEBSITE LINK, EXPERT CONSULTATION) FOR THIS POPULATION *
Please separate sources using a semicolon (;)

The final question for each population in Section 5 is optional, allowing the assessor to provide any further information or clarification on what has been answered between Q28–Q48, such as denoting if Nc was based on habitat data rather than actual counts. Please indicate such details in Q50.

50 TO | ANY ADDITIONAL COMMENTS OR NOTES REGARDING THE INFORMATION THAT HAS BEEN PROVIDED OR WHY IT COULD NOT BE FOR POPULATION 1?

Section 6: Modified Indicator 1 for the Entire Species Within the Country of Assessment (Questions 51-57)

This section will only appear if you answered "No, but Census size data does exist for the species as a whole " in Q19, Section 4. *This section should not be completed if individual population size data exists* . The questions presented here are identical to the census size questions asked for each population in Section 5 (Q40-46), but these*specifically relate to the entire species within the country* .

For some species, whole species count estimates are available, but not for individual populations (as is sometimes found in the IUCN Red List Assessments). This information can still be valuable, especially if it is already known that the entire species census size is under 5000 mature individuals, which would indicate the species (and each of its population) are at risk. Even if an exact (point estimate) is unknown, a general range may be available. Knowing whether a species is close to or far from 5000 mature individuals would also be informative in estimating risk.

For transboundary species, where a total species count is known, but no specific count exists for the country of the assessment, please estimate a census count by taking the proportion of the species within the country of assessment (Q68 below, Section 8) and multiplying it by the total species count. For example, 25% of species A exists in the assessment country, and the total (global) species count is estimated at 30 000. The estimate for this country will be report as 0.25*30 000 = 7 500. We acknowledge this is an estimation. To be sure it is flagged properly for analysis, please be sure to fill in Q65 and Q68 about the transboundary nature of the species, and make a comment in Q57 as follows: "Species census in country estimated based on X% range in the country.".

49 S1M — CENSUS SIZE - IS THIS A RANGE OR POINT ESTIMATE? *

- ○ quantitative range (e.g. "1,000 to 2,000" or "expert says aroung 3,000")
- ○ point estimate (quantitative data with or without confidence intervals)

50 S1M-49 — WHAT IS THE RANGE OF NC FOR THE SPECIES? *

- ○ < 5,000 by much
- ○ < 5,000 but not by much (tens or a few hundred more)
- ○ > 5,000 but not by much (tens or a few hundred more)
- ○ > 5,000 by much
- ○ estimate is a range including both less and greather than 5,000 (e.g. "3,000 to 10,000")

51 TO-49 — IF A MORE DETAILED RANGE IS AVAILABLE, PLEASE ENTER IT HERE.

52 NM-49 — WHAT IS THE CENSUS SIZE (NC) FOR THE SPECIES? (POINT ESTIMATE) *

If you have a confidence interval include it in next questions. Leave blank if Nc was not quantitatively estimated.

53 NO-52 — IF AVAILABLE, WHICH IS THE LOWER LIMIT OF THE NC CONFIDENCE INTERVAL FOR THE SPECIES?

This should be the lower value of the 95% Confidence Interval. If that is unavailable, please record the confidence interval used (e.g. 90%) in the 'ANY ADDITIONAL COMMENTS OR NOTES' question at the end of the Section.

54 NO-52 — IF AVAILABLE, WHICH IS THE UPPER LIMIT OF THE NC CONFIDENCE INTERVAL FOR THE SPECIES?

This should be the upper value of the 95% Confidence Interval. If that is unavailable, please record the confidence interval used (e.g. 90%) in the 'ANY ADDITIONAL COMMENTS OR NOTES' question at the end of the Section.

55 TM — IN WHAT YEAR WAS NC ESTIMATED FOR THE SPECIES? *

Please state the year when the sampling was done, not when it was published

56 TM — SOURCE OF SPECIES CENSUS SIZE INFORMATION (LITERATURE REFERENCE, WEBSITE LINK, EXPERT CONSULTATION) *

Please list all relevant sources used in acquiring the species information separated by a semi-colon (;) and upload all documents to a species specific folder in your countries folder within the Data Collection folder of the Google Drive. If information was based on expert consultation, please provide name of expert(s).

57 TO — ANY ADDITIONAL COMMENTS OR NOTES WITH RESPECT TO THE INFORMATION PROVIDED IN THIS SECTION.

E.g., record the confidence interval used for the point estimate if not 95%.

Section 7: Indicator 3 (Questions 58-61)

Questions in this section will contribute towards Indicator 3 (number of species and

populations in which genetic diversity is being monitored using DNA based methods within the country). This indicator is calculated as a count of studies that use DNA data sampled within the country to help managers assess genetic status and choose appropriate actions, such as studies of genetic connectivity, hybridization, adaptation, and mating patterns. *Note* that these studies can sometimes use data from different countries (e.g. genetic monitoring of populations of transboundary species), so please ensure that at least some of the samples used are for the species within the country of assessment. Phylogenetic studies would refer to studies with many species and typically only a few samples for the focal species. This of course can provide useful information for conservation (e.g., clarifying species boundaries). However, as above, please ensure that some of the samples reported in the phylogenetic study are from the species within the country being assessed. Most other studies would fall under 'population level' studies. It can be included even if only one population is studied.

Temporal studies refer specifically to sampling and analysis that occurred at two time points, typically separated by one or more generations or cohorts (e.g. reflecting genetic change over time).

58
S1M
HAVE GENETIC STUDIES BEEN CONDUCTED INVOLVING THE SPECIES? *
- Yes, but only phylogenetic/phylogeographic studies.
- Yes, but only population-level studies.
- Yes, both phylogenetic and population studies.
- No

59
S1M
HAS TEMPORAL GENETIC MONITORING BEEN CONDUCTED FOR ONE OR MORE POPULATIONS OF THIS SPECIES? *
A temporal comparison using at least two time points of various genetic diversity metrics for the species.
- Yes
- No
- Unknown

60
S1M-59
IF YES, WHAT YEARS DID THIS TAKE PLACE? *

61
S1M-58/59
PLEASE CITE ALL DATA SOURCES FOR THE GENETIC STUDIES (LITERATURE REFERENCE, WEBSITE LINK, EXPERT CONSULTATION) SEPARATED BY A SEMI-COLON (;) AND UPLOAD ALL AVAILABLE DOCUMENTS IN A SPECIES SPECIFIC FOLDER IN THE PROJECT GOOGLE DRIVE (IN THE DATA COLLECTION FOLDER). *

Section 8: Other Species Information (Questions 62-92)

Important Note: **For transboundary species, answer the questions in relation to the country of assessment and NOT for the species entire range.**

Answers to the questions in this section may be used in several ways. They may be used to disaggregate the indicators (e.g. report indicator values separately by habitat type, lifespan, threat status, or taxonomic group). They may also help refine metrics, such as the Ne:Nc ratio. Lastly, they provide the country with understanding of bias in the type of species being assessed (e.g., threatened status, life history classifications) which could be important to countries in their national reporting and future efforts. As such, the majority of these questions are mandatory to fill in. However, if the information cannot be found during completion of the assessment (e.g., the information is not provided in the reports/ literature/ databases consulted), *it is perfectly acceptable to mark the questions as Unknown* . Do not spend an unreasonable amount of time searching for this information for each species.

Habitat Data

62
S+M
REALM *
Select all that apply
- Marine
- Estuarine
- Freshwater
- Terrestrial

Four geographic realms are recognized; however some species might utilize/inhabit more than one realm. For example, many species of amphibians exist in the terrestrial and freshwater realms. Similarly, anadromous fish utilize freshwater and marine realms at different stages of their lives. Please select all realms that would apply to your species within the assessment country.

Within each of the four realms, species might occur in one or more major habitat types. The ones listed below are taken from the*IUCN Habitat Classification Scheme*. If a species has been assessed for IUCN's Red

List, all related habitat types will be listed in the Habitat and Ecology section of the report. For a detailed explanation on each habitat type and the sub-types within them, please consult the link above. For species that have not been Red Listed, please try to select the closest match for your species following the Habitat Classification Scheme.

63
S+M

IUCN HABITAT CLASSIFICATION *

IUCN (2012) IUCN Habitat Classification Scheme. https://www.iucnredlist.org/resources/habitat-classification-scheme. Select all that apply.

- [ ] Forest & Woodland
- [ ] Savanna
- [ ] Shrubland
- [ ] Grassland
- [ ] Wetland
- [ ] Rocky Area
- [ ] Caves & Subterranean habitat
- [ ] Desert
- [ ] Marine-Neritic
- [ ] Marine-Oceanic
- [ ] Marine-Deep Ocean Floor
- [ ] Marine-Intertidal
- [ ] Marine-Coastal/Supratidal
- [ ] Unknown/Other

Because the habitat types listed above are broad groups, you may include additional habitat (e.g., sub-type) information. For example, within IUCN's Habitat Classification Scheme the Wetland habitat type encompasses streams, rivers, and lakes, among others; and areas such as beaches fall within Marine Intertidal, while sand dunes fall within Marine Coastal/Supertidal. Providing this finer habitat detail is welcome here.

64
TO

OTHER HABITAT DATA

Please feel free to elaborate further on the habitat of the species. E.g., Wetland may be broken down further into streams/rivers, lakes, etc.

Distribution

Endemic species are clearly within the purview of national reporting, and are likely to be more straightforward to assess for the proposed genetic indicators than more widespread, transboundary species. However, the inclusion of international, migratory and.or oceanic species is still important.

65
S1M

IS THIS SPECIES A NATIONAL ENDEMIC? *

- ○ Yes
- ○ No

If a species is not a national endemic, additional questions will appear relating to the transboundary nature of the species.

Because the transboundary nature of a species might be explained by more than one of the options listed below (e.g., whales), please select all that apply.

66
S+M-66

IF NO, PLEASE SELECT THE TRANSBOUNDARY NATURE OF THE SPECIES. *

- Present in more than 1 country
- Migratory
- Oceanic
- Other

67
TM-66

IF OTHER, PLEASE EXPLAIN. *

For Q68, if the species is migratory, *occurs* refers to where the species breeds and/or spends most of its time. It is ok to make a 'best guess' for this question. If you really have no idea, choose Unknown.

68
S1M

WHAT PROPORTION OF THE SPECIES RANGE OCCURS WITHIN THE ASSESSMENT COUNTRY? *

- Less than 10%
- 10-25%
- 25-50%
- 50-75%
- 75-99%
- Unknown

Range

Note: **Please remember to only consider *the range of the species within the country of assessment.***

The range of a species may be classified as wide-ranging or restricted and/or rare. Each range type can impact on the effective size of species' populations and therefore it is important to understand how species are distributed.

While wide-ranging species are often assumed to be common (and in many instances they are), some species are distributed widely, but occur in scattered, small populations (e.g., *Aloe framesii, Aloe kniphofioides* in South Africa), and are thus "rare". To disentangle this information, the extent and rarity of species distributions are asked separately.

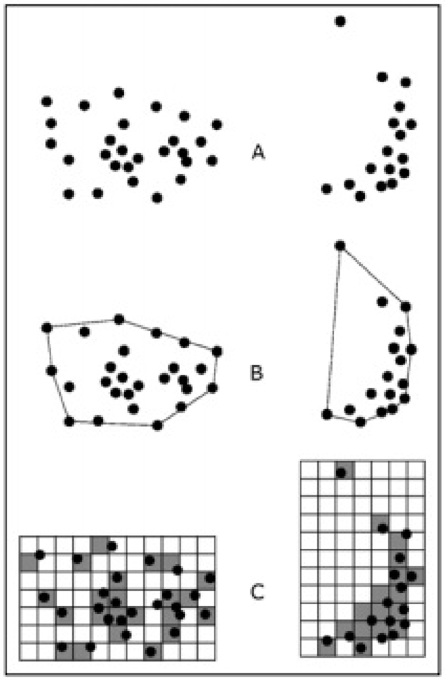


Figure 2. Two examples of the distinction between extent of occurrence and area of occupancy. (A) is the spatial distribution of known, inferred or projected sites of present occurrence. (B) shows one possible boundary to the extent of occurrence, which is the measured area within this boundary. (C) shows one measure of area of occupancy which can be achieved by the sum of the occupied grid squares.

We use the following definitions:

- Extent of occurrence (EOO; as defined by the IUCN) is the general region a species occurs in, including all known, inferred or projected sites. It is calculated as the area of a convex hull around the whole distribution- basically a polygon around the whole range. EOO reflects large or small distribution.
- Area of Occurence (AOO) is the area within its EOO which is actually occupied by a taxon. It is calculated as the area of the sum of grid cells a species occurs in. AOO reflects how often you find the species within its large distribution
- Wide-ranging species have an EOO $>$ 20 000 km^2 following IUCN's Criterion B1 or are present in $>$ 1/3 of a country's 20-km grid squares (following Katayama et al. 2014 in PLoSOne).
- Restricted species are those with an EOO $<$ 20 000 km^2 or an AOO $<$ 2 000 km^2. A list of restricted species compiled using KBA criteria (i.e.IUCN Criteria B2) can be found online from*https://www.keybiodiversityareas.org/working-with-kbas/proposing-updating/criteria-tools*; however, it is recognized that not all restricted species will be included in this list.
- Rare species must meet at least one of the three criteria (see Rabinowitz 1981):
- Restricted range: EOO $<$500 km^2, OR
- Habitat specialist: restricted to a specialized microhabitat so that it has a very small AOO (typically smaller than 20 km^2), OR
- Low densities of individuals: always occurs as single individuals or very small subpopulations (typically fewer than 50 mature individuals) scattered over a wide area

In addition, we ask if the species is naturally (historically) rare or recently rare due to anthropogenic influences (i.e., threats) (Q70).

69 S1M

SPECIES RANGE *

Wide-ranging: an EOO greater than 20 000 km2 (based on IUCN Criterion B1) or present in more than one-third of a country's 20-km grid squares (following Katayama et al. 2014 PLoSOne study). Restricted: an EOO < 20 000 km2 or an AOO < 2 000 km2. A list of restricted species compiled using KBA criteria (i.e.IUCN Criteria B2) can be found online from https://www.keybiodiversityareas.org/working-with-kbas/proposing-updating/criteria-tools; however, it is recognized that not all restricted species will be included in this list.

- ◯ Wide-ranging
- ◯ Restricted (i.e., narrow)
- ◯ Unknown

70 S1M

IS THE SPECIES RARE? *

Rare: Low densities of individuals: Species always occurs as single individuals or very small subpopulations (typically fewer than 50 mature individuals) scattered over a wide area

- ◯ Yes - naturally rare
- ◯ Yes - recently rare (anthropogenic effect)
- ◯ No

If available, please provide the EOO and AOO of the species in the country being assessed in kilometers squared (km^2). You can sometimes find this in National IUCN Red List Assessments. *For transboundary species, please report only on the EOO and AOO within the country of assessment.* If you cannot find or calculate this information, you may skip this question.

71 TO

EXTENT OF OCCURRENCE

If a point estimate is not available, please enter a range value.

72 TO

AREA OF OCCURRENCE

If a point estimate is not available, please enter a range value.

Q73 asks about the level of population fragmentation in the species *within the assessment country* . While this might be inferred from EOO and AOO, a classification would be helpful. This information could inform the number of populations (or meta-populations) for the species.

73 S1M

LEVEL OF POPULATION FRAGMENTATION *

As per IUCN definition, severely fragmented means that more than half of the species' total AOO is in habitat patches that are (1) smaller than would be required to support a viable population, and (2) separated from other habitat patches by a large distance. Moderately fragmented refers to a species with less than half of its AOO in habitat patches.

- ◯ Severely fragmented
- ◯ Moderately fragmented
- ◯ None (continuous population)
- ◯ Unknown

If additional information exists on the species range, please include it as additional information (Q74).

74 TO

ADDITIONAL INFORMATION ON SPECIES RANGE.

Feel free to include other specific information on the range of the species.

Conservation Status

If a species has been assessed using IUCN's Red List criteria, globally and/or nationally, please enter the current Red List status for the species, under Q75 for global and Q76 for national or regional.

75 S1M — GLOBAL RED LIST CATEGORY (IUCN) *

- ◯ Critically Endangered (CR)
- ◯ Endangered (EN)
- ◯ Vulnerable (VU)
- ◯ Near Threatened (NT)
- ◯ Least Concern (LC)
- ◯ Data Deficient (DD)
- ◯ Not assessed

76 S1M — NATIONAL RED LIST CATEGORY *

- ◯ Critically Endangered (CR)
- ◯ Endangered (EN)
- ◯ Vulnerable (VU)
- ◯ Near Threatened (NT)
- ◯ Least Concern (LC)
- ◯ Data Deficient (DD)
- ◯ Not assessed
- ◯ Unknown

We recognize that many, but not all species, have been assessed according to IUCN's Red List criteria, and that some countries have their own status system (including with legislation at national or state/ province levels). If this applies to the species being assessed, please record the conservation designation for the species (e.g. G1, Threatened, Species of Concern) (Q77), as well as the name of the national/regional assessment (e.g. NatureServe, USA Endangered Species Act) (Q78).

77 TO — OTHER SPECIES STATUS ASSESSMENT(S)

Please write the species conservation status as recognized by all other assessments or the status range in instances where different classifications are provided for different regions, states, provinces or a country. Please separate all entries with a semicolon (;).

78 TO — NAME OF OTHER ASSESSMENT(S)

If multiple assessments are available, please list all following the order in the previous question. Separate each with a semi-colon (;)

If multiple assessments are available for a species (e.g., both NatureServe and USA Endangered Species Act OR different assessment between States, Provinces, Regions), please enter the details of all in Q77 and Q78, separating each item with a semicolon, and in the same order for Q77 and Q78.

For example , Species X was classified as G1 under Natureserve and Threatened under USA Endangered Species Act. The entry for Q78 would be 'G1; Threatened'; and the entry for Q79 would be 'Natureserve; USA Endangered Species Act'.

To ensure all data associated with the species' distribution and status is recorded, please provide all relevant sources of information used to compile the information entered. This may be in the form of, but not limited to, scientific literature, government reports, websites, or expert consultation. Please separate each source with a semicolon (;). You may also choose to enter each source on a different line. To do this, click CTRL+Enter at the end of one reference to move the cursor to the next line.

79
TM

SOURCE OF SPECIES STATUS AND DISTRIBUTION (LITERATURE REFERENCE, WEBSITE LINK, EXPERT CONSULTATION) *

Please list all relevant sources used in acquiring the species information separated by a semicolon (;) and upload all documents to a species specific folder in your countries folder within the Data Collection folder of the Google Drive. If information was based on expert consultation, please provide name of expert(s).

Life History Traits

Life history traits that are known to affect Ne are fecundity, reproductive strategy and age of adults. If this information is unknown for the species being assessed, but it is available for a closely related species, please answer the life history questions based on the closely related species, and record these details in Q90 & Q91.

80
S1M

LIFE HISTORY TRAIT - FECUNDITY (NUMBER OF OFFSPRING PER YEAR) *

- ◯ < 1
- ◯ 1-2
- ◯ 3-5
- ◯ 6-10
- ◯ 10s
- ◯ 100s
- ◯ 1 000s
- ◯ 10 000s
- ◯ 100 000s
- ◯ >100 000s
- ◯ Unknown
- ◯ Not applicable (e.g., semelparous)

81
NM-80

IF SEMELPAROUS, HOW MANY OFFSPRING ARE PRODUCED IN A SINGLE EVENT?

82
S+M

LIFE HISTORY TRAIT - REPRODUCTIVE STRATEGY *

Please select all that apply

- [ ] Sexual
- [ ] Cross-pollination
- [ ] Asexual
- [ ] Self-pollination
- [ ] Vegetative
- [ ] Clonal
- [ ] Oviparous
- [ ] Viviparous
- [ ] Semelparous
- [ ] Iteroparous
- [ ] Other

83
TM-82

IF OTHER, PLEASE LIST

The next set of questions (Q84-Q89) inquire about the age of adults for the species being assessed. Because various metrics relating to this may be known or reported, Q85 asks the user to select any and all that might apply for the species. Q86-Q89 will then appear based on the selections made in Q84.

84
S1M

LIFE HISTORY TRAIT - AGE OF ADULTS

What data exists relating to the age of adults? Please select all that apply.

- [ ] Maximum lifespan
- [ ] Median lifespan
- [ ] Age at maturity (first reproduction)
- [ ] Other
- [ ] Unknown

85
TM-84

IF OTHER, PLEASE LIST

86
S1M-84

LIFE HISTORY TRAIT - WHAT IS THE SPECIES' MAXIMUM LIFESPAN? *

- < 1 year
- 1-5 years
- 6-10 years
- 11-25 years
- 26-50 years
- 51-100 years
- > 100 years
- Unknown

87
S1M-84

LIFE HISTORY TRAIT - WHAT IS THE SPECIES' MEDIAN LIFESPAN? *

- < 1 year
- 1-5 years
- 6-10 years
- 11-25 years
- 26-50 years
- 51-100 years
- > 100 years
- Unknown

88
S1M-84

LIFE HISTORY TRAIT - WHAT IS THE SPECIES' AGE AT MATURITY? *

- < 1 year
- 1-5 years
- 6-10 years
- 11-25 years
- 26-50 years
- 51-100 years
- > 100 years
- Unknown

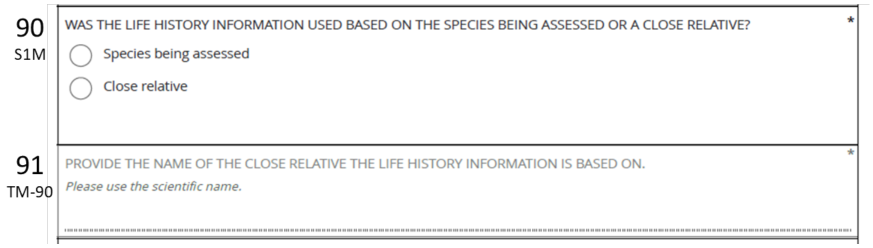
89
S1M-84

LIFE HISTORY TRAIT - WHAT IS THE SPECIES' AGE? *

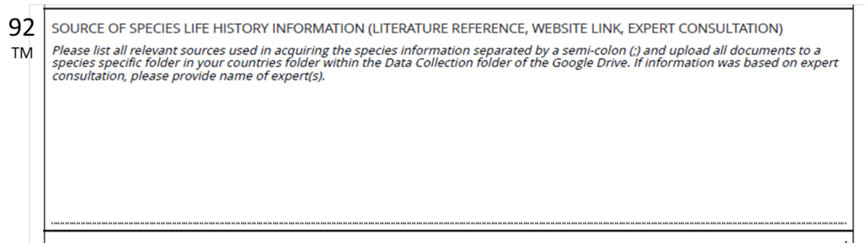
- < 1 year
- 1-5 years
- 6-10 years
- 11-25 years
- 26-50 years
- 51-100 years
- > 100 years
- Unknown

Q89 will only appear if the assessor chooses 'Other' in Q84; therefore, the 'Species' Age' refers to whatever metric the assessor has found (i.e., different from the options listed in Q84) and has chosen to report on. This age metric will be specified in Q85.

Indicate the species on which the above life history information (Q80-Q89) was based.



Please provide all relevant sources of information used to compile the information entered. This may be in the form of, but not limited to scientific literature, government reports, websites, or expert consultation. If you selected unknown for any of the life history traits, but have this information for a close relative, please provide those details here. To enter each source on a different line, click CTRL+Enter at the end of one reference to move the cursor to the next line. See note above about citation format.



How to save assessments

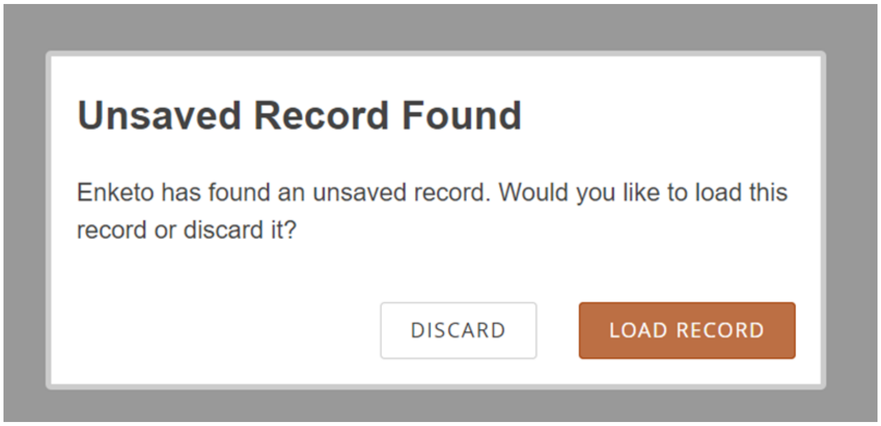
If you are unable to complete the form during one session, please be sure to click *Save Draft* .

If you experienced internet problems, which caused you to lose your entry, before starting over please reopen the Kobo form and follow the instructions under *Accessing Saved and Unsaved Drafts* .

Once information for all populations have been entered, please click Submit.

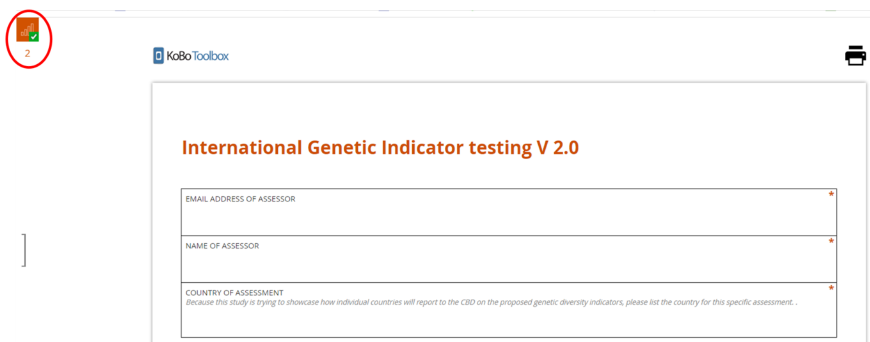
Accessing Saved and Unsaved Drafts

If you saved an assessment (because you could not complete it in one session or were not connected to internet), you can reload the assessment by going to the form link. A pop up should appear informing you of your unsaved (unsubmitted record).

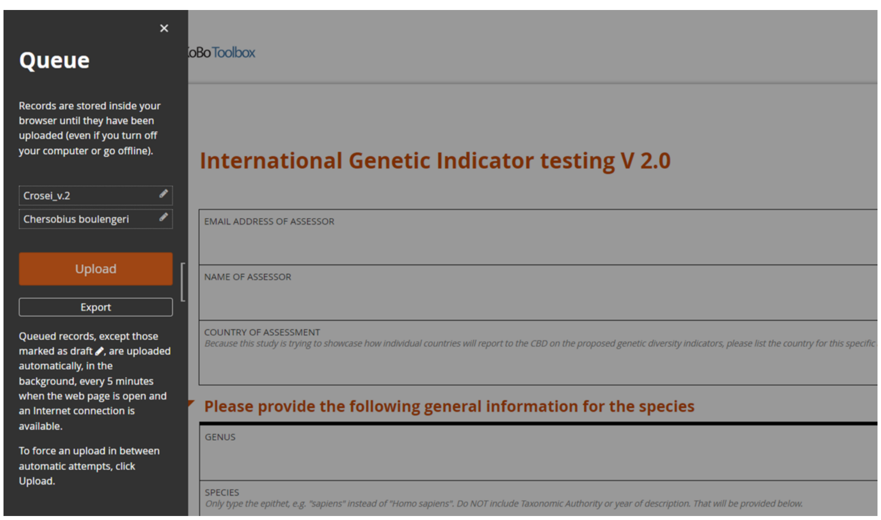


Click on Load Record. This should load the last form you were working on.

However if you cannot see your input, move your cursor to the small number on the top left of your screen.



Left click on the number and a list of queued records will appear.



Click on the record you want to complete. Once all areas have been entered, click submit (as shown above).