

The final report for the Project:

Return of the Curlew.

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With support from Landcare Australia and Citipower Powercor.



Abstract

For many years the Kowree Farm Tree Group (KFTG) has been concerned at the ongoing decline of the local, tiny population of Bush Stone Curlews (*Burhinus grallarius*). Efforts to arrest this decline have been ineffective and so with financial support from Landcare Australia, the Kowree Farm Tree Group set about turning this decline around.

The first stage was to investigate what options were available and whether they would be effective. Contacting people who could assist as well as raising the profile of the issue locally were also necessary foundations for a successful recovery project. It was soon discovered that concern for the plight of the bird in southern Australia is widespread. A number of other groups had attempted to arrest the decline, and all except for one project in the Riverina in southern NSW, have so far been ineffective. However all of the projects reviewed have been valuable case studies.

The Riverina project involved captive breeding and release of young, newly fledged birds. This report considers the feasibility of replicating this work in the South West Wimmera. To do so was found to be extremely complex and expensive, well beyond the current capabilities of the Kowree Farm Tree Group.

Whether the complexities of such a project could be managed by another organisation or a coalition of organisations was also discussed.

A well organised partnership certainly could carry out this work. However the one insurmountable hurdle which could not be managed was fox control. Without permanent suppression or eradication of the fox population (which is not currently possible), Bush Stone Curlews which are artificially released into the environment would suffer a repeat of the current extinction event.

It has been decided to suspend our efforts to save the local Bush Stone Curlew community. We have carefully documented our findings, so that if a solution to the fox issue is ever found this information may be used by the Kowree Farm Tree Group or other interested groups.

Acknowledgements

This project was funded by Landcare Australia Limited with funds from CitiPower Powercorp. Their generous contribution to this rather unusual pre-project project is a solid illustration of the necessity of non-government funds to work with locally endangered species such as the Bush Stone Curlew. Also their flexibility has allowed the Kowree Farm Tree Group the freedom to adjust the goals of this project in changing circumstances.

The discussions with numerous passionate advocates for Bush Stone Curlew conservation across three states were inspiring and their contribution to our research was enthusiastic and generous. These contributors include David Baker-Gabbe, Rachel Farran, Richard Hill, Dan Harley, Jan Lubke, Neville Lubke, Judy Crocker, Peter Redfearn, Peter Copley, Oisín Sweeney, Ken McPhee, Phil Cheetham, Rick Webster, Bob Wallace and Angela Goode.

After having talked to these people, shared their enthusiasm and listened to their stories it is with great regret that we have decided not to proceed with a recovery project. We hope that the valuable information that we have learned from them can, at some time in the future, be used to find a way forward where we could not.

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Introduction

The Kowree Farm Tree Group is a group of people who live around Edenhope in the South West Wimmera, Victoria who promote trees and conservation on farms. They are mostly farmers and some school teachers too.

The group has been running for 25 years.



Figure 1: Bush Stone Curlew in fox-free nest site.

The Bush Stone Curlew (*Burhinus grallarius*) is a brown flecked bird which stands knee high. It lives, feeds and nests on the ground in grassy woodland habitat across much of Australia. It is nocturnal and has a blood-curdling scream for a call. In northern Australia it is common, but in the south, extremely rare. In western Victoria the population has declined to now number in the dozens. Bush Stone Curlews are long-lived, but have trouble rearing chicks due to fox predation of their nests on the ground. They usually die without rearing young.

The KFTG has, in the past few years, identified a number of nesting sites and erected 1 to 2 hectare fox-proof enclosures around them. This has boosted reproduction, but not fast enough to save the local remnant population from imminent extinction.

Members of the KFTG are keen to boost the effectiveness of their Bush Stone Curlew program. With a substantial grant from Landcare Australia Limited the Kowree Farm Tree Group aimed to lay the foundations for a project to breed birds in captivity and release them into the local environment.

In order to do this the project's aims were to:

- I. Coordinate and mobilise existing local expertise.
- II. Liaise and work with relevant government agencies in two states.
- III. Cope with complex regulatory issues.
- IV. Gather information and technical support from similar projects elsewhere.
- V. Create a workable strategy for a captive-release program.
- VI. Promote the scheme widely; especially locally and to potential funders.
- VII. Raise money; probably a few hundred thousand dollars.
- VIII. Lay all the ground-work to successfully implement the captive release program.

A successful result to this project would be:

- a. A written, workable plan.
- b. A strong, committed group to support the plan.
- c. A high level of awareness and approval by local communities and relevant government agencies.
- d. Sponsors to fund the implementation of the plan.
- e. Finish in a year.

Along the way there were a couple of major diversions.

Firstly, in our process of liaising with government agencies, we learnt that the Department of Environment and Natural Resources (DENR) in South Australia were proposing to set up a captive breeding program just over the border from where we operate. In response to this, we altered the aims of this project so that the Kowree Farm Tree Group would support the DENR project rather than instigate our own. We had to wait while the DENR application for funds was assessed. After a few months their bid failed and we resumed our quest.

Next, in December 2011, a new round of state government funding was established: Communities for Nature. The Kowree Farm Tree Group carried out some hurried research on the mechanics of a captive release program and wrote an application for a grant of \$150,000 for a three year project. Once again we had to wait for a result. After a few months their bid failed and we resumed our quest.

So eight months into our twelve month project KFTG employed Sue Close to run this project in its original form.

After extensive research and gathering of information we refined our objective to:

By the year 2022, create a regional population of at least 50 Bush Stone Curlews, in a suitable locality, which would be viable without ongoing human intervention.

This report analyses the various options available for improving the outlook for the local Bush Stone Curlew population and whether these options are capable of meeting the objective above.

To do that we will consider the biology of the bird, the current and historic threats to its survival, the interventions available which could reverse the current population decline.

- At the time of creating the objective above, and as the likely complexity and cost of running a

successful Bush Stone Curlew recovery project became apparent, it became clear that it was well beyond the capacity of KFTG to run it alone. So this report is written as a record of what we have learned. If, at some time in the future, solutions to a number of currently insurmountable hurdles arise, this report can be used as foundation to commence effective recovery work.

The target audience for this document is:

- the Kowree Farm Tree Group for use sometime in the future.
- prospective partner organisations (which will be essential to run an effective Bush Stone Curlew recovery program).
- Other groups or organisations elsewhere which may contemplate Bush Stone Curlew recovery activities

It is hoped that this document will complement the existing body of literature rather than unnecessary repetition of what has been written before.

Methods

The KFTG has been working with Bush Stone Curlews for a number of years. In that time, much has been learned about their biology, habits and local distribution. Also, networks of other interested people have been developed.

The level of research and networking was dramatically escalated in 2011 when Bill Wallace and Rachel Farran wrote an application (unsuccessful) to the Victorian Government for funds to carry out a captive breeding and release project.

In early 2012 Sue Close was employed to build on the work of Bill and Rachel and by using their contacts and accumulated knowledge instigate a captive release project. Sue gathered more relevant literature and visited all the relevant experts in this field. She looked at programs in SA, Victoria and NSW and discussed the practicalities and effectiveness of their work (Appendix I).

Information on these birds is plentiful. The KFTG is certainly not the only group with concerns about the plight of the Bush Stone Curlew in southern Australia. Most of these organisations have documented their experiences thoroughly. One of the main challenges was to analyse this copious information comprehensively and with sufficient rigor to go forward and build a sound, effective Bush Stone Curlew recovery project. Another challenge is to write a report which adds something new and valuable to the existing body of information.

The analysis of the various management options available for the recovery of Bush Stone Curlew is a three stage process:

1. Determining whether they are capable of achieving our stated objective. Those management options which do not meet the objective are discarded.
2. Those options best able to meet that objective are further tested against their ability to overcome threats to the survival and proliferation of Bush Stone Curlews.
3. Finally the identified organisational challenges associated with each management option are reviewed.

This report has bypassed in- depth discussion of the biology of the bird and has only provided detailed analysis of the one management option which almost manages to meet the objective and which has also been demonstrably successful in the field. The list of references is a major component of this report and contains plenty of readily available relevant background information to supplement this summary document.

Control of foxes is both a major threat to Bush Stone Curlews and also a formidable organisational problem to be overcome. As no adequate solution for fox control has been proposed, it is impossible to provide a budget for that activity. Barring some form of biological control the cost will be enormous.

Results and discussion.

Our objective:

By the year 2022, create a regional population of at least 50 Bush Stone Curlews, in a suitable locality, which would be viable without ongoing human intervention.

Management Options (9 of them)

I: Do nothing.

This option involves leaving the Bush Stone Curlew to its fate which at the moment is in serious decline.

This option will leave the Bush Stone Curlew on a trajectory that will inevitably lead to its decline and local extinction. Each year a bird or two goes missing never to be re-sighted. We are now down to just a few pairs locally and so it is likely that in the next five to ten years these too will disappear.

2: Improve habitat & hope.

This involves protecting existing open grassy woodland patches, perhaps fencing off from the worst impacts of stock and of course protection from cultivation. Encouraging landholders to leave or even add coarse woody litter would also be part of improving habitat with minimal input. As well, revegetation projects can be targeted at open grassy woodland which is suitable for Bush Stone Curlew.

This option targets one of the drivers of Bush Stone Curlew decline (habitat loss) but fails to address the problem of reproduction. With the fox populations at high levels they have little opportunity to nest and rear chicks unmolested.

Although, alone, this option would be ineffective, it is an essential adjunct to other more decisive management options.

3: Fox-proof nesting sites

The KFTG has already constructed 4 fenced off nesting/roosting areas with mixed success. These enclosures are 1 to 2 ha in size, fenced with 8x1200mm high electric wires and designed to keep out foxes from the nest area. They are sited where existing pairs roost. Some sites have been successful in allowing pairs to nest safely while others have not produced chicks at all. In some instances the birds have moved away to nest, in others they have failed to nest for unknown reasons. Sometimes the birds will nest in the enclosure and then move their chicks out as they become mobile and thus end up in vulnerable situations where they are preyed upon.

This option targets the problem of nest and chick predation from foxes but fledgling mortality and the ability of fledged offspring to disperse to find a mate is doubtful given the scattered nature of the remaining Bush Stone Curlew. As individuals they do range over quite large areas but the prospect of encountering a potential new mate is probably too low to be viable.

4: Massive fox control program.

This strategy involves a wide scale and sustained fox baiting program using 1080 Fox-off® baits and/or bait ejectors 1080 baits. There may need to be some follow-up with shooting as well to target difficult individual foxes that are bait shy.

This option addresses one of the main causes of the decline of Bush Stone Curlew. Theoretically at least, if the fox predation problem was eliminated then the existing Bush Stone Curlew would be able to breed successfully and thus begin the process of restoring their population to a more sustainable level.

Routine fox control work is done at the 490ha army munitions site at Mangalore in central Victoria which has maintained a population of ten pairs of Bush Stone Curlews. (Johnson & Baker-Gabbe 1994, Baker-Gabbe 2009). Fox control has been used successfully at the Puckapunyal Army Base of 44,500 ha in central Victoria. The army conducted an intensive fox control program for 3 years. The resident Bush Stone Curlew population quickly responded to the removal of the predators and doubled in numbers. This fox control program ceased in 1997 and some subsequent decline in the Bush Stone Curlew population followed. (Animal Control Technologies Australia Report 1997) It is to be presumed that the Bush Stone Curlews there will now follow the fate of other populations in southern Australia, namely to survive as adults, but not manage to reproduce.

The Puckapunyal experience demonstrates a number of useful points:

- It is possible to adequately suppress fox populations across a significant area.
- Bush Stone Curlews can quickly respond to the removal of foxes.
- Fox control is a very expensive activity which is extremely difficult to sustain over a long period.

Transferring the experience at Puckapunyal to the South West Wimmera would be difficult for several reasons:

- We lack the fire-power of the Australian Army.
- To cover a similar area would require the approval and active participation of at least twenty landholders, rather than one landholder at Puckapunyal.
- The current resident population in the South West Wimmera is now too low to quickly capitalise on the removal of predators.
- Indefinite fox control is highly unlikely to occur anywhere in southern Australia due to a lack of resources.

At Venus Bay, on the west coast of South Australia fox predation has been resolved by building a predator-proof fence in 1996 across a narrow section of the Weyland Peninsula and eradicating all cats and foxes on the seaward side of the fence. Since that time a number of species of near extinct small mammals have been successfully re-established in this area (Venus Bay Conservation Park Management Plan 2006). This approach, as well as fox-free off-shore islands, such as Kangaroo Island in South Australia, present rare opportunities to create a suitable habitat for Bush Stone Curlews in southern Australia.



Figure 2: Enemy number 1: Foxes.

5: Captive breeding & release.

This option has been explored in some detail by the KFTG and we consider it the most viable way to address the problem given the very low state of existing wild populations.

This procedure involves the captive breeding of Bush Stone Curlew. The fledged chicks are then placed in to a “soft release” pen and fed until they are socialised with each other (all the chicks go in together from different pairs). After a period of a couple of months or so, the pen gate is opened and they are allowed to disperse into the surrounding environment at will. They continue to be fed in the enclosure until they disperse. This is usually timed to coincide with spring when abundance of available natural food is high so they learn to forage when conditions are at their most favourable. Ideally at least some of these young birds would carry satellite tracking devices so that the dispersal patterns and survival rates can be monitored. As well, this option would place soft release enclosures away from intensive agriculture so as to lessen the chance of inadvertent poisoning from snail baiting and other chemical use.



Figure 3 Bush Stone Curlew and chick.

This option addresses the problem of low base population numbers and is a more reliable way of introducing new birds to the region. However Captive Breeding and Release alone does not address the major underlying causes of Bush Stone Curlew extinction in southern Australia which is predation of young birds by foxes. Breeding and releasing

young fledged birds into the wild to be preyed on by foxes is a problem of efficiency and ethics.

6: 2+3: Improve habitat PLUS fox-proof nesting sites.

A combination of the above two strategies is of course better than one only. Within the area of the Kowree Farm Tree Group this combination of activities has already been tried. It has possibly slowed the rate of decline of birds locally, does not seem capable of raising chicks to adulthood and formation of new breeding pairs.

7. 3+4: Captive breeding & release PLUS fox-proof nesting sites.

This would involve captive breeding and release, followed by tracking of birds. When birds pair and establish a territory and a preferred nesting site (which is most likely to occur after radio tracking devices have ceased to work) a fox proof enclosure is built and the birds would be expected to use this area to nest and raise young.

The Kowree Farm Tree Group experience in this activity has been reasonably successful over a few years with about half (of four) sites successfully raising young birds. However, this approach relies on identifying preferred nesting sites on private land and appealing to the owner to participate. This method requires continuous active management of nesting sites by those farmers who happen to own the land the Bush Stone Curlews decide to call home. Expecting disinterested farmer to suddenly become passionate Bush Stone Curlew stewards and commit significant time and resources to manage these sites forever is simply not realistic.

The other major flaw in this approach is that only a fraction of the nesting sites would be found, then only a fraction of the farmers would be willing to participate, and of those who do only a fraction would have success. That would leave almost all of the released birds to fend for themselves, which they cannot do.

Construction of fox-proof nesting sites does have promise, but it is a technique which may have some limited application as part of a more efficient management approach.

8: 4+5: Captive breeding & release PLUS massive fox control program.

If captive breeding and release is to be carried out it is essential to control the main threat to their on-going survival: foxes.

This management option is currently being used in the Riverina where birds have successfully been released into the wild to establish a robust community of Bush Stone Curlews. Fox control has been carried out across two neighbouring properties using the conventional mix of spot-lighting, shooting and baiting.

Whether the level of control is sufficient to allow breeding pairs to successfully raise chicks, which successfully fledge, form flocks and then go on to reproduce is not clear. Also the vexed question of how to maintain adequate fox suppression for evermore is yet to be answered.

Clearly, the logistics of carrying out a successful fox control program is least difficult on large properties where small numbers of landholders need to be convinced to take part. The examples we have so far are Puckapunyal Army Base: one landholder; Riverina; two landholders; Venus Bay National Park: one landholder. In South West Wimmera smaller property sizes would necessitate many farmers' active long-term participation in fox control, making this option extremely difficult to achieve.

The other consideration is how much control of foxes is enough? In most situations eradication is impossible. Suppression is the best we can achieve, but to what degree? Also we know that as soon as suppression efforts stop, fox numbers quickly return to their previous level. At least with Bush Stone Curlews foxes don't eradicate the population, they only manage to prevent adult pairs from raising young. So an imperfect fox control program, which occasionally falters, will not result in the immediate loss of the whole Bush Stone Curlew population. These questions currently

do not have answers, but they leave the door open for lower level, targeted fox control strategies which may not be impossible to fund.

9: 4+5+?: Captive breeding & release PLUS effective long term control of foxes (either by locating on a fox-free off-shore island or the invention of some effective biological control agent).

Effective long term control of foxes is currently not possible in the South West Wimmera, so this option has been included as a hypothetical example on which to build further discussion. By assuming that we can deal with the single biggest problem, foxes, we are free to analyse the other aspects of a Bush Stone Curlew recovery project. In the event that the fox issue can be resolved, this discussion may become more relevant.

The first point to consider is that if foxes are taken out of the equation, all the other lower order threats to the survival of Bush Stone Curlews rise up the priority list.

Option number 9 has been tried. At Venus Bay (SA) in 2001 12 Bush Stone Curlews were released into a fox-free area on Weyland Peninsula. This peninsula has a narrow neck across which has been built a predator-proof fence, designed to exclude cats and foxes. Within a year of their release 9 of the 12 birds released had been found dead. None of these deaths were the result of fox predation (Venus Bay Conservation Park Management Plan 2006).

The message here is that although foxes are the number one threat to Bush Stone Curlews, they are not the only threat. Acclimatisation of captive bred fledgling birds is now recognised as a vital step which was missing from the Venus Bay project (Baker-Gabbe 2009). By paying close attention to this aspect of Bush Stone Curlew release the later Riverina project has certainly managed to successfully establish robust communities of adult birds in the wild.

Threats to survival of Bush Stone Curlews in southern Australia.

Does the preferred option (#9 Captive breeding & release PLUS effective long term control of foxes) deal with the list of threats below?

1. Foxes

For this discussion we are pretending that we can do this.

2. Age of the Bush Stone Curlew population.

Young newly fledged birds would be released, quickly lowering the average age of the local population.

3. Low density of the population.

Captive bred birds would be released in small batches to enable the formation of localised flocks. This flocking of young birds would be encouraged in the soft release phase. It is hoped that birds would not quickly disperse over a large area. Radio tracking of released birds in the Riverina has shown a marked tendency to remain in close contact with other Bush Stone Curlews. This would create a small population of birds at a high local density which enables a healthy social interaction to occur.

4. Agricultural chemicals.

Locating the release site in an area of low intensity agriculture would be the main method of avoidance of agricultural chemicals. Forecasting future agricultural practices for a given area is problematic, but it is assumed that the release site is more likely to be where there is a high proportion of native vegetation remaining within an agricultural setting.

Community awareness may also play a part in minimising the adverse effects of chemicals on these birds, but it would need to be based on an increased knowledge of the effects of chemicals on Bush Stone Curlews.

5. Cats.

Cats are not a problem for Bush Stone Curlew survival and reproduction (Gates & Paton 2009) They certainly are for a large number of other highly depleted small native animals. If predator control were to be practised for a range of species (including Bush Stone Curlew) cats would then certainly be on the list.

6. Roadkill.

It would be hoped that careful siting of the release site would minimise this threat.

7. Inbreeding.

An infusion of young genetically diverse birds would eliminate this threat. Any management options which rely on re-building the Bush Stone Curlew population from its current small base would not.

8. Lack of suitable habitat and food.

It would be hoped that careful siting of the release site would minimise this threat. There is plenty of perfect habitat for Bush Stone Curlews in the South West Wimmera. If all of the issues above are dealt with this could easily be solved too. The map below (Fig 4) shows large areas of high value habitat which would be very suitable for Bush Stone Curlew feeding and nesting.

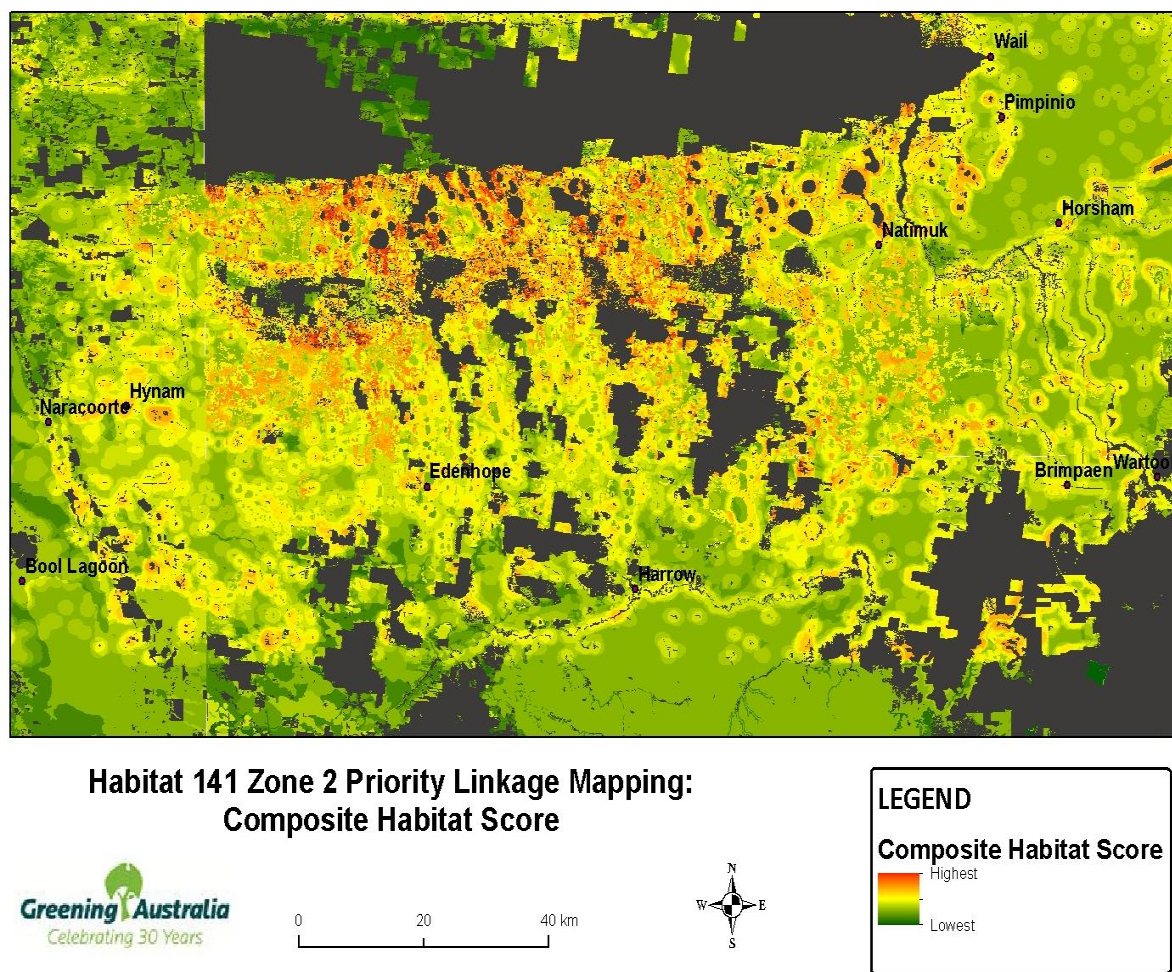


Fig 4. Agricultural areas with a moderate to high (orange & red) habitat score are likely to be ideal for Bush Stone Curlew nesting and feeding.

Koch, P Gardner, J (2012; draft document) *Habitat 141, Zone 2, Conservation Action Plan Summary Report*, Greening Australia

9. Other.

The myriad of other ways to kill a Bush Stone Curlew are best dealt with by adequate juvenile learning. The soft-release phase has been shown to be very important (Baker-Gabbe 2009) and so too is the flocking phase which should continue after release. During this time young birds would learn life skills in a relatively safe environment. This process needs to be unhurried and thorough in order to compensate for the lack of parental guidance which would normally occur in healthy natural populations.

The preferred option: a case study.

Captive breeding of Bush Stone Curlew

A brief summary of notes based on my interview with

Neville & Jan Lubke (JL) at Jindera NSW

Peter Redfearn (PR) at Moulamein NSW

“Breeding curlews is a dark art and management can be complex” (PR)

Paper work

- licences, annual translocation policy doc, various scientific permits, animal ethics, etc.
- APPROVAL from ALL relevant authorities obtained in advance
- Reporting & monitoring on-going requiring substantial energy & time depending on current policy and sources of funding

Curlew housing

- Minimum size 6x6mts with a third of the pen being sheltered area
- Provide stick cover, branches
- Automatic water system, ceramic feed bowls, ant deterrent
- Fox/snake proof perimeter
- Artificial shade if required
- Other? eg sparrow proof netting



Figure 5: Breeding pen at Jindera: fox-proof and snake-proof.

Curlews for breeding

- sourcing stock - consider genetics – Adelaide Zoo, Melbourne Zoo, Halls Gap Zoo (need substantial lead time if required to breed Bush Stone Curlew)
- identify male and female birds with permanent leg bands
- generally need to be 2 years old to breed successfully
- usually breed from September to January
- not all pairs will breed or raise young
- frequently only rear one chick
- can double brood (consider removing eggs to incubator)
- young are fully fledged at 60 days
- chicks are not directly fed by the parents, but parent may kill & indicate the food to a chick

Curlew care

- post hatching feed mealworms and boiled eggs for at least 2 weeks
- Feeding is a commitment – freshly cut up dog sausage daily/evening (flies an issue in summer)
- Worm regularly with medication in water bowls
- Leg band below the knee. Size 10 ABBS metal leg bands fitted by a licensed bird bander
- Watch for leg injuries due to bands
- Eye condition needs observation
- Health tests for parasites prior to release
- Group wean birds (send to soft-release pens at Moulamein) in March or sometimes earlier if particular individuals are victims of harassment.

Post Weaning – Soft Release

Release pen

- Larger version of breeding pen with 2 gates – sized to accommodate more birds at least 1 ha in size, preferably 6x26mt
- Electrified perimeter fence around the fence to exclude predators
- Release site around the pen and protected area needs to have a reasonable pocket of suitable day roost and adjacent open feeding areas with room for birds to expand further out.
- Include small wet depression for tadpoles/insects – mimic natural environment; as far as possible encourage natural foraging to prepare for the wild
- **ESSENTIAL: SITE AND NEIGHBOURING AREAS MUST HAVE PREDATOR CONTROL**
- **FOX IS THE MAIN PREDATOR** –generally only the young curlew is vulnerable



Figure 6: Peter Redfearn (Moulamien) at the release pen which is situated within the larger (20ha) soft release enclosure; mostly the door is open and birds are provided with supplementary feed inside or nearby.



Figure 7: 2m high fence around 20ha soft release enclosure at Moulamein in the Riverina.

Curlew release

“provide what the bird wants, not what the scientist demands.....the birds are highly strung and take about 6 weeks to subdue after handling” (PR)

- Release the weaned birds in early September (after about 3 months in the soft release pen) when there should be abundant insects, moisture etc
- continue feeding them until they cease returning – sweep sandy patch area & check for tracks
- Radio tracking of released birds with 2.25 Holohil BD 2 radio transmitters fitted to the bird’s tail (do not use

back pack style transmitters as they cause harm possibly death to the birds)

- Use model AY/C hand held 3 element Yagi collapsible gamma tuned antenna, frequency for radio tracking.
- Radio tracking for 6 weeks at Moulamein has revealed very successful adaptability to the wild. Bird recorded up to 10 km from release site.
- Losses recorded due to road kill and power lines.

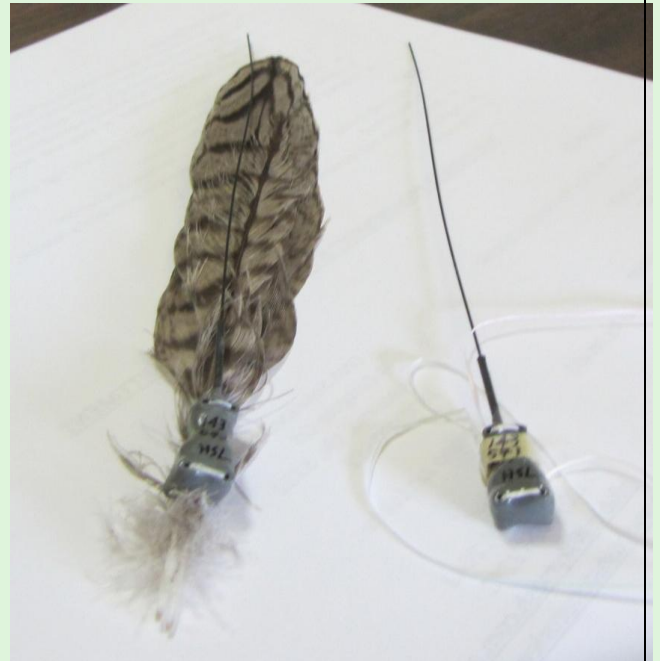


Figure 8: Radio tracking devices (one is super-glued to a feather)

How could this program be adapted to the South West Wimmera?

The Nature Conservation Working Group in the Riverina has certainly had great success with their program, so modification for use in the South West Wimmera would be minimal.

The size of the soft release pen is contentious, largely due to its cost. In the Riverina a 20ha pen is used, but the manager questions the need for this size. It does however seem to be very successful at acclimatising young birds to their local environment. We know that we have to have a soft release pen for success, but how big is big enough? In the budget above we have lowered the size from 20ha to 5ha, at a cost of \$113,000 (*Budget; P19*), but with no real basis for knowing whether this is adequate.

Also, there are on-going advances in bird tracking devices. Now, it appears that a satellite tracking system would be more cost effective: more expensive to buy, but requiring far less labour to use, so probably cheaper to use. Also, when a satellite tracker dislodges from a bird it may be possible to find again.

The management of birds as practised in the Riverina is obviously best practice. Management of the local (human) community in the South West Wimmera is going to be far more difficult, due to the fact that the property size here is much smaller. Many more people have to be induced to participate in the effective establishment of a viable Bush Stone Curlew colony. Promotion of this project to achieve that high level of community participation would be a significant additional cost to the project. In our budget we have allowed \$3,000 per year over the 10 year project.

Hurdles

“Hurdles” are those organisational problems which we have to overcome in order to carry out our favoured management approach: Option # 9. They are:

Gaining community support

There is a low level of awareness of the Bush Stone Curlew in the South West Wimmera. Those who are aware are either old enough to remember them when they were common or else they have a pair of the birds on their farm. This minority group are usually passionate supporters.

To successfully run a captive breeding and release project at least twenty farms in a cluster would need to actively participate. They would need to make significant changes to their farm management practices in order to accommodate the needs of those curlews which decide to move onto their farms.

These changes to management would need to be carried out indefinitely. There would need to be some significant pay-off for this to happen. The pay-off is unlikely to be money. It could be pride in having these birds on their farm. It could be that the Bush Stone Curlew program is part of a larger environmental project which has local community benefits, such as new businesses and opportunities for community groups.

Widespread community support would also be a pre-requisite to obtaining sufficient funds for this project.

Raising sufficient community support required to do all this would be hard, but possible.

Finding a manager

Releasing and acclimatising birds to freedom is a labour intensive task. Birds need to be fed daily for a long period while they occupy an enclosure and also a soft-release pen.

When birds leave the soft-release pen and either join a flock or pair to mate and search for a territory it will be necessary to track their movements for the life of the radio or satellite tracker. Measuring and recording data on the success of the program is critical.

This work would require a paid manager and the occasional assistance of some voluntary workers too. Recruiting these people would be, once again a challenge, but achievable.

Longevity of program

The objective was to run a ten year program and by that time have created an environment conducive to the on-going survival and reproduction of a colony of Bush Stone Curlews. It would be possible to run a project for this duration. Maintaining the enthusiasm of community and funding organisations for longer than this would be extremely difficult.

Once the project was complete maintaining heightened community awareness would remain vital for success. Using Bush Stone Curlew as a mascot for the town, shire or local football club might be strategies which could do this.

Sites for soft release

This would be relatively straight-forward. There are already several sites identified on private land which are suitable.

Build a soft-release enclosure and other bird pens.

Building an enclosure is expensive, but a relatively straightforward task for a contractor.

As discussed above, the optimum size of the enclosure is not known. Due to the requirement for fox-proof fencing the size is extremely cost sensitive.

Access to young birds

A number of licensed breeders have indicated their willingness to breed Bush Stone Curlews for us. These breeders are in three states. The regulatory constraints to moving birds across borders have not been investigated, but that would probably be a minor constraint to getting birds.

Funding

Bush Stone Curlews are not a nationally threatened species. This makes the likelihood of gaining government funding (and particularly federal government) very slim. The core part of the captive release activities will almost certainly rely on non-government funds. Some of the supporting activities such as fox control and grassy woodland conservation would easily attract government money.

The cost of a captive breeding and release project is likely to be a six-figure sum, with the bulk of the funds needed at the start of the project. Obtaining this level of funding from either corporate or philanthropic donors looks extremely challenging. However, as this project relies on having a high profile and significant community participation it may be quite attractive to some corporate donors.

Regulatory requirements

Permits are required to carry out this work. Also, in order to gain and hold the necessary government approvals the standard of the project would need to be above certain thresholds in order to:

- Overcome the threats to the bird which led to their demise.
- Monitor the success or otherwise of the program and the released birds.
- Ensure adequate genetic heterogeneity in the birds released.
- Ensure the health, nutrition and welfare of the birds is of a high level.
- Ensure that the above are all well documented and that lessons learnt are available for others to use.
- Maintain the necessary permits for the life of the project.

*Budget for option #9 adapted
for use by KFTG:*

Captive breeding and release.

(excluding fox control costs)

Key Task	2012-14	2015-22	Total
Enclosure & Shelter			
Enclosure & Shelter	98,000		98,000
Labour	15,000		15,000
Tracking:			
Argos Satellite PTT's (10)	25,000		25,000
Argos Time Slots	9,000	36,000	45,000
Labour	4,000	16,000	20,000
Bush Stone Curlew			
Capital cost	3,000		3,000
Direct Costs (annual)	5,000	13,000	18,000
Labour	17,000	45,000	62,000
Vet	1,000	2,000	3,000
Breed Pens	3,000		3,000
Labour	2,000		2,000
Network			
Meetings	1,500	4,000	5,500
Coordinator			
Base salary	36,000	96,000	132,000
On-costs (super/workcover)	5,000	12,000	17,000
Office & service Oh's	6,000	16,000	22,000
Travel	9,000	24,000	33,000
Training & Conference	1,500	4,000	5,500
Administration	5,000	12,000	17,000
Promotion			
Promotion	9,000	20,000	29,000
	\$255,000	\$300,000	\$555,000

Discussion: Could the KFTG do this?

There are three questions to be considered by the KFTG:

1. Can we do this?
2. Given that this would be a massive undertaking, likely to dominate all that we do for 10 – 15 years is it the best use of our current resources?
3. Finally, if the answer to the two earlier questions is yes, is this project good value for money?

Can the Kowree Farm Tree Group do this?

Most of the “Hurdles” listed above are difficult to manage and some are very difficult. The very difficult ones include fund-raising, managing the necessary regulations, the reporting required for both of those things and keeping a project going for over 10 years. For a small group such as the KFTG each of these hurdles on its own would probably be surmountable, but not all of them in a single project.

Given that this would be a massive undertaking, likely to dominate all that we do for 10 – 15 years is it the best use of our current resources? Committing a small group to one very demanding, long term activity which directs it away from its core work would not work.

Is this project good value for money? The project aims to establish 50 birds within 10 years. The cost of doing this would be between \$500,000 and \$600,000. So, assuming that we can achieve that goal, then each of those 50 birds would cost \$10-12,000. This price assumes that fox control would somehow be magically achieved at no cost. If another few hundred thousand were allocated to fox control, then the cost per bird would climb towards \$20,000. Is the establishment of 50 Bush Stone Curlews the most effective use of \$1 million for conservation in the South West Wimmera? Once again the answer is no.

If the KFTG cannot do this, could anyone else? If this project were to be run by a small community group, it would need to be specifically set up for this purpose. It would need to operate in a partnership with other organisations which shared the load of various parts of the project.

Many aspects of the project would have considerable spin-off benefits for other conservation activities. The most obvious of these are fox control which would allow many other near-extinct small native species to regain a place in the local environment. It would also be of benefit to local farmers who often lose lambs to foxes. And the second spin-off would be to raise public awareness by using the Bush Stone Curlew as a flagship species for broader conservation work.

As part of a broader conservation project run by a coalition of organisations which had fox control as a central aim and which required high levels of community participation to succeed, the captive breeding and release of Bush Stone Curlews could very well be feasible and possibly cost effective.

Right now, such broad-scale conservation activity is being planned. *Habitat 141*^o is a massive landscape-scale conservation plan and the South West Wimmera is right in the middle of it. In-depth conservation planning for the South West Wimmera has been carried out by a group of interested organisations in 2012. Suitable collaborative projects which would suit incorporation of Bush Stone Curlew captive breeding and release are now being planned. However, even here the main constraint would re-emerge: can there be adequate control of foxes? And if so, is this likely to be maintained in perpetuity?



Figure 9: The successful Riverina project certainly relies on a complex (govt, NGOs & community) alliance which supports a community group established specifically for the task of running a captive breeding and release project.

Conclusions

After an extensive review of interventions aimed at reversing the decline in populations of Bush Stone Curlews we decided to refine our objective. We needed to have an objective which was achievable and created a functional community of birds which would at least persist and with luck possibly grow indefinitely.

The objective we came up with and against which we have tested all the possible interventions we investigated plus a few we dreamt up ourselves is:

By the year 2022, create a regional population of at least 50 Bush Stone Curlews, in a suitable locality, which would be viable without ongoing human intervention.

We quickly ascertained that any intervention which did not invigorate the existing population with the introduction of birds from other areas was not going to work.

The captive release options were capable of overcoming most of the threats to the establishment of a local Bush Stone Curlew community. The intractable threat, and the most serious one, was fox predation of young birds. At present, permanent fox control in the South West Wimmera, across a suitable area, can't be achieved. So the result is that none of the interventions can fully meet the objective.

Rather than ending our analysis here and effectively turning our backs on our battling local community of Bush Stone Curlews we created another scenario. We considered the feasibility of the captive release option without foxes, in the hypothetical situation of being able to remove foxes permanently.

In this hypothetical situation, captive breeding and release could meet all aspects of our objective. (In this scenario an artificially established colony of 50 birds would not only survive, but quickly expand to colonise a much larger area as demonstrated at Puckapunyal). If the area was suitably sited and there was some community empathy, this option would deal with all the other (non fox) threats to the persistence of a Bush Stone Curlew community. However, the organisational issues which need to be managed in order to carry out a captive breeding and release program are formidable, both in number and difficulty.

The steps which would most likely need to be followed are:

- Create a community based organisation specifically to run this project.

- Find suitable partners:
 - An organisation able to provide tax-deductions to private or corporate donors which support this project.
 - Corporate and private donors.
 - An organisation to actively promote the project.
 - Organisation(s) which could ensure that suitable habitat is maintained and improved (including predator control).
 - Bird breeder(s) who can regularly supply healthy birds which are not in-bred.
 - Research organisations to support monitoring activities.
- Identify a suitable area to carry out the project: many of the threats to the ongoing survival of a Bush Stone Curlew population depend on suitable siting.
- Within the project area identify a property to build a soft release site with tenure of at least 10-15 years.
- Commence acquisition of necessary permits.
- Raise funds from a variety of sources. Commitments of at least \$600,000 over ten years would be required, with half of this needed in the first 3 years.
- Secure the selected land for the soft-release pen.
- Commence operational activities:
 - hire a manager,
 - organise breeding of birds,
 - build confined pens,
 - build a soft release pen,
 - organise bird-tracking equipment & procedures,
 - monitor predator numbers and control as required.
- Start promotional activities targeting:
 - local community in order to gain their collaboration,
 - relevant target audiences of the funding organisations.
- Ensure that parallel projects relating to maintenance and improvement of suitable habitat for released birds are running in a way which complements this work.
- Keep all this going for a minimum of ten years.

Is this enormous cost and effort required to establish an isolated population of fifty birds in the South West Wimmera a worthwhile use of time and funds? Would other conservation pursuits give much greater results for a similar investment? As foxes are the major impediment to success and cannot be magically removed these are questions we are not now forced to answer.

Post-script

Much of the writing of this document was carried out by the authors at Bill Wallace's house, north of Apsley. Next to it is one of the fox-proof nesting sites where a pair of Bush Stone Curlews have nested for a number of years. For many of those years they managed to hatch eggs and raise young birds to fledge and eventually migrate away from the enclosure.

In the past few months, after the fledglings left, one of the pair has disappeared.

As we toiled away together over a number of nights, writing and desperately searching for solutions in the quiet of this isolated house, we could hear the anguished screams of this lone curlew. There were few other sounds to be heard outside, just the occasional bump and growl of a possum, but also in the background, the triumphant yap of a fox.

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