Holloways Beach Environmental Education Centre
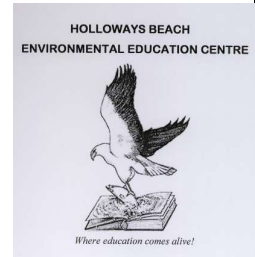
Mangrove Field Study Workbook
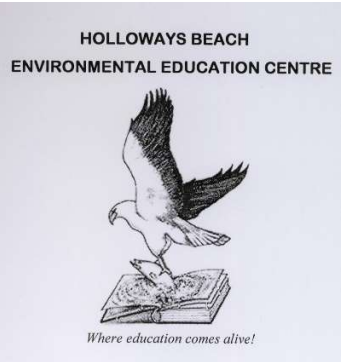
Name_____

Teacher Name_____

School_____**Subject**_____

HOLLOWAYS BEACH
ENVIRONMENTAL EDUCATION CENTRE

Where education comes alive!

HBEEC site 3- disturbed

HBEEC site 2- undisturbed, regular tidal inundation

HBEEC site 4- occasional tidal inundation

Poinsettia Reserve

Barron River

HBEEC site 1- Undisturbed, regular tidal inundation
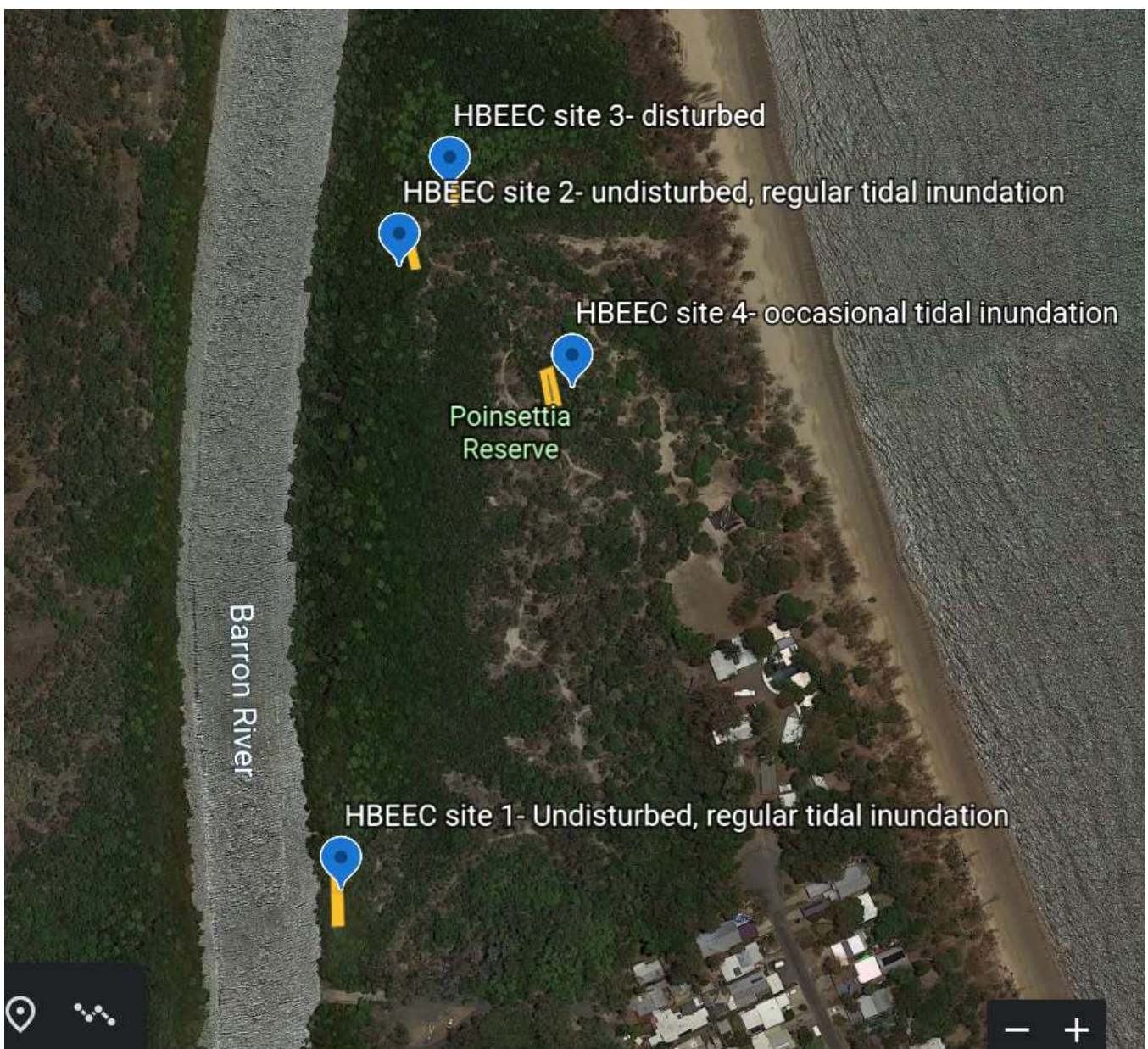
A day at Holloways Beach EEC

The day at HBEEC is designed to be used in 3 ways;

1. Collect and interpret data; or

2. Collect, interpret data and practice sampling techniques; or

3. Collect, interpret data, practice sampling techniques and design your own hypothesis.

Also while at Holloways Beach today you will be given the opportunity to use
➢ The process of stratified sampling to collect primary data.
➢ Identify species
➢ Classify ecosystems in relation to the Interim Australian National Aquatic Ecosystem (ANAE) and the Regional Ecosystem Classification: https://apps.des.qld.gov.au/regional-ecosystems/
➢ Collect Data that can then be used with the Simpson's Diversity Index
➢ Sample in a relatively undisturbed and disturbed ecosystem or different tidal inundated ecosystem of the same classification.
➢ Reflect on the findings of the day.

On your day at Holloways Beach please record general observations about weather and tide.

High Tide Time:_____   Height:_____

Low Tide Time:_____   Height:_____

Moon phase:_____

Temperature from Bureau Of Meteorology (BOM) Min:_____ Max:_____

Last Rainfall: _____

Suitable data that you collect today will be submitted to our Citizen Science research partners:
• Mangrove Watch: http://mangrovewatch.org.au/regions/australia/queensland/
• Ausmap: https://www.ausmap.org/
• Crystal Bowl: https://crystal-bowl.com.au/
• Wet Tropics Healthy Waterways Partnership: https://wettropicswaterways.org.au/

And will be used for our own ecosystem monitoring by HBEEC.

Mangrove Identification Dichotomous Key

Mangrove Identification

| 1. | Leaves large, > 12cm | Go to 2 |
| | Leaves smaller < 12cm | Go to 3 |

| 2. | Large "prop" roots looping out from near base of tree | Rhizophora |
| | No obvious "prop" roots | Go to 4 |

| 3. | Underside of leaves greyish | Avicennia |
| | Underside of leaves green | Go to 5 |

| 4. | Underside of leaves silver/grey | Heretiera |
| | Underside of leaves green | Bruguiera |

| 5. | Leaf with a small notch or indent at tip | Go to 6 |
| | Tip of leaf round or pointed | Go to 7 |

| 6. | Crushed leaf smells of eucalypt | Osbornia |
| | Crushed leaf has no smell | Lumnitzera |

| 7. | Tip of growing stem flat or spear-shaped | Ceriops |
| | Tip of growing stem round or pointed | Go to 8 |

| 8. | Base of leaf stalk slightly swollen | Xylocarpus |
| | Base of leaf stalk not swollen | Go to 9 |

| 9. | Bark rough, with many small bumps on surface | Excoecaria |
| | Bark fairly smooth, may be salt crystals on leaf surface | Aegiceras |

Holloways Beach Environmental Education Centre

Types of Roots

Buttress Roots
Knee Roots
Pencil Roots
Prop Roots
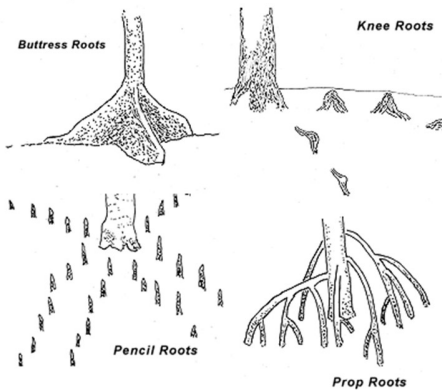
Common Leaf Arrangements

Alternate
Opposite
Whorled
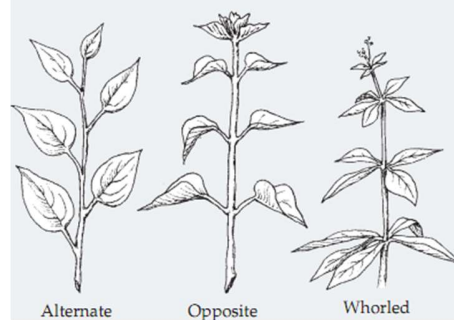
Mangrove Identification Quick Reference Table

Scientific name Code	Common name	Root type	Leaf ID sketch	Bark Type obvious lenticels black, corky, scaly, smooth, greenish	Leaf Arrangement Alternate/Opposite (Circle)	Other (stipules, latex-milky sap, salt glands, salt on leaves)
Ceriops tagal CT	Yellow mangrove				A/O	
Excoecaria agallocha EA	Milky (blind-your-eye) mangrove				A/O	
Avicennia marina AM	Grey mangrove				A/O	
Bruguiera gymnorhiza BG	Orange mangrove				A/O	

Aegiceras corniculatum **AC**	River mangrove				A/O	
Rhizophora stylosa **RS**	Red/spotted/stilted mangrove				A/O	
Xylocarpus granatum **XG**	Cannonball mangrove				A/O	
Osbornia octodonta **OO**	Myrtle mangrove				A/O	
Lumnitzera racemose **LR**	Black mangrove				A/O	
Heritieria littoralis **HR**	Looking glass mangrove				A/O	

Mangrove Watch Long Plot Rapid Assessment (belt transects for comparative sites)

The Mangrove Watch Program is a Citizen Science Program which allows groups with a trained leader to collect data on Mangrove ecosystems to assess the health of these systems, monitor for changes, and calculate carbon storage.

Methodology

1. Set up transect along the zone, not across the zone
2. Fill in the top section of every datasheet (start time, compass bearing, location etc.)
3. Divide into 3 groups: Tree measurements, Quadrat data, Photos and ipad
4. **Photo group**-Take a photo looking down the transect
5. **Tree Group**: Take and record the following measurements from every tree in the transect in order. *(minimum of 25 live canopy trees):*
   - Location along tape (mid-point)
   - Distance to the tree (mid-point)
   - Side of the plot (left or right)
   - Girth
   - Height
   - Lean (degrees from vertical)
   - Canopy **(C)** Sub Canopy **(SC)** or Emergent **(SA)**
   - Tree Health (0-5) and damage code
6. **Quadrat Group** you will be taking measurements for items 1-6 on page 9.
7. **Photo Group** you are responsible for taking measurements for items 7-10 (remember to take photos up and down the transect as well).
8. Take a compass reading at the end and take a photo back down the line
9. Ensure that all equipment is brought back to the centre and cleaned.

Below is an example of your transect sheet with the data already filled in- note that the species codes are the ones found in your species table (pg. 5 and 6) and that damage codes have been included in condition comments. The codes can be found on your reference sheets.
Please ensure that you use the correct codes!

RAPID MANGROVE VEGETATION ASSESSMENT - LONG PLOT DATASHEET · PAGE 1

Date:	7/9/2019	Start Time: 9.34					Location:	DRI.02				
		End Time: 11.40					Forest Type:	BP				
Collectors: JOCK SANDRA SAM FLORENCE GRIFF CHARLOTTE							Plot number:	2				
Start Coords & WP: 16° 15' 31" S 145° 23' 45" E							Distance to shore:	20 M				
End Coords & WP:							Plot Length: 12.2 m			Plot Width: 2 M		
Compass Bearing from Start:	49											

Site # DRI.02   Dead Tree Tally: ‖‖ ‖‖ ‖‖ ‖   Canopy Tree Tally: (Live) ‖‖ ‖‖ ‖‖ ‖‖ ‖‖ ‖‖ ‖

Stem No.	Tree No.	Multi Stem (a,b?)	Dist. Along Tape (in m)	Dist from Tape (in m)	Side L/R	Spp. code*	Girth (cm) (0.1)	Tree Hgt (m) (0.1)	Lean	Pos C,SC,	Health Score (0-5)	Tree Damage Code	Comment
1	1	—	0.9	0	R	BP	16.5	17	—	C	4.5	LTW	
2	2	a	3.0	0.75	R	RS	11	13	—	C	4.5	LC	Ant plant
3		b	3.1	0.9	R	RS	12.5	13	5%	C	4.5	LC	
4		c	3.3	0.8	R	RS	11	11	10%	C	4.5	LC	
5	3	—	4.2	0.4	R	BP	14	15	—	C	4.5	LTW	
6	4	—	5.1	0.7	R	XG	3.5	3.3	—	SC	4.5	LC	
					R	RP	10	0.75	—	—	0	DST	DEAD

Date:	Start Time:		Location:		
	End Time:		Forest Type:		
Collectors:			Plot number:		
Start Coords & WP:			Distance to shore:		
End Coords & WP:			Plot Length:		Plot Width:
Compass Bearing from Start:					

Site #			Dead Tree Tally:				Canopy Tree Tally:							
Stem No.	Tree No.	Multi Stem (a,b?)	Dist. Along Tape (in m)	Dist from Tape (in m)	Side L/R	Spp. code*	Girth (cm) (0.1)	Tree Hgt (m) (0.1)	Lean	Pos C,SC,	Health Score (0-5)	Tree Damage Code	Comment Epiphytes, insects, animals etc.
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													
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40													

Transect Method Reflections

Positive	Limitations	Changes

Simpson's Diversity Index

Simpson's Diversity Index is a measure of diversity. In ecology, it is often used to quantify the biodiversity of a habitat. It takes into account the number of species present (richness), as well as the abundance of each species (evenness).

$$SDI = 1 - \left(\frac{\sum n(n-1)}{N(N-1)}\right)$$ Where;

- n is the total number of individuals of a particular species
- N is the total number of organisms of all species
  - $\sum n(n-1)$ is the sum of all species calculations of n(n-1)

SDI ranges between 0 and 1- the closer the SDI is to 1, the more diverse the community; i.e. one species is not more prevalent than the others.

Identify all the species found in your transect and complete the following table:

Species	Tally (n)	n(n-1)
TOTAL	N=	Σ n(n-1) =

Calculate the SDI for your site:

Quadrat and Photo groups

Methodology: Divide your transect line into 5 roughly equal sections. Beginning at the very start of each section, place a 50cm x 50cm quadrat directly alongside the transect line, and take the following data from inside the quadrat. *Quadrat group are responsible for items 1-6 below, Photo group for 7-10.*

Measurement Circle Abiotic (A) or Biotic (B)		Methodology	Transect Position				
			1	2	3	4	5
1. Wind speed (km/h)	A / B						
2. Air temperature	A / B						
3. Relative humidity (%)	A / B						
4. Soil temperature	A / B						
5. Substrate (soil) type	A / B						
6. Altimeter reading	A / B						
7. Canopy Cover (%)	A / B						
8. Mangrove propagule/sapling count	A / B						
9. Ground cover leaf litter (%)	A / B						
10. Number of crab holes	A / B						

Methodology Reflection (pick one from the table above)

Positive	Limitations	Changes

Compare the SDI for Mangrove species data from 2 disparate sites:

Site	Location	Description	SDI
Site 1			
Site 2			

Explain any differences or similarities

_____

_____

_____

_____

_____

_____

_____

_____

Classify the ecosystem (to be completed at school)

Use the following website to classify the Mangrove region at HBEEC:
Queensland Government's Regional Ecosystem Descriptions:
https://apps.des.qld.gov.au/regional-ecosystems/

Level 1. What is the name and number of your bioregion? _____

Level 2. What is the name and number of your land zone? _____

Level 3. What is the name and number of your regional ecosystem? _____

Why is the Regional Ecosystem Description classification system appropriate for this ecosystem?

_____

_____

_____

_____

Ensure that you have collated the data from all the groups onto your worksheet.