

Form 2 – Risk Management Plan

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Project: The influence of detached kelp (*Ecklonia radiata*) on the trophic dynamics of seagrass-associated mesograzers in temperate south-western Australia.

Post Graduate Degree or research: Honours

Full time/Part time: Full time

Brief Description: Small exclusion cages will be established along six separated ~300m transects in seagrass meadows in Marmion Lagoon, between Hillarys and Ocean Reef Boat Harbours. The six sites are all located within 2km offshore, at depths ranging from 1.5 to 9m. Exclusion cages will be installed and removed throughout May and June, 2014. The metal, mesh cages are 30cm long, 14cm high and 12cm wide, and coated in plastic (bait cages). The cages will be covered in plastic fly-screen mesh and contain tethered, epiphyte removed kelp. Cages will be attached to the benthos with metal stakes by using a hammer. The cages will be left *in situ* for a 5 day period, after which they will be bagged underwater and removed. The bagged cages will be transported to ECU, where the contents will be sieved and stored in freezers for later analyses. Analyses will include kelp and macroinvertebrate weighing, and macroinvertebrate identification. Subsequent to analyses, all flora and fauna will be promptly disposed.

Controlled laboratory feeding experiments will take place at ECU, throughout July and August, 2014. Flora and fauna will be collected from the seagrass meadow sites within Marmion Lagoon. The experiments will take place in aerated plastic aquaria, 30cm long, 16cm wide, and 13cm high. Mesograzers (amphipods and gastropods) will be stored in aquaria prior to experimentation. Aged and fresh macrophytes will be cleaned of epiphytes and be stored in freezers prior to experimentation. The mesograzers will then be fed an array of fresh and aged macrophytes, for time periods of 5 days. The biomass loss of the macrophytes will then be measured.

Transport using a boat and SCUBA diving from the boat, will be both be used for the project. The boat will be launched from the Hillarys or Ocean Reef Marina boat ramps. Snorkelling from the boat and from the shore may also take place.

Section 2: Risks Identified

Medical considerations:

1. Using volunteers incurs a duty of care from the researcher and the school.

Likelihood of risks range from low to high, as the Researcher may be supervising experienced to non-experienced personnel. The severity of consequences range from low, e.g. development of cold, to high, e.g. burst ear drum.

Personnel having problems equalising, becoming cold or exhausted pose a high risk. The severity of the consequences range from low, e.g. sore ears, to high, e.g. burst ear drum, hyperthermia, drowning.

Fieldwork:

2. As a supervisor of volunteers, boating and SCUBA, the Researcher is currently very inexperienced. The likelihood of risks range from low to high (see below for examples). Severity of consequences from low to high (see below for examples).

3. Working with boats.

The likelihood of experiencing boat equipment problems or bad weather conditions is low to medium when managed. Severity of consequences range from low, e.g. motor flooding or minor sea sickness, to high, e.g. sinking/losing the boat.

4. Working with SCUBA.

4a Lack of qualifications, skills, abilities or experience. Likelihood of not having = Low Consequence= low to high
4b The likelihood of the dive equipment not functioning properly is low when managed. The severity of the consequences range from low, such as BCD waist clip breaking, to high, such as suffocation or gas embolism.

4c Due to diving in shallow (1.5 to 9m) waters the risk of divers' regularly ascending to the surface is low. The consequences range from low, i.e. no consequence, to high, e.g. sinus/ear problems or gas embolism.

5. Working with SCUBA/snorkelling.

5a Lack of qualifications, skills, abilities or experience. Likelihood of not having = Low Consequence= low to high
5b Collecting samples in the vicinity of dangerous flora/fauna are a low to medium risk. The severity of the consequences range from low, e.g. rash, to high, e.g. shark attack.

5c Diving/snorkelling in the ocean always has variable risk, as conditions can range from glassy water, no current and excellent visibility, to poor visibility, strong currents and massive surge. The severity of the consequences range from low, e.g. fear and minor abrasions, to high, e.g. buddy loss, thrown onto reef, hyperventilation.

6. Attaching the cages with tent sized metal pegs to the benthos through the use of a hammer has a low risk as the pegs are very small, and the consequences are low, e.g. slight exhaustion and sore finger/hand.

Laboratory work:

7. Transporting heavy macrophyte samples from the boat to vehicle/laboratory has a low risk but the consequences could be high, e.g. pulling out back.

8. Using a razor/scalpel to remove epiphytes from the macrophytes has a low risk, where the severity of the consequences could range from low to moderate, e.g. cut finger.

9. Water spilled from aquaria and from flora/flora onto floor in laboratory and aquaria rooms is a high risk, which has low, e.g. slippery surface, to high consequences, e.g. slip and break arm and electrocution.

10. Remains of flora and fauna have a low risk with low consequences that may create bad odours and a potential breeding ground for bacteria and disease.

11. After hours laboratory work has a low risk with potentially high consequences, e.g. medical emergency with no one available to help.

Section 3: Risk Management Proposed

Medical considerations:

1. Emergency Contact Health and Fitness Form for Staff, Postgrad Students and Volunteers must be reviewed, and any potential problems will be assessed firstly by the Researcher. If problems don't appear to be a hindrance on any diving/snorkelling/boat person activity (e.g. hay fever), the volunteer will be allowed to partake in field work after appropriate advice is given. If problems appear to be serious (e.g. sinus problems, severe flu), the Researcher will need to consult the Safety Officer or the Primary Supervisor (Dr Hugh Mungous).

1. Each person's general health will need to be assessed before each field trip.

1. Personnel that have difficulty equalising, become cold, or exhausted must not enter the water, and if already in the water, must exit the water immediately and remain in the boat.

1. If there is not an adequate amount of fit and healthy people, i.e. three, to begin/continue the field work, it will be cancelled.

Fieldwork:

1, 3, 4b & 4c. All new volunteer divers/snorkellers and boat persons will be briefed on the commencement of their first field trip, and when new field activities are planned. (See attached for field briefing sheet).

2. The Researcher will conduct the field trips with a more experienced person(s) (Supervisor[s]) until it is deemed that he has satisfactory volunteer, boat handling and SCUBA supervisory skills by the supervisor.

3. The skipper of the boat must possess an Australian approved Recreational Skippers Licence (RST) and have adequate experience in boat handling, as determined by the Safety Officer.

3. Volunteer Marine and Sea Rescue must be notified at the departure and return of every field trip.

3. Field work will need to be cancelled if weather conditions are deemed unsafe for working in, before departure or change during the field operations.

Weather conditions will be assessed by the Researcher (and/or Supervisor[s], Safety Officer), but will also be deemed unsafe if swell and seas are high (>2m) and winds are high (>18kn).

1, 4a. All personnel involved in the use of SCUBA must possess at least a PADI open water certification and current dive medical, and must be registered for diving at ECU.

1, 4. Normal safe diving requirements always followed (i.e. signalling; buddy diving; safety stops [if required]; times in and out recorded; air in and out recorded).

4, 5. A boat person must always be present and keep watch when they divers/snorkellers are in the water.

4. Buddy checks must be conducted before entering the water.

4. Carry an extra set of dive equipment on boat and don't use any equipment that isn't functioning properly.

1, 4. Divers will plan for a single controlled descent and ascent for each dive. Safety stops are required at 3m for 1 minute when dive has been conducted between 5 and 9m, and at 5m for 3 minutes when dives are conducted >9m.

1, 4. Dives will be conducted in a manner where the deepest sites are planned first and the shallowest dives are planned last, when numerous dives occur.

1, 4, 5. An oxygen recovery kit and a first aid kit will always be carried on board. There will always be at least one person on board trained in DAN O₂ recovery and Senior 1st Aid.

5a. Snorkelers will either be qualified scuba divers or able to pass the SONS test for open water snorkellers. This will be documented (see appendix)

5. All personnel will be warned about the dangerous flora and fauna in the region, and offered individual shark shields when in the water. Gloves will also be recommended, but will not be essential, as no dangerous flora or fauna is required to be handled for the research.

5. Divers/snorkellers must only enter the water in conditions that they are comfortable working in. Personnel must be warned of currents, rips, etc. prior to entering the water. If conditions become too rough the trip will be terminated.

6. Divers using the hammer underwater should wear gloves for protection and only use the hammer when visibility is sufficient.

Laboratory work:

7. When macrophyte samples are all contained in a single nelly bin, it will require at least two people to lift the bin using correct lifting procedures. Alternatively, samples could be divided into many smaller containers for easier transportation. Transportation from the vehicle compound to the laboratory will always be done with a trolley.

8. Razors and/or scalpels will be used with care, by cutting away from body, and all sharps will be safely disposed of within the correct bins.

9. All water spilt must be cleaned up immediately, sign-posted if necessary, and the other users in the area notified.

10. All remains of flora and fauna must be disposed of properly and promptly within the correct bins and locations. Work benches and equipment must also be properly cleaned with disinfectant (ethanol spray).

11. Security must be notified when after hours work is taking place in the labs, where I will be located, and how long I expect to be there.

Section 4: Sign off

Date Assessment submitted: _____ .

Risk Assessed by : _____ . Date _____ .

Supervisor: _____ . Student/Researcher: _____ .

Head of School

Please discuss this plan with your supervisor and return to Safety officer with any comments/modifications. Once the student, supervisor and Safety officer agree, each will sign off. Any unresolved matters go to HOS/Safety Committee.

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