Pesticide Detectives

AQUATIC ENVIRONMENTAL STRESS RESEARCH GROUP

PESTICIDE DETECTIVES

INSTRUCTION MANUAL

PREPARED AND PRESENTED BY

AQUATIC ENVIRONMENTAL STRESS RESEARCH GROUP (AQUEST)
RMIT UNIVERSITY

An Australian Government Initiative

Inspiring AUSTRALIA

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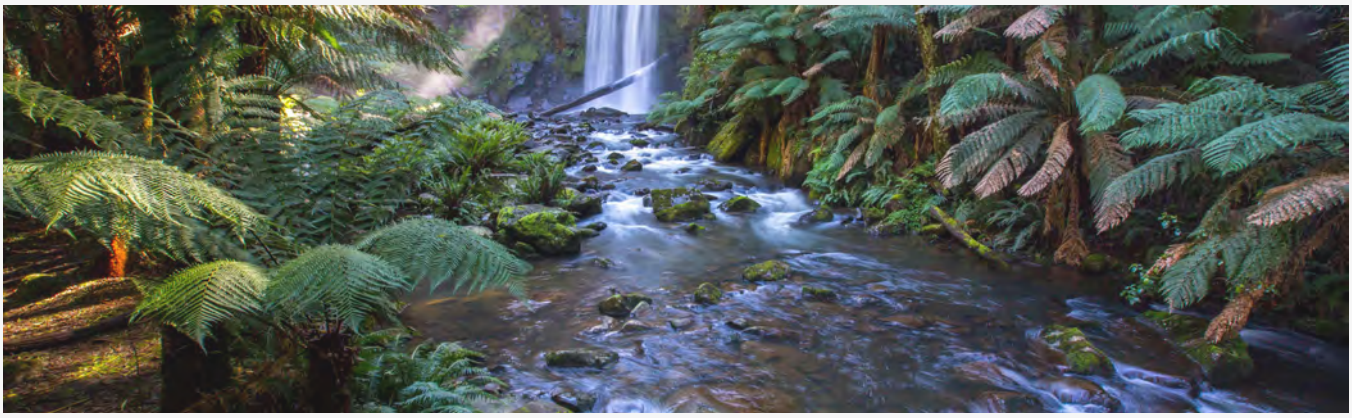


Thank you for joining the Pesticide Detectives Project!

The Pesticide Detectives is a national project to assess the occurrence of pesticides, commonly used around the home and in agricultural and urban situations. Funded by the Department of Industry, Innovation and Business, Pesticide Detectives is a collaborative project combining the scientific expertise of RMIT University's Aquatic Environmental Stress research group (AQUEST) and efforts of citizen volunteers from Waterwatch, EstuaryWatch, Landcare and other groups in the collection of sediment and soil samples from waterways across Australia.

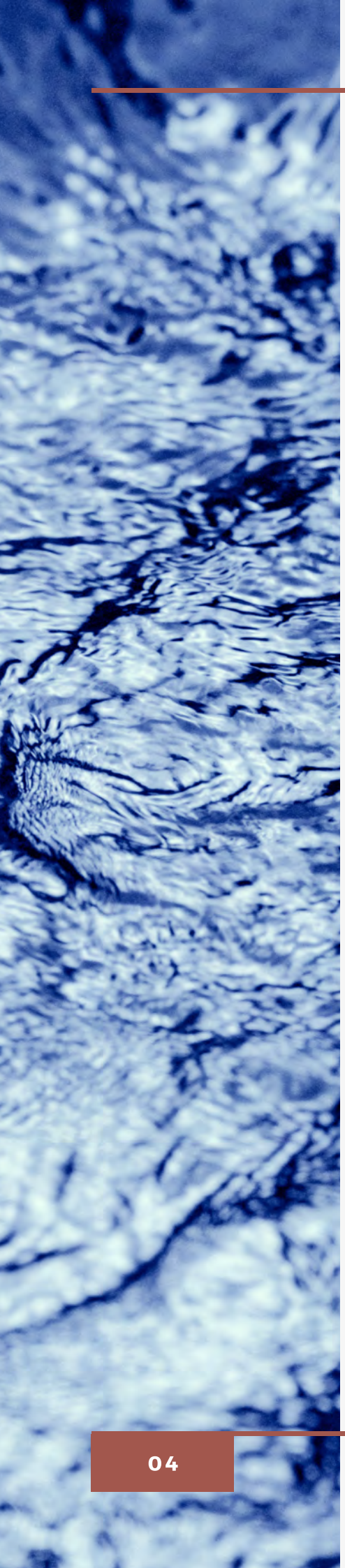
The goal of the project is to provide individuals across Australia an opportunity for involvement in a simple, yet meaningful monitoring program where they can learn about the health of their local waterways and gain an awareness of the pressures placed on them, while also providing valuable data on the quality of Australia's waterways in respect to pesticides.

This manual provides some background information on why we want to know more about pesticides in our waterways and detailed instructions for safety in the field, collecting reliable and representative sediment and soil samples, and submitting samples and data to the AQUEST Scientists.

For further instruction on the Pesticide Detectives sampling protocols, please refer to the training videos on our webpage at www.rmit.edu.au/pesticidedetectives.

To obtain copies of the video or manual please contact the AQUEST project manager at:
kavitha.chinathamby at
Aquest.citizenscience@rmit.edu.au

The AQUEST group hope that you, the volunteer, find this manual helpful in monitoring and protecting your local waterway.



WHY PESTICIDES AND THE PESTICIDE DETECTIVES PROJECT

Pesticides are increasingly being detected in waterways across Australia and worldwide. Their presence is a concern for aquatic life and human health.

Australia's waterways have intrinsic ecological, economic and social value. Information on the quality of Australia's water resources is of critical interest to local, state and federal agencies as water quality is integrally linked to the long-term availability of clean water.

Of primary concern is the ever-increasing use of chemicals in our everyday life, and the risks they pose to the health and beneficial uses of waterways.

Pesticides are one group of contaminants increasingly being detected in waterways across Australia and worldwide.

Pesticides are chemical compounds that are used to control, prevent, kill, suppress, or repel pests. "Pesticide" is a broad term that includes insecticides (insect killers), herbicides (weed or plant killers), fungicides (fungus killers), rodenticides (rodent killers), growth regulators, and other materials like miticides, which are used for mite control, or products that kill snails and slugs (molluscicides).

There are thousands of different pesticides in use today in and around houses, shops, offices, storerooms, sheds, gardens, farms, pastoral stations and many other places.

Pesticides are designed to be toxic to the pests they target—whether they be insect, weed or other unwanted home, garden or agricultural invader. When used properly, pesticides can protect your plants, home, or animals. However, when the label instructions are not followed correctly, plant injury may occur and pests may not be controlled. Furthermore, human health may be impaired, and pesticides may contribute to the pollution of aquatic environments.

The Pesticide Detectives project will investigate the occurrence and concentrations of pesticides used in homes and gardens as well as agricultural and urban settings in Australia's waterways. The project will advance our knowledge base on the state of Australian aquatic environments, providing data to inform on priority pesticides of concern at local, regional and national levels.

SEDIMENT

Sediment is the ultimate repository for many contaminants, including pesticides, once they enter aquatic environments. River, stream, lake or wetland sediments are an important component of aquatic ecosystems, providing habitat and food for many aquatic organisms. The presence of pesticides in sediment can be a source to overlying waters and to the ecosystem through the benthic food chain. Sediment can therefore be thought of as a fingerprint of pesticide contamination.

PROJECT AIMS

As part of the Pesticide Detectives project sediment samples will be collected from locations across Australia over repeated intervals to assess for a range of current use and emerging pesticides. In addition, observational data such as surrounding land use, habitat condition, and waterway characteristics will be collected.

Specifically, this project aims to:

1. Assess the occurrence and concentrations of pesticides in waterways.

2. Assess relationships between pesticide occurrence, concentrations and surrounding land use.

3. Determine whether pesticides are present at concentrations that pose risks to human health, aquatic life or fish-eating wildlife.

4. Assess how concentrations are changing over time.

YOUR ROLE AS PESTICIDE DETECTIVES VOLUNTEER

Pesticide Detective volunteers play an important role in the collection of reliable and representative environmental samples for pesticide analysis and in completing site assessments.

As a member of a participating group:

- You will visit selected sites during pesticide sampling blitzes and learn to collect sediment and/or soil samples for environmental testing.
- You will learn to make site observations about environmental waterway condition and surrounding land-use.
- You'll be encouraged to participate in and promote online surveys of pesticide use in and around homes.

Scientific data collected by volunteers will be summarised to investigate spatial and temporal differences in pesticides across Australian waterways. Summarised data will be made available on the Pesticide Detectives webpage and to government organisations such as Water Authorities, the Environmental Protection Authority, Catchment Management Authorities and local councils to help identify pesticides of concern at local, regional and national levels.

For more information on becoming involved, visit the Pesticide Detectives volunteering section at www.rmit.edu.au/pesticidedetectives.

SAFETY INFORMATION (OH&S)

Pesticide Detectives participant safety must be a top priority for all groups. This section contains important information to assist group coordinators and volunteers to understand and reduce risks. It is essential that all Pesticide Detectives project participants understand and implement the OH&S procedures detailed below.

Training in field procedures

Training is important to ensure that the group has the skills to gather quality assured (QA) data.

All participants need to familiarise themselves with the protocols for collection of sediment and soil samples through the Pesticide Detectives Instruction Manual and view the sample collection videos on the project webpage. Following this if participants have further questions regarding sample processing they can first contact their group co-ordinator and then the Pesticide Detectives program manager.

Understand the risks

Risk assessments need to be completed by each group for each site on the first visit to a site and reviewed at subsequent visits. The risk assessment proforma is provided in the Appendix and hard copies are supplied in the Pesticide Detective field kit. Once completed, risk assessments need to be uploaded via the Pesticide Detectives webpage.

*You are not required to complete a new risk assessment if a risk assessment has already been completed for the site under your organisation (e.g. Waterwatch). Please tick the disclosure statement on the Site Risk Assessment Form to acknowledge that you have an existing risk assessment for the site and understand the risks at the site. Upload the Risk Assessment Form with your details and disclosure ticked.

The purpose of a risk assessment is to:

- identify potential hazards that participants may be exposed to
- assess the level of risk associated with the hazard
- implement and enforce corrective measures to eliminate/control or
- reduce the level of risk of hazards according to the hierarchy of controls
- review risk assessment and evaluation of the effectiveness of the corrective measures.

Risk Management

Before you participate in sample collection, ensure the following actions are taken:

- A risk assessment is completed during the initial sampling event using the form provided (see Appendix) and reviewed each time the site is visited as conditions may change over time.
- You understand the risks at the site by reading and signing the risk assessment.
- You are familiar with safety procedures, as listed below,
- You have read the Pesticide Detectives Instruction Manual and are familiar with the sampling requirements for this program.

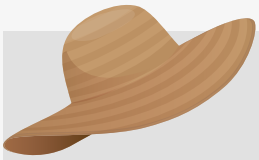
Remember, if monitoring requires putting a participant at risk, do not attempt it

Safety procedures for field sampling

- Use the buddy system when collecting water samples (Don't sample alone).
- Always have your sites checked and approved by your group coordinator before commencing your monitoring.
- Choose sites that have safe and easy access to the waters edge and avoid sites that have steep, slippery or unstable banks, are adjacent to deep, swiftly flowing water, or have long grass and vegetation.
- Check that sites are not prone to rapid flood or tidewater rise without warning.
- When entering the water to collect your sediment sample, only enter water that is less than knee deep. Test water depth using a pole (e.g.: stick) before stepping in.
- Do not wear waders unless you have completed 'wader training'. Gumboots should be sufficient.
- Beware of water quality contamination and ensure personal hygiene and protection.

Environmental hazards

- Wildlife hazards include snakes, spiders, crocodiles, bees, mosquitos, etc.
- Mosquito repellent should be used if in areas of high populations.
- If the site is heavily vegetated, wear long pants, gaiters, strong boots and a long-sleeved shirt to avoid scratches and snakebites.
- Be aware of potential hazards that may arise depending on the site.



Safety equipment & clothing

- Always wear gloves when collecting and handling samples.
- If it is sunny, wear a hat, sunglasses, long sleeved shirts and trousers and apply sunscreen.
- If it is cold and could rain, wear warm clothing, a raincoat and sturdy waterproof shoes.
- Wear clothing that is bright so that you can be easily seen (think Hi Vis).
- When entering shallow waters, make sure you wear gumboots or enclosed solid footwear that can get wet with a good grip and don't enter water above the knee.
- Bring extra clothes and a towel in case someone slips in and gets wet.

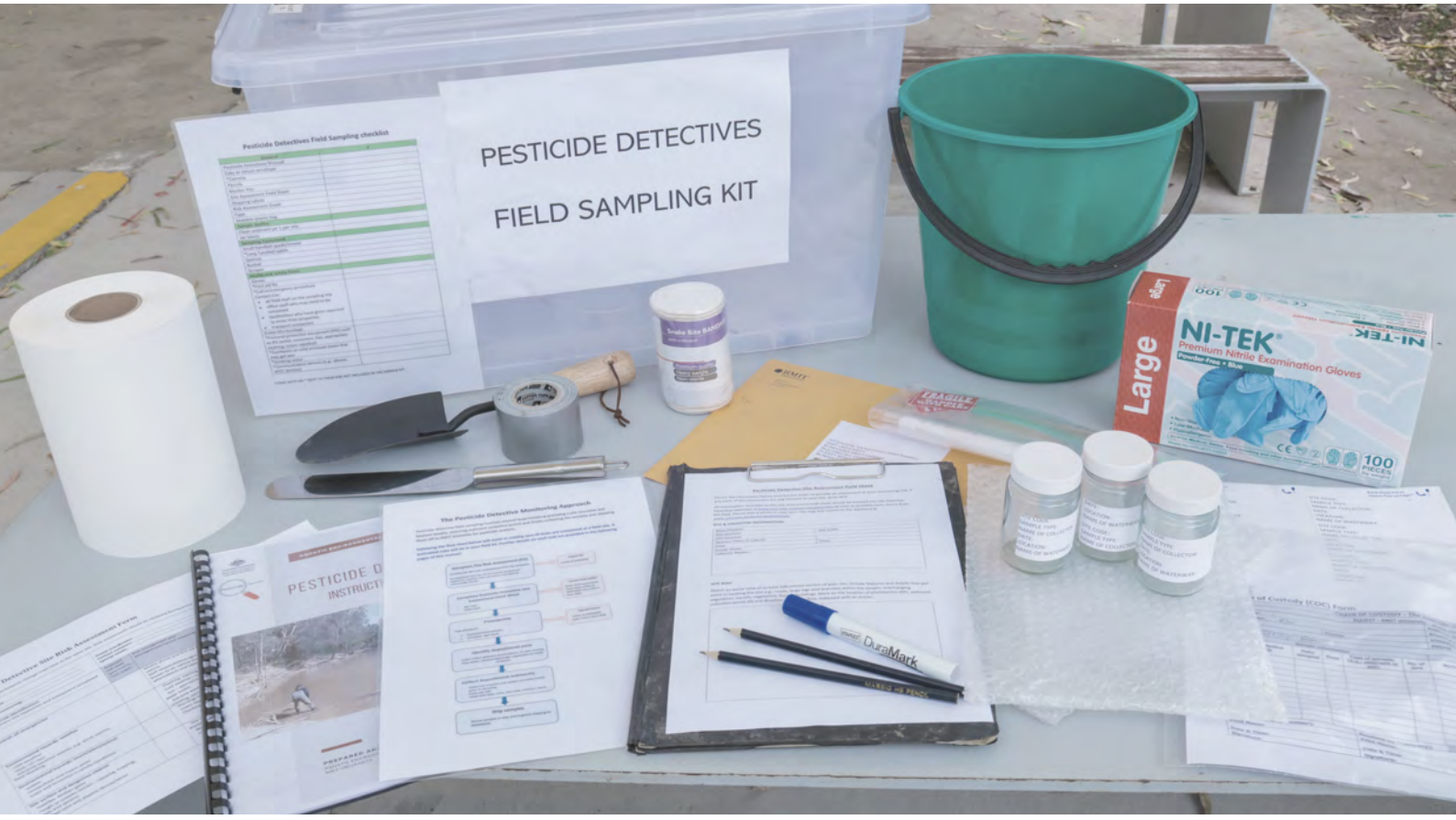
First Aid

- Keep a First Aid Kit nearby. Your Pesticide Detectives sampling kit contains a bandage in case of snake bite.
- A mobile phone should be available on all field trips.
- Carry drinking water with you. Do not drink water from the water source at the site as it may be polluted.
- Bring hand washing supplies for use after sampling. This is especially important if you bring food to the field trip.

FIELD SAMPLING

Group coordinators will have received a sampling kit containing all the equipment needed to collect samples and specific instructions to guide you through sample collection. Check your equipment regularly for defects, dirt, mould or damage. Carefully clean (wash with warm water) and dry your equipment after use. Do not work with malfunctioning equipment.

A field sampling checklist is included in the Appendix and a laminated copy is in your kit.
Your Pesticide Detectives monitoring equipment remains the property of RMIT University and must be returned to your group coordinator or the Pesticide Detectives project manager, on completion of the project.



Field Sampling Kit

1. GLOVES
2. SPATULA
3. TROWEL
4. GLASS JARS & LABELS
5. PENCILS & MARKER PENS
6. A BUCKET
7. TAPE
8. PAPER TOWELS
9. CLIPBOARD
10. SNAKE BITE BANDAGE
11. BUBBLE WRAP
12. BUBBLE BAGS
12. PREPAID ENVELOPES
13. INSTRUCTION MANUAL
14. FIELD SAMPLING CHECKLIST
15. SITE ASSESSMENT FORM
16. RISK ASSESSMENT FORM
17. THE PESTICIDE DETECTIVES MONITORING APPROACH
18. STANDARD OPERATING PROTOCOLS

The Pesticide Detectives Monitoring Approach

Pesticide Detectives field sampling involves several tasks including providing a site overview and location details, selecting sample collection points and finally collecting the samples and shipping. The following pages provide information on these tasks. A flow chart is provided on the next page and in the field sampling kit.

Monitoring Site Assessment

Good sampling practice always involves the use of detailed field notes. Specific information about seemingly unimportant facts such as the time of day, weather conditions and land use are often important when interpreting data. You must complete the site assessment form and take photos of your site after sampling.

Pesticide Detectives Site Assessment Form

The site assessment form provides site information from the volunteers collecting samples, a site map and an overview of the sampling site including land use information, waterway/habitat condition, & sample collection points. This data is important as it is used in the interpretation and comparison of pesticide results across different sites.

The site assessment sheet is included in the Appendix and supplied in the Pesticide Detectives sampling kit. The sheet can be filled in online in the field or manually filled out in the field. At the end of each sampling event we ask that all details are submitted via the online form at www.rmit.edu.au/pesticidedetectives. Site maps should be uploaded on the webpage.

THE PESTICIDE DETECTIVES MONITORING APPROACH

Following the flow chart below will assist in making sure all tasks are completed at a field site. A laminated copy is included in your field sampling kit.

Complete Risk Assessment Form (RA)

On initial site visit a full risk assessment MUST be completed, unless your organisation has an existing RA for the site. At subsequent site visits, the RA must be checked and updated if required. New volunteers must read and acknowledge the RA.

→ **SUBMIT RA**

Online at: www.rmit.edu.au/pesticidedetectives

Identify depositional zones

Fine sediment accummulates in slow moving flow areas - behind snags, vegetation and inside of river bends.

Collect sediment samples

- Rinse sampling equipment 3 times prior to sampling
- Use one jar per site
- Label jars with date, time, site code and collector name

Photopoints

Take photos of site:
- Upsteam and downstream, left bank and right bank

→ **UPLOAD PHOTOS**

Online at: www.rmit.edu.au/pesticidedetectives

Complete Site Assessment Form

- Include a site map drawing

→ **SUBMIT SITE ASSESSMENT**

Form is online at: www.rmit.edu.au/pesticidedetectives

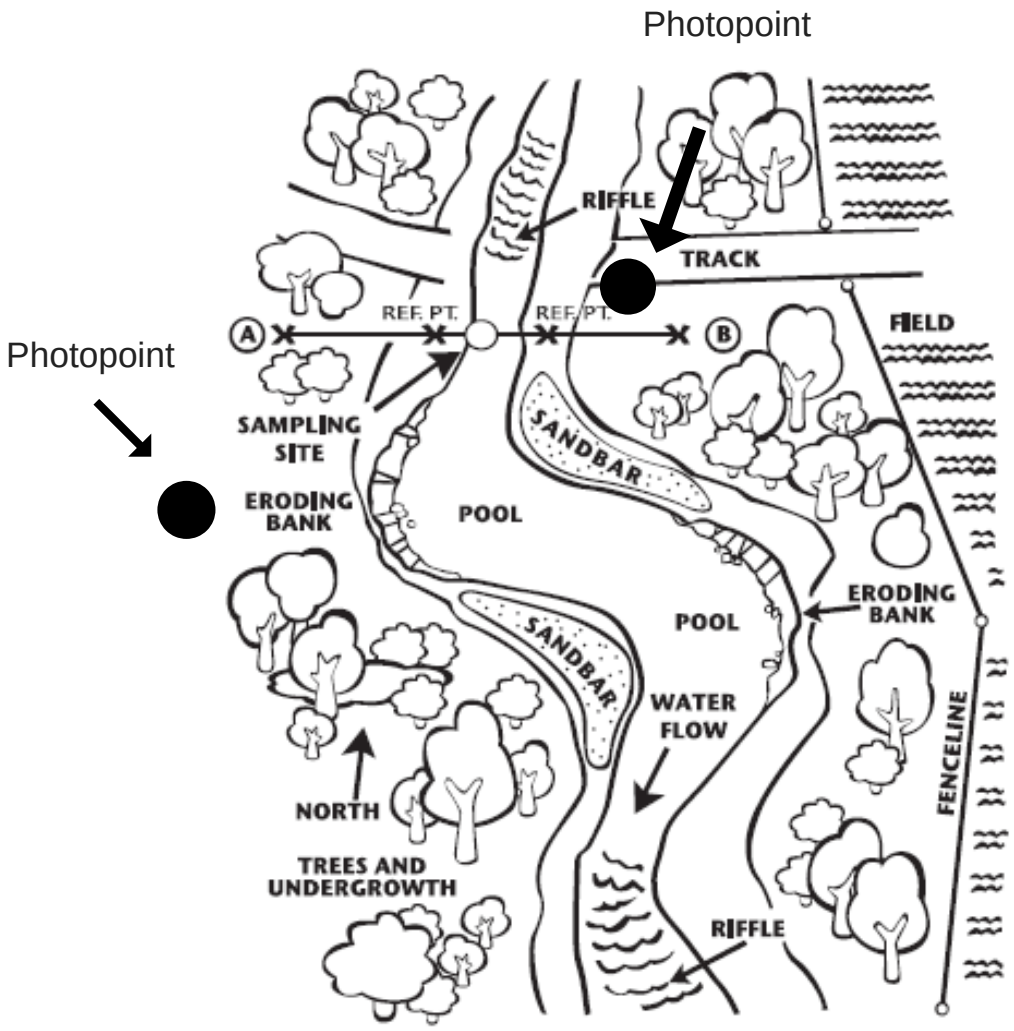
Ship samples

- Wrap samples securely with bubble wrap
- Place into bubble bag and into prepaid envelope
- Send off samples at post office and notify aquest.citizenscience@rmit.edu.au

DRAWING THE SITE MAP

A site map provides an aerial view of your site. This type of map provides a clear visual description of the features of your site. Site maps should cover a section of your waterway of at least 10 metres. Locations for sediment collections, photopoints and direction of stream flow should be marked together with key features such as large logs and branches within the stream, overhanging vegetation, aquatic vegetation, fences, buildings, roads and any other key features at the site.

Your map may look something like the sketch below.



PHOTOPOINTS OF YOUR SITE

Photos provide a visual record of your site over time and provide evidence of change. Find a location at the site where you can take photographs to compare changes over time. You must be able to find the same position to take photos at this site on subsequent visits. Below are guidelines on setting up photoprints, identifying photo points, taking photos, naming files and uploading to the database.

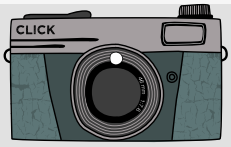
Setting up a photopoint

Consider:

- Safe access to the site, both now and in the future.
- The use of landmark features which future pictures can be matched up with which will not change or be hidden - use a tree, fence post, range of hills or bend in the drain for a guide.
- Ensure the present and future view from the camera to the point of interest is uncluttered.
- That young tree/shrub vegetation will get taller as it grows and can become a wall of green at the front of your site.

Photos we would like:

- Upstream/downstream
- Left bank/right bank
- Human changes/natural changes
- Potential pollution sources



Taking photos

Accurately identify your photopoint for exact repeatability.

- It is not possible to install stakes as reference points, so you will need to identify reference points at your site that will not move over time. This may be a particular fence post that you stand at each time you take a photograph.

- You should also include a reference point within the picture that you line the shot up with each time (i.e.: top of drain, fence post).

TAKING PHOTOS - INITIAL AND SUBSEQUENT VISITS

- Only take one photo from each photopoint to avoid confusion
- Set camera to record GPS coordinates (if applicable), date stamp "on", and set to "Auto" setting.
- Do not use a wide angle or a telephoto lens, as this alters the perspective of the photo and makes it difficult to repeat.
- Use the highest resolution possible. This will allow the use of photos for reports and promotion of the Pesticide Detectives project.
- Take a hard copy of the picture(s) with you on future visits to make lining up the shots easier, make sure they are framed in the same manner.
- Have as little "sky" in the shot as possible

Photos - naming convention

USE THIS CONVENTION:
PP_DM_(SITE CODE)_(date (yy/dd/mm))_Photographer name.

This is the name that would appear on a photo taken on Murray River (site code MR1234) for a photo taken on January 27, 2018 by Volunteer Joe Brown. This particular site has two photopoint monitoring positions and the photo was taken from position 2:
PP_DM_MR1234_182701_P2_JoeBrown

If more than one photopoint is active at a site, include the letter P after the date and the number. For example, P1, P2, etc.

Legend for naming convention

PP or NP = Photopoint (PP) (to distinguish between non-photopoint photographs (NP)).
DM = Data Monitoring, P = Position

Uploading photos

It is good practice to upload your collected photos the day you return from the field. That way you won't forget which photos were for each site and photopoint. You can upload all photos on the Pesticide Detectives' webpage at www.rmit.edu.au/pesticidedetectives

SAMPLE COLLECTION FOR ENVIRONMENTAL TESTING

The following information provides background on the type of sediment the Pesticide Detectives program is targeting, how to locate this type of sediment at your sampling site and sample labelling. A step-by-step protocol for the collection of sediment and/or soil samples can be found on pages 20 and 21.

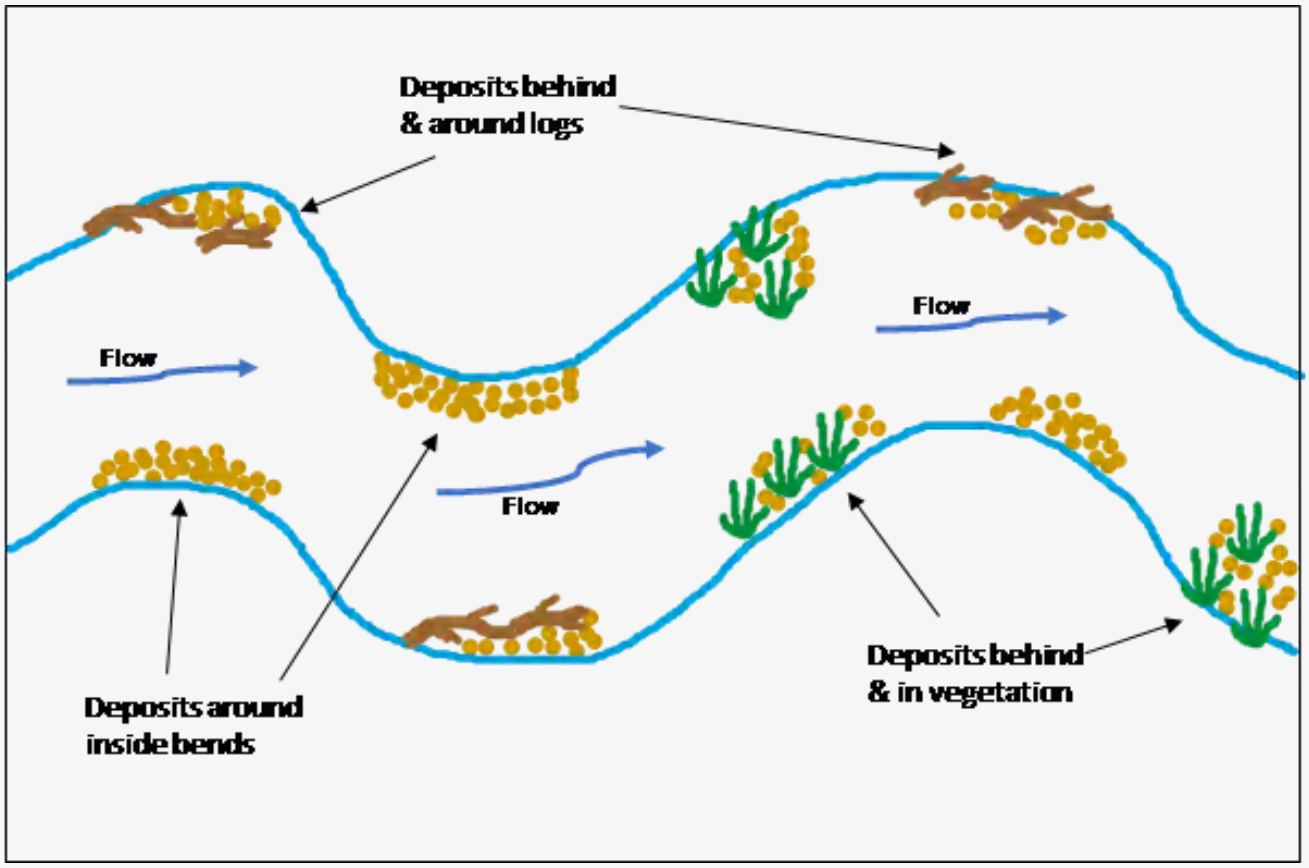
Sediment and soil collected using the techniques outlined below will be analyzed for sediment chemistry and physical characteristics such as particle size distribution. The essential tasks in sediment and soil sampling are to collect representative, undisturbed samples, and to prevent deterioration and contamination of the samples before analyses.

SEDIMENT

Sediment is the mud and sand particles that settle at the bottom of a lake, wetland or a slow-moving stream or river. River sediments provide an important habitat for organisms. However, sediments also act as sinks in aquatic systems for chemicals such as pesticides. This means assessing sediments can provide a fingerprint of pesticide contamination in waterways. For the assessment of sediment quality, fine surface sediments are most important. The fine surface layer (upper 0-2cm) provides information on the most recently deposited sediment material and is used to assess variation in sediment properties and the distribution of contaminants. Fine surface sediments offer a greater surface area for adsorption of contaminants (a greater area for contaminants to stick to) and generally contain higher proportions of organic matter which can readily bind organic compounds such as pesticides. Therefore, sediments need to be collected from locations in your river, stream, lake or wetland where finer surface sediments tend to be deposited, known as depositional zones.

LOCATING SEDIMENT DEPOSITIONAL ZONES

Sediments with a higher proportion of finer grains can typically be found where water current velocities are low e.g. large and deep water-holes, inside bends in rivers, behind reeds/plants/snags (See figure below). At your site, before getting in to collect your samples look around and identify the depositional areas where you can collect your sediment samples.



The figure above shows where to find depositional areas for fine sediment.

FACTORS THAT MAY AFFECT THE QUALITY OF YOUR COLLECTED SAMPLES

The quality of data generated in a laboratory depends, to a large degree, on the integrity of the samples that arrive at the laboratory. Consequently, in the field, precautions to protect samples from contamination and deterioration need to be considered. There are many sources of contamination; the following are some basic precautions to consider:

- Getting the wrong sediment. We are targeting fine sediments. If sand or organic material is collected, this will impact on the analytical results. Make sure you have understood where to get the correct type of sediments and ask for clarification if unsure.
- Only sample jars that have been provided should be used for sample collection. These have been prepared especially for the sample analysis being targeted.
- The inner portion of jars and caps must not be touched with anything (e.g. bare hands, gloves, etc.) other than the sample itself.
- Samples must never be permitted to get warm; they should be stored in a cool place (e.g. in the shade and inside).
- Sample collectors should always wear disposable gloves when handling sampling equipment and jars and during sample collection. Change gloves between samples.
- Keep hands clean and refrain from smoking or eating while working with samples.
- Apply sunscreens and insect repellents prior to undertaking sampling or removing sampling equipment from your car. Ensure your hands are gloved to prevent contaminating your sample with sunscreen and insect repellent that you have applied to your own person.

SEDIMENT SAMPLING PROTOCOL

Watch sediment sampling instructional video for further information on collection methods at www.rmit.edu.au/pesticidedetectives

1. Label sampling jars with site details, time, date, and collector name.

2. Locate depositional zones where fine sediments tend to accumulate. Fine sediment collects where water moves more slowly - inside bends in rivers, behind reeds/plants/snags.

3. Clean all sampling equipment prior to sampling by rinsing 3 times in site water, downstream of where you will collect your sediment samples.

4. Put on clean gloves.

5. Wade to the identified sampling location, taking care not to disturb the sampling area.

6. Gently skim your clean trowel or shovel across the bottom of the river bed, going no deeper than 2cm, to collect the fine top layer of sediment.

7. Transfer the sediment to a clean bucket and repeat steps 5-6 collecting fine surface sediments from areas 1-10m apart around your site to collect a composite sample.

8. With a clean stirrer/spatula carefully stir the collected sediment to mix/homogenize, then scoop small amounts into your pre-labelled sample jars until the jars are almost full to the brim leaving little to no airspace.

9. Seal and carefully pack the jars with bubble wrap and then into the bubblebag.

10. Place jars into a prepaid envelope with a completed Chain of Custody form (see Appendix) and drop off at the nearest Post Office. Email aquest.citizenscience@rmit.edu.au to notify that samples have been sent.

IMPORTANT NOTE: Wash buckets and spades with site water 3 times before leaving site. Conduct a final rinse of equipment with tap water to avoid contamination between sites. Make sure to check that there is no sediment left on them. Take a bottle of tap water with you for rinsing equipment and your hands prior to leaving site.

SOIL SAMPLING PROTOCOL

Watch soil sampling instructional video for further information on soil collection methods at www.rmit.edu.au/pesticidedetectives

1. Label sampling jar/s with site details, time, date, collector name.

2. Put on clean gloves.

3. Clean trowel prior to sampling by rinsing in tap water (take a bottle of water to the sites). Dry the trowel with a tissue or paper towel.

4. Select a sampling location (approximately 1 square meter) that has exposed soil. If no soil is visibly exposed, push aside any vegetation, sticks, leaves or other debris to expose the soil underneath.

5. Select 2 or 3 discrete locations within the 1 square meter selected area (these are to be combined to make a composite sample).

6. Using the trowel gently transfer the loose soil at each of the discrete locations to the pre-labelled sampling jar/s, taking only the top 1 cm of soil. If no loose soil is available, gently break up the top 1 cm of soil using the trowel. Once enough soil has been broken up transfer this to the sampling jars.

7. Ideally fill the sampling jar/s to the top but if not enough soil is present fill to at least 3/4 full.

8. Seal and carefully pack the jar/s with bubble wrap and then into the bubblebag.

9. Place jar/s into a prepaid return envelope with a completed Chain of Custody form (see Appendix) and drop off at the nearest Post Office. Email aquest.citizenscience@rmit.edu.au to notify that samples have been sent.

IMPORTANT NOTE: Wash sampling equipment with tap water to avoid contamination between sites. Make sure to check that equipment is clear of soil. Take a bottle of tap water with you for rinsing equipment and your hands prior to leaving site.

SAMPLE LABELLING

Sampling jar labelling convention

To avoid confusion, each sample must be given a unique name/identifier. Field sites will be given a unique code (supplied in your sampling kit). For consistency we would like the following naming convention to be used:

SITE CODE_(date (dd/mm/yy))_SAMPLE TYPE

Legend for naming conventions:
SITE CODE- unique identifier provided by the Pesticide Detectives project Manager
Sample Type = Sediment or soil

This is the name that would appear on a sediment sample taken on Murray River (site code MR1234) on January 27, 2018:

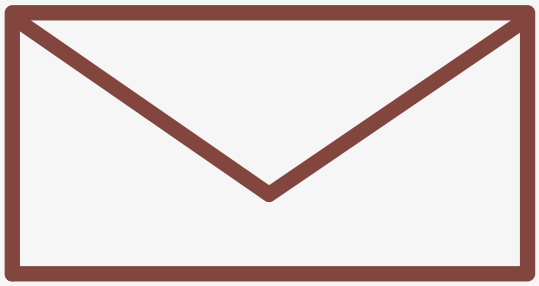
MR1234_270118_sediment

Several jars may be used to collect a 'sample'. These jars must have the same sample name recorded on the labels and the chain of custody form . The number of jars per site must be recorded on the chain of custody form.

SHIPPING

Pesticides can and do degrade during transport. To reduce the loss of pesticides between sample collection and analysis, it is important to transport the samples to the laboratory as soon as possible, to keep the samples as cool as possible, and out of direct sunlight.

Once sampling is completed, drop samples with the completed Chain of Custody form to the nearest post office in the supplied pre-addressed prepaid envelope for analysis at the laboratory.
Email aquest.citizenscience@rmit.edu.au to notify that the samples have been sent.



CONTACTS

PESTICIDE DETECTIVES PROJECT MANAGER

Kavitha Chinathamby

kavitha.chinathamby@rmit.edu.au

03 9925 1903

OTHER IMPORTANT CONTACTS

To report a Pollution Incident, Illegal Dumping, or Sharps

- In NT: Call the NT Environmental Protection Agency: 1800 064 567
- In Victoria: Call Environmental Protection Agency Victoria: 1300 372 842
- In QLD: Call the Queensland Government: 1300 130 372
- In SA: Call the SA Environmental Protection Agency: 1800 623 445
- In WA: Call the Government of Western Australia: 1300 784 782
- In Tasmania: Call the Tasmania Environmental Protection Agency: 1800 005 171
- In ACT: Call the ACT Environment Protection Agency: 13 22 81
- In NSW: Call the NSW Environment Protection Agency: 131 555

To report injured wildlife

Wildlife Rescue (Nationwide): 1300 596 457
Access Canberra: 13 22 81 (Injured Kangaroos in ACT)
WIRES: 13000WIRES or 1300 094 737 (NSW—north of Bredbo)
LAOKO (south of Bredbo) 02 64561313
ACT Wildlife: 0432 300 033 (ACT)
Wildcare: 6299 1966 (NSW)
RSPCA ACT: 02 6287 8113 (Business Hours) or 0413 495 031 (After Hours)
Wildlife Victoria: 03 8400 7300

THE CITIZEN SCIENCE TEAM

THE AWESOME PEOPLE BEHIND THIS PROJECT

DR KAVITHA CHINATHAMBY
PORJECT MANAGER

DR JACKIE MYERS
SENIOR RESEARCHER

PROF. VINCENT PETTIGROVE
PRINCIPLE INVESTIGATOR

Pesticide Detectives is an extensive nationwide citizen science project. The first of its kind on this scale, to target pesticides in waterways and around our home. This project was made possible by passionate people from many organisations including WaterWatch, Estuarywatch, Landcare, Care For Our Bays, and Coastcare - Ballarine Catchment Network. The involvement of citizen scientists mean that we are able to collect important data Australia-wide for the analysis of pesticides in sediment and soil.

We thank everyone who has been involved in the project including the making of the instruction video, webpage construction, recruiting volunteers, organising sample collection, sampling group coordination, providing feedback and survey participation. This has never been done before at such a large scale. We hope that the results from the project will contribute to the understanding of pesticide use in homes and identifying pesticides of concern and their persistence in our waterways.

A big thank you for participating in the Pesticide Detectives project!

APPENDICES

CHAIN OF CUSTODY (COC) FORM

CHAIN OF CUSTODY - The Pesticide Detectives					
AQUEST - RMIT University – Phone number +61 (3) 9925 1903					
Group Leader:			**Pesticide Detective Laboratory Details:**		
Contact Person:			**Attention: Kavitha Chinathamby**		
Phone:	**Mobile:**		**ADDRESS: BLD 201, Level 1, Room 5, RMIT SHE Common Store Room Clements Drive, Bundoora West Campus 3083**		
Email:			**PHONE: 61 0422 247 095**	**Email: Kavitha.chinathamby@rmit.edu.au**	
Sites:					
Sample information					**Comments**
Pesticide Detectives Sample Site Code	**Date sampled**	**Time**	**Type of sample: (e.g.: sediment or soil)**	**No. of jars**	**NOTES/COMMENTS: Provide as much information about the sample as you can**
Relinquished by (Volunteer):			**Received by (Company):**		
Print Name:			**Print Name:**	**Cooling: Ice / Ice pack / None**	
Date & Time:			**Date & Time:**	**Security seal: Intact / Broken / None**	
Signature:			**Signature:**		

Pesticide Detectives Risk Assessment Form

Please note: Site hazards change over time at the same site. Risk assessments should be reviewed during every site visit prior to conducting sampling. Please contact your coordinator if you need assistance with the form.

Group name: …… **Location:** …… **Date of monitoring:** ……		**Group coordinator:** …… **Contact numbers:** …… **Special needs:** ……	
Hazard/risk identification Preliminary site inspection and assessment completed Date: ……	**Assessed risk level** (see matrix, next page)	**Risk management plan – Management/control measures**	**Who?**
General: all emergencies		Mobile phone and first aid kit carried in support vehicle. Staff responsibilities agreed, and emergency numbers known to all; vehicle access to site, base staff know of whereabouts and expected time of return.	
Environmental hazards: weather □ cold weather □ heat, UV rays □ extreme weather events, e.g. wind, storms, flash flooding		□ Checking, warning, avoidance. Protection and shelter. □ Cold weather – take warm clothing. □ Sun – appropriate clothing, hat, sunscreen and water bottle. □ Extreme weather – alternative sheltered location, checking, warning.	
Environmental hazards: insect/plant/animal □ snakes and crocodiles □ mosquitoes and insect pests □ trees and branches in windy conditions		□ Warnings issued. Check sites. Avoid high risk sites. □ Insect repellent, sunscreen and water at each site. □ Checking trees, warnings and alternative venue.	
Hazard/risk identification Preliminary site inspection and assessment completed Date: ……	**Assessed risk level** (see matrix, next page)	**Risk management plan – Management/control measures**	**Who?**

People □ existing medical conditions □ allergic reactions		Pass on information regarding existing and potential conditions.	
Water testing activities (cross out if it does not apply) □ use of equipment □ carrying equipment, e.g. spade, buckets		□ Supervision of participants. □ Safety equipment – rubber gloves and safety glasses.	
Proximity to water □ drowning □ health issues – dirty water, mud and sediment		□ Supervision, no swimming, work with a buddy. □ Wash hands thoroughly after contact with water. Gloves on request.	

Risk assessment matrix	**How likely is it to be serious?**				Consultation prior to monitoring: Date: Consulted with (signature)
How serious could the injury be?	**Very likely**	**Likely**	**Unlikely**	**Very unlikely**	
Death or permanent disability	**1**	1	2	3	Persons exposed to risk: Attach list of participants and special needs (e.g. wheelchair access)
Long-term illness or serious injury	**1**	2	3	4	
Medical attention and several days off	**2**	3	4	5	**Comments:**
First aid needed	**3**	4	5	6	

Pesticide Detectives Site Assessment Form

Please fill in this sheet only if you don't have access to the online form on your phone. Please upload site map on PD webpage.

The online form is available at http://bit.ly/PesticideDetectivesSA or at www.rmit.edu.au/pesticidedetectives

All information, including site photos and site map, recorded on this assessment sheet should be submitted using the online form (link above) as soon as possible upon return from the field. If any parts of the assessment are **not** relevant to your site, write N/A.

SITE & COLLECTOR INFORMATION:

River/Stream/Waterbody Name:	
Site location (Eg. Name of street)	Site Code:
Latitude and Longitude (Decimal Degrees):	
Nearest Town or suburb:	Postcode:
Date:	Time:
State:	
First and Last Name of person filling in information sheet:	Contact number: (Please include area code)
Group Name:	
Collector Names:	

SITE MAP:

Sketch an aerial view of at least a 10 metre section of your site. Include features and details that will assist in locating the site e.g.: roads, large logs and branches within the stream, overhanging vegetation, aquatic vegetation, fences, and buildings. Mark on the location of photopoints (PP), sediment collection points (X) and direction of water flow, indicated with an arrow. Please refer to Page 14 of the instruction manual for tips on drawing a site map.

SITE CHARACTERISTICS

WATERBODY TYPE

Tick the box in the table below that best describes your site:

Freshwater rivers and streams	Tick	Estuary/marine	Tick	Standing water	Tick
Upland River		Estuary		Lake/reservoir	
Low Land river		Coastal stream (tidal)		Dam	
				Wetland	

WATERBODY WIDTH

WHAT IS THE WETTED WIDTH OF THE WATERBODY (m)? This provides an idea of the size of your sampling site.

WATERBODY COLUMN DEPTH

WHAT IS THE WATER COLUMN DEPTH ABOVE YOUR SEDIMENT COLLECTION AREA (m)?

RATE OF WATER FLOW

Circle the most appropriate option.

Flowing
Trickle
Still/no flow

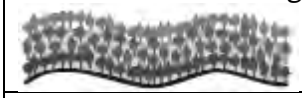
SEDIMENT TYPE

Please circle the option/s below that best represent the type of sediment at your sample collection area.

Boulder (>256 mm)	Small-medium gravel (8-16 mm)
Large cobble (128-256mm)	Small gravel (2-8 mm)
Small cobble (64/128 mm)	Silt-sand (0.63-2mm)
Large gravel (32-64 mm)	Mud/fine sediment (< 0.6)
Medium-large gravel (16-32 mm)	

RIPARIAN CHARACTERISTICS

Tick the box that best describes vegetation along the banks of your site.

Features of riparian vegetation	Tick
Wide corridor of mainly undisturbed native vegetation 	
Well vegetated with native and/or introduced species 	
Narrow corridor of native and/or introduced species 	
Clumps of native and/or introduced species 	
Little or no riparian vegetation 	

IS YOUR RIPARIAN ZONE:

Please tick the most appropriate option/s.

	TICK
Fenced	
Not fenced	
Has stock access	
None of the above	
Other (Please specify)	

SITE IMPACTS

WATER CONDITION

Please circle the most appropriate option/s below that best represent the condition of the water at your site.

Clear	Smelly
Muddy	Brown
Oily	Other (Please specify)
Frothy	

DID YOUR SITE RECENTLY RECEIVE ANY RAINFALL?

YES/NO/NOT SURE

If you selected Yes above, please circle the most appropriate option/s below.

Raining now	Last 7 days
Last 24 hrs	Other (Please specify)
Last 3 days	

DESCRIBE BRIEFLY ANY POLLUTION EVENT/S AT THE SITE (PAST/PRESENT) THAT MAY AFFECT OR HAS AFFECTED THE HEALTH OF THE WATERWAY (IF APPLICABLE).

IS THERE A STORMWATER OUTFALL WITHIN VISION OF YOUR SAMPLING SITE?

YES/NO/NOT SURE

SURROUNDING LANDUSE (Land directly abounding/influencing your site)

Tick as many as apply

Agriculture	
Cropping	
Grazing (Cattle, sheep, deer, goats)	
Horses	
Feed lot	
Dairying	
Orchard	
Market Garden	
Other agricultural land	
Forestry	
Other (name) …….	
Recreation	
Swimming	
Fishing	
Boating	
Picnic area	
Camp-ground	
Golfing	
Other (name) …….	
Built Environment	
Urban residential	
Rural residential	
Industry (factories)	
Commercial, e.g. shops	
Schools	
Park/gardens	
Roads/Bridges	
Sewage Treatment Plants	
Water Treatment Plant	
Construction Underway	
Housing development	
Commercial building	
Road or bridge repair/works	
Other Land uses	
Landfill site/rubbish tip	
Mines/quarry/gravel pits	
Aboriginal cultural heritage site	
Other (name) ……..	
Bush, forests, reserves	
Bushland area native	
Bushland area exotic	
Water supply catchment	
State/national park	
Crown land	
River reserve	
Wetlands	
Other (name)……..	

Pesticide Detectives Field Sampling Checklist

ITEMS WITH AN * NEXT TO THEM ARE NOT INCLUDED IN THE SAMPLE KIT.

General	√
Pesticide Detectives Instruction Manual	
Pesticide Detectives Monitoring Approach	
Risk Assessment Form	
Site Assessment Form	
Sediment Sampling Protocol	
Soil Sampling Protocol	
Sealable plastic bag	
Paper towels	
Pencils	
Marker pen	
Clipboard	
Tape	
Bubble wrap	
Polycell bubble bags	
Prepaid envelope/s	
Chain of Custody Form	
*Camera	
*Bottle of tap water for rinsing	
Sample Jars	
Clean glass jars 2 per site (may include additional jars)	
Jar labels	
Sampling Equipment	
Small handled trowel	
*Long handled spade	
Spatula	
Bucket	
Health and Safety Items	
Snake bite bandage	
Gloves	
*First aid kit	
*Emergency procedure Contact List: • all field staff on the sampling trip • office staff who may need to be contacted • landholders who have given approval to enter their properties	
*Personal protective equipment (PPE) such as life jacket, sunscreen, hat, appropriate clothing, insect repellent	
*Gumboots or solid enclosed shoes that can get wet	
*Drinking water	
*Communication devices (e.g. phone, SPOT devices)	