24/1/2025

Independent Animal Welfare Evaluation
Charlie Girl Kākā

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Executive Summary

This evaluation relates to Charlie Girl, an older adult South Island kākā. When she was young, Charlie was injured and brought into permanent human care. For about a year she was kept in severely impoverished conditions with only human interaction. When she arrived at the DOC Bird Sanctuary in Te Anau (TA), Charlie showed severely abnormal behaviours which have reportedly declined over her 20+ year tenure there. While she has bred and successfully raised chicks a number of times with one male, her social behaviour is also known to be abnormal and she is apparently strongly human-focussed. In 2023, Charlie was scheduled to move to Dunedin Botanic Garden's (DBG) as part of the SI Kākā Captive Breeding Programme. When this move did not happen due to keeper concerns, she was scheduled to move in mid-2024. Following a thorough veterinary examination, Charlie was given a clean bill of health and transferred to DBG. The facility is acknowledged to be managed excellently and the birds provided appropriate enrichment. However, Charlie has exhibited a marked and persistent return of the abnormal behaviours that were reported to have largely resolved at TA, as well as failing to bond with a new male and subsequently with her previous mate. Charlie's behaviour since arriving at DBG has become the subject of intense concern and a public campaign, resulting in an MPI investigation. One of the recommendations of that investigation was that an independent expert assessment of Charlie's welfare be undertaken, using the Five Domains model.

Applying the model, observable/measurable indicators are organized into four domains reflecting aspects of the animal's welfare: nutrition, physical environment, health/functional status and behavioural interactions with the environment, including other animals and humans. Evidence was gathered by interviewing or emailing kākā keepers at various facilities, other relevant DOC staff, veterinary staff at Dunedin Wildlife Hospital and other parties who do not work for these organizations but have been involved in the case, and from documents released via an Official Information Act request. I also made direct observations of the DBG and TA facilities and spent selected periods undertaking structured observations of Charlie's behaviour over 3 days in December 2024. This information was used to infer Charlie's likely current and future mental experiences (Domain 5) and overall welfare state. Qualitative judgements about the sufficiency/standard of care and resulting animal welfare were made with reference to 3 key documents (Kākā Husbandry Manual, Zoo Code of Welfare, ZAA's welfare accreditation criteria) and published literature on wild kākā (no published literature on captive kākā was found).

A key limitation to my welfare assessment was the discovery that there were no data on Charlie's behaviour collected in a sufficiently detailed, rigorous, consistent, structured and

objective manner to facilitate comparison between the two facilities. The lack of objective data on which to compare her behaviour before and after the move, coupled with the dearth of information on 'normal' captive behaviour in kākā, make it difficult to draw robust conclusions about the effect of the move and her current welfare state. Programme-level recommendations to rectify these limitations relate to the development of an ethogram for captive kākā and guidelines for the way behavioural data should be collected in captive facilities to enable the monitoring and management required in the CoW and KHM. The assessment is therefore largely based on qualitative reports and informally gathered behavioural observations.

Domain 1 (Nutrition and Hydration) – There have been no concerns about Charlie's weight or body condition score. From the information provided, all indicators support that Charlie's nutritional and hydration status is excellent and will continue to be so. She is (and has previously been) regularly provided with a balanced diet in adequate quantities as well as access to daily and seasonally variable diet items, some of which are known to be preferred. All minimum standards (MS) in the CoW and KHM are met.

Domain 2 (Physical and Sensory Environment) – The natural variability of the thermal and sensory environment, the range of available microclimates and substrates and the opportunity to reduce sensory stimuli by going indoors or below the visual barrier indicate that Charlie should be able to avoid extreme physical conditions, damage or injury and maintain homeostasis. While no specific signs of aversion or behavioural disruption due to physical or non-social sensory stimuli were observed, Charlie's use of the available space and substrates seems somewhat restricted compared to other birds her age, and her overall behaviour is not normal (see Domain 4). All MS in the CoW are met. All MS in the KHM are met, with the possible exception of providing water for bathing.

Domain 3 (Health and Function) – Avian veterinary specialists are confident that Charlie is in good physical health and that any inflammation and pain associated with her old fractures is well managed. Management practices, the curator's knowledge, management and relationship with a specialist vet are appropriate to continue to support Charlie's health and effectively manage her chronic arthritis. All MS in the CoW are met. More structured/detailed observations and records of behaviour would be valuable and may technically be necessary to meet some of the KHM MS. A programme recommendation relates to developing, and encouraging/enforcing use by all kākā holders, of a protocol to facilitate appropriate behavioural assessment before and after transfers and when new breeding pairs are introduced; this may help circumvent (or at least allow more expeditious resolution of) some of the problems experienced in recent years. A key challenge to achieving this will be keepers' limited time and resources.

Domain 4 (Behavioural interactions) – Charlie shows a range of characteristics that suggest her abnormal behaviours are driven by perseveration/dysfunctional behaviour regulation. While these abnormal behaviours are known to be long-standing, this does not mean the apparently marked increase in their expression following the move to DBG is not cause for concern. Perseverative ARBs (abnormally repetitive behaviours) can be linked to reduced ability to respond appropriately to novel stimuli and with tendencies to find environmental change stressful. This is highly relevant in Charlie's case and may explain the reportedly marked and persistent changes in her overall behaviour since arriving at DBG: Increased type, frequency and

duration of ARBs, abolished responsiveness to people, avoidance of familiar male cage-mate, low general activity and interest in enrichment. These abnormal behaviours may also cause perceptions of poor welfare in the public visiting the aviaries.

These changes in behaviour are not surprising, given the numerous and varied changes that have occurred over the 6 months since Charlie's transfer: living in a new environment, an unfamiliar male cage-mate and four other kākā in close proximity, disruption of familiar routines, regular catching and handling by an unfamiliar person, much reduced access to visitors and cessation of any positive interaction with humans (e.g. training for rewards), a subsequent change of aviary and cage-mate who apparently sometimes shows frustration when Charlie fails to respond positively to his advances, and the prolonged daily presence and then absence of a familiar visitor outside the aviary. This represents a constantly changing and demanding environment for a bird that is neurologically underequipped to cope with change and might explain why her abnormal behaviours persist more than 6 months after arrival.

The enrichment provided at DBG is widely regarded to be good. While the more complex social conditions would be enriching for a socially normal kākā, Charlie may be finding them stressful at this stage. The loss of positive human interaction is likely to be having some negative effect on her welfare.

Domain 5 (Mental state) – No evidence was found that Charlie is subject to, or at risk of, any negative experiences relating to her nutrition or hydration status, thermal, physical or non-social sensory environment, or physical health. She likely has frequent positive experiences relating to food and foraging and when she can choose to move among microclimates within her aviary (e.g. thermal pleasure of warming). The open nature of the aviary means that Charlie is exposed to a range of sensory stimuli; while captive parrots generally find such variation engaging and enjoyable, Charlie is known to be sensitive to change and so may find this less positive than other kākā would. Some evidence was found of negative experiences such as anxiety, fear or stress due to Charlie's perception of, and interactions with, her new environment. While the environment and enrichment provided at DBG would be expected to reduce negative experiences like frustration in normal kākā and provide opportunities for positive experiences, Charlie's poor ability to cope with the many and varied changes in her new environment may result in feelings of loss of control, fear/anxiety or stress. The removal of all rewarding human interactions has likely led to loss of any associated positive experiences.

Unfortunately, Charlie is not, and will never be, a normal captive kākā. While her care and the enrichment provided are appropriate, she is still likely having some negative experiences associated with her new physical and social environment. I think her welfare can be improved at DBG, given time and stability and if some positive human interaction can be reinstated. This will take longer than would be expected for a behaviourally normal bird. While her abnormal behaviours may never completely go away, a marked reduction in their expression, showing interest in visitors again, more engagement with other enrichment (e.g. misters) and some evidence of her bond with Bling being reinstated would signal an improvement in her mental state and overall welfare. Based on this evaluation, several specific recommendations for Charlie's future management are noted and a range of broader recommendations are made for the captive kākā management programme.

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Background and purpose of evaluation:

Charlie Girl is a female South Island kākā (*Nestor meridionalis meridionalis*), roughly 24 years old. She was injured in the wild as a young bird and was kept in severely impoverished conditions for approximately a year before being housed at the Department of Conservation (DOC) Te Anau Bird Sanctuary (Punanga Manu o Te Anau; TA) for the following 20 or so years. In mid-2024, Charlie was relocated to the Dunedin Botanic Gardens (DBG) aviaries as part of an overarching plan to concentrate all breeding SI kākā in one location. The DBG aviaries are owned by Dunedin City Council (DCC) who hold kākā under a permit from DOC. The DBG aviaries are welfare accredited by the Zoo and Aquarium Association (ZAA), Australasia's zoo industry representative body, with the last accreditation visit taking place in February 2023.

It is DOC that ultimately make decisions about the management and movement of individual kākā to achieve the objectives of the sub-species captive management plan (SI kākā plan out-of-date since 2020); each year these decisions are outlined in a SI Kākā Captive Breeding Programme Flocking and Breeding Plan. However, Charlie's long-term keepers and others who have worked with or visited her expressed concern about the planned move, and a campaign to have Charlie returned to Te Anau (TA) has been ongoing since she was relocated. This follows a similar situation involving transfer of another bird from TA to DBG one year prior. Welfare assessments have been undertaken in the last six months by a specialist avian veterinarian from the Dunedin Wildlife Hospital (DWH) and by Ministry for Primary Industry investigators.

The purpose of this report is to provide an independent expert assessment of Charlie's welfare at DBG structured according to the Five Domains model. In addition, comments on the suitability of TA's facility for Charlie and other kākā are noted. Recommendations are made, specifically for Charlie's future management, and also regarding documents and processes for captive management of SI kākā more generally.

Method of evaluation:

Qualitative judgements about the sufficiency/standard of care and resulting animal welfare are made with reference to three key documents: The Kākā Husbandry Manual (2021), New Zealand Code of Welfare (Zoos) (2018) and the Zoo and Aquarium Association (ZAA Australasia)'s Animal welfare accreditation criteria, as well as to the published literature on wild kākā (no published literature on captive kākā was found). The ZAA accreditation documents are confidential and are thus not explicitly referenced but the criteria were used to structure consideration of welfare within each domain. The Code of Welfare (CoW) outlines minimum standards; while these are not legally binding in and of themselves, they can be used by those in charge of animals held in zoos to demonstrate that they have met their obligations under the NZ Animal Welfare Act (1999). The Kākā Husbandry Manual (KHM) also specifies minimum standards for DOC-permitted holders of kākā; captive holders are required to follow the standards in the manual (South Island Kākā Captive Management Plan, 2010 – 2020). How compliance with these standards by permitted holders is monitored and enforced by DOC is not clear.

The Five Domains model provides a structured approach to assessing animal welfare (Mellor et al., 2020). To apply the model, observable/measurable indicators are organized into four domains reflecting different aspects of the animal's welfare: three physical/functional domains

relating to the animal's nutrition, physical environment, and health/functional status, and one domain relating to the animal's goal-directed behavioural interactions with its environment and other animals including humans. That information is used to infer the animal's associated mental/affective experiences in the fifth domain. These various mental/affective experiences, arising due to the animal's own perception of its health and physical state and its environment, are considered to most directly reflect its overall welfare state at any point in time (Mellor et al. 2020).

In each domain, indicators reflecting Charlie's welfare status at the time of evaluation in are presented – these are animal-based indicators which most directly reflect an animal's welfare state (Harvey et al. 2020). In addition, information is collated about risks to Charlie's welfare – these are resource- or management-based indicators that reflect aspects of her physical and social environment which may, in turn, influence her welfare negatively or positively. The indicators collated are compared to the standards outlined above as well as the literature describing the diet, environment, physical state, social and other behaviour of the species. Together this information on welfare status and risk are used to infer Charlie's likely current and future mental experiences (Domain 5) and overall welfare state.

Claims or reports are evidenced throughout using footnotes to indicate the (anonymized) source of the information. Information was gained by interviewing or gathering information by email from kākā keepers at various facilities, other relevant DOC staff, and veterinary staff at the Dunedin Wildlife Hospital (DWH). Information was also gleaned from publicly documents released via an Official Information Act (OIA) request. The term 'public members' is used to refer to those parties who do not work for DOC, DBG/CC or DWH but who have a direct interest and concern in Charlie's welfare and have been directly involved in this case in some way. Two of these parties were interviewed and/or provided information in the form of videos and notes. Finally, I made direct observations of the DBG and TA facilities and spent selected periods undertaking structured observations of Charlie over three days in mid-December, 2024.

Domain 1 – Nutrition and Hydration

Animal-based indicators of nutritional status

Animal-based indicators reflecting Charlie's physical state relating to nutrition and hydration are bodyweight, body condition score (BCS) and observations of drinking and eating, including preferred foods. It is difficult to find a reliable reference range for body weight/mass for adult SI kākā, at least in the publicly available peer-reviewed literature. From a recently published study of birds in the Orokonui Ecosanctuary, the range of weights for healthy subadult/adult wild SI kākā of both sexes (aged 1-10 years) was 444 – 588g, with an average of 524g (Forrest et al. 2024). An earlier study of adult birds caught in the Nelson Lakes region from 1984-1996 provided a range of 478 – 578g for birds classified as females by bill length and 576 – 630g for those classified as males (range 430 – 630g for all adult birds including the majority, for which sex could not be confirmed) (Wilson et al., 1998). In the 2021 KHM (p11), the maximum weight of male SI kākā is reported as 575g and of females 500g (no source provided); these values are not consistent with published data, but it is not clear whether they include juvenile birds.

Unlike in mammals, BCS can only be evaluated in birds by handling and palpation. Using a 9-point scale, a BCS of 5/9 is considered ideal for birds and is described as 'pectoral musculature well-formed and rounded with a slight dip on either side of the sternum.' (Species 360, 2020). Scores on either side of ideal are acceptable in otherwise healthy birds. In under-conditioned birds (BCS <4), the keel becomes discernible on palpation, rounding of the pectoral muscle mass is reduced and feather condition declines when the score is very low. In over-conditioned birds (>6), the pectoral muscles become flat or bulge over the edge of the sternum, the keel is no longer palpable and fat is deposited in other locations. Both severe under- and over-conditioning will influence bird health and welfare.

Charlie's average weight was indicated by her TA keepers as 480g and pretty constant. However, records of body weight and BCS were apparently not regularly kept in the 24 years Charlie resided at TA and there is indication that she was not regularly weighed in the last 10 years (not caught specifically for the purpose of weighing and not scale trained until early 2024).[1] In addition, records provided by TA keepers on request in July 2024 did not include regular weights and birds' more formal files, in which weights were apparently recorded, were not provided when records were requested.[2]

The only available veterinary clinical record of Charlie's body weight prior to her pre-transfer health in June 2024 is from her admission at DWH in early summer (Nov/Dec) 2020 when she and her chicks (and mate) were admitted due to toxoplasmosis infection. On admission her weight was recorded as 520g and body condition was noted as poor to moderate. While in hospital for two weeks, her weight dropped to 487g (regurgitation noted on many days) but she was cleared for return to TA.[3] All weights reported at this time fall within the published range for wild adult female SI kākā and weight loss was likely due to short-term stress of hospitalization as well as regurgitation, perhaps due to treatment for toxoplasmosis. While BCS was, and continues to be, lower than ideal, this has consistently been attributed to impairment of flying

[1] Interview 2, 12/12/24
[2] Interview 2, 12/12/24
[3] DWH clinical notes, provided 7/1/25

ability due to her old wing injury and thus reduced pectoral muscle, rather than overall body condition. Weight/BCS data for the following 3.5 years at TA were not available.

Inadequate records notwithstanding, Charlie was noted to be in good health and condition when she arrived at DWH on June 7, 2024.[4] On admission, her weight was 478g, which is consistent with keepers' reported average. This is still within the reference range of weights for subadult/adult female SI kākā and may be lower than the single clinical record due to the time of year (winter); BCS was noted as moderate. During her 12-day stay at DWH, which included a general anaesthetic, she lost further weight, was reportedly not self-feeding and was crop-tubed several times per day. No concern was noted about this in the clinical notes, and she was cleared for transfer to DBG on 19/6/2024 at the same weight as arrival (478g).

She lost further weight in the first weeks at DBG (460g one week after arrival, 468g about one month after arrival). Body condition score is occasionally noted in these clinical records and was 4/9 about one month after arrival at DBG and again in early October and 3/5 in December; this was interpreted as lean but satisfactory, given her wing injury and lack of flying. A period of more-often-than-usual catching by an unfamiliar person commenced in June/July due to complaints about Charlie's welfare at DBG which, in conjunction with a period of adaptation to the new physical and social environment, might have contributed to the period of weight loss. In late August, Charlie's weight was reported as 480g,[5] indicating a return to her normal.

The target weight for Charlie is 480 – 485g and she is now weighed about every month by catching, as is standard practice at DBG. There is some lack of clarity in the KHM (2021, p34) about the expected regularity of weighing adult birds and recording weights – twice annually and monthly are mentioned, depending on the method of weighing. See Domain 4 for further consideration. **Overall, there have been no concerns from those expert in kākā health and management about Charlie's weight or body condition score, including from public members.[6]**

In the wild kākā spent much of their time foraging, including on the ground (Beggs and Wilson, 1991; Moorhouse, 1997). The structure of the DBG aviaries means it is not possible to observe eating/drinking without being inside the aviary itself, except for food brought up to the perches or nibbling of browse visible above the barrier. In mid-December, I was not able to observe Charlie in the period immediately following provision of fresh feed (8.00-10.30am). She was out of view below the barrier for the first 20% of my daytime observation (beginning at 11am) and could have been eating/drinking then; this was the only time during 3 days of structured observation I saw potential feeding behaviour.

Some time was spent in the foliage above/near the top of the barrier (50% of 30 mins in one early morning observation and 40% of one dusk observation) (Figure 1, p 13). In both cases, Charlie was mostly resting/preening rather than feeding on the browse. It is not known how fresh the browse was; Charlie may browse more when foliage is fresh (a preference for fresh browse was noted at TA).[7] Less formal observations made by the DWH vet in mid-morning/mid-

[4] DWH vet welfare assessment report, 18/10/24
[5] Email correspondence and materials provided, 7/1/25
[6] Interview 3, 12/12/24, OIA released email correspondences
[7] Interview 2, 12/12/24

afternoon in July, August and October mention some time spent out of view, presumably feeding, and some time spent nibbling on browse.[8] Note: I did not observe, nor did previous reports mention, Charlie's male cage-mate providing her food but her observed/reported avoidance of her cage-mate suggests she wouldn't accept it even if offered.

Charlie's TA keepers stated (and their handover notes support) that her appetite fluctuated though her weight reportedly remained stable. She was noted as 'fussy' – at times, she was not keen on parrot pellets. Consistent with this, Charlie is reported to have stopped eating for the first 3-4 days after a familiar observer arrived at DBG.[9]

Overall, although little time was observed spent in foraging/feeding behaviour, the period of observation was limited. Prior observations were not structured/detailed enough to inform time spent feeding. However, given Charlie's acceptable and generally stable body weight and condition, she must be accessing sufficient food and water. There was also no evidence of persistent food-seeking behaviour from my own or others' observations in 2024.

Resource/management-based indicators of nutritional status (alerting indicators)

Potential resource/management-based indicators for assessing bird welfare are the quantity, quality, variety, seasonal variability, presentation method and frequency and provision of particular foods known to be preferred by the individual animal. Kākā are described as omnivorous generalists or seasonal specialists, changing the composition of their diet with seasonally available food supplies (Beggs & Wilson, 1987; Moorhouse, 1997). The diet of wild kākā includes the fruits, berries, flowers, leaves and seeds of native forest plants, nectar, sap and pollen, honeydew and invertebrates (e.g. Beggs and Wilson, 1991; Moorhouse, 1997). Foraging occurs both in the canopy and on the ground. A key food-related behaviour of male kākā is provisioning females and chicks with high fat/protein food (i.e. beetle larvae in wood), and this provisioning is also a key part of courtship and pre-copulatory behaviour (Beggs and Wilson, 1987). Successful breeding is associated with masting of certain tree species, so diet may influence captive breeding success (Powlesland et al. 2009).

In accordance with the CoW, the KHM indicates that captive diets should be formulated and presented in quantities sufficient to meet kākā's nutritional requirements across all seasons and physiological states, should be varying and flexible and elicit natural foraging and feeding behaviours while maintaining high standards of hygiene. Example diets are provided. At DBG, kākā are fed a base diet every morning, consistent with the diets presented in the KHM, comprising: chop (fruit and vegetable mix with leafy greens) with standard components as well as seasonal variety; sprouted seed mix (10 seeds); mineral supplement powder plus calcium; peas and corn; commercial parrot pellets (Rowdy Bush or Harrison – pellet brands are sometimes changed); Wombaroo nectar mix or own mix presented in a bowl.

Food and water are provided in a feeding station under cover in the birds' indoor off-display area to minimize contamination, presented in metal bowls and trays (CoW MS 6d Presentation of food and water). In addition, various whole fruits are hidden around the outdoor enclosure to

[8] DWH vet welfare assessment report, 18/10/24
[9] Interview 4, 12/12/24

elicit foraging behaviour (food-related enrichment). Records of feeding or eating are not made daily but visual monitoring of what the pair of birds has eaten, combined with monthly body weights, is used to ensure adequate nutrition.[10] Kākā are also provided a variety of local and exotic browse – large pieces of foliage are added every second week (e.g. gum, manuka, kanuka) and smaller pieces more frequently (e.g. bottlebrush) – flowers are added daily. The type of browse depends on seasonal variation and availability. Ideally, staff would like to change large foliage weekly. Rotting logs for excavation of invertebrates are replaced weekly in summer and less often in winter.

Keepers at both TA and DBG and staff at DWH mentioned Charlie's fondness for flowers (and fresh browse at TA; and nectar at DBG), indicating consistent food preferences that are recognized and met by carers. It was also consistently noted that Charlie is less interested in digging in logs and eating grubs than other kākā.[11]

From the information provided by keepers, all alerting indicators support the conclusion that Charlie's nutritional and hydration status is likely to be excellent and continue to be so (meeting the CoW MS 6 Food and Water). She is (and has previously been) regularly provided with a balanced diet in adequate quantities as well as access to daily and seasonally variable diet items, some of which are known to be preferred.

Domain 2 – Physical and sensory environment

Resource-based indicators of effects of thermal and sensory environment (alerting indicators)

Most indicators reflecting animals' risk of compromised welfare relating to their physical environment are resource-based. These parameters generally reflect how closely features of the physical and sensory environment in captivity replicate wild conditions and match the animal's evolved (species) and individual ability to respond effectively to maintain homeostasis. Features of the thermal conditions, substrates, space, air quality, light and noise, as well as appropriateness of environmental variability and predictability are considered (Mellor et al. 2020). The open aviary at DBG means that Charlie is exposed to thermal and weather conditions and variability similar to those in which she has lived for 24 years in captivity in TA and to those in which wild SI kākā live (CoW MS 4c Ventilation). She is thus expected to be adapted to cope physiologically and behaviourally with these conditions.

Importantly, in the wild, many animals move among microclimates within their habitat to support thermal homeostasis (McWhorter et al. 2018); thus captive environments should also contain an appropriate variety of microclimates to facilitate thermoregulatory behavioural choices. Charlie's aviary is designed to provide shelter from sun/rain (back half) as well as opportunities to experience both directly (front half). The kākā/kea aviaries are roughly north-facing and birds can access direct sun and shade in different parts of the aviary over the course of the day. There is also a reasonably-sized (3m x 1.5m x 4m = 18m^3) indoor off-display/feeding area that is open to the pair of birds at all times and is heated. These design features are

[10] Interview 4, 12/12/24
[11] Interview 1, 11/12/24, Interview 2, 12/12/24

consistent with MS3f in the KHM and MS 7 (Physical environments) and MS 10 c (Housing and controlled environments) in the CoW. In hot weather, water misters are deployed in the middle hours of the day to help birds cool down if they want to.[12]

While water for bathing was available to kākā in one of the lower aviaries in DBG as an adjustable seep and water troughs, I didn't see this in Charlie's aviary. If correct, this is not consistent with MS3h in the KHM which notes that 'fresh water must be provided at all times…source of minimum dimensions 1m^2 x 200mm deep (to allow bathing behaviours). It was noted by Charlie's TA keepers that she 'loves to bathe and will submerge and roll onto her side in the water' and made regular use of the pool in her enclosure there[13] so she would benefit from water access at DBG [**SPECIFIC RECOMMENDATION 3**].

Because the aviary is open to the environment, Charlie is exposed to natural, varying and some unpredictable environmental conditions in addition to weather. Circadian and seasonal light cycles and wind are natural (for a city environment), air quality is grossly similar to the wild although the proximity to the city will expose the birds to anthropogenic contaminants and different smells and a wide variety of predictable and unpredictable sights and noises (see also Domain 4 regarding human and conspecific signals and cues). Some of these may be interesting, some may be pleasant and some may be unpleasant. While kākā are noted to be neophobic compared to kea (Diamond and Bond, 2004), parrots in general are behaviourally adaptable (Kalmar et al., 2010) so a variety of sensory conditions should be well tolerated. Having said that, Charlie is considered by all who know her to be 'unusual/odd'[14] and sensitive to change[15] due to her early history and has lived most of her life in the same facility, so she may be less adaptable than kākā generally. The opportunity to reduce some these stimuli by going indoors or below the visual barrier at the bottom of the enclosure is always available but Charlie was very rarely observed to use these areas.

Animal-based indicators of effects of thermal and sensory environment

Animal-based indicators reflecting Charlie's physical state relating to her interaction with her physical/sensory environment are behaviours indicative of thermal stress and her use of microclimates. These include shivering in cold weather and panting and lingual fluttering to increase evaporative heat loss in very hot weather (McWhorter et al. 2018). At the time of observation in mid-December, weather conditions ranged from overcast to light rain with periods of clear skies and temperatures were generally mild/cool throughout. As expected for such conditions and in a healthy bird (see Domain 3) with reasonable body condition, no overt thermoregulatory behaviours were observed. Nor were any specific signs of aversion or behavioural disruption due to other sensory parameters (light, non-conspecific ambient noises, smell) observed but any such effects would require much longer detailed behavioural observation to detect.

[12] Interview 1, 10/12/24, Interview 4, 12/12/24.
[13] Interview 1, 12/12/24, Email correspondence 13/12/24
[14] Interviews 2-4, 12/12/24
[15] Interview 1, 12/12/24

Resource-based indicators of interactions with/effects of substrates (alerting indicators)

Substrates appropriate for the species and to any specific needs of the individual are necessary to minimise the risk of injury and physical damage that could cause pain or discomfort or alter normal behaviour. Wild kākā interact with a variety of substrates, spending much of their time on tree trunks and branches but also foraging on the ground. Thus a variety of substrates and surfaces should be provided in the captive environment. In DBG, the enclosure is surrounded by mesh with small openings which allows birds to navigate in different planes using their feet and bills – this looked to be in excellent condition with no evidence of repairs (CoW MS 9a Facilities and Equipment). A variety of perches made of natural branches of differing diameter (with bark for chewing), metal bar or chain are provided at different heights in the front, back and indoor areas. In addition, large pieces of natural foliage are provided which allow perching at different heights and locations and a playboard made of differing sizes of wood attached to a vertical surface is located at the apex of the outdoor enclosure. Perches and playboards are replaced 'as required' [16], i.e. when they get chewed. While Charlie has reduced flying capability, she can (and was observed to) fly for short distances and was not reported by any party to have any balance problems requiring environmental modifications.

The ground in Charlie's outdoor aviary is mostly bark and indoors, where food is presented, is concrete for ease of cleaning. While exact measurements were not made, I would estimate that more than 50% of the ground area was bark and low plants. Nest boxes are available both inside and outside and lined with pet grade sawdust. Thus a variety of substrates are available, and the types and amounts align with MS3b, c and d and MS4a in the KHM.

Animal-based indicators of interactions with/effects of substrates

Over my nine observation periods in mid-December, Charlie spent more than 50% (on average) on various perches, 29% on the wire, 11% perching in natural foliage and almost no time on/near the ground (Figure 1), noting that the number of observation days was extremely limited, the immediate post-feeding mid-morning period was not captured and the dusk period is over-represented. The DWH vet noted time spent on various perches, roosting/napping in foliage, on the wire and out of view below the bottom barrier during a number of different days[17] but the relative time spent interacting with each type of substrate cannot be quantified.

Concern has been expressed by some parties about the vigorous activity Charlie performs while hanging on the ceiling wire and the potential for musculoskeletal damage and discomfort.[18] The only behaviour observed that could potentially reflect physical damage and discomfort of this sort due to interaction with the wire is nibbling at the base of the toes on the left foot whilst perching. This behaviour was observed for 18 minutes without interruption on one occasion (60% of one dusk observation period of 9 made; Figure 2) and was noted or shown in various videos made by public observers representing non-random data capture over several months at DBG.[19] See Domain 3 and 4 for further consideration of this behaviour.

[16] Interview 1, 10/12/24, Interview 4, 12/12/24
[17] DWH vet welfare assessment report, 18/10/24
[18] Interview 3, 12/12/24.
[19] Interview 3, 12/12/24

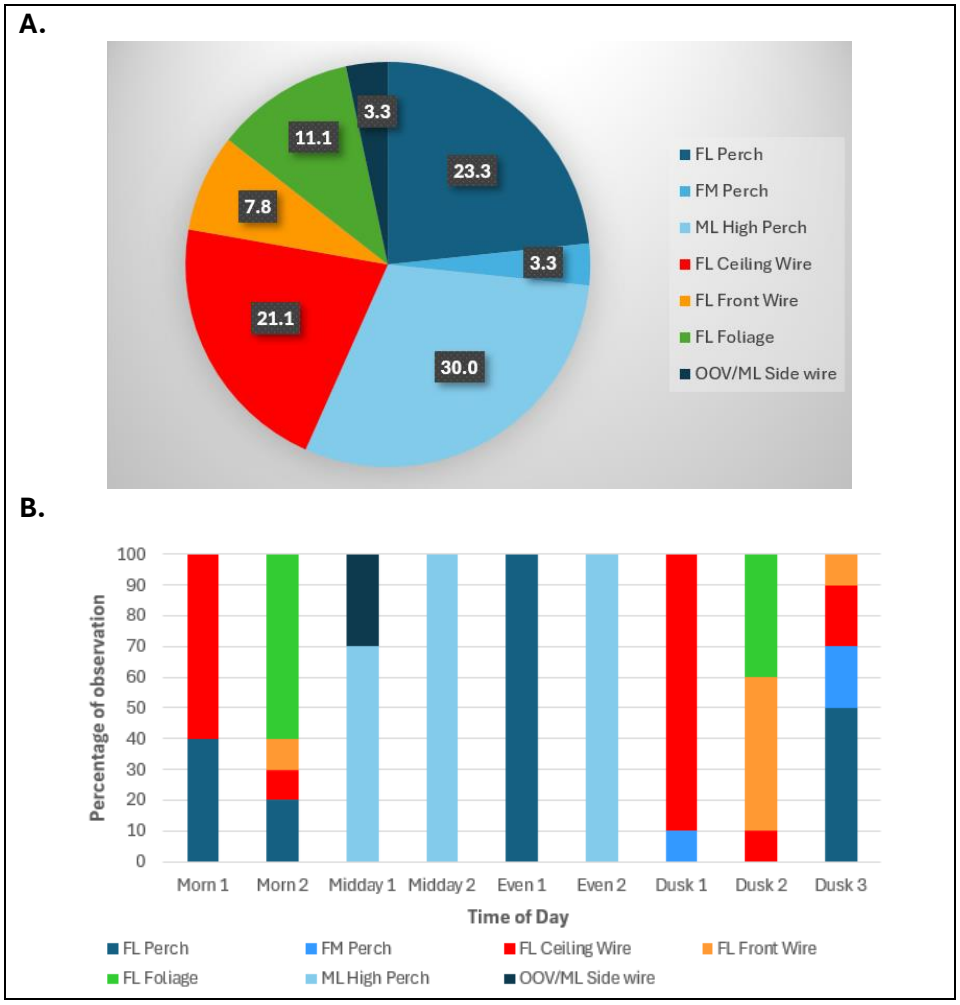

Figure 1. A. Average percentage of 30-minute observation period Charlie spent on different types of substrate and locations in enclosure. Averages based on two early morning, two late morning/early afternoon, two early evening and three late evening/dusk observation periods of 30-minutes long. **B.** Percentages for each of the nine observations periods. Location codes within enclosure: F – front; M – midway between front and back; L – birds' left as facing front; M – midway between left and right; OOV – out of view below coloursteel barrier at bottom of enclosure. Samples of location were taken at 3-minute intervals. Observations made over 3 consecutive days in mid-December 2024. Morning 1 and 2 are consecutive 30-minute periods on the same day (5.30 – 6.33am). Midday 1 and Midday 2 are non-consecutive periods on the same day (11.00am – 12.15pm). Evening periods from 2 different days (6.10 – 6.50pm). Dusk 1 and 2 are non-consecutive periods on the same day (9.00pm – dark).

Resource-based indicators of effects of available space (alerting indicators)

The aviary shared by Charlie and her cage-mate at DBG is much larger than the minimum requirement of 120m^3 for two birds stated in the KHM (MS3a), providing a total of 242m^3. The outdoor area is 3.5m wide x 8m long x 8m high (224m^3) and the indoor/off-display area provides an additional 18m^3 (3m wide x 1.5m long x 4m high). The height of the enclosure, particularly, allows kākā the opportunity to replicate their arboreal habit, maintain distance from visitors and gain a landscape view.

Animal-based indicators of effects of available space

Charlie's cage-mate and neighbouring birds were observed making regular use of the length and height of the top aviaries for short flights. While space for flying is not really relevant for Charlie, she was observed and reported to be much less active than the other birds in the same aviaries.[20] In the few days of observation in mid-December, she spent most of her time in the/her left-hand side of the aviary in the front corner or midway back on the high perches (Figure 1). However, earlier non-quantitative observations suggest she makes greater use of the available space.[21]

The natural variability of the thermal and sensory environment, the range of available thermal microclimates and substrates and the opportunity to reduce sensory stimuli by going indoors or below the visual barrier at the bottom of the enclosure indicate that Charlie should be able to avoid extreme physical conditions, damage or injury and maintain homeostasis. While no specific signs of aversion or behavioural disruption due to physical or non-social sensory stimuli were observed, Charlie's use of the available space and substrates seems somewhat restricted compared to other birds her age and her overall behaviour is not normal (see Domain 4 for further consideration).

Domain 3 – Health and Functional status

Animal-based indicators of health (disease, injury, function)

Charlie was assessed as being in good health and acceptable body condition (accounting for her longstanding functional impairment) upon arrival at DWH in early June 2024 for quarantine prior to transfer to DBG. She was free of parasites and infectious disease and her bloodwork was normal including lead level and fibrinogen (2g/L; normal reference range 1-4g/L: Awanui Veterinary Laboratory), a marker of inflammation which may be associated with pain. Radiographs were also taken at this time and showed no evidence of arthritic progression in her old injuries (Left wing: Old displaced fracture of the left radius and ulna. Large amount of bony callus. Elbow has reduced range of motion; Left wing: Old mid shaft fracture of the left tibiotarsus - large amount of callus between fragments) or other skeletal problems.[22]

Together, these findings indicated that Charlie's arthritis was well controlled using the dose of medication started at TA in 2023 (see below). At the time of transfer to DBG, the DWH vet recommended continuing the same dose (Metacam 0.5mg/kg orally, administered twice per day, total 1mg/kg daily). Repeat bloodwork was scheduled for October but was delayed due to disruption at DBG. It was eventually undertaken in late December and showed no evidence of active inflammation causing arthritic pain (normal white cell count, fibrinogen 1g/L).[23]

These findings strongly support the conclusion that Charlie has been pain-free for the entirety of her time at DBG. Thus, it is unlikely that the extended periods of nibbling of the left foot (noted in

[20] Interview 4, 12/12/24
[21] DWH vet welfare assessment report, 18/10/24
[22] DWH clinical notes, provided 7/1/25
[23] Avian long term medication plan (Sept 2024), DWH clinical notes 2020 – 2024, provided 7/1/25

Domain 2 above) or worsening left wing sag (as claimed by public observers but refuted by the DWH vet)[24] are indicative of pain. No observations of the other previous indicator of arthritis in the left leg (i.e. reduced left foot grip strength) were flagged by public observers at DBG or in the more formal assessments performed by the DWH vet.

As noted above, when Charlie was assessed at DWH in June, the only physical impairment of note was reduced range of motion in the left elbow, expected to limit flight. Charlie is able to fly for short distances – this was observed in a video of training with a keeper in early 2024 (provided[25]), noted in observations by the DWH vet and public observers at DBG from June to October[26] and observed directly by me in December. In the videos/observations at DBG, flights were almost all made to avoid another bird (cage-mate or neighbour) – see Domain 4.

Overall, avian veterinary specialists are confident that Charlie is in good physical health and that any inflammation and pain associated with her permanent injuries is well managed. This meets MS 13a (Illness and Disease) in the CoW. In late December, the DWH vet recommended a trial reduction of Charlie's medication over the summer months, with the goal of giving medication only in the colder months when arthritic pain may increase. The reason given for this recommendation is the risk of kidney and gastrointestinal problems when anti-inflammatory drugs are used long term.[27] Kākā females also can't act as foster parents while medicated because they regurgitate food for chicks[28] so ongoing year-round medication would preclude Charlie from fostering, which was her planned role in the 2024/2025 flocking plan.[29] The dose would be reduced gradually and the effect evaluated in ~2 months by repeat bloodwork as well as daily monitoring by DBG staff for signs of increased discomfort.[30] [**SPECIFIC RECOMMENDATION 2**]

Resource-based indicators of health (alerting indicators for disease, injury, function)

i. Cleaning, hygiene and biosecurity

The KHM outlines specific practices to ensure the physical health of kākā is not compromised and MS 4 (Hygiene) in the CoW is met. Holders of kākā must ensure biosecurity through daily monitoring of enclosures for perimeter breaches, introduction of foreign material and entry of pests (KHM MS 6d). Pests carrying diseases relevant to captive birds include wild birds (e.g. small passerines) and rodents. The DBG curator noted the inability to exclude small passerines in some enclosures[31] but whether this was the case for kākā enclosures was not clear. This suggests that at least mice would also be able to enter those enclosures, but rodents were not mentioned.

[24] OIA released email correspondence, videos and notes of observations July – Oct 2024 (provided), DWH vet welfare assessment report, 18/10/2024
[25] Various email correspondences, 12/24
[26] DWH vet welfare assessment report, 18/10/24, Various email correspondences, 12/24
[27] Avian long term medication plan (Sept 2024), DWH clinical notes 2020 – 2024, provided 7/1/25
[28] Interview 1 10/12/24, Interview 1, 16/12/24
[29] SI kākā captive breeding programme flocking and breeding plan for 24/25 (1/5/2024)
[30] DWH clinical notes 2020 – 2024, provided 7/1/25
[31] Interview 4, 12/12/24

In addition, all foods must be stored appropriately to ensure they remain fresh and free of pests and all food preparation areas must be kept clean and hygienic (KHM MS 13). Food and water dishes must be cleaned daily using a suitable disinfecting procedure and food scraps/leftovers removed from enclosures (KHM MS 5 Cleaning p31). I did not observe food storage or preparation areas during my visit to DBG but all enclosures were very clean and the routines described by the curator indicated that all practices complied with these requirements.[32] For example, food and water bowls are cleaned daily using a specific veterinary disinfectant (F10), all food is presented under cover or indoors to minimize contamination (meets CoW MS 6d), with the exception of whole fruits presented around the enclosure as enrichment, and a footbath was required before entering the kākā back-of-house area. All aviaries are cleaned weekly, soiled top bark is removed, perches are scrubbed, vegetation is nipped to avoid fungal growth and the enclosure hosed. Bark substrate is fully replaced every 12 months – presumably this is done when birds are still in the aviary although the recommended best practice is to move birds to minimize the risk of aspergillosis (KHM MS 3c). Aspergillosis has occurred once at DBG, in kākā chicks, and all survived with veterinary support.[33] Nest boxes are lined with pet-grade sawdust and have false bottoms so that they can be cleaned as needed. Concrete surfaces are water-blasted every 6 months but these are mostly in the indoor area so birds could retreat outside. In support, various parties acknowledged that a very high standard of cleanliness and hygiene '…and good husbandry' are provided at DBG.[34]

Note: The 2021 KHM has no explicit minimum standards relating to biosecurity planning or preparation. Staff at both TA and DBG mentioned being involved in HPAI (high pathogenicity avian influenza) preparation, through either the Dunedin City Council (DBG) or DOC (TA) – at TA an influenza protocol was reportedly in place for 4 months but was then stopped.[35]
[**PROGRAMME RECOMMENDATION 6**]

ii. Health knowledge and monitoring, disease screening, preventative and reactive healthcare

Four Minimum Standards in the CoW are relevant: MS 1 (The Zoo Operator), MS 3 (Staff training), MS 2 (Inspections) and MS 13 (Illness and Disease). The KHM minimum standards provide more specific detail on how these can be met for kākā. The DBG is owned by the DCC and holds kākā and other native birds under permit from DOC – thus the CEO of DCC would be the person with overall responsibility, i.e. the operator of this zoo. The Zoo Operator must employ trained staff who possess the appropriate ability, knowledge and professional competence to handle and care for the species held (CoW MS 1). Part of this responsibility is ensuring that sufficient numbers of staff are available to care for the animals held (MS 3a) and that those staff are appropriately knowledgeable, trained and competent to ensure that the health and welfare of the animals are maintained according to the other MS in the CoW. In particular, staff must be trained to understand the normal range of behaviours of the species and recognize poor health,

[32] Interview 1, 10/12/24
[33] Interview 4, 12/12/24
[34] OIA released email correspondence, Interviews 1, 2, 3, 12/12/24
[35] Interview 3, 12/12/24

injury and welfare in animals generally (MS 3a, MS 13c) and in kākā specifically (KHM MS 5 Health Management p33).

The DBG curator is a qualified veterinary nurse with specialist knowledge and experience in avian medicine and in wild bird behaviour and management from her work in field conservation. She has cared for captive kākā for 8 years. The curator is supported by two other staff and a number of contractors to care for the birds. She is active in daily operational tasks and supervises and guides the other staff.[36] The curator's qualification, training, relevant experience and guidance of other animal care staff demonstrate achievement of the CoW and KHM minimum standards.

In-house health monitoring for kākā at DBG complies with KHM MS 6a and b: Adult birds are weighed and physically examined monthly. This exam involves feeling the bird all over, checking eyes and orifices for discharge and discolour, checking feathers for moulting and lice and moving all joints looking for free movement. As noted in Domain 1, Charlie has been caught, weighed and examined much more frequently (weekly for a time) since her arrival at DBG. Faecal and blood sampling occur at least every 6 months; sometimes the vet comes to DBG, sometimes the birds are taken to DWH. Charlie's last blood sample was taken at DBG in late December 2024, mainly to check her inflammatory marker to monitor arthritis pain. Drenching for parasites is only undertaken if necessary.[37]

The CoW MS 2 requires at least daily checks be made of animals. The KHM MS 6a requires daily distance observations and recording of changes in behaviour (MS 6b). Daily health monitoring for kākā at DBG comprises checking food intake (for pair of birds), general appearance and demeanour, obvious changes in behaviour, visual evaluation of faeces and vent soiling and, for new birds, becoming familiar with what is normal behaviour for the individual.[38] More frequent inspection may be required when new animals have been introduced (CoW MS 2biii) or group structure changes (2biv). This is reflected in the KHM MS10iv that requires 'daily ongoing monitoring of social groupings so issues can be picked up early and appropriate changes made quickly.' Thus, it could be argued that multiple checks per day were required following Charlie's introduction to her new cage-mate at DBG. This was begun, with the curator initially undertaking three 15-minute observations per day (see Domain 4 below) before this practice was stopped due to public disruption which continued for at least 6 weeks.[39] It is unclear how or how often in-house inspections of Charlie were made subsequently.

Any animal showing signs of sickness, injury, loss of condition or undue distress must be thoroughly assessed, and remedial action taken (COW MS 13a). To support these obligations, DCC, as the operator via DBG staff, has a close and effective relationship with specialist avian vets at DWH, as required in the KHM MS 7. This is a higher standard than required in the CoW, according to which this is Recommended Best Practice (RBP) only (Part 2.1 Zoo Operator p7). The DWH vet created an explicit Management plan (no date, late July or early August) and an Avian Long-term Medication plan (no date, around Sept) for Charlie. The Management plan

[36] Interview 1, 10/12/24
[37] Interview 4, 12/12/24
[38] Interview 1, 10/12/24, Interview 4, 12/12/24
[39] Interview 1, 10/12/24, Interview 4, 12/12/24, DWH vet welfare assessment report, 18/10/24

recommended semi-structured observations by the curator for 4 weeks followed by a repeat behaviour and welfare assessment to be done by the vet and a follow-up assessment 6 months later. Fortnightly communications between DBG and DWH were recommended and monthly meetings with/reports to DOC SI kākā captive coordinators were included in the plan – I have not seen these reports but the vet's informal behavioural assessments were included in her report.[40]

Comparative assessment of post-transfer behaviour with behaviour recorded at TA was proposed to inform further actions/plans for Charlie's management.[41] However, as noted, the method of informal behaviour observation undertaken at DBG by the curator and by the DWH vet would not facilitate objective comparison, and such records were not available from TA anyway. [**SPECIFIC RECOMMENDATION 2, PROGRAMME RECOMMENDATIONS 1 and 2**] The DWH vet also recommended on multiple occasions that an independent observer undertake unbiased observations of Charlie's behaviour. Finally, a comprehensive health check was recommended annually or more frequently if the curator is concerned, due to Charlie's pre-existing health conditions. The next check at DWH is scheduled for June 2025. As noted above, the Medication plan outlined the approach to managing Charlie's arthritis while safeguarding her longer-term health and welfare and ability to foster chicks.

Note: Aggression from a cage-mate is mentioned as a significant source of stress in KHM (p31 and 32) that could increase vulnerability to infectious illness in kākā. This has been a point of contention between public observers and DBG/DWH staff (see Domain 4 for discussion), however Charlie has shown no indication of ill health since moving to DBG.

iii. Record keeping

There are no requirements, per se, for record keeping in the CoW but it would not be possible to comply with the KHM MS without some records. Part 11 (Quality Management) outlines RBPs for Quality Assurance Systems (11.1) which include implementing a system that documents procedures, ensures the operator meets the MS and recommendations in the CoW, provides means for evaluating animal well-being within the facility and keeping records. Part 11.2 Records and Identification outlines detailed RBPs including that operators should keep records that provide evidence that the facility conforms to the MS in the CoW. Some of the RBPs (e.g. 11.2 cii and iv) are covered by other DOC documents, such as the annual SI Kākā Captive Breeding Programme Flocking and Breeding Plan.

The KHM MS 16 requires individual records be maintained for every kākā ever held at an institution. The information required aligns with some of the CoW RBPs, e.g. individual identification, source and movement of birds, 6-monthly weights, notes on faecal sampling and results, notes on health problems and treatments, important behavioural notes. Other records required in the KHM include: records of every incident of bird restraint (MS 12iii); and records of protocol, observations and outcomes during the introduction of new breeding pairs (MS 14ii). Whether complete records are kept for each kākā at DBG is not known. The latter, in particular, would have been helpful for addressing public concerns about the interactions between Charlie

[40] DWH vet welfare assessment report, 18/10/24
[41] DWH vet welfare assessment report, 18/10/24

and Caesar and DBG's monitoring and response. [**SPECIFIC RECOMMENDATION 2, PROGRAMME RECOMMENDATIONS 1 and 2**]

The KHM MS 16 does not cover other CoW RBPs such as records of individual animal diet sheets and a record of all diets, records of injuries, ill-health and distress including: details of observed deviations from normal animal health or behaviour daily and the dates of the observation of illness, diagnosis, treatment and final outcome. While such record keeping is time consuming and may be impractical due to staff resourcing, it would have been invaluable if completed consistently by both the sending and receiving facilities in this case and the similar case which unfolded in mid-2023. [**PROGRAMME RECOMMENDATIONS 2 and 5**]

Management practices (cleaning, hygiene), the curator's health knowledge and management at DBG and relationship with an avian veterinary specialist are excellent and appropriate to continue to support Charlie's physical health and effectively manage her chronic arthritis. More structured and detailed observations and records of behaviour would be valuable. Neither of the facilities involved in this case keep records in the detail required to undertake an objective evaluation of Charlie's behaviour and the effects of the move on her overall welfare. This is understandable, given their limited time and the other birds under their care. However, developing, and encouraging/enforcing the use by all kākā holders, of a protocol and templates to facilitate appropriate behavioural assessment before and following transfers and when new breeding pairs are introduced may help circumvent (or at least allow more expeditious resolution of) some of the problems experienced in the last few years.

Note: The KHM MS 9a(Quarantine) requires birds be isolated for at least 14 days before being introduced to other birds. Charlie was held for only 12 days at DWH prior to transfer into an aviary with a new cage-mate at DBG. The early transfer was reportedly based on 'most tests being negative' and signs that she was becoming frustrated in temporary housing.[42] Explicit consideration of such extenuating factors should be included in the KHM MS.

DOMAIN 4 – Behavioural interactions

Animal-based indicators of Charlie's ability to express normal behaviour and agency

For captive animals, problems in Domain 4 result mainly from the fact that the environment fails to provide the level of stimulation, physical, cognitive and social challenges appropriate for the species and restricts animals' ability to express highly motivated behaviours, i.e. their agency (choice and control) (Mellor et al., 2020; Harvey et al., 2020). It has been proposed that the greater the mismatch between the animal's wild and captive environment, the higher the risk of behavioural abnormalities and other indicators of poor welfare (Mellor et al. 2021).

For parrots, major mismatches exist between captive and wild environments in social complexity and in the opportunities available for exploration, foraging, decision-making and cognitive problem-solving. In general, parrots have advanced cognitive processing, associated

[42] DWH Clinical notes 2020 – 2024, provided 7/1/25

with their relatively large brain, slow development, longevity and long period of parental association (ShuckPaim and Borsari 2009). This mismatch puts parrots, particularly larger-brained species showing generalist omnivorous feeding strategies and intelligence, like kākā and kea, at high risk of behavioural abnormalities and welfare problems in captivity (Mellor et al., 2021).

Abnormal Repetitive Behaviours (ARBs) are defined as repetitive behaviours induced by frustration, repeated attempts to cope and/or central nervous system dysfunction (Mason, 2008). They always indicate that the animal's environment has been suboptimal at some point but their relation to current welfare state varies according to factors such as when, how and for how long the animal has been in those conditions and features of the behaviour, species and individual animal itself (Mason and Latham, 2004; Mellor et al., 2021).

ARBs can further be understood as Frustration-induced or Malfunction-induced. Frustration-induced ARBs are 'maladaptive but readily reversible responses of normal animals to abnormal environments' (Mason, 2008). Some of these are acute behavioural expressions appropriate for the frustrating situation (i.e. behavioural responses persistently triggered by the environment); these correlate with other indications that the animal is currently having a negative experience (e.g. increased levels of stress hormone) (Mason et al. 2007). Others function as 'do-it-yourself-enrichment' and 'mantra' behaviours – these are thought to help the individual animal cope better in that environment than individuals not performing the behaviour but still indicate that the *current* environment is problematic (Mason and Latham, 2004). Environmental enrichment can help address the behaviours *if* the underlying motivation to perform them (i.e. frustration due to the inability to express highly motivated behaviours) is effectively addressed.

In contrast, Malfunction-induced ARBs represent a spectrum of pathologies which are evidenced by various forms of abnormal perseveration and/or direct signs of impaired central nervous system (CNS) functioning (Mason, 2008). In some cases, a behavioural sequence becomes automated with repetition (i.e. when the animal is in suboptimal conditions) and can then be performed with minimal cognitive processing or need for sensory feedback. Over time, these centrally controlled or habitual ARBs become 'easier to perform and harder to interrupt' as the habit deepens, so that they are elicited by a wider range of arousing situations and bouts last longer. This may be why enrichment becomes less effective for reducing ARBs with age (Mason and Latham, 2004).

Perseveration, on the other hand, is the continuation or recurrence of an activity without the apparent stimulus (Mason and Latham, 2004). In such cases, the animal itself has been altered such that *all* its behaviour is less appropriately coupled to its external circumstances and internal state (Mason and Latham, 2004). People with CNS dysfunction that impairs proper regulation of behaviour (e.g. autism, impoverished conditions early in life) tend to show behavioural responses to environmental cues that are unnecessary or inappropriate and such individuals are also prone to inappropriate repetition. Neurologically, this represents a failure to inhibit old or inappropriate responses (disinhibition).

Perseverative forms of ARB can be differentiated from 'habits' (centrally controlled ARBs) as they are elicited by only a few specific cues and the individual doesn't behave normally when not performing the ARB (Mason and Latham, 2004). Perseverative ARBs can be linked to

reduced ability to respond appropriately to novel stimuli and with tendencies to find environmental change stressful. This is highly relevant in Charlie's case and may help explain her failure to show (her) normal social behaviour when reinstated with her familiar male cage-mate as well as the reportedly marked and persistent changes in her overall behaviour (see below). In support of this idea of sensitivity to change, Charlie and her established mate failed to breed in the year they were moved from the kākāriki enclosure to the larger kea enclosures at TA.[43] Likewise, Charlie is reported to have stopped eating for the first 3-4 days after a familiar observer arrived at DBG.[44]

Whether habitual or perseverative, these kinds of entrenched/pathological behaviours are largely resistant to environmental enrichment and are not considered to be reliable indicators of welfare state as their expression can persist after the causal stimulus has ceased. Having said that, ARBs linked to perseveration may reflect a welfare problem when the subject is in a demanding, constantly changing environment or may sometimes be the product of stress (reviewed by Mason and Latham, 2004). This might explain why some environments or procedures considered enriching for the species might cause stress and fear for the individual animal and an increase or recurrence of ARBs.

Charlie shows a range of characteristics that suggest her abnormal behaviours are driven by perseveration. The severe restrictions imposed by her early environment are well known – she was kept in a very small cage indoors, was isolated from conspecifics and interacted solely with her human caretaker for at least a year. It is also well known that the primary ARB (swaying), or a version of it, was well established when she was removed from that environment to a less restricted one. Numerous reports indicate that Charlie performed frequent and prolonged upright swaying/weaving behaviour (i.e. while sitting on a perch) when brought to TA. She also reportedly showed or developed a hanging version of this behaviour (i.e. while hanging from the ceiling wire). The frequency and nature of her upright/hanging swaying behaviour ('she doesn't do that at all anymore' or 'rocking on perch, seen as juvenile, has been very rare in the last 5 years – only when triggered') and other abnormal behaviours apparently declined over her 20-year tenure at TA.[45] Although no appropriately detailed records have been provided to substantiate this, regular public visitors to TA support this.[46]

In addition to this ARB (and others – see below), other aspects of Charlie's behaviour appear abnormal. She is characterized by the most experienced kākā keeper as 'the oddest kākā I've ever met. She is more aloof and shows unusual behaviour here…(swaying, freezing on the wire). She doesn't interact with a familiar male as normal females would….she doesn't know how to kākā.'[47] Likewise, there are historical reports of Charlie 'not getting on with other birds'[48] and she was sometimes separated from her male cage-mate (various males over the years) because of

[43] Interview 3, 12/12/24
[44] Interview 4, 12/12/24
[45] Email correspondence, 13/12/24
[46] Interview 1,2,3, 12/12/24, Various email correspondences 12/24, OIA released email correspondences
[47] Interview 1, 11/12/24
[48] Interview 3, 12/12/24

social incompatibility.[49] Even when she did successfully breed with her established mate she was apparently 'on and off' with him during breeding season.[50]

While Charlie has bred and raised multiple clutches of chicks, a previous keeper said she was very surprised Charlie ever bred because she is so human-focussed.[51] It is possible that even though her early period of restriction occurred after fledging, it was severe and prolonged enough to derail normal social development and regulation of behaviour. Like other large-brained parrots, juvenile kākā spend a long period interacting with adult birds following fledging and this period is thought to be important for development of normal social behaviour (Diamond and Bond, 2004).

Perseverative dysfunction is also supported by Charlie's apparent inability to settle at DBG in an environment considered to be highly enriched for captive kākā (see below). Noting that no objective data collected in a systematic way are available from either facility, most parties agree that Charlie's behaviour at DBG is markedly different from her behaviour at TA.[52] To summarize, key differences are:

i. Increased type, frequency and duration of ARBs

Abnormal behaviours observed by the curator, DWH vet and public observers at DBG over 6 months include: swaying from the ceiling, nibbling/licking of toes on the left foot, wire biting and 'freezing on the wire'.[53] Charlie is reported to have performed this version of swaying behaviour and toe nibbling at TA, while no mention was made of the other two behaviours.[54] In my own observations in mid-December, all of these behaviours were observed except wire-biting, and some took up a significant proportion of the observed period. Figure 2 shows that on the days observed, swaying and the motionless posture (probably the same as 'freezing on the wire') were performed exclusively in the early morning and late evening and, combined, consumed an average of 40-60% of the period (sway 10-60% of observation period; motionless 10-50%). This pattern may be expected as kākā are most active at dawn and dusk (Diamond and Bond, 2004) and this may be when key social triggers to these behaviours were most intense (see below). While I didn't see these behaviours in my midday and early evening observations, the curator, vet and public observers did report seeing them during the day in June to October. It is important to note this circadian pattern because Charlie would not ordinarily be observed outside of working hours (8 to ~3pm) and so the amount of swaying/freezing may be under-estimated by other observers.

Periods of swaying behaviour comprised a variable number of bouts, each usually 5-10 seconds long, repeated for many minutes at a time (a block). The bouts within a block of swaying were interspersed with a small number of other behavioural patterns – these were either a period spent motionless while gripping the ceiling wire or the right foot with her bill or throwing her

[49] Interview 2, 12/12/24, Various email correspondences, 12/24
[50] Interview 1, 2, 12/12/24
[51] Interview 1, 12/12/24
[52] Email correspondence, 13/12/24
[53] Interview 3, 4, 12/12/24, Various email correspondences 12/24 and 1/25, DWH vet welfare assessment report, 18/10/24
[54] Interview 1, 2, 3, 12/12/24, Various email correspondences 12/24, 13/24

head down and back, sometimes looking around and sometimes calling before returning to swaying again. Most of her vocalizations (whistle calls and shraak calls) during the early morning and dusk periods occurred in these inter-bout pauses and seemed to be directed to kākā in the lower DBG aviary. Shraak calls are used to communicate with other kākā across longer distances to maintain social cohesion (Van Horik et al. 2007). While Charlie is clearly aware of her surroundings between swaying bouts within a block, the relatively fixed repertoire of inter-bout patterns is also suggestive of perseverative behaviour.

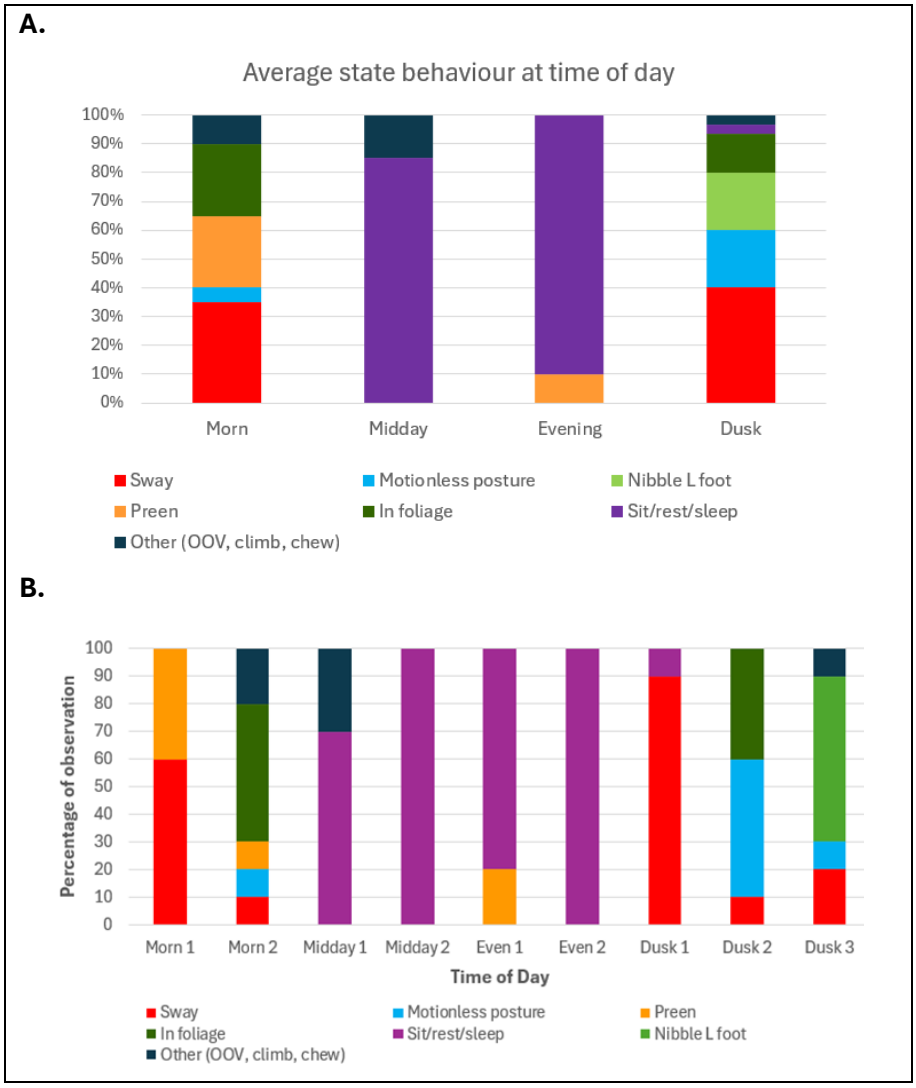

Figure 2. A. Average percentage of 30-minute observation period Charlie spent in different behavioural states at various times of day. **B.** Percentages for each of the nine observations periods. Sway – hanging from ceiling wire performing rapid, repeated side to side movement; Motionless posture – hanging vertically on side/front wire (right foot higher than left), with no body movement and no or occasional, very small head movements; OOV – out of view below colorsteel barrier at bottom of enclosure or hidden in foliage. Samples of behaviour were taken at 3-minute intervals. Observations made over 3 consecutive days in mid-December 2024. Morning 1 and 2 are consecutive 30-minute periods on the same day (5.30 – 6.33am). Midday 1 and Midday 2 are non-consecutive periods on the same day (11.00am – 12.15pm). Evening periods from 2 different days (6.10 – 6.50pm). Dusk 1 and 2 are non-consecutive periods on the same day and Dusk 3 is from a different day (9.00pm – dark).

In this context, the toe nibbling/licking observed and reported by others is likely to also reflect Charlie's perseverative response to change, rather than indicating pain. This behaviour may have started as an 'appropriate' response to arthritic pain[55] but become habitual/perseverative over time, even when pain is appropriately managed (see Domain 3). If toe nibbling is considered an ARB, on average 80% of Charlie's dusk time over the days observed was spent engaged in perseverative behaviours (Figure 2A).

These general changes in behaviour are consistent with the reduced ability of perseverative individuals to respond appropriately to novel stimuli and the tendency to find environmental change stressful. Initially, Charlie had to deal with two novel environments in quick succession, living in an aviary with very different dimensions, an unfamiliar male cage-mate and four other kākā in close proximity, disruption of her familiar routines, regular catching and handling by an unfamiliar person, much reduced access to visitors and cessation of any positive interaction with humans (e.g. training for rewards, close proximity with visitors). This was followed by another change of aviary and cage-mate several months later (albeit to one she seemingly preferred) who apparently sometimes shows frustration when Charlie fails to respond positively to his advances[56], and the prolonged daily presence and then absence of a familiar visitor outside the aviary. Even before her move to DBG, in recent years she had lived with or beside three different males and alone for a period of weeks.[57] This could fairly qualify as a 'constantly changing' or 'demanding' environment for a bird that is neurologically underequipped to cope with change and might explain why her abnormal behaviours persist more than 6 months after arrival.

While a busier social environment like that at DBG would likely be enriching for normal kākā in captivity, advances, close proximity, activity or even vocal contact from other birds may be the acute trigger for bouts of ARBs for a socially abnormal bird like Charlie. While I was not able to reliably capture what preceded the start of swaying/freezing bouts, they often seemed to follow an advance from her cage-mate or close proximity of a neighbouring bird. **In this context, the re-emergence or increase in the frequency and duration of reportedly quiescent ARBs is likely to reflect Charlie finding some aspect(s) of the new environment stressful.**

ii. Abolished responsiveness to people

Various ARBs expressed by an individual may have different functions/triggers and can differ in their relationship to current welfare state. Even ARBs of broadly similar form may not mean the same thing (Mason and Latham, 2004). There is anecdotal evidence for Charlie expressing ARBs with different functions and possibly indicating different mental states. Keepers at TA report that in recent years, the hanging sway ARB has virtually disappeared, only emerging when Charlie is acutely stressed – for example by impending capture of herself or her cage-mate.[58] Likewise, other parties reported observing this behaviour when she was captured by an unfamiliar person

[55] Email correspondence 13/12/24, Various email correspondences 12/24
[56] DWH vet welfare assessment report, 18/10/24
[57] Interviews 1,2,3, 12/12/24, Interview 1, 16/12/24, OIA released email correspondences
[58] Interviews 1,2,3, 12/12/24, Email correspondence 13/12/24, OIA released email correspondences

for transport at TA, when held at DWH and on first arrival at DBG (Note: this behaviour was not reported in 2020 when Charlie and her chicks were at DWH).[59]

However, TA keepers also report a related, but 'qualitatively different' sway/weave behaviour expressed in a different context – Charlie's 'happy dance'. While clearly abnormal and repetitive, this behaviour was reportedly performed when people arrived outside her aviary – familiar visiting adults, school groups or keepers training kākā in the adjacent aviary or bringing fresh browse were noted as stimuli for the happy dance.[60] Given the specific context of its expression, coupled with approach behaviour (coming down the wire to be near the people) and reward for approaching (e.g. tour guide offering almonds)[61], this particular ARB may reflect a positive experience such as excitement or anticipation (it may have been rewarded in her early life) or may simply be part of Charlie's preservative character.

Either way, this kind of perseverative or habitual behaviour is not expected to *reduce* readily with changes in the environment (Mason and Latham, 2004), so it is somewhat concerning that Charlie is no longer responding to familiar visitors or school children.[62] As noted, a key feature of Charlie's behaviour at TA was her reported focus on human interaction, although generally only when the people were outside her aviary in later years.[63] Since arriving at DBG, she has reportedly shown a complete lack of response to visitors, including those very familiar to her and school children (I observed no response at all to visiting children in mid-December). The happy dance has not been reported. In December, Charlie was apparently still unwilling to come into the indoor off-display area when people were inside[64] - this is consistent with her reported behaviour at TA prior to the start of the most recent training programme.[65]

iii. Avoidance of male cage-mate

After some courtship/nesting behaviour soon after she was reunited with her established mate Bling at DBG, Charlie has transitioned to actively avoiding proximity with both her cage-mate and neighbouring kākā.[66] In my observations over 3 days in mid-December, I did not see any affiliative/positive or even neutral interaction between the pair; every time Bling came near Charlie she moved away. Video evidence from September/October shows similar examples although some sequences have been interpreted by the vet as normal breeding behaviour (see below).[67]

iv. Lower activity and interest?

In recent years at TA, Charlie was reportedly quite active but rested more than her male cage-mates.[68] On the days I observed her at DBG, she was markedly less active than Bling; she rested

[59] DWH vet welfare assessment report, 18/10/24, OIA released email correspondences, Email correspondence 7/1/25
[60] Interviews 1,2,3, 12/12/24
[61] Interview 4, 12/12/24
[62] Interview 4, 12/12/24, Various email correspondences 12/24
[63] Interviews 1,2,3, Email correspondence 13/12/24
[64] Interview 1, 11/12/24
[65] Interview 4, 12/12/24
[66] Various email correspondences 12/24 and 1/25, OIA released correspondences
[67] DWH vet welfare assessment report, 18/10/24
[68] Email correspondence, 13/12/24

or slept for 85-90% of the midday and evening periods (Figure 2) while he was often actively moving around the aviary. Charlie failed to respond to the mister and rain, despite water-play being a preferred enrichment activity at TA.[69] Earlier observations in June to October at DBG indicate that she was often more active during the day than what I observed, using various parts of the aviary and engaging in a wider range of behaviours[70], so my midday observations may not have been representative, and the curator noted that this had seemed to be one of Charlie's 'bad days'.[71] She reportedly shows less engagement with new browse than other kākā[72] although she was described by several people as being 'very excited' about fresh browse at TA.[73]

Ultimately, the focus of the DBG facility is on captive breeding to boost the wild population of SI kākā. To this end, the curator wants to manage the birds in ways that keep them as 'normal captive kākā', encouraging them to entertain each other, not have people entertain them.[74] **Unfortunately, Charlie is not, and will never be, a normal captive kākā. Importantly, Charlie needs time <u>without any change</u> to adapt to her new physical and social environment. This has taken, and will take, longer than would be expected for a behaviourally normal bird (E. Mellor, personal communication 20/12/24). When confronted with new conditions, the welfare state of a perseverative/dysfunctional individual can worsen before it (possibly) improves (Mason and Latham, 2004). However, the extent to which Charlie's behaviour will improve without addressing suspected triggers is uncertain.**

If she is to stay at DBG, it is likely that modified management will be needed to optimize her welfare. If triggers can be reduced, the welfare state of a perseverative individual may improve *even though performance of the ARB continues to some degree* (Mason and Latham, 2004). It would be useful to design a targeted approach to reducing candidate triggers, with a clear timeline and milestones, along with a structured method for quantifying any changes in behaviour. Possible approaches could be reinstituting positive human interactions (e.g. scale training for rewards) and/or moving Charlie and her cage-mate to an aviary with no immediate kākā neighbours, ideally with closer access to visitors [SPECIFIC RECOMMENDATION 1, see also SPECIFIC RECOMMENDATION 2, PROGRAMME RECOMMENDATIONS 1 and 2]. Various parties suggest that regular interactions with humans wouldn't compromise Charlie's ability to parent/foster successfully as she is apparently quite 'single-minded' when parenting.[75] Charlie and her mate bred multiple times when living in proximity to visitors at TA and keepers reportedly continued to provide human enrichment at that time.[76] Thus, it may be possible to undertake such training/therapy regularly and not compromise (or even improve) her role as a breeding bird/fosterer in the conservation programme. However, a key challenge may be staff resource/time to continue the training programme, and the effects on chicks being reared for release would have to be considered by someone with such expertise.

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[69] Email correspondence, 13/12/24
[70] DWH vet welfare assessment report, 18/10/24
[71] Interview 1, 11/12/14
[72] Interview 1, 11/12/24 and Interview 4, 12/12/24
[73] Interviews 1,2, 3, 12/12/24
[74] Interview 1, 11/12/24
[75] DWH vet welfare assessment report , 18/10/24
[76] Interview 2, 3, 12/12/24

Note: Perseverative tendencies may be higher in abnormally reared animals (Mason and Latham, 2004). This is an important consideration for captive rearing of kea and kākā for release, as large-brained, intelligent parrots are known to be predisposed to developing ARBs in captivity (Mellor et al., 2021). I did see evidence of ARBs in at least one of the birds in the larger aviary; whether this was a juvenile bird and how early ARBs may begin in captive kākā (and kea) is unknown. This may have implications for the success and conservation value of captive-bred juveniles, as well as retired breeding adults released to the wild. I also saw ARBs in other adult birds that had reportedly had difficult early lives, and public observers claim that a wild-caught adult bird was showing, and had intermittently previously shown, ARBs.[77] [**PROGRAMME RECOMMENDATION 3**]

Resource-based indicators of Charlie's ability to express normal behaviour and agency (alerting indicators)

i. Environment and enrichment

A range of minimum standards in the CoW and KHM relate to provision of appropriate environmental features and enrichment to facilitate and encourage normal behaviour and avoid abnormal behaviour:

- CoW MS 10 (Housing and Controlled Environments) (g) Housing must provide for the physical and psychological needs of the species and be of such quality that displacement or stereotypic activity is avoided.
- CoW MS 11 (Normal Patterns of Behaviour) (a) A behavioural and environmental enrichment programme appropriate to the species must be developed and implemented for each species of animal held, (c) All animals must be given an opportunity appropriate to their species to exercise daily in an area with provision for behavioural enrichment.
- KHM MS 3 f '…design of an enclosure which takes the kākā's natural environmental conditions into account to maximise expression of normal behaviour should be developed.'
- KHM MS11 Daily enrichment must be provided on a rotational, unpredictable, ad lib basis with a minimum of one item from three different types of enrichment supplied per day (nutritional, occupational, physical/sensory or nutritional, social and occupational)

Enrichment is defined in the CoW as: providing captive animals with cognitive challenges, allow[ing] opportunities for appropriate social interaction and exploration, give[ing] animals some control over their environment, and meet[ing] species-specific behavioural needs, through the provision of shelter, and opportunities for hiding, foraging and exercise. All parties I spoke to acknowledged that … 'good enrichment and good husbandry' are provided at DBG.[78] Details of food-related and physical enrichments are provided in Domain 1 and 2, including those accounting for Charlie's individual preferences (flowers, misters). Some of this enrichment is scheduled (flowers, browse, rotting logs) and some is spontaneous. The curator

[77] Interview 3, 12/12/24, Various email correspondences, OIA released email correspondences
[78] OIA released email correspondence, Interviews 1,2,3, 12/12/24

reported not keeping records or plans for enrichment.[79] As noted above, if no bathing water is available to Charlie, this might be a valuable addition. [**SPECIFIC RECOMMENDATION 3**]

Animals must also be provided space, refuge areas or barriers that allow them to isolate themselves from other animals in the enclosure and the public gaze (CoW MS 7fii). For kākā, this means areas must be provided in the enclosure where birds can retreat totally from public display and can comprise artificial or natural shelters/screening (e.g. browse or logs) (KHM MS 3g). Associated with this, kākā must be able to sleep without interruptions [largely undisturbed would be more realistic] (KHM MS 4b). Appropriate provision of opportunities for retreat and sleep in the DBG aviaries are discussed in Domain 2.

ii. Social environment

Conditions that reflect the species' natural social structure are considered to be enriching for captive kākā. However, as noted above, while the more complex social conditions provided at DBG would be enriching for a socially normal adult kākā, there is cause to believe they may in fact be stressful for Charlie at this stage.

The CoW MS 8 (Social environments) states that (a) Species and individuals that are behaviourally incompatible must not be held in such proximity that it causes distress. Charlie was first kept at DBG with an unfamiliar male (Caesar) in the hopes that she would bond and breed with him.[80] Various minimum standards in the KHM outline the approach to undertaking and monitoring new pairings: Housing new pairs together must be undertaken and monitored by competent, confident personnel following appropriate protocol and records of the protocol, observations and outcomes must be maintained during the introduction process (KHM MS 14 Breeding requirements); Integration of new birds must be undertaken in appropriate facilities by experienced personnel, birds must be monitored during this period utilising standardized protocol by competent personnel, daily records of integration process must be maintained (KHM MS 10). More generally, multiple checks per day are required for newly introduced animals (CoW MS 2 (Inspections) iii and iv) and keepers must be able to record changes in behaviour (KHM MS 6b Monitoring).

When Charlie was housed with Caesar, a programme of three 15-minute observations periods per day was initiated by the curator[81] – how they were done and how long they lasted (at least a month) before being abandoned due to the presence of public members is uncertain. In order to allow evaluation of changes in a pair's behaviour over time, a protocol outlining the sampling method, defined behaviours to be quantified (i.e. a species ethogram) and structured record keeping is needed. **[PROGRAMME RECOMMENDATIONS 1, 2 and 3]** I was not able to view records of behaviour at DBG but my understanding is that there is not time to make such detailed behavioural observations of birds.[82]

A key concern of public members was about aggression directed towards Charlie by Caesar. Numerous videos apparently made in September and October were provided as evidence of

[79] Interview 1, 11/12/24
[80] SI kākā captive breeding programme flocking and breeding plan for 24/25
[81] DWH vet welfare assessment report, 18/10/2024
[82] Interview 1, 11/12/24, Interview 4, 12/12/24

these concerns. However, by the time these video observations were made, Charlie had apparently already been given the opportunity to select her own preferred aviary and cage-mate and was housed with Bling. This management change indicates that sufficient daily monitoring must have been in place to detect any aggression/stress or failure to bond between the first pair and to make appropriate changes, as required in KHM MS 10. This action is also consistent with CoW MS 12 f): Alternative provisions, such as modifying the physical or social environment, or relocation to a more acceptable enclosure, must be made for individuals or species showing chronic signs of distress related to their environment and management.

The change was made by opening the window between aviaries 3 and 4 and allowing the four birds to move freely between them over a period of days. Charlie reportedly settled in aviary 3 where her familiar mate, Bling, had been living with another female. Videos taken in September and October are consistent with Charlie living with Bling (I only saw a male with a white leg band in any of those videos). This change was variously reported to have happened in September or around '6 weeks after she arrived' which would have been early August.[83] Whether it is appropriate that this decision took 2-3 months is outside my expertise to answer but it would be useful to consider adding further guidance for such decisions in the KHM. **[PROGRAMME RECOMMENDATIONS 1, 2, and 5]**

As noted above, approach behaviours from Bling seen in the Sept/Oct videos have been interpreted as normal courtship behaviours by the experienced curator and DWH vet but as aggression and harassment by public members.[84] Charlie apparently showed signs of breeding behaviour with Bling early on in their time together (e.g. working the nest box) and some copulations were recorded on videos in September/October but her interest apparently waned.[85] In my own observations in December I saw no evidence of affiliative or positive interactions and Charlie moved away rapidly every time Bling approached her. As noted earlier, Charlie's social interactions with Bling at TA were also unusual so this, in itself, may not be cause for concern but there is insufficient detail about her previous behaviour towards him to be sure.

iii. Human interaction as enrichment, training and handling

There is no clear information on the historical approaches taken by keepers at TA to address Charlie's abnormal behaviours except for general approaches: changes to diet, enrichment (particularly fresh browse and bathing).[86] However, interactions with humans seem to have been a key component of Charlie's enrichment at TA. For example, in the early 2000s, a public member was invited, on her first visit to the park, to enter Charlie's enclosure and interact with her unsupervised. Charlie was reportedly very friendly and playful, rolling on her back and playing footsie. This kind of visitor interaction was apparently a regular occurrence and was deemed 'part of her treatment plan'. At the time Charlie had been at TA 3-4 years and was reportedly housed alone in an enclosure 'not quite tall enough to stand in but long', as she had

[83] Email correspondence 6/1/25, DWH vet welfare assessment report, 18/10/24
[84] DWH vet welfare assessment report 18/10/24, Various email correspondences 12/24 and 1/25
[85] Interview 1, 11/12/24, DWH vet welfare assessment report 18/10/24, Various email correspondences 12/24
[86] Interview 1, 12/12/24

'not gotten along with other birds.'[87] In the 20-plus years she lived at TA she was also regularly visited by TA locals and exposed to daily tours and large school groups. As a result she was familiar with a number of specific people – regular visitors, volunteers and tour guides. Her most recent keepers regard human interactions as a key part of her enrichment, along with fresh browse and rotten logs, flowers, puzzles and other food-related toys.[88]

In early 2024, a more formal programme of training and voluntary physical therapy was instituted by keepers and a volunteer vet at TA, with the aims of being able to weigh birds without restraint and improving Charlie's movement.[89] From the summary and video examples of training sessions provided, the training seemed to meet CoW MS 11g (Normal patterns of behaviour - If animals are trained or perform). Keepers and the vet reported rapid improvement in Charlie's trust and engagement with them inside the aviary as well as her movement over a period of weeks.[90]

In contrast, since arriving at DBG Charlie has had much reduced opportunities for positive human interaction. The design of the aviary means that Charlie can't come down to the level of visitors to interact with them closely as she did at TA. Due to concerns for her welfare, Charlie has been caught, restrained and weighed more often (weekly for a time) requiring than the expected minimum outlined in the KHM; this is much more frequent than is DBG's regular practice for adult kākā (monthly weighing) and is likely to have caused additional stress and a negative human-animal relationship with the curator. As a rule, training of kākā of any kind or for any purpose is not undertaken at DBG[91], which aligns with the curator's desire to minimize human influence on the behaviour of parents and chicks.[92] Nonetheless, early attempts were made to train Charlie to perch for non-invasive weighing at DBG but this was noted to be unsuccessful due to reduced engagement from Charlie, probably because of regular catching and restraint.[93]

In order to minimize fear and distress, animals must only be handled and managed by, or under the supervision of, appropriately qualified and experienced staff and handling must be done with care in order to protect the animal's welfare and to avoid unnecessary discomfort, stress and physical harm (COW MS 12 Fear and distress). The KHM MS 12 further requires that restraint be used only for husbandry or research purposes and the details of every event be recorded (see Domain 3). Handling at DBG is always undertaken by an expert kākā keeper and the period of restraint is kept to the minimum necessary for weighing, physical examination or other husbandry procedures (<15 minutes).[94] Whether records of each restraint event are kept is unknown. [**PROGRAMME RECOMMENDATION 2**]

The environmental and foraging enrichment provided at DBG is widely regarded to be good. While the more complex social conditions provided at DBG would be enriching for a

[87] Interview 4, 12/12/24
[88] Interview 1, 2, 12/12/24
[89] Interview 3, 12/12/24, Email correspondences 12/24
[90] Interviews 1,2,3 12/12/24, Email correspondences and materials provided 12/24
[91] Email correspondence, 6/1/25
[92] Interview 1, 11/12/24
[93] Interview 4, 12/12/24
[94] Interview 4, 12/12/24

socially normal adult kākā, there is cause to believe Charlie may be finding them stressful at this stage. When monitoring indicated that the newly paired Charlie and Caesar were not bonding, a management change was made, and Charlie was given the opportunity to choose her preferred aviary and mate. When I observed them several months later, she did not show any positive/affiliative behaviour towards the familiar male she had chosen, Bling. The loss of positive human interaction is likely to be having some negative effect on Charlie's welfare.

Domain 5 – Mental state

Mental or affective experiences are feelings or emotions that are negative or positive; in other words, they are experiences that matter to the animal itself (Mellor et al. 2020). These experiences arise due to the animal's perception of its own physical state (i.e. its body) and its interactions with its environment and they may vary according to the species and the individual, depending on its genetics, personality and past events. Mental experiences are subjective and internal and thus cannot be measured directly. Instead we infer the animal's likely mental experiences from observable/measurable indicators collated in each of the first four domains (Mellor et al. 2020).

No evidence was found that Charlie is subject to, or at risk of, any negative experiences relating to her nutritional or hydration status (e.g. prolonged hunger or thirst). She likely has (and had in her previous facility) frequent positive experiences relating to food, due to the knowledge of her keepers of her specific food preferences and regular provision of these foods as a part of her balanced and appropriately varied diet.

No evidence was found that Charlie is subject to, or at risk of, any negative experiences relating to her thermal environment and she may experience regular positive experiences when she can choose to move among microclimates within her aviary (e.g. thermal pleasure of warming). The open nature of the aviary means that Charlie is exposed to a range of sensory stimuli in addition to weather, some of which are predictable and some not; parrots are generally well-equipped to deal with some variation and may find it engaging and enjoyable. However, Charlie is known to be sensitive to change and so may find this less positive than other kākā would. She is always able to retreat to less exposed areas if she so chooses.

No evidence was found that Charlie is subject to negative experiences such as pain or sickness. She is in good overall health and any arthritic pain in her left wing and leg is well managed by medication. The risk of future arthritic pain is low as her keeper is knowledgeable and has the support of an avian veterinary specialist and there is a plan in place for monitoring any recurrence of pain behaviour that might arise if her medication is reduced.

Some evidence was found of negative experiences such as anxiety, fear or stress due to Charlie's perception of, and interactions with, her new environment. While the environment and enrichment provided at DBG would be expected to reduce negative experiences like frustration in normal kākā and provide opportunities for positive experiences, Charlie's difficult early life has apparently impaired her ability to regulate her behaviour normally and adapt to change. She shows perseverative tendencies which manifest as severely abnormal behaviours. The marked

re-emergence of various known (and other) abnormal perseverative behaviours following her move to DBG likely reflect her inability to cope with the many and varied changes in her environment and the subsequent feelings of loss of control, fear or stress. These abnormal behaviours may also cause perceptions of poor welfare in the viewing public visiting the aviaries. In addition, the removal of all rewarding human interactions has likely led to the loss of any associated positive experiences.

Overall Conclusion

Overall, the care, management and enrichment provided to Charlie are appropriate to support good welfare in a normal captive kākā. While Charlie is still likely having some negative experiences associated with her new physical and social environment, I think her welfare can improve at DBG, given time and stability and if some positive human interaction can be reinstated. While her abnormal behaviours may never completely go away, a marked reduction in their expression, showing interest in visitors again, more engagement with other enrichment (e.g. misters) and some evidence of her bond with Bling being reinstated would signal an improvement in her mental state and overall welfare.

Specific recommendations for future management of Charlie:

1. Because Charlie finds it difficult to adapt to change, it is vitally important that she is given a period of stability at Dunedin Botanic Garden aviaries to become familiar with the environment, people, management and other birds. She has experienced significant, numerous and ongoing changes over the last 7 months. Adaptation will take longer for Charlie than would be expected for a behaviourally normal bird and a minimum of 12 months undisturbed is recommended. The physical and social environment (including cage-mate) should be kept as constant as possible. The one change I would recommend for Charlie is reinstituting some form of regular positive human interaction (e.g. scale training for rewards) as this seemed to have a beneficial effect before she left TA and would facilitate regular weighing without the negative experiences associated with catching and restraint (p 26). Again due to Charlie's sensitivity to change, this interaction should be introduced gently and gradually to build trust and small, incremental and flexible milestones mapped. A clear plan should be developed for monitoring Charlie's progress and transparently deciding when and how to make any management changes. The detailed plan should be written, regular records kept, and any deviations noted and explained. Included should be a protocol for sampling and recording clearly defined behaviour to allow objective evaluation of changes (see Specific Recommendation 2 and Programme Recommendations 1 and 2 for details), a timeline, milestones for decision-making and possible management interventions.

2. When any management change is proposed (such as a reduction in medication, an enrichment intervention or implementation of a training programme), a clear protocol should be developed for structured monitoring and detailed recording to objectively and

transparently evidence claims of change/no change in Charlie's behaviour (p 15) (see Programme Recommendations 1, 2 and 3 below for details of protocol and behavioural observations).

3. If no bathing water is available to Charlie in her enclosure this would be a valuable addition to her environmental enrichment (p 11).

Recommendations for kākā captive management programme:

1. The lack of appropriately collected behavioural data at either facility has limited the reliability of this welfare assessment. In future, observations of kākā behaviour for the various purposes required in the KHM and CoW, including for Charlie's immediate and future management (as above), should be undertaken by all holders in a consistent and structured way. This is critical to facilitate evaluations of changes over time which could signal new health problems, effects of treatments for medical problems, changes in management or interventions for behavioural issues, monitoring introductions of new breeding pairs, benefits of training, welfare assessments and, importantly, comparisons of behaviour before and after transfers between facilities.

   As part of this, a detailed ethogram (see Programme Recommendation 3 below) and a structured, randomized sampling protocol (the protocol itself should be recorded) are essential for objectively quantifying kākā behaviour (e.g. interval scan sampling plus time sampling of key point behaviours). In addition, the sampling protocol should capture circadian (and seasonal, if relevant) variability in behaviour. Applying a structured, pre-determined sampling protocol allows the most representative, consistent and unbiased behavioural observations to be made. A minimum standard could be added to the KHM requiring any party monitoring behavioural changes to use a structured approach to observation that meets these criteria. Guidelines, example protocols and suggested software for appropriate collection of behavioural data should be included in the KHM (p 18).

2. There would be value in developing more detailed guidance and perhaps even example templates for daily/regular record keeping that meet the requirements for institutions sending birds to other holders. The guidelines should include reference to all record-keeping required in the KHM, e.g. every restraint event, protocol, observations and outcomes for introductions of new breeding pairs (AZA 2020 Kea Care Manual has a good example Introduction Protocol). These guidelines/templates might fit within the KHM or, if not, should be completely consistent with all sections/minimum standards therein. Ideally some kind of regular audits of these records would ensure that they were fit for purpose when the information is needed (p 19).

3. Development of a detailed species-level ethogram for captive kākā (and kea) is required (p 27). I have encountered no species or individual level ethogram for wild or captive kākā – the only two documents that provide some such information are one on social play in kākā and

kea (Diamond and Bond, 2004) and one on the vocal ethology of North Island (Kapiti) kākā (Van Horik et al., 2007). For kea, there is an ethogram providing categories of behaviour for wild kea (Diamond and Bond, 1991), a rudimentary ethogram for captive kea in Auckland zoo (King, 2021) and a more comprehensive though still incomplete ethogram in the AZA Kea Care Manual (2020).

Development of the ethogram should be based on a mechanistic approach to characterizing behaviour for each species i.e. describing the body parts and movement patterns that make up each discrete behaviour, rather than attempting to interpret their meaning and applying leading descriptors and labels. Creating an ethogram of captive behaviour for these species is the first step to understanding the behavioural repertoire and time budgets of captive kākā, circadian and seasonal variations, indicators of problems, as well as evaluating the effects of enrichment strategies and targeted interventions to improve behaviour and welfare. It is also necessary to appropriately monitor kākā behaviour during new social groupings and following transfers among holders, as required in the CoW and KHM, and for investigating other important issues such the prevalence, and risk factors for the development, of abnormal repetitive behaviours in captive individuals (e.g. bird source, enclosure size or dimensions, rearing method). Proper behavioural assessment is key to meeting the objectives of a captive breeding programme, now that this seems to be continuing for SI kākā (not self-limiting as outlined in the 2010 – 2020 CMP). As noted, understanding these factors is relevant to the success and conservation value of captive-bred juveniles, as well as retired breeding adults released to the wild.

Development of the ethogram could be undertaken as a postgraduate student research project(s), video-capturing structured samples of behaviour at multiple facilities to construct the definitions of captive behaviour and generating time budgets. The starting point for the project could be capturing data from Charlie and the other kākā and kea at DBG. For Charlie, this could be used as baseline data to quantitatively evaluate the effects of time and targeted interventions on her behaviour and welfare. Having these methods and data for kākā holders to use will make it easier to objectively evaluate such cases as Charlie's (p 27).

4. The KHM should be thoroughly revised and updated following the development of the ethogram and capture of reference data for the captive population in general. Wording in the minimum standards and associated text should be clarified ('must' versus 'should', consistency among sections), make all sections internally consistent and rectify errors (e.g. two Minimum Standard 5s, mostly cereals and whole grains should be fed – MS13?) and include references to the aligned minimum standards in the NZ CoW. Reconsider use of 'minimum standard' in these documents as it is easily confused with legal minimum standards in Codes of Welfare. Some information is out of date, and some is oversimplified which limits its value in cases such as this. It is uneven in coverage, detail, supporting references and style. It's my opinion that the manual would be clearer if references to what happens in facilities are removed or appendixed as current practice may or may not be good practice, so this is confusing.

5. Develop Captive Kākā Transition Management Guidelines – include requirement to have a written plan covering: Capturing information about the individual and any special needs and preferences before the move; Monitoring adaptation to new facility including roles/responsibilities, behavioural observation protocols (see Programme Recommendations 1 and 2 above); details of required record keeping, methods of capturing and sharing information; timelines; milestones; and possible alternative management strategies. This might be a stand-alone document (like the DOC Translocation SOP) or might fit with the current Quarantine section in the KHM with new minimum standards associated.

6. The next revision of the KHM should include explicit requirements or recommendations for approaches to biosecurity planning and preparation as the SI kākā region, in particular, is at high risk for HPAI. This should include consideration of how to manage birds if they all had to be kept off-display for prolonged periods during disease outbreak (p 16).

7. Update the SI kākā Captive Management Plan for what is now clearly a different captive management programme to that originally intended. Correct apparent errors in origins table and text (Charlie is missing). I would remove reference to 'captive dementia' if text is referring to Charlie (male, Stewart Island, held at TA, captive dementia) – this term is a reputational risk to DOC if they have continued to hold an individual with 'captive dementia' for a further 20 years and would probably now breach a minimum standard in the CoW. The CMP 2010-2020 refers to an advocacy plan, with which holders are required to comply if birds are held on display. Most birds are on display. Does this plan exist?

References

Association of Zoos and Aquariums. 2020. AZA Kea Species Survival Plan (*Nestor notabilis*). (2020). Kea Care Manual. Silver Spring, MD: Association of Zoos and Aquariums.

Beggs, J.R., Wilson, P.R. 1987. Energetics of South Island kaka (*Nestor meridionalis meridionalis*) feeding on the larvae of Kanuka longhorn beetles *(Ochrocydus huttoni)*. *New Zealand Journal of Ecology* 11, 143-147.

Beggs, J.R., Wilson, P.R. 1991. The kākā *Nestor meridionalis*, a New Zealand parrot endangered by introduced wasps and mammals. *Biological Conservation* 56(1), 23-38.

Diamond, J., Bond, A.B. 1991. Social behavior and the ontogeny of foraging in the Kea (Nestor notabilis). *Papers in Behavior and Biological Sciences*. 45.

Diamond, J., Bond, A.B. 2004. Social play in kaka (*Nestor meridionalis*) with comparisons to kea (*Nestor notabilis*). *Behaviour* 141(7), 777-798.

Dubey, J. 2022. Clinical toxoplasmosis in zoo animals and its management. *Emerging Animal Species* 2, 100002.

Forrest, S.W., Rodríguez-Recio, M., Seddon, P.J., 2024. Home range and dynamic space use reveals age-related differences in risk exposure for reintroduced parrots. *Conservation Science and Practice* 6 (5), e13119.

Harvey, A., Beausoleil, N.J., Ramp, D., Mellor, D.J. 2020. A ten-stage protocol for assessing the welfare of individual non-captive wild animals: Free-roaming horses (*Equus ferus caballus*) as an example. *Animals* 10(1), 148.

Kākā (*Nestor meridionalis*) Husbandry Manual. 2021. Massey University and Todd Jenkinson.

Kalmar ID, Janssens GP, Moons CP. 2010. Guidelines and ethical considerations for housing and management of psittacine birds used in research. *ILAR Journal* 51(4):409-23. doi: 10.1093/ilar.51.4.409

King, H., Kemp, C. 2021. The impact of enrichment on the behaviour of kea (*Nestor notabilis*) at Auckland Zoo. Environmental and Animal Sciences, Unitec Institute of Technology

Mason, G.J., Latham, N.R. 2004. Can't stop, won't stop: is stereotypy a reliable animal welfare indicator? *Animal Welfare* 13(Suppl), S57–S69.

Mason, G., Clubb, R., Latham, N., Vickery, S. 2007. Why and how should we use environmental enrichment to tackle stereotypic behaviour? *Applied Animal Behaviour Science* 102(3-4), 163-188

Mason, G.J. 2008. Chapter 11. Stereotypic Behaviour in Captive Animals: Fundamentals and Implications for Welfare and Beyond. p325 – 351. In: Mason, G.J., Rushen, J. Stereotypic Animal Behaviour: Fundamentals and Applications to Welfare (2nd edition), CAB International, Wallingford, Oxon, UK.

McWhorter, T.J., Gerson, A.R., Talbot, W.A., Krabbe Smith, E., McKechnie, A.E., Wolf, B.O. 2018. Avian thermoregulation in the heat: evaporative cooling capacity and thermal tolerance in two Australian parrots. *Journal of Experimental Biology* 221(6): jeb168930.

Mellor, D.J., Beausoleil, N.J., Littlewood, K.E., McLean, A.N., McGreevy, P.D., Jones, B., Wilkins, C. 2020. The 2020 Five Domains Model: Including human–animal interactions in assessments of animal welfare. *Animals* 10(10), 1870.

Mellor, E.L., McDonald Kinkaid, H.K., Mendl, M.T., Cuthill, I.C., van Zeeland, Y.R.A., Mason, G.J. 2021. Nature calls: Intelligence and natural foraging style predict poor welfare in captive parrots. *Proceedings of the Royal Society B: Biological Sciences* 288(1960), 20211952.

Moorhouse, R.J. 1997 The diet of the North Island kākā (*Nestor meridionalis septentrionalis*) on Kapiti Island. *New Zealand Journal of Ecology* 21(2), 141- 152.

Ministry for Primary Industries, New Zealand Code of Welfare for Zoos (2018), Wellington, New Zealand.

Powlesland, R.G., Greene, T.C., Dilks, P.J., Moorhouse, R.J., Moran, L.R., Taylor, G., Jones, A., Wills, D.E., August, C.K., August, A.C.L. 2009. Breeding biology of New Zealand kākā. *Notornis* 56, 11-33.

Shuck-Paim, C., Borsari, C. 2009. Means to an end: Neotropical parrots manage to pull strings to meet their goals. *Animal Cognition* 12, 287301.

Species 360 ZIMS body condition score 2020 Accessed 10/01/2024 at chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://training.species360.org/Documents/ZIMShelp/ZIMSHELP-medical%20-%20body%20condition%20score.pdf

Van Horik, J., Bell, B., & Burns, K. C. (2007). Vocal ethology of the North Island kākā (Nestor meridionalis septentrionalis). *New Zealand Journal of Zoology*, 34(4), 337–345. https://doi.org/10.1080/03014220709510093

Wilson, P.R., Karl, B.J., Toft, R.J., Beggs, J.R., Taylor, R.H. 1998. The role of introduced predators and competitors in the decline of kaka (*Nestor meridionalis*) populations in New Zealand. *Biological Conservation*, 83(2), 175-185.

Appendix 1: Comments on the DOC Te Anau Bird Sanctuary

Note on characterization of facility: The DOC facility in Te Anau is officially named, by DOC, Te Anau Bird Sanctuary (Punanga Manu o Te Anau). When asked whether the facility is a sanctuary, keepers working there said they don't regard it as having that role, although they do judge it to be the best place for Charlie to spend her 'retirement'.[95] I was told that the facility evolved from the early 1970s when it only kept takahe, that non-releasable birds were acquired over time and the facility then became bird breeders. It was not intended to be a sanctuary.[96] Rangers instead describe the facility as a zoo, defined in the CoW (2018) as 'A site on which animals are kept for public exhibition, education, conservation, research or entertainment and usually will hold a range of exotic (new organisms), domestic and native species. For the purposes of this Code, a zoo also includes a containment facility approved under the Biosecurity Act 1993 for the purpose of holding animals in containment, and includes animal parks and aquariums.' This is an appropriate classification for the DOC TA facility.

Domain 1

1. Notes on animal-based indicators: Charlie's average weight was indicated by her TA keepers as 480g and pretty constant. However, records of body weight and BCS were apparently not regularly kept in the 24 years Charlie resided at TA and there is indication that she was not regularly weighed in the last 10 years (not caught specifically for the purpose of weighing and not scale trained until early 2024).[97] In addition, records provided by TA keepers on request in July 2024 did not include regular weights and birds' more formal files, in which weights were apparently recorded[98], were not provided when records were requested. However, when Charlie arrived at DWH in June 2024 she was judged to be of a good weight and in good health.

   Charlie's TA keepers stated (and their handover notes support)[99] that her appetite fluctuated though her weight reportedly remained stable. She was noted as 'fussy' – at times, she was not keen on parrot pellets.

2. Notes on diet and feeding: The diet provided at TA was generally similar to that at DBG and thus consistent with the KHM recommendations. The base diet was presented in the morning and comprised pellets (1/4C per bird per day) presented in a hopper, nectar mix, fruits and vegetables finely chopped (carrot, root vegetable, broccoli, apple, grapes, pomegranate, melon).[100] Supplements were not mentioned. Handover notes referred to a 'recipe for special pellets' to tempt her appetite; the composition, nutritional value and contribution to a balanced diet of these pellets is not known. Fresh branches and browse were provided at least weekly and included foliage, seeds, berries and flowers of various

[95] Interviews 1, 2, 3, 12/12/24, Various email correspondences 12/24 and 1/25
[96] Interview 3, 12/12/24
[97] Interview 2, 12/12/24
[98] Interview 2, 12/12/24
[99] OIA released email correspondences
[100] Interview 2, 12/12/24

species (coprosma, kowhai, flax, rata, manuka, cabbage, beech). Rotten logs were provided weekly or as required. Individual almonds were used for training or by regular tour guide. Keepers at TA mentioned Charlie's fondness for flowers and fresh browse, indicating that food preferences were recognized and met by carers. It was also noted that Charlie is less interested in digging in logs and eating grubs than other kākā.[101]

Domain 2

Key points about the physical and sensory environment provided by the TA aviaries and their suitability for holding kākā in their current state:

1. The aviaries are smaller than the top aviaries holding kākā at DBG – The right side aviary is 110.8m^3 (main area 89.6m^3 plus 21.2m^3 central area) and the left side aviary is 115.0m^3 (main area 89.6m^3 plus 26.3m^3 central area). There is also a common porch area, but this can't be counted as the enclosures wouldn't have the required double entrance 'airlock' (MS 3e in KHM) if accessible to birds. If the flight door was left permanently open, both aviaries together would provide the required space for two birds (~226.7m^3). There is no minimum space requirement for long-term housing of individual birds, presumably as they are not supposed to be singly-housed. The size of the aviaries would be adequate for 4 birds, (220m^3 needed; 50m^3 per additional bird) only if the whole space was open to all birds all the time.

   Note on enclosures size requirements: The KHM indicates that the minimum size of a kākā enclosure is determined by their basic requirements, particularly the ability to express natural locomotive behaviour. However, scientifically based recommendations for species-specific cage dimensions are scarce (Kalmar et al. 2010) and many captive environments provide inadequate space for their inhabitants to engage in 'extensive free flight' as they naturally would. No captive environment can approximate the space used by kākā in the wild. To illustrate, a recent study of 10 kākā living in Orokonui Ecosanctuary, near Dunedin, found that individual home ranges varied from 0.34km^2 to 9.92km^2 (mean ± SD 4.12 ± 3.83 km^2) (Forrest et al., 2024). Older birds had smaller home ranges – on average 1.09km^2 for birds 5 years and older compared to 6.14km^2 for kākā up to 3 years old. This finding is proposed to be partly because older individuals are typically more neophobic and more efficient foragers, which can reduce the need for large home ranges relative to younger individuals. However, these differences are academic when considering the significantly smaller space available to captive kākā. The largest captive aviary mentioned in the KHM is 0.03km^2 which is 250 times larger than the minimum volume required for two kākā (120m^3; MS3) but 10 times smaller than the smallest home range of local wild kākā. On these grounds, justification for the minimum 120m^3 enclosure size for two birds indicated in the KHM is not clear.

[101] Interview 2, 12/12/24

2. The maximum height of the aviaries/retreat is 3.5m compared to 8m at DBG. Whether this is adequate to make the birds feel safe from humans or whether it 'maximizes the birds' outlook' (KHM MS 3f) is unknown but it is slightly taller than the example given as acceptable in KHM MS 3a. Note: The dimensions that achieve the minimum required enclosure volume in the KHM may or may provide sufficient length to accommodate free flight for kākā. One example is given: 8m L x 5m W x 3m H. But no minimum height for flighted birds is mentioned.

3. The central area in each aviary cannot be classified as a retreat as it is screened only on 2-3 sides (trellis and tarpaulin). The only area that offers each bird total refuge/retreat from public scrutiny (MS 3g) is the top of this central area, measuring roughly 1.45m x 1.5m x 1.5m ($3.3m^3$) on the left and 1.7 m x 1.5m x 1.5m ($3.8m^3$) on the right. This appears to be screened using timber trellis on the lake side. Birds reportedly roost and sleep here.[102] This is much smaller than the refuge/off-display areas in the DBG aviaries: $18m^3$ indoor plus the area below the colour steel barrier (~$56m^3$). Additions have been made (unclear when) to increase shelter/screening in parts of the enclosures. Prior to the current retreat areas being built, retreat was reportedly provided by natural browse/screening.[103] How birds retreated to sleep at height is unknown.

4. The central area is roofed, providing each bird about $26m^3$ of reasonably sheltered space (trellis/tarpaulin protection from wind), including perches and a complete retreat, compared to $130m^3$ of sheltered area at DBG (outdoor and indoor). The only shelter provided in the main aviary areas comes from vegetation growing around and over the enclosures. Overhanging trees mean that little direct sunlight is likely to be available for birds in the aviaries. Fewer microclimates (especially warm spots) seem available for birds to behaviourally thermoregulate. There is no heated area as is provided in the off-display area in the DBG aviaries.

5. Nesting pairs must be provided with a nest area which is undisturbed by the public to ensure aggression and stress does not result. Where nest boxes could be/were positioned is unclear. It has been suggested that nesting boxes were positioned on the ground in the past not up high like a more natural nest. This was noted to cause concern about the keepers' knowledge of kākā husbandry, particularly breeding.[104]

6. Substrates – natural branch perches of various sizes (with bark for chewing) and heights and orientations (e.g. hanging vertically) and large pieces of natural foliage/browse were provided. The ground in the right aviary comprises an area of grass, some soil/stones/leaf litter, larger rocks, while quite a significant proportion of the left aviary floor is concrete, surrounded by concrete/rock features and vegetation. Natural leaf litter falls from trees above. This seems to meet MS 3c, d and MS 4a in the KHM.

[102] Interview 2, 12/12/24
[103] Email correspondence, 13/12/24
[104] Email correspondence, 7/1/25

7. Both aviaries have a pond for drinking/bathing which appear to meet the KHM requirement in MS 3h.

8. In places the (large holed) wire mesh has been repaired with a piece of smaller-holed mesh which could leave kākā exposed to sharp edges. This may not meet the KHM MS 3b or CoW MS 9a 'Enclosures, barriers, facilities and equipment must be maintained in a condition that minimises harm or injury to animals and if likely to cause injury or harm must be repaired or replaced or the animal relocated immediately.' The holes in some mesh look large enough to allow small birds and rodents (mice and possibly rats) into the aviaries.

9. In terms of the sensory environment (excluding conspecifics/humans), kākā at TA would likely be exposed to fewer anthropogenic (e.g. air pollutants) and more 'natural' sensory stimuli because the site is more remote and less disturbed. However, the site is visited daily by tour and school groups.

10. TA keepers indicated their kākā aviaries were 'non-compliant with KHM' when Charlie moved.[105] They reportedly asked for the facility to be reviewed to check they were on the right track with their improvements. I believe a general review of the facility by DOC is underway. The keepers believe that they are 'up to scratch' with ZAA accreditation requirements, except for their record keeping (see Domain 3 below) which they are working to improve.

Domain 3

1. Charlie's medical history at TA: It is difficult to understand the history of Charlie's arthritis and treatment from the information provided – there are several suggestions that she had been on/off an anti-inflammatory drug (meloxicam) prior to 2023[106] but when and for how long is unclear. DWH records for Charlie date back only to 2020 and refer to arthritis only from 2023. These clinical records indicate that Charlie and two of four surviving chicks were admitted to DWH in late 2020 for suspected toxoplasmosis (which killed the other two chicks). Subsequent to positive diagnoses, Charlie's male cage-mate was also admitted, found to be infected and treated. Toxoplasmosis is relatively common in captive wild animals and the source of infection in New Zealand is exposure to oocysts in the faecal material of domestic cats, which could be brought into enclosures on people's feet, washed in with rain, drainage or storm water, or be introduced through poor food storage and hygiene (Dubey, 2022). Features of the TA facility's location, infrastructure, visitation or animal management may increase the risk of toxoplasmosis infection, but I did not gather sufficient information to judge this.

[105] Interview 2, 12/12/24
[106] OIA released email correspondence

In early 2023, TA keepers reported seeing behavioural changes suggestive of pain (reduced grip strength in left foot, biting at foot, reduced flying behaviour).[107] Charlie was taken to a local companion animal vet who diagnosed arthritis at the sites of her old injuries and prescribed a daily dose of meloxicam. The specialist vet at DWH was consulted at that time and agreed with the diagnosis and treatment plan.[108]

In late 2023, keepers took guidance from a longstanding volunteer vet who has postgraduate qualifications in holistic veterinary medicine/physical therapies (chiropractic, acupuncture) and experience in parrot rehabilitation and training.[109] Training activities with Charlie and her then-companion male were instituted/refined/increased (what training was done before this time is unclear) in early 2024 to facilitate non-restraint weighing and increased movement through structured voluntary physical therapy. Detail of this training programme along with exemplar videos were provided to DOC and MPI on request in August.[110] Keepers and the volunteer vet report rapid improvements in perch gripping and movement but no structured observations of behaviour were recorded/provided to substantiate these claims.

2. Notes on cleaning and hygiene: Hygiene and cleaning practices at TA were not discussed in detail, except to ask specifically about water blasting. Water blasting concrete areas and ponds inside the aviaries was done a couple of times a week (season/weather dependent) with the birds still in the aviary. This raises concerns for increased risk of respiratory disease and regular stress due to the loud noise[111], but keepers report they 'got used to it quickly' and that Charlie would retreat to a high perch. Given the relatively small size and low height of the aviaries and reports that birds were usually confined to only one side, this would not allow them to retreat very far. Whether this contributed to Charlie's general wariness of keepers inside her enclosure is unknown.

   Regular cleaning involved sweeping and refreshing water in the ponds, scraping the top layer of the garden beds in the aviaries; loose leaves were refreshed and gravel brought in occasionally. I heard no reports of aspergillosis occurring at TA. Like DBG, TA keepers mentioned the inability to exclude small passerines from some enclosures and the use of hoppers to present parrot pellets.[112] This suggests that at least mice would also be able to enter those enclosures. At least one pest control device (Goodnature traps) was noted at TA but areas where rodents could likely enter the kākā enclosure were also observed (see Domain 2).

3. Notes on health monitoring and healthcare: The degree to which routine health monitoring and management was undertaken for kākā at TA is not terribly clear. Birds were reportedly weighed weekly 'for a while' but not in a regular or scheduled way. Keepers reported that birds were not handled a lot and were caught only when necessary, not specifically for the

[107] OIA released email correspondence, Interview 1, 2, 3, 12/12/24
[108] OIA released email correspondence
[109] Interview 3, 12/12/24
[110] Various email correspondences, 12/24 and OIA released email correspondences
[111] Email correspondence, 7/1/2025
[112] OIA released correspondences

purpose of weighing.[113] In early 2024, a few months before transfer to DBG, keepers and a vet volunteer were training Charlie to hop onto the scale to facilitate restraint-free weighing. Initially she wouldn't hop on until the keeper left the enclosure, perhaps because she was suspicious that she would be caught. Video evidence provided shows Charlie voluntarily engaging in training with both keepers and the volunteer vet in early 2024 and this evidence was provided to DOC and MPI on request in August.[114] This would have facilitated more regular weighing before Charlie left TA but whether these weights were recorded is unknown.

Keepers also report collecting faecal samples and sending these to the local vet for analysis every six months; they report never having a positive result in 10 years and so didn't have to drench birds. I saw no evidence that the local vet's clinical records had been requested by DOC[115] but presumably the captive coordinator would have followed up had this information not been included in the annual reports. The fact that Charlie, an aged kākā, was in excellent health on her arrival at DBG[116] supports TA keepers' reports of good health monitoring and management.

4. Notes on staff knowledge and training: Both the CoW and the KHM require that keepers possess the appropriate ability, knowledge and professional competence to handle and care for the species held and ensure their health and welfare. Kākā keepers must be trained to understand the normal range of behaviours of the species and recognize poor health, injury and welfare in the animals under their care (CoW MS 3a, MS 13c; KHM MS 5 Health Management p 33).

   The Zoo Operator, in this case DOC's nominated person responsible for the TA facility, must employ trained staff who possess the appropriate ability, knowledge and professional competence to handle and care for the species held (CoW MS 1). Part of this responsibility is ensuring that sufficient numbers of staff are available to care for the animals held (MS 3a). Keepers at TA report not having time to undertake training of kākā for restraint-free weighing during work hours and coming in during their own time to learn how to do it as well as entering information into the birds' formal records at home. There are multiple indications at the site that resources are limited and that keepers do not have sufficient time to keep the facility running to a high standard (see below).

   The Zoo Operator must also ensure that staff are appropriately knowledgeable, trained and competent to ensure the health and welfare of the animals are maintained according to the other minimum standards in the CoW. In particular, 'staff responsible for the care of particular zoo animals must receive training in understanding the normal range of behaviours of the species and in recognising poor animal health and welfare' (CoW MS 3b); for kākā this is outlined in the KHM MS 5 Health Management (p 33). Staff should be familiar

[113] Interview 3, 12/12/24
[114] Various email correspondence, 12/24
[115] OIA released email correspondences
[116] Interview 1, 10/12/24

with the biology of the species, animal husbandry and care, handling, restraint and transport, the normal range of behaviours of the animals with emphasis on seasonal and/or day-to day variations in both individuals and groups, an understanding of the changes in behaviour associated with ill-health, indicators of disease, injury or distress, a general understanding of animal welfare, methods to minimize distress, how to integrate animals into social groups, how to habituate animals to humans, provision of adequate diets and emergency management (CoW Part 2.4 General Information).

Both keepers were hired as rangers by DOC to care for a number of bird species without relevant qualifications or knowledge and it appears that no structured plan for training or upskilling has been provided over the last 8-10 years. Neither keeper is qualified in areas relevant to captive bird management or avian behaviour/medicine. Both keepers readily acknowledged that they are not experts in avian behaviour and medicine as they learned on the job from a previous (unqualified?) keeper there. Learning about wild animal care has been mainly from a senior colleague and learning about animal behaviour, training and welfare (Five Domains) from volunteers, not through any structured embedded programme of training. A key challenge with this model is the persistence of old ideas and traditions when better methods exist. They note that they rely heavily on the KHM for guidance on bird care. A ranger commented that no qualification was sought because the facility was always expected to close (on the cards for years) and no investment was made in staff because of this ongoing expectation.[117]

Both have actively endeavoured to increase their relevant knowledge and skills by visiting Massey's Wildbase hospital (Palmerston North) and other facilities holding or working with kākā (Kiwi Birdlife park in Queenstown, Orokonui Ecosanctuary) but this is reportedly difficult because of DOC resources. There is no kākā annual conference/workshop like the kea conferences.[118] They have both worked with a small animal veterinarian with a personal interest and experience in parrot behaviour and who has taught them about animal welfare (Five Domains), and they have apparently fairly recently developed a working relationship with a local companion animal vet.

Concern has been voiced about the keepers' knowledge of normal kākā behaviour, ability to perform health management procedures (e.g. medication) and that both adult birds were infected with toxoplasmosis in 2020 which only became apparent when two chicks died.[119] A keeper mentioned that in the past, medication was not given to birds because they didn't have the necessary knowledge.[120] Again, both Charlie and a bird transferred from TA to DBG in 2023 were found to be in good health and condition upon arrival. In addition, keepers sought (non-specialist) veterinary advice when Charlie's behaviour suggested she was painful in 2023. However, a more experienced kākā keeper indicated that there were attempts to get Charlie to DWH for assessment for some time prior to that.[121]

[117] Interview 2, 12/12/24
[118] Interviews 1 and 2, 12/12/24
[119] Email correspondence 7/1/25
[120] Interview 2, 12/12/24
[121] Interview 4, 12/12/24

Finally, there is evidence that the relationship been DWH and keepers at TA has been challenging for some years, with TA keepers ultimately instructed not to correspond directly with DWH but to pass information via DOC supervisors.[122] TA keepers felt this compromised their ability to fulfil MS 7 in the KHM (working relationship with avian vet). As noted above, concerns have been voiced about the general standard of bird care, knowledge of kākā behaviour and husbandry and handling and basic healthcare abilities of TA staff.[123] At least one TA keeper is aware of this view but feels DWH vets don't have first-hand knowledge of the individual birds as they do.

Rangers also feel there is a conflict of interest for decision-makers between the priorities and activities supporting captive breeding for release and the welfare of captive individuals and that observations and recommendations supporting breeding take priority.[124] This has clearly led to a breakdown of trust and goodwill over the last 2 years and, from time to time, appears to have hindered effective communication about birds and their care.[125] This problem will invariably continue to affect bird care and management in the future unless a proactive approach is taken. From various communications, it seems unlikely this relationship can be improved without dramatic and holistic change (e.g. upgrading the TA facilities and formally upgrading keeper knowledge and skill). If TA is to continue holding kākā and other birds, some kind of remediation or alternative specialist veterinary support will likely be needed.

5. Notes on record keeping: Inadequate record-keeping at TA has been noted as a key challenge to understanding and addressing Charlie's behaviour since she arrived at DBG (similar issues were evident a year earlier when another bird moved from TA to DBG). According to the KHM MS 9g (Quarantine), a complete copy of the bird's individual record must be sent by the sending institution to the receiving institution. This was not done although apparently such as file existed for Charlie. TA keepers report that each bird at the facility has a formal file. These are handwritten and additions are made infrequently and not consistently. In the past, some of the information was collated at home (the site had only just got internet connectivity in late 2024). Information is added about medication, weights and faecal testing along with a summary of key events (e.g. vet visits, nesting, hatching) and dates at the back of the file. This is the information needed for the annual report to the captive coordinator and one of the keepers does all reporting. For some species on-site (teal), the information is entered online for the species coordinator but not for kākā. For Takahe, a whole team comes annually to do an operational review. Normal behaviour is not recorded daily. Time and resources for record keeping are a challenge and the keepers feel they have received limited guidance about what, exactly, to record.[126]

[122] OIA released correspondences, Email correspondence, 7/1/25
[123] Interview 3, 12/12/24, Email correspondence 7/1/25
[124] Interview 2, 12/12/24
[125] OIA released correspondence.
[126] Interviews 1 and 2, 12/12/24

The reason given to me for not providing this file to DBG on request was that it did not contain detailed information about Charlie's behaviour. [127] It is unclear exactly what TA keepers were asked to provide after the transfer but the expectation to provide the individual bird's complete record is clear in the KHM. Rather 4 years of informal daily 'handover' notes, essentially communications among keepers and volunteers for daily operations, were provided. They include information about what was fed that day, enrichment provided and anything notable, e.g. illness. The notes are intended for other staff, relievers and volunteers and not as a proper record for evaluation of behaviour.[128]

The bird's record must include an individual identifier (KHM MS 1), usually a leg-band number. Charlie was reportedly leg-banded by the DWH vet in late June 2024 after transfer to DBG;[129] it is unclear whether/why she wasn't banded before this and how she could have been reliably identified in the records if she wasn't previously banded. Notes were reportedly found in the keepers' handover diaries about not being able to correctly identify birds which meant medications were not administered.[130] This would seem to be the responsibility of someone more senior than the TA keepers.

Domain 4

1. Notes on environmental and physical enrichment: Some details of foraging and environmental enrichments are provided in Domain 1 and 2, including those accounting for Charlie's individual preferences (flowers, fresh browse, bathing). In addition, a keeper showed me a range of enrichment objects (woven baskets, food puzzles, toys) provided to kākā and other birds and indicated that some such enrichment was presented every day but plans or records of enrichment were not kept.[131]

2. Notes on retreat/refuge: Animals must be provided space, refuge areas or barriers that allow them to isolate themselves from other animals in the enclosure and the public gaze (CoW MS 7fii). For kākā, this means areas must be provided in the enclosure where birds can retreat totally from public display and can comprise artificial or natural shelters/screening (e.g. browse or logs) (KHM MS 3g). Associated with this, kākā must be able to sleep without interruptions [largely undisturbed would be more realistic] (KHM MS 4b). Comments on the opportunities to retreat are made above in Domain 2.

3. Notes on handling: How often and why birds were caught and restrained is unknown. As noted in Domain 3, keepers reported that birds were not handled a lot and were caught only when necessary, not specifically for the purpose of weighing. Whether records of each

[127] Interview 2, 12/12/24
[128] Interview 2, 12/12/24
[129] DWH Clinical notes 2020 – 2024, provided 7/1/25
[130] Email correspondence, 7/1/25
[131] Interview 2, 12/12/24

restraint event were kept is unknown. Concerns have been voiced about the inability of TA keepers to successfully catch kākā in their aviaries in TA, e.g. for hospital treatment.[132]

4. Notes on social conditions: There are varying reports on the degree to which kākā were pair- or individually-housed while living at TA. As noted above, the KHM explicitly notes that birds should not be housed alone except when they are in quarantine or undergoing medical treatment or where they have always lived alone and are proven to be unable to be integrated with other kākā (MS 10 Social housing). This is not the case with Charlie as she has lived and bred with Bling. Claims were made that social interactions between various pairings were regularly interrupted over the years and that at times birds spent most of their time living individually.[133] TA keepers indicated that this done when one or other bird was acting aggressively towards the other or 'tiring' the other out. Handover notes support this management practice, indicating that some pairings should not be left together unsupervised.[134] It is interesting to note that Charlie was left alone at TA for a period of around 8 weeks following her then-mate's transfer to DBG in mid-2023. This was a key point used by TA keepers to support their argument that he should be returned.[135] The CoW MS 12 (Fear and Distress) may be relevant here: (e) Animals temporarily accommodated away from others must not be separated for such a period of time that would cause difficulties when reintroduced to their group unless required for veterinary treatment.

   Due to inadequate record-keeping no information was available on how formation of new breeding pairs was undertaken at TA but concerns about the rangers' knowledge of normal kākā behaviour and experience mean that the KHM MS 14 (Breeding requirements) may not have been met: The formation of new breeding pairs must be undertaken and monitored by competent, confident personnel following appropriate protocol ad records of the protocol, observations and outcomes must be maintained during the introduction process. How these introductions were monitored is unknown.

5. Notes on humans as enrichment: Charlie's long-standing abnormal behaviours are acknowledged. There is no clear information on the historical approaches taken by keepers at TA to address them except for general approaches: changes to diet, enrichment (particularly fresh browse and bathing).[136] Keepers and regular visitors noted that Charlie has always been very human-focussed and interactions with humans have long been regarded as a key component of Charlie's enrichment at TA. For example, in the early 2000s, a public member was invited, on her first visit to the park, to enter Charlie's enclosure and interact with her unsupervised. Charlie was reportedly very friendly and playful, rolling on her back and playing footsie. This kind of visitor interaction was apparently a regular occurrence and was deemed 'part of her treatment plan'. At the time Charlie had been at TA 3-4 years and was reportedly housed alone in an enclosure 'not quite tall enough to stand in

[132] Email correspondence, 7/1/25
[133] Email correspondence, 7/1/25
[134] OIA released email correspondences
[135] OIA released email correspondences
[136] Interview 1, 12/12/24

but long', as she had 'not gotten along with other birds.'[137] In the 20-plus years she lived at TA she was also regularly visited by TA locals and exposed to daily tours and large school groups. As a result she was familiar with a number of specific people – regular visitors, volunteers and tour guides. Her most recent keepers regard human interactions as a key part of her enrichment, along with fresh browse and rotten logs, flowers, puzzles and other food-related toys.[138]

There is some inconsistency in these reports as her more recent keepers report that Charlie did not like people entering her aviary, including them. How this accords with those early reports of her positive interactions with strangers inside her aviary is unclear. In early 2024, a more formal programme of training and voluntary physical therapy was instituted by keepers and a volunteer vet at TA, with the aims of being able to weigh birds without restraint and improving Charlie's movement.[139] From the summary and video examples of training sessions provided, the training seemed to meet CoW MS 11g (Normal patterns of behaviour - If animals are trained or perform). Keepers and the vet reported rapid improvement in Charlie's trust and engagement with them inside the aviary as well as her movement over a period of weeks.[140]

Overall comments on TA: It is beyond the scope of this evaluation to speculate on the broader decision-making for the TA Bird Sanctuary. However, I would note that this evaluation (and other information gained by chance) suggest to me that this facility is a reputational risk to DOC in terms of animal welfare. The infrastructure is run down and there are multiple indications that resources are limited and that keepers do not have sufficient time to keep the facility running to a high standard (tools left lying around in enclosures, numerous non-compliant patch jobs to mesh, clogged drains, leaking taps, tree branches hanging on predator fences, signage covered in vegetation, improvements made to habitats with inappropriate/short-lived materials, volunteers required to get through basic tasks, no time to learn to train birds for non-restraint weighing). Keepers note that the 'place is on its last legs'[141] and that conservation stories and connections with the public can only be made if animals are living their best life in 'crumbling aviaries'. Without significant strategic investment, this facility will not represent high standards of animal welfare, despite the very best intentions and efforts of staff and volunteers.

It does feel, at times, that responsibility has been unfairly or unrealistically placed on the TA rangers, when in fact it probably lies higher up within DOC. An example is the complaints against rangers for their lack of qualifications, experience and knowledge when they were hired to do the job in that state and no structured plan for rectifying these deficits has apparently been provided.[142] Likewise, it seems unlikely that rangers have control over the resources

[137] Interview 4, 12/12/24
[138] Interview 1, 2, 12/12/24
[139] Interview 3, 12/12/24, Email correspondences 12/24
[140] Interviews 1,2,3 12/12/24, Email correspondences and materials provided 12/24
[141] Interview 2, 12/12/24
[142] Excerpt from Critical Issues document in OIA released documents (date unknown)

available to upgrade the Bird Sanctuary facilities, but they appear to bear the brunt of the criticism for any non-compliance.

It is also my view that given the problems that arose when another kākā was moved from TA to DBG in mid-2023 and the apparent failure to subsequently implement more rigorous and structured transition processes and protocols, it was inevitable that the same issues would arise in the lead up and following Charlie's move to DBG. It appears from the OIA-released documents that uncertainty about internal relationships and responsibilities and limited resourcing may have precluded such changes being implemented.

Appendix 2: Author's qualifications and expertise

Ngaio is Professor of Animal Welfare Science and Co-Director of the Animal Welfare Science and Bioethics Centre, School of Veterinary Science, Massey University, NZ. For the purposes of writing this report, she is acting as an independent consultant.

Ngaio has a PhD in animal science and has been active in research, teaching and scholarship in welfare science for 20 years, with over 90 peer-reviewed publications. Her research employs behavioural and physiological methods to investigate various aspects of animal welfare in both domestic and wild animal species. A key strength is her systematic, science-based approach to evaluating animal welfare impacts and she has been closely involved in the evolution of the Five Domains Model for more than a decade. She also has special expertise in understanding the effects of conservation activities on the welfare of free-living and captive wild animals, having investigated topics such as the welfare impacts of vertebrate pest control, field conservation of badgers and feral horses, identification marking of reptiles, amphibians and marine mammals and the management of stranded cetaceans as well as husbandry of captive kiwi.

Ngaio provides scientific support, advice and research to governments, various animal industries and veterinary professional bodies in New Zealand and around the world. She is Chair of the New Zealand Veterinary Journal editorial board, an independent scientific expert on the Wellington Zoo Animal Welfare Committee and the Australia New Zealand Council for the Care of Animals in Research and Teaching and liaison to the UK Universities Federation for Animal Welfare.