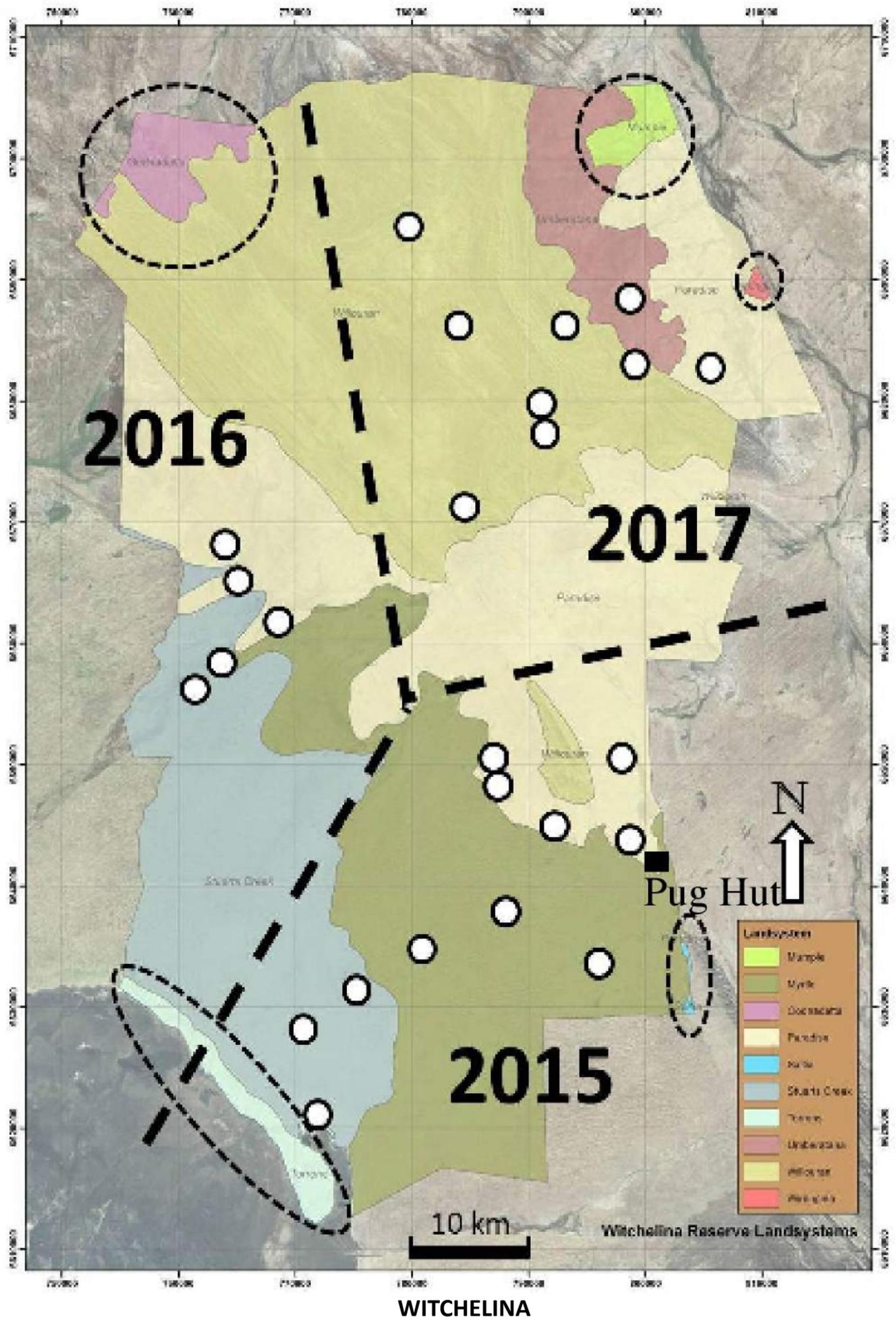




**Witchelina Expedition
2015
Expedition Manual**



The year numbers refer to this and proposed future surveys. The circles refer to previous survey sites. Pug Hut is approximately 20 km west of Lyndhurst

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Introduction

The Scientific Expedition Group Inc. is a non-profit organisation which aims:

- to promote and run expeditions of a scientific, cultural and adventurous nature.
- to encourage knowledge and appreciation of the natural environment.
- to promote the values and philosophies of wilderness to develop skills required for competent field work.
- to develop interpersonal skills by living and working towards a common goal.

The Scientific Expedition Group Inc. was established in 1984 and is a volunteer, non-profit organisation, relying on contributions and membership fees to organise and run expeditions and to produce the SEGments newsletter. Management of SEG is by a committee.

The Nature Foundation of South Australia is a not-for-profit wildlife charity which has worked to save, protect and restore South Australia's natural biodiversity since 1982. The Foundation focuses on three key areas:

- purchase and management of land with significant conservation value;
- funding conservation research;
- conducting environmental watering projects along the Murray River.

In the past Nature Foundation SA raised funds that have helped to purchase 21 properties that are now part of the National Reserve System. Many of these properties have been donated to other organisations to manage, including the Gawler Ranges National Park managed by SA DEWNR. Since 2010 Nature Foundation SA has purchased six properties which it now manages for conservation.

Witchelina station was purchased by the Nature Foundation SA in 2010 and this biodiversity survey will be used to prepare a management plan for its rehabilitation following many years of grazing.

Background Information on Witchelina

The Scientific Expedition Group's (SEG) 2015 survey will take place on Witchelina, a private reserve owned by the Nature Foundation SA (NFSA). Witchelina Pastoral Station was bought by NFSA in February 2010, and is now managed for nature conservation. Witchelina Reserve covers an area of 4,219 km². The reserve is located between the north-eastern shore of Lake Torrens and the township of Maree.

The varied landscape of Witchelina includes salt lake coast, extensive dune fields, undulating gibber country, old man saltbush and red gum along normally dry creeks, and rocky hills. Witchelina includes a significant proportion of the Willouran Ranges, an important refuge for arid zone plants and animals. The reserve protects ecosystems that are widespread in arid Australia, but were previously under-represented in Australia's Reserve System. Witchelina also contributes to the Trans-Australia EcoLink and the Flinders-Olary Nature Links corridor.

Overgrazing and predation by domestic and feral animals have caused declines and extinctions of animals and plants across southern Australia. Management of Witchelina Reserve has focused on reduction of grazing pressure from cattle, sheep and goats, and control of feral predators (cat and fox) (Nankivell & Johnston 2013).

Previous surveys of Witchelina Reserve

Witchelina had not been the subject of any systematic biological surveys prior to 2010, although the South Australian Biological Survey and Royal Geographical Society of South Australia had undertaken work in the stony deserts and salt lakes to the north (Brandle 1998a; Slaytor 1999), and the Flinders Ranges to the south of Witchelina (Brandle 1998b, 2001). The birds of the Willouran Ranges have been described by Badman (1981).

Since the NFSA took ownership of Witchelina there have been two biological surveys on the reserve. Visits to Witchelina by Birds SA, the South Australian Herpetology Group and the Mammal Group of the Field Naturalist's Society of South Australia have provided additional information on birds, mammals and reptiles.

The first biological survey was a 'Bushblitz' in October, 2010 (Bush Blitz Species Discovery Program 2013). This survey focused on exploration, rather than systematic sampling, and provided an important initial inventory of species on the Reserve. However the extent of field work was severely limited by adverse weather.

The second survey was carried out in September 2011 (EBS Ecology, 2012). This survey was commissioned by Nature Foundation SA to systematically survey the reserve, and set-up sites for future environmental monitoring.

Coverage of the Reserve by both the Bushblitz and EBS surveys and other visiting natural history groups was constrained by time available, limited access and the large size of Witchelina. In particular, access to the dune fields and Lake Torrens coast was limited by lack of access tracks and difficult terrain in the remote south of the Reserve.

The need & aims of the current survey

Knowledge of the fauna and flora of Witchelina is limited, despite previous surveys. There is a need to increase knowledge of what species live on Witchelina, and also to monitor changes in their distribution and abundance in response to management actions on the reserve.

The EBS Ecology survey quantified plants and/or animals present at each of 25 sites. These sites were established in five of the ten IBRA landsystems (major habitat types) on the reserve (EBS Ecology 2012). Thus five of the landsystems that occur there remain unsurveyed on Witchelina.

The survey will: (1) establish new survey sites so that each landsystem on Witchelina is sampled, and (2) revisit established survey sites so that changes in animal and plant distribution and abundance can be documented.

This survey will concentrate on the southern portion of Witchelina which is mainly dune and swale country.

Emergency Response Procedures

Medical Emergency

For all medical emergencies the first contact should be Bronwyn Forward.

Steps to manage a medical emergency

1. *Assess the area for any dangers* that may pose further threat to you, others or the casualty. When the area is safe, attend to the casualty (see point 2). If it is not possible to remove the danger or access the casualty without placing your own life at risk, call for help, and explain the dangers as well as the medical emergency.
2. *Assess the casualty.* Determine if the casualty is conscious by asking their name or seeking a response. If there is no response use your first aid training to check airways, and position casualty appropriately.
3. *Check breathing.* If the casualty is breathing place in recovery position and call 000. Apply first aid to any life threatening injuries that need immediate attention. If the casualty is not breathing call 000 for medical assistance then begin CPR and continue until medical assistance arrives.
4. *Continue to manage casualty.* Follow the advice and instructions provided by the emergency services. Try to keep the casualty comfortable and calm until medical assistance arrives.

Treatment for snake bite

Injected venom is mainly distributed via the body's lymphatic system, which is heavily influenced by patient movement. Decreased movement = decreased venom distribution. Recent medical research shows that the speed of application of an effective pressure-immobilisation bandage and splinting influences patient survivability.

The victim should lie still.

Do not ignore a trivial bite.

Do not cut, wash, clean or wipe the bite or apply chemicals or suction.

Apply a broad bandage to the limb firmly but not like a tourniquet. Starting at toes or fingers, extend the bandage to cover as much of the limb as possible, to inhibit movement. Bind over clothing rather than moving the limb to remove clothing.

Apply a splint to immobilise the limb, including the joints.

Mark the location of the bite on the bandage (for venom detection in hospital).

No food, only sips of water on victim's request.

Bring transport to the victim.

The best position for an unconscious person is on one side with the head supported.

If the victim develops major breathing difficulty, apply mouth to mouth respiration.

Call 000.

EMERGENCY PHONE NUMBERS

We have two satellite phones. Numbers are:

0011 8816 2245 9958

0011 8816 2144 5417

Witchelina homestead 8675 2001 (note that the homestead is 50 km over bad roads so this number should only be used if other methods are not successful)

Suggested Equipment List

Camping equipment

Backpack Must be comfortable to carry your survival kit, lunch, etc.

Tent Preferably mosquito-proof, with built-in floor

Sleeping mat Thermarest or Earthmat are best but foam or huff'n'puff type air mattress is O.K.

Sleeping bag, blankets etc

Eating utensils Unbreakable bowl, mug, knife, fork, spoon. Please keep in a labelled hygienic drawstring bag.

Named tea towel

Container or bags for lunch. A lunch box is best.

Pen, pencil, note book or clipboard and paper

Torch and spare batteries A reasonably powerful head torch is good for spotlighting night birds and animals.

Sunscreen Very necessary

Eye protection Sun glasses, goggles or ordinary glasses.

Insect repellent Lotion or roll-on 'Rid' is suggested.

Folding camp stool or chair

Camera Optional

Small binoculars Optional – good for bird watching

Small musical instruments Optional

Water bottle Essential! If you do not have a water bottle, Soft drink bottles, 1-1.5 litre, are strong and do not leak in your day pack.

Personal first aid kit Essential! May include pain treatment, alcohol swabs, assorted bandaids, bandages, antiseptic cream, tweezers, safety pins, etc.

Compass

Whistle To attract attention in emergency

Clothing suggestions

Boots must be strong with deep non-slip tread and good ankle support. Uppers should be leather or leather/synthetic combination. A suitable size is one that feels comfortable when worn with one or two pairs of thick socks. *They must be well broken in before extensive walking.* Hint for purchasing: Go in the afternoon after walking round for a while so your feet are warm and slightly swollen.

Camp shoes, e.g. sneakers.

Gaiters are good for preventing seeds and stones from getting in socks and boots

Warm garment (in case the evenings are cool)

Long sleeves and trousers protect arms and legs from sun. If shorts, etc, are preferred, use sun screen liberally.

Towel and personal toiletries

Waterproof garment Heavy duty poncho type are OK and not ridiculously expensive. Japara or Goretex are even better.

Hat that will protect your face and ears

Gloves for handling pitfall fences, etc

Snack food

While all other food is provided by SEG, expeditioners are asked to bring their own snack food, which is important to maintain energy levels during physical activity. We suggest muesli bars or scroggin - a mixture of nuts, dried fruit, lollies - whatever you fancy. Chocolate might melt!

Also bring some money for stops on the journey there and back.

Accommodation

Pug Hill Hut – Base camp

The base camp will be set up at Pug Hill Hut which is located approximately 50 kms from the Witchelina homestead. The hut offer basic bedrooms, a kitchen, science rooms and a store room. There is no personal accommodation available in the hut.

All accommodation for expeditioners is in their own tents and there is a clear level area for tents near to the hut. See diagram below.

The hut will be powered by a generator which will power lights, fridges and other small appliances. There may be a period during the night where we need to rest the generator but this will be discussed at the start of the expedition.

There will be two long drop toilets.

Water is available for washing but there are no showers.

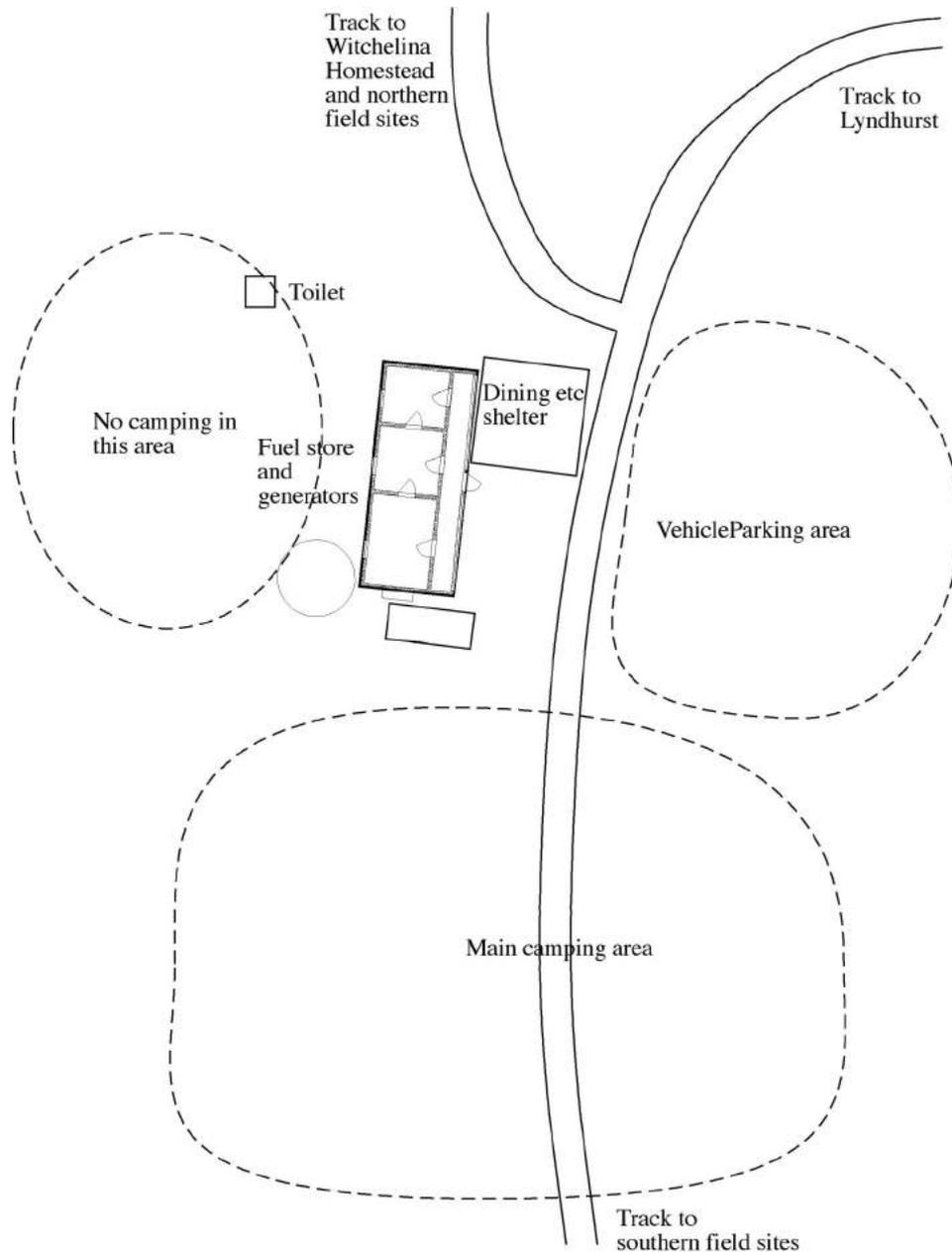
Telephone

Mobile phone reception is not available on Witchelina.

Lab/Processing area

A science area will be set up in two of the rooms of Pug hill Hut. There are numerous tables and chairs available and power will be supplied. We also have a number of floodlights but if you have your own lights please bring them along.

Power points for charging mobile phones, satellite phones, survey equipment or camera batteries will be set up.



Domestic Arrangements

Water

Limited water is available from a tank fed from the roof of the hut. Please don't waste water. If the tank runs dry, there will be no more rainwater available until it rains. Drinking water will be available from a 1000 litre cube. Please do not waste.

Meals

Get your own breakfast from the food put out by the duty team.

Prepare your own take-away lunch from the food put out by the duty team at breakfast time.

Dinner will be cooked and served at about 6:00 pm by the duty team.

Duty teams

During the expedition all participants, (except scientific leaders) will be formed into teams. Where possible each team will be allocated to a different biodiversity survey for each day.

Each team will also spend probably two or three separate days as a duty team to carry out jobs associated with the health and welfare and maintenance of the camp. Completion of these jobs will ensure that the camp is able to operate effectively for the benefit of the whole group.

The jobs to be completed by the duty team will include the following:

- Prepare, cook and serve food
- Clean and sanitize cooking utensils and equipment
- Provide facilities for washing plates and eating utensils
- Sweep and clean toilets
- Sweep and clean shower rooms
- Sweep and clean kitchen area
- Sweep and clean dining area
- Dispose of food scraps and waste liquids
- Dispose of rubbish and recyclables from kitchen and food store areas
- Apply fire prevention procedures in kitchen area
- Issue food from store
- Wash kitchen cloths and tea towels
- Implement dust reduction measures to reduce food contamination
- Pest control (flies, insects)

For a duty day, the team members will start at 6:00 am with the preparation of breakfast and conclude at about 8:00 pm in the evening after the cleaning up from dinner. It is expected that there will be several hours in the middle of the day when the duty team members will be free to arrange their own program which may include having a sleep or a walk to nearby interesting sites or any other activities.

Instruction sheets will be provided giving details for each of the jobs that have to be completed. Each team will make their arrangements and allocate members to do specific jobs.

Daily Requirements for Duty Team

Morning

Breakfast is between 6.30 and 7.30 am (or earlier if some teams need to make an early start).

Wash your hands.

Put out breakfast food.

Put out wash-up water for campers.

Wash any cooking utensils used for preparing breakfast.

Put out lunch food.

Tidy kitchen and eating area, wash tables, make sure all food and cooking utensils are safely stored.

Evening

Dinner is at 6.00 pm.

Duty team begin evening chores by 4.30 pm.

Clean toilets and renew supply of toilet paper.

Wash your hands.

Cook and serve dinner.

Put out wash-up water for campers.

Wash dinner cooking gear.

Tidy kitchen and dining areas, wash tables, make sure all food and cooking utensils are safely stored.

Risks

Food contamination; Diarrhoea

It is very important to protect food from contamination. Bacteria cannot move from place to place by themselves; they need help from food handling practices. Poor food handling often allows bacteria to be transferred from a non-food source to food, and from food to another person.

The risk of contamination is often greater when camping because only basic equipment and amenities may be available

To protect food from contamination

- Wash your hands before preparing or handling food.
- Keep food covered.
- Use separate utensils such as knives and chopping boards for different foods.
- Keep raw meat and raw fruits and vegetables well away from foods which are ready to eat, such as cooked meat and salads.
- Always thoroughly wash and dry your hands after handling raw meat.
- Thoroughly wash and dry eating and drinking utensils and store in a clean place.
- Cooking utensils and work surfaces must be thoroughly washed.
- No smoking in kitchen or eating area.

Knife injury, burns

First aid kit and fire extinguisher to be kept in kitchen

Serious illness or injury

See Emergency Response Procedures. All members of the expedition should have ambulance cover or travel insurance for the expedition.

Other personal risks

Snakes; Bats (possibly infected by rabies); Mosquitoes; Flies; Dehydration; Walking over rough ground; Eye injury; Sunburn.

Do not handle snakes or bats.

See Suggested Equipment List for recommended protective clothing.

Food Safety at Camp

There are Food Safety Laws and Regulations that affect food and food safety. The rules are simple and straightforward and are nearly all common sense.

To ensure the safety and health of our members, it is imperative to follow good practices. Most rules can be easily achieved and are familiar to most of us.

So what do we need to look out for?

- **Food hygiene:** it is important that you maintain the highest standard of cleanliness and hygiene at all times.
- **High risk foods:** includes cooked meat products, egg products and dairy foods.
- **Prevention of food poisoning:** use methods to break the food poisoning chain.
- **Smoking:** do not smoke in the area where food is being prepared.
- **Canned foods:** badly dented, seam damaged, holed or rusty cans are rejected.
- **Refrigeration:** separate cool boxes are ideal.
- **Preparation and cooking of food:** good hygiene during food preparation prevents food poisoning.
- **Cleaning and disposal of waste:** all refuse and waste food must be removed from inside the food preparation area at the end of each meal.
- **Pest control:** avoid pest problems by not leaving any food or rubbish where it may attract them.

Safety Code

As with all outdoor activities, there are hazards associated with remote environments. To minimise the hazards, follow the safety code and use common sense and caution.

When leaving camp

Go with other people, as a group, not on your own.

Let a leader know where you are going, when you will return and who is with you.

Always stay together as a group.

Take your survival kit with you.

Survival Kit

The following should be carried with you at all times when away from camp:

- 1 litre of water, minimum, and snack food
- rain coat
- personal first aid kit
- whistle
- compass

What to do if you are lost

Don't panic; take some time to think about where you have come from and where you last saw the others. Blow your whistle or call out, and listen for any response.

If you are unsure where you are and how to get back, stay where you are. Look after yourself and don't waste energy by walking if you don't know where you are going.

A SEARCH PARTY WILL BE ORGANISED.

Minimum Impact Code for Camping

We are the guests of Witchelina. We can help to conserve the natural and cultural significance of the area by adhering to the following code.

At base camp

Please camp only in the designated area.

Please put rubbish in the bin provided.

Please put waste liquids into the wet pit.

If you smoke, seal your butts in an empty film canister, where lack of oxygen will extinguish them. The canister can then be emptied into a rubbish bin.

Please do not use toilets for disposal of rubbish.

When away from base camp

The ideal is to leave no trace of your presence.

When driving, please keep to established tracks. When you stop and leave your vehicle, please ensure that it will not obstruct other vehicles. Do not park over long grass or other vegetation that might catch fire from hot exhaust pipes.

When walking, move carefully to avoid damage to vegetation and keep soil disturbance to a minimum.

Bring all rubbish back to base camp and put it in the bin.

Aboriginal Sites

There are artifacts and other evidence of Aboriginal occupation in the Witchelina area. The Aboriginal Heritage Act of South Australia (1988) provides blanket protection for all Aboriginal sites and objects. Any group, organization or individual found to knowingly disturb or destroy Aboriginal sites or objects without permission from the Minister for Aboriginal Affairs is liable to prosecution under the Act.

Risk Management

Risks that might be encountered during this expedition, and appropriate measures relating to them, are detailed at relevant places in this handbook. The SEG Committee considers that it is necessary to incur these risks in order to achieve the expedition's purposes. However, no member of any SEG expedition should feel obliged to do anything he or she considers too risky or too difficult. What is easy for one person might be hazardous for another.

What will we be doing?

Expeditioners will participate in a number of scientific surveys led by scientists with expertise in various fields. They will gain practical experience of techniques used in ecological surveys. The work will be undertaken using the Biological Survey of SA methodology approved by the SA Department of Environment and Natural Resources.

Scientific Methods

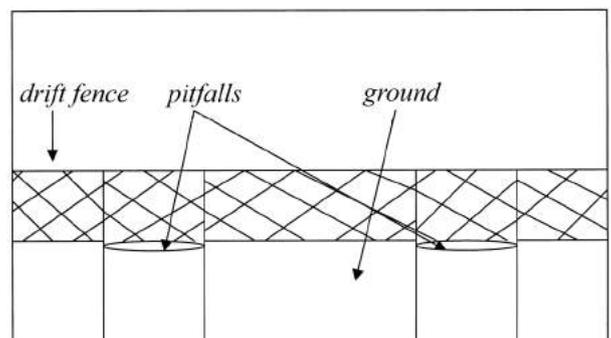
In each of the major habitats a 100 x 100 metre sampling area or 'quadrat' will be marked out, and the species composition of the flora and fauna will be quantified using techniques outlined below. The methods used conform to National Parks and Wildlife SA guidelines for biological surveys in South Australia.

Vertebrate Survey (mammals and reptiles)

Pitfall trap

Data will be collected in two ways at each site: trapping and observations (active search and incidental sightings). Four trapping methods will be employed during the survey. At each site there will be two lines spaced apart by 40 metres within the same habitat type. The site will consist of 2 pit lines, an Elliott trap line of 15 traps, 2 cage traps, 4 funnel traps and 1 micro-pitfall lines. Trap lines should be positioned so they are not easily visible from public access roads (Owens, 2001). The standard pit line consists of 6 macro-pits placed at 10 metre intervals in the ground flush with the surface. The line is then connected by a 60-metre flywire fence. The diagrams outline the general set-up of a pit line and a survey site (see page 13).

Trap lines are open for four nights. Installation is a team effort as it takes a long time to establish pit lines. A trench needs to be dug between the pits and a couple of metres either side of the start and finish to stand the fence up in. Pins will be used either side of the pits, however the fence should be able to stand up on its own.



Pit line layout

The fence must run centrally over the pit and should not have any folds otherwise some small skinks can run along it. Under no circumstances should a length of drift fence be torn or cut in half to use elsewhere. Weather conditions may be quite variable so toilet paper cores or similar tubes and/or leaf litter should be placed in the bottom of the pits to protect captured animals. A glass jar full of ethanol should be placed near the first macro-pit to collect any invertebrate specimens found in the pit line.

The micro-pit line (small plastic vials containing 75% ethanol) are to be placed in the ground flush with the surface and parallel to the macro-pit line. The micro-pits need to be placed about 2 metres away from the macro-pits to avoid people walking on them. Flagging tape should be used to mark the position. Micro-pits are to be left open for the whole trapping period, i.e. four days. Micro-pits need to be checked daily and filled up with ethanol when necessary. Further details of micro-pits on page 11.

Funnel trap

These are used two to each site along the pitfall fence line to collect larger vertebrates, especially reptiles which may be too large to fall into or fit into a pitfall. The funnel traps also collect small lizards and invertebrates and careful inspection of the funnel traps should be made.

Elliott trap

The Elliott trap line consists of 15 Elliott traps placed approximately 10 metres apart. These are generally placed parallel to, but approximately 10 metres away from the pit line. A small ball of bait (rolled oats and peanut butter, about the size of a 20 cent piece) is placed at the back of the trap ensuring it is not under the trigger plate. The

Elliotts need to be placed flat on the ground and preferably under shrubs or on the western side of any vegetation to reduce the risk of exposure from the morning sun. Each individual trap must be laid in consecutive number sequence and marked with flagging tape. Ensure that the traps are all in the same vegetation type.

Cage trap

Each trap-line requires two cage traps which are either placed at each end or at other locations, for example next to a fallen tree. The cage traps are baited with a peanut butter and rolled oats mixture. A small rock should be placed on top of the cage trap to minimise disturbance from birds and foxes. To limit exposure, a piece of sacking be spread over the top of the trap. The door should be able to close without brushing against sticks and stones.

Active searching

Each site will need to be checked for at least 1 hour over the 4 days for reptiles and frogs. Searching is done by lifting rocks and logs, raking leaf litter etc. Any tracks or scats should also be recorded and if any sub-fossil material is found a sample and location details may be recorded. Spotlighting will also occur in each site for nocturnal reptiles and mammals. Please bring a torch along.

Opportunistic sightings

Any observations during the day or night outside the sites and while travelling between them should be recorded.

Voucher specimens

As requested by the SA Museum, a small number of specimens may be taken for scientific purposes.

Animal handling

If any snakes are encountered either in the pit-falls or while active searching please advise one of the scientific leaders immediately. You must not handle snakes. Some species of legless lizards look remarkably like snakes. If you are unsure of the species please inform your group leader promptly. All animals need to be handled with care as some creatures may bite and then escape. Safe handling of animals will be shown to you by the scientific leaders. All captures should be marked to ascertain recapture numbers.

The following equipment will be supplied:

Calico bags

Callipers or ruler

Data sheets and folder

Global Positioning System unit

Flagging tape

Identification books — Reptiles (Cogger), Mammals (Strahan), Birds (Simpson & Day, Pizzey etc)

Reference

Owens, H. (Ed.) (2000) *Guidelines for Vertebrate Surveys in South Australia Using the Biological Survey of South Australia*. Biological Survey and Research Section, National Parks and Wildlife SA, Department for Environment and Heritage.

Ant Survey

Ants are an ideal indicator group to monitor Environmental Change. Many species have narrow tolerances and thus respond quickly to environmental change. Ant's small size and reliance on relatively high temperatures make them equally sensitive to climate and micro-climate change. Some ant colonies are long-lived species and have permanent nests that can be marked and revisited. Long-lived species thus allow us to monitor the health of a colony as the environment changes around it. In contrast, short-lived ant species show high turn over and

immediate responses to a stressor. If ants are to be used as bio-indicators of some aspect of the environment or if a rigorous census of species is desired then the richness and abundance measures must be described explicitly per unit area or per unit of sampling effort.

Aim

To collect Ants by direct collecting, tree collecting and from pitfall traps.

Thus there will be three methods of collecting from one location. This will show more biodiversity than if just one method is used. The soil types, micro-climate and macro-climate are also noted.

Method

Ants are collected in micro-pits (a tube 10cm deep and 2cm diameter). Small holes are dug with a garden trowel to bury the micro-pit up to the top, with a ramp levelled out around the rim. At each site 6 micro-pits are placed 10m apart to form a line (they are placed about 2m away from the macro-pits). Each micro-pit will have a bamboo stick with a yellow tag at the top, placed within 30cm of the micro-pit hole. All the micro-pits for each week are labelled, filled with 100% ethanol, (need 100% Ethanol for DNA testing). All the micro-pits for week 1 are put out on the *same* day and similarly all the micropits for week 2 are put out on the *same* day. They are left open for four nights – the international standard for collecting invertebrates - before being brought in on the fifth day. The date, GPS location and time are recorded.

Direct sampling involves searching for and collecting in different micro-habitats within the survey area.

Ground collecting: Quietly walking around the survey area and collecting what you see on the ground.

Tree Collecting: paint a solution of honey onto the trunk at shoulder height. Tying a tag onto the branch and returning to that branch an hour or so later.

Pitfall Traps: These are the 6 micro-pits left out for four nights at the survey site.

Back at the Entomology Section of the Science Centre, S.A. Museum, The ants will be identified into genus. The results will be tabulated and a report given to the Collection Manager of the S.A. Museum, SEG science leader, and any other group involved eg DEWNR.

Conclusion

The data produced by direct sampling includes richness, (the number of genera at that site), abundance (the number of specimens in each genus), competition, and frequency of occurrence of species at that location.

Bird survey

Birds will be surveyed at each site. The procedure is to spend half an hour at each site in a morning and an evening and record the birds observed.

Feral Animal Survey

Witchelina has had a serious problem with feral animals particularly foxes, cats and goats. Extensive fox baiting has been carried out over recent months. For this reason no dogs may be taken on the survey. Any observations of feral animals should be recorded on an opportunistic recording sheet.

Standard layout of vegetation and fauna site

