

Year 11 Biology

Module 3 – Biological diversity



Image by: Andrew Scott

The disappearing microbats of Scheyville National Park

Student worksheets

2018

Name: _____

Purpose

Your aim today is to identify the type of ecosystems at Longneck Lagoon and to determine their condition. To do this you will conduct a range of scientific investigations and collect data regarding the biotic and abiotic factors of the site in order to assess the suitability of the conditions for a range of echolocating bat species.

Parameter selection

Terrestrial: select 5 parameters from the list below and enter them on the following table. Transfer these chosen parameters to page 3.

Air moisture	Canopy density	Slope
Leaf litter density	Light	Soil temperature
Soil pH		

Terrestrial parameter	Equipment / method	Reason for choice
1.		
2.		
3.		
4.		
5.		
6. Herbivory	Leaf survey	Indicates presence of herbivorous insects

Aquatic: select 5 parameters from the list below and enter them on the following table. Transfer these chosen parameters to page 6.

Ammonia	Dissolved oxygen	Turbidity
pH	Phosphorous	Temperature
Salinity		

Aquatic parameter	Equipment / method	Reason for choice
1.		
2.		
3.		
4.		
5.		
6. Biological indicators	Dipnetting - pollution index	Indicator of the health of the aquatic ecosystem and potential food sources for the bats

Date:
Time:

Transect

Conditions:

		Open woodland	Forest	Open woodland								
Profile	Height 15m											
Key Tree												
1	10m											
2												
3	5m											
4												
	0m											
Transect line	0m	*	20m	40m	60m	*	80m	100m	120m	*	140m	160m
Parameter	Measure the chosen parameters at 3 intervals as marked on the transect line *											
1.												
2.												
3.												
4.												
5.												

Considering all available data, what is the terrestrial ecosystem at Longneck Lagoon classified as?

Biodiversity survey – indication of overall health of an ecosystem

Circle the scores of those factors that are present.

Factor		Possible score
Area	Small (<1ha)	1
	Medium (1ha-20ha)	2
	Large (>20ha)	3
Layers	Trees	1
	Shrubs	1
	Herbs/ground cover	1
Native plants	None	0
	Some	1
	Most	2
Weeds/exotics	None	3
	Some	2
	Most	1
Habitat	Nests/hollows	2
	Water	2
	Leaf litter	1
	Logs	1
	Rocks	1
Total score		

Biodiversity ranking	
Low	3-5
Moderate	6-8
Good	9-12
High	13-18

Trophic interactions – herbivory

A healthy ecosystem has 15% to 20% herbivory.

Trophic interactions results table:

Table A

Your sample of 10 leaves
(Do not pick leaves)

Leaf	% Eaten
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
Total table A	

Table B

Gather totals from 9 other people

Your total from A:	
Totals from 9 other people	
Total:	
Average: (Total÷100)	

Roost sites

Different species of bats choose different sites for roosting or sleeping during the day. Some species roost by themselves (solitary species) while others may roost in small groups or up to the thousands!

Throughout your day check your surroundings to see what potential roost sites exist and note them below. See some examples below.

Roost site	Tick if present
Cave	
Mine shaft	
Building	
Bridge	
Tree hollow	
Loose bark	
Artificial	

Human impact on bats

Key threats	Observed	Impact
Disturbance to roost caves/areas		
Reduction in water body quality		
Land clearing of habitat and adjacent to foraging areas		
Introduction of diseases		
Cave or other area entrances being blocked for human use/safety		
Hazard reduction fires and wildfires		
Application of pesticides		
Loss of tree hollows		
Artificial light pollution in roosting or foraging areas		
Other threats		
Paths/tracks/trails		
Buildings		
Introduced species		

Aquatic testing results

Parameter	Result
1.	
2.	
3.	
4.	
5.	
6. Biological indicators (Pollution index)	

Pollution index	
Poor	0-20
Fair	21-34
Good	35-44
Excellent	45+

Food items and biological indicators of water pollution

- Circle sensitivity rating if animal found
- Count number of animals for abundance
-

Macroinvertebrate common name & sensitivity	Sensitivity rating	Abundance	Bat food source
Very sensitive			
Stonefly nymph	10		✓
Mayfly nymph	9		✓
Dobsonfly larva	8		✓
Caddisfly larva	8		✓
Sensitive			
Water mite	6		
Beetle	5		✓
Freshwater shrimp	4		✓
Tolerant			
Dragonfly nymph	3		✓
Damselfly nymph	3		✓
Freshwater mussel	3		
Mosquito larva	3		✓
Bloodworm	3		
Nematode	3		
Very tolerant			
Backswimmer	2		✓
Water boatman	2		✓
Water scorpion	2		✓
Water strider	2		✓
Worm	2		
Leech	1		
Freshwater snail	1		
Total			

Potential food items

Potential food sources for echolocating bat species are indicated in the table on the left. Transfer the number of food sources identified to the table below.

Additional food items not listed in the biological indicators assessment can include fish and tadpoles.

Count the number of macroinvertebrate food species, fish, tadpoles and other vertebrate species to find out the total number of potential food sources.

Food sources	
Number of different macroinvertebrate food species	
Fish	
Tadpoles	
Other vertebrates	
Total number of food sources	