Northern Australia Environmental Resources Hub

National Environmental Science Programme

Indigenous Ranger field guide to the Shoreline Video Assessment Method

MangroveWatch

TropWATER Centre for Tropical Water and Aquatic Ecosystem Research

JAMES COOK UNIVERSITY AUSTRALIA

Tropical Water Quality Hub — National Environmental Science Programme

Marine Biodiversity Hub — National Environmental Science Programme

Earth Systems and Climate Change Hub — National Environmental Science Programme

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Back cover: MangroveWatch surveys of the Albert River estuary in Queensland by rangers with the Carpentaria Land Council Aboriginal Corporation (photo Jock Mackenzie).

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Welcome to MangroveWatch

We thank you for your support for MangroveWatch – as a MangroveWatcher – and, as custodian of valuable mangrove shorelines. ***Thank you!***

What is MangroveWatch?

MangroveWatch is a community-driven science-community partnership between community members and specialist scientists for monitoring the condition and health of coastal and estuarine mangroves and saltmarsh of local tidal wetlands.

MangroveWatch is here to help you

- Learn about mangroves and tidal wetlands in your region
- Discover the many benefits of mangroves and saltmarsh
- Explain misconceptions about mangroves and saltmarsh
- Monitor changes to mangroves, saltmarshes and shoreline habitat health
- Help with surveys of shoreline and estuarine condition
- Join a mangrove and saltmarsh rehab team
- Get advice and training from specialists

Australia's mangroves are rich in biodiversity and biomass (more than half of the world's mangrove species occur in Australia) and they are among the most extensive in the world. Mangroves provide multiple ecosystem services that protect, enhance and maintain our coastal ecologic, economic, social and cultural values. Mangroves are common along the coastline of Australia, but we should **not** take this for granted. 'Times are changing!' Changing climate and rising sea levels threaten mangroves like never before. Human impacts like development, feral animals, agricultural runoff, weeds and altered water flows reduce mangrove health and limit the capacity of mangroves to withstand climate impacts. To ensure mangroves have the best chance of survival we must limit human impacts where possible. This requires knowledge of where mangroves are vulnerable to climate change, identification of the local impacts and devising local management action plans that can be implemented by local communities.

Traditional Owners and Indigenous rangers are well placed to look after mangroves on their country and have a vested interest to do so. By working with Traditional Owners and Indigenous rangers, the goal of MangroveWatch is for scientists to learn from the people who use them and rely on them about local issues of change and threats. This includes identifying local values, local issues and local concerns. In return the MangroveWatch program will work with Indigenous ranger groups to devise a plan to gain greater knowledge for the protection of your local mangrove resources in partnership with a small team of internationally recognised scientists.

Mangroves are important & useful!

‘No mangroves – no fish!’

Mangroves are essential habitat where bountiful and beneficial fish live, feed and breed. Nearly all seafood needs mangroves.

‘Healthy mangroves – healthy catchment upstream!’

Responsive mangroves act as end-of-catchment indicators. Mangroves show the effects of runoff sediments, nutrients and agricultural chemicals.

‘Coastal kidneys’ – protecting local reefs & seagrass beds

Coastal mangroves protect coral reef and seagrass by filtering catchment runoff and reducing shoreline erosion. Healthy mangroves support healthy corals with clearer, cleaner water - lower in sediments and harmful chemicals.

‘Climate change champions’ – mangroves are carbon storage powerhouses

Mangroves store 5 times more carbon than other forests and trap carbon up to 50 times faster. This plant carbon is called *blue carbon.*

‘Mangroves are unique indicators of change’

Reading the condition of mangroves and the stresses and signs of change affecting them helps those who manage these important parts of land and sea country.

‘Mangroves connect land and sea country’

Mangroves are an important habitat in the coastal landscape, sharing terrestrial and marine features. These habitats are important along cultural song lines as traditional food sources, habitat for significant wildlife, medicines and tools. Mangroves also protect adjacent seagrass habitats that are important for sea turtles and dugong.

MangroveWatch overview

MangroveWatch is a partnership between scientists from James Cook University and local communities

MangroveWatch is a community–science partnership and monitoring program aimed at addressing the urgent need to protect mangroves and shoreline habitat worldwide.

The MangroveWatch program began in 2008 in the Burnett–Mary region with support from Caring for Our Country an Australian Government Initiative.

MangroveWatch monitoring is currently being undertaken in Torres Strait, Gulf of Carpentaria estuaries, Cooktown, the Wet Tropics Region, Mackay, estuaries in the Port Curtis & Coral Coast region, Burnett–Mary Region, Sunshine Coast, Moreton Bay, Logan River and Barwon River, Vic. There are two partner MangroveWatch groups operating in Tampa Bay Florida and the Philippines. There are currently over 300 registered MangroveWatch volunteers from 20 different corporate, non-government and government organisations.

The MangroveWatch scientific hub is based at the Centre for Tropical Water & Aquatic Ecosystem Research (TropWATER), James Cook University, Townsville.

The Mangrove Hub

The Hub is your support base on all matters related to MangroveWatch. This includes advice, training, speaking engagements for your group, access to appropriate monitoring equipment and reading material on assessment of mangrove habitat biota and its condition. Our hub group consists of Dr Norm Duke plus his students and other volunteers who assist in the functioning of MangroveWatch. We are based mostly at James Cook University in Townsville.

MangroveWatch Directors

Dr Norm Duke, Professor Damien Burrows and Jock Mackenzie

TropWater

James Cook University, Townsville

Email mangrovewatch@gmail.com

Visit: www.mangrovewatch.org.au

For information relating to equipment or methods please contact Jock on 0407 578 807 or email mangrovewatch@gmail.com

MangroveWatch program aspirations

The aim of the Indigenous Ranger MangroveWatch program is to provide Traditional Owners with the tools and knowledge to identify and map mangrove dieback, mangrove and saltmarsh management issues, culturally significant sites within tidal wetlands and mentor young Indigenous people to understand and appreciate tidal wetland ecosystems through a traditional owner and researcher partnership. The partnership between scientists and Traditional Owners is designed to identify management and conservation issues and implement strategic on-ground management actions informed by a scientific approach. It is hoped that this program will establish an on-going knowledge exchange between Traditional Owners, tidal wetland scientists and resource managers, to ensure tidal wetland habitats and their traditional use ecosystem values maintain their ecological, economic and culturally significant values into the future.

Summary of the Gulf of Carpentaria mangrove surveys in October 2018.

MangroveWatch mission statement

To provide coastal stakeholders with a tool to assess and monitor local shoreline habitats that:

- is scientifically valid
- engages and empowers local people
- promotes effective natural resource management
- provides a visual baseline from which to assess future change.

For more information on MangroveWatch visit: www.mangrovewatch.org.au

Traditional knowledge of land and sea country is needed for the best possible care and management of Australia's unique and fragile northern shorelines.

The MangroveWatch approach

There are four primary data collection methods as part of the MangroveWatch program.

1. Mangrove & saltmarsh species identification and distribution records
2. MangroveWatch Shoreline Video Assessment (S-VAM)
3. Mangrove forest rapid assessment transects – long plots
4. Rapid saltmarsh value and threat assessments

NB This manual focuses on collection method 2 (S-VAM) in the above list. 1, 3 and 4 are briefly summarised from page 35 of this guide.*

MangroveWatch's S-VAM is achieved through a five-step process:

1. Community training and information session by the MangroveWatch Hub

MangroveWatch participants are provided with a MangroveWatch kit, trained in data collection methods and discuss the importance of mangroves, local threats and issues.

2. Community data collection

MangroveWatchers collect geo-tagged video of local shorelines, mangrove species ID, and identify local tidal wetland threats and values.

3. Data transfer

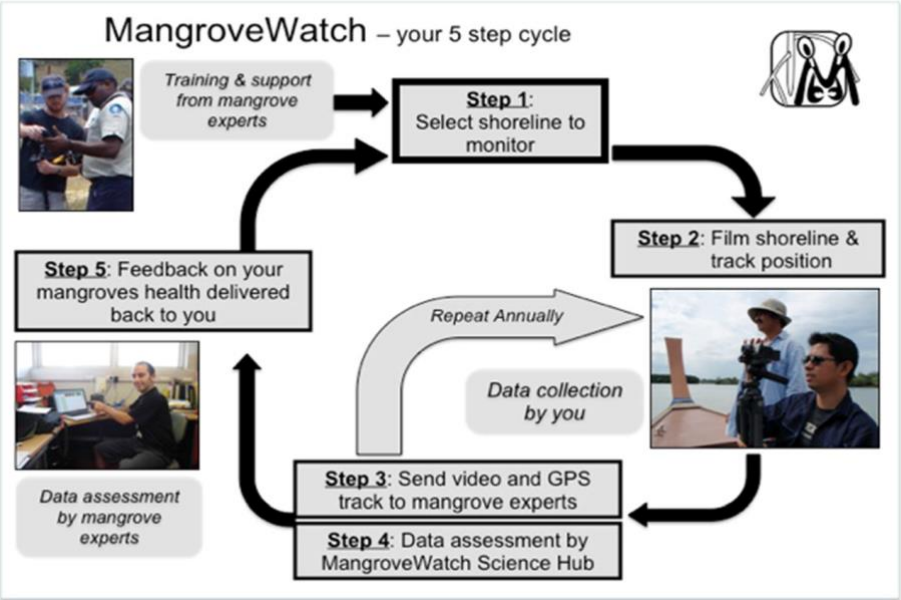
Data is transferred to MangroveWatch science team at James Cook University via HDD.

4. Data assessment by mangrove scientists

MangroveWatch data is analysed by scientists to determine health of local tidal wetland habitats and devise suitable management responses.

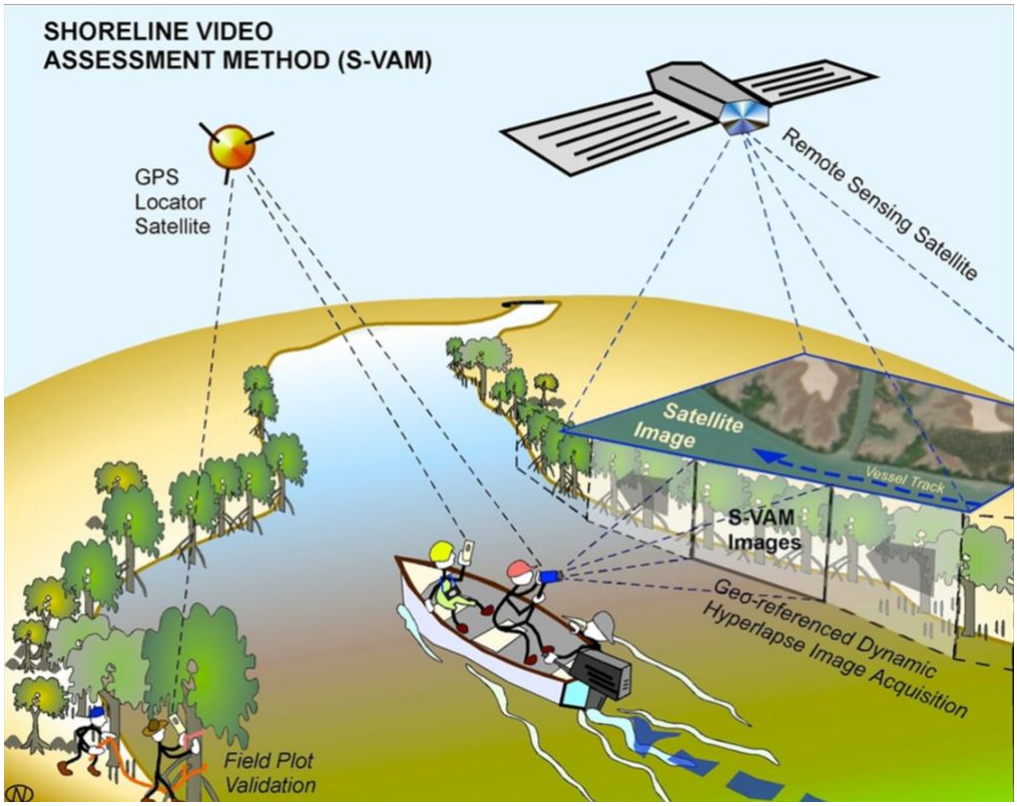
5. Data feedback to coastal stakeholders

Data is presented back to the community in report form.



The MangroveWatch Shoreline Video Assessment Method (S-VAM) approach in five steps.

Advantages of the MangroveWatch S-VAM approach



The Shoreline Video Assessment Method (S-VAM). From Mackenzie, Duke et al. (2016)

The Shoreline Video Assessment Method (S-VAM) used for MangroveWatch is the perfect tool for citizen science. The advantages of S-VAM are that it is:

- **Easy to do** – only limited technological skills are required to operate a video camera, handheld GPS and digital still camera
- **Scientifically valid** – no objective decision-making is required by community participants as all imagery is assessed remotely by mangrove experts. Video data enables data quality control. The GPS track ensures repeatability. Video image assessment is backed up by ground-truthing and accuracy assessments
- **Rapid** – Video imagery can be collected quickly allowing large areas to be assessed with minimal time commitment from MangroveWatch community participants. On average, 10km of shoreline only requires 1 hour of filming.
- **A permanent visual record** – video imagery data provides a permanent visual record from which to assess future change and overcomes shifting baseline of environmental perception. Our intention in the near future is to make all video image data available via the MangroveWatch website.
- **A whole of system assessment** – a continuous collection of geo-tagged shoreline images allows for the quantification of data across entire estuaries, rather than from a collection of random points along the bank or within the forest. This allows shoreline habitat features and process to be seen within the context of the whole system that better informs estuary and coastal management.

Partnering scientists with local people greatly improves our understanding of shoreline habitats and is one of the major advantages of the MangroveWatch approach.

Working with local people and Traditional Owners enables:

- **Local knowledge input** – local people provide locally relevant information that enhances scientific assessment and provides local context to shoreline habitat assessment. Local observations of change, historical information and knowledge of local values are highly valuable insights.
- **Large spatial coverage** – there are very few mangrove scientists and many keen local mangrove enthusiasts. Working with local people means that more information can be gathered from more places to improve our understanding of shoreline habitats.
- **Community education, empowerment and environmental stewardship** – when local communities are informed they are empowered. By working with scientists, local people can gain more information on the value of their local mangroves and the issues that affect them, empowering them to take action at the local scale.

Launching into Mule Creek estuary in the Northern Territory for MangroveWatch training in shoreline surveys with the Li-Anthawirriyarra Sea Rangers of Mabunji Aboriginal Resource Indigenous Corporation Borroloola..

Introduction to MangroveWatch video assessment

The shoreline video assessment method (S-VAM) is the primary data collection tool of MangroveWatch. The MangroveWatch video assessment technique is designed to take a continuous video recording of the shoreline. From this video, the state of the mangroves can be determined through observations of mangrove: height, tree density, species presence, the number of seedlings, the health of the forest. Other features that influence mangroves are recorded such as: bank type and condition, adjacent landuse, built features and other vegetation. This assessment then provides an indication of the health of the mangroves and the estuary as a whole.

Your job is to be the eyes and ears of MangroveWatch. Because the video is reviewed elsewhere, it is important to provide as much information as possible. During the assessment, record your observations, opinions and any historical facts that may help to piece together a story about the mangroves and the estuary itself. By being in the estuary and observing changes, you provide invaluable information that can: help identify the causes behind your observed changes, assist in the development of strategies to improve the estuary condition and/or instigate actions to prevent further environmental degradation.

But most importantly, MangroveWatch is a great excuse to get out on the water and observe your local waterways whilst having fun and hanging out with friends old and new.

Normanton Carpentaria Land Council Aboriginal Corporation Rangers MangroveWatching on the Norman River.

What you need to go MangroveWatching: Shoreline Video Assessment Method (S-VAM)

- A boat
- A nice day
- A good tide
- A team of four or more people Including a boat driver
- A MangroveWatch kit with charged batteries and memory space
- Safety equipment, snacks, water, sun protection
- Navigation Aids (Google Maps)

The MangroveWatch Kit

The MangroveWatch Kit contains everything you need to go MangroveWatching. Kit contents include:

- A video camera
- GPS
- Still camera
- Monopod (In white tube)
- Data recording sheets
- Clapper board
- Whiteboard pens and eraser
- Pens/pencils
- Spare batteries & memory
- Bluetooth microphone
- Quick guides (cheat sheets)

Where to go MangroveWatching

Choose your mangrove area

These MangroveWatch methods are specifically designed for shoreline mangroves, estuaries and tidal inlets.

Criteria for choosing a MangroveWatch location

A shoreline that interests you and is:

- easy to access
- mostly easy to navigate
- somewhere that can be repeatedly monitored

Who to take – your MangroveWatch team

A team of four or more people is recommended, but you can do it with three if necessary.

- Boat driver
- Handycam operator
- Observer/recorder
- Photographer

When to go MangroveWatching

Optimal conditions:

- Daylight 9am to 3pm
- Good light conditions
- Light winds
- Low chance of rain
- Low to mid tide (not high tide)

A bright cloudy day with no wind at low tide are the perfect conditions for MangroveWatching. It is unlikely that all these conditions can be met at all times, so try your best but don't let it stop you. The two most important conditions are the tide height (not high tide) and not raining.

The MangroveWatch video needs to be taken at low to mid tide so that the bank type and seedlings can be seen. The peak high tide is no good. But there may be times when to gain access to certain areas you need a high tide so, just do your best. All video is good video.

Do not plan to take the video if it looks like it will rain as visibility is greatly reduced and equipment gets damaged.

How to S-VAM

Start recording at an identifiable “starting point” (eg. boat ramp). Travel along the estuary at 6–13kts (11–20 km/h) approximately 30–50m off the bank following the shoreline as best as possible as the Handycam records one side of the estuary (left or right bank). Record the video until the channel is no longer safely navigable or you are beyond the estuary extent, out to sea or there no more mangroves). Return to the start location whilst recording the opposite bank. If the starting point is in the middle of the estuary, restart the video with the starting location in the frame and record the rest of the estuary.

MangroveWatch tasks

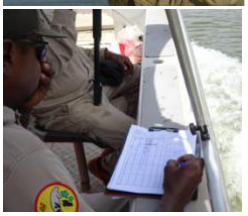
There are 5 tasks involved in MangroveWatching:

1. Handycam operator – controlling the handycam

2. GPS operator – taking waypoints and tracks

3. Photographer – as many as you can

4. Observer/recorder



5. Boat driver

S-VAM checklist

Before you get on the boat

S-VAM kit has:

- ☐ Video camera
- ☐ GPS
- ☐ Camera
- ☐ Clapper board
- ☐ Whiteboard pen & eraser
- ☐ Monopod
- ☐ Cheat sheets
- ☐ Spare batteries & spare memory
- ☐ Datasheets

Other things to check:

- ☐ Batteries are charged
- ☐ Video camera, still camera & GPS are downloaded
- ☐ You have checked the filming location to assess potential sun impacts
- ☐ You have checked the tides and weather forecast

Before you start filming

- ☐ GPS track log is on and recording set to time in 1- second intervals
- ☐ Still camera GPS is on and set to auto-sync time by GPS
- ☐ Video camera GPS is on and set to auto-sync time by GPS (if available)
- ☐ Video camera is set to record in ‘FX’ (highest quality)
- ☐ Video camera ‘dual record’ is off
- ☐ Video camera lens is clean
- ☐ Still camera lens is clean
- ☐ Clapper board is filled in
- ☐ Datasheets top are filled in
- ☐ Photo and video taken of GPS time showing hh:mm:ss
- ☐ Photo and video taken of clapper board

When you stop filming

- ☐ Photo and video taken of clapper board.
- ☐ Photo of datasheets sent to mangrovewatch@gmail.com (at end of trip)

When you get home

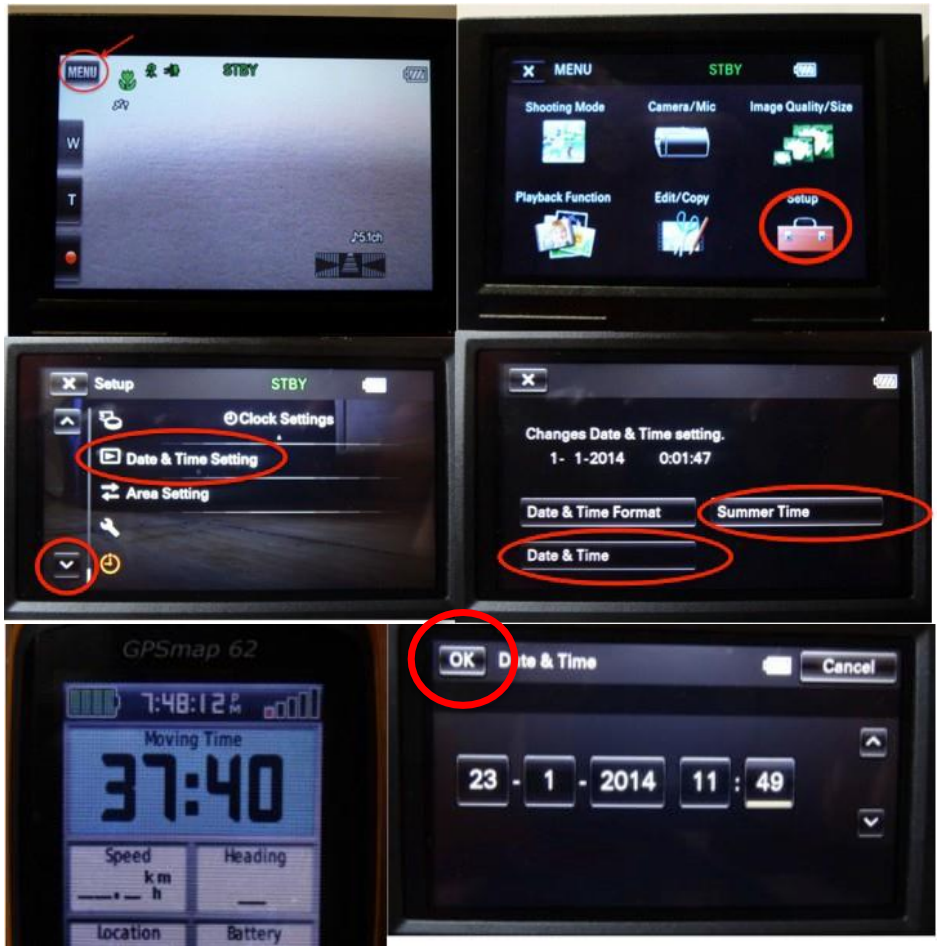
- ☐ Data is downloaded
- ☐ GPS downloaded – tracks and waypoints
- ☐ Map created showing survey track (Google Earth)
- ☐ Camera downloaded
- ☐ Video downloaded
- ☐ Datasheets copied
- ☐ Word document summarising survey observations
- ☐ All data sent to MangroveWatch
- ☐ Video camera battery charged
- ☐ Still camera battery charged
- ☐ GPS batteries charged
- ☐ Equipment wiped down and cleaned
- ☐ Datasheet stocks replenished

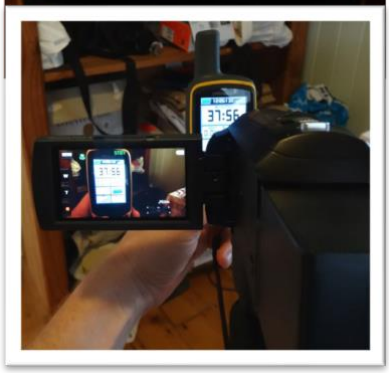
Instructions for the handycam operator

Before you start filming

It is important you are familiar with the handycam before getting in the boat.

1. **Manually set the handycam time to be the same as the GPS ***VERY IMPORTANT*****





Notes: Check summertime is ON or OFF as needed.

The GPS screen is “Trip Computer”. You may need to change the ‘dashboard’ to “Large Data Fields” to see the time including seconds. On the ‘Trip Computer’ screen. Press “Menu”. Navigate to ‘Change Dashboard’ and select ‘Large Data Fields’.

Change the handycam time to the next minute from what’s on the GPS. Count down from the GPS when the time reaches 50 seconds. On the change of minute – press OK.

When “OK” is pressed the time is set.

2. Check the recording quality is set to FX

3. Check sound recording mode is set to “Wind Noise Reduction ON”

4. Attach the lens hood

5. Clean the lens – use a soft cloth, not a tissue

During filming

1. **Take a short film of the clapper board**
2. **Start recording – shout "3,2,1 GO!"**

3. **Keep the camera 90° to the direction of travel (side of boat) at all times!**
4. **Keep the handycam steady** – hold the monopod
5. **Avoid vibration** – do **not** sit the camera on the boat or on the boat seat. Rest the base of the monopod on your leg
6. **Maintain the best shot** – a little sky, a little water

Don't worry about getting the tops of terrestrial trees (eucalypts etc) – focus on the mangroves.

7. **Use the trigger grip to *slowly* tilt the camera if required**

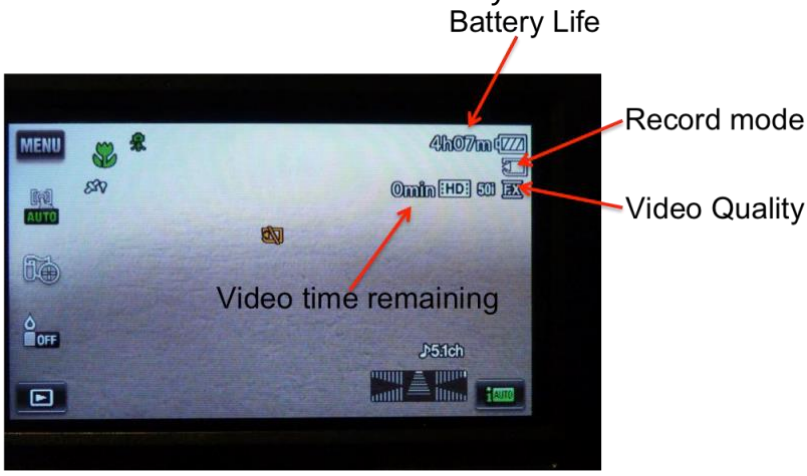
8. **Keep the lens clean** – check for water spots

9. **Keep watching the viewfinder**

10. **Provide continuous commentary** – see guide to commentary

11. **Never film into the sun for extended periods – it is a waste of time!**

If there is sun directly in front of the camera it may be necessary to change banks or come back at a different time of day.



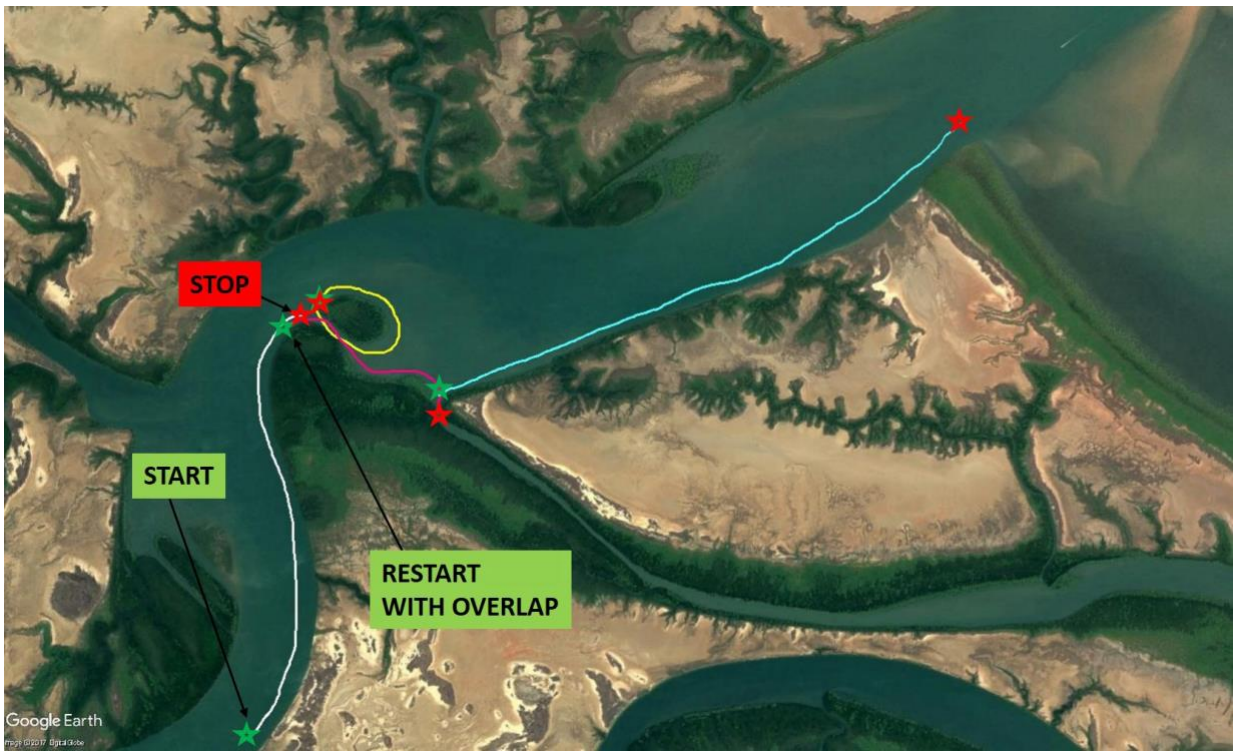
12. **Watch out for the lens hood in the shot.**

When the lens hood is popped out it can be seen when the camera is not zoomed in. To avoid this, always zoom in a little bit when the lens hood is popped out.

If you are very close to the bank – you will need to press the lens hood down.

Notes on filming

- Start from a recognisable feature – e.g. the boat ramp.
- Position the boat so that as you film past it you can shout “3-2-1 Go” as the feature passes the centre of the screen.
- Film clearly distinct units of shoreline. If you change direction, move across a channel to an island, need to turn around, hit a sandbank etc. Stop and then re-start.
- Note a feature where you stopped – e.g. big dead tree.
- Where necessary – repeat a small overlap of shoreline.
- Record start-stop times and notes about location, direction etc, in the datasheet.



Instructions for the GPS operator

Before you start filming

It is important you are familiar with the GPS before getting in the boat.

1. **Turn the GPS on**
2. **Turn the track log on and set to record every 1 second**

VERY IMPORTANT!

Use the Page button to navigate to 'Main Menu'

Setup – Enter

Tracks – Enter

The screen should be the same as the bottom left (except time as 1s)

If all the **same** – press the Quit button

If these setting are **different** – select Enter and enter manually. You will need to use the arrow keys to select 'Done' and press Enter when setting the time.

3. Make sure there is a **photo** and **short video** of the GPS time clearly displaying time with hours:minutes:seconds

This needs to be done at the start of each filming session, but not for every video. If you have stopped filming for more than 30 minutes take another time shot and time clip.

During filming

1. **Ensure the GPS records the track by checking the map screen** (note – after recording for some time, the track line may disappear when it has been archived. A new track should appear). Use the zoom (**In & Out**) buttons on the **Map** page to zoom in on your track.

2. **Ensure the GPS always has a clear signal**

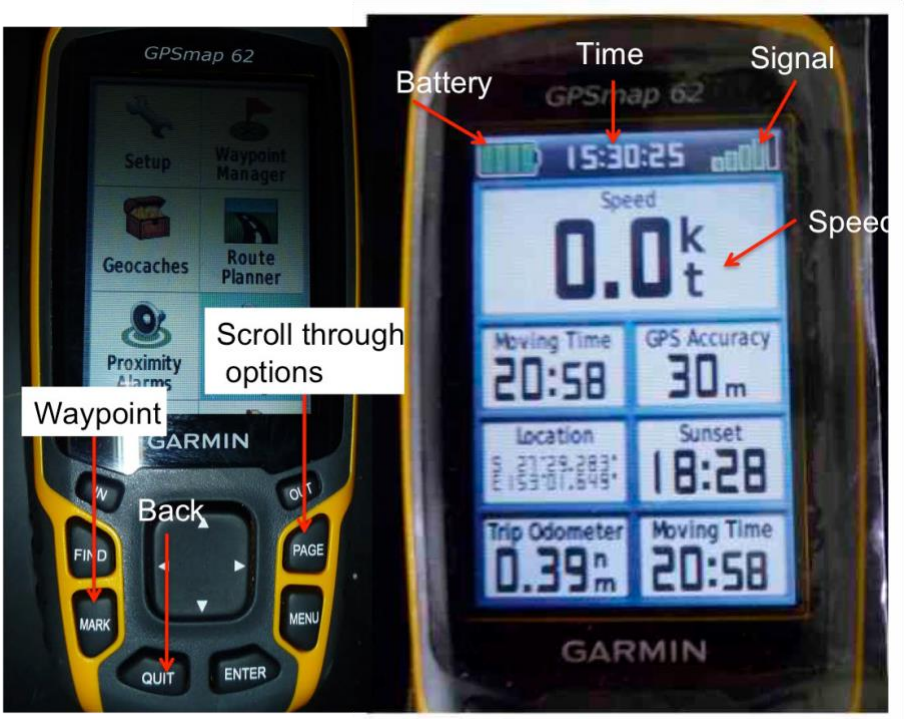
3. **At "3-2-1 GO!" take waypoints of the start and stop positions.** Have your finger ready on the button to press when "Go" is said.

4. Take waypoints of interesting features

5. **Shout out waypoints so they can be heard on camera and describe briefly (one or two words) what the waypoint is for,** e.g. "Mark 123 erosion" or "Waypoint 123 croc slide".

6. Ensure the GPS batteries don't go flat.

7. **Keep an eye on the boat speed – 6–10kts or 11–19km/h.** Speed can be seen on the trip computer screen.

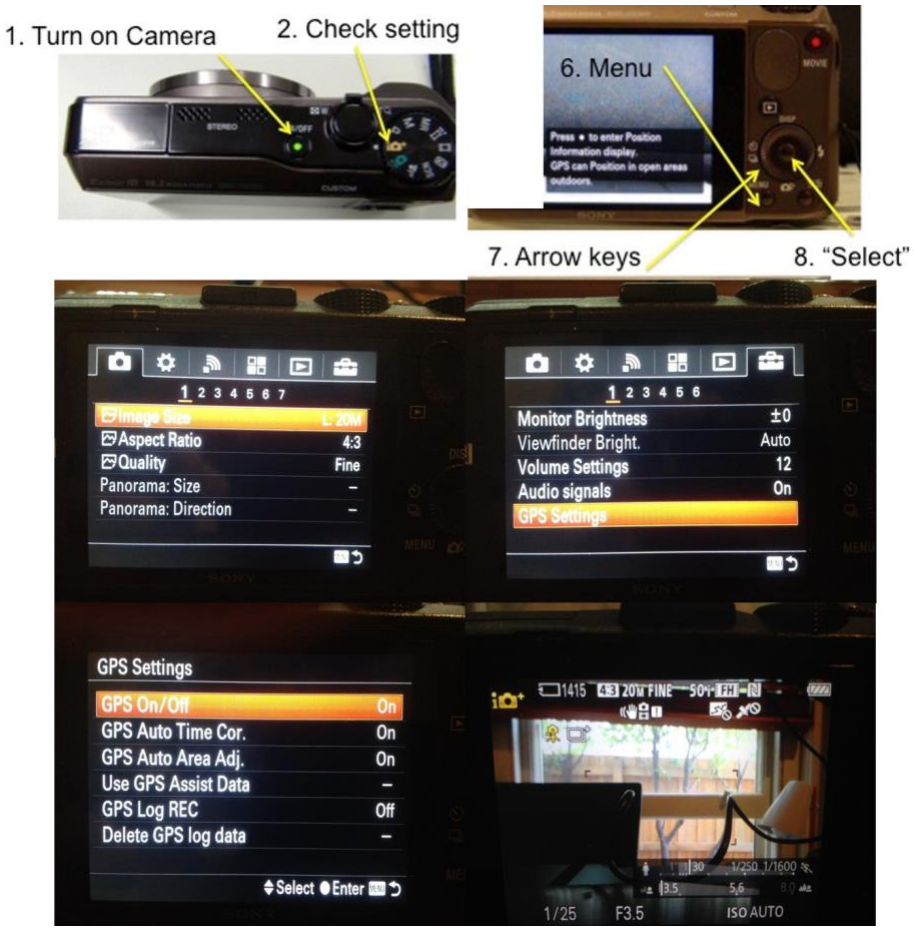


Instructions for the photographer

Before you start filming

It is important you are familiar with the camera before getting in the boat.

1. **Setup the camera so that GPS is ON and synchronised to update time/date & is refreshed to the new location**



Press **Menu –** use circle to navigate right to Toolbox Icon – press **Enter (centre circle)** – navigate to **GPS Settings** – press **Enter** – check settings are the same as above in the bottom left.

Make sure the satellite symbol (bottom right image) on the display screen has bars before starting shooting. If you can't see these symbols press **DISP** on the circle.

2. Check you have the spare ***battery*** and enough ***memory***
3. **Check the camera is set to *auto* unless you know what you're doing**
4. ***Clean* the camera lens**

During filming

At the start of each film

1. **Take a photo of the clapper board**
2. **Take a photo of the GPS time showing seconds**

At 3-21 GO!

1. **Take 5 photos**
   1. the shoreline
   2. up the shoreline
   3. down the shoreline
   4. behind you
   5. of people

2. **Take lots of photos – there is never too many! Just keep clicking.**

3. **Don't forget to take photos of *people* as well as shoreline – think about the report writing.**

4. **Say what you're taking a photo of so it can be heard on the handycam, e.g. "photo white egret" –** the number of the photo is not important.

5. Keep fingers out of the lens and try to avoid capturing boat straps and canopy supports.

6. **KEEP THE LENS CLEAN**

7. **Be careful not to bump the settings wheel on the top of the camera to P or M.**

At the end of each film

1. **Take a photo of the clapper board**

2. **Take the 5 photos**
   1. the shoreline
   2. up the shoreline
   3. down the shoreline
   4. behind you
   5. of people

At the end of the day – take a photo of the datasheets and send to mangrovewatch@gmail.com

Instructions for the observer

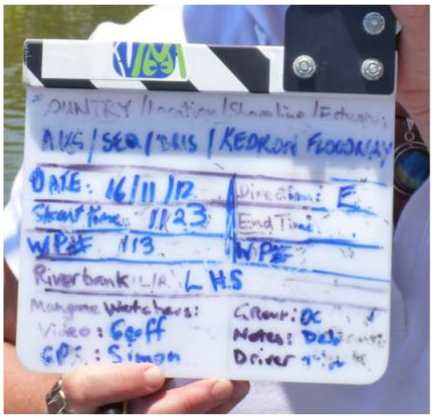
Before you start filming

It is important you are familiar with the equipment before getting in the boat.

Summary

1. Record the following information on the clapper board

a. Location – country/region/estuary or shoreline
b. Date
c. Start waypoint number – the next waypoint
d. Estimated time of video start (to nearest second)
e. Bank side relative to the direction of travel
f. Video number for the day
g. Names of MangroveWatchers



Make sure there is a short film and photo of the clapper board.

2. Fill in the top sections of the S-VAM observations datasheets

During filming

- Make sure everyone is doing their jobs correctly

Video camera

- The camera is 90 degrees
- The lens is clean
- The commentary is being said and is **relevant**
- The shot is being captured – a little sky, a little water

Photographer

- Photos are being taken and what they are is being said
- The lens is clean

GPS

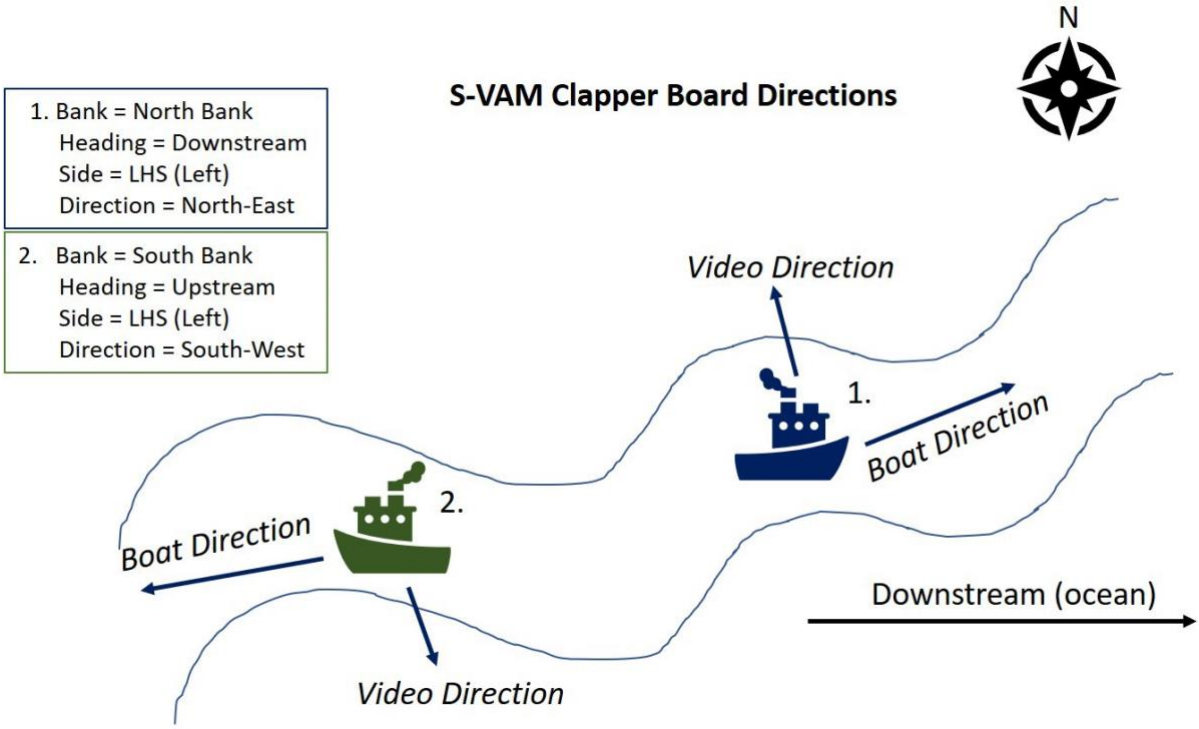
- Be on the lookout for interesting features and direct the GPS recorder to make a waypoint.

Boat driver

- The boat is going at a suitable speed, slow down if close or far from the bank
- Swap banks if sun is a problem
- Make commentary and repeat observations so it can be recorded on the camera if necessary

When stopped

- Record stop, start and change of direction waypoints
- Record interesting features observed
- Make notes on wildlife, human use, threats and mangrove phenology (flowering and fruiting)



Instructions for the boat driver

Before you start filming

1. **Check a map to check if the sun will be a problem**

East facing banks = afternoon survey

West facing banks = morning survey

North facing banks = anytime except around midday

South facing banks = anytime, but around midday is best

You may have to swap banks during the survey to avoid sun.

2. **Think about the tides and how it will affect the survey**

3. **Make sure all safety equipment is on board and crew are familiar with safety procedures**

During filming

1. **Maintain a good distance from the shore (~25m)**

Note: 10-15m is about the minimum distance from the shore

If you are close to the shore (~15m) or far (~100m), GO SLOW and drop the speed to 4kts.

In narrow channels, keep as far from the bank as is possible.

200m is max distance. If you're more than 200m from shore, the data won't be used

2. **Follow the curves of the shoreline, not the channel**

3. **Keep a good speed (6-–10 kts or 11–18 km/h) but avoid wake**

4. **Watch for hazards – safety first!**

5. **Listen to the instructions from the handycam operator**

A quick guide to S-VAM commentary

How you can help the scientists

In order of importance:

- **Tell local stories about the estuary/shoreline –** history, current issues, future concerns, observations of change, local values
- **Potential restoration sites**
- **What's happening behind the mangroves?** – land use
- **Species ID –** mangrove and terrestrial
- **Observed fauna & known wildlife in the area**– fish, birds
- **Human impacts –** drains, cutting, etc.
- **Human use –** recreation, fishing, etc
- **Damage –** insects, dieback, dead branches, dead trees. *If dieback or dead – why?*
- **Erosion**
- **Seedlings**

Take waypoints ('marks') at as many interesting features as possible and use the S-VAM issue and species codes as reference

There are no right answers – so your best guess is OK.

Here's what the scientists look for:

- Mangrove species (see guide)
- Mangrove stem density – *dense, open, patchy, sparse, scattered*
- Mangrove canopy density –*thick, open, very open*
- Dieback and dead trees –*many, some, few, 1 or 2*
- Fallen trees – why? – erosion, storm?
- Exposed roots
- Seedling density -*Many, some, few, 1 or 2*
- Human impacts – structures, damage, pollution (drains)
- Erosion (new or old) and mud banks

A quick guide to S-VAM issue & species observations

1. Fill in the top section of the datasheet – this should match the clapper board.

Note:

Shoreline refers to the bank being filmed. If an estuary – this should be named as the side of the estuary at the mouth, i.e. north, south, east, west).

Boat direction: Upstream or downstream. Or for islands – clockwise, anti- clockwise.

Riverbank: The side the shoreline you are filming relative to the direction of travel, e.g. left (LHS) or right (RHS).

S-VAM Issue Scores — Datasheet #: ____of _____ — SHORELINE SURVEY
MangroveWatch — **THREAT Categories & Mangrove Species**

COUNTRY/State (AU/Q):	**Location** (name): *Boyne River*				
Boat Direction: *Upstream*	**Shoreline** (overall): *North*		**Riverbank** (left/right): *RHS*		
Date:	**T E A M**	Skipper:	GPS:		
Start Time: **WPt**:		Video:	Notes:		
End Time: **WPt**:		Observer:	Photos:		

WPt	Indicator CODES	Mangrove (Height) CODES	WPt	Indicator CODES	Mangrove (Height) CODES
487	SL/DL - channel	RS(3-4), +XM			

2. Familiarise yourself with the species likely to be present and the S-VAM issue codes. Use the Mangrove Click, MangroveID or Australia's Mangroves book to assist.

3. Record observations with a GPS waypoint ('MARK') – circle waypoints where a photo is taken.

4. Where possible use species codes to refer to dominant species, with '+' to indicate other species present. Estimate mangrove canopy height in metres.

5. For continuous issues like bank erosion – record start and stop points, e.g. BE start.

6. At each 'clapper stop' – circle the issues and species observed.

S-VAM Issue Codes — Cover Sheet — SHORELINE SURVEY
Mangrove Project — **THREAT Categories & Mangrove Species**

Location:	Date:
Start WPt:	End WPt:

Condition Type	Indicator	Habitat	CODE	Mangrove Species	Common Name	CODE
Human related **Structure Loss**	rockwalls, wharf, ramps, roads.	any zone	SL	*Acrostichum speciosum*	Mangrove Fern	AS
Human related **Direct Loss**	clearing, dead trees, landfill	any zone	DL	*Aegialitis annulata*	Club Mangrove	AA

7. At the completion of the survey. Take a photo of all datasheets and send to mangrovewatch@gmail.com as soon as possible (from your phone on the boat if possible).

S-VAM Issue Scores
MangroveWatch

Datasheet #: ____of _____

SHORELINE SURVEY

THREAT Categories & Mangrove Species

COUNTRY/State (AU/Q):	**Location** (name):	
Boat Direction:	**Shoreline** (overall):	**Riverbank** (left/right):

Date:	**TEAM**	Skipper:	GPS:
Start Time: **WPt**:		Video:	Notes:
End Time: **WPt**:		Observer:	Photos:

WPt	Indicator **CODES**	Mangrove (Height) **CODES**	WPt	Indicator **CODES**	Mangrove (Height) **CODES**
487	SL/DL - channel	RS(3-4), +XM			

NOTE: circle WPt if photo taken; add general notes on the other side if needed.

S-VAM Issue Codes Cover Sheet SHORELINE SURVEY

Mangrove project **THREAT categories** & **mangrove species**

Location: Date:

Start WPt: End WPt:

Condition type	Indicator	Habitat	Code	Mangrove species	Common Name	Code
Human related **Structure Loss**	rockwalls, wharf, ramps, roads.	any zone	SL	*Acrostichum speciosum*	Mangrove Fern	AS
Human related **Direct Loss**	clearing, dead trees, landfill	any zone	DL	*Aegialitis annulata*	Club Mangrove	AA
Human related **Altered Hydrol.**	bunds, drains, impounded areas.	mostly higher zones	AH	*Aegiceras corniculatum*	River Mangrove	AC
Human related **Encroachment**	no buffer, cut-off tributaries	upper edge zone	EB	*Avicennia marina*	Grey Mangrove	AM
Human related **Access Tracks**	vehicles, tracks, foot pathways	mostly saltpans	AT	*Bruguiera dungarra*	Dungarra Orange	BD
Human related **Stock Impact**	cattle, horses, goats, tracks.	mostly saltpan - upper	SI	*Bruguiera exaris tata*	Rib-fruited Orange	BE
Human related **Feral Damaqe**	pigs, tracks, wallows, diggings	mostly saltpan - upper	FD	*Bruguiera gymnorhiza*	Large-leafed Orange	BG
Human related **Pollutant Impact**	oil spill, scum, dump site, dieback	any zone	PI	*Ceriops australis*	Smooth-fruited Orange	CA
Human related **Nutrient Excess**	enhanced growth, expansion	any zone	NE	*Ceriops tagal*	Rib-fruited Orange	CT
Human related **Fire Scorch**	fire damage, dieback	upper edge zone	FS	*Cynometra iripa*	Wrinkle-pod	CI
Human related **Weed Smother**	smothering, weeds, dieback.	mostly edge zone	WS	*Excoecaria agallocha*	Milky Mangrove	EA
				Heritiera littoralis	Keeled-pod Mangrove	HL
				Lumnitzera racemosa	White-flowered Black	LR
				Osbornia octodonta	Myrtle Mangrove	00
Climate/Natural - **Stonn Damage**	broken trees, forest damage	mangrove zones	SD	*Pemphis acidula*	Reef Barrier Mangrove	PA
Climate/Natural - **Shore Erosion**	fallen trees, steep bank, dieback	seaward zone	SE	*Rhizophora stylosa*	Stilted Mangrove	RS
Climate/Natural- **Root Burial**	fallen trees, steep bank, dieback	mostly seaward zone	RB	*Scyphiphora hydrophylacea*	Yamstick Mangrove	SH
Climate/Natural - **Fringe Collapse**	irregular dieback, canopy gaps	sea-edge mangroves	FC	*Sonneratia alba*	Apple Mangrove	SA
Climate/Natural - **Bank Erosion**	fallen trees, steep channel bank	channel edges	BE	*Xylocarpus granatum*	Cannonball Mangrove	XG
Climate/Natural - **Pan Scouring**	sheet erosion, missing saltmarsh	saltpan zone	PS	*Xylocarpus moluccensis*	Cedar Mangrove	XM
Climate/Natural - **Ecotone --Shift**	dead trees, fringe loss, retreating	saltpan-mangrove	ES-			
Climate/Natural - **Ecotone +Shift**	young trees, fringe gain, encro aching	saltpan-mangrove	ES+			
Climate/Natural - **Deposit'! Gain**	young trees, bank & edge expansion	water edge	DG			
Climate/Natural - **Terr'l Retreat**	back edge dieback, scouring erosion	upper zone	TR			
Climate /Natural - **Light Gaps**	circular canopy holes/dieback	mangrove zones	LG			
Climate/Natural - **Altered Hydrol.**	dead trees, naturally impounded	Back beach chnls, sand ridges	AN			

NOTE: circle codes used – as observed during the survey; add more codes as needed.

Downloading the data

Set up a folder on the external HDD

1. **Main folder – river/shoreline name,** e.g. McArthur River
2. Create a folder for the **Date** using the format yyyymmdd, e.g. 20170915
3. **Sub-folders**
   - Video
   - Photos
   - GPS
   - Data/notes

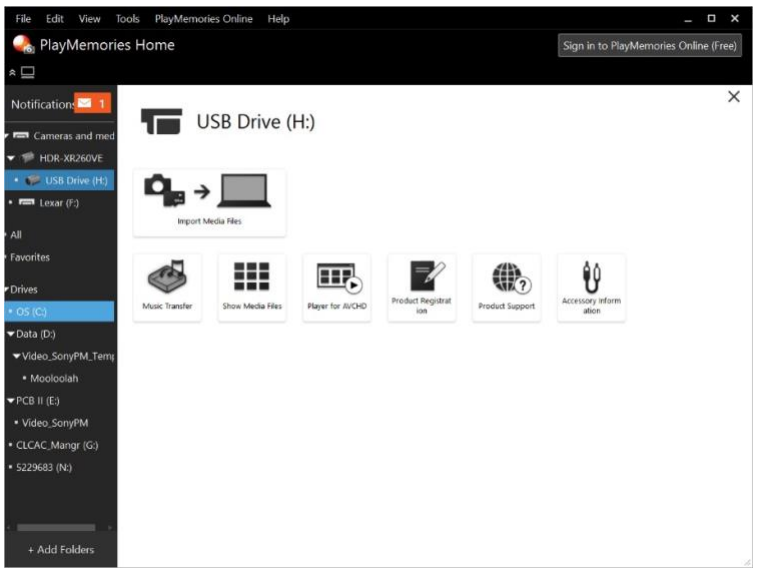
Copying video

Download the **Sony PlayMemories Home** software (free) - www.sony.com.au/support/download/587771

Connect the video to your computer using the USB connector cable attached to the Video-USB cable tucked in the side handle-strap.

Open the viewing screen of the video and press 'USB Connect'.

Open the Play Memories Software (it should open automatically).



Select – Import Media Files.

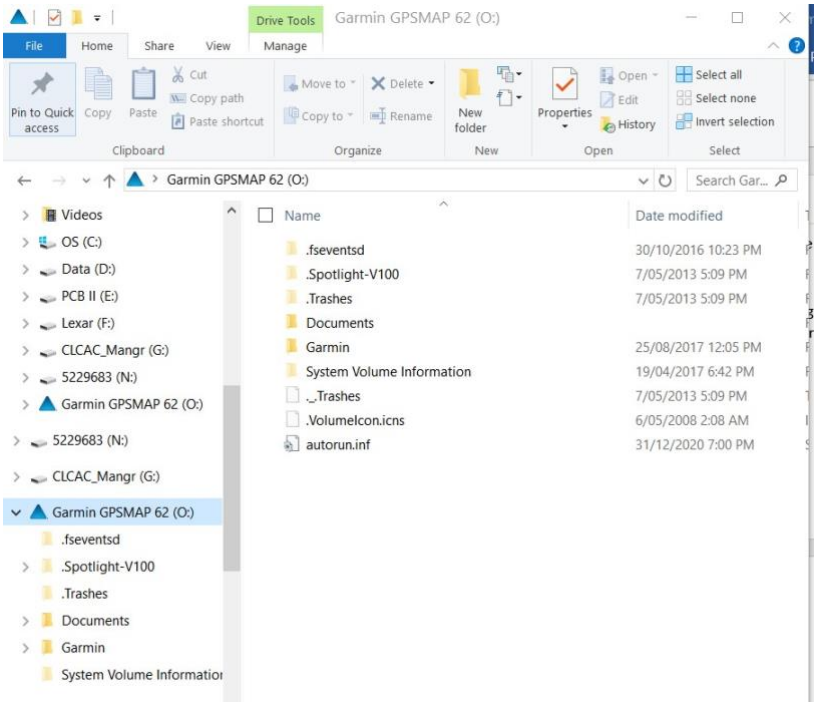
Choose the video files (usually all) and the change the folder destination to the appropriate 'Video' folder on the external HDD and then press Import. *This can take some time, so make sure there is plenty of battery on the video*

Copying GPS

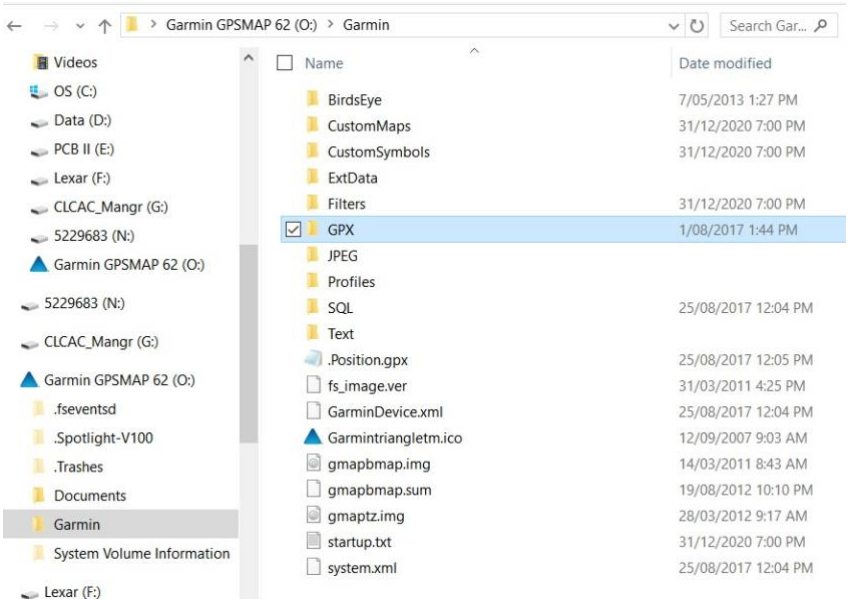
Turn on the GPS

Connect the GPS to the computer using the USB cable

A ‘Garmin’ drive should appear in your drive list, the same as it would for a USB drive.



Open the Garmin folder and then Copy (Ctrl+c or mouse right click) the **GPX** folder.



Paste (ctrl+v) into the GPS folder.

Do not try and sort the GPS files before copying – everything that is needed is within the GPX folder. Not copying the entire GPX folder can lead to missing files and lost data.

Copying the photos

Connect the camera or insert the memory card. Copy all the photos to the photos file.

Copying the datasheets

Scan and copy the datasheets into the Data folder

Notes

Make a Word document that describes the activities for the day. Include:

Date

Location

Crew

Time spent – total estimated time spent (including equipment prep, boat loading, filming and data download).

Equipment & technical issues

Interesting observations

Comments

Additional MangroveWatch field programs

There are three other training programs with MangroveWatch.

Identification of mangrove trees and shrubs

Used for the identification of mangrove plants in your local mangroves.

Mangrove plants are being described, new species recognised and guide books published from the work being done by MangroveWatch groups.

Dr Duke working with CLCAC rangers to identify and name local mangrove plants on the Norman River, Queensland.

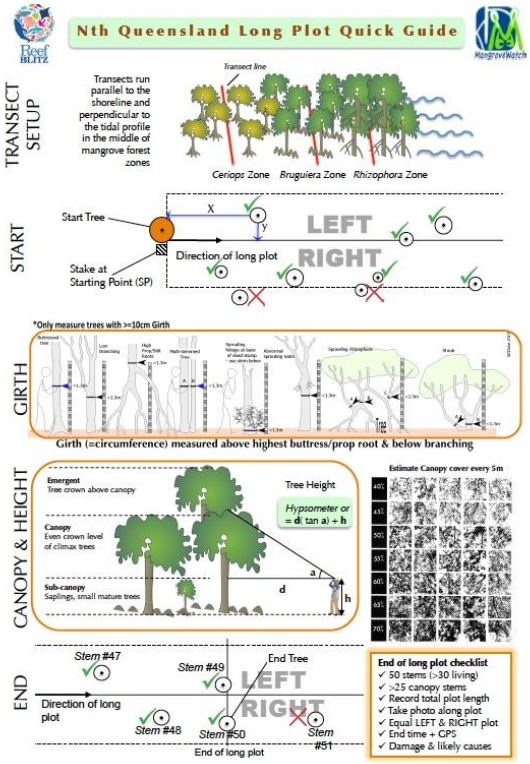
Rapid saltmarsh assessment of values & threats

Used to identify and define the values and threats faced by saltmarsh habitats.

CLCAC rangers and MangroveWatch preparing to conduct a saltmarsh survey.

Long plots for rapid mangrove forest asssessments

Used for the quantification of mangrove forest biomass and structure as well as estimates of carbon in trees and soil.



Information sheet for the MangroveWatch long plot method.

Specifically, this method describes a practical and effective way to measure biomass and living carbon content of mangrove forests. Descriptors of mangrove forest vegetation units, as key stand structural descriptors, include: plot area; species assemblages; structural form; density of trees; size of individual trees based on height and stem diameter; plus, condition of trees and canopy foliage. This methodology evaluates mangrove forests in a way that is scientifically reliable, accurate, low cost, low skilled, simple, pragmatic and relevant.

Dr Duke with CLCAC rangers in the mangroves along the Norman River.

Northern Australia Environmental Resources Hub

National Environmental Science Programme

www.nespnorthern.edu.au

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MangroveWatch

TropWATER Centre for Tropical Water and Aquatic Ecosystem Research

JAMES COOK UNIVERSITY AUSTRALIA

Tropical Water Quality Hub — National Environmental Science Programme

Marine Biodiversity Hub — National Environmental Science Programme

Earth Systems and Climate Change Hub — National Environmental Science Programme