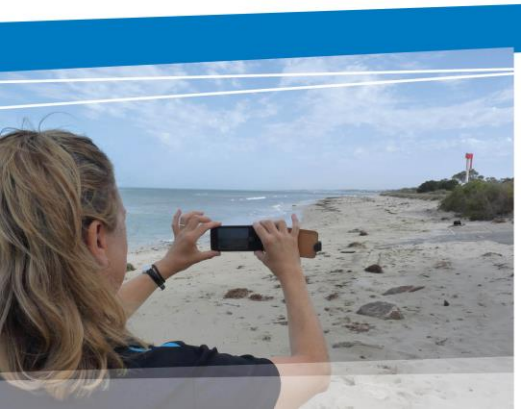
USING PHOTOMON FOR MONITORING ENVIRONMENTAL CHANGE

User Manual (June 2014)

Supporting people to support the natural environment



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QUICK GUIDE: DEMO MODE OPERATION

No log in details required, does not link to a database.

1

Log In

1. Download app from iTunes® Store or Google® Play

2. Ensure location services are enabled on the smartphone

3. Tap Photomon icon and select 'Demo' on the log in page

2

Take Photo

1. Tap '+' *(top right of screen)*

2. Select the direction you are facing to take the photo

3. Do you have a Guide Photo?

Yes - automatically comes up.

No - No Guide Photo comes up

4. Tap the camera icon (*right*)

If you are at a new site you will be asked to create a 'New a*d hoc* site name' after taking the photo

3

Review Photo

1. Do you want to save the photo?

Yes - Add notes if required then tap 'Save'. New image will be added to list on main screen

No - Tap 'Cancel' to return to the main screen

4

Guide Photo

1. Would you like to create a new Guide Photo?

Yes -

1. From the main Photomon screen tap on the photo you wish to make as a Guide
2. Tap 'Make Guide'
3. Return to main Photomon screen (*top left*)
4. Guide Photos will be highlighted in green

No - No action required

5

Saved photos

1. Do you want to save photo(s) to smartphone camera roll?

Yes -

1. Tap individual photo(s)
2. Tap 'Save to Roll'
3. From the phone camera roll photos can be transferred to any computer

No - No action, *or*

1. Photos can be individually deleted
2. *Ad hoc* sites can be individually deleted (*bottom right '...' icon*)

QUICK GUIDE: NACC COASTAL MONITORING PROGRAM OPERATION

Log in details required, links to NACC database

1

Log In

1. Download app from iTunes® Store or Google® Play

2. Ensure location services are enabled on the smartphone

3. Tap the Photomon icon and enter your Username and Password provided by NACC staff

2

Guide Photo

1. Do you have a Guide Photo for your current location?

Yes - Go to 'Take Photo'

No - To obtain Guide Photo:

1. Tap 'Guide Photo'
2. Scroll through list and select site from list
3. Tap 'Download'
4. Wait for photo to download to main screen

3

Take Photo

1. Tap '+' *(top right)*

2. Select the direction you are facing to take the photo

3. Move the phone & yourself to match the phone screen with the Guide Photo

4. Slide the bar (*right*) to adjust transparency of the Guide Photo

5. Tap the camera icon (*right*)

4

Save or Cancel

1. Do you want to save the photo?

Yes - Add notes if required *(bottom right)* then tap 'Save'

No - Tap 'Cancel' to return to the main screen

1. INTRODUCTION

One of the most simple and unambiguous ways to detect environmental change is by taking regular photos over time of exactly the same place. Photo-monitoring can be used to document change in anything, from seasonal growth of algae in a rock pool to the effects of grazing on vegetation over a broad landscape, and the great thing is, anyone can do it!

Photo-monitoring provides an accurate record of environmental change if:

1. Every photo from a monitoring point is taken in exactly the same place each time and has the same field-of-view (FOV);
2. Photos are taken regularly and at a frequency suitable for capturing the information you want to record;
3. The resulting photos are easily stored and secure, yet readily accessible to those who can benefit most from the information.

This photo-monitoring app, ***Photomon***, was developed by the Northern Agricultural Catchments Council (NACC) initially to assist community volunteers in Geraldton, Western Australia, to monitor changes in their local beaches [See *Geraldton Volunteer Beach Monitoring Manual*] and incorporates features aimed at simplifying the photo-monitoring process while increasing its accuracy. It was quickly recognised that ***Photomon's*** value extends well beyond the coastal strip.

The ***Photomon*** app has two usage modes:

1. Demo mode – photos are simply stored within ***Photomon*** on the smartphone; and
2. NACC monitoring program mode – photos are uploaded to a database maintained by NACC

Anyone can use the app in Demo mode but only volunteers registered with one of NACC's monitoring programs are provided access to the database via a username and password.

Customising ***Photomon***

There are three ways in which ***Photomon*** may be used by people not associated with NACC monitoring programs.

1. Demo mode may be used for free for small-scale monitoring programs such as local revegetation projects by community groups.
2. Larger photo-monitoring programs can be facilitated by engaging ***Photomon's*** developer to link the app to a separate and dedicated database. This option requires payment to the developer for amending the app and maintaining the new database.
3. Large organisations wishing to link ***Photomon*** to their own database can enter into a license agreement with NACC to amend the app to link directly to their own database.

For more information on options 2 and 3 above please contact NACC at nacc@nacc.com.au.

NACC is dedicated to the long-term maintenance of *Photomon* and any funds received via the in-app donation feature will go towards its improvement. Please consider a donation if you find this app useful.

NACC is the not-for-profit Regional Natural Resource Management organisation for the Northern Agricultural Region (NAR) of Western Australia (WA), based in Geraldton. ***Photomon*** was developed with funding support from WA's Department of Planning through the Coastwest program and the federal government's Caring for Our Country program.

2. INSTALLING THE APP

Photomon can be installed on iPhones from the iTunes® Store or on Android smartphones from the Google® Play store. Once installed, tap on the app to open it.

Tip! To use the app effectively, ensure your smartphone has its location services enabled. You will be able to check this through 'settings.'

3. DEMO MODE OPERATION

In *Demo* mode, ***Photomon*** can be used for any photo-monitoring task you wish without having to connect to a database. To activate, tap 'Demo' on the Login screen. This will cause two pop-ups to appear in succession, neither of which apply to the use of the app in *Demo* mode, so tap 'OK' for both of these.

ATTENTION NACC PHOTO-MONITORS

To use this app for NACC photo-monitoring programs you must be a registered photo-monitor.

To Log in:

1. Ensure the top box contains the database URL for the program you are contributing to
2. Enter the email address you have provided to NACC into the middle box
3. Enter the password provided by NACC into the bottom box
4. Tap 'Login'

Once you have logged in, the app will remember your email address and password and automatically connect to the database whenever the app is opened. If you wish to use the *Demo* feature or connect to a different monitoring database tap 'Logout'.

Please remember not to upload photos of children.

The main screen will now come up with the heading ***Photomon***. Once you have taken some photos these will be listed on this screen. There are six navigation options (note: for Android phones most of these options are listed under the menu button at the top right of the screen).

Main *Photomon* Screen

1. **'Logout'** disconnects the app from the database
2. **'+'** opens the camera for taking monitoring photos
3. **'Info'** provides information about the app
4. **'Donate'** provides an opportunity for users to contribute to the maintenance and upgrade of the app
5. **'Reminder'** allows you to set up regular reminders to prompt you to take monitoring photos
6. **'…'** opens a pop-up that allows users to manage *ad hoc* sites created in *Demo* mode

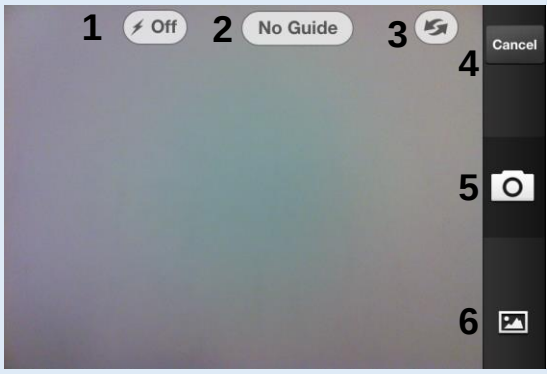
3.1 Taking Your First Photo

To take a photo, tap on the '+' icon. This will open the camera screen which has a selection box overlayed. The box asks the user to select a direction: north, south, east, west or point. Tap the direction you will be facing to take the photo. The option *Point* allows for a photo of the photo point (a reference photo to guide the user to the location where the user must stand to take the photo) to be stored for future reference.

Once you have selected a direction you will then be able to take a photo using the phone's camera. This screen has six navigation options:

Camera Screen

1. **Flash** symbol turns the flash on/off/auto
2. **'No Guide'** turns the *Guide Photo* feature on/off (see Section 3.4)
3. **Front or back** camera selection
4. **'Cancel'** takes you back to the main screen
5. **Camera** symbol takes a photo
6. **Landscape** symbol opens the smartphone's camera roll/gallery from which photos can be selected and added to that site



To take a monitoring photo, stand at the selected photo-point for that site. Align the camera FOV so that the view includes all the features you wish to monitor and tap the camera icon to take the photo.

When taking the first monitoring photo at a new site in *Demo* mode, ***Photomon*** will ask you to give that site an *ad hoc* name, e.g. My Garden. All subsequent photos taken within an approximately 50 m radius of that site will then be saved automatically under that site name. The option of selecting either north, south, east or west directions allows four monitoring directions to be stored for each site.

Type in an appropriate *ad hoc* name and tap 'Done'.

ATTENTION NACC PHOTO-MONITORS

GUIDE PHOTO

Please ensure you have downloaded the *Guide Photos* for each site by tapping 'Guide Photo' (bottom centre of main ***Photomon*** screen). Scroll through the list of sites and tap on each that you wish to download. Tap 'Download' and wait a few minutes.

Photo Point

When you download the *Guide Photos*, a *Photo Point* reference will also be downloaded. Use this image to locate where you need to stand to take the photo.

Site name

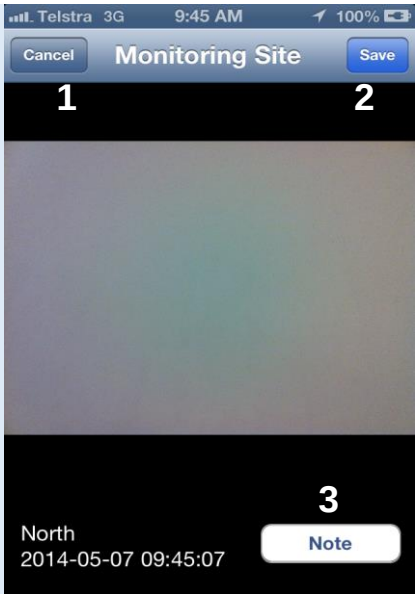
You do not need to add an *ad hoc* name, as the site names have already been allocated for NACC photo-monitoring programs. Your smartphone's internal GPS will automatically determine which site you are at.

3.2 Saving New Photos

When the photo has been taken, this screen will appear with your new photo (located in the centre grey rectangle), as well as the *ad hoc* site name (top), direction, date and time (bottom left) and more options:

Review Photo Screen

1. **'Cancel'** returns you to the main screen without saving the photo (tap the 'Back' icon on Androids)
2. **'Save'** will save the photo within the app
3. **'Note'** allows the user to add text that will be saved with the photo



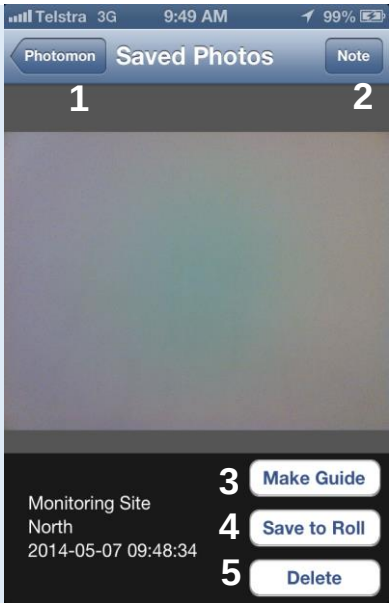
Associated text can be added and saved with the photo using the *Note* function. If the photograph is to your satisfaction (ie it has an appropriate FOV for the relevant site and direction and there are no fingers in the way), tap 'Save' to save it within the app. The location, direction, date, time and notes will all be saved with each photo. Once saved, the photo will appear in the list on the main screen.

3.3 Reviewing Saved Photos

Saved photos can be opened from the main screen list by tapping on them. This will allow you to view them individually on another screen with the title *Saved Photos*.

Saved photos screen

4. **'Photomon'** takes you back to the main screen
5. **'Note'** allows you to view (but not edit) notes
6. **'Make Guide'** will select this photo as the reference Guide Photo for this particular site and direction (see Section 3.4.1)
7. **'Save to Roll'** will save the photo to the smartphone's camera roll/gallery
8. **'Delete'** will remove the photo from the app



3.4 Guide Photos

Photo-monitoring is most effective when the FOV for each photo series is as similar as possible. ***Photomon*** includes a feature that allows you to select a *Guide Photo* for each direction at each monitoring site. Only one *Guide Photo* can be selected for each direction at each site, and this photo appears on the camera screen as a ghosted image overlay when you are lining up to take a photo at that site. This feature enables you to align the camera's current FOV with the *Guide Photo* and take the photo when they correspond. If they won't align you may need to change your position slightly. Using this method, it is possible to obtain a photo series with almost exactly the same FOV.

3.4.1 Establishing *Guide Photos*

To establish a *Guide Photo* for a site and direction, open the saved photo that you wish to make the *Guide Photo* as described in Section 3.3. Tap the 'Make Guide' icon, then tap 'Photomon' to return to the main screen. You should see the *Guide Photo* is now highlighted in green.

3.4.2 Taking photos using *Guide Photos*

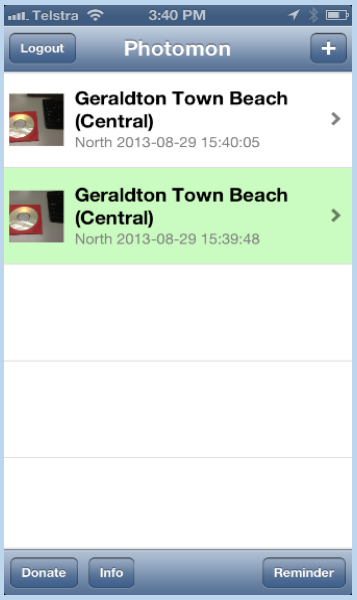
With a *Guide Photo* now established, every time you take a photo at that location and direction, the *Guide Photo* will appear as a ghosted image to enable you to align your current FOV with the standardised FOV of the *Guide Photo*.

If the *Guide Photo* function is not useful for you, simply tap 'Guide On' at the top centre of the screen to turn it off.

Tip! It is helpful to have your screen settings on maximum brightness to make it more visible in the outdoor glare.

3.4.3 Managing *Guide Photos*

Designated *Guide Photos* appear on a green background on the main screen. They cannot be easily deleted, preventing accidental deletion. To change a *Guide Photo*, it is necessary to unselect the previous *Guide Photo* first. Do this by opening the current *Guide Photo* and tap 'Remove Guide'. Proceed to select a new *Guide Photo* by following the instructions in Section 3.4.1 Establishing Guide Photos.



Guide Photos are highlighted in green on the main screen.

Copies of *Guide Photos* can be saved to the smartphone's camera roll/gallery by tapping on 'Save to Roll' with the *Guide Photo* open. These *Guide Photos* can be kept secure on the camera roll as back-ups or transferred to another device during upgrades.

A *Guide Photo* can be imported into ***Photomon*** from the smartphone's camera roll/gallery. To import and establish a *Guide Photo* you must first ensure your photo is saved on the camera roll and go to the physical location of the monitoring site.

1) Select the new *Guide Photo* from the camera roll. Photos used may be imported from:
    a. Email
    b. Text message
    c. Other device (ie computer) via cable plug-in
    d. Download from smartphone internet browser
    e. Taken using the smartphone's camera (automatically saved on camera roll)
2) While located at the monitoring site, open ***Photomon*** and tap '+' so it is ready to take a photo
3) Select the direction relevant to the *Guide Photo* you wish to save
4) Tap the Landscape symbol to access the camera roll/gallery
5) Select the relevant photo from the roll/gallery. The photo can also be moved and scaled, although this is not desirable in most cases
6) Tap 'Choose'
7) Tap 'Save'

This photo will be saved in ***Photomon*** and can be selected as a *Guide Photo* using the *Make Guide* feature described in Section 3.4.1. Be aware that FOVs can vary greatly between cameras in which case it may not be possible to align an imported *Guide Photo* with your smartphone's camera. In this case use the imported photo to take a closely-matching photo on your phone and make this the new *Guide Photo*.

ATTENTION NACC PHOTO-MONITORS

It is preferable to use the *Guide Photos* already designated by NACC. However, if you would like to change a *Guide Photo* add a note to the new photo, ie. 'new ref' and advise the database administrator who will make the change.

3.5 Setting Reminders

Taking regular photos is an important aspect of photo-monitoring and ***Photomon*** includes a function to allow you to set reminders. To do this:

1) Tap 'Reminder' on the main screen
2) Tap 'Enable' to turn on the function
3) Set the date and time when you would like the reminder to be activated
4) Set the frequency
5) Tap 'Save' ('Done' for Androids)
6) For iPhones, exit ***Photomon*** and open the phone's Settings, tap 'Notifications', scroll down to ***Photomon***, tap to open and then change the setting from 'Banners' to 'Alerts'. This ensures that you will hear the alert when it is activated. No changes are required for Android devices

ATTENTION NACC PHOTO-MONITORS

For the NACC beach photo-monitoring program, it is desirable to follow the frequency guides below, noting that before and after storms and high swell is particularly valuable.

Time of year	Frequency
September – April (Summer)	at least monthly
May – August (Winter)	at least fortnightly

*if possible before and after storms and high swell

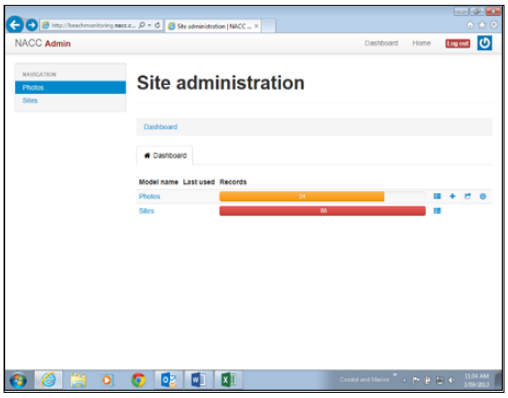
Beaches in this region experience greater change during winter than in other months. More frequent photos are greatly appreciated but entirely optional. A project coordinator will email reminders to switch monitoring frequencies at the start of September and April.

4. NACC PHOTO-MONITORING ONLINE DATABASE

Connecting ***Photomon*** to a database means that monitoring photos are conveniently identified, named and stored. A key benefit of ***Photomon*** is that it automates what was once a tedious, time consuming process of having to manually enter photo details. Photos from a single monitoring program can all be stored in the one place, making it easy for natural resource managers to access information.

The table below explains how NACC monitors may access an online database that is linked to the app in one of the NACC monitoring modes. Only registered users of ***Photomon*** in NACC's monitoring programs have access to the database, which allows them to manage their own photos.

LOGGING IN

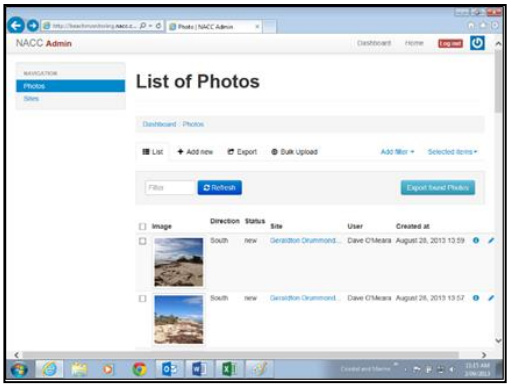


1. Enter the address http://beachmonitoring.nacc.com.au into your internet browser and click 'go/search'
2. Enter the email address you provided to NACC into the first box
3. Enter the password provided by NACC into the second box
4. Click 'Login'

Once you have logged in you will see links to view your photos and monitoring sites. You can edit and manually upload your own photos but you cannot edit photos uploaded by other people or monitoring site details.

REVIEWING AND EDITING PHOTOS

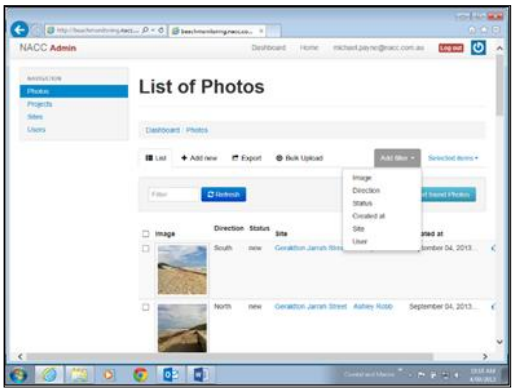
Users can check that photo details are correct and delete photos that may be of poor quality or repeats. To view and edit photos you have already uploaded, follow this procedure:



1. Click on 'Photos'
2. Scroll down the 'List of Photos' to view your photos which includes a thumbnail image, direction, site, date and time taken
3. Click the thumbnail to view a large image of the photo in a separate window
4. To edit a photo, click on the pen symbol on the far right
5. Photos can be deleted by clicking 'Delete'
6. Once corrections have been made, click 'Save'

FILTERING DATA

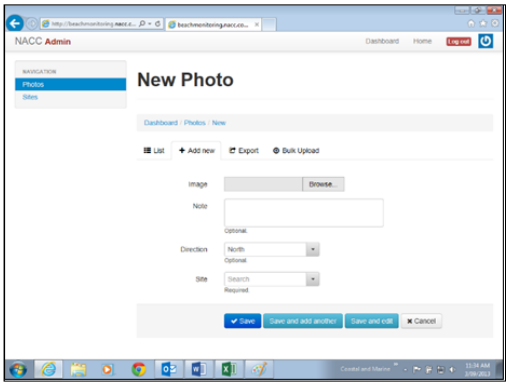
It is possible to apply filters to your photos so that only a subset of your photos is displayed. For example, all the north views at Town Beach taken between Jan 2012 and Dec 2012. To do this:



1. Open the 'List of Photos'
2. Click on the 'Add filter' icon and a list of scroll-down fields will appear
3. Select the filter you want to apply, which will then appear above the 'Refresh' button
4. Fill in the options required for that filter
5. You can add another filter by repeating the steps above
6. When you have finished click on 'Refresh'
7. Only photos that satisfy all the filter parameters will now appear in the list of photos.

MANUALLY UPLOADING PHOTOS TO A DATABASE

You should only need to manually upload photos if you do not have a smart phone, or if there is an issue with ***Photomon***. To upload photos manually from a digital camera to the database, first make sure you have saved the photos onto a computer or external storage device. To upload a single photo:



1. Open your 'List of Photos' as outlined above
2. Click '+ Add new'
3. Select the direction from the drop-down box
4. Type the site name into the box, then select it from the drop-down box
5. Click 'Browse', and navigate to the place where you have stored your photos and click on the photo you wish to upload
6. Click 'Save'
7. The photo will now appear on your list

Another option is to use the 'Bulk Upload' feature which enables you to upload multiple photos of the same site and direction in one go. To do this, you must first create a folder that contains only photos of one site and direction (eg north view at Town Beach) and then compress (zip) the folder. The procedure for this is different for various computer operating systems. Once you have a zipped folder of photos ready for upload:

1. Click 'Bulk Upload' on the *List of Photos* screen
2. Select the direction from the drop-down box
3. Type the site name into the box then select the name when it drops down in the list
4. Click 'Browse' and navigate to and select the zipped folder
5. Click 'Save'
6. Wait for all the photos contained in the zipped folder to upload and appear in your list of photos. Be patient - this will take some time!

5. OTHER FEATURES

5.1 Donations

If you have found ***Photomon*** to be useful then please consider making a donation towards its ongoing maintenance. Donations of $2 or more are tax deductible in Australia. To make a donation, tap on the 'Donation' icon located in the bottom left corner of the main ***Photomon*** screen.

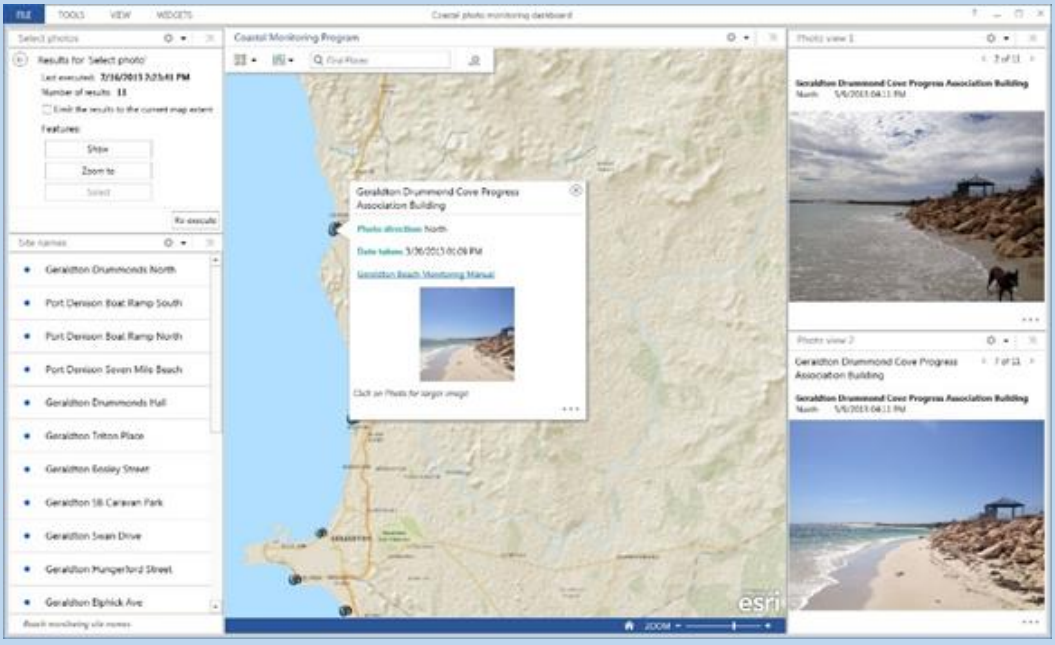
We also welcome your feedback on improvements that could be included in future ***Photomon*** upgrades.

5.2 Info

Information on using photo-monitoring for detecting environmental change can be found by tapping on the 'Info' icon at the bottom centre of the main ***Photomon*** screen.

6. PHOTOMON AND NARVIS

NARvis is an interactive web-based mapping system that provides information on NACC projects to the public. Photos in the database will be exported regularly to the NARvis system which will mark the monitoring sites on a map and allow anyone to view thumbnail images associated with that site. This system will also be used as a source of *Guide Photos* for each site and direction.



NARvis will allow users to view recent images of monitoring sites and to source Guide Photos.

REFERENCES

Department of Transport (2012) *How to photo monitor beaches*, Dept of Transport, Perth WA. http://www.transport.wa.gov.au/mediaFiles/marine/MAC_IS_HowToPhotoMonitorBeaches.pdf

Northern Agricultural Catchments Council (2011) *Geraldton Volunteer Beach Monitoring Manual*, NACC, Geraldton WA. http://www.nacc.globalagencies.com.au/files/101/files/Geraldton%20Beach%20Monitoring%20Manual%202011%20Final2.pdf

FAQS – PHOTOMON FOR NACC COASTAL MONITORING PROGRAM

1. I've never been to this site before - how do I know exactly where I need to take the photo?

Download the *Guide Photo* for the site. See the answer for #2 below on how to do this. A *Photo Point* photo will be downloaded along with the *Guide Photos* for the site. These will be highlighted in green on the main screen. To view where you need to take the photo:

1. Tap the site name that says *Photo Point* underneath it
2. Look at the photo and tap 'Note' (top right of screen) to read instructions on how to find the *Photo Point* from where you need to stand to take the photo

2. How do I get the *Guide Photo* and/or *Photo Point* for my site?

From the main ***Photomon*** screen:

1. Tap 'Guide Photo' in the bottom centre of the screen
2. Scroll through the list of site names and select the site you require. When selected there will be a tick shown next to it
3. Tap 'Download' (blue icon top right of screen). Wait a few minutes for the *Guide Photos* (and associated *Photo Points*) to download. *Guide Photos* will be highlighted in green on the main screen when they are downloaded

When you tap the '+' (top right of screen) to take a photo, the *Guide Photo* will show automatically on the camera screen.

3. Do I have to use the *Guide Photo*?

No. The *Guide Photo* can be turned on and off by tapping 'Guide On' or 'No Guide' (top centre of screen), however it is preferable that you do use the *Guide Photos* for NACC monitoring.

4. How can I create a new *Guide Photo*?

If you have a photo you would like to be the designated *Guide Photo* for a site direction, add a note using the *Note* function when reviewing the photo in ***Photomon*** (using the smart phone). Alternatively, add a note to the photo by clicking on the 'Edit' tool (indicated by the pen symbol) when you are in the database (asking to change the *Guide Photo*).
The database administrator can manage the site and change the *Guide Photo*.

5. Can I review my photos?

Yes. You can review photos you have taken through the app on your smart phone or in the database. On your phone you can select the photo from the list on the main screen, then swipe left and right to scroll through your photos taken since ***Photomon*** was downloaded.
Alternatively, log onto the database using your username and password to access all the photos you have taken for the program.

6. Why won't the *Guide Photo* come up for my site?

Either there is no designated *Guide Photo* for the site, or there is an issue with the satellite signal that is preventing the *Guide Photo* from finding you at the site. This is common, as some sites have weak signals that do not allow GPS, internet and mobile phone towers to locate you very well. If you know your site has a weak signal you can save the *Guide Photo* (when you have it downloaded) to the camera roll. Then you can refer to the photo on your phone's camera when you need to take the photo.

7. How often does the database get reviewed?

The database gets reviewed on a weekly basis.

8. What happens to the data once it is stored?

Data collected for the NACC photo-monitoring program is considered to be valuable baseline data from which changes can be evidenced through later photos of the area being monitored. The data collected and stored in NACC's database, NARvis, may be accessed by stakeholders such as government departments, local councils and other decision-making authorities to track changes in the environment and to help plan appropriately for the future. Photo-monitoring datasets can be supported by other data, such as weather, swell and bathymetry. This will allow more detailed explanations to be formed about changes observed.

TERMINOLOGY

Demo Mode	Demonstration mode which allows the use of ***Photomon*** without requiring a log in username or password. This mode may be used for free by small-scale monitoring programs such as local revegetation projects by community groups.
Guide Photo	A transparent photo that is 'ghosted' over the top of the camera screen so the two images can match up.
Photo Point	A photo of either the actual location a monitor needs to stand to take a monitoring photo in order to have the correct FOV, or a photo of another object that can be used as a reference from which a monitor locates the correct location.
App	Short for 'Mobile Application' – software designed to run on smart phone technology. ***Photomon*** is the name of a software program specifically designed to monitor environmental change by taking photos with a smart phone.
***Ad hoc* name**	Name given to a photo-monitoring site in *Demo* mode.
GPS	'GPS' stands for 'Global Positioning System'. This is a system which communicates with satellites to locate the user/device's position on the Earth's surface.
Android	A smartphone operating system alternative to that of the iPhone, which is owned by Google.