

Supplementary Material

Document 1

Questionnaire directed to volunteer group leaders/co-ordinators. The final questionnaire was piloted prior to the actual survey. The questionnaires were circulated by intermittent posting from August 2019 to May 2020 via e-mails where users could access a link to the survey and complete it voluntarily.

Questionnaire for volunteer group leaders/co-ordinators to understand the group and what they do

1. In your volunteer group, do you control invasive alien species?

[yes] [no]

If yes, give name of the group, _____

and continue.

If no answer Q2 and skip the rest.

2. Does the group only control invasive species?

[yes] [no]

Or does it also contract other social or environmental activities? If it conducts other activities what are these?

3. How much of your time (as a group) do you spend on invasive species control?

[>25%] [25-50%] [50-75%] [75-100%] [100%]

4. When was the volunteer group formed?

6. Who/which organisations helped to form the group?

7. Which areas does the group work on and how do they prioritise these areas?

8. Which invasive species does the group target and how do they prioritise the species?

9. Is there a particular growth form that you target?

10. How many people are in the group?

11. How often does the group go out to remove invasive species?

[once a week] [twice a week] [three times a week] [more than three times a week]

12. Which season does the group most go out to control invasive species?

[summer] [winter] [spring] [autumn]

13. For how long does the group go out?

[<3 hours] [five hours] [more than five hours]

14. How does the group control (what methods) identified invasive species?

[mechanical] [chemical control]

15. Please rate the effectiveness of your control methods on a scale of 1 to 5 (1 not effective and 5 highly effective).

[1] [2] [3] [4] [5]

16. How does the group measure success (do they collect data)?

17. Does the group have a budget?

[yes] [no]

If yes, how much per year?

18. Who is funding the group?

19. What is the budget for?

20. Does the group own any assets i.e. chainsaw, GPS's etc.?

21. What are the primary expenses for the group?

[transport] [tools] [herbicides] [protective clothing]

If other, specify:

22. Are these expenses covered by funding or do people cover their own expenses e.g. petrol?

23. Do you use herbicide in your group?

[yes] [no]

If yes, is there someone sponsoring the group with herbicides and how much?

If no, how much do you spend on herbicides?

24. Is the group/at least one member of the group trained and have PCO licences for herbicide applications?

[yes] [no]

25. Does the group require support from other conservation sectors such as DEA, SANBI, SANParks and CoCT etc.?

[yes] [no]

If yes, what?

26. How does the group recruit and advertise for new participants? What are the criteria for being a member of a hack group?

27. What are the group's main challenges?

28. Does the group detect and report new invasive species?

[yes] [no]

If yes, where do they report these species?

29. Would the group be willing to monitor and collect data on emerging invasive species?

[yes] [no]

30. Do you know of any other volunteer groups involved in invasive species management in Western Cape?

[yes] [no]

If yes, give the group name and contact details for the group:

31. Would the group be willing to monitor their control efforts and provide me with data for six months to a year?

[yes] [no]

Document 2

Questionnaire directed at individual members of the groups including group leaders/co-ordinators. The final questionnaire was piloted prior to the actual survey. The questionnaires were circulated by intermittent posting from August 2019 to May 2020 via emails where users could access a link to the survey and complete it voluntarily.

Questionnaire with volunteers working in each group controlling invasive species

1. Which hack group are you involved in?

2. How did you hear about this hack group?

[social media] [by a friend or colleague] [newspaper] [a poster/flyer] [from another volunteer group]

If other, specify:

3. How long have you been involved with this group?

4. What were your reasons for initial engagement in volunteering?

5. What are the current motivations to volunteer and control invasive species?

6. What are the primary positive experiences or benefits you get from volunteering?

7. How often do you volunteer to control invasive species?

[once a week] [twice a week] [>three times a week]

8. Is this the maximum time you are willing to put in for volunteering or would you do more if there were more opportunities?

9. When do you find time to volunteer?

[on weekends] [mid-week] [take annual leave for it] [whenever you are available to do it]

10. Does volunteering cost you anything financially? E.g. membership fees, transport?

11. Do you have to drive to sites personally?

[yes] [no]

If yes, how far?

12. Do you detect and report invasive species?

[yes] [no]

If yes, where do you report these species?

13. What are your personal barriers to volunteering and negative experiences?

14. Suggestions of changes to improve the group or your personal experience

15. Do you know of any other volunteer groups involved in invasive species management in Western Cape?

[yes] [no]

If yes, give the group name and contact details for the group:

Demographic

1. Name:

2. Age:

3. Location:

4. Residency time in this location:

[Born here] [>20 yeas] [10–20 years] [5–10 years] [1–5 years] [<1 year]

5. Education level:

6. Current or previous field of work:

7. Contact details:

Document 3

Categories for motivations and challenges for groups and for individual members/volunteers of the groups.

Categorising motivations		Categorising challenges faced	
Motivation categories for groups	Motivation categories for volunteers	Categories for challenges faced by the groups	Categories for challenges faced by volunteers
To stop the expansion of invasive species	To stop the expansion of invasive species	Attracting additional members	None
Preserve nature/biodiversity	Preserve nature/biodiversity	To extirpate IAPS	Time constraints
To preserve ecosystem services	To preserve ecosystem services	Old volunteers	Lack of support from government entities and landowners
To protect cultural and biodiversity sites	Enjoyment and socialising	Difficult terrain	Difficult to extirpate/contain the spread of IAPS
Moral obligation	Exercise	Sustainability for long term funding	Lack of funding
Aesthetics	Aesthetics	Previous bad clearing	Shortage of volunteers and equipment
	Education and awareness	Lack of support from Government	Other
	Moral obligation	Fluctuating volunteer support	
	Other	Other	

Document 4

Identified volunteer groups in Western Cape. Groups were identified by doing an online search on Google using the following terms in English, isiXhosa and in Afrikaans (hack groups, volunteer groups, invasive alien species control, and friends' groups) in April 2019. Snowball sampling was also used in search of volunteer groups. Groups that participated in the survey are indicated by the date of their establishment, group size or both.

	Hack group name	Location	Established	Group size (individual members per group)
1.	Friends of Helderberg Nature Reserve	Somerset West	Before 2006	20
2.	Friends of Stellenbosch Mountains	Stellenbosch		
3.	Friends of Blaauberg Conservation Area	Blaauberg	2014	5
4.	Friends of Rondebosch Common	Rondebosch		9
5.	Friends of Bot River estuary	Kleinmond		5
6.	Friends of Kenilworth Conservation Area	Kenilworth		
7.	Friends of the Liesbeek River	Mowbray	1994	8
8.	Friends of the Prince Alfred's Pass	De Vlucht	2014	4
9.	Friends of Tokai Park (light hack group)	Tokai		5
10.	Friends of Tokai Park (chainsaw gang)	Tokai		10
11.	Friends of Tokai Park (arboretum clearing)	Tokai	2015	5
12.	Friends of Tygerberg	Tygerberg		
13.	Friends of Bracken Nature Reserve	Brackenfell		
14.	Friends of Pledge Nature Reserve in Knysna (Weeding Wednesday)	Knysna	2017	10
15.	Friends of Lions Head & Signal Hill	Table Mountain National Park	23 years ago (1996)	5
16.	Friends of & Signal Hill (FLASH)	Table Mountain National Park	2019	5
17.	Friends of Zeekoevlei and Rondevlei	Grassy Park Retreat and Muizenburg		
18.	Mountain club of South Africa	Cape Peninsula		
19.	Scouts SA	Wellington		
20.	Greyton Conservation Society	Greyton	1980	8
21.	Nirvana Fynbos Reserve	West Coast		
22.	Pringle Bay Hack Group	Pringle Bay		
23.	Betty's Bay Hack Group	Betty's Bay		
24.	Hermanus hack group	Hermanus	2008	20
25.	Friends of Silvermine	Silvermine Reserve		8
26.	Riverine Rovers	Fish Hoek		
27.	Noordhoek Wetlands	Noordhoek		
28.	Fish Hoek and Glencairn group alien invasive eradication group	Fish Hoek and Glencairn	1980	8

	Hack group name	Location	Established	Group size (individual members per group)
29.	Great Braak River Conservancy	Great Braak	1997	20
30.	Napier Hack Group (Klippedrift Alien Clearing	Napier	2018	9
31.	SANParks Honorary Rangers	Table Mountain Natioanl Park		5
32.	Vineyard Hotel group	Silvermine Reserve	2006	25
33.	The Botanical Society, Kirstenbosch Branch	Kirstenbosch		
34.	Southern Overberg Botsoc	Overberg Region		
35.	Zandvlei Estuary Nature Reserve	Zandvlei		
36.	Cape West Coast Biosphere	West Coast		
37.	Wolfkloof Boerdery	Swellendam		
38.	Sonderend Alien Clearing	Garden route area		
39.	Precious tree project	Knysna/George area		
40.	Plet Botanical group	Plettenberg Bay		
41.	The Crags	Kurland		
42.	Bain's kloof and Hex River Mountains	Wellington		
43.	Green prop			
44.	Friends of Vlakenberg	Observatory		
45.	Kommetjie Residents' and Ratepayers' Association	Kommetjie	1990	50
46.	Lourens River Conservation Society	Somerset West		
47.	Montagu	Montagu		
48.	Elsies Peak	Elsies Peak Nature Reserve	Early 1980's	4
49.	Botfriends	Fisherhaven	About 12 years ago	6
50.	Klippedrift Alien Clearing	Riebeeck Wes	2018	9
51.	Knysna Alien Busters	Knysna	2018	10
52.	Ladismith Hackers	Ladismith	2018	3

Document 5

List of species that are being controlled by volunteer groups who participated in the survey in Western Cape, South Africa.

No.	Species name	Common name	NEM:BA Category
1.	<i>Acacia cyclops</i>	red eye, rooikrans	1b
2.	<i>Acacia longifolia</i>	golden wattle	1b
3.	<i>Acacia mearnsii</i>	black wattle	2 Exempted for an existing plantation.
4.	<i>Acacia melanoxylon</i>	Australian blackwood	2 Exempted for an existing plantation.
5.	<i>Acacia saligna</i>	Port Jackson	1b
6.	<i>Ageratina adenophora</i>	crofton weed	1b
7.	<i>Anredera cordifolia</i>	Madeira vine	1b
8.	<i>Canna indica</i>	Indian shot	1b Sterile cultivars or hybrids are not listed.
9.	<i>Casuarina cunninghamiana</i>	beefwood	2 1b within 100 metres of riparian areas or untransformed land
10.	<i>Casuarina equisetifolia</i>	horsetail tree	2
11.	<i>Cortaderia selloana</i>	pampas grass	1b Sterile cultivars or hybrids are not listed.
12.	<i>Echium plantagineum</i>	Patterson's curse	1b
13.	<i>Eucalyptus globulus</i>	blue gum	Not listed on NEM:BA
14.	<i>Greviella striata</i>	beef wood	3
15.	<i>Hakea gibbosa</i>	rock hakea	1b
16.	<i>Hakea sericea</i>	silky hakea	1b
17.	<i>Hedera helix</i>	English ivy	3 Sterile cultivars or hybrids are not listed.
18.	<i>Hedychium coronarium</i>	white ginger lily	1b
19.	<i>Lantana camara</i>	lantana	1b
20.	<i>Leptospermum laevigatum</i>	Australian myrtle	1b
21.	<i>Lythrum salicaria</i>	purple loosestrife	1a
22.	<i>Melaleuca spp</i>	bottlebrushes	Various
23.	<i>Myriophyllum aquaticum</i>	parrot's feather	1b
24.	<i>Opuntia spp.</i>	prickly pears	Various
25.	<i>Paraserianthes lophantha</i>	stink bean	1b
26.	<i>Pennisetum clandestinum</i>	kikuyu grass	1b in Protected Areas and wetlands in which it does not already occur. b. Not listed elsewhere
27.	<i>Phytolacca americana</i>	American pokeweed	1b
28.	<i>Phytolacca octandra</i>	forest inkberry	1b

No.	Species name	Common name	NEM:BA Category
30.	<i>Pinus pinaster</i>	cluster pine	2 for plantations and wind-rows. 1b elsewhere.
31.	<i>Pittosporum undulatum</i>	Australian cheesewood, sweet pittosporum	1b
32.	<i>Robinia pseudoacacia</i>	black locust	1b
33	<i>Schinus terebinthifolius</i>	Brazilian pepper tree	1b in Eastern Cape, KwaZulu-Natal, Limpopo and Mpumalanga. 3 in Free State, Gauteng, North-West, Northern Cape and Western Cape.
34.	<i>Sesbania punicea</i>	red sesbania	1b
35.	<i>Solanum pseudocapsicum</i>	Jerusalem cherrie	1b
36.	<i>Solanum mauritianum</i>	bugweed	1b
37.	<i>Spartina alterniflora</i>	smooth cordgrass	1a
38.	<i>Spartium junceum</i>	Spanish broom	1b in Eastern Cape and Western Cape. 3 in Free State, Gauteng, KwaZulu-Natal, Limpopo, Mpumalanga. North-West and Northern Cape.
39.	<i>Tradescantia fluminensis</i>	wandering Jew	1b
40.	<i>Vichia benghalensis</i>	purple vetch	Not listed on NEM:BA