Appendix 12-B Snail Translocation Trial DEWHA Referral

Australian Government

Department of the Environment, Water, Heritage and the Arts

Referral of proposed action

What is a referral?

The *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act) provides for the protection of the environment, especially matters of national environmental significance (NES). Under the EPBC Act, a person must not take an action that has, will have, or is likely to have a significant impact on any of the matters of NES without approval from the Australian Government Environment Minister. To obtain approval from the Environment Minister, a proposed action should be referred. The purpose of a referral is to obtain a decision on whether your proposed action will need formal assessment and approval under the EPBC Act.

Your referral will be the principal basis for the Minister's decision as to whether approval is necessary and, if so, the type of assessment that will be taken. These decisions are made within 20 business days, provided that sufficient information is provided in the referral.

Who can make a referral?

Referrals may be made by a person proposing to take an action, the Commonwealth or a Commonwealth agency, a state or territory government, or agency, provided that the relevant government or agency has administrative responsibilities relating to the action.

When do I need to make a referral?

A referral must be made for actions that are likely to have a significant impact on the following matters protected by Part 3 of the EPBC Act:

- World Heritage properties (sections 12 and 15A)
- National Heritage places (sections 15B and 15C)
- Wetlands of international importance (sections 16 and 17B)
- Listed threatened species and communities (sections 18 and 18A)
- Listed migratory species (sections 20 and 20A)
- Protection of the environment from nuclear actions (sections 21 and 22A)
- Commonwealth marine environment (sections 23 and 24A)
- The environment, if the action involves Commonwealth land (sections 26 and 27A), including:
    - actions that are likely to have a significant impact on the environment of Commonwealth land (even if taken outside Commonwealth land);
    - actions taken on Commonwealth land that may have a significant impact on the environment generally;
- The environment, if the action is taken by the Commonwealth (section 28)
- Commonwealth Heritage places outside the Australian jurisdiction (sections 27B and 27C)

You may still make a referral if you believe your action is not going to have a significant impact, or if you are unsure. This will provide a greater level of certainty that Commonwealth assessment requirements have been met.

To help you decide whether or not your proposed action requires approval (and therefore, if you should make a referral), the following guidance is available from the Department's web site:

- the Policy Statement titled Significant Impact Guidelines 1.1 – Matters of National Environmental Significance. Additional sectoral guidelines are also available.
- the Policy Statement titled Significant Impact Guidelines 1.2 - Actions on, or impacting upon, Commonwealth land, and actions by Commonwealth agencies.
- the interactive map tool (enter a location to obtain a report on what matters of NES may occur in that location).

Can I refer part of a larger action?

In certain circumstances, the Minister may not accept a referral for an action that is a component of a larger action and may request the person proposing to take the action to refer the larger action for consideration under the EPBC Act (Section 74A, EPBC Act). If you wish to make a referral for a staged or component referral, read 'Fact Sheet 6 Staged Developments/Split Referrals' and contact the Referral Business Entry Point (1800 803 772).

Do I need a permit?

Some activities may also require a permit under other sections of the EPBC Act. Information is available on the Department's web site.

What information do I need to provide?

Schedule 2 of the EPBC Regulations sets out the information that must be included in a referral. Completing all parts of this form will ensure that you submit the required information and will also assist the Department to process your referral efficiently.

You can complete your referral by entering your information into this Word file.

Instructions

Instructions are provided in green text throughout the form.

Attachments/supporting information

The referral form should contain sufficient information to provide an adequate basis for a decision on the likely impacts of the proposed action. You should also provide supporting documentation, such as environmental reports or surveys, as attachments.

Coloured maps, figures or photographs to help explain the project and its location should also be submitted with your referral. Aerial photographs, in particular, can provide a useful perspective and context. Figures should be good quality as they may be scanned and viewed electronically as black and white documents. Maps should be of a scale that clearly shows the location of the proposed action and any environmental aspects of interest.

Please ensure any attachments are below two megabytes (2mb) as they will be published on the Department's website for public comment (Note: the Minister may decide not to publish information that is commercial-in-confidence). To minimise file size, enclose maps and figures as separate files if necessary. If unsure, contact the Referral Business Entry Point for advice. Attachments larger than two megabytes (2mb) may delay processing of your referral.

How do I submit a referral?

Referrals may be submitted by mail, fax or email.

Mail to:

Referral Business Entry Point
Environment Assessment Branch
Department of the Environment, Water, Heritage and the Arts
GPO Box 787
CANBERRA ACT 2601

- If submitting via mail, electronic copies of documentation (on CD/DVD or by email) are appreciated.

Fax to: 02 6274 1789

- Faxed documents must be of sufficiently clear quality to be scanned into electronic format.
- Address the fax to the mailing address, and clearly mark it as a 'Referral under the EPBC Act'.
- Follow up with a mailed hardcopy including copies of any attachments or supporting reports.

Email to: epbc.referrals@environment.gov.au

- Clearly mark the email as a 'Referral under the EPBC Act'.
- Attach the referral as a Microsoft Word file and, if possible, a PDF file.
- Follow up with a mailed hardcopy including copies of any attachments or supporting reports.

What happens next?

Following receipt of a valid referral (containing all required information) you will be advised of the next steps in the process, and the referral and attachments will be published on the Department's web site for public comment (**Note: the Minister may decide not to publish information that is commercial-in-confidence**).

The Department will write to you at the end of 20 business days to advise you of the outcome of your referral and whether or not formal assessment and approval under the EPBC Act is required. There are a number of possible decisions regarding your referral, including:

The proposed action is NOT LIKELY to have a significant impact and does NOT NEED approval

No further consideration is required under the environmental assessment provisions of the EPBC Act and the action can proceed (subject to any state or local government requirements).

The proposed action is NOT LIKELY to have a significant impact IF undertaken in a particular manner

The particular manner in which you must carry out the action will be identified as part of the final decision. You must report your compliance with the particular manner to the Department.

The proposed action is LIKELY to have a significant impact and does NEED approval

If the action has, will have or is likely to have a significant impact it is called a *controlled action* and the particular matters upon which the action may have a significant impact (such as World Heritage or threatened species) are known as the *controlling provisions*.

The proposed action is subject to a public assessment process before it can be considered for approval. The assessment approach will usually be decided at the same time as the controlled action decision. (Further information about the levels of assessment and basis for deciding the approach are available on the Department's web site.)

Compliance audits

The Department may audit your project at any time to ensure that it was completed in accordance with the information provided in the referral or the particular manner specified in the decision. If the project changes, such that the likelihood of significant impacts could vary, you should write to the Department to advise of the changes.

For more information

- call the Department of the Environment, Water, Heritage and the Arts Community Information Unit on 1800 803 772 or
- visit the web site www.environment.gov.au/epbc

All the information you need to make a referral, including documents referenced in this form, can be accessed from the above web site.

Referral of proposed action

Project title:

Translocation Trial for the Boggomoss Snail, *Adclarkia dawsonensis*

1 Summary of proposed action

NOTE: You must also attach a map/plan(s) showing the location and approximate boundaries of the area in which the project is to occur. Maps in A4 size are preferred. You must also attach a map(s)/plan(s) showing the location and boundaries of the project area in respect to any features identified in 3.1 & 3.2, as well as the extent of any freehold, leasehold or other tenure identified in 3.3(j).

1.1 **Short description**

To conduct a translocation trial for the Boggomoss Snail *Adclarkia dawsonensis*. The translocation trial will involve the movement of individuals from the Mt Rose population to two sites considered to be suitable habitat and not to be directly affected by the proposed Nathan Dam water storage. The purpose of these translocation trials is to determine whether the snail can be translocated successfully and if so, this would be proposed as a means to mitigate impacts of the dam.

1.2 **Latitude and longitude**

	Latitude			Longitude		
location point	degrees	minutes	seconds	degrees	minutes	seconds
Site 14	25	27	8.4594	150	01	42.258
Site 15	25	27	37.08	150	01	12
Site 16	25	27	22.6794	150	01	16.3194

The locations given are those of the known population on the Mt Rose boggomoss site. This being the core of the distribution of the species.

1.3 **Locality**

The population of the snail from which a selection of individuals are proposed to be translocated is confined to a 0.5 ha patch of boggomoss habitat on Mt Rose Station located approximately 45 km north-east of Taroom (**Figure 1**).

Based on the snail's habitat preference, both contemporary and historical, three broad habitats were selected for the conduct of translocation trials viz. brigalow, boggomoss and riparian. The trials would comprise test sites in riparian and brigalow habitat and a control site in the existing Mt Rose boggomoss habitat.

While selection of the exact translocation destinations forms part of the project, the control site will be on the Mt Rose boggomoss and the riparian site will be in the vicinity of the Isla-Delusion Crossing.

1.4 **Size of the development footprint or work area (hectares)**

The source area is approximately 0.5 ha but snails will likely be extracted from just a small portion of this. The destination sites will include a safe enclosure of at least 3 x 3 m plus a small surrounding work area.

1.5 **Street address of the site**

n/a

1.6 **Lot description**

Mt Rose is Lot 2 LE284

1.7 **Local Government Area and Council contact (if known)**

Banana Shire Council
CEO: Jason Bradshaw
Address: Biloela Civic Centre, Rainbow Street
P. O. Box 412, Biloela, Queensland 4715

1.8 **Timeframe**

Autumn 2009 till March 2012. This will incorporate time before the breeding season of 2009-2010 and includes three subsequent breeding seasons.

1.9	**Alternatives**	X	No
			Yes, you must also complete section 2.2
1.10	**State assessment**	X	No
			Yes, you must also complete Section 2.4
1.11	**Component of larger action**		No
		X	Yes, you must also complete Section 2.6
1.12	**Related actions/proposals**		No
		X	Yes, provide details: This action is related to the Nathan Dam and Pipelines project on the Dawson River, Qld.
1.13	**Australian Government funding**	X	No
			Yes, provide details:

2 Detailed description of proposed action

NOTE: It is important that the description is complete and includes all components and activities associated with the action. If certain related components are not intended to be included within the scope of the referral, this should be clearly explained in section 2.6.

2.1 Description of proposed action

The proposal is to undertake a translocation trial for the Boggomoss Snail *Adclarkia dawsonensis* which is listed as Critically Endangered under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Surveys undertaken in 1995-1996 found only two populations of the snail from locations in the Dawson Valley, north-east of Taroom, south-east Queensland (Stanisic 1996). One population was confined to riparian habitat in the vicinity of the Isla-Delusion Road crossing of the Dawson River, while a second population lived in a 0.5ha patch of boggomoss habitat on Mt Rose Station. This latter habitat would be inundated by the proposed Nathan Dam and was initially assessed by Ingram and Stanisic (1997).

A comprehensive survey in 2008 (BAAM 2009) found live snails at five sites including the original sites (sites 11, 14 (original); plus sites 8, 15, 16) (**Figure 1**). Two of the new locations were on isolated boggomosses on Mt Rose Station (Sites 15, 16) while the third was in riparian habitat along the Dawson upstream of the Isla-Delusion camping and water reserve (Sites 8). The two new locations on Mt Rose Station would also be inundated by the proposed Nathan Dam. The population on the main Mt Rose site was estimated at >350 individuals whereas in 1996 it was estimated at <100. It was not possible to estimate the population at the other sites as a result of the low numbers of snails recovered, however in 1996 the estimated population at Isla-Delusion crossing was <500.

Given the 'Critically Endangered' status of the snail, and the projected inundation of the population at Mt Rose Station, the successful translocation of this population is considered a crucial mitigating action requiring detailed investigation. Furthermore, the threats to the survival of the species, as outlined in the Recovery Plan, are considerable. Without practical intervention, the species could be forced to extinction through impacts that result from these existing threats. A lightening strike and ensuing fire at the Mt Rose site could be catastrophic for the species. Conduct of translocation trials, potentially leading to establishment of further and physically separate viable populations, would be an appropriate conservation action irrespective of the potential impact of the proposed Nathan Dam.

In order to demonstrate that successful translocation could be achieved, it was suggested by the DEWHA (letter to Project Manager, Nathan Dam and Pipelines project dated 19 August 2008) that translocation trials, under the supervision of the Recovery Team for the species, be conducted to determine the feasibility of this option. SunWater engaged Dr John Stanisic, author of the Recovery Plan and the only scientist to have undertaken substantial investigations related to the species, to develop the translocation trial proposal.

The translocation trials would involve the movement of individuals from the Mt Rose population to one or more of the sites considered to be suitable habitat and not to be directly affected by the Nathan Dam project. From the information gathered in the 2008 survey, three broad habitats that can be utilised for the trials present themselves:

- Riparian;
- Brigalow; and
- Boggomoss.

The trials would comprise test sites in riparian and brigalow habitat and a control site in the existing boggomoss habitat at Mt Rose. The source population would be the Mt Rose population. Populations

at the other three known sites would not be used as sources of colonists so would be left undisturbed by the trials.

Suitable riparian habitat is sparse between Taroom and Theodore due to land clearing and flood impacts. The riparian habitat represented by the Isla-Delusion area is the most extensive (approximately 44.5 ha) and includes a variety of flood immunity levels. It has evidenced survival of the snail for at least 12 years but should not be regarded as optimal habitat for the species. However, the fact that it has been able to support a breeding population makes it suitable for translocation trials if not for actual translocation.

The gilgaied brigalow habitat that once existed on the alluvial flats of the Dawson formed part, and possibly formed the core of the Boggomoss Snail distribution. However, this has largely been cleared but besides small remnant areas, corridors of brigalow regrowth exist on alluvium in the Taroom area. These are similar in structure to those inhabited by a sister snail species at Chinchilla. These habitats are also considered suitable for the conduct of snail translocation trials provided measures are taken to exclude stock. There may also be other such habitats outside the inundation zone in the Taroom area which are yet to be identified.

A total of 23 boggomosses were investigated during the 2008 or previous surveys. Only those which support substantial tree, hence litter, development are potentially suitable as translocation sites. No such sites currently exist though a number could be rehabilitated to potentially provide suitable habitat. Hence no new boggomoss sites are proposed to be used in the trial.

The Mt Rose boggomoss currently estimated to harbour the main mass of the Boggomoss Snail distribution would be used as a control site to see whether the mechanics of translocation have any bearing on the outcomes of the trials. Handling and even short-distance removal of snails from their microhabitats may be important complicating factors affecting the outcome of the trials.

Source Population

The only available source population of sufficient size is that on a boggomoss on Mt Rose Station.

Composition of transfer groups. Sometime prior to the 2009-2010 breeding season, Boggomoss Snails will be collected from the Mt Rose boggomoss for transfer to the enclosures at the trial sites. Each off-site enclosure will receive 20 adult individuals while the on-site enclosure will receive 10 adult, 10 sub-adult and 10 juvenile snails. The latter size ratio is not a strict requirement but represents a reasonable target. This means 40 adult snails will be moved off-site and 30 snails will be collected for use in the on-site control enclosure.

The entirely adult composition of the individuals to be transferred to the off-site enclosures was chosen so as to maximise the chances of breeding but to minimise the impact on the source population. Those chosen for the on-site enclosure were selected to provide a representation of the source population and for monitoring survival, egg-laying and growth rates.

It is suggested that less than 20 adults may not provide a viable F1 generation at the trial locations, allowing for natural mortality and a range of fecundities within the translocated individuals. The lower number at the control location places some limits on the statistical comparison between control and experimental sites but takes into account the likely development of sub-adults, and to a lesser extent juveniles, during the course of the project.

Effects of Removal

The size of the Mt Rose population of the Boggomoss Snail is estimated as > 350 individuals. This is a viable breeding population (judging by the juveniles collected on the recent survey) and the initial removal of 40 individuals to the off-site locations (approximately 11% of the population) should not have a detrimental effect on the source population. The control individuals will remain on the boggomoss, though separated from the remainder of the population. At the conclusion of the

experiment they can be returned to the population or be translocated, if the trial process is successful and full translocation is approved.

It should also be noted that no snails at the other three known locations will be involved in the experiments so their populations will not be disturbed. The number of snails to be moved from the Mt Rose site probably comprises in the order of 5% of this total population.

Predator reduction actions on the Mt Rose boggomoss can potentially compensate for the removal of individuals from Mt Rose because BAAM (2009) found 63% of dead individuals had been predated by mice and rats. As the number of dead shells found was nearly 10x the number of live snails, the impact of this predation is clear.

Collection and Relocation Methods

Collection. The 70 Boggomoss Snails to be transferred to enclosures will probably be able to be collected over a period of two to three days (depending on success of collection each day).

Boggomoss Snails will be collected under the supervision of Dr John Stanisic (a Boggomoss Snail expert) and placed into suitable transportable holding containers together with leaf litter and other debris from the source site.

Prior to being placed in these containers each Boggomoss Snail will be measured and the shell marked with an acrylic waterproof paint. This method of marking snails has been used elsewhere without any detrimental effects to the snail.

Holding containers will consist of terraria specifically designed for holding invertebrates and commonly used by the Queensland Museum. These will be ventilated and stored in a cool, shady area prior to transport.

Transfer. Holding containers will be placed in eskies for transport by vehicle to the predator free enclosures located at the trial sites.

Each Boggomoss Snail will be carefully located in the enclosure either among moist leaf litter or under logs depending on the size of the individual.

The collection and translocation process does pose some risks to the snails because of the physical disturbance involved however previous handling by Queensland Museum staff suggests the process is relatively low risk if conducted with due care and attention by trained staff.

Translocation enclosures

To meet the ecological requirements of the Boggomoss Snail, predator proof enclosures will be established at the trial locations. These enclosures will be at least 3m x 3m and consist of a gabled frame covered by shade cloth or chicken wire with roof holes to allow for leaf fall. Habitat in the enclosures will be natural in situ grass, supplemented with timber logs and leaf litter as required. They will be of sufficient height and structure to allow for ease of human access without endangering the resident snails. As predators have been shown to be a significant issue for the snail, a predator proof barrier will be placed around the base of the enclosures to a height of approximately 750mm and be embedded in the ground to a depth of 300mm. Scaffolding planks will be supported within the enclosures to allow monitoring without causing accidental trampling of the snails.

The fuel load in the area immediately surrounding the enclosures will be maintained at low levels to reduce the risk of fire. The climate and habitat at the trial sites are within the known limits for the species as the sites are within its traditional range. However, small weather stations will be located at each of the sites to record fluctuations in temperature, humidity and rainfall. The precise location of the enclosures will be selected based on the suitability of the in situ microhabitat and safety in terms of keeping the sites out of the public gaze (particularly in the Isla-Delusion area). At the Isla-

Delusion area this will include inspection to ensure no snails currently exist at the specific location, though a nearby group is not problematic for the experiment.

Natural climatic fluctuations can have drastic impacts on snail populations. Prolonged periods of dry weather can either restrict the activity periods of snails (affecting both feeding and egg-laying) or cause death through desiccation (especially in eggs and juveniles). Because the trials need to demonstrate the feasibility of translocation, optimal conditions for survival will need to be maintained in the off-site enclosures. In order to provide these optimal growing conditions the following will be undertaken:

- food will be supplemented with commercial fungi (*Agaricus* sp.) and a bran/calcium mix during the establishment period only. [The species was successfully maintained in captivity by the Queensland Museum on such a mixture].
- moisture will be supplemented with the construction of a timer-operated misting system.

The on-site control enclosure will have no supplementation of food and moisture and therefore reflect the feeding and climatic conditions on the boggomoss. This population will provide baseline ecological data on the species. It has been suggested that monitoring of the existing population on the boggomoss, including mark-recapture, should be carried out in situ. This is considered impractical given the complexity of the boggomoss habitat and the potential damage caused to snails and the habitat by searching for the marked individuals.

Operational targets

- collect 20 adult snails from the Mt Rose boggomoss for transfer to each of two off-site enclosures (40 snails in total) located in brigalow and riparian habitats prior to the beginning of the 2009-2010 breeding season (Spring 2009). These constitute the F1 generation.
- collect 30 snails (approximately equal numbers of adults, sub-adults and juveniles) from the Mt Rose boggomoss for transfer to an on-site enclosure (control, that is the specimens are not moved off the Mt Rose boggomoss) prior to the beginning of the 2009-2010 breeding season (Spring 2009).
- measure and mark all individuals being moved (at transfer).
- conduct monthly monitoring of all enclosures to measure initial survival and movement of marked snails within the enclosures.
- confirm egg-laying and clutch size through inspection of all enclosures during the first breeding season (Oct 2009-March 2010).
- observe juvenile development (F2 generation) in the enclosures after first breeding season (Oct 2010-March 2011) through the recorded presence of unmarked juvenile individuals. If juveniles are observed, move F1 adults to a separate partitioned space within the trial enclosures and mark new recruits in order to monitor the recruitment of F2 generation juveniles into the adult population. (Note the separation will ensure there is no confusion between an F2 breeding event and a second F1 breeding event and will achieve this result without the need to undertake genetic inspection)
- confirm egg-laying and clutch size through inspection of all enclosures during the second breeding season (Oct 2010-March 2011). The F1 and F2 generations will be inspected and maintained separately.
- observe recruitment of the second F2 generation (from F1) and the first F3 (from F2) individuals in the enclosures after second breeding season (Oct 2011-March 2012) through the recorded presence of unmarked individuals in the separated parts of the enclosures.

- terminate trials in early 2012 and make recommendation on the feasibility of translocation.

Note that it is not recommended that testing whether snails are gravid or observation during egg laying be conducted because the former requires internal analysis and the latter is very disturbing during a critical period. Proof that eggs have been laid can be confirmed by observation post the event or by the recognition of young juveniles. The ability to confirm breeding by the F2 generation can be accommodated by physically separating all F1 individuals within the enclosure. They can then be separately monitored to confirm a second breeding event.

Defining success in translocating the Boggomoss Snail

Sherley (1994) suggests that evidence of a 'self-sustaining population' is prime criterion for successful translocation. Even the presence of breeding individuals is in itself not considered to constitute success (Dodd & Seigel 1991). A translocation trial in which F2 and F3 generation snails are recruited into the population is considered a robust measure of success. That is, the originally translocated snails must breed and produce viable young which then also breed and produce viable young (the grandchildren of the originally translocated snails). The success, or otherwise, of the Boggomoss Snail translocation trial can only be determined through long-term monitoring.

Success criteria are divided into "mandatory" (must achieve) and "non-mandatory" (not essential, but would be preferred) criteria. The relative success or otherwise with respect to achievement of non-mandatory criteria will be thoroughly discussed in the final report.

Mandatory criteria

1. F1 generation (the translocated snails) must produce young (juveniles recorded) more than once

2. F2 generation must produce young that reach maturity (being adult stage)

3. The rate of population growth at the conclusion of the trials in test sites must be greater than, or at least not be significantly different from, that at the control location (the latter is in case the control population declines for natural reasons and it is appreciated that there is only one control and two test locations but statistical certainty is sacrificed for sake of not placing undue risk on the species)

Non-mandatory criteria

1. 80% survival of translocated adult individuals for at least 3 months after translocation

2. The proportion of F1 off-spring surviving for at least 3 months is not significantly different between test and control locations

[The latter will allow for an interim assessment of the likelihood of F1 off-spring developing into a viable F2 generation.]

Treatment of snails at conclusion of trials

If the trials are successful then the translocated snails will remain where they are. SunWater will include release of those snails from the enclosures and translocation of the extant populations at and near Mt Rose as a mitigation strategy in the Nathan Dam and Pipelines EIS. The detail of the full translocation will be provided at that time. This will be one aspect which the Minister will consider at that time regarding approvals for the Project.

If the trials are not successful but snails remain alive at the translocation sites, they will be released at that site. Two of the sites are existing snail habitat so this action is low risk and will return the snails to the existing larger population. As the snails at the brigalow site will be in quite different

habitat to the Mt Rose boggomoss, return to the boggomoss was not considered suitable as the snails may have been exposed to different pathogens.

2.2 Alternative locations, time frames or activities that form part of the referred action
n/a

2.3 Context, planning framework and state/local government requirements

The boggomoss snail *Adclarkia dawsonensis* is currently listed as 'Critically Endangered' under the EPBC Act. A Recovery Plan for the species has been prepared (Stanisic, 2008).

Since the Nathan Dam and Pipelines project was referred to DEWHA (17 June 2008), SunWater and DEWHA have been liaising regarding the interaction between the Nathan Dam project, the Boggomoss Snail Recovery Plan and possible translocation trials. In a letter to SunWater dated 19 August 2008, DEWHA suggested that a translocation trial be undertaken and gave success criteria as 70% survival of translocated individuals. In a letter dated 3 October 2008 DEWHA supported the field surveys which were to be conducted prior to any translocation trials. As a result of those surveys the author of the Recovery Plan has now suggested that the translocation trials proceed and he has a prepared a proposal to do so. That plan is the subject of this referral.

The successful conduct of the translocation trial will provide the basis for the total translocation of the Mt Rose Boggomoss Snail population prior to construction of Nathan Dam, should it be approved. Snails would also be translocated at that time from the two other boggomosses near Mt Rose on which the snail was recently found.

If the trial was not successful and a proposal to construct Nathan Dam was submitted for approval, the action may be seen as contradictory to the recovery plan. SunWater understands that this will not be the only aspect considered by the Minister at that time.

No international agreements currently list the boggomoss snail.

The boggomoss snail is not listed under threatened species legislation in Queensland, though such listing is a recommendation of the Recovery Plan.

No protocols or guidelines exist for the translocation or conduct of translocation trials of invertebrates in Australia. Consequently the design of the translocation trial has been initially based on guidelines used by the New Zealand Department of Conservation for the transfer of all indigenous flora and fauna. Although these guidelines were developed for translocation they also have relevance to the conduct of translocation trials. They are based on numerous experiences of actual translocation, many involving invertebrates (including snails) and aim to ensure both sound justification for intended translocation and that all foreseeable implications of these are considered. Lessons learnt from the New Zealand experiences have resulted in designing a trial that recognises the reasons for failure of early attempts in New Zealand.

2.4 Environmental impact assessments under Commonwealth, state or territory legislation
n/a

2.5 Consultation with Indigenous stakeholders
The recovery plan for the species notes that "there has been no indication that the species is significant to local Indigenous people" furthermore, "the Gurang Land Council was provided with the opportunity to comment on the recovery plan. No comment was received however traditional owners will be encouraged to be involved in further consultation and implementation of recovery actions where appropriate" (Stanisic, 2008).

As part of the greater Nathan Dam project SunWater will work with the relevant native title applicants to develop cultural heritage management plans (CHMPs) for the sections of their claims that are impacted by the project. Where no native title claims exist, SunWater has invited (by public notice) interested aboriginal parties to participate in the development of CHMPs.

CHMPs will be developed over all parts of the Nathan Dam project subject to the following native title claims:

- The Wulli Wulli people have a registered native title claim (QC99/005) over the land occupied by the proposed dam wall and the lower section of the impoundment area (both sides of the Dawson River downstream of Cockatoo Creek on the right bank and Spring Gully on the left bank).
- The remainder of the proposed dam impoundment (the upstream section) is not the subject of a registered native title claim, and two aboriginal parties (the Wulli Wulli and Iman #2 people) have formally registered their interest in the cultural heritage of the area in response to a public notice placed by SunWater.

2.6 A staged development or component of a larger project

As discussed in section 2.1, approval for the Nathan Dam project is in part dependant on the success of the translocation trial of the Boggomoss Snail. The translocation trial forms a component of the Nathan Dam project which has already been referred to the Department of Environment, Water Heritage and the Arts (no. 2008/4313) and a decision made that it constitutes a 'Controlled Action'. The Recovery Plan for the Boggomoss Snail was not in place at the time the referral was submitted. The Recovery Plan timeframe is 2007 – 2011. Information generated by the trials will likely be taken into account when re-drafting the Recovery Plan and it will be contingent upon SunWater to show that the Nathan Dam and pipeline project does not conflict with the Recovery Plan as it stands at that time.

Should the trial be successful and the Nathan Dam project approved, SunWater will request approval to undertake full translocation of all individuals in areas to be inundated be the dam.

3 Description of environment & likely impacts

3.1 Matters of national environmental significance

3.1 (a) World Heritage Properties

Description

No World Heritage Listed properties exist within the project area.

Nature and extent of likely impact

The proposed action is not likely to have an impact on any World Heritage Properties

---

3.1 (b) National Heritage Places

Description

No National Heritage Places exist within the project area.

Nature and extent of likely impact

The proposed action is not likely to have an impact on any National Heritage Places.

3.1 (c) Wetlands of International Importance (declared Ramsar wetlands)

Description

No Wetlands of International Importance exist within the project area.

Nature and extent of likely impact

The proposed action is not likely to have an impact on any Wetlands of International Importance.

3.1 (d) Listed threatened species and ecological communities

Description

The boggomoss snail Adclarkia dawsonensis is listed as 'Critically Endangered' under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The EPBC Protected Matters search tool identified another 13 threatened species or species habitats that may occur within the project area.

Nature and extent of likely impact

The size of the Mt Rose population of the Boggomoss Snail is estimated as > 350 individuals. This is a viable breeding population (judging by the juveniles collected on the recent survey) and the initial removal of 40 individuals (approximately 11%) to the off-site locations from the site should not have a detrimental effect on the source population. Thirty individuals will also be moved from one location on the boggomoss to another on the same boggomoss, though separated from the remainder of the population. Because observations throughout the experiment will occur primarily within the enclosures, the natural environment at the Mt Rose and Isla-Delusion crossing sites will remain largely undisturbed. In order to provide mitigation for the removal of 11% of the population at Mt Rose, a predator reduction program has been developed. Recent surveys (BAAM 2009) estimated over 63% of the dead shells found had been predated by mice and rats and a trapping survey found high numbers of these predators. The predator reduction program is suggested as potentially compensating entirely for the number of snails used in the experiments.

Similarly the frequent presence of researchers at the sites will allow rapid intervention should a problem be observed, such as a break in the fence at Mt Rose.

It should also be noted that no snails at the other three known locations will be involved in the experiments so their populations will not be disturbed. The number of snails to be moved from the Mt Rose site probably comprises in the order of 5% of this total population.

The population proportions noted above represent the worst case scenario in terms of impact to the existing population should the experiments fail completely and all snails used in the experiments die. This is considered a very low probability because two of the sites are existing snail habitat and one, the control location on the Mt Rose boggomoss, is the core of the distribution. If the experiments achieve their desired outcome the total population of the Boggomoss Snail will have increased overall.

Due to the very targeted nature of the translocation trial, its very small footprint of impact and lack of identifiable likely secondary impacts, the proposed action is not likely to have an impact on any other threatened species.

3.1 (e) Listed migratory species

Description

The EPBC Protect Matters search tool identified 13 migratory species or species habitat that may occur within the project area.

Nature and extent of likely impact

Due to the targeted nature of the translocation trial, the proposed action is not likely to have an impact on any Listed Migratory Species.

3.1 (f) Commonwealth marine area

Description

No Commonwealth marine areas exist within or in close proximity to the project area.

Nature and extent of likely impact

The proposed action is not likely to have an impact on any Commonwealth marine areas.

3.1 (g) Commonwealth land

Description

No Commonwealth land exists within the project area.

Nature and extent of likely impact

The proposed action is not likely to have an impact on any Commonwealth land.

3.2 Nuclear actions, actions taken by the Commonwealth (or Commonwealth agency), actions taken in a Commonwealth marine area, or actions taken on Commonwealth land

3.2 (a)	**Is the proposed action a nuclear action?**	X	No
			Yes (provide details below)

If yes, nature & extent of likely impact on the whole environment

3.2 (b)	**Is the proposed action to be taken by the Commonwealth or a Commonwealth agency?**	X	No
			Yes (provide details below)

If yes, nature & extent of likely impact on the whole environment

3.2 (c)	**Is the proposed action to be taken in a Commonwealth marine area?**	X	No
			Yes (provide details below)

If yes, nature & extent of likely impact on the whole environment (in addition to 3.1(f))

3.2 (d)	**Is the proposed action to be taken on Commonwealth land?**	X	No
			Yes (provide details below)

If yes, nature & extent of likely impact on the whole environment (in addition to 3.1(g))

3.3 Other important features of the environment

3.3 (a) Soil and vegetation characteristics

The preferred habitat of the species is the black soil alluvial flats (floodplain) of the Dawson River. Historically, these were an extensive archipelago of habitats supporting a locally circumscribed vegetation community located between the stream-bound riparian habitats dominated by *Livistona nitida* and the drier scrubs of the surrounding hillsides.

The Boggomoss Snail on Mt Rose Station occurs in a highly altered landscape. The black soil alluvial floodplains of the Dawson between Taroom and Theodore have been highly modified for farming. In this context, the Mt Rose boggomoss environments (where the main mass of the species is located) are refugial remnants of these habitats maintained by the moisture from the associated aquifer.

According to the CSIRO land system maps the Mt Rose alluvial flats were largely 'brigalow country on alluvium associated with the Dawson River'. The soils were depositional alluvium on deep cracking clays with gilgai formations. The vegetation was brigalow with some shrub understorey and associated grassland (Speck *et al*. 1968). It would therefore appear that these gilgaied brigalow habitats formed the historical core area of Boggomoss Snail distribution.

That the relatively thin-shelled Boggomoss Snail is able to survive near the boggomoss is due to a combination of the moist environment (maintained through good ground cover and a relatively closed canopy) and the accumulation of deep litter and timber.

The 2008 survey indicates very strongly that the critical environmental requirement of the species is deep, moist litter and fallen timber. These provide food, shelter and egg-laying sites for the snail. A closed or relatively closed canopy appears vital to maintaining a stable moist environment.

3.3 (b) Water flows, including rivers, creeks and impoundments

Glebe Weir on the Dawson River sits adjacent to the known Boggomoss Snail locations on Mt Rose station. The downstream Gyranda Weir sits adjacent to the population at and near Isla-Delusion crossing.

3.3 (c) Outstanding natural features, including caves

No outstanding natural features are known to exist within translocation area.

3.3 (d) Gradient (or depth range if action to be taken in a marine area)

The general area is characterised by low undulating plains and river flats.

3.3 (e) Buildings or other infrastructure

The project will not affect buildings or other infrastructure. The enclosures will be approximately 3m x 3m.

3.3 (f) Marine areas

The Project will not affect marine areas. The estuary of the Fitzroy River commences approximately 625 km downstream.

3.3 (g) Kinds of fauna & flora

The Project will not affect any fauna or flora other than that already described.

3.3 (h) Current state of the environment in the area

Extensive clearing has occurred over the species natural distribution, with native vegetation now largely restricted to Eucalypt and softwood scrub highlands and along watercourses. Extensive areas of native and improved pastures support beef cattle grazing, while dryland and irrigated grain and

fodder cropping occurs on alluvial plains. Soil degradation is evident throughout the area, in particular in areas of recent clearing. The area immediately surrounding sites 15 and 16, and adjacent site 11, is cleared farming country which is often irrigated by a centre pivot irrigator.

3.3 (i) Other important or unique values of the environment

Numerous boggomosses have been identified in the vicinity of Glebe Weir. Boggomoss Area No 1 is located on Mt Rose Station and comprises 800 ha of land situated to the north of the confluence of Cockatoo Creek and the Dawson River. Boggomoss Area No 2 comprises 300 ha of land situated to the east and extending into Nathan Gorge and along Price Creek on the property 'Boggomoss'. State Nature refuges for the protection of boggomosses have been established on the properties 'Mt Rose' and 'Boggomoss'. Boggomoss Area No 1 provides known habitat to the boggomoss snail.

3.3 (j) Tenure of the action area (eg freehold, leasehold)

The proposed trial locations are on leasehold, freehold and crown reserve land. SunWater will negotiate for the conduct of the trials on the various jurisdictions.

3.3 (k) Existing land / marine uses of area

The predominant land use in the area is agriculture.

3.3 (l) Any proposed land / marine uses of area

The Project does not propose any new land use.

4 Measures to avoid or reduce impacts

The design of the translocation trial has considered and incorporated the following measures to increase the likelihood of a successful trial or to mitigate the removal of individuals from Mt Rose.

Management of Threats and Contingency

The threats or circumstances that could cause the translocation trials to fail include:

- Predators. Specific threats are rodents and possibly reptiles. This threat will be managed by making the trial enclosures predator proof. Rats and mice will also be trapped in the broader Mt Rose boggomoss area in order to reduce the threat to the source population. Appropriate permits will be sought from the Queensland EPA
- Fire. The build up of fuel loads at the trial sites has the potential to encourage fires which could destroy the snail enclosures, and possibly the snails. This threat will be managed through appropriate fire abatement programs such as reducing fuel load in the immediate vicinity of all enclosures.
- Stock grazing. Cattle have the potential to damage the snail enclosures. This threat will be managed by ensuring the construction standard of the enclosures is sufficient to withstand such interaction. Note that stock are currently excluded from the Mt Rose site.
- Handling. There may be an associated risk to the translocated snail populations due to regular handling for monitoring purposes. This risk will be assessed as part of the on-going program and if necessary the monitoring program will be reviewed. The design of the enclosures includes internal raised planks upon which researchers will walk in order to avoid trampling of snails.
- Drying of the habitat. Snails can suffer natural attrition due to prolonged dry periods. This threat will be managed by installing a water reticulation system at the off-site enclosures.
- Lack of food. Food is provided through natural decomposition processes. Food at the off-site enclosures will be artificially supplemented during the initial stages of the trial. Initial selection of the enclosure locations will largely be based on a suitable micro-habitat being available, including food resources. Previous translocations (in New Zealand) failed because shade cloth prevented leaf litter from entering the area. The design of the boggomoss snail enclosures allows natural litterfall to enter the enclosure.
- Disease. Any pathogens associated with the relocated individuals will also be present in the source population. At present there are no known pathogens in the source population.
- Failure to collect the preferred number of Boggomoss Snails. If Boggomoss Snail numbers in the period allowed for collection are low then the collection period will be extended. Further sites within the collection area will then be checked to ensure that additional snails, in accordance with the population size prediction, exist. If upon reassessment the population is estimated to be less than 300, work will cease till DEWHA can assess the result.
- Failure of the trials to achieve any of the operational targets. As an example, the F1 translocated snails may not breed in the first year of transfer or the F2 generation may not breed in their first year. If this occurs the trial may be extended, at SunWater's discretion, and the results at test sites compared to that at the control location before a decision is made with respect to termination of the trials.
- Failure of the trials to achieve the success criteria. The degree by which the criteria were not met will be reported and the experiment will be reviewed to determine the cause or causes of failure. Justification of further trials will be considered at that time and would include a reassessment of the extant populations at the known sites.

- Secondary ecological impacts caused by the trials. Given the very specific nature of the trials and the small scale of the enclosures, no secondary impacts on non-target species are expected.

Project Team

A team (final composition yet to be determined) led by land snail expert, Dr John Stanisic (Project Leader), will form the translocation trial team. All members of the team will be experienced in field survey and will include one member with botanical skills. A dedicated Research Officer (to be employed by BAAM, a company of which Dr Stanisic is a Director) will be appointed to run the research part of the project and assist with monitoring the trials.

Monitoring and Research Program

The Boggomoss Snail trial populations will be monitored generally on a monthly basis but more frequently during the breeding season. A dedicated research officer will undertake all monitoring under the supervision of Dr John Stanisic.

Mark-recapture monitoring will be used to establish movement patterns and growth rates. A series of intense short term monitoring events will supplement the regular monitoring. Each year's new recruits will be marked such that the cohort is identifiable.

Research on breeding and lifecycle will be carried out in conjunction with the above.

An annual inspection of the extant populations in the four known locations will be undertaken for the purpose of confirming their continued presence and producing population estimates where possible in line with procedures used in the recent field surveys. The exact locations from which snails were collected for the trials will be inspected to see if any recolonisation has occurred.

Weather stations will be established at each site to record temperature, rainfall and other relevant parameters.

Ongoing vegetation management in the snail enclosures will be required to ensure regrowth does not affect the enclosures or access for monitoring.

Reporting

Written reports will be submitted every 6 months (approximately April and October). Succinct interim reports will be provided after each regular or intense monitoring event. A final report with recommendations will be presented in April 2012. DEWHA will be informed immediately of any unexpected circumstances that may affect the experiments. DEWHA is invited to accompany the research team during monitoring events.

5 Conclusion on the likelihood of significant impacts

Identify whether or not you believe the action is a controlled action (ie. significant impacts on the matters protected under the Act are likely) and the reasons why. If you think that the action is a controlled action, you must also identify the relevant protected matters in section 5.3. (An action is a controlled action if it has, will have, or is likely to have a significant impact on a matter protected by a provision of Part 3 of the EPBC Act).

5.1 Do you THINK your proposed action is a controlled action?

	No, complete section 5.2
X	Yes, complete section 5.3

5.2 Proposed action IS NOT a controlled action.

Specify the key reasons why you think the proposed action is not a controlled action (ie. NOT LIKELY to have significant impacts).

5.3 Proposed action IS a controlled action

Type 'x' in the box for the matter(s) of the EPBC Act that you think are likely to be impacted (controlling provisions).

	Matters likely to be impacted
	sections 12 and 15A (World Heritage)
	sections 15B and 15C (National Heritage places)
	sections 16 and 17B (Wetlands of international importance)
X	sections 18 and 18A (Listed threatened species and communities)
	sections 20 and 20A (Listed migratory species)
	sections 21 and 22A (Protection of the environment from nuclear actions)
	sections 23 and 24A (Commonwealth marine environment)
	sections 26 and 27A (Protection of the environment from actions involving Commonwealth land)
	section 28 (Protection of the environment from Commonwealth actions)
	Sections 27B and 27C (Commonwealth Heritage places outside the Australian Jurisdiction)

Specify the key reasons why you think the proposed action is a controlled action (ie. LIKELY to have significant impacts).

The referrer believes that the translocation trial for the boggomoss snail is a controlled action because it will involve actions that will directly impact a critically endangered snail and the snails' habitat. However the level of impact is not predicted to be significant because:

- Snails will be removed from only 1 of the five known locations
- The number of snails to be removed from the Mt Rose site is the minimum with which the trials can feasibly be conducted and comprises approximately 11% of the population.
- Predator reduction at Mt Rose is predicted to substantially compensate for the removed individuals irrespective of the results of the translocation trial
- The frequent presence of researchers will allow reactive management should problems, unassociated with the trials, occur at the sites
- At the conclusion of the experiment the Mt Rose enclosure will be dismantled so that snails can interact with the extant population

6 Environmental history of the responsible party

NOTE: If a decision is made that a proposal needs approval under the Act, the Minister will also decide the assessment approach. The EPBC Regulations provide for the environmental history of the party proposing to take the action to be taken into account when deciding the assessment approach for actions that need approval under the Act.

		Yes	No
6.1	**Does the party taking the action have a satisfactory record of responsible environmental management?** **Provide details** SunWater has an Environmental Management System based on ISO 14001:2004 and certified by SAI Global. A system of monitoring occurs to capture adverse trends so action can be taken before an environmental incident that breaches the Law (Commonwealth or State) can occur. Furthermore an internal auditing process is in place to facilitate continual improvement in environmental performance. The key research scientist, Dr John Stanisic, is a land snail expert, former Queensland Museum curator and author of the Recovery Plan for the species.	X	
6.2	**Has the party taking the action ever been subject to any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources?** **If yes, provide details** One of SunWater's subsidiary companies is currently involved in proceedings instituted in the Federal Court under the Environment Protection and Biodiversity Conservation Act 1999 (Cth) by the Wide Bay Burnett Conservation Council.	X	
6.3	**If the party taking the action is a corporation, will the action be taken in accordance with the corporation's environmental policy and planning framework?** **If yes, provide details of environmental policy and planning framework** See attached SunWater Environmental Policy	X	
6.4	**Has the person proposing to take the action previously referred an action under the EPBC Act?** **Provide name of proposal and EPBC reference number (if known)** Nathan Dam Project (no. 2008/4313)	X	

7 Information sources and attachments

(For the information provided above)

7.1 References

BAAM. 2009. Results of Boggomoss Snail survey. Unpublished report for SunWater. Biodiversity Assessment and Management Pty Ltd, Brisbane. [Prepared by Dr John Stanisic].

Dodd, C.K. & Seigel, R.A. 1991. Relocation, repatriation and translocation of amphibians and reptiles: are they conservation strategies that work? Herpetologica 47: 336-355.

Ingram, G.J. & Stanisic, J. 1997. Dawson River Project. Impact assessment study; Boggomosses (mound springs) and other spring fed areas. Queensland Museum: Brisbane.

Meads, M.J. 1994. Translocation of New Zealand's endangered insects as a tool for conservation. Pp. 53-56 *in* Serena. M. (ed.) 'Reintroduction biology of Australian and New Zealand fauna'. Surrey Beatty & Sons: Chipping Norton.

Sherley, G. 1994. Translocations of the Mahoenui Giant Weta *Deinacrida* n. sp. and *Placostylus* land snails in New Zealand: what have we learnt? Pp. 57-63 *in* Serena. M. (ed.) 'Reintroduction biology of Australian and New Zealand fauna'. Surrey Beatty & Sons: Chipping Norton.

Stanisic, J. 1996. New snails from boggomoss environrnents in the Dawson Valley, southeastern Queensland (Eupulmonata: Charopidae and Camaenidae). Memoirs of the Queensland Museum 39: 343-354

Stanisic, J. 2008. Recovery plan for the boggomoss snail *Adclarkia dawsonensis*. Report to Department of Environment, Water, Heritage and the Arts, Canberra. Environmental Protection Agency: Brisbane.

7.2 Reliability and date of information

The information used to prepare this referral was based on all of the information, including the most recent available data on the species, that data being collected in late 2008 by Dr John Stanisic. Historical data have also been used. This included a range of state and federal databases, as well a scientific reports and other publications. As far as SunWater and Dr Stanisic are aware, there are no further scientific data available on the species other than that referenced here.

7.3 Attachments

Indicate the documents you have attached. All attachments must be less than two megabytes so they can be published on the Department's website. Attachments larger than two megabytes (2mb) may delay the processing of your referral.

		✓ attached	Title of attachment(s)
You must attach	figures, maps or aerial photographs showing the project locality (section 1)	✓	Location of Boggomoss Snails
	figures, maps or aerial photographs showing the location of the project in respect to any matters of national environmental significance or important features of the environments (section 3)	✓	Location of Boggomoss Snails

If relevant, attach	copies of any state or local government approvals and consent conditions (section 2.3)	n/a	
	copies of any completed assessments to meet state or local government approvals and outcomes of public consultations, if available (section 2.4)	n/a	
	copies of any flora and fauna investigations and surveys (section 3)	✓	Results of Boggomoss Snail Survey (BAAM 2009)
	technical reports relevant to the assessment of impacts on protected matters and that support the arguments and conclusions in the referral (section 3 and 4)		
	report(s) on any public consultations undertaken, including with Indigenous stakeholders (section 3)	n/a	

8 Contacts, signatures and declarations

NOTE: Providing false or misleading information is an offence punishable on conviction by imprisonment and fine (s 489, EPBC Act).

Under the EPBC Act a referral can only be made by:

- the person proposing to take the action; or
- a Commonwealth, state or territory government, or agency that is aware of a proposal by a person to take an action, and that has administrative responsibilities relating to the action[1].

Project title:

8.1 Person proposing to take action

Name	Peter MacTaggart
Title	Project Manager
Organisation	SunWater
ACN / ABN (if applicable)	ACN 131 034 985
Postal address	PO Box 15536, City East QLD Australia 4002
Telephone	07 3120 0094
Email	Peter.mactaggart@sunwater.com.au
Declaration	I declare that the information contained in this form is, to my knowledge, true and not misleading. I agree to be nominated as the proponent for this action.
Signature	 Date 8/5/09

[1] *If the proposed action is to be taken by a Commonwealth, state or territory government or agency, section 8.1 of this form should be completed. However, if the government or agency is aware of, and has administrative responsibilities relating to, a proposed action that is to be taken by another person which has not otherwise been referred, please contact the Referrals Business Entry Point (1800 803 772) to obtain an alternative contacts, signatures and declarations page.*

8.2 Person preparing the referral information (if different from 8.1)

Individual or organisation who has prepared the information contained in this referral form.

Name	Peter MacTaggart
Title	Project Manager
Organisation	SunWater
Postal address	PO Box 15536, City East QLD Australia 4002
Telephone	3120 0094
Email	Peter.mactaggart@sunwater.com.au

Declaration I declare that the information contained in this form is, to my knowledge, true and not misleading.

Signature  Date 8/5/09

If the referring party is a small business (fewer than 20 employees), estimate the time taken, in hours and minutes, to complete this form (include your time reading the instructions, working on the questions and obtaining the information and time spent by all employees in collecting and providing this information).

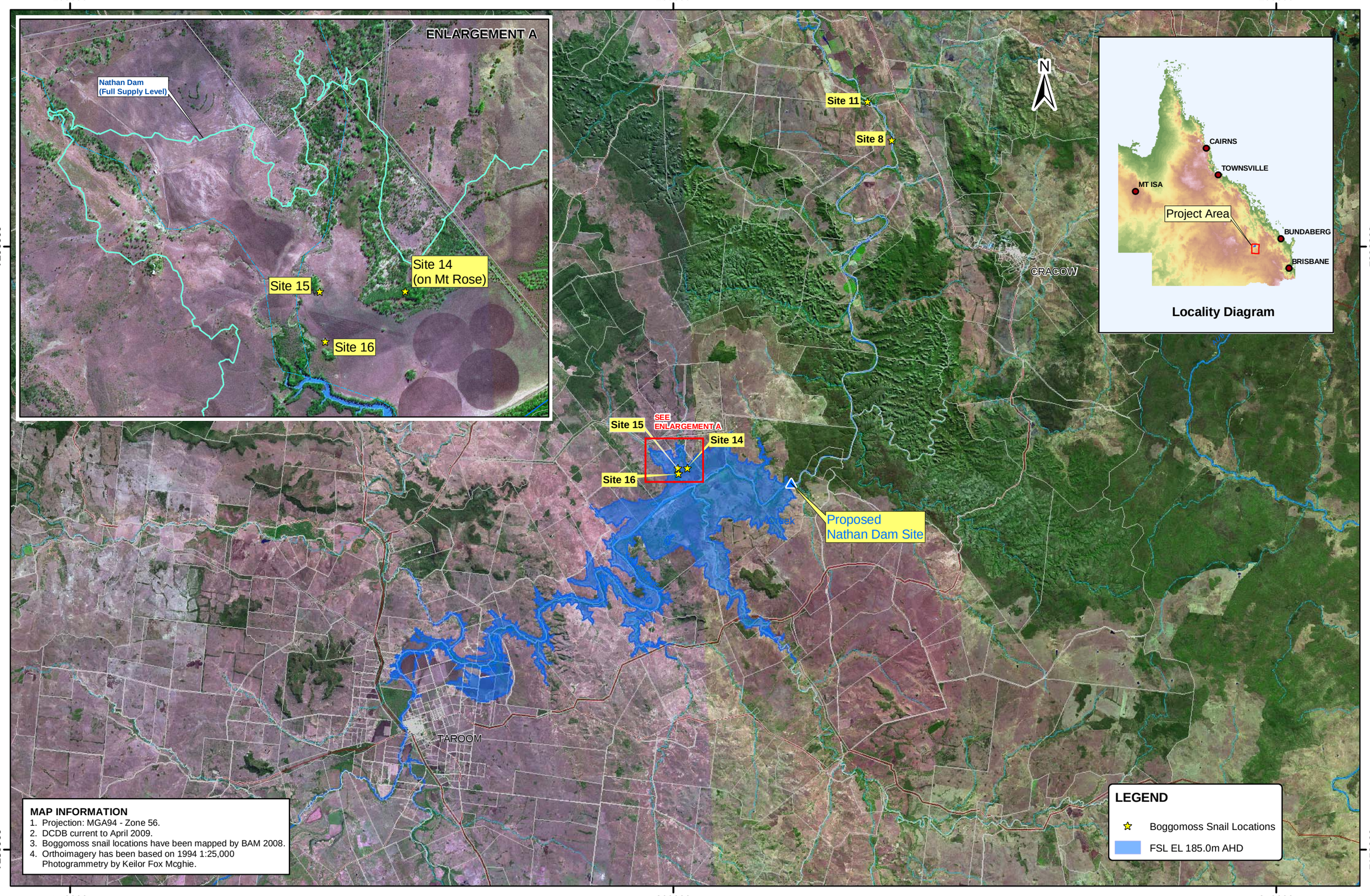
Hours	Minutes

REFERRAL CHECKLIST

NOTE: This checklist is to help ensure that all the relevant referral information has been provided. It is not a part of the referral form and does not need to be sent to the Department.

HAVE YOU:

- ❑ Completed all required sections of the referral form?
- ❑ Included accurate coordinates (to allow the location of the proposed action to be mapped)?
- ❑ Provided a map showing the location and approximate boundaries of the project area?
- ❑ Provided a map/plan showing the location of the action in relation to any matters of NES?
- ❑ Provided complete contact details and signed the form?
- ❑ Provided copies of any documents referenced in the referral form?
- ❑ Ensured that all attachments are less than two megabytes (2mb)?
- ❑ Sent the referral to the Department (electronic and hard copy preferred)?



REVISION					REFERENCED DRAWINGS	
DATE		REMARKS	CKD	PSD		

SCALES (A3 SIZE)

5,000 2,500 0 5,000 Metres

1:300,000

DRAWN	DESIGNED
SRA	F.V
CHECKED	CHECKED
JN	LB
APPROVED	
RP	
PLANNING MANAGER	

SunWater

DAWSON RIVER - AMTD 315.3km
NATHAN DAM SITE
LOCATION OF BOGGOMOSS SNAILS

FIGURE 1

DRAWING NUMBER
234068

DATE **13 MAY 2009**