

# Bale Eco-Region Sustainable Management Programme (BERSMP) of FARM-Africa, SOS Sahel Ethiopia and Oromia State Forest Enterprises Supervising Agency



The Bale Eco-Region Sustainable Management Programme (BERSMP) has been operating in the Bale Massif since the end of 2006 and aims to bring local communities into a central role in sustainable natural resources management supported by government services, across the whole Bale Massif.

The programme is supported by the Irish, Netherlands and Norwegian embassies.

**Potential for sustainable trophy sport hunting on  
Mountain Nyala  
(*Tragelaphus buxtoni*) in the Bale Mountains of  
Ethiopia**

**Field research progress report submitted to BERSMP**

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## **Introduction**

### **1.1 Back ground**

The charismatic mountain nyala (*Tragelaphus buxtoni*) is an endemic flagship species for the Ethiopian highlands that is now limited in its distribution to the Bale and Aarsi massif. As a result of its restricted population and steady decline in numbers, it is listed as Endangered by the IUCN Red List. Since its discovery in 1908, mountain nyala have declined substantially in numbers and distribution. The population of mountain nyala was estimated to be 7000 to 8000 in the 1960's while around 2000 individuals remain today. A number of factors have contributed to the mountain nyala's population decline, including habitat loss and habitat fragmentation as a result of the occupation of suitable areas by humans and livestock, direct disturbance by humans and livestock in areas where they overlap with mountain nyala, and illegal hunting for bush meat. It is estimated that the Bale Mountains harbour 74% of the remaining mountain nyala population.

### **1.2 Community-based conservation and trophy hunting**

Wildlife conservation in developing countries with high number of people living in poverty is a challenging task and increasingly necessitates community involvement and economic benefits from conservation activities. Community-based approaches that allow communities to derive economic benefits from their wildlife resources in the management of wildlife are increasingly being implemented in many African countries. Community-based conservation, which attempts to devolve responsibility for the sustainable use of wildlife resources to the local level, can include consumptive activities, such as trophy hunting, as well as non consumptive activities, such as tourism. Trophy sport hunting can be a successful conservation tool as it has the potential to generate substantial amounts of money that can be directed to the local community and further

conservation efforts. Since its discovery in 1908, the mountain nyala has become an important trophy species for sport hunting in Ethiopia. When sustainably implemented, mountain nyala trophy hunting has the potential to provide economic incentives for conservation, including economic benefits to local communities for community-based conservation.

## **2. Objective and phases of the study**

The General objective of the research is to provide a scientific back ground for sustainable practice of trophy sport hunting on mountain nyala in such a way that, both the local people and Mountain Nyala conservation practices are benefited. The Research will be carried out in two phases.

### **2.1 Phase one**

- 2.1.1 Mountain nyala general habitat mapping and producing transects and other important inputs needed in the field work in four localities in the Bale Mountains
- 2.1.2 Mountain nyala population estimate in the four study areas
- 2.1.3 Mountain nyala habitat vegetation composition studies in the four study areas

### **2.2 Phase two**

- 2.2.1 Identify all localities where mountain nyala still exist and estimate their population
- 2.2.2 Identify all potential suitable area for mountain nyala

### **3. Methods**

Intensive field work is undergoing since June, 2007 in four study areas. GPS locations were taken following boundaries of the hunting concessions with little modification based on the human settlement in developing the general map of these study areas and other methods used in the study are based on this map. Currently the population estimate and vegetation studies are being carried on quadrats which are developed based on the GIS map prepared during the first phase of the research. If need be, details of the methodology section is found with the main proposal submitted to farm Africa.

### **2. Objective**

As back ground of the main study which is indicated in the proposal, this phase of the research was primarily focused in mapping the locations of mountain nyala trophy hunting concessions in the Bale ecoregions. From these results, transects used in estimating population size and appropriate random locations to study the details of the vegetation composition were developed and incorporated to this report.

## 5. Results

### 5.1 Hunting concessions

A total of 3354 GPS locations (812 in Odoobullu, 1384 in Abasheba-Demero, 499 in Hanto and 659 in Horra) were taken around the boundaries of each hunting concessions. The GPS locations were then entered to Excel and the Map was prepared by using GIS Arc Map (Fig 1).

Odobullu and Abasheba-Demero are well protected against any human interference with 32 km<sup>2</sup> and 34 km<sup>2</sup> area respectively. However, because the forest is extended to huge distance, the core areas of the mountain nyala probably may be larger than this area. Further studies will clarify this uncertainty. The northern hunting concession is threatened by human settlement, deforestation and agriculture. The mountain nyala are existing in two fragmented patches Hanto and Hora areas with a total areas of 23 km<sup>2</sup> and 21 km<sup>2</sup> respectively.

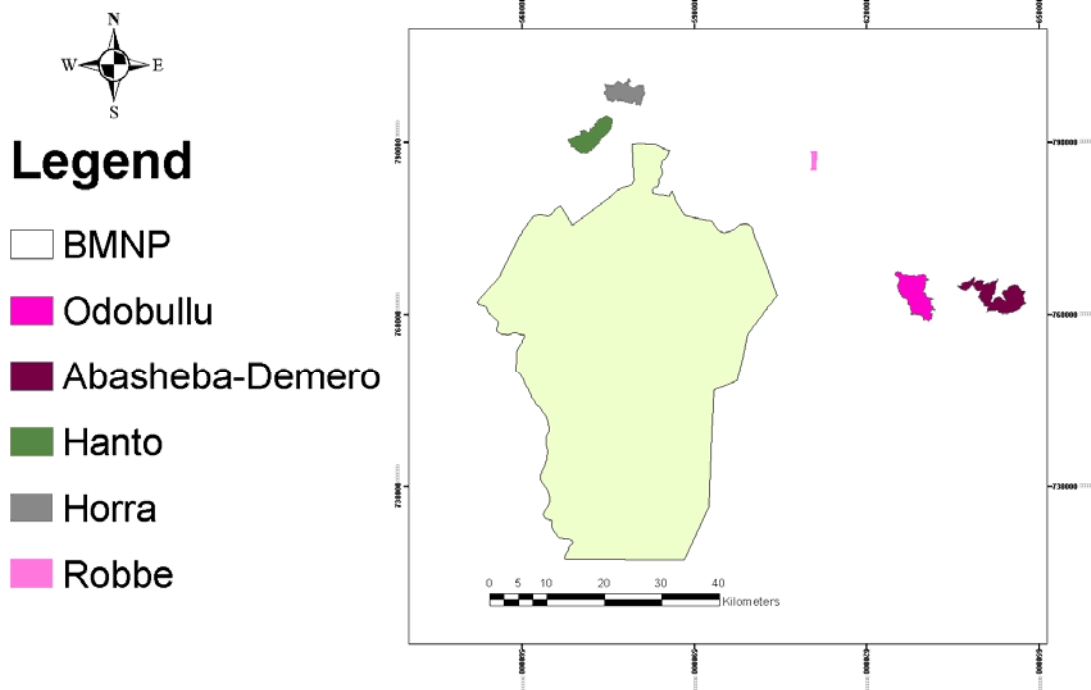


Fig 1. Hunting concessions in the Bale Ecoregions.

## 5.2 Mountain nyala population distribution

The major nyala populations in the Bale Mountains are existing in five fragmented populations in Gasaya, Odobullu, Abasheba-Demero, Hanto and Horra (Fig. 2). The population dynamics and the fragmentation effects will be studied in the next phase of the study.

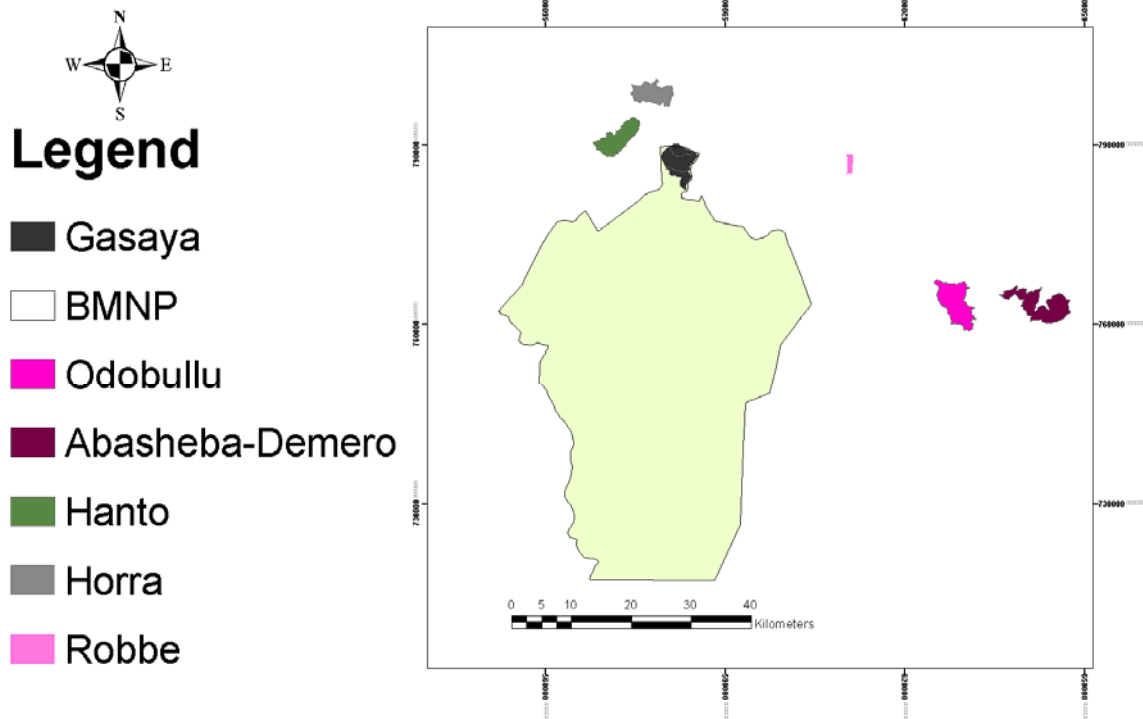


Fig 2. Major Nyala Habitats across the Bale eco-regions (four out side the BMNP and one in the BMNP).

## 5.3 Transects and random locations

For the second phase of the study that will focus on population nyala estimate and examining vegetation composition, in each study area an average of 30 transects each with 20 random locations that sum up 3260 GPS locations in total are prepared by Arc GIS and Excel programs.

### 5.3.1 Odobullu

In odobullu, 36 transects with 250 meter difference are prepared (Fig 3).

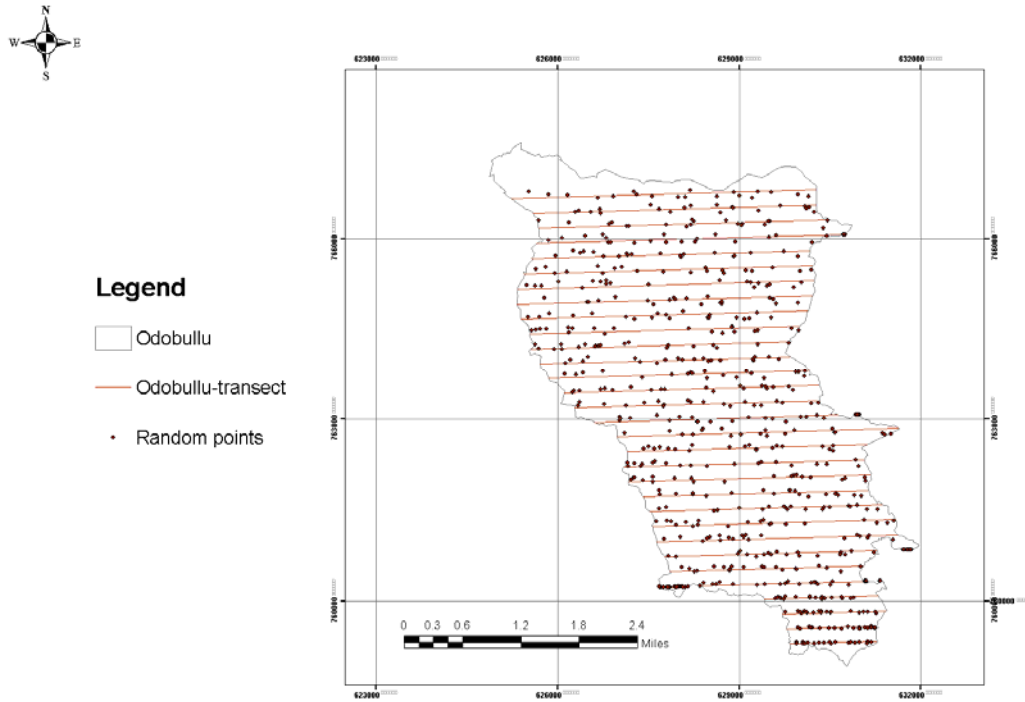


Fig.3 Transects and random points in Odobullu area.

Starting and end points of each transect are given in table 1. Each transect have 20 random locations that sum up 760 locations in odobullu area (Table 8).

Table 1. Transect ID with starting and end locations for Odobullu.

Id	Starting locations		End locations	
	Loc X	Loc y	Loc X	Loc y
1	625229	766660	630274	766807
2	625590	766420	630281	766557
3	625686	766173	630501	766314
4	630718	766070	630755	766071
5	625656	765922	630702	766069
6	625577	765670	630177	765804
7	625448	765416	630224	765555
8	625338	765163	630241	765306
9	625333	764912	630223	765055
10	625403	764664	630136	764802
11	625543	764418	629998	764548
12	625558	764169	629848	764294
13	625713	763923	629852	764044
14	625855	763677	630158	763803
15	626105	763434	630331	763558
16	626283	763189	630335	763308
17	630931	763075	630990	763077
18	626614	762949	630647	763067
19	626985	762710	631638	762845
20	627153	762464	631126	762580
21	627100	762213	631077	762329
22	627175	761965	631181	762082
23	627408	761722	631139	761830
24	627528	761475	631378	761587
25	627576	761226	631598	761344
26	627637	760978	631628	761094
27	631771	760848	631854	760851
28	631714	760847	631735	760847
29	627774	760732	631283	760834
30	627854	760484	631062	760578
31	631332	760335	631336	760336
32	631080	760328	631111	760329
33	628317	760247	631079	760328
34	627679	760229	628165	760243
35	629419	760029	631305	760085
36	629717	759788	631429	759838
37	629789	759540	631271	759583
38	629848	759292	631279	759333

### 5.3.2. Abasheba-Demmero

In Abasheba-Demmero, 27 transects with 250 meter difference are prepared from north to south direction (Fig 4).

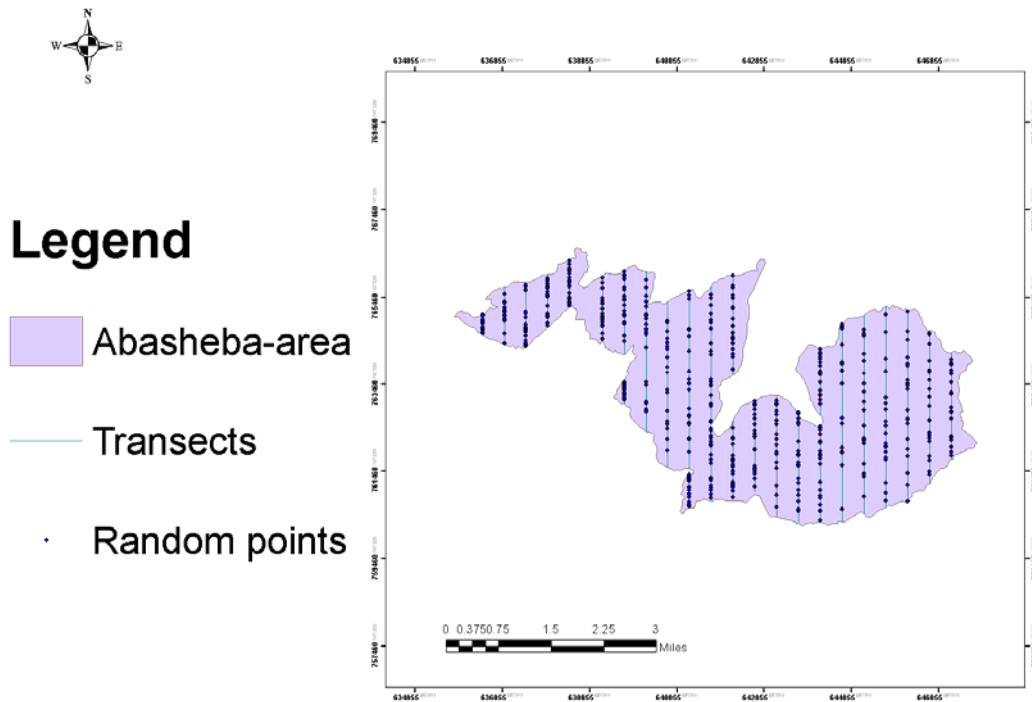


Fig. 4 Transects and random points in Abasheba-Demmero area.

Starting and end points of each transect are given in table 2. Each transect have 20 random locations that sum up 540 locations in Abasheba-Demmero area (Table 7).

Table 2. Transect ID with starting and end locations for Abasheba-Demmero.

ID	Starting loc			End location	
	POINT_X	POINT_Y		POINT_X	POINT_Y
1	647145	764196		647145	761731
2	646645	764697		646645	761165
3	646145	765177		646145	760739
4	645645	765257		645645	760631
5	645145	765045		645145	760471
6	644645	764853		644645	760307
7	644145	764293		644145	762743
8	644145	762498		644145	760287
9	643145	763193		643145	760408
10	642145	765964		642145	763666
11	642145	762644		642145	760785
12	641645	765724		641645	762561
13	641645	762433		641645	760771
14	641145	765626		641145	761513
15	641145	761382		641145	760629
16	640645	765366		640645	761547
17	640145	766052		640145	762368
18	639645	766072		639645	764159
19	639645	763551		639645	763021
20	639145	765961		639145	764434
21	638395	766323		638395	765252
22	637895	765991		637895	764777
23	637395	765805		637395	764335
24	636895	765705		636895	764396
25	636395	765073		636395	764615
26	642645	760997		642645	763102
27	643645	760304		643645	762843

### 5.3.3. Horra

In Horra, 28 transects with 250 meter difference are prepared from north to south direction (Fig 5).

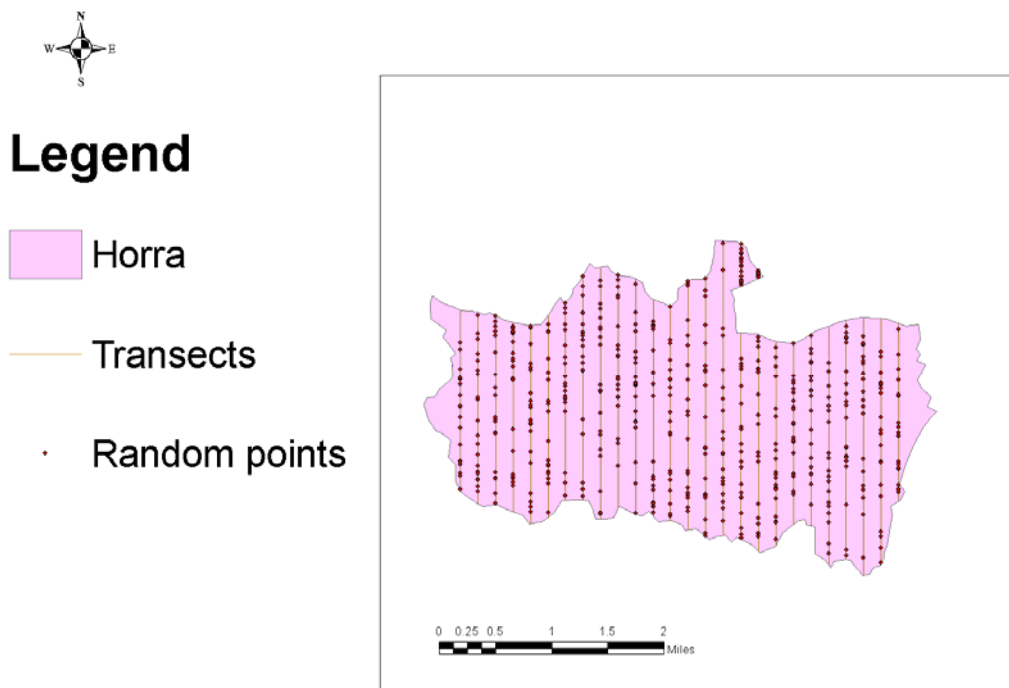


Fig.5 Transects and random points in Horra area.

Starting and end points of each transect are given in table 2. Each transect have 20 random locations that sum up 560 locations in Horra area (Table 9).

Table 3. Transect ID with starting and end locations for Horra.

	Starting locations		End locations	
	Loc_X	Loc_Y	Loc_X	Loc_Y
1	574700	797504	574700	800104
2	574950	797334	574950	800082
3	575200	797319	575200	800038
4	575450	797218	575450	799933
5	575700	797052	575700	799902
6	575950	797138	575950	800042
7	576200	797380	576200	800232
8	576450	797382	576450	800607
9	576700	797119	576700	800726
10	576950	797271	576950	800611
11	577200	797189	577200	800559
12	577450	797155	577450	800267
13	577700	797098	577700	800166
14	577950	796964	577950	800530
15	578200	796869	578200	800566
16	578450	796882	578450	801102
17	578708	800458	578708	801055
18	578708	796825	578708	799783
19	578958	800567	578958	800675
20	578958	796651	578958	799769
21	579208	796750	579208	799662
22	579458	797046	579458	799638
23	579708	797024	579708	799776
24	579958	796463	579958	799878
25	580208	796542	580208	799972
26	580458	796315	580458	800005
27	580708	796477	580708	799995
28	580958	797376	580958	799928

### 5.3.4. Hanto

In Hanto area, 31 transects with 250 meter difference are prepared from north to south direction (Fig 6).

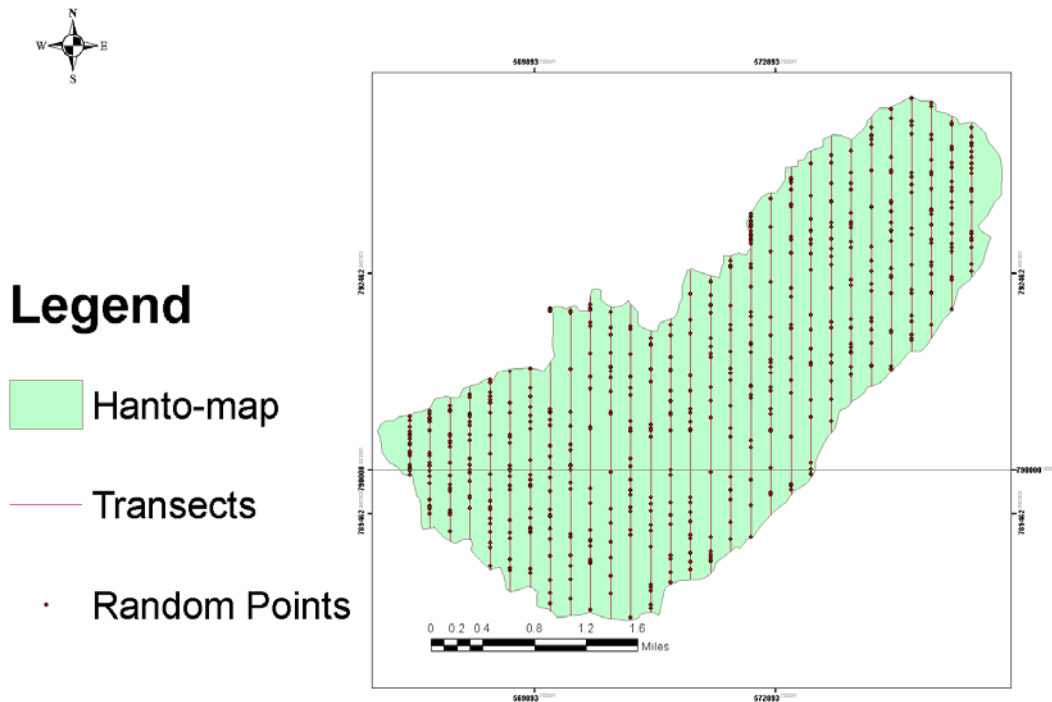


Fig.6 Transects and random points in Hanto area.

Starting and end points of each transect are given in table 2. Each transect have 20 random locations that sum up 620 locations in Horra area Hanto (Table 12).

Table 4. Transect ID with starting and end locations for Hanto.

	Starting locations		End location	
	Loc x	Loc y	Loc x	Loc y
1	568340	789938	568340	790674
2	568590	789278	568590	790776
3	568840	789118	568840	790907
4	569090	789139	569090	791045
5	569340	788761	569340	791141
6	569590	788493	569590	791263
7	569840	788546	569840	791279
8	570090	791983	570090	792020
9	570090	788256	570090	791356
10	570340	788191	570340	792043
11	570590	788232	570590	792182
12	570840	788158	570840	792049
13	571090	788137	571090	792079
14	571340	788232	571340	791745
15	571590	788583	571590	791894
16	571840	788635	571840	792515
17	572090	788722	572090	792438
18	572340	788994	572340	792687
19	572590	792818	572590	793207
20	572590	789161	572590	792785
21	572840	789450	572840	793466
22	573090	789694	573090	793790
23	573340	789907	573340	793991
24	573590	790469	573590	794184
25	573840	790839	573840	794130
26	574090	791045	574090	794419
27	574340	791230	574340	794539
28	574590	791489	574590	794664
29	574840	791655	574840	794612
30	575090	792009	575090	794422
31	575340	792414	575340	794346

### 5.3.5. The head quarter

In the head quarter area, 13 transects with 250 meter difference are prepared from east to west direction (Fig 7).

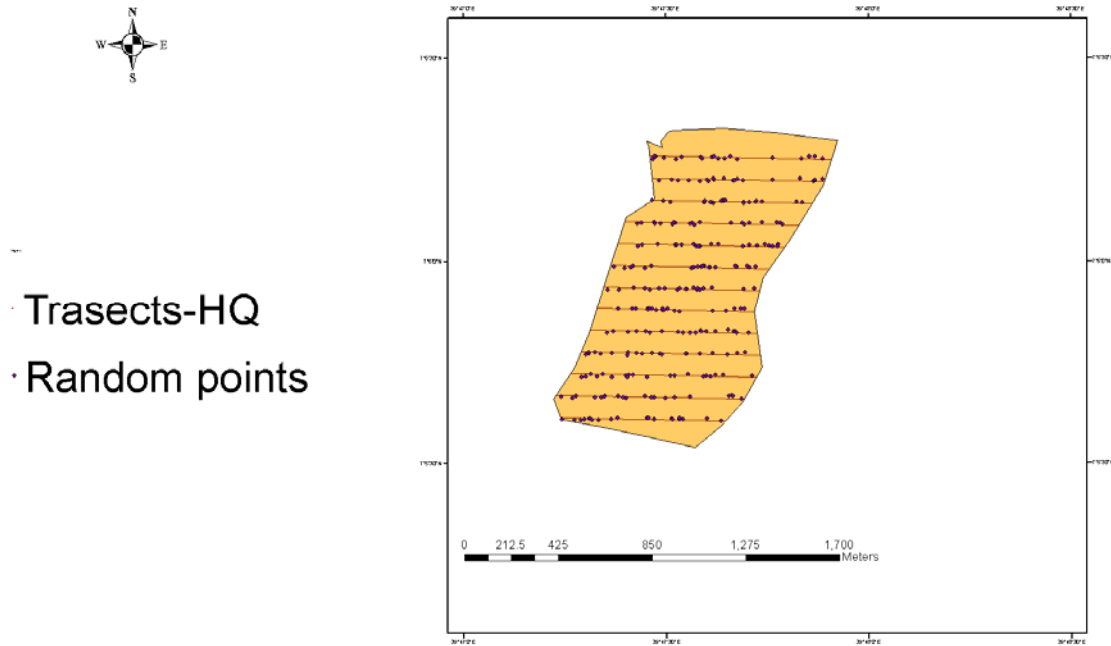


Fig. 7 Transects and random points in the head quarter area.

Starting and end points of each transect are given in table 2. Each transect have 20 random locations that sum up 260 locations in the head quarter (Table 10).

Table 5. Transect ID with starting and end locations for Head Quarter.

Transects in the Head Quarter of the bale mountains national parl					
ID	Starting points		End points		
	POINT_X	POINT_Y	POINT_X	POINT_Y	
1	587350	785356	588176	785341	
2	587360	785256	588145	785241	
3	587361	785156	588088	785142	
4	587238	785058	588027	785043	
5	587205	784958	587963	784944	
6	587172	784859	587895	784846	
7	587139	784760	587851	784746	
8	587108	784660	587825	784647	
9	587077	784561	587840	784547	
10	587038	784461	587854	784446	
11	586991	784362	587836	784347	
12	586925	784264	587781	784248	
13	586945	784163	587697	784149	

### 5.3.6. Gasaya

In Gasaya area, 13 transects with 250 meter difference are prepared from east to west direction (Fig 7).

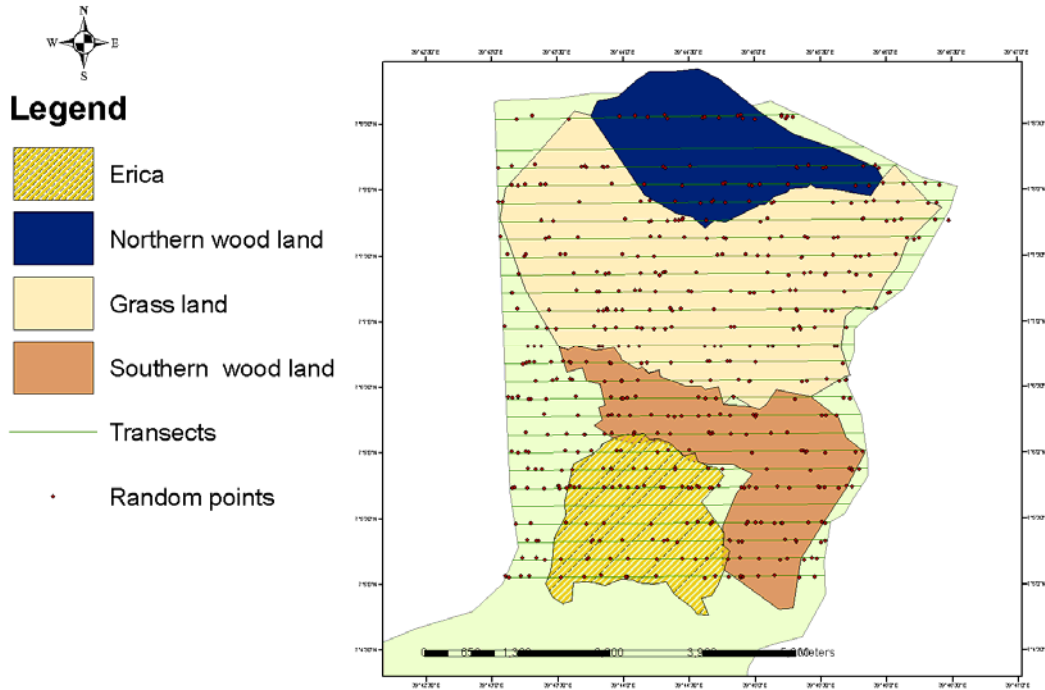


Fig. 8 Transects and random points in Gasaya area.

Starting and end points of each transect are given in table 2. Each transect have 20 random locations that sum up 520 locations in the head quarter (Table 11).

Table 6. Transect ID with starting and end locations for Gasaya.

ID	Loc x	Loc y		Loc x	Loc y
1	579197	789108		584358	789151
2	579207	788858		584832	788905
3	579217	788608		585456	788660
4	579227	788359		585594	788411
5	579237	788109		585479	788160
6	579247	787859		585330	787909
7	579257	787609		585190	787658
8	579267	787359		585045	787407
9	579277	787109		584882	787155
10	579288	786859		584550	786903
11	579298	786609		584264	786650
12	579308	786359		584217	786359
13	579318	786109		584168	786149
14	579179	789537		583444	789607
15	579328	785859		584122	785899
16	579338	785609		584197	785650
17	579348	785359		584308	785400
18	579358	785110		584344	785151
19	579368	784860		584384	784901
20	579379	784610		584407	784651
21	579389	784360		584315	784400
22	579423	784110		584155	784149
23	579461	783860		583886	783897
24	579500	783611		583839	783647
25	579432	783360		583797	783396
26	579321	783109		583799	783146

Table 7. Random locations in each transect in Abasheba-Demero

<b>Random locations in Abasheba-Demero</b>				
	<b>ID</b>	<b>647145</b>	<b>Loc X</b>	<b>Loc Y</b>
<b>Transect 1</b>	1	647145		762472
	2	647145		762824
	3	647145		761817
	4	647145		762011
	5	647145		763706
	6	647145		763960
	7	647145		763915
	8	647145		763229
	9	647145		762924
	10	647145		761907
	11	647145		763266
	12	647145		762669
	13	647145		763772
	14	647145		762262
	15	647145		763505
	16	647145		762229
	17	647145		762169
	18	647145		764028
	19	647145		762810
	<b>Transect 2</b>	20	647145	
1		646645		764388
2		646645		763780
3		646645		764628
4		646645		763549
5		646645		761797
6		646645		762622
7		646645		761700
8		646645		762285
9		646645		764008
10		646645		761441
11		646645		763163
12		646645		762341
13		646645		764615
14		646645		763731
15		646645		761388
16		646645		762613
17		646645		763337
18		646645		762142
19		646645		762225
<b>Transect 3</b>	20	646645		762952
	1	646145		762550
	2	646145		762185
	3	646145		761409
	4	646145		761812
	5	646145		763473

Transect 4	6	646145	762649
	7	646145	763557
	8	646145	762660
	9	646145	765137
	10	646145	764685
	11	646145	762862
	12	646145	761144
	13	646145	761970
	14	646145	763343
	15	646145	763935
	16	646145	763414
	17	646145	764089
	18	646145	763893
	19	646145	764485
	20	646145	760777
	1	645645	761721
	2	645645	764051
	3	645645	760958
	4	645645	762029
	5	645645	760781
6	645645	762493	
7	645645	764660	
8	645645	763147	
9	645645	763760	
10	645645	763015	
11	645645	762014	
12	645645	765078	
13	645645	762088	
14	645645	761774	
15	645645	762326	
16	645645	762591	
17	645645	762872	
18	645645	761902	
19	645645	760778	
20	645645	761197	
Transect 5	1	645145	762168
	2	645145	762504
	3	645145	763711
	4	645145	761331
	5	645145	764582
	6	645145	763270
	7	645145	763998
	8	645145	761624
	9	645145	763471
	10	645145	761329
	11	645145	764162
	12	645145	761406
	13	645145	760877
	14	645145	764627
	15	645145	762096

Transect 6	16	645145	762859
	17	645145	762207
	18	645145	764709
	19	645145	762153
	20	645145	763042
	1	644645	764797
	2	644645	760596
	3	644645	764801
	4	644645	764778
	5	644645	762541
	6	644645	763967
	7	644645	762683
	8	644645	764746
	9	644645	764768
	10	644645	763475
	11	644645	761993
	12	644645	761895
	13	644645	763939
	14	644645	763783
	15	644645	764376
Transect 7	16	644645	761594
	17	644645	763774
	18	644645	764844
	19	644645	764754
	20	644645	761878
	1	644145	764048
	2	644145	763673
	3	644145	764162
	4	644145	764093
	5	644145	764194
	6	644145	763764
	7	644145	764202
	8	644145	763896
	9	644145	762995
	10	644145	763727
	11	644145	763308
	12	644145	763104
	13	644145	763195
	14	644145	764275
	15	644145	763501
16	644145	763970	
Transect 8	17	644145	763203
	18	644145	763509
	19	644145	763675
	20	644145	763693
	1	644145	761817
	2	644145	762141
	3	644145	762450
	4	644145	761750
	5	644145	762298

Transect 9	6	644145	761853
	7	644145	761925
	8	644145	760905
	9	644145	762397
	10	644145	761212
	11	644145	760551
	12	644145	760336
	13	644145	761748
	14	644145	760845
	15	644145	760688
	16	644145	760566
	17	644145	762477
	18	644145	761028
	19	644145	761625
	20	644145	762113
	1	643145	761659
	2	643145	760640
	3	643145	762298
	4	643145	762833
	5	643145	761856
6	643145	762759	
7	643145	762616	
8	643145	762065	
9	643145	762627	
10	643145	760909	
11	643145	762989	
12	643145	762636	
13	643145	763084	
14	643145	761124	
15	643145	762999	
16	643145	762199	
17	643145	761901	
18	643145	761528	
19	643145	763017	
20	643145	762534	
Transect 10	1	642145	764272
	2	642145	764166
	3	642145	764975
	4	642145	764099
	5	642145	764545
	6	642145	764806
	7	642145	764800
	8	642145	765209
	9	642145	764648
	10	642145	764511
	11	642145	764515
	12	642145	765445
	13	642145	765510
	14	642145	764554
	15	642145	765964

Transect 11	16	642145	765684
	17	642145	765228
	18	642145	764408
	19	642145	765728
	20	642145	763804
	1	642145	761733
	2	642145	761563
	3	642145	761718
	4	642145	761188
	5	642145	762082
	6	642145	761207
	7	642145	761685
	8	642145	761460
	9	642145	762205
	10	642145	761019
	11	642145	762454
	12	642145	761131
	13	642145	761088
	14	642145	761466
	15	642145	761827
Transect 12	16	642145	762217
	17	642145	761153
	18	642145	761396
	19	642145	760868
	20	642145	761613
	1	641645	763436
	2	641645	763001
	3	641645	764151
	4	641645	765446
	5	641645	764894
	6	641645	764740
	7	641645	763509
	8	641645	762959
	9	641645	765086
	10	641645	764229
	11	641645	762612
	12	641645	765274
	13	641645	763574
	14	641645	765518
	15	641645	764233
Transect 13	16	641645	763196
	17	641645	764401
	18	641645	764944
	19	641645	763416
	20	641645	762586
	1	641645	761080
	2	641645	762052
	3	641645	761268
	4	641645	762080
	5	641645	761645

Transect 14	6	641645	762386
	7	641645	762150
	8	641645	762226
	9	641645	762053
	10	641645	760923
	11	641645	761119
	12	641645	761035
	13	641645	761730
	14	641645	762427
	15	641645	762087
	16	641645	761837
	17	641645	761262
	18	641645	760856
	19	641645	762273
	20	641645	761304
	1	641145	764732
	2	641145	765432
	3	641145	763573
	4	641145	762713
	5	641145	762566
6	641145	762543	
7	641145	762194	
8	641145	764223	
9	641145	762525	
10	641145	762737	
11	641145	764575	
12	641145	761901	
13	641145	763469	
14	641145	763768	
15	641145	765609	
16	641145	762887	
17	641145	764711	
18	641145	765513	
19	641145	763319	
20	641145	762207	
Transect 15	1	641145	760661
	2	641145	761086
	3	641145	761377
	4	641145	761325
	5	641145	761355
	6	641145	760709
	7	641145	761035
	8	641145	761299
	9	641145	760760
	10	641145	760760
	11	641145	760924
	12	641145	760688
	13	641145	760872
	14	641145	761233
	15	641145	761295

Transect 16	16	641145	761278
	17	641145	760942
	18	641145	761368
	19	641145	761093
	20	641145	761349
	1	640645	764688
	2	640645	764275
	3	640645	763267
	4	640645	764345
	5	640645	764888
	6	640645	762836
	7	640645	761936
	8	640645	762838
	9	640645	763319
	10	640645	763720
	11	640645	762436
	12	640645	764927
	13	640645	762604
	14	640645	762527
	15	640645	764523
Transect 17	16	640645	762200
	17	640645	764081
	18	640645	763252
	19	640645	764425
	20	640645	763862
	1	640145	763023
	2	640145	764839
	3	640145	762875
	4	640145	764966
	5	640145	765859
	6	640145	765249
	7	640145	764618
	8	640145	765491
	9	640145	763496
	10	640145	764318
	11	640145	763438
	12	640145	765068
	13	640145	764670
	14	640145	763056
	15	640145	762818
16	640145	765364	
Transect 18	17	640145	764725
	18	640145	765046
	19	640145	765042
	20	640145	765681
	1	639645	765288
	2	639645	764856
	3	639645	765156
	4	639645	765953
	5	639645	765882

Transect 19	6	639645	765681
	7	639645	765390
	8	639645	764584
	9	639645	764858
	10	639645	765071
	11	639645	764890
	12	639645	766061
	13	639645	765640
	14	639645	765497
	15	639645	765940
	16	639645	765423
	17	639645	765981
	18	639645	765638
	19	639645	764449
	20	639645	765034
	1	639645	763314
	2	639645	763503
	3	639645	763432
	4	639645	763393
	5	639645	763327
6	639645	763397	
7	639645	763230	
8	639645	763463	
9	639645	763352	
10	639645	763124	
11	639645	763265	
12	639645	763437	
13	639645	763463	
14	639645	763501	
15	639645	763198	
16	639645	763131	
17	639645	763093	
18	639645	763144	
19	639645	763442	
20	639645	763344	
Transect 20	1	639145	764797
	2	639145	764985
	3	639145	765089
	4	639145	765318
	5	639145	764936
	6	639145	765442
	7	639145	765662
	8	639145	765336
	9	639145	764993
	10	639145	765799
	11	639145	764834
	12	639145	765016
	13	639145	764895
	14	639145	764521
	15	639145	765918

Transect 21	16	639145	764511
	17	639145	765205
	18	639145	764639
	19	639145	765036
	20	639145	765374
	1	638395	765751
	2	638395	766079
	3	638395	765361
	4	638395	765810
	5	638395	765563
	6	638395	765845
	7	638395	765265
	8	638395	766090
	9	638395	765450
	10	638395	766211
	11	638395	765906
	12	638395	765309
	13	638395	765699
	14	638395	765305
	15	638395	766292
Transect 22	16	638395	765426
	17	638395	765443
	18	638395	765342
	19	638395	766126
	20	638395	766014
	1	637895	765786
	2	637895	765762
	3	637895	765850
	4	637895	765594
	5	637895	765894
	6	637895	765091
	7	637895	765712
	8	637895	765691
	9	637895	765507
	10	637895	765893
	11	637895	765675
	12	637895	764869
	13	637895	764804
	14	637895	765518
	15	637895	765256
16	637895	765084	
Transect 23	17	637895	765468
	18	637895	765076
	19	637895	765010
	20	637895	765030
	1	637395	764673
	2	637395	765129
	3	637395	764724
	4	637395	764339
	5	637395	765753

Transect 24	6	637395	764374
	7	637395	764703
	8	637395	764395
	9	637395	764768
	10	637395	765630
	11	637395	764998
	12	637395	765127
	13	637395	765699
	14	637395	765622
	15	637395	764777
	16	637395	764590
	17	637395	765079
	18	637395	764847
	19	637395	764408
	20	637395	764470
	1	636895	765239
	2	636895	764632
	3	636895	764932
	4	636895	764963
	5	636895	764404
6	636895	765056	
7	636895	765115	
8	636895	765033	
9	636895	764967	
10	636895	764414	
11	636895	765175	
12	636895	764974	
13	636895	764957	
14	636895	765055	
15	636895	765216	
16	636895	765537	
17	636895	765229	
18	636895	765357	
19	636895	765129	
20	636895	765328	
Transect 25	1	636395	764751
	2	636395	764749
	3	636395	764960
	4	636395	764713
	5	636395	764673
	6	636395	764768
	7	636395	764761
	8	636395	764639
	9	636395	764887
	10	636395	764893
	11	636395	764933
	12	636395	764783
	13	636395	764637
	14	636395	764903
	15	636395	765066

Transect 26	16	636395	764856
	17	636395	764955
	18	636395	764667
	19	636395	764786
	20	636395	765038
	1	642645	762250
	2	642645	762527
	3	642645	761443
	4	642645	762381
	5	642645	761580
	6	642645	761404
	7	642645	762320
	8	642645	761952
	9	642645	762244
	10	642645	762867
	11	642645	762666
	12	642645	763006
	13	642645	761106
	14	642645	761963
	15	642645	761502
Transect 27	16	642645	761289
	17	642645	762753
	18	642645	761529
	19	642645	762964
	20	642645	763065
	1	643645	760776
	2	643645	760547
	3	643645	761857
	4	643645	761923
	5	643645	761663
	6	643645	761820
	7	643645	760544
	8	643645	762585
	9	643645	760593
	10	643645	760916
	11	643645	762809
	12	643645	762137
	13	643645	761034
	14	643645	762533
	15	643645	761609
16	643645	761570	
17	643645	761191	
18	643645	762776	
19	643645	762666	
20	643645	761281	

Table 8. Random locations in each transect in Odobullu

Random points in Odobullu			
		Loc x	Loc y
Transect 1	1	629687	766785
	2	628193	766796
	3	627560	766699
	4	629308	766778
	5	627304	766734
	6	627259	766780
	7	628000	766678
	8	629005	766707
	9	626161	766724
	10	626918	766694
	11	630155	766701
	12	629973	766733
	13	629215	766677
	14	628910	766760
	15	626662	766673
	16	628636	766691
	17	625855	766725
	18	629530	766766
	19	625524	766774
	20	628108	766684
Transect 2	1	627868	766440
	2	628636	766552
	3	626545	766444
	4	630089	766527
	5	627536	766557
	6	628895	766515
	7	626292	766443
	8	629318	766462
	9	628903	766504
	10	630115	766499
	11	628104	766506
	12	629682	766541
	13	627679	766485
	14	628695	766423
	15	626701	766490
	16	630159	766525
	17	630247	766434
	18	628204	766543
	19	626347	766463
	20	626709	766421
Transect 3	1	627140	766205
	2	626187	766261
	3	627174	766203
	4	628246	766292
	5	628137	766200
	6	628227	766307
	7	628200	766227

	8	629514	766288
	9	630470	766301
	10	626897	766264
	11	627801	766225
	12	626859	766238
	13	629489	766285
	14	629061	766246
	15	628786	766296
	16	629046	766220
	17	625693	766301
	18	629427	766234
	19	630391	766176
	20	628981	766237
Transect 4	1	630737	766071
	2	630737	766071
	3	630730	766070
	4	630750	766070
	5	630754	766071
	6	630724	766070
	7	630725	766070
	8	630741	766070
	9	630722	766071
	10	630747	766070
	11	630735	766071
	12	630734	766070
	13	630722	766071
	14	630728	766070
	15	630735	766070
	16	630719	766071
	17	630719	766070
	18	630740	766071
	19	630752	766071
	20	630731	766071
Transect 5	1	626845	765934
	2	626452	766040
	3	629495	766020
	4	629618	766053
	5	627763	766064
	6	625857	765976
	7	626744	766065
	8	627797	765937
	9	626071	766005
	10	628935	765949
	11	626878	765942
	12	627278	765922
	13	630452	766046
	14	628058	765950
	15	628615	766064
	16	627544	765967
	17	628271	765952
	18	628310	765997

Transect 6	19	630214	765936
	20	626807	766005
	1	629979	765708
	2	627021	765710
	3	629196	765765
	4	628047	765694
	5	626262	765803
	6	627145	765754
	7	625971	765717
	8	626764	765709
	9	629741	765788
	10	628606	765768
	11	626429	765787
	12	628093	765738
	13	627226	765735
	14	626595	765780
	15	628921	765700
	16	628924	765711
	17	627155	765727
	18	627699	765755
Transect 7	19	628026	765713
	20	626376	765760
	1	627060	765533
	2	626748	765425
	3	627747	765453
	4	625642	765493
	5	630200	765478
	6	625802	765533
	7	627322	765458
	8	629108	765475
	9	626671	765537
	10	628749	765423
	11	628468	765466
	12	628210	765441
	13	629218	765459
	14	625960	765421
	15	628449	765516
	16	628728	765476
	17	626150	765451
	18	629560	765522
19	626945	765502	
Transect 8	20	630008	765459
	1	629906	765197
	2	626416	765183
	3	626711	765289
	4	629515	765240
	5	629259	765192
	6	626009	765280
	7	629326	765263
	8	626881	765257
	9	627509	765236

	10	626580	765297
	11	630035	765271
	12	626806	765305
	13	625485	765230
	14	629134	765285
	15	629198	765270
	16	625734	765221
	17	625630	765217
	18	629458	765218
	19	626810	765248
	20	628687	765305
Transect 9	1	626497	764953
	2	629971	764941
	3	629511	765017
	4	627927	765012
	5	628130	765006
	6	628715	764927
	7	627492	764976
	8	628379	764918
	9	626511	764951
	10	628698	764939
	11	628483	765042
	12	626963	765024
	13	629614	764924
	14	628712	764960
	15	629569	765000
	16	627852	764978
	17	627946	764998
	18	625776	765020
	19	626676	764973
	20	627591	764918
Transect 10	1	628081	764793
	2	628967	764686
	3	626577	764767
	4	625519	764699
	5	627563	764690
	6	627852	764681
	7	628520	764736
	8	628482	764694
	9	626259	764723
	10	629176	764679
	11	625699	764704
	12	627132	764708
	13	629533	764691
	14	627792	764736
	15	627654	764759
	16	627272	764665
	17	629304	764775
	18	625858	764756
	19	629096	764671
	20	628507	764693

<b>Transect 11</b>	<b>1</b>	<b>629309</b>	<b>764485</b>
	<b>2</b>	<b>626181</b>	<b>764531</b>
	<b>3</b>	<b>628175</b>	<b>764517</b>
	<b>4</b>	<b>625569</b>	<b>764483</b>
	<b>5</b>	<b>626608</b>	<b>764516</b>
	<b>6</b>	<b>628730</b>	<b>764431</b>
	<b>7</b>	<b>629867</b>	<b>764522</b>
	<b>8</b>	<b>629985</b>	<b>764485</b>
	<b>9</b>	<b>626187</b>	<b>764447</b>
	<b>10</b>	<b>625642</b>	<b>764492</b>
	<b>11</b>	<b>628898</b>	<b>764543</b>
	<b>12</b>	<b>626785</b>	<b>764423</b>
	<b>13</b>	<b>628560</b>	<b>764456</b>
	<b>14</b>	<b>625711</b>	<b>764505</b>
	<b>15</b>	<b>628878</b>	<b>764537</b>
	<b>16</b>	<b>626930</b>	<b>764520</b>
	<b>17</b>	<b>626252</b>	<b>764512</b>
	<b>18</b>	<b>629266</b>	<b>764468</b>
	<b>19</b>	<b>628924</b>	<b>764456</b>
	<b>20</b>	<b>625811</b>	<b>764507</b>
<b>Transect 12</b>	<b>1</b>	<b>625688</b>	<b>764178</b>
	<b>2</b>	<b>628633</b>	<b>764196</b>
	<b>3</b>	<b>627828</b>	<b>764239</b>
	<b>4</b>	<b>626681</b>	<b>764224</b>
	<b>5</b>	<b>627177</b>	<b>764281</b>
	<b>6</b>	<b>627109</b>	<b>764266</b>
	<b>7</b>	<b>628250</b>	<b>764217</b>
	<b>8</b>	<b>626634</b>	<b>764229</b>
	<b>9</b>	<b>628583</b>	<b>764242</b>
	<b>10</b>	<b>626062</b>	<b>764244</b>
	<b>11</b>	<b>629313</b>	<b>764245</b>
	<b>12</b>	<b>626712</b>	<b>764233</b>
	<b>13</b>	<b>626071</b>	<b>764170</b>
	<b>14</b>	<b>629820</b>	<b>764269</b>
	<b>15</b>	<b>626356</b>	<b>764202</b>
	<b>16</b>	<b>626617</b>	<b>764216</b>
	<b>17</b>	<b>626460</b>	<b>764254</b>
	<b>18</b>	<b>625943</b>	<b>764173</b>
	<b>19</b>	<b>625625</b>	<b>764252</b>
	<b>20</b>	<b>627811</b>	<b>764185</b>
<b>Transect 13</b>	<b>1</b>	<b>627280</b>	<b>764015</b>
	<b>2</b>	<b>629260</b>	<b>764042</b>
	<b>3</b>	<b>626505</b>	<b>764035</b>
	<b>4</b>	<b>628269</b>	<b>764002</b>
	<b>5</b>	<b>629244</b>	<b>763976</b>
	<b>6</b>	<b>626218</b>	<b>763995</b>
	<b>7</b>	<b>628700</b>	<b>763986</b>
	<b>8</b>	<b>628413</b>	<b>764020</b>
	<b>9</b>	<b>627783</b>	<b>763992</b>
	<b>10</b>	<b>626423</b>	<b>763968</b>
	<b>11</b>	<b>627365</b>	<b>763955</b>

	12	629502	764040
	13	628071	763997
	14	627648	763931
	15	628543	763983
	16	629656	763999
	17	628492	763966
	18	629234	763999
	19	627999	764011
	20	626135	763937
Transect 14	1	628477	763683
	2	626745	763795
	3	628958	763687
	4	627400	763690
	5	628160	763748
	6	626422	763776
	7	630083	763715
	8	628744	763722
	9	626308	763736
	10	628207	763773
	11	629208	763764
	12	627885	763733
	13	628234	763759
	14	629988	763783
	15	629415	763678
	16	626121	763748
	17	630091	763791
	18	628443	763792
	19	629944	763784
	20	629123	763800
Transect 15	1	627552	763481
	2	629084	763508
	3	629828	763537
	4	628465	763517
	5	629376	763551
	6	629458	763502
	7	629894	763485
	8	626269	763472
	9	628575	763457
	10	629443	763535
	11	626366	763469
	12	627716	763490
	13	626915	763481
	14	626715	763497
	15	627769	763489
	16	626784	763500
	17	629569	763531
	18	626249	763445
	19	627219	763523
	20	629025	763554
Transect 16	1	627765	763236
	2	630312	763269

	3	628157	763305
	4	627668	763292
	5	629631	763291
	6	626341	763225
	7	627433	763275
	8	629715	763266
	9	628754	763244
	10	627130	763227
	11	629257	763224
	12	629369	763221
	13	626775	763250
	14	627751	763210
	15	628206	763286
	16	628855	763209
	17	630194	763255
	18	629101	763285
	19	626368	763276
	20	628413	763277
Transect 17	1	630946	763076
	2	630933	763076
	3	630986	763075
	4	630945	763076
	5	630966	763075
	6	630943	763075
	7	630985	763076
	8	630946	763075
	9	630940	763075
	10	630949	763076
	11	630946	763076
	12	630973	763075
	13	630974	763076
	14	630958	763076
	15	630937	763075
	16	630988	763076
	17	630985	763075
	18	630936	763076
	19	630977	763076
	20	630953	763076
Transect 18	1	629445	763017
	2	630409	763019
	3	629560	762997
	4	628536	762960
	5	627032	763040
	6	627028	762979
	7	628311	762959
	8	630294	763060
	9	627036	763018
	10	629778	762952
	11	630116	763041
	12	628891	762969
	13	630022	763033

	14	628323	762954
	15	628229	763026
	16	627201	763009
	17	629163	763026
	18	628018	763032
	19	627860	762979
	20	627651	763061
Transect 19	1	630552	762838
	2	629035	762751
	3	628867	762719
	4	627853	762800
	5	629437	762815
	6	629364	762762
	7	628068	762747
	8	630587	762786
	9	630599	762780
	10	629768	762758
	11	628407	762835
	12	628717	762841
	13	631516	762756
	14	631373	762767
	15	631407	762744
	16	629461	762721
	17	627112	762765
	18	629921	762811
	19	628237	762749
	20	628389	762812
Transect 20	1	627947	762500
	2	629098	762542
	3	630561	762482
	4	629621	762562
	5	629721	762549
	6	627501	762542
	7	629283	762505
	8	628176	762476
	9	629172	762567
	10	627687	762534
	11	630562	762563
	12	627594	762516
	13	629555	762522
	14	627420	762509
	15	630387	762548
	16	628224	762573
	17	629292	762487
	18	630506	762503
	19	628842	762535
	20	627828	762510
Transect 21	1	630290	762257
	2	627166	762226
	3	627799	762269
	4	629619	762287

	5	630979	762222
	6	627272	762270
	7	628931	762255
	8	629373	762291
	9	628201	762228
	10	627402	762254
	11	627152	762275
	12	627581	762281
	13	630933	762328
	14	627607	762308
	15	627378	762216
	16	629874	762237
	17	628028	762232
	18	629327	762271
	19	628474	762217
	20	630448	762255
Transect 22	1	630186	762034
	2	627244	762020
	3	627217	761998
	4	631092	761978
	5	627575	761969
	6	629584	762064
	7	630047	762042
	8	627571	762051
	9	628253	761970
	10	627418	761984
	11	629905	762075
	12	630756	762026
	13	628222	762023
	14	629869	762059
	15	627941	762029
	16	628762	761965
	17	630706	762005
	18	631077	762035
	19	629952	762079
	20	627270	762035
Transect 23	1	630444	761761
	2	629408	761822
	3	628236	761752
	4	630151	761724
	5	630612	761772
	6	628236	761773
	7	630593	761772
	8	630636	761743
	9	628882	761778
	10	628457	761735
	11	629995	761759
	12	627684	761825
	13	627687	761755
	14	629840	761830
	15	629581	761771

	16	631028	761736
	17	629851	761826
	18	629925	761813
	19	630907	761748
	20	627957	761771
Transect 24	1	630499	761544
	2	629007	761533
	3	627684	761528
	4	628652	761498
	5	629796	761507
	6	630951	761584
	7	629861	761562
	8	630409	761546
	9	629761	761540
	10	628595	761492
	11	630388	761509
	12	630819	761574
	13	629493	761553
	14	630104	761509
	15	629390	761512
	16	631297	761514
	17	629746	761561
	18	627802	761547
	19	631122	761513
	20	630838	761555
Transect 25	1	630091	761273
	2	631453	761287
	3	629355	761311
	4	628317	761258
	5	627880	761316
	6	628127	761306
	7	631566	761330
	8	627639	761312
	9	628819	761227
	10	628333	761328
	11	627966	761251
	12	631071	761332
	13	629400	761339
	14	627807	761321
	15	631282	761292
	16	629511	761264
	17	629781	761262
	18	629534	761273
	19	628236	761227
	20	629151	761298
Transect 26	1	628677	761084
	2	631000	761067
	3	631545	761013
	4	628474	761035
	5	629368	761083
	6	631148	761085

	7	629052	761084
	8	628829	761044
	9	628031	761054
	10	631126	761040
	11	630740	761035
	12	628695	761003
	13	629082	761062
	14	628408	760987
	15	627760	761018
	16	629117	761086
	17	629157	761015
	18	630952	761089
	19	628903	761026
	20	628517	761061
Transect 27	1	631839	760850
	2	631822	760848
	3	631817	760851
	4	631850	760849
	5	631805	760849
	6	631852	760851
	7	631801	760850
	8	631805	760850
	9	631837	760849
	10	631847	760850
	11	631776	760850
	12	631805	760851
	13	631774	760850
	14	631775	760849
	15	631836	760849
	16	631800	760849
	17	631831	760851
	18	631822	760849
	19	631776	760849
	20	631837	760850
Transect 28	1	631729	760847
	2	631721	760847
	3	631727	760847
	4	631724	760847
	5	631714	760847
	6	631714	760847
	7	631735	760847
	8	631718	760847
	9	631723	760847
	10	631734	760847
	11	631728	760847
	12	631722	760847
	13	631718	760847
	14	631734	760847
	15	631727	760847
	16	631723	760847
	17	631715	760847

Transect 29	18	631734	760847
	19	631719	760847
	20	631729	760847
	1	629487	760789
	2	629537	760760
	3	630760	760763
	4	629784	760766
	5	629632	760815
	6	631237	760797
	7	630299	760747
	8	630760	760770
	9	629294	760733
	10	629996	760740
	11	630685	760797
	12	630678	760764
	13	627963	760732
	14	629416	760765
	15	628989	760774
	16	629137	760767
	Transect 30	17	629973
18		629020	760820
19		630859	760819
20		627827	760737
1		628849	760501
2		630685	760486
3		630459	760548
4		629945	760532
5		628176	760532
6		629956	760525
7		629378	760565
8		628049	760551
9		629620	760551
10		629724	760513
11		628265	760490
12		628754	760554
13		628880	760569
14		628593	760569
15		628851	760524
16		629416	760560
Transect 31	17	631012	760567
	18	630331	760573
	19	629079	760552
	20	628308	760493
	1	631335	760335
	2	631334	760336
	3	631333	760335
	4	631332	760335
	5	631332	760335
	6	631334	760335
	7	631334	760335
	8	631334	760335

	9	631332	760336
	10	631332	760336
	11	631333	760335
	12	631334	760335
	13	631334	760335
	14	631333	760335
	15	631333	760335
	16	631333	760335
	17	631334	760335
	18	631334	760336
	19	631335	760335
	20	631335	760335
Transect 32	1	631086	760329
	2	631082	760328
	3	631086	760329
	4	631105	760329
	5	631080	760328
	6	631088	760329
	7	631087	760329
	8	631095	760329
	9	631082	760329
	10	631095	760328
	11	631091	760328
	12	631109	760329
	13	631098	760329
	14	631089	760329
	15	631090	760328
	16	631110	760328
	17	631100	760328
	18	631102	760329
	19	631094	760329
	20	631109	760329
Transect 33	1	630002	760272
	2	629295	760266
	3	630509	760261
	4	630810	760262
	5	630546	760317
	6	628902	760275
	7	630302	760281
	8	629814	760323
	9	629771	760285
	10	628354	760251
	11	629428	760279
	12	629424	760278
	13	628566	760273
	14	628626	760279
	15	630193	760296
	16	630269	760315
	17	629680	760274
	18	628679	760315
	19	628412	760303

<b>Transect 34</b>	<b>20</b>	<b>630241</b>	<b>760306</b>
	<b>1</b>	<b>627703</b>	<b>760233</b>
	<b>2</b>	<b>628021</b>	<b>760239</b>
	<b>3</b>	<b>627811</b>	<b>760235</b>
	<b>4</b>	<b>627854</b>	<b>760234</b>
	<b>5</b>	<b>627695</b>	<b>760234</b>
	<b>6</b>	<b>627933</b>	<b>760242</b>
	<b>7</b>	<b>627950</b>	<b>760230</b>
	<b>8</b>	<b>627843</b>	<b>760234</b>
	<b>9</b>	<b>628117</b>	<b>760234</b>
	<b>10</b>	<b>628008</b>	<b>760236</b>
	<b>11</b>	<b>627984</b>	<b>760240</b>
	<b>12</b>	<b>627816</b>	<b>760234</b>
	<b>13</b>	<b>628155</b>	<b>760236</b>
	<b>14</b>	<b>627755</b>	<b>760233</b>
	<b>15</b>	<b>628049</b>	<b>760241</b>
	<b>16</b>	<b>628062</b>	<b>760241</b>
	<b>17</b>	<b>627692</b>	<b>760243</b>
	<b>18</b>	<b>627686</b>	<b>760240</b>
	<b>19</b>	<b>627967</b>	<b>760235</b>
<b>20</b>	<b>628079</b>	<b>760235</b>	
<b>Transect 35</b>	<b>1</b>	<b>629702</b>	<b>760040</b>
	<b>2</b>	<b>630421</b>	<b>760043</b>
	<b>3</b>	<b>630899</b>	<b>760055</b>
	<b>4</b>	<b>629603</b>	<b>760043</b>
	<b>5</b>	<b>629644</b>	<b>760063</b>
	<b>6</b>	<b>630377</b>	<b>760065</b>
	<b>7</b>	<b>629674</b>	<b>760060</b>
	<b>8</b>	<b>630179</b>	<b>760053</b>
	<b>9</b>	<b>630273</b>	<b>760058</b>
	<b>10</b>	<b>629938</b>	<b>760067</b>
	<b>11</b>	<b>630708</b>	<b>760044</b>
	<b>12</b>	<b>630176</b>	<b>760073</b>
	<b>13</b>	<b>630854</b>	<b>760047</b>
	<b>14</b>	<b>629643</b>	<b>760059</b>
	<b>15</b>	<b>629742</b>	<b>760030</b>
	<b>16</b>	<b>630369</b>	<b>760032</b>
	<b>17</b>	<b>630693</b>	<b>760064</b>
	<b>18</b>	<b>630363</b>	<b>760041</b>
	<b>19</b>	<b>629771</b>	<b>760075</b>
	<b>20</b>	<b>630535</b>	<b>760056</b>
<b>Transect 36</b>	<b>1</b>	<b>629771</b>	<b>759822</b>
	<b>2</b>	<b>629976</b>	<b>759836</b>
	<b>3</b>	<b>630458</b>	<b>759826</b>
	<b>4</b>	<b>630238</b>	<b>759811</b>
	<b>5</b>	<b>630366</b>	<b>759830</b>
	<b>6</b>	<b>631065</b>	<b>759817</b>
	<b>7</b>	<b>630846</b>	<b>759838</b>
	<b>8</b>	<b>631131</b>	<b>759823</b>
	<b>9</b>	<b>630328</b>	<b>759838</b>
	<b>10</b>	<b>631269</b>	<b>759794</b>

	11	630124	759809
	12	630078	759838
	13	630358	759813
	14	630033	759795
	15	630006	759817
	16	630989	759807
	17	630509	759804
	18	630116	759824
	19	631252	759824
	20	630526	759827
Transect 37	1	630165	759574
	2	630699	759544
	3	630337	759551
	4	630208	759570
	5	630182	759562
	6	630808	759572
	7	630987	759563
	8	631002	759546
	9	630994	759546
	10	630578	759556
	11	631189	759583
	12	631242	759557
	13	630487	759552
	14	631250	759569
	15	631135	759556
	16	630900	759555
	17	629972	759563
	18	631184	759566
	19	631083	759560
	20	630011	759542
Transect 38	1	631135	759330
	2	630527	759297
	3	630330	759312
	4	630599	759317
	5	630061	759326
	6	631193	759319
	7	630853	759325
	8	630246	759299
	9	630811	759310
	10	630061	759292
	11	629957	759320
	12	630143	759314
	13	630920	759304
	14	630989	759322
	15	631120	759300
	16	630405	759313
	17	630504	759316
	18	629954	759293
	19	630088	759292
	20	630847	759323

Table 9. Random locations in each transect in Hora

Random points in Hora area			
		Loc X	Loc Y
Transect 1	1	574700	798070
	2	574700	797835
	3	574700	798838
	4	574700	799653
	5	574700	798194
	6	574700	798097
	7	574700	799102
	8	574700	799425
	9	574700	799447
	10	574700	798791
	11	574700	798213
	12	574700	799648
	13	574700	798716
	14	574700	799203
	15	574700	798237
	16	574700	799076
	17	574700	799213
	18	574700	799904
	19	574700	799207
	20	574700	799687
Transect 2	1	574950	799218
	2	574950	799990
	3	574950	798228
	4	574950	799257
	5	574950	799213
	6	574950	798598
	7	574950	798681
	8	574950	799746
	9	574950	797811
	10	574950	797608
	11	574950	797587
	12	574950	797347
	13	574950	797943
	14	574950	799242
	15	574950	799498
	16	574950	798626
	17	574950	798129
	18	574950	798443
	19	574950	798751
	20	574950	798545
Transect 3	1	575200	798360
	2	575200	799437
	3	575200	799748
	4	575200	799285
	5	575200	797388
	6	575200	798456

	7	575200	799558
	8	575200	799161
	9	575200	798389
	10	575200	798606
	11	575200	799537
	12	575200	799647
	13	575200	798178
	14	575200	797840
	15	575200	797923
	16	575200	799411
	17	575200	799684
	18	575200	799312
	19	575200	798815
	20	575200	798030
Transect 4	1	575450	798687
	2	575450	799180
	3	575450	798022
	4	575450	799870
	5	575450	797481
	6	575450	799150
	7	575450	799151
	8	575450	797647
	9	575450	799103
	10	575450	798121
	11	575450	799771
	12	575450	798545
	13	575450	797681
	14	575450	797716
	15	575450	799060
	16	575450	797835
	17	575450	799926
	18	575450	799137
	19	575450	798194
	20	575450	798840
Transect 5	1	575700	798723
	2	575700	799214
	3	575700	799431
	4	575700	798053
	5	575700	797301
	6	575700	798055
	7	575700	797403
	8	575700	798127
	9	575700	798756
	10	575700	799163
	11	575700	799072
	12	575700	798633
	13	575700	797205
	14	575700	798035
	15	575700	797536
	16	575700	798587
	17	575700	798830

Transect 6	18	575700	798471
	19	575700	799703
	20	575700	799123
	1	575950	797314
	2	575950	798498
	3	575950	797397
	4	575950	798402
	5	575950	797809
	6	575950	797522
	7	575950	799062
	8	575950	798744
	9	575950	799431
	10	575950	799759
	11	575950	797393
	12	575950	799877
	13	575950	799446
	14	575950	798165
	15	575950	797786
	16	575950	799844
	17	575950	797886
Transect 7	18	575950	799833
	19	575950	799000
	20	575950	799019
	1	576200	799582
	2	576200	798993
	3	576200	800101
	4	576200	798048
	5	576200	800134
	6	576200	799032
	7	576200	799369
	8	576200	798972
	9	576200	799075
	10	576200	798585
	11	576200	798571
	12	576200	800160
	13	576200	797818
	14	576200	799110
	15	576200	799895
	16	576200	798837
	17	576200	798381
18	576200	799074	
19	576200	797788	
Transect 8	20	576200	798019
	1	576450	800018
	2	576450	800358
	3	576450	797615
	4	576450	797806
	5	576450	798934
	6	576450	800382
	7	576450	798484
8	576450	797828	

	9	576450	797413
	10	576450	798811
	11	576450	800014
	12	576450	800029
	13	576450	799787
	14	576450	799872
	15	576450	800108
	16	576450	797408
	17	576450	799021
	18	576450	799673
	19	576450	799580
	20	576450	800415
Transect 9	1	576700	797727
	2	576700	799387
	3	576700	797328
	4	576700	798636
	5	576700	799984
	6	576700	798008
	7	576700	797960
	8	576700	799721
	9	576700	798496
	10	576700	799257
	11	576700	797194
	12	576700	798510
	13	576700	797997
	14	576700	799259
	15	576700	798432
	16	576700	798647
	17	576700	799701
	18	576700	800251
	19	576700	798332
	20	576700	799131
Transect 10	1	576950	799012
	2	576950	797797
	3	576950	800389
	4	576950	798647
	5	576950	800514
	6	576950	797720
	7	576950	799754
	8	576950	798244
	9	576950	799036
	10	576950	800092
	11	576950	799456
	12	576950	800264
	13	576950	797969
	14	576950	800525
	15	576950	799033
	16	576950	798215
	17	576950	799646
	18	576950	799808
	19	576950	797848

Transect 11	20	576950	797295
	1	577200	799296
	2	577200	798355
	3	577200	799667
	4	577200	798948
	5	577200	799588
	6	577200	799855
	7	577200	799793
	8	577200	799556
	9	577200	797865
	10	577200	797271
	11	577200	800017
	12	577200	798990
	13	577200	798423
	14	577200	799637
	15	577200	797347
	16	577200	798851
	17	577200	800495
	18	577200	800072
	19	577200	800191
Transect 12	20	577200	798053
	1	577450	798552
	2	577450	798451
	3	577450	797937
	4	577450	797399
	5	577450	798617
	6	577450	800161
	7	577450	798748
	8	577450	799595
	9	577450	797658
	10	577450	799167
	11	577450	800212
	12	577450	799248
	13	577450	798920
	14	577450	798893
	15	577450	798120
	16	577450	797663
	17	577450	800186
	18	577450	799089
	19	577450	797374
Transect 13	20	577450	799816
	1	577700	799594
	2	577700	799753
	3	577700	798648
	4	577700	799809
	5	577700	797304
	6	577700	798184
	7	577700	799650
	8	577700	797343
	9	577700	797659
10	577700	798396	

	11	577700	797908
	12	577700	799429
	13	577700	797541
	14	577700	799099
	15	577700	799149
	16	577700	799699
	17	577700	799773
	18	577700	799498
	19	577700	800151
	20	577700	797374
Transect 14	1	577950	799123
	2	577950	799852
	3	577950	799768
	4	577950	798789
	5	577950	799364
	6	577950	800522
	7	577950	797180
	8	577950	799366
	9	577950	798279
	10	577950	798555
	11	577950	799222
	12	577950	798779
	13	577950	799104
	14	577950	798899
	15	577950	799385
	16	577950	799390
	17	577950	799552
	18	577950	800463
	19	577950	800393
	20	577950	797050
Transect 15	1	578200	799504
	2	578200	797808
	3	578200	799066
	4	578200	799088
	5	578200	797690
	6	578200	798922
	7	578200	798741
	8	578200	797331
	9	578200	799071
	10	578200	797885
	11	578200	798196
	12	578200	798862
	13	578200	798725
	14	578200	800098
	15	578200	798902
	16	578200	798259
	17	578200	800205
	18	578200	800016
	19	578200	798352
	20	578200	799470
Transect 16	1	578450	798743

	2	578450	797962
	3	578450	800921
	4	578450	800065
	5	578450	799276
	6	578450	800084
	7	578450	799658
	8	578450	801020
	9	578450	798376
	10	578450	801099
	11	578450	800591
	12	578450	799289
	13	578450	799074
	14	578450	798524
	15	578450	798398
	16	578450	799025
	17	578450	797617
	18	578450	799330
	19	578450	799489
	20	578450	799871
Transect 17	1	578708	800752
	2	578708	801024
	3	578708	800942
	4	578708	800657
	5	578708	800553
	6	578708	800881
	7	578708	800557
	8	578708	800711
	9	578708	801002
	10	578708	800495
	11	578708	800836
	12	578708	800971
	13	578708	800867
	14	578708	800835
	15	578708	800550
	16	578708	800626
	17	578708	800723
	18	578708	800484
	19	578708	800486
	20	578708	800898
Transect 18	1	578708	797438
	2	578708	798550
	3	578708	799620
	4	578708	799650
	5	578708	797150
	6	578708	799589
	7	578708	798432
	8	578708	797625
	9	578708	797395
	10	578708	798390
	11	578708	797343
	12	578708	796867

	13	578708	797901
	14	578708	797313
	15	578708	798197
	16	578708	799720
	17	578708	798129
	18	578708	799422
	19	578708	797336
	20	578708	799233
Transect 19	1	578958	800568
	2	578958	800574
	3	578958	800670
	4	578958	800592
	5	578958	800666
	6	578958	800635
	7	578958	800599
	8	578958	800609
	9	578958	800616
	10	578958	800642
	11	578958	800623
	12	578958	800664
	13	578958	800668
	14	578958	800621
	15	578958	800628
	16	578958	800646
	17	578958	800648
	18	578958	800616
	19	578958	800601
	20	578958	800666
Transect 20	1	578958	798788
	2	578958	797504
	3	578958	798735
	4	578958	798333
	5	578958	797192
	6	578958	797490
	7	578958	799155
	8	578958	798239
	9	578958	798875
	10	578958	799228
	11	578958	797709
	12	578958	797228
	13	578958	797114
	14	578958	798975
	15	578958	797378
	16	578958	797201
	17	578958	799559
	18	578958	799717
	19	578958	799715
	20	578958	796903
Transect 21	1	579208	797410
	2	579208	797880
	3	579208	798573

	4	579208	798816
	5	579208	799515
	6	579208	797257
	7	579208	797205
	8	579208	799587
	9	579208	796974
	10	579208	799074
	11	579208	796784
	12	579208	797134
	13	579208	798174
	14	579208	799598
	15	579208	798740
	16	579208	798923
	17	579208	798272
	18	579208	798658
	19	579208	798063
	20	579208	799531
Transect 22	1	579458	798740
	2	579458	798946
	3	579458	797553
	4	579458	798208
	5	579458	797886
	6	579458	799539
	7	579458	798348
	8	579458	797616
	9	579458	799480
	10	579458	799550
	11	579458	798366
	12	579458	799389
	13	579458	798804
	14	579458	797236
	15	579458	797572
	16	579458	799550
	17	579458	799278
	18	579458	799496
	19	579458	798191
	20	579458	797466
Transect 23	1	579708	798033
	2	579708	798537
	3	579708	797989
	4	579708	797202
	5	579708	798626
	6	579708	797562
	7	579708	797698
	8	579708	797653
	9	579708	799353
	10	579708	799572
	11	579708	798453
	12	579708	799775
	13	579708	799512
	14	579708	798043

	15	579708	799174
	16	579708	798372
	17	579708	797178
	18	579708	798584
	19	579708	798841
	20	579708	797857
Transect 24	1	579958	798690
	2	579958	797498
	3	579958	799363
	4	579958	799002
	5	579958	798833
	6	579958	799240
	7	579958	798093
	8	579958	797279
	9	579958	798202
	10	579958	798134
	11	579958	797601
	12	579958	796469
	13	579958	797953
	14	579958	797871
	15	579958	796591
	16	579958	799263
	17	579958	799477
	18	579958	798454
	19	579958	799274
	20	579958	799316
Transect 25	1	580208	797655
	2	580208	798152
	3	580208	797534
	4	580208	799034
	5	580208	799601
	6	580208	798058
	7	580208	798131
	8	580208	798971
	9	580208	799743
	10	580208	797643
	11	580208	797453
	12	580208	799617
	13	580208	799140
	14	580208	798181
	15	580208	796715
	16	580208	799500
	17	580208	797160
	18	580208	799438
	19	580208	796579
	20	580208	799928
Transect 26	1	580458	797406
	2	580458	799474
	3	580458	796815
	4	580458	799091
	5	580458	797306

	6	580458	796470
	7	580458	797027
	8	580458	797152
	9	580458	796538
	10	580458	796831
	11	580458	797994
	12	580458	798610
	13	580458	799478
	14	580458	796326
	15	580458	798256
	16	580458	798305
	17	580458	797676
	18	580458	798751
	19	580458	799771
	20	580458	797329
Transect 27	1	580708	797516
	2	580708	797616
	3	580708	797280
	4	580708	798787
	5	580708	798087
	6	580708	798902
	7	580708	798681
	8	580708	797261
	9	580708	796529
	10	580708	798356
	11	580708	798590
	12	580708	799701
	13	580708	797051
	14	580708	798330
	15	580708	797815
	16	580708	798787
	17	580708	798919
	18	580708	798626
	19	580708	798596
	20	580708	799916
Transect 28	1	580958	798137
	2	580958	797530
	3	580958	799896
	4	580958	797618
	5	580958	798611
	6	580958	797463
	7	580958	798870
	8	580958	799321
	9	580958	799290
	10	580958	798367
	11	580958	798549
	12	580958	797756
	13	580958	798564
	14	580958	799585
	15	580958	799323
	16	580958	798500

	<b>17</b>	<b>580958</b>		<b>799515</b>
	<b>18</b>	<b>580958</b>		<b>797810</b>
	<b>19</b>	<b>580958</b>		<b>799785</b>
	<b>20</b>	<b>580958</b>		<b>799510</b>

Table 10. Random locations in each transect in head quarter

Random locations in the head quarter of the BMNP			
Transect 1		Loc x	Loc Y
	1	588137	785345
	2	588103	785354
	3	588077	785353
	4	588041	785343
	5	587910	785347
	6	587748	785342
	7	587717	785353
	8	587693	785343
	9	587664	785344
	10	587642	785355
	11	587635	785350
	12	587588	785345
	13	587582	785351
	14	587495	785352
	15	587469	785342
	16	587455	785348
	17	587417	785348
	18	587378	785355
	19	587371	785355
	20	587364	785341
Transect 2	1	588136	785251
	2	588102	785244
	3	588101	785247
	4	588096	785241
	5	588033	785253
	6	587910	785247
	7	587775	785245
	8	587750	785252
	9	587736	785246
	10	587730	785246
	11	587688	785255
	12	587645	785247
	13	587640	785253
	14	587618	785243
	15	587611	785247
	16	587579	785241
	17	587529	785246
	18	587479	785245
	19	587451	785249
	20	587394	785245
Transect 3	1	588045	785146
	2	588019	785149
	3	587860	785148
	4	587835	785152
	5	587831	785148

	6	587803	785146
	7	587778	785147
	8	587778	785142
	9	587694	785154
	10	587684	785155
	11	587684	785151
	12	587675	785152
	13	587640	785143
	14	587630	785146
	15	587629	785144
	16	587601	785152
	17	587598	785146
	18	587446	785145
	19	587413	785151
	20	587361	785155
Transect 4	1	587953	785045
	2	587943	785051
	3	587927	785057
	4	587861	785057
	5	587804	785053
	6	587780	785045
	7	587773	785054
	8	587721	785053
	9	587578	785055
	10	587555	785043
	11	587543	785051
	12	587535	785048
	13	587467	785051
	14	587460	785057
	15	587453	785046
	16	587401	785048
	17	587374	785049
	18	587371	785055
	19	587312	785051
	20	587293	785049
Transect 5	1	587935	784958
	2	587932	784948
	3	587908	784948
	4	587894	784949
	5	587875	784955
	6	587838	784950
	7	587804	784954
	8	587776	784947
	9	587664	784956
	10	587632	784955
	11	587579	784946
	12	587574	784948
	13	587562	784948
	14	587552	784956
	15	587497	784952
	16	587475	784952

	17	587466	784953
	18	587388	784956
	19	587316	784953
	20	587298	784946
Transect 6	1	587834	784855
	2	587803	784852
	3	587794	784858
	4	587746	784855
	5	587740	784858
	6	587651	784852
	7	587625	784852
	8	587622	784851
	9	587598	784857
	10	587591	784858
	11	587585	784853
	12	587571	784855
	13	587550	784850
	14	587542	784849
	15	587357	784857
	16	587330	784849
	17	587276	784856
	18	587265	784851
	19	587238	784847
	20	587188	784853
Transect 7	1	587825	784754
	2	587777	784751
	3	587633	784757
	4	587596	784754
	5	587580	784747
	6	587569	784755
	7	587567	784749
	8	587551	784757
	9	587520	784751
	10	587514	784752
	11	587485	784754
	12	587477	784748
	13	587418	784754
	14	587393	784755
	15	587353	784747
	16	587331	784753
	17	587328	784756
	18	587279	784759
	19	587212	784748
	20	587161	784748
Transect 8	1	587782	784659
	2	587764	784660
	3	587736	784658
	4	587699	784649
	5	587637	784649
	6	587488	784647
	7	587464	784649

	8	587433	784657
	9	587417	784652
	10	587410	784651
	11	587408	784657
	12	587382	784651
	13	587361	784660
	14	587351	784657
	15	587344	784657
	16	587343	784660
	17	587341	784655
	18	587289	784658
	19	587272	784657
	20	587208	784659
Transect 9	1	587800	784550
	2	587745	784549
	3	587740	784557
	4	587732	784555
	5	587708	784561
	6	587649	784555
	7	587608	784557
	8	587586	784557
	9	587581	784559
	10	587561	784549
	11	587535	784550
	12	587504	784551
	13	587479	784552
	14	587407	784557
	15	587351	784549
	16	587333	784557
	17	587291	784556
	18	587254	784553
	19	587186	784557
	20	587156	784548
Transect 10	1	587784	784461
	2	587749	784458
	3	587704	784450
	4	587638	784456
	5	587579	784453
	6	587519	784453
	7	587516	784452
	8	587406	784451
	9	587397	784454
	10	587361	784457
	11	587318	784455
	12	587290	784456
	13	587251	784459
	14	587249	784447
	15	587180	784458
	16	587129	784455
	17	587103	784461
	18	587074	784460

Transect 11	19	587074	784454
	20	587060	784449
	1	587818	784355
	2	587686	784358
	3	587651	784356
	4	587626	784352
	5	587609	784354
	6	587594	784351
	7	587526	784362
	8	587464	784354
	9	587444	784355
	10	587339	784349
	11	587274	784356
	12	587257	784358
	13	587248	784349
	14	587243	784353
	15	587179	784348
	16	587137	784359
	17	587113	784351
	18	587083	784359
Transect 12	19	587059	784352
	20	587040	784349
	1	587767	784249
	2	587730	784261
	3	587725	784263
	4	587711	784260
	5	587533	784257
	6	587464	784254
	7	587423	784250
	8	587372	784256
	9	587357	784255
	10	587328	784261
	11	587242	784252
	12	587230	784255
	13	587208	784260
	14	587147	784260
	15	587145	784258
	16	587131	784255
	17	587103	784254
	18	587014	784260
Transect 13	19	586998	784251
	20	586949	784258
	1	587677	784150
	2	587610	784160
	3	587504	784157
	4	587486	784156
	5	587486	784161
	6	587455	784156
	7	587450	784158
	8	587370	784157
	9	587345	784163

	10	587339	784161
	11	587203	784161
	12	587176	784157
	13	587119	784152
	14	587088	784153
	15	587078	784158
	16	587077	784158
	17	587054	784156
	18	587039	784153
	19	587008	784151
	20	586950	784155

Table 11. Random locations in each transect in Gasay

Random points in in gasay area of the BMNP			
		loc X	Loc Y
Transect 1	1	580595	789109
	2	579931	789145
	3	584104	789130
	4	581226	789114
	5	581490	789120
	6	579569	789134
	7	581166	789118
	8	580881	789120
	9	580302	789132
	10	581192	789142
	11	582027	789144
	12	579900	789113
	13	582869	789123
	14	583682	789114
	15	583580	789113
	16	581820	789132
	17	580354	789111
	18	579911	789115
	19	580845	789117
	20	580414	789116
Transect 2	1	580763	788881
	2	584563	788859
	3	580466	788870
	4	581543	788874
	5	584507	788900
	6	584343	788883
	7	583417	788858
	8	579235	788860
	9	581575	788861

Transect 3	10	583407	788878
	11	579747	788904
	12	583779	788861
	13	580693	788880
	14	580395	788874
	15	580715	788869
	16	583579	788900
	17	583821	788870
	18	580450	788884
	19	581920	788890
	20	579424	788889
	1	582748	788620
	2	581274	788630
	3	581808	788612
	4	582786	788613
	5	585409	788622
	6	579417	788622
	7	580820	788640
	8	584911	788640
	9	582405	788655
10	584240	788612	
11	582380	788639	
12	582895	788632	
13	584616	788652	
14	579608	788632	
15	585214	788655	
16	584427	788612	
17	579824	788632	
18	583290	788633	
19	579892	788632	
20	579510	788612	
Transect 4	1	581706	788394
	2	583063	788363
	3	582245	788399
	4	581358	788399
	5	584181	788365
	6	579233	788381
	7	582219	788379
	8	582747	788398
	9	584827	788383
	10	582409	788373
	11	579292	788381
	12	585251	788366
	13	581227	788393
	14	582066	788363
	15	585370	788377
	16	583089	788381
	17	580365	788386
	18	583919	788375
	19	584388	788387

Transect 5	20	584489	788406
	1	579999	788118
	2	585351	788138
	3	582142	788124
	4	579832	788125
	5	581819	788156
	6	581807	788141
	7	581371	788117
	8	584670	788121
	9	581343	788110
	10	584779	788130
	11	584875	788146
	12	581712	788125
	13	581763	788126
	14	584338	788151
	15	581013	788145
	16	581598	788115
	17	582906	788109
	18	583000	788157
	19	585542	788123
Transect 6	20	584346	788160
	1	583204	787896
	2	579266	787902
	3	584958	787880
	4	582418	787868
	5	585127	787878
	6	581495	787897
	7	581842	787893
	8	579894	787870
	9	583563	787879
	10	579939	787890
	11	581368	787900
	12	585056	787860
	13	583993	787887
	14	582153	787867
	15	582391	787884
	16	583927	787881
	17	583034	787875
	18	580349	787887
	19	579892	787870
Transect 7	20	583529	787896
	1	582373	787654
	2	584237	787619
	3	584301	787626
	4	579597	787625
	5	582866	787633
	6	581188	787626
	7	579363	787649
	8	580968	787655
9	582299	787647	

Transect 8	10	580100	787649
	11	582694	787655
	12	583487	787612
	13	584799	787655
	14	584418	787647
	15	580171	787652
	16	581415	787627
	17	583015	787633
	18	583922	787639
	19	579616	787650
	20	583480	787609
	1	584147	787406
	2	581573	787404
	3	584243	787364
	4	580729	787374
	5	583294	787360
	6	582001	787400
	7	583819	787384
	8	584439	787361
	9	583004	787392
10	583511	787384	
11	583608	787395	
12	580614	787402	
13	583809	787369	
14	581539	787399	
15	580288	787389	
16	580779	787384	
17	581225	787384	
18	579521	787381	
19	581428	787399	
20	581492	787361	
Transect 9	1	579419	787111
	2	581217	787147
	3	582819	787111
	4	581148	787146
	5	580328	787148
	6	583081	787128
	7	582486	787143
	8	584718	787120
	9	584691	787111
	10	583314	787148
	11	581428	787133
	12	584077	787126
	13	582756	787110
	14	580916	787139
	15	583392	787150
	16	581934	787131
	17	579427	787111
	18	581896	787138
	19	580642	787127

Transect 10	20	580611	787132
	1	580752	786893
	2	581355	786878
	3	581643	786899
	4	583814	786866
	5	583901	786866
	6	583415	786861
	7	579943	786870
	8	583409	786886
	9	584525	786900
	10	579499	786891
	11	581665	786868
	12	583914	786863
	13	580972	786878
	14	580635	786861
	15	580885	786871
	16	581788	786894
	17	580762	786875
	18	580706	786865
	19	582247	786883
Transect 11	20	583177	786885
	1	579776	786639
	2	580045	786610
	3	580736	786612
	4	583449	786644
	5	583667	786631
	6	584105	786628
	7	581245	786617
	8	581175	786630
	9	583367	786612
	10	583461	786611
	11	580884	786630
	12	582538	786641
	13	581235	786619
	14	581409	786609
	15	581566	786612
	16	580577	786643
	17	581655	786634
	18	579914	786615
	19	579319	786650
Transect 12	20	582492	786640
	1	580689	786359
	2	582264	786359
	3	580916	786359
	4	579647	786359
	5	582752	786359
	6	583437	786359
	7	580633	786359
	8	583938	786359
9	582752	786359	

<b>Transect 13</b>	10	583009	786359
	11	579736	786359
	12	581054	786359
	13	582346	786359
	14	583981	786359
	15	580657	786359
	16	583082	786359
	17	582121	786359
	18	583066	786359
	19	579831	786359
	20	581204	786359
	1	580232	786138
	2	579665	786134
	3	579740	786131
	4	582831	786134
	5	584059	786115
	6	581646	786125
	7	579631	786121
	8	580247	786125
	9	582162	786140
10	581313	786124	
11	579974	786136	
12	580141	786142	
13	580787	786121	
14	581236	786118	
15	582189	786140	
16	579576	786109	
17	582478	786139	
18	580811	786111	
19	580462	786134	
20	582437	786142	
<b>Transect 14</b>	1	581326	789570
	2	581558	789600
	3	582318	789555
	4	581604	789551
	5	583201	789600
	6	580221	789539
	7	583203	789576
	8	581148	789592
	9	583359	789564
	10	582630	789593
	11	583261	789546
	12	582660	789553
	13	583282	789582
	14	580928	789573
	15	582094	789559
	16	582588	789592
	17	582828	789541
	18	579487	789542
	19	582119	789572

Transect 15	20	579704	789586
	1	584110	785886
	2	581934	785859
	3	583483	785861
	4	580962	785873
	5	580718	785859
	6	580955	785860
	7	583557	785865
	8	582754	785872
	9	580266	785884
	10	583834	785897
	11	580049	785892
	12	580237	785897
	13	579757	785869
	14	582597	785883
	15	582202	785882
	16	584011	785865
	17	581185	785881
	18	582743	785862
	19	584098	785881
Transect 16	20	579993	785880
	1	583385	785610
	2	579374	785645
	3	579686	785613
	4	580955	785619
	5	579506	785644
	6	582280	785622
	7	580982	785621
	8	584066	785631
	9	579652	785615
	10	579905	785611
	11	584158	785617
	12	582531	785638
	13	580815	785637
	14	582032	785638
	15	582134	785616
	16	581037	785632
	17	580317	785647
	18	581159	785646
	19	579431	785635
Transect 17	20	579506	785646
	1	582184	785387
	2	580821	785398
	3	579873	785399
	4	582807	785390
	5	581611	785376
	6	581371	785398
	7	582840	785390
	8	581702	785365
9	583970	785388	

Transect 18	10	582031	785371
	11	582336	785400
	12	582479	785388
	13	581796	785375
	14	583761	785385
	15	581077	785383
	16	580917	785383
	17	582837	785364
	18	580349	785386
	19	583822	785380
	20	580772	785382
	1	579618	785148
	2	581138	785151
	3	580816	785136
	4	582179	785143
	5	582232	785134
	6	582489	785126
	7	583054	785141
	8	582200	785123
	9	580194	785129
10	581644	785124	
11	583283	785146	
12	580443	785119	
13	580727	785125	
14	579920	785115	
15	579918	785115	
16	581125	785116	
17	581459	785133	
18	581458	785135	
19	582710	785119	
20	580439	785121	
Transect 19	1	581462	784866
	2	580346	784874
	3	583504	784893
	4	582788	784861
	5	579659	784872
	6	580174	784887
	7	580950	784889
	8	583535	784868
	9	581906	784897
	10	584333	784882
	11	583554	784885
	12	583813	784865
	13	579508	784865
	14	579617	784881
	15	581612	784900
	16	580532	784894
	17	583472	784889
	18	580891	784887
	19	579422	784884

Transect 20	20	584235	784866
	1	584175	784647
	2	581308	784642
	3	583606	784618
	4	581711	784650
	5	580120	784617
	6	584286	784632
	7	582369	784630
	8	581711	784620
	9	579643	784641
	10	580269	784623
	11	582176	784646
	12	582990	784632
	13	584189	784617
	14	580812	784642
	15	579842	784635
	16	580702	784645
	17	584142	784648
	18	581129	784640
	19	580816	784635
Transect 21	20	579756	784632
	1	580191	784364
	2	580298	784379
	3	581046	784380
	4	582679	784366
	5	580831	784378
	6	580093	784362
	7	582014	784395
	8	580074	784399
	9	583731	784379
	10	581181	784381
	11	579641	784371
	12	583709	784389
	13	584185	784383
	14	582045	784380
	15	581512	784380
	16	584109	784399
	17	582847	784367
	18	579874	784362
	19	581549	784376
Transect 22	20	581897	784372
	1	582324	784398
	2	583140	784391
	3	583799	784380
	4	582636	784376
	5	582226	784365
	6	581275	784394
	7	580243	784393
	8	580364	784387
9	579429	784366	

Transect 23	10	579456	784382
	11	582191	784368
	12	583999	784369
	13	581936	784372
	14	580712	784373
	15	580936	784392
	16	583312	784365
	17	581896	784372
	18	582741	784388
	19	580079	784395
	20	581811	784383
	1	582202	783867
	2	580179	783885
	3	582838	783884
	4	582917	783886
	5	583811	783873
	6	582027	783891
	7	581372	783861
	8	582703	783861
	9	582728	783892
10	580464	783863	
11	583100	783878	
12	579685	783876	
13	583201	783869	
14	583759	783890	
15	583211	783869	
16	582232	783895	
17	580716	783869	
18	579480	783864	
19	581873	783870	
20	583572	783887	
Transect 24	1	583812	783632
	2	581743	783612
	3	582471	783636
	4	582482	783632
	5	580971	783639
	6	583409	783620
	7	583755	783611
	8	582600	783618
	9	579793	783632
	10	582644	783617
	11	583251	783644
	12	579636	783634
	13	580651	783630
	14	580531	783619
	15	581556	783627
	16	583398	783637
	17	581391	783645
	18	580557	783633
	19	579767	783624

Transect 25	20	581596	783639
	1	582452	783373
	2	581454	783366
	3	580475	783373
	4	583519	783360
	5	581993	783373
	6	582151	783383
	7	583620	783389
	8	583691	783382
	9	579762	783388
	10	582614	783394
	11	581045	783380
	12	581812	783376
	13	583282	783382
	14	580494	783389
	15	582882	783383
	16	580806	783383
	17	579887	783363
	18	579571	783395
	19	583184	783362
Transect 26	20	580111	783372
	1	582128	783109
	2	579384	783114
	3	579330	783132
	4	579545	783137
	5	582630	783112
	6	580435	783127
	7	581040	783119
	8	581018	783125
	9	582459	783122
	10	579666	783132
	11	582653	783125
	12	583446	783114
	13	581443	783135
	14	583097	783145
	15	582275	783130
	16	582872	783135
	17	583663	783123
	18	582629	783133
	19	580108	783118
20	580670	783144	

Table 12. Random locations in each transect in Hanto

Random locations in Hanto area			
		Loc X	Loc Y
Transect 1	1	568340	790525
	2	568340	790237
	3	568340	790246
	4	568340	790068
	5	568340	790267
	6	568340	790656
	7	568340	790645
	8	568340	790461
	9	568340	790046
	10	568340	790315
	11	568340	789944
	12	568340	790437
	13	568340	790083
	14	568340	790380
	15	568340	790054
	16	568340	790547
	17	568340	789986
	18	568340	790360
	19	568340	790173
	20	568340	790124
Transect 2	1	568590	789490
	2	568590	790376
	3	568590	789932
	4	568590	790617
	5	568590	790433
	6	568590	789366
	7	568590	790313
	8	568590	790435
	9	568590	790225
	10	568590	790121
	11	568590	790623
	12	568590	790237
	13	568590	789477
	14	568590	790752
	15	568590	790425
	16	568590	789632
	17	568590	789508
	18	568590	790254
	19	568590	790729
	20	568590	790769
Transect 3	1	568840	789273
	2	568840	789473
	3	568840	790230
	4	568840	790225
	5	568840	789599

Transect 4	6	568840	790579
	7	568840	789701
	8	568840	789791
	9	568840	790043
	10	568840	789458
	11	568840	789126
	12	568840	789250
	13	568840	790851
	14	568840	789474
	15	568840	789737
	16	568840	789460
	17	568840	789693
	18	568840	789733
	19	568840	789659
	20	568840	789214
	1	569090	790053
	2	569090	789851
	3	569090	789346
	4	569090	789144
	5	569090	789991
6	569090	790691	
7	569090	789850	
8	569090	790668	
9	569090	789345	
10	569090	790336	
11	569090	790635	
12	569090	789764	
13	569090	790668	
14	569090	789893	
15	569090	790504	
16	569090	791006	
17	569090	791003	
18	569090	789481	
19	569090	790728	
20	569090	790061	
Transect 5	1	569340	790486
	2	569340	789358
	3	569340	789307
	4	569340	789818
	5	569340	790390
	6	569340	789762
	7	569340	788833
	8	569340	790316
	9	569340	791047
	10	569340	789995
	11	569340	789145
	12	569340	789438
	13	569340	789687
	14	569340	789836
	15	569340	790649

Transect 6	16	569340	789406
	17	569340	790037
	18	569340	789781
	19	569340	790741
	20	569340	789174
	1	569590	791183
	2	569590	790171
	3	569590	790352
	4	569590	788665
	5	569590	790126
	6	569590	788525
	7	569590	788926
	8	569590	789702
	9	569590	790962
	10	569590	788531
	11	569590	790405
	12	569590	788868
	13	569590	788700
	14	569590	790406
	15	569590	790060
Transect 7	16	569590	791094
	17	569590	790437
	18	569590	790345
	19	569590	789124
	20	569590	789644
	1	569840	788850
	2	569840	789143
	3	569840	790337
	4	569840	790971
	5	569840	790375
	6	569840	790244
	7	569840	788880
	8	569840	790702
	9	569840	789515
	10	569840	789434
	11	569840	790838
	12	569840	790258
	13	569840	789018
	14	569840	790070
	15	569840	790485
16	569840	789123	
17	569840	789753	
18	569840	789554	
19	569840	789714	
Transect 8	20	569840	789993
	1	570090	791987
	2	570090	791991
	3	570090	792008
	4	570090	791983
5	570090	791986	

Transect 9	6	570090	792009
	7	570090	792000
	8	570090	792002
	9	570090	792014
	10	570090	791998
	11	570090	792015
	12	570090	792008
	13	570090	792016
	14	570090	792002
	15	570090	791989
	16	570090	791997
	17	570090	792012
	18	570090	791996
	19	570090	791985
	20	570090	792010
	1	570090	790284
	2	570090	791319
	3	570090	789000
	4	570090	790279
	5	570090	790386
6	570090	789355	
7	570090	789226	
8	570090	789481	
9	570090	789574	
10	570090	790683	
11	570090	789336	
12	570090	788681	
13	570090	790386	
14	570090	790002	
15	570090	791123	
16	570090	788808	
17	570090	789653	
18	570090	790133	
19	570090	790977	
20	570090	791307	
Transect 10	1	570340	789516
	2	570340	790352
	3	570340	791779
	4	570340	789457
	5	570340	791416
	6	570340	791798
	7	570340	791158
	8	570340	791942
	9	570340	791556
	10	570340	790848
	11	570340	789672
	12	570340	791889
	13	570340	791022
	14	570340	789933
	15	570340	788471

Transect 11	16	570340	790276
	17	570340	788753
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	4	570590	792033
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	8	570590	790003
	9	570590	791211
	10	570590	791641
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	12	570590	788564
	13	570590	791925
	14	570590	790655
	15	570590	789315
Transect 12	16	570590	788747
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	18	570590	789652
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	20	570590	790495
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	2	570840	788275
	3	570840	789202
	4	570840	788769
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	8	570840	789051
	9	570840	789625
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	13	570840	788884
	14	570840	789870
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18	570840	790005	
19	570840	789069	
Transect 13	20	570840	789304
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	2	571090	788657
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	4	571090	791094
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Transect 14	6	571090	788622
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	9	571090	788828
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	11	571090	791314
	12	571090	789948
	13	571090	791730
	14	571090	792026
	15	571090	790105
	16	571090	791946
	17	571090	791171
	18	571090	789729
	19	571090	791904
	20	571090	791371
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	2	571340	788437
	3	571340	791255
	4	571340	790921
	5	571340	789156
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7	571340	789827	
8	571340	791430	
9	571340	788633	
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11	571340	791562	
12	571340	790463	
13	571340	791283	
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15	571340	789420	
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17	571340	791134	
18	571340	790427	
19	571340	790733	
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Transect 15	1	571590	788605
	2	571590	791733
	3	571590	789257
	4	571590	789794
	5	571590	790544
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	8	571590	791386
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	10	571590	790736
	11	571590	791783
	12	571590	789930
	13	571590	789560
	14	571590	790601
	15	571590	791630

Transect 16	16	571590	791623
	17	571590	789238
	18	571590	788650
	19	571590	790555
	20	571590	789182
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	2	571840	788649
	3	571840	792090
	4	571840	791424
	5	571840	790064
	6	571840	790062
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	8	571840	790148
	9	571840	791611
	10	571840	788779
	11	571840	789688
	12	571840	788710
	13	571840	792016
	14	571840	789241
	15	571840	790180
Transect 17	16	571840	790643
	17	571840	789455
	18	571840	792390
	19	571840	791048
	20	571840	789119
	1	572090	791321
	2	572090	791477
	3	572090	788979
	4	572090	790205
	5	572090	789349
	6	572090	789410
	7	572090	790514
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	12	572090	791572
	13	572090	791465
	14	572090	789596
	15	572090	790737
16	572090	791204	
Transect 18	17	572090	791646
	18	572090	790545
	19	572090	792148
	20	572090	790469
	1	572340	789907
	2	572340	790307
	3	572340	791398
	4	572340	791416
	5	572340	792564

Transect 19	6	572340	790208
	7	572340	789174
	8	572340	791733
	9	572340	792098
	10	572340	792000
	11	572340	791527
	12	572340	790952
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	16	572340	789804
	17	572340	790698
	18	572340	792193
	19	572340	790583
	20	572340	789077
	1	572590	792997
	2	572590	792823
	3	572590	793017
	4	572590	792846
	5	572590	793153
6	572590	792910	
7	572590	793099	
8	572590	792838	
9	572590	792948	
10	572590	793103	
11	572590	793188	
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15	572590	792969	
16	572590	793098	
17	572590	793155	
18	572590	793017	
19	572590	793085	
20	572590	792986	
Transect 20	1	572590	792154
	2	572590	789626
	3	572590	792448
	4	572590	791151
	5	572590	789628
	6	572590	792302
	7	572590	790396
	8	572590	792633
	9	572590	789706
	10	572590	791433
	11	572590	790638
	12	572590	792042
	13	572590	789953
	14	572590	790633
	15	572590	792020

Transect 21	16	572590	791274
	17	572590	789407
	18	572590	789422
	19	572590	791515
	20	572590	789800
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	2	572840	793238
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	4	572840	790160
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	6	572840	792460
	7	572840	791742
	8	572840	791653
	9	572840	789746
	10	572840	792316
	11	572840	791842
	12	572840	793150
	13	572840	791541
	14	572840	791709
	15	572840	792842
Transect 22	16	572840	790868
	17	572840	790642
	18	572840	789702
	19	572840	791916
	20	572840	790370
	1	573090	791445
	2	573090	791259
	3	573090	793318
	4	573090	793171
	5	573090	791327
	6	573090	793310
	7	573090	789750
	8	573090	793630
	9	573090	793725
	10	573090	789836
	11	573090	792795
	12	573090	792141
	13	573090	791136
	14	573090	793122
	15	573090	792987
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Transect 23	17	573090	792877
	18	573090	790757
	19	573090	792272
	20	573090	791643
	1	573340	793762
	2	573340	793553
	3	573340	791294
	4	573340	790685
	5	573340	791061

Transect 24	6	573340	792994
	7	573340	792361
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	9	573340	790404
	10	573340	790003
	11	573340	791427
	12	573340	791834
	13	573340	793937
	14	573340	792982
	15	573340	790143
	16	573340	793783
	17	573340	790339
	18	573340	791217
	19	573340	793032
	20	573340	792076
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	3	573590	793411
	4	573590	793173
	5	573590	790882
6	573590	790668	
7	573590	791654	
8	573590	791763	
9	573590	793204	
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11	573590	792230	
12	573590	791159	
13	573590	792817	
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16	573590	792878	
17	573590	793688	
18	573590	792461	
19	573590	791936	
20	573590	791114	
Transect 25	1	573840	793968
	2	573840	793854
	3	573840	792730
	4	573840	793525
	5	573840	793704
	6	573840	792440
	7	573840	793035
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	9	573840	794018
	10	573840	794057
	11	573840	793275
	12	573840	793225
	13	573840	793903
	14	573840	793503
	15	573840	792631

Transect 26	16	573840	791635
	17	573840	793479
	18	573840	791018
	19	573840	792345
	20	573840	793911
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	2	574090	792927
	3	574090	793533
	4	574090	792137
	5	574090	791519
	6	574090	792934
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	11	574090	792351
	12	574090	791505
	13	574090	792875
	14	574090	794064
	15	574090	792342
Transect 27	16	574090	793888
	17	574090	793215
	18	574090	793054
	19	574090	794012
	20	574090	793158
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	4	574340	791489
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	6	574340	792752
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	8	574340	794007
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	10	574340	794033
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	12	574340	791351
	13	574340	793773
	14	574340	794384
	15	574340	793012
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Transect 28	17	574340	792455
	18	574340	793319
	19	574340	791843
	20	574340	793675
	1	574590	794055
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4	574590	793114	
5	574590	793049	

Transect 29	6	574590	794383
	7	574590	793643
	8	574590	791832
	9	574590	794388
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	13	574590	793008
	14	574590	794576
	15	574590	793782
	16	574590	793141
	17	574590	794290
	18	574590	793645
	19	574590	792420
	20	574590	793466
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	2	574840	792914
	3	574840	792216
	4	574840	792178
	5	574840	793221
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7	574840	793015	
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16	574840	792549	
17	574840	794316	
18	574840	793946	
19	574840	792242	
20	574840	794052	
Transect 30	1	575090	793081
	2	575090	792340
	3	575090	792661
	4	575090	793435
	5	575090	792604
	6	575090	792104
	7	575090	792015
	8	575090	792389
	9	575090	794027
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	11	575090	793586
	12	575090	794139
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Transect 31	16	575090	793038
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	18	575090	794323
	19	575090	793506
	20	575090	794348
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	5	575340	794179
	6	575340	794003
	7	575340	793284
	8	575340	794124
	9	575340	793540
	10	575340	793692
	11	575340	793565
	12	575340	794246
	13	575340	792696
	14	575340	794037
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