

Animal Welfare Toolkit

British & Irish Association of Zoos and Aquariums (BIAZA)



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Contents

1. BIAZA Welfare Mission Statement	2
2. Introduction to Animal Welfare	3
3. How to Develop a Collection Welfare Policy	9
4. How to Perform a Collection Welfare Audit	12
5. Testimonials & Case Studies	15
6. Useful Resources	16
Appendix: Welfare Assessment Templates	18

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1. BIAZA Welfare Mission Statement

Our Mission

The British and Irish Association of Zoos and Aquariums (BIAZA) is a professional body representing and promoting the values of the best zoos and aquariums in the UK and Ireland. We lead and support our members:

- To inspire people to help conserve the natural world.
- To participate in effective cooperative conservation programmes.
- To deliver the highest quality environmental education, training and research.
- To achieve the highest standards of animal care and welfare in zoos, aquariums and in the wild.

We have more than 120 zoo and aquarium members whom we support in their commitment to be at the forefront of conservation, education, research and animal welfare.





2. Introduction to Animal Welfare

What is animal welfare?

There is no single, universally accepted definition of animal welfare, but broadly it refers to **the state of the animal as perceived by the animal itself**, with regards to its attempts to cope with its environment (Broom, 1988). Welfare and **ethics** are closely linked but are not the same; ethics is to do with *how we (society) think an animal should be treated* (Gray, 2017).

The difference between animal welfare & animal care

Even though as zoo professionals we have the best intentions for our animals, **good animal welfare is not always guaranteed by good animal care**. An animal could have poor welfare because of an underlying health issue or **inability to cope** with something, even if every effort has been made to provide for its welfare

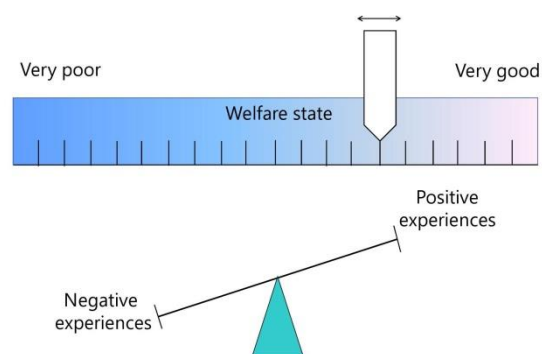
It can be useful to visualise the dynamic nature of animal welfare as a spectrum or a 'see-saw'. Welfare can be depicted as sliding along a **spectrum, ranging from very poor to very good**. A see-saw depicts welfare as the **overall balance of positive and negative mental experiences** an animal has. Some welfare problems may be short-lived and will not reflect an animal's overall **quality of life**, whereas others may be chronic and have more significant impacts (Green & Mellor, 2011).

needs, such as opportunities to express species-specific behaviours, appropriate nutrition and veterinary care. For this reason, animal welfare assessment should be as **scientific and objective** as possible; this requires us to take measurements not just from the animal's environment but also from the animal itself.

Mental & physical components of animal welfare

A growing number of scientists believe that **an animal's feelings are central to assessing its welfare**. There is evidence for both positive and negative feelings in nonhuman animals. **Physical health** is also an integral part of welfare, but the link between physical health and welfare is not always straightforward. An animal cannot always 'feel' physical health problems; for example if a disease causes no pain or suffering. We must remember that welfare is about the animal's own experiences, not ours (Broom, 1988).

The spectrum and see-saw approaches to visualising an animal's welfare:



Zoo animal welfare in perspective

Zoos have **moral, ethical and legal obligations** towards the animals in their care (Mellor et al., 2015; Gray, 2017). Striving for the **highest possible animal welfare standards** for the benefit of the animals themselves is justification alone. But high animal welfare standards also underpin the **key roles of the modern zoo: conservation, education and research**. Animals with good welfare are better candidates for conservation breeding programmes, are more valid subjects for research projects, and are better ambassadors for their species when educating the public.

Zoos are striving forwards with animal welfare

Within the last decade, zoos have made significant welfare advances including more **collaborations** with academic and industry researchers; acceptance and refinement of **new tools and techniques**; and increased employment of dedicated **zoo animal welfare scientists** (Fraser, 2009; Ward et al., 2018). The World Association of Zoos and Aquariums (**WAZA**) **Animal Welfare Strategy** states that zoos are now centres for animal welfare expertise, and that the zoo community should strive to be “*animal welfare leaders, advocates and authoritative advisers*” (Mellor et al., 2015, p. 9).

For more information on animal welfare theory, please see **Section 6, Useful Resources** in this Toolkit.



Zoo animal welfare at a glance

The scientific study of animal welfare is rapidly advancing in zoos.

Good standards of care (housing and husbandry) contribute to, but do not always guarantee, good animal welfare.

There are mental and physical components of welfare, but most scientists now agree that how an animal *feels* is central to assessing its welfare.



How to assess zoo animal welfare

Behavioural indicators

The problem with the 'feelings approach' to welfare is that we cannot directly ask animals how they *think* or *feel*. For this reason it is necessary to observe how an animal *behaves* and infer their welfare from this. The most common approach is to look for and measure **behavioural indicators of positive and/or negative welfare**. Many of these indicators are species-specific. How much of the animal's time they occupy relative to other behaviours also needs to be considered, not just whether they are present/absent.

Once behavioural indicators have been '**validated**' (there is scientific evidence to support they are related to good or poor welfare because they are also linked to other indicators), it is then possible to use them more reliably as **behavioural shortcuts** to assess welfare.

Behaviour checklist

Possible indicators of positive welfare

- Exploration
- Play
- Social behaviour
- Appropriate level/timing of activity

Possible indicators of negative welfare

- Signs of pain (flinching, lameness)
- Excessive signs of fear (startling, hiding)
- Signs of boredom (apathy) or disengagement
- Signs of frustration (overt aggression)
- Abnormal/aberrant behaviour

This is not an exhaustive list, and will not be relevant to all zoo species.

There are many different methods available for assessing animal welfare. The methods commonly used in zoo animals are:

Animal-based indicators

- Behaviour
- Physical/physiological signs

Resource-based indicators

- What resources are available in the environment

Some scientists measure how much time an animal spends performing a range of different behaviours, and compare these to levels seen in the wild. The notion that **naturalistic behaviour** reflects good welfare is debated, including whether a behaviour seen in the wild has the same function or benefit for an animal under managed care (Veasey et al., 1996). Some highly motivated behaviours, known as '**behavioural needs**' may be the most important for welfare (Jensen & Toates, 1993). Examples of these could include exploration and nest-building.





Physiological indicators

The measurement of **stress hormones** such as cortisol is becoming more accessible to zoos through collaborations with external labs, and there are a small number of specialist labs within major zoos. However, this is still a complex method requiring endocrinology expertise, time and financial investments which far exceed the traditional behaviour approach (Moberg & Mench, 2000).

Scientists are beginning to understand that **not all stress is associated with poor welfare**. While animals can show an increase in stress-related hormones in times of *distress*, these hormones can equally increase in a response to playing, mating and cognitive challenge. Other physical and physiological responses to stress, such as changes to heart rate and blood pressure, can be measured using bio-loggers if appropriate for the species and setting (Moberg & Mench, 2000).

Resource indicators

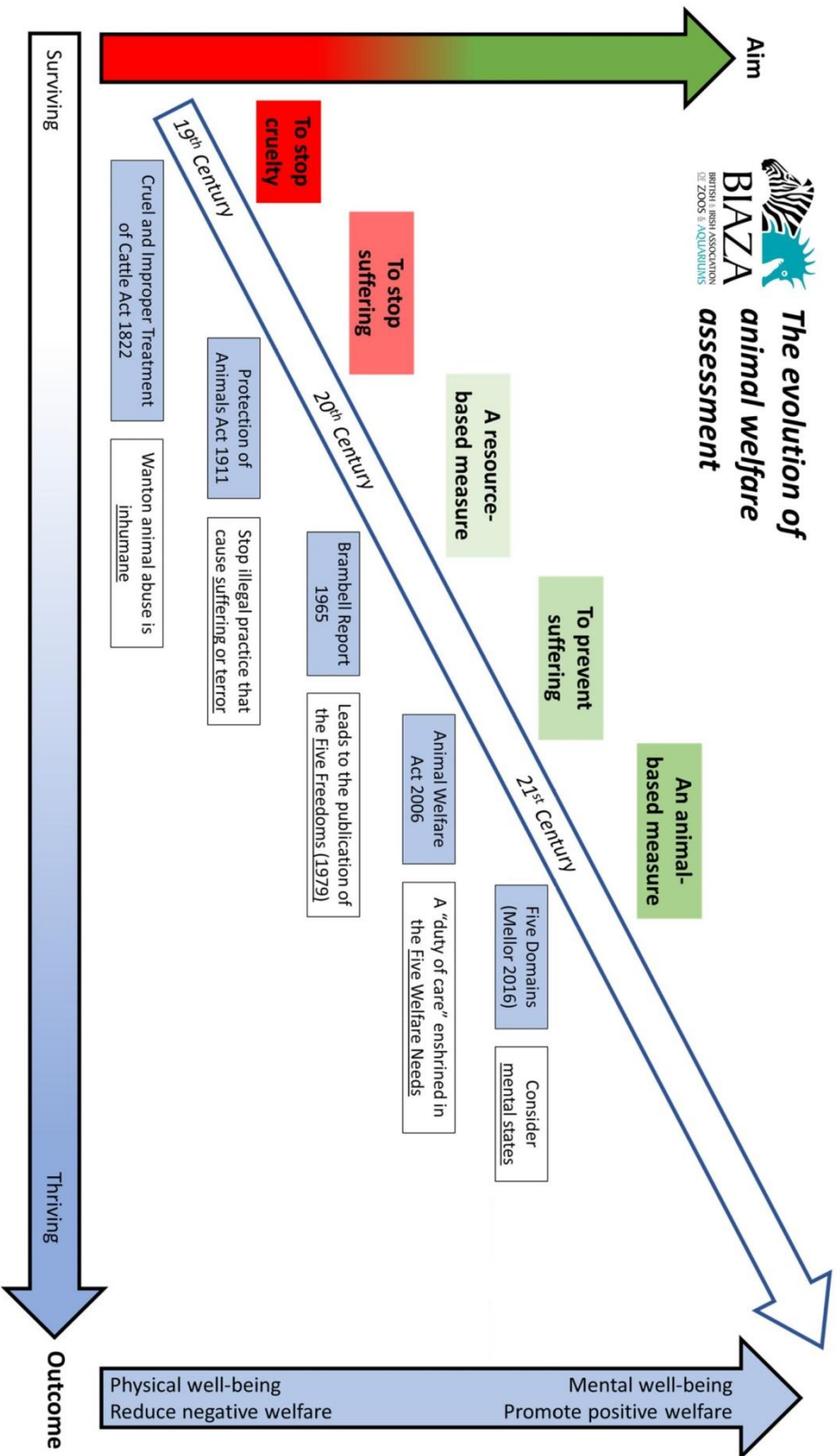
Given some of the difficulties with assessing welfare through **animal-based**

measures (what an animal *does*, inferred from its behaviour or health signs), it is not surprising that many zoos favour a **resource-based** approach. Welfare is assessed in terms of what the animal *has* in its environment. When using resource-based indicators of welfare, it is important to have evidence to support that those resources are actually linked to **increased welfare**.

Freedoms, Needs or Domains?

The Five Freedoms has been a widely-recognised animal welfare “checklist” for decades, but was originally established for farmed animals. The **Five Welfare Needs** was a modification to the original Five Freedoms, referring to what provisions an animal needs for good welfare.

The Five Freedoms/Needs do not reflect our current knowledge of animal welfare, which has significantly advanced over the past several decades (Mellor et al., 2015). The most modern animal welfare assessment framework is the **Five Domains**, which places more emphasis on an animal’s feelings (see Welfare Evolution diagram on next page, and **Section 4, How to Perform a Collection Welfare Audit**).



How welfare assessment has evolved for zoo animals, and animals as a whole, since the 19th Century.

Zoo animal welfare audits

A welfare audit is an objective assessment and formal recording of the current welfare state of one or more animals. Some zoos have never attempted to formally assess welfare using an audit, some would benefit from a more structured approach, and others may already have an established procedure.

As discussed earlier, the framework most popularly used to assess zoo animal welfare has changed over time. Currently, the **WAZA Animal Welfare Strategy** (Mellor et al., 2015) recommends the **Five Domains** framework. This framework is divided into animal and resource-based components, and crucially includes an animal's mental state (Mellor & Beausoleil, 2015). BIAZA currently believes most of its members will find the Five Domains approach to welfare challenging to achieve, due to limited time, resources and current scientific welfare knowledge of the taxa they house. However, it is certainly a framework we support our members to strive towards as zoo animal welfare science continues to advance, and our welfare audit template (**Appendix**) is built to accommodate the recording of mental states wherever possible.

The audit method(s) that a collection chooses will depend on the time and resources they have available, the expertise of their staff including knowledge of the animal's biology and behaviour, and the ultimate aim of the assessment (for example whether it is part of an **ongoing monitoring** programme, or an **end-of-life assessment**).

Section 4 of this document gives guidance to collections on **How to Perform a Collection Welfare Audit**.

Conclusions

The assessment of animal welfare, and striving for the highest possible welfare standards, is an essential part of modern zoo management.

Animal welfare is multi-faceted, but the modern approach is to consider **animal feelings**, as well as physical health and available resources, particularly if there is scientific evidence these are important to the animal's welfare.

Animal welfare **audits** are a framework for assessing animal welfare in zoos, and can be tailored to fit different taxonomic groups, time and resources.

All zoo professionals have a part to play in the advancement of zoo animal welfare science, working closely with their animals, with each other, and with external collaborators.



3. How to Develop a Collection Welfare Policy

Overview

BIAZA encourages all collections to develop their own bespoke Animal Welfare Policy. When creating their Welfare Policy, bear in mind that, at a minimum, all BIAZA member collections are required to follow the **BIAZA Welfare Policy** available on the BIAZA website.

Important considerations for developing your Animal Welfare Policy (see **Section 2, Introduction to Animal Welfare** for more information):

- i) **Welfare** encompasses more than the physical health of an animal. It refers to **what an animal experiences in its life**. We encourage members to use the categories defined by Mellor's **Five Domains** model: Behaviour, Physical Health, Nutrition, and Environment; and within these, Mental State (Mellor & Beausoleil, 2015).
- ii) **Welfare applies to all taxa**. The majority of animal welfare science has focussed on mammalian species, with domesticated birds featuring to a lesser extent. Hearteningly, more studies are emerging that demonstrate a level of cognition and sentience in other taxa, including fish and some invertebrates. Whilst much work is still required to understand the level of sentience in every species, at present it would be wise to assume that all mammals, birds, reptiles, amphibians, fish and cephalopods have feelings and can suffer under impoverished welfare conditions. And that for all other species whereby concepts of suffering and sentience are not determined (i.e. non-cephalopod invertebrates), appropriate resources that maintain health and proper physiological function are provided as is biologically -and ecologically- relevant. Therefore, all animals under human influence and care (wild, domestic, native, exotic, etc.) should be given welfare consideration
- iii) **Welfare is variable** and may range anywhere from **very poor to very good**. It should **not** be classed as **present or absent**, but instead considered on a sliding scale. Furthermore an animal's level of welfare will vary over time depending on its experiences. It may change from year to year or day to day. Assessments need to be repeated over time to remain relevant.
- iv) Welfare is **experienced by the individual**. Individuals within a group may have differing standards of welfare depending on their place within their social hierarchy, their previous experiences (e.g. during early life and rearing), their cognitive bias, and their personality. We appreciate that assessment at an individual level is not always practical (e.g. tadpoles, fish) and in these cases group assessment should be carried out.

BIAZA recognizes that its member collections are unique in different ways, and therefore you may find it appropriate to add specific principles into your Animal Welfare Policy. These principles should complement the BIAZA Welfare Policy and other BIAZA Policy Documents. Using the BIAZA Welfare Policy as a starting point, you may develop your own bespoke Welfare Policy document and include language that encompasses both general and specific values of your collection.

Choosing a welfare framework

You may find it useful to base your Animal Welfare Policy on an animal welfare framework such as the **Five Needs** or **Five Domains**. Please review the *Evolution of Animal Welfare Assessment Diagram* (page 7) for further details. You may want to list the core concepts of the chosen framework and give a brief description of how you will provide for each concept. Going forward, we recommend steering away from the outdated **Five Freedoms** framework which is primarily concerned with the avoidance of negative experiences such as pain and hunger, and overlooks how to promote positive experiences.

Policy principles

Animal management All animals in your care (including wild, domestic and native species) should be treated with the utmost care and their welfare should be paramount at all times. Appropriate animal husbandry practices must be in place and sound veterinary care available. Members should refer to BIAZA and other relevant Zoo Association husbandry guidelines (e.g. EAZA, WAZA), research papers, care sheets and codes of practice when formulating their own husbandry routines, enclosure designs and management practices.

Example (theoretical policy wording)

"Housing, husbandry and management procedures will be regularly reviewed and updated in line with scientific evidence-bases."

"Animal staff will encourage species-typical natural behaviours by providing a stimulating and dynamic environment tailored to meet the specific needs of each species in the collection, and by providing enrichment."

"The Animal Manager will ensure all members of the animal care team are trained/qualified to oversee and implement the most current welfare practices for all animals housed in the collection."



Enclosure standards At all times, animals should be protected from conditions known (or supposed to be) detrimental to their welfare, and the appropriate and most up-to-date husbandry standards adhered to. 'Enclosures' include but are not limited to: public displays, off-show enclosures, temporary housing, quarantine, and isolation facilities.

Example

"All enclosures will be of sufficient shape and dimensions to allow animals to express a natural behavioural repertoire (exceptions may be made for animals undergoing veterinary care)."

"Enclosures will contain sufficient material and complexity to allow behavioural enrichment and expression of natural, species-typical behaviours."

"Within the enclosure, animals will have the ability to access areas where environmental parameters are within a range they are physiologically adapted to cope with."

"Enclosure substrates and furnishings will be provided with consideration of the physiological and behavioural needs of the species. Animals must have areas to which they can retreat from people and conspecifics (e.g. visual barriers, spatial separation, areas at height)."

Mutilations Wing pinioning is not restricted under the BIAZA Position Statement on Flight Restraint. However, your collection may deem that wing pinioning does not align with your ethical position. If so, you may choose to include the following in your policy:

Example

"Wing pinioning will not be used as a method to prevent flight in captive birds, but this does not preclude the acquisition of stock that has previously been pinioned."

Pest control When developing pest control measures for your collection you may have specific native species programmes, as well as humane culling protocols, that require specific language to be included in your policy.

Example

"The following methods are currently considered acceptable for pest rodent control: live trapping followed by humane euthanasia, and spring-powered kill traps checked three times per day. Before the use of any anticoagulant rodenticides, an ethical review and approval by an ethics committee must be achieved."

These examples of policy wording are suggestions. They are not an exhaustive list of all the principles you would include in your Welfare Policy. It is important to reinforce that all collections, at minimum, are required to adopt and follow the BIAZA Welfare Policy.

Visit: www.biaza.org.uk/policies-guidelines to find BIAZA's latest policies and Position Statements.



4. How to Perform a Collection Welfare Audit

Overview

This section provides guidance on **how to perform an animal welfare audit at your collection**. You can find two example audits in the **Appendix**.

FAQs

What are the aims of an animal welfare audit?

There are many reasons for undertaking an animal welfare audit (see **Section 2, Introduction to Animal Welfare** for more information). In addition to identifying any current welfare problems in your animals, an audit may help to discover where welfare-relevant information is lacking which could cause a welfare problem in future; for example a lack of dietary records or a need for more research on an animal's behaviour. Most collections have limited resources and therefore any welfare concerns will need to be prioritised before they are addressed. A welfare audit helps collect evidence which can be used in management decision making, including budgeting and capital expenditure.

Who will undertake the animal welfare audit?

It is recommended to have more than one person, preferably coming from different departments (e.g. animal care, veterinary, science), complete an audit for each animal or group of animals. A keeper may not have access to all of the animal's veterinary clinical records. And even if a keeper did, they may not be the best person to decipher this information from a welfare perspective.

Similarly, a vet may be unfamiliar with an animal's environmental conditions and subtle daily changes in behaviour.

If several people can complete an audit, each person should complete their **own** form. Multiple forms can be collated afterwards, but the collection should keep track of where the original scores have come from, and if there are significant differences in perception across different personnel/departments. We appreciate that it may not always be possible for smaller collections to have more than one person undertake a welfare audit. With this in mind, the workload could be shared so that several people perform the assessments across the collection over time. The procedure will certainly benefit from additional perspectives.

Which animals should be audited?

The audit templates provided in the **Appendix** are flexible - they can be used to assess one animal's welfare at a time, a group (e.g. enclosure) at a time, or to assess all animals in a collection. If a collection is small and/or resource-restricted, it may be wise to begin the audit process on animals that have known welfare concerns, or have had welfare concerns in the past. BIAZA intend to facilitate the creation of more taxon-specific audits over time, to avoid species bias. For now, we hope that you will be able to customise the template(s) included in this Toolkit to suit the species housed in your collection.

How long will an audit take?

This will depend on the number of animals to be audited. The audit may require consultation of animal records such as daily keeper reports, diet sheets and veterinary reports. The audit should be completed in a timely fashion because an animal's welfare state is always changing. For example 'The animal can consume a high-quality, nutritious diet' refers to the *current* status of the diet, not an approximate answer for the season or year.



How often should an audit take place?

We encourage audits to take place on a rolling basis; it is not enough to perform one audit on a long-lived animal because welfare changes over time. Indeed, if an audit highlights a welfare problem, a follow-up audit should be arranged after a proposed solution has been implemented. The timings of audits will depend on staff availability, and how long any proposed solutions will take to implement.

What is the outcome of the audit? Does each animal get a welfare score?

Auditing welfare should help staff to understand if and why there is an animal welfare problem. Relatively speaking, animals with higher total scores on either

of the two audit templates (**Appendix**) are probably faring better than animals with lower scores. Furthermore, the BIAZA template (**Appendix**) encourages the development of a **Welfare Action Plan**, which is essentially a list of welfare concerns highlighted by the audit, proposed solutions, and named personnel to drive them forwards with deadlines.



Context and perspective is important when interpreting the results of an audit. For example, if an animal did not have the correct bedding materials at the time of the assessment, this does not automatically mean the animal has poor welfare; we must remember that *welfare is the state of an animal, as experienced by the animal itself*. Resource-based welfare indicators can be used to create an overall picture of the animal's welfare, but we should place more weight on animal-based indicators of welfare such as behaviour and signs of physical health.

What happens after the audit? How will welfare actions be prioritised after an audit?

The results of the audit should be used to enhance welfare. The scores can help with prioritising time and resources. The **BIAZA Welfare Action Plan (Appendix)** sets out one method for approaching this.

Where can I get help regarding welfare problems identified in the audit?

Animal welfare science is a burgeoning field. BIAZA encourages members to employ or consult with a zoo animal welfare scientist or similar wherever possible to provide expertise and support animal keepers in their role. Where such a staff member is not available, we encourage you to use **Section 6, Useful Resources** of this Toolkit, reach out to other local and regional zoos for support and collaboration, and contact the BIAZA office if there are outstanding concerns. BIAZA holds a list of named animal welfare scientists/similar relevant positions held in member collections, as well as some external consultants.

Audit templates

There are two audit templates provided in the **Appendix** of this toolkit, produced by BIAZA and the Detroit Zoological Society.

Over the past two years, staff and volunteers at several BIAZA member zoos have been developing an audit flexible enough to be used across many British and Irish zoos. The Detroit Zoological Society audit is a modified version of the one originally published in the Journal of Applied Animal Welfare Science (Kagan et al., 2015).

IMPORTANT: Customizing the templates to suit the collection, and animal(s) being audited

Neither of these templates will completely suit all animal collections, because no two collections are the same. We urge you to customise the templates as appropriate for your collection. Simply remove the statements which are not applicable, or re-word them as appropriate.

BIAZA template

We encourage you to try the BIAZA template if:

- You wish to focus on both animal-based and resource-based indicators of animal welfare.
- You wish to make use of animal records (although not mandatory).
- You can respond to around 60 statements (although not all statements are applicable to all animals, some are specific to aquatic environments etc.).
- You wish to feed results of the audit forward into a **Welfare Action Plan**, to help with prioritising resources.

Detroit template

We encourage you to try the Detroit template if:

- You are looking for a **shorter, tick-box** audit.
- You can answer around 25 general questions.
- You wish to focus on resource-based indicators of animal welfare, and management procedures in place.



5. Testimonials & Case Studies

The Zoo Manager

"It's really important to realise that when aspects of animal welfare are scored zero on the audit, this is not a negative reflection of any member of staff or the zoo as a whole. There will be negative welfare implications whether in a managed or wild environment. In a managed environment we are fortunate to be able to intervene and improve welfare outcomes; the wild often limits our input. The welfare assessment enables us to acquire the information and have the power to implement change. How we respond to our findings is the critical component".

Jessica Harley, Conservation, education & research manager, Tayto Park

The Zoo Keeper

"As keepers, we know when something is not right with our animals and when the environment is contributing to that... but how do you convince or prove to your manager the things that you just 'know'? Welfare audits are a fantastic way of documenting all possible welfare aspects of an animal, from the positives to the negatives, and at the end of the process there is a document for all to see".

Jamie Graham, Team leader, HUB/Park Birds section, ZSL Whipsnade Zoo

The Vet

"High standards of animal welfare are fundamental to the health of all captive animals, and can be considered to be one of the central pillars of preventative medicine in any zoo. It follows that regular welfare assessments are as essential in preventing disease in its broadest sense as are vaccination programmes and infectious disease surveillance. If we fail to respond to the welfare needs of animals in our care, we not only impoverish their lives unnecessarily, but will continue to need reactive veterinary interventions on a daily basis. Some of the most profound improvements I have seen in the health of both individuals and social groups of animals under my care in zoos during the past 33 years have followed critical review of their welfare needs. Welfare assessments are not only desirable, they are essential".

John C. M. Lewis, MA, VetMB, PhD, DipECZM, MRCVS

The Animal Welfare Scientist

"We recently helped to develop and trial the BIAZA template at our zoo. We are fortunate to have students available to help collect and collate behavioural data – therefore we can customize our audit to place more emphasis on animal behaviour and 'feelings'. My hope is that once the auditing process is established, we will start to see some really useful data emerge that will empower keepers and help in management decision-making".

Fay E. Clark, PhD., Animal welfare scientist, Bristol Zoo Gardens



6. Useful Resources

Scientific publications

Welfare concepts & reviews

- Broom, D. M. (1988). The scientific assessment of animal welfare. *Applied Animal Behaviour Science*, 20(1-2):5-19.
- Fraser, D. (2009). Assessing animal welfare: different philosophies, different scientific approaches. *Zoo Biology*, 28(6): 507-518.
- Green, T. C., & Mellor, D. J. (2011). Extending ideas about animal welfare assessment to include 'quality of life' and related concepts. *New Zealand Veterinary Journal*, 59:6, 263-271.
- Mellor, D. J., & Beausoleil, N. J. (2015). Extending the 'Five Domains' model for animal welfare assessment to incorporate positive welfare states. *Animal Welfare*, 24: 241-253.
- Mellor, D. J. (2015). Positive animal welfare states and reference standards for welfare assessment. *New Zealand Veterinary Journal*, 63(1): 17-23.
- Mellor, D. J., & Reid, C. S. W. (1994). Concepts of animal well-being and predicting the impact of procedures on experimental animals. In: Baker, R., Jenkin, G., & Mellor, D. J. (eds). *Improving the Well-being of Animals in the Research Environment* pp 3-18. Glen Osmond: Australian and New Zealand Council for the Care of Animals in Research and Teaching.
- Mellor, D. J., Hunt, S. & Gusset, M. (eds). (2015). *Caring for Wildlife: The World Zoo and Aquarium Animal Welfare Strategy*. Gland: WAZA Executive Office. **aka the WAZA Animal Welfare Strategy.**

Recent advancements in welfare science

- Gray, J. (2017). *Zoo Ethics: The Challenges of Compassionate Conservation*. Victoria: CSIRO Publishing.
- Ward, S. J., Sherwen, S., & Clark, F. E. (2018). Advances in Applied Zoo Animal Welfare Science. *Journal of Applied Animal Welfare Science*, 21(sup1): 23-33.

Welfare assessment

- Barrows, M. 2017. Welfare Assessment in Zoo Animals. *Veterinary Record*, 181: 141-142.
- Draper, C., Harris, S. (2012). The Assessment of Animal Welfare in British Zoos by Government-Appointed Inspectors. *Animals*, 2(4): 507-528.
- Stamp Dawkins, M. (2003). Behaviour as a tool in the assessment of animal welfare. *Zoology*, 106(4): 383-387.
- Whitham, J.C., Wielebnowski, N. (2009). Animal-based welfare monitoring: using keeper ratings as an assessment tool. *Zoo Biology*, 28(6): 545-560.
- Wolfensohn, S., Shotton, J., Bowley H., Davies, S., Thompson, S., & Justice, W. S. M. (2018). Assessment of Welfare in Zoo Animals: Towards Optimum Quality of Life. *Animals*, 8(7): 110.

Specific examples of welfare assessments

- Clegg, I. L. K., Borger-Turner, J. L., & Eskelinen, H. C. (2015). C-Well: The development of a welfare assessment index for captive bottlenose dolphins (*Tursiops truncatus*). *Animal Welfare*, 24(3): 267-282.
- Honess, P., & Wolfensohn, S. (2010). The Extended Welfare Assessment Grid: A Matrix for the Assessment of Welfare and Cumulative Suffering in Experimental Animals. *Alternatives to Laboratory Animals*, 38: 205-212.
- Justice, W. S. M., O'Brien, M. F., Szyszka, O., Shotton, J., Gilmour, J. E. M., Riordan, P., & Wolfensohn, S. (2017). Adaptation of the animal welfare assessment grid (AWAG) for monitoring animal welfare in zoological collections. *Veterinary Record*, 181: 143.
- Wolfensohn, S. E., Sharpe, S., Hall, I., Lawrence, S., Kitchen, S., & Dennis, M. (2015). Refinement of welfare through development of a quantitative system for assessment of lifetime experience. *Animal Welfare*, 24: 139-149.
- Kagan, R., Carter, S., & Allard, S. (2015). A Universal Animal Welfare Framework for Zoos. *Journal of Applied Animal Welfare Science*, 18(sup 1): S1-S10.

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- Veasey, J. S., Waran, N. K., & Young, R. J. (1996). On comparing the behaviour of zoo housed animals with wild conspecifics as a welfare indicator. *Animal Welfare*, 5:13-24.

Websites

[BIAZA Animal Welfare resources](#)

[WAZA Magazine: Towards Positive Animal Welfare. Vol. 16, 2015.](#)

[Center for Zoo and Aquarium Welfare and Ethics, Detroit Zoological Society](#)

[Wild Welfare: Animal Welfare Assessments](#)

[Welfare Quality Network: Assessment Protocols](#)

[Improving animal welfare using the Animal Welfare Assessment Grid \(AWAG\)](#)

Please note that these resources are not specifically endorsed by BIAZA.



Appendix

Template 1: BIAZA Audit Template*

Instructions for use

You (the assessor) should respond to all statements to the best of your ability, drawing on your experience, knowledge and expertise. The evidence base column to the right of the form should be ticked to acknowledge any external sources of information used as evidence of appropriate welfare standards. This may include husbandry guidelines; scientific papers on housing, husbandry and nutrition; and enrichment studies involving the species or taxa.

Ideally, there will be **more than one assessor** (see **Section 4, How to Perform a Collection Welfare Audit**).

You will be required to make observations of the animal(s) in their enclosure, and pre-record information where relevant. This may include: keeper and veterinary records; diet and weight records; and any research projects which were undertaken on the specific animal(s) being audited. But remember, this is an audit of the animal's *current* welfare (the period in which you are conducting the assessment – include 24 hour period not just opening hours), rather than their welfare historically over long periods. Drawing information from these multiple sources takes time but creates a more valid welfare assessment, so plan your time accordingly.

If you score a statement a 'zero' (i.e. a negative response) this must then be listed in the **Welfare Action Plan**, where a solution and priority level can be determined. The BIAZA audit is flexible because it can be completed for one individual animal, one group of the same species, or multiple species in a mixed-species enclosure. Simply replicate the columns in the template, using one column for each individual or species to be audited at the same time.

Example: mixed-species enclosure of two lemur species, 15 individuals in total

You could audit the enclosure once as a whole, but also have the option to audit once per lemur species or even once per individual. This depends on whether you believe the individual lemur's welfare scores will be sufficiently different from each other to warrant one audit per lemur.

It may be wise to complete one 'Part 1' (animal-based indicators) for each individual, and one 'Part 2' (resource-based indicators) for each species.

Electronic (editable) audit templates will be made available on the BIAZA website.

*This is the first version of an evolving document. The BIAZA Animal Welfare Working Group plan to refine and update the Animal Welfare Toolkit and included templates over time.

BIAZA Animal Welfare Audit Version 1 2019

ID of animals/species to be audited e.g. house names, ZIMs IDs	
Person completing this audit (name, position)	
Audit period start dd/mm/yy – end dd/mm/yy <i>(duplicate columns in table below as necessary)</i>	

<p>Score for each statement:</p> <p>1 - Yes/Meets Criteria 0 - No/Does Not Meet Criteria N/A - Not Applicable N/W - Not witnessed during audit period</p>



PART 1: ANIMAL-BASED INDICATORS OF WELFARE			
1A: BEHAVIOUR			
	Score	Notes	Evidence base available? Tick Yes
The animal/s:			
1. Can approach and avoid conspecifics or other species in the enclosure.			
2. Performs appropriate levels of self-care (maintenance) behaviours e.g. grooming, feeding, drinking, resting, comfort activities.			
3. Has mostly positive, non-harmful interactions and relationships with conspecifics or other animals.			
4. Has mostly positive or neutral interactions and relationships with staff.			
5. Has mostly neutral or positive experiences of visitors (i.e. non-aggressive/fearful/aversive)			
6. Responds appropriately to novel changes in the environment (e.g. enrichment) with interest rather than aversion and fear.			
7. Can express choice and control over being in indoor/outdoor areas of enclosure, except for enclosure cleaning, maintenance and feeding.			
8. Can patrol/maintain territory in the enclosure, as appropriate.			
9. Can perform appropriate foraging (searching for food) and feeding (consuming food) behaviours.			
10. Can play, alone or socially.			
11. Can achieve appropriate levels and patterns of rest and sleep.			
12. Can experience tactile pleasures such as social grooming, scratching on substrates.			

13. Can express motivated courtship and mating behaviours.			
14. Can express species-specific 'behavioural needs' such as rooting, nest-building.			
15. Does not perform abnormal (e.g. self-injurious, stereotypic) behaviours.			
16. If abnormal behaviours are known, measures are in place to understand the causes of this behaviour and if/how it may be reduced or eliminated.			

1B: PHYSICAL HEALTH

The animal/s:	Score	Notes	Evidence base available? Tick Yes
17. Appears to be in good physical condition (e.g. no abnormal discharge; good condition of pelage, plumage, skin, scale, scute, teeth, horn).			
18. Has no signs of pain and/or suffering (e.g. wincing, flinching, lameness).			
19. Has a 'body condition score' and/or body mass within normal limits.			
20. Has good muscle definition and tone.			
21. Has appropriately formed faeces.			
22. Has no signs of debility/weakness.			
23. Has no known recurring acute disease or injury.			
24. Has no known chronic disease or injury.			
25. Has a routine health check at appropriate intervals.			
26. Has parasitology screening and treatments at appropriate intervals.			
27. Has a positive reinforcement training programme to facilitate husbandry and veterinary procedures.			
28. Has routine grooming and maintenance procedures carried out (as needed) (e.g. clean and cut talons, hooves, teeth; brush pelage).			
29. For aging animals with a chronic health issue (e.g. arthritis), actions are being taken to investigate and manage pain or suffering such as a geriatric care plan, ongoing monitoring and quality of life assessment.			

PART 2: RESOURCE INDICATORS OF WELFARE

2A: NUTRITION

The animal/s:	Score	Notes	Evidence base available? Tick Yes
30. Can drink from water on demand.			
31. Can drink from a clean, fresh water source.			

32. Can consume an appropriate quantity of food.			
33. Can consume a high-quality, nutritious diet.			
34. Can consume an appropriately presented diet (consider timing, format, position in enclosure, social interactions).			
35. A diet sheet is available for the species, and is reviewed incorporating best-practice guidelines for nutrition and evidence-based literature as available for the taxa.			
2B: ENVIRONMENT			
The enclosure:	Score	Notes	Evidence base available? Tick Yes
36. Has an appropriate temperature level, which may include a temperature gradient or access to shaded and heated areas.			
37. Has an appropriate humidity level, which may include a humidity gradient.			
38. Has high air quality, free of pollutants, heavy dust and aversive odours, and is well-ventilated.			
39. Has appropriate lighting frequency/colour/brightness, without flicker or glare.			
40. Has an appropriate photoperiod (light-dark cycle).			
41. Has appropriate sound pressure (audible noise, vibration) levels.			
42. Has adequate size, shape and topography for animal exercise and territory exploration.			
43. Has appropriate substrate for locomotion (abrasion, traction, support).			
44. Has appropriate substrate for resting (comfort, depth, and cleanliness).			
45. Has appropriate substrate for foraging (depth, cleanliness).			
46. Has appropriate shelters, retreats, off-show/out-of-sight areas away from visitors and conspecifics.			
47. <i>Aquatic environments</i> : life support systems are fully operational, and regularly maintained.			
48. <i>Aquatic environments</i> : water flow and movement allows sufficient oxygenation.			
49. <i>Aquatic environments</i> : water testing is carried out on a routine basis, and checked against acceptable known ranges.			
50. <i>Terrestrial environments</i> : is not water-logged; there is no poaching of the ground and substrates are not soaked through.			

There is no pooling of rainwater in indoor or outdoor housing.			
51. <i>Terrestrial environments</i> : Provides recreational (non-drinking) water.			
52. Has appropriate and effective environmental enrichment (which may be food-based, sensory, structural, cognitive, social, or a combination). Some species may derive enrichment from the environment; therefore enrichment is not necessarily a temporary addition to the environment.			
53. Is within acceptable stocking density (e.g. is not over-crowded).			
54. Is clean and disinfected while respecting natural olfactory cues and being mindful of chemical safety.			
55. Has no unnecessary pooling of faecal matter and/or urine (e.g. not applicable to latrine-using species).			
56. Has pest control methods in place, which are effective without risking animal health & safety (NB: the health and safety of humans and non-target species, e.g. native wildlife, is always to be considered but is not applicable to this audit).			
57. Has a structure which is safe and secure with no or mitigated risk of harm (e.g. fences and barriers).			

Welfare score – calculate the total number of statements scored as meeting criteria (1). This can then be presented as a percentage based on total points achieved over total points possible (not including N/A or N/W statements).	
Have you transferred each zero point to the Welfare Action Plan ? <input type="checkbox"/> Yes	

Evidence-base: Use this section to record the resources used to determine appropriate welfare standards.

e.g. Weerman, J. 2015. EAZA Best Practice Guidelines for Red Panda (*Ailurus fulgens*).

BIAZA Welfare Action Plan Version 1 2019

ID of animals/species audited e.g. house names, ZIMs IDs	
Person completing this audit name, position	
Audit period start dd/mm/yy – end dd/mm/yy	

Statement # (and animal ID if appropriate) from Welfare audit	Describe known/potential welfare problem	Proposed solution/s	Personnel who will be responsible	Priority level High, medium, low	Deadline for solution DD/MM/YY

Add additional rows as necessary

Template 2: Detroit Audit Template

Instructions for use

The individual Animal/Environment Welfare Assessment is designed to provide an overview of the physical and social considerations for one or more animals sharing a habitat. Although a single assessment can provide meaningful information, it is recommended to have three to four individuals complete assessments for each individual or environment selected, preferably from more than one department (e.g., animal care, veterinary care and welfare) to gain additional perspective.

Questions have several answer options, as well as a notes section to capture any additional qualitative information. Each person completing an assessment should answer the questions to the best of their ability, based on their knowledge and expertise.

Scoring the assessment is achieved in the following way:

- Positive answers receive a "2"
- Somewhat answers receive a "1"
- Negative answers receive a "0"
- N/A and not clear answers, or those with only notes, are not counted in the score.

Be aware that there is a mixture of yes and no responses which equate to good welfare; pay close attention when converting yes and no responses to scores. Total scores are tabulated and a percentage is calculated based on total points achieved over total points possible. Total points possible will vary depending on individual assessments, as some animals may not have an alternate habitat for example, and the questions pertaining to alternate spaces would therefore not be counted.

Percentages can help to categorize individual situations from poor to good/great, and can help to prioritize next steps or decision-making. Additionally, the assessments can generate productive internal discussion for questions where scores vary between different people.

The Detroit Zoological Society (DZS) Individual Animal/Environment Welfare Assessment is reproduced here with kind permission from DZS. The template and instructions have been altered slightly for formatting purposes.

Detroit Animal Welfare Audit

Question		Tick one response					Notes
		Yes	Some-what	No	N/A	Not clear	
1.	Does it appear the physical environment meets the needs of the animal(s) in terms of size?						
2.	Does it appear the physical environment meets the needs of the animal(s) in terms of complexity?						
3.	Does each animal make use of a variety of locations and features in the habitat?						
4.	Does the environment provide climatic conditions (temperature, humidity) similar to natural environment/appropriate for the species?						
5a.	Does each animal have 24-hour (or close to) access to primary physical habitat?						
5b.	Is each animal kept in alternative (non-primary) areas for a substantial portion of each 24-hour period?						
5c.	Is each animal kept in alternative (non-primary) areas for substantial portions of the year or season?						
5d.	Does each animal have access to primary habitats during their active periods (e.g., nocturnal animals in primary environments during night)?						
5e.	Are multiple groups or individuals required to rotate through the same primary habitat (e.g., "timeshare" the primary space and spend the rest of their time in back areas)?						
6a.	Do behind-the-scenes (non-primary) holding areas provide adequate space for the time the animal(s) must be in them?						
6b.	Do behind-the-scenes (non-primary) holding areas provide adequate complexity for the time the animal(s) must be in them?						
7.	Does each animal have the ability to choose where to spend their time?						
8.	Does it appear that social environments are appropriate in terms of number of animals, species, demographic composition (ages and sexes)?						
9.	Does each animal have 24-hour (or close to) access to primary social habitat?						
10.	Does each animal have the ability to choose with whom they spend their time?						
11.	Does each animal interact with group-mates in the manner expected?						
12a.	Does each animal have the ability to avoid being disturbed by other animals outside of the primary habitat (e.g., local wild animals, animals in nearby habitats)?						

Question		Tick one response					Notes
		Yes	Some-what	No	N/A	Not clear	
12b.	Does each animal have the ability to avoid being disturbed by guests?						
12c.	Does each animal have the ability to avoid being disturbed by animal care activities (e.g., cleaning, facility maintenance and repair activities, etc.)?						
13a.	How would you rate the keeper-animal relationship for the animal(s)	pos	neutral	neg			
13b.	What steps are being taken to make a relationship more positive?						
14.	Do we have the ability to provide veterinary care in a way that minimizes stress?						
15.	Does each animal appear to be in good body condition?						
16.	Do any of the animals have a history of disease or injury that requires changes in management?						
17a.	Are diets delivered in species-appropriate ways (content, texture, taste, and schedule)?						
17b.	How often is the diet varied? Please describe in the notes section.	rarely	some-times	Frequent-ly			
18a.	Is there a comprehensive programme of maintaining environmental complexity (enrichment, changing environmental features, etc.)?						
18b.	Does each animal interact with enrichment in the manner expected?						
19a.	Is there an operant conditioning training programme and what is it used for (e.g., veterinary, shows)?						
19b.	Does each animal react positively to training sessions?						
20a.	Does each animal appear to be displaying a variety of species-appropriate behaviours?						
20b.	Are any species-specific behaviours prevented either through space or management?						
21.	Does the animal(s) react negatively to novel stimuli?						
22a.	Do any of the animals demonstrate stereotypic behaviours? If yes, please note specific behaviour in the notes section						
22b.	If yes, is there an understanding of what is causing the stereotypies?						
22c.	What are the measures in place to try to address them?						
23a.	Are behavioural observations being conducted to better understand activity budgets for each animal?						
23b.	Is the behavioural data used to make any necessary modifications to the management or space of the individual animal(s)?						

24.	Have any welfare concerns been reported for this individual or environment? If yes, please note concern and outcome in notes section.						
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Notes section

Statement number	Notes

(end of document)