Photo: Apes are kept in various forms of captivity. This chapter focuses on captive apes in rescue and rehabilitation centers, sanctuaries and zoos. © Jo-Anne McArthur / Born Free Foundation / We Animals Media

CHAPTER 8

The Welfare and Status of Captive Apes

Introduction

Apes are kept in various forms of captivity. They can be found in biomedical laboratories; breeder and dealer facilities; entertainment and exhibition contexts such as, circuses, multi-media companies and tourism; private homes; and rescue and rehabilitation centers, sanctuaries and zoos. The movement of apes between these different forms of captivity—for example from a laboratory to a sanctuary—reflects increasing public concern for ape welfare and recognition of ape sentience (Fleury, 2017; Hirata *et al.*, 2020). This chapter focuses on captive apes in rescue and rehabilitation centers, sanctuaries and zoos, hereafter collectively referred to as *captive facilities*, except where further distinction is needed.

Photo: Animal welfare refers to how an animal is experiencing life. A balance of emotional, mental and physical components, as well as the attainment of species-specific ethological needs.

This chapter comprises two main sections. Section I focuses on understanding and measuring the welfare of captive apes. Key findings include:

- Effective ape welfare systems rely on consistently applied governance and operational systems as well as species- and context-specific responses. Partnerships with other organizations can help co-create welfare knowledge, practice and assessment approaches, while also facilitating access to resources.
- How animal welfare is understood and discussed influences how it is assessed and how the resulting findings are used. Welfare-focused dialogue on neglected topics such as illegal trade and conservation translocation can support both ape welfare and conservation outcomes, particularly if it reflects current legal and scientific thinking—and public opinion—on animal sentience.
- The welfare of captive apes often falls between the cracks of domestic animal health and wild animal conservation legislation and regulations. Country-level, cross-disciplinary analyses of relevant legal instruments are needed to identify current enforcement gaps and resource requirements. A dedicated convention or agreement could mainstream animal welfare in the global arena.
- Institutional standards tend to determine what apes experience on a day-to-day basis, influencing their quality of life.

By applying for and attaining professional accreditation, captive facilities can strengthen systems and features that support good animal welfare.

- Appropriate, enforceable standards at multiple levels—legal, professional and institutional—serve as mutually reinforcing insurance policies to support ape welfare.
- A growing body of evidence indicates which welfare features are critical to captive great apes, although less attention has been paid to gibbons. Universal agreement on species-specific ape welfare indicators remains elusive, but ongoing initiatives highlight momentum and synergies.
- The effectiveness of welfare assessments depends on both the utility and immediate applicability of their results. They need to be practical to implement and produce context relevant information, such as to inform management decisions and/or expedite improvements in ape welfare.

Section II updates statistics on captive ape populations in zoos, rescue and rehabilitation centers, and sanctuaries around the globe. The key findings are:

- Available ape census data show little variation overall compared to data presented in previous volumes of *State of the Apes*.
- When they do occur, variations are not well understood, largely due to insufficient data. A lack of information sharing among zoos and with captive animal census databases such as Species360 or studbooks continues to be an impediment. Barriers to information sharing include language, use of different systems and skepticism about the merits of collaboration.

Section I: Improving Captive Ape Welfare

Understanding Animal Welfare

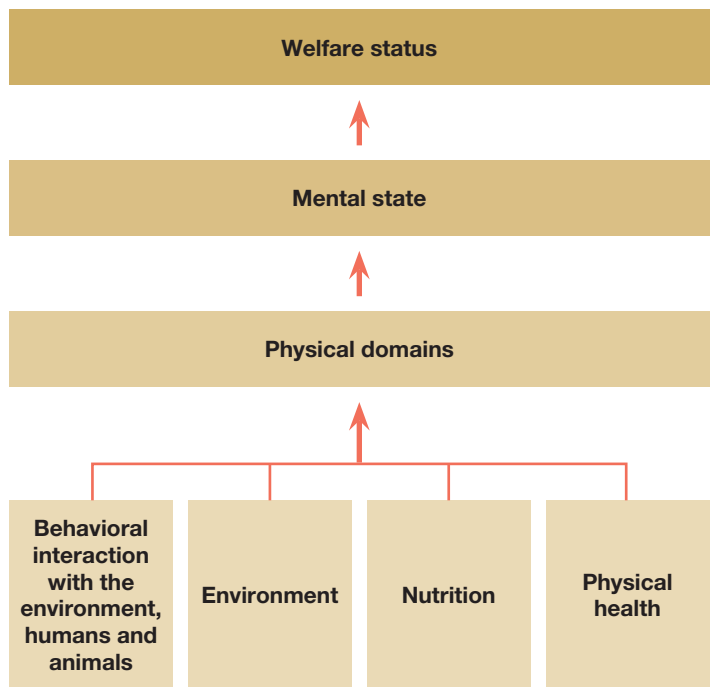
Constructs and Language

Animal welfare refers to how an animal is experiencing life. A balance of emotional, mental and physical components, as well as the attainment of species-specific ethological needs, determines an animal's overall wellbeing and welfare state (Cox and Lennkh, 2016).

As shown in Figure 8.1, the Five Domains Model reflects current thinking on the welfare of animals in human care (Mellor *et al.*, 2020). Four physical domains give rise to negative or positive subjective experiences that contribute to an animal's mental state, known as the fifth domain. Any form of captivity comes with some

FIGURE 8.1

Five Domains Model



Source: Adapted from Mellor *et al.* (2020)

Photo: The movement of apes between different forms of captivity—for example from a laboratory to a sanctuary—reflects increasing public concern for ape welfare and recognition of ape sentience. Mari was born in a laboratory and one arm was badly broken and the other pulled off when her mother was in an agitated state. She now lives at the Center for Great Apes.
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risks, but animals managed in line with the five domains are expected to be healthier physically and psychologically, safer for staff to work with, more likely to qualify for release (if other crucial factors are addressed), and more representative of their species for educational purposes.

It is also generally agreed that animal welfare is not a static construct but a continuum. An individual ape's welfare thus lies somewhere on a scale between good and poor (Broom, 1999; Spruijt, van den Bos and Pijlman, 2001). Reflecting this continuum, Brando and Buchanan-Smith (2018) propose a 24-hour, seven-day animal welfare framework that includes the animal's life-cycle and natural history.

Issues related to animal welfare are often complex and linked to cultural, economic, political, religious and social factors. Local interventions that recognize the roles of each of these factors are more likely to be effective (Sinclair and Phillips, 2018b). Numerous other considerations also merit inclusion in the welfare dialogue, including age-related changes in captive apes and issues linked to ape captivity in spaces away from public view (Brando and Coe, 2022; Krebs *et al.*, 2018; Ross *et al.*, 2010). This chapter highlights the illegal wildlife trade and translocation, both of which can have profound effects on animal welfare.

Language itself can also influence the welfare conversation. Animal welfare can mean different things in different languages—assuming the term exists in the first place. In Chinese, for instance, there was no conceptual or linguistic equivalent of "animal welfare" until the mid-1990s (Hobson, 2007; Lu, Bayne and Wang, 2013). As discussed in Box 8.1, language can create and empower social change and, conversely, hinder it.

Compassionate conservation sees welfare and conservation outcomes as integrated. The approach, which recognizes animal sentience and personhood, encourages conservation practitioners to consider animals as individuals and not just as members of populations of species (Wallach *et al.*, 2018, 2020). Similarly, the One Welfare approach, which expands on One Health, attempts to bridge the gaps between different disciplines, explicitly recognizing and explaining the interconnections between animal welfare, human wellbeing and the environment (Pinillos *et al.*, 2016; see Chapter 2).

BOX 8.1

Language Matters

Language can devalue the intrinsic worth of animals and disassociate their use or exploitation from their suffering (Kahn, 1992; Stibbe, 2001). Such depreciating usage remains in place in the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and among zoos. For instance, CITES uses the term "disposal" to refer to the process by which government authorities manage confiscated live animals (CITES, 2016). The Cambridge Dictionary defines "disposal" as an act of getting rid of something or throwing it away. Meanwhile, many zoos describe animals in their care as "stock," which the Cambridge Dictionary equates to a "supply or amount of goods."

The use and impact of language can and does change, however. In the 1960s, Jane Goodall contributed to the current understanding of chimpanzee sentience by naming her study subjects and defying the established scientific approach (Goodall, 1998). More recently, she and other leading advocates requested an update to the Associated Press Stylebook, a style guide used in journalism, to promote the use of gendered or plural (rather than inanimate) personal pronouns for animals (Graef, 2021). By updating their use of language in line with changes in animal science, law and public opinion on animal sentience, entities such as CITES and zoos could encourage greater empathy, more respect and better care for animals worldwide.

Species-Specific Welfare Requirements in a Systems Approach

There is growing evidence that specific, interrelated features of a captive environment underpin and promote good welfare practice. Zoo experts rated great apes' ability to avoid one another, enclosure appearance and furnishings, group size and social structure as the most important indicators of their welfare. The order of importance of these indicators varies across species: physical attributes of an enclosure are more important for orangutans, while group size and social structure matter more for other species (Fernie *et al.*, 2012). A recent study on chimpanzees underlines the importance of a conspecific for companionship, while other key factors include the caregiver–chimpanzee relationship, opportunities for choice and control, diet, environmental enrichment, and the quality and complexity of space (Ross, 2020; see Figure 8.2).

FIGURE 8.2

Enclosure Design to Facilitate Choice and Control, Center for Great Apes, North America

Note: In North America, the Center for Great Apes provides choice and control for its apes in 19 different habitats with elevated tunnels, which enable apes to move between habitats. Twelve adult male orangutans can move between 11 habitats at different times. If apes want to stay indoors, they can. At night they can choose to sleep inside or outside (P. Ragan, personal communication, 2020).

A recent revision of the Five Provisions Model also highlights human–animal interaction as a significant welfare indicator (Mellor *et al.*, 2020).

Barber and Mellen (2008) suggest seven programs collectively make up "welfare infrastructure": animal training, environmental enrichment, habitat, husbandry, nutrition, research and veterinary care. The omission or removal of any of these programs destabilizes the welfare infrastructure and may cause it to collapse (Bettinger *et al.*, 2017). Professional accreditation systems that review the whole welfare system —including these seven programs, governance and operational standards, and direct welfare support services—are the most robust and effective.

Animal Welfare and Trade

Cruelty is pervasive throughout the live animal "supply chain." The capture, transport and subsequent "use" of wildlife negatively impact them in all five welfare domains (Baker *et al.*, 2013; Clifford and Steedman, 2021). As a result, captive facilities face the short- and long-term need to manage myriad complex ape health and welfare issues (see Figure 8.3). Case Study 4.3 provides evidence of the many clinical issues and implicit poor welfare affecting privately held gibbons. Even after apes are confiscated, their suffering may be exacerbated, including by transfer processes, which can be complicated by inadequate cooperation among multiple agencies, and by limits on facilities' capacity to provide immediate and appropriate triage and care. Some apes have died before they could arrive at a suitable facility.

In recognition of such risk factors, the Conservation Action Plan for great apes in the eastern Democratic Republic of Congo (DRC) includes an objective to develop a procedure for the safe seizure and transfer of confiscated animals.[1] Such responses remain limited, however, despite increasing awareness that debates concerning the wildlife trade typically omit the issue of animal welfare. Some observers attribute this inertia to the durability of the view that non-human animals are no more than property, commodities or resources—rather than individuals or sentient beings (D'Cruze *et al.*, 2020; Wyatt *et al.*, 2022).

It is not only the illegal trade that impacts animal welfare, as legal and illegal trading activities are inextricably entwined. In relation to some species, the legal trade is far greater in magnitude than the illegal one (Ban Animal Trading and EMS Foundation, 2020; Nijman, 2021). Based on assessments of the (allegedly) legal and illegal trade in captive chimpanzees from Africa to China, the facilities in which the apes live are not suitably equipped to house or care for them, contravening CITES regulations for an import permit (Ape Alliance, 2018; Ban Animal Trading and EMS Foundation, 2020). More than half of the chimpanzees in these facilities were under ten years of age when they died; about 15% of them had not reached their first birthday (Ape Alliance, 2018). These mortality statistics underscore the potential deleterious impact of trade and transfer on ape welfare in the absence of appropriate oversight and decision-making. They are particularly stark when compared to the high survival rates at Pan African Sanctuary Alliance (PASA) sanctuaries, which had a 2% mortality rate in 2020 (G. Tully, personal communication, 2021).

Overall, there are arguments for and against the legal transfer of animals between zoos. By performing effective due diligence in individual cases, facilities that seek to acquire or transfer an animal have a responsibility to ensure that their behavioral, physiological and psychological requirements can be met (BIAZA, 2019; Pierce and Bekoff, 2018; Rietkerk and Pereboom, 2018).

FIGURE 8.3

Mubaki's Progress from Confiscation through Captive Care in Eastern DRC

Note: About 90% of confiscated individuals who arrive at sanctuaries that are members of the Pan African Sanctuary Alliance are malnourished and sick, suffering from a range of physical and psychological conditions (Farmer, 2002; PASA, 2009). Despite poor arrival conditions, survival rates are similar to those seen in member facilities of the Association of Zoos and Aquariums, although survival itself is not necessarily a sign of good welfare (Faust *et al.*, 2011). Left to right: Mubaki at confiscation and after receiving treatment and care at the Lwiro Primate Rehabilitation Center in the eastern DRC.

Animal Welfare and Release Programs

Under ideal circumstances, release programs follow international guidance. The reintroduction guidelines of the International Union for Conservation of Nature (IUCN) focus on release for conservation purposes but also define welfare-based release (Beck *et al.*, 2007; Campbell, Cheyne and Rawson, 2015). According to the precautionary principle, however, the conservation of a taxon takes precedence over an individual captive ape's welfare; a welfare-defined release may not meet, or may even contravene, the IUCN principle (Beck *et al.*, 2007; Campbell, Cheyne and Rawson, 2015). Regardless of the goal, designing a rehabilitation and release process that consistently considers animal welfare during each stage is crucial to supporting successful conservation outcomes (see Figure 8.4). Adverse stress may occur at any stage of the release process—from capture, handling, examination and transport to holding, monitoring after release and post-release evaluation (Berg, 2018; Teixeira *et al.*, 2007). While stress responses generally have adaptive value in the short term, they can have devastating impacts on brain function and susceptibility to disease in the long term, depending on the duration, magnitude and nature of the event (McCormick, Shea and Langkilde, 2015; Moberg, 2000).

Just as captivity can compromise welfare, so too can release. In contrast to life in captivity, which is characterized by predictability, life in the wild involves fluctuations and variations in the food supply, predator and competitor types and numbers, and social pressures (Swaisgood, 2010; Teixeira *et al.*, 2007). Nevertheless, some released apes have survived and thrived after release (Goossens *et al.*, 2005; Humle *et al.*, 2011; King, Chamberlan and Courage, 2012; Wedana *et al.*, 2021). In some cases, however, released apes negatively impact the welfare of wild conspecifics.[2]

FIGURE 8.4

Design of the Rehabilitative Environment at Kalaweit Gibbon Project, Indonesia

Note: Wild gibbons are highly territorial, regulating their spacing through direct contact or loud calls. Left: Sufficient space between enclosures is prioritized at Kalaweit. Right: Triangular lozenge-shaped cages are designed to avoid 90-degree angles and prevent intimidation and aggression during integrations. As release becomes possible, gibbons are transferred to a release site where they spend several months in a more natural enclosure to facilitate adaptation (A. Brulé, personal communication, 2020).

Standards of Practice

National Legislation and Regulations

By passing appropriate, enforceable animal welfare legislation and regulations, countries can demonstrate a national commitment to captive and wild animal care and management. A Model Animal Welfare Act serves as a basic template and guidance document for governments interested in enacting new or improving existing legislation (Cox and Lennkh, 2016). Two countries—Malawi and Costa Rica—recently saw positive developments in animal welfare legislation, although their impact has yet to be examined (see Annex IX). In countries where some form of animal welfare legislation exists, its configuration, the extent of coverage and enforcement vary greatly (Hassan, 2016). Understanding a country's commitment to animal welfare requires comparing relevant legal requirements, inspection measures and control procedures (Lundmark, Berg and Röcklinsberg, 2018). A recent analysis of the legal protection of apes found that none of the ten African ape range states under review included criminal provisions on the welfare or exhibition of apes (Rodriguez *et al.*, 2019).

Country examples highlight that captive wildlife welfare often falls between the cracks of laws and regulations that govern wildlife conservation and animal health. Conservation law is most often focused on the management and survival of free-roaming wildlife species, while animal welfare law targets domestic animals (Prisner-Levyne, 2020; Whitfort, 2019). Complicating matters is the issue of ape provenance.

Wildlife conservation laws sometimes apply only to apes in their natural habitat or country of origin, or only to wild-born and not to captive-born apes (Beastall, Bouhuys and Ezekiel, 2016; Rodriguez *et al.*, 2019). Indeed, even within the conservation community, a distinction is made between the intrinsic value of apes in their natural habitat versus apes forcibly removed from the same habitat. Country-level cross-disciplinary analyses of relevant legal instruments are urgently required to allow for an assessment of legislative gaps and requisite enforcement resources.

While not a substitute for appropriate, enforceable animal welfare legislation, conservation litigation may help to "remedy" harm caused to affected species and individual animals (Phelps *et al.*, 2021b, 2021c). Remedies are the actions needed to address harm and help an animal recover; an example for an individual orangutan might be rehabilitation and post-release monitoring or long-term care (Phelps *et al.*, 2021b). The provision of good welfare requires money. Captive facilities that are ethically driven yet often short on resources are forced to react as animals are seized or ownership is transferred (Fleury, 2017). Since seizure and post-seizure events involving illegally held and traded live animals are unplanned, however, related costs are not generally included in law enforcement grant budget lines. Nor are they covered in assessments of case severity or decisions about penalties or sentencing, which could potentially help facilities recoup costs associated with seizure and management.

In Indonesia, the environmental group WALHI North Sumatra and the Medan Legal Aid Institute have filed a ground-breaking lawsuit against a company that keeps protected species, including an orangutan, at its zoo without legal permission (Walhisumut, 2021). In court proceedings elsewhere, plaintiffs have focused on the impact of biodiversity loss and the suffering of individual captive animals to strengthen sentencing for wildlife offenses (Knott, 2021; Whitfort, 2019).

International Conventions and Declarations

Convention on International Trade in Endangered Species of Wild Fauna and Flora

CITES signatories have three options: they can maintain confiscated animals in captivity, return them to the wild or perform euthanasia. In most cases, they choose captivity—in its different forms (CITES, 2016; CITES Secretariat, 2017; IUCN, 2019a). Sparse information is provided on the required resources, benefits or challenges associated with each option. Overcrowded Southeast Asian zoos highlight the challenge of having to manage large numbers of confiscated and abandoned animals (Agoramoorthy, 2010; Karokaro, Gokkon and Suriyani, 2017). While CITES is not about welfare, trade and "disposal" decisions can have negative welfare impacts, and good outcomes are not guaranteed with any option (Rivera, Knight and McCulloch, 2021; Ronfot, 2016; Wyatt *et al.*, 2022; see Box 8.1). CITES provides a framework, but each country must adopt its own domestic legislation to ensure national implementation (CITES Secretariat, 2021).

Only ten of the 26 ape range states that are CITES members have laws that satisfy all requirements (Sherman and Greer, 2018). Thailand, for example, has met some CITES requirements, but its wildlife laws have significant shortcomings with respect to native ape species and offer no protection for non-native ape species. Moreover, Thailand exhibits severe welfare problems in government-run captive facilities, where most captive wild animals are held (Beastall, Bouhuys and Ezekiel, 2016; Moore, Prompinchompoo and Beastall, 2016; Ronfot, 2016).

Photo: Just as captivity can compromise welfare, so too can release. In contrast to life in captivity, which is characterized by predictability, life in the wild involves fluctuations and variations in the food supply, predator and competitor types and numbers, and social pressures.
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The incoming joint IUCN–CITES task force aims to support each country in developing national action plans to manage seized animals (N. Maddison, personal communication, 2020). Explicitly acknowledging the importance of welfare for positive conservation outcomes within the development of these plans may help to integrate welfare-focused considerations and action.

Universal Declaration on Animal Welfare

Although animal welfare commitments are a prerequisite for greater awareness, they are rarely included at the international policy level. There is no global agreement or treaty to protect the welfare of animals (Bridgers, 2021). The Animal Issues Thematic Cluster and the World Federation for Animals are among the collaborative initiatives that aim to fill this policy gap (AITC, n.d.; WFA, n.d.).

The Universal Declaration on Animal Welfare (UDAW) is a proposed intergovernmental agreement whose aim is to prevent cruelty to animals, reduce their suffering and promote welfare standards (Appleby and Sherwood, 2007). UDAW has received more support than any other international animal welfare initiative: it has been formally endorsed by more than 60 governments and 270 animal welfare organizations from 78 different countries, including the World Organisation for Animal Health (formerly the Office International des Epizooties) and the World Veterinary Association (Gibson, 2011; D.J. Verdonk, personal communication, 2021). UDAW is recognized as an important step towards the proposed UN Convention on Animal Health and Protection, a framework with legally binding provisions (GAL, 2018). A feasibility study would help to identify the challenges and resources needed to adopt and implement such an agreement.

Pledges made at the 4th African Animal Welfare Conference[3] included a call for African governments to support the process of developing and securing the adoption of an animal welfare-focused resolution at the next UN Environment Assembly and to confirm their support for UDAW as an African Union resolution to the UN General Assembly (AAWC, 2020; Chumo, 2021). In 2022, UN Environment Assembly member states adopted the first-ever resolution to make explicit reference to animal welfare, recognizing the link between animal welfare, environment and sustainable development (UNEP, 2022; WFA, 2022).

Professional Associations and Accreditation

Professional systems can be more flexible than legal ones, enabling changes, updates and adaptations to new developments and knowledge (Lundmark, Berg and Röcklinsberg, 2018). In the absence of appropriate, enforceable legislation, the membership of a professional association may facilitate advances in animal welfare through accreditation (Banes *et al.*, 2018). Accreditation processes are usually conducted by a professional body and require assessment against predetermined standards, which are reviewed at designated intervals to ensure they are maintained and adapted as required. The advantage of accreditation, assuming the system is appropriate, is that it can provide a public position on the extent to which captive facilities meet stated standards. As they fall outside of the legal system, accreditation schemes do not normally have the same requirements of transparency and predictability, although the accrediting body may choose to disclose results to increase transparency.

Sanctuary networks and accreditation systems differ in their geographical scope —from international to regional—and in terms of their service provision, which can focus on any combination of accreditation and advocacy, shared learning, and capacity-strengthening programs and events. Their approaches and standards may also vary, as most manage their own accreditation systems internally. Only the North American Primate Sanctuary Alliance requires third-party verification by the Global Federation of Animal Sanctuaries (GFAS) or Association of Zoos and Aquariums (AZA). Each approach has its own merits: the standards developed by internally managed accreditation systems can appeal to captive facilities, while independent third-party verification with species-specific guidance is a more robust benchmark for partners, the public and donors. Separately, Animal Advocacy and Protection has developed a system for assessing the capability of European rescue centers, sanctuaries and zoos to receive its "outplaced" animals (AAP, n.d.). Their system includes assessment of an organization's ability to provide for the welfare of each animal (O. Martin, personal communication, 2020).

The overarching international body for zoos—the World Association of Zoos and Aquariums (WAZA)—has more than 400 members, including regional and national zoo associations. Individual zoos that apply for WAZA membership must be accredited by a recognized association in their own region, if one exists (WAZA, n.d.). WAZA relies on its regional member associations to enforce standards among their member zoos. While standards and compliance control currently vary across regions, WAZA requires all regional associations to have an animal welfare evaluation process in place by 2023 to accredit individual zoos and to ensure compliance among all institutional members (WAZA, 2019). Associations are free to develop their own standards and processes, so long as the standards are based on expert input, best practice and science, and processes that reflect animal-based measures (P. Cerdán Codina, personal communication, 2021).

Internally Developed Standards

The foundations of good animal welfare are standards of practice at the captive facility level; in some cases, these standards may be the only available guidelines for facility staff. While some facilities may have informal standards informed by institutional values, many others have formalized policies, standard operating procedures (SOPs), behavioral management plans and welfare assessment tools. Every institution has its own unique set of approaches to determining what is needed and how best to implement plans on a day-to-day basis. Given variations across facilities, accreditation systems are crucial for ensuring compliance. As part of its new evaluation process, WAZA requires regional associations to verify institutional-level animal welfare policies and evidence of compliance (P. Cerdán Codina, personal communication, 2021).

In North America, Save the Chimps formalized its philosophy of care to ensure consistent and exemplary care for the 230+ chimpanzees in its sanctuary. The philosophy gives rise to a theory of change with which the organization's policies, protocols and methodologies conform and align (see Figure 8.5). The intended outcomes are achieved through standards of care that guide the implementation of SOPs. Care practices are shaped by proven methods and published literature on animal welfare, including more than 100 specific care plans based on chimpanzee past history and current status. Specific care plans are updated based on regular welfare assessments (A. Halloran, personal communication, 2020).

FIGURE 8.5

Save the Chimps Approach to Promoting Chimpanzee Welfare

Source: Save the Chimps (n.d.)

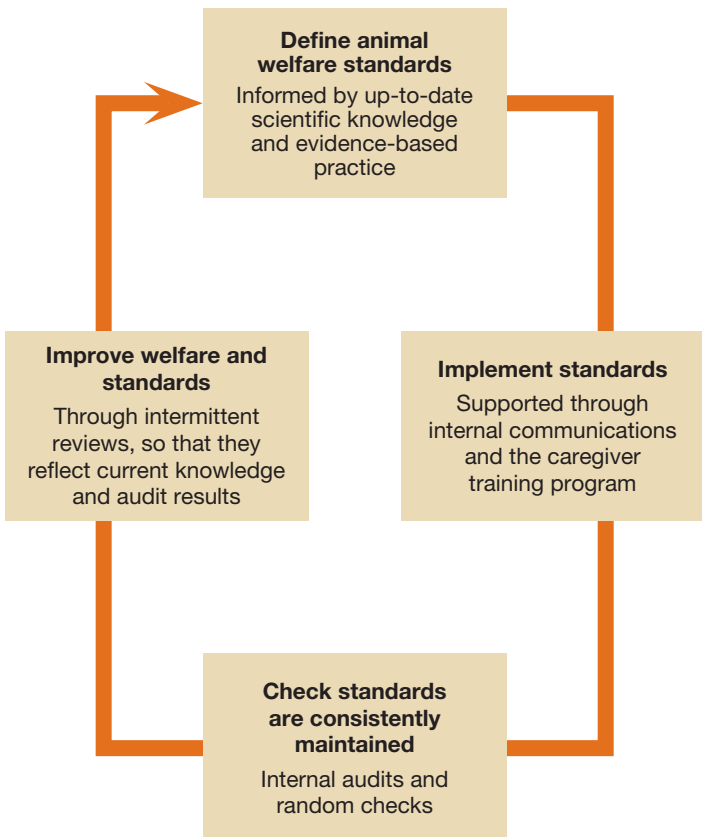
Theory of change	
Ultimate goal	Chimpanzee well-being: provide an evironment in which chimpanzees thrive as a result of the exemplary care they receive
Desired outcomes	■ Safety and well-being of chimpanzees and staff is at forefront of all sanctuary operations ■ Individualized care ■ Enriching environment with freedom of choice ■ Opportunities for resocialization and social integration ■ Exemplary veterinary care
Challenges to achieving goal	■ Difficulty closely monitoring apes in large habitats ■ Need to isolate chimpanzees for veterinary procedures ■ Balancing individual versus group needs
Overcoming barriers	■ Observe apes when indoors and with remote cameras ■ Facilitate cooperation through operant conditioning ■ Accommodate diverse needs whenever possible
Indicators of progress	■ Assurance of safe working environment ■ Alignment of standard operating procedures and Philosophy of Care ■ Fulfillment of individual care plans ■ Welfare, monitoring and intervention assessments ■ Social competence and integration ■ Contribute to improving care practices within the animal care industry

The animal welfare organization Four Paws, whose 12 sanctuaries in 11 countries care for more than 250 bears, big cats and orangutans, ensures standardized welfare outcomes, care and management services across its facilities through an articulated quality management system (Four Paws International, 2020a; I. Redtenbacker, personal communication, 2020). As illustrated in Figure 8.6, the system involves four mutually reinforcing, iterative steps:

- **define animal welfare standards** based on sanctuary-specific handbooks, SOPs and guidance on management topics, informed by current scientific knowledge;
- **implement standards** by supporting clear internal communication, a year-long caregiver training program (comprising three in-person workshops complemented by eight e-learning courses) and an annual quality management system workshop to inform staff of standards and expectations;
- **check standards** through internal annual audits and random checks carried out by trained staff to ensure compliance; and
- **improve welfare and standards** based on results from audits and checks as well as recommendations, all of which are shared with staff and management at each facility (I. Redtenbacher, personal communication, 2020).

FIGURE 8.6

Four Paws Quality Management System Promoting Animal Welfare



Standards for Rehabilitation and Release

For some facilities, rehabilitation for release is a key consideration in determining how an ape is managed. In assessing whether an individual ape has the skills required for life in the wild, including the necessary level of locomotor skill, facilities may use dedicated frameworks such as the Enclosure Design Tool (see Case Study 8.1). As part of the rehabilitation process, they may also aim to minimize human–animal interaction (Russon, Smith and Adams, 2016; see Annex IX). In Indonesia, for instance, subadult rehabilitant female orangutans in the care of International Animal Rescue serve as foster mothers after being paired with rescued infants, which significantly reduces the apes' dependency on and interaction with humans. This approach decreases the duration of rehabilitation from seven years or longer to two–three years until release (K. Sanchez, personal communication, October 2020).

IUCN reintroduction guidelines for great apes and gibbons cover several considerations that influence welfare outcomes, such as behavioral criteria and assessment,

phased approaches to release and post-release support to facilitate adaptation (Beck *et al.*, 2007; Campbell, Cheyne and Rawson, 2015). GFAS accreditation standards for sanctuaries include aligned adaptations for rehabilitation centers that are complementary with IUCN guidelines (GFAS, 2022). Capturing lessons learned on the effective features of rehabilitation and release from field practitioners could help underpin the development of agreed welfare indicators for released apes.

Failure to Promote Good Animal Welfare

Failure to provide good animal welfare may be a consequence of simultaneous and interrelated issues. Annex X summarizes common legal, professional and institutional issues as well as barriers to and opportunities for good captive ape welfare, based on shared experience. In short, barriers to good animal welfare include inappropriate accreditation systems, corruption, unfavorable cultural aspects (geographical, sectoral or organizational), inadequate financial or human resources (such as poor leadership or technical deficiencies), pressure from authorities to accept or release animals, and a state's failure to prioritize welfare. A recent analysis focused on Southeast Asia shows a similar level of complexity, highlighting the need for strengthened political will, policy and legislation, as well as enhanced accountability of captive facility management through proper licensing, permitting, regulations and regular inspections (Rivera, Knight and McCulloch, 2021).

Achieving high welfare standards requires an ability to recognize good practice in each part of the system. While high standards in one part can influence outcomes across a system, they can also be specific to a particular area (such as organizational systems or staff competencies) or domain (see Figure 8.1). Under good leadership and with team buy-in, standards can be learned and become self-sustaining (Sinclair and Phillips, 2018a; Walraven and Duffy, 2017). This process requires ongoing self-reflection and integration of emerging science and practice, as proposed by the Four Paws and Save the Chimps systems (see Figures 8.5 and 8.6).

Facilities that operate outside of professional zoo associations may suffer from weak institutional governance mechanisms, inappropriate leadership, or limited engagement and learning opportunities (Ward *et al.*, 2020). Membership in a zoo association does not necessarily translate into higher animal welfare standards, however, especially if the association lacks an appropriate accreditation system and enforcement mechanism (Draper and Harris, 2012; Rainer *et al.*, 2020). In Indonesia, for example, 50% of zoos are officially accredited, yet a mere 14% are deemed decent and appropriate (Saudale, 2015). Uneven compliance across association members is another complicating factor. Contravening both WAZA and regional association guidelines, zoos in Malaysia, the Philippines and South Africa have permitted direct interaction with chimpanzees, gibbons and orangutans (Corrigan, 2010; WAP, 2019). Poorly run accreditation systems can falsely suggest that facilities are providing an appropriate level of animal care and treatment, which can do more harm than good (Winders, 2017).

The Southeast Asian Zoos and Aquariums Association (SEAZA) acknowledges the challenges inherent in streamlining its members' varying approaches and capacities to achieve and maintain compliance with WAZA's new (2023) requirements (Manansang, 2020). WAZA now requires SEAZA to conduct onsite audits every five years and to seek evidence that facilities are conducting self-assessments of animal welfare (the principles of which are not explicit) at least annually, in between audits. Furthermore, SEAZA is responsible for training

Photo: The socioecological complexity that characterizes ape species can make measuring welfare a daunting task.
© GRACE Gorillas

inspectors and developing a complaints and disciplinary system (P. Cerdán Codina, personal communication, 2021). By monitoring the impact of permitted variation around the world, WAZA will be able to assess if this flexibility leads to pronounced regional variations in animal welfare outcomes.

The welfare challenge is not restricted to zoos. The terms "rescue center" and "sanctuary" are not legally regulated; facilities that adopt either of them are not necessarily providing good animal welfare (Doyle, 2017; Winders, 2017). Indeed, the quality of care and welfare of apes in sanctuaries has come under scrutiny for not meeting acceptable standards (Grimm, 2020; Sherman and Greer, 2018). The impact of accreditation on the sanctuary sector is likewise limited by the proportion of facilities that are accredited; in Africa, for example, only 19% of great ape sanctuaries have officially met GFAS standards (GFAS, n.d.; see Section II of this chapter). In Southeast Asia, the demand for animal tourism is fueling the rise of "faux rescue centers" (Rivera, Knight and McCulloch, 2021). Unregulated or improperly managed facilities and inappropriate depictions of—and interactions with—animals can have negative welfare impacts that are unrecognized by visitors, enhance demand for exotic pets and undermine conservation goals (Moloney *et al.*, 2021; Moorhouse *et al.*, 2015; Ross *et al.*, 2008).

While no single global body regulates wildlife tourism, an increasing number of tourism-focused initiatives have emerged in response to failures in welfare systems and the lack of communication about appropriate accreditation systems for benchmarking. One such initiative is the Animal Protection Network, designed to help tourism operators and visitors make humane choices (Animondial, n.d.). The IUCN Primate Specialist Group's Section for Human–Primate Interactions' responsible primate watching guidelines include a chapter on primates in

captivity, as well as looking at tourism and primate welfare (Waters *et al.*, 2023).

IUCN reintroduction guidelines state that great apes with significant deficits in knowledge and skills should not be released without sufficient rehabilitation and post-release support (Beck *et al.*, 2007). Nevertheless, limited resources and carrying capacity, along with pressure from authorities, may lead facilities to release animals without proper protocols, with unknown welfare and conservation outcomes (Mitman *et al.*, 2021; Sherman and Greer, 2018). Low long-term survival rates of released orangutans are attributed to a lack of familiarity with current research on orangutan behaviors, the extended periods apes are kept in captivity and the application of a "hard release" strategy, which involves the immediate release of an ape from captivity without post-release support (Sherman, Ancrenaz and Meijaard, 2020). At best, a failure to recognize deteriorating welfare after release can lead to recapture (and re-release), which can cause additional stress; at worst, the result is the animal's death (Sherman, Ancrenaz and Meijaard, 2020; Wilson and McMahon, 2006).

> "Identifying welfare indicators is the first step in developing an objective, scientific process by which to assess, monitor and improve welfare."

Assessing Ape Welfare

Assessment is key to the philosophy of continuous welfare improvement. Some zoo associations and sanctuary alliances have developed animal care guidelines and standards for the keeping of ape species.[4] Overall, however, guidance on how to assess species-specific animal welfare is sparse and inconsistent, and the development of assessment processes is often left to individual captive facilities and affiliated academics.[5] This section focuses on key elements of welfare assessments and recent ape-specific developments; it is complemented by Annex XI, which reviews the features of four tools used to assess captive ape welfare.

Understanding Welfare Indicators

Welfare assessments usually consist of a survey with indicators that caregivers score based on whether an animal or group meets given criteria. Identifying welfare indicators is the first step in developing an objective, scientific process by which to assess, monitor and improve welfare. Since welfare is multi-dimensional, assessing it requires a variety of indicators that can generate an overall picture of an animal's physical and psychological wellbeing. The Five Domains Model often underpins the design of assessments, while indicators broadly represent the four physical domains (Sherwen *et al.*, 2018; see Figure 8.1). Ideally, an assessment combines indicators that are resource-based (inputs) and animal-based (outputs):

- **Resource-based indicators** relate to the support and conditions an organization provides to improve animal welfare, including housing, group size and composition, and management (including staff-to-animal ratio and the competency of staff).
- **Animal-based indicators** include direct animal responses to the inputs, such as behavior, body condition and other clinical signs.[6]

These two types of indicators are closely related since an animal's response to resources and consequent welfare status both depend on the quality of resources and how these are applied and managed. For practical reasons, accreditation systems focus on resource-based indicators while institutional welfare assessments primarily use animal-based indicators or a combination of both (see Annex X). Animal-based indicators allow caregivers to assess an animal's welfare more directly, although they could readily check records for basic health conditions or conduct a brief inspection.

As these indicators can be difficult to measure and interpret, however, they require significant time and resources (Brando and Buchanan-Smith, 2018; Crockett and Ha, 2010; Project Chimps, 2020; Truelove *et al.*, 2020).

Specifically, the interpretation of behavioral abnormalities as indicators of welfare remains controversial, mainly because an absence of suffering does not equal good welfare (Bloomsmith *et al.*, 2020; Broom, 1991). Chimpanzees, for example, may not exhibit obvious behavioral abnormalities, even in the most deprived environments. While a facility may not be meeting a chimpanzee's welfare needs appropriately, an absence of such abnormalities may simply demonstrate the species' resilience and adaptability, while stress may be having hidden impacts (S. Ross, personal communication, 2020). Conversely, apes' abnormal behavior does not necessarily signal that they are experiencing poor welfare; any number of factors, past and present, can result in an expression of suffering (Bloomsmith *et al.*, 2020).

Identifying Species-Specific Indicators

The socioecological complexity that characterizes ape species can make measuring welfare a daunting task (Goodall, 1986; Mitra Setia *et al.*, 2009; Ross, 2020). Ape behavior is relatively well understood, as are features of captive (zoo) environments that are important for their welfare, particularly for captive and wild chimpanzees.[7] This body of knowledge enables the development of meaningful welfare indicators for some ape species (see Annex XI).

The preferences of captive facilities—and the available time of their keepers—often determine which indicators and scales they use for scoring. To simplify the assessment process, facilities that care for many species may use more generic measures, such as a mammal template, with adaptations for specific species as required (D. Free and S. Wolfensohn, personal communication, May 2021).[8] A common strategy involves constructing lists of welfare indicators as determined by consensus of expert opinion. An appropriate range of expert input and agreement is crucial for wide uptake and, ultimately, welfare impact. Veasey notes that while there can be a strong agreement between in situ and ex situ expertise, discrepancies can also reflect differing backgrounds (Veasey, 2020a).

> "The interpretation of behavioral abnormalities as indicators of welfare remains controversial."

The process for soliciting input and agreement ranges from informal, one-off meetings and questionnaire-based surveys to more formalized approaches, such as multiple-round Delphi consultations. Established across many disciplines, the Delphi method enables stakeholders (the expert panel) to address a complex problem collectively and reach consensus, as indicated by agreement across multiple rounds of consultation (Dalkey and Helmer, 1963; Hsu and Sandford, 2007; Millar *et al.*, 2007). Having gained popularity in conservation and animal welfare circles thanks to its adaptability, Delphi was recently used to identify welfare indicators for laboratory-housed macaques.[9] In addition to assisting in the identification and validation of animal-based welfare indicators, Delphi also serves to assess their feasibility and reliability (Truelove *et al.*, 2020). The tools presented in Annex XI reflect some features of the Delphi process, although they lack its rigor.

Engaging an appropriate range of experts from multiple facility types in a systematic process can strengthen the prospects of obtaining universal acceptance of species-specific ape welfare indicators. Work led by the University of Birmingham in the UK, in collaboration with the European Association of Zoos and Aquaria (EAZA) and PASA, includes a consultation process with a range of stakeholders, in particular zoos and sanctuaries, to help identify, gain consensus and validate welfare indicators for

Photo: Camera systems can greatly reduce the amount of time needed to visually access animals in large enclosures. They can also monitor without disturbance, including during times when staff members are absent, and they can store footage for later viewing. Drawbacks include potentially high costs, more limited identification of individual animals, and time-consuming footage viewing.
© Lwiro Primates Rehabilitation Center

captive great apes (J. Neufuss, personal communication, 2021).

Tools, Technology and Context

Once stakeholders agree on and validate indicators, the development of a welfare assessment tool can normally be explored (Truelove *et al.*, 2020). Many methods and tools to monitor and assess health and welfare, and to fulfill accreditation requirements, are developed in-house. As noted above, Annex XI presents a selection of tools for assessing captive ape welfare.

Behavioral measures are critical to assessing welfare (Wolfensohn *et al.*, 2018). They represent a common and relatively low-cost method, although they can be time-consuming and subjective (Binding *et al.*, 2020; Watters, Margulis and Atsalis, 2009; Whitham and Wielebnowski, 2009, 2015). Behavioral data can be collected by people with varying levels of expertise, resources and objectivity. Digital options for data collection can save time by eliminating the need to enter data manually, reducing the number of errors made during collection or entry, providing immediate feedback through reports and charts, and facilitating opportunities for multi-institutional collaboration (Wark *et al.*, 2019). At the same time, facilities that opt for digital data collection may need to purchase commercial software and hardware—or to have the skills and time to design a software solution (McDonald and Johnson, 2014).

One app that is widely used in academic zoo-based behavioral research on apes is ZooMonitor. The app, which is also employed in some sanctuaries, records animal behavior and habitat use using standardized methods, while also logging individual characteristics (Wark *et al.*, 2019). Other software and applications are available (Clegg, 2021; McDonald and Johnson, 2014; Whitham and Miller, 2016). Camera systems, for example, can greatly reduce the amount of time needed to visually access animals in large enclosures. They can also monitor without disturbance, including during times when staff members are absent, and they can store footage for later viewing. Drawbacks include potentially high costs, more limited identification of individual animals, and time-consuming footage viewing (Hansen *et al.*, 2018).

Animal welfare, conservation, farm and laboratory-based researchers are asking different questions, but collectively the answers to these questions could make emerging technology more relevant and adaptable (Buller *et al.*, 2020; Coe and Hoy, 2020; Langford *et al.*, 2010; Wich and Piel, 2021). For example, advances in software are making it possible to measure the body posture of animals over time in a variety of contexts (Graving *et al.*, 2019). Multi-disciplinary collaboration and resource pooling among practitioners, researchers and technical experts can help to develop solutions for specific needs, encourage market developments and strengthen the sustainability of solutions (Allan *et al.*, 2018; Joppa, 2015; Mulero-Pázmány, 2021). A simplified Delphi process may help to bring together key features of an assessment tool fit for purpose across multiple contexts, facilities and species.

Since many captive facilities are strapped for resources and struggle due to limited technical capacity, power and connectivity, technical solutions need to adapt to their needs to be workable. Small, rugged devices, with a relatively long battery life and a simple method for backing up data, can help facilities working in field conditions (McDonald and Johnson, 2014). Software that produces simple graphic outputs can enable easy interpretation and presentation, helping staff to understand the results, which can strengthen ownership of welfare solutions. Until technology becomes affordable, user-friendly enough for widespread use and more inclusive in its taxonomic coverage, it will need to be complemented with more traditional methods. For example, placing photographs of chimpanzees in the order of dominance and sociability, rather than using traditional numerical scales, enables staff with low literacy levels to provide input into integration processes (R. Atencia, personal communication, 2020).

Assessing the Welfare of Released Apes

In the field of conservation, assessments of released animals and reporting about related outcomes tend to focus on their physical state—and their "fitness" in particular (Beausoleil *et al.*, 2018). Post-release assessments that incorporate the contemporary understanding of animal welfare better reflect the resource-intensive nature of rehabilitation. Although released apes may no longer be under human control, they are not necessarily fully competent at the point of release or for some time thereafter. In such cases, releasing individuals may give rise to a "duty of care" not normally provided to free-ranging wild animals (Berg, 2018). Little attention has been paid to the methods for monitoring ape welfare after release, partly because of the delicate balance required between helping and hindering adaptation, and partly because of the challenge of capturing data (Harrington *et al.*, 2013).

The type, frequency and duration of monitoring after release is influenced by several factors, including the goal of the action, site topography, species morphology and the temperament of individual apes. Monitors are advised to locate apes as often as possible—and every day in the beginning of the process—for at least one annual cycle (Campbell, Cheyne and Rawson, 2015; Sherman, Ancrenaz and Meijaard, 2020). While locating released apes to monitor welfare can be challenging, observers can facilitate the task by familiarizing themselves with ape ranging patterns, learning to identify sleeping sites, utilizing bioacoustics technology (to pick up gibbon calls, for example) and employing radio telemetry (Beck *et al.*, 2007; Campbell, Cheyne and Rawson, 2015). Radio telemetry collars have worked well for chimpanzees and there has been some success with implants for orangutans, but animal-borne technology remains elusive for other ape species and its use can present another set of welfare challenges, such as the risk of infection at the surgical site of implantation (Dore *et al.*, 2020; Robins *et al.*, 2019; Trayford and Farmer, 2012).

Whether an ape can be monitored through direct ground observations or remote monitoring determines what type of data and other information can be collected (see Figure 8.7). A single measure may not provide a full picture of ape welfare; a combination of data and other information—such as on behavior, stress hormones, and negative or positive experiences—can offer a more complete indication of an individual's state, especially when collected over time. Unless the monitor is highly familiar with an ape species or individuals, simply collecting data on behavior may miss crucial information on body condition. A monitor who knows

FIGURE 8.7

Monitoring of a Released Orangutan at Jantho, Sumatra

Note: Data collection on released orangutans' locations, positions in trees, behavior, body conditions and health status in Jantho, Sumatra. Tracking movement from nest to nest and acquiring local knowledge can help monitors locate released orangutans.

the individual animals may be particularly helpful in the early phases of post-release monitoring. While there are no easy answers to monitoring the welfare of apes after release, explicitly identifying monitoring as a key activity can underpin donor support for the development of appropriate approaches and tools.

Case Study 8.1 specifically considers the rehabilitation of apes for release and introduces the Enclosure Design Tool. To improve adaptation and welfare outcomes, the tool provides a framework to make enclosures less predictable and to ensure they behave like natural habitats, even if they do not look like them.

CASE STUDY 8.1

The Enclosure Design Tool: An Evidence-Based Framework for Improving Captive Ape Wellbeing

Context

All wild apes are highly arboreal, inhabiting forests that are characterized by enormous complexity and spatio-temporal variability (Wessling *et al.*, 2018). In contrast, captive environments are often relatively small, simple and unchanging, offering limited capacity for challenging arboreal activity. Many sanctuaries have large, forested enclosures for their apes during daylight hours, but they house individuals in substantially smaller "night dens" for up to 14–16 hours per day. Captive apes may also spend time (from hours to years) in other kinds of facilities, such as quarantine, clinics or other holding areas for health, welfare or management reasons.

In terms of musculoskeletal health, the repercussions of living in captivity are significant. Captive apes need prolonged natural (arboreal) loading patterns on their muscles and bones, particularly during growth, to gain the strength, skill and stamina needed to express physically demanding natural behaviors and to prevent age-related musculoskeletal degeneration (Chappell and Thorpe, 2022; Sarmiento, 1985). Captive apes also need to experience species-typical wild-type cognitive challenges to interact positively with their environment and to avoid frustration and boredom (Colditz and Hine, 2016). These experiences are particularly critical for apes being rehabilitated for release. While "forest schools" offer valuable exposure to natural habitat, they rarely facilitate the prolonged and diversified exposure to natural challenges required to prepare the apes mentally and physically for life after release (Chappell and Thorpe, 2022).

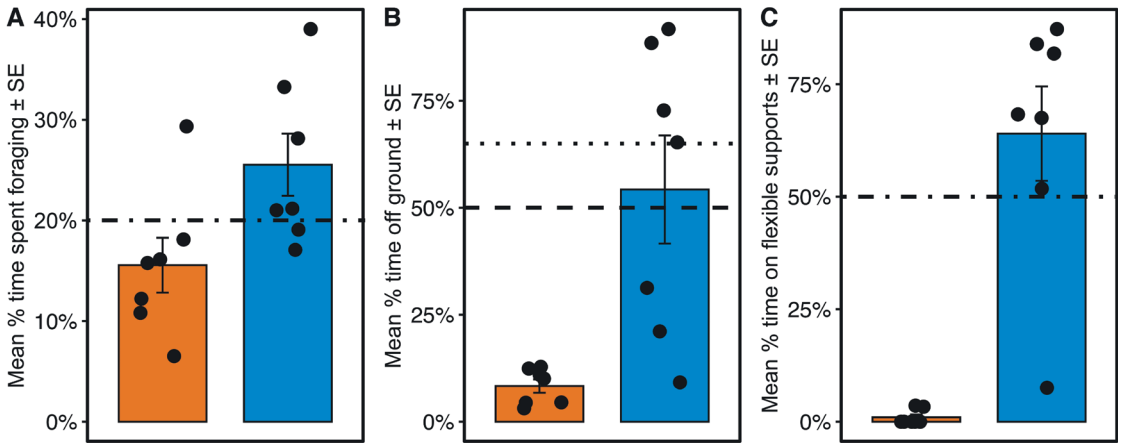
The Enclosure Design Tool (EDT) is an evidence-led, web-based framework created to address these issues (Chappell and Thorpe, 2022; University of Birmingham, n.d.). Its aim is to allow captive environments in which animals move, sleep, feed and rest to offer species-appropriate challenges, choice and control options that resemble the physical and intellectual challenges they would face in the wild. The first EDT focused on zoo chimpanzees and later versions were adapted to accommodate sanctuary chimpanzees in Cameroon and rehabilitant orangutans in Indonesia.

Photo: In terms of musculoskeletal health, the repercussions of living in captivity are significant. The EDT aims to allow captive environments to offer species-appropriate challenges, choice and control options that resemble the physical and intellectual challenges they would face in the wild. © Ian Bickerstaff

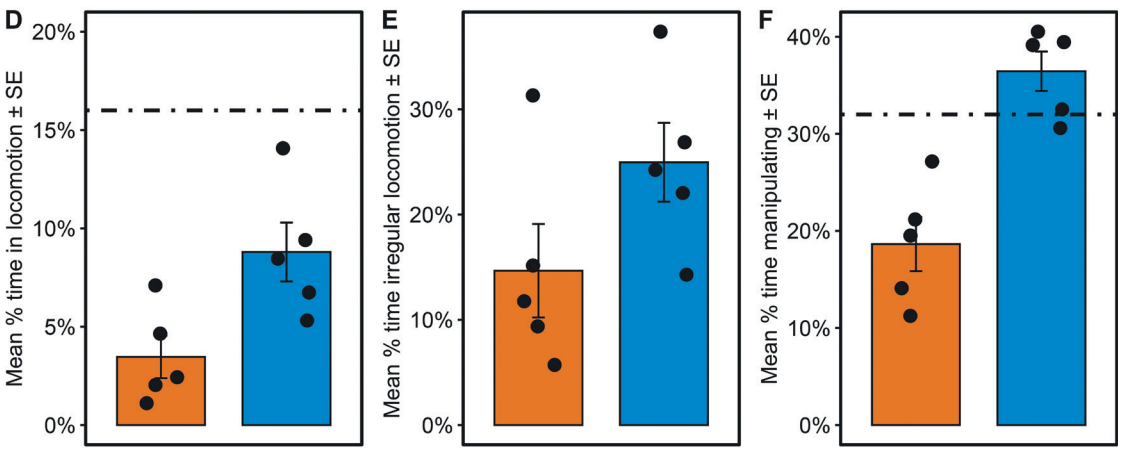
FIGURE 8.8

Summary of Results from the EDT Process

Chimpanzees



Orangutans



Period of data collection:

Before modification

After modification

Notes: Panels A–C (chimpanzees) and D–F (orangutans) show means of the variable before (orange bars) and after (blue bars) enclosure modification, with standard error bars. Solid black points show means for each tested individual. Horizontal lines represent the comparison threshold created from data on wild apes: dashed lines show the threshold for adult males, dotted lines for adult females and dotted–dashed lines show the threshold for both groups.

Chimpanzees

A: Percentage of time spent foraging before and after modification; B: Percentage of time spent off the ground; C: Percentage of time spent off the ground on flexible supports.

Orangutans

D: Percentage of time spent in locomotion; E: Percentage of time spent in challenging locomotor modes; F: Percentage of time spent manipulating food items, using tools, exploring the environment or building nests.

Source: Chappell and Thorpe (2021)

The EDT focuses on a series of key locomotor, cognitive and social behaviors, chosen in consultation with end users, to enhance apes' quality of life in captivity and release success. Data collection protocols are suitable for captive facility staff without scientific backgrounds or high levels of literacy. Users can collect data on ape behavior during normal husbandry procedures, upload them to the EDT and then compare them to data on wild individuals. Comparisons are presented graphically, enabling users to explore results. In interpreting the graphs, including data on behaviors in the wild and in captivity, users can ascertain good results and highlight areas that could be improved. Users can also use data analysis to produce bespoke recommendations on how best to modify captive settings to elicit absent or underrepresented wild-type behaviors. Once users have made the modifications, they can collect and upload a post-modification dataset to the EDT, which compares it to wild and baseline data (Chappell and Thorpe, 2022).

Is the EDT Effective?

Results are promising (see Figure 8.8). At Ape Action Africa, for example, implementation of EDT recommendations led to a substantial reduction in the rate of attacks among chimpanzees—from 0.32 to 0.07 per hour of observation—which resulted in a decrease in chimp-induced injuries and the need for veterinary intervention. The results also show a radical increase in activity and engagement thanks to the provision of physical and cognitive stimulation, even within very small cages (5 m × 5 m × 3 m). In particular, there was a significant increase in the percentage of time chimpanzees spent foraging and off the ground, as well as in the percentage of off-the-ground time spent moving on energy-demanding flexible supports (see Figures 8.8A–C).

Similarly, orangutans at the Bornean Orangutan Survival Foundation substantially increased arboreal and complex activity, more than tripling the percentage of time spent in locomotion and doubling the percentage of physically demanding wild-type climbing and clambering behavior (see Figures 8.8D and 8.8E). Taken together, these changes can substantially increase the apes' strength and stamina, which they would need for prolonged bouts of locomotion in the wild, should they be released. Another benefit is the considerable decrease in inactivity, as the percentage of time the orangutans spent manipulating food, nests and other objects doubled (see Figure 8.8F).

One way to ensure uptake of the EDT and keep the process practicable is to balance the amount of data required for meaningful impact with the time required for data collection. The next steps involve creating EDTs for all ape species and rolling out the tool to a wider range of facilities (Chappell and Thorpe, 2022). The results may help to guide the development of environments that are more conducive to rehabilitation for release and that can support—in conjunction with explicit welfare indicators for post-release monitoring—positive welfare outcomes for released apes.

Shared Learning and Action Supporting Animal Welfare

Supporting the many dimensions of animal welfare requires multiple competencies rarely found within a single institution (Kagan, Carter and Allard, 2015; Sinclair and Phillips, 2018a, 2018b). Almost three-quarters of sanctuaries are part of collaborations, with some participating in more than one (Sherman and Greer, 2018). Benefits of collaboration include greater access to expertise and resources; an increase in reach (credibility, visibility and access to relevant connections); opportunities to influence policy through a collective voice; and improved processes, both internal (such as through access to established procedures or adoption of methods and mindsets) and external (such as enhanced approaches to confiscation and ape transfer).

Each collaboration has its own set of goals. For example, the Gorilla Rehabilitation and Conservation Education Center (GRACE) in the eastern DRC was built as a collaborative partnership from the outset, comprised of GRACE staff, based in the DRC and the United States, and advisors with expertise in gorilla management at multiple AZA-accredited US zoos (K. Fawcett, personal communication, 2020). Reciprocal sharing of knowledge and learning has played a critical role in building and strengthening GRACE, enabling the facility to be resilient and maintain welfare during times of crisis and insecurity, including the Ebola epidemic and the COVID-19 pandemic (see Figure 8.9). In 2019, GRACE became the first great ape sanctuary in Africa to receive accreditation from GFAS; in 2020, the facility received the GFAS Annual Outstanding

International Sanctuary Award (GFAS, 2019, 2020).

Research collaboration among facilities, universities and other scientific organizations can serve to bolster welfare knowledge and practice (Ross and Leinwand, 2020; Sherwen *et al.*, 2018). In Spain, for example, collaboration between the MONA Foundation sanctuary and the University of Girona has supported hundreds of master's students in primatology. They have conducted non-invasive research at MONA, gaining degrees and developing career pathways while providing the sanctuary with a long-term, continuous monitoring dataset to aid captive management and welfare.

FIGURE 8.9

Strengthening Capacity for Animal Health and Welfare, GRACE, Eastern DRC

Note: Zoo partners have provided GRACE staff members with positive reinforcement training to facilitate examination of gorillas in the eastern DRC. Gorilla training: arm up.

In the United States, collaboration between Chimp Haven and the Lincoln Park Zoo Fisher Center represents the first major partnership between an accredited sanctuary and an accredited zoo in North America. Their collaborative projects have focused on outcomes that support the overlapping philosophies of improving chimpanzee care and management. Outputs include Chimp Haven's longitudinal dataset, which is almost exclusively welfare-based (Ross *et al.*, 2019).

Captive Ape Welfare: Conclusion

Previous volumes of *State of the Apes* have reviewed various forms of ape captivity as well as some of the laws that regulate them, observing that what is permitted or prohibited varies, and that current standards do not always meet the needs of apes or promote their wellbeing. The welfare of captive wildlife has yet to be adequately included in relevant dialogue, especially since it often falls between the cracks of domestic animal health and wildlife conservation legislation and regulations. Annex IX considers recent legal "bright spots," including strengthened national standards in Malawi and Costa Rica, whose experiences indicate, for example, that welfare crime is best included in campaigns for legislative reform from the outset.

How animal welfare is understood and discussed influences how it is assessed and how resulting findings are used (Beausoleil *et al.*, 2018). The COVID-19 pandemic has put a spotlight on systems approaches, presenting opportunities to look at the relationship between humans and animals more holistically, and to integrate animal welfare considerations into dialogue, strategy and legal instruments. Efforts to mainstream animal welfare on the global environmental agenda include work on a dedicated UN convention. The legal systems to combat the illegal wildlife trade, for example, can only be strengthened if each part of the trade chain is targeted, including welfare outcomes for confiscated and surrendered apes. Weak links between the welfare and conservation sectors, the tendency to treat welfare as a low priority and the exclusion of relevant stakeholders from important discourse also need to be addressed if regulatory gaps are to be filled. The inclusion of dialogue on animal welfare in high-level intergovernmental forums on combating the illegal wildlife trade would help to ensure that the full range of costs borne by captive facilities are identified and factored into sentencing and penalty decisions, as well as related decision-making and actions. Both animal welfare and conservation outcomes would benefit as a result. The language used in these discussions, however, needs to reflect current legal and scientific thinking—as well as public opinion—on animal sentience.

While professional body accreditation is not a substitute for national standards, robust systems can provide a benchmark for welfare management. Committing to rigorous standards and a trustworthy compliance system can provide greater credibility and accountability (Lundmark, Berg and Röcklinsberg, 2018; Pierce and Bekoff, 2018). The process of applying for accreditation can be as valuable as the actual stamp of approval, mainly because it demands self-reflection and forces facilities to articulate and formalize crucial internal policies and processes (GRACE, 2019).

Captive facilities' institutional systems serve as bastions of good welfare and tend to determine what apes experience on a day-to-day basis (see Figure 8.10). Key elements that embed animal welfare in a facility's operations include the explicit recognition of a commitment to promote animal wellbeing in its organizational statements, principles and values; an operational framework through which the institutional

philosophy is delivered, such as committees, policies and welfare assessment tools; an organizational culture that furthers the approach by investing in staff; and dedicated resources (Farmer, 2012; Kagan, Carter and Allard, 2015; Walraven and Duffy, 2017). While strategy is important, the people part of the system can be an organization's most valuable resource. Initiatives and programs focused on strengthening leadership skills may be increasingly prevalent in the conservation field, but they remain absent for animal welfare (Bruyere *et al.*, 2020).

Appropriate, enforceable standards and control systems at the legislative, professional accreditation and institutional levels serve as mutually reinforcing insurance policies to safeguard welfare and linked conservation outcomes. Understanding why welfare programs go wrong can be complex; poor results may be attributable to shortcomings at different levels, any or all of which could potentially impact features of a welfare system (see Annex X). Society also plays a role in setting welfare standards, in particular by granting or denying industrial outfits, such as captive facilities that are open to the public, a social license to operate. As scientific evidence that animals think and feel grows, so does public concern for animal welfare. As a result,

FIGURE 8.10

Adaptations to the Physical Environment at the Fauna Foundation, Canada

Note: Ropes placed along the ceiling and a smooth floor help Sue Ellen, who has limited use of her legs, move through the tunnel and enclosure at Fauna Foundation, Canada.

animal welfare is increasingly becoming a crucial consideration in people's willingness to give "wildlife use industries" a social license to operate (Hampton, Jones and McGreevy, 2020).

Collaboration within and across disciplines—as well as among animal welfare and conservation practitioners, scientists, lawyers and technologists—can harness knowledge and resources. A strong ethos of shared learning and collaboration across the sanctuary and zoo sector has led to a better understanding of the most important features of a captive environment for great apes, although less attention has been paid to gibbons (Fernie *et al.*, 2012; Ross and Leinwand, 2020). The importance of specific features and services may vary according to the species and context, for example with respect to lifetime care and rehabilitation for release.

Universally agreed species-specific welfare indicators would not only allow for a more comprehensive way to assess the captive world for apes, but also to help shape it. They would aid monitoring within and across facilities, help set professional standards and make it easier for authorities to determine whether a welfare crime has been committed (Whitfort, 2019). While such indicators remain elusive, this section and Annex XI present examples of promising tools and initiatives.

Welfare assessment tools must walk the line between being practical for the context, but specific enough to produce useful outcomes (Wark *et al.*, 2019). Relatively few sanctuaries have the resources to employ scientists, and many studies are initiated by external academics and students (Ross and Leinwand, 2020). Such partnerships can help bolster welfare knowledge and practice. Just like conservation, however, welfare needs to be championed locally to shape narratives and gain prominence (Sayektiningsih *et al.*, 2020; Sinclair and Phillips, 2018b).

Section II: The Status and Number of Captive Apes

Overview

This update provides country-level animal welfare scores for 2020, drawn from the Animal Protection Index (API) produced by World Animal Protection (Nizamuddin and Rahman, 2019; WAP, n.d.-a). It covers regions and countries whose scores were not reported in previous volumes of *State of the Apes*.

The scores range from A (highest) to G (lowest). A country's "overall" API score is the average of its scores in ten categories, which cover recognition of animal sentience, the presence of animal welfare legislation, the establishment of supportive government bodies and support for international animal welfare standards. This section presents overall scores as well as scores for two indicators that pertain to apes in captivity and in the wild: "legislation protecting animals in captivity" and "legislation protecting the welfare of wild animals" (WAP, n.d.-c).

This section also provides the best available data on the number of apes in captive facilities in 2020, gathered from reliable and transparent sources such as databases, published annual reports and personal communications whenever possible. In the absence of such sources, data were drawn from facility webpages, facility social media accounts and news articles. As noted in previous volumes of *State of the Apes*, data on captive apes are sometimes incomplete or inconsistent (Durham, 2020).

Africa

Overall, API scores for African countries range from D in Kenya and Tanzania to F in Algeria, Egypt, Ethiopia and Morocco (WAP, n.d.-a; see Table 8.1). The scores indicate that animal welfare conditions across

Africa range from somewhat deficient to very poor. Scores for legislation protecting animals in captivity are equivalent to or weaker than the overall API average scores. Nigeria, the only African ape range state to be scored, was given an E for its "legislation protecting the welfare of wild animals," as the country's anti-cruelty legislation does not extend to wild animals and there is no ban on non-subsistence hunting (WAP, n.d.-a).

TABLE 8.1

API Scores for African Countries, 2020

Country	Overall API score	Animals in captivity	Welfare of wild animals
Algeria	F	F	E
Egypt	F	F	E
Ethiopia	F	F	E
Kenya	D	F	A
Morocco	F	F	D
Niger	E	E	D
Nigeria	E	E	E
South Africa	E	F	E
Tanzania	D	G	C

Notes: The only range state on the list, Nigeria, is shaded in gray. Scores in the last two columns relate to legislation that protects animals in captivity and legislation that protects the welfare of wild animals, respectively.

Data source: WAP (n.d.-a)

TABLE 8.2

Number of Apes in African Sanctuaries, 2011–2020

Year	Bonobos	Chimpanzees	Gorillas	Total
2011	55	1,071	83	**1,209**
2015	72	1,072	127	**1,271**
2018	70	1,136	118	**1,324**
2020	70	1,261	75*	**1,406**

Notes: Figures may include apes in pre-release or other semi-wild release sites. *Indirect accounts suggest there are between one and a few additional gorillas at Projet Protection des Gorilles sites in Gabon and the Republic of Congo (G. Tully, personal communication, 2020).

Data sources: Ambassade de France (2019); Ape Action Africa (n.d.); Chimfunshi Wildlife Orphanage (n.d.); Chimp Eden (n.d.); Chimpanzee Conservation Center (2020); Durham (2018, 2020); Friends of Animals (n.d.); GRACE (2020); HELP Congo (n.d.); J.A.C.K. Sanctuary (n.d.); Jane Goodall Institute (n.d.); Limbe Wildlife Centre (2020); Ngamba Island Chimpanzee Sanctuary (2020); P-WAC (2020); Parc National des Virungas (n.d.); PASA (n.d.a); Prak (2020); Projet Gorille Fernan-Vaz (n.d.); Second Chance Chimpanzee Refuge Liberia (2020); Tacugama Chimpanzee Sanctuary (n.d.); personal communication in 2020 with N. Bachand, K. Cereghino, N. Colwill, J. Desmond, K. Farmer, D. Morel, S. Ngulu, E. Raballand and G. Tully

Zoos

For the year 2020, African zoos reported holding 53 chimpanzees, 26 gibbons, 5 gorillas and 1 orangutan, accounting for 6% of apes in captivity on the continent (Species360, n.d.). While gorilla and orangutan numbers were similar to those reported in previous volumes of *State of the Apes*, chimpanzee and gibbon numbers increased from 46 and 22 in 2018, respectively. Data on African zoos are limited in scope and may be underestimated, due in part to the voluntary nature and cost of reporting (Durham, 2020). The Species360 database indicates that eight African institutions accounted for 53 chimpanzees in 2020; by contrast, one rescue center's records for the same year show that 27 chimpanzees were in public and private zoos in Ivory Coast alone (E. Raballand, personal communication, 2020).

Sanctuaries

African sanctuaries housed 1,406 apes in 2020 (see Table 8.2). The number of bonobos (*Pan paniscus*) in sanctuaries has remained largely unchanged in recent years. While 14 bonobos from Lola Ya Bonobo sanctuary awaited their release to a dedicated reserve, 15 bonobos were rescued in 2019 and 2020. Sanctuary staff suggest that the increase may be due to greater engagement of local conservation actors, as well as a rise in poaching for wild meat and wildlife trafficking (D. Morel, personal communication, 2020).

The number of gorillas reported in sanctuaries in 2020 is significantly lower than in previous years. As nearly all facilities with gorillas supplied data for 2020 for this update, the level of confidence in the figures

is high. Reasons for the drop since 2015 and 2018 are unknown. African sanctuaries, including the Chimp Rehabilitation Project in the Gambia, often include apes released into semi-wild or pre-release settings in reported captive populations (J. Sherman, personal communication, 2020). Hence, one possibility is that released gorillas were counted in previous sanctuary population estimates.

Non-range state sanctuaries account for 23% of African sanctuary chimpanzees reported for 2020 (see Table 8.3). Their numbers are similar to those reported in previous years (Durham, 2020). Captive chimpanzees in range states, however, have increased by 15% since 2018 and 21% since 2011 (Durham, 2015, 2020; see Table 8.4). The increase in intake of chimpanzees at range-state sanctuaries suggests that wild meat hunting and subsequent trafficking of orphans may be increasing (GRASP and IUCN, 2018; Ondoua *et al.*, 2017; J. Desmond, personal communication, 2020). Intake rates could also be influenced by other factors, such as increased rescue efforts, which would be expected given the growth of the Liberia Chimpanzee Rescue and Protection sanctuary

TABLE 8.3

Number of Great Apes in African Sanctuaries, by Country, 2020

Country	Number of sanctuaries	Bonobos	Chimpanzees	Gorillas
Cameroon	4	0	271	40
DRC	6	70	134	18
Gabon	3	0	30	17*
Gambia	1	0	>100	0
Guinea	1	0	64	0
Ivory Coast	1	0	3	0
Kenya	1	0	36	0
Liberia	2	0	127	0
Nigeria	1	0	28	0
Republic of Congo	3	0	172	0*
Sierra Leone	1	0	92	0
South Africa	1	0	33	0
Uganda	1	0	50	0
Zambia	1	0	120	0
Total	**27**	**70**	**>1,260**	**75**

Notes: Figures account for sanctuary populations and may include apes in pre-release or other semi-wild release sites. Range states are shaded in gray.

* Indirect accounts suggest there are between one and a few additional gorillas at Projet Protection des Gorilles sites in Gabon and the Republic of Congo (G. Tully, personal communication, 2020).

Data sources: Ambassade de France (2019); Ape Action Africa (n.d.); Chimfunshi Wildlife Orphanage (n.d.); Chimp Eden (n.d.); Chimpanzee Conservation Center (2020); Friends of Animals (n.d.); GRACE (2020); HELP Congo (n.d.); J.A.C.K. Sanctuary (n.d.); Jane Goodall Institute (n.d.); Limbe Wildlife Centre (2020); Ngamba Island Chimpanzee Sanctuary (2020); PASA (n.d.a); Prak (2020); Projet Gorilles Fernan-Vaz (n.d.); Second Chance Chimpanzee Refuge Liberia (2020); Tacugama Chimpanzee Sanctuary (n.d.); personal communication in 2020 with N. Bachand, K. Cereghino, N. Colwill, J. Desmond, K. Farmer, D. Morel, S. Ngulu, E. Raballand and G. Tully

TABLE 8.4

Number of Chimpanzees in Range-State Sanctuaries, 2011, 2015, 2018 and 2020

Country	2011	2015	2018	2020
Cameroon	244	246	247	271
DRC	85	109	117	134
Gabon	20	20	20	30
Guinea	38	50	46	64
Ivory Coast	4	1	2	3
Liberia	76	63	99	127
Nigeria	28	30	28	28
Republic of Congo	156	145	161	172
Sierra Leone	101	75	74	92
Uganda	45	49	49	50
Total	**797**	**788**	**843**	**971**

Data sources: Ambassade de France (2019); Ape Action Africa (n.d.); Chimfunshi Wildlife Orphanage (n.d.); Chimp Eden (n.d.); Chimpanzee Conservation Center (2020); Durham (2018, 2020); Friends of Animals (n.d.); HELP Congo (n.d.); J.A.C.K. Sanctuary (n.d.); Jane Goodall Institute (n.d.); Limbe Wildlife Centre (2020); Ngamba Island Chimpanzee Sanctuary (2020); P-WAC (2020); PASA (n.d.a); Prak (2020); Second Chance Chimpanzee Refuge Liberia (2020); Tacugama Chimpanzee Sanctuary (n.d.); personal communication in 2020 with K. Cereghino, J. Desmond, K. Farmer, E. Raballand and G. Tully

in Liberia and the expansion of the non-governmental organization Eco-Activists for Government and Law Enforcement (EAGLE) across African ape range states (EAGLE, 2019; Liberia Chimpanzee Rescue & Protection, n.d.).

Increased chimpanzee intake is of concern for three main reasons. First, the slow maturation and reproduction rates of chimpanzees make their populations especially vulnerable to poaching pressure (Ondoua *et al.*, 2017). Second, the number of chimpanzees in sanctuaries is increasing in three of the range states of the critically endangered western chimpanzee (*Pan troglodytes verus*)—Guinea, Liberia and Sierra Leone (Durham, 2018, 2020). Third, the rise in intake may be linked to the increase in commercial and private poaching, due in part to the financial impact of the COVID-19 pandemic on the tourism industry in areas surrounding wild ape populations (Dalton, 2020; Somerville, 2020; Zenda, 2020).

Asia

API scores for Asian states range from C in India and Malaysia to E in China, Indonesia and Japan (see Table 8.5). These scores demonstrate that animal welfare is relatively poor in Asian countries. Most range states have a better score for legislative protection of animals in captivity than they do for protecting the welfare of wild animals. This discrepancy suggests a need for improved legislation to protect the welfare of wild animals, which, if enforced, could decrease the numbers of wild apes entering captivity.

China is the exception to the trend: its score for legislation protecting the welfare of wild animals (D) is higher than its score for laws that protect the welfare of animals in captivity (E). The higher score reflects China's introduction of bans on advertisements concerning the illegal wildlife trade and the ivory trade. Wildlife trafficking and the treatment of wildlife as a resource continue

TABLE 8.5

API Scores for Asian Countries, 2020

Country	Overall API score	Animals in captivity	Welfare of wild animals
Azerbaijan	G	E	E
China	E	E	D
India	C	C	E
Indonesia	E	D	D
Iran	G	G	E
Japan	E	D	E
Korea	D	D	D
Malaysia	C	C	D
Myanmar	F	D	E
Pakistan	E	E	D
Philippines	D	D	E
Thailand	D	D	E
Vietnam	F	E	E

Notes: Range states are shaded in gray. Scores in the last two columns relate to legislation that protects animals in captivity and legislation that protects the welfare of wild animals, respectively.

Data source: WAP (n.d.-a)

to have a deleterious impact on animal welfare in China (WAP, n.d.-a, n.d.-b).

Zoos

The number of apes reported by Asian zoos for the year 2020—excluding those in Japan, which is discussed below—is substantially lower than the figure for 2018 (Durham, 2020; Species360, n.d.; see Table 8.6). Roughly one-third of the drop is due to a change in methodology: Israel, Turkey and the United Arab Emirates were included in Asian regional totals for 2018, but for 2020 these countries are listed among the European totals because their reporting zoos are EAZA members (D. Durham, personal communication, 2020; see Figure 8.11).

Concerning gibbons in particular, experts indicate that the discrepancy between the 2018 and 2020 zoo population numbers is probably due to data and reporting problems

TABLE 8.6

Apes in Asian Zoos Reporting to Species360, excluding Japan, 2018 and 2020

Year	Chimpanzees	Orangutans	Gorillas	Gibbons	Total
2018	220	170	25	436	**851**
2020	137	144	8	280	**569**

Notes: Figures from 2020 represent aggregate zoo data and could include previous years' holdings.[10] No bonobos were reported. As not all zoos report to Species360, this table does not cover all apes in Asian zoos.

Data source: Species360 (n.d.)

(S. Cheyne and B. Lefaux, personal communication, 2020). Zoo numbers can be affected by illegal trade in gibbons, which is not reported to CITES. Since many Chinese and other Asian zoos did not report to Species360, however, no firm conclusions can be drawn (B. Lefaux, personal communication, 2020).

Variations in reported zoo holdings demonstrate the limitations of data from voluntary databases such as Species360. Participation in Species360 and similar databases is limited in regions around the world, including Asia (Banes *et al.*, 2018; Durham, 2020). Two recent studies of Asian zoos underscore this point. The first presents data from 58 Asian, non-Japanese institutions. In comparison, just 30 institutions outside of Japan reported to Species360 in 2020 (Banes *et al.*, 2018; Durham, 2020; Species360, n.d.). The second report counts 213 gibbons, 85 orangutans, 50 chimpanzees and 1 gorilla in zoos in Thailand and Malaysia alone. Of the 42 institutions identified in this report, only seven reported to Species360 in 2020 (Beastall, Bouhuys and Ezekiel, 2016; Species360, n.d.).

Rescue and Rehabilitation Centers and Sanctuaries

Figures provided by Indonesian facilities for 2020 indicate that the number of captive orangutans fell by 12% since 2016 (see Table 8.7). Two key factors help to explain this decrease. First, massive forest fires in 2015 led to an unusually high number of orangutan rescues in 2016 (Sherman, Ancrenaz and Meijaard, 2020). Second, orangutan populations fluctuate year to year, depending on releases of rehabilitated orangutans back into the wild. More than

TABLE 8.7

Number of Orangutans and Gibbons in Asian Rescue and Rehabilitation Centers and Sanctuaries, by Country, 2016 and 2020

Country	Orangutans		Gibbons	
	2016	2020	2016	2020
Cambodia	n/a	n/a	77	93
India	n/a	n/a	–	15
Indonesia	1,147	1,006	293	439
Lao People's Democratic Republic	n/a	n/a	–	5
Malaysia	98	87	–	12
Taiwan	n/a	n/a	–	15
Thailand	2	2	229	163
Viet Nam	n/a	n/a	45	39
Total	**1,247**	**1,095**	**644**	**781**

Notes: Some figures are drawn from aggregated data submitted to Species360 and may thus reflect holdings from previous years. A median was used in a single case for which a range of values had been provided. "–" no data available. "n/a" not applicable, as there are no orangutans in rescue and rehabilitation centers in these countries.

Data sources: BOSF (2020); Durham (2018); Endangered Asian Species Trust (2020a, 2020b, 2020c); Gibbon Rehabilitation Project (n.d.); Highland Farm (n.d.); Lee, Leong and Dzar (2020); Orangutan Appeal UK (n.d.); Orangutan Foundation International (n.d.); SOC (n.d.); Species360 (n.d.); Wildlife Rescue Center Jogja (n.d.); personal communication in 2020 with L. Biddle, B. Chan, A. Brulé, R. Durgut, D. Hendarto, F. Magne, N. Marx, P. Nurantika, K. Pei, A. Pipe, S. Preuschoft, K. Sánchez, J. Sherman, T. Tran and M. Wedana

600 rehabilitants were released between 2007 and 2017, while more than 100 were released in 2019 alone (BOSF, 2020; International Animal Rescue, 2020; PanEco, 2020; Sherman, Ancrenaz and Meijaard, 2020). Intake of newly rescued wild orangutans also continues at high levels, with more than 50 rescued in 2019 alone (BOSF, 2020; International Animal Rescue, 2020; PanEco, 2020).[11]

There are also notable variations across Indonesian reporting facilities. One rescue and rehabilitation center, International Animal Rescue, reported a markedly lower intake of orangutans in 2018 and 2019, which, coupled with releases of rehabilitated orangutans, has resulted in a lower population overall (K. Sánchez, personal communication, 2020).

Continued analysis is necessary to confirm whether the overall orangutan population decline indicated by the data constitutes a trend, especially given the continued pressures of poaching, possession and trafficking facing wild populations (Freund, Rahman and Knott, 2017; Nijman, 2017; Sherman, Ancrenaz and Meijaard, 2020). Recent research suggests captive populations in Indonesia will not decline to zero at current rates of rescue, release and captive birth (Sherman, Ancrenaz and Meijaard, 2020).

Gibbon populations may appear to have dropped by 29% in Thailand and increased by 50% in Indonesia between 2016 and 2020, but inconsistencies in gibbon facility numbers make it difficult to draw conclusions with any degree of accuracy (Ancrenaz *et al.*, 2020, table 1.1; Durham, 2018; see Table 8.7). Moreover, the illegal pet trade, which is increasingly supported by social media, continues to push gibbons into captivity (Gill, 2017; Rainer *et al.*, 2020; Yu and Jia, 2015). Laws protecting apes are often disregarded, as few offenders are prosecuted (Nijman, 2017).

Japanese Captive Facilities

In Japan, figures for apes in captive facilities for 2020 are 3% lower than for 2018, down to 6 bonobos, 303 chimpanzees, 20 gorillas, 46 orangutans and 170 gibbons (Durham, 2020; GAIN, n.d.). Figures for Japan are more reliable than those for some other regions, as the GAIN studbook in which they are reported is complete and consistent (Banes *et al.*, 2018; Durham, 2018). Japan has an overall API score of E (WAP, n.d.-a; see Table 8.5).

Europe

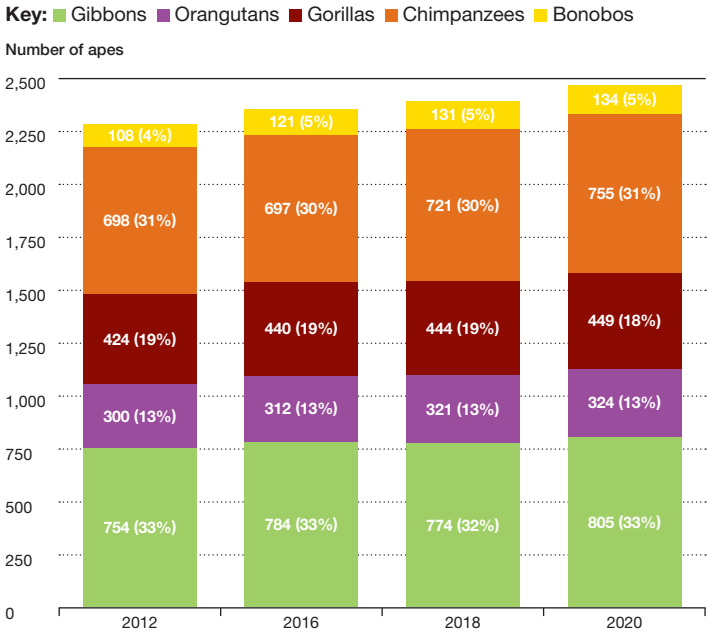
In 2020, European zoos held a total of 2,467 captive apes, one-third of whom were gibbons (Species360, n.d.; see Figure 8.11). Compared to data for 2018, the 2020 figures show that the total ape population increased 3%, with the number of chimpanzees rising by 5% and gibbons by 4% (Durham, 2020). While in keeping with rates for stable captive population growth, these increases could reflect the addition of data from zoos in Israel, Turkey and the United Arab Emirates. As noted above, these countries are included in the European 2020 dataset because their institutions are EAZA members (Species360, n.d.).

The most recent figures for apes in European sanctuaries suggest there could be as many as 186 chimpanzees, 15 orangutans and 17 gibbons.[12]

Fewer lone apes in captivity were reported in 2020 (13) than in 2018 (23) (Durham, 2020; Species360, n.d.). On the legislative front, France and Lithuania joined 28 other European countries in enacting bans on the use of wild animals in circuses and more generally (AFP, 2020; Four Paws International, 2020b; GATO, 2020). In Spain, the Castilla–La Mancha region—which is home to more than three-quarters of Spain's population—has banned wild animals in circus performances (AAP, 2020b;

FIGURE 8.11

Number of Apes in European Zoos Reporting to Species360, 2012, 2016, 2018 and 2020



Notes: Figures for 2020 are drawn from aggregated data submitted to Species360 and may thus reflect holdings from previous years. Institutions reporting to Species360 from Israel, Turkey and the United Arab Emirates are included here. As not all zoos report to Species360, this table does not cover all apes in European zoos.

Data sources: Durham (2015, 2018, 2020); Species360 (n.d.)

Pozo, 2020). It is worth noting that trafficking remains a concern in Europe. Research conducted over a six-week period in 2017 shows that 152 live primates were sold via online sales, mainly on Russian platforms (IFAW, 2018).

Latin America

A recent survey of Latin American zoos found that while facilities and training for veterinarians need to be improved, most survey respondents had access to tools to manage large animals, including apes. In addition, the Association of Latin American Zoos (ALPZA) started implementing accreditation standards in 2017 (Riva, Zordan and Sánchez, 2020). All ALPZA members must be accredited under ALPZA standards by 2025 (ALPZA, n.d.).

Latin American facilities—zoos and sanctuaries—reported 183 apes in 2020 (see Table 8.8). These include 79 chimpanzees and one orangutan in four sanctuaries associated with the Great Ape Project (J. Ramos, personal communication, 2020).

The number of apes reported to Species360 for 2020 is lower than the 2018 figure (Durham, 2020; see Table 8.8). As mentioned in Volume IV of *State of the Apes*, official reporting by Latin American zoos, including to databases such as Species360, is limited (Durham, 2020). In 2020, just 16 institutions reported housing apes to Species360.[13] As in 2018, additional information for the 2020 data was collected via personal communication or online searches (Durham, 2020). Variations in figures provided for 2018 and 2020 in Table 8.8 may be partly due to the use of unofficial results, the lack of responses from certain sources and inconsistent reports obtained though indirect inquires.

TABLE 8.8

Number of Apes in Selected Latin America Facilities, 2020

	Chimpanzees	Gorillas	Orangutans	Gibbons	Total
2018	170	12	13	19	**208**
2020	151	9	10	13	**183**

Notes: Zoo data are aggregated and could include previous years' holdings. No bonobos were reported. As not all zoos report to Species360 or share their ape figures on their webpages or social media sites, this table does not cover all apes in Latin American zoos.

Data sources: adnCUBA (2020);[14] Durham (2020); Fauna Silvestre de Nicaragua (2020); G1 (2020); Listín Diario (2019); Matos Mendes (2020); Olhar Animal (2020); Sierra Maestra (2020); Species360 (n.d.); ZooLeón (n.d.);[15] Zoológico de Culiacán (2020); I. Ho and J. Ramos, personal communication, 2020

Oceania

Figures for apes in Australian zoos are consistent with those presented in the previous volume of *State of the Apes*, except figures for chimpanzees (Durham, 2020). While the population size is small, the number of chimpanzees in zoos increased by roughly 35% from 2018 (see Table 8.9). This increase could be the result of a transfer of 12 chimpanzees to Australia from Germany (CITES, n.d.). Facing possible closures due to the budgetary ramifications of the COVID-19 pandemic, the Australian government granted nearly AUS$100 million (US$65 million) to help zoos with animal welfare costs for up to six months (Brown, 2020).

New Zealand zoos reported similar figures for 2020 as they did for 2018, except for a decrease in the number of gibbons (Durham, 2020; see Table 8.9). Reasons for the decrease are not clear. No transfers are indicated in the CITES trade database (CITES, n.d.). The New Zealand government gave out nearly NZ$9.5 million (US$6.2 million) to support zoos in response to COVID-related reductions in revenue (RNZ, 2020).

TABLE 8.9

Number of Apes in Zoos in Australia and New Zealand Reporting to Species360, 2018 and 2020

	Australia		New Zealand	
	2018	2020	2018	2020
Chimpanzees	37	50	16	16
Gorillas	17	19	3	3
Orangutans	18	18	3	3
Gibbons	54	51	15	9
Total	**126**	**138**	**37**	**31**

Notes: Figures for 2020 are drawn from aggregated data submitted to Species360 and may thus reflect holdings from previous years. As not all zoos in Australia and New Zealand report to Species360, this table does not cover all apes in zoos in these two countries.

Data sources: Durham (2020); Species360 (n.d.)

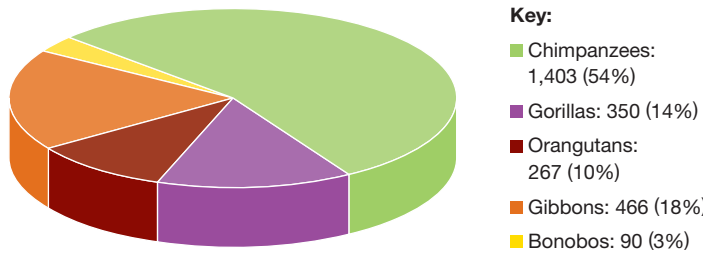
United States

US facilities reported a total of 2,576 captive apes for 2020 (see Figure 8.12). Compared to 2018, the captive populations of the following taxonomic groups increased: bonobos (up by 8%), orangutans (10%) and gibbons (21%) (Durham, 2020). These increases could be the result of animals reported here that are not typically reported in Species360. The Fort Worth Zoo, for example, does not report to Species360, but the bonobo data it reported on social media are included in Figure 8.12. Similarly, the number for captive orangutans includes individuals outside of AZA-accredited zoos and GFAS-accredited sanctuaries, for which data were obtained by an expert in the field. In the case of gibbons, the increase is probably due to higher numbers of gibbons reported in zoos outside of Species Survival Plan populations, which are relatively stable (B. Richards, personal communication, 2020).

Durham (2018) reported that changes to the US Department of Agriculture's Animal Welfare Act database dramatically impacted the accessibility of data on apes held in private collections. As of September 2020, the

FIGURE 8.12

Number of Apes in Captivity in the United States, 2020



Notes: Some figures are drawn from aggregated data submitted to Species360 for 2020 and may thus include previous years' holdings. Bonobo numbers were obtained through Species360, the Bonobo Species Survival Plan website hosted by the Zoological Society of Milwaukie, and the Fort Worth Zoo. Orangutan numbers are from Megan Elder of the Orangutan Species Survival Plan, Patti Ragan at the Center for Great Apes and from Species360; they include animals in non-AZA zoos, entertainment facilities and a private breeder. Gorilla numbers are from Roby Elsner of the Gorilla Species Survival Plan and include non-AZA zoos.

Data sources: A.P.E.S. (n.d.); ChimpCare (n.d.-a); Fort Worth Zoo (2020); GCC (n.d.); IPPL (n.d.); Species360 (n.d.); Zoological Society of Milwaukie (n.d.); personal communication in 2020 with M. Elder, R. Elsner, K. Lukas, and P. Ragan, S. Ross, J. Taglialatela and L. Wathne

database was again accessible online (PETA, 2020; USDA, 2020). Nonetheless, there is no reliable way to obtain information about the number of gibbons held by private parties or institutions outside of AZA-accredited zoos and GFAS-accredited sanctuaries (Durham, 2018; B. Richards, personal communication, 2020).

While captive gorilla populations have remained stable, captive chimpanzee numbers continue to decline, dropping 27% since 2011 (Durham, 2020; see Figure 8.12 and Table 8.10). Very few chimpanzees are born in private settings and sanctuaries do not have any breeding programs (Ross and Leinwand, 2020; S. Ross, personal communication, 2020). Sanctuary populations grew by 13% between 2018 and 2020, largely as a result of the transfer of chimpanzees from biomedical facilities; this trend will probably continue in the short term, before declining as the captive chimpanzee population ages and eventually dies out (Ross and Leinwand, 2020).

Statistical Update: Conclusion

Poaching, trafficking and increasing human–ape conflict due to pressures associated with the loss of habitat and political instability continue to be a problem for wild ape populations. As reflected in this section, the results include the ongoing intake of apes into sanctuaries and continued demand for rescue–release operations. Sanctuaries, in particular, often operate at, or over, capacity (Karokaro, Gokkon and Suriyani, 2017 ; G. Tully, personal communication, 2020). The pressures apes face in the wild may have been compounded in 2020 due to the knock-on effects of the COVID-19 pandemic on tourism-dependent local economies.

The lack or inadequacies of law enforcement may also have played a role in the 2020 captive ape data. Trafficking of apes and other wildlife online, especially through social media, continues to be a concern. More studies are needed to assess the impact of anti-trafficking measures on social media, law enforcement and offenders.

Based on reliable data that are available, captive ape populations are largely stable. This conclusion can be drawn for locations where data were reported to captive ape databases—such as ChimpCare, GAIN and Species360—and where sanctuary data were shared publicly.

On the whole, however, data continue to be limited in breadth because relatively few

TABLE 8.10

Number of Chimpanzees in Different Forms of Captivity in the United States, 2011–2020

Captivity Type	2011	2014	2016	2018	2020	% change from 2018	% change 2011–2020
Biomedical labs	962	794	658	464	310	-33%	-68%
GFAS* sanctuaries	522	525	556	585	659	13%	26%
AZA zoos**	261	258	259	236	244	3%	-7%
Unaccredited ***	106	196	111	192	154	-20%	45%
Dealer or pet owner	60	52	37	61	25	-59%	-58%
Trainer or media	20	18	13	10	11	10%	-45%
Total	**1,931**	**1,843**	**1,634**	**1,548**	**1,403**	**-9%**	**-27%**

Notes: * Global Federation of Animal Sanctuaries. ** Association of Zoos and Aquariums. *** Unaccredited facilities include zoos that are not AZA members, as well as sanctuaries and institutions that are not accredited by the North American Primate Sanctuary Alliance; these sites may share characteristics with accredited zoos and sanctuaries, as well as dealers.

Data sources: 2011: Durham and Phillipson (2014, fig. 10.2); 2014: Durham (2015, table 8.4); 2016: Durham (2018, table 8.1); 2018: Durham (2020); 2020: ChimpCare (n.d.-a)

institutions report to Species360 or other transparent zoo population databases. The reliability of data also remains of concern, as many sanctuaries do not report any data publicly. This lack of information sharing hinders the accuracy of captive population assessments, while also precluding the establishment of a clear baseline number against which to compare changes over time.

There may be an opportunity for funders, accreditors and sanctuary coalition organizations to assist in the facilitation of data sharing by requiring transparency from their grantees, accredited facilities or members. Greater transparency can contribute to the development of a clearer picture of how the number of apes in captivity changes over time, which, in turn, can help to determine to what extent illegal hunting and trade activities continue to affect these species.

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Endnotes

1 Unpublished 2015 revision of Maldonado *et al.* (2012), read by authors.

2 Beck (2017); Berg (2018); Browning and Veit (2021); Guy *et al.* (2014); Sherman, Ancrenaz and Meijaard (2020).

3 The annual African Animal Welfare Conference is co-hosted by the Africa Network for Animal Welfare in collaboration with the United Nations Environment Programme and the African Union Inter-African Bureau for Animal Resources (AAWC, n.d.).

4 AZA has issued care manuals for chimpanzees (AZA Ape TAG, 2010); gorillas (AZA Gorilla Species Survival Plan Program, 2017); and orangutans (AZA Ape Taxon Advisory Group, 2017). The European Association of Zoos and Aquaria has produced best practice guidelines for bonobos (Stevens, 2020); chimpanzees (Carlsen, de Jongh and Pluháčková, 2022); gorillas (Abelló, Rietkerk and Bemment, 2017); and orangutans (Bemment, 2018). GFAS released standards for great apes and gibbons (GFAS, 2022). PASA has guidelines for African apes (PASA, 2016).

5 See, for example, Clegg, Borger-Turner and Eskelinen (2015); Kagan, Carter and Allard (2015); Mellor (2017); Ross (2020b); Sherwen *et al.* (2018); Whitham and Wielebnowski (2015); Wolfensohn *et al.* (2018); and Yon *et al.* (2019). For reviews of zoo-based animal welfare assessments, see Hill and Broom (2009) and Wolfensohn *et al.* (2018).

6 This section focuses on behavior as health indicators are covered in other chapters.

7 See, for example, Boesch, Hohmann and Marchant (2002); Brent (2001); Fernie *et al.* (2012); Goodall (1986); Hopper and Ross (2020); Lonsdorf *et al.* (2010); Nakamara *et al.* (2015); and Ross (2020a).

8 See Brouwers and Duchateau (2021) for adaptations made to the Animal Welfare Assessment Grid for zoo-housed gorillas.

9 Greggor *et al.* (2016); Mukherjee *et al.* (2015); Rioja-Lang *et al.* (2020a; 2020b); Truelove *et al.* (2020); Veasey (2020a; 2020b).

10 Table 8.6 shows the number of apes in Asian zoos reporting to Species360. Reports came from Hong Kong (Hong Kong Zoological and Botanical Gardens); India (Arignar Anna Zoo Park, Lucknow Zoological Park, Mysore Zoo, Nandankanan Biological Park, Nehru Zoological Park, Sanjay Gandhi Biological Park); Indonesia (Bali Safari and Marine Park, Batu Secret Zoo, Gembira Loka Zoo, Maharani Zoo and Caves, Prigen Safari Park, Taman Safari Bogor); Kazakhstan (Almaty State Zoo); Malaysia (Zoo Taiping); Nepal (Central Zoo); Singapore (Singapore Zoological Gardens); South Korea (Everland Zoological Gardens, Seoul Zoo); Taiwan (Taipei Zoo); Thailand (Chiangmai Night Safari, Chiangmai Zoological Garden, Khao Kheow Open Zoo, Khao Suan Kwang Zoo, Nakhon Ratchasema Zoological Park, Songkhla Zoo, Ubon Ratchathani Zoo); Uzbekistan (Tashkent Zoo); and Viet Nam (Saigon Zoo).

11 Unpublished data gathered by J. Sherman covering changes in intake levels of newly rescued wild orangutans between 2016 and 2019, reviewed by the author, 2020.

12 AAP (2020a); Ape Monkey Rescue (n.d.); Gut Aiderbichl (n.d.); Monkey World (n.d.); Monte Adone (n.d.); Rainfer (n.d.); Sh Barcelona (2016).

13 In 2020, 16 Latin American zoos reported housing apes to Species360: Argentina (Ecoparque de Buenos Aires); Brazil (Bioparque de Rio, Fundação de Parques Municipais e Zoobotânica/Belo Horizonte, Fundação Parque Zoológico de São Paulo, Zoológico de Pomerode); Chile (Buin Zoo, Zoológico Nacional/Parquemet); Colombia (Bioparque Ukumari); Dominican Republic (Parque Zoológico Nacional/ZOODOM); Guatemala (Zoológico Nacional La Aurora); Mexico (Africam Safari, Guadalajara Zoo, Zacango Ecological Park, Zoofari, Zoológico de Chapultepec, Zoológico de San Juan de Aragón) (Species360, n.d.).

14 The visual count from film may underestimate the actual number.

15 Data extracted from map and species list with one individual allocated to each, which may underestimate the actual number.

16 Wild Ally Consulting (www.linkedin.com/in/kayfarmer/).

17 University of Birmingham (https://www.birmingham.ac.uk/schools/biosciences/index.aspx) then Wildlife Health Australia (https://wildlifehealthaustralia.com.au).

18 Independent consultant (www.linkedin.com/in/christine-caurant).

19 University of Birmingham (www.birmingham.ac.uk/schools/biosciences/index.aspx).

20 At time of writing: University of Birmingham (www.birmingham.ac.uk/schools/biosciences/index.aspx).

21 University of Birmingham (www.birmingham.ac.uk/schools/biosciences/index.aspx).

22 University of Birmingham (www.birmingham.ac.uk/schools/biosciences/index.aspx).

23 University of Birmingham (www.birmingham.ac.uk/schools/biosciences/index.aspx).

24 Orangutan Veterinary Advisory Group (www.ovag.org).

25 University of Birmingham (www.birmingham.ac.uk/schools/biosciences/index.aspx).

26 University of Birmingham (www.birmingham.ac.uk/schools/biosciences/index.aspx).