Waterwatch ALT App (WALTA) Scope

Prepared by **The Waterbug Company Pty Ltd**

Compiled by The Waterbug Company Pty Ltd for consideration by Melbourne Water, and the Department of Sustainability and Environment (Government of Victoria).

Queries about the content should be addressed to:

John Gooderham (Co-Director - The Waterbug Company Pty Ltd)
ph: 0447893519
email: flatworm@ozemail.com.au

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Waterwatch ALT App (WALTA) or WALTA for Melbourne Waters

Up Front

Waterbugs allow us to coarsely assess the health of our waterways. The App proposed in the following pages aims to make waterbug identification possible with some basic equipment and an IPhone / Android smartphone or Android tablet / IPad. The App has a basic or "lite" version that enables the user to assess a site using software on the phone. The full version allows registered users (including Waterwatch volunteers) to upload their assessments to a database. The App also has a browse function which displays records for the river sites nearby and the waterbugs likely to exist in nearby rivers and wetlands.

Background

Waterbugs are reasonably good indicators of the health of a water body. This is due to the fact that if water quality is consistently good at a location, and a suitable set of habitat exists, then a diverse range of waterbugs are likely to make the place their home. If there is a pollution event, or if the long term health of a site is degraded, then the more specialised or delicate waterbugs will be unable to establish themselves, and so the overall diversity will be reduced at these sites, and the site will be dominated by waterbugs that are tolerant to the pollution.

Melbourne Water currently uses waterbug data in both stream management and educational contexts. Melbourne Water currently collect waterbug data as part of its Long Term monitoring project, works evaluation project and for the Rolling Tributaries program. These data are then used for evaluating the success of works and for strategic planning. Waterbugs are also commonly collected by members of Melbourne WaterWatch team. The App will be named Melbourne Water WALTA.

Waterwatch uses both water quality and waterbugs in their assessment of sites, and since late 2010 have had methods in place to quality control the water quality measurements taken by Waterwatch participants. The Agreed Level Taxonomy (ALT) method was designed as a way of allowing volunteers to consistently identify waterbugs without a microscope (which is required for most other stream assessment tools such as AUSRIVAS and SIGNAL). The method is used in the field using live specimens, which avoids large numbers of waterbugs being killed every time someone takes a sample. The ALT method also allows the waterbug data collected by Waterwatch to be dealt with in a QA/QC framework so that it can be considered with confidence alongside the water quality data already in use.

The ALT keys were developed through a series of DSE funded workshops with Waterwatch volunteers, and established a series of taxonomic levels at which trained Waterwatch co-ordinators were able to consistently identify waterbugs. These are the "Agreed Levels" in ALT and vary from Order through to Genus and Species. The ALT keys use features such as colour and movement and these extra characters (which are lost in preserved specimens) increase the reliability of waterbug identifications. The ALT method enables identification, and therefore

assessment of sites, to be completed in the field. This removes the lengthy process of sorting

and identifying preserved samples in a laboratory with a microscope.

Currently, the ALT keys for the identification of freshwater invertebrates (Waterbugs) are available from:

www.thewaterbug.net/ALT.html

They exist in PDF format, and are generally used as a large, printed document. WALTA will hopefully make this literature more portable.

Audience

Three main audiences have been identified for WALTA:

Melbourne Water: The App allows field officers to perform quick assessments of streams within the Melbourne Water catchments and eventually to access a database of historic data. The app uses currently accepted methods (used by Waterwatch Victoria) for coarse site assessment. In instances where unexpected results are returned, field officers should take a RAP(AUSRIVAS) sample for a more detailed assessment. The BROWSER and QUICK SITE functions of the App will also provide invaluable education tools for the Melbourne Water community education program. The App allows a rapid, field based assessment of the state of a stream by trained Melbourne Water staff and contractors as well as access to database of historic data.

The general public: The App will also allow the general public to access either a cut down site assessor version, browse the entire app, or use the full app and upload data that is tagged as being submitted by an untrained user.

Waterwatch Victoria: Waterwatchers will be able to use the full app to identify animals and upload site assessments tagged with their user ID.

Conventions used in this document:

Indicates a selected screen item

Is a mobile device (IOS, or Android) A generic layout is intended.

Front Page

The App will have three main workflows that can be initiated by the user (seeFigure 1) :

The WALTA assessment results in an assessment of a site, and the uploading of data. It is the most extensive of the workflows.

The QUICK SITE ASSESSMENT workflow is similar to the main workflow, but draws upon a limited number of waterbugs for the assessment, making the process faster. This data is not uploaded and is analysed on the phone. The ID process uses only a combination of SPEEDBUG and a modified ALT key. There are no options to select from a list (or it might be available through the menu perhaps) as most users of this workflow will not know the nmes of the animals yet.

The WATERBUG BROWSER workflow allows users access to all the information needed to identify waterbugs, without the site assessment tools or upload functions.

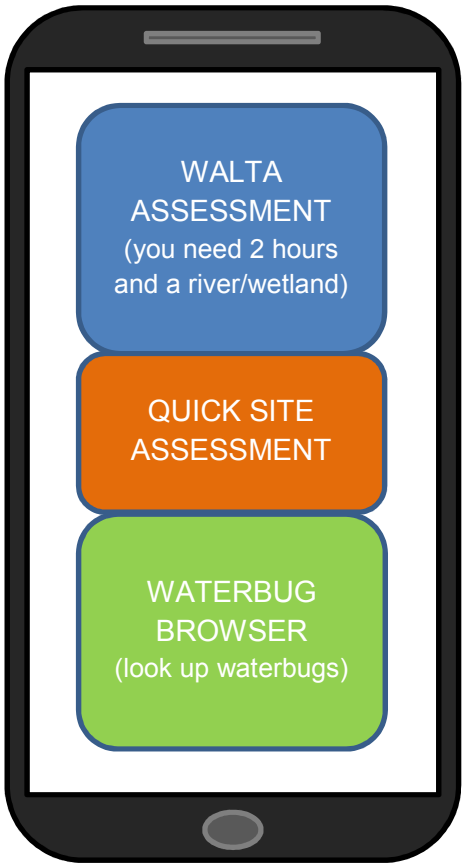


Figure 1 The front page of the App needs to link to three different workflows. It could look better than this.

The layout of the following document roughly follows the order that screens will be encountered as part of the WALTA site assessment workflow, with notes on how other workflows may differ. The workflows are all illustrated in the final section from page 29 .

Method and Safety tips

WALTA and QUICK workflows will need to go through a screen that offers safety tips and instructions on how to take a sample (also accessible from the menu option at all times like HELP).

Safety

This will need to be worked up in line with existing Waterwatch and Melbourne Water OH and S protocols. It will also contain a disclaimer (?).

How to take a waterbug sample

- PDF version of existing method docs
- graphic version for sampling method (to be scoped separately)

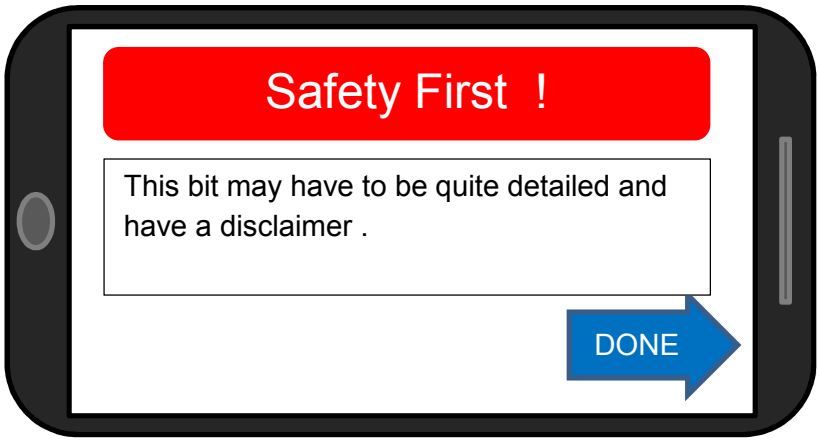


Figure 2 The existing Melbourne Water and DSE /Waterwatch safety protocols need to be included in some way.

The Safety section will need to be useful, but also contain any disclaimers that we may need. Advice from Melbourne Water and DSE needs to be sought on this topic as they currently run programs that operate under similar sets of risks.

Generated data "The Sample"

The WALTA workflow results in a sample which contains the following data. The data is to be saved / uploaded.

- Sample code (generated using a rule set)
- Site name (user generated - possibly link to another screen that asks for River, Road and upstream or downstream and combines them to create a code using rules)
- Login details (name and QC info from Waterwatch database)
- Geotag or map point
- Date and Time
- Rain (Y/N)
- Current weather (of 3 options)
- Notes (type is Char and needs to store up to 500 characters)
- River or Wetland (binary choice)
- Habitat data (either 10 selections, or less turned into %)
- WATERBUG DATA:
    - waterbug Id $_{n}$
    - waterbug abundance $_{n}$ (of 3 options)
    - waterbug Id $_{n+1}$
    - waterbug abundance $_{n+1}$ (of 3 options)
- Possibly also save the generated SIGNALT and weighted SIGNALT

The QUICK workflow results in the following data, and is processed on the phone, possibly saved, but not necessarily uploaded.

Field names/types and table structures need to match the existing DSE database currently used to hold Waterwatch ALT creature data as much as possible to allow the collected data to be readily uploaded as batches after data cleansing. The DSE Data structure is available on request from John Gooderham (contact details at the front of this document).

Data cleansing / upload to DSE database

The data from the App will reside in a temporary database (location and form to be discussed), it will then be QC processed (by The Waterbug Company as part of their ongoing commitment to the DSE Waterwatch ALT program). In the first year this will be done monthly, or as required. As a lot of sampling is seasonal Autumn/Spring, it might be necessary to process data more frequently during this period.

MENU and BACK functions

Some phones have separate Menu and Back buttons (usually lower left and lower right of the screen). These may need to be simulated on-screen for IPhone and some android models.

Their standard functions are detailed below. On some screens MENU and BACK may have more prescribed functions.

MENU:	offer options such as access to the method and safety info. or start again at the beginning of the ALT key
BACK:	Return to previous screen

Menu functions may be added, but the only instance where a different behaviour has been identified, is where people have selected either LISTS, QUICKBUG or ALT KEY, but would like to swap to a different method to identify the next bug (see page 13).

Login

When log in is complete download Waterwatch ID, also download info on user's training. This is used to quality code the data being submitted.

Geotag

Once the user has decided to do an ALT style sample, the location of the site is stored with the rest of the sample data. Date and time are also added to the sample data from the device (?or from the geotag?). If geotag isn't possible (no satellites or veg is obscuring the signal), perhaps have a link to the map app and cross hairs ...and users place the site using land marks. Open for discussion.

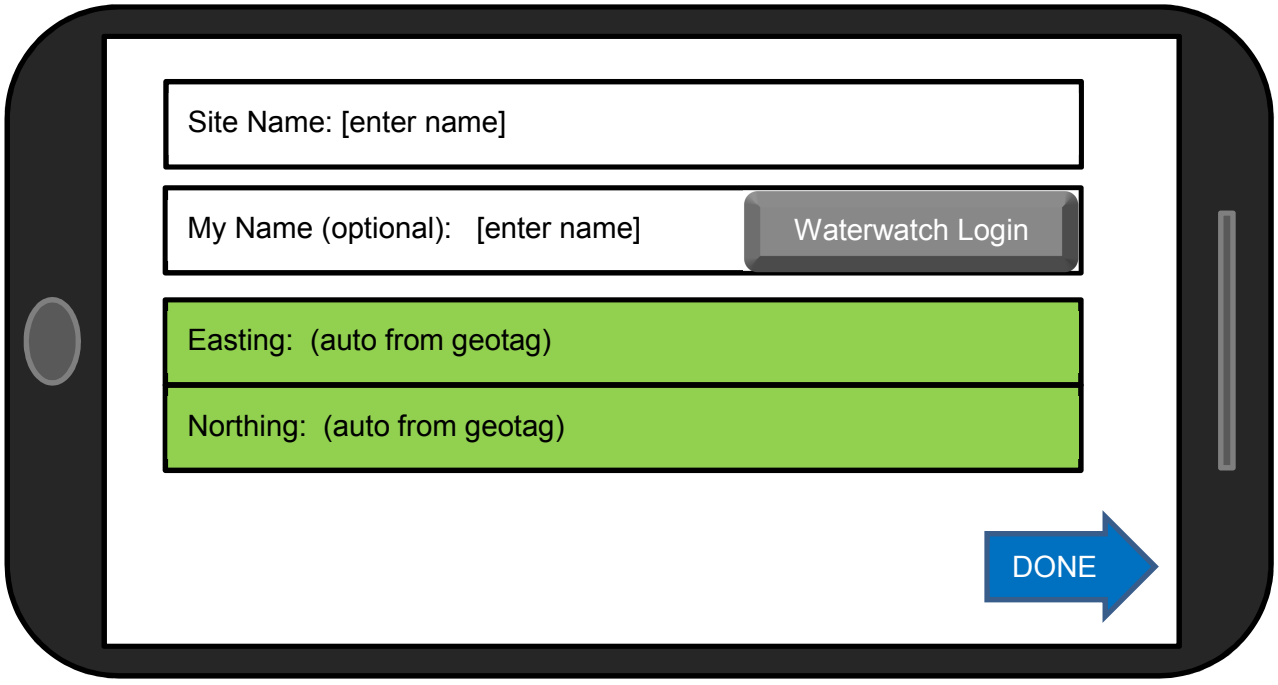


Figure 3 When the geotag is accurate these boxes go green indicating that they are ok to submit, and Done can be pressed. If the signal is too weak perhaps try later, or pick location from a map? but let the process continue.

Site Observations

Each sample includes a set of site observations. This allows the QAQC process to filter data, based on conditions at the time. The Identification process is difficult if it is dark or if the operators are uncomfortable, so data collected in overcast conditions or on rainy days may need checking further. Heavy rains in the previous days can also depress how well a site scores

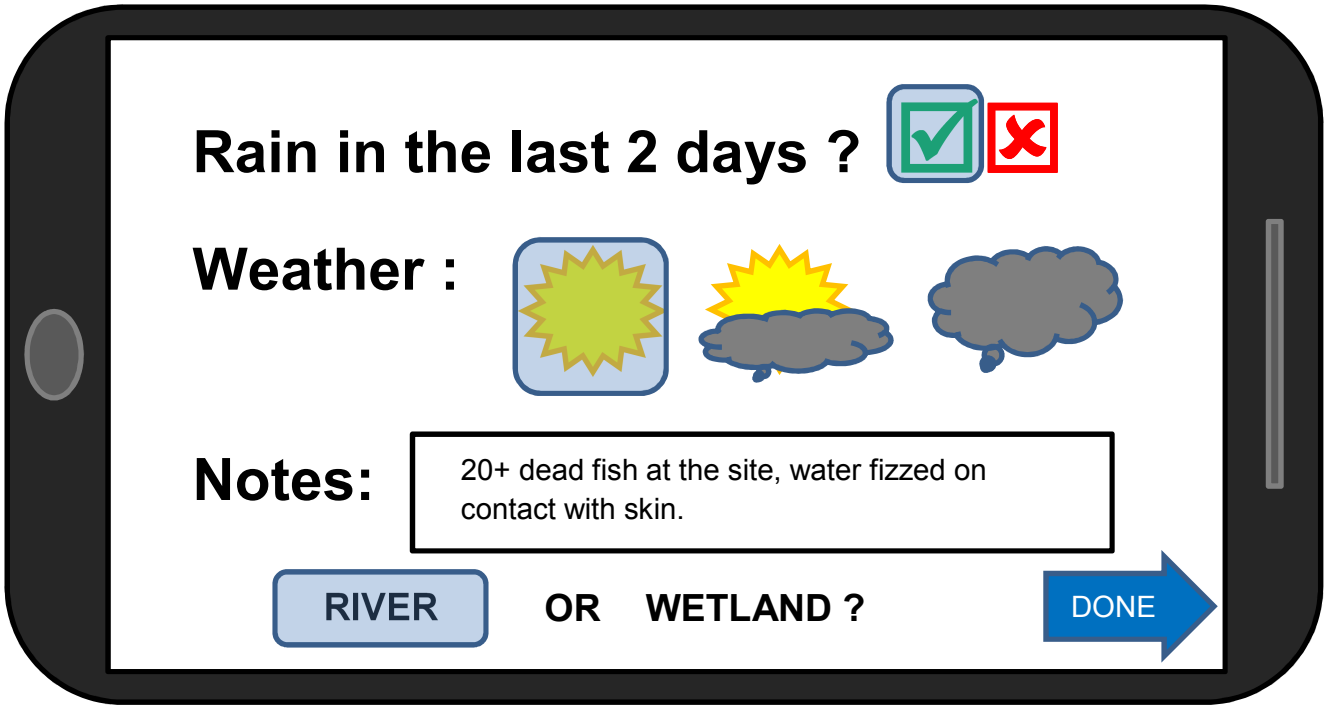


Figure 4 A limited set of observations are collected to help with the QC process later. Notes can be added through the devices native keyboard functions. Users also need to select River or Wetland before starting. In this figure RIVER has been selected. This selection is stored with the habitat data, but is no longer needed on screen. All fields except notes must be filled before moving to the next screen (by pressing "DONE").

Habitat Data

Habitat data provides a coarse assessment of geomorphic or biotope diversity at the site. It also allows comparisons between dissimilar sites to be avoided. So for example, a rocky site would not be expected to have the same waterbugs as one dominated by sand and silt and plants. Storing habitat data alongside the waterbug data is an important part of the ALT methodology.

The figures shown here illustrate the habitats in RIVER. Selecting WETLAND would show five slightly different habitats: aquatic vegetation, edge vegetation, open water, sand/silt, and wood. The data would be managed and recorded in the same way as in Figure 5, Figure 6 and Figure 7.

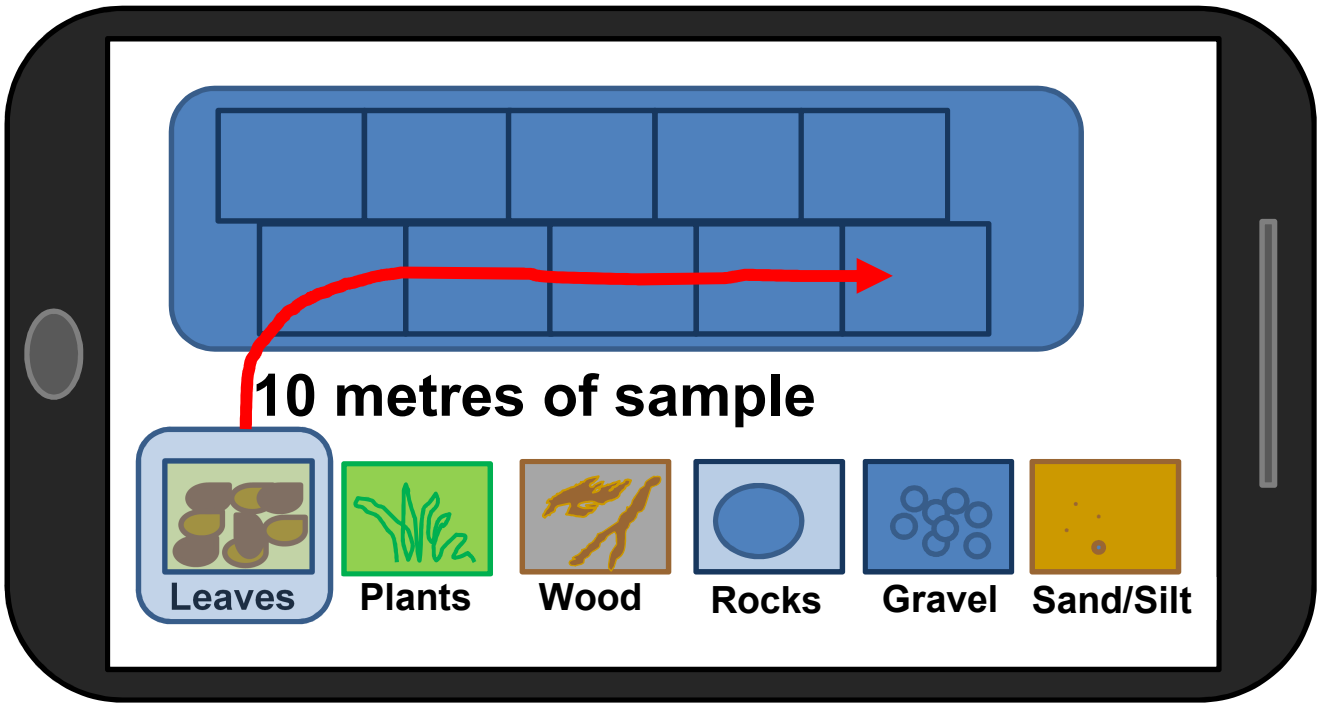


Figure 5 Habitat data is collected by dragging habitat types across to fill the ten cells in the river. The RIVER/WETLAND selection might fit better with the previous screen.

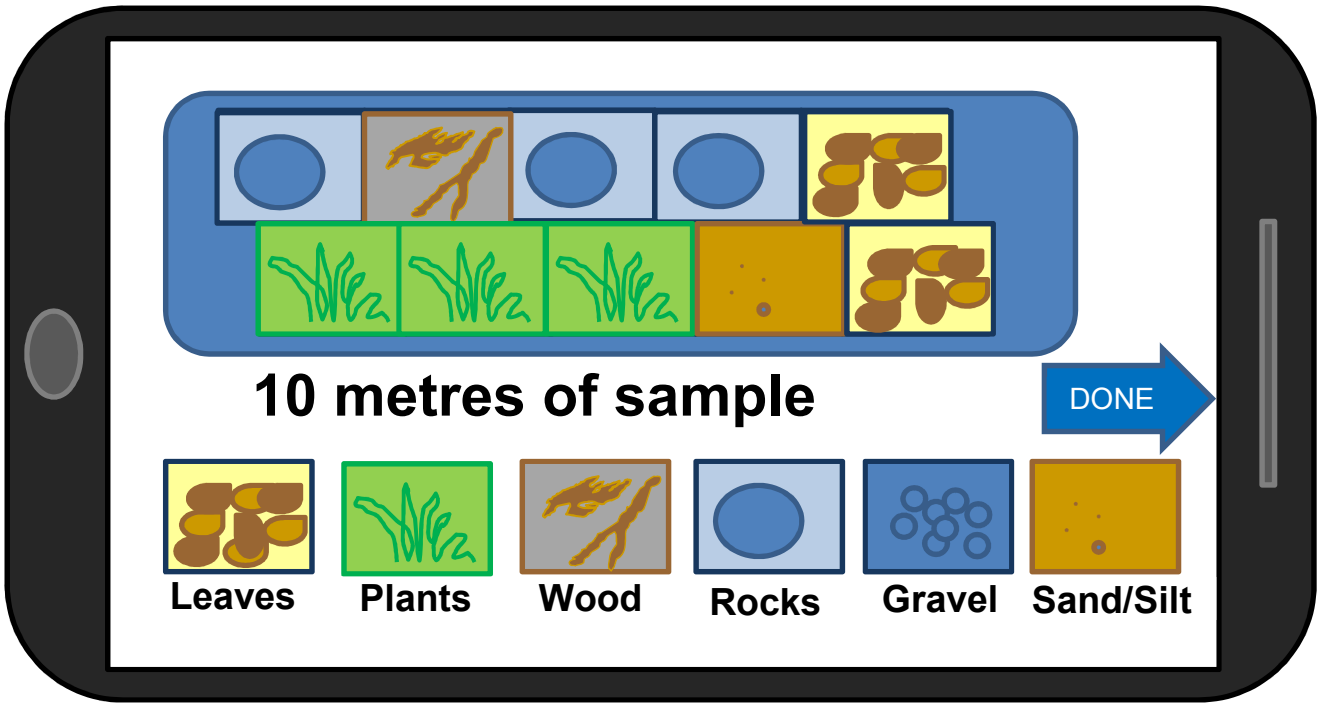


Figure 6 A completed habitat screen.

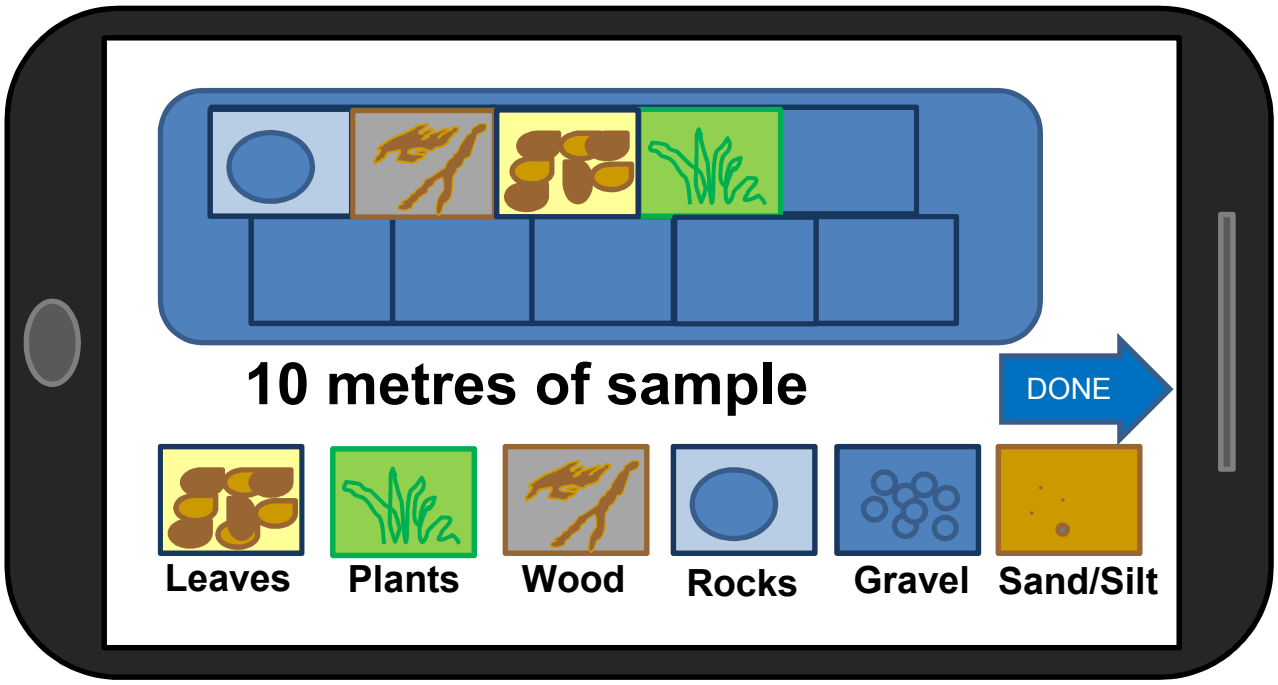


Figure 7 If only some of the cells are filled habitat totals are divided between the habitats present. In this example each habitat would be 25% of the sample.

Method

Once the Habitat data is complete, it is worth offering the option to review the sampling method (Figure 8)

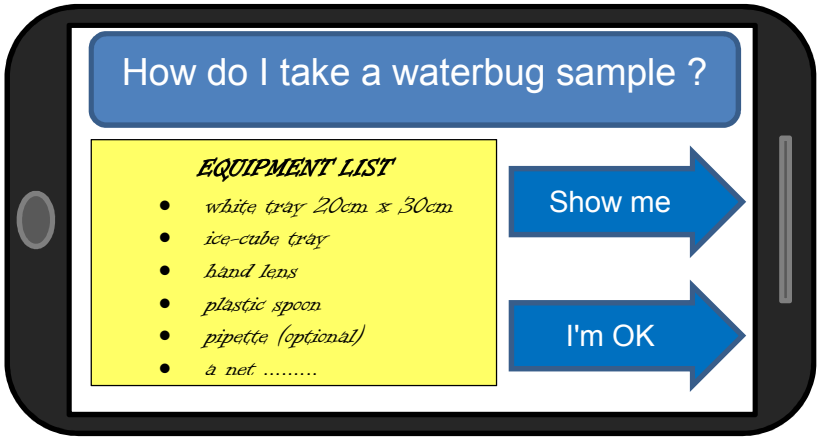


Figure 8 The screen that links to the method offers a reminder of the equipment needed, and an option to link to the graphic METHOD Doc (for those that are trained, the "I'm OK " link takes them to the beginning of the Waterbug ID task.

Waterbug ID

The Site assessment ultimately needs a list of names of the waterbugs that have been found by the user in order to calculate a site assessment. The Waterbug identification and data collection is done through the virtual ice-cube tray. Users select a cell from the ice cube tray (Figure 9) and this triggers the options for identifying waterbugs screen (Figure 10). Users are returned to this screen after identifying a bug and offered a new cell of the tray to fill. They can also Edit/Review the TRAY if they need to change an entry. The "CHANGE BUGS" button links to the Tray/List screens (see page 21). The "Done" button also links to the tray / list, but with the intent of giving the user one last look at the bugs before submitting them. Given the behaviours are so similar these buttons could be combined, the name/tag needs some thought .

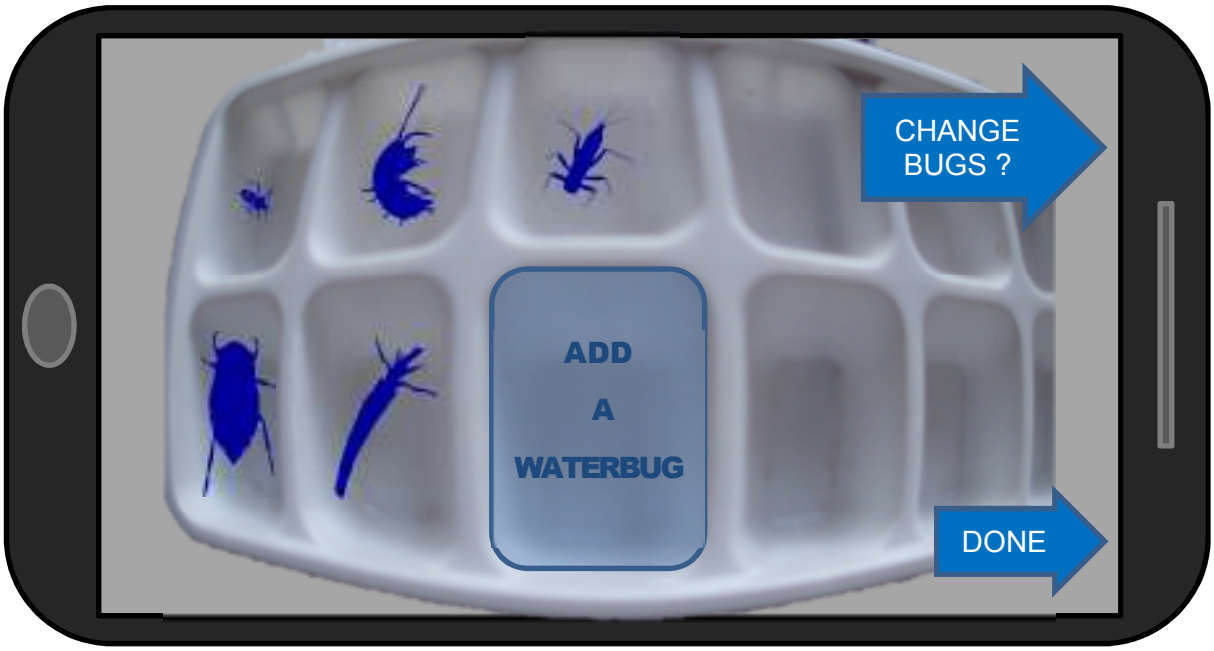


Figure 9 This screen has no bugs in it to start with, but is populated as each new bug is added. After each confirmed bug, the user is returned to this screen to either add an additional bug, or to click "DONE" to submit a finished sample.

Figure 10 Three different tools exist for identifying waterbugs.

The three different methods overlap slightly (as illustrated in the workflow section (page 29), they are SPEEDBUG, the ALT KEY, and LISTS.

Needs to be discussed, but possibly, the decision on this screen should be saved (and not offered for subsequent bug ID), but the user can swap to a different method through a menu option. After the first selection the App needs a message telling them they can change methods through the menu.....To be discussed.

SPEEDBUG

SPEEDBUG is a list of silhouettes arranged in roughly increasing complexity and grouped so that similar animals are near one another. Selection options are the silhouette or "Not Sure ?". For some animals, the silhouette is distinctive enough for a match, while for others the silhouette will link to a place in the ALT key where extra questions (usually only 2 or 3) will give a final ID. If the user is not sure, but knows roughly, then the "Not Sure?" link takes them to a slightly earlier spot in the ALT key.

Navigation is similar to that used in an address book ("Contacts") with forward and back arrows, and a "jump to" option along the base/side. The "jump to" would be the alphabet in an address book, but the SPEEDBUG list uses small animal silhouettes of different kinds. The animals become more complex (more legs and bits towards the right). The order and images for this tool are yet to be finalised, but it will be a list of between 100 to 140 images (roughly ten repeated in the "jump to" bar). It is almost certain this will need extensive user testing to get it to work.

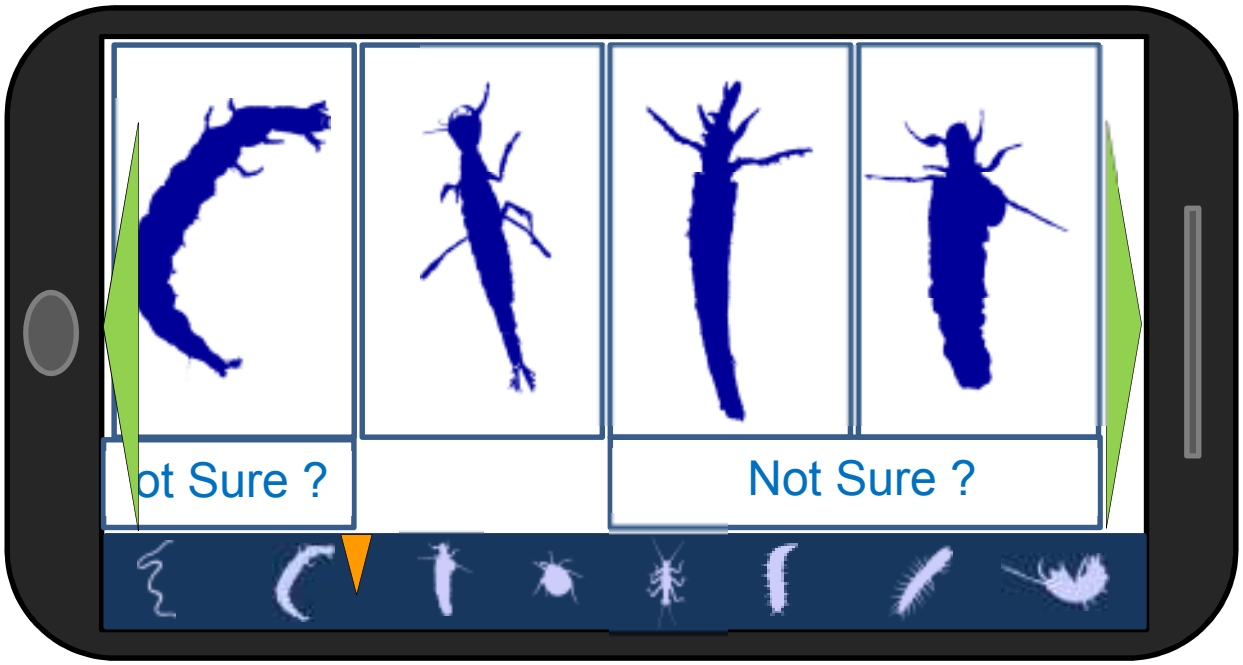


Figure 11 Roughly 100 - 140 silhouettes are used in SPEEDBUG. The list can be swiped in either direction, or arrows can progress the carousel-like display. The darker band along the bottom is the "Quick jump" strip, the orange marker shows where the current selection is in the overall list.

The ALT Key

Standard format

Taxonomic keys (for identifying animals or plants) work by presenting a series of questions that are linked in a hierarchical fashion (see Figure 12) .

As an App, taxonomic keys will be a series of screens with simple questions (see Figure 13). Selecting one or the other of the options will progress the user to the next screen until an endpoint (the identification) is reached. To help with decisions, a variety of media options can be linked to the questions, either short movies, or images of the animals in question (see Figure 13).

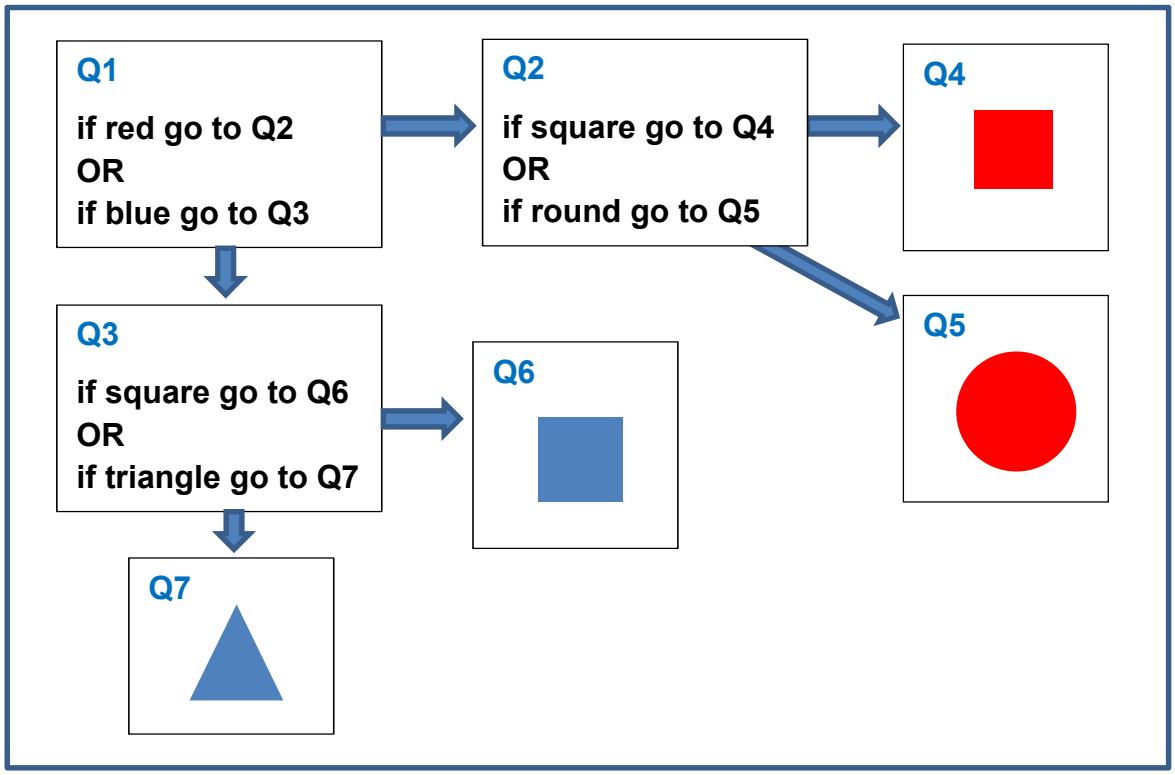


Figure 12 A grossly oversimplified taxonomic key demonstrating how it would be possible to identify blue and red shapes with a series of questions.

The ALT key was developed using a set of characters observed from live abnimals, so it can include questions about movement (as in Figure 13).

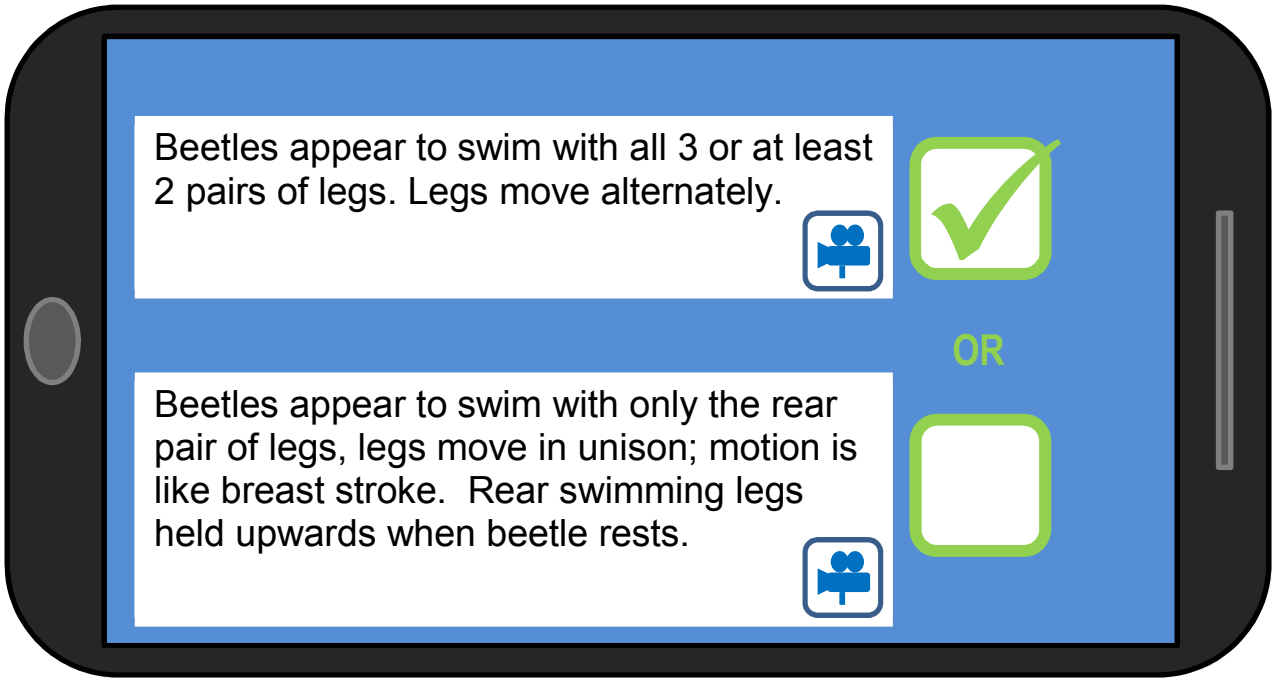


Figure 13 The ticked box dictates which screen in the hierarchical key is called next. The movie icon (blue) links to short movie clips that play full screen, looped until the "done" arrow is clicked, the user then returns to this screen.

In most instance it will refer to characters that can be readily seen on pictures (Figure 14).

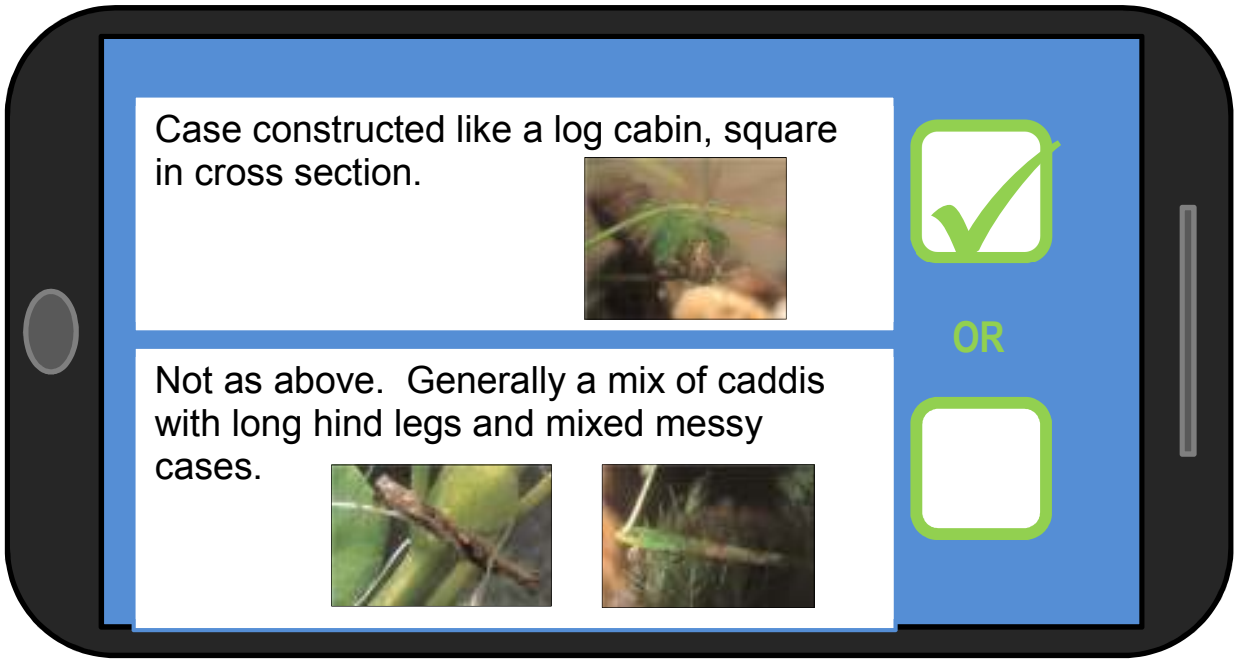


Figure 14 Another key screen, but in this case the extra media is still images. Selecting an image opens it as a full screen image (see Figure 15).

In instances, where the question refers to a very specific part of an animal it may be necessary to add pointers to images to highlight the parts in question. Mostly, the question can be illustrated with a whole image, especially once these have been displayed full screen (Figure 15).

Figure 15 Full screen images make it possible to see characters that are rferred to in the keys.

The ALT key will consist of around 120 screens , however the user will only use a fraction of these for each identification they make.

The QUICK key will use about 40 screens, and most of these will be identical to screens used in the ALT key.

QUICK uses a subset of waterbugs from ALT plus new taxa
The QUICK function will not use the entire set of 140 ALT waterbugs. instead, it will use coarser taxonomic levels that are simpler to identify, with less than 40 waterbugs. The Quick taxa use a modified key with fewer (and slightly different end points. Selecting QUICK associates the QUICK key, opening WALTA associates the ALT key but the same assessment workflow is used for both.

....all the end points could be in the same library, and different keys are called.

QUICK will start with SPEEDBUG to ID bugs, rather than offering the ALT KEY or LISTS.

Shortcuts (from the SPEEDBUG LIST)
If a specific selection can't be made from the SPEEDBUG menu, or the silhouette chosen is typical of more than one animal, then a link lands the user at a relevant bookmark in the ALT KEY, and a final identification can be made typically after only a few extra questions.

ID endpoints
Each string of questions, or LISTS link will eventually terminate in an identification. At this point, the user is provided with any extra information on the animal that might be available (extra photos or possibly footage (as in Figure 16). At this stage they can either browse extra info, or

accept the ID, at which point they are taken to the abundance screen (Figure 18). If they are certain that the identification is wrong, they can activate the "Wrong Bug Go Back" function.

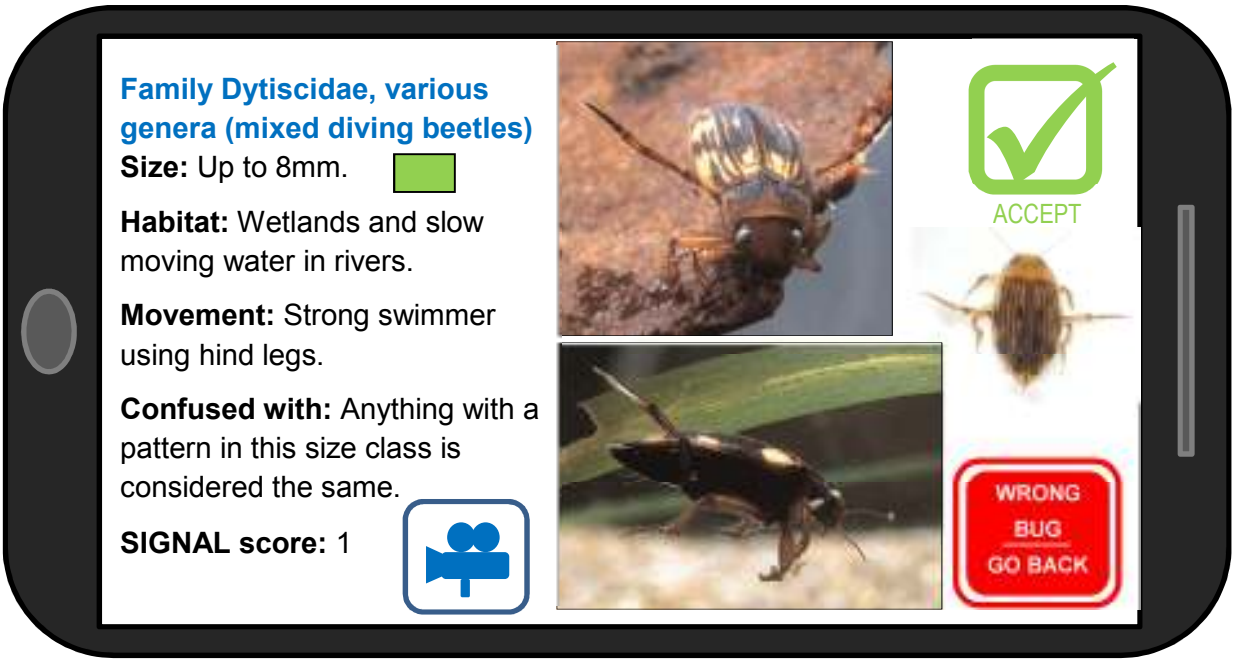


Figure 16 The movie icon (blue) links to short movie clips that play full screen, looped until the "done" arrow is clicked, the user then returns to this screen.

Wrong bug Go Back !

This option takes the user backwards through the key showing them their decisions, and asking if they thought that decision was correct. At the point where they have doubts, the key can start going forwards again and will hopefully end in a positive ID this time.

LISTS

Using the menu function lists can be :

- scientific names
- common names
- all words (both common and scientific - like an index)

If the chosen name is not a final ID (too coarse, for example beetle, or Coleoptera) people are linked back to the key at a relevant node (key icon). Most names are endpoints, activating the relevant ID endpoint, where they can confirm the ID....or not.

This functionality is unavailable in QUICK, or only available through the MENU.

Figure 17: "scientific" (Left), "common" (middle) and "both" (right) displays. The list can be swiped in either direction, or arrows can progress the carousel-like display. A darker band with "Quick jump" strip which features the alphabet. Menu function might be good to alter text/cell size with a zoom, and also to allow to swap between "scientific" "common" or "both" displays. Green key icons indicate coarse taxonomic levels that will require more keying. These link to specific anchors in the ALT key. All other entries reference an endpoint.

When users link to an ID endpoint from the LISTS workflow, selecting the "Wrong bug Go Back !" option should return them to lists, rather than throwing them into the ALT KEY.

Abundances

The rough quantities of the animal that has just been identified are entered as in Figure 18. There is the possibility that this will need to be 5 categories as people are familiar with the existing categories from SIGNAL 2 (1-2, 3-5, 6-10, 11-20, >20).

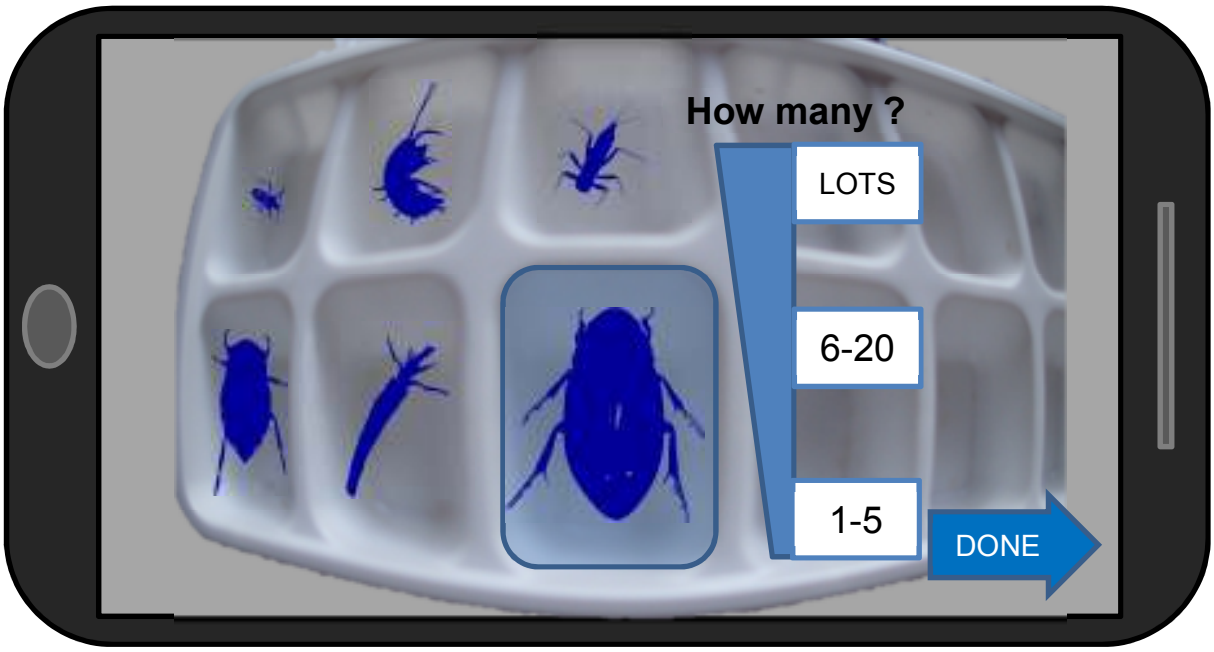


Figure 18 The current Waterwatch method uses 4 categories... so this might be a bit different?

Completing the abundance screen sends the user back to the "Add a waterbug" screen (Figure 9). If this was their final animnal, they can click "DONE" and view the completed sample (Figure 19).

The completed sample

Users are likely to want to check over the entire sample before submitting it for assessment, this can be done as "Tray view" (Figure 19) or "List view" (Figure 20), and these toggle. The sample can be submitted to be assessed from either view ("DONE" option).

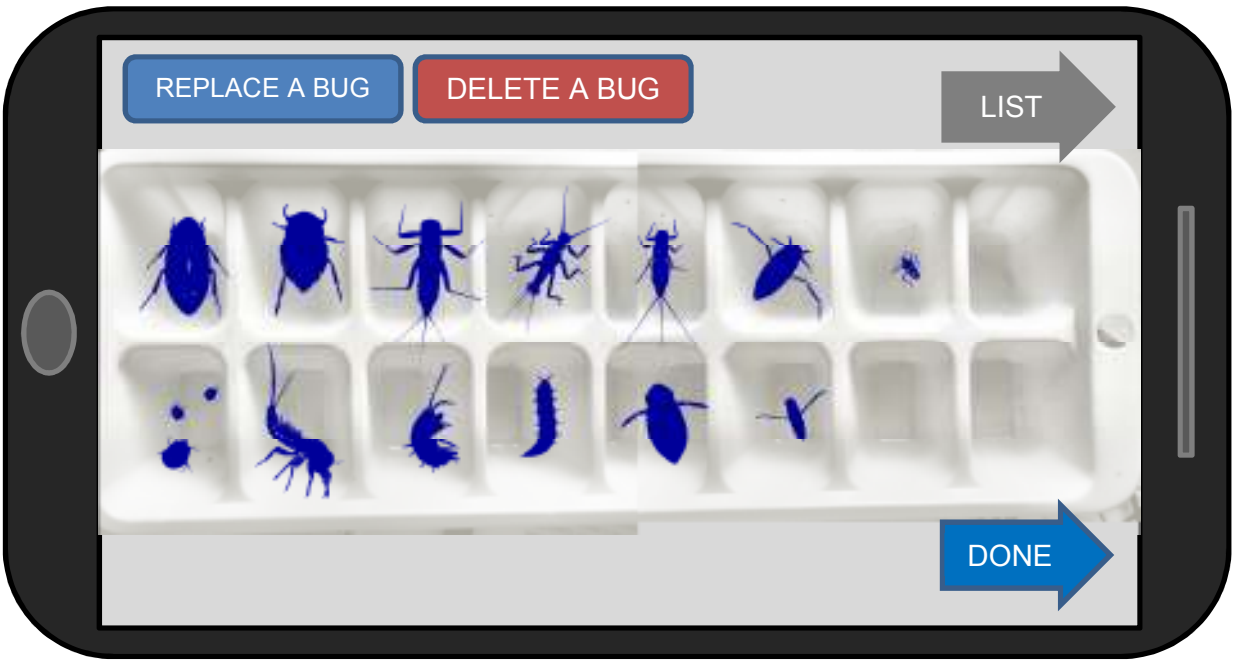


Figure 19 A completed sample viewed in tray view (all the bugs should be different). If the tray has more than 16 animals it should scroll (a maximum of 60 cells is possible). "REPLACE" deletes a selected bug and returns the user to "ADD A WATERBUG" to find an alternative. Delete simply removes the selected bug.

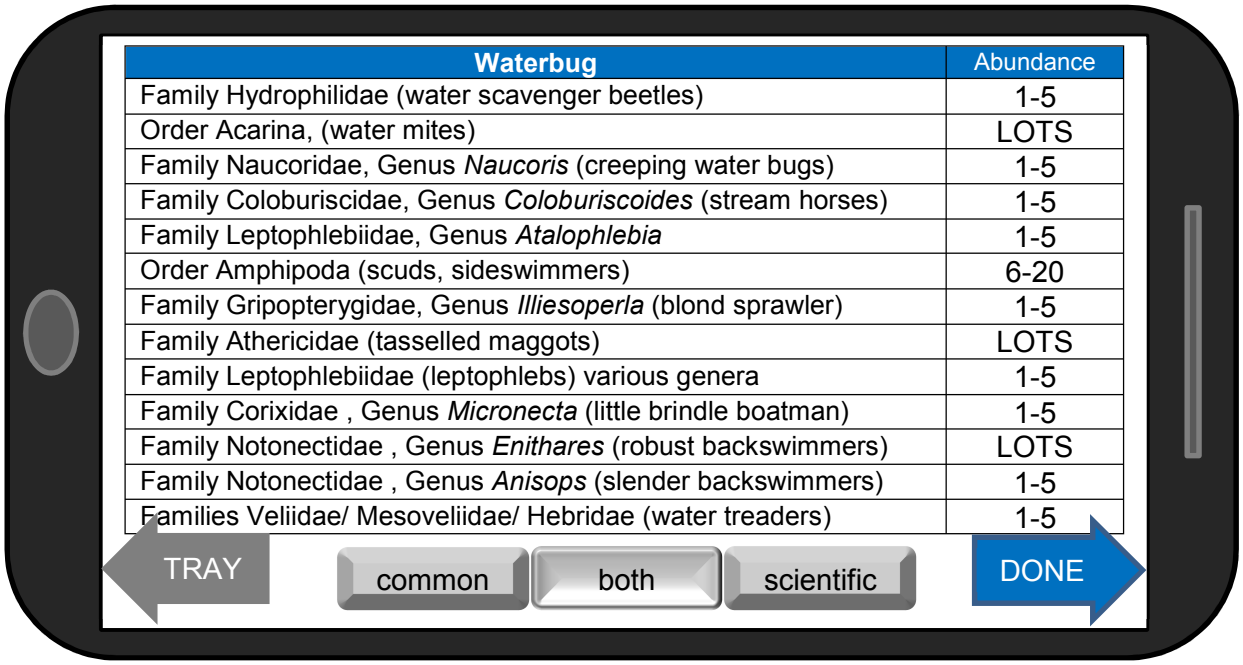


Figure 20 The same completed sample as a list. As with all lists, you can toggle between "common", "scientific" and "both" names on screen. Default behaviour is "both".

DELETE and REPLACE function might be useful in the list view also. The "DONE button could be replaced with an "ASSESS MY SITE" button on these screens....I have used "DONE" for continuity.

Site Assessment

The site assessment is calculated using the list of waterbugs entered, and their associated SIGNAL ALT scores. A weighted SIGNAL ALT Score and an unweighted score are calculated, the weighted version uses the abundance data to inflate the influence of numerically dominant animals on the final score assigned to the sample/site.

SIGNAL2 - how it works

The site or sample SIGNAL score is calculated by averaging the SIGNAL grades for all the waterbugs present at a site /sample.

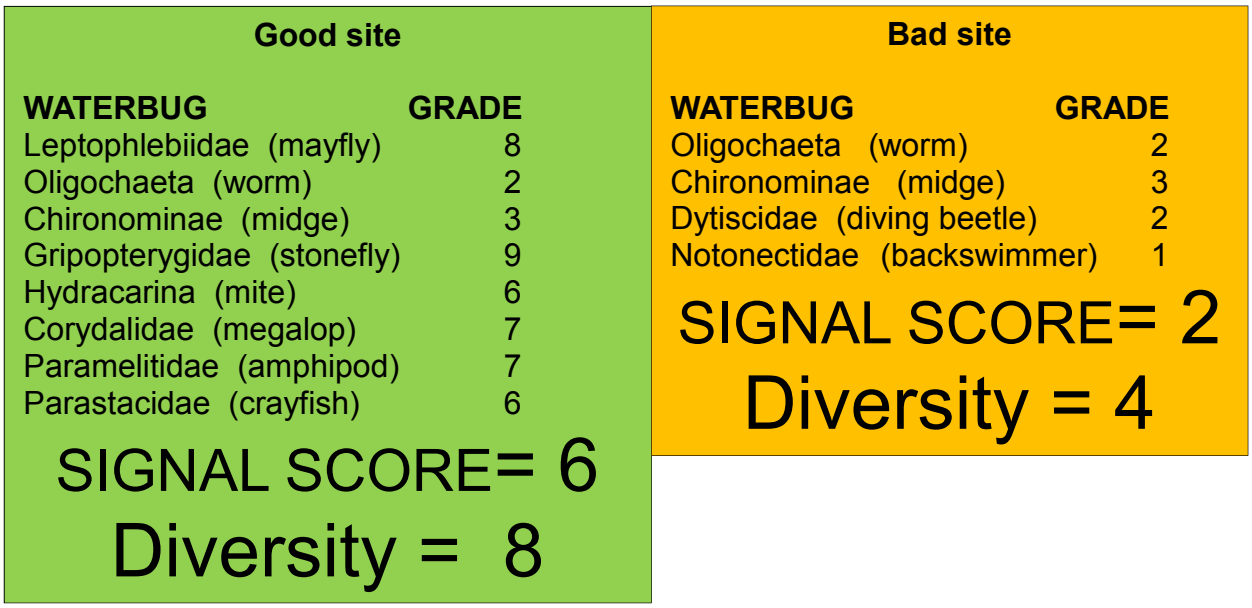


Figure 21 A good site and a bad site and their SIGNAL scores as calculated from the SIGNAL grades of all he waterbugs present at each.

A weighted score is calculated the same way, but the following multipliers are used as weighting factors.

Abundance	Weight factor
1-2	1
3-5	2
6-10	3
11-20	4
>20	5

Scores are calculated and displayed on the site assessment screen (Figure 22). The QUICK site assessment will be less precise, as it has been calculated from a subset of possible animals. For this reason it should only show the graphic interpretation, the scale, rather than displaying calculated SIGNAL scores.

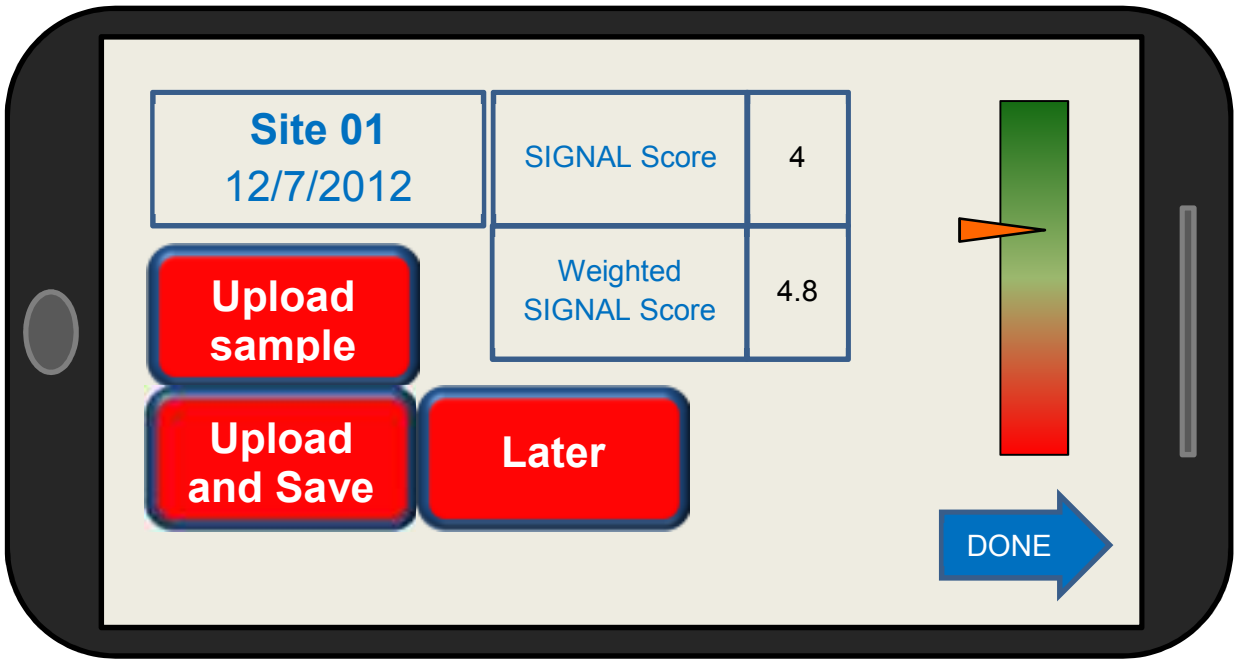


Figure 22 A Site Assessment for the full WALTA site assessment.

Quick Site Assessment:

The QUICK Workflow follows a similar workflow to WALTA with the following differences:

- The key/waterbug selection is at a coarser level
- No information on abundance is entered (unless it is easier to leave this in)
- The site assessment is reported as one of five categories (green to orange?)
- No data is uploaded
- The App final screen offers links to Resources (Waterwatch and Melbourne Water) if people are interested in learning more or joining Waterwatch.

The entire QUICK workflow can be found in the workflow section starting page 29

Waterbug Browser

Some users won't want to complete an entire sample but might want to browse the ALT KEY, SPEEDBUG or LISTS as these options allow waterbug identification without data entry.

Figure 23 Options for browsing. Starts with a similar screen to the beginning uf waterbug ID, but with an extra option "Other Info." Other Info could be called Resources

The entire WATERBUG BROWSER workflow can be found in the workflow section starting page 29

Menu of things needed to be on hand - most screens:

- Link to ALT method
- Disclaimer?
- Safety tips
- Resources page

Resources/Other Info

- The ALT Method
- Safety considerations
- Melbourne Water Info
- Contact Waterwatch / Waterwatch website
- Useful waterbug related sites
- DSE Info EPA info if used
- links to Developer Designer websites
- Credits

Use context:

In many instances, the App will be used in areas where the connectivity may be limited (river valleys / rural locations) so data upload must be a task than can be scheduled for completion later, and the multimedia resources must be storable on the phone if desired.

WALTA Lite

Ideally, a LITE version that retrieves images and media as required and is smaller but only has the WATERBUG BROWSER or QUICK SITE workflows would need to be an option for people when downloading the App. Option needs to be discussed further. Might be restricted to the QUICK workflow?

Tasks - quotable components of the work

Content and project co-ordination - provided by Melbourne Water and The Waterbug Company Pty Ltd

App Creation - to be quoted - including estimates of time

Graphic Design - to be quoted - including estimates of time

Licensing considerations

The source for this project is to be available under OSI approved licensing arrangements (GPL v.3 or AGPL) this includes making the coding for the IPhone version available. The source material for the ALT project is all available through the Creative Commons.

Minimum requirements

WALTA
IPhone OS ? equiv for IPad?

Android v? equiv for Android Tablet?

WALTA Lite
IPhone OS ? Android v?

Database Hosting options

The data generated by the app needs to reside somewhere pre-cleansing and incorporation into the DSE database. Options are to be costed by the successful tenderer for App Creation and discussed. A rough indication can be included in the response to tender documents, but this component is considered beyond the scope of the project.

Images and Movies:

The following associated media will need saving in appropriate format/resolution for the App:

- Images - roughly 280
- Movies 6-10 second loops. roughly 40

All will need to exist as thumbnail and full-screen formats. The possibility of slightly higher resolution versions for use on IPad/tablet devices needs to be discussed.

Screen orientation

Some screens may require a specific orientation, but whenever possible both a landscape and portrait orientation should be available.

Additional ALT work

While most of the ALT material is available "off the shelf", several components will need to be developed afresh for this project. These include:

- 140 endpoint screens
- A map of SPEEDBUG and Index link to parts of the ALT key

Timeline for development

- Development of extra ALT content required (1 month)
- Re-design of App at finer scale using graphic design and coding operators (1 week)
- Graphic design of screen layout
- Coding of App
- Development of Safety guidelines (Melbourne Water / DSE)
- Testing phase (10 Waterwatchers, 10 untrained)
- Finalisation of coding/design based on feedback from testing

Versions

The current project will be considered complete when the WALTA, BROWSER and QUICK SITE workflows are useable operational to the level described in this document.

Future work:

A number of additional functions have been considered for the App, and while they are unlikely to be part of the initial release, they are mentioned here so that the current App can be created in such a way that does not preclude the following functions being developed at a later date:

- Adding Site photos for each sample
- Logging directly into the DSE database
- Can't ID a bug? - get a photo - submit
- Connect to bugface for IDs
- park a sample pending bugface ID
- review past samples , both your's (on phone) and other's (database)
- test mode (random test footage and bug pic that you have to ID) ...set of 10?

Ongoing requirements:

- Data cleansing / upload to DSE database
- Help
- ALT training and accreditation (subsidised by DSE through Waterwatch)

WORKFLOWS

Workflows

WALTA Workflow

Login Option: tags the current sample with user ID. from Waterwatch

User defined sample name, and if not logged on, the option to add user's name

Add geotag Date and time to sample data see page 9.

WALTA and QUICK workflows will need to go through a screen that offers safety tips and instructions on how to take a sample (also accessible from the menu option at all times like HELP)

To METHOD

Add Site Observation data. See page 10

DONE

OR

DONE

Rivers
Add Habitat data.
See page 10

DONE

Wetlands
Add Habitat data.
See page 10

DONE

DONE

To METHOD

DONE

Start ID
See page 10
FULL SET OF 140 BUGS AVAILABLE

ADD ANOTHER BUG

SPEEDBUG page 15

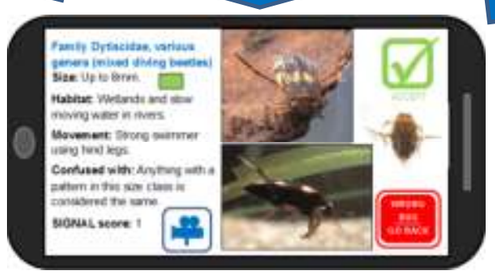
ALT KEY page 16

LISTS page 20

DONE

DONE

DONE



DONE

If there are no more waterbugs to identify go to tray summary (left). If more bugs then follow loop back to "Start ID process" page 10.

DONE

These screens also offer users the chance to edit the tray. See page 21.

DONE

Upload Data (The Sample see page 8) or store on phone until upload is possible.

Workflows

QUICK Workflow

WALTA and QUICK workflows will need to go through a screen that offers safety tips and instructions on how to take a sample (also accessible from the menu option at all times like HELP)

To METHOD

User defined sample name,

Option to add user's name

Display co-ordinates

DONE

OR

DONE

Rivers
Add Habitat data.
See page 10

DONE

Wetlands
Add Habitat data.
See page 10

DONE

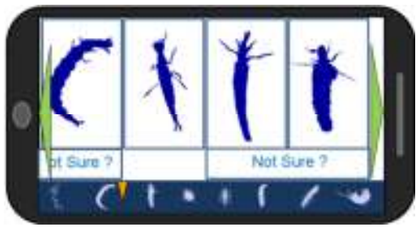
To METHOD

DONE

Start ID process
See page 10

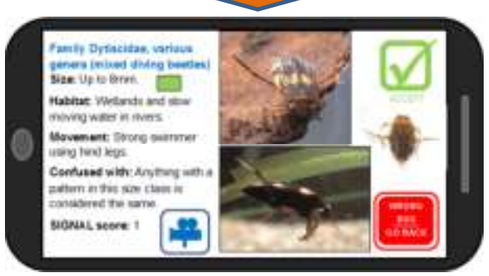
ONLY 40 BUGS

SPEEDBUG page 15



ALT KEY page 16

DONE



DONE

ADD ANOTHER BUG

If there are no more waterbugs to identify go to tray summary (left). If more bugs then follow loop back to "Start ID process" page 10.

DONE

These screens also offer users the chance to edit the tray. See page 21.

DONE

Upload Data (The Sample see page 8) or store on phone until upload is possible.

Workflows

BROWSER Workflow