Site Unseen:
Archaeology, Cultural Resource Management, Planning and Predictive Modelling in the Melbourne Metropolitan area.

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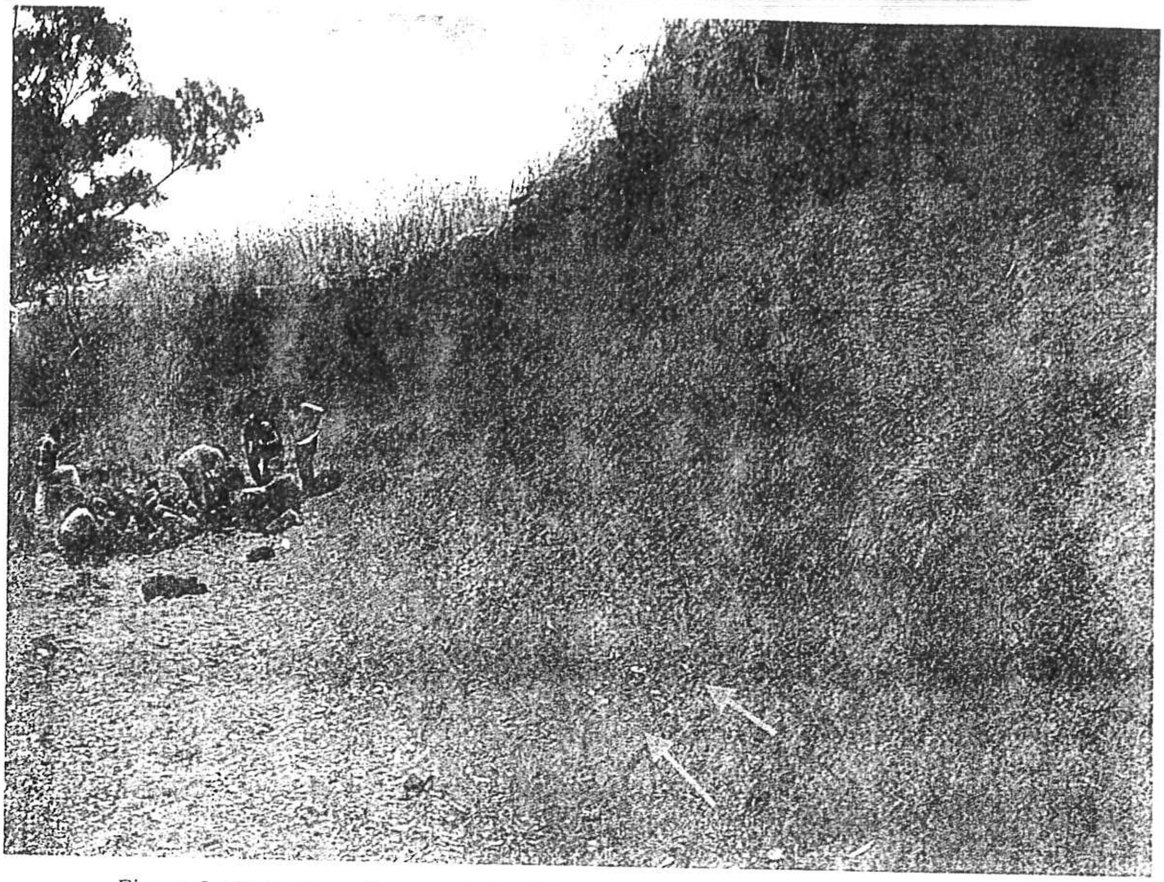


Figure 5-18: Section of exposed alluvial terrace at the DC1 survey area. Four thinly bedded gravel beds can be seen (arrowed) in this image, indicating past stream activity. This is important in identifying the presence of deeply stratified deposits, which may contain traces of ancient Aboriginal cultural material.

The alluvial sediments at DC1 are of considerable archaeological potential, given that similar sedimentary sequences lower in the Maribyrnong catchment have revealed evidence of Pleistocene Aboriginal occupation of the region. Although the identified silcrete microlith was most likely intrusive to this site, the geomorphological sequence identified at DC1 is nonetheless likely to contain in situ archaeological deposits of considerable antiquity.

Organ Pipes National Park.

The penultimate fieldwork session of two-weeks duration was conducted at Organ Pipes National Park between January 24th and February 7th, 2001. Organ Pipes National Park (OPNP) is located approximately 20 kilometres northwest of the Melbourne CBD, just off the Calder Freeway at Sydenham (Figure 5-20 and 5-23). The park is divided in two by Jacksons Creek, a major tributary of the Maribyrnong River. The confluence of Jackson's Creek and Deep Creek is approximately 2 kilometres south (downstream) of OPNP. The irregular boundary of the park encloses an area of some 140 ha of basalt plain and deeply dissected creek valley landscapes. OPNP is registered on the United Nations list of National Parks and Protected Areas as a Category III (Natural

Monuments) area, primarily to reflect the geological significance of the basalt columnar jointing formations that give the park its name (Hills, 1975; Parks Victoria, 1998a).

Figure 5-19: Another view of the alluvial deposits at DC1. To give some sense of scale, the person arrowed in green is 201 centimetres tall. The blue arrow indicates where the one small silcrete microlith was found at DC1.The red lines delineate the top and bottom of the extant gravel beds.

The park is situated on the 'Keilor Plains', which forms a small part of the greater Western Victorian volcanic plains stretching from Melbourne to Millicent in South Australia (Hills, 1975), a distance of some 450 kilometres. Although a comparatively small park, the OPNP protects a sample of the basalt plains land system located in close proximity to Melbourne. This land system is under considerable development pressure northwest along the Calder Freeway corridor. The OPNP also protects a small part of the least modified area of Volcanic Plain grassland and grassy woodland west of Melbourne (Parks Victoria, 1998a). Less than 1% of the original grasslands of Western Victoria survive intact today (Jones, 1999; Society for Growing Australian Plants, 1995). Of this surviving grassland, an extremely small proportion is located on public lands (Parks Victoria, 1998a). Of significance to the greater project, as well as having implications for the archaeological record of the OPNP area, the Maribyrnong Valley (including the Jackson's Creek area) is the only natural 'corridor' following significant waterways from the forested mountains of Mount Macedon to the north, to the confluence of the Maribyrnong and the Yarra Rivers near Port Phillip Bay.

Topographically, the OPNP area is similar to the Deep Creek farms area. However, the incised valley at OPNP is deeper, wider and steeper than that evident higher up in the Maribyrnong catchment. The terrain surrounding the deeply incised valley of OPNP is composed almost entirely of basalt plain of very low relief. The terrain further north in the catchment (such as at the Deep Creek farm sites) tends towards a mixture of low hills and basalt plain. The huge expanses of relatively flat basalt plain, characteristic of the area to the west of Melbourne, are relatively treeless grasslands. Trees occur mainly on creek or river margins, or around swampier areas (Aboriginal Affairs Victoria, 1996). This lack of trees is characteristic of the majority of the remnant basalt plain grasslands.

Although the volcanic soils of the basalt plains are highly fertile, they are 'shallow, heavy and prone to waterlogging. They swell in winter and crack deeply in summer. The plains also have low rainfall, hot summers, winter frosts, and ever-present wind' (Society for Growing Australian Plants, 1995:12). Indigenous tree species have generally not adapted to these conditions, although the occasional Sheoak, Buloke, Wattle or Banksia survives on the otherwise inhospitable plains. The dominant vegetation regime of the basalt plains before settlement was grassland composed mainly of Kangaroo Grass (*Themeda triandra*), Common Tussock Grass (*Poa labillardieri*), and Wallaby Grass (*Danthonia setacea*).

Many other forms of indigenous vegetation were also common on the fertile basalt plains, such as daisies, lilies, orchids, a variety of other grasses, and native peas. Wetland areas were relatively common on the Basalt Plain in the later Holocene, and these were predominantly fringed with River Red Gum (*E. camuldulensis*) and had a grassy under story dominated by Wallaby Grass and Tussock Grass. These wetter areas also supported rich crops of various types of daisies. (Society for Growing Australian Plants, 1995). An area of grassland and grassy woodland such as the OPNP was home to a wide variety of vegetation before the arrival of Europeans. The vegetation of the OPNP area was broadly similar to that described above, while the escarpment area was home to a dense woody scrubland, with a variety of species including correas, bottlebrushes, acacias and sweet bursaria (Melbourne and Metropolitan Board of Works, 1984; Society for Growing

Australian Plants, 1995). This greater diversity was mainly a result of the shelter and drainage provided by the valley walls, and the more diverse soils of the escarpments.

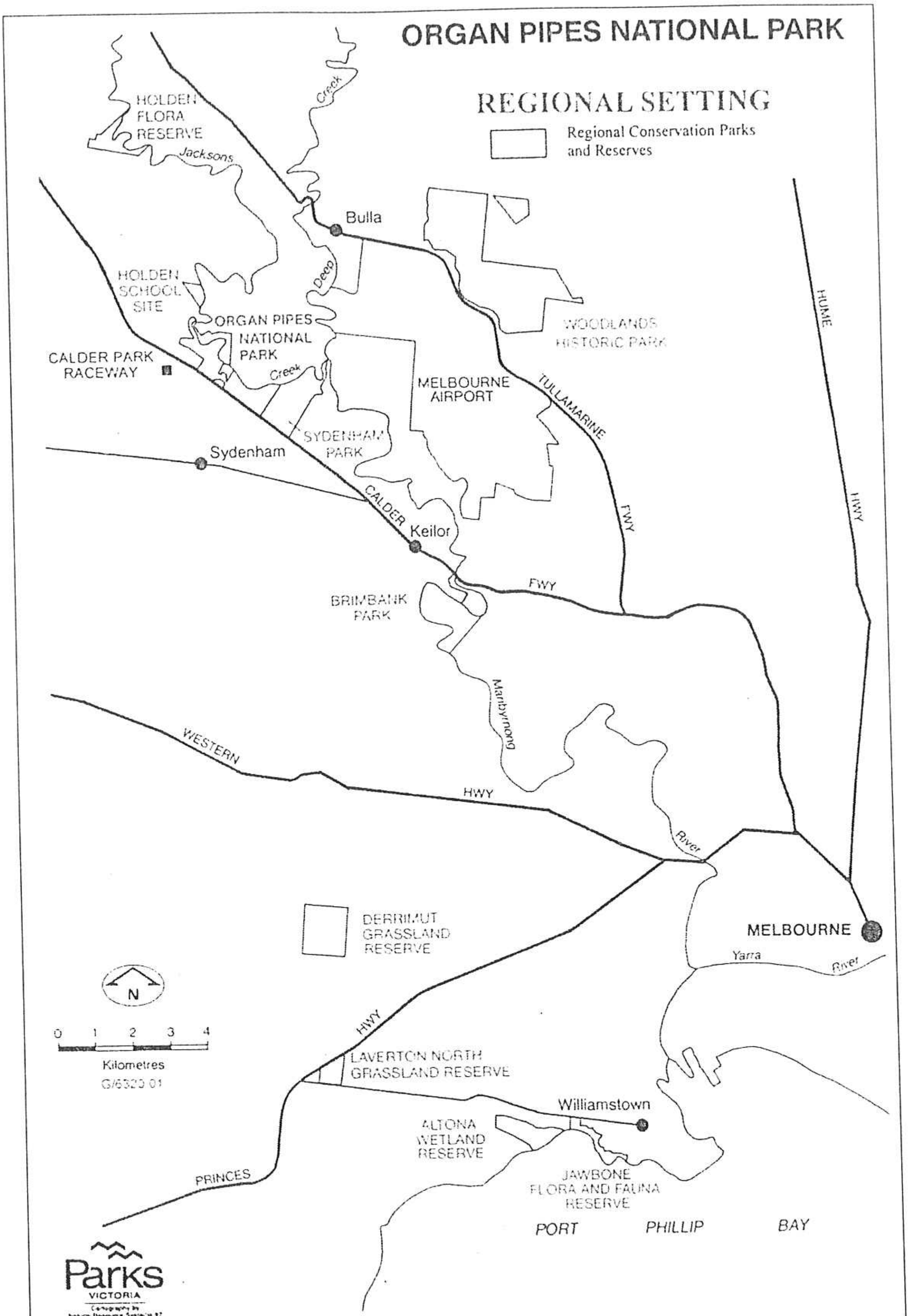


Figure 5-20: Map showing the location of Organ Pipes National Park in relation to the Melbourne CBD and Woodlands Historic Park. Source: Organ Pipes Management Plan, Parks Victoria, 1998.

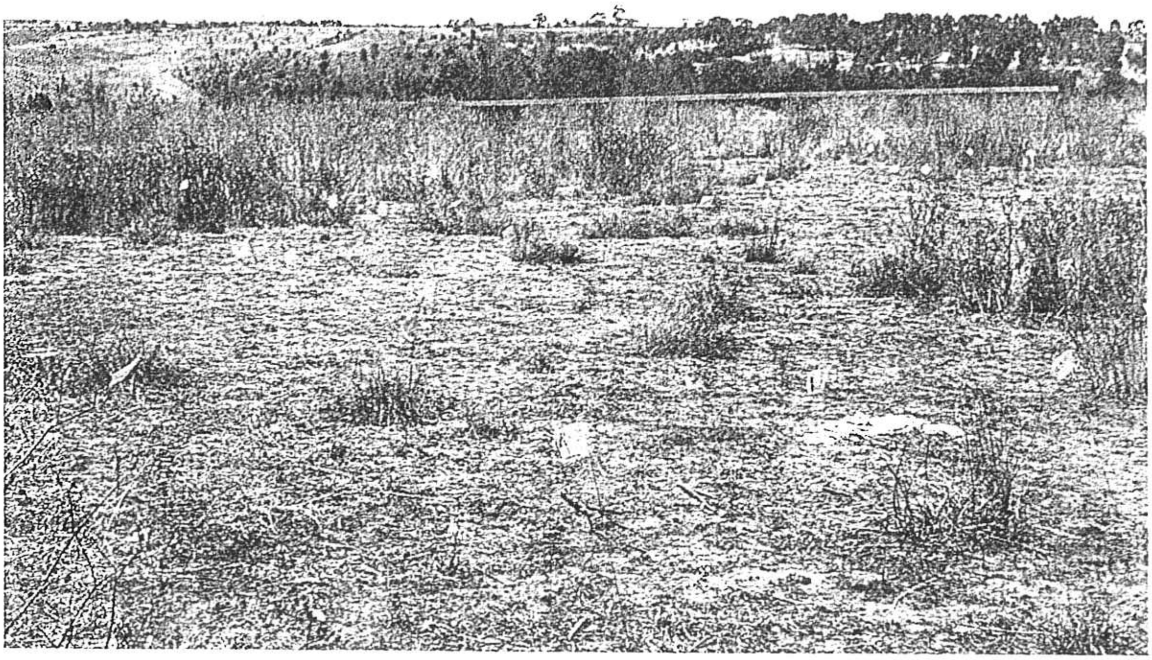


Figure 5-21: A section of the large artefact scatter that extends for virtually the entire length of the OPNP. This image was taken approximately 75 metres back from the edge of the escarpment, which can be seen by the row of small trees in the immediate background. The red line marks the approximate location of the edge of the western side of the escarpment.

It has been shown that of the 550 species of plants endemic to the basalt plains, 25% of these are recorded as having been used by Aboriginal people, with at least 20% being for food (Gott, 1999). Gott (1999) also suggests that at least 50% of the diet of Aboriginal people living on the basalt plains consisted of plant foods, and that the abundance of plant types also influenced the availability of animal food for human consumption. These incredibly rich and diverse patches of grassy woodlands bordering the basalt plains were also home to an enormous variety of fauna. The Atlas of Victorian Wildlife lists 15 mammal, 148 avian, nine amphibian, 16 reptilian and three fish species as being indigenous to the region (Ecology Australia Pty Ltd, 1996).

The generally low relief and heavy soils of the basalt plains causes severe waterlogging during the winter months (June-August). During the winter months, the plains are also subject to strong, bitterly cold, westerly winds. Conversely, drought-like conditions are common in the extremely dry summer months, while the plains are blasted by hot winds (Aboriginal Affairs Victoria, 1996). The colder and wetter winter months, combined with a lack of shelter and fuel for fires would have made the majority of the open plains unsuitable for more permanent occupation by Aboriginal people in all but times of absolute necessity. These same factors, however, increase the attractiveness of localities such as the OPNP (Jackson's Creek) area. The deeply incised valleys provide shelter from the elements year round (particularly the wind), and the heavily wooded areas within these valley areas would have provided adequate supplies of timber for fuel, shelter and tool manufacture for Aboriginal people. Similarly, in summer the valley edges would have provided shelter from the relentless hot winds, while providing campsites in close proximity to permanent fresh water. These valley environments are not without detractions however. Large parts of the region surrounding OPNP are in a rain shadow caused by Mount Macedon to the northwest. This rain shadow reduces the amount of rainfall received at OPNP to around 580mm per annum, and as low as 400mm per annum in other nearby areas (Figure 5-22). The majority of this rain falls in winter and early spring (June-September), and can cause localised flooding and erosion in the Maribyrnong catchment, particularly downstream of OPNP (Parks Victoria, 1998a). Flooding in recent years (1993) destroyed vegetation and heavily eroded the banks of Jackson's Creek at OPNP (Parks Victoria, 1998a).

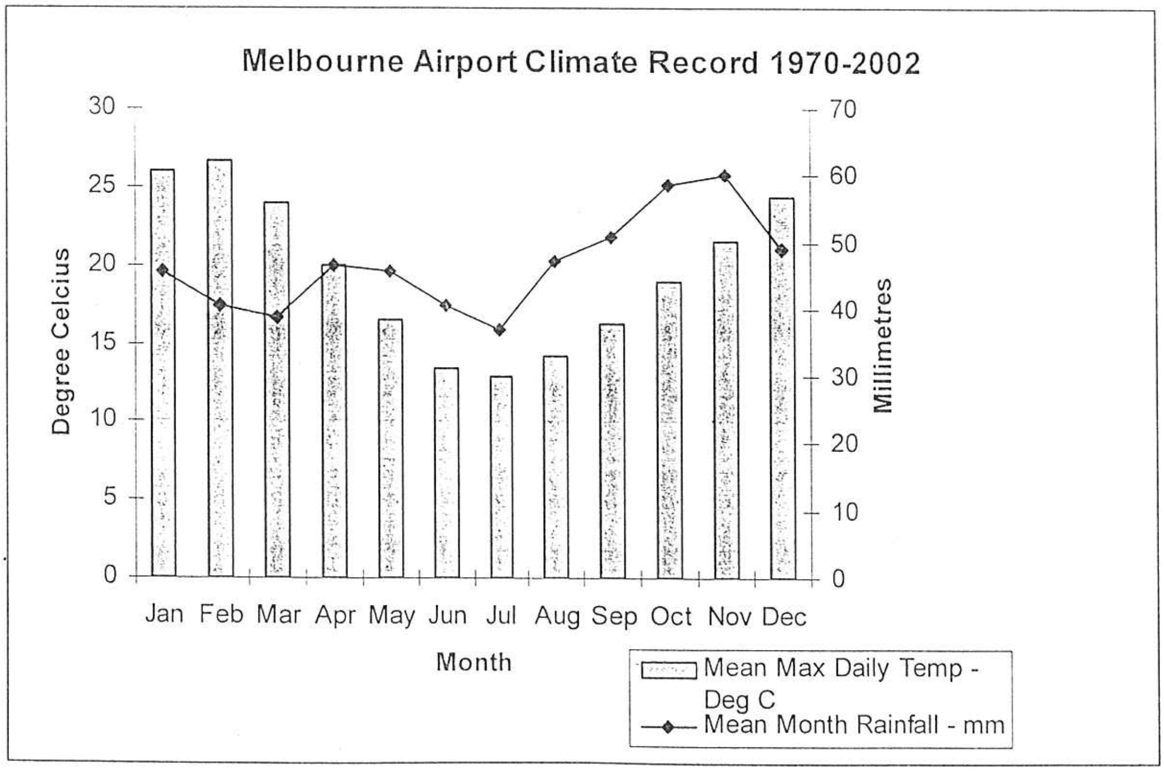


Figure 5-22: Melbourne Airport climate record for the period 1970-2002. This is the closest contemporary weather station to both OPNP and WHP

Previous Archaeological Work

Only one previous archaeological survey has been undertaken in OPNP. Annette Xiberras completed this survey as part of an indigenous training program in 1991 (Xiberras, 1991). Seven previously unrecorded sites were identified. Sixteen registered sites are located at OPNP. These sites consist of 12 artefact scatters, two isolated artefacts, one quarry, and one exposure in a bank.

OPNP Fieldwork

The vegetation and topography (Figure 5-23) of OPNP presented similar surveying challenges to those encountered in all of the previously surveyed areas. Both indigenous grasses and non-indigenous weeds (particularly Chilean Needle-Grass, Serrated Tussock, and Phalaris) are present throughout the park. Thus, ground surface visibility in the majority of OPNP could only be described as very poor. Despite the poor visibility, it was decided to attempt to survey as much of the park as possible in the two weeks of allocated fieldwork.

The method of survey utilised was the same close-interval transect method as used in all the other areas surveyed for this project. Although the field crews physically walked transects through the majority of the park, only 25.4 ha (17.7%) was intensively inspected. The remainder of the park was covered in dense vegetation affording no ground surface visibility whatsoever. Visibility in the 25.4 ha intensively inspected ranged between 10% and 100%.

Summary of OPNP Fieldwork

Approximately 25.4 ha of OPNP were intensively surveyed during the course of the two-weeks of fieldwork at OPNP. This resulted in the location and recording of approximately 5,060 stone and glass artefacts (196.85 artefact/ha). This was archaeologically by far the richest and most diverse area encountered during the entire survey program (Figure 5-25). The majority of material was located in a continuous scatter along the interface of the basalt plain and the escarpment edge, on the western side of the valley. This stone artefact scatter extends along the escarpment uninterrupted for approximately 1,000 metres. Where roads or buildings break the scatter, it continues on the other side of the disturbance. This is an example of the 'continuous' nature of the archaeological record in this region (Figures 5-21 and 5-24).

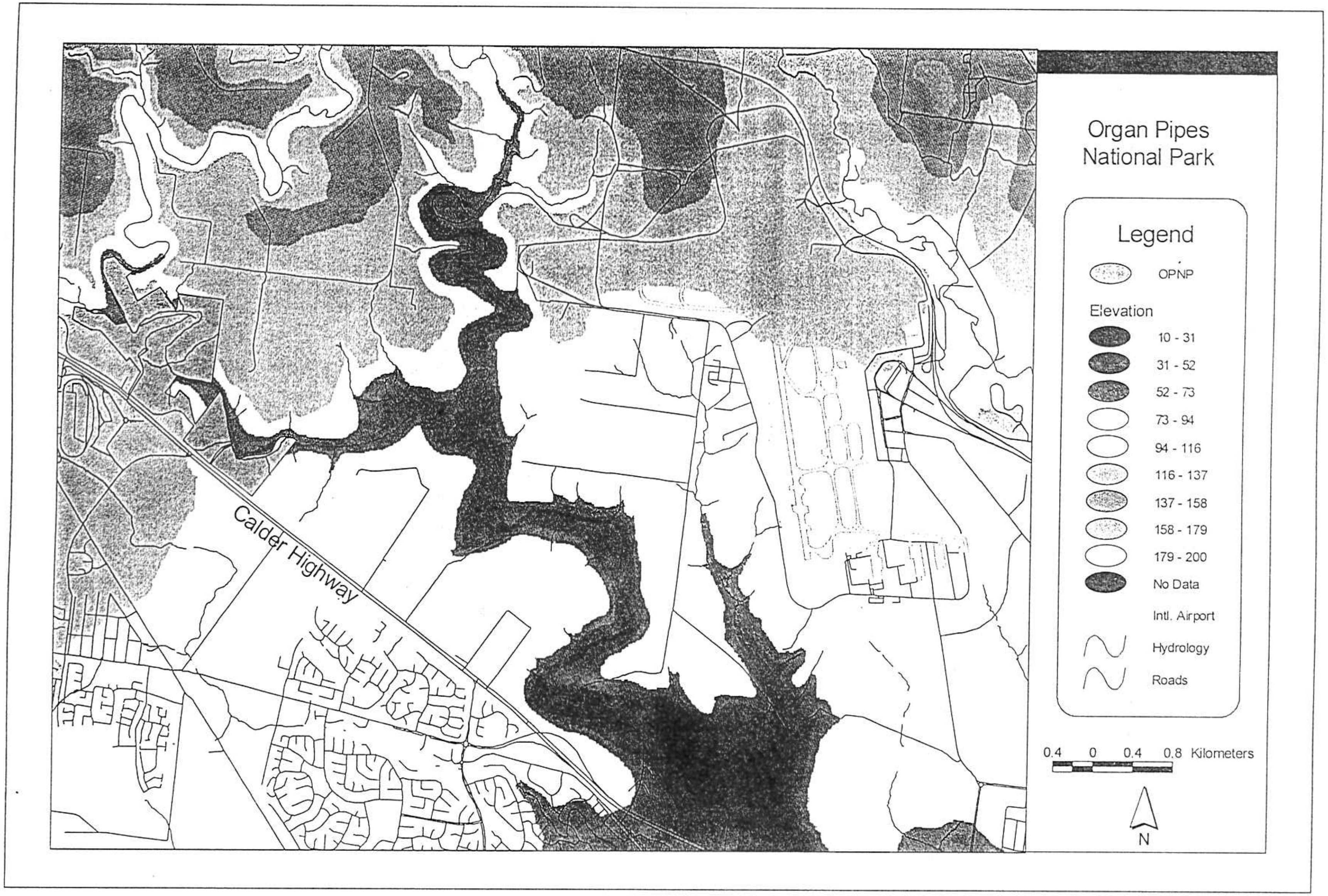


Figure 5-23: Organ Pipes National Park and environs.

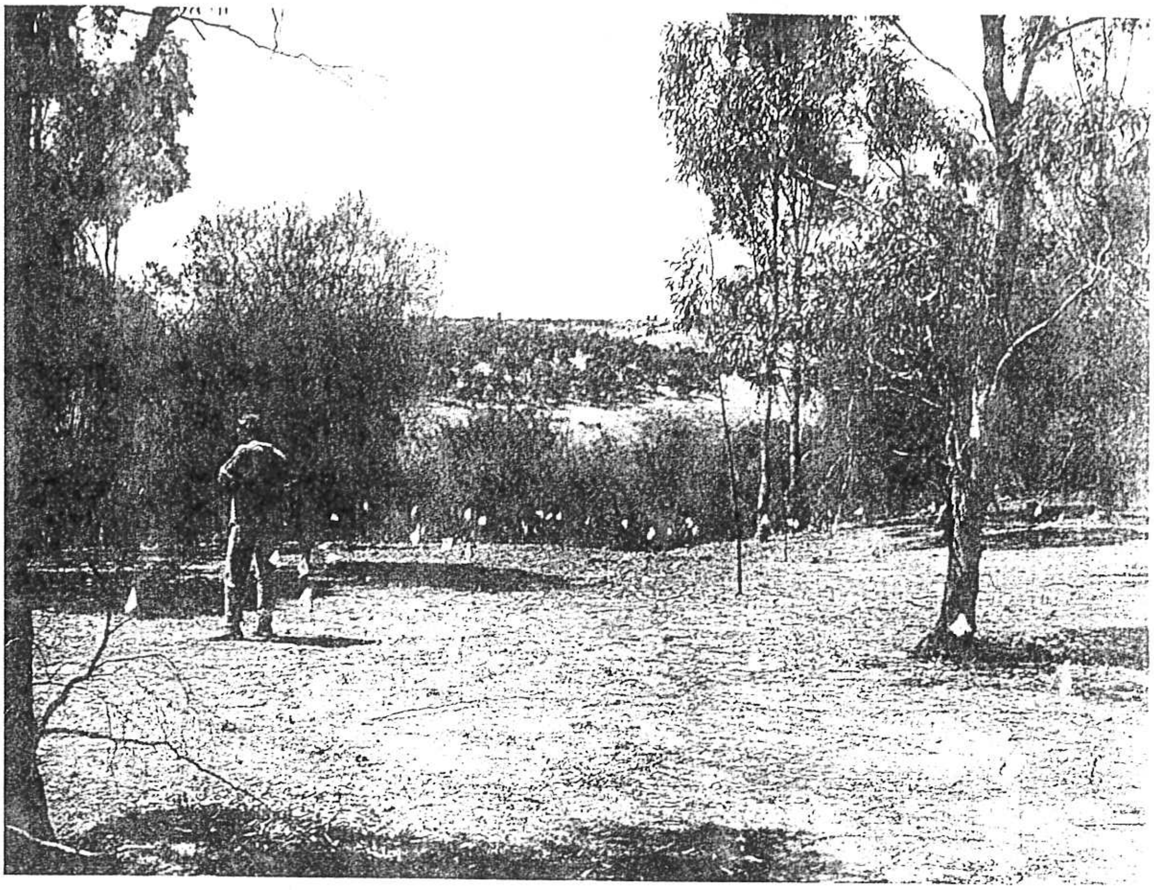


Figure 5-24: Part of the extensive stone artefact scatter along the western edge of the escarpment at OPNP.

Figure 5-25: Artefacts recorded in the OPNP survey. The larger piece is a clearly used hammer stone, also with anvil pitting on two margins

Smaller amounts of archaeological material were also located along the banks of Jackson's Creek. The area where the majority of the material was located (see Figure 5-26, below) would have been the more attractive occupation area for a number of reasons. The western side of the escarpment (just below the 'lip' of the basalt plain) is located in the lee of the prevailing winds; therefore, it is cooler and less humid than the valley floor in summer. It is safer in time of flood or fire; would have allowed observation along the length of the valley; but was close enough to Jackson's Creek to exploit the resident flora and fauna.

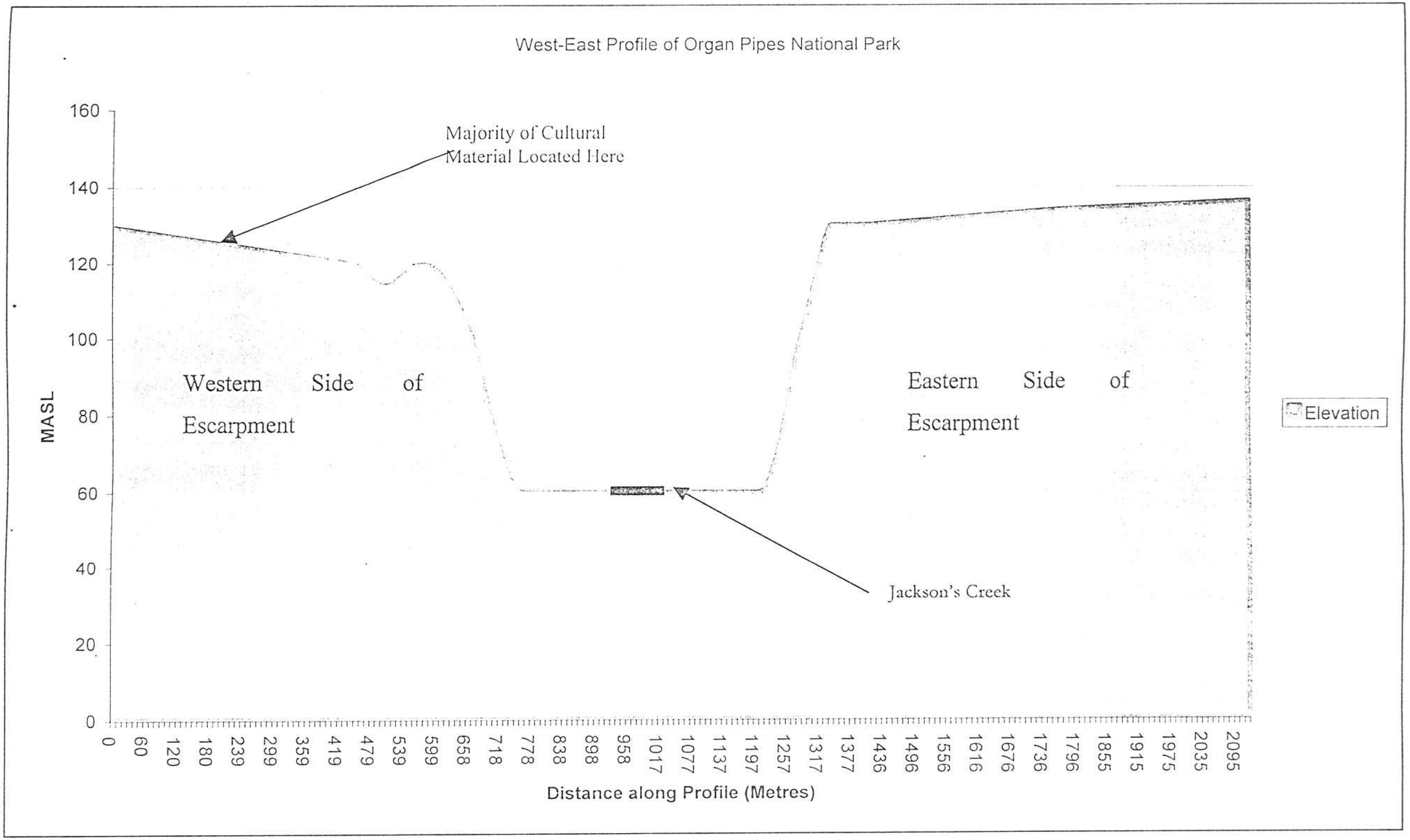
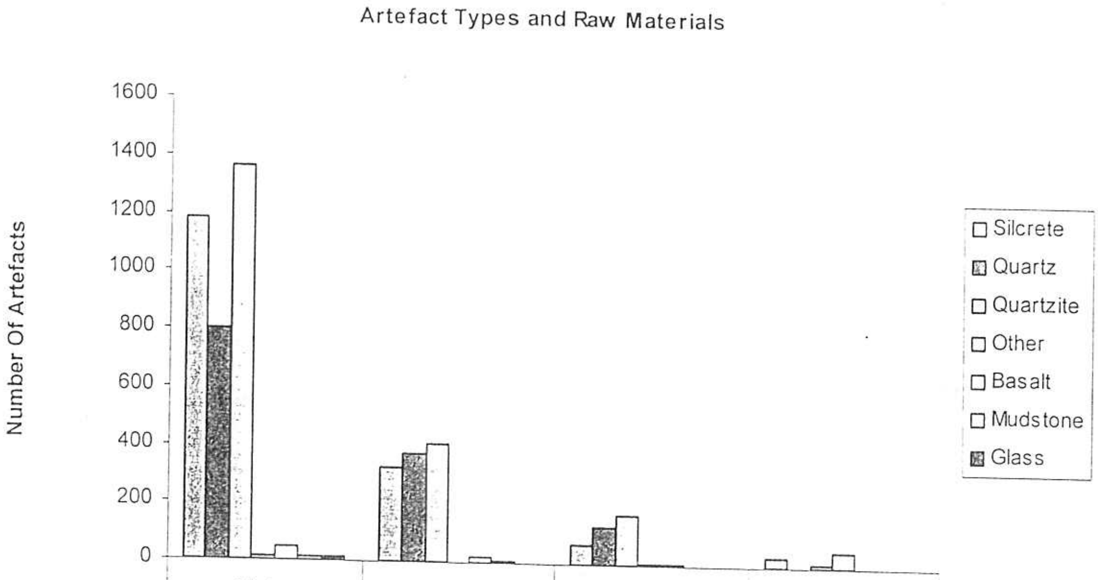


Figure 5-26: Profile of Organ Pipes National Park. The majority of cultural material was located on the western side of the escarpment, in the lee of the plain. This figure was generated using a landscape profiling routine in *ArcView 3.2*.The distribution of materials along the western margins of the escarpment can be seen in Figures 5-40 and 5-41 (below) .

Organ Pipes National Park (OPNP)

The Organ Pipes National Park session resulted in the discovery of the greatest amount of cultural material of the surveyed areas. Some 5,060 pieces of Aboriginal cultural material were recorded during this phase of the field survey.



	Flake	Cores	Debris or Debittage	Impements
Silcrete	1182	325	69	32
Quartz	803	373	129	1
Quartzite	1363	411	171	13
Other	12	2	8	58
Basalt	48	22	5	0
Mudstone	15	4	0	0
Glass	11	3	0	0

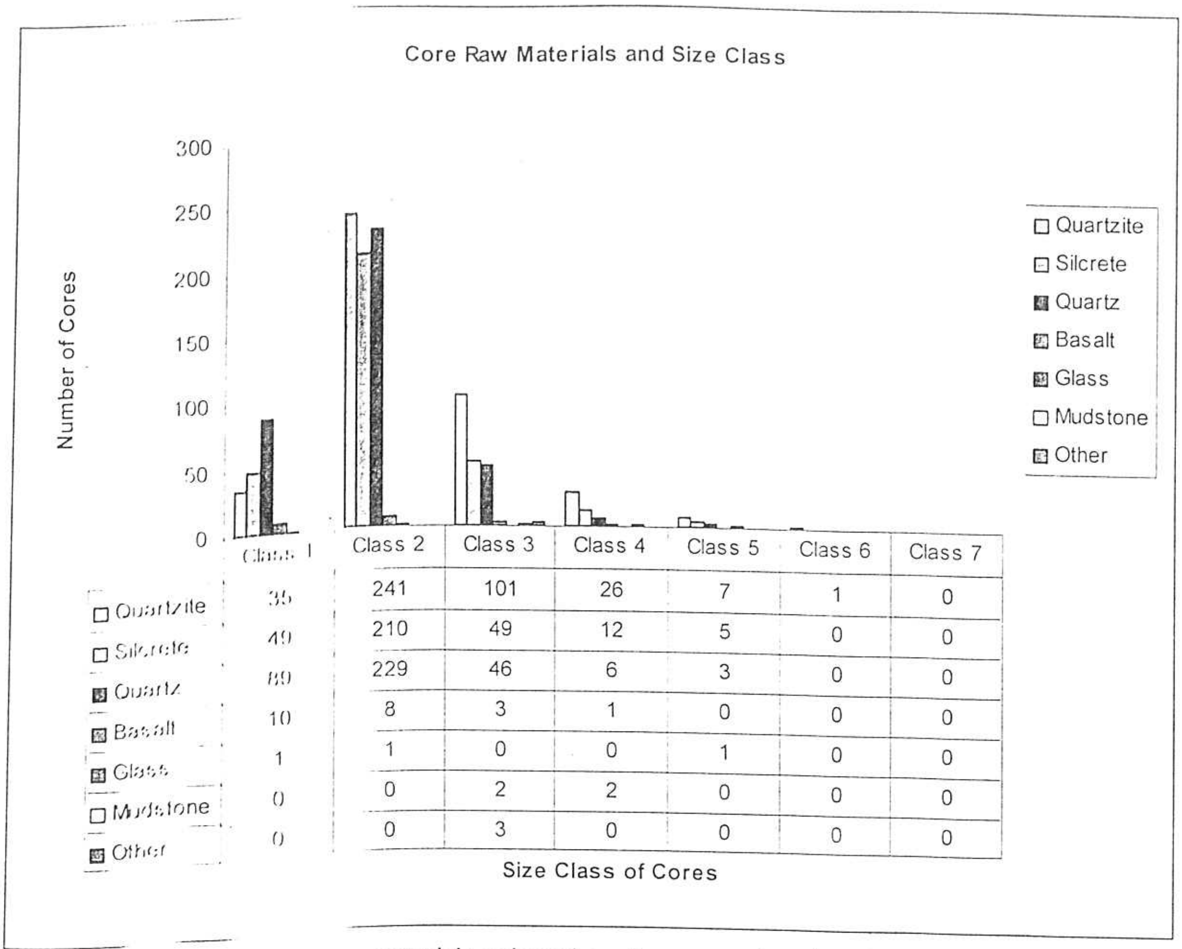
Artefact Type

Figure 9-9: Artefact types and Raw Materials-OPNP.

Artefact Type	N	Silcrete	Quartz	Quartzite	Basalt	Glass	Mudstone	Other	Total %
Flake	3,434	1,182	803	1,363	48	11	15	12	67.9
Cores	1,140	325	373	411	22	3	4	2	22.5
Debris or débitage	382	69	129	171	5	0	0	8	7.5
Implements	104	32	1	13	0	0	0	58	2.1
Totals	5,060	1,608	1,306	1,958	75	14	19	80	
(% of Total)	(100)	(31.8)	(25.8)	(38.7)	(1.5)	(0.3)	(0.4)	(1.6)	100

Table 9-24: Percentage of each artefact class and raw material-OPNP.

At OPNP 1,140 cores were recorded.



	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Class 7
Quartzite	35	241	101	26	7	1	0
Silcrete	49	210	49	12	5	0	0
Quartz	89	229	46	6	3	0	0
Basalt	10	8	3	1	0	0	0
Glass	1	1	0	0	1	0	0
Mudstone	0	0	2	2	0	0	0
Other	0	0	3	0	0	0	0

Figure 9-10: Core raw materials and number of cores per size class-OPNP.

Quartzite was the most common material in the OPNP assemblage. Quartzite cores accounted for 36.1% of the total number of cores recorded. Quartz (32.7%) and silcrete (28.5%) were the next most common raw materials. All other materials recorded account for only 2.7% of the total cores recorded. The majority of all cores fall in size class 2 (60.4%), while significant numbers of cores are size class 1 (16.1%) or size class 3 (17.9%). There was 64 cores larger than size class 3, accounting for 5.6% of the total assemblage. The majority (66.5%) of cores recorded did not display cortex.

Cortex %	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
N=1,140	758	21	58	4	49	16	49	1	65	2	64	0	21	1	10	4	10	0	3	3	1

Table 9-25: Core Percentage of Cortex-OPNP.

3,434 flaked pieces were recorded at OPNP-545 complete flakes, and 2,889 broken flakes.

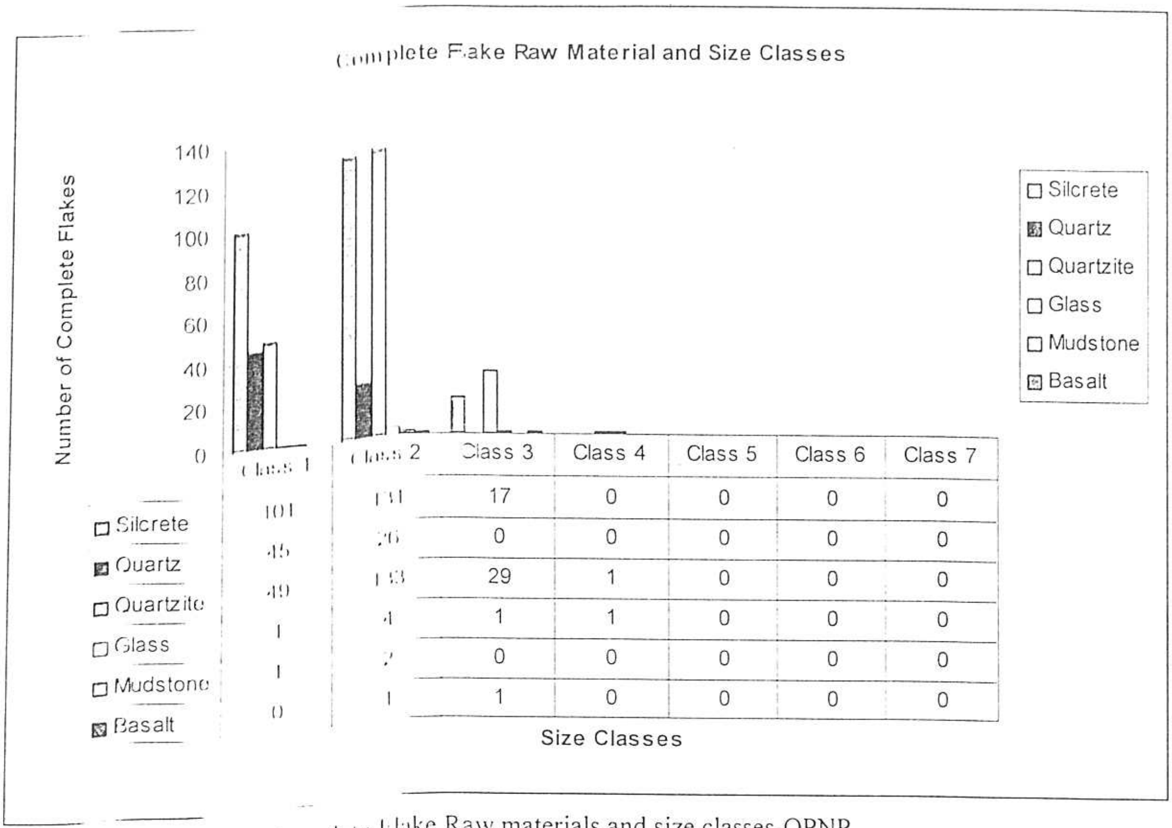


Figure 9-11 Complete Flake Raw materials and size classes-OPNP.

Silcrete was the dominant raw material used in the manufacture of complete flakes (45.7%), followed by Quartzite (38.9%) and Quartz (13.1%). All other materials account for only 2.4% of the total assemblage. The majority of complete flakes were size class 2 (54.7%), with significant numbers of complete flakes being both size class 1 (36.3%) and size class 3 (8.6%). Only 0.4% of complete flakes were larger than size class 3. 95% of complete flakes displayed no cortex.

Cortex %	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
N=545	516	5	5	0	6	0	2	0	2	0	8	0	1	0	0	0	0	0	0	0	0

Table 9-26 Complete Flake Cortex-OPNP.

2,889 broken flakes were recorded at OPNP.

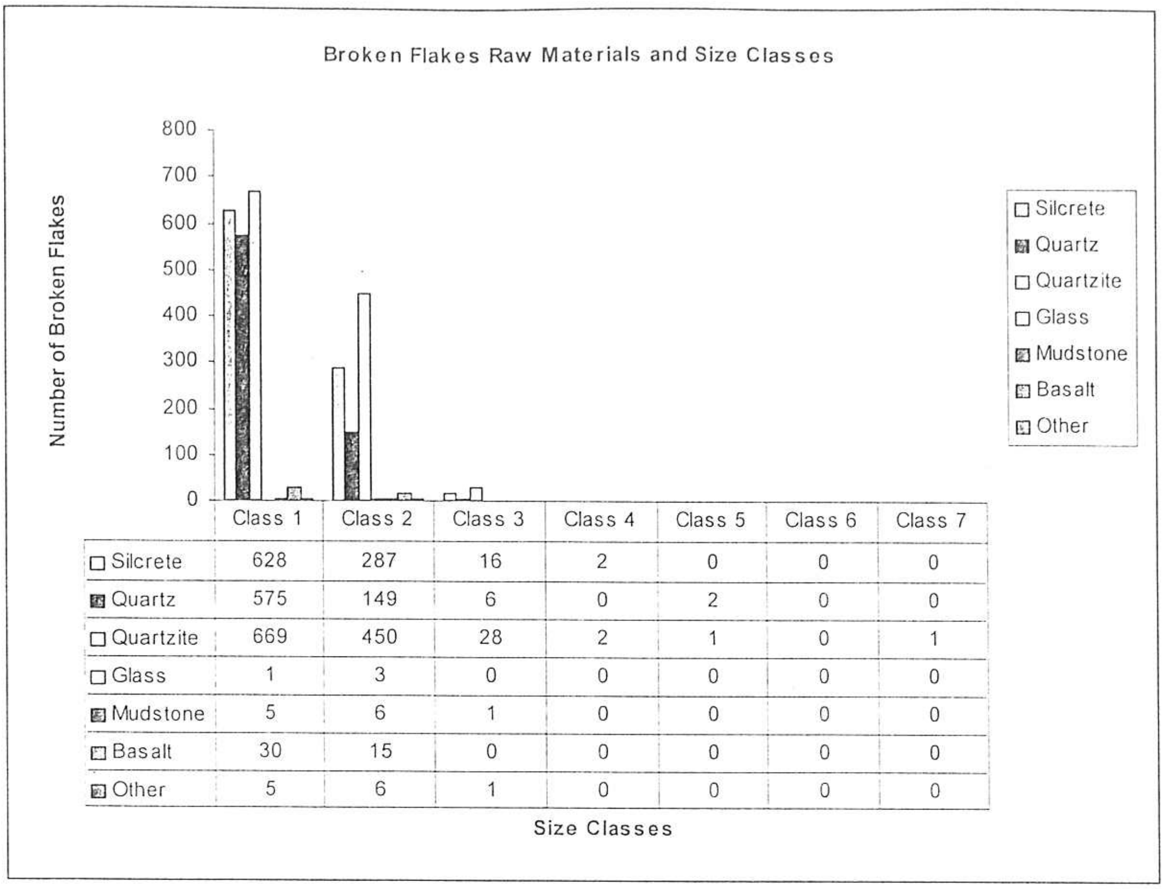


Figure 9-12: Broken flakes raw materials and size classes-OPNP.

Raw Material	N	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Class 7	Total %
Silcrete	933	628	287	16	2	0	0	0	32.3
Quartz	732	575	149	6	2	0	0	0	25.3
Quartzite	1,151	669	450	28	2	1	0	1	39.8
Glass	4	1	3	0	0	0	0	0	0.1
Mudstone	12	5	6	1	0	0	0	0	0.4
Basalt	45	30	15	0	0	0	0	0	1.6
Other	12	5	6	1	0	0	0	0	0.4
Totals	2,889	1,913	916	52	6	1	0	1	100

Table 9-27: Number and Frequency of broken flake raw material types-OPNP.

Quartzite was the dominant raw material in the broken flake artefact category (39.8%), closely followed by Silcrete (32.4%) and Quartz (25.34%). 66.22% of all broken flakes were size class 1, and 31.71% of broken flakes were size class 2. The remainder of all material types accounts for only 2.1% of all broken flakes. 92% displayed no cortex.

Cortex %	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
N=2,889	2,650	37	46	0	41	4	25	0	25	0	52	0	1	0	2	0	4	1	1	0	0

Table 9-28: Broken Flakes Percentage of cortex-OPNP.

Of the 5,060 artefacts recorded at OPNP, only 104 (2%) were recognisable formal tools. Each category of implement recorded will be addressed separately below.

Implement	N	%
Geometric Microlith	16	15.4
Scraper	22	21.2
Hammer stone	30	28.8
Grindstone	28	26.9
Backed Piece	8	7.7
Total	104	100

Table 9-29: Implements-OPNP.

1. Geometric Microliths

A total of 16 geometric microliths was recorded during the OPNP survey (15.38% of implements).

Raw Material	N	%	Class 1	Class 2
Silcrete	8	50	6	2
Quartz	1	6.2	1	0
Quartzite	7	43.8	4	3
Total	16		11	5
(% of Total)			(68.8)	(31.2)

Table 9-30: Geometric Microliths-OPNP.

Silcrete was most common implement raw material (50%), followed by quartzite (43.8%), while 68.8% of the Geometric Microliths were size class 1. All were either class1 or class 2. None of the 16 Geometric Microliths recorded exhibited cortex.

2. Scrapers

A total of 22 scrapers were recorded at OPNP. Silcrete was the dominant raw material (77.3%), with the remainder being made on quartzite. 13 of the 22 scrapers displayed secondary retouch, while only four displayed cortex.

Raw Material	N	%	Class 1	Class 2	Class 3
Silcrete	17	77.3	6	8	2
Quartzite	5	22.7	1	3	1
Total	22		7	11	3
(% of Total)			(31.8)	(50)	(18.2)

Table 9-31: Scrapers-OPNP.

3. Hammer Stones

A total of 30 hammer stones were recorded at OPNP. All of the hammer stones were made on locally sourced quartzite river cobbles that showed characteristic evidence of the battering associated with stone tool manufacture.

Raw Material	N	%	Class 2	Class 3	Class 4	Class 5	Class 6
Quartzite River Cobbles	30	100	2	11	7	8	2

Table 9-32: Hammer Stones-OPNP.

All of the recorded hammer stones displayed considerable cortex, but none displayed any flaking.

Cortex %	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
N=30	0	0	0	0	0	0	2	0	5	0	10	0	2	1	3	0	1	0	0	3	3

Table 9-33:Hammer stone Cortex-OPNP.

4. Grinding Stones.

A total of 28 grinding stones were located during the OPNP fieldwork. These items displayed characteristic concave or convex polishing on at least one surface, and were often polished on multiple surfaces. Once again, all of the grinding stones were made on locally sourced quartzite river cobbles.

Raw Material	N	%	Class 3	Class 4	Class 5	Class 6	Class 7
Quartzite River Cobbles	28	100	5	14	3	3	3

Table 9-34: Grinding Stones-OPNP.

The majority of grinding stones were size class 4 or larger (82.14%), and cortex was present on all.

Cortex %	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
N=28	0	0	0	0	0	0	1	0	1	0	8	1	1	0	3	4	2	0	3	4	0

Table 9-35: Grinding Stone Cortex-OPNP.

5. Backed Pieces

A total of 8 backed pieces were recorded during the OPNP survey.

Raw Material	N	%	Class 1	Class 2
Silcrete	7	87.5	5	2
Quartzite	1	12.5	0	1
Total	8		5	3
(% of Total)			(62.5)	(37.5)

Table 9-36: Backed Pieces-OPNP.

Most backed pieces were made on silcrete (87.5%), and none displayed any cortex.

A total of 382 pieces classified as debris or débitage was recorded during the OPNP survey (8% of total).

Raw Material	N	%	Class 1	Class 2	Class 3	Class 4
Silcrete	69	18.1	27	36	5	1
Quartzite	171	44.8	25	128	16	2
Quartz	129	33.8	84	45	0	0
Basalt	5	1.3	4	1	0	0
Other	8	2.1	1	1	6	0
Total	382		141	211	21	3
(% of total)		100	(36.9)	(55.2)	(5.5)	(0.8)

Table 9-37: Debris or débitage-OPNP.

Cortex %	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
N=382	327	4	12	0	8	1	4	0	6	0	12	0	7	0	0	0	1	0	0	0	0

Table 9-38: Debris or débitage Cortex-OPNP.

Quartzite accounted for 44.8% of all debris, while 55.2% of all pieces of debris were size class 2. 85.6% of debris displayed no cortex.

Size class one (48.6%) artefacts were the most common at OPNP, while quartzite was the most common raw material (38.7%), and 84.8% of all artefacts displayed no cortex.