**Biodiversity Audit II analysis questions by subject**

The following suggested analysis refer to subjects rather than questions with exact wording because this approach leave flexibility for users to extract information relevant to their needs and scale.

1. **Trend by biodiversity asset** (measures of change in condition over time). This question cumulatively addresses questions regarding which biodiversity assets have increased/decreased/remained static and why and provides counts and totals (from which it is possible to then display graphically and or as proportions) for either whole of State or individual subregions. For species, the most informative metrics are numbers of populations and mature individuals whereas for ecological communities these are number of occurrences and area of occupancy.

|  | **Threatened flora** | | **Threatened fauna** | | **Threatened/priority ecological communities** | |
| --- | --- | --- | --- | --- | --- | --- |
| **Trend** | Number of populations | Number of mature individuals | Number of populations | Number of mature individuals | Number of occurrences | Area of occupancy |
| **Loss (pressures > recovery actions)** | 52 details | 117 details | 25 details | 56 details | 11 details | 59 details |
| **Loss (new knowledge - taxonomy)** | 13 details | 18 details | 9 details | 10 details | N/A | N/A |
| **Loss (new knowledge - reclassification of community)** | N/A | N/A | N/A | N/A | 3 details | 5 details |
| **Static (increases = losses)** | XX details | XX details | XX details | XX details | XX details | XX details |
| **Static (no change)** | XX details | XX details | XX details | XX details | XX details | XX details |
| **Increase (new knowledge - biological survey)** | XX details | XX details | XX details | XX details | XX details | XX details |
| **Increase in occurrences (new knowledge - reclassification of community)** | N/A | N/A | N/A | N/A | XX details | XX details |
| **Increase (new knowledge - taxonomy)** | XX details | XX details | XX details | XX details | XX details | XX details |
| **Increase (recovery actions > pressures)** | XX details | XX details | XX details | XX details | XX details | XX details |
| **Large fluctuations** | XX details | XX details | XX details | XX details | N/A | N/A |
| **Unknown** | XX details | XX details | XX details | XX details | XX details | XX details |
| Total number (sum) | 415 | 415 | 210 | 210 | 350 | 350 |

When the user clicks on details, it would just display the relevant list of biodiversity assets (scientific name, common name, community ID, community name) and possibly a notes field and/or reference as well. Trends for wetlands include more simplistic measures for biotic and abiotic components which do not fit with this framework but could be done separately.

1. **Trend across range.** This question allows the user to select a biodiversity asset and examine summary trend information across the whole range, and put trends in context and allows decisions to be made about where to target recovery actions. This table could also include EOO/AOO trend or link to threats/management? This analysis is only relevant for biodiversity assets found in more than one subregion but there could be some behind the scenes fix which would ensure assets which only occur in one subregion have appropriate notes.

Selection box: biodiversity asset

| **Subregion** | **Trend in number of populations/occurrences** | **Notes** | **Number of mature individuals** | **Notes** |
| --- | --- | --- | --- | --- |
| Western Australia | Increase in populations (new knowledge - biological survey) | Explanatory text xyz | Declining (pressures > recovery actions) | Explanatory text xyz |
| AVW02 | Static (increases = losses) | Explanatory text xyz | Large fluctuations | Explanatory text xyz |
| MAL02 | Static (no change) | Explanatory text xyz | Declining (pressures > recovery actions) | Explanatory text xyz |
| JAF02 | Static (no change) | Explanatory text xyz | Declining (pressures > recovery actions) | Explanatory text xyz |
| WAR01 | Loss of populations (pressures > recovery actions) | Explanatory text xyz | Declining (pressures > recovery actions) | Explanatory text xyz |
| ESP01 | Increase in populations (new knowledge - biological survey) | Explanatory text xyz | Unknown | Explanatory text xyz |
| ESP02 | Increase in populations (recovery actions > pressures) | Explanatory text xyz | Increasing (recovery actions > pressures) | Explanatory text xyz |

1. **Past pressures and future threats by biodiversity asset.** Serge has already written the code for analysis of dominant past pressures by subregion by asset. The suggested approach builds on this info (ie. provides additional and different info) and allows the user to select either whole of State or individual subregions to determine the top five (for example) threats for each biodiversity asset. This question addresses the landscape level pressures which currently affect threatened species and ecological communities and the addition of future threats provides direction on planning needs (numbers in blue are the count). In most cases, the list of past pressures and future threats is quite similar, with the important exception of development projects which are planned/possible but have not occurred yet. Another option would be to include all the past pressures and future threats (ie. including those which affect very few biodiversity assets) but the table would be very long.

|  | **Threatened flora** | | **Threatened fauna** | | **Threatened/priority ecological communities** | | **Wetlands** | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Pressure/threat category (top 5 for each type of asset)** | Past pressure (2002-2013) | Future threat (2013 to 2033) | Past pressure (2002-2013) | Future threat (2013 to 2033) | Past pressure (2002-2013) | Future threat (2013 to 2033) | Past pressure (2002-2013) | Future threat (2013 to 2033) |
| Vegetation dieback (specify) | 22 details | 22 details | 25 details | 25 details | 18 details | 18 details |  |  |
| Weeds (specify dominant spp) | 26 details | 26 details |  |  |  |  |  |  |
| Fire regime (intensity, frequency, seasonality, scale) | 58 details | 58 details | 43 details | 43 details | 32 details | 32 details | 15 details | 15 details |
| Livestock farming (specify) | 30 details | 30 details | 15 details | 15 details | 27 details | 27 details | 17 details | 17 details |
| Exploration | 29 details |  |  |  | 22 details |  |  |  |
| Mining |  | 29 details |  |  |  | 22 details |  |  |
| Invasive/introduced predators (specify) |  |  | 30 details | 30 details |  |  |  |  |
| Invasive/introduced omnivores (specify) |  |  | 19 details |  |  |  |  |  |
| Climate change (long-term reduced rainfall) |  |  |  | 19 details |  |  |  |  |
| Water abstraction (specify) |  |  |  |  | 29 details |  | 32 details | 32 details |
| Pollution (agriculture) |  |  |  |  |  |  | 44 details | 44 details |
| Urban development |  |  |  |  |  |  | 28 details | 28 details |

When the user clicks on details, it would just display the relevant list of biodiversity assets (scientific name, common name, community ID, community name, wetland name, wetland location) and possibly a notes field and/or reference as well.

1. Counts of management actions by subregion or biodiversity asset are not informative as they do not provide issue on the priority (eg. taxa A has 3 management actions listed while taxa B has 27 actions listed but this means little in terms of the importance or difficulty of each). However the number/list of biodiversity assets requiring each type of action is much more useful for planning. Some management actions, notably research and recovery planning occur at whole range scale, while others are relevant at individual population level. The approach below enables analysis of biodiversity assets grouped according to management requirements at relevant scales.

**Research and conservation planning (whole of State scale):**

|  | **Threatened flora** | **Threatened fauna** | **Threatened/priority ecological communities** | **Wetlands** |
| --- | --- | --- | --- | --- |
| SC i.a) Taxonomic work to describe patterning/variability to assist alpha taxonomy | XX details | XX details | XX details | N/A |
| SC i.b) Nomenclature | XX details | XX details | XX details | N/A |
| SC ii) Phylogeography & genetic variation/structuring | XX details | XX details | XX details | N/A |
| SC iii) Determination/re-evaluation of conservation status/formal classification | XX details | XX details | XX details | XX details |
| IN i) Vegetation mapping (specify scale) | XX details | XX details | XX details | XX details |
| etc |  |  |  |  |

When the user clicks on details, it would just display the relevant list of biodiversity assets (scientific name, common name, community ID, community name, wetland name, wetland location), specify and possibly a notes field and/or reference as well.

**Evaluation, direct management and indirect management**

|  | **Threatened flora** | **Threatened fauna** | **Threatened/priority ecological communities** | **Wetlands** |
| --- | --- | --- | --- | --- |
| MD i) Fire management for biodiversity (specify) | XX details | XX details | XX details | XX details |
| MD ii) Weed control or eradication | XX details | XX details | XX details | XX details |
| MD iii) Predator control or eradication | XX details | XX details | XX details | XX details |
| MD iv) Herbivore/omnivore control or eradication | XX details | XX details | XX details | XX details |
| MD v) Pathogen control or eradication (specify) | XX details | XX details | XX details | XX details |
| MI i) Habitat protection through formal conservation reservation (specify) | XX details | XX details | XX details | XX details |
| MI ii) Habitat protection through other statutory mechanisms (specify) | XX details | XX details | XX details | XX details |
| MI iii) Habitat management through informal or complementary conservation mechanisms (specify) | XX details | XX details | XX details | XX details |
| MI iv) Habitat management through whole of landscape management approach (specify) | XX details | XX details | XX details | XX details |
| MI v) Ex-situ conservation (specify) | XX details | XX details | XX details | XX details |
| MI vi) Biosecurity measures – pre-border (risk analysis) (specify) | XX details | XX details | XX details | XX details |
| MI vii) Biosecurity measures – border (inspections, regulatory control) (specify) | XX details | XX details | XX details | XX details |
| MI viii) Biosecurity measures – post border (surveillance) (specify) | XX details | XX details | XX details | XX details |
| MI ix) Regulation - Water allocation | XX details | XX details | XX details | XX details |
| MI x) Regulation - Native vegetation clearing/pollution | XX details | XX details | XX details | XX details |
| MI xi) Regulation - environmental impact assessment | XX details | XX details | XX details | XX details |
| MI xii) Planning processes | XX details | XX details | XX details | XX details |
| MI xii) Assessment of compliance to approval/conditions/land use under legislation and/or enforcement of legislation | XX details | XX details | XX details | XX details |
| etc |  |  |  |  |

However in this case, when the user clicks on details, display would be more detailed as the biodiversity assets (scientific name, common name, community ID, community name, wetland name, wetland location) and accompanying specify field, subregion and possibly a notes and/or reference are important.