**Supplementary Table 1. Modified Animal Welfare Assessment Grid: Welfare Scoring for Physical Sections**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| General condition | Clinical assessment | Faeces | Activity | Food and drinks |
| Weight, condition, coat/feather condition | Score | Injury, alopecia, vomiting and other clinical symptoms | Score | Faecal consistency | Score | Activity level, mobility | Score | Not eating/drinking or reported hungry/thirsty | Score |
| Weight within normal range and good condition and coat/feather condition. | 1 | Clinically healthy; no injuries | 1 | formed | 1 | Normal | 1 | Normal | 1 |
| Weight outside normal range by <10%. And/or a minor reduction in coat/feather condition | 3 | Mild transient subclinical/clinicalSymptoms, minor injury | 3 | Soft | 3 | Increased activity or slight reduction in activity | 3 | Food/water intake reduced,or reported hungry for twoto three days | 2 |
| Weight outside normal range by<20%. r a substantialreduction in coat/feathercondition. | 5 | Mild-to-moderate clinical disease | 5 | Loose | 5 | Sizeable increase ordecrease in activity thatshows some recovery | 5 | Food/water intake reduced for 1~2 days or reported hungry for 2~6 days | 3 |
| Weight outside normal range by<30% | 7 | Moderate clinical disease or injury | 7 | Loose | 7 | Sizeable increase ordecrease in activit | 7 | Food/water intake reducedor reported hungry for morethan 7days | 4 |
| Weight outside normal range by>30% | 9 | Severe disease with clinical symptomsor severe injury | 9 | Very loose | 9 | Minimal movement, Lethargy or signsof hyperactivity | 9 | Animal reported very thirstyor dehydrated for 1~2 dayor anorexic for 1~2 day | 9 |
| Weight outside normal range by>30% and over/under conditionfor >21 days. | 10 | Severe disease with clinical signs and/or severe injury, and no chance of full ormoderate recovery | 10 | Soft to very loosewith the presenceof blood and/ormucus. | 10 | Complete lethargy | 10 | Animal reported very thirstyor dehydrated for three daysor anorexic for three days | 10 |

**Supplementary Table 2. . Modified Animal Welfare Assessment Grid: Welfare Scoring for Psychological Sections**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Abnormal behaviours | Response to catching event | Social status | Enrichment | Aversion to ‘normal’ events | Training |
| Automutilation, regurgitation, stereotypies | S\* | Trained/ habituated, catching method | S | Hierarchy upset/dispute, aggression/bullying | S | Includes food-based enrichment | S | Trained/ habituated, emotional expression | S | Expression,participation | S |
| None | 1 | Trained/habituated animal, nostress or fear | 1 | None | 1 | Multiple types/items of enrichment provided, all used well | 1 | Trained/habituatedanimal, nonenoted | 1 | Animal participated wellwith the session | 1 |
| Low~medium frequency, minimaltime spend, no damage done | 3 | Trained/habituated animal, some stress or fear noted; caught without intervention;possible multiple attempts | 3 | Some present in thegroup, short duration, | 3 | Multiple enrichment provided, someused well | 3 | Trained/habituatedanimal, somestress or fearnoted | 3 | Some stress or fear noted or notraining took place | 3 |
| Medium~high frequency, sometime spend, no damage done | 5 | Non-habituated animal, stress or fear noted; caught by crushor box | 5 | Some present in the group, short to medium duration, | 5 | Enrichmentprovided, some use | 5 | Untrained/Some stress or fear noted;possibleaggression | 5 | Some stress or fearnoted associated withthe training session;animal did notparticipate well | 5 |
| High frequency,considerable time spend, damage noted | 7 | Non-habituated animal, stress or fear noted ; caught by crushor box transfer | 7 | Regular presence in the group, short to mediumduration, | 7 | Enrichmentprovided, minimal use | 7 | Some stress, fearand aggression | 7 | Medium levels of stress or fear | 7 |
| High frequency, majority of free time spend,sizeable damage | 9 | Non-habituated animal, stress or fear evident; caught by crush, net or box transfer | 9 | Often occurrence in the group, medium to long duration | 9 | Enrichmentprovided but not usedor adverse reactionnoted | 9 | High levels ofstress and fearwith possibleaggression | 9 | Stress or fear evident | 9 |
| High frequency, majority of free time spend, severedamage (eg, large wound or digit damage | 10 | Non-habituated animal, stress or fear evident; caught by netting; multiple attempts | 10 | Often occurrence overmore than two days,medium to longduration | 10 | No enrichmentprovided | 10 | High levels ofstress, fear andsome aggression | 10 | Stress or fear evident. animaldid not participate | 10 |

\* Score

**Supplementary Table 3. . Modified Animal Welfare Assessment Grid: Welfare Scoring for environmental Sections**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Housing | Group size | Furnishing/enclosure design | Nutrition | Access | Contingent events |
| Good space provision, lighting, ventilation, available shelter, materialsused, temperature, drainage, humidity, UV (if needed) and low noiselevels; enclosure is suitable for the species housed in terms of location, public viewing, proximity to other animals, and so on | S\* | Group size in adherence with natural group size;stocking densityappropriate for theenclosure; groupstructure is suitable | S | Branches/plants/ hiding places/shelters/nestboxes and other itemsare available allowingthe expression ofnatural behaviours | S | Diet and forage (nutrition)provided are optimallysuited to the species-specific needs (nutritional, physiological and behavioural) as well asthat of the individual | S | Access to all ofenclosure | S | Animal movement,enclosure changes,building works,visitor intervention | S |
| All sutable | 1 | suitable | 1 | suitable | 1 | suitable | 1 | Access to all ofenclosure | 1 | None | 1 |
| 1-3 factor is below standard | 3 | Group structure differs Slightly, nooverstocking | 3 | Natural behaviours can be expressed however the options provided for this are minimal | 3 | The nutrition provided hasreduced suitability to theindividual needs whichwould benefit from review | 3 | Shut in/out good/largesized enclosure for one day | 3 | External interruption (eg,ongoing building works, New animal, some change in enclosure furnishing) taking place with minimaldisturbance | 3 |
| 4-6 factor is below standard | 5 | Group structure differs, Stocking density slightlyhigher | 5 | One type of naturalbehaviour is limited | 5 | The nutrition provided issuited to the species,however not the individual | 5 | Shut in/outmedium-sizedenclosure for part~1 day | 5 | External interruption taking place with some disturbance (Animal moves enclosures, or the enclosure furnishing is taken out and changed) | 5 |
| 7-8 factor is below standard | 7 | slightoverstockingGroup structure shows alarge difference | 7 | Numerous natural behaviours is limited | 7 | The nutrition provided lacks behavioural & physiological requirements | 7 | Shut in/out enclosure for two to seven days | 7 | External interruption taking place with definite disturbance Multiple newAnimals, | 7 |
| 9-10 factor is below standard | 9 | Group structure shows a large difference with Stocking density higher | 9 | Natural behaviours are very limited | 9 | The nutrition provided lacks nutritional requirements of the species | 9 | Shut into small indoor/outdoor enclosure for part~1 day | 9 | External interruption taking place with definitedisturbance over more than seven days | 9 |
| All factors scoredinadequate | 10 | Large difference(Solitary housingof social animals) | 10 | The options are notprovided | 10 | The nutrition provided is not suited to the requirements of the species and the individua | 10 | Shut into small indoor/ outdoor enclosure formore than one day or medium/largeenclosure for more than seven days | 10 | Animal introduced into new enclosure and group, with ongoing external disturbance | 10 |

\* Score

**Supplementary Table 4. Modified Animal Welfare Assessment Grid: Welfare Scoring for procedural Sections**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Restraint | Sedation | Time birdrestrained before/during procedure | Veterinary procedure | Change in daily routine | Visitor score––number, noiselevel, adverseinteractions |
| Train/ habituated to restraint | S\* | Sedation stress, recovery | S | Time bird restrained before/ during procedure | S | Degree of veterinaryprocedure, effect | S | Starving hours, changing housing, solitary housing  | S | Visitor number, noise level, adverse interaction | S |
| Trained animal, no stressor fear noted; positivereinforcement used | 1 | No sedation | 1 | Procedureperformedimmediately whilebird in hand aftercatching | 1 | No veterinary procedure | 1 | No change | 1 | No visitors | 1 |
| Trained animal, somestress or fear noted | 3 | Calm induction and recovery andrapid return to normal | 3 | Bird held in crate<30 minutesbefore procedure | 3 | Minor veterinary procedurewith noticeable short-termeffect on animal | 3 | Starved for <6 hours, Change in housing for the aftermath of the procedure (max 4 hours) | 3 | <50 visitors during hr obs moderately increased noiselevel | 3 |
| Non-habituated animal;no stress / Trained/habituatedanimal; some stress orfear noted | 5 | Stressful induction and/or recovery butrapid return to normal for a few hoursafter event | 5 | Bird held in crate30–60 minutesbefore procedure | 5 | Moderate veterinary procedure with noticeable short-term or medium-term effect on anima | 5 | Change in housing for the aftermath of the procedure (max 12 hours) | 5 | 50–100 visitorsduring hr obs littleincreased noiselevel | 5 |
| Non-habituated animal;some stress or fear noted/ | 7 | Sedation with either stressful induction/recovery and/or effects on normal behaviour and medium-term effects onintegration with the group afterwards | 7 | Bird held in crate>1 hour beforeprocedur | 7 | Moderate veterinary procedure with noticeable long-term effect on animal including loss of group status | 7 | Starved between 6–12 hours in primates; change in housing for the aftermath of the procedure (max 12 hours) | 7 | 50–100 visitorsduring hr obs greatly increased noise level or adverseinteractions | 7 |
| Trained/habituated animal; stress or fear evident | 9 | Prolonged sedation with highly stressful induction and/ or recovery and moderatelong-term effects on normal behaviour and affecting integration with the group | 9 | Bird held in crate1–2 hours beforeprocedure | 9 | Extensive veterinary procedure resulting in severe short-term pain despite appropriate treatment and analgesiaand a loss of status in thehierarchy | 9 | Change in housing (>12 hours) (solitary in birds) and starved >12 hours (in primates) | 9 | >100 visitors during hr obs moderatelyincreased noiselevel | 9 |
| Non-habituated animal;stress or fear evident; | 10 | Prolonged sedation with highly stressful induction and/ or recovery and prolongedeffects on normal behaviour and food intake afterwards and/or preventing integrationwith the group | 10 | Bird held in crate>2 hours beforeprocedure | 10 | Extensive veterinary procedure resulting in severe long-term pain despite appropriate treatment and analgesiaand a loss of status in thehierarch | 10 | Change in housing(>12 hours) (>24 hours in birds), starved for >12 hours (in primates),solitary housing | 10 | >100 visitors during hr obs greatly increased noise level or adverse interactions | 10 |

\* Score