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Discussion paper for the Recovery Team
Future directions for studies of *Ctenotus lancelini*

Prepared by Barbara Jones
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Introduction

When we first approached our task of studying and managing *C.lancelini* we had very little knowledge of this skink, and much of what we thought we knew was based on guesswork. During our first year, work done on the Island by Barb Jones, and on the mainland by Dave Pearson and the WASAH group has resulted in a much more substantial knowledge of the species we are responsible for managing.

The purpose of this paper is to convey to the Recovery Team a brief summary of our results, and to highlight their implications for future deliberations on the direction of further studies and other aspects of management.

Summary of the first year's work on Lancelin Island

In accordance with the 1993 IWMG a wildlife consultant (Barbara Jones) was contracted in November 1993 to conduct field studies of *C.lancelini* on Lancelin Island. The study aimed to document *C.lancelini* population parameters and to investigate habitat parameters considered to have the potential to limit abundance (including weed invasion and silver gull activity).

The first 12 months of trapping resulted in 242 *C.lancelini* captures (233 captures of 210 adults and 19 captures of young). Results showed that *C.lancelini* occurred in each of the three main habitat types, and that abundance varied within habitat types. Recently hatched *C.lancelini* were caught in each of the three main habitat types. An estimate of *C.lancelini* population density of 250-500 per hectare was derived using November 1994 recapture rates, and indicated that the population numbers (for the whole Island: 1750-3500) were not extremely low.

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Anecdotal evidence examined (including old photographs of the Island and interviews with earlier workers) showed that areas of vegetation had changed substantially during the last 20 years, and indicated the general trend for expansion of the winter grasses (principally ryegrass) and a decline in the abundance of woody perennials. This process of change was most extensive on shallow soil over limestone. Observations of the abundance of Silver Gulls and several other seabirds common on the Island, and reference to earlier workers observations suggested that there has been an increase in the overall usage rate of the island's habitats by breeding seabirds. Earlier work (Gilham 1961) concluded that the pattern of guano accumulation and release into the soil was a major factor affecting the vegetation of SW islands. Hence, changes to the Island's vegetation appear to be in response to a general increase in nesting seabird activity (rather than being ascribable to a single species). The above model for the process of change to vegetation has important implications for consideration of management proposals to eradicate weeds or re-establish 'original' vegetation.

The seasons during which this work occurred were particularly dry, and, at present, there is a substantial abundance of dead woody shrubs that provide visual evidence of the possible rate of change to the vegetation which might occur over the next couple of years. In some areas up to 50% of the shrubby cover has died off, and winter grasses will probably have claimed the soil below such dead shrubs in a couple of winters. Whilst I'm not a botanist, my intuitive extrapolations of a possible upper limit to the rate of change to the vegetation lead me to believe that in 20 years time up to 70% of the Island could be without perennials, the woody shrubs having been replaced by the winter grasses. The 'forces' driving this change seem to relate to increasing guano loads (as a result of increasing seabird numbers) and the presence of introduced weeds.

The current status of *C. lancelini*

Survey work on the mainland (Pearson, Rolfe, WASAH) resulted in the collection (by hand) of a single *C. lancelini* from the foreshore reserve opposite Lancelin Island, but trapping conducted by the group in late 1994 did not result in any further captures. Thus, at the present time, there is no data on which to estimate the distribution or size of the mainland population/s.

The work on Lancelin Island (this study) has shown that despite the low capture rates reported by workers between 1991-1993 (CALM, Browne-Cooper and Maryan) a population of over 1000 *C. lancelini* occurs on the Island, and that these skinks occur in a range of habitats. Although the population estimates indicate that the species has not declined to a critically low level, observations of changes to Island vegetation indicate that the habitat of *C. lancelini* on Lancelin Island is unstable. Data exists to indicate there has been changes to the reptile communities within the areas most affected by the death of perennials and the spread of the ryegrass: data for *C. lancelini* suggests, but does not 'prove' there has been a decline in this species abundance in rocky areas, data for *Egernia bos* provides more solid evidence for decline of this species in the rocky areas..

On the basis of the information currently available it is not possible to assess the long-term viability of the mainland population, and the habitat of *C. lancelini* on Lancelin Island is unstable.

Management Issues

Despite the improvement in our knowledge of *C. lancelini* that has resulted from our first year of work we are a long way from being able to reliably assess the species long-term viability. Fortunately, the species appears to be relatively secure on Lancelin Island, at least for a few years, and this relieves the urgency for immediate attempts to 'rescue' the species that seemed so appropriate 12 months ago.

There is one set of information which we lack, and which has relevance to all discussions or decisions about the status or management of *C. lancelini*:

What is the species distribution ?

An answer for this question will provide the basic information prerequisite to an informed assessment of the need for intensive (and often expensive) management procedures (e.g. translocation, habitat modification on Lancelin Island, captive breeding). The importance of the Lancelin Island population to the species long-term persistence can not be reliably evaluated until more is known about the species distribution and relative abundance.

The determination the species distribution is no small task. Usually species distributions are based on records collected over many years. However, the task can be broken down into manageable units. For *C.lancelini* the first unit could be to determine the distribution and abundance of the species in the Lancelin area (an area bounded by the mobile or recently vegetated dunes that occur to the north, south and east of Lancelin: these are likely to have formed a biogeographic barrier during times of drier climate and lower sea-levels during the last 15-20 thousand years). Information about the occurrence of *C.lancelini* within this area would provide valuable insight into mainland habitat requirements (which may differ from those on Lancelin Island), and so help to target further survey work outside the Lancelin area.

Work on Lancelin Island has shown that capture rates for *C.lancelini* are relatively low at all times of the year except for about eight weeks between mid-October and mid-December, when many individuals are involved with reproductive activities. Hence, surveys aimed at determining the species distribution should be conducted during October-December. Such surveys should employ the same trapping techniques as used on the Island, since under these conditions relative capture rates can be used to estimate population numbers by calibration against the Island results.

Further study on Lancelin Island

While we know that there are at least two populations of *C.lancelini*, we have no other evidence with which to challenge our earlier assumption that the species long-term persistence is best ensured by studying, and if necessary, actively managing the Island population. Hence it seems prudent to hold to the original assumption (at least until useful survey results indicate the assumption was inappropriate).

There is sufficent data available to suggest that *C.lancelini* numbers on Lancelin Island may be suject to decline in the near future (10-20 years) because of apparently rapid habitat change. Hence, an ongoing monitoring program should be established which should give early warning of any trend towards falling numbers. Ideally traps should be laid out during winter 1995 and results collected for spring 1995, providing solid baseline data for comparison with future trapping results.

While the first 12 months of work on the Island has provided substantial detailed information about *C.lancelini*, there are numerous grey areas where further effort would substantially improve the quality of data. Last season only 19 juvenile *C.lancelini* were caught, and further work during February-April and in spring (1995) could substantially improve the information relating to recruitment rates. Spring 1995 provides an excellent opportunity to conduct a trapping schedule aimed at generating more accurate population estimates, which

could be used to derive a relationship between capture rates and population density (which could be used to estimate mainland population densities from capture rates).

Weeds and Silver Gulls

Originally Burbidge and Roife considered weeds and silver gulls to be possible threats to the Lancelin Island *C. lancelini* population. Results of the first years work suggest that weeds at their current level of abundance do not pose a serious threat to the population's viability. However, the rate at which winter weeds seem able to replace the natural vegetation leads to the conclusion that the weed problem is not stable, and is likely to continue at a constant rate, or perhaps accelerate over the next 10-20 years.

Spraying weeds with a herbicide was recommended in an attempt to improve habitat quality for *C. lancelini*. The windy and wet conditions during winter provide poor and unpredictable conditions for spraying. Further, should the spraying be successful in killing winter grasses then the following outcomes seem likely: an immediate reduction in cover over the soil or rocks (which I suspect would probably disadvantage *C. lancelini* more than the weeds presence) and subsequently, replacement of the grasses by some of the other weed species (which might be either more or less deleterious for *C. lancelini*).

spraying

During the first year of study there was no evidence that silver gulls were having any direct interaction with *C. lancelini*. If silver gull activity has contributed to a decline in *C. lancelini* population density, then the impact has probably been associated with patterns of guano deposition, and its effect on the vegetation. The winter breeding silver gulls are less numerous than the main summer-breeders (bridled terns, and the shearwaters), and Gilham's 1961 work indicates that summer guano accumulations may have a greater impact on the vegetation than winter accumulations.

It seems to be generally accepted (e.g. CALM's Silver Gull Action Plan) that attempts to cull silver gulls are generally unsuccessful in controlling gull numbers.

The above discussion leads me to believe that habitat treatments proposed in the earlier IWMP which aimed to alter aspects of the Lancelin Island ecosystem are likely to be difficult and perhaps unsuccessful, and may even be deleterious.

However, small scale habitat manipulations could be applied to some areas to gather further information about the limiting effects of cover and food in different areas. Briefly, such an experiment would be undertaken by applying treatments to small areas around a suitable number of selected traps and comparing capture rates for spring 1994 with those obtained during spring 1995 (after a late-winter treatment). The treatments would aim to influence habitat factors associated with the abundance of food and cover, and basking opportunity. By pulling up grass plants (during early flowering) and piling up them up according to specified plan treatments can be applied which should lead to altered levels of availability of resources between the springs of 1994 &95, and, if this leads to increased usage of the areas around pits, this should be reflected in the relative capture rates for the two springs. Untreated pits would provide the necessary 'control' treatments. An assumption inherent in this process is that increased usage rates are associated with higher habitat quality, and that if higher quality habitat is ensured for several consecutive seasons higher population numbers will follow.

If any such treatments appear to be useful for improving *C. lancelini* habitat quality, then they would be relatively safe and easy to apply by groups of volunteers pulling grass during a couple of day-trips out from Perth. Almost no equipment is required, and detailed instructions on patterns of pulling and piling could be easily provided.

Discussion

There are three main components of field study of *C. lancelini* which can be undertaken during 1995.

1. Continuation of study of *C. lancelini* on Lancelin Island
2. Survey for *C. lancelini* occurrence in the Lancelin area
3. Survey for *C. lancelini* occurrence in other areas (both mainland and island)

Other aspects of study of *C. lancelini* which have been proposed or initiated include:

4. Continuation of the captive breeding programme
5. Fusilade toxicity trials
6. Genetic assessment of *C. lancelini*

It is my belief that, at present, our need for data resulting from units 1-3 is substantially greater than our need for results from units 4-6.

Units 1 & 2 form a cohesive block of work which could be undertaken simultaneously (thus providing the most efficient use of the funds needed to get a fieldworker out in the field).

During this work it has become apparent that very little is known about the ecological processes which affect vegetation on southwestern islands. Gilham (1961) points out that the SW islands differ from the majority of seabird breeding islands which have been studied because they have a dry summer-wet winter climate (compared to eastern australian or northern hemisphere islands), and she thought that such a climate appeared to amplify the effects of higher guano levels. Since management of such islands is a substantial issue for CALM (and also for the long-term persistance of *C. lancelini* on Lancelin island) a detailed study of patterns of seasonal and annual variation in soil nutrient levels and their effects on island vegetation would yeild information valuable to the management of a large number of seabird breeding islands. I would like to propose that the Recovery Team recommend that CALM investigate the options for such a study to be undertaken by approp iately qualified soil scientists and botanists.

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LANCELIN ISLAND SKINK

RECOVERY TEAM

ANNUAL REPORT

1994

by

David Pearson and Barbara Jones

for

The Lancelin Island Skink Recovery Team

Western Australian Department of Conservation and Land Management
W.A. Wildlife Research Centre, P.O. Box 51 Wanneroo WA 6065

SUMMARY

This report summarises work carried out during 1994 for the conservation of the Lancelin Island Skink, *Ctenotus lancelini*. The Lancelin Island Skink Recovery Team met for the first time in December 1993. A further two meetings were held during 1994. The Recovery Team, consisting of representatives from CALM, ANCA, WA Museum, Perth Zoo, Shire of Gingin, WA Society of Amateur Herpetologists and a consultant researcher, co-ordinated the implementation of Interim Wildlife Management Guidelines for the species. ANCA provided the majority of funds to carry out the required actions.

A field ecological study of *C. lancelini* by Barbara Jones commenced in November 1993 and continued throughout 1994. She found that *C. lancelini* was abundant on Lancelin Island and distributed across all major habitats, in contrast to recent survey findings. The difference in results reflects the emphasis on rock-turning by earlier workers, restricted activity periods of the skink, its cryptic habits, and the use of more appropriate trapping techniques. The skinks were found to be breeding on the Island despite dry conditions during 1993-4. Considerable data on the basic ecology of the species have now been obtained.

Preliminary results of the ecological study suggest that factors thought to have caused the apparent decline in *C. lancelini*, namely Silver Gulls and weed invasion, were not as important as previously believed. Silver Gulls were most abundant on the Island when the skinks were inactive and the skink's cryptic behaviour suggests predation by gulls would not occur, or be very rare. Habitat modification by nesting gulls does not appear to be a major disturbance on the Island at this time. The nesting activities of other seabirds are probably having a greater impact on vegetation composition and structure.

A survey of presumed suitable habitat on the mainland by CALM and the WA Society of Amateur Herpetologists, was successful in locating *C. lancelini* in a foreshore reserve at Lancelin, the first record of the taxon on the mainland. Ongoing survey along the stretch of coast from Lancelin to Ledge Point has failed to locate any further populations.

The captive breeding program has developed suitable techniques for the captive maintenance of *Ctenotus* skinks. Two eggs were produced during in December 1994 from the analogue species, *Ctenotus labillardieri*, used for the initial trials of this program. One was desiccated when found, but the other has been successfully incubated and hatched 35 days after laying.

Information on the Lancelin Island Skink and the actions being taken to improve its conservation status have been disseminated in the local printed press, popular magazines, in radio interviews and through talks to school groups in Lancelin.