


Guide to Understanding and Reducing Harm to Parrots in Suriname

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Foreword

This report complements the parrot population size study on three parrot species (Blue-and yellow Macaw, Red-and green Macaw and the Mealy Parrot), that was initiated in August 2021, and continued in January 2022 and in June/July 2022. The overall aim of this project was to learn about species of parrots and their numbers. This document is in support of this project as it addresses the need for trapping and trade guidelines, which are informed by the overall health and welfare of parrots in the parrot trade in Suriname. The primary author LoraKim Joyner has been involved in other aspects of this project, including participating in field data activities in Suriname. This report is part of the overall parrot survey project as described earlier. Serano Ramcharan MSc. and Marchal Lingaard (field researcher) were directly involved and appointed for the field data and processing, while Serano Ramcharan had the overall lead as well. LoraKim Joyner has contributed nicely to the overall project and together with this report we offer an overall baseline on parrots, trade and issues in Suriname, and hope that overall parrot health and handling will improve.

Lead researcher with the overall Parrot survey project in Suriname 2021-2022,

Serano Ramcharan MSc.

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Introduction

Humans interact with wild parrots in Suriname in a variety of ways, including trapping for the legal and illegal trade, commercial domestic interests (such as pet stores, zoos, and tourism sites), individual capture for domestic pets, hunting, nuisance impact of nests and foraging activities, conservation activities (such as rehabilitation and liberation), and ecotourism (such as bird watching, wildlife photography, etc.). In each of these activities there is varying levels of harm to birds, people, and the environment, as well as lowered avian welfare. Human-parrot interactions can also result in benefits, such as when birds are rescued and liberated, and when people benefit through income and companionship. This guide emphasizes the potential of harm and welfare reduction and describes how to mitigate this harm and improve welfare. It also describes harm to humans, ecosystems, and other species. The best approach to reduce harm and suffering in wild parrots is not to trap them for any reason or hold them in captivity unless absolutely necessary for the benefit and welfare of avian individuals and populations. As birds are currently being trapped and held captive in Suriname, this guide offers recommendations to measure and improve the welfare of parrots in Suriname.

What is Harm and Welfare?

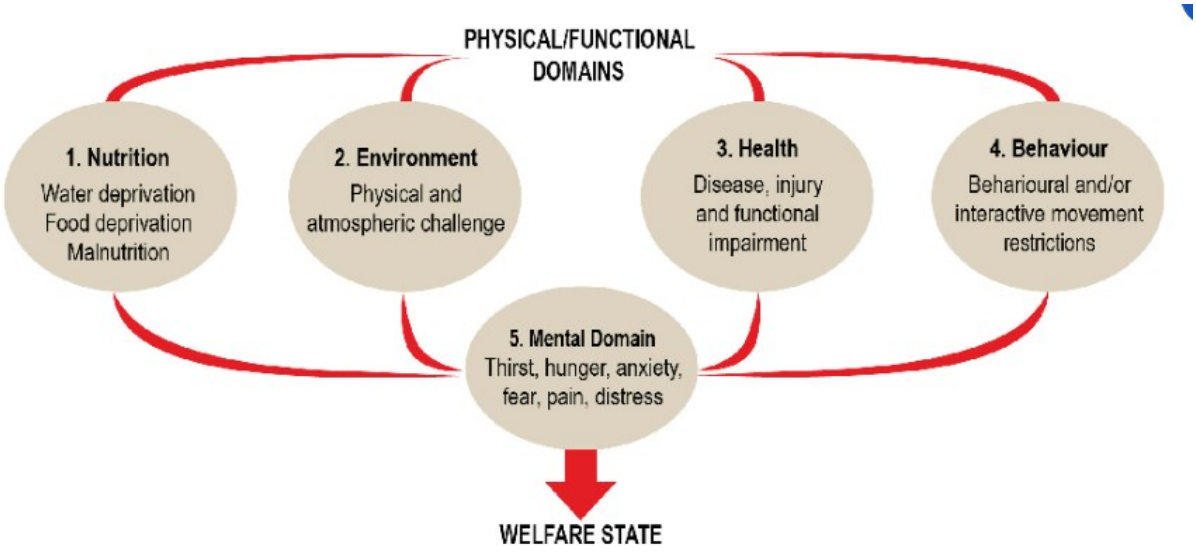
There are generally two modes of assessing harm and welfare in animals: the Five Freedoms (Five Freedoms 2022, Wyatt 2021) and the Five Domain Model (Mellor D, 2017). The Five Freedoms Model has been adopted by the World Animal Health Organization and a variety of other organizations. It is the foundation for the Universal Declaration of Animal Welfare, which has over 2.5 million signatures with approval from 46 countries, and approval from 7 further countries (Universal Declaration of Animal Welfare, 2022). Its basic structure stipulates that for animals to have adequate welfare and for harm to be reduced, they must experience the following five freedoms:

1. Freedom from hunger or thirst by ready access to fresh water and a diet to maintain full health and vigor

2. Freedom from discomfort by providing an appropriate environment, including shelter and a comfortable resting area
3. Freedom from pain, injury or disease by prevention or rapid diagnosis and treatment
4. Freedom to express (most) normal behavior by providing sufficient space, proper facilities, and company of the animal's own kind
5. Freedom from fear and distress by ensuring conditions and treatment which avoid mental suffering

Similar, but more robust, is the Five Domains Model. It explores in more detail the mental state of an animal, including emotions and subjective experiences that impact welfare. One of its strengths is that only minimizing or resolving negative physical or mental states does not mean that animals will have positive welfare. They must also have the opportunity to have positive experiences, such as anticipation, satisfaction, and satiation. Recently, the Five Domains model expanded to include human-animal interactions, which will inform how humans can best interact with parrots (Mellor 2020). The Five Domains are: nutrition, environment, health, behavior, and mental state, all of which lead to assessment of an animal's welfare state (Figure 1).

Figure 1: Five Domains Model



Other frameworks addressing animal welfare include the Universal Declaration of Animal Rights (Universal Declaration of Rights 1979) and Declaration of Animal Rights (Declaration of Animal Rights, 2011). The use of any models for wild parrots is not exhaustive. Trained veterinarians can be used to expand on all of these models and how they inform human-parrot interactions in Suriname.

Parrot Characteristics Impacting Welfare Considerations

Parrots are some of the most intelligent and social of all animals, making them particularly prone to welfare issues due to the complexity of their mental state and social connections (Mellor 2021). Many bird species surpass or match mammals in cognitive abilities (Emery 2006). Amongst birds, corvids and parrots appear to be cognitively superior to other birds, rivaling great apes in many psychological domains (Clayton 2015, Emery 2006, Emery 2004). They manufacture and use tools, solve problems with insight, infer causality, recognize themselves in a mirror, plan out their future needs, and based on their own experience, can anticipate future behavior of their own species, and others, including humans. (Auersperg 2012, Bugnyar 2007, Emergy 2001, Huber 2006, Laumer 2017, Prior 2008, Raby 2007, Taylor 2012, Weir 2002).

In addition, parrots share with songbirds, corvids, humans, and a few other animal groups a rare capacity for vocal learning (Jarvis 2004) and parrots learn words to communicate with humans. (Pepperberg 1999). Parrots can communicate their desires, they can count, add, and subtract, and remarkably, they even understand the concept of zero (Grrlscientist 2008, Grrlscientist 2012). Researchers found that the kea parrot from New Zealand has powers of statistical analysis that were previously only seen in great apes. Though parrots' bodies are small, their mathematic ability is better than that of monkeys and on a par with chimpanzees (Bastos 2020). Some find parrots to be almost as cognitively capable as a five-year-old human (Pepperberg 2019) and in some tests, out score college-age students (Pailian 2020). Some species have been found to teach chicks their individual names (Berg 2011).

> *The mental abilities of corvids and parrots are as sophisticated and diverse as those of apes. Among other things, they are capable of thinking logically, of recognizing themselves in the mirror and of empathy* (Güntürkün 2016)

Many of these abilities are due to the unique brain structure of parrots. For instance, blue and yellow macaws have more neurons in their brains than do rhesus monkeys and parrots pack primate-like numbers of neurons in their forebrain (Oklowicz 2016). The medial spiriform nuclei is a very large section of parrot brains. It is like a super-packed highway connecting the cortex to the cerebellum. Information looping between the cortex and cerebellum allows for planning and sophisticated behaviors. In parrots it is likely the foundation of their self-awareness and other cognitive abilities.

Given the similarities of the cognitive and social nature of parrots and apes, the ability to assure a parrot's welfare in captivity, like primates and especially great

apes, poses a great challenge. In many states in the USA, and in other countries, primates cannot be kept in captivity. The USA is now trying to prohibit all primates in captivity due to their social nature and cognition, which is less or maybe on par with parrots. The welfare status of parrots in captivity must be carefully considered, as there is ample room for harm to occur.

Harm to Birds

The following sections refer to harm as including anything that lowers the welfare status of a bird. Harm to or lack of welfare for wild parrots can happen at various points when they are sought for trade or as domestic pets, including initial capture from the wild, transportation of parrots, placement into holding or quarantine areas, and long-term caging or restraint. Harm and a low welfare status can also occur during confiscation, treating and rehabilitating of injured or sick parrots, liberation of wild parrots, and other conservation activities. Less so, but still possible, harm can happen to birds during ecotourism activities.

Levels of harm and negative impacts on welfare vary according to the training and expertise of human handlers, species and age of the parrot, and handling methodologies employed. In one study on the legal trade of African Grey parrots in Africa, the conclusion was that there was no aspect of the trade that was free from suffering (World Animal Protection 2019).

Varying levels of mortality have been reported in the literature at all stages of capture and transport and in all ages of parrots. In Mexico, an estimated 75% - 90% of parrots die before reaching the buyer (Guzman 2007). Higher mortality likely exists in illegal trade routes, though in many countries and with many species the illegal trade is mixed up with the legal trade and differentiating levels and sites of mortality may be difficult to discern. One report stated that the mortality levels are unacceptable (Thompson 1992). In Columbia, morality reached 50 % (Sollund 2017).

Some birds may not experience mortality, but are still subjected to multiple experiences of harm and lowered welfare. Statistics or descriptions about harm to birds in the trade rarely, if ever, includes morbidity (Guzman 2007) or lowered welfare states. There have also been few studies done on the welfare of animals in the trade and welfare is rarely mentioned and is underreported. (Baker 2013). Welfare issues may not only be underreported but may also be more widespread than imagined (Wyatt 2021). Currently, resources are lacking to ensure adequate welfare states for birds in the trade (Thomsen 1992).

Adult Parrots

Trapping

Adult parrots can be trapped or killed in a variety of ways, including the use of projectiles (from guns, slingshots, and rocks/sticks), mist nets set on the ground, different kinds of mist nets or sticky gum preparations set with a climber in the tree, mist nets set at an opening to a cavity, and, less frequently, poison or the use of sedation and narcotics in food and water. Mortality, morbidity, lowered welfare, and suffering can occur in all instances of trapping and transport, though specific research studies are lacking (Wyatt 2021). Often pre-export mortality, such as what happens during trapping and transport to holding and export stations, is an issue (Edwards 1992).

The use of gum stick branches in tree heights to capture African Greys resulted in 66% mortality (World Animal Protection 2019). In another study, mortality for African Greys averaged 35% during initial trapping and an additional 25% during transit from field to export (Oehler 2017). Capture injuries include fractures of wing and leg bones, luxations, soft tissue avulsion/crushing /laceration/maceration, myopathy, hypoglycemia, and exhaustion (Latas 2020).

Capturing adults can also result in harm to post-fledging juveniles or chicks. as parents may still be feeding and parenting post-fledging. Parrots' breeding seasons often shift from year to year, and can be much longer than normally thought, as some individuals nest on the far ends of a perceived breeding season. Hence, it is difficult to ensure that chicks are not also impacted when trapping adults. Also, young birds are parented and protected well past the nesting stage, up to a year or more in macaws, so trapping adults at any stage can cause harm to chicks and juveniles dependent on them. In addition, capture, subsequent transport, and lack of adequate diet is very stressful for trapped adults (Weston 2009)

Chicks in Nest

Trapping

Chicks can be removed from their nests in a variety of ways, including being pulled out of the nest by hand (sometimes lifted only by a leg, head, or wing), hooked out of the nest (using a fish hook on the end of a line that snags a wing), roped out with a loop (that attaches to a head, wing, or foot), and by lowering a mist net into the cavity. Chicks can also be removed through damage to the tree. This may include gutting out the interior of a palm tree so chicks fall towards

the ground within the tree, enlarging the natural entrance, making other entrances into the tree, burning the tree so that it falls, or cutting the tree down.

In one report, 50% of chicks die when a tree is felled. Patients at wildlife rescue centers and confiscated birds often present with fractured wings and legs, some of which have not and will never be treated. In Peru, cutting down trees or cutting open nest trees resulted in a morality rate of 8% in amazon parrot chicks and 48% in macaw chicks (Weston 2009).

Parrot Trapping Techniques and Processing in Suriname

Introduction

Hunting and trapping of species of parrots have been observed for years by the Nature Conservation Division (NCD) of Suriname. Interest to assess the parrot species population trends has been raised by CITES, in order to responsibly allow exports of certain parrot species. Without data on species population levels and how these fluctuate over time, managing and allowing the export of parrot species is problematic. Also is it required according to CITES to get an understanding of the wild populations of Mealy parrot (*Amazona farinose*), Blue-and- yellow macaw (*Ara ararauna*) and Red-and-green macaw (*Ara chloropterus*). In this regard a pre-field study was initiated from March 18-25 2021, to understand the areas where these birds are being trapped and how to approach the areas to understand the species population size. From August 17 – September 4 2021, the first field trips were performed to collect population size data. In that regard, data on how parrots are being trapped were collected. To learn and understand how parrot species are being trapped, interviews with local people were held (especially with catchers). Photos were taken during the visits in the different areas. The photos used within this report are all coming from observations along the Coppename and Wayambo River.

Findings

The findings are based on observations that were obtained along the Coppename and Wayambo River. The catching techniques of parrots are mostly by means of mist net trapping (Ramcharan & Lingaard, 2021). The catching technique can be described as follows:

Trapping parrots is mostly done by two persons. The catcher will build a cabin, also called a “nest” in a tree or a palm. The tree/palm should be stable and strong enough to support the catcher. Once the catcher has found himself a suitable position on the top of the tree, he will build a cabin/nest from leaves (see Photo 1-2). Most of the time catchers use palm leaves. This is done to camouflage himself.

During the interview, it was stated, that the catching strategies to collect adult bird species, is by means of building a trapping cabin in a tree and to wait for the birds to sit on protruding sticks. On one of these sticks the catcher will have his trapped parrot, a caller bird, which he will use to attract parrots of the same species.

Some catchers would stimulate the bird to scream by poking the bird. This will attract birds of its own species in the surrounding area. Once parrots have perched on the sticks or the cabin, the catcher inside the cabin will make decide whether to catch the birds. He will use a mist net attached to sticks to quickly capture the birds. Once birds are caught in the net, he will send them for the processor underneath the tree. No feathers are cut, since exporters require intact birds. In order to cope with wild adult birds, the last three primaries of at least one wing are tied with a cable tie and the bird is thrown downwards. The catcher below the tree will collect the bird, which needs to be done quickly before the bird has cut the cable tie with its bill. He then will fasten the bird to a stick by tying the feet to the stick. Once the catchers have their quantum for the day, they will carry the birds on sticks to their field camp and keep them in cages. Birds are transported in cages and are sold so. This methodology can be quite traumatic for the birds and birds that are thrown, in part because they might get hit during their fall as well.

In general, catchers trap birds (adults) between June-August). The collection of young birds takes place between March and May. To collect young birds, catchers either climb are cut down a tree with known nesting holes. Cutting down the tree, might kill or injure the young birds. These strategies are well known among catchers and have been practiced for a long time.

Long Term Impacts

Psittaciformes are one of the most threatened taxa of birds, with 29% (117 of 402) of species categorized as globally threatened and 58% (233 of 402) having a decreasing trend in their population sizes (Chan 2021, IUCN 2020). Although, once abundant, several parrot species are now facing extinction, with the pet trade implicated as one of the primary causes of this drop in population, if not the most important cause of this decline, along with habitat loss (Annorbah 2016, (Berkunsky 2021, Birdlife 2022, Dudi 2021, Collar 1992, Snyder 2000,). Other causes, depending on species and locations, such as environmental and geographical characteristics, can also contribute to population decline and threats (Olah 2018). Lacking knowledge of the spatial and temporal changes of wild parrot populations and the activity of trappers, demands from the pet trade has led to the unsustainable trapping of parrots. This has caused many parrot species to be at risk of population reductions or even extinction (Forshaw 2017).

Trapping of adults doubly hits population numbers. Without their parents present, dependent chicks lack sustenance and protection, which increases population loss as chicks and juveniles die when breeding pairs are removed. Even including a small number of adults among a harvest had a far greater impact on population size than a similar number of juveniles in one study on African Gray parrots (Valle 2017).

Holding/Transport/Export/Import Stations

The amount of harm post-trapping depends on species, method of capture (which can result in stress and sustained injuries or disease), and method of transport (whether birds are being moved clandestinely or not). Assessing harm is challenging as generally pre-export data is scarce, especially including what happens to the birds immediately after trapping and before they get to export station holding areas (Thomsen 1992).

Some information is available. In African Greys, 30-90% died between post-capture and pre-export (World Animal Protection 2019). In another study, 4.6% of birds were dead on arrival to export stations and 12.8% died while in quarantine (Thompson 1992). In Mexico 31% died in transport, and 75% died before reaching the purchaser (Guzman 2009). In Suriname, a recent report summarized from interviews said that 10% died in export stations and one government official said that the conditions were terrible, with 15% of macaws dying and 25% of other parrots (World Animal Protection 2020).

The author visited one trapper in Suriname and the birds were kept in cages that were too small and overcrowded, with very poor hygiene and poor diets, and with untreated diseases and injuries. There was no enrichment in the cages, except for chewing on coconut shells, and not enough space to fly, stretch wings, or seek protection from predators and climate.

Parrots as Pets/At Destination

> *Although individual exceptions exist and the level of suitability may vary depending on species, in general, their presence in the pet trade has resulted in serious animal welfare and conservation challenges for parrots, indicating that these animals be unsuitable as human companions.* (Engebretson 2006)

Parrots kept in captivity in countries where they naturally range often die young due to lack of adequate care and poor nutrition (Sollund 2013, Alvarez, A, personal communication, August 2021). In general, parrots kept as pets in Latin

America suffer from hypovitaminosis A and other forms of malnutrition (Weston 2009). Though parrots might be valued by the family, they are often kept in enclosures too small, are isolated from conspecifics, have an inadequate diet, rarely have veterinary care, and suffer a high mortality rate (Weston 2009). Veterinarians in the Americas report that birds rarely live long lives and in one survey in Honduras, when pet owners were asked how long parrots lived, they reported 2-5 years on average, when the life span of amazon parrots and macaws approximates that of humans. The author visited one pet store in Paramaribo and found birds in lower welfare states – they were overcrowded, poorly fed, cages were dirty, had been fighting, had untreated wounds, feather condition was poor, the birds were listless, and there was no enrichment or ways to seek sanctuary from climate or human gaze and activities.

Parrots living outside their natural range, except perhaps budgerigars, lovebirds, cockatiels, and parrotlets, cannot be considered domesticated. As wild animals, the typical captive environment is a far cry from the environments parrots inhabit in the wild (Meehan 2006). Lack of flight and foraging opportunities is one of the biggest causes of low welfare, as is a general lack of enrichment. In one study, 96% of parrots in a captive colony exhibited stereotypy, that is, repetitive actions that serve no obvious purpose. Stereotypy is not simply a behavioral response to an inappropriate environment, but also a product of abnormal developmental process that leads to neurological deficits. Thus, birds in captivity since birth are at higher risk for developing psychological and neurological deficits due to inadequate environments (Meehan 2006). When parrots are hatched in captivity and hand raised chicks develop for some period away from their parents, which can cause abnormalities in sexual behavior and nesting and is a potent disruptor of normal behavioral development in some studied species (Fox 2006).

One of the more common indicators of low welfare is Feather-Damaging-Behavior (FDB), such as chewing, plucking, and/or ingestion of their own feathers (Gaskins 2011, McDonald 2013, Mellor 2021), and is present in 10–15% of pet parrots, while another study found up to 21% impacted (Mellor 2021). As such, this feather damage compromises flying and thermoregulation and can cause tissue damage (McDonald 2013, van Zeeland 2009, Munshi-South 2006).

Lowered welfare is also associated with birds who need complex diets and with larger brain to body ratios, such as in smarter birds like parrots. Birds tend to have better welfare with more naturalistic diets, often not offered in captive situations (Mellor 2021). Psychological stress in captivity triggers an increase in the endogenous production of glucocorticoids and increases metabolic rate of

birds. This increases their nutritional requirements and can result in disease (Cordero 2014a).

Other signs of low welfare in parrots in captivity include cardiovascular disease, beak and nail abnormalities, obesity, trauma, and infectious disease, often caused by exposure to novel microbes from outside their native ranges (Mellor 2021). Psychiatric problems resulting from relational trauma experienced by parrots during formative years of development include social dysfunction, diminished capacity to cope with stress, and affect dysregulation (Bradshaw 2009).

Being wild animals, parrots' suitability to live with humans away from their natural habitats not only results in lower welfare for the birds, but also, as they sexually mature, results in the challenges of having them in people's homes. They do not make good pets because they need ample space and conspecifics to live with, have complicated nutritional and social requirements, and often are aggressive and overly vocal. For this reason, many pet owners give away or relinquish their birds, and given that birds can live as long as humans do, this makes for a given parrot being moved to multiple homes, ending up in a sanctuary, or, even worse, being maltreated, for decades. Though sanctuaries do their best to care for these birds, they arrive with a multitude of problems wrought by cavity (Windsor 2021). Though there is no reliable documentation on exact numbers, there are probably at least ten-thousands of parrots relinquished every year in the USA to sanctuaries, many of who will never be adopted because of their unsuitability to live in homes (Windsor, K, personal communication, February 2022).

Infectious Disease

Increased risk to infectious disease occurs in parrots all along the transport route from capture to captivity, often in holding cases often much more densely populated than birds would ever congregate in the wild and at destination locations. Many of these infectious agents can carry over to other species of birds, including domestic birds. Captive and free-flying wild parrots in the Americas have been documented to carry Newcastle virus (Villatoro-Chacon), *cryptosporidium baileyi* (Bruno 2017), avipox virus (Esteves 2017,Murer 2018), herpesvirus (Deem 2005, Gilaridi 1995, Turral Ramírez 2017), Chlamydia (Freitas Raso 2001, Gilardi 1995), polyoma virus (Dolz 2013, Gilardi 1995,), Salmonella (Deem 2005), and Psittacine Beak and Feather Disease virus (Dolz 2013). Infectious agents, though present in the wild, appear more commonly in captive birds. Recent research has found that the global parrot trade most probably

resulted in the transmission of the Beak and Feather Disease virus to eight countries where this virus had not existed before (Fogell 2018, Morinha 2020).

Bird Watching and Feeding

Watching birds can potentially harm wild birds by disturbing their nesting, foraging, and roosting activities (Sekerciog 2002). Human presence around bird nests increases lack of nest attentiveness, nest abandonment, and egg loss due to nest predators Hanson 2000, (HaySmith 1995). Playing calls of species to lure them out of their hiding places may stress birds, as well as leave nests exposed to predators. Accidently flushing birds can cause high physiological costs, which can be fatal during times of food shortage. (Gabrielsen 1995). Trappers may target certain species and individuals, but many different species of birds might be negatively impacted by their presence.

Feeding wild birds can also result in unintended consequences, such as spreading avian diseases, altering migratory behavior, helping invasive species outcompete natives, and giving predators, including free-roaming neighborhood cats, easy access to birds and their nestlings. There is also the danger of collisions with buildings and windows as birdfeeders are often placed where humans congregate.

Conservation Activities

Conservation activities can include bird watching and feeding, and as such can cause harm. Conservation might also include catching tagging, banding. translocation, and general manipulation of parrots, all of which can also cause harm, similarly in a way to trapping for the pet trade. Long-term breeding programs can also propagate low welfare risks like those which occur when keeping parrots as pets

Confiscation, Rehabilitation and Liberation

Rescue, rehabilitation, and liberation centers also demonstrate high mortality in wild parrots that are brought to them because of the harm the birds experience before ever arriving at the centers. Often this is due to lack of resources, knowledge, or capacity to take care of the birds adequately, both before and after entry into these centers and locations. In Costa Rica, most wild confiscated parrots die in captivity (World Animal Protection 2019). In Mexico, the mortality rate of parrots in rescue centers from 1995-2005 was 45% (Guzman 2007). Confiscated birds can suffer from Chlamydiosis, respiratory disease, and

Candidiasis, all complicated by the stresses of overcrowding, inadequate and prolonged transportation, poor nutrition, and substandard sanitary condition, all of which leave them prove to infection. (Freitas 2004).

Harm to Ecosystems

The demand for wildlife causes a threat to biodiversity and its subsequent loss (Kitzes 2017). Parrots, for example, provide multiple environmental services, such as acting as genetic linkers, providing food for secondary seed dispersers, and plant protectors, all resulting in a pervasive impact on plant assemblages (Guillermo 2015). They sometimes also serve as primary seed dispersers (Guillermo 2016, Tella 2015, 2016) and provide fertilizer and discarded food remnants for forest floor dwellers (IPBES 2020, Thomson 1992).

When trees are harmed or felled to take wild parrots, this further reduces flora diversity, ultimately impacting the fauna as well. In some parts of Honduras, entire swaths of forest are devoid of pine trees sufficiently large for macaw nests, as the trees suitable for nesting have been cut or burned down by trappers.

Harm to People

Humans can be harmed directly during trapping activity. The author receives on a regular basis news of climbers with injuries in many countries in the Americas, including Suriname, and who also fall to their death or suffer debilitating injuries due to falls. One mother of a trapper told the author in Suriname that she holds her hand over heart every time her son goes out to trap parrots because she knows of the danger. In this same village two youth fell from a tree while trapping parrots and experienced minor injuries in 2020. More chronic impacts of those who work with rescued wildlife include musculoskeletal lesions as contractures, low back pain, muscle strain, development of bony callus, skin lesions and wounds from tools, and development of eczema and rashes (Cordero 2014b), as well as disease transmitted to both humans and other animals (Hogerwerf 2020).

Wildlife trafficking hurts people by negatively impacting income, since trappers are paid relatively low rates for the risks they take while middle buyers reap much larger percentages of the profit (Can 2019, Thompson 1992). In Mexico, one study showed that economic gain through parrot trapping did not appear to benefit the country as a whole, nor did it profit the trapper in the field (Inigo-Elias 1991). “Those achieving the most financial reward are the least likely to be

dependent on wildlife trade for their livelihood." (Wyatt 2021). Trappers in Indonesia receive only a small fraction of what wild-caught birds ultimately sell for in the United States (Thompson 1992).

People are also exposed to possible zoonotic diseases while handling parrots, including Chlamydiosis (Thompson 1992). Chlamydiosis in one wild bird refuge center resulted in infections in the staff (Kalmar 2014). Other possible zoonotic organisms include mycobacterium, salmonella and other bacteria (such as E. coli), dermatophytes, avian influenzas, and certain protozoans. These risks to humans and parrots are increased through overcrowding and close proximity of parrots to diverse bird species and other animal species. This risk is further exacerbated by human poverty, poor husbandry, unhygienic conditions, and poor nutrition (Latas 2020).

Parrots can also help spread disease, such as Newcastle's Disease and Avian Influenza, that can impact domestic species, resulting in loss of food and income for humans (Thompson 1992). Humans are also negatively impacted long-term by losing sustainable ecosystems due to the loss of parrots and trees and the multiple plants and wildlife that depend on them. People also lose their cultural and spiritual ties to parrots as populations decrease. One Indigenous Miskito ex-trapper in Honduras nearly died from an assassination attempt because he reported to the government illegal activities on Indigenous land and the criminals took revenge and tried to kill him. The author asked him why he continued to risk his life and he said, "Everything is at risk so I am willing to risk everything. If the parrots don't' make it, neither do my people." He expresses the prevailing view of the One Health approach to well-being, which is that wildlife welfare is human welfare (Wyatt 2021). Animal well-being positively benefits human-wellbeing by improving health and social development, reducing poverty and hunger, augmenting disaster management, and promoting environmental sustainability (Universal Declaration of Anima Welfare 2022). In short, if we improve parrot well-being, we improve human wellbeing (Thompsen 1992, Wyatt 2021)

For example, removal of natural resources, such as parrots, reduces biodiversity (Maher 2016), which hits Indigenous people particularly hard (IPBES 2020). Reducing biodiversity also increases the possibility of pathogens interacting with people (IPBES 2020). In addition, removal of wildlife increases the spread of invasive alien species (Menchetti 2014) while reducing biodiversity and increasing the risk of human disease.

Pilot Survey on the Impact of Trapping on the Welfare of Parrots

More research is needed to understand the impact of trapping on the welfare of parrots, as it is repeatedly stated in the literature cited so far. To address this issue, a pilot study was conducted to address this lack of research and to inform these guidelines. For the complete study results, please go to the Appendix.

Summary of Pilot Survey on Parrot Trapping

At the end of 2021 and beginning of 2022, the author conducted a pilot survey examining the perceived impact of parrot-trapping for permanent removal from the wild on the welfare of both birds and people. The Survey Monkey platform offered 105 questions and text responses, including contact information. A total of 24 people responded from a wide range of professions, including veterinarians, veterinarian technicians, rehabilitators, graduate students, professors, teachers, researchers, direct psittacine caregivers, welfare investigators, law enforcement officials, conservationists, and trappers. Although there are limitations to the survey, responses from these experienced professionals clearly showed they have significant welfare concerns with trapping methods and well-defined perceptions regarding the negative impact of trapping on individual birds' welfare (Figures 2, 3, 4, 5). Respondents report less severe, but not negligible, impact on humans during the trapping experience. Given these results, we recommend more detailed research to document, evaluate, and rate the severity of impacts of particular trapping methods at particular sites on particular species. We also recommend investigations into how mitigating the negative impacts of trapping parrots in the wild can improve welfare and outcomes for both birds and people.

Figure 2: Respondents rate the severity of the impact on the welfare of individual birds based on trapping method

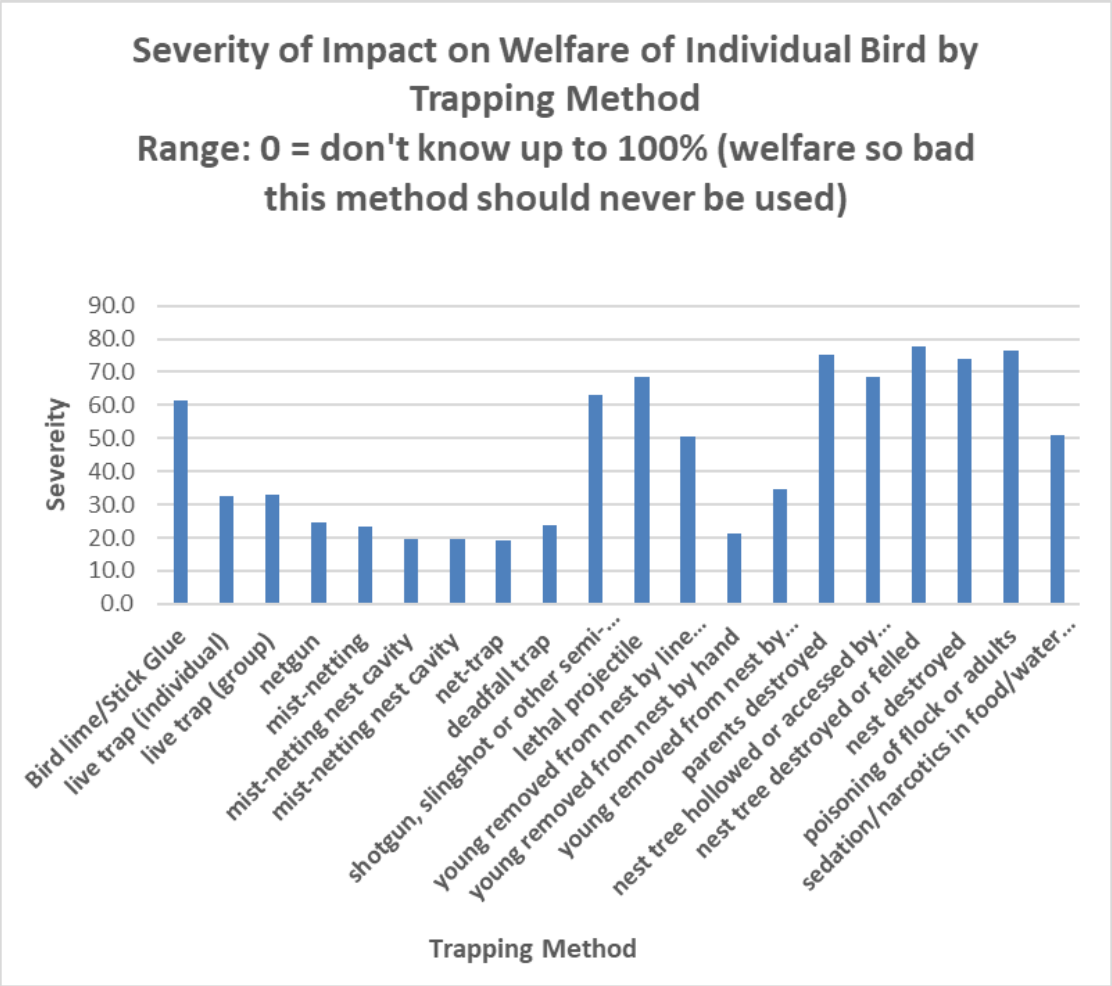


Figure 3: Respondents rate the severity of the impact on the welfare of individual birds based on trapping method

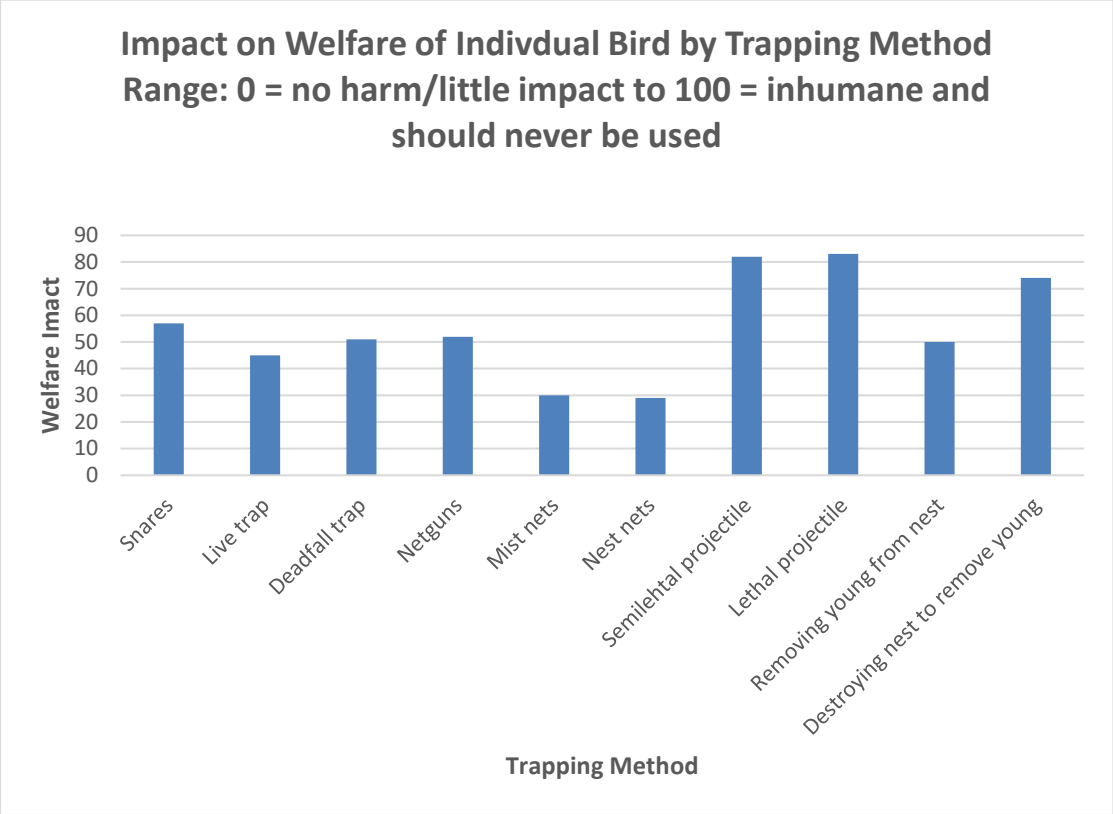


Figure 4: Percentage of respondents (N=18) indicating that they see these injuries or problems with trapping of any kind

ANSWER CHOICES		RESPONSES	
direct trap injury		55.56%	10
mortality from the trap		38.89%	7
long bone fractures		44.44%	8
joint issues		27.78%	5
feather damage		66.67%	12
substance soiling/persistance		27.78%	5
self-trauma		50.00%	9
predator attack		16.67%	3
exhaustion		61.11%	11
dehydration		72.22%	13
starvation		44.44%	8
debilitation		44.44%	8
stress-related immune issue		38.89%	7
post-capture myopathy		16.67%	3
malaise, depression, panic		38.89%	7
Other (please specify)	Responses	16.67%	3
Total Respondents: 18			

Figure 5: Summary of respondents replying to the question, "Do you consider trapping for the LEGAL pet trade to be…."

ANSWER CHOICES	RESPONSES	
acceptable when regulated and enforced	13.33%	2
necessary to sustain legal trade	6.67%	1
unethical	53.33%	8
amoral	46.67%	7
cruel	40.00%	6
not sustainable	73.33%	11
Total Respondents: 15		

Summary of Harm

> *The value of the global wildlife trade is not worth the risks it represents from a human health, animal welfare, and global economic perspective. The cost of the trade is unsustainably high – for both human and non-humans, both can benefit from an enhanced welfare response.* (Wyatt 2021)

In reality, all of the harm that can be caused by removing parrots from the wild is not known, as studies are scarce, nor are the long-term impacts known. Future generations of parrots and people are not usually listed as recipients of harm in trapping wild parrots (Baker 2013). The precautionary principle is an approach in policy making that legitimizes the adoption of preventative measures to address potential risks to the public or environment associated with certain activities or policies. This principle should be adopted regarding the trapping of wild parrots by prohibiting this activity. Trapping cannot be done without severe diminishment of welfare for birds, and often for people, and should only be carried out under the most necessary conditions to create the most benefit and reduce the most harm.

Nevertheless, the people of Suriname will likely find themselves dealing with parrots for some time and for this reason, we offer the following

Recommendations and Introduction to Measuring Welfare

Recommendations for Understanding and Reducing Harm to Parrots in Suriname

1. As provisioning of the welfare of wildlife is a domestic concern and CITES covers only transport (Wyatt 2021), each country must develop their own national protocols on the care of parrots, including wild population support within their natural range and conservation measures. We suggest then that Suriname develop protocols on how to care for parrots in the custody of humans. Protocols should also cover the care of humans, ecosystems, trapping and trade activities, bird watching, conservation measures, and any situation where birds are in captivity including zoos, collections, pet stores, and private ownership.
2. To develop these protocols, the previous sections in this document should be reviewed, taking note of where harm originates and making recommendations where to eliminate harmful practices. We conclude that this would mean ending the trapping of wild parrots unless absolutely necessary for the benefit of an individual bird or a species' population.
3. Governing authorities and those involved with parrot care should gain proficiency using the Five Domains model to measure animal welfare in all aspects, taking note of what can be improved upon to decrease negative causes of welfare and increase positive benefits to welfare. The Five Domains Model has been used to document welfare reduction in the wildlife trade (Baker 2013), though without specifics for parrots. It can be adapted to use with parrots in conjunction with a thorough understanding of wild parrot biology, natural history, cognitive ethology, and behavior, as well as the characteristics of the species and individual parrot being cared for. Individuals and species can vary remarkedly and basing care on a general assessment of parrot welfare will not suffice. See Introduction to Measuring Welfare (below) for examples of how to use this model.
4. Measuring and understanding welfare, as well as understanding how to care and manage parrots in captivity, will help formulate national guidelines for care. Much literature exists defining positive welfare and suggested management parameters for captive psittacines in zoological and private collections, animal shelters, and sanctuaries. There are also guidelines regarding wildlife rehabilitation, confinement, welfare, and wildlife well-being. We suggest consulting "Resources on Care of Parrots Under Human Responsibility" for a general idea on what should be considered to maximize welfare, though each species, and even each individual bird, will have

different needs. There is no "standard of care" as a measure of good welfare. Instead, each individual animals needs to be observed to assess how they are responding to their situation and that response should be linked to scientifically established measures.
5. Provide training on measuring and improving welfare for people in all stages of caring for parrots
6. Provide veterinary care in all stages of caring for parrots, including disease testing
7. Implement livelihood enhancement programs and policies for people at all stages of caring for parrots, so the people can provide better care for themselves and for the birds and acquire greater resources for care (Thompson 1992). It has been shown that the more time, resources, and training people have, the better they are able to care for wildlife.
8. Conduct studies on where harm occurs, and its impact upon humans and parrots, when humans interact with parrots, including disease surveillance. More evidence-based research is needed to improve welfare and reduce harm (Baker 2013).
9. Approach caring for humans and wildlife using a One Health approach. Basically, this means that the needs and well-being of all species and individuals are important and interconnected. Protocols seek to address the well-being of all through a holistic approach that maximizes flourishing for all (IPBES 2020).
10. Any guidelines or protocols that are developed should be reviewed regularly as new research and information accrues.

Resources on Care of Parrots Under Human Responsibility

"How To' Guides for Bird Shelters and Care Facilities." Avian Welfare Organization. http://www.avianwelfare.org/shelters/

Latas, PJ et al. *Wildilfe Rehabilitation of Consfiscated Parrots*. Apple Books, 2020. https://books.apple.com/us/book/wildlife-rehabilitation-for-confiscated-psittacines/id1543058458.

"Living with a Parrot." Foster Parrots. https://www.fosterparrots.com/living-with-a-parrot

"Standards for Birds Not Bred for Use in Research under the Animal Welfare Act – A Proposed Rule by the Animal and Plant Health Inspection Service." *Federal Register* 2022. https://www.federalregister.gov/documents/2022/02/22/2022-03565/standards-for-birds-not-bred-for-use-in-research-under-the-animal-welfare-act USDA Welfare Guidelines – only under review but will come out:

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"Resources." *Global Federation of Animal Sanctuaries.* https://www.sanctuaryfederation.org/information-tools-resources/

Oehler, DA et al. Rehabilitation Of African Grey Parrots / Rehabilitation Des Perroquets Gris Africains Field Manuel. WCS 2017. Available online: https://www.academia.edu/35824590/Rehabilitation_Of_African_Grey_Parrots_R%C3%89habilitation_Des_Perroquets_Gris_Africains_Field_Manual_Guide_Pratique

Introduction to Measuring Welfare

Measuring welfare in all stages of parrots' interaction with humans is necessary, for low welfare at any state in the pathway from wild to captivity can lead to even more harm in the future through mortality. Birds that die, especially those that die young, can cause people to replace birds that die or become ill in suboptimal living arrangements. Replacing birds means even more birds being trapped, or bred in captivity, so one of the best things to improve the welfare of parrots in Suriname is to keep the birds already in captivity well and flourishing. This requires being able to judge levels of welfare and areas that need improvement, both of which are paramount for improving overall welfare.

We recommend using the Five Domains Model to assess welfare in five different categories (Nutrition, Physical Conditions, Health, Behavior, Mental State) with an additional, but important, category of Human Interactions (Mellor 2020, Figures 1, 6). Human interactions should be considered because they are so present in birds' lives in captivity and can so readily cause both positive and negative impacts on birds. Little research has been done on humans interacting with parrots as opposed to other species, but one study showed that humans who score lower on general empathy can possibly cause higher stress in parrots (Cramton 2006).

For a specific bird in a specific situation, each category is scored along a gradient that measures compromised levels of welfare. There are five levels: no compromise to welfare, low welfare, mild to moderate low welfare, marked to severe low welfare, very severe low welfare. Physical parameters judging reduced welfare, such as level of diet variation, has not been specifically categorized into welfare reduction categories in parrots, but a system can be developed based on what has been done with other animals (Mellor 2017, Figure 7). Also, interpreting an animal's response to reduced welfare should be standardized, such as interpreting stereotypy and causes of feather damages, and, as of yet, this has not been done for parrots.

In addition, each animal is graded as to their "Animal Welfare Enhancement Opportunities), ranging from none (0), low level (+), mid-level (++), and high level (+++). This assessment of Welfare Enhancement results in a final score that can be used to guide improvements. As of yet there is no standard for using this in parrots, but templates to develop one have been constructed (Mellor 2017, Figure 8). Grading is vulnerable to subjective interpretation by humans, but with practice, ample time to observe the animals, knowledge of wild parrots, and

availability of wild parrot and veterinary consultants, a system of grading can be documented that reduces subjectivity.

Below is an example of the categories to consider in the Five Domains Model gaging the welfare status of wild adult trapped macaws by describing negative and positive impacts.

Nutrition

1. Exposure to lack of water in transport, water bowl spills, exertion, heat, cramped spaces, and/or poorly ventilated areas leads to thirst. Drinking correct quantities of water leads to quenching and the pleasures of drinking.
2. Exposure to inadequate food intake during transport, when food bowls spill, and/or novel foods that are rejected leads to hunger. Eating enough food leads to postprandial satiety and the pleasures of taste and salt.
3. Exposure to poor food quality by being offered food inadequate for evolved physiology leads to deficits in food enjoyment and satiety. Positive impacts lead to the pleasures of food tastes/smells/textures, masticatory pleasures, and gastrointestinal comfort.

Physical Environmental Conditions

1. Close confinement, overcrowding, unsuitable substrate, wire mesh bottom in cages, and/or inadequate and varied perching leads to general stiffness, muscle tension, musculoskeletal pain, and skin irritation. Positive conditions lead to physical comfort.
2. Air pollutants during transport along roads, CO_2, dust if transported on dirt roads, and/or smoke if housed near open fires in kitchen, agriculture, or wildfires leads to breathlessness, air passage irritation and pain, possible toxicity, and infectious agents. Positive conditions leads to respiratory comfort and good health.
3. Aversive odors, such as from combustible engines or urban areas during transport, leads to revulsion to foul or repellent odors. Positive conditions lead to olfactory comfort.
4. Thermal extremes, such as open transport cages in hot or cool weather or with rain and wind, or housing without shade or sanctuary, leads to chilling, dampness, and/or overheating. Positive conditions lead to thermal comfort.
5. Loud or otherwise unpleasant noise, such as people talking, combustion engines, or music, leads to impaired hearing, ear pain, or stress. Positive conditions lead to auditory comfort.
6. Light of inappropriate density, such as housing in lighted areas at night, no sanctuary in housing to escape light, and/or kept in poorly lit enclosures, leads to eye strain due to flashing, glare, or darkness as well as

stress and lack of rest. Positive conditions lead to visual and physical comfort.

7. Monotony (ambient, physical, and/or lighting), such as housing without enrichment, few and/or unvaried perching, inability to move around a large area in a cage, indoor caging such as that found in holding or quarantine areas, and/or abrupt changes in environment, leads to malaise from unnatural constancy. Positive conditions lead to congenial variety and predictability.
8. Unpredictable events, such as during trapping, handling, caging, transport, and/or separation from conspecifics, leads to anxiety, fear, and/or hypervigilance. Positive conditions lead to relaxation-based ease and calmness.
9. Physical limits on rest and sleep, such as constant transport, constant exposure to novel and/or threatening events/people/pets leads to exhaustion. Positive conditions lead to being well rested.

<u>Health Conditions</u>

1. Acute injuries, such as during trapping, handling and transport, and chronic husbandry mutilations (such as tying wings, inadequate caging and perches, and housing with other individuals or species), acute and chronic disease (such as weakened conditions due to other low welfare states, exposure to human infectious agents during captivity, and exposure to avian and other species infectious agents due to overcrowding and mixing of species and mixing of same species from different regions) leads to pain (many times), breathlessness, debility, weakness, sickness, malaise, nausea, and/or dizziness. Positive conditions lead to the comfort of good health, function capacity, and vitality.
2. Functional impairment, such as tying or clipping of wings, tying feet to a perch, and caging, leads to pain, debility, and discomfort. Positive conditions lead to fully functional body, comfort of good health, functional capacity, and vitality
3. Obesity from offering high fat foods, such as sunflower seeds, or leanness from inadequate food and nutritional intakes leads to physical, metabolic and/or pathophysiological consequences. Positive conditions lead to optimal body condition, comfort of good health, functional capacity, and vitality
4. Poor physical fitness and muscle de-conditioning, such as inability to walk, climb, or fly, leads to physical weakness and exhaustion. Positive conditions lead to vitality of fitness and pleasurably vigorous exercise.

Behavior

1. Invariant, barren environments (ambient, physical, and/or biotic) with choices markedly restricted and constraints on environmental focused activity, such as being housed in same cage at all times, in an outdoor location or holding area, being unable to move variable distances in a day and/or to fly, and/or having unavailable engaging choices (such as exploration and/or foraging), leads to lack of agency and choice, boredom, depression, withdrawal, neophobia, and/or stereotypic behaviors. Positive conditions lead to necessary mental and physical stimulation, such as being pleasantly occupied and in good health due to a varied environment where behavior choices are enhanced, enjoyment of novelty exists, and parrot experiences feelings of being in control.
2. Inescapable sensory impositions, such as vocalizations of humans and other species nearby and/or increased amplitude from many voices during transport and holding, leads to stress, lack of agency and/or choice. Positive conditions lead to congenial sensory inputs, and calmness.
3. Constraints on animal-to-animal interactive activity, such as being housed apart from conspecifics and/or chosen flock members, friends, or mates, leads to boredom, depression, lack of playing, lack of sexual and reproductive activity, lack of bonding or reaffirming bonds, frustration, and/or lack of good mental and physical health. Positive conditions lead to necessary mental and physical stimulation, good health, maternal and paternal rewards, excitation and playfulness, sexual gratification, and affectionate sociability.
4. Limits on threat avoidance, escape, or defensive activity, such as when caught in a trap or housed outside in a cage when predators come, leads to anxiety, increased energy expended, hypervigilance, anger, and possible physical harm. Positive conditions lead to a sense of safety, calmness, confidence, comfort, enjoyment of novelty, and good health.
5. Limitations on sleep and rest, such as in enclosures where birds cannot escape other species making noise or movement and/or in areas where there is not quiet time during the day and full darkness at night, leads to physical and mental ill health. Positive conditions lead to refreshment, and energy.

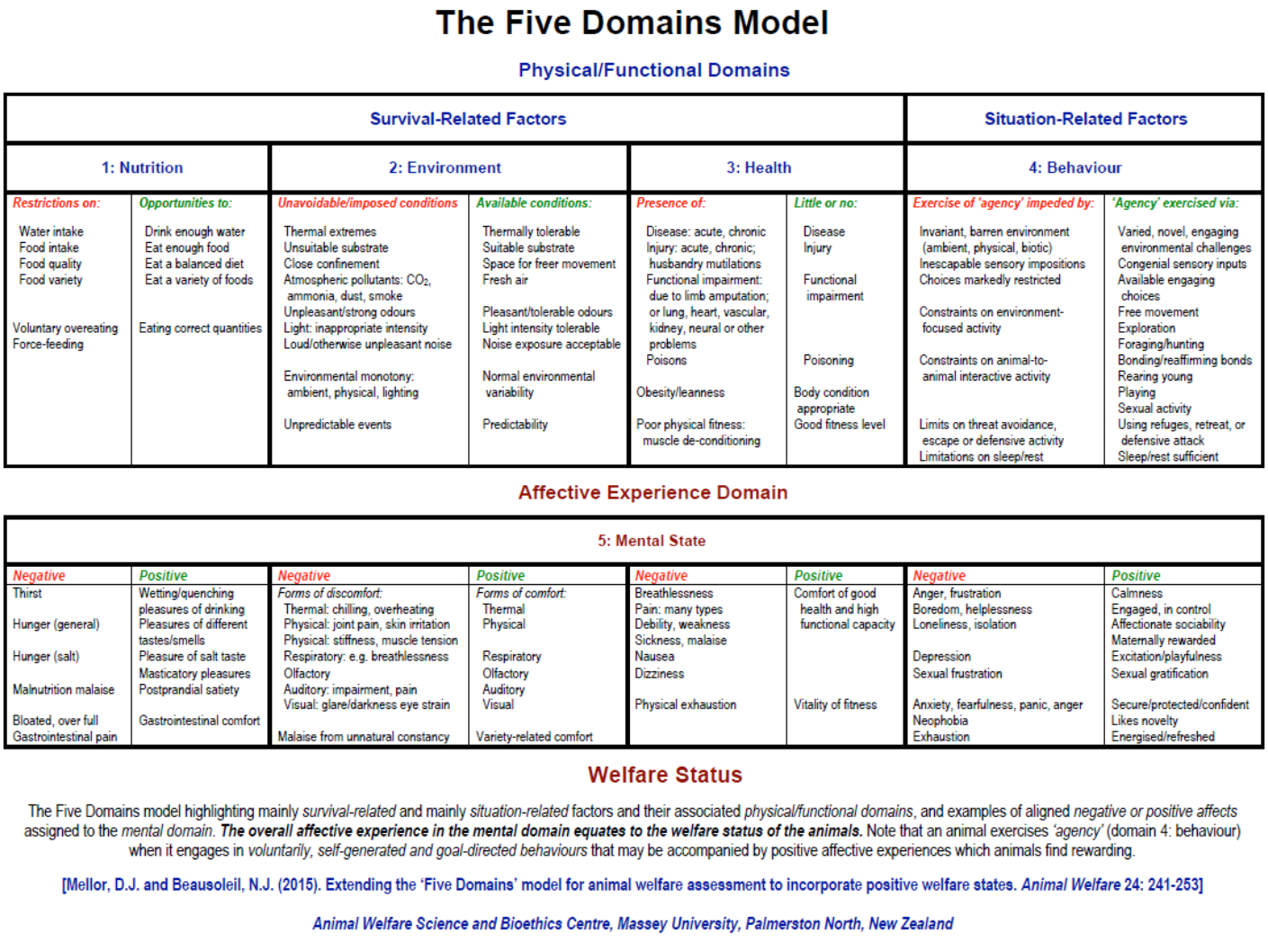
Mental State

This the fifth domain that includes mental well-being. Mental well-being was addressed in the previous four domains above.

Special Considerations of Human Interaction

1. If humans are uncertain, fearful, indifferent, insensitive, impatient, oppressive, belligerent, domineering, callous, cruel or vindicative, or have voices that are angry, loud, and/or shouting any time during birds' interaction with them during trapping, transportation, handling, and/or in holding cages, leads to parrots exhibiting behaviors such as hypervigilance, attacking, fighting, hyperreactivity, escape avoidance, cowering, and/or appearing withdrawn.
2. Humans who are inexperienced, unskilled, untrained, unqualified, and/or handle animals erratically or with excessive force, and/or are punished-focused (which can happen at any stage where humans interact with parrots) leads to anxiety, fear, panic, terror, neophobias, insecurity, confusion, uncertainty, persistent unease, helplessness, pain from injuries, and/or negative cognitive bias.
3. Positive interactions with humans lead to improvements in all five domains.

Figure 6: Five Domains Model



The Five Domains Model

Physical/Functional Domains

Survival-Related Factors						Situation-Related Factors	
1: Nutrition		2: Environment		3: Health		4: Behaviour	
Restrictions on:	*Opportunities to:*	*Unavoidable/imposed conditions*	*Available conditions:*	*Presence of:*	*Little or no:*	*Exercise of 'agency' impeded by:*	*'Agency' exercised via:*
Water intake Food intake Food quality Food variety Voluntary overeating Force-feeding	Drink enough water Eat enough food Eat a balanced diet Eat a variety of foods Eating correct quantities	Thermal extremes Unsuitable substrate Close confinement Atmospheric pollutants: CO_2, ammonia, dust, smoke Unpleasant/strong odours Light: inappropriate intensity Loud/otherwise unpleasant noise Environmental monotony: ambient, physical, lighting Unpredictable events	Thermally tolerable Suitable substrate Space for freer movement Fresh air Pleasant/tolerable odours Light intensity tolerable Noise exposure acceptable Normal environmental variability Predictability	Disease: acute, chronic Injury: acute, chronic; husbandry mutilations Functional impairment: due to limb amputation; or lung, heart, vascular, kidney, neural or other problems Poisons Obesity/leanness Poor physical fitness: muscle de-conditioning	Disease Injury Functional impairment Poisoning Body condition appropriate Good fitness level	Invariant, barren environment (ambient, physical, biotic) Inescapable sensory impositions Choices markedly restricted Constraints on environment-focused activity Constraints on animal-to-animal interactive activity Limits on threat avoidance, escape or defensive activity Limitations on sleep/rest	Varied, novel, engaging environmental challenges Congenial sensory inputs Available engaging choices Free movement Exploration Foraging/hunting Bonding/reaffirming bonds Rearing young Playing Sexual activity Using refuges, retreat, or defensive attack Sleep/rest sufficient

Affective Experience Domain

5: Mental State							
Negative	*Positive*	*Negative*	*Positive*	*Negative*	*Positive*	*Negative*	*Positive*
Thirst Hunger (general) Hunger (salt) Malnutrition malaise Bloated, over full Gastrointestinal pain	Wetting/quenching pleasures of drinking Pleasures of different tastes/smells Pleasure of salt taste Masticatory pleasures Postprandial satiety Gastrointestinal comfort	*Forms of discomfort:* Thermal: chilling, overheating Physical: joint pain, skin irritation Physical: stiffness, muscle tension Respiratory: e.g. breathlessness Olfactory Auditory: impairment, pain Visual: glare/darkness eye strain Malaise from unnatural constancy	*Forms of comfort:* Thermal Physical Respiratory Olfactory Auditory Visual Variety-related comfort	Breathlessness Pain: many types Debility, weakness Sickness, malaise Nausea Dizziness Physical exhaustion	Comfort of good health and high functional capacity Vitality of fitness	Anger, frustration Boredom, helplessness Loneliness, isolation Depression Sexual frustration Anxiety, fearfulness, panic, anger Neophobia Exhaustion	Calmness Engaged, in control Affectionate sociability Maternally rewarded Excitation/playfulness Sexual gratification Secure/protected/confident Likes novelty Energised/refreshed

Welfare Status

The Five Domains model highlighting mainly *survival-related* and mainly *situation-related* factors and their associated *physical/functional domains*, and examples of aligned *negative or positive affects* assigned to the *mental domain*. ***The overall affective experience in the mental domain equates to the welfare status of the animals.*** Note that an animal exercises *'agency'* (domain 4: behaviour) when it engages in *voluntarily, self-generated and goal-directed behaviours* that may be accompanied by positive affective experiences which animals find rewarding.

[Mellor, D.J. and Beausoleil, N.J. (2015). Extending the 'Five Domains' model for animal welfare assessment to incorporate positive welfare states. *Animal Welfare* 24: 241-253]

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Figure 7: Compromise Grades of Lowered Welfare

Animal Welfare Challenge	Compromise Grade				
	A: None	**B: Low**	**C: Mild to Moderate**	**D: Marked to Severe**	**E: Very Severe**
			Domain 1: Nutrition		
Access to water in livestock, pets, working animals, etc.:	Water freely available:	12-h interruption in water supply, cold weather:	24-h interruption in water supply; hot weather:	Within-group competition for limited water long term:	Water not available (supply failure, drought):
Availability; inferred thirst	No to very low-level thirst	Low-level thirst	Moderate thirst	Severe thirst	Extreme thirst
Feeding level in sheep:	Good-level and stable body condition (3/5):	Mid-level and stable body condition (2.5/5):	Mid-level body condition (2.5/5), slowly decreasing:	Rapidly decreasing or low-level body condition (1.5/5):	Very low body condition (0.5/5)—emaciated:
Body condition score; inferred hunger	No to very low-level hunger	Low-level hunger	Moderate hunger	Severe hunger	Extreme hunger
			Domain 2: Environment		
Heat load in sheep: Panting; inferred hyperthermic distress	Ambient conditions thermoneutral: No panting No hyperthermic distress		High radiant load, temperature, humidity: Closed mouth panting Mild to moderate distress		Extreme radiant load, temperature, humidity: Open mouth panting Very severe distress
Air quality in housed pigs: NH_4 levels; inferred eye and nasal irritation	Good ventilation, fresh air: No eye/nasal irritation		Ventilation poor: NH_4 10–15 ppm Mild eye/nasal irritation	Ventilation very poor: NH_4 greater than 25 ppm Marked eye/nasal irritation	

Figure 8: Grading Animal Welfare Enhancement Activities

Domain	**Animal Welfare Enhancement Opportunities**			
	None (o)	**Low-Level (+)**	**Mid-Level (++)**	**High-Level (+++)**
Domain 1: Nutrition	Quantity and quality meet functional needs	Quantity and quality meet functional needs	Quantity and quality meet functional needs	Quantity and quality meet functional needs
Livestock fed indoors and/or outdoors	Diet components and palatability constant over long periods	Very limited choice among diets with pleasant smells, tastes and textures via food supplements or outdoor seasonal changes	Moderate choice among varied diets with pleasant smells, tastes and textures available indoors and/or outdoors	Widely varied diets enabling choices between pleasant food smells, tastes and textures in engagingly different locations
Domain 2: Environment	Monotonous ambient, physical and lighting conditions	Marginal increase in space allows freer movement	Moderate increase in space allows greater separation between resting animals	Space sufficient for separate eating, resting and dunging sites
Groups of pigs kept indoors	Limited space restricts animals' activities		Deep, clean, dry floor substrate	Space for calm social interaction

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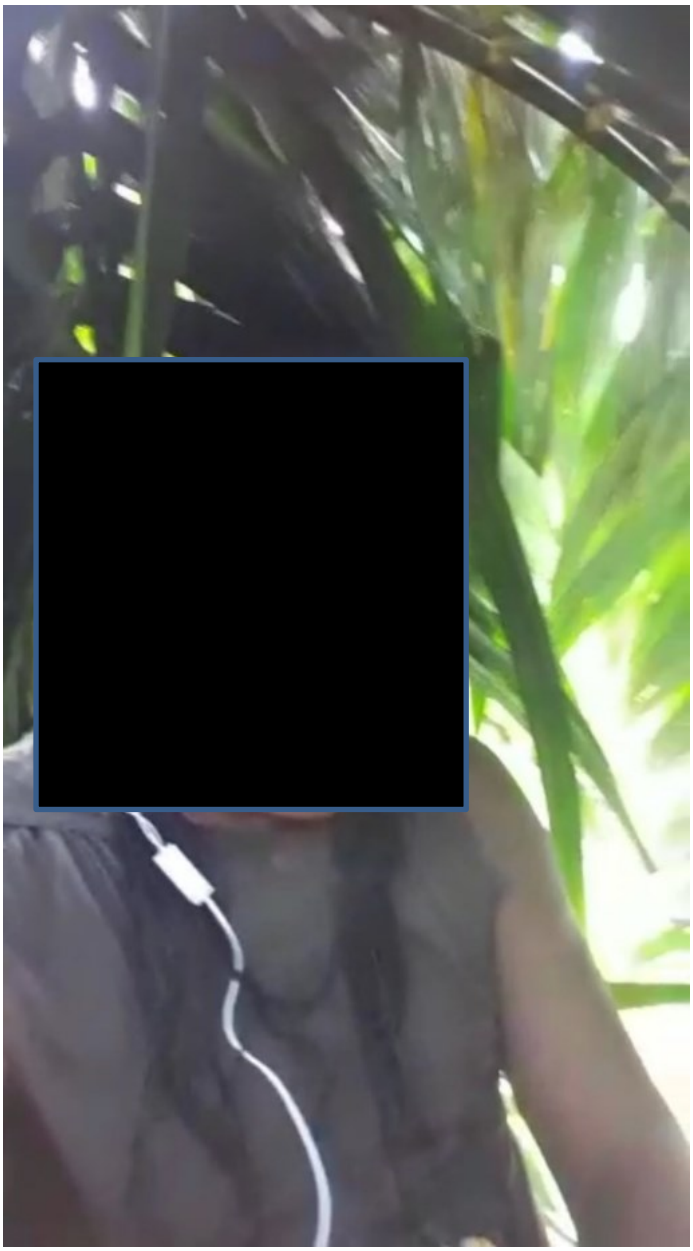
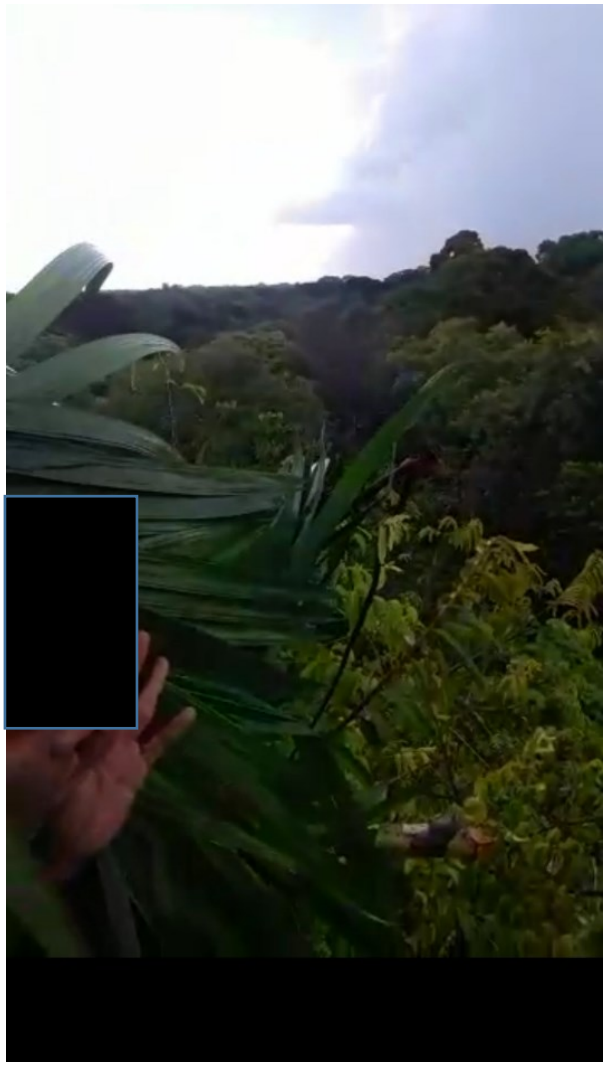
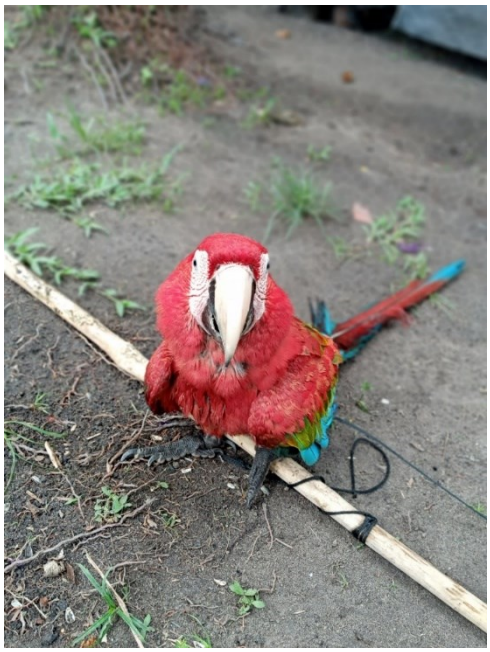
Appendix 1: Photos





Parrot trapper up in a tree in the nest/cabin with a view of the surrounding area. The trapper waits here until the caller bird attracts other parrots



Red-and-green macaw tied to a stick after capture (above).

Parrots held in Suriname 2021 by trappers showing low welfare: poor diet, low enrichment, crowding, no sanctuary, unable to fly, poor feather condition, wounds, and low hygiene (below).

Parrots in a pet store in Paramaribo 2021 showing low welfare: poor sanitation, poor diet, wounds and feather loss from overcrowding, listlessness with closed eyes, no sanctuary, exposure to street and pollution

Honduran Miskito villagers mourning at the base of a scarlet macaw nest tree where a fellow villager fell to his death while removing chicks from a wild nest (above). Rosa (below) was an injured scarlet macaw chick who was taken from her wild nest by the felling of the tree. Her injuries included two broken wings and two broken legs. She was not treated by a veterinarian until she was nearly one year old and by then she could only walk by pulling herself along a perch with her beak.

Appendix 2: Survey on the impact of trapping, capture, and collection methods on the welfare of wild parrots

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Summary

At the end of 2021 and beginning of 2022, we conducted a pilot survey examining the perceived impact of parrot trapping for permanent removal from the wild on the welfare of both birds and people. The Survey Monkey platform offered 105 survey questions and text responses, including a request for contact information. A total of 24 people responded from a wide range of professions including veterinarians, veterinarian technicians, rehabilitators, graduate students, professors, teachers, researchers, direct psittacine caregivers, welfare investigators, law enforcement officials, conservationists and trappers. Although there are limitations to the survey, responses from these experienced professionals clearly showed they have significant welfare concerns with trapping methods, and well-defined perceptions regarding the negative impact of trapping on an individual birds' welfare. Respondents report less severe, but not negligible, impacts on humans during the trapping experience. Given these results, we recommend detailed research to document, evaluate, and rate the severity of particular trapping methods at specific sites on specific species. We also recommend investigations into how mitigating the negative impacts of trapping parrots in the wild can improve welfare and outcomes for both birds and people.

Methods

A preliminary survey on the impact of trapping for permanent removal from the wild on the welfare of parrots and people was conducted at the end of 2021 and beginning of 2022 using Survey Monkey with 105 questions or text boxes, including a request for contact information. Potential respondents were notified through known contacts of the Parrot Researchers Group (Parrot Researchers Group, Parrot Researchers Group Website), the International Wildlife Rehabilitation Council, and individual biologists, wildlife rehabilitators, and wildlife veterinarians, who then distributed the link to closed networks of professionals. No broad advertisement was done publicly or on social media. Respondents were directed to an online link using the Survey Monkey platform.

Results:

A total of 24 people responded from a wide range of professions including veterinarians, veterinarian technicians, rehabilitators, graduate students, professors, teachers, researchers, direct psittacine caregivers, welfare investigators, law enforcement officials, conservationists, and trappers. Eleven respondents (48%) were veterinarians and 26% (n=6) of those responded that

they were in clinical practice. More than half of the respondents (65%, n=15) indicated that they work with wildlife. People (n=23) reported that they experienced an average of 20 years of witnessing parrots that were trapped, with 12 respondents reporting seeing at least 100 or more individual trapped birds during their time, and the others averaging 58 birds seen. Ten respondents estimated seeing 1,000-11,500 total birds. Respondents worked globally, with the fewest in African nations and Europe, and with the majority reporting from Mexico, Central America, and the Caribbean. A summary of their results follows.

Figure 1: Respondents rated how much they knew about each trapping method

	I DO NOT KNOW ABOUT THIS METHOD	I HAVE USED THIS METHOD	I HAVE SEEN THIS METHOD USED	I HAVE HEARD OF THIS TECHNIQUE	I HAVE HANDLED BIRDS TRAPPED THIS WAY	I HAVE CARED FOR OR TREATED BIRDS INJURED BY THIS TECHNIQUE	TOTAL RESPONDENTS
bird lime/sticky trap/glue	47.37% 9	0.00% 0	15.79% 3	36.84% 7	5.26% 1	15.79% 3	19
live trap individual	27.78% 5	11.11% 2	38.89% 7	27.78% 5	11.11% 2	27.78% 5	18
live trap groups	50.00% 9	5.56% 1	16.67% 3	27.78% 5	5.56% 1	11.11% 2	18
net gun	38.89% 7	5.56% 1	16.67% 3	38.89% 7	5.56% 1	5.56% 1	18
mist netting	43.75% 7	31.25% 5	12.50% 2	31.25% 5	18.75% 3	6.25% 1	16
mist netting nest cavity	52.94% 9	0.00% 0	11.76% 2	41.18% 7	5.88% 1	0.00% 0	17
net trap	35.29% 6	5.88% 1	29.41% 5	35.29% 6	5.88% 1	11.76% 2	17
deadfall trap	81.25% 13	0.00% 0	0.00% 0	18.75% 3	0.00% 0	0.00% 0	16
shotgun, slingshot, other sub-lethal projectile	47.06% 8	5.88% 1	5.88% 1	35.29% 6	0.00% 0	11.76% 2	17
shotgun, slingshot, other lethal projectile	41.18% 7	5.88% 1	11.76% 2	35.29% 6	0.00% 0	11.76% 2	17
young removed from nest by line around neck or leg ("noose")	47.06% 8	0.00% 0	5.88% 1	47.06% 8	0.00% 0	0.00% 0	17
young removed from nest by "hooking"	37.50% 6	0.00% 0	25.00% 4	43.75% 7	0.00% 0	6.25% 1	16
parents destroyed	58.82% 10	5.88% 1	11.76% 2	29.41% 5	0.00% 0	5.88% 1	17
nest cavity accessed by hollowing or cutting	17.65% 3	5.88% 1	41.18% 7	41.18% 7	0.00% 0	17.65% 3	17
nest tree felled or destroyed	12.50% 2	0.00% 0	37.50% 6	50.00% 8	0.00% 0	25.00% 4	16
nest destroyed	23.53% 4	5.88% 1	29.41% 5	47.06% 8	0.00% 0	17.65% 3	17
poisoning	64.71% 11	5.88% 1	5.88% 1	23.53% 4	0.00% 0	5.88% 1	17
sedative/narcotic in food or water	52.94% 9	11.76% 2	0.00% 0	35.29% 6	0.00% 0	0.00% 0	17
gassing or smoking the cavity	76.47% 13	0.00% 0	0.00% 0	23.53% 4	0.00% 0	0.00% 0	17

Comments (2)

The following methods were listed for trapping adult birds: bird lime/glue, live trap, netgun, mist net, net trap, cavity nest trap, deadfall, poison, sedatives/narcotics, gassing or smoking the cavity, semi-lethal projectiles, and lethal projectile. 20% or more of the respondents were experienced with live traps and nest-trapping for adults. Techniques for removal of chicks from nests included removal from the cavity by hand, noose line, or a sharp hook and

extraction by damaging the cavity, damaging the nest, or felling the tree. 20% or more of the respondents were experienced with chicks removed from the cavity by hand, extraction by damaging the cavity, damaging the nest, or felling the tree. Assessment of the severity of impact on the welfare of the individual bird was asked in two different ways (Figures 2, 3)

Figure 2: Respondents rate the severity of the impact on the welfare of individual birds based on trapping method

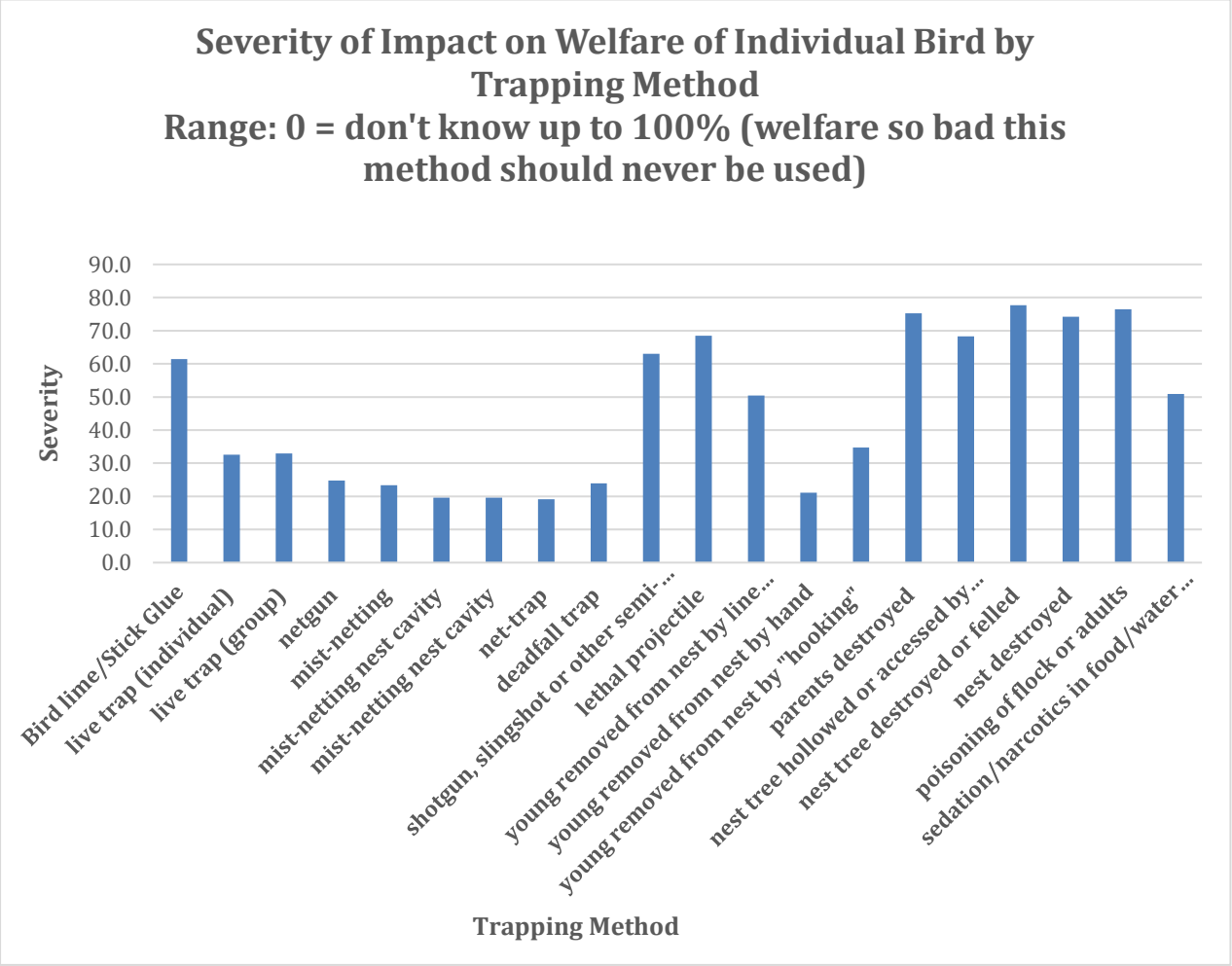
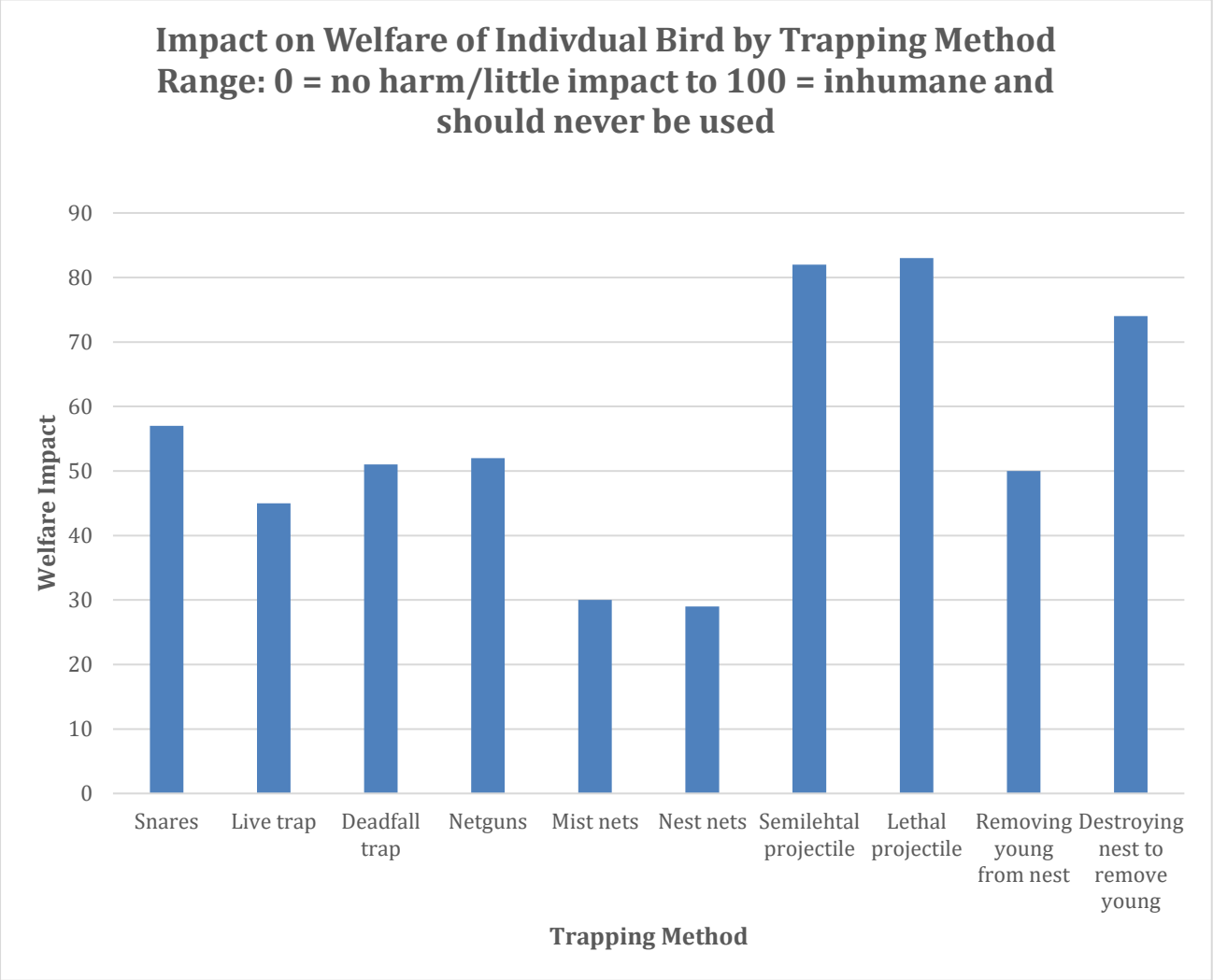


Figure 3: Respondents rate the severity of the impact on the welfare of individual birds based on trapping method



Respondents were asked what injuries or problems they see with trapping and 18 responded (Figure 4). Other responses included depression, panic, pain, and cardiac arrest. Note that respondents reported that they estimated 56% of birds are injured directly from the trapping (n=10 respondents).

Figure 4: Percentage of respondents (N=18) indicating that they see these injuries or problems with trapping of any kind

ANSWER CHOICES		RESPONSES	
direct trap injury		55.56%	10
mortality from the trap		38.89%	7
long bone fractures		44.44%	8
joint issues		27.78%	5
feather damage		66.67%	12
substance soiling/persistance		27.78%	5
self-trauma		50.00%	9
predator attack		16.67%	3
exhaustion		61.11%	11
dehydration		72.22%	13
starvation		44.44%	8
debilitation		44.44%	8
stress-related immune issue		38.89%	7
post-capture myopathy		16.67%	3
malaise, depression, panic		38.89%	7
Other (please specify)	Responses	16.67%	3
Total Respondents: 18			

Respondent estimated 33% of birds died from trapping (n=14 respondents), 36% (n=14) of birds suffered morbidity from one cause or another, and 42% experienced chronic illness or injury (n=14).

Of 18 people who had worked with trapped parrots or knew others who trapped parrots, the majority suffered no injuries due to trapping activity, while 40% suffered short term and minor injuries from birds (biting, clawing, etc.), and 11.8 – 23.5 % suffered minor injuries from falls, saws/tools, equipment failure, and human violence (Figure 5). Seventeen also reported injuries they knew of that other people sustained during trapping. Three different people reported four fatal accidents (falls and saws/tools), accounting for 17.6% of respondents, none reported debilitating/career ending injuries, and 64.7 % – 88.2 % reported no injuries for any of the categories (Figure 6).

Figure 5: Respondents indicating harm they have experienced during trapping of any kind

	DEBILITATING/CAREER-ENDING	MAJOR INJURY/LONG-TERM RECOVERY	MAJOR INJURY/SHORT-TERM RECOVERY	MINOR INJURY	NONE	TOTAL RESPONDENTS
fall	5.56% 1	0.00% 0	0.00% 0	22.22% 4	72.22% 13	18
saw, tools, etc	5.56% 1	0.00% 0	0.00% 0	16.67% 3	77.78% 14	18
equipment failure	5.56% 1	0.00% 0	0.00% 0	11.11% 2	83.33% 15	18
human violence	5.56% 1	0.00% 0	0.00% 0	11.11% 2	83.33% 15	18
injury from the birds	5.56% 1	0.00% 0	5.56% 1	33.33% 6	55.56% 10	18

Comments (1)

Figure 6: Summary of respondents who indicate they know of harm to others from any method of trapping

	FATAL	DEBILITATING/CAREER-ENDING	MAJOR INJURY/LONG-TERM RECOVERY	MAJOR INJURY/SHORT-TERM RECOVERY	MINOR INJURY	NONE	TOTAL RESPONDENTS
fall	22.22% 4	0.00% 0	0.00% 0	16.67% 3	0.00% 0	61.11% 11	18
saw, tools, etc	11.11% 2	0.00% 0	0.00% 0	11.11% 2	5.56% 1	72.22% 13	18
equipment failure	5.56% 1	0.00% 0	0.00% 0	11.11% 2	11.11% 2	72.22% 13	18
human violence	5.56% 1	0.00% 0	5.56% 1	0.00% 0	5.56% 1	83.33% 15	18
injury from the birds	5.56% 1	0.00% 0	5.56% 1	11.11% 2	11.11% 2	66.67% 12	18

Comments (1)

Respondents were asked if bird trapping had negatively impacted their own welfare, health, and well-being, with a range of 0 meaning none, 50 = some, and 100 = very negative. The average response for 18 respondents was 12, with four responding around 50 and the rest none or 1. A similar question asked how bird trapping negatively impacted family/home life and the average response was 9, with two people responding around 50, one at 21, and the others none or 1. For community impacts, the average response was 8, with two responding around 50 and all the rest none or 1.

Another question asked if trapping had impacted the local environment, with the average rating (n=17) of 26, 6 respondents rating greater than 50 while the rest were none or 1. The average rating of the impact on agriculture was 11 with 3 respondents rating greater than 50 and the rest none or 1 or 2; and for the

impact on local hunting/subsistence the answer was 3 of 17 respondents rating the impact greater than 50 and the rest none or 1,2,3. The ratings for the impact on other than self/family are difficult to ascertain because we did not extract those who might not know about agriculture, local environment, and hunting/subsistence as they were further removed from where trapping actually takes place.

The survey then asked respondents three questions that were on a scale of 0 = No, 50 = maybe/depends, and 100 = yes. Asked if birds should ever be trapped for the legal trade, the average answer was 7 (n=15); for culling the average answer was 15 (n=15); and for research it was 56 (n=15). Framed another way, respondents were asked if parrots should ever be trapped for any reason on a scale of 0 = never and 100 = with legitimate reasons/need. The average answer was 68 (n=15).

When asked, "Do you agree that trapping for the legal pet trade is inhumane, cruel, or has a negative impact on individual parrot welfare?", responses on a scale of 0 = no, 50 = maybe, and 100 =yes, averaged 90 (N=15).

Respondents were also asked; "Do you consider trapping for the LEGAL pet trade to be…" and they responded as indicated in Figure 7 (n=15).

Figure 7: Summary of respondents replying to the question, "Do you consider trapping for the LEGAL pet trade to be…."

ANSWER CHOICES	RESPONSES	
acceptable when regulated and enforced	13.33%	2
necessary to sustain legal trade	6.67%	1
unethical	53.33%	8
amoral	46.67%	7
cruel	40.00%	6
not sustainable	73.33%	11
Total Respondents: 15		

Discussion

This survey was intended as a preliminary step in understanding what next steps might be needed to understand impacts on the welfare of birds and people, and the perceptions of workers that are involved directly with trapping or the consequences of trapping to the health, welfare and well-being of all those involved. The limitations of this survey include low number of respondents (24), nonrandom sampling and recruitment techniques, the absence of defining the relationship between species to specific trapping techniques, and lack of correlating those who had actually worked directly with birds or were veterinarians with their answers. The concept of welfare was left to subjective

interpretation of the participants, as there is no standardized evaluation of welfare status for wild parrots, which is an obstacle to objective observation and statistical analyses. In spite of the difficulties and deficits, responses clearly showed that trapping parrots for permanent removal from the wild elicits significant welfare concerns from experienced professionals for both birds and people. Even though they report less severe impacts on humans than birds, there are impacts on human, family, and community welfare.

Given these preliminary results, we recommend additional detailed research to document, evaluate, and rate the severity and occurrence of particular trapping methods on specific species at specific sites. We also recommend investigations into how mitigating the negative impacts of trapping parrots in the wild can improve welfare and outcomes for both birds and people.