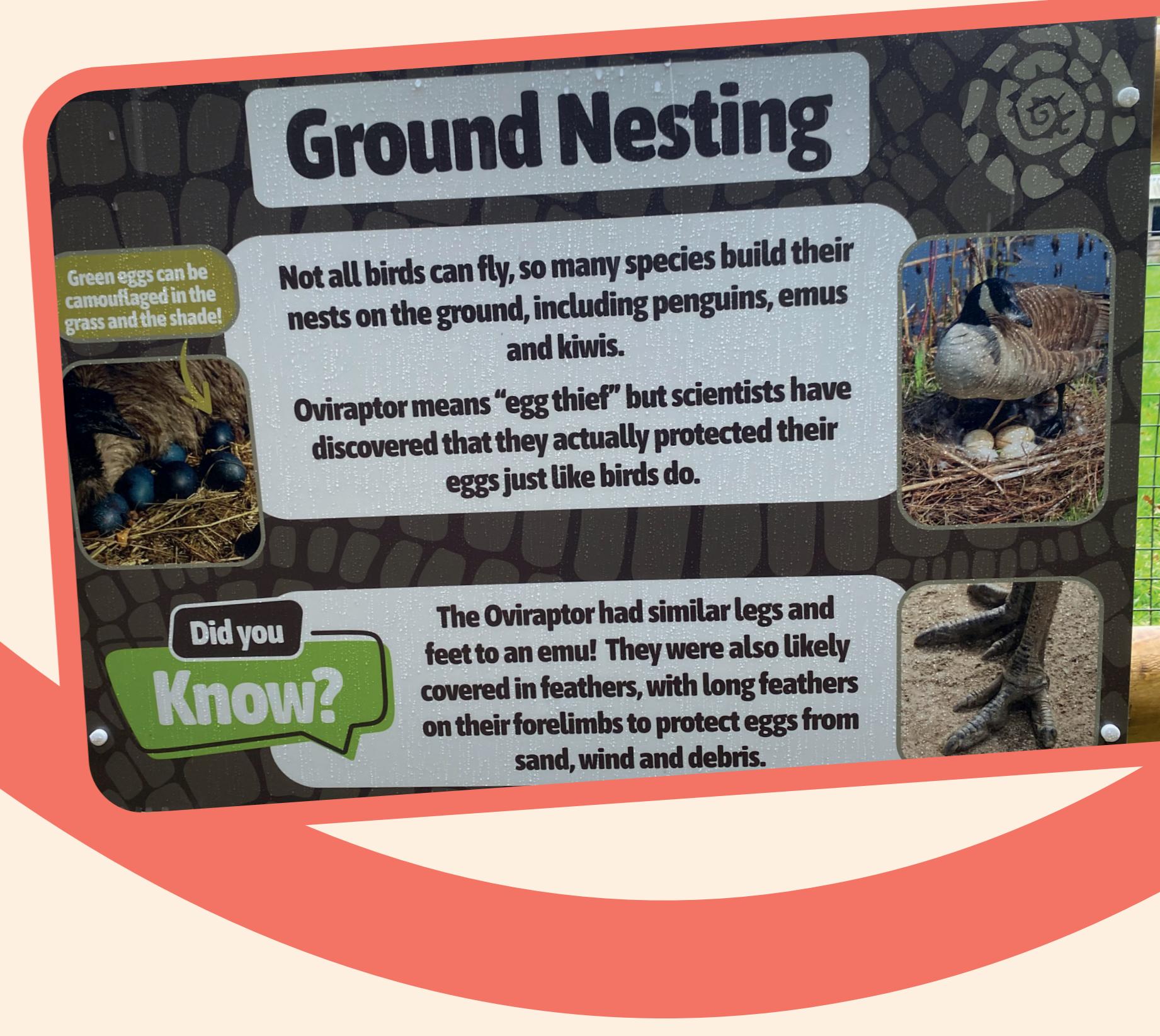


# How Birdworld created an educational dinosaur trail that fitted our zoo

Mandy Glass, Conservation Education Team Lead, Birdworld.  
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## 1. Introduction

We wanted to build a model dinosaur trail to attract more guests into the park, but we wanted it to be a Birdworld-style trail, with education about BIRDS and how they link back to dinosaurs, not only through evolution, but also in their behaviour, diets, habits, anatomy, social behaviour, even feather covering.



## 2. Which dinosaurs?

A mix of different dinosaur models were chosen with varying sizes, diets, behaviours etc. Models on the market vary in accuracy (made harder by millions of years between us and them), so many were discounted.

## 3. It's not just about birds evolving from dinosaurs

We identified links between some of the birds we have on site and some ancient species of all kinds of dinosaur, not just the theropods which birds evolved from. These are the signs we made...

Theme of Sign	Dinosaur model	Information
Crests and Casques	Dilophosaurus	Dilophosaurus had a casque but not those frills!
Carnivores	Spinosaurus	Meat-and fish-eating.
Spines and Defence	Stegosaurus	Thermoregulation and defence - beaks and casques.
Intelligence	Velociraptor	Social intelligence and problem-solving.
Herbivores	Brachiosaurus	Plant-eaters often have long necks to reach leaves.
Display	Triceratops	Using feathers and frills to show off.
Ground Nesting	Oviraptor	Egg-laying and ground-nesting.
Flight	Pteranodon	Wings and flight patterns.
Feathers	Velociraptor	The evolution of the feather.
Therapods and Evolution	Tyrannosaurus	Extinction of non-avian dinosaurs.

## 4. Trail worksheet

Along with the information signs we also created a trail worksheet which we give out to guests at admissions. This contains questions, the answers to which can only be found on the information signs. Guests get a sticker on the way out if they complete the trail.



## 5. Has it worked?

Anecdotally, yes! Children have engaged very well with the models, the information signs and the trail sheets, and feedback online has been entirely positive. Hopefully we can add more models in the future.

# The first successful rearing of a chick with “blackspot” at Birdworld

Bea Detnon, Birdworld Aviculture Team Lead,  
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## What is “blackspot”

While we don't know the full cause of “blackspot” and what it is, it presents as a literal black spot on the right side of the abdomen. Usually present from hatch, it can develop within the first few days. Historically for Birdworld (and anecdotally in the aviculture community) this has been a death sentence with no cure and found in a variety of species. We've investigated bacterial, viral and environmental causes with no success. Usually the chick's abdomen will swell, become compacted and unable to produce faeces, then they will become lethargic and die within the first 5 days.

## Our Sumatran Laughingthrushes and “blackspot”

Our current pair of Sumatran Laughingthrushes have difficulty reaching full incubation on their own. After trying various things, we decided to pull two eggs, artificially incubate and return the hatching chicks to the parents for rearing.

Two chicks, A & B, hatched successfully, both presenting with “blackspot”. As this is usually a death sentence, we decided to hand rear. Unsurprisingly we lost Chick A in the first 48hrs of hatching after it displayed further symptoms of blackspot. Chick B's stomach began to swell on the second day.

Chick B had been started on pinkie mouse/ papaya finely chopped feeds. Hartmann's fluids were added to this to form a liquid consistency, and Chick B was fed drop by drop every hour from 7am-9pm. Chick B began passing faeces again that evening and its stomach began to return to normal from grey and swollen.

Feeds continued in this way until Chick B was 6 days old. At this point less liquid was added to the pinkie mix, based on how wet the faeces produced was. At day 5 the black spot on its abdomen disappeared, rearing continued and Blackbeard is still with us to this day!



## What do we do next?

For our Sumatran Laughingthrushes, our goal is to get them parent rearing.

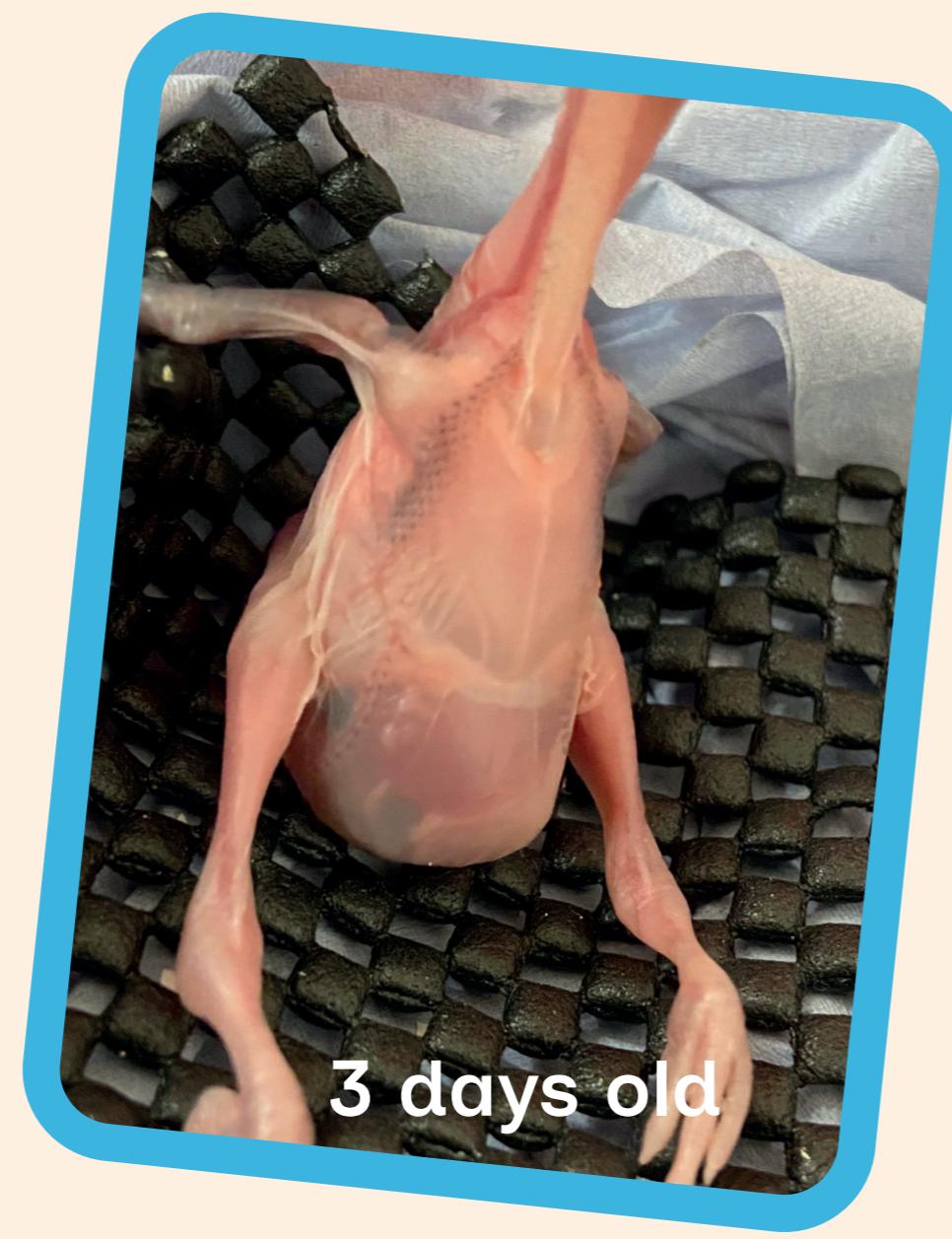
For “blackspot”, the research continues. We would love to hear your thoughts and experiences about “blackspot” so we can try to fully understand what it is and how we can get chicks through it. You can contact me below:

Please email me at  
[bea.detnon@birdworld.co.uk](mailto:bea.detnon@birdworld.co.uk)

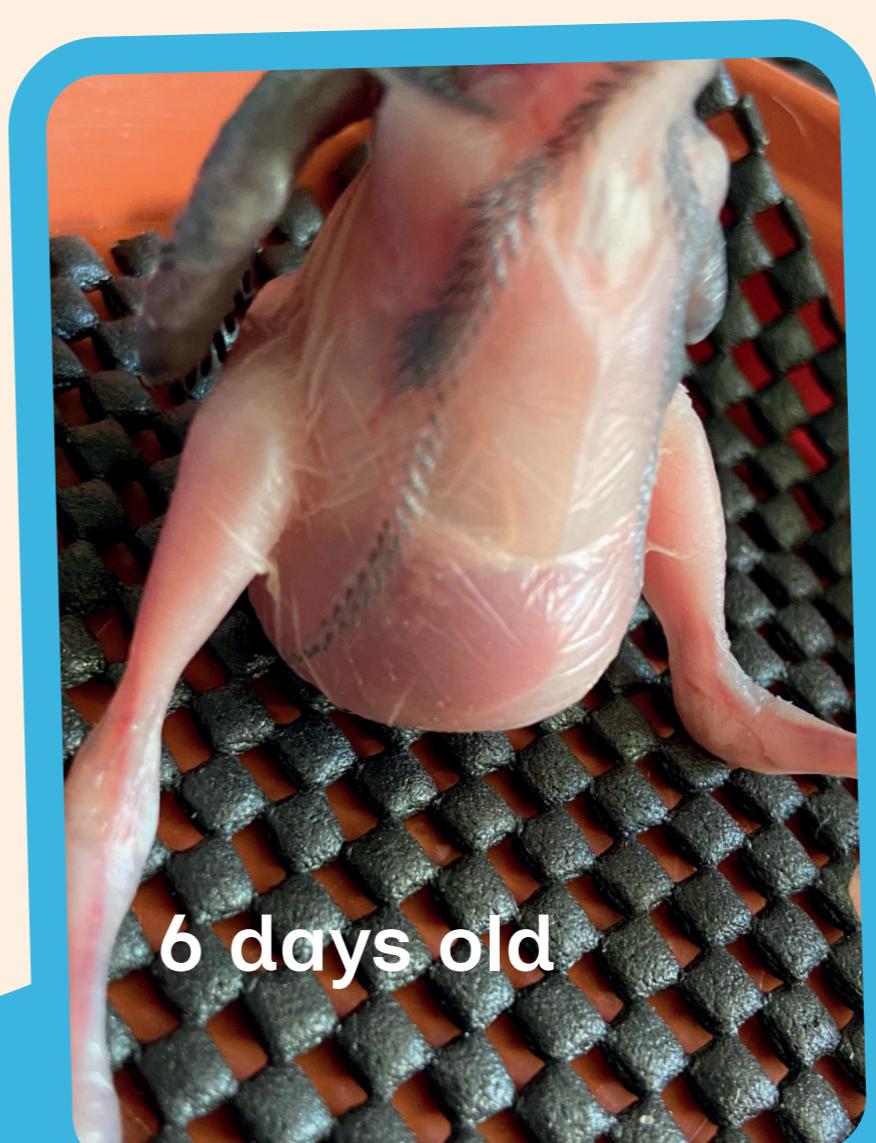
And if you have time, please take my blackspot survey



Freshly hatched



3 days old



6 days old

# Pairing Southern Ground Hornbills (*Bucorvus leadbeateri*) in Captivity

Alessandra Oliveto, Birdworld Senior Keeper



## Introduction

Southern Ground Hornbills (*Bucorvus leadbeateri*) are long-lived, socially complex, and endangered birds. Captive management plays a key role in the conservation of this species, requiring a balance between behavioural training, welfare, and breeding objectives.

## Initial Behavioural Assessment

**Mopane:** Avoided human presence, remained on high perches, and showed hesitation to engage with keepers.

**Jumoke:** Displayed pacing, door-directed behaviour, and attempted to follow or interact with the keeper at close range.

These contrasting profiles required tailored training approaches to reduce stress, redirect human-focused behaviours, and build positive associations with husbandry routines.

## Method

**Mopane:** start date 26 June 2025

**Jumoke:** Start date on arrival 17 July 2025



## Enrichment and Behavioural Management

Enrichment played a major role in Jumoke's progress, providing physical outlets and redirecting energy from human-focused attention to natural exploratory behaviours.

Food-based enrichment was introduced only when both birds were calm on the top perches. This ensured safe keeper access for cleaning and feeding tasks and reinforced patience and spatial awareness.

## Behavioural Outcomes

**Jumoke** now calmly waits on perches and responds reliably to cues.

**Mopane** shows confidence in keeper presence, readily engaging in feeding and scale sessions.

Both individuals display frequent pair-bonding behaviours: food sharing, beak play, courtship displays, vocal duets, cooperative and affiliative interaction with enrichment.

Individual	Tools & Methods	Key Objectives
<b>Mopane</b>	Hand signal, cue word, station training. Recently adding target	Build confidence, reduce avoidance, allow cleaning and inspection
<b>Jumoke</b>	Clicker, target, cue word, station, and circuit training	Redirect focus from people to tasks, reduce pacing and door-directed

## Conclusion

The successful pairing of Mopane and Jumoke highlights the importance of structured behavioural training, consistency, and species-appropriate enrichment in managing complex hornbill behaviour.



# Sow What? When Wildlife Met Willpower

## Evaluation, purpose, and future use of a novel pledge activity created for conservation education engagement at a UK zoo.

Katrice Pomeroy, Mandy Glass, Paula Bradley & Robyn Myers Contact email: education@birdworld.co.uk

### Missions & Measurements

Zoos are widely seen as fun and educational spaces that raise awareness of conservation issues, but it has been suggested that while many collect operational data (e.g., footfall, talk attendance), some struggle to measure educational outcomes like knowledge gain or conservation intent [1]. Many zoo mission statements have shifted towards a conservation education theme, but the wording often uses emotive language such as 'inspiration', making it hard to gauge alignment. When trying to meet mission-related educational outcomes for analysing impact or meeting licencing requirements, it may be beneficial to switch to action-oriented messaging to better assess learning [2].

As UK legislation requires zoos to demonstrate conservation efforts beyond their grounds [3], using strategies from WAZA [4] and BIAZA, or creating your own engagement opportunities such as talks, signage, and interactive experiences, can deliver impactful conservation messages and promote behavioural change – as urged in the BIAZA Conservation Education Policy [5].

Whilst measurable outcomes and inclusivity remain key challenges, engagement activities have the power to instil the pro-environmental behaviours that are vital for protecting the natural world. By creating more inclusive learning opportunities with educational outcomes that measure behavioural change, the zoo's impact on guests may be better demonstrated, and consistency may help future analysis [6].

### Pledges & Promises

In summer 2024, guests at Birdworld were invited to write or draw their conservation promises on wildflower seed embedded card, ready to be planted on site or in their own gardens to encourage biodiversity. The initiative aimed to explore how signage and staff interactions influence visitor learning, while encouraging pro-environmental behaviours. It also offered inclusive opportunities for guests to connect with nature and reflect on their environmental impact.

The activity ran six times for a total of 16 hours, with a mixture of supervised and unsupervised sessions across two high-footfall locations. 96 seed card pledges were collected, with 84 containing useable information. These were then categorised into 6 themes – 'constructive actions', 'habitat creation', 'discontinuation of harmful actions', and 'miscellaneous'.

#### Constructive actions

Guests pledged to take positive steps like feeding birds, recycling, litter picking, or using public transport.

#### Habitat creation

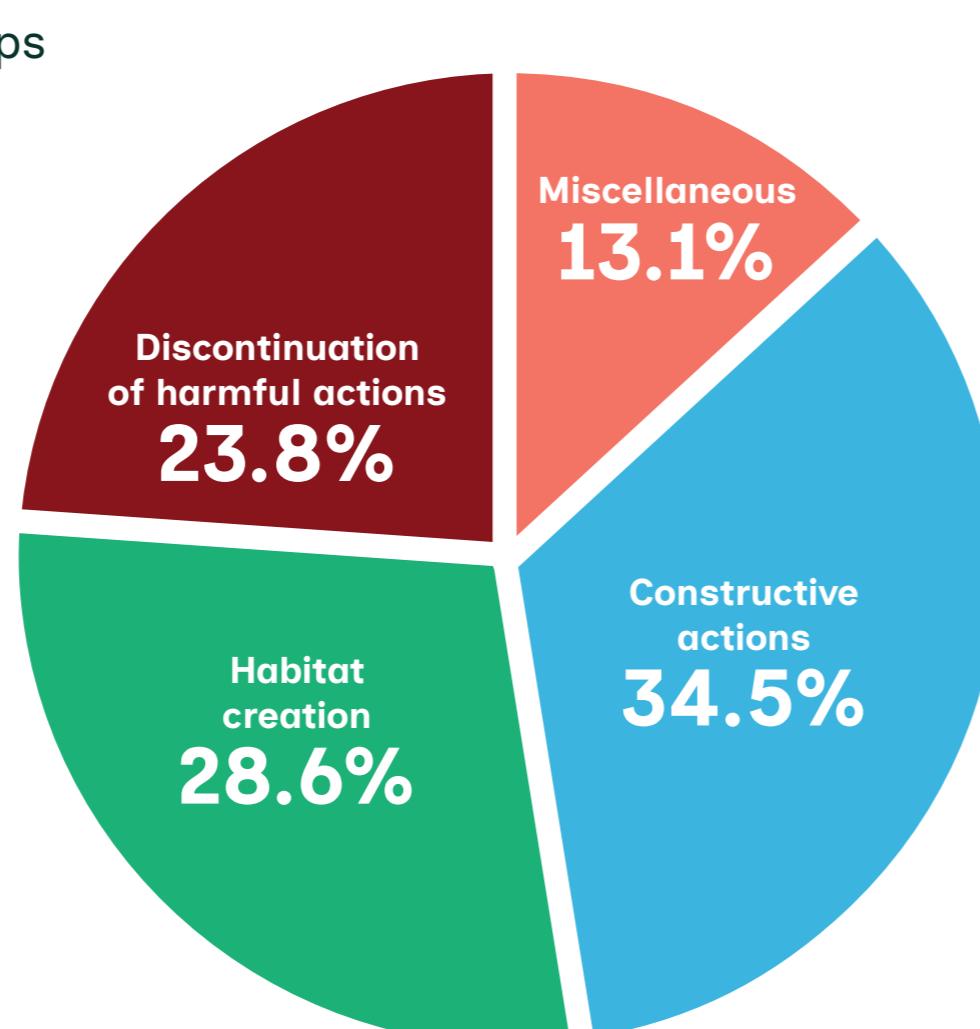
Guests promised to plant wildflowers, build wildlife shelters, or creating water sources.

#### Discontinuation of Harmful Actions

Guests committed to stopping littering, harming animals, or picking plants.

#### Miscellaneous

Guests mentioned generalised responsibilities like 'help the bees', 'teach others', or explained current actions they are taking.



*"Zoos must aim to raise awareness of the value of biodiversity, connect people to nature, and build capacity for individuals to take sustainable actions"*

BIAZA Conservation Education Policy

### Focus & Future

For the next pledge activity, clearer definitions of participation are needed, with an initial focus on tracking different levels of engagement (e.g. observing, interacting, pledging) to help measure impact and gauge inclusivity. Trial sheets will then be used to monitor changes, with each running explaining what has been adapted, and what the impact was. Over time, future pledge activities could also include other elements, such as pre-written pledge cards to sign and hang and social media engagement to collect data on when and where the pledges were planted, and what species have been seen on the flowers.

### Goals & Guidelines

This activity, as well as other engagement that helps protect native species or create safe spaces for nature, work well to fulfil best practice guidelines and recommendations such as those from BIAZA [5], WAZA [4], and the SSSMZP [3] which aim to connect people to nature through inclusive engagement and encourages 'beyond the zoo' conservation. When combined with other tools like the IINS [7] - a nature connectedness scale, the activities impact could be better estimated and could provide opportunities to 'bridge the gap' between guests being inspired and wanting to act in the moment and having the opportunity to act – i.e. by writing or planting their pledge. It also meets the education departments in-house goals to continue to evaluate the delivery of engagement activities to improve visitor experience and inclusivity.

### Snags & Strengths

As the seed card pledge activity was intended as a trial run for future seasons, there were many aspects to be evaluated and reflected on. Firstly, some adults in family groups viewed the activity as just for children and didn't want to join in, through overall the sessions were well received. This could have also created the varied levels of engagement seen in other adults – from walking past and reading the signs or hanging pledges, to wanting to write complex pledges. Secondly, the unsupervised sessions made tracking participation hard, as the only measurement available was how many pledges were left at the end of the session. Staff had noticed, however, that guests had a longer dwell-time in the area than normal, and there was lots of positive feedback received verbally from guests around the park. Thirdly, there will always be uncertainty on how many of the pledge cards taken home by guests were planted, meaning there was no guarantee that there would be a benefit to biodiversity from planting wildflowers or that the seeds were even viable. Any seed cards left at Birdworld were later planted around the grounds by staff, but logistical concerns at the time meant that we could not follow through on ideas such as community planting spaces on site or social media follow up engagement. Lastly was the issue surrounding the illegible drawings and handwriting on some cards. Though this activity was designed to encourage multi-generational participation with a family friendly format, without witnessing the person writing the pledge and having a conversation about its meaning, over 10% of the pledges had to be omitted as the meaning could not be extrapolated. In future, the use of pens instead of pencils will also be implemented as some writing was very pale.

The main strengths for this activity were the amount of people who showed enthusiasm for helping nature and wanted to show off what they already know and what they have learned on the topic, often expressing more ideas than they wrote down on the pledge cards. Drawings by young children also frequently reflected species discussed in the Wildlife Garden, indicating baseline conservation awareness and species ID skills, and some pledges echoed messages from nearby signs or talks, such as conservation grazing – all indicating the impact conservation education can have.

### Concepts & Conclusions

The seed card pledge activity was successful in engaging guests with conservation topics, and it aligns well with key conservation education frameworks and best practice guidelines to promote biodiversity awareness and pro-environmental behaviours. In future, it could also be an effective tool to encourage sustainable actions and aid studies on long term behavioural change. As zoos and aquariums need to be increasingly focussed on education of the natural world, activities that measure engagement and learning outcomes are more important than ever. Fulfilling mission statements and meeting legal standards to show the public the positive impacts of living collections, may help to secure their place in the lives of future generations.

### References



1. 2. 3. 4. 5. 6. 7.

# Breeding the Chattering Lory at Birdworld 2025

Beth Overman, Birdworld Keeper b.overman@outlook.com

## Introduction

The Parrot section at Birdworld has had a brilliant but challenging breeding season this year. Here are the stories of our new chicks, including the changes we made from last year and the difficulties that we have faced this year.

## Yellow-backed Chattering Lory (*Lorius garrulous flacopalliatus*) – Vulnerable

Our Yellow-backed Chattering Lory pair (16 and 10 years old) were introduced together in May 2021, and after several unsuccessful breeding seasons, this year they successfully hatched and reared their first chick.

Each year they have produced and incubated several clutches of eggs, all of which have been infertile. This year it once again looked to be going the same way, with infertile eggs being laid in February and April. However, keepers were pleasantly surprised at the end of May that one of the two eggs in their third clutch was fertile.

Towards the end of 2024 the pair were moved to a larger aviary and taken off show from public view, which is likely to have been the reason for this positive development.

The chick hatched on the 19th of June and fledged on the 13th of August. Both parents took excellent care of the chick and no keeper intervention was needed, an excellent result for first time parents.



Yellow-backed Chattering Lory chick at 8 days old (a), 21 days old (b), 29 days old (c) and 45 days old (d)

# Breeding the Critically Endangered Citron-crested cockatoo at Birdworld 2025

Beth Overman, Birdworld Keeper b.overman@outlook.com

## Introduction

The Parrot section at Birdworld has had a brilliant but challenging breeding season this year. Here are the stories of our new chicks, including the changes we made from last year and the difficulties that we have faced this year.

## Citron-crested Cockatoo (*Cacatua cinnarocristata*) – Critically endangered

Jaffa and Mrs Jaffa (25 and 28 years old) are our Citron-crested Cockatoo pair that have been together for 15 years, and this year they had their fourth chick, affectionately nicknamed Baby Jaffa until the DNA sexing results arrive.

Their previous three chicks hatched in 2016, 2017 and 2018, but since being moved into a different enclosure in 2019 that was very public facing, they had shown no interest in breeding or nesting behaviour. This year the decision was made to move them into an off show enclosure in the hopes that the seclusion from visitors would encourage them to breed again. They settled into their new home straight away and Mrs Jaffa showed immediate interest in the nest box, and an egg was laid a month later in May.

Baby Jaffa hatched on the 15th of June. Both parents were attentive to the chick and took turns inside the nest box, as they had been doing during incubation. When the chick was around a month old some feather plucking started to occur. This was something that the parents had also done to previous chicks but stopped once the chicks fledged. To help reduce and prevent further plucking the quantity of browse and enrichment was increased.

Keeper consistency meant that the keeper was able to check the chick regularly without causing stress to chick or parents, as a good relationship had been built through the shared reinforcement history. The parents also didn't show territorial/protective behaviours during everyday husbandry, making daily routine efficient and stress free for both birds and keeper.

Baby Jaffa fledged on the 14th of August, and feather condition was closely monitored. The parents did cease the plucking once the chick had fledged, and its feathers have now grown in nicely. All three are continuing to do well together, and once Baby Jaffa's sex is known we can make plans for the future.



# Breeding the Mitchell's Lorikeet at Birdworld 2025

Beth Overman, Birdworld Keeper b.overman@outlook.com

## Introduction

The Parrot section at Birdworld has had a brilliant but challenging breeding season this year. Here are the stories of our new chicks, including the changes we made from last year and the difficulties that we have faced this year.

## Mitchells Lorikeet (*Trichoglossus forsteni* *mitchellii*) - Endangered

The Mitchells Lorikeets have been the biggest challenge for us this breeding season, with all the chicks having to be hand reared from different ages. From four pairs we had eleven eggs, seven of which hatched. Of the other eggs, one was infertile, and the rest failed at varying stages in development.

One chick, named Ozzy, was hand reared from the beginning as we had to artificially incubate the egg due to the parents deciding to nest on the floor (other options were available) and we were concerned about the pest risk.

Another chick we pulled for hand rearing at three weeks old as the parents killed its older sibling. There was no obvious reason for this happening so we had to remove the surviving chick due to concerns for its safety. It was named Speckle and raised alongside Ozzy. They are both continuing to do well and are now out on section.

The other four chicks, from two pairs, all had to be pulled for hand rearing due to feather plucking from the parents. The chicks all developed well for the first few weeks, but we found that around a month old is when the feather plucking started to occur. Our biggest concern was that due to the wing feathers being plucked, the chicks would be unable to fledge, or attempt to fledge and be stuck on floor, where they could get cold or injured by pests.

Mitchells Lorikeet parents feather plucking their chicks is a historical problem we have had at Birdworld and we have been trying a combination of several different options to try and prevent this from happening. The two pairs that feather plucked were in different areas of the park, one off show and one on show to visitors. One pair was in a heavily planted aviary and both were given constant browse and enrichment. One pair was an established pair that have been together for several years, and the other was newly paired this year. We also added Spirulina and Bee Pollen supplements to their diets.

Next breeding season we will be looking into more options to help prevent this and are hoping to do more research into why this is occurring with our Mitchells Lorikeets.



# Encouraging Breeding of Eastern White Pelicans (*Pelecanus onocrotalus*) at Birdworld

Anita Halligan, Birdworld Bird Keeper

## Introducing our Pelicans

Our group consists of 3.2 Eastern White Pelicans – Anfield, Trevor & Flump our males and Elsie & Digger our females. Anfield, Trevor & Digger all arrived together in 2011, followed by Elsie in 2016 and Flump is our newest resident arriving in Dec 2024.



## Breeding History

Breeding behavior in the group was first recorded in May 2022 but nothing again until March 2023 when Anfield, Trevor & Digger started showing physical signs of breeding condition (pink colouration to feathers, cheek & head swellings) and displaying courtship behaviours (vocalising, pouch stretching, head shaking). Elsie showed no signs of breeding condition or any interest in the males. No mating was recorded.

In February 2024 courtship behaviours between Trevor & Digger intensified. Despite Anfield being in breeding condition Elsie showed no interest in him or Flump. Elsie's history is unknown, she was found wandering in the Netherlands and brought to the UK as a rescue. Elsie has a history of escaping from the enclosure during the breeding season often wandering up & down the path as if in search of something. In 2024 & early 2025 this intensified and she was jumping out daily, her record being at least 6 times in one day. She oddly became obsessed with men with beards & cameras and would follow them intently. She also encouraged the others to follow her on occasions. Her escaping antics were finally curtailed in mid-April 2025 when the height of the perimeter fence was increased. Her obsession with men with beards continued but once she realised she couldn't get out she turned her attention to one of the local herons instead! She was finally in breeding condition but appeared very confused, agitated and didn't seem to know what to do. Eventually she decided Anfield was an eligible male after all and courtship behaviour between them was observed. The group was now in 2 pairs – Trevor & Digger, Anfield & Elsie. Flump was on the outskirts of the group and showed no interest in breeding.



## Enclosure

The enclosure consists of a grassy paddock with a large pond and a large shed which the pelicans are locked in overnight. Outside there are 2 wooden 'towers' for the pelicans to potentially build nests on but these were largely ignored until February 2024 when they were first observed using them. However as the pelicans are locked away nightly the outside 'towers' are not very practical for breeding and the pelicans made no effort to nest build



on them, instead they just used them to stand on and display to each other.



As the outside wooden towers were not practical for breeding I thought it might be worth trying to encourage them to breed inside their night shelter. The pelicans already used straw bales to sleep on at night so extra straw bales were added to increase the height and create 'towers'. On the 24th April 3 separate towers were created to allow them one per pair and one for Flump.

The pelicans accepted the 'towers' straight away and each pair chose a tower. Courtship behaviour between the pairs intensified over the next few weeks and they spent more time

in the shed, often only coming out to feed then running straight back inside and up on their towers. Mating had not been observed. On the 8th May both males were attempting to mate the females but unable to balance properly due to the narrow towers. On the 9th May extra straw bales were added and 2 towers moved next to each other creating one large platform to make mating easier. The pelicans accept this change easily and despite the pairs squabbling next to each other they appeared more comfortable.

By the 12th May both Digger & Elsie were sitting on the towers under the males waiting to be mated however the males seemed oblivious. Finally on the 13th May 2025 the first mating was observed between Anfield & Elsie but not yet between Trevor & Digger. Regular mating was seen over the next 2 weeks between Anfield & Elsie and constant courtship between Trevor & Digger, all 4 spending most of their time inside their shed, only coming out to feed and bathe. On the 27th May Elsie was sat tight and by mid-morning she revealed an egg! Mating was also finally observed between Trevor & Digger. A very exciting day! Unfortunately, the next day both pairs were out on the pond and the egg was abandoned on the floor. It was put back up on the tower in the hope that Elsie would sit on it again, a second egg was laid on the 30th May but the 1st egg was found broken and removed. The second egg was removed on the 2nd June as it was abandoned and all pelicans were out swimming. By the 11th June the pelicans began moulting and no further breeding activity was observed.

Despite not resulting in any chicks, 2025 was a very positive breeding season for the Eastern White pelicans. The straw bale 'towers' inside their shed were a huge success and the fact that Elsie finally paired with Anfield (an actual pelican!), mating was observed between both pairs and 2 eggs produced was amazing. Bring on 2026!

# Inca Tern Breeding at Birdworld 2025

Jodie Morton, Birdworld Keeper

## Past Inca tern breeding

In the past few years, aside from 1-2 pairs, our Inca Terns have nested outside, preferring the rocks and crevices over the night shelter. This has never resulted in great success, with chicks often succumbing to cold, wet or, unfortunately rats in this enclosure.

Just before the 2025 breeding season, two partitions were put up in the night shelter. This was mostly to provide the different species in the enclosure some visual barriers and comfort.

## 2025 Breeding

Five pairs of Inca Terns decided to nest inside the night shelter, each claiming a ground nest against the partitions or in the rockery. We used coloured rocks to ID each nest easily and left the birds to it.

Four out of five inside nests hatched, plus a nest outside, giving us six chicks in total this year. Chicks were visually checked when first hatched, ringed and weighed at approx. 18 days and fledged at approx. 42 days.

The one difficulty we had with this was that multiple pairs in one general area meant it was harder to ID parents. It was vital we ID each parent for the chick's genetics as we wanted to make sure we were breeding viable pairs only. This meant we had to make sure our flock were all ringed with individual colour bands (still a work in progress!) and make sure the chicks kept to the right nests. To do this, pre-ringing the chicks, we drew with a coloured marker on their backs.

When they were ringed, they were given colour rings instantly. For parent IDs, it was a case of being patient for some of the families and IDing with binoculars once chicks had fledged, though we also filmed some of the nests and were able to ID parents from that.

## Future breeding plans

For the future we are looking to explore cave and tunnel like nestboxes as we had one chick disappear into the night shelter rockery and join another nest, as well as two chicks from the outside nest vanish for a couple of weeks as they entered the larger cave system of the rocks that we couldn't access. We knew parents were still attending something, but we weren't able to see both chicks at that time.



# A Penguin Who Picked Up: Dr Cod and his graduation from Medical School

Natalie Marshall, Birdworld Senior Keeper

Dr Cod hatched on 24/04/2025 to parents Mr Otto (28 years old), and Kipper (10).

This is the second year they have been with us and the first they have had fertile eggs at Birdworld. Mr Otto only has two living descendants and Kipper doesn't appear to have any, so this year was a chance to let them raise a chick together.

On the 07/05/2025 during a general health check, it was shown that the chick (now named 'Dr. Cod' - a play on his parents' names) had a heart murmur, but nothing to be worried about. He did grow out of this!

28/05/2025 a health check and weigh showed that he was not meeting his targets and was underweight for a bird his age. Keepers started monitoring closely at this stage, though were not overly worried. He was weighed daily and these weights were measured against the fact his parents were inexperienced. He was supplementary fed alongside his parents with sprats injected with fluids.

On the 30/05/2025, Dr Cod was found lying on his side with his right leg looking strange. Not defending himself and not protesting any manhandling and very lethargic. Due to these factors, a decision was made to pull him for hand rearing. He continued to lose weight and vet advised taking to our local exotics. Appointment made for after the weekend, given supportive care, standing and gaining strength but breathing laboured. Blood taken, unsure what was wrong with him, investigations/tests started.

03/06/2025 Dr Cod was taken to colony for a supervised visit as health improved slightly and felt it was needed for him. Out of all the colony Kipper instantly came running to see him straight away, we were unsure of her reaction as this is her first chick with us (or ever) and so her reaction to him took us a bit by surprise.

On the 04/06/2025, parents relocated to our off-show holding area for the penguins and Dr Cod allowed to spend time with the parents in the day, returning to the rearing room at night. Kipper and Mr Otto were very accommodating with keepers, allowing them to help with Dr Cod and help with his recovery.

Results came back and indicated aspergillosis. Dr Cod started on treatment and continued to improve. Supervised parental visits continued, with chick improving day by day.

On the 11/06/2025, Dr Cod spent his first night out with the parents in the off show holding area. At this stage, keepers were only medicating/weighing him while parents did the rest of the rearing.

On the 14/06/2025, Kipper spent most of her time with Dr Cod while Mr Otto spends most of the day out in the pool. From this point on, at colony feed times at 11:00 and 15:30, Dr. Cod joined the feed, protected by keeper and Kipper.

18/06/2025 vet inspection revealed his lungs sounded clear. Medication was stopped and Dr Cod was fully reared by parents at this point. He continued to thrive, socialising with the group and making both friends and enemies (mainly from fellow pool-mates 'Barbie' and 'Buddy'). Mum Kipper would spent time outside of the off-show area in the pool, but would return to check on him whenever she could.

10/07/2025 Dr Cod went for his first swim! On the 14th he got his identification band and spent more and more time in the pool, supervised.

And, finally, on the 30/07/2025 he became a full time member of the colony, joining them out in the enclosure 24/7 and unsupervised by humans.



# Planting outside the box: impacts of outside-adjacent native flora on guests, captive animals and wildlife

Robyn Myers, Conservation Education Guide – Birdworld, UK

## Introduction

A wealth of literature has been published on the provision of browse, vegetation and foliage to meet captive zoo animals' physiological, psychological and behavioural needs (Ramont et al., 2025; Smith et al., 2024). However, much of this research pertains to its availability within an enclosure (both planted and unplanted) (see Figure 1).

There are clear knowledge gaps in not only how outside-adjacent planting can influence animal behaviour, for example space usage or stress-related stereotypies. There is also insufficient data conveying its effects on visitor learning, behaviour and animal interactions. It is widely accepted that there are great benefits to native fauna when there is an increased availability of diverse flora species within suitable spaces, whether these be urban or rural (Tallamy, 2012). This could potentially include the spaces surrounding enclosures, especially those which allow for the incorporation of features such as overhanging leaves or branches.



Figure 1: A planted rhinoceros and pelican enclosure at the Audubon Zoo in New Orleans, USA. (Jones, 2025).

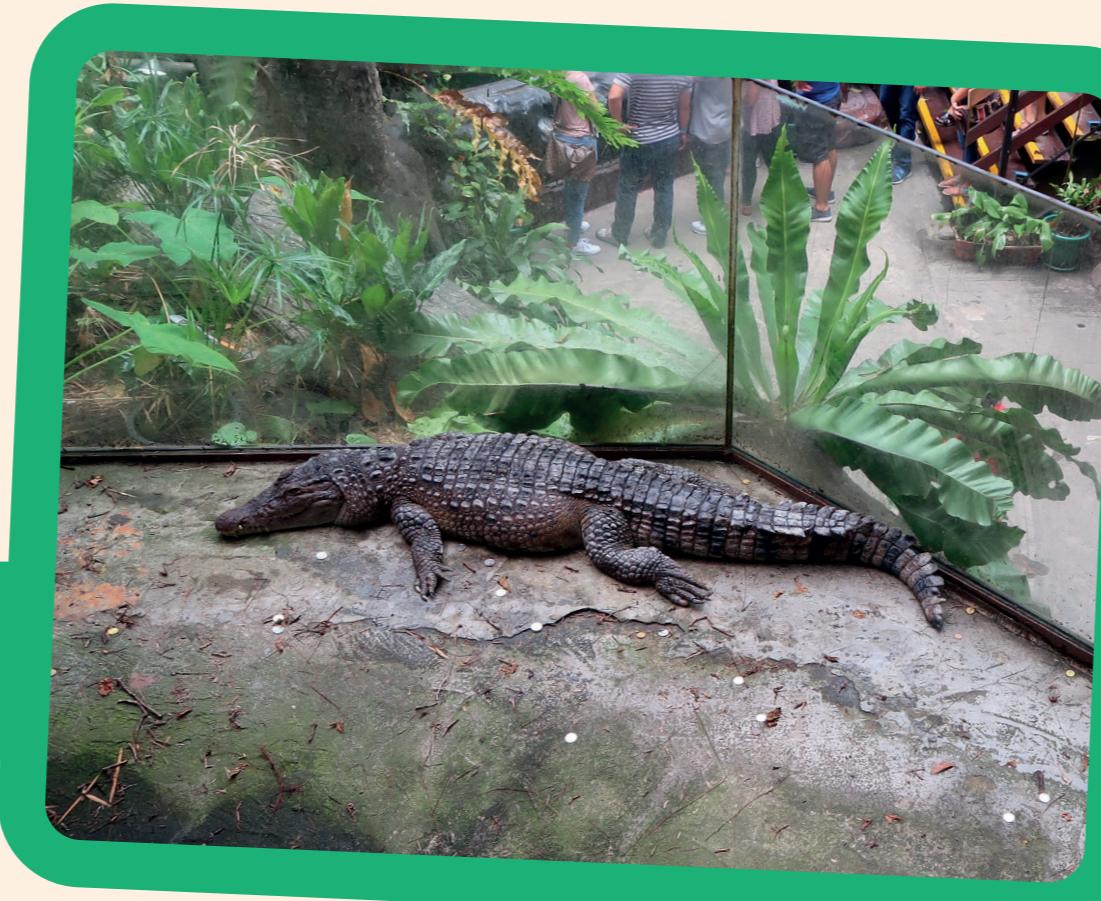


Figure 2: A giraffe consuming browse within its enclosure. (Soulflux Studio, 2025).



Figure 3: A meerkat exhibiting a natural 'surveillance' posture (Sominka, 2025).

## Potential impacts

By viewing the zoo as one whole dynamic ecosystem there is the potential to positively enrich guest experiences through creating an immersive naturalistic environment. This is not only aesthetically pleasing but also demonstrates that the management of small outdoor spaces, like those which may be available to them in their home environments, can be easily achieved. Many studies have documented that overall population health is associated with exposure to urban greenness (White et al., 2018). This also allows them to observe captive animals expressing natural behaviours (see Figure 2), as the result of being allowed the opportunity to safely interact with outside-adjacent vegetation.

This may lead to decreased stress-related behaviours in these animals, especially if the subject flora were cultivated to partially obscure or barricade the enclosure from guests (see figure 3). Previous studies show that there is a significant decrease in abnormal or aggressive interspecific behaviour when captive animals are unable to, or mostly

unable to, view guests (Blaney & Wells, 2004; Sherwen & Hemsworth, 2019). Habitat complexity is significant in the maintenance of higher welfare standards for zoo animals, promoting better physiological wellbeing and more ethological diversity (de Azevado et al., 2023).

Finally, the most obvious beneficiaries of native species planting in zoos are vagrant or residential UK wildlife. To date there are 315 BIAZA Accredited institutions partaking in the online 'Spotted on Site' campaign, recording over 141,000 wildlife observations in zoos (BIAZA Spotted on Site, 2025). Trees and plants provide species-specific feeding opportunities, not just to captive animals but also to their wild counterparts. Dedicated spaces can also become 'stepping stone biotopes', or natural stopovers amid desolate landscapes, for species to rest, shelter, eat and/or drink before moving on to other microclimates.

## Conclusion

In conclusion, the integration of native flora to the surrounding areas of animal enclosures offers the opportunity for enhanced welfare, as well as positive educational and biodiversity outcomes. Stress-related behaviours in captive animals may be reduced through careful outside-adjacent planting, as well as immersing guests in more naturalistic displays. Vital microhabitats for native wildlife are also provided when zoo exhibits are treated as interconnected ecosystems as opposed to isolated areas, promoting local conservation and advancing public engagement too. Quantitative research into these benefits will be essential in guiding evidence-based strategies for planting which enable both guests and animals to thrive in more sustainable and greener zoo landscapes.

# Cold-Blooded but Warmly Welcomed: Promoting Native Reptile and Amphibian Conservation in Zoos

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## Introduction

The UK hosts seven native amphibians, as well as six species of reptile (Speight et al., 2025). An IUCN Red List assessment found that there are fewer than 50 breeding populations of Natterjack toad (*Epidalea calamita*), for example, which is now classed as a 'Vulnerable' species (Reyne et al., 2022). There are also two species of 'Endangered' reptile, the sand lizard (*Lacerta agilis*) and smooth snake (*Coronella austriaca*), as well as one 'Critically Endangered' amphibian, the northern pool frog (*Pelophylax lessonae*) (see Figure 1) (Lyons, 2025).

One may argue that, as institutes of pioneering conservation techniques and research, it is the responsibility of UK zoos to invest in the protection and sustainability of native wildlife, such as these reptiles and amphibians, as well as their captive counterparts. This can take many forms, from funding external projects to undertaking in-situ conservation (Elwell et al., 2021; Brereton, 2022).



Figure 1: A northern pool frog (*Pelophylax lessonae*). (Sat, 2025).  
Figure 2: Work in progress on the newest wildlife pond at Birdworld. 2025

## Native spaces

Through the planting and exhibiting of native flora in dedicated and carefully managed spaces (e.g. a 'wildlife garden'), coupled with engaging and informative signage, the zoo can offer solutions which bridge the gap between visitors and the often-secretive natural world around them (Kleespies et al., 2025).

An example of this, as seen in Figure 2, is Birdworld's newest wildlife pond (currently under development as of November 2025). By constructing a tiered pond, this allows for not only the planting of a variety of submergible aquatic plants but also those which are suitable for pond edges; this is particularly beneficial to amphibians as constant cover is provided, as well as opportunities for rest and egg-laying (Siebert et al., 2025). Varying levels also support the needs of different life stages of amphibians, from shallow-dwelling tadpoles and breeding adults to hibernating individuals who will require at least a 60cm depth to prevent the freezing of the pond (Guderyahn et al., 2016).

Another example of a native species-friendly space is a 'moon garden'. This is an area which is designed to be most aesthetically pleasing when viewed under moonlight, characterised by the exhibition of flora with white or silver flowers and foliage, as well as evening scenting flowers. As well as creating a serene atmosphere for collection staff and after-dark guests, this space attracts nocturnal pollinators such as bats and moths. Not only is this important as pollination improves

biodiversity, but also because the presence of these animals is indicative of an ecologically healthy environment (Jones et al., 2009). A moon garden can be achieved through planting native night-blooming white and silver flowers, like gardenia (*Gardenia jasminoides*). Soft, warm-toned lighting for seating and paths may also attract nocturnal insects, with water features also reflecting moonlight and often bringing aquatic wildlife to the moon garden too.

## Conservation education

The role of the modern zoo encompasses not only conservation action as well as prioritising animal welfare, but also the education of its visitors and other relevant institutions (Chen, 2024). This can include involving guests in conversations and positive interactions with native wildlife, such as offering advice on sustainable methods of promoting environmental wellbeing in local areas (including homes and residential gardens).



Figure 3: A reptile refuge at Birdworld. 2025.

## ARC partnership

Since 2024, Birdworld has been partnered with The Amphibian and Reptile Conservation Trust (herein ARC) to monitor the stability of the local population of reptiles and amphibians.

The conservation education team conduct 8-10 surveys during spring/summer and 2 in autumn, by lifting specially designed refuges. These areas measure approximately 1m x 0.5m and consist of rubber (see Figure 3), which is an ideal material as it provides waterproof sheltering as well as basking opportunities. 11 tiles are placed sporadically around the site, in partially sunlit areas. Any reptile or amphibian found underneath the tile is recorded on a survey sheet, which is submitted to ARC's national database.

Birdworld also contributes to ARC's Reptile Genebank, a project enabling long term research into the effects of population isolation in snakes and lizards in the UK. When reptile sloughs are recovered from the site's refuges, these are individually posted to ARC so that DNA can be extracted and information of the genetic diversity of the local population generated.

# Restoring Storks, Restoring Nature: The Cornish White Stork Project

## A rewilding collaboration between Birdworld and the Cornish White Stork Project

In 2021, Yan Swiderski began his dream of connecting landowners, conservationists, farmers together to inspire humans to engage with nature by beginning the Cornish White Stork Project. The aims of the project are simple yet have a massive impact: restore the white stork in the UK and inspire and connect humans with nature. By connecting humans with nature, ecosystems can be restored and protected, under the flagship of the white stork.

## Why the white stork?

There is nothing as magical as seeing a white stork soaring through the skies. They were once native to the UK and have been steeped in folklore throughout our history. To lose any species from native soil is a heartbreak, but a charismatic one such as the white stork is a tragedy. They are a flagship species for their ecosystem, a beacon of hope to restoring some of the most depleted habitats across the UK. To save a species you have to save an ecosystem, and to do this there has to be a collaborative effort behind a simple cause.



The Cornwall Stork Project

## What is the plan?

It's simple – breed white storks on native land so they imprint to their birthplace and return to breed without human intervention. Through the support of Cornwall Wildlife Trust, Paradise Park, The Screech Owl Sanctuary and partnerships with local farmers and the community, multiple sites across Cornwall have been nominated as breeding and holding-for-release pens. Once 20 birds have fledged, the project will begin the release phase and this will repeat for years to come.

Breeding and releasing these white storks will inspire change and partnerships in communities, restore biodiversity under the flagship, connect people to nature once again and work with farmers to promote sustainability while helping conservation.

Birdworld will be used as a quarantine and breeding facility. We will house birds before they join the project in Cornwall and ensure they are fit and well to be paired for breeding. We will also assist in the incubation and rearing of chicks when needed, and will help spread the word about the Cornish Stork Project with our resident flock of white storks serving as ambassadors for their species.

The hard work is never done, however, and we need your help! Please scan the QR code to donate to the fundraiser.

