

SASS 5

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UNIVERSITY OF THE
FREE STATE
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NATURAL AND
AGRICULTURAL SCIENCES
NATUUR- EN
LANDBOUWETENSAPPE

CENTRE FOR ENVIRONMENTAL MANAGEMENT
SENTRUM VIR OMGEWINGSBESTUUR

CONTENT

- INTRODUCTION TO SASS 5
- EQUIPMENT
- METHOD
 - Site selection
 - Sampling
 - Recording & Analysis
- PRESERVATION
- SASS ACCREDITATION

A scenic view of a river flowing through a forest. The water is dark and turbulent, cascading over several large, mossy rocks. The surrounding vegetation is lush and green, with tall grasses and ferns growing along the banks. The background shows a dense forest of trees. The overall atmosphere is serene and natural.

INTRODUCTION TO SASS 5

WHAT IS SASS 5?

- South African Scoring System Version 5
- Standard method for rapid bio-assessment in South Africa
- Assess water quality and health in river systems
- Monitor the present state of macro-invertebrates

WHY SASS 5?

- Standardised method
- Rapid method
- Equipment is cost effective
- Macro-invertebrates good indicators
 - Visibility to naked eye
 - Ease of identification
 - Rapid lifecycle (reflect present pollution impact)

WHERE IS SASS 5 USED?

1. Main indicator used in the National River Health Programme
2. Determine the Ecological Reserve
3. Determine the flow requirements of rivers
4. Impact assessments
5. By many institutions

A scenic view of a river flowing through a lush forest. The water is dark and turbulent, cascading over several large, mossy rocks. The surrounding vegetation is dense and green, with tall grasses and ferns in the foreground. The overall atmosphere is serene and natural.

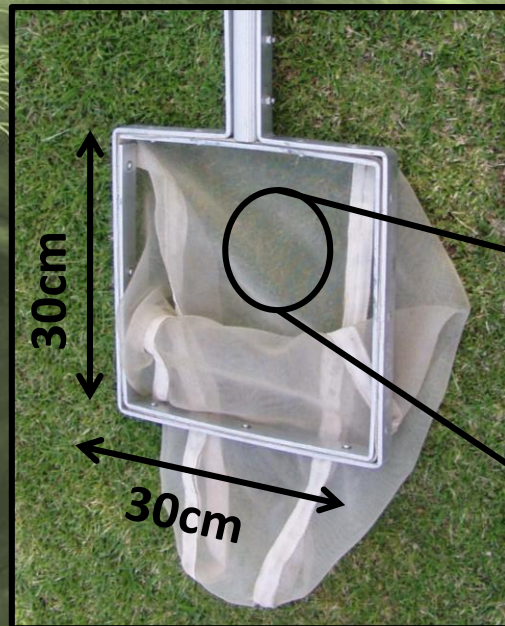
EQUIPMENT

1. STANDARD SASS 5 SAMPLING NET



Net Frame:

- Square
- Size:
30cm × 30cm



Net pore size:

- 1mm
- Sample only visible organisms

2. TRAYS



- White or cream
- Flat bottomed
- About 30cm × 45cm in size
- About 1cm deep

3. STANDARD SASS 5 DATA SHEET

SASS Version 5 Score Sheet										Version date: Sep 2005																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
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Procedure:		<p>Kick SIC & bedrock for 2 mins, max. 5 mins. Kick SOOC & bedrock for 1 min. Sweep marginal vegetation (IC & OOC) for 2m total and aquatic veg 1m². Stir & sweep gravel, sand, mud for 1 min total. * = airborns others</p> <p>Hand picking & visual observation for 1 min - record in biotope where found by circling & estimate abundance on score sheet. Score for 15 mins/biotope but stop if no new taxa seen after 5 mins.</p> <p>Estimate abundance: 1 = 1, A = 2-10, B = 10-100, C = 100-1000, D = >1000 S = Stone, rock & solid objects; Veg = All vegetation; GSM = Gravel, sand, mud SWC = South Western Cape, T = Tropical, ST = Sub-tropical</p> <p>Rate each biotope sample: 1 = very poor (i.e. limited diversity), 5 = highly suitable (i.e. wide diversity)</p> <p>Rate flows: Zero, trickle, low, medium, high, flood</p> <p>Rate turbidity: V low, Low, Medium, High, Very High</p> <p>Rate colour: transparent, tea brown, light brown, dark brown, light green, dark green, yellow, red, grey, milky white, black</p>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												

FOR SAFETY

- Wader/gumboots

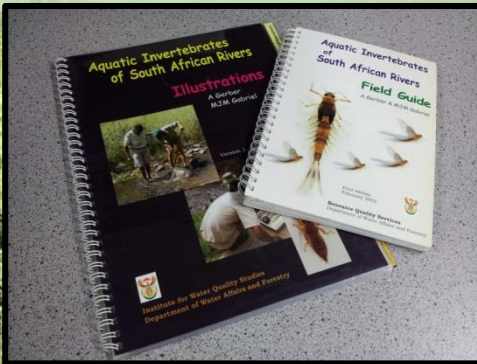


- Gloves



OTHER HELPFUL EQUIPMENT

- Field guides



- Pipettes
- Forceps



- Stopwatch



- Clipboard & pencil/pen



- Magnifying glass



- Ice cube tray





METHOD: SITE SELECTION

THE SITE

1. Should represent that river or reach
2. Should be easily accessible
3. Should have no signs of recent flooding
4. Should have no other visible impacts
5. Should consider the available habitat

A photograph of a river flowing through a forest. The water is dark and turbulent, with white foam from rapids. The banks are covered in lush green vegetation, including tall grasses and ferns. A large, mossy rock is visible in the foreground. A semi-transparent white rectangular box is overlaid in the center of the image, containing the text "METHOD: SAMPLING" in bold black letters.

METHOD: SAMPLING

WHEN NOT TO SAMPLE

- When a river is in flood
 - Endanger operator
 - Not true representation of biota
- In wetlands, estuaries and other lentic habitats
- Use with caution in non-perennial rivers

Note

1. Method designed for low to moderate flow hydrology
2. Works best in a diversity of biotopes

SAMPLE 3 MAIN BIOTOPES

1. Stones
2. Vegetation
3. Gravel, Sand and Mud

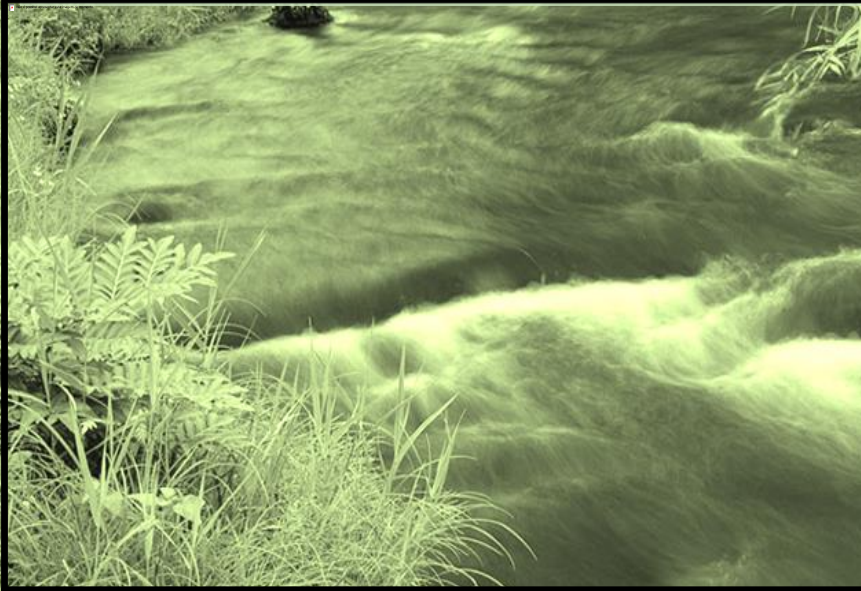
Handpicking & visualising

STONES

- Stones in the current
 - **Sample 2 – 5min** (more bedrock – closer to 5min)
 - Rapids/riffles and runs
- Stones out of the current
 - **Sample 1min at most**
 - Out of main current (not backflow)

Sample all over the biotope

EXAMPLE: STONES IN CURRENT



EXAMPLE: STONES OUT OF CURRENT

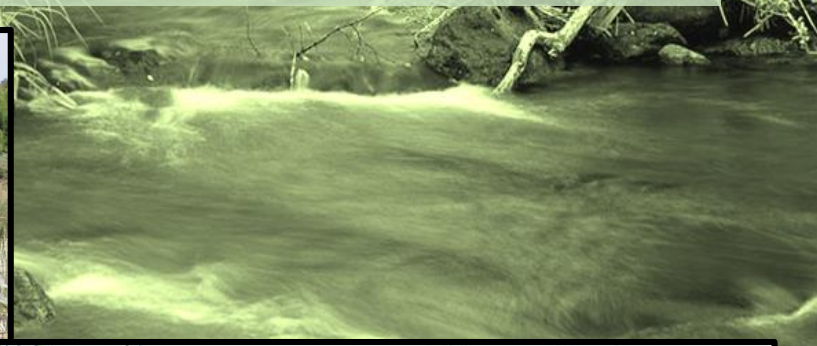


VEGETATION

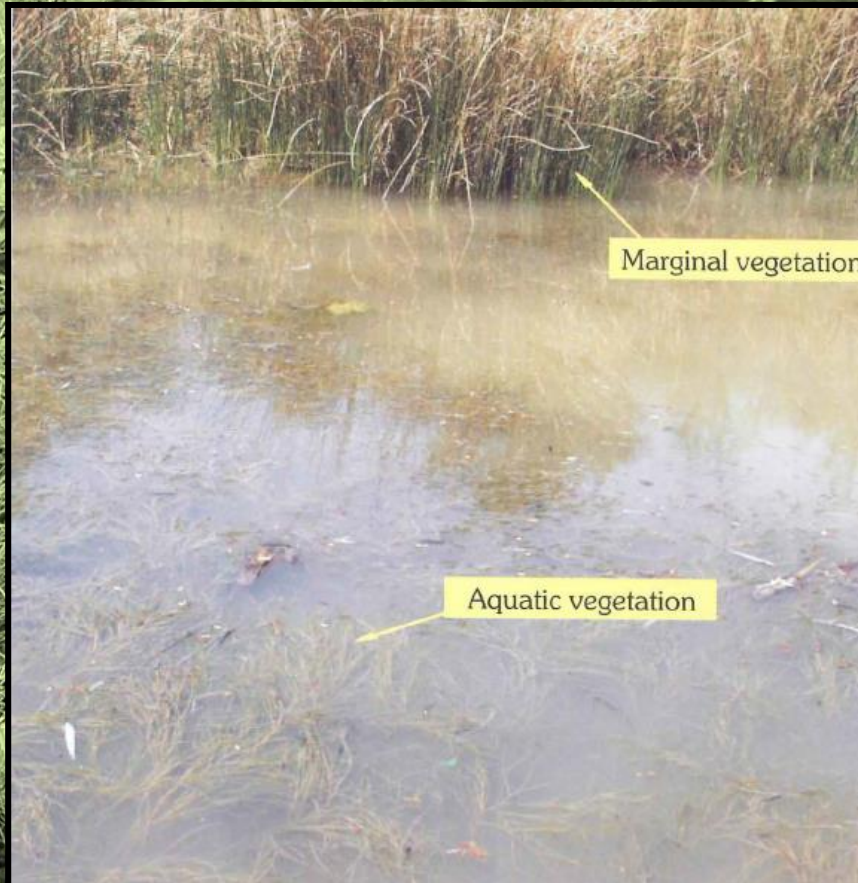
- Marginal vegetation (in the current & out of the current)
 - Sample 2 metres
- Aquatic vegetation (in the current & out of the current)
 - Sample 1m²

Sample all vegetation types at site

EXAMPLE: MARGINAL VEGETATION



EXAMPLE: AQUATIC VEGETATION



Water Weed



GRAVEL, SAND AND MUD (GSM)

- Gravel (2mm – 2cm)
- Sand (0.06mm – 2mm)
- Mud (Smaller than 0.06 (e.g. Clay, silt))
- In slow moving or pool areas
- **Sample for 1min**

EXAMPLE: GSM



HANDPICKING & VISUALISATION

- Sample about 1min
- E.G. Gyrinidae (Whirligig beetles)
- Indicate on SASS sheet:



COLEOPTERA (Beetles)					
Dytiscidae/Noteridae* (Diving beetles)	5	1	A	1	A
Elmidae/Dryopidae* (Riffle beetles)	8	A		1	A
Gyrinidae* (Whirligig beetles)	5		A	B	B
Haliplidae* (Crawling water beetles)	5				
Helodidae (Marsh beetles)	12				
Hydraenidae* (Minute moss beetles)	8				
Hydrophilidae* (Water scavenger beetles)	5		1		1
Limnichidae	10				
Psephenidae (Water Pennies)	10	B		A	B

A scenic view of a river flowing through a lush forest. The water is dark and turbulent, cascading over several large, mossy rocks. The surrounding vegetation is dense and green, with tall grasses and ferns in the foreground. The background shows a dense forest of trees. The overall atmosphere is natural and serene.

RECORDING & ANALYSIS

RECORDING MACRO- INVERTEBRATES

- Max. of 15min per biotope
- Identify to FAMILY level
 - Baetidae & Hydropsychidae:
Know the number of different species
- Best to stick to order → monitoring
 - E.G. Always sample: 1st stones, 2nd vegetation and 3rd GSM
- When you empty the tray, have a quick look to see if you missed something
 - E.G. Molluscs, leeches, etc.

ESTIMATE THE ABUNDANCE

- Record as:

- 1 → 1
- A → 2-10
- B → 10-100
- C → 100-1000
- D → >1000

COLEOPTERA (Beetles)		S	V	G	T
Dytiscidae/Noteridae* (Diving beetles)	5	1	A	1	A
Elmidae/Dryopidae* (Riffle beetles)	8	A		1	A
Gyrinidae* (Whirligig beetles)	5		A	B	B
Halplidae* (Crawling water beetles)	5				
Helodidae (Marsh beetles)	12				
Hydraenidae* (Minute moss beetles)	8				
Hydrophilidae* (Water scavenger beetles)	5		1		1

COMPLETING THE SASS SHEET

Date: RHP Site Code: Collector/Sampler: River: Level 1 Ecoregion: Quaternary Catchment:			(dd.ddddd)		
			Grid reference (dd mm ss.s) Lat:	S	
				Long:	E
				Datum (WGS84/Cape):	
				Altitude (m):	m
Site Description:	Temp (°C):		Cond (mS/m)		
	pH:		Clarity (cm):		
	DO (mg/L):		Turbidity:		
	Flow:		Colour:		
	Riparian Disturbance:				
Instream Disturbance:					

COMPLETING THE SASS SHEET

- Rate each biotope (Score between 1 & 5)
 - 1 = very poor
 - 5 = highly suitable
 - 0 or – when not sampled (not present)

Biotores Sampled	Rating (1 - 5)	Time (min)
Stones In Current (SIC)		
Stones Out Of Current (SOOC)		
Bedrock		
Aquatic Veg		
MargVeg In Current		
MargVeg Out Of Current		
Gravel		
Sand		
Mud		
Hand picking/Visual observation		

THE RIVER HEALTH PROGRAMME
 DEPT. OF WATER AFFAIRS & FORESTRY
 WATER RESEARCH COMMISSION
 DEPT. OF ENVIRONMENTAL AFFAIRS & TOURISM

ANALYSIS

Taxon	QV	S	Veg	GSM	TOT
DIPTERA (Flies)					
Athericidae	10				
Blepharoceridae (Mountain midges)	15				
Ceratopogonidae (Biting midges)	5	1			1
Chironomidae (Midges)	2			A	A
Culicidae* (Mosquitoes)	1				
Dixidae* (Dixid midge)	10				
Empididae (Dance flies)	6				
Ephydriidae (Shore flies)	3				
Muscidae (House flies, Stable flies)	1				
Psychodidae (Moth flies)	1				
Simuliidae (Blackflies)	5	1			1
Syrphidae* (Rat tailed maggots)	1				
Tabanidae (Horse flies)	5	A			A
Tipulidae (Crane flies)	5	A		1	A
GASTROPODA (Snails)					
Ancylidae (Limpets)	6	A	A		B
Bulininae*	3				
Hydrobiidae*	3				
Lymnaeidae* (Pond snails)	3				
Physidae* (Pouch snails)	3				
Planorbinae* (Orb snails)	3	A	A	1	A
Thiaridae* (=Melanidae)	3				
Viviparidae* ST	5				
PELECYPODA (Bivalvles)					
Corbiculidae	5			A	A
Sphaeriidae (Pills clams)	3				
Unionidae (Perly mussels)	6				
SASS Score					231
No. of Taxa					36
ASPT					6.4

- Total column
- SASS Score
- No. of Taxa
- Average score per taxon (ASPT)
- Note:
 - Baetidae & Hydropsychidae

INTERPRETATION

- Important to interpret data in relation to the habitat quality, availability and diversity
- In relation to ecoregion and season
- Ancillary data (Temp, pH, conductivity, etc)

Note:

SASS Score more variable

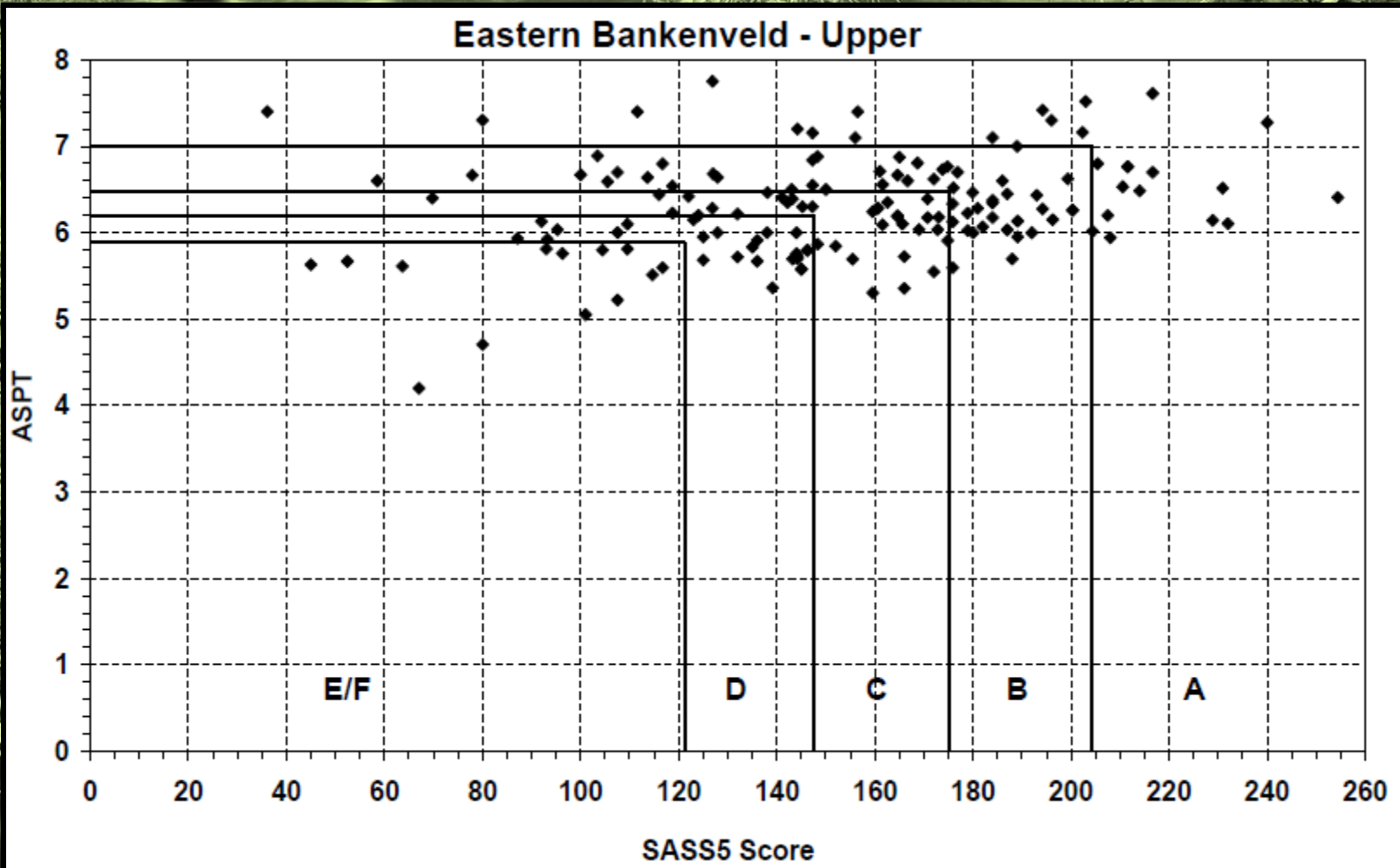
Average Score per Taxon more reliable

ECOLOGICAL CATEGORIES FOR THE INTERPRETATION OF SASS DATA

Table 2.1 Ecological Categories for interpreting SASS data

Ecological Category	Ecological Category Name	Description	Colour
A	Natural	Unmodified natural	Blue
B	Good	Largely natural with few modifications	Green
C	Fair	Moderately modified	Yellow
D	Poor	Largely modified	Red
E	Seriously modified	Seriously modified	Purple
F	Critically modified	Critically or extremely modified	Black

ECOLOGICAL CATEGORIES



A scenic view of a river flowing through a lush forest. The water is dark and turbulent, cascading over several large, mossy rocks. The surrounding vegetation is dense and green, with tall grasses and ferns growing along the banks. The overall atmosphere is serene and natural.

PRESERVATION

TYPES OF PRESERVATION

- Cold preservation
- Chemical preservation (Not SASS sample)
- May preserve specific organisms if unable to identify
 - Preserve in 70% ethanol
 - Note on SASS sheet
 - Label vial: Date, Time, Collection site, Biotope, River name, Collector name, and any other helpful information

A scenic view of a river flowing through a lush forest. The water is dark and turbulent, cascading over several large, mossy rocks. The surrounding vegetation is dense and green, with tall grasses and ferns growing along the banks. The overall atmosphere is serene and natural.

SASS ACCREDITATION

SASS ACCREDITATION

- Need to be accredited to do SASS in South Africa
 - This will ensure the credibility of the data
- During accreditation you are tested:
 - Sampling techniques
 - Theory
 - Identification of the insects
 - Completing the SASS Sheet