

Chapter 6: Re-Examination of Stuarts Point 1 – Results

6.1 Introduction

In this chapter I assemble all of the evidence available to this research from Cutting II, Stuarts Point 1. As in Chapter 5, I will describe all of the excavated material from Cutting II of the 1975 Stuarts Point I excavation. This description includes the stratigraphy, shellfish remains, fish remains, and terrestrial faunal remains. I will also include a section on the radiocarbon dates obtained on shellfish remains in 2002, and compare these with the dates obtained by Connah (1975).

6.2 Site Description

The shell midden site of Stuarts Point 1 is located on the estuarine peninsula of Stuarts Point approximately two and a half kilometres north of the southernmost point of the peninsula. The midden sits atop a Pleistocene sand dune dated to approximately 120,000 BP (Mundell 2000). Extensive shell midden deposits extend almost continuously along the western edge of the peninsula, with scatters of broken and fragmented shell along the eastern edge (Figure 3.14). When I visited the site in 2001, a large shell mound was located near the southern end of the peninsula. The peninsula is surrounded on the eastern, southern, and western margins by estuarine waters, and is quite heavily vegetated (Figure 6.1). The site of Stuarts Point 4 which was salvaged after being transgressed by a backhoe during 1974 (Figure 3.12) showed a similar profile as that in Figure 6.2. Two excavation pits were excavated, separated by 2 metres, Cutting I being to the east of Cutting II (Figure 6.2). A further two pits were excavated at the eastern and western edges of the transect (Figure 6.2). As already stated the site was excavated in arbitrary spits of 10 cm to a depth of nearly two metres (Figure 6.3).



Figure 6.1 The Stuarts Point 1 Midden Under Excavation (Connah, 1975)

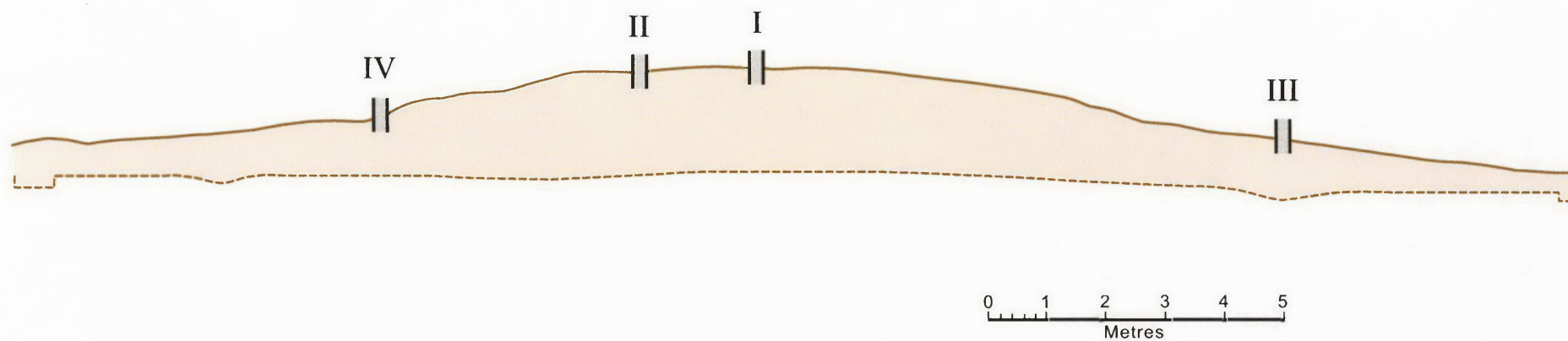


Figure 6.2 Schematic Elevation of the Stuarts Point Shell Midden (after Connah et al., 1976)



Figure 6.3 Cutting II, Stuarts Point

6.3 Radiocarbon Dating

The dating of the Stuarts Point site was the subject of some controversy when it was published in 1976. It was suggested that the site needed re-dating (Beaton 1985), perhaps on the shell rather than charcoal, as it was felt that charcoal from beneath the midden may have been introduced as a result of bush fires, rather than being a result of cultural deposition. Connah had dated Spits 8 and 9 (90-110 cm below surface), which appears to be just below where a large tree root had penetrated the cutting, and Spit 13 (140 – 150 cm below surface), which was noted in the field notes as containing sparse cockles, the ‘odd’ marine snail, and ‘the odd’ quartz flake. These charcoal samples returned dates of 3750 ± 280 BP, and 9320 ± 160 BP (Table 6.1). The basal date made this site the oldest recorded for a coastal shell midden on the mid-north coast of New South Wales (Connah 1976:3). Further samples were submitted for dating (Connah 1976:3), but the results of these have not been published.

Table 6.1 Radiocarbon Dating of Stuarts Point I, Cutting I (Connah 1976:3)

Reference	Date	Provenance	Dating Sample
SUA482	3750 ± 280	Cut 1/Lay 2/Spit 8 & 9	charcoal
SUA484	9320 ± 160	Cut 1/Layer 2/Spit 13	charcoal

6.3.1 Re-Dating of Stuarts Point 1, Cutting II

In order to confirm the antiquity of the occupation of the Lower Macleay I chose to use available funds to re-date the Stuarts Point site. Cutting II was chosen for this re-dating, because of its more horizontal stratigraphy; and charcoal from the sites was not available, and in light of some of the criticisms of the previous dates, shell was used as samples for dating. It was decided to obtain five radiocarbon dates on shell from throughout the site. Sample 1 (FR57) was oyster shell (*Saccostrea glomerata*), while all of the other samples (FR227, FR322, FR335, FR379) were *Anadara trapezia*. Oyster

(*Saccostrea glomerata*) shell needed to be used for the first sample because sufficient *Anadara trapezia* shell to allow for a radiocarbon date to be possible from the upper layers of Cutting II could not be located in the University of New England archaeological storage unit.

The dates on Cutting II returned from Waikato laboratory (Table 6.2) are somewhat different to those obtained by Connah on Cutting I (Table 6.1). The uppermost date on Cutting I was 3750 \pm 280 BP, taken on a sample from 90-110 cm below surface, which is in keeping with that obtained for 100-110 cm below surface on Cutting II, 4087 \pm 58.

Table 6.2 Radiocarbon Dates Stuarts Point I, Cutting II – Marine Reservoir Corrected (Stuiver et al. 1998); Delta_R 10 \pm 7.

Sample No	Reference	Provenance	Depth B.S.	Sample Type	Date
FR57	Wk11201	Cutting II/Layer 1/Spit 3	0-30cm	oyster	3477 \pm 57
FR227	Wk11202	Cutting II/Layer 2/Spit 5	60-70cm	cockle	3898 \pm 53
FR322	Wk11203	Cutting II/Layer 2/Spit 9	100-110cm	cockle	4087 \pm 58
FR335	Wk11204	Cutting II/Layer 2/Spit 10	110-120cm	cockle	3926 \pm 58
FR379	Wk11205	Cutting II/Layer 2/Spit 13	140-150cm	cockle	4052 \pm 54

However, the dates vary widely when those taken on samples from Spit 13, 140-150cm below surface in both cases, are considered. Cutting I was dated at over 9,000 BP on the charcoal sample, whereas the shell sample from Cutting II returned a date that is statistically little different from that obtained at 100-110 cm below surface (A. Hogg, Waikato Laboratory, pers com, Aug 2002). The more recently obtained dates on Cutting II present a history of occupation of around 500 years.

There could be a number of reasons for the wide variation in radiocarbon dates of the two cuttings. The obvious one is that they represent very different stages of occupation. This however may be unlikely considering their close physical association. The charcoal used to obtain the basal date on Cutting I may have been introduced to the site by means other than cultural deposition, such as being deposited after bush fires. There are also 27 years

represented between the two dating incidents. Technology and techniques for carrying out radiocarbon dating have improved somewhat during this time. The result of the 2002 dating of the shell from Cutting II must leave open the question of the accuracy of the 1975 dates on Cutting I for the present, until funds can be obtained to re-date associated material from the same excavation pit.

The radiocarbon dates obtained for Cutting II were calibrated using the OxCal computer program, the results of which appear in Figure 6.4.

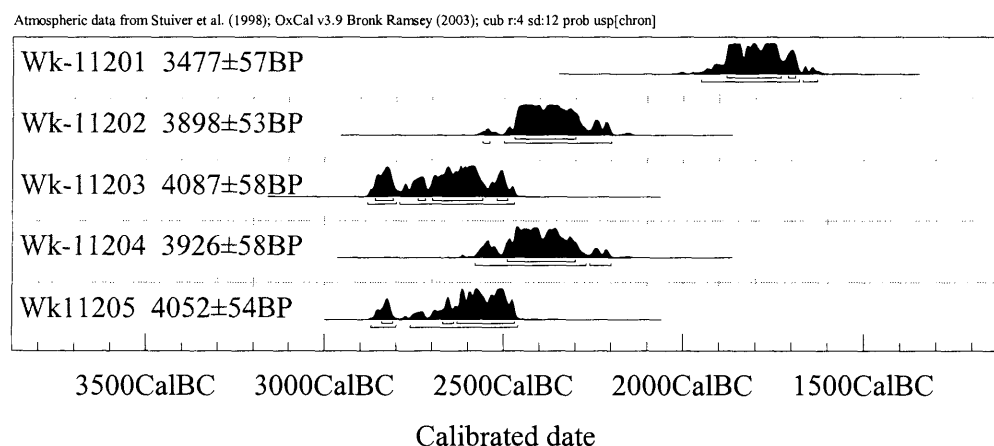


Figure 6.4 Calibrated Dates – Stuarts Point 1, Cutting II

6.4 Cutting II, Stuarts Point 1 – 1975 Excavation

Layer 1/Spit 1: 0-10cm BS

“Black humus, shell-free for upper 2-3 cm then fragments of shell, some whole, including one whole oyster complete with lid. Charcoal present but discarded. Human bone present, photographed and bagged separately.”

Weight of deposit excavated was 532.25 kg.

The charcoal present in this spit was discarded due to the possibility of contamination.

The 'day book' notes that "the site has clearly been burnt off in recent years: burnt trees and stumps are present near the excavation area".

Layer 1/Spit 2: 10-20cm BS

“Black humus containing shell, most of which is fragmentary. Oyster dominate. A few small unopened cockles were found. Worked stone and bone present.”

Weight of deposit excavated was 442.05 kg.

Layer1/Spit 3: 20-30cm BS

“Black soil, containing much shell, both whole and fragmented. Oyster dominant. A few unopened juvenile cockle shells noted. One bone point was found in sieve.”

Weight of deposit excavated was 220.25 kg.

This spit was radiocarbon dated for this analysis using oyster shell (*Saccostrea glomerata*) to 3477 \pm 57 BP (Wk-11201).

Layer 2/Spit 1: Surface to 30cm

The 'day book' notes that Layer 2 is defined as "shell deposit proper". Layer 2 was reached after 30cm in Cutting II, but not until 50cm in Cutting I.

"Very dense shell in dark brown soil which dries to a paler surface. Much shell is fragmentary. Oyster predominant species. Abundant bone. Less worked stone than in previous spits. Unopened juvenile cockles noted.”

Weight of deposit excavated was 257.25 kg.

Layer 2/Spit 2: 30-40cm BS

“Layer 2 continues unchanged. One bone point was found by trowel...at 38 cm BS. Oyster continues to be dominant species, although in some areas cockles are most frequent. Juvenile unopened cockles found. Cockles most frequent in SW corner and along western section for about half its length.”
Weight of deposit excavated was 345.25 kg.

Layer 2/Spit 3: 40-50cm BS

“Very shelly layer in brownish black soil continues. Oysters predominate, one oyster found containing yellow sand. One bone point was retrieved from the sieve. Juvenile unopened cockles present.”
Weight of deposit excavated was 486.5 kg.
A large tree root (approximately 3cm in diameter) had grown through this spit (day book).

Layer 2/Spit 4: 50-60cm BS

“The trench was halved so that it measures 2 x 1 metres. Very dense shell layer with a gradation from east to west so that oysters predominate in east and cockles seem more prominent in the western corner. Abundant bone.”
Weight of deposit excavated was 128 kg.
The 'day book' does not go into any detail of why the excavation pit was halved in area.

Layer 2/Spit 5: 60-70cm BS

“Presence of juvenile unopened cockles. Black soil, dense shell, cockles becoming more frequent. Whelks becoming less. Bone point found in trench.”
Weight of deposit excavated was 151.75 kg.
This spit was radiocarbon dated for this analysis using *Anadara trapezia* shell to 3898±53 BP (Wk11202)

Layer 2/Spit 6: 70-80cm BS

“Densely packed shell, predominantly cockle. Some juvenile unopened cockles present. Abundant bone. Few artefactual stones.”

Weight of deposit excavated was 146.75 kg.

The day book notes that there is a "species change from oyster to cockle in east end section and 2/3 of area dug".

Layer 2/Spit 7: 80-90cm BS

“Densely packed shells in brown black soil. Cockles predominate in each part of spit. One bone point recovered from sieve. Presence of unopened juvenile cockles. Bondi point in sieve.....”

Weight of deposit excavated was 144.75 kg.

Layer 2/Spit 8: 90-100cm BS 90-100cm BS

“Presence of unopened oyster and unopened cockles. Densely packed shells, cockles predominate. In places little or no matrix material between shells which are very loose from point of view of digging a section through them.”

Weight of deposit excavated was 133.5 kg.

Layer 2/Spit 9: 100-110cm BS

“Presence of unopened cockles. As spit 8 but more matrix material between shells. Matrix now becoming a dark brown sandy material. Cockles and little else.”

Weight of deposit excavated was 179.5 kg.

This spit was radiocarbon dated for this analysis using *Anadara trapezia* shell to 4087±58 BP (Wk 11203).

Layer 2/Spit 10: 110-120cm BS

“Densely packed cockles with little dark brown sandy material between them. Most oysters that have been found bear traces of roots. Presence of mature unopened cockles.”

Weight of deposit excavated was 138.5 kg.

This spit was radiocarbon dated for this analysis using *Anadara trapezia* shell to 3926 \pm 58 BP (Wk 11204).

Layer 2/Spit 11: 120-130cm BS

“Densely packed cockles, in dark brown sandy matrix. Presence of juvenile unopened cockles.”

Weight of deposit excavated was 122.75 kg.

Layer 2/Spit 12: 130-140cm BS

“Densely packed cockle shell in dark brown sandy soil. Within 5 cm of surface of spit, came to a level of dark mottled sand with few cockles.”

Weight of deposit excavated was 173.5 kg.

Layer 2/Spit 13: 140-150cm BS

“Light coloured sand, some darker mottling, some yellow staining. Few shells. Whole and fragmented cockles. Small pieces of yellow conested (?) sand. Some charcoal. Little bone. The odd piece of quartz.”

Weight of deposit excavated was 193.5 kg.

This spit was radiocarbon dated for this analysis using *Anadara trapezia* shell to 4052 \pm 54 BP (Wk 11205).

This was the final spit excavated.

6.5 Re-Examination of Shellfish Remains Recovered from Stuarts Point 1, Cutting II

The weight of all of the shellfish remains recovered from Cutting II of the Stuarts Point 1975 excavation were logged in the 'trench book'. I have taken the totals for each spit from this information. I have also cross-checked these amounts with those presented in Callaghan (1980). The amounts and totals for each species appears in Table 6.3.

Table 6.3 Shellfish remains excavated from Stuarts Point 1, Cutting II

Taxa	L1S1	L1S2	L1S3	L2S1	L2S2	L2S3	L2S4	L2S5	L2S6	L2S7	L2S8	L2S9	L2S10	L2S11	L2S12	L2S13
	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg
<i>Anadara trapezia</i>	8.25	13.75	10.25	13.25	41.75	39.75	14	28.5	50.75	87.25	86	120.3	61	72.55	65	2.5
<i>Saccostrea glomerata</i>	42.75	75.5	48.25	72	94.75	151	62.5	49.75	22.75	10.25	7	5.5	4	1	0.5	0
<i>Pyrazus ebinus</i>	4.75	3	1.75	2.5	6.5	8.75	0.5	0	0	0	0	0	0	0	0	0
Other	9	6.5	4.75	5.25	9	15	2.75	4	2.5	2	1.75	0.5	0.75	0.5	0.5	0
Fragments	52.75	69.5	32.5	49.5	61.25	55	13.75	16	13	12	10.75	13	10.5	5.5	4	0
	117.5	168.3	97.5	142.5	213.3	269.5	93.5	98.25	89	111.5	105.5	139.3	76.25	79.55	70	2.5

Layer 1 Spit 1

This spit contained a total of 117.5 kg of shellfish remains. Oyster (*Saccostrea glomerata*) accounted for the largest amount of identified shell with a weight of 42.75 kg (Table 6.3). 8.25 kg of cockle shell (*Anadara trapezia*) and 4.75 kg of mud whelk (*Pyrazus ebinus*) were also present. Shellfish remains which were unidentified at the time of the excavation accounted for 9 kg, and fragmented shell 52.75 kg of the total.

Layer 1 Spit 2

This spit contained a total of 168.3 kg of shellfish remains. Oyster (*Saccostrea glomerata*) accounted for the largest amount of identified shell with a weight of 75.5 kg (Table 6.3). 13.75 kg of cockle shell (*Anadara trapezia*) and 3 kg of mud whelk (*Pyrazus ebinus*) were also present. Shellfish remains which were unidentified at the time of the excavation accounted for 6.5 kg, and fragmented shell 69.5 kg of the total.

Layer 1 Spit 3

This spit contained a total of 97.5 kg (Table 6.3) of shellfish remains. Oyster (*Saccostrea glomerata*) accounted for the largest amount of identified shell with a weight of 48.25 kg or 36% of the total (Table 6.3). 10.25 kg of cockle shell (*Anadara trapezia*) and 1.75 kg of mud whelk (*Pyrampus ebinus*) were also present. Shellfish remains which were unidentified at the time of the excavation accounted for 4.75 kg, and fragmented shell 32.5 kg of the total.

Layer 2 Spit 1

This spit contained a total of 142.5 kg of shellfish remains. Oyster (*Saccostrea glomerata*) accounted for the largest amount of identified shell with a weight of 72 kg (Table 6.3). 13.25 kg of cockle shell (*Anadara trapezia*) and 2.5 kg of mud whelk (*Pyrampus ebinus*) were also present. Shellfish remains which were unidentified at the time of the excavation accounted for 5.25 kg, and fragmented shell 49.5 kg of the total.

Layer 2 Spit 2

This spit contained a total of 213.3 kg of shellfish remains. Oyster (*Saccostrea glomerata*) accounted for the largest amount of identified shell with a weight of 94.75 kg (Table 6.3), although the amount of cockle (*Anadara trapezia*) appears to have increased in comparison to the previous 4 spits with a weight recovered of 41.75 kg. 6.5 kg of mud whelk (*Pyrampus ebinus*) were also present. Shellfish remains which were unidentified at the time of the excavation accounted for 9 kg, and fragmented shell 61.25 kg of the total.

Layer 2 Spit 3

This spit contained a total of 269.5 kg of shellfish remains. Oyster (*Saccostrea glomerata*) accounted for the largest amount of identified shell with a weight of 151 kg (Table 6.3). 39.75 kg of cockle (*Anadara trapezia*) and 8.75 kg of mud whelk (*Pyrampus ebinus*) were also present. Shellfish remains which were unidentified at the time of the excavation accounted for 15 kg, and fragmented shell 55 kg of the total.

Layer 2 Spit 4

This spit contained a total of 93.5 kg of shellfish remains. Oyster (*Saccostrea glomerata*) accounted for the largest amount of identified shell with a weight of 62.5 kg (Table 6.3). Only 14 kg of cockle (*Anadara trapezia*) and .5 kg of mud whelk (*Pyrazus ebinenus*) were present. Shellfish remains which were unidentified at the time of the excavation accounted for 2.75 kg, and fragmented shell 13.75 kg of the total.

Layer 2 Spit 5

This spit contained a total of 98.25 kg of shellfish remains. Oyster (*Saccostrea glomerata*) accounted for the largest amount of identified shell with a weight of 49.75 kg (Table 6.3). 28.5 kg of cockle (*Anadara trapezia*) were present. The mud whelk (*Pyrazus ebinenus*) is absent from the shellfish remains in this spit and for the following eight spits. Shellfish remains which were unidentified at the time of the excavation accounted for 4 kg, and fragmented shell 16 kg of the total.

Layer 2/Spit 6

In this spit the cockle (*Anadara trapezia*) overtakes the oyster (*Saccostrea glomerata*) as the predominant taxon identified. The total weight of shellfish excavated was 89 kg (Table 6.3), with cockle (*Anadara trapezia*) accounting for 50.75 kg and (*Saccostrea glomerata*) 22.75 kg. Other taxa not identified at the time of the excavation weighed 2.5 kg and fragmented shell equated to 13 kg.

Layer 2/Spit 7

The total weight of shell recovered from spit 7 of level 2 was 111.5 kg (Table 6.3). Of this 87.25 kg or 78% of the total was *Anadara trapezia*. *Saccostrea glomerata* accounted for on 10.25 kg (9% of total). Unidentified shell weighed 2 kg and the fragmented shell was 12 kg.

Layer 2/Spit 8

The total weight of shell recovered from spit 8 of level 2 was 105.5 kg (Table 6.3). Of this amount 86 kg or 81% of the total was *Anadara trapezia*. *Saccostrea glomerata* accounted for on 7 kg (7% of total). Unidentified shell weighed 1.75 kg and the fragmented shell was 10.75 kg.

Layer 2/Spit 9

The total weight of shell recovered from spit 9 of level 2 was 139.3 kg (Table 6.3). Of this amount 120.3 kg or 87% of the total was *Anadara trapezia*. *Saccostrea glomerata* accounted for on 5.5 kg (4% of total). Unidentified shell weighed .5 kg and the fragmented shell was 13 kg.

Layer 2/Spit 10

The total weight of shell recovered from spit 10 of level 2 was 76.25 kg (Table 6.3). Of this amount 61 kg or 80% of the total was *Anadara trapezia*. *Saccostrea glomerata* accounted for on 4 kg (5% of total). Unidentified shell weighed .75 kg and the fragmented shell was 10.5 kg.

Layer 2/Spit 11

The total weight of shell recovered from spit 11 of level 2 was 79.55 kg (Table 6.3). Of this amount 72.55 kg or 91% of the total was *Anadara trapezia*. *Saccostrea glomerata* accounted for on 1 kg (1% of total). Unidentified shell weighed .5 kg and the fragmented shell was 5.5 kg.

Layer 2/Spit 12

The total weight of shell recovered from spit 12 of level 2 was 70 kg (Table 6.3). Of this amount 65 kg or 92% of the total was *Anadara trapezia*. *Saccostrea glomerata* accounted for on .5 kg (1% of total). Unidentified shell weighed .5 kg and the fragmented shell was 4 kg.

Layer 2/Spit 13

Only 2.5 kg of shellfish remains were recovered from this spit. All of the recovered shell was ascribed to the taxon *Anadara trapezia* (Table 6.3).

Figure 6.5 shows the weight of shellfish remains recovered from each spit excavated from Cutting II, Stuarts Point 1. *Anadara trapezia* dominates the assemblage in spits six to thirteen of Layer 2. In the upper spits, oyster (*Saccostrea glomerata*) is more plentiful, and the mud whelk *Pyrazus ebinenus* also appears.

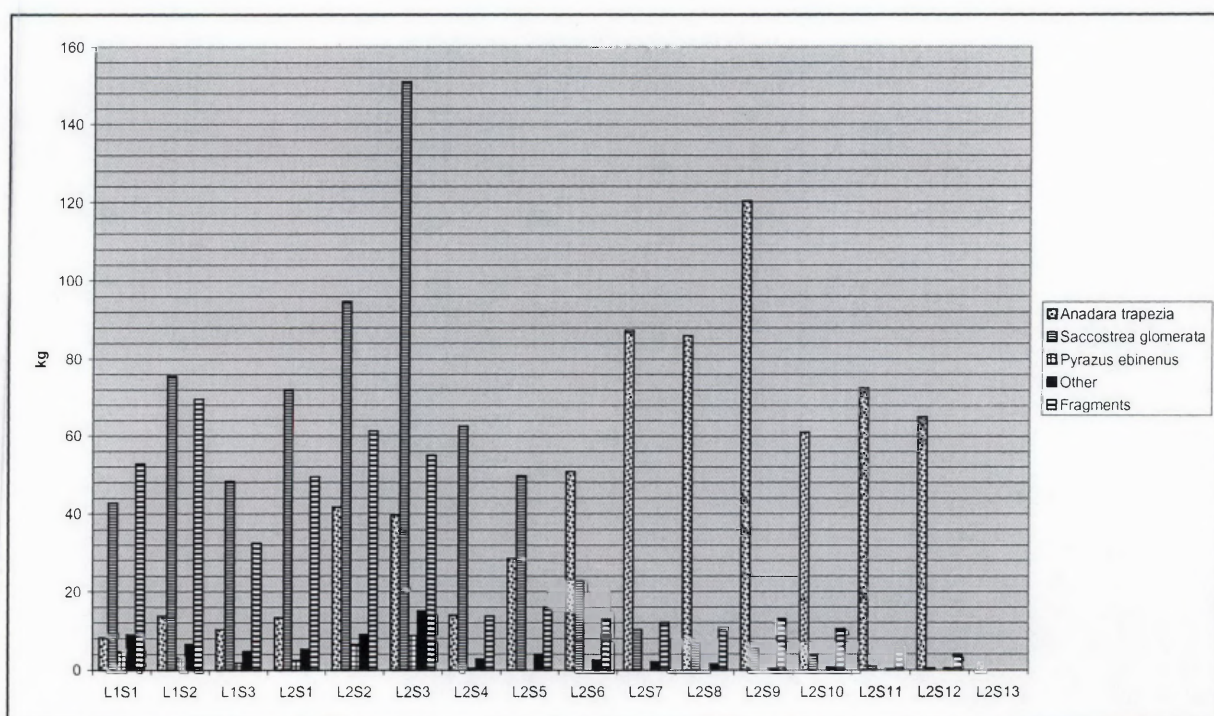


Figure 6.5

Shellfish Represented in Cutting II, Stuarts Point I

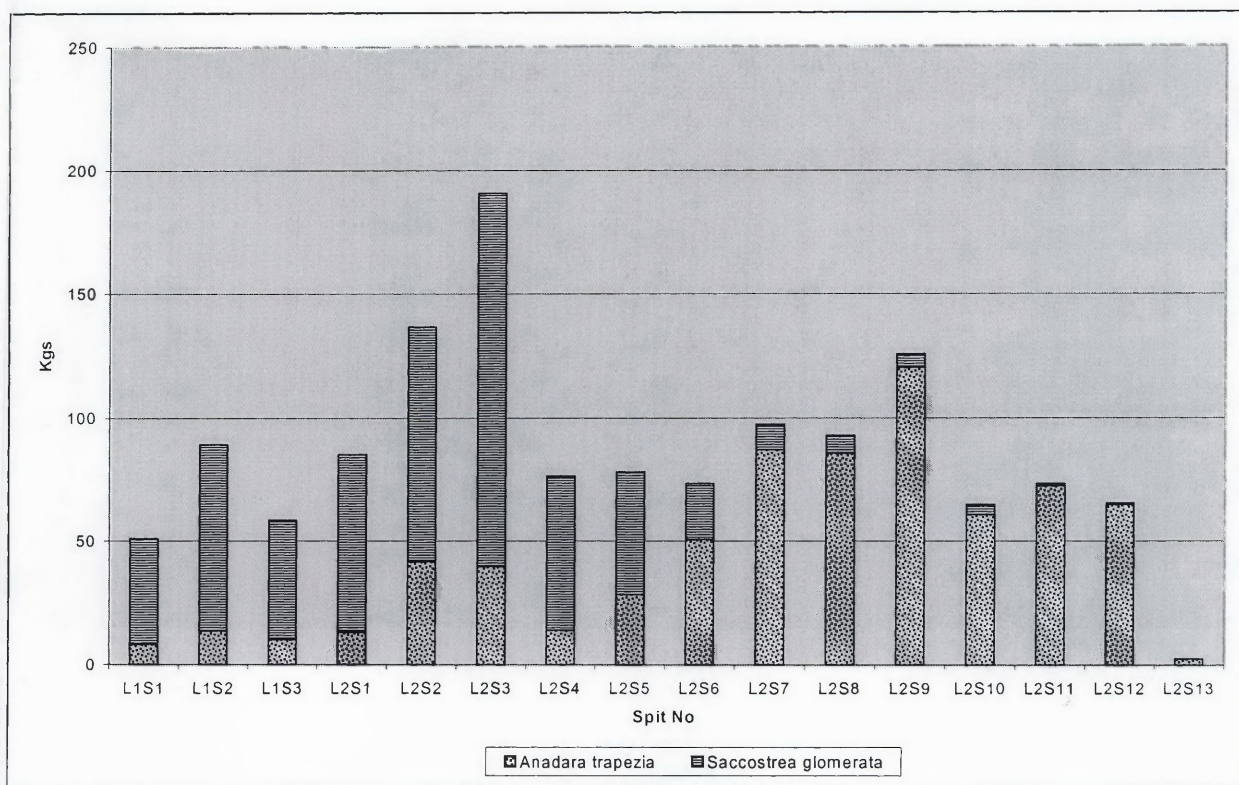


Figure 6.6 Comparison of *Anadara trapezia* to *Saccostrea glomerata*, Cutting II, Stuarts Point 1

When only the dominant species of shellfish are graphed (Figure 6.6), the change in abundance of species from *Anadara trapezia* in the lower spits to *Saccostrea glomerata* in the upper spits is more clearly evident.

6.6 Re-Identification of Fishbone Recovered from Stuarts Point I, Cutting II

Layer 1/Spit 1

Spit 1 of Layer 1 contained 224 pieces of fishbone, 157 of which were not able to be identified to taxon (Table 6.4). The taxon *Platycephalidae* is represented by 43 specimens comprising dentary, articular, premaxilla, prevomer, cleithrum, post-temporal, 1st vertebrae (atlas), and ultimate vertebrae. Eleven of the *Platycephalidae* skeletal elements could be identified to the species *Platycephalus fuscus* (the dusky flathead)

Table 6.4 Fish Skeletal Elements Represented SP 1 II/1/1

Taxon	Dentary	Broken Dentary	Articular	Premaxilla	Broken Premax	Quadrate	Prevomer	Palatine	Supraoccipital	Cleithrum	Post-temporal	Atlas	Vertebrae	Ultimate vert	Spines/Ptery	Pieces	NISP	Total NISP	Weight (g)	MNI
<i>Platycephalidae</i>	14	1	1	11			1			1	1	2					32	43	14.44	11
<i>Platycephalus fuscus</i>														11			11			
<i>Sparidae</i>					3				15	1							19	24	10.68	15
<i>Acanthopagrus australis</i>				4													4			
<i>Rhabdosargus sarba</i>		1															1			
NISP	14	2	1	15	3		1		15	2	1	2		11			67	67	25.12	
Unidentified						1		1			1		6		35	113	157		26.72	
Totals	14	2	1	15	3	1	1	1	15	2	2	2	6	11	35	113	224		51.84	

using the ultimate vertebrae. *Sparidae* is represented by 24 specimens comprising dentary, premaxilla, supraoccipital, and cleithrum. The species *Acanthopagrus australis* (bream), NISP four, and *Rhabdosargus sarba* (tarwhine), NISP one were able to be identified from the premaxilla and dentary.

The MNI for *Platycephalidae* is 11 based upon the number of ultimate vertebrae, which can all be assigned to the species *Platycephalus fuscus*. The MNI for *Sparidae* is 15, based on the supraoccipital, also as there is only one of these elements in each fish. *Acanthopagrus australis* accounts for two of the *Sparidae* based on the left and right premaxillae, and *Rhabdosargus sarba* for one.

Layer 1/Spit 2

Spit 2 of Layer 1 contained 632 pieces of fishbone, 466 of which were not able to be identified to taxon (Table 6.5). The taxon *Platycephalidae* is represented by 130 specimens comprising dentary, articular, maxilla, premaxilla, quadrate, prevomer, palatine, 1st vertebrae (atlas), abdominal vertebrae, and ultimate vertebrae. Twenty-one of the *Platycephalidae* skeletal elements could be identified to the species *Platycephalus fuscus* (the dusky flathead) using the ultimate vertebrae.

Table 6.5 Fish Skeletal Elements Represented SP 1 II/1/2

Taxon	Dentary	Broken Dentary	Articular	Maxilla	Premaxilla	Quadrate	Prevomer	Broken Prevomer	Palatine	Supraoccipital	Cleithrum	Urohyal	Post-temporal	Inter-musc	Atlas	Abdominal vert	Vertebrae	Broken vert	Ultimate vert	Vert Pieces	Spines/Ptery	Pieces	NISP	Total NISP	Weight (g)	MNI
<i>Platycephalidae</i>	32	11	16	1	31	1	1	6	1						7	2							109	130	53.17	21
<i>Platycephalus fuscus</i>																			21				21			
<i>Sparidae</i>			1		4					21						1			1				29	33	11.01	21
<i>Acanthopagrus australis</i>	1				2																		3			
<i>Rhabdosargus sarba</i>					1																		1			
<i>Mugilidae</i>																1							1	1	.20	1
<i>Sillaginidae</i>																1	1						2	2	.34	1
NISP	33	12	16	2	38	1	1	6	1	21					8	5			22				166	166	64.72	
Unidentified					3				2		8	2	1	4			6	11	1	9	67	352	466		73.44	
Totals	33	12	16	2	38	4	1	6	3	21	8	2	1	4	8	5	6	11	23	9	67	352	632		138.16	

Sparidae is represented by 33 specimens comprising dentary, maxilla, premaxilla, supraoccipital, abdominal vertebrae, and one ultimate vertebra. The species *Acanthopagrus australis* (bream), NISP three, and *Rhabdosargus sarba* (tarwhine), NISP one were able to be identified from the premaxilla and dentary. One *Mugilidae* (mullet) abdominal vertebrae was identified, along with a 1st vertebrae (atlas) and an abdominal vertebrae from *Sillaginidae* (whiting) were identified.

The MNI for Platycephalidae is 21 based upon the number of ultimate vertebrae. The species *Platycephalus fuscus* accounts for all of these. The MNI for Sparidae is 21 based on the supraoccipital, also as there is only one of these elements in each fish.

Acanthopagrus australis accounts for two of the 21 based on the left and right premaxillae, and *Rhabdosargus sarba* for one. The MNI for Mugilidae is one, as is Sillaginidae.

Layer 1/Spit 3

Spit 3 of Layer 1 contained 626 pieces of fishbone, 500 of which were not able to be identified to taxon (Table 6.6). The taxon Platycephalidae is represented by 84 specimens comprising dentary, articular, premaxilla, prevomer, palatine, 1st vertebrae (atlas), abdominal vertebrae, and ultimate vertebrae. Twenty of the Platycephalidae skeletal elements could be identified to the species *Platycephalus fuscus* (the dusky flathead) using the ultimate vertebrae.

Table 6.6 Fish Skeletal Elements Represented SP 1 II/1/3

Taxon	Dentary	Broken Dentary	Articular	Maxilla	Premaxilla	Broken Premax	Quadrate	Prevomer	Broken Prevomer	Palatine	Supraoccipital	Cleithrum	Urohyal	Otolith	Atlas	Abdominal vert	Vertebrae	Broken vert	Ultimate vert	Spines/Ptery	Pieces	NISP	Total NISP	Weight (g)	MNI
Platycephalidae	18	1	4		25			1	8	1					4	1			1			64	84	28.91	20
<i>Platycephalus fuscus</i>																			20			20			
Sparidae	5		2	1	2	3					14				1	2						30	35	10.47	14
<i>Acanthopagrus australis</i>					5																	5			
Mugilidae																2						2	2	.20	1
Sillaginidae															1	4						5	5	.73	1
Sciaenidae														1								1	1	.56	1
NISP	23	1	6	1	32	3		1	8	1	14			1	6	9			21			127	127	40.87	
Unidentified	5						2				1	7	9				1	38	6	85	346	500		65.80	
Totals	28	1	6	1	32	3	2	1	8	1	15	7	9	1	6	9	1	38	27	85	346	627		106.67	

Sparidae is represented by 35 specimens comprising dentary, articular, maxilla, premaxilla, supraoccipital, 1st vertebra (atlas), and abdominal vertebrae. The species *Acanthopagrus australis* (bream), NISP 5 was identified from the premaxilla. Two Mugilidae (mullet) abdominal vertebrae were identified. Sillaginidae (whiting) is

represented by one 1st vertebra and four abdominal vertebrae. One otolith from Sciaenidae (mulloway) was recovered.

The MNI for Platycephalidae is 20 based upon the number of ultimate vertebrae. The species *Platycephalus fuscus* accounts for all 20 of the MNI for Platycephalidae. The MNI for Sparidae is 14, based on the supraoccipital. *Acanthopagrus australis* accounts for four of the Sparidae based on the left and right premaxillae. The MNI for Mugilidae is one, as is Sillaginidae and Sciaenidae.

Layer 2/Spit 1

Spit 1 of Layer 2 contained 1150 pieces of fishbone, 1002 of which were not able to be identified to taxon (Table 6.7). The taxon Platycephalidae is represented by 94 specimens comprising dentary, articular, premaxilla, prevomer, 1st vertebrae (atlas), abdominal vertebrae, and ultimate vertebrae. Nineteen of the Platycephalidae skeletal elements could be identified to the species *Platycephalus fuscus* (the dusky flathead) using the ultimate vertebrae.

Table 6.7 Fish Skeletal Elements Represented SP 1 II/2/1

Taxon	Dentary	Broken Dentary	Articular	Maxilla	Premaxilla	Broken Premax	Prevomer	Broken Prevomer	Palatine	Supraoccipital	Cleithrum	Hyomandib	Urohyal	Pre-operc	Neurocranium	Inter-musc	Atlas	Axis	Abdominal vert	Vertebrae	Broken vert	Ultimate vert	Spines/Ptery	Scale	Pieces	NISP	Total NISP	Weight(g)	MNI	
Platycephalidae	18	2	10		26		4	7									5		3							75	94	34.16	19	
<i>Platycephalus fuscus</i>																					19						19			
Sparidae	3	3	1	2	4	2				9									2	1						27	38	9.15	9	
<i>Acanthopagrus australis</i>					10																					10				
<i>Rhabdosargus sarba</i>					1																					1				
Mugilidae																			6							6	6	.86	1	
Sillaginidae																		1	1	6						8	8	.92	1	
Sciaenidae		1															1									2	2	1.01	1	
NISP	21	6	11	2	41	2	4	7		9							6	1	12	7	19					148	148	46.10		
Unidentified	12				1				1	2	14	1	12	1	5	5			16	78	5	153	1	695	1002		116.50			
Totals	33	6	11	2	42	2	4	7	1	11	14	1	12	1	5	5	6	1	12	23	78	24	153	1	695	1150	162.60			

Sparidae is represented by 38 specimens comprising dentary, articular, maxilla, premaxilla, supraoccipital, abdominal vertebrae, and one vertebra which was not able to be placed in context along the spinal column. The species *Acanthopagrus australis* (bream), NISP 10 was identified from the premaxilla, as was *Rhabdosargus sarba*, NISP

one. Six Mugilidae (mullet) abdominal vertebrae were identified. Sillaginidae (whiting) is represented by one 2nd vertebra (axis), and one abdominal vertebrae, and six vertebrae also not able to be placed in context along the spinal column. One dentary and one 1st vertebra (atlas) from Sciaenidae (mullet) were recovered.

The MNI for Platycephalidae is 19 based upon the number of ultimate vertebrae, the species *Platycephalus fuscus* accounting for all of these. The MNI for Sparidae is nine, based on the supraoccipital. *Acanthopagrus australis* is represented by five of these based on the number of left and right premaxillae, and *Rhabdosargus sarba* accounts for one. The MNI for Mugilidae is one, as is Sillaginidae and Sciaenidae.

Layer 2/Spit 2

Spit 2 of Layer 2 contained 2224 pieces of fishbone, 1913 of which were not able to be identified to taxon (Table 6.8). The taxon Platycephalidae is represented by 141

Table 6.8 Fish Skeletal Elements Represented SP 1 II/2/2

Taxon	Dentary	Broken Dentary	Articular	Maxilla	Premaxilla	Broken Premax	Prevomer	Broken Prevomer	Palatine	Supraoccipital	Cleithrum	Hyomandib	Urohyal	Post-temporal	Neurocranium	Inter-musc	Atlas	Abdominal vert	Caudal vert	Vertebrae	Broken vert	Ultimate vert	Vert Pieces	Spines/Ptery	Pieces	NISP	Total NISP	Weight (g)	MNI
Platycephalidae	24	20	12		22		4	15	3					10			6	3	1			17				120	141	51.04	21
<i>Platycephalus fuscus</i>																										17			
<i>Platycephalus indicus</i>																						4				4			
Sparidae	5	22	5	8	3	16			48								2	14	6							129	145	43.68	48
<i>Acanthopagrus australis</i>	2				12																					14			
<i>Rhabdosargus sarba</i>	1				1																					2			
Mugilidae																		17								17	17	2.26	2
Sillaginidae																	1	5								6	6	.55	1
Sciaenidae		1																								1	1	.13	1
Pomatomidae		1																								1	1	.30	1
NISP	32	44	17	8	38	16	4	15	3	48				10			9	39	7			21				311	311	97.96	
Unidentified	1		13						2	47	4	12		39	7					48	72	8	139	368	1153	1913		241.17	
Totals	33	44	30	8	38	16	4	15	5	48	47	4	12	10	39	7	9	39	7	48	72	29	139	368	1153	2224		339.13	

specimens comprising dentary, articular, premaxilla, prevomer, palatine, post-temporal, 1st vertebrae (atlas), abdominal vertebrae, caudal vertebrae and ultimate vertebrae.

Seventeen of the Platycephalidae skeletal elements could be identified to the species *Platycephalus fuscus* (the dusky flathead), and four to the species *Platycephalus indicus* using the ultimate vertebrae.

Sparidae is represented by 145 specimens comprising dentary, articular, maxilla, premaxilla, supraoccipital, 1st vertebrae (atlas), abdominal vertebrae, and caudal vertebrae. The species *Acanthopagrus australis* (bream), NISP 14 was identified from the dentary and premaxilla, as was *Rhabdosargus sarba*, NISP two. Seventeen Mugilidae (mullet) abdominal vertebrae were identified. Sillaginidae (whiting) is represented by one 1st vertebra (atlas), and 5 abdominal vertebrae. One dentary from Sciaenidae (mulloway) was recovered. A piece of dentary from a Pomotomidae (tailor) was also identified.

The MNI for Platycephalidae is 21 based upon the number of ultimate vertebrae present. The species *Platycephalus fuscus* accounts for 17 of these, and *Platycephalus indicus* for four. The MNI for Sparidae is 48, based on the supraoccipital. *Acanthopagrus australis* accounts for six of based on the left and right premaxillae, and *Rhabdosargus sarba* for one. The MNI for Mugilidae is two (based on the number of abdominal vertebrae present divided by 11) the number of abdominal vertebrae found in Mugilidae. Sillaginidae, Sciaenidae and Pomotomidae were found to have a MNI of one each.

Layer 2/Spit 3

Spit 3 of Layer 2 contained 3068 pieces of fishbone, 2739 of which were not able to be identified to taxon (Table 6.9). The taxon Platycephalidae is represented by 132 specimens comprising dentary, premaxilla, prevomer, palatine, 1st vertebrae (atlas), abdominal vertebrae, and ultimate vertebrae. Twenty-three of the Platycephalidae skeletal elements could be identified to the species *Platycephalus fuscus* (the dusky flathead) using the ultimate vertebrae.

Sparidae is represented by 121 specimens comprising dentary, articular, maxilla, premaxilla, supraoccipital, abdominal vertebrae, and caudal vertebrae. The species *Acanthopagrus australis* (bream), NISP 18, was identified from the premaxilla; as was *Rhabdosargus sarba*, NISP one. One Mugilidae (mullet) dentary was identified – a

surprising result as most researchers would not expect to find any remains from the very delicate Mugilidae dentition. Mugilidae are also represented by 51 abdominal vertebrae and eight caudal vertebrae. Sillaginidae (whiting) is represented by one palatine, two 2nd vertebrae (axis), and 11 abdominal vertebrae. One dentary from Sciaenidae (mulloway) was recovered. A premaxilla from a Girellidae (luderick) was also identified.

Table 6.9 Fish Skeletal Elements Represented SP 1 II/2/3

Taxon	Dentary	Broken Dentary	Articular	Maxilla	Premaxilla	Broken Premax	Prevomer	Broken Prevomer	Palatine	Supraoccipital	Urohyal	Post-temporal	Neurocranium	Inter-musc	Atlas	Axis	Abdominal vert	Caudal vert	Vertebrae	Broken vert	Ultimate vert	Vert Pieces	Spines/Ptery	Pieces	NISP	Total NISP	Weight (g)	MNI
Platycephalidae	35	23			26		4	2	4						9		6								109	132	57.86	23
<i>Platycephalus fuscus</i>																					23				23			
Sparidae	17	5	3	6	6	13				30							19	3				23			102	121	37.84	30
<i>Acanthopagrus australis</i>					18																				18			
<i>Rhabdosargus sarba</i>					1																				1			
Mugilidae	1																51	8							60	60	8.87	5
Sillaginidae									1								2	11							14	14	1.46	2
Sciaenidae	1																								1	1	1.76	1
Girellidae					1																				1	1	.10	1
NISP	54	28	3	6	52	13	4	2	5	30					9	2	87	11			23				329	329	107.89	
Unidentified	7		12								27	1	1	7					97	202	13	159	440	1773	2739		269.95	
Totals	61	28	15	6	52	13	4	2	5	30	27	1	1	7	9	2	87	11	97	202	36	159	440	1773	3068		377.84	

The MNI for Platycephalidae is 23 based upon the number of ultimate vertebrae, all of which belong to the species *Platycephalus fuscus*. The MNI for Sparidae is 30, based on the supraoccipital. *Acanthopagrus australis* is represented by 11 of these based on the left and right premaxillae, and *Rhabdosargus sarba*, one. The MNI for Mugilidae is five, based on the number of abdominal vertebrae. Sillaginidae has a MNI of two based on the 2nd vertebrae (axis). Sciaenidae and Girellidae each have a NISP of one and therefore a MNI of one each.

Layer 2/Spit 4

Spit 4 of Layer 2 contained 1146 pieces of fishbone, 1004 of which were not able to be identified to taxon (Table 6.10). The taxon Platycephalidae is represented by 65 specimens comprising dentary, articular, maxilla, premaxilla, prevomer, palatine, 1st vertebrae (atlas), abdominal vertebrae, caudal vertebrae, and ultimate vertebrae. Seven

of the Platycephalidae skeletal elements could be identified to the species *Platycephalus fuscus* (the dusky flathead) using the ultimate vertebrae.

Table 6.10 Fish Skeletal Elements Represented SP 1 II/2/4

	Dentary	Broken Dentary	Articular	Maxilla	Premaxilla	Broken Premax	Quadrate	Preopercle	Broken Preopercle	Palatine	Supraoccipital	Cleithrum	Urohyal	Neurocranium	Otolith	Atlas	Abdominal vert	Caudal vert	Vertebrae	Broken vert	Ultimate vert	Vert Pieces	Spines/Ptery	Scale	Pieces	NISP	Total NISP	Weight (g)
Taxon																												
Platycephalidae	16	12	11	3	3			1	3	3						2	1	3								58	65	17.18
Platycephalus fuscus																					7					7		
Sparidae	7	3	2	2	2	4					6						2	2				7				30	39	10.86
Acanthopagrus australis					7																					7		
Rhabdosargus sarba					2																					2		
Mugilidae																	22	2			5					29	29	4.03
Sillaginidae																	1	1								2	2	.19
Sciaenidae	1				1										1											3	3	2.23
Girellidae																	2									2	2	.12
Scorpididae																	2									2	2	.22
NISP	24	15	13	5	15	4		1	3	3	6				1	2	30	8			12					142	142	34.83
Unidentified	2						1					1	18	6					22	89	1	21	126	5	712	1004		83.31
Totals	26	15	13	5	15	4	1	1	3	3	6	1	18	6	1	2	30	8	22	89	13	21	126	5	712	1146		118.14

Sparidae is represented by 39 specimens comprising dentary, articular, maxilla, premaxilla, supraoccipital, abdominal vertebrae, and caudal vertebrae. The species *Acanthopagrus australis* (bream), NISP seven, was identified from the premaxilla; as was *Rhabdosargus sarba*, NISP two. Mugilidae are represented by 22 abdominal vertebrae, two caudal vertebrae, and five ultimate vertebrae. Sillaginidae (whiting) is represented by one abdominal vertebra, and one caudal vertebra. One dentary, one premaxilla, and one otolith from Sciaenidae (mulloway) was recovered. Two abdominal vertebrae from each of the Girellidae (luderick) and Scorpididae (sweep) were also identified.

The MNI for Platycephalidae is nine based upon the number of right and left dentaries. The species *Platycephalus fuscus* accounts for seven of these based on the ultimate vertebrae. The MNI for Sparidae is six based on the number of supraoccipital specimens. *Acanthopagrus australis* accounts for four of these based on the left and right premaxillae; and *Rhabdosargus sarba* for one. The MNI for Mugilidae is five, based on the number of ultimate vertebrae. Sillaginidae has a MNI of one based on the vertebrae. Sciaenidae, Girellidae and Scorpididae each have a MNI of one each.

Layer 2/Spit 5

Spit 5 of Layer 2 contained 1642 pieces of fishbone, 1460 of which were not able to be identified to taxon (Table 6.11). The taxon *Platycephalidae* is represented by 100 specimens comprising dentary, articular, premaxilla, prevomer, palatine, post-temporal, 1st vertebrae (atlas), abdominal vertebrae, caudal vertebrae, and ultimate vertebrae. Seven of the *Platycephalidae* skeletal elements could be identified to the species *Platycephalus fuscus* (the dusky flathead) using the ultimate vertebrae.

Table 6.11 Fish Skeletal Elements Represented SP 1 II/2/5

Taxon	Dentary	Broken Dentary	Articular	Maxilla	Premaxilla	Broken Premax	Prevomer	Broken Prevomer	Palatine	Supraoccipital	Urohyal	Post-temporal	Atlas	Abdominal vert	Caudal vert	Vertebrae	Broken vert	Ultimate vert	Vert Pieces	Spines/Ptery	Scale	Pieces	NISP	Total NISP	Weight (g)	MNI
Platycephalidae	22	11	11		17		4	11	3			2	5	1	4								91	100	23.04	13
<i>Platycephalus fuscus</i>																		9					9			
Sparidae	4	9	2	3	2	2				9				6									37	46	9.15	9
<i>Acanthopagrus australis</i>					9																		9			
Mugilidae														27	1		1	5					34	34	4.57	5
Girellidae														1									1	1	.13	1
Scorpididae														1									1	1	.11	1
NISP	26	20	13	3	28	2	4	11	3	9		2	5	36	5		1	14					182	182	37.00	
Unidentified											17		1			39	119	7	42	261	4	970	1460		117.85	
Totals	26	20	13	3	28	2	4	11	3	9	17	2	6	36	5	39	120	21	42	261	4	970	1642		154.85	

Sparidae is represented by 46 specimens comprising dentary, articular, maxilla, premaxilla, supraoccipital, and abdominal vertebrae. The species *Acanthopagrus australis* (bream), NISP nine was identified from the premaxilla. *Mugilidae* are represented by 27 abdominal vertebrae, one caudal vertebra, one broken vertebra, and five ultimate vertebrae. *Girellidae* (luderick) and *Scorpididae* (sweep) were identified by one abdominal vertebra each.

The MNI for *Platycephalidae* is 13 based upon the number of right and left dentaries. At least nine of these would be *Platycephalus fuscus* based on the ultimate vertebrae identified. The MNI for *Sparidae* is nine based on the supraoccipital. *Acanthopagrus australis* would account for four of these based on the left and right premaxillae, and

Rhabdosargus sarba one. The MNI for Mugilidae is five, based on the number of ultimate vertebrae. Girellidae and Scorpididae each have one identified specimen and therefore have a MNI of one each.

Layer 2/Spit 6

Spit 6 of Layer 2 contained 1068 pieces of fishbone, 916 of which were not able to be identified to taxon (Table 6.12). The taxon Platycephalidae is represented by 88 specimens comprising dentary, articular, premaxilla, prevomer, palatine, post-temporal,

Table 6.12 Fish Skeletal Elements Represented SP 1 II/2/6

Taxon	Dentary	Broken Dentary	Articular	Premaxilla	Broken Premax	Quadrate	Prevomer	Broken Prevomer	Palatine	Supraoccipital	Cleithrum	Hyomandib	Urohyal	Post-temporal	Operculum	Neurocranium	Atlas	Abdominal vert	Caudal vert	Vertebrae	Broken vert	Ultimate vert	Vert Pieces	Spines/Ptery	Scale	Pieces	NISP	Total NISP	Weight (g)	MNI
Platycephalidae	12	8	14	13			2	9	2					3			8		1				14				72	88	21.53	16
<i>Platycephalus fuscus</i>																											14			
<i>Platycephalus indicus</i>																							2				2			
Sparidae	1	4	2		9					10								4	1								31	44	12.68	10
<i>Acanthopagrus australis</i>				12																							12			
<i>Rhabdosargus sarba</i>					1																						1			
Mugilidae			1															9	3			3					16	16	2.13	3
Sillaginidae																		1	2								3	3	.21	1
Girellidae			1																								1	1	.04	1
NISP	13	12	17	26	10		2	9	2	10				3			8	14	7			19					152	152	36.59	
Unidentified	7					2					16	1	15		7	18				10	45	1	49	185	1	559	916		84.64	
Totals	20	12	17	26	10	2	2	9	2	10	16	1	15	3	7	18	8	14	7	10	45	20	49	185	1	559	1068		121.23	

1st vertebrae (atlas), caudal vertebrae, and ultimate vertebrae. Fourteen of the Platycephalidae skeletal elements could be identified to the species *Platycephalus fuscus* (the dusky flathead) and 2 to the species *Platycephalus indicus* using the ultimate vertebrae.

Sparidae is represented by 44 specimens comprising dentary, articular, premaxilla, supraoccipital, abdominal vertebrae, and caudal vertebra. The species *Acanthopagrus australis*, NISP 12, was identified from the premaxilla; and one specimen of *Rhabdosargus sarba* was identified from a broken pre-maxilla. Mugilidae are represented by one articular, nine abdominal vertebrae, and one caudal vertebra.

Sillaginidae is represented by one abdominal vertebra and two caudal vertebrae.

Girellidae was identified by one premaxilla.

The MNI for Platycephalidae is 16 based upon the number of ultimate vertebrae.

Fourteen of these are *Platycephalus fuscus* and two are *Platycephalus indicus* based on the ultimate vertebrae identified. The MNI for Sparidae is 10 based on the supraoccipital. *Acanthopagrus australis* would account for seven of these based on the left and right premaxillae, and *Rhabdosargus sarba* one. The MNI for Mugilidae is five, based on the number of ultimate vertebrae. Girellidae and Scorpidae each have one identified specimen and therefore have a MNI of one each.

Layer 2/Spit 7

Spit 7 of Layer 2 contained 705 pieces of fishbone, 603 of which were not able to be identified to taxon (Table 6.13). The taxon Platycephalidae is represented by 55 specimens comprising dentary, articular, premaxilla, prevomer, palatine, post-temporal, 1st vertebrae (atlas), 2nd vertebra (axis), caudal vertebrae, and ultimate vertebrae. Nine of the Platycephalidae ultimate vertebrae could be identified to the species *Platycephalus fuscus* (the dusky flathead) and two to the species *Platycephalus indicus*.

Table 6.13 Fish Skeletal Elements Represented SP 1 II/2/7

Taxon	Dentary	Articular	Maxilla	Premaxilla	Prevomer	Palatine	Supraoccipital	Cleithrum	Hyomandib	Urohyal	Post-temporal	Neurocranium	Atlas	Axis	Abdominal vert	Caudal vert	Vertebrae	Broken vert	Ultimate vert	Vert Pieces	Spines/Ptery	Pieces	NISP	Total NISP	Weight (g)	MNI
Platycephalidae	12	12		4	2	1					1		7	1		4							44	55	13.11	11
<i>Platycephalus fuscus</i>																			9				9			
<i>Platycephalus indicus</i>																			2				2			
Sparidae	7	1	2	7			5								2	3							27	31	8.59	5
<i>Acanthopagrus australis</i>				4																			4			
Mugilidae																9			4				13	13	1.74	4
Sillaginidae																1							1	1	.06	1
Sciaenidae	1																						1	1	.22	1
Girellidae															1								1	1	.10	1
NISP	20	13	2	15	2	1	5				1		7	1	3	17			15				102	102	23.82	
Unidentified		1				1		10	4	9	1	17	7	1	3	17	7	22		31	136	365	603		55.85	
Totals	20	14	2	15	2	2	5	10	4	9	1	17	7	1	3	17	7	22	15	31	136	365	705		79.67	

Sparidae is represented by 31 specimens comprising dentary, articular, maxilla, premaxilla, supraoccipital, abdominal vertebrae, and caudal vertebra. The species *Acanthopagrus australis*, NISP 4, was identified from the premaxilla. Mugilidae are represented by nine abdominal vertebrae, and four ultimate vertebrae. Sillaginidae is represented by one caudal vertebrae. Sciaenidae is represented by one dentary and Girellidae was identified by one abdominal vertebra.

The MNI for Platycephalidae is 11 based upon the number of ultimate vertebrae. Nine of these are *Platycephalus fuscus* and two are *Platycephalus indicus* based on the ultimate vertebrae identified. The MNI for Sparidae is five based on the supraoccipital. *Acanthopagrus australis* would account for three of these based on the left and right premaxillae. The MNI for Mugilidae is four, based on the number of ultimate vertebrae. Sciaenidae and Girellidae each have one identified specimen and therefore have a MNI of one each.

Layer 2/Spit 8

Spit 8 of Layer 2 contained 325 pieces of fishbone, 276 of which were not able to be identified to taxon (Table 6.14). The taxon Platycephalidae is represented by 32 specimens comprising dentary, articular, premaxilla, prevomer, palatine, post-temporal, 1st vertebrae (atlas), and ultimate vertebrae. All of the five Platycephalidae ultimate vertebrae were identified to the species *Platycephalus fuscus*.

Sparidae is represented by eight specimens comprising maxilla, premaxilla, and supraoccipital. The species *Acanthopagrus australis*, NISP three was identified from the premaxilla. Mugilidae is represented by one abdominal vertebra, and one ultimate vertebra. Sillaginidae is represented by one abdominal and one caudal vertebrae. Sciaenidae is represented by one dentary and one premaxilla, and Girellidae was identified by one premaxilla and one abdominal vertebra.

Table 6.14 Fish Skeletal Elements Represented SP 1 II/2/8

Taxon	Dentary	Broken Dentary	Articular	Maxilla	Premaxilla	Prevomer	Broken Prevomer	Palatine	Supraoccipital	Cleithrum	Urohyal	Post-temporal	Neurocranium	Inter-musc	Atlas	Abdominal vert	Caudal vert	Vertebrae	Broken vert	Ultimate vert	Vert Pieces	Spines/Ptery	Scale	Pieces	NISP	Total NISP	Weight (g)	MNI
Platycephalidae	2	5	7		5	1	2	1				2			2										27	32	5.43	5
<i>Platycephalus fuscus</i>																				5					5			
Sparidae				1					4																5	8	3.75	4
<i>Acanthopagrus australis</i>					3																				3			
Mugilidae																1				1					2	2	.28	1
Sillaginidae																1	2								3	3	.22	1
Sciaenidae	1				1											1									2	2	1.06	1
Girellidae																									2	2	.16	1
NISP	3	5	7	1	10	1	2	1	4			2			2	3	2			6					49	49	10.90	
Unidentified										17	5	7	2	2	2	3	2	1	8		3	70	2	161	276		26.34	
Totals	3	5	7	1	10	1	2	1	4	17	5	2	7	2	2	3	2	1	8	6	3	70	2	161	325		37.24	

The MNI for Platycephalidae is five based upon the number of ultimate vertebrae, all of which were identified as the species *Platycephalus fuscus*. The MNI for Sparidae is four based on the supraoccipital. *Acanthopagrus australis* would account for two of these based on the left and right premaxillae. The MNI for Mugilidae is one, based on the ultimate vertebra. Sciaenidae and Girellidae each have a MNI of one.

Layer 2/Spit 9

Spit 9 of Layer 2 contained 169 pieces of fishbone, 149 of which were not able to be identified to taxon (Table 6.15). The taxon Platycephalidae is represented by eight specimens comprising dentary, articular, premaxilla, abdominal vertebra, and ultimate vertebra. The only ultimate vertebra was identified to the species *Platycephalus fuscus*.

Table 6.15 Fish Skeletal Elements Represented SP 1 II/2/9

Taxon	Dentary	Broken Dentary	Articular	Premaxilla	Broken Premax	Quadrate	Cleithrum	Urohyal	Neurocranium	Atlas	Abdominal vert	Vertebrae	Broken vert	Ultimate vert	Vert Pieces	Spines/Ptery	Pieces	NISP	Total NISP	Weight (g)	MNI
Platycephalidae	1	2	3								1							7	8	1.55	2
<i>Platycephalus fuscus</i>														1				1			
Sparidae	1	1	1	2	1						1							7	10	1.57	3
<i>Acanthopagrus australis</i>				3														3			
Mugilidae											1							1	1	.06	1
Girellidae											1							1	1	.07	1
NISP	2	3	4	5	1						4			1				20	20	3.25	
Unidentified						2	5	2	2	1		1	4		10	18	104	149		14.03	
Totals	2	3	4	5	1	2	5	2	2	1	4	1	4	1	10	18	104	169		17.28	

Sparidae is represented by 10 specimens comprising dentary, articular, premaxilla, and abdominal vertebra. The species *Acanthopagrus australis*, NISP three, was identified from the premaxilla. Mugilidae and Girellidae are represented by one abdominal vertebra each.

The MNI for Platycephalidae is two based upon the articular. The MNI for Sparidae is three based on the premaxillae. *Acanthopagrus australis* would account for two of these based on the left and right premaxillae. Mugilidae and Girellidae each have a MNI of one.

Layer 2/Spit 10

Spit 10 of Layer 2 contained 83 pieces of fishbone, 69 of which were not able to be identified to taxon (Table 6.16). The taxon Platycephalidae is represented by six specimens comprising dentary, premaxilla, 1st vertebra (atlas), and ultimate vertebra. Both of the ultimate vertebrae were identified to the species *Platycephalus fuscus*.

Table 6.16 Fish Skeletal Elements Represented SP 1 II/2/10

Taxon	Dentary	Maxilla	Premaxilla	Broken Premax	Palatine	Supraoccipital	Cleithrum	Hyomandib	Urohyal	Post-temporal	Atlas	Broken vert	Ultimate vert	Vert Pieces	Spines/Ptery	Pieces	NISP	Total NISP	Weight (g)	MNI
Platycephalidae	1		2								1						4	6	1.01	2
<i>Platycephalus fuscus</i>													2				2			
Sparidae	1	1	1	2		2											7	7	1.76	2
Girellidae					1												1	1	.04	1
NISP	2	1	3	2	1	2					1		2				14	14	2.81	
Unidentified							4	1	1	1		6		2	11	43	69		7.16	
Totals	2	1	3	2	1	2	4	1	1	1	1	6	2	2	11	43	83		9.97	

Sparidae is represented by seven specimens comprising dentary, maxilla, premaxilla, and supraoccipital. Girellidae was identified by one palatine.

The MNI for Platycephalidae is two, both of which are *Platycephalus fuscus*, based upon the ultimate vertebrae. The MNI for Sparidae is two based on the supraoccipital.

Girellidae has a MNI of one.

Layer 2/Spit 11

Spit 11 of Layer 2 contained 47 pieces of fishbone, 42 of which were not able to be identified to taxon (Table 6.17). The taxon Platycephalidae is represented by four specimens comprising dentary, 1st vertebra (atlas), abdominal vertebra, and ultimate vertebra. The ultimate vertebra was identified to the species *Platycephalus fuscus*. Sparidae is represented by one specimen, a dentary.

The MNI for Platycephalidae is one, a *Platycephalus fuscus*, based upon the ultimate vertebra. The MNI for Sparidae is one as there is only one skeletal element identified.

Table 6.17 Fish Skeletal Elements Represented SP 1 II/2/11

Taxon	Dentary	Atlas	Abdominal vert	Vertebrae	Broken vert	Ultimate vert	Vert Pieces	Spines/Ptery	Pieces	NISP	Total NISP	Weight (g)	MNI
Platycephalidae	1	1	1							3	4	1.00	1
<i>Platycephalus fuscus</i>						1				1			
Sparidae	1									1	1	.22	1
NISP	2	1	1			1				5	5	1.22	
Unidentified				1	2	1	1	6	31	42		4.51	
Totals	2	1	1	1	2	2	1	6	31	47		5.73	

Layer 2/Spit 12

Spit 12 of Layer 2 contained 20 pieces of fishbone, 12 of which were not able to be identified to taxon (Table 6.18). The taxon Platycephalidae is represented by six specimens comprising dentary, articular, and palatine. Sparidae is represented by one supraoccipital and one premaxilla belonging to the species *Acanthopagrus australis*. The MNI for Platycephalidae is two based upon the right and left articular. The MNI for Sparidae is one.

Table 6.18 Fish Skeletal Elements Represented SP 1 II/2/12

Taxon	Dentary	Articular	Premaxilla	Quadrate	Palatine	Supraoccipital	Cleithrum	Broken vert	Spines/Ptery	Pieces	NISP	Total NISP	Weight (g)	MNI
Platycephalidae	2	3			1						6	6	1.35	2
Sparidae						1					1	2	1.15	1
<i>Acanthopagrus australis</i>			1								1			
NISP	2	3	1		1	1					8	8	2.50	
Unidentified				1			1	3	3	4	12		1.68	
Totals	2	3	1	1	1	1	1	3	3	4	20		4.18	

Layer 2/Spit 13

Spit 13 of Layer 2 contained 29 pieces of fishbone, 23 of which were not able to be identified to taxon (Table 6.19). The taxon *Platycephalidae* is represented by three specimens comprising articular, and premaxilla. *Sparidae* is also represented by three specimens, one each of dentary, supraoccipital, and abdominal vertebra. The MNI for both the *Platycephalidae* and the *Sparidae* is one.

Table 6.19 Fish Skeletal Elements Represented SP 1 II/2/13

Taxon	Dentary	Articular	Premaxilla	Supraoccipital	Abdominal vert	Vertebrae	Broken vert	Vert Pieces	Spines/Ptery	Pieces	Total NISP	Weight (g)	MNI
<i>Platycephalidae</i>		1	2								3	0.64	1
<i>Sparidae</i>	1			1	1						3	0.8	1
NISP	1	1	2	1	1						6	1.44	
Unidentified						1	1	3	4	14	23	1.87	
Totals	1	1	2	1	1	1	1	3	4	14	29	3.31	

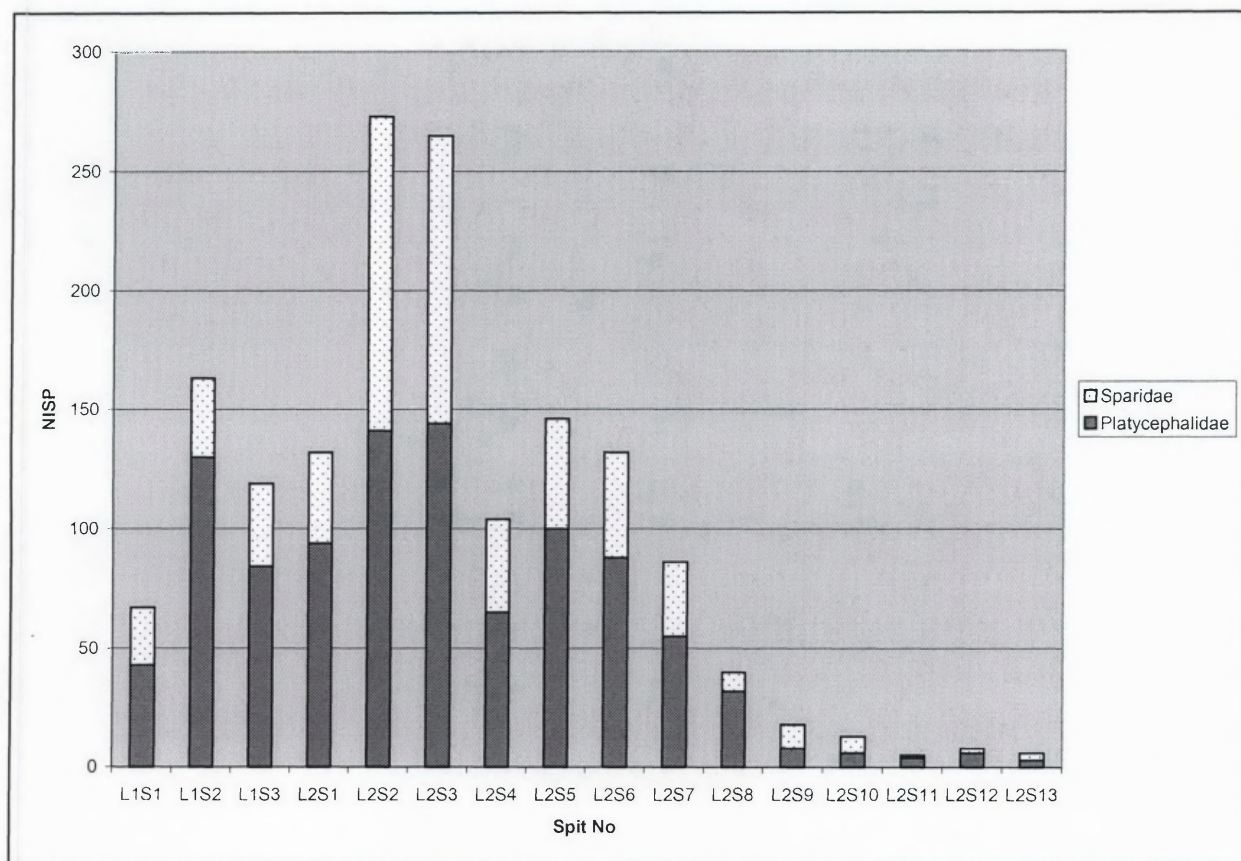


Figure 6.7 Platycephalidae and Sparidae Represented in Cutting II, Stuarts Point I

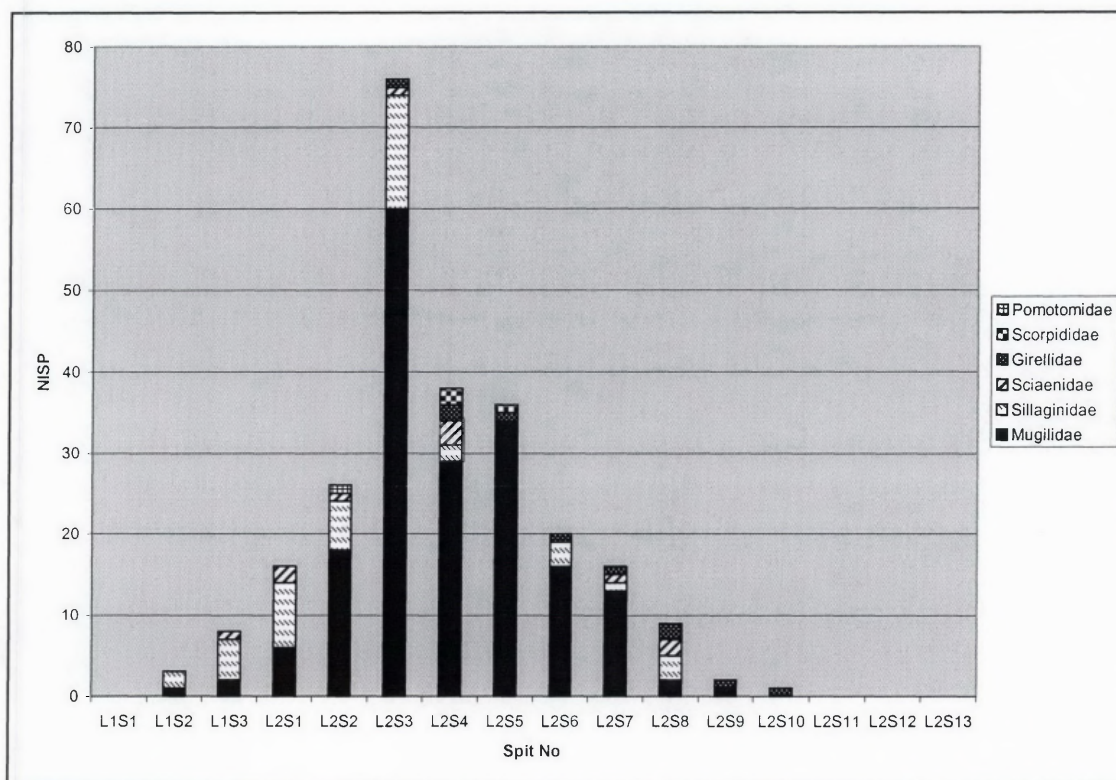


Figure 6.8 Other Fish Species Represented in Cutting II, Stuarts Point I

Figures 6.7 and 6.8 show the identified fish remains – represented by NISP – recovered from all of the spits excavated from Cutting II, Stuarts Point 1. Platycephalidae and Sparidae account for a large percentage of the identified fishbone (Figure 6.7). The greatest amount of fishbone recovered was from Layer 2, spits 2 and 3.

6.7 The Flotation Samples

Experiments with the use of a froth flotation chamber (I. Davidson, pers com, 2002) – similar to the one illustrated in Jarman et al 1972 – for the retrieval of small or very light archaeological materials were carried out on Cuttings I and II of Stuarts Point I. The function of the flotation device, in this instance, was to retrieve plant remains (Cubis 1977), and was possibly not intended for the retrieval of small faunal remains. The light fraction retrieved from the flotation device was duly collected and labelled according to its cutting, layer and spit number. Unfortunately, the heavy fraction, which contained a lot of the small bone assemblage, was collected as one entity. That is, all of the heavy fraction from all of the layers and spits of Cuttings I and II were collected as a single sample. This material was saved and stored in plastic containers, but every container is marked ‘Stuarts Point I-75-Float Sample-(sludge)-1mm sieve’, therefore making it impossible to provenance the samples. I was not able to ascertain how this procedure was carried out. All I can deduce is that the heavy fraction of the flotation sample was left to gather in the bottom of the flotation apparatus, and therefore both the samples from Cuttings I and II became mixed. The field notes say that flotation samples were processed from both of the cuttings.

A total of 2564.97 g of ‘heavy fraction’ sediment was captured in the flotation device. Table 6.20 sets out the total weight of each container of sediment. As a test of what might have been, container one – representing 14 % of the total by weight of the samples of unprovenenced flotation sediment – was carefully sorted. A breakdown of the contents shows that the majority of the flotation sediment was shell (83% by weight), with fishbone comprising 45.81 g (13%), and the remainder consisting of burnt pieces of bone, fish scales, charcoal, non-fish bone, stone and 3 Mugilidae otoliths (Table 6.21).

Table 6.20 Weight of 'Heavy' Fraction Sediments Collected in the Flotation, Stuarts Point I, Cuttings I and II

Sample No	FR No	Screen Size (mm)	Weight (g)
1	87		353.4
2	87	0.03	43.85
3	91 unknown		6.75
4	87	1	349.57
5	87	1	388.11
6	87	1	216.16
7	87	1	289.09
8	87	1	378.85
9	5	1	180.04
10	87	1	359.15
Total			2564.97

Table 6.21 A Breakdown of the Contents of One Container of the 'Heavy' Fraction of the Flotation Samples

Sample	Weight (g)
Shell fragments	294.5
Burnt bone	4.33
Fish scales	1.26
Charcoal	4.73
Fishbone	45.81
Bone (not fish)	0.45
Stone	1.98
Otoliths	0.34
Total	353.4

Nine identifications were able to be made from the fishbone recovered from the sample of the heavy fraction of the flotation assemblage (Table 6.22). Platycephalidae accounted for four of the identifications (two atlas, and two caudal vertebrae), equating to a MNI of two. One each of abdominal, caudal and ultimate vertebrae were identified to Mugilidae,

giving a MNI of one. Sillaginidae also had one each of abdominal and caudal vertebrae, also equating to a MNI of one.

Even though this material is not able to be provenienced to Cutting, Layer or Spit of the Stuarts Point I excavation, I believe it is important to take into consideration this material when analysing the fishbone assemblage. As this research deals with change in taxa over time, any evidence of a sizeable change in any aspect of the assemblage needs to be considered. The 'heavy' fraction of the flotation sample may give some indication of any large amounts of very small fish, which would have been missed in larger screens, and indicate whether this needs to be taken into consideration.

Table 6.22 Sample of the Fish Remains from 'Heavy' Fraction Flotation Screening, Stuarts Point I

Taxon	Atlas	Abdominal vert	Caudal vert	Vertebrae	Broken vert	Ultimate vert	Pieces/spines	NISP	Weight (g)	MNI
Platycephalidae	2		2					4	0.2	2
Mugilidae		1	1			1		3	0.08	1
Sillaginidae		1	1					2	0.02	1
Total	2	2	4			1		9	0.3	
Unidentified-Pieces & Spines									44.3	
Unidentified				10	24				0.53	
Total	2	2	4	10	24				45.1	

The light fraction of the flotation samples contained 128 specimens of fishbone, but none of this was identifiable to taxon (Table 6.23). The retrieved bone consisted of small, fragmented pieces and broken vertebrae, and one broken pieces of a dentary, and weighed a total of 1.72 g.

Table 6.23 Fishbone Retrieved from 'Light' Fraction of Flotation Screening, Stuarts Point I, Cutting II.

Layer	Spit No	Regn No	Sieve size	Lab No	Element	No. of specimens	Weight (g)	Tot Wt Spit (g)	NISP
1	1	10	3mm	1	frags	76	1.35		
1	1	10	3mm	2	br vert	1	0.01		
1	1	7	2mm	4	frags	3	0.01	1.37	80
1	3	28	2mm	8	frags	6	0.03	0.03	6
2	1	43	4mm	9	frags	5	0.04	0.04	5
2	2	53	4mm	10	frags	3	0.01		
2	2	54	2mm	12	frags	4	0.05	0.06	7
2	3	63	2mm	14	frags	14	0.09	0.09	14
2	4	78	4mm	15	frags	2	0.04	0.04	2
2	5	93	4mm	16	frags	2	0.01		
2	5	94	2mm	17	frags	4	0.01	0.02	6
2	7	118	4mm	21	frags	4	0.04		
2	7	118	4mm	22	dentary	1	0.01	0.05	5
2	8	128	4mm	24	frags	2	0.01	0.01	2
2	10	144	2mm	29	frags	1	0.01	0.01	1
Totals						128	1.72	1.72	128

6.8 Re-Identification of Other Faunal Remains Recovered from Cutting II, Stuarts Point I

The archaeological remains from terrestrial animals recovered from Cutting I, Clybucca 3 were examined, along with the fish remains. Terrestrial animal remains which had been previously included in the fish remains were removed and added to the terrestrial remains. Some pieces which had been ascribed to terrestrial remains were also removed from these totals and added to the fish remains. In particular, a large Platycephalidae ultimate vertebra from Level 1, Spit 3, which had previously been ascribed to 'seal bone'.

Layer 1/Spit 1

A total of 177.69 g of bone from terrestrial animals was recovered from this spit (Table 6.24). Much of this bone was fragmented pieces, though it included fractured mammal long bones, a piece of a macropod mandible, and a reptile vertebra.

Layer 1/Spit 2

This spit contained terrestrial bone from mammal (*Macropus sp*), reptile (possibly *Tiliqua scinoides*, the blue tongue lizard) and unidentified bird remains, weighing a total of 147.48 g (Table 6.24). This included fractured, mammal long bones, a reptilian mandible and vertebra, part of a mandible and teeth from a macropod, and a small amount of bird bone.

Layer 1/Spit 3

This spit contained only 25.79 gram of terrestrial bone (Table 6.24). This included a piece of macropod mandible (*Macropus giganteus*), and a piece of reptilian dentition (*Tiliqua scinoides*). The other bone, including the bird, was fragmented pieces.

Table 6.24 Other Faunal Remains recovered from Stuarts Point I, Cutting II

Layer	Spit	Mammal g	Reptile g	Bird g	Crab g	Total g
1	1	177.57	0.12	0	0	177.69
1	2	146.59	0.57	0.32	0	147.48
1	3	24.79	0.2	0.8	0	25.79
2	1	26.36	0	0	1.01	27.37
2	2	32.15	0.21	0	0	32.36
2	3	38.34	0	0	0	38.34
2	4	5.27	0	0	0	5.27
2	5	12.26	0	0	0	12.26
2	6	7.03	0	0.88	0	7.91
2	7	4.26	0	0.18	0	4.44
2	8	5.04	0	0	0	5.04
2	9	1.29	0	0	0	1.29
2	10	2.54	0	0	0	2.54
2	11	1.88	0	0	0	1.88
2	12	9.03	0	0	0	9.03
2	13	2.87	0	0	0	2.87

Layer 2/Spit 1

This spit contained 27.37 g of terrestrial bone (Table 6.24). 1.01g of this was identified as crab, and 4.3g could be identified as macropod (*Bettongia gaimardi*, brush tailed rat kangaroo), and the remaining 22.06g was identified only to mammal.

Layer 2/Spit 2

This spit contained 32.36 g of terrestrial bone (Table 6.24). Included in this was a reptilian vertebra, an incisor and a piece of mandible (*Trichosaurus vulpecular*, brush tail possum). The remaining 30.28g consisted of fragmented pieces identified only to mammal.

Layer2/Spit 3

This spit contained 38.34 g of terrestrial bone (Table 6.24). All of this was identified to macropod, including two pieces of dentition (*Bettongia gaimardi*), except for 0.21 g which could only be identified to mammal.

Layer 2/Spit 4

Only 5.27 gram of terrestrial bone was recovered from this spit (Table 6.24). All of this could only be identified to the level of mammal.

Layer 2/Spit 5

12.26 g of terrestrial bone was recovered from this spit (Table 6.24). All of this could only be identified to the level of mammal.

Layer2/Spit 6

This spit contained 7.91 g of terrestrial bone (Table 6.24). Bird bone accounted for 0.88 g, and the remainder was identified to mammal.

Layer2/Spit 7

This spit contained 4.44 g of terrestrial bone (Table 6.24). Bird bone accounted for 0.18 g, and the remainder was identified to mammal.

Layer 2/Spits 8 to 13

These spits all contained a very small amount of terrestrial bone (Table 6.24). All of this bone consisted of small fragmented pieces and could only be identified to the level of mammal.

6.9 Conclusion

Cutting II of Stuarts Point 1 was excavated in sixteen arbitrary spits of 10 cm each to a depth of 160 cm, and Connah (1975) recognised two stratigraphic layers during the excavation. The Stuarts Point 1 midden was re-dated for this research. The re-dating of the Cutting showed an occupation of the site between c. 4,000 BP and 3,500 BP.

Shellfish species showed a change over time, with a predominance of *Anadara trapezia* in the lower spits, changing to a predominance of *Saccostrea glomerata* in layer 2/spit 5, with this domination of the shell taxa continuing to the top of the cutting. Mud whelk (*Pyrazus ebinus*) appears in layer 2/spit 4, and continues to be present to the top of the cutting. Eight families of fish were identified from Cutting II, representing 10 species. Fish remains were most plentiful in spits 2 and 3 of Layer 2. Comparative weights of fish and terrestrial remains appear to show a dominance of the use of fish at the Stuarts Point site, apart from Spits 1 and 2 of Layer 1. Archaeological material recovered in the 'heavy' fraction of the flotation sample cannot be provenanced to Cutting, Layer, or Spit, but the information obtained from the analysed sample will need to be taken into account during analysis, so that an estimation of whether the size range of the fish analysed is being biased by the lack of inclusion of the material from the heavy float fraction.

The results of the compilation of all of this data will be used in the analysis of the site presented in Chapter 7.