A survey of mudflats and sandflats

Commissioned by: National Parks and Wildlife Services
Carried out by: Aquatic Service Unit
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Aquatic Services Unit

Contents

1. Introduction and Brief

Aquatic Services Unit, University College Cork, was employed by the Department of Environment. Heritage and Local Government to carry out a survey of mudflats and sandflats across seven intertidal SAC's (Special Areas of Conservation) around Ireland. As part of this survey, ASU undertook a detailed survey of seven tidal embayments (Figure 1.1). These were:

1. Dundalk Bay, Co. Louth
2. Trawbreaga Bay, Co. Donegal
3. Sligo Bay, Co. Sligo
4. Ballysadare Bay, Co. Sligo
5. Tralee Bay, Co. Kerry
6. Castlemaine Harbour, Co. Kerry
7. Bannow Bay, Co. Wexford

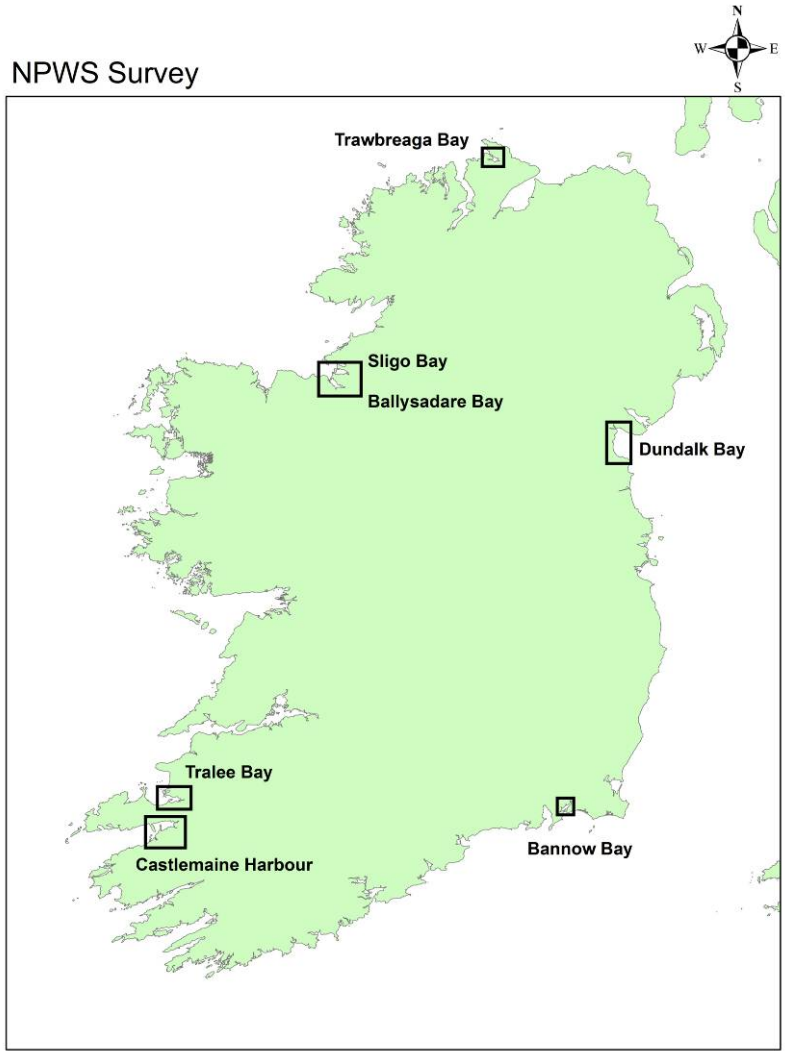


Figure 1.1: Map of Ireland showing the locations of the seven tidal embayments surveyed.

2. Methodology

Site Selection

Transect locations within each of the embayments were selected by NPWS to obtain maximum coverage of sedimentary and biological facies across all these embayments. Specific sampling sites were selected by the surveyors on the ground. Sampling positions were chosen in areas where there was an obvious change in tidal zonation and/or bio-sedimentary factors. A total of three sampling heights were sampled (*High*-, *Mid*- and *Low*-shore sites)

Pre-Field Assessment Checks

Prior to all field campaigns, pre-fieldwork checks were undertaken to allow for a detailed visual inspection of all equipment. Batteries were charged and all electronic equipment was tested prior to departure. Transect locations identified by NPWS were positioned and these positions were loaded into a GPS prior to departure.

Sampling bags were labelled prior to departure. Each site was given a unique identifier code. Transects within each embayment were also uniquely coded. Sampling positions within each transect were then assigned a code based on shore height (*high, mid* and *low*). Strand line samples (for Gammarids only) were allocated the identifier '*Strand*'. In addition, waterproof labels were written prior to field sampling. Two duplicate labels were written for each sampling position.

Field Sampling

Strand Line

At each strandline sampling station, Gammarids were collected using a coarse sieve (2mm), through which sediment or algal matter was passed. Gammarids retained in the sieve were then collected in a plastic container, preserved with a 10 percent formaldehyde-seawater solution, and transported back to the laboratory.

Infaunal Sediment and Granulometry Sampling

At each site

- 5 x Replicate 11.1cm Ø cores (Area = 0.01m^2) were taken to a depth of 20cm at each shore height. Each core was placed in a plastic bag with 2 waterproof labels. The cores were then puddle sieved on site through a 1mm sieve. The sample retained on the sieve was then carefully washed into a plastic bag and preserved in a 10% formaldehyde-seawater solution and sealed for transfer back to the laboratory.

- A 1 x 1 meter area of sediment was dug out with a hand spade to a depth of 20cm. The removed sediment was then examined on site for macro fauna either by sieving through a 5mm sieve or examining the sediment by hand. The retained sample was then preserved as described in the previous section.

- A data record sheet was filled out for each sampling station.

- Photographs were taken and recorded using a digital camera.

- A 7cm Ø core was taken to a depth of approximately 5cm for granulometric and Loss on Ignition (LOI) analyses. The contents from each core was then carefully transferred to a pre-labelled plastic zip-lock bag and stored in a cooler box with ice packs for transport back to the laboratory.

Laboratory Analyses

Granulometric Analyses

On arrival back to the laboratory the sediment samples were either transferred to a 4ºC cold room or the drying process was started immediately. Grain size analyses were initiated on all samples within 3 days of collection.

To start the drying process, the collected sediments were transferred to aluminium trays, homogenised by hand and dried in an oven at 100 ºC for 24 hours. The oven dried samples were then ready for grain size analyses following the methodology below as described by Holme and McIntyre (1971).

- Approximately 25g of dried sediment was weighed out and placed in a labelled 1L glass beaker to which 100 ml of a 6 percent hydrogen peroxide solution was then added. This was allowed to stand overnight in a fume hood.

- The beaker was then placed on a hot plate and heated gently. Small quantities of hydrogen peroxide were added to the beaker until there was no further reaction. This peroxide treatment removes any organic material from the sediment which can interfere with grain size determination.

- The beaker was then emptied of sediment and rinsed into a. 63µm sieve This was then washed with distilled water to remove any residual hydrogen peroxide. The sample retained on the sieve was then carefully washed back into the glass beaker up to a volume of approximately 250ml of distilled water.

- 10ml of sodium hexametaphosphate solution was then added to the beaker and this solution was stirred for ten minutes and then allowed to stand overnight. This treatment helps to dissociate the clay particles from one another.

- The beaker with the sediment and sodium hexametaphosphate solution was then washed and rinsed into a 63µm sieve. The retained sampled was then carefully washed from the sieve into a labelled aluminium tray and placed in an oven for drying at 100ºC for 24 hours.

- When dry this sediment was sieved through a series of graduated sieves ranging from 4 mm down to 63µm for 10 minutes using an automated column shaker. The fraction of sediment retained in each of the different sized sieves was weighed and recorded.

- The silt/clay fraction was determined by subtracting all weighed fractions from the initial starting weight of sediment as the less than 63µm fraction was lost during the various washing stages.

Loss on Ignition Analysis

On arrival back to the laboratory the sediment samples were either transferred to a 4 cold room or the drying process was started immediately. Loss on Ignition (LOI) is a proxy measurement of the amount or organic material in sediment. LOI analysis was initiated on all samples within 3 days of collection. LOI analysis was carried out following the methods described by Consalvey (2005).

Initially, the collected sediments were transferred to aluminium trays, homogenised by hand and then dried in an oven at 100ºC for 24 hours.

- A sample of dried sediment was then placed in a mortar and pestle and ground down to a fine powder.

- 1g of this ground sediment was weighed into a pre-weighed crucible and placed in a muffle furnace at 450ºC for a period of 6 hours.

- The sediment samples were then allowed to cool in a dessicator for 1 hour before being weighed again.

- The organic content of the sample was determined by expressing as a percentage the weight of the sediment after ignition over the initial weight of the sediment.

Faunal Sorting

Bags with the preserved faunal samples were carefully emptied over a 1mm sieve and rinsed with tap water to remove any traces of excess formaldehyde. These samples were then carefully washed into a plastic tray for sorting. Sorting was done by picking through the entire sample under illumination with a fine forceps and carefully removing all fauna. The fauna were split into 4 groups Polychaetes, Molluscs, Crustaceans and Others. Each faunal group was placed into a separate container with a water proof label and stored in a 70% alcohol solution. These samples were then shipped via courier for identification.

Faunal Identification

Fauna was sent to the following individuals for identification

Molluscs
Dr. Julia Nunn & Dr. Shelagh Smith

Polychaetes and Oligochaetes
Dr. Peter Garwood, Identichaet

Crustaceans & Others
Dr. Sammy De Grave, Oxford University Museum of Natural History.

3. Results

3.1 Dundalk Bay

Sampling Area: Dundalk Bay

Number of Transects: Four Transects (T1 – T4)

Site Map

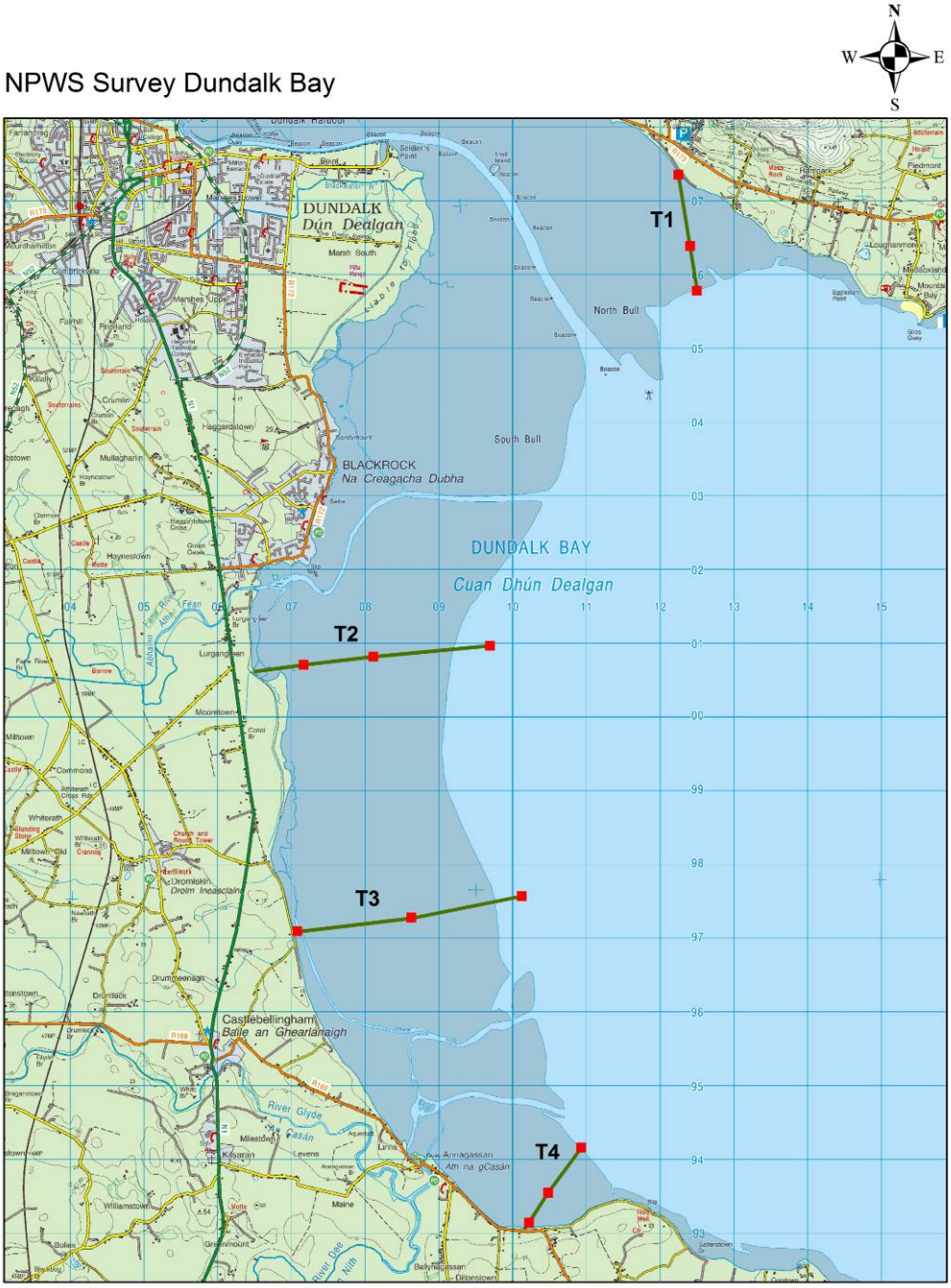


Figure 3.1.1: Dundalk Bay; Transect locations

Embayment	Transect	Shore Ht	Date	Easting	Northing
Dundalk	Transect 1	High	02/08/2007	312248	307355
		Mid	02/08/2007	312407	306389
		Low	02/08/2007	312499	305779
	Transect 2	High	02/08/2007	307164	300707
		Mid	02/08/2007	308111	300818
		Low	02/08/2007	309694	300967
	Transect 3	High	02/08/2007	307080	297099
		Mid	02/08/2007	308625	297281
		Low	02/08/2007	310124	297571
	Transect 4	High	03/08/2007	310222	293143
		Mid	03/08/2007	310483	293547
		Low	03/08/2007	310931	294163

Table 3.1.1: Sampling locations within Dundalk Bay. Positions are given in Irish National Grid.

Dundalk Bay – Transect 1

Date: 02/08/2007

Transect Length: 1650m

Overview of Transect:

This site was located along the northern shore of Dundalk Bay. The shore was backed by a steeply sloping cobble/boulder shoreline which borders an area of scrubland beyond it. Along the bottom part of this boulder shore, there was a small band dominated by *Mytilus edulis* and *Littorina littorea*. Immediately next to this cobble shore is an area of muddy sand, with evidence of use by motorised vehicles. *Arenicola* casts are absent along the upper and lower parts of the shoreline, and are present throughout the mid-shore section. Large shallow channels are also present throughout the shoreline and there is evidence of cockle dredging activity 500 meters downshore along the transect. The mid- and low-shore sections of the shore are dominated by rippled sand, with evidence of cockle dredging present in parts across the shore.

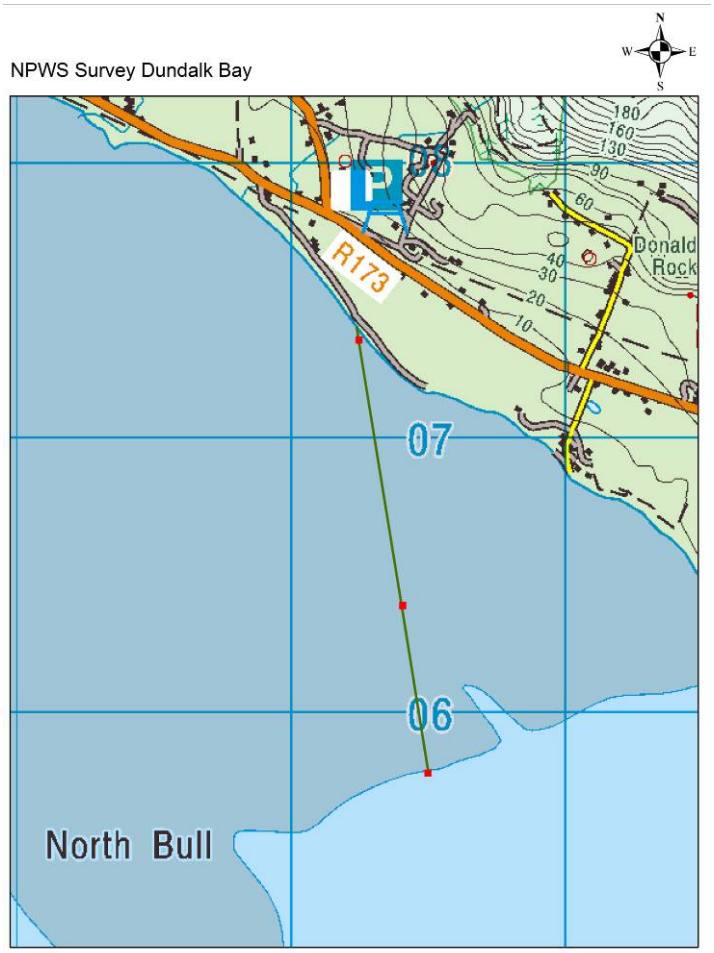


Figure 3.1.2: Transect 1, Dundalk Bay

Plate 3.1.1: View of steep boulder/cobble shore which borders Transect 1, Dundalk Bay.

Plate 3.1.2: View down-shore across the transect at Transect 1, Dundalk Bay.

Transect 1: Strand Line

	Orchestia gammarellus
Strand Line	27

The strandline at Transect 1 returned 27 specimens of a single species, *Orchestia gammarellus.*

T1 High

Overview of Site:

Shore Height Upper Shore
Substrate Poorly Sorted Fine Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	3.1%
Medium Sand	26.8%
Fine Sand	39.2%
Very Fine Sand	24.2%
Mud	6.7%

	% Loss on Ignition
T1 High	0.8%

Faunal Composition

	Obs (1m)	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Hydrobia ulvae			1				
Cerastoderma edule		10		1			
Angulus tenuis		1					
Macoma balthica		196	8	8	8	5	5
Scrobicularia plana		1					
Mya arenaria		1					
Eteone longa					1		
Nereis diversicolor		28	6	4	5	2	2
Nephtys hombergii		2	1	2	1	2	1
Pygospio elegans			1				1
Arenicola marina		15		1		1	2
Heterochaeta costata			2		1		3
Carcinus maenas					1		
Corophium volutator					1		2
Crangon crangon		8		1			

Station Description

Distance from shoreline: 50m

This station was located 30 meters from the end of the cobble shoreline which bordered the soft-sediment part of the shoreline. The sediment was classified as fine sand. The sediment was covered by a thin layer of standing water (covering approximately 80% of the sediment surface). An anoxic layer was evident at 2-3cm. The green algae *Enteromorpha intestinalis* were present on the sediment surface at

this shore height. No *Arenicola* casts were observed in the area but 15 were returned in the dig. *Macoma balthica* were the most abundant species in the dig (196 specimens returned).

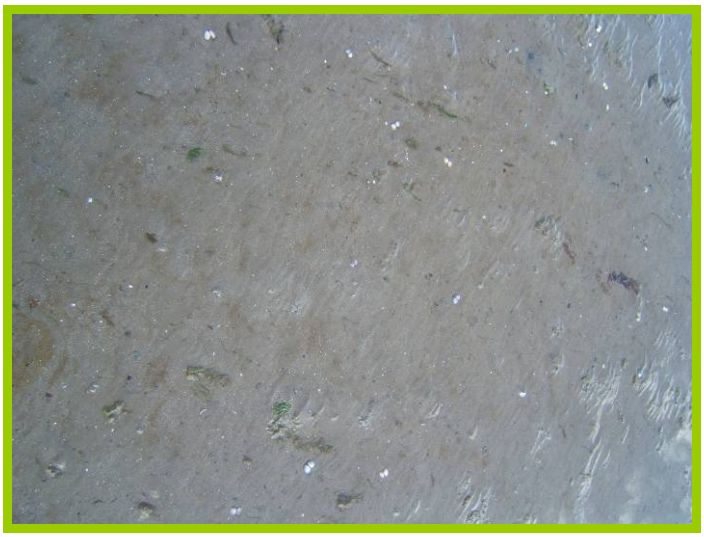


Plate 3.1.3: View of sediment at Dundalk Bay, Transect 1 High

Plate 3.1.4: View north-west across the shoreline at Dundalk Bay, Transect 1 High.

T1 Mid

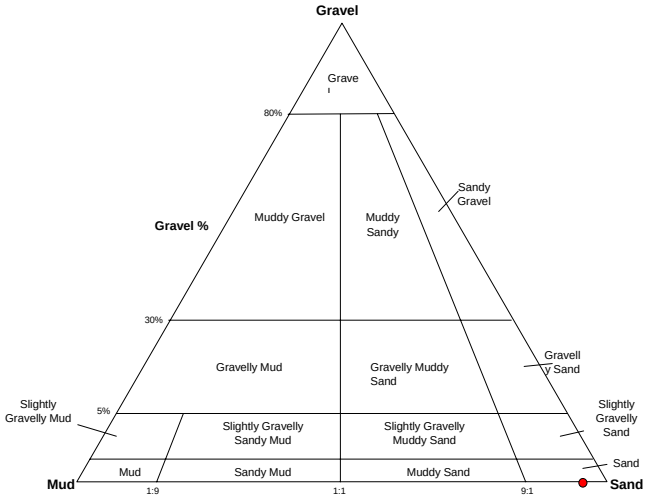
Overview of Site:

Shore Height Mid Shore
Substrate Well Sorted Fine Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	0%
Medium Sand	1.4%
Fine Sand	68.9%
Very Fine Sand	29.3%
Mud	0.4%

	% Loss on Ignition
T1 Mid	0.9%



Faunal Composition

	Obs (1m)	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Angulus tenuis		117	4	5	4	4	2
Sigalion mathildae		1					
Nephtys cirrosa			1			1	
Nephtys hombergii		5			2		
Orbinia latreillei		1			1		
Arenicola marina	5	1					
Crangon crangon		1			1		

Station Description

Distance from shoreline: 1030m

This sediment at this station was classified as fine rippled sand. The anoxic layer was not visible at this station. Over 50% of the sediment was covered by a thin layer of standing water, and the site was located near a large drainage channel. Five *Arenicola* casts were identified in the 1 meter quadrat, although only one specimen was returned in the dig. The most abundant species present in the dig was the bivalve mollusc *Angulus tenuis* (117 specimens recorded in the dig)

Plate 3.1.5: View of sediment at Dundalk Bay, Transect 1 Mid.

Plate 3.1.6: View west across the shore at Dundalk Bay, Transect 1 High

T1 Low

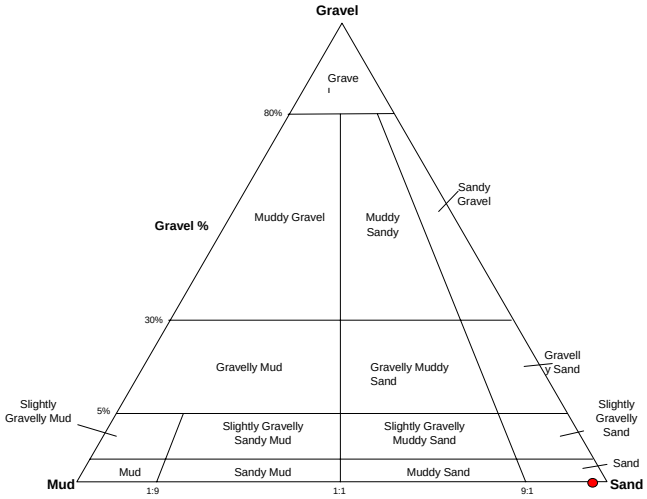
Overview of Site:

Shore Height Low Shore
Substrate Well Sorted Fine Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	0%
Medium Sand	0%
Fine Sand	72.8%
Very Fine Sand	25.4%
Mud	1.8%

	% Loss on Ignition
T1 Low	1.5%



Faunal Composition

	Obs (1m)	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Angulus tenuis		5			1	1	3
Fabulina fabula		29	1	1	1		
Sigalion mathildae		1					
Eteone longa				1			
Nephtys hombergii		1	1				
Orbinia latreillei		1					
Spiophanes bombyx						1	
Magelona johnstoni			1				
Lanice conchilega		1					

Station Description

Distance from shoreline: 1640m

This station was taken immediately adjacent to the main channel at low water, although there was a thin layer of water present across all the shore at this height... Sediment at this site was classified as fine sand. There was no visible fauna present on the sediment surface. The anoxic layer at this site was deeper than anoxic layers present along the remainder of the transect (~15cm deep).

Plate 3.1.7: View of sediment at Dundalk Bay, Transect 1 Low

Plate 3.1.8: View east across the shore at Dundalk Bay, Transect 1 Low

Dundalk Bay – Transect 2

Date: 02/08/2007

Transect Length: 3220m

Overview of Transect:

This site was located along the western shore of Dundalk Bay. There was evidence of cockle dredging across extensive areas of this shore. The shoreline backed onto an extensive saltmarsh, which extended 600 meters to the top of the shore. Immediately below the saltmarsh was a muddy sand area. The upper shore area of the transect was muddy sand, with *Corophium volutator* present on the sediment surface. The mid- and low-shore areas were rippled fine sands. An extensive area on the mid-shore area was subjected to cockle dredging resulting in shallow, water filled furrows across the sediment surface. Large numbers of *Cerastoderma edule* were visible on the sediment surface between mid- and low-shore.

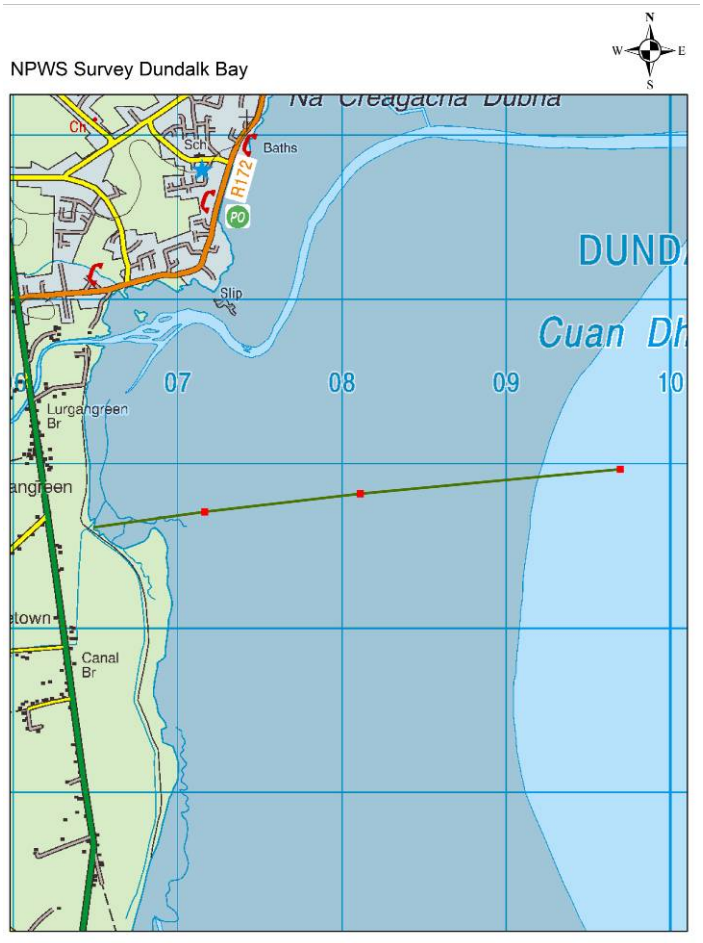


Figure 3.1.3: Transect 2, Dundalk Bay

Plate 3.1.9: View of salt marsh bordering upper edge of Dundalk Bay, Transect 2

Plate 3.1.10: View down shore at Dundalk Bay Transect 2.

Transect 2: Strand Line

As the transect backed onto an extensive saltmarsh area with no drift weed in evidence, there was no strandline samples taken at this site.

T2 High

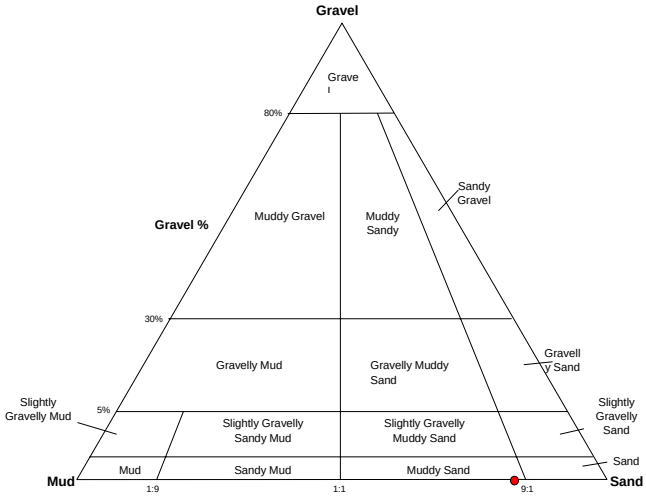
Overview of Site:

Shore Height Upper Shore
Substrate Muddy Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	0%
Medium Sand	0%
Fine Sand	16.8%
Very Fine Sand	70.3%
Mud	12.9%

	% Loss on Ignition
T2 High	1.2%



Faunal Composition

	Obs (1m)	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Hydrobia ulvae			10	8	5	7	6
Macoma balthica		10	1		1	2	
Eteone longa			1	2	4	5	3
Nereis diversicolor		4	2	2		2	1
Pygospio elegans		3	13	13	12	22	20
Corophium volutator	Numerous	3	59	138	137	66	168

Station Description

Distance from shoreline: 10 meters from the edge of the saltmarsh, 600+ meters from the top of the shoreline.

This station was immediately adjacent to the lower extent of an extensive saltmarsh which dominated the upper shore. The sediment at this station was characterised as muddy sand. The depth of the anoxic layer at this site was 3-4 cm, and a compacted shell layer was present at a depth of 20cm. There was numerous *Corophium volutator* present on the sediment surface and this was reflected in the number of *C. volutator* returned in the cores. The bivalve *Macoma balthica* was the most abundant fauna returned in the dig (10 per square meter).

Plate 3.1.11: View of sediment at Dundalk Bay, Transect 2 High

T2 Mid

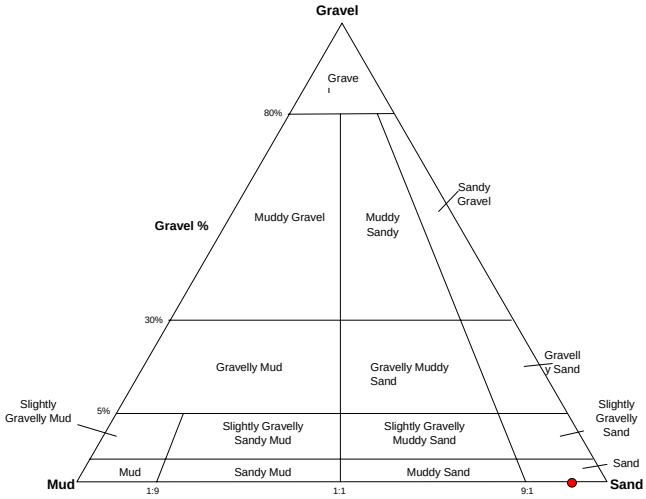
Overview of Site:

Shore Height Mid Shore
Substrate Well Sorted Fine Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	0%
Medium Sand	0%
Fine Sand	83.9%
Very Fine Sand	14.1%
Mud	2%

	% Loss on Ignition
T2 Mid	0.8%



Faunal Composition

	Obs (1m)	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Hydrobia ulvae				1	1	1	1
Cerastoderma edule		26	4	1			2
Angulus tenuis		202	10	13	15	20	12
Macoma balthica		43		2		3	1
Mya arenaria		1					
Sigalion mathildae		1					
Nephtys cirrosa							1
Nephtys hombergii		1	2	2	2	1	5
Pygospio elegans			1	2		1	1
Heteromastus filiformis						1	
Arenicola marina	9	5					
Lanice conchilega		1					
Tubificoides benedii			1				
Corophium volutator					1		
Crangon crangon			1	1		1	1
Bathyporeia pelagica						1	

Station Description

Distance from shoreline: 960 meters from the base of the saltmarsh, 1640 meters from the top of the shore

This sediment at this station was classified as rippled fine sand. The site was in close proximity to suction dredger marks. The anoxic layer was at a depth of 10-15cm. There was a significant amount of standing water present within this area, with ~90%

of the sediment covered with a thin layer of standing water. The most abundant species present in the digs were the bivalve molluscs, *Cerastoderma edule, Angulus tenuis* and *Macoma balthica* (26, 202 & 43 specimens respectively).

Plate 3.1.12: View of sediment at Dundalk Bay, Transect 2 Mid

Plate 3.1.13: View south along the shore at Dundalk Bay, Transect 2 Mid. Note the evidence of cockle dredging on the sediment.

T2 Low

Overview of Site:

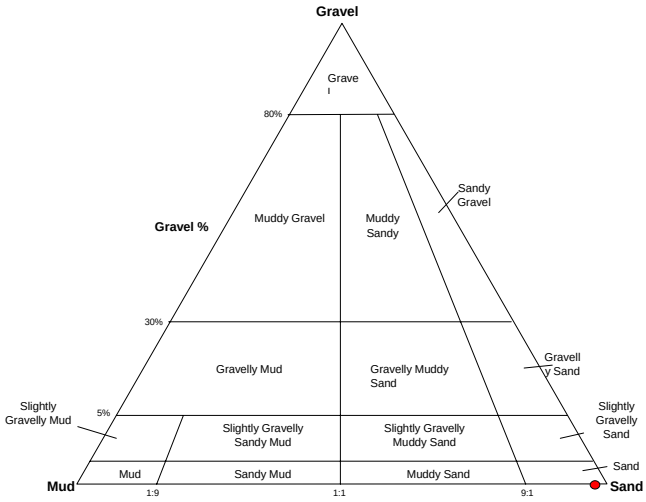
Shore Height Low Shore

Substrate Well Sorted Fine Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	0.2%
Medium Sand	0.0%
Fine Sand	70.9%
Very Fine Sand	27.4%
Mud	1.5%

	% Loss on Ignition
T2 Low	1.2%



Faunal Composition

	Obs (1m)	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Fabulina fabula		5	1	1		1	
Nemertea indet.							1
Sigalion mathildae		2		1			
Glycera tridactyla				1			
Nephtys hombergii		2		1	1	1	1
Orbinia latreillei		2	1				1
Scoloplos armiger					1		2
Spiophanes bombyx		2					
Magelona johnstoni						1	
Arenicola marina	3	4					
Lanice conchilega	Occasional	8					
Ampelisca brevicornis					1		
Eulimnogammarus obtusatus		2					
Gammarus locusta					1		
Praunus flexuosus		3					

Station Description

Distance from shoreline: 2550 meters from the base of the saltmarsh, 3200 meters from the top of the shore

This station was taken immediately adjacent to the main channel at low water. Sediment at this site was classified as slightly rippled sand. Three *Arenicola* casts were visible on the sediment surface and four were returned in the dig. The anoxic

layer at this site was 10cm deep. As the area was sampled during the incoming tide, 100% of the sediment was covered in a thin layer of water. There were occasional *Lanice conchilega* tubes evident on the sediment surface, and these were the most abundant species recovered in the dig (8 specimens per square meter).

Plate 3.1.14: View of sediment at Dundalk Bay, Transect 2 Low

Plate 3.1.15: View up shore across the transect at Dundalk Bay, Transect 2 Low

Dundalk Bay – Transect 3

Date: 02/08/2007

Overview of Transect:

This site was located along the eastern shore of Dundalk Bay. The shore was backed by a steeply sloping cobble/gravel shoreline, backed by a narrow strip of scrubland and adjacent to a road. A large channel crossed the shore at 60 meters from the top of the shore, and the sediment in the upper shore area comprised of muddy sand. Further along the shore, there were extensive areas where cockle suction dredging was undertaken, resulting in extensive shallow, water filled furrows crossing the mid- and low-shore areas. The mid- and low-shore areas had extensive areas which were covered by standing water. The sediment at the mid- and low-shores was firm sand. *Arenicola* casts were absent at the upper shore section and became abundant at mid-shore level (8 per square meter) although they became less abundant at low-shore (1 per square meter, occasionally more). *Enteromorpha intestinalis* was present on the sediment along the mid- and low-shore levels.

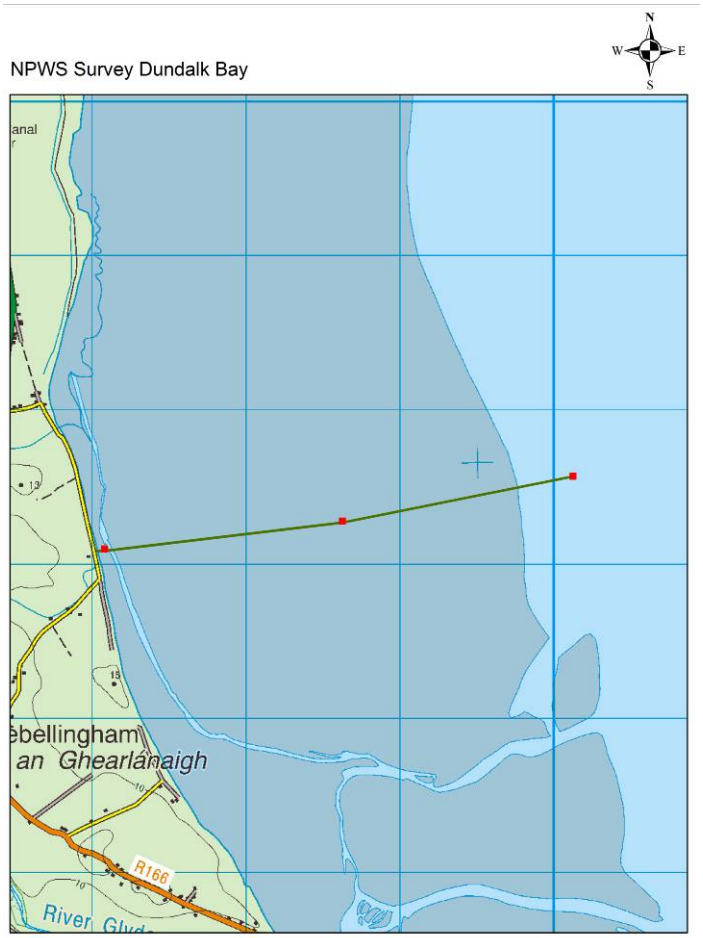


Figure 3.1.4: Transect 3, Dundalk Bay

Plate 3.1.16: View of sloping cobble shoreline at the upper part of Dundalk Bay Transect 3.

Plate 3.1.17: View of sediment at Dundalk Bay, Transect 3 indicating the influence of cockle dredging on the sediment surface.

Transect 3: Strand Line

[Locate missing sample]

T3 High

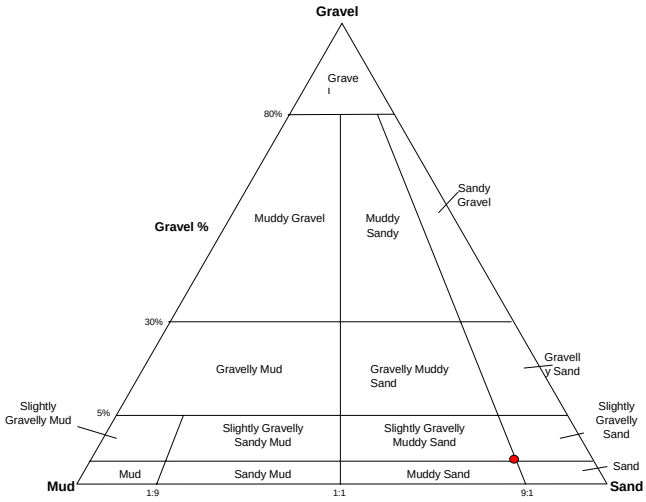
Overview of Site:

Shore Height Upper Shore
Substrate Slightly Gravely Muddy Sand

Granulometric Composition

	% Composition
Gravel	0.8%
Coarse Sand	1.7%
Medium Sand	71.6%
Fine Sand	13.8%
Very Fine Sand	1.4%
Mud	10.7%

	% Loss on Ignition
T3 High	2.0%



Faunal Composition

	Obs (1m)	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Macoma balthica		1			1	1	
Scrobicularia plana		21	4	2	3	1	3
Mya arenaria		3					
Eteone longa						1	
Nereis diversicolor		36	7	3	3	5	2
Pygospio elegans			1			2	
Heteromastus filiformis			5	7	2	12	3
Tubificoides benedii		5	15	28	22	20	30
Tubificoides pseudogaster		1			1		1
Corophium volutator				1			

Station Description

Distance from shoreline: 50m

This station was immediately adjacent to a large channel which crossed the channel at 60m. The sediment at this station was classified as slightly gravely muddy sand. The site was located in a gently sloping area, with no evidence of surface water. The anoxic layer was present just below the sediment surface. The most abundant species recovered in the dig was the ragworm, *Nereis diversicolor* and the bivalve *Scrobicularia plana*.

Plate 3.1.18: View of sediment at Dundalk Bay, Transect 3 High

Plate 3.1.19: View south across the sediment at Dundalk Bay, Transect 3 High

T3 Mid

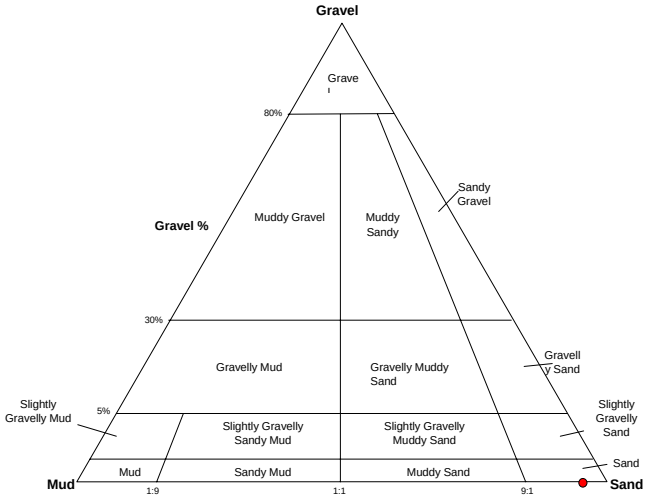
Overview of Site:

Shore Height Mid Shore
Substrate Well Sorted Fine Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	0%
Medium Sand	0%
Fine Sand	75.6%
Very Fine Sand	22.2%
Mud	2.2%

	% Loss on Ignition
T3 Mid	1.3%



Faunal Composition

	Obs (1m)	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Potamopyrgus antipodarum						1 dead	
Cerastoderma edule		3					
Angulus tenuis		333	20	8	16	27	11
Macoma balthica		1					
Nemertea indet.		1					
Sigalion mathildae		4					
Nephtys cirrosa		2			1		1
Nephtys hombergii		4	3	2	1	1	2
Orbinia latreillei		1					
Pygospio elegans				1		2	
Arenicola marina	8	1					
Owenia fusiformis		39		1	1	1	
Lanice conchilega		1					
Crangon crangon		1					
Gammarus locusta		1					

Station Description

Distance from shoreline: 1600m

This sediment at this station was classified as fine sand. The depth of the anoxic layer at this site was 10-15 cm deep, and a subsurface shell layer was present at 20cm. There was a significant amount of standing water present at this site, with 100% of the area under water. *Arenicola* casts were present (8 per square meter) although only one was returned in the dig. There were patches of *Enteromorpha intestinalis* present

at this site also. The most abundant species present in the dig was the bivalve mollusc *Angulus tenuis* (with 333 specimens identified from the dig

Plate 3.1.20: View of sediment at Dundalk Bay, Transect 3 Mid

Plate 3.1.21: View south across the shore at Dundalk Bay, Transect 3 Mid.

T3 Low

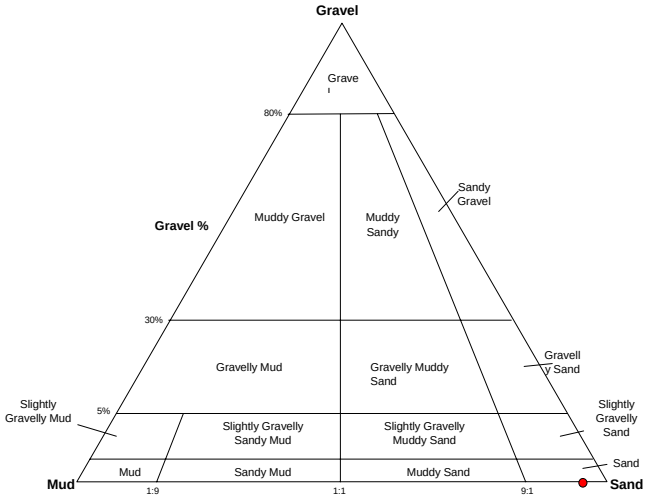
Overview of Site:

Shore Height Low Shore
Substrate Well Sorted Fine Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	0%
Medium Sand	0%
Fine Sand	75.5%
Very Fine Sand	23.1%
Mud	1.4%

	% Loss on Ignition
T3 Low	0.9%



Faunal Composition

	Obs (1m)	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Nucula nitidosa							1
Fabulina fabula		2			1		1
Arenicola marina	1						
Nemertea indet.		1			1		
Malmgrenia marphysae		2					
Sigalion mathildae		2	1	1			
Nephtys hombergii		1		1			
Orbinia latreillei		4					
Scoloplos armiger					1	1	
Spiophanes bombyx		1					
Magelona johnstoni				1			
Magelona filiformis				1			
Owenia fusiformis		1					
Lanice conchilega	Numerous	11	1				
Crangon crangon						1	
Ophiothrix fragilis			1				
Liocarcinus holsatus		1					

Station Description

Distance from shoreline: 3100m

This station was taken immediately adjacent to the main channel at low water. Sediment at this site was classified as rippled fine sand. Numerous *Lanice conchilega* tubes and a single *Arenicola* cast were evident on the sediment surface at this site. .

The anoxic layer at this site was absent. The site was under 100% surface water at the time of sampling. Occasional *Enteromorpha intestinalis* were present on the sediment surface.

Plate 3.1.22: View of sediment at Dundalk Bay, Transect 3 Low

Plate 3.1.23: View up shore from the low water at Dundalk Bay Transect 3

Dundalk Bay – Transect 4

Date: 03/08/2007

Transect Length: 1350 meters

Overview of Transect:

This site was located along the southern shore of Dundalk Bay and is subjected to regular picking for cockles by shore based cockle pickers. The shore was backed by a gently sloping cobble shore, with a large amount of algal debris along the upper section of this cobble shore. Immediately adjacent to this is an extensive area of muddy cobble with *Mytilus edulis* present on boulders and cobble within the sediment between these muddy cobble structures. The upper shore was classified as muddy sand, and the mid- and low-shore areas were rippled sand. In addition there was extensive standing water across the mid and low-shore sections.

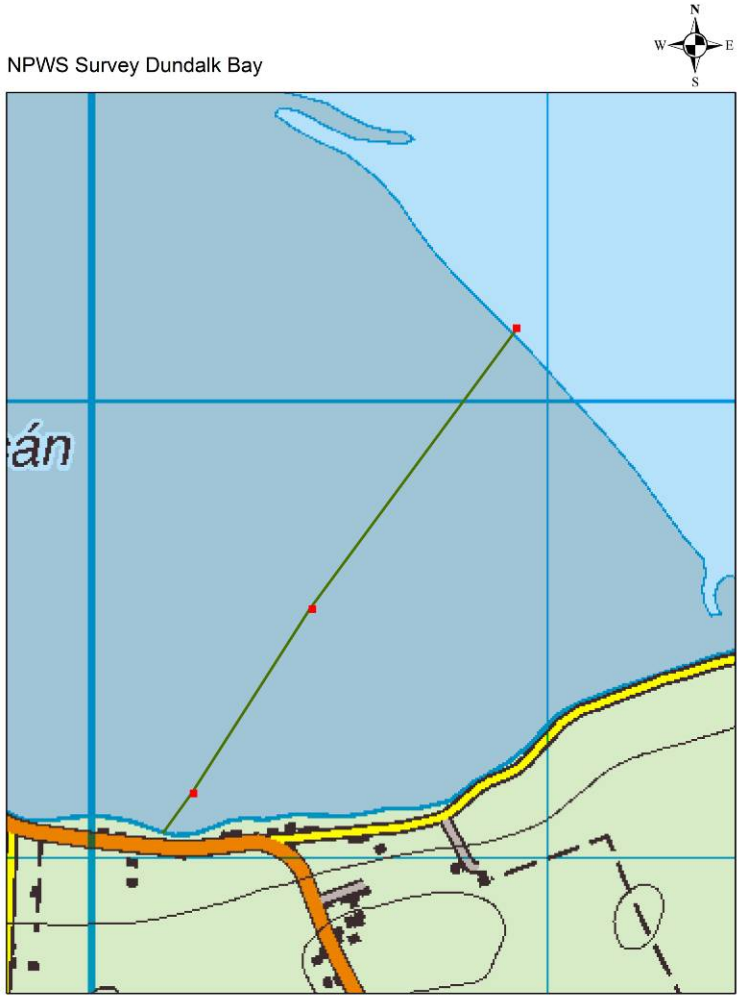


Figure 3.1.5.: Transect 4; Dundalk Bay.

Plate 3.1.24: View across the Transect at Dundalk Bay, Transect 4. The people on the shoreline are cockle pickers. More than 20 people were collecting cockles across transect 4 during the course of the survey.

Plate 3.1.25: View of raised muddy structures at the upper section of the transect at Dundalk Bay, Transect 4.

Transect 4: Strand Line

	Orchestia gammarellus
Strand Line	187

The strandline at Transect 4 returned 187 specimens of a single species, *Orchestia gammarellus.*

T4 High

Overview of Site:

Shore Height Upper Shore
Substrate Muddy Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	0%
Medium Sand	1.5%
Fine Sand	28.6%
Very Fine Sand	37.4%
Mud	32.5%

	% Loss on Ignition
T4 High	1.4%

Faunal Composition

	Obs (1m)	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Hydrobia ulvae			2				
Cerastoderma edule		23	1	2	1		1
Angulus tenuis		229	7	8	11	7	6
Macoma balthica		107	4	2	3	4	3
Mya arenaria		1					
Arenicola marina	2						
Glycera tridactyla						1	
Nephtys cirrosa						1	
Nephtys hombergii		2	1	3	2	2	1
Scoloplos armiger			1				
Pygospio elegans			1		2	1	1
Carcinus maenas		1					
Corophium volutator					1		1
Crangon crangon		8				1	

Station Description

Distance from shoreline: 100m

This station was immediately adjacent to the lower extent of a muddy cobble and *Mytilus edulis* dominated area of the shore. The sediment at this station was classified as muddy sand. The depth of the anoxic layer was 3-4cm at this site. *Arenicola* casts were present on the sediment surface (2 per square meter) although none were returned in the grid. In addition, 2 *Cerastoderma edule* were present on the sediment surface. This site was located close to a shallow creek (20 meters).

Plate 3.1.26: View of sediment at Dundalk Bay, Transect 4 High.

Plate 3.1.27: View of muddy cobble and *Mytilus edulis* common in the area of Dundalk Bay, Transect 4 High.

T4 Mid

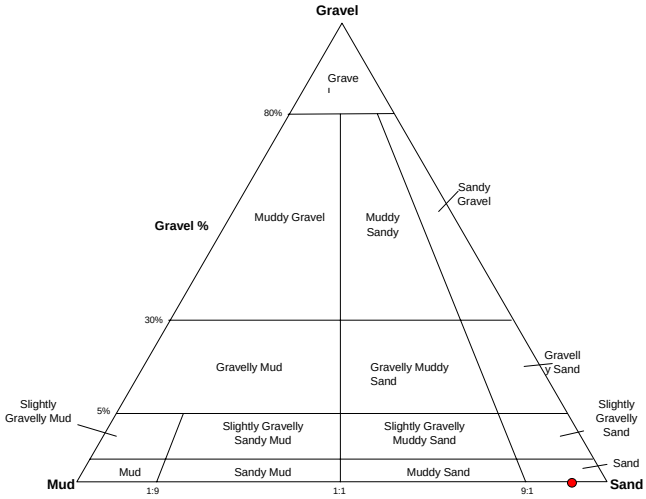
Overview of Site:

Shore Height Mid Shore
Substrate Well Sorted Fine Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	0%
Medium Sand	11.6%
Fine Sand	79.5%
Very Fine Sand	5.8%
Mud	3.1%

	% Loss on Ignition
T4 Mid	1.1%



Faunal Composition

	Obs (1m)	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Cerastoderma edule		1					
Angulus tenuis		206	12	16	8	14	10
Nephtys cirrosa			2	1	1		1
Nephtys hombergii		1			2	2	
Orbinia latreillei		1					
Arenicola marina	2	1					
Carcinus maenas					1		
Crangon crangon		3	2				

Station Description

Distance from shoreline: 590m

This sediment at this station was dominated by rippled sand. There was no evidence of an anoxic layer at this station. There was a significant amount of standing water present within this area, with 100% of the sediment covered with a thin layer of standing water. *Arenicola* casts were evident on the sediment surface (2 per square meter) and one was returned in the dig. *Enteromorpha intestinalis* was present in small patches on the sediment surface. The bivalve mollusc, *Angulus tenuis* was the most abundant species returned in the dig (206 individuals).

Plate 3.1.28: View of sediment at Dundalk Bay, Transect 4 Mid

Plate 3.1.29: View up shore across the shore at Dundalk Bay, Transect 4 Mid

T4 Low

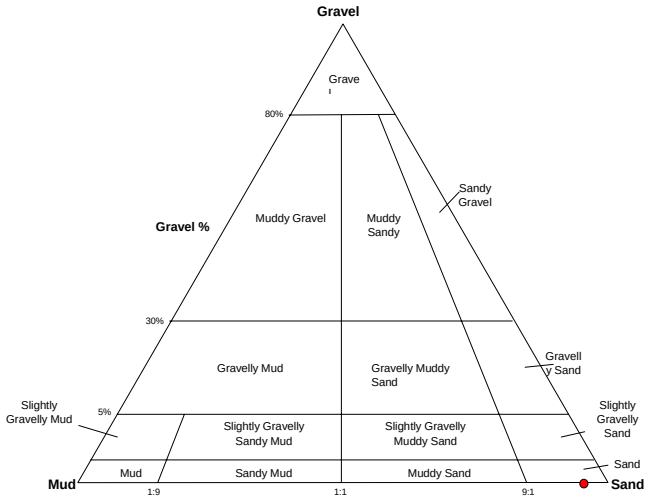
Overview of Site:

Shore Height	Low Shore
Exposure	Moderately Exposed
Substrate	Well Sorted Fine Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	0%
Medium Sand	0%
Fine Sand	76.7%
Very Fine Sand	21.4%
Mud	1.9%

	% Loss on Ignition
T4 Low	1.1%



Faunal Composition

	Obs (1m)	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Nucula nitidosa					1		
Angulus tenuis				1			
Fabulina fabula						2	2
Arenicola marina	1						
Chamelea gallina		1					
Sigalion mathildae		1			1	2	
Nephtys hombergii		1					
Orbinia latreillei		2		1			1
Pygospio elegans							1
Spiophanes bombyx		1		1			
Magelona johnstoni				2			1
Magelona mirabilis			1				
Owenia fusiformis		5				1	1
Lanice conchilega		1	1				

Station Description

Distance from shoreline: 1350m

This sediment at this station was dominated by rippled sand. The depth of the anoxic layer at this site was 15cm. There was a significant amount of standing water present within this area, with 100% of the sediment covered with a thin layer of standing water. *Arenicola* casts were evident on the sediment surface (1 per square meter) although none were returned in the dig. *Enteromorpha intestinalis* was present in

small patches on the sediment surface. The bivalve mollusc, *Angulus tenuis* was the most abundant species returned in the dig (206 individuals).

Plate 3.1.30: View of sediment at Dundalk Bay, Transect 4 Low

Plate 3.1.31: View east across the shoreline at Dundalk Bay, Transect 4 Low

3.2 Trawbreaga Bay

Sampling Area: Trawbreaga Bay

Number of Transects: Four Transects (T1 – T4)

Site Map

Figure 3.2.1: Trawbreaga Bay, Transect locations

Embayment	Transect	Shore Ht	Date	Easting	Northing
Trawbreaga	Transect 1	High	31/07/2007	244972	450359
		Mid	31/07/2007	244949	450264
		Low	31/07/2007	244914	450148
	Transect 2	High	31/07/2007	245627	448229
		Mid	31/07/2007	245425	449235
		Low	31/07/2007	245396	449508
	Transect 3	High	01/08/2007	241861	449525
		Mid	01/08/2007	242021	449321
		Low	01/08/2007	242151	449139
	Transect 4	High	01/08/2007	243004	450858
		Mid	01/08/2007	243146	451077
		Low	01/08/2007	243301	451305

Table 3.2.1: Sampling locations within Trawbreaga Bay. Positions are given in Irish National Grid.

Trawbreaga Bay – Transect 1

Date: 31/07/2007

Tidal height and time (LW): 14:23 (0.6m) – [based on tides from Portmore]

Transect Length: 370m

Overview of Transect:

This site was located along the northern section of Trawbreaga Bay. The shore was backed by a cobble/gravel shoreline, along which evidence of extensive oyster culture were evident (Oyster bags, sorting tables etc.). In addition, evidence of Oyster aquaculture was present within the vicinity of this transect (although it wasn't present along the transect). The shore measured 370m at this point. The upper section of the shore was characterised by an extensive area of *Ascophyllum nodosum* and *Fucus vesiculosis* attached to boulder and bedrock interspersed with gravel and sand. Immediately adjoining this *Ascophyllum*/*Fucus* bed is an area of sandy gravel which gradually gives way to firm sand throughout the course of the transect. *Arenicola marina* were present along the mid-shore section, although numbers were relatively low (2 casts per meter) and were not present along the low-shore.

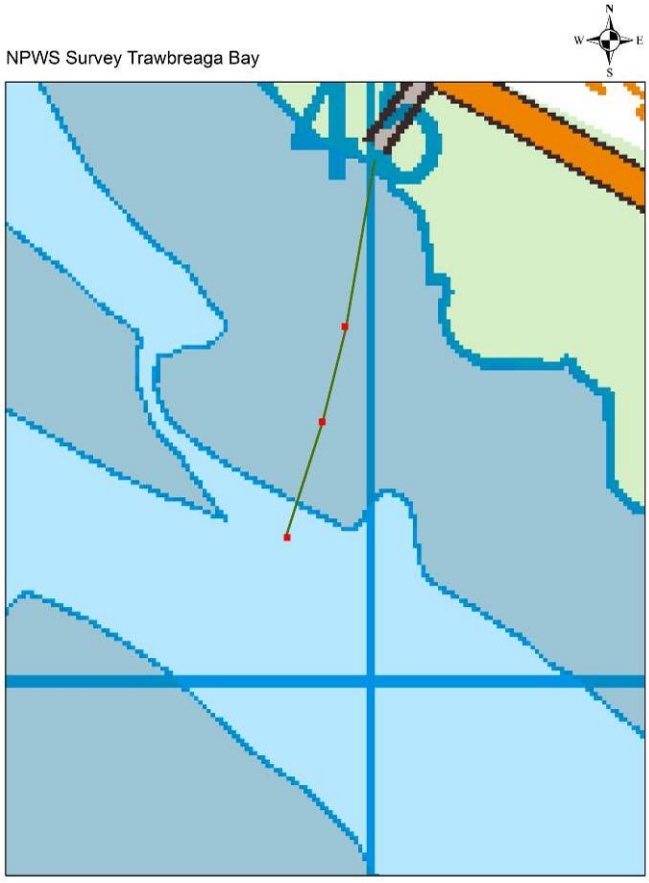


Figure 3.2.2: Transect 1, Trawbreaga Bay

Plate 3.2.1: *Ascophyllum nodosum* and *Fucus vesiculosis* present along the upper shore section of Transect 1.

Plate 3.2.2: View upshore across *A. nodosum* bed to top of shore. Evidence of intensive aquaculture present along the upper shore.

Transect 1: Strand Line

	Orchestia gammarellus
Strand Line	74

The strandline at Transect 1 returned 74 specimens of a single species, *Orchestia gammarellus*.

T1 High

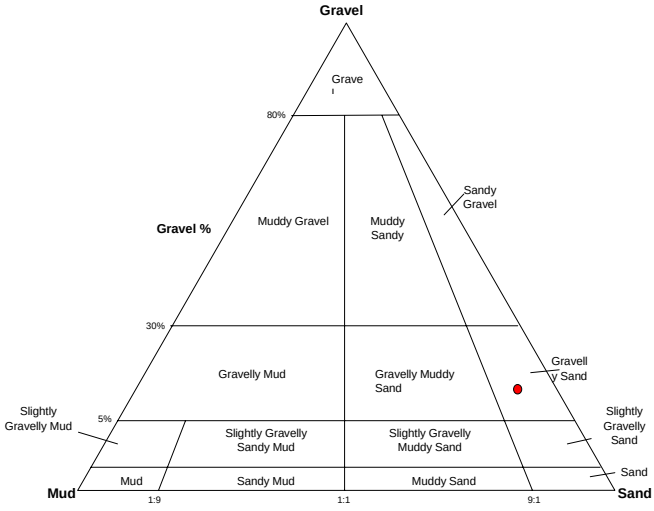
Overview of Site:

Shore Height Upper Shore
Substrate Poorly Sorted Gravely Sand

Granulometric Composition

	% Composition
Gravel	13.9%
Coarse Sand	1.7%
Medium Sand	39.1%
Fine Sand	35.4%
Very Fine Sand	1.5%
Mud	5.3%

	% Loss on Ignition
T1 High	0.7%



Faunal Composition

	Dig	Cores			
		Rep A	Rep B	Rep C	Rep D	Rep E
Lucinoma borealis			2			
Chamelea gallina					1	
Lineus indet.				1		
Phyllodoce mucosa				1		
Nereis virens	1	3	1	3		1
Scoloplos armiger	6	7	7	8	9	11
Aricidea minuta					1	
Malacoceros sp.		2	2	1	1	
Pygospio elegans			10	5	5	2
Capitella capitata (complex)		1	3	1	4	5
Heteromastus filiformis		2	1		2	
Clymenura leiopygos		1				
Galathowenia oculata				1	1	
Tubificoides benedii		1	1	2		1
Tubificoides pseudogaster			1	1		
Corophium volutator		9	2	3		1

Station Description

Distance from shoreline: 150m

This station was immediately adjacent to the lower extent of a mixed *Ascophyllum nodosum*/*Fucus vesiculosis* zone present on cobble/boulders in mixed sediment. The sediment at this station was dominated by the presence of a significant amount of gravel throughout the shore at this height. In addition, there was a significant amount of standing water present (~60%). An anoxic layer was present just below the sediment surface, and a coarse layer (consisting of gravel) was present 3-5 cm deep.

There were no visible fauna present, although clumps of *A. nodosum* and *F. vesiculosis* were present throughout the shore at this height.

Plate 3.2.3: Sediment at Trawbreaga Bay T1 High.

Plate 3.2.4: View up shore from Trawbreaga T1 High.

T1 Mid

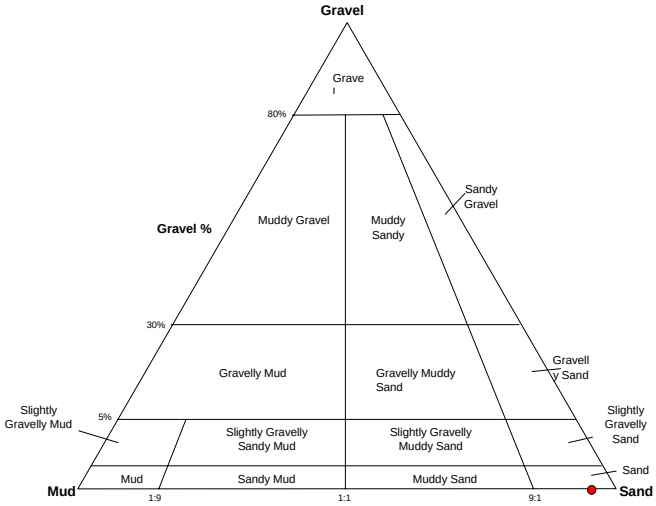
Overview of Site:

Shore Height Mid Shore
Substrate Moderately Well Sorted Fine Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	0.4%
Medium Sand	35.4%
Fine Sand	60.7%
Very Fine Sand	0.4%
Mud	3%

	% Loss on Ignition
T1 Mid	0.8%



Faunal Composition

	Observed (1m)	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Angulus tenuis		7		2	2	1	1
Nephtys cirrosa		1		1	1		
Marphysa bellii		1					
Scoloplos armiger			1	1		1	1
Pygospio elegans			2				2
Spio martinensis							1
Clymenura leiopygos		18	1	1	2	2	
Lanice conchilega		1					
Polycirrus norvegicus					1		
Carcinus maenas			1				
Corophium volutator							1
Orchestia gammarellus				1			
Arenicola marina	2	1					

Station Description

Distance from shoreline: 245m

This sediment at this station was dominated by fine rippled sand. The anoxic layer was present between 1-5cm depth, and presented as a grey layer. Immediately within the 1 square meter sampling position, no standing water was present, although it should be noted that standing water was present at zones within this shore height along this transect. Two *Arenicola* casts were identified in the quadrat, although only one specimen was returned in the dig.

Plate 3.2.5: View of sediment at Trawbreaga T1 Mid.

Plate 3.2.6: View up shore of Transect from Trawbreaga T1 Mid.

T1 Low

Overview of Site:

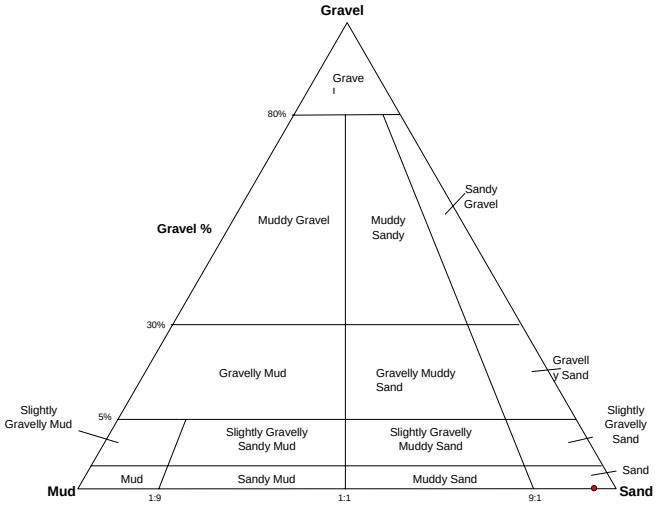
Shore Height Low Shore

Substrate Moderately Well Sorted Medium Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	0.6%
Medium Sand	57.3%
Fine Sand	38.4%
Very Fine Sand	0.8%
Mud	2.5%

	% Loss on Ignition
T1 Low	0.6%



Faunal Composition

	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Angulus tenuis	12	2	2	4	2	
Nephtys cirrosa	1	1				1
Orbinia latreillei	1					
Scoloplos armiger	1	2	1	1	1	1
Pseudopolydora pulchra						1
Pygospio elegans		1		1	1	
Spio martinensis			1			
Clymenura leiopygos	11	1	1		1	
Travisia forbesii		1			1	
Crangon crangon	1					

Station Description

Distance from shoreline: 370m

This station was taken immediately adjacent to the main channel at low water. Sediment at this site was characterised as medium sand. There was no visible fauna present on the sediment surface. The anoxic layer at this site was deeper than anoxic layers present along the remainder of the transect (~15cm deep).

Trawbreaga Bay – Transect 2

Date: 31/07/2007

Transect Length: 1540m

Overview of Transect:

This site was located along the southern section of Trawbreaga Bay, and was the innermost transect present in this bay. Evidence of Oyster aquaculture was evident along the transect with Oyster trestles present at locations adjacent to the transect at low water. In addition, evidence of the use of motorised vehicles was present on the sediment surface along the transect. The upper shore was characterised by the presence of fucoids and mussels (*Mytilus edulis*) within a gravely sand shore. This area dominated the transect. The mid shore area consisted of a relatively narrow area, dominated by smooth muddy sand. Oyster trestles were present within this area. The low shore area consisted of firm rippled sand. Oyster trestles were present both upstream and downstream of the end of the transect.

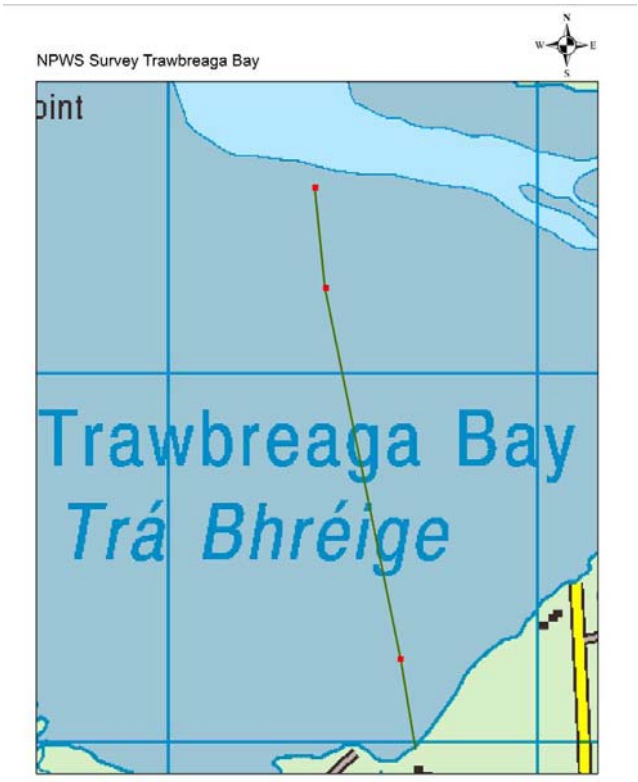


Figure 3.2.3: Map of Transect 2, Trawbreaga Bay.

Transect 2: Strand Line

	Carcinus maenas	*Orchestia gammarellus*
Strand Line	1	326

The strandline at Transect 2 returned 326 specimens of *Orchestia gammarellus* and a single specimen of *Carcinus maenas*.

T2 High

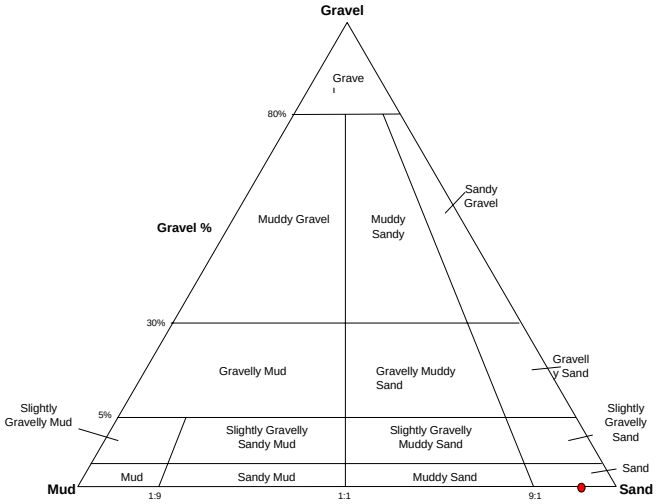
Overview of Site:

Shore Height Upper Shore
Substrate Moderately Sorted Medium Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	12.4%
Medium Sand	40.9%
Fine Sand	36.3%
Very Fine Sand	3.9%
Mud	4.3%

	% Loss on Ignition
T2 High	0.7%



Faunal Composition

	Observed 1m	Dig 1m	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Cerastoderma edule		2		1 dead			
Scrobicularia plana		1					
Eteone longa							1
Microphthalmus southerni		1					
Nereis diversicolor		4				1	
Scoloplos armiger		1				1	
Malacoceros sp.		1	1	2			
Pygospio elegans		1	2	4	2		1
Capitella capitata (complex)					1	1	
Arenicola marina	36	31	1	2		3	2
Heterochaeta costata				1	3	4	1
Tubificoides benedii		4	7	5	8	8	4
Tubificoides pseudogaster		5	6		6	8	1
Insect larva						1	
Carcinus maenas		1					
Corophium volutator		1			2		1
Crangon crangon		6		1			
Eurydice pulchra				1			
Cerastoderma edule		2					

Station Description

Distance from shoreline: 240m

This station was immediately adjacent to the lower extent of a mixed fucoid/mussel zone which dominated the upper shore. The sediment at this station was dominated by firm sand. In addition, standing water was present (~30%). An anoxic layer was

present just below the sediment surface, and a coarse layer (consisting of gravel) was present 5 cm deep. There were extensive *Arenicola* casts present (36 per m^2), and clumps of *F. vesiculosis* attached to rocks and *Enteromorpha* on the sediment were present throughout the shore at this height.

Plate 3.2.7: View of sediment at Trawbreaga T2 High.

Plate 3.2.8: View across shore at Trawbreaga T2 High. Note the presence of gravel and *Mytilus edulis* on rocks present at this shore height.

T2 Mid

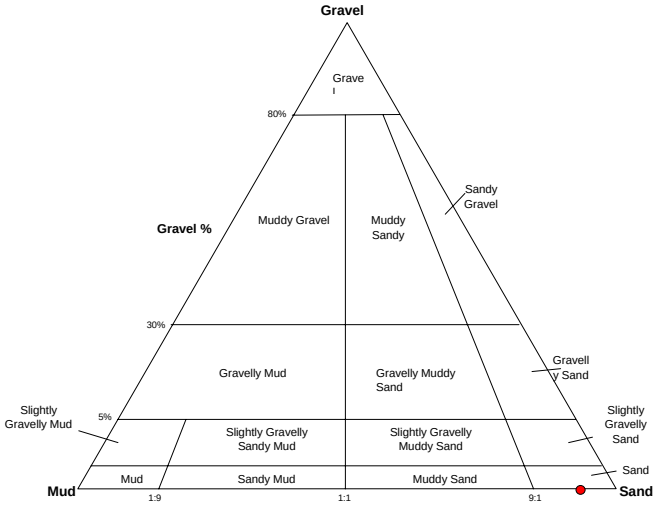
Overview of Site:

Shore Height Mid Shore
Substrate Well Sorted Fine Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	3.7%
Medium Sand	10.0%
Fine Sand	74.7%
Very Fine Sand	6.6%
Mud	4.4%

	% Loss on Ignition
T2 Mid	0.7%



Faunal Composition

	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Lucinoma borealis	1 dead					
Cerastoderma edule		1				
Angulus tenuis	5		1			
Nemertea indet.			1			
Sigalion mathildae						1
Nephtys cirrosa				1		
Marphysa bellii	5	1	1	2		3
Scoloplos armiger	1	1	1	1	1	1
Pygospio elegans		1				
Mediomastus fragilis			2		1	2
Notomastus latericeus			1			
Clymenura leiopygos	46			2	3	3
Galathowenia oculata				1		
Lanice conchilega	1					
Tubificoides benedii				1		
Corophium volutator		5	9	2	4	3
Crangon crangon	5					
Urothoe brevicornis					1	
Eurydice pulchra		5	2	1	1	
Bathyporeia pelagica		2		2	2	4

Station Description

Distance from shoreline: 1020m

This sediment at this station was dominated by fine sand. The anoxic layer was present between 1-5cm depth. There was a significant amount of standing water

present within this area, with ~80% of the sediment covered with a thin layer of standing water. Oyster trestles were present 30 meters from the location of this sampling position, although there was no obvious influence of aquaculture activity on this sampling location.

Plate 3.2.9: View of sediment at Trawbreaga T2 Mid.

Plate 3.2.10: View across shore to oyster trestles along this transect

T2 Low

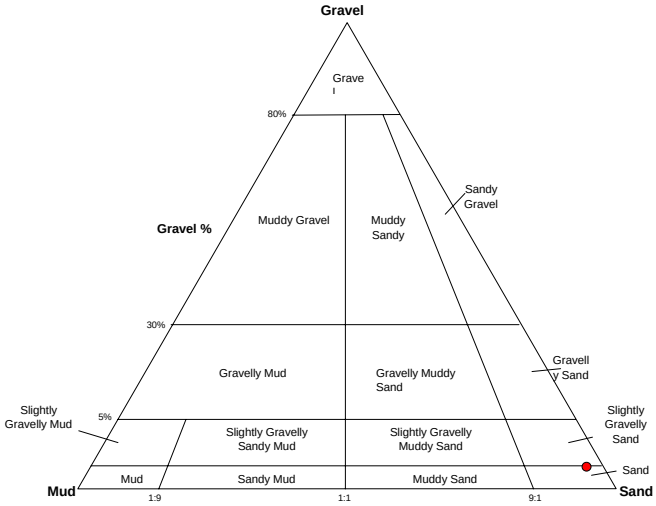
Overview of Site:

Shore Height Low Shore
Substrate Slightly Gravely Sand

Granulometric Composition

	% Composition
Gravel	0.5%
Coarse Sand	18.3%
Medium Sand	41.8%
Fine Sand	28.7%
Very Fine Sand	1.0%
Mud	2.1%

	% Loss on Ignition
T2 Low	1.0%



Faunal Composition

	Observed (1m)	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Angulus tenuis		77	4	5	8	7	5
Nemertea indet.				1			
Nephtys cirrosa		1					
Nephtys hombergii		1					
Spio martinensis			1				
Arenicola marina	2	2					
Travisia forbesii		10				1	1

Station Description

Distance from shoreline: 1540m

This station was taken immediately adjacent to the main channel at low water. Sediment at this site was characterised as slightly gravely rippled sand. Two *Arenicola* casts were visible on the sediment surface. The anoxic layer at this site was 10cm deep. Standing water (10%) was present between the ripples on the sediment surface. As with the mid shore site, Oyster trestles were present in close proximity (both upstream and downstream) to the sampling area.

Plate 3.2.11: View of sediment at Trawbreaga T2 Low.

Plate 3.2.12: View of oyster trestles at low water in close proximity to Trawbreaga T2 Low

Trawbreaga Bay – Transect 3

Date: 01/08/2007

Transect Length: 506m

Overview of Transect:

This site was located along the inner section of Trawbreaga Bay running from a point on Doagh Isle to Binconor Point for a distance of about 500 meters. The shore was backed by a cobble shoreline and grassland immediately adjacent to the road. The upper shore section was dominated by dry muddy sand, with occasional fucoids present on boulders within the sediment matrix. This band extended for about 200m along the transect. From this point to low water, surface water was evident on the sediment, and *Arenicola marina* casts became abundant (from 0 at the upper shore to 19 per meter at mid shore and 25 per meter at low shore). The sediment became firmer across the transect, with muddier sediment present higher up the shore, and clean sand present at the low water site. The depth of the anoxic layer was generally similar throughout the transect, typically 2-3 cm deep.

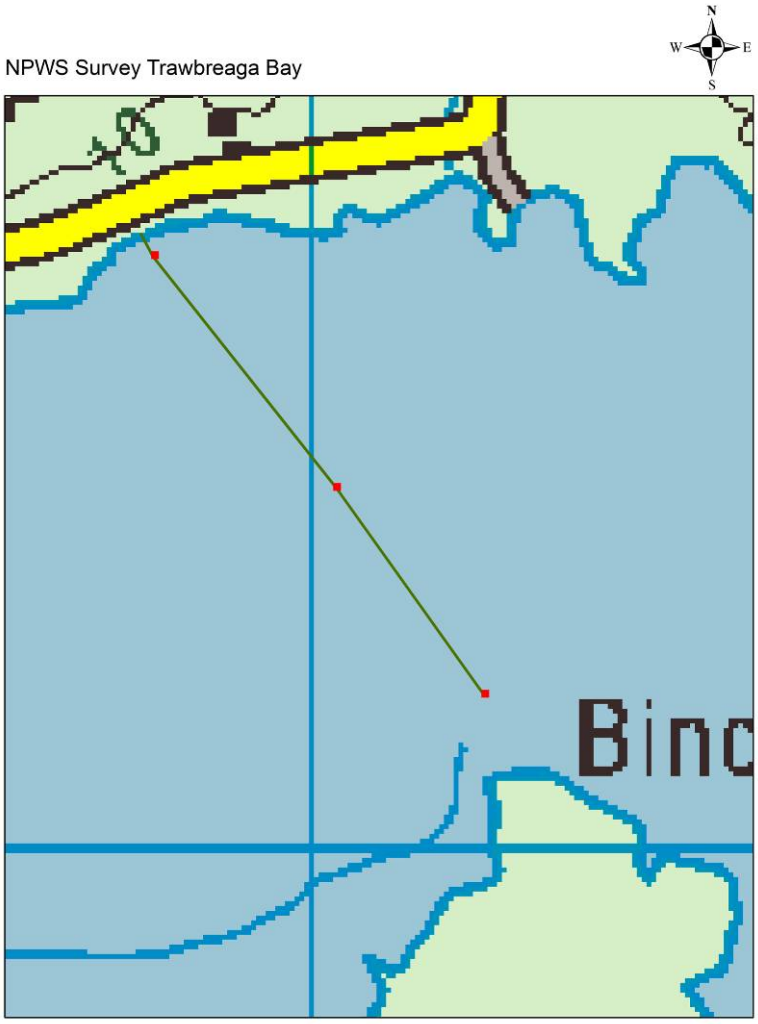


Figure 3.2.4: Transect 3, Trawbreaga Bay.

Plate 3.2.13: View of upper shore of Trawbreaga T3.

Plate 3.2.14: View up shore from low water at Trawbreaga T3.

Transect 3: Strand Line

	Ligia oceanica	*Orchestia meditteranea*
Strand Line	2	10

The strandline at Transect 2 returned 10 specimens of *Orchestia meditteranea* and a 2 specimens of *Ligia oceanica*.

T3 High

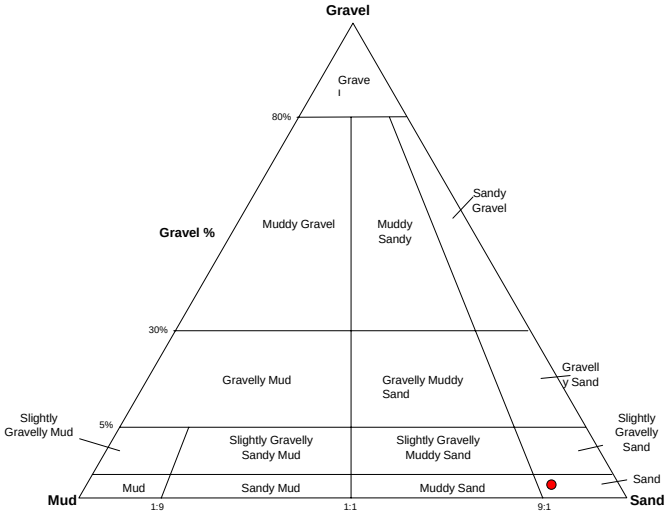
Overview of Site:

Shore Height Upper Shore
Substrate Poorly Sorted Slightly Gravely Sand

Granulometric Composition

	% Composition
Gravel	0.3%
Coarse Sand	0.5%
Medium Sand	13.8%
Fine Sand	71.1%
Very Fine Sand	5.7%
Mud	8.4%

	% Loss on Ignition
T3 High	0.9%



Faunal Composition

	Obs (1m)	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Hydrobia ulvae			3	5	6	3	6
Macoma balthica				1			
Scrobicularia plana		5					
Nereis diversicolor		8	24	25	22	28	22
Malacoceros sp.			1	2	5		2
Pygospio elegans			5	3	6	2	2
Heterochaeta costata			2	12	26	9	15
Tubificoides benedii		1	5	9	5	13	6

Station Description

Distance from shoreline: 20m

The upper shore is backed by a cobble shore which adjoins a roadway. Immediately adjacent to this cobble shore, the upper shore site was located within an area of muddy sand. Occasional dead *Scrobicularia* shells were present on the surface of the sediment. Clumps of *Fucus vesiculosis* attached to rocks were present across the shore at this height. Large numbers of *Nereis* burrows were evident on the sediment surface.

Plate 3.2.15: View of sediment at Trawbreaga T3 high.

Plate 3.2.16: View of upper shore section at Trawbreaga T3 high

T3 Mid

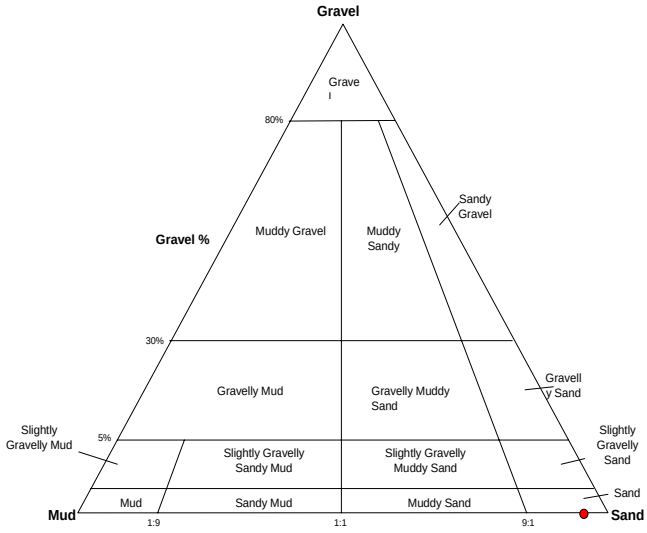
Overview of Site:

Shore Height Mid Shore
Substrate Very Well Sorted Fine Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	0%
Medium Sand	0%
Fine Sand	84%
Very Fine Sand	13%
Mud	3%

	% Loss on Ignition
T3 Mid	1.2%



Faunal Composition

	Obs (1m)	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Eteone longa					1		
Malacoceros sp.				1	1	1	
Pygospio elegans			1		6	15	4
Spio martinensis						4	1
Capitella capitata (complex)			1	1	1	4	1
Arenicola marina	19	17		1			

Station Description

Distance from shoreline: 280m

The sediment at this station was dominated by rippled muddy sand, with a significant amount of standing water present between the ripples (~75%). Anoxic sediment was visible on the sediment surface in areas where *Arenicola* casts are present. 19 *Arenicola* casts were present on the sediment surface, and 17 were returned in the dig. No other fauna were visible on the sediment surface.

Plate 3.2.17: View of sediment at Trawbreaga T3 Mid.

Plate 3.2.18: View up shore of Trawbreaga T3 Mid.

T3 Low

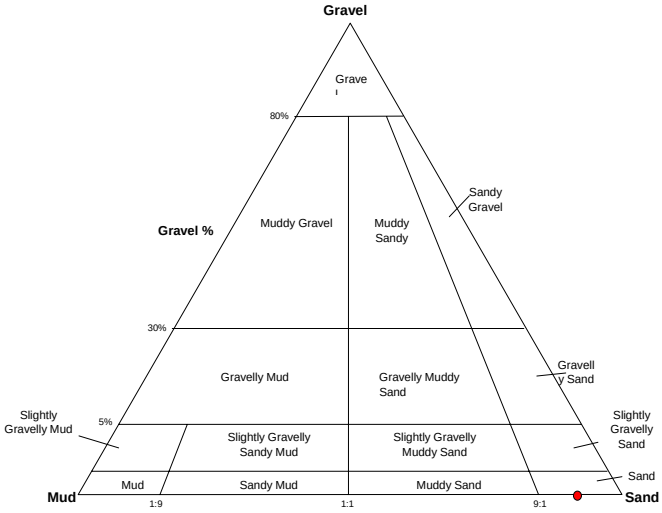
Overview of Site:

Shore Height Low Shore
Substrate Well Sorted Fine Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	0.8%
Medium Sand	5.2%
Fine Sand	84.8%
Very Fine Sand	6.6%
Mud	2.6%

	% Loss on Ignition
T3 Low	0.8%



Faunal Composition

	Obs (1m)	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Abra alba		1					
Lineus indet.		1					
Nereis diversicolor		5		3	3	2	2
Malacoceros sp.				2			
Spio martinensis				1			
Spiophanes bombyx							1
Baldia johnstoni			1	1			1
Capitella capitata (complex)				1	1		
Arenicola marina	25	9					
Owenia fusiformis							1
Tubificoides pseudogaster		1			1		
Crangon crangon		2					
Neomysis integer							1

Station Description

Distance from shoreline: 505m

This station was taken immediately adjacent to a shallow channel which bisected the inlet in close proximity to the other shore. The site is dominated by fine rippled sand, with a coarse gravel layer present at 15cm. *Arenicola* casts were most abundant at this shore height (25 per square meter).

Plate 3.2.19: View of sediment at Trawbreaga T3 Low

Plate 3.2.20: View of shallow channel present at the low water of Trawbreaga T3.

Trawbreaga Bay – Transect 4

Date: 01/08/2007

Transect Length: 548m

Overview of Transect:

This transect was located along a small inlet near Doaghmore on Doagh Isle. The transect measured nearly 550 meters. The shoreline was backed by a narrow salt marsh/grassland area which borders a roadway. Immediately adjacent to the grassland was an area dominated by dry sand. Small pebbles were occasionally present within the sediment, although sand dominated the sediment. Within this zone, the upper shore station was situated within this zone. Immediately below this is a narrow *Zostera nolti* bed which extends 55m down the shore. A small, shallow creek crosses the transect immediately below the *Zostera* bed. Beyond this creek, there was an extensive sandy zone which extended to Low water. Low water at this transect revealed unusual sand formations present. These sand formations indicated the presence of intensive hydrodynamic pressures at this site.

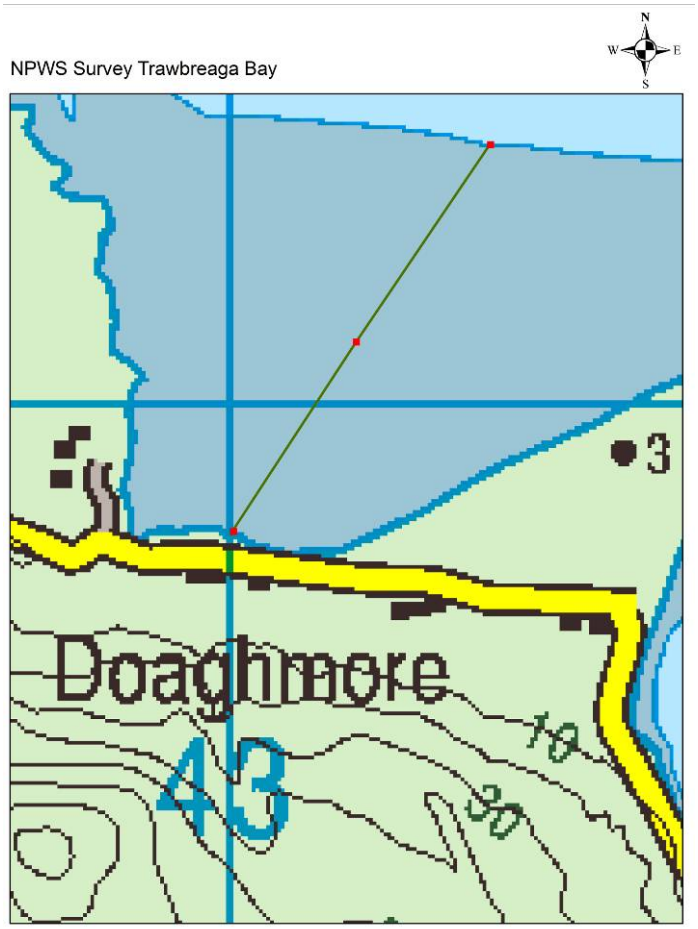


Figure 3.2.5: Transect 4, Trawbreaga Bay.

Plate 3.2.21: View up shore of upper section of Trawbreaga T4.

Plate 3.2.22: View of narrow band of *Zostera* present along Trawbreaga T4.

Plate 3.2.23: View of *Zostera* along Trawbreaga T4.

Transect 4: Strand Line

As the shore at Transect 4 backs onto a saltmarsh area with no algal drift, no strandline sample was recorded for this area.

T4 High

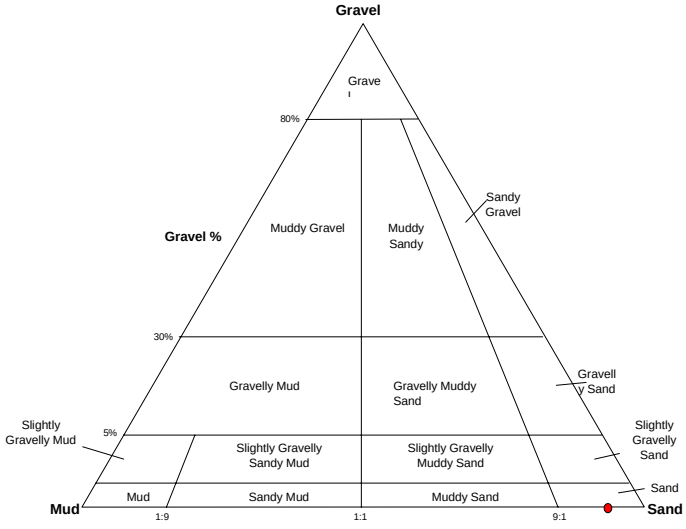
Overview of Site:

Shore Height Upper Shore
Substrate Moderately Well Sorted Fine Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	1.0%
Medium Sand	45.1%
Fine Sand	49.1%
Very Fine Sand	2.0%
Mud	2.8%

	% Loss on Ignition
T4 High	1.0%



Faunal Composition

	Dig 1m	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Hydrobia ulvae		27	23	18	23	33
Nereis diversicolor		13	18	14	15	9
Malacoceros sp.		6	2	3	3	6
Pygospio elegans		1	2	1	4	3
Heterochaeta costata		6	8	5	5	3
Corophium volutator		1				
Orchestia gammarellus			1			

Station Description

Distance from shoreline: 10m
This station was taken immediately adjacent to the grassland/salt-marsh area which borders this transect. The sediment was dominated by fine sand, with no evidence of fauna visible on the sediment surface. The anoxic layer was present within 2cm of the sediment surface. Standing water (25%) was present on the sediment surface. Immediately downshore of this site a narrow *Zostera* bed was evident.

Plate 3.2.24: View of sediment at Trawbreaga T4 high.

T4 Mid

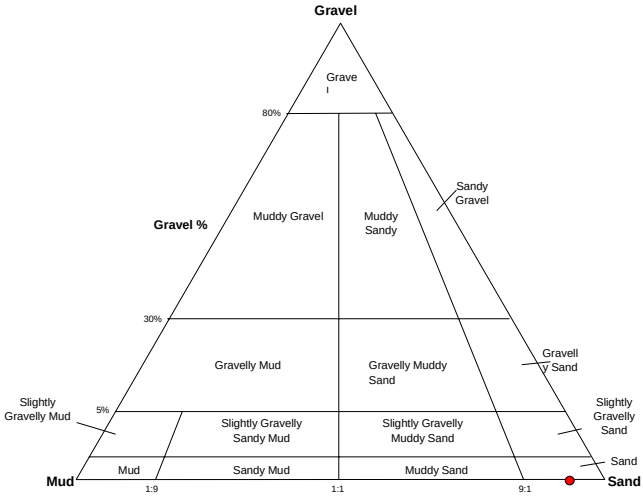
Overview of Site:

Shore Height Mid Shore
Substrate Very Well Sorted Fine Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	0%
Medium Sand	9.0%
Fine Sand	89.7%
Very Fine Sand	0.5%
Mud	0.8%

	% Loss on Ignition
T4 Mid	1.2%



Faunal Composition

	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Cerastoderma edule	2					
Arenicola marina	5					
Crangon crangon	3					
Eurydice pulchra				1		1
Bathyporeia pelagica			2	6		12

Station Description

Distance from shoreline: 265m
This site was dominated by fine rippled sand, with no anoxic layer evident. Standing water was present. There was no evidence of fauna on the sediment surface, although five *Arenicola marina* were present in the dig.

Plate 3.2.25: View of sediment at Trawbreaga T4 Mid.

Plate 3.2.26: View downshore of the transect at Trawbreaga T4 Mid.

T4 Low

Overview of Site:

Shore Height Low Shore

Substrate Moderately Well Sorted Medium Sand

Granulometric Composition

	% Composition
Gravel	0.0%
Coarse Sand	0.6%
Medium Sand	63.7%
Fine Sand	35.1%
Very Fine Sand	0.4%
Mud	0.2%

	% Loss on Ignition
T4 Low	0.9%

Faunal Composition

	Observed (1m)	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Angulus tenuis		77	4	5	8	7	5
Nemertea indet.				1			
Nephtys cirrosa		1					
Nephtys hombergii		1					
Spio martinensis			1				
Arenicola marina	2	2					
Travisia forbesii		10				1	1

Station Description

Distance from shoreline: 540m

The shore level drops off very quickly at the low water site along this transect. The sediment was dominated by featureless, flat medium sand. In addition, there were unusual sand structures present along shore bordering the water channel. A coarse gravel layer was present at 10 cm depth, and coring beyond this was not possible. There was no evidence of fauna on the sediment surface, but two *Arenicola* were recovered in the 1m dig.

Plate 3.2.27: View of sediment at Trawbreaga T4 Low.

Plate 3.2.28: View of unusual sediment structures located along the low water level at Trawbreaga T4.

3.3 Sligo Harbour

Sampling Area: Sligo Harbour

Number of Transects: Three Transects (T1 – T3)

Site Map

Figure 3.3.1: Sligo Harbour, Transect locations

Embayment	Transect	Shore Ht	Date	Easting	Northing
Sligo	Transect 1	High	28/08/2007	166537	336724
		Mid	28/08/2007	166163	337522
		Low	28/08/2007	165711	338470
	Transect 2	High	28/08/2007	164005	337045
		Mid	28/08/2007	163430	338195
		Low	28/08/2007	163205	338673
	Transect 3	High	29/08/2007	161378	337370
		Mid	29/08/2007	161355	337403
		Low	29/08/2007	161330	337464

Table 3.3.1: Sampling locations within Sligo Bay. Positions are given in Irish National Grid.

Sligo Harbour – Transect 1

Date: 28/08/2007

Transect Length: 1930m

Overview of Transect:

This site was located along the southern shore of Sligo Harbour. It was the innermost transect taken within Sligo Harbour. The shore was backed by a 2 – 3 meter high sea wall, which connected directly to the main road. The upper section of the wall was characterised by the presence of lichens. At the base of the seawall was a band of green algae *Enteromorpha ulva*. This immediately gave way to a band of *Fucus vesiculosis* which was attached to cobble within a sediment matrix. There was evidence of freshwater influence across the area, as a drain was present 10 meters from the start of the transect. The transect crossed a shallow channel approximately 30 meters from the start of the transect. The upper shore site was located within the intertidal from the sea wall to the shallow channel. The transect crossed an extensive mussel bank, which ran in a west-northwest direction across Cummeen Strand. This raised bank of mussels measured approximately 35 to 40 meters across at this point of the transect. The mid shore area of the transect was characterised by the presence of a significant amount of standing water (ranging from 50% to nearly 100% in places). *Arenicola* casts were abundant at this shore height. A clam farm was present approximately 1 ½ km along the transect, and there was evidence of motorised vehicles use on the sediment. The low water site was taken immediately adjacent to the main channel.

Figure 3.3.2: Transect 1, Sligo Harbour

Plate 3.3.1: View of sea wall at Sligo Harbour, Transect 1 upper shore.

Plate 3.3.2: View of mussel bank present along Sligo Harbour, Transect 1 mid shore area. The mussel bank is extensive and runs along Cummeen Strand in a west-northwest direction.

Transect 1: Strand Line

	Orchestia gammarellus
Strand Line	25

The strandline at Transect 1 returned 25 specimens of a single species, *Orchestia gammarellus*.

T1 High

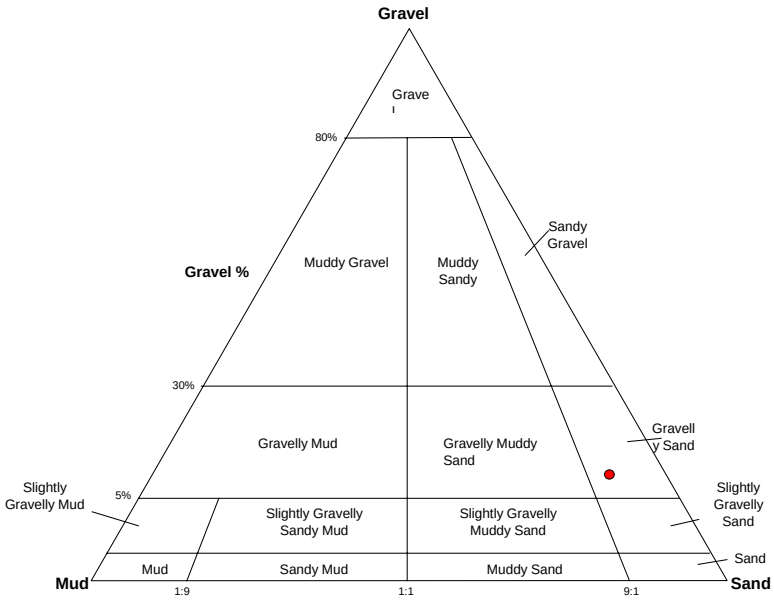
Overview of Site:

Shore Height Upper Shore
Substrate Poorly Sorted Gravely Sand

Granulometric Composition

	% Composition
Gravel	10.9%
Coarse Sand	3.1%
Medium Sand	2.7%
Fine Sand	65.3%
Very Fine Sand	11.5%
Mud	6.5%

	% Loss on Ignition
T1 High	1.9%



Faunal Composition

	Obs (1m)	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Hydrobia ulvae			1	9	1		2
Macoma balthica		13	1				
Scrobicularia plana		3		2	2		2
Nereis diversicolor		25	5	5		3	4
Pygospio elegans		1	17	7		8	23
Arenicola marina		1					
Heterochaeta costata			14	13		1	13
Tubificoides benedii		5	10	17		5	26
Tubificoides pseudogaster			1	1			
Crangon crangon					1		2

Station Description

Distance from shoreline: 20m

The sediment at this shore height has been classified as gravely sand, with a significant amount of mud present. Standing water was evident at the site, covering 25% of the sediment surface. An anoxic layer was present just beneath the sediment surface, with evidence of a stone layer at a depth of 10cm. The station was located approximately 20 meters from a shallow channel which crossed the transect at the upper shore level. *Macoma balthica* shells were present on the sediment surface, and

live specimens were recovered in the dig. *Enteromorpha intestinallis* and *Fucus vesiculosis* were present on the sediment surface. No *Arenicola* casts were present within this shore height, although a single specimen was recovered in the 1m dig.

Plate 3.3.3: View of sediment at Sligo Harbour, Transect 1 High.

Plate 3.3.4: View across the shore at Sligo Harbour, Transect 1 High.

T1 Mid

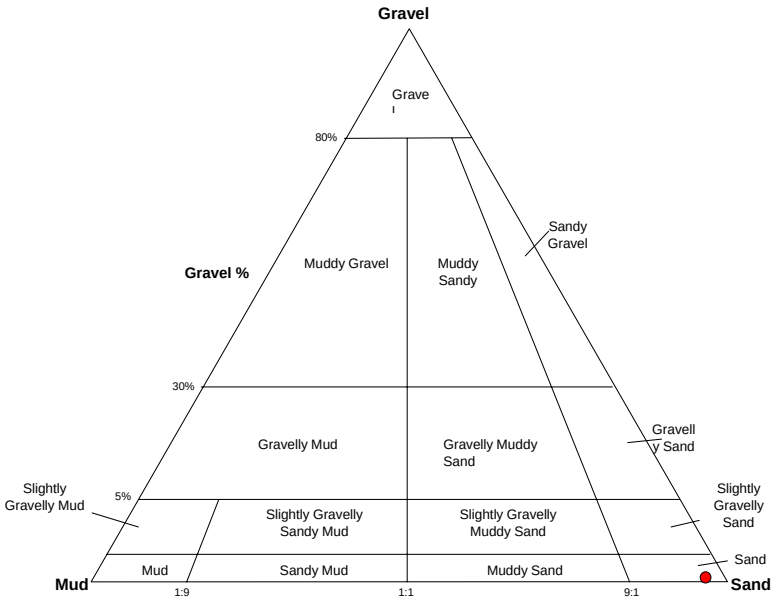
Overview of Site:

Shore Height Mid Shore
Substrate Very Well Sorted Slightly Gravely Sand

Granulometric Composition

	% Composition
Gravel	0.1%
Coarse Sand	0.3%
Medium Sand	3.6%
Fine Sand	88.1%
Very Fine Sand	6.0%
Mud	1.9%

	% Loss on Ignition
T1 Mid	0.9%



Faunal Composition

	Obs (1m)	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Hydrobia ulvae				88		2	
Cerastoderma edule		4	1	1		2v	1
Angulus tenuis		6		2	1		
Macoma balthica		1			2		
Eteone longa							1
Glycera tridactyla			1				
Scoloplos armiger					1		
Pygospio elegans				1			
Spio martinensis			1		1		
Capitella capitata (complex)				1			
Heteromastus filiformis				2		1	1
Arenicola marina	15	2					
Owenia fusiformis				1			
Ampelisca brevicornis				1	1	1	
Crangon crangon		1	1	2	1	2	1

Station Description

Distance from shoreline: 900m

This sediment at this station was dominated by fine rippled sand. The anoxic layer was present at a depth of 2 cm, and presented as a black layer. A thick shell layer was

present at a depth of 15cm. The sediment was under a significant amount of standing water (~85%). Fifteen *Arenicola* casts were identified in the quadrat, although only two specimens were returned in the dig. In addition, large numbers of dead cockle shells were present on the sediment surface. *Enteromorpha intestinallis* and *Fucus vesiculosis* were present on the sediment surface. The station was located approximately 100m from the raised mussel bank.

Plate 3.3.5: View of sediment at Sligo Harbour, Transect 1 mid.

Plate 3.3.6: View across the shore at Sligo Harbour, Transect 1 mid shore.

T1 Low

Overview of Site:

Shore Height Low Shore

Substrate Well Sorted Slightly Gravely Sand

Granulometric Composition

	% Composition
Gravel	0.5%
Coarse Sand	1.3%
Medium Sand	22.9%
Fine Sand	70.7%
Very Fine Sand	2.5%
Mud	2.1%

	% Loss on Ignition
T1 Low	0.7%

Faunal Composition

	Obs (1m)	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Hydrobia ulvae						1	
Angulus tenuis		78	3	1	1	3	4
Fabulina fabula		1					
Glycera tridactyla			2				1
Nephtys cirrosa		1				1	
Nephtys hombergii				1			
Orbinia latreillei				1	1		
Scoloplos armiger		1	1	2		3	1
Spio martinensis			4		1	2	1
Capitella capitata (complex)							1
Clymenura leiopygos		1		1			
Lanice conchilega		11					1
Crangon crangon		2					

Station Description

Distance from shoreline: 1950m

This station was taken immediately adjacent to the main channel at low water. Sediment at this site was characterised as rippled gravely sand. There was no visible fauna present on the sediment surface, although the red algae *Ceramium* sp. was

present. The depth of the anoxic layer at this site was 10cm. Approximately 30% of this site was under standing water, which was present between the ripples.

Sligo Harbour – Transect 2

Date: 28/08/2007

Transect Length: 1990 meters

Overview of Transect:

This transect was located along the southern shore of Sligo Harbour running from the shoreline near Coney Island causeway to in a north-northwest direction to the lighthouse on Oyster Island. The shore was backed by a narrow strip of saltmarsh and agricultural land giving way to fine rippled sand with a layer of water over it. This gave way to an extensive area of rippled sand with extensive amounts of *Cerastoderma edule* and *Arenicola marina* casts on the sediment surface. At the low water site *Lanice conchilega* dominated. *C. edule* were also evident at low water.

Figure 3.3.3: Transect 2, Sligo Harbour

Transect 2: Strand Line

	Ligia oceanica	*Orchestia meditteranea*
Strand Line	5	9

The strandline at Transect 2 returned 9 specimens of *Orchestia meditteranea* and 5 specimens of *Ligia oceanica*.

T2 High

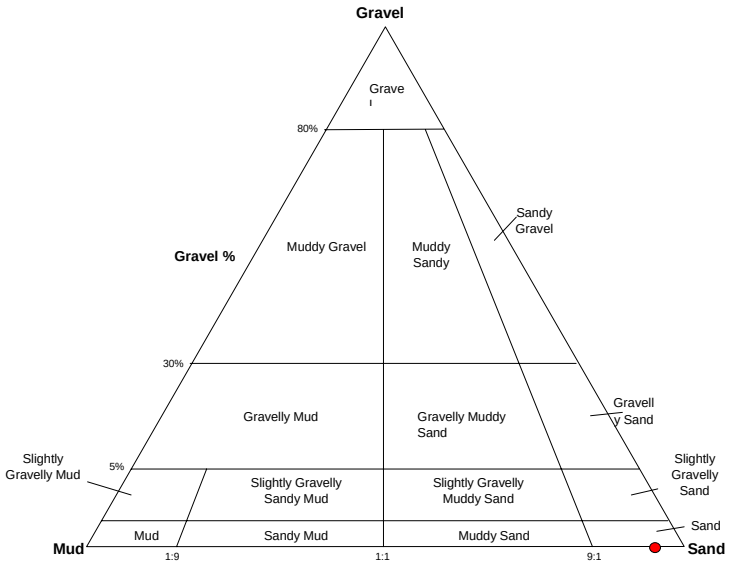
Overview of Site:

Shore Height Upper Shore
Substrate Well Sorted Fine Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	0.5%
Medium Sand	22.5%
Fine Sand	73.4%
Very Fine Sand	1.4%
Mud	2.2%

	% Loss on Ignition
T2 High	0.7%



Faunal Composition

	Dig 1m	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Hydrobia ulvae	4	16	124	52	127	25
Cerastoderma edule	2					
Eteone longa			1			
Nereis diversicolor	1	1	1	7	1	
Pygospio elegans				12	4	1
Capitella capitata (complex)		1	1			
Arenicola marina	1					
Heterochaeta costata				6		
Crangon crangon	1					

Station Description

Distance from shoreline: 185m

The sediment at this station was dominated by fine sand. The site was located in a water channel, with a very weak flow (100% cover). Dead cockle shells were present on the sediment surface. *Arenicola* casts were present on the sediment surface (3 per square meter) and 1 was returned in the dig. There was occasional *Enteromorpha* present at this shore height.

Plate 3.3.7: View of sediment at Sligo Harbour, Transect 2 High.

Plate 3.3.8: View across the shore at Sligo Harbour, Transect 2 high.

T2 Mid

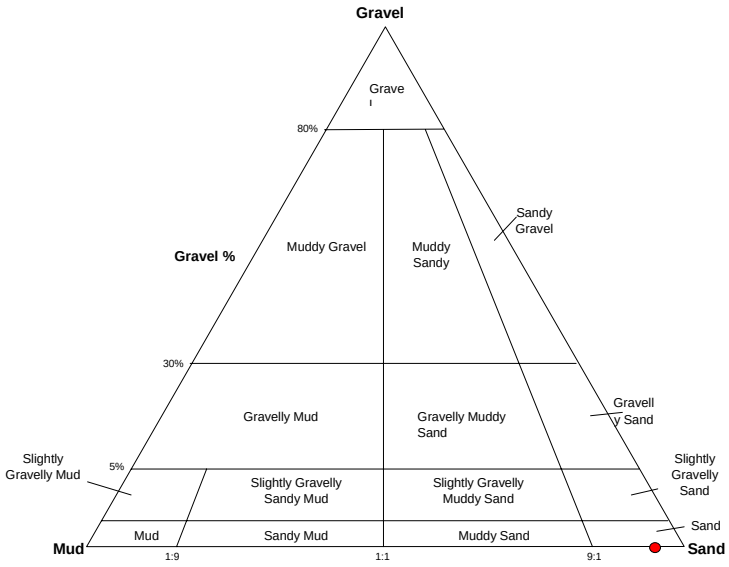
Overview of Site:

Shore Height Mid Shore
Substrate Poorly Sorted Muddy Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	0.4%
Medium Sand	14.6%
Fine Sand	78.7%
Very Fine Sand	3.1%
Mud	3.2%

	% Loss on Ignition
T2 Mid	1.0%



Faunal Composition

	Obs (1m)	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Hydrobia ulvae			3		5	1	1
Lucinoma borealis		1					
Cerastoderma edule		23			1	2	
Angulus tenuis		120	9	1	9	10	8
Arenicola marina	2						
Eteone longa						1	
Glycera tridactyla				1		1	
Nephtys hombergii		1					
Scoloplos armiger		1	1		2		
Pygospio elegans					1	5	3
Clymenura leiopygos		3					
Ampelisca brevicornis				1			
Crangon crangon				1	3	1	1
Bathyporeia pelagica						1	

Station Description

Distance from shoreline: 1460m

This sediment at this station was characterised as rippled muddy sand. The anoxic layer was present at 4cm depth. There was a significant amount of standing water present within this area, with ~75% of the sediment covered with a thin layer of

standing water. There were significant numbers of *Cerastoderma edule* on the sediment surface. *Arenicola* casts were present (2 per square meter) although none were returned in the dig. There were occasional clumps of *Enteromorpha* present at this shore height.

Plate 3.3.9: View of sediment at Sligo Harbour, Transect 2 mid.

Plate 3.3.10: View across the shore at Sligo Harbour, Transect 2 mid.

T2 Low

Overview of Site:

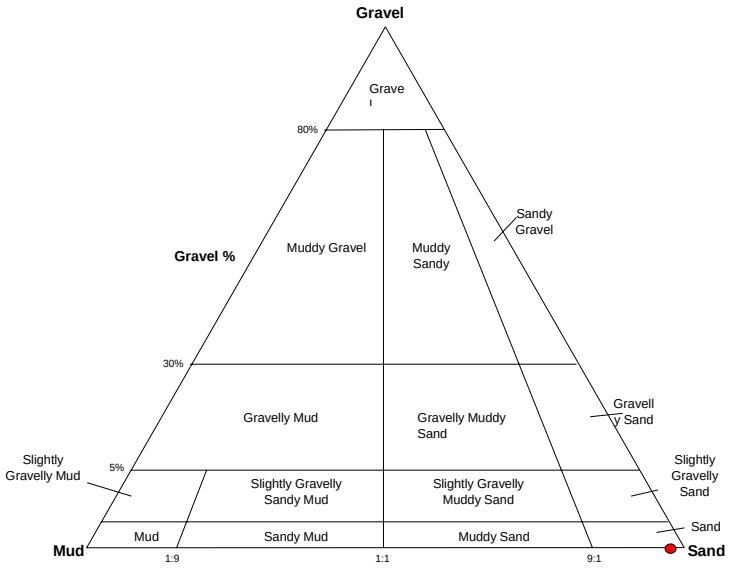
Shore Height Low Shore

Substrate Moderately Well Sorted Fine Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	3.7%
Medium Sand	30.5%
Fine Sand	60.9%
Very Fine Sand	2.1%
Mud	2.8%

	% Loss on Ignition
T2 Low	1.1%



Faunal Composition

	Obs (1m)	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Cerastoderma edule		7					
Angulus tenuis		28	4	3	3	7	1
Nemertea indet.				2			
Eteone longa							1
Glycera tridactyla		2	1			1	1
Exogone hebes						1	
Nephtys cirrosa		1		2		1	
Orbinia latreillei		3					
Scoloplos armiger			1	1	3		4
Pygospio elegans					1		
Spio martinensis		1	1	1	2		1
Clymenura leiopygos		7	1	3	1		
Travisia forbesii		1					
Lanice conchilega	Numerous	20				1	
Ampelisca brevicornis			2				
Ophiothrix fragilis					1		

Station Description

Distance from shoreline: 1980m

This station was taken immediately adjacent to the main channel at low water. Sediment at this site was characterised as rippled fine sand. The anoxic layer at this

site was 15cm deep. Standing water (10%) was present between the ripples on the sediment surface. *Lanice conchilega* and *Cerastoderma edule* were abundant and algae were present in significant numbers on the sediment surface (*Enteromorpha* and *Ceramium*).

Sligo Harbour – Transect 3

Date: 29/08/2007

Length of Transect: 135m

Overview of Transect:

This site was located along the outer part of Sligo Harbour between the mainland, near Sligo Airport and Coney Island. There was a channel running between Coney Island and the mainland. The shore was backed by a dune system, giving way to a cobble/boulder with a large amount of algal drift at the uppermost part of this. This leads to a soft mobile sand area with occasional clumps of *Fucus vesiculosis* and *Fucus serratus*. At 50 meters this sand becomes more firm. *Arenicola* casts were present from this location to the low water site. It 60 meters, the sediment becomes wet, and *Enteromorpha* became more abundant. The bottom of the transect is characterised by shell and sand with large numbers of *Enteromorpha*. On both sides of this transect, the shoreline was dominated by a fucoid covered boulder shore, with limited soft sediment in evidence.

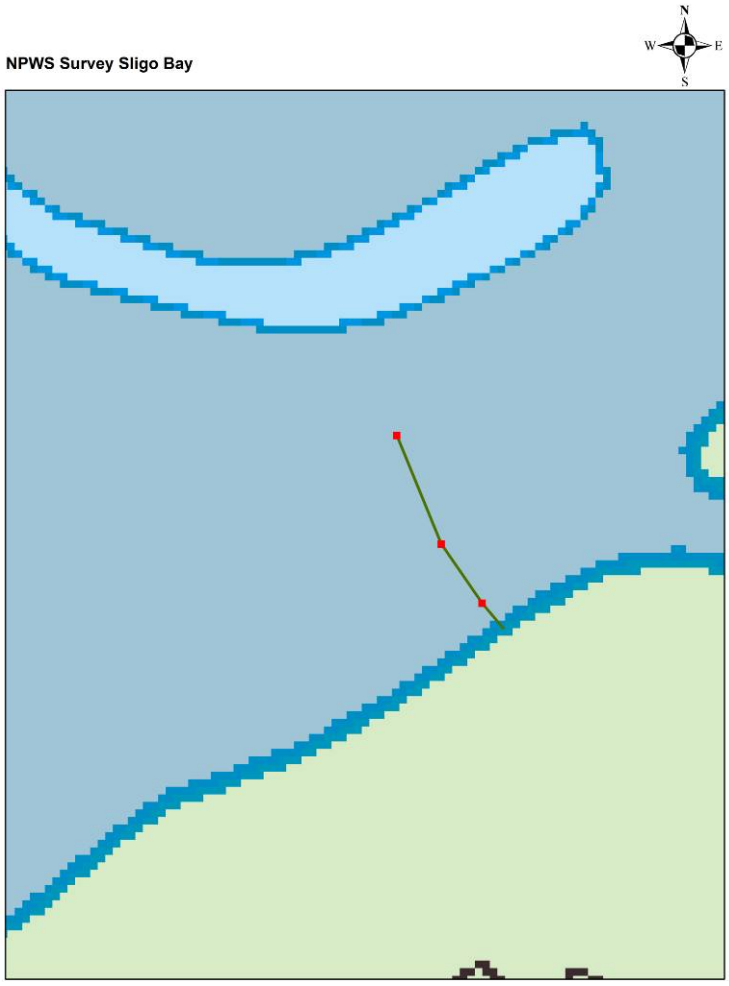


Figure 3.3.4: Transect 3, Sligo Harbour

Plate 3.3.11: View of upper shore at Sligo Harbour, Transect 3. Transect is backed by a dune system and cobble shore.

Plate 3.3.12: View of sediment at Sligo Harbour, Transect 3 upper section.

Transect 3: Strand Line

	Orchestia gammarellus
Strand Line	94

The strandline at Transect 3 returned 94 specimens of a single species, *Orchestia gammarellus*.

T3 High

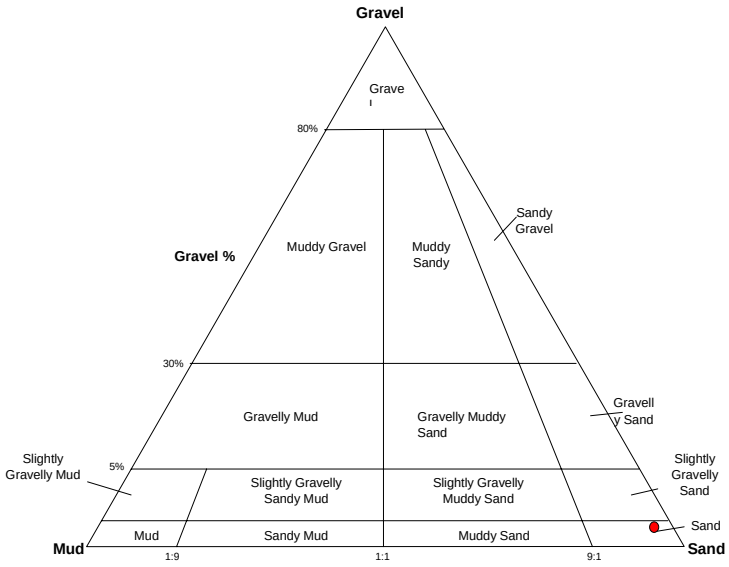
Overview of Site:

Shore Height Upper Shore
Substrate Moderately Well Sorted Slightly Gravely Sand

Granulometric Composition

	% Composition
Gravel	0.4%
Coarse Sand	0.9%
Medium Sand	35.6%
Fine Sand	59.9%
Very Fine Sand	1.2%
Mud	2%

	% Loss on Ignition
T3 High	1.3%



Faunal Composition

	Dig	Cores			
	Rep A	Rep B	Rep C	Rep D	Rep E
Pygospio elegans	4	3	1		
Scolelepis squamata		2	4	3	2
Spio martinensis	1				
Insect larva	1				
Eurydice pulchra		1		2	4
Bathyporeia pelagica	1	2	2	1	

Station Description

Distance from shoreline: 20m

The sediment at this station was characterised as rippled gravely sand. The sediment was very dry and there was no evidence of fauna on the sediment surface. The anoxic layer was not visible at this site.

Plate 3.3.13: View of sediment at Sligo Harbour, Transect 3 high.

Plate 3.3.14: View of sediment and fucoids at Sligo Harbour, Transect 3 high.

T3 Mid

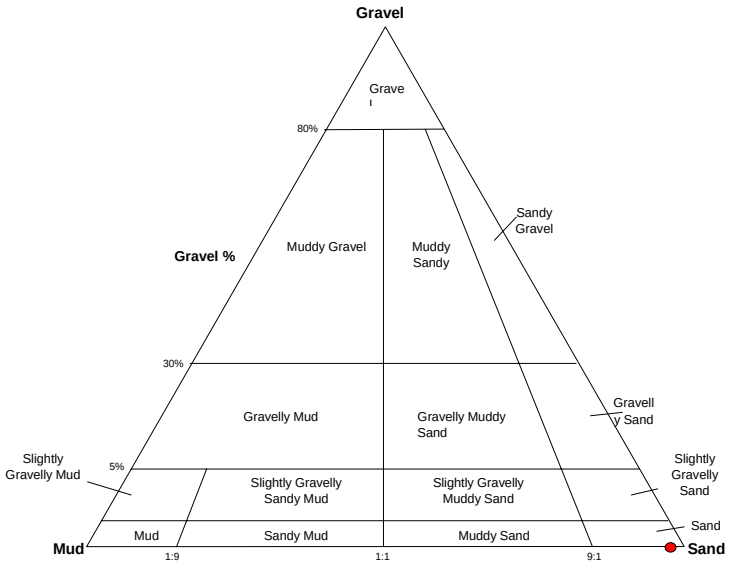
Overview of Site:

Shore Height Mid Shore
Substrate Moderately Well Sorted Fine Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	0.7%
Medium Sand	37.4%
Fine Sand	53.2%
Very Fine Sand	4.1%
Mud	4.6%

	% Loss on Ignition
T3 Mid	1.6%



Faunal Composition

	Obs (1m)	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Hydrobia ulvae			9		2	12	5
Macoma balthica					2		
Eteone longa						2	
Phyllodoce mucosa						1	2
Glycera tridactyla				1	2		3
Nephtys cirrosa							1
Nephtys hombergii		1			1		1
Scoloplos armiger		1		1		2	
Pygospio elegans		9	17	7		8	2
Spio martinensis			1		1		1
Capitella capitata (complex)					1		
Heteromastus filiformis					1		
Arenicola marina	6	1					
Clymenura leiopygos		2					
Galathowenia oculata				2		4	
Owenia fusiformis		1					
Tubificoides benedii			2	4	4	5	2
Tubificoides pseudogaster				1			
Carcinus maenas		1					
Crangon crangon		4					

Station Description

Distance from shoreline: 60m

The sediment at this station was dominated by wet sand. The anoxic layer was present just beneath the sediment surface. *Enteromorpha* was present on the sediment surface with occasional clumps of *Fucus* present along the shore height. *Arenicola* casts were present at this shore height (6 per square meter), although only 1 specimen was returned in the dig.

Plate 3.3.15: View of sediment at Sligo Harbour, Transect 3 Mid.

Plate 3.3.16: View along the shore at Sligo Harbour, Transect 3 Mid.

T3 Low

Overview of Site:

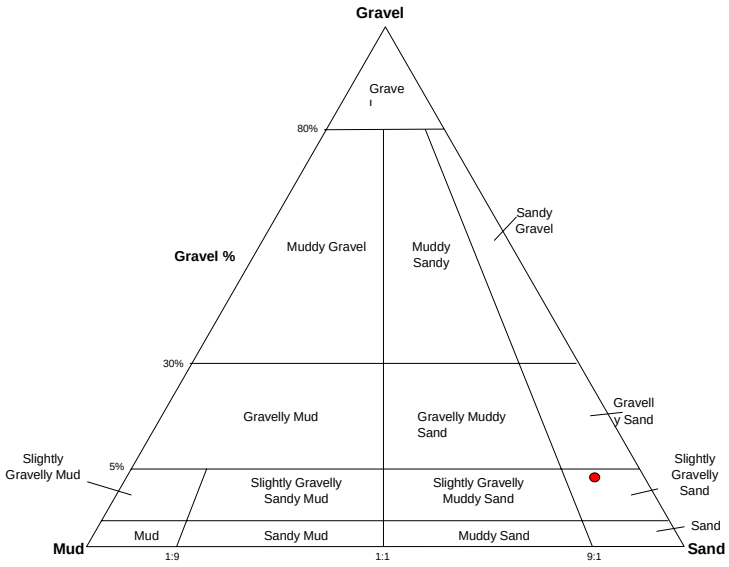
Shore Height Low Shore

Substrate Poorly Sorted Slightly Gravely Sand

Granulometric Composition

	% Composition
Gravel	4.4%
Coarse Sand	2.1%
Medium Sand	11.6%
Fine Sand	67.9%
Very Fine Sand	7.9%
Mud	6.1%

	% Loss on Ignition
T3 Low	0.7%



Faunal Composition

	Obs (1m)	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Hydrobia ulvae					1		
Cerastoderma edule					1		
Eteone longa			2	2	5	1	3
Phyllodoce mucosa				1		2	2
Glycera tridactyla			1		2	1	1
Nephtys hombergii		3	1	3			2
Scoloplos armiger			9	2	3	5	12
Pseudopolydora pulchra							1
Pygospio elegans		1	8	2		2	5
Spio martinensis						1	
Arenicola marina	1	1					
Clymenura leiopygos		1		1		3	
Owenia fusiformis		1					
Lagis koreni		1					
Lanice conchilega		3					
Tubificoides benedii			2	1	1	2	1

Station Description

Distance from shoreline: 130m

This station was taken immediately adjacent to the main channel at low water. Sediment at this site was characterised as gravely sand. The anoxic layer was present

just beneath the sediment surface. The surface of the sediment was dominated by the fucoid algae, *F. serratus* and *F. vesiculosis*, with *Enteromorpha* present in significant numbers. *Arenicola* casts were present (1 per square meter) and a single specimen was returned in the dig.

Plate 3.3.17: View of sediment at Sligo Harbour, Transect 3 Low.

Plate 3.3.18: View along the shore at Sligo Harbour, Transect 3 Low.

3.4 Ballysadare Bay

Sampling Area: Ballysadare Bay

Number of Transects: Four Transects (T1 – T4)

Site Map

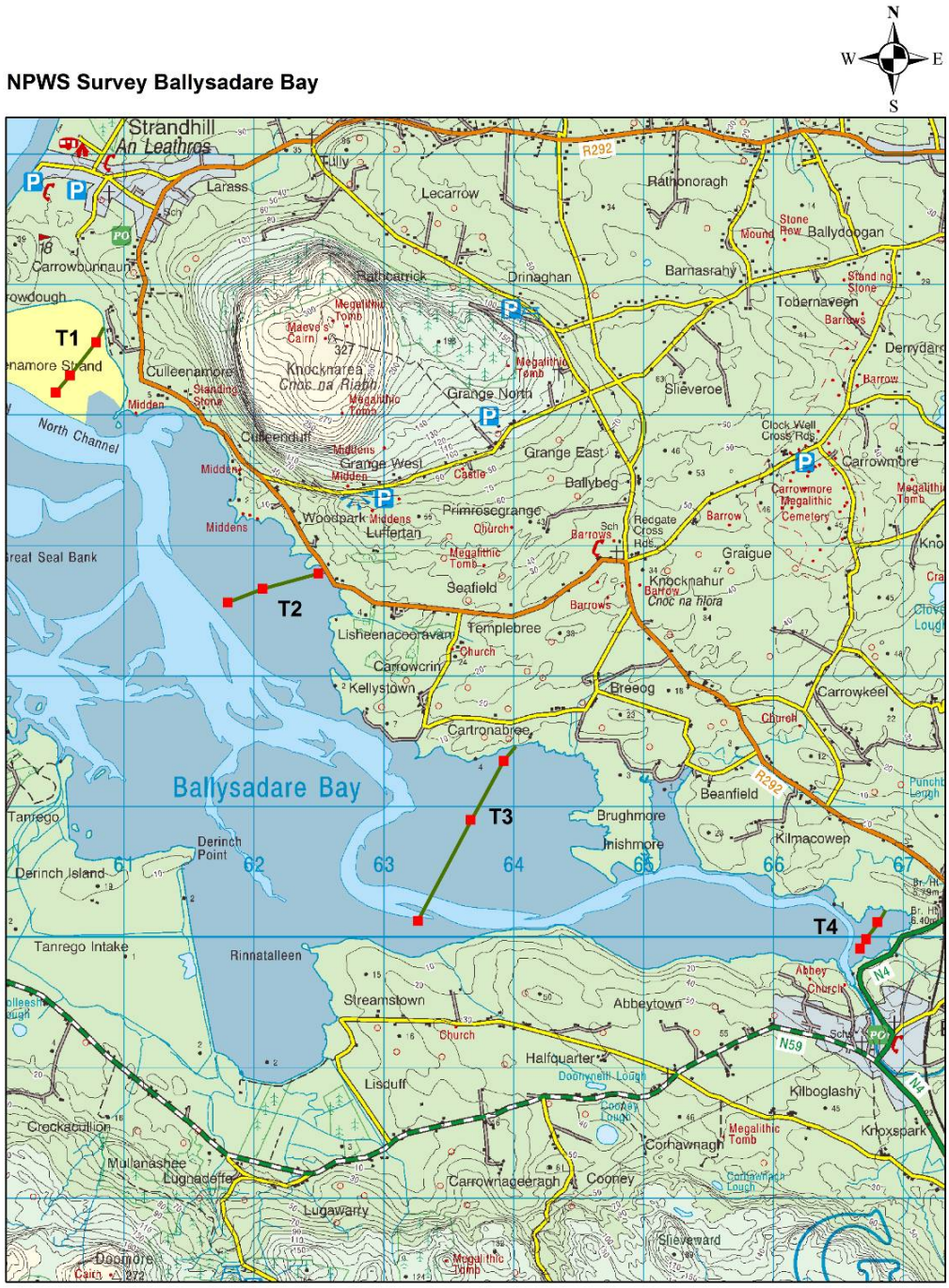


Figure 3.4.1: Overview of sampling locations at Ballysadare Bay

Embayment	Transect	Shore Ht	Date	Easting	Northing
Ballysadare	Transect 1	High	29/08/2007	160784	334558
		Mid	29/08/2007	160584	334305
		Low	29/08/2007	160473	334173
	Transect 2	High	30/08/2007	162496	332787
		Mid	30/08/2007	162067	332670
		Low	30/08/2007	161798	332565
	Transect 3	High	30/08/2007	163922	331350
		Mid	30/08/2007	163668	330900
		Low	30/08/2007	163263	330125
	Transect 4	High	30/08/2007	166799	330116
		Mid	30/08/2007	166711	329984
		Low	30/08/2007	166666	329912

Table 3.4.1: Sampling locations within Ballysadare Bay. Positions are given in Irish National Grid.

Ballysadare Bay – Transect 1

Date: 29/08/2007

Transect Length: 620m

Overview of Transect:

This site was located in Cullenamore Strand, a large strand located at the mouth of Ballysadare Bay on the northern shore of Ballysadare Bay. The shore was backed by grassland and an extensive dune system was present along the northern and western section of the bay. A transect was taken from the car park, located to the north east of Cullenamore Strand, along a south-west bearing to the channel of the Ballysadare River on the south side of the strand. The shore was approximately 630 meters at this point, and the sediment was predominantly sand along the full length of this transect. The depth of the anoxic layer varied across this transect, 2-3 cm depth at the upper shore to 10cm at the low water site.

Figure 3.4.2: T1 sampling location at Ballysadare Bay

Plate 3.4.1: View up shore from low water site at Ballysadare T1.

Transect 1: Strand Line

	Orchestia meditteranea
Strand Line	23

The strandline at Transect 1 returned 23 specimens of a single species, *Orchestia meditteranea*.

T1 High

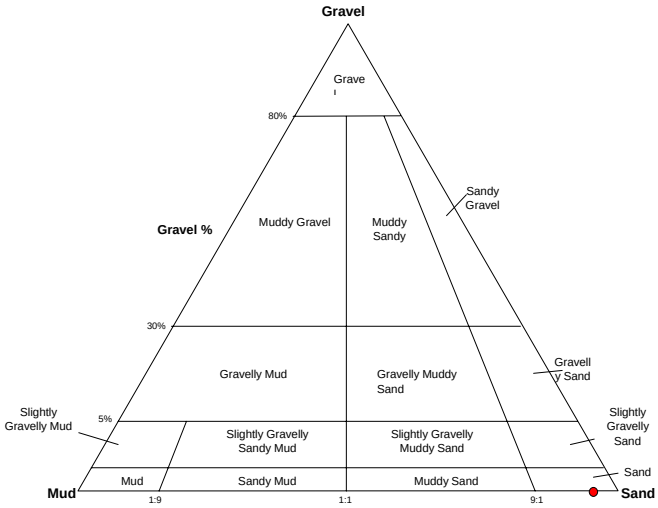
Overview of Site:

Shore Height Upper Shore
Substrate Very Well Sorted Fine Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	0%
Medium Sand	15.3%
Fine Sand	81.0%
Very Fine Sand	0.8%
Mud	2.6%

	% Loss on Ignition
T1 High	0.9%



Faunal Composition

	Obs (1m)	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Hydrobia ulvae			112	196	226	232	240
Cerastoderma edule		8	4	7	15		4
Macoma balthica				1			
Nereis diversicolor		84				1	
Pygospio elegans			1	2	1	1	3
Arenicola marina	3	2					
Tubificoides benedii		2				1	1
Insect larva						1	
Crangon crangon				1			

Station Description

Distance from shoreline: 110m

This station was approximately 100 meters from the top edge of the shore and was situated in an area of damp sand typical of the upper shore region. The sediment was dominated by firm, medium sand. The anoxic layer was present at a depth of 2cm. *Arenicola* casts were present on the sediment surface (3 per meter) and 2 were recovered in the dig. *Nereis diversicolor* were the most abundant species recovered in the dig.

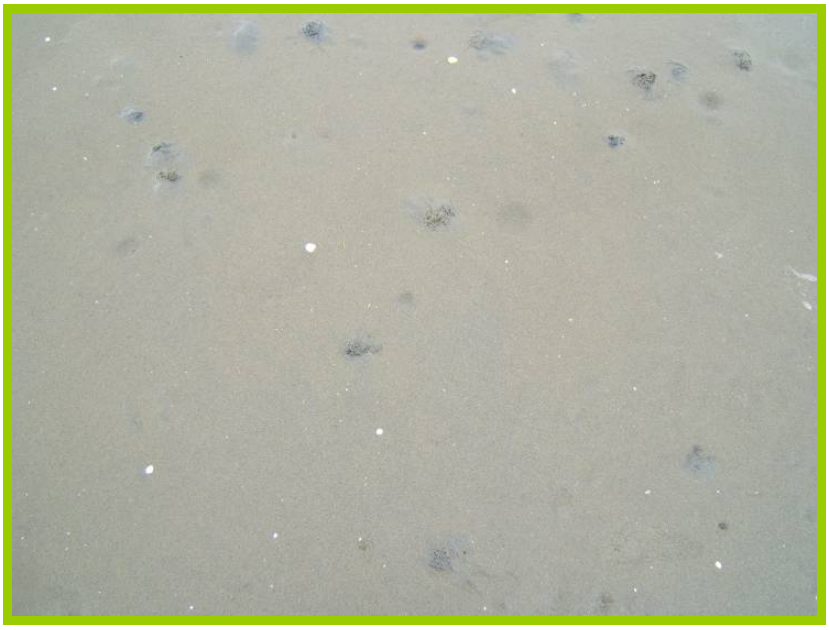


Plate 3.4.2: Sediment at Ballysadare T1 High.

Plate 3.4.3: View south east from sampling position at Ballysadare T1 High.

T1 Mid

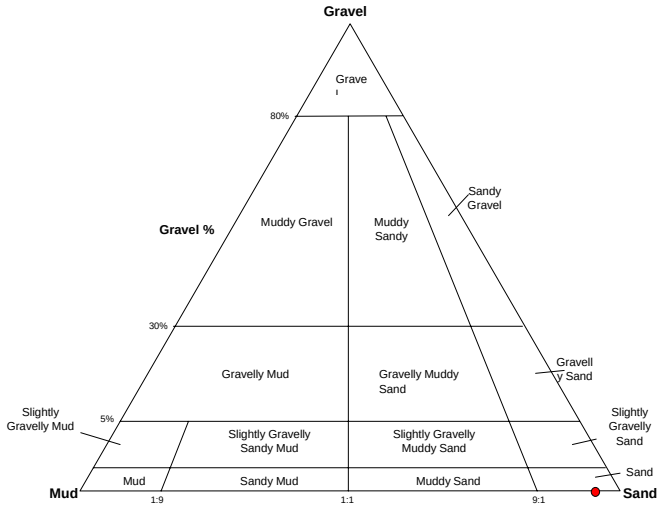
Overview of Site:

Shore Height Mid Shore
Substrate Moderately Well Sorted Fine Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	0%
Medium Sand	42.8%
Fine Sand	55.5%
Very Fine Sand	0.8%
Mud	0.9%

	% Loss on Ignition
T1 Mid	0.7%



Faunal Composition

	Obs (1m)	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Hydrobia ulvae		2	7	1		4	3
Cerastoderma edule		4					
Angulus tenuis		29	6	3	2	3	3
Arenicola marina	3						
Eteone longa		1					
Phyllodoce mucosa		1		1			
Glycera tridactyla					1		
Nephtys cirrosa		1	1	1			1
Scoloplos armiger		1					
Capitella capitata (complex)							1
Clymenura leiopygos		3	1	2			
Travisia forbesii		2		1		1	
Corophium volutator		9		1		1	
Crangon crangon		1					
Eurydice pulchra		1				4	
Urothoe elegans		6					1
Bathyporeia pelagica		5	2				

Station Description

Distance from shoreline: 435m

The sediment at this station was dominated by rippled sand, which was covered by approximately 70% surface water. The anoxic later was not visible during the dig (>20cm). Three *Arenicola* casts were observed on the sediment surface, although no

specimens were returned in the dig. The dominant fauna observed in the dig were small bivalve molluscs (identified as *Angulus tenuis*)

Plate 3.4.4: Sediment at Ballysadare T1 Mid.

Plate 3.4.5: View west along strand at Cullenamore Strand, Ballysadare T1 Mid. The extensive dune system is evident in the background.

T1 Low

Overview of Site:

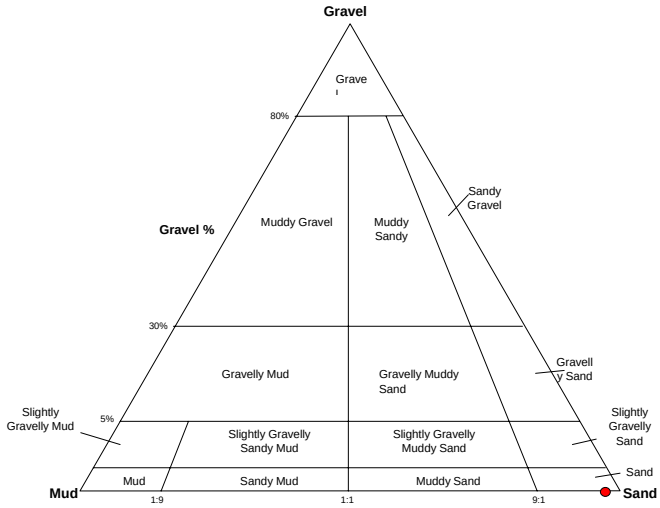
Shore Height Low Shore

Substrate Moderately Well Sorted Medium Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	0.8%
Medium Sand	55.7%
Fine Sand	41.0%
Very Fine Sand	0.5%
Mud	2%

	% Loss on Ignition
T1 Low	0.7%



Faunal Composition

	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Cerastoderma edule	1					
Angulus tenuis	107	2	8	4	5	2
Nemertea indet.	1		1			
Malmgrenia marphysae	1					
Pholoe synophthalmica	1					
Glycera tridactyla	1	1				2
Streptosyllis websteri	1					
Nephtys cirrosa	7			1	1	1
Scoloplos armiger	1					
Magelona filiformis		1				
Capitella capitata (complex)	3					
Clymenura leiopygos	7					2
Lagis koreni	2					
Lanice conchilega	61	1		4		3

Station Description

Distance from shoreline: 610m

This station was taken immediately adjacent to the main channel at low water. Sediment at this site was characterised as well sorted medium sand. The sediment at this site was lightly rippled. There was a large amount of *Lanice conchilega* tubes present on the sediment surface, and a large number of live individuals were returned in the dig. The depth of the anoxic layer was 10cm.

Plate 3.4.6: Sediment at Ballysadare T1 Low. *Lanice conchilega* tubes are evident on the sediment surface

Plate 3.4.7: View west along the strand at Ballyasdare T1 Low.

Ballysadare Bay – Transect 2

Date: 30/08/2007

Transect Length: 800m

Overview of Transect:

This site was located along the northern shore of Ballysadare Bay. The shore was backed by a narrow strip of saltmarsh vegetation which is next to a wall bordering a road. Immediatey adjacent to the saltmarsh vegetation is a narrow band of *Pelvetia canaliculata* on cobble which then gives way to a *Fucus/Ascophyllum* zone. The substrate in this area is large cobble and sediment and it extends for about 50 meters from the start of the transect. Immediately adjacent to this is the soft sediment part of the transect which extends to low water. The upper part of the soft sediment is sandy, with no visible *Arenicola* casts on the sediment surface. *Arenicola* casts appear at 70m and number 10-15 per meter at this point, although visible casts decrease as you move down the shore. A narrow, shallow channel crosses the transect at 110m.

Figure 3.4.3: T2 sampling location at Ballysadare Bay

Plate 3.4.8: View downshore across fucoid belt at Ballysadare T2.

Plate 3.4.9: View of upper shore region at Ballysadare T2.

Transect 2: Strand Line

	Ligia oceanica	*Orchestia gammarellus*
Strand Line	3	118

The strandline at Transect 2 returned 118 specimens of *Orchestia gammarellus* and 3 specimens of *Ligia oceanica*.

T2 High

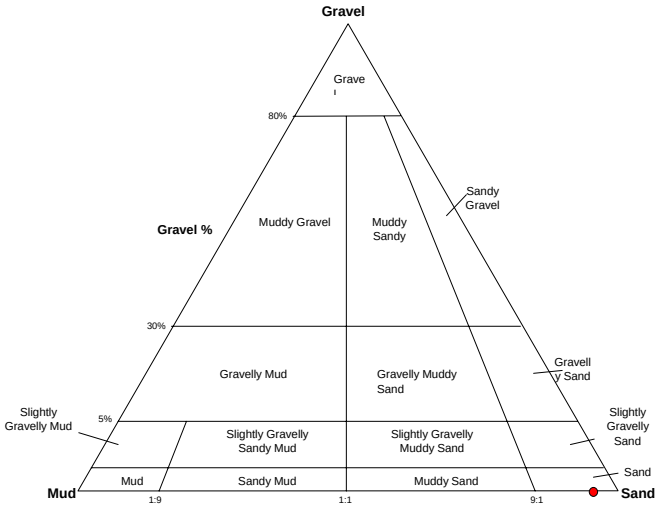
Overview of Site:

Shore Height Upper Shore
Substrate Moderately Well Sorted Medium Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	0%
Medium Sand	47.3%
Fine Sand	46.0%
Very Fine Sand	2.1%
Mud	4.2%

	% Loss on Ignition
T2 High	1.0%



Faunal Composition

	Dig 1m	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Mytilus edulis						1
Macoma balthica	1					
Scrobicularia plana	2	2				1
Eteone longa			1			
Nereis diversicolor	2	3	4	3	2	5
Pygospio elegans		26	57	29	19	27
Tubificoides pseudogaster		10	14	5	6	21
Crangon crangon	1		1	2	1	2

Station Description

Distance from shoreline: 70m

This station was immediately adjacent to the lower extent of the fucoid zone which dominated the upper shore. The sediment at this station was dominated by firm sand. In addition, there was a significant amount of standing water present (~80%). The depth of the anoxic layer was 3cm. There was no visible evidence of fauna on the sediment surface. This site was located approximately 40 meters up shore of a shallow channel which crossed this transect.

Plate 3.4.10: Sediment at Ballysadare T2 High. Site was covered by a thin layer of surface water.

T2 Mid

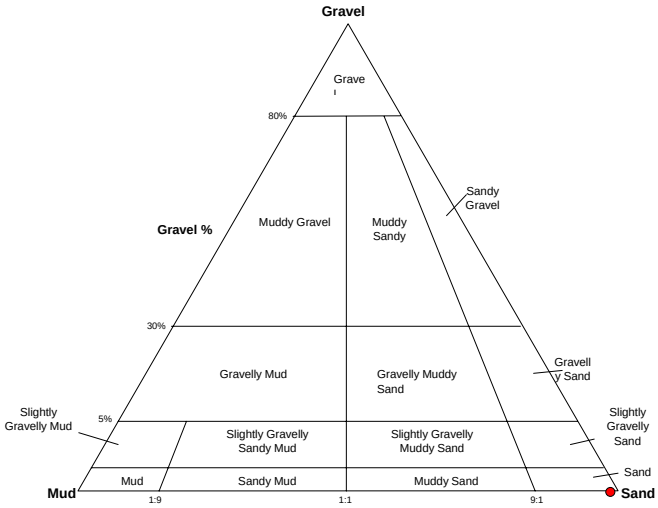
Overview of Site:

Shore Height Mid Shore
Substrate Moderately Well Sorted Medium Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	0.3%
Medium Sand	54.2%
Fine Sand	43.7%
Very Fine Sand	0.9%
Mud	0.9%

	% Loss on Ignition
T2 Mid	0.9%



Faunal Composition

	Obs (1m)	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Cerastoderma edule		4	1		1	1	
Angulus tenuis		138	4	13	12	12	5
Nemertea indet.		1					
Phyllodoce mucosa					1	1	
Arenicola marina	3 – 4						
Glycera tridactyla				1			
Nephtys cirrosa		1	1				1
Pygospio elegans					1		
Capitella capitata (complex)							1
Clymenura leiopygos		26		2	1		
Travisia forbesii		8	2		1		
Tubificoides pseudogaster						1	
Carcinus maenas		1					
Corophium volutator				1	1		
Crangon crangon		2	1				1
Eurydice pulchra				1	2	1	1
Haustorius arenarius		1					
Urothoe elegans			1				
Bathyporeia pelagica			1	2			

Station Description

Distance from shoreline: 520m

The sediment at this station was dominated by rippled sand. Similar to the T2 High site, the area was covered by a significant amount of standing water (70%). The

anoxic layer was not visible at this station (>20 cm depth). Occasional strands of *Enteromorpha* were present attached to shells on the sediment surface. Shells of the bivalve mollusc, *C. edule* were common on the sediment surface. *Arenicola* casts were visible (2-3 per meter) but none were returned in the dig.

Plate 3.4.11: Sediment at Ballysadare T2 Mid. Site was covered by a thin layer of surface water and occasional strands of *Enteromorpha* algae.

T2 Low

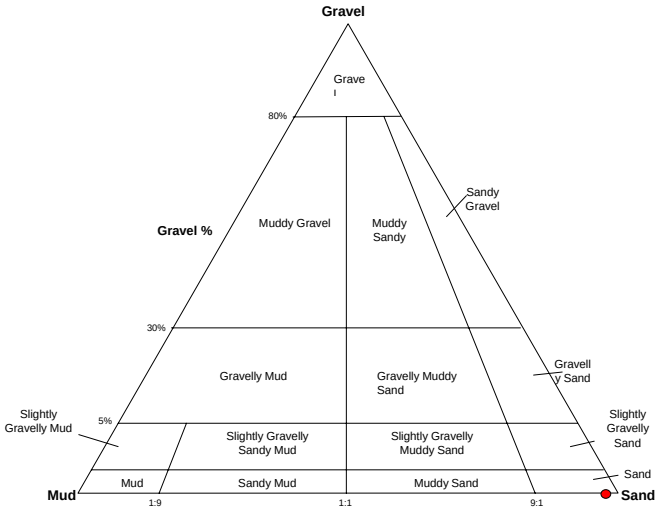
Overview of Site:

Shore Height Low Shore
Substrate Moderately Well Sorted Fine Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	0.3%
Medium Sand	39.6%
Fine Sand	56.7%
Very Fine Sand	0.5%
Mud	2.9%

	% Loss on Ignition
T2 Low	0.7%



Faunal Composition

	Obs 1(m)	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Cerastoderma edule		1					
Angulus tenuis		188	5	5	8	8	7
Nephtys cirrosa					1		1
Nephtys hombergii		1		1			
Pygospio elegans							1
Spio martinensis			1		1	1	
Capitella capitata (complex)						2	
Arenicola marina	2	1					
Corophium volutator						2	
Crangon crangon				1	1		
Eurydice pulchra			1				

Station Description

Distance from shoreline: 790m

This station was taken immediately adjacent to the main channel at low water. Sediment at this site was characterised as firm rippled sand. Two *Arenicola* casts were visible on the sediment surface, although this would occasionally be zero at this shore height. The anoxic layer at this site was 15cm deep. Standing water (10%) was present between the ripples on the sediment surface.

Plate 3.4.12: Sediment at Ballysadare T2 Low. Site was covered by a thin layer of surface water.

Plate 3.4.13: View northwest from Ballysadare T2 low.

Ballysadare Bay – Transect 3

Date: 03/08/2007

Overview of Transect:

This site was located along the northern shore of Ballysadare Bay. The shore was backed by a narrow saltmarsh fringe which backed onto agricultural land. A narrow band of small, algae covered rocks and boulders were present immediately adjacent to the saltmarsh fringe. The transect measured approximately 1500 meters from the upper shore to the channel of the Ballysadare River. The transect was crossed by a number of shallow channels across the whole of the transect. The sediment consisted of firm sand across the length of this transect. A narrow *Zostera* bed (approximately 100m wide) was present immediately adjacent to the saltmarsh fringe. This *Zostera* bed was present along the complete upper section of the sandflat to the edge of the promontory at Brughmore/Inishmore (approximately 1km to the south east). *Arenicola marina* casts were abundant across the upper and mid sections of the shore (20 per square meter) but were much reduced at the edge of the channel (2 per square meter).

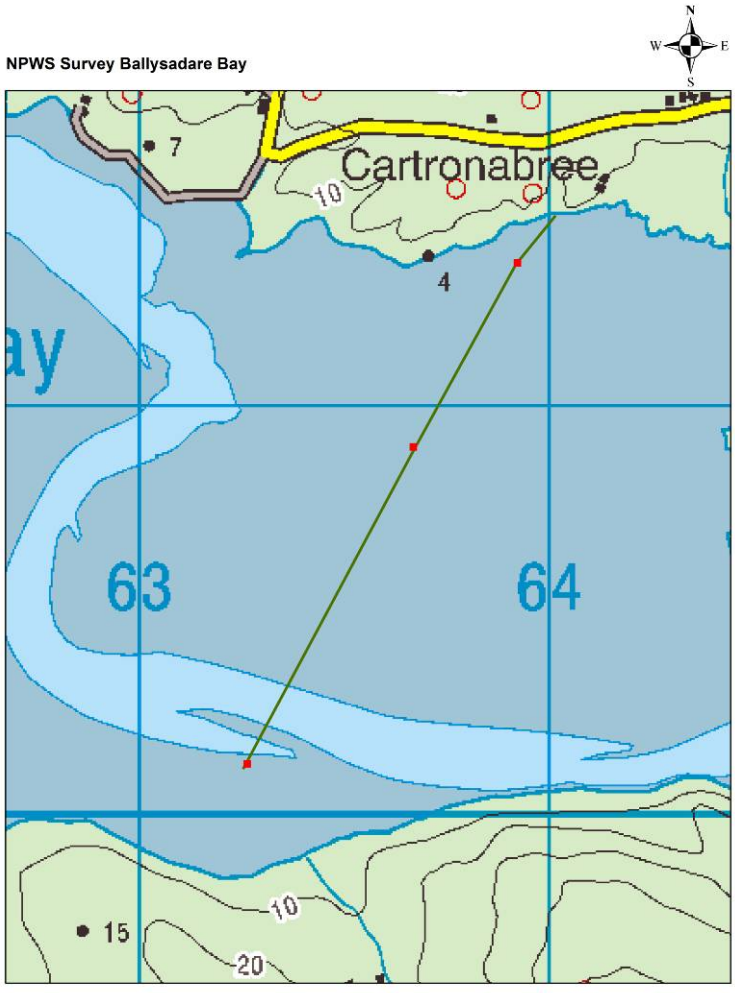


Figure 3.4.4: T3 sampling location at Ballysadare Bay

Plate 3.4.14: Upper shore at Ballysadare T3. Transect is backed by narrow saltmarsh fringe bordering agricultural land.

Plate 3.4.15: Upper shore at Ballysadare T3. Transect is backed by narrow saltmarsh fringe bordering agricultural land.

Plate 3.4.16: Upper shore at Ballysadare T3. Transect is backed by narrow saltmarsh fringe bordering agricultural land with a 100 meter *Zostera* bed in evidence along the upper margins of the soft sediment.

Transect 3: Strand Line

	Orchestia gammarellus
Strand Line	237

The strandline at Transect 3 returned 237 specimens of a single species, *Orchestia gammarellus*.

T3 High

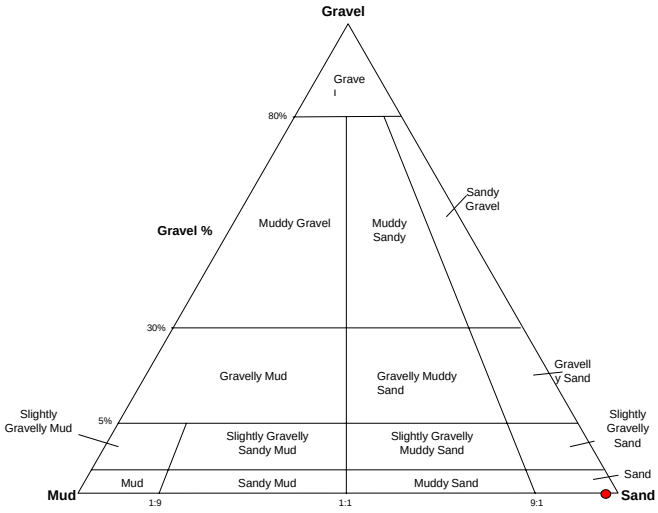
Overview of Site:

Shore Height Upper Shore
Substrate Well Sorted Fine Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	0.6%
Medium Sand	8.4%
Fine Sand	81.6%
Very Fine Sand	6.8%
Mud	2.6%

	% Loss on Ignition
T3 High	1.1%



Faunal Composition

	Obs (1m)	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Hydrobia ulvae	Present		315	395	168	172	43
Cerastoderma edule		3			1	1	
Macoma balthica		34				2	
Scrobicularia plana		1					
Nereis diversicolor		16	1	2	5	2	1
Malacoceros sp.				1			
Pygospio elegans			9	29	4	7	8
Heteromastus filiformis			1	1		1	
Arenicola marina	15	10		1			
Tubificoides benedii		3	29	25	24	49	36
Tubificoides pseudogaster			1			4	
Carcinus maenas		1					

Station Description

Distance from shoreline: 110m

This station was immediately adjacent to the lower extent of a narrow *Zostera* bed which dominates the upper 100m of the soft sediment shore. The sediment was characterised as fine sand. A shell layer was present at 10cm depth and the anoxic layer was visible just below the surface. A large number of *Hydrobia ulvae* were present on the sediment surface and *Arenicola* were abundant (>15-20 per square meter).

Plate 3.4.17: View of sediment at Ballysadare T3 High.

Plate 3.4.18: View across shore at Ballysadare T3 High. Shot is taken across to Brughmore/Inishmore promontory.

T3 Mid

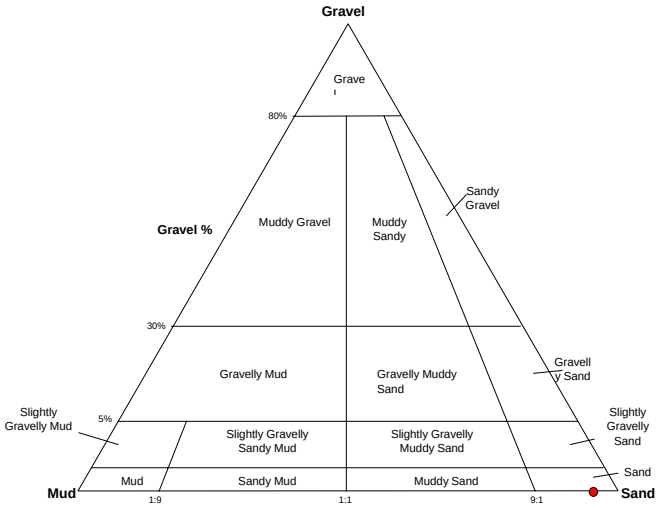
Overview of Site:

Shore Height Mid Shore
Substrate Moderately Well Sorted Fine Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	0%
Medium Sand	34.4%
Fine Sand	57.9%
Very Fine Sand	4.2%
Mud	3.5%

	% Loss on Ignition
T3 Mid	1.5%



Faunal Composition

	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Macoma balthica	8					1
Scrobicularia plana	1					
Eteone longa		1	1	3	3	
Nereis diversicolor	1		1	1	1	
Pygospio elegans		3	1	2	3	1
Spio martinensis			1			
Capitella capitata (complex)		3	6		3	
Heteromastus filiformis		6	21	9	13	5
Arenicola marina	15 8					
Crangon crangon	1		1			3

Station Description

Distance from shoreline: 630m

This sediment at this station was dominated by fine rippled sand. The anoxic layer was present at 4cm depth, and presented as a black layer. There was a significant amount of standing water present within the ripples (~40%). *Arenicola* casts were abundant (15 – 20 per square meter) at this shore height.

Plate 3.4.19: View of sediment at Ballysadare T3 mid.

Plate 3.4.20: View across shore at Ballysadare T3 mid.

T3 Low

Overview of Site:

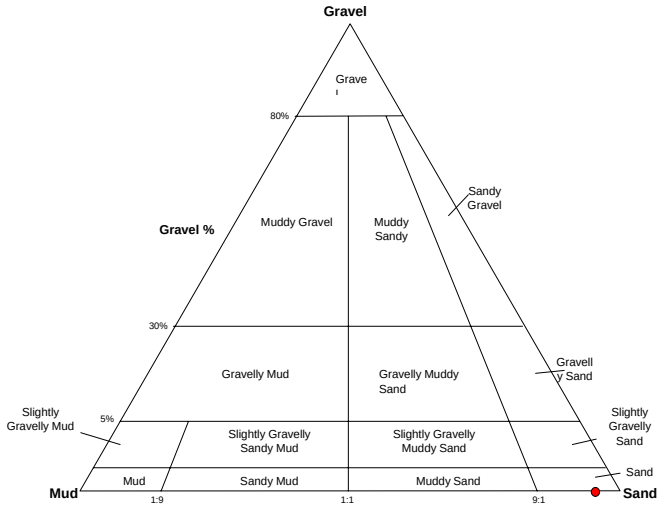
Shore Height Low Shore

Substrate Moderately Well Sorted Medium Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	0.8%
Medium Sand	70.6%
Fine Sand	24.4%
Very Fine Sand	0.9%
Mud	3%

	% Loss on Ignition
T3 Low	0.8%



Faunal Composition

	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Angulus tenuis	6			1		
Eteone longa				1		
Glycera tridactyla	1					
Nereis diversicolor					1	
Pygospio elegans			1	1	1	
Spio martinensis			1			2
Capitella capitata (complex)					3	
Tubificoides pseudogaster				1		
Crangon crangon				1		

Station Description

Distance from shoreline: 1520m

This station was taken immediately adjacent to the main channel at low water. Sediment at this site was characterised as medium sand (coarser than the upper areas of the transect). There was no visible fauna present on the sediment surface. The anoxic layer at this site was present at 4cm and there was a noticeable smell of sulphide from the anoxic sediment.

Plate 3.4.21: View of sediment at Ballysadare T3 Low.

Plate 3.4.22: View along the shore at Ballysadare T3 Low.

Ballysadare Bay – Transect 4

Date: 03/08/2007

Transect Length: 340m

Overview of Transect:

This site was located along a very soft mudflat along the inner section of Ballysadare Bay. The Upper section of this transect was dominated by an extensive reed bed, which measured approximately 90 – 100 meters in length across the top of the transect. An extensive (but patchy) *Zostera* bed was present bordering the reed bed for approximately 150 meters from the edge of the reed bed. This *Zostera* bed covered most of the upper shore of this inlet. The mid and low shore sections of this transect were characterised by muddy sands. *Corophium* burrows were evident along the mid shore section of the transect. The low site was immediately adjacent to a narrow little stream which drained into the Ballysadare River.

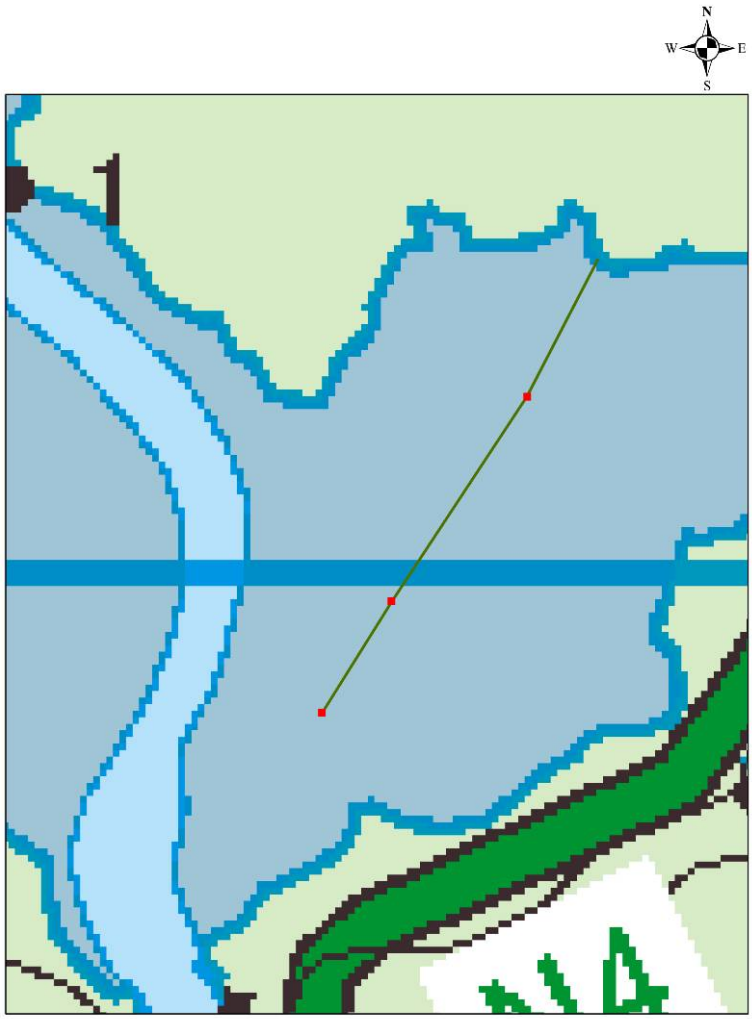


Figure 3.4.5: T4 sampling location at Ballysadare Bay

Plate 3.4.23: View of Reed Bed along the upper section of Ballysadare T4.

Plate 3.4.24: View of *Zostera* bed along the upper section of Ballysadare T4. Note the patchy nature of the bed.

Transect 4: Strand Line

As the shore at Transect 4 backed onto an extensive reed bed, no strand line sample was taken at this site.

T4 High

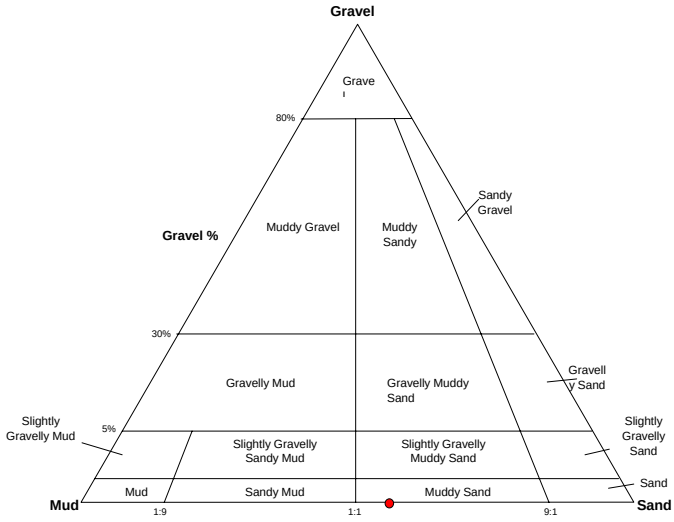
Overview of Site:

Shore Height Upper Shore
Substrate Poorly Sorted Muddy Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	0%
Medium Sand	6.3%
Fine Sand	25.3%
Very Fine Sand	24.7%
Mud	43.7%

	% Loss on Ignition
T4 High	3.4%



Faunal Composition

	Obs (1m)	Dig 1m	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Potamopyrgus antipodarum			1	2	1	2	
Nereis diversicolor			12	7	2	9	12
Insect larva					1		
Corophium volutator	Holes Visible		69		56		

Station Description

Distance from shoreline: 95 m

This station was immediately adjacent to a large reed bed which extended from the shoreline to approximately 100 meters. The sediment at this site was muddy sand. The site was within an extensive *Zostera* bed. *Corophium* burrows were visible on the sediment surface. The anoxic layer was present at 2 cm depth. No dig was taken because the site was within an extensive *Zostera* bed.

Plate 3.4.25: View of sediment at Ballysadare T4 high. Station was within an extensive, but patchy *Zostera* bed.

T4 Mid

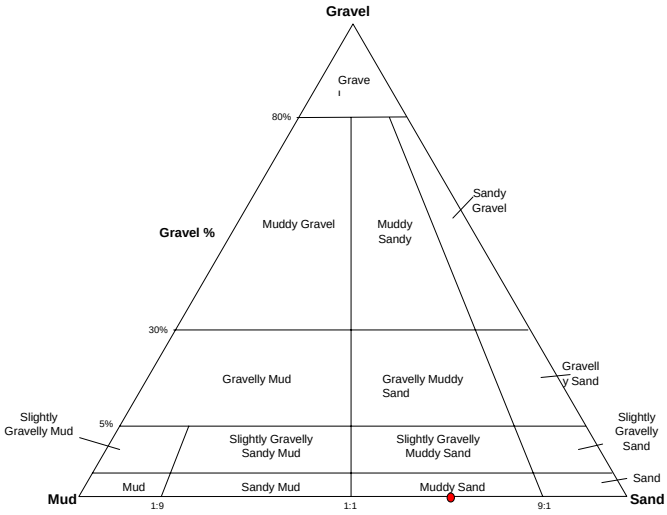
Overview of Site:

Shore Height Mid Shore
Substrate Poorly Sorted Muddy Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	0%
Medium Sand	0%
Fine Sand	46.2%
Very Fine Sand	24.1%
Mud	29.7%

	% Loss on Ignition
T4 Mid	3.5%



Faunal Composition

	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Hydrobia ulvae					1	1
Nereis diversicolor		9	6	9	7	7
Heterochaeta costata		3	15	3	4	
Corophium volutator		68	66	97	39	112
Eulimnogammarus obtusatus			2	4		
Gammarus locusta		1				
Lekanesphaera hookeri		1				
Crangon crangon	3	2				

Station Description

Distance from shoreline: 260m

This sediment at this station was dominated by muddy sand. The anoxic layer was present between 2-3cm depth. This site was located close to the start of the *Zostera* bed.

Plate 3.4.26: View of sediment at Ballysadare T4 mid.

Plate 3.4.27: View across shore at Ballysadare T4 mid.

T4 Low

Overview of Site:

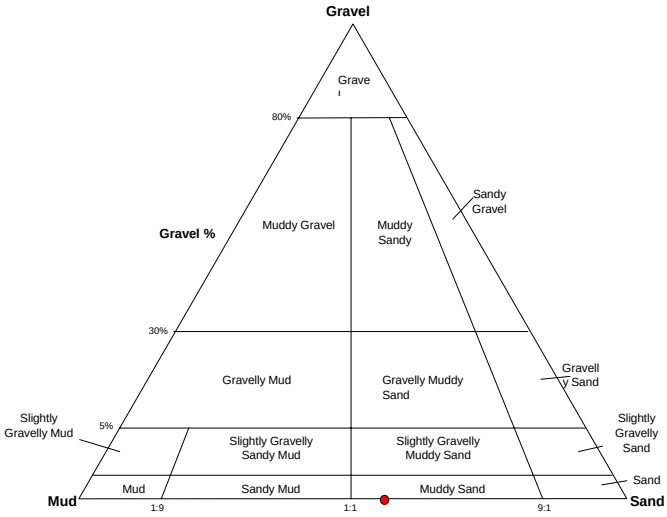
Shore Height Low Shore

Substrate Well Sorted Fine Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	0%
Medium Sand	12.9%
Fine Sand	27.9%
Very Fine Sand	12.3%
Mud	46.9%

	% Loss on Ignition
T4 Low	5.0%



Faunal Composition

	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Hydrobia ulvae			1		3	
Nereis diversicolor		3	5	3	3	3
Heterochaeta costata		15	14	9	4	5
Carcinus maenas			1			
Corophium volutator		21	47	43	20	58

Station Description

Distance from shoreline: 340m

This sediment at this station was anoxic muddy sand. The anoxic layer was present immediately beneath the surface and a strong sulphide smell was evident at this site. There was no evidence of fauna on the sediment surface, and no fauna were returned in the dig.

3.5 Tralee Bay

Sampling Area: Tralee Bay

Number of Transects: Five Transects (T1 – T5)

Site Map

Figure 3.5.1: Tralee Bay, Transect locations

Embayment	Transect	Shore Ht	Date	Easting	Northing
Tralee	Transect 1	High	16/07/2007	75707	113554
		Mid	16/07/2007	75522	113787
		Low	16/07/2007	75422	113905
	Transect 2	High	15/07/2007	75877	113000
		Mid	15/07/2007	75980	112940
		Low	15/07/2007	76099	112856
	Transect 3	High	16/07/2007	78032	112585
		Mid	16/07/2007	77932	112954
		Low	16/07/2007	77844	113404
	Transect 4	High	17/07/2007	78628	115111
		Mid	17/07/2007	78880	114809
		Low	17/07/2007	79118	114453
	Transect 5	High	17/07/2007	74321	117047
		Mid	17/07/2007	73907	117373
		Low	17/07/2007	73684	117541

Table 3.5.1: Sampling locations within Tralee Bay. Positions are given in Irish National Grid.

Tralee Bay – Transect 1

Date: 16/07/2007

Transect Length: 500m

Overview of Transect:

This site was located along the northern shore of Derrymore Island at the mouth of Tralee Bay. The shore was backed by a cobble shoreline which bordered an extensive marshland area that dominates Derrymore Island. The length of the cobble shoreline measured 30 to 40 meters in length. The upper part of the cobble shoreline was dominated by algal drift. Within this zone, the strandline sample was taken. The remainder of the transect consisted of rippled sand with some red algae present on the sediment surface. *Arenicola* casts were evident along the upper and mid shore parts of the shore, with no *Arenicola* observed at low water. Also, there was some degree of standing water present along the upper and lower parts of the shoreline, however, a large band along the mid-shore level consisted of dry rippled sand.

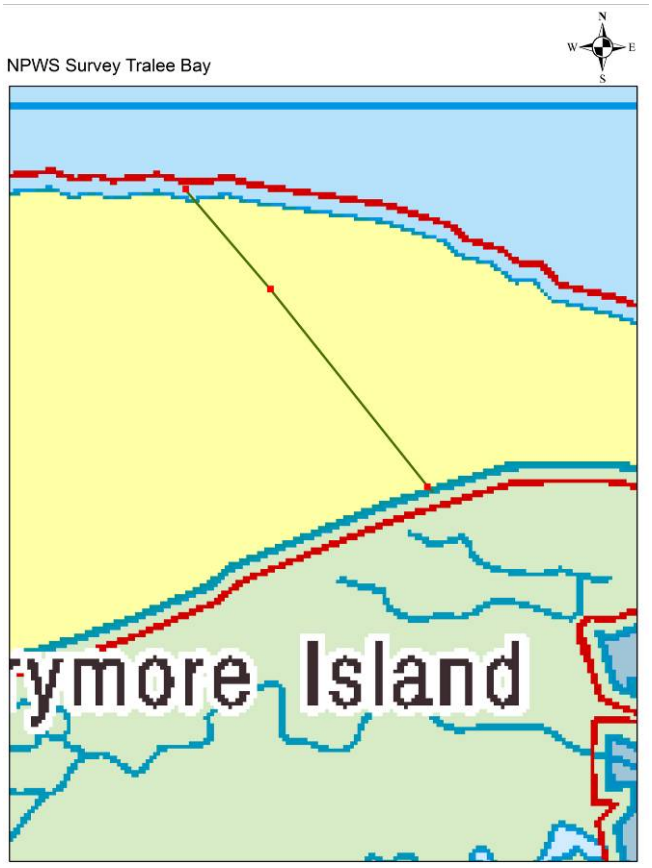


Figure 3.5.2: Tralee Bay, Transect 1

Plate 3.5.1: View of down shore across the cobble shoreline at the beginning of Tralee Bay Transect 1.

Plate 3.5.2: View of cobble shoreline at the beginning of Tralee Bay Transect 1.

Transect 1: Strand Line

	Orchestia gammarellus
Strand Line	77

The strandline at Transect 1 returned 77 specimens of a single species, *Orchestia gammarellus.*

T1 High

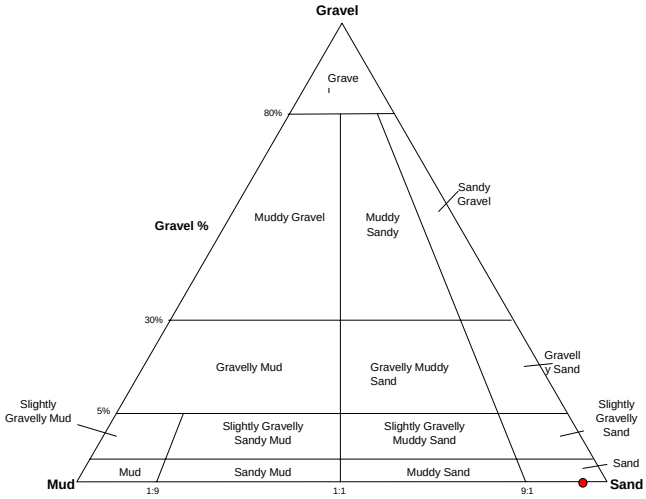
Overview of Site:

Shore Height Upper Shore
Substrate Moderately Well Sorted Fine Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	1.8%
Medium Sand	35.0%
Fine Sand	58.4%
Very Fine Sand	2.3%
Mud	2.5%

	% Loss on Ignition
T1 High	0.4%



Faunal Composition

	Obs (1m)	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Hydrobia ulvae			108	112	109	165	155
Cerastoderma edule		49	1		2	3	1
Angulus tenuis		44	1	3	2	3	1
Macoma balthica		8					
Scrobicularia plana		2					
Mya arenaria		1					
Eteone longa			2		3		
Phyllodoce mucosa		1					
Nephtys hombergii		1					
Scoloplos armiger		7	5	1	2	3	1
Pygospio elegans		1		1	3		
Arenicola marina	10	3					
Enchytraeidae indet.		1					
Crangon crangon		1					
Gammarus locusta		1					

Station Description

Distance from shoreline: 50m

This station was located 10 meters from the end of the cobble shoreline which bordered the soft-sediment part of the shoreline. The sediment was classified as rippled fine sand. The sediment was covered by a thin layer of standing water (covering approximately 60% of the sediment surface). An anoxic layer was evident at 5cm, and a cobble layer was present at a depth of 20cm. The red algae *Ceramium*

sp. and the green algae *Enteromorpha* intestinalis were present on the sediment surface at this shore height. *Arenicola* casts were observed (10 per square meter) and 3 were returned in the dig. *Cerastoderma edule* and *Angulus tenuis* were very abundant within the dig (49 and 44 respectively).

Plate 3.5.3: View of sediment at Tralee Bay Transect 1 High.

T1 Mid

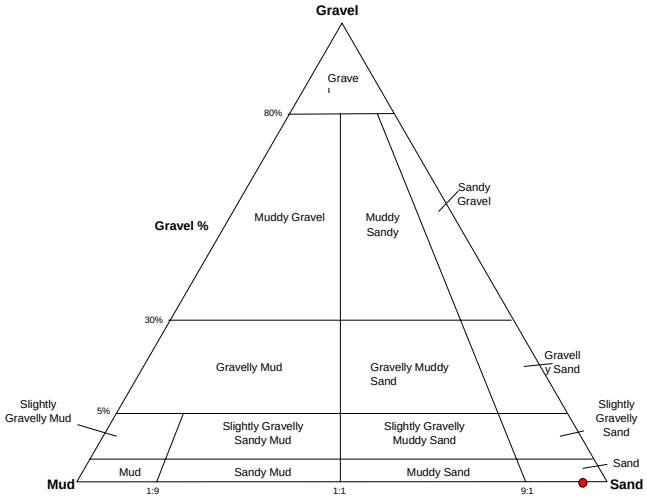
Overview of Site:

Shore Height Mid Shore
Substrate Moderately Well Sorted Fine Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	0.8%
Medium Sand	27.9%
Fine Sand	66.2%
Very Fine Sand	2.2%
Mud	2.9%

	% Loss on Ignition
T1 Mid	0.6%



Faunal Composition

	Obs (1m)	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Lepidochitona cinerea				1			
Cerastoderma edule		9	2	1		1	
Angulus tenuis		192	14	12	14	10	
Phyllodoce mucosa		1			1		
Nephtys cirrosa				1			
Scoloplos armiger		1					
Arenicola marina	7	1					
Urothoe brevicornis			2			2	

Station Description

Distance from shoreline: 340m

The sediment at this shore height was classified as rippled fine sand. This area of the transect was very dry, with no standing water in evidence on the sediment surface. The anoxic layer was not visible, and there was no evidence of a subsurface coarse layer. *Arenicola* casts were visible on the sediment surface (7 per square meter) and 1 was returned in the dig. The most abundant species recorded in the dig was the bivalve mollusc *Angulus tenuis*. There were also 9 *Cerastoderma edule* recorded in the dig.

Plate 3.5.4: View of sediment at Tralee Bay Transect 1 Mid.

T1 Low

Overview of Site:

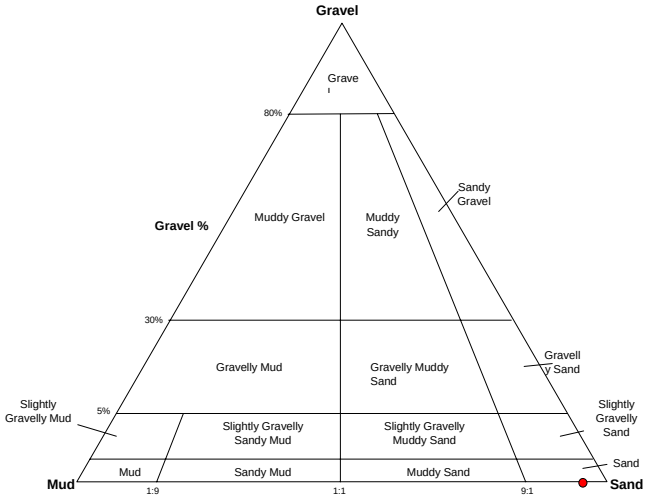
Shore Height Low Shore

Substrate Moderately Well Sorted Fine Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	1.1%
Medium Sand	19.9%
Fine Sand	72.8%
Very Fine Sand	3.1%
Mud	3.1%

	% Loss on Ignition
T1 Low	0%



Faunal Composition

	Obs (1m)	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Angulus tenuis		7	3	3	3	2	7
Nemertea indet.		1					
Nephtys cirrosa		1	1			1	2
Orbinia latreillei		1					
Pygospio elegans				1		1	1
Spio martinensis					1	2	1
Spiophanes bombyx			1				
Travisia forbesii		1					1
Urothoe brevicornis				2			6

Station Description

Distance from shoreline: 500m

This station was taken immediately adjacent to the main channel at low water. Sediment at this site was characterised as fine rippled sand. There was no visible fauna present on the sediment surface. The anoxic layer at this site was not detectable during the survey (>20cm deep). No *Arenicola* casts were evident and no specimens were returned in the dig. *A. tenuis* was the most abundant species present in the dig, although numbers were much reduced compared to both mid- and high-shore sites. *C. edule* was not present at the low-shore height of this shoreline.

Plate 3.5.5: View of sediment at Tralee Bay Transect 1 Low.

Plate 3.5.6: View along the low water shore level at Tralee Bay Transect 1 Low.

Tralee Bay – Transect 2

Date: 15/07/2007

Transect Length: 295m

Overview of Transect:

This transect was located on the south eastern side of Derrymore Island. A transect was taken from the peninsula in a south-eastern direction to the northern channel of Bealathaleen Creek. The transect measured approximately 285 meters. The shoreline was backed by an extensive marshland and graze land which dominated Derrymore Island. The top of the shore consisted of a gravel bank which gave way to a muddy shore. Within this muddy shore, the sediment was covered by an algal matrix and standing water. This zone gave way to an extensive *Zostera noltii* bed which dominated the mid-shore area of this shore line. The low-shore area of the shoreline was dominated by sand with occasional *Enteromorpha intestinalis* on the surface.

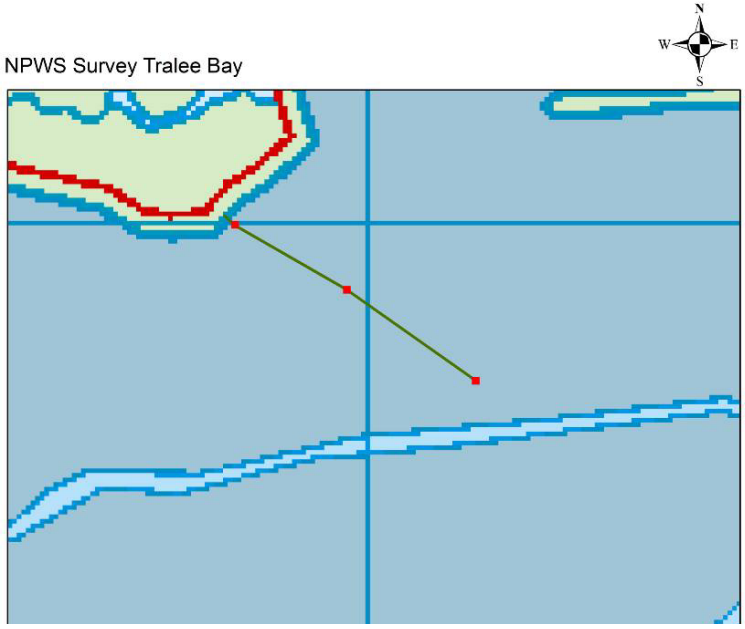


Figure 3.5.3: Tralee Bay, Transect 2.

Transect 2: Strand Line

	Orchestia gammarellus
Strand Line	11

The strandline at Transect 2 returned 11 specimens of a single species, *Orchestia meditteranea*.

T2 High

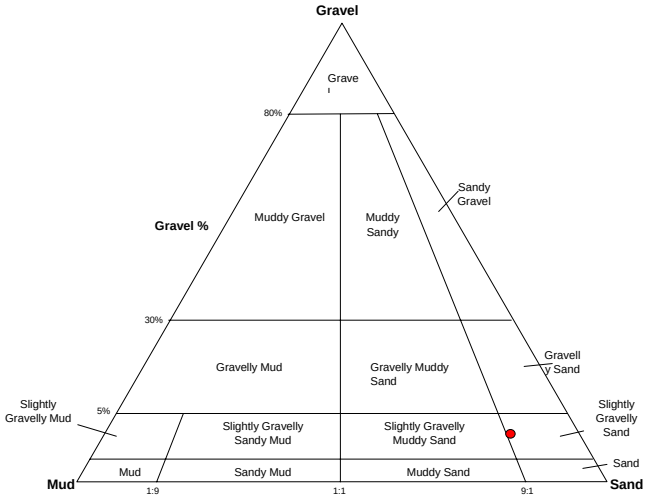
Overview of Site:

Shore Height Upper Shore
Substrate Poorly Sorted Slightly Gravely Sand

Granulometric Composition

	% Composition
Gravel	3.1%
Coarse Sand	2.9%
Medium Sand	59.9%
Fine Sand	23.3%
Very Fine Sand	1.4%
Mud	9.4%

	% Loss on Ignition
T2 High	0.6%



Faunal Composition

	Obs (1m)	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Hydrobia ulvae		21	8	43	51	60	32
Mytilus edulis		3					
Cerastoderma edule		58	6	1	2	4	3
Macoma balthica		4		1	1		1
Tapes decussatus		1					
Eteone longa			2	2	1	1	
Phyllodoce mucosa							5
Glycera tridactyla					1		
Pygospio elegans			1		1		
Arenicola marina	6	5					
Tubificoides benedii					1		

Station Description

Distance from shoreline: 30m

This station was located approximately 30 meters from the top of the shore. The surface of the sediment was dominated by a thick layer of algae (*Fucus vesiculosis* and *Enteromorpha intestinalis* with occasional red algae present on the sediment surface. In addition, there was an extensive amount of standing water present here, with parts of the shore being under 100% standing water. Within this algal matrix, some *Zostera* was visible, occasionally reaching 10% cover, although more often present in patches (<5% cover). The sediment was classified as gravely muddy sand. The depth of the anoxic layer at this site was just beneath the sediment surface, and a

narrow layer of crushed shell was present at a depth of 3cm. *Arenicola* casts were evident at the site (6 per square meter) and 5 were returned in the dig. In addition, *Cerastoderma edule* shells were visible within the algal matrix, with 58 specimens returned in the dig.

Plate 3.5.7: View of sediment surface at Tralee Bay Transect 2 High.

T2 Mid

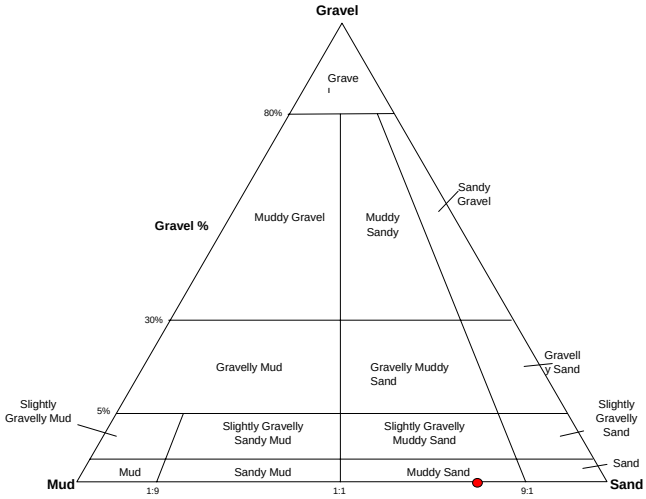
Overview of Site:

Shore Height Mid Shore
Substrate Poorly Sorted Muddy Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	0.2%
Medium Sand	0.7%
Fine Sand	28.0%
Very Fine Sand	50.1%
Mud	21 %

	% Loss on Ignition
T2 Mid	1.1%



Faunal Composition

	Obs (1m)	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Hydrobia ulvae			236	247	81	160	154
Cerastoderma edule	Shells Evident	32	6	1	2	2	2
Macoma balthica		2				1	1
Nephtys hombergii		2					
Arenicola marina	11	2					
Tubificoides benedii						1	1
Carcinus maenas					2		

Station Description

Distance from shoreline: 140m

This station was located approximately 140 meters from the top of the shore. The surface of the sediment was dominated by 95% cover of *Zostera noltii*. In addition, *Fucus vesiculosis* and *Enteromorpha intestinalis* were present in large pools nearby. The sediment was classified as muddy sand. The depth of the anoxic layer at this site was 6 cm. *Arenicola* casts were evident at the site (11 per square meter) and 2 were returned in the dig. In addition, *Cerastoderma edule* shells were visible within the algal matrix, with 32 specimens returned in the dig. It should be noted that the dig undertaken in the *Zostera* bed required careful removal of the upper 3cm of the sediment to maintain the integrity of the sea-grass bed. The sediment present under the seagrass was then checked for fauna. The seagrass was then returned to reduce the impact of digging.

Plate 3.5.8: View of sediment at Tralee Bay Transect 2 Mid.

Plate 3.5.9: View across the mid-shore at Tralee Bay Transect 2 Mid.

T2 Low

Overview of Site:

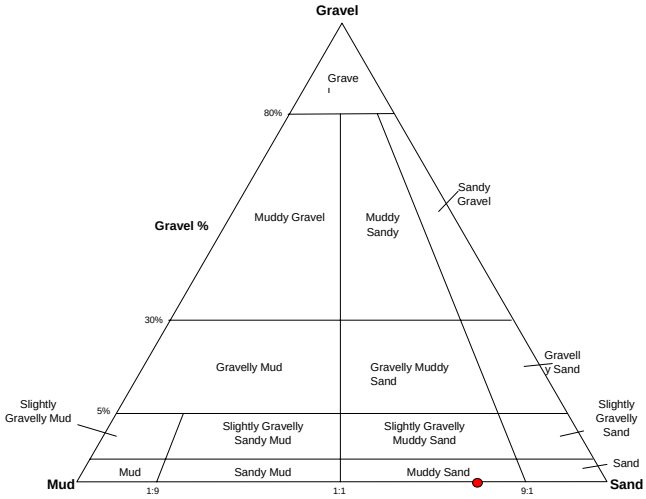
Shore Height Low Shore

Substrate Poorly Sorted Muddy Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	0 %
Medium Sand	1.3%
Fine Sand	27.4%
Very Fine Sand	48.7%
Mud	22.6%

	% Loss on Ignition
T2 Low	1.5%



Faunal Composition

	Obs (1m)	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Hydrobia ulvae				1		3	
Cerastoderma edule		3			1		2
Macoma balthica			1				
Eteone longa						1	
Nephtys hombergii			2				
Pygospio elegans			1	1			3
Heteromastus filiformis			1	1		1	1
Tubificoides benedii			1				

Station Description

Distance from shoreline: 290m

This station was taken immediately adjacent to a small shallow channel at low water. Sediment at this site was characterised as muddy sand. The anoxic layer was present at a depth of 2cm. There was no evidence of fauna present on the sediment surface. There were occasional patches of *Enteromorpha intestinalis* present on the sediment.

Plate 3.5.10: View of sediment at Tralee Bay Transect 2 Low.

Tralee Bay – Transect 3

Date: 16/07/2007

Transect Length: 890 meters

Overview of Transect:

This site was located along the southern shore of Tralee Bay. The shore borders farmland with an extensive boulder shore present at the uppermost part (~20 meters long). Immediately adjacent to this cobble shoreline was a large area dominated by coarse red sand. In addition, clumps of mussels (*Mytilus edulis*) were present on boulders/cobbles present within the sediment. A narrow band of raised mussel banks and *Zostera noltii* was present just below the area of coarse red sand and prior to the mid-shore level. *Arenicola* casts were evident along the length of the transect, but numbers of active casts reduced along the length of the transect. The mid shore are comprised of extensive *Enteromorpha intestinalis* bed in standing water. The extensive algal bed finished approximately 500m along the length of the transect. Immediately adjacent to this zone is an area of transition between mid- and low-shore levels. This area of transition was characterised by standing water and raised sediment mounds. Immediately below this transition zone was the low-shore area, which was characterised by rippled sand bordering the main channel.

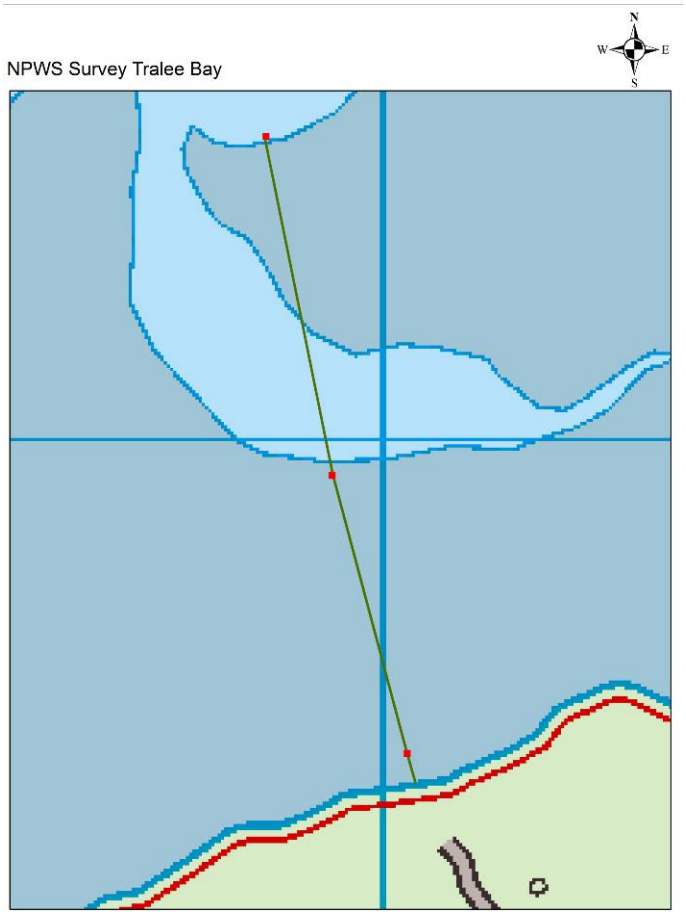


Figure 3.5.4: Tralee Bay, Transect 3.

Plate 3.5.11: View down shore at Tralee Bay Transect 3 High.

Plate 3.5.12: View of *Mytilus edulis* and *Zostera* present along Tralee Bay Transect 3.

Transect 3: Strand Line

	Orchestia gammarellus
Strand Line	22

The strandline at Transect 2 returned 22 specimens of a single species, *Orchestia gammarellus.*

T3 High

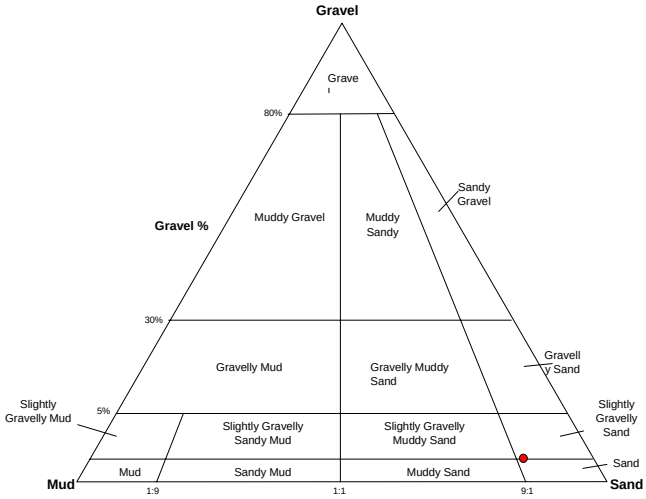
Overview of Site:

Shore Height Upper Shore
Substrate Poorly Sorted Slightly Gravely Sand

Granulometric Composition

	% Composition
Gravel	0.7%
Coarse Sand	9.3%
Medium Sand	50.5%
Fine Sand	27.1%
Very Fine Sand	3.2%
Mud	9.2%

	% Loss on Ignition
T3 High	0.3%



Faunal Composition

	Obs (1m)	Dig	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Hydrobia ulvae		21	77	64	90	79	51
Mytilus edulis		1					
Cerastoderma edule		55	3	5	4	2	1
Angulus tenuis		3				1	1
Macoma balthica		30	2	2	2	1	1
Tapes decussatus		4					
Eteone longa		6	2				1
Phyllodoce mucosa		3					
Glycera tridactyla		1				1	
Nephtys hombergii		10	1			1	
Scoloplos armiger		7				1	
Pygospio elegans		9	16	8	7	3	9
Scolelepis foliosa		5	1		1		
Heteromastus filiformis		6	1			2	
Arenicola marina	7	1					
Ampharete acutifrons		2					
Tubificoides benedii		1					
Tubificoides pseudogaster		5			2		1
Crangon crangon		4			1		1

Station Description

Distance from shoreline: 50m

The sediment at this station was classified as slightly gravely sand. The most striking thing about the sediment was its bright red colour. The depth of the anoxic layer at

this site was just below the surface. A subsurface layer, consisting of stones was present at 5cm, making coring difficult. There were occasional patches of standing water, with areas of up to 25% covered by standing water. *Mytilus edulis* were present in clumps attached to rocks and boulders within the sediment. *Arenicola* casts were present (7 per square meter) and 1 specime was returned in the dig. The most abundant species within the dig were the bivalves, *Cerastoderma edule* (55 per square meter) and *Macoma balthica* (30 per square meter). In addition, *Hydrobia ulvae* were present on the sediment surface.

Plate 3.5.13: View of sediment at Tralee Bay Transect 3 High.

Plate 3.5.14: View across the shore at Tralee Bay Transect 3 High.

T3 Mid

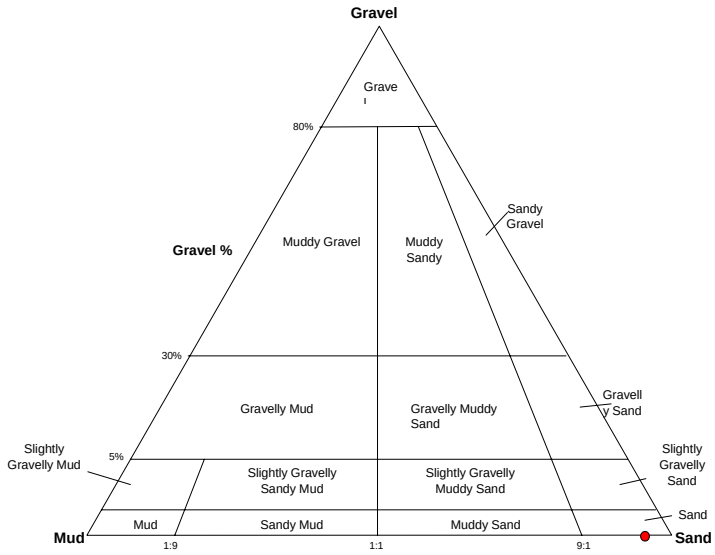
Overview of Site:

Shore Height Mid Shore
Substrate Moderately Well Sorted Fine Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	0.1%
Medium Sand	0.0%
Fine Sand	62.3%
Very Fine Sand	32.2%
Mud	5.4%

	% Loss on Ignition
T3 Mid	0.5%



Faunal Composition

	Obs (1m)	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Nucula sulcata					1		
Angulus tenuis		19	1		3	1	
Fabulina fabula		11				2	1
Macoma balthica		1					
Lineus bilineatus		3					
Arenicola marina	3						
Eteone longa		1		1			
Eumida sanguinea		1					
Glycera tridactyla						1	
Nephtys hombergii		3				1	
Scoloplos armiger		4	5	2	2	5	5
Pygospio elegans		2		2	2	1	1
Spio martinensis				1			
Heteromastus filiformis			1	1			
Notomastus latericeus		5	1			1	
Galathowenia oculata				1			
Melinna palmata		5				2	
Ampharete acutifrons							1
Lanice conchilega		44			4	2	3
Polycirrus norvegicus				1			1
Ampelisca brevicornis		9		2	2		1
Crangon crangon		5	2		1		1
Gammarus locusta		4					
Orchestia gammarellus		1					
Praunus flexuosus		2				1	1

Station Description

Distance from shoreline: 430m

The sediment at this shore height was classified as fine sand. The area was completely under a 2-3cm deep layer of standing water. Within this standing water, a large amount (50%) of green algae *Enteromorpha intestinalis* was present. The anoxic layer was present just below the sediment surface. A shell layer was also present at a depth of 20cm. The large amount of standing water made the 1m dig difficult, due to slumping of the sides during excavation. *Arenicola* casts were present (3 per square meter) but no specimens were returned in the dig. There was a significant amount of *Lanice conchilega* present at this height (44 per meter). In addition, the bivalves *Angulus tenuis* and *Fabulina fabula* were present in significant numbers (19 and 11 respectively)

Plate 3.5.15: View of sediment at Tralee Bay Transect 3 Mid.

Plate 3.5.16: View across the shore at Tralee Bay Transect 3 Mid.

T3 Low

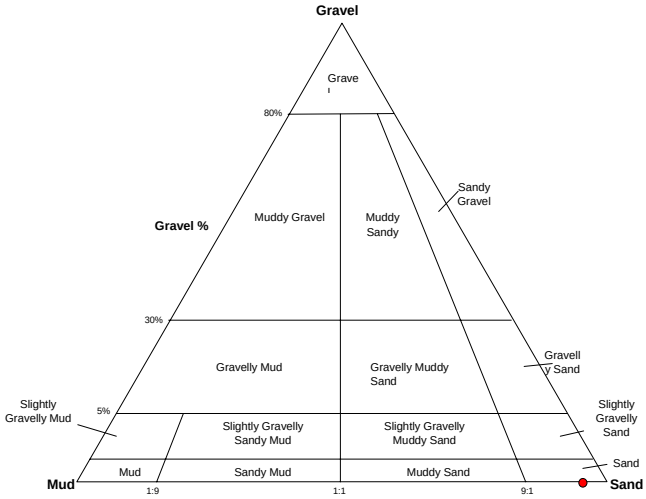
Overview of Site:

Shore Height Low Shore
Substrate Well Sorted Fine Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	0%
Medium Sand	0%
Fine Sand	78.6%
Very Fine Sand	18.3%
Mud	3.1%

	% Loss on Ignition
T3 Low	0.3%



Faunal Composition

	Obs (1m)	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Hydrobia ulvae					1	3	1
Angulus tenuis		6	3				1
Fabulina fabula		17	3	3	3	1	
Arenicola marina	1						
Nemertea indet.		1		1			
Glycera tridactyla		1					1
Scoloplos armiger				1	2	1	1
Pygospio elegans			1	2	7	7	
Spio martinensis				1			
Notomastus latericeus				1	1		
Polycirrus norvegicus				1			

Station Description

Distance from shoreline: 885m

This station was taken immediately adjacent to the main channel at low water. Sediment at this site was characterised as rippled fine sand. A single *Arenicola* cast was present on the sediment surface, but no specimens were recovered in the dig. There was no visible fauna present on the sediment surface. The anoxic layer at this site was present at a depth of 4-5cm. There was some standing water present within the ripples. The most abundant species in the dig were the bivalves *Fabulina fabula* and *Angulus tenuis* (17 and 6 respectively).

Plate 3.5.17: View of sediment at Tralee Bay Transect 3 Low.

Plate 3.5.18: View across low shore at Tralee Bay Transect 3 Low.

Tralee Bay – Transect 4

Date: 17/07/2007

Transect Length: 870m

Overview of Transect:

This site was located along the northern shore of Tralee Bay, and was the innermost transect present in this bay. The site was backed by a shingle ridge and bedrock shore. Immediately adjacent to this shingle shore line was a narrow muddy area with *Mytilus edulis* present on the muddy surface. This then lead to firmer sediment, dominated by muddy sand and *Zostera*. Further downshore, the sediment became firmer, and a *Enteromorpha intestinalis* was evident on the sediment surface. The sediment became softer again at low water and near side channels which dominated the mid- to low- shore region. *Arenicola* casts were present along the length of the transect.

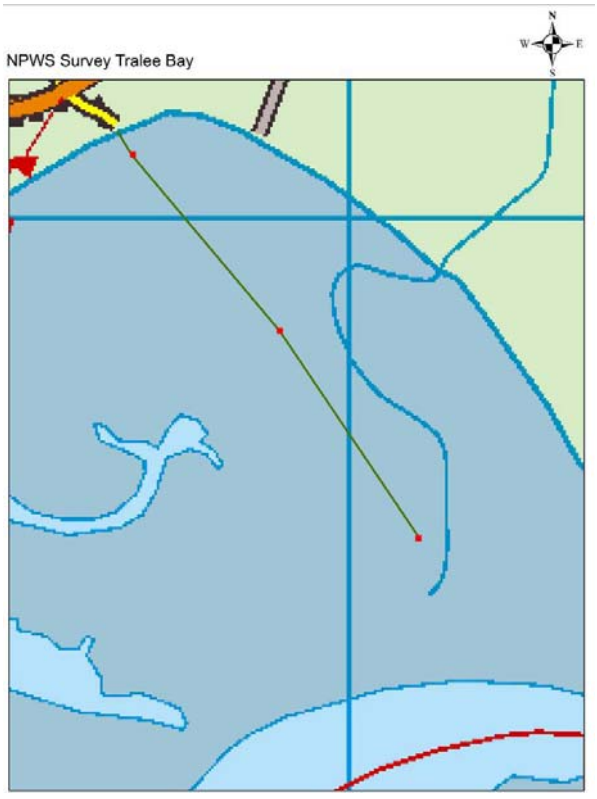


Figure 3.5.5: Tralee Bay, Transect 4.

Transect 4: Strand Line

	Gammarus locusta
Strand Line	11

The strandline at Transect 4 returned 11 specimens of a single species *Gammarus locusta*.

T4 High

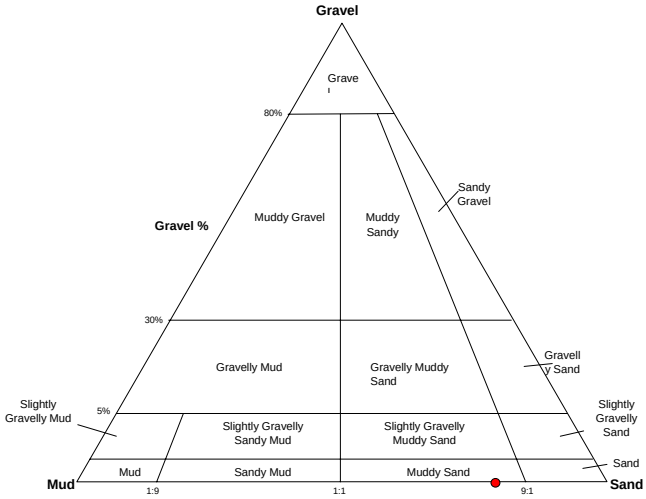
Overview of Site:

Shore Height Upper Shore
Substrate Poorly Sorted Muddy Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	0.1%
Medium Sand	0.7%
Fine Sand	53.5%
Very Fine Sand	28.7%
Mud	17%

	% Loss on Ignition
T4 High	1.8%



Faunal Composition

	Obs (1m)	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Hydrobia ulvae			6	17	10	26	23
Cerastoderma edule		32	1	2	1	1	1
Macoma balthica		53	1	2	2	5	1
Scrobicularia plana				1			
Arenicola marina	3						
Nemertea indet.		1					
Eteone longa		1				1	
Nereis diversicolor		7					
Nephtys hombergii		2				1	
Pygospio elegans						1	
Carcinus maenas		1		1			
Crangon crangon		2					
Gammarus locusta		3			1		
Idotea sp.			1				
Palaemon elegans		1					

Station Description

Distance from shoreline: 50m

This station was located approximately 50 meters from the top of the shore. The surface of the sediment was dominated by 100% cover of *Zostera noltii*. The sediment was classified as muddy sand. The depth of the anoxic layer at this site was 2-3 cm. *Arenicola* casts were evident at the site (3 per square meter) although none were returned in the dig. In addition, *Cerastoderma edule* shells were visible within

the seagrass matrix, with 32 specimens returned in the dig. The most abundant species present in the dif was the bivalve mollusc *Macoma balthica* (53 individuals). It should be noted that the dig undertaken in the *Zostera* bed required careful removal of the upper 3cm of the sediment to maintain the integrity of the sea-grass bed. The sediment present under the seagrass was then checked for fauna. The seagrass was then returned to reduce the impact of digging.

Plate 3.5.19: View of sediment at Tralee Bay Transect 4 High.

Plate 3.5.20: View across the *Zostera* bed at Tralee Bay Transect 4 High.

T4 Mid

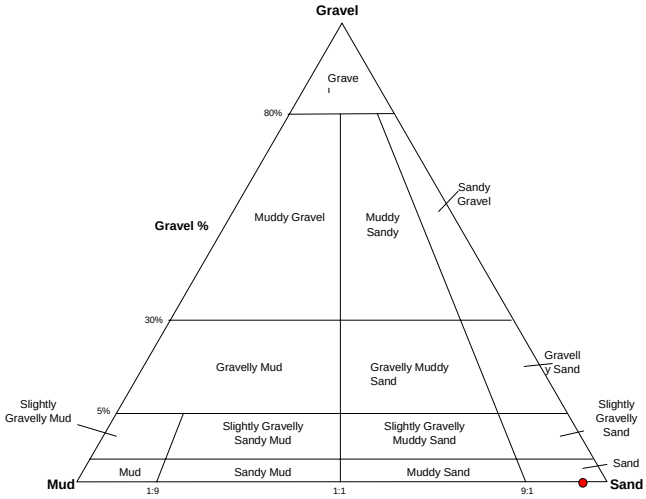
Overview of Site:

Shore Height Mid Shore
Substrate Well Sorted Fine Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	0%
Medium Sand	0%
Fine Sand	76.9%
Very Fine Sand	19.0%
Mud	4.1%

	% Loss on Ignition
T4 Mid	0.7%



Faunal Composition

	Obs (1m)	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Cerastoderma edule		10	2	1	1	1	
Angulus tenuis		13		1		4	1
Macoma balthica		11	1				
Nephtys hombergii		2		1			
Scoloplos armiger					3	1	
Pygospio elegans						5	
Arenicola marina	5	1					
Lanice conchilega		2			1		
Crangon crangon			1			1	
Praunus flexuosus			1				

Station Description

Distance from shoreline: 440m

This sediment at this station was dominated by fine sand. The anoxic layer was not visible at this shore height. There was a significant amount of standing water present within this area, with ~80% of the sediment covered with a thin layer of standing water. There was a small number of *Enteromorpha intestinalis* present at his shore height (5%). The bivalve molluscs *Cerastoderma edule*, *Angulus tenuis* and *Macoma balthica* were the most abundant species present (10, 13 and 11 individuals respectively).

Plate 3.5.21: View of sediment at Tralee Bay Transect 4 Mid.

Plate 3.5.22: View across mid-shore height at Tralee Bay Transect 4 Mid.

T4 Low

Overview of Site:

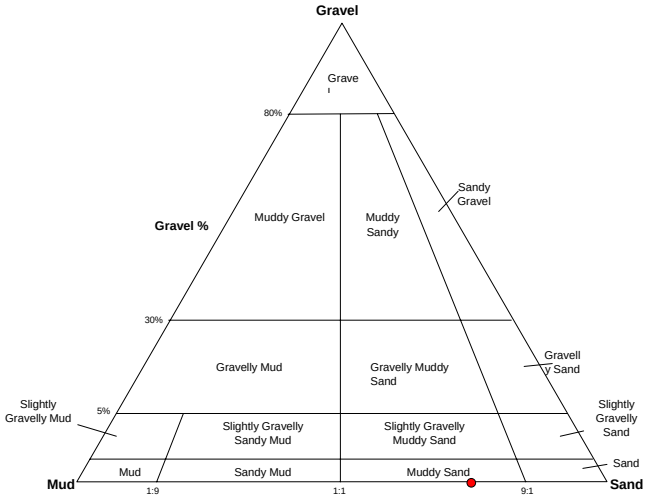
Shore Height Low Shore

Substrate Poorly Sorted Muddy Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	0%
Medium Sand	0.5%
Fine Sand	49.5%
Very Fine Sand	27.7%
Mud	22.3%

	% Loss on Ignition
T4 Low	0.9%



Faunal Composition

	Obs (1m)	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Macoma balthica				1		1	
Nereis diversicolor				1			
Nephtys hombergii			1				1
Pygospio elegans			1	1		2	
Arenicola marina	3	1					
Crangon crangon					1		
Praunus flexuosus			3	33		2	1

Station Description

Distance from shoreline: 865m

This station was taken immediately adjacent to the main channel at low water. Sediment at this site was softer than the mid-shore level and was classified as muddy sand. Three *Arenicola* casts were visible on the sediment surface and one was returned in the dig. The anoxic layer was at a depth of 3-4 cm. Only a single *Arenicola marina* specimen was returned in the dig.

Plate 3.5.23: View of sediment at Tralee Bay Transect 4 Low.

Plate 3.5.24: View of low-shore level at Tralee Bay Transect 4 Low.

Tralee Bay – Transect 5

Date: 03/08/2007

Transect Length: 840m

Overview of Transect:

This site was located along the southern shore of Barrow Harbour, a small bay with a narrow inlet located to the north of Tralee Bay, between Barrow and Fenit. The bay is sheltered from the prevailing winds by a large causeway and island (Fenit Within). The transect runs from the base of a sea wall in a north-western direction for 840 meters. At the base of the seawall is a gently sloping cobble and boulder beach which was approximately 35 meters wide. This was dominated by *Fucus vesiculosis* and *Enteromorpha intestinalis*. This cobble/boulder beach led into an area of firm sand which was characterised by an extensive *Zostera* bed which extended 200m down the shore. Within the *Zostera* bed, *Arenicola* were common (9 per square meter, occasionally more). The mid- and low-shore was characterised by an extensive area of clean, rippled sand with *Arenicola* casts (9 per square meter, occasionally more). This area was the predominant zone on the shore.

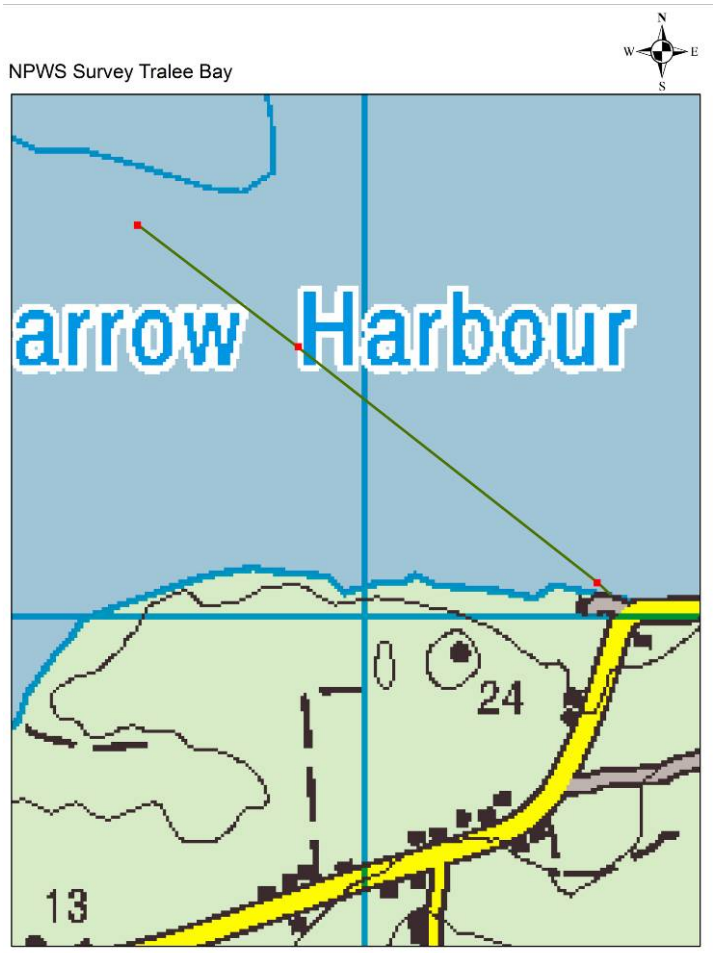


Figure 3.5.6: Tralee Bay, Transect 5.

Plate 3.5.25: View of shingle beach and cobble shore at Tralee Bay Transect 5.

Transect 5: Strand Line

	Carcinus maenas	*Ligia oceanica*	*Orchestia mediterranea*
Strand Line	1	1	26

The strandline at Transect 5 returned 26 specimens of *Orchestia mediterranea* and a single specimen each of *Carcinus maenas* and *Ligia oceanica*.

T5 High

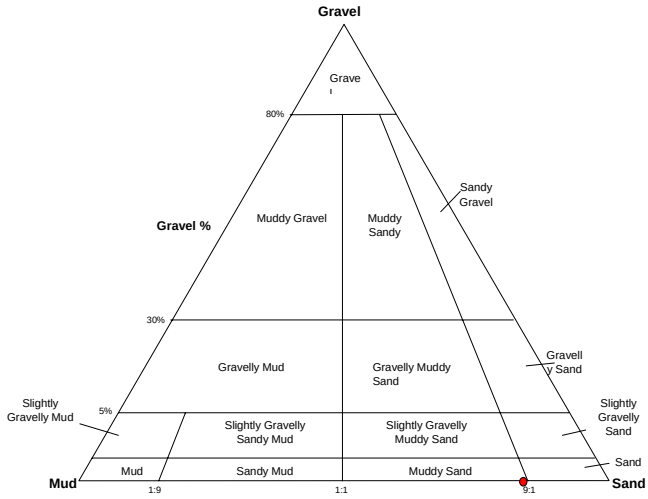
Overview of Site:

Shore Height Upper Shore
Substrate Poorly Sorted Muddy Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	1.8%
Medium Sand	31%
Fine Sand	51.8%
Very Fine Sand	4%
Mud	11.4%

	% Loss on Ignition
T5 High	2.2%



Faunal Composition

	Obs (1m)	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Hydrobia ulvae		10	22	139	11	116	28
Cerastoderma edule		69		4			2
Macoma balthica		1					
Arenicola marina	9						
Tapes decussatus		2					
Nereis diversicolor		2				1	2
Tubificoides benedii						1	
Carcinus maenas		6					1
Crangon crangon			1	9	8	15	4

Station Description

Distance from shoreline: 40m

This station was located approximately 50 meters from the top of the shore. The surface of the sediment was dominated by 95% cover of *Zostera noltii* with occasional *Fucus serratus*. The sediment was classified as muddy sand. The depth of the anoxic layer at this site was 2-3 cm and a sub-surface coarse layer of compacted shell was present at 10cm. *Arenicola* casts were evident at the site (9 per square meter) although none were returned in the dig. In addition, *Cerastoderma edule* shells were visible within the seagrass matrix, with 69 specimens returned in the dig. It should be noted that the dig undertaken in the *Zostera* bed required careful removal of the upper 3cm of the sediment to maintain the integrity of the sea-grass bed. The sediment present under the seagrass was then checked for fauna. The seagrass was then returned to reduce the impact of digging.

Plate 3.5.26: View of sediment at Tralee Bay Transect 5 High.

Plate 3.5.27: View downshore along the transect from the *Zostera* bed at Tralee Bay Transect 5 High.

T5 Mid

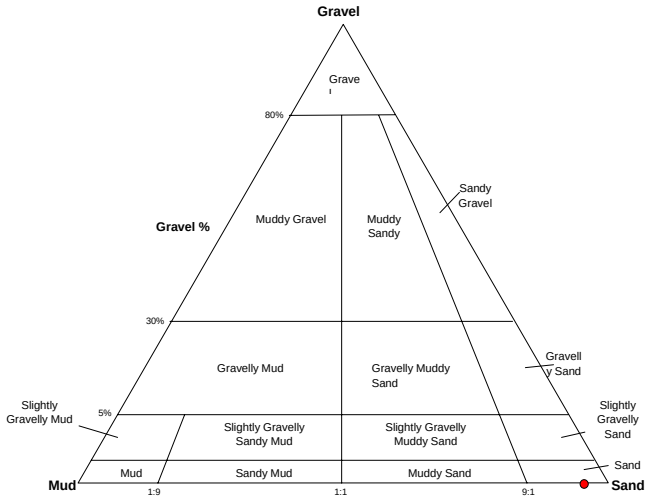
Overview of Site:

Shore Height Mid Shore
Substrate Well Sorted Fine Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	0.2%
Medium Sand	5.3%
Fine Sand	87.2%
Very Fine Sand	5.6%
Mud	1.4%

	% Loss on Ignition
T5 Mid	0.9%



Faunal Composition

	Obs (1m)	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Hydrobia ulvae			5	2	7	6	13
Cerastoderma edule		14					
Angulus tenuis		3	1				
Macoma balthica		4	1	1			
Abra alba		1					
Arenicola marina	9						
Glycera tridactyla		1			1		
Nephtys caeca		1					
Scoloplos armiger							1
Pygospio elegans			1	4	1	3	3
Scolelepis squamata					1		
Capitella capitata (complex)							1
Crangon crangon		1					

Station Description

Distance from shoreline: 570m

This sediment at this station was classified as fine sand. The anoxic layer was present at a depth of 3-4cm. 30% of the sediment covered with a thin layer of standing water. *Arenicola* casts were present (9 per meter squared) although none were returned in the dig. The most dominant fauna present at the site was the cockle, *Cerastoderma edule* with 14 specimens returned in the dig.

Plate 3.5.28: View of sediment at Tralee Bay Transect 5 Mid.

Plate 3.5.29: View west across the shore at Tralee Bay Transect 4 Low.

T5 Low

Overview of Site:

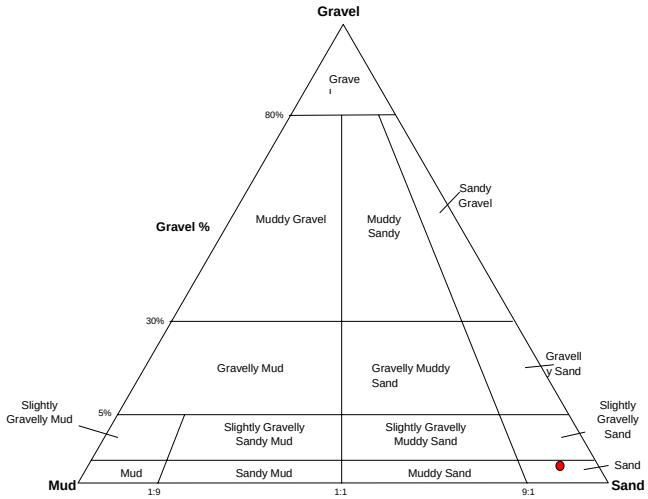
Shore Height Low Shore

Substrate Moderately Well Sorted Slightly Gravely Sand

Granulometric Composition

	% Composition
Gravel	0.5%
Coarse Sand	3.2%
Medium Sand	42.1%
Fine Sand	50.3%
Very Fine Sand	1.3%
Mud	2.6%

	% Loss on Ignition
T5 Low	1.0%



Faunal Composition

	Obs (1m)	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Hydrobia ulvae				3			
Angulus tenuis		24	8	2	5	1	5
Arenicola marina	1						
Nemertea indet.		1					
Glycera tridactyla		1					
Nephtys cirrosa			1			2	1
Scoloplos armiger			1				
Pygospio elegans			1		1	1	
Magelona filiformis			1				
Bathyporeia pelagica					2	1	

Station Description

Distance from shoreline: 840m

This station was taken immediately adjacent to the main channel at low water. Sediment at this site was characterised as slightly rippled gravely sand. Only one *Arenicola* casts was visible on the sediment surface and none were returned in the dig. The anoxic layer at this site was 10cm deep. Standing water (20%) was present between the ripples on the sediment surface. The most abundant species present in the dig was the bivalve *Angulus tenuis* (24 per meter squared).

3.6 Castlemaine Harbour

Sampling Area: Castlemaine Harbour

Number of Transects: Six Transects (T1 – T6)

Site Map

Figure 3.6.1: Castlemaine Harbour, Transect Locations

Embayment	Transect	Shore Ht	Date	Easting	Northing
Castlemaine	Transect 1	High	13/08/2007	65746	100090
		Mid	13/08/2007	66768	100088
		Low	13/08/2007	67831	100088
	Transect 2	High	13/08/2007	66846	98095
		Mid	13/08/2007	67588	98301
		Low	13/08/2007	68234	101871
	Transect 3	High	14/08/2007	71962	101954
		Mid	14/08/2007	71960	101919
		Low	14/08/2007	71956	101871
	Transect 4	High	27/09/2007	76893	100122
		Mid	27/09/2007	76480	100121
		Low	27/09/2007	76226	99824
	Transect 5	High	15/08/2007	66848	93172
		Mid	15/08/2007	66778	93447
		Low	15/08/2007	66694	93726
	Transect 6	High	28/10/2007	70943	97143
		Mid	28/10/2007	71000	97538
		Low	28/10/2007	71050	97987

Table 3.6.1: Sampling locations within Castlemaine Harbour. Positions are given in Irish National Grid.

Castlemaine Harbour – Transect 1

Date: 13/08/2007

Transect Length: 2220m

Overview of Transect:

This transect was located along the inner shore of the Inch Strand peninsula. The site was backed by an extensive Dune system which gave way to grazed grassland, an extensive saltmarsh system and to sediment. A transect was taken due east across the shore. The shore was 2¼ km long at this point. The upper shore composed of muddy sand with an extensive *Zostera noltii* bed present across the upper and mid-shore regions of the transect. *Hydrobia ulvae* were also present on the sediment surface along the upper shore. An extensive *Zostera* bed started 200 meters down shore and continued on for 500 meters. *Zostera* was extensive within this zone, covering between 75% and 100% in areas. Immediately adjacent to this *Zostera* bed was an area of *Mytilus edulis* and *Fucus vesiculosis* over fine sand. The mid- and low-shore sections for this site were covered by a thin layer of standing water. At low water, the sediment was classified as gravely sand. At the bottom of the shore, aquaculture structures were visible in the water.

Figure 3.6.2: Transect 1, Castlemaine Harbour

Transect 1: Strand Line

As this transect backed onto an extensive saltmarsh area with no algal drift, no strand line sample was taken at this site.

T1 High

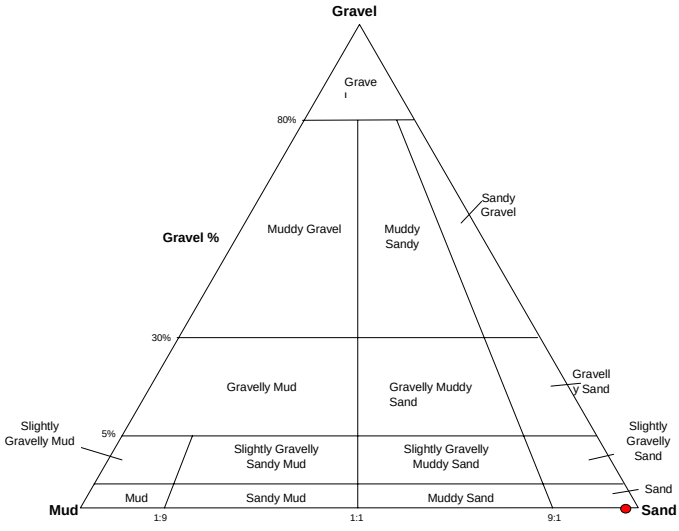
Overview of Site:

Shore Height Upper Shore
Substrate Well Sorted Fine Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	0.2%
Medium Sand	18.8%
Fine Sand	76.8%
Very Fine Sand	2.9%
Mud	1.3%

	% Loss on Ignition
T1 High	1.1%



Faunal Composition

	Obs (1m)	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Hydrobia ulvae		4	77	82	73	54	44
Nereis diversicolor	50+ casts	66	6	1	4	5	7
Heterochaeta costata				2	5	1	
Insect larva		1		1	5	1	2
Carcinus maenas		1	1				
Corophium volutator			5	2	4	1	1
Crangon crangon		4					
Gammarus locusta							1

Station Description

Distance from shoreline: 140m

This station was located approximately 140 meters from the top of the shore and 15 meters from a channel which crossed the shore at this height. The sediment is classified as sand. The anoxic layer was present just below the sediment surface. In addition, standing water was present (~25%). There were extensive casts present (50+ per m^2). A *Zostera* bed was present immediately adjacent to the adjoining saltmarsh, but none was evident at this station. The most abundant species recorded in the dig was the ragworm *Nereis diversicolor* (with 66 specimens returned in the dig)

T1 Mid

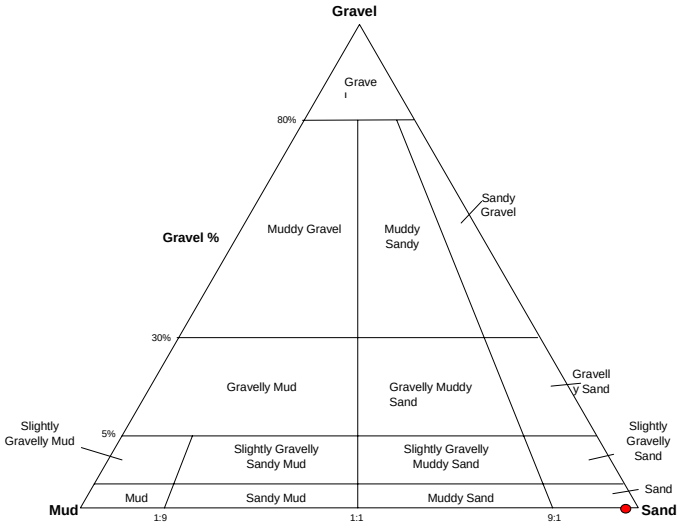
Overview of Site:

Shore Height Mid Shore
Substrate Moderately Well Sorted Fine Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	0.2%
Medium Sand	40.8%
Fine Sand	56.0%
Very Fine Sand	0.7%
Mud	2.3%

	% Loss on Ignition
T1 Mid	1.3%



Faunal Composition

	Obs (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Hydrobia ulvae		26	30	4	9	16
Scoloplos armiger		1	1	1		1
Pygospio elegans		2	2		1	4
Arenicola marina	10					
Tubificoides benedii		1	1			1
Carcinus maenas		1				
Crangon crangon		1	2	3		

Station Description

Distance from shoreline: 1165m

This area was dominated by an extensive *Zostera* bed. The seagrass meadow comprised of raised areas covered with 100% *Zostera* cover and pools with 75% *Zostera* cover. The sediment at this site was classified as fine sand. *Arenicola* casts were evident within the seagrass meadow (5-10 per square meter, occasionally more). No dig was taken at this location due to the presence of the *Zostera* bed.

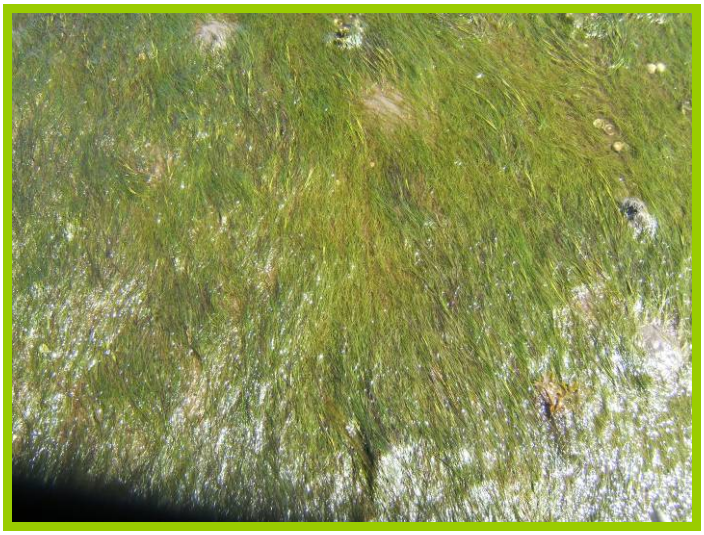


Plate 3.6.1: View of sediment at Castlemaine Transect 1 Mid.

Plate 3.6.2: View north across the shore at Castlemaine Transect 1 Mid.

T1 Low

Overview of Site:

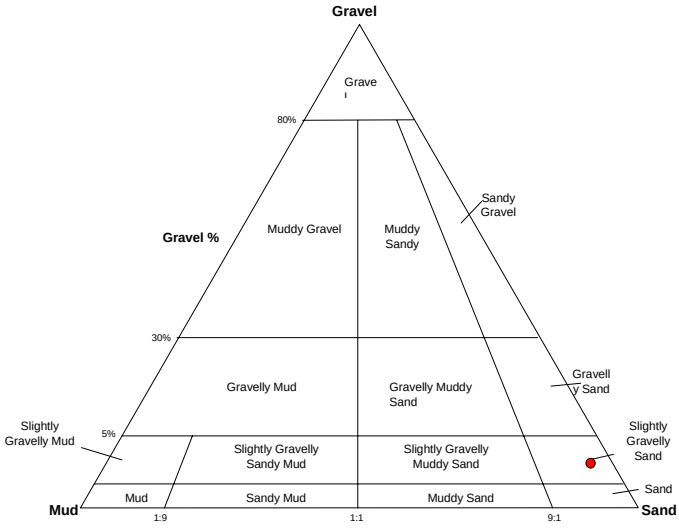
Shore Height Low Shore

Substrate Well Sorted Slightly Gravely Sand

Granulometric Composition

	% Composition
Gravel	2.5%
Coarse Sand	0.9%
Medium Sand	42.6%
Fine Sand	49.0%
Very Fine Sand	2.3%
Mud	2.7%

	% Loss on Ignition
T1 Low	0.5%



Faunal Composition

	Obs (1m)	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Mytilus edulis	Shells on surface	11					
Cerastoderma edule		1					
Angulus tenuis		2	2	2	2		
Glycera tridactyla				1			
Nephtys hombergii		1	1			1	
Scoloplos armiger		1	1	3	5	3	2
Polydora indet.		1					
Pygospio elegans		1			1	1	
Spio martinensis			2		6		1
Lanice conchilega		2					
Pomatoceros lamarcki		10					
Corophium volutator		1					
Crangon crangon			1				
Gammarus locusta		1					

Station Description

Distance from shoreline: 2225m

This station was taken immediately adjacent to the main channel at low water. Sediment at this site was characterised as slightly gravely sand. There was a large

amount of shells on the sediment surface. The depth of the anoxic layer at this site was 3-4cm.

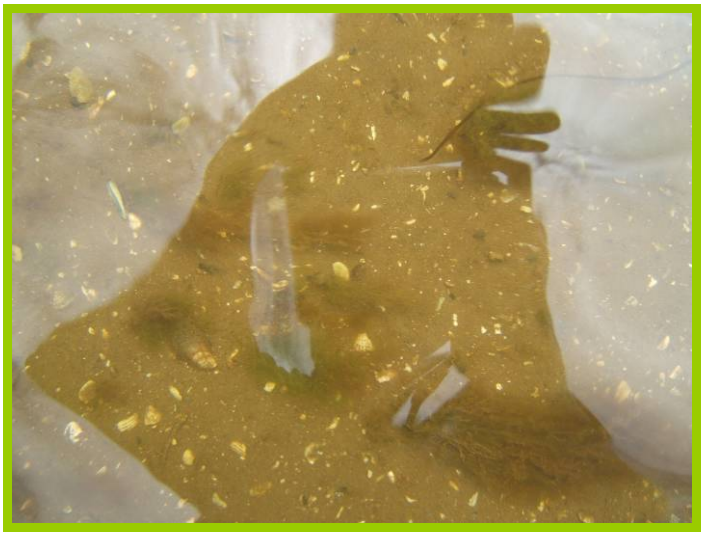


Plate 3.6.3: View of sediment at Castlemaine Transect 1 Low. Photograph taken during the incoming tide. Site was not under water during the initial sampling event.

Castlemaine Harbour – Transect 2

Date: 13/08/2007

Transect Length: 1500m

Overview of Transect:

This transect was located along the inner shore of the Inch Strand peninsula. The site was backed by an extensive Dune system which gave way to a narrow shingle beach and sediment. A transect was taken due east north-east across the shore. The shore was 1½ km long at this point. The upper shore composed of muddy sand with scattered patches of *Zostera noltii* present on the sediment surface. *Hydrobia ulvae* were also present on the sediment surface along the upper shore. An extensive *Zostera* bed started 200 meters down shore and continued on for 500 meters. *Zostera* was extensive within this zone, covering between 75% and 100% in areas. Immediately adjacent to this *Zostera* bed was an area of *Mytilus edulis* and *Fucus vesiculosis* over fine sand. The mid- and low-shore sections for this site were covered by a thin layer of standing water. At low water, the sediment was classified as gravely sand. At the bottom of the shore, aquaculture structures were visible in the water.

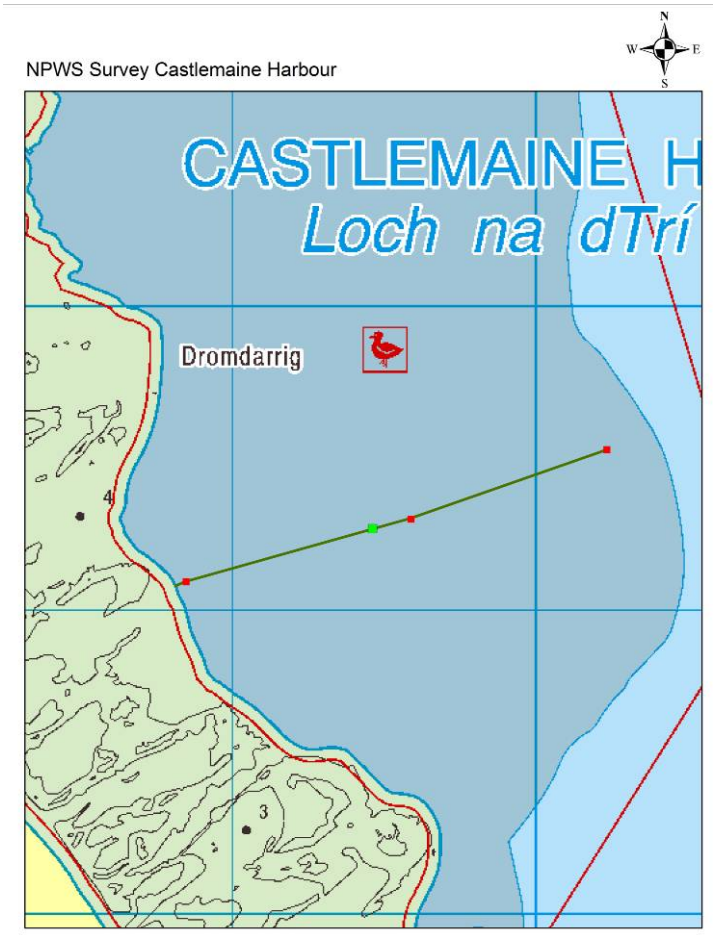


Figure 3.6.3: Transect 2, Castlemaine Harbour. Position in green is the location of the mid-shore *Zostera* survey station.

Plate 3.6.4: View of extensive dunes system which backs Castlemaine Harbour Transect 2.

Plate 3.6.5: View north across shore of strandline at Castlemaine Harbour Transect 2.

Plate 3.6.6: View of aquaculture structures present at the bottom of Castlemaine Harbour Transect 2.

Transect 2: Strand Line

	Orchestia gammarellus
Strand Line	145

The strandline at Transect 2 returned 145 specimens of a single species, *Orchestia gammarellus.*

T2 High

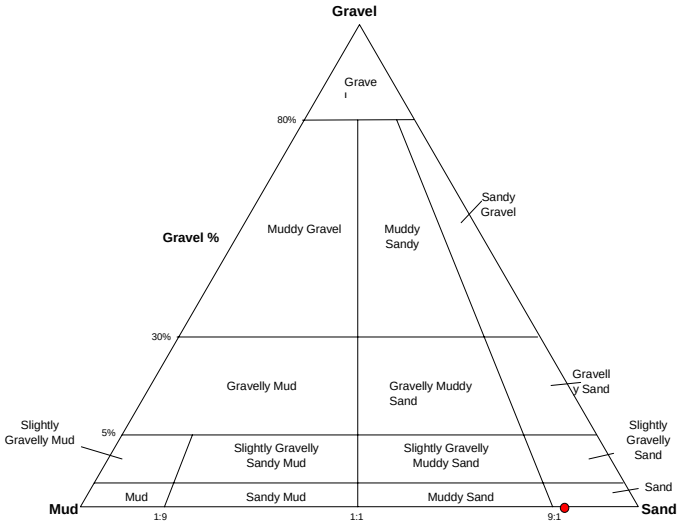
Overview of Site:

Shore Height Upper Shore
Substrate Moderately Well Sorted Fine Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	0.1%
Medium Sand	0.0%
Fine Sand	86.4%
Very Fine Sand	4.7%
Mud	8.8%

	% Loss on Ignition
T2 High	0.5%



Faunal Composition

	Obs (1m)	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Hydrobia ulvae	Abundant		107	120	84	60	77
Cerastoderma edule			1				
Macoma balthica				1			1
Scoloplos armiger						1	
Pygospio elegans			2				
Heteromastus filiformis					1		
Arenicola marina					1	1	
Insect larva			1				
Abludomelita palmata			1				
Crangon crangon			1	1	1	1	
Gammarus locusta			10	2			
Praunus flexuosus						1	

Station Description

Distance from shoreline: 40m

This station was located 40 meters from the end of the gravel shoreline which bordered the dunes. The sediment was classified as fine sand, although there was a significant muddy component in the sediment. The depth of the anoxic layer at this site was present just below the surface. There were occasional *Zostera* patches present at this site. *Hydrobia ulvae* were abundant on the sediment surface. No *Arenicola* casts were observed in the area but 15 were returned in the dig. *Macoma balthica* were the most abundant species in the dig (196 specimens returned).

Plate 3.6.7: View of sediment at Castlemaine Harbour Transect 2 High.

Plate 3.6.8: View up shore of transect at Castlemaine Harbour Transect 2 High.

T2 Mid (Zostera)

Overview of Site:

Shore Height Upper Mid Shore
Substrate Sand

Position of sample

	Easting	Northing
Castlemaine T2 Zostera	67461	98270

Faunal Composition

	Cores				
	Rep A	Rep B	Rep C	Rep D	Rep E
Hydrobia ulvae	148	141	137	147	113
Cerastoderma edule	2	2			1
Macoma balthica	2	2	1	1	1
Nereis diversicolor	2	1		1	2
Scoloplos armiger	2	1		1	4
Malacoceros	1	1		2	1
Pygospio elegans			1	2	2
Tubificoides benedii			1		
Carcinus maenas			1		
Crangon crangon	3			1	3
Gammarus locusta			1		
Idotea sp.		1	1		

Station Description

Distance from shoreline: 675m

This site was covered with 100% cover of *Zostera*. 5 replicate cores were taken at this location. No dig was taken. The dominant fauna present is the gastropod mollusc, *Hydrobia ulvae*.

T2 Mid

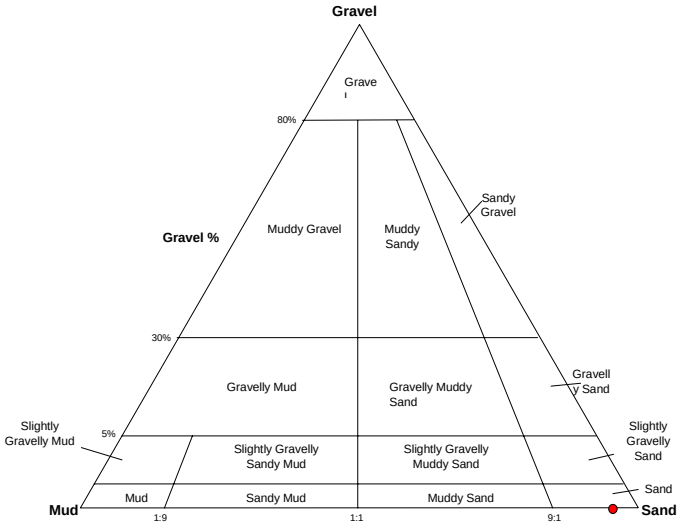
Overview of Site:

Shore Height Mid Shore
Substrate Very Well Sorted Fine Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	0.1%
Medium Sand	4.7%
Fine Sand	89.8%
Very Fine Sand	2.5%
Mud	2.9%

	% Loss on Ignition
T2 Mid	0.9%



Faunal Composition

	Obs (1m)	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Hydrobia ulvae			47	164	94	121	31
Cerastoderma edule						2	3
Nereis diversicolor				1			1
Nephtys hombergii				2			
Pygospio elegans						2	
Abludomelita palmata				1			
Carcinus maenas			1		1		
Crangon crangon					4	1	3
Eulimnogammarus obtusatus							1
Gammarus locusta				6			
Idotea sp.							1

Station Description

Distance from shoreline: 800m

This sediment at this station was classified as fine rippled sand. The anoxic layer was present at a depth of 1cm, and a subsurface coarse layer was present at 15cm, consisting of compacted shell. There were extensive raised mussel banks present at this shore height. In between these raised mussel banks, the sediment was covered by a thin layer of standing water. Attached to the mussels within this zone was the fucoid algae *Fucus ceranoides*. No fauna were returned in the dig.

Plate 3.6.9: View of sediment at Castlemaine Harbour Transect 2 Mid.

Plate 3.6.10: View north across the shore at Castlemaine Harbour Transect 2 Mid.

T2 Low

Overview of Site:

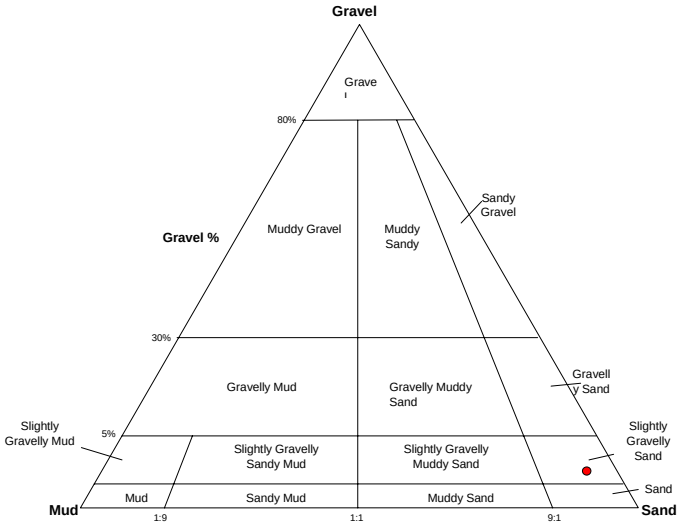
Shore Height Low Shore

Substrate Moderately Sorted Slightly Gravely Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	0%
Medium Sand	0%
Fine Sand	72.8%
Very Fine Sand	25.4%
Mud	1.8%

	% Loss on Ignition
T2 Low	0.9%



Faunal Composition

	Obs (1m)	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Hydrobia ulvae			1				
Angulus tenuis					3		
Nephtys hombergii		1		1	1		
Scoloplos armiger		1					2
Pygospio elegans				1	2		
Scolelepis foliosa		1					
Spio martinensis				1			1
Tharyx sp. A				1			
Enchytraeidae indet.							1
Insect larva		1					
Ampelisca brevicornis				1			
Idotea sp.						1	

Station Description

Distance from shoreline: 1500m

This station was taken immediately adjacent to the main channel at low water. Sediment at this site was classified as slightly gravely sand. There was no visible fauna present on the sediment surface. The depth of the anoxic layer at this site was just below the sediment surface, and a subsurface shell layer was present at a depth of 10cm. The sediment at this shore was covered by a layer of water.

Plate 3.6.11: View of sediment at Castlemaine Harbour Transect 2 Low.

Plate 3.6.12: View up shore (west) across the shore at Castlemaine Harbour Transect 2 Low.

Castlemaine Harbour – Transect 3

Date: 14/08/2007

Overview of Transect:

This was a very unusual transect. The transect was located along the northern shore of Castlemaine Harbour. The top of the shore was dominated by a sloping cobble shore with extensive *Ascophyllum nodosum* and *Fucus vesiculosis* cover across the shore. Immediately below this was an area dominated by *Enteromorpha intestinalis* over hard sediment and cobble. A narrow band (10m) of sediment was present between this *Enteromorpha* bed and a narrow channel which crossed the shore. The sediment here was classified as gravely muddy sand, with *Enteromorpha* and *Fucus vesiculosis* present on the surface. Immediately after the channel was an area of raised dry rippled sand, with occasional *Ascophyllum* present on rock within the sand. Immediately adjacent to this raised sand area was an area of cobble/gravel with Mussels and Fucoids. This continued to low water. Within this mussel/fucoid area the shore had raised dry areas, dominated by mussels and fucoids, surrounded by pools of standing water. Within these pools there was a large community of red and green algae. This mussel bank continued into the water for a distance of 150 meters.

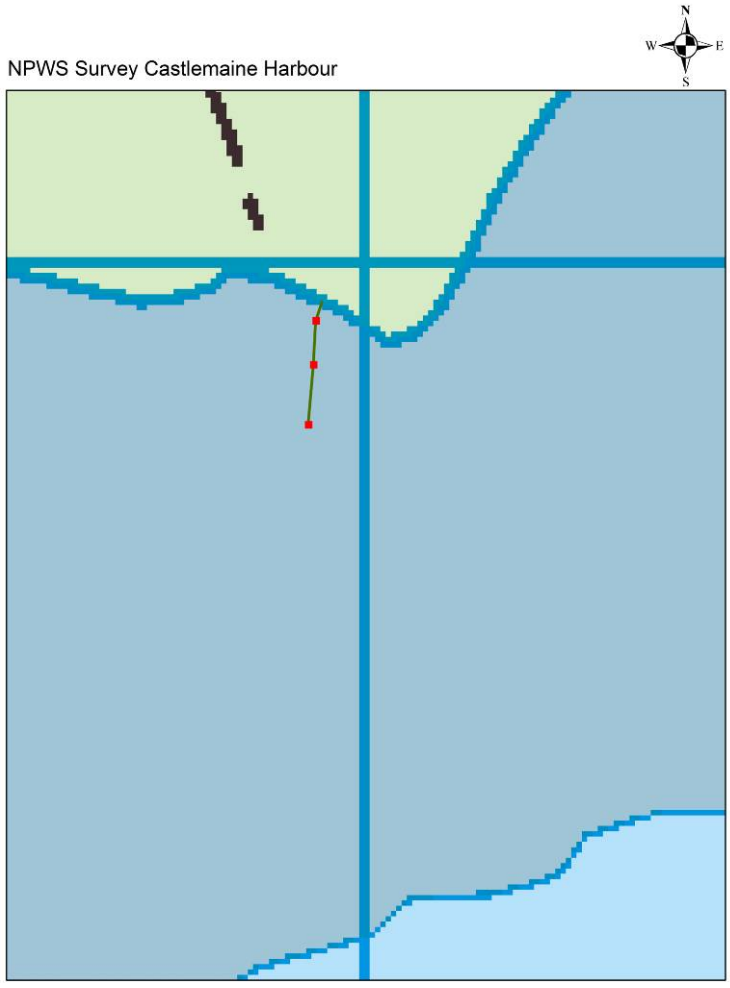


Figure 3.6.4: Transect 3, Castlemaine Harbour

Plate 3.6.13: View eastwards along the upper shore section of Castlemaine Harbour Transect 3.

Plate 3.6.14: View up shore (north) across the shore at Castlemaine Harbour Transect 3.

Plate 3.6.15: View up shore (north) from the waters edge across the shore at Castlemaine Harbour Transect 3.

Plate 3.6.16: View *Enteromorpha* covered sediment mounds present at Castlemaine Harbour Transect 3.

Transect 3: Strand Line

	Ligia oceanica	*Orchestia gammarellus*
Strand Line	4	89

The strandline at Transect 3 returned 26 specimens of *Orchestia gammarellus* and 4 specimens of *Ligia oceanica*.

T3 High

Overview of Site:

Shore Height Upper Shore
Substrate Poorly Sorted Gravely Sand

Granulometric Composition

	% Composition
Gravel	9.7%
Coarse Sand	10.7%
Medium Sand	34.5%
Fine Sand	31.3%
Very Fine Sand	5.6%
Mud	8.2%

	% Loss on Ignition
T3 High	6.3%

Faunal Composition

	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Cerastoderma edule	13		1			
Scrobicularia plana						1
Eteone longa		1				
Nereis diversicolor		1	1	1	2	1
Polydora cornuta		1		1	1	2
Tharyx sp. A				3		
Heteromastus filiformis			1	1		
Carcinus maenas						2
Crangon crangon		1				
Palaemon serratus			1			
Praunus flexuosus		1		1		

Station Description

Distance from shoreline: 15m

This station was taken immediately bordering the cobble shoreline dominated by fucoids which characterised the upper shore. The sediment at this site is classified as gravely muddy sand. The anoxic layer was present just beneath the sediment surface and coincided with a sub-surface peat layer which was also present at the same depth. The sediment surface was dominated by small gravel and shells. *Enteromorpha intestinalis* was present throughout the shore height.

Plate 3.6.17: View of sediment at Castlemaine Harbour Transect 3 High.

Plate 3.6.18: View east across the shore at Castlemaine Harbour Transect 3 High.

T3 Mid

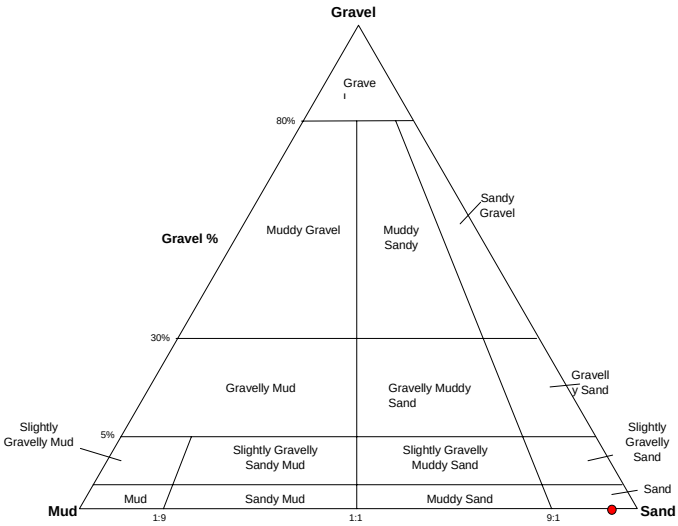
Overview of Site:

Shore Height	Mid Shore
Exposure	Sheltered
Substrate	Well Sorted Medium Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	9.2%
Medium Sand	82.0%
Fine Sand	5.7%
Very Fine Sand	0.4%
Mud	2.7%

	% Loss on Ignition
T3 Mid	2.7%



Faunal Composition

	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Hydrobia ulvae			1			
Eteone longa		1		1	2	
Nephtys cirrosa			2			
Nephtys hombergii	1					
Scoloplos armiger	1			1	1	
Arenicola marina	1					
Ophelia rathkei			2	1	1	
Tubificoides pseudogaster		1				
Urothoe brevicornis				1		

Station Description

Distance from shoreline: 50m

This sediment at this station was classified as fine rippled sand, which appeared very dry. The anoxic layer was present at a depth of 15cm. There was no evidence of fauna on the sediment surface.

Plate 3.6.19: View of sediment at Castlemaine Harbour Transect 3 Mid.

T3 Low

Overview of Site:

Shore Height	Low Shore
Substrate	Cobble/Mussels – Under water

Faunal Composition

No Fauna Returned

Station Description

Distance from shoreline: 200+m

It was not possible to take a low water sample at this transect. Walking to waist deep into the channel the substrate remained cobble/gravel with mussels and algae present on the surface.

Castlemaine Harbour – Transect 4

Date: 27/09/2007

Transect Length: 850m

Overview of Transect:

This site was located along the eastern shore of Castlemaine Harbour, and was the innermost transect present in this bay. The shore was backed by a seawall at the base of which was dominated by fucoids. This led to soft mud along the upper and mid-shore regions of the shore. Extensive bird activity was noted in the area, with bird tracks evident across much of the upper and mid-shore regions. *Nereis diversicolor* holes were abundant across the upper and mid-shore regions. A large deep channel was present 40 meters up shore from the mid-shore site. The low shore was characterised by the presence of a large number of empty *Mya arenaria* shells.

Figure 3.6.5: Transect 4, Castlemaine Harbour

Plate 3.6.20: View of seawall bordering agricultural farmland along the upper shore of Transect 4.

Transect 4: Strand Line

	Eulimnogammarus obtusatus
Strand Line	11

The strandline at Transect 4 returned 11 specimens of a single species, *Eulimnogammarus obtusatus*.

T4 High

Overview of Site:

Shore Height Upper Shore
Substrate Poorly Sorted Gravely Muddy Sand

Granulometric Composition

	% Composition
Gravel	17%
Coarse Sand	2.1%
Medium Sand	2.1%
Fine Sand	57.9%
Very Fine Sand	12.1%
Mud	8.8%

	% Loss on Ignition
T4 High	1.2%

Faunal Composition

	Obs (1m)	Dig 1m	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Hydrobia ulvae					2	2	
Macoma balthica		1			2	1	2
Eteone longa				1	1	1	1
Exogone naidina		1					
Nereis diversicolor	Numerous	49	15	12	13	17	17
Pygospio elegans		2	1		1	3	4
Streblospio shrubsolii							1
Heterochaeta costata		4	4			2	2
Tubificoides benedii			1				
Carcinus maenas							1

Station Description

Distance from shoreline: 50m

This station was immediately adjacent to the lower extent of a mixed fucoid/mussel zone which dominated the upper shore. The sediment at this station was classified as gravely muddy sand. Similar to the mid-shore site, there was a thin layer of water covering the sediment surface (90%). The depth of the anoxic layer at this station was <1cm deep. There was extensive bird activity present on the sediment surface. A large number of *Nereis diversicolor* holes were present on the sediment surface, and these were the most abundant species returned in the dig (49 specimens returned).

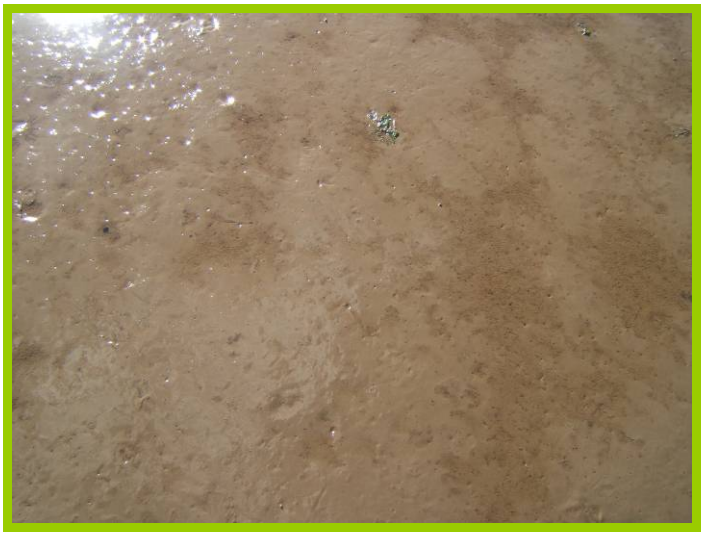


Plate 3.6.21: View of sediment at Castlemaine Harbour Transect 4 High.

Plate 3.6.22: View north across the high shore at Castlemaine Harbour Transect 4 High.

T4 Mid

Overview of Site:

Shore Height Mid Shore
Substrate Moderately Sorted Slightly Gravely Muddy Sand

Granulometric Composition

	% Composition
Gravel	2.5%
Coarse Sand	0.2%
Medium Sand	1.0%
Fine Sand	64.1%
Very Fine Sand	22.4%
Mud	9.8%

	% Loss on Ignition
T4 Mid	1.2%

Faunal Composition

	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Hydrobia ulvae	1					
Mytilus edulis						1
Macoma balthica	1					1
Eteone longa				1		1
Nereis diversicolor	80	6	4	10	3	9
Pygospio elegans				3	5	3
Streblospio shrubsolii		2	6			1
Heterochaeta costata	2	2		10		1
Crangon crangon		1	3	1		2
Neomysis integer	1	5	2	1	19	

Station Description

Distance from shoreline: 460m

This sediment at this station was classified as gravely muddy sand. The anoxic layer at this station was present just beneath the sediment surface. In addition, 2-3 cm beneath the sediment surface was a sandy layer. There was a significant amount of standing water present within this area, with ~90% of the sediment covered with a thin layer of standing water. There was some evidence of bird activity on the surface, with bird tracks evident. Several holes caused by *Nereis diversicolor* were also present on the sediment surface. These were also the most abundant species returned in the dig (80 specimens returned).

Plate 3.6.23: View of sediment at Castlemaine Harbour Transect 4 Mid.

Plate 3.6.24: View north across the mid shore at Castlemaine Harbour Transect 4 Mid.

T4 Low

Overview of Site:

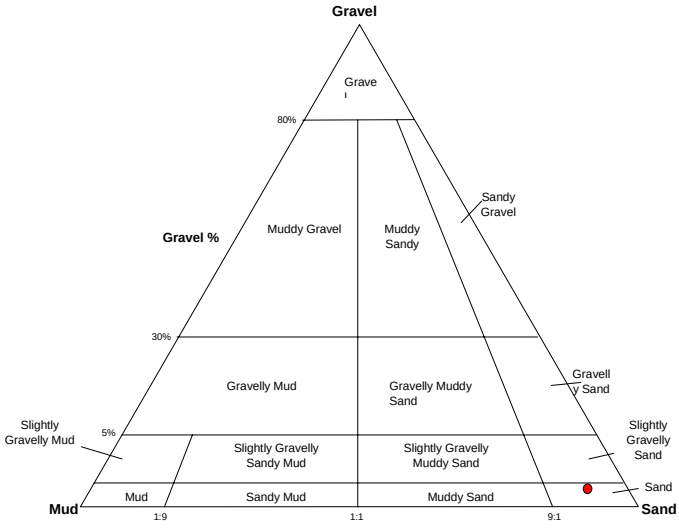
Shore Height Low Shore

Substrate Well Sorted Slightly Gravely Sand

Granulometric Composition

	% Composition
Gravel	0.4%
Coarse Sand	2.2%
Medium Sand	11.2%
Fine Sand	73.1%
Very Fine Sand	8.2%
Mud	4.9%

	% Loss on Ignition
T4 Low	0.6%



Faunal Composition

	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Nereis diversicolor	7		1	2		1
Pygospio elegans		2	3	1	2	1
Enchytraeidae indet.			4			
Neomysis integer				9		
Pomatoschistus sp. indet.					1	

Station Description

Distance from shoreline: 850m

This station was taken immediately adjacent to the main channel at low water. Sediment at this site was classified as gravely sand. A large number of *Mya arenaria* shells were present along the surface of the sediment, although no live specimens were returned during the survey. The depth of the anoxic layer at this site was <1cm, and there was a strong sulphide smell from the sediment.

Plate 3.6.25: View of sediment at Castlemaine Harbour Transect 4 Low.

Plate 3.6.26: View west across the low shore at Castlemaine Harbour Transect 4 Low.

Castlemaine Harbour – Transect 5

Date: 15/08/2007

Transect Length: 675m

Overview of Transect:

This site was located along the southern shore of Rossbehy Creek, a small intertidal area at the southern mouth of Castlemaine Harbour. The shore backed onto a small roadway which gave way to a narrow (20 meter) cobble shore. Immediately adjacent to the cobble shore was a cobble and fucoid shore within a sediment matrix. Immediately adjacent to this cobble/fucoid shore was a 70 meter wide *Zostera* bed on fine sand. This led into an upper shore dominated by sand, with a thin layer of standing water on it. Further downshore, the sand became rippled, with a reduction in the area submerged in water. This sediment type continued to low water.

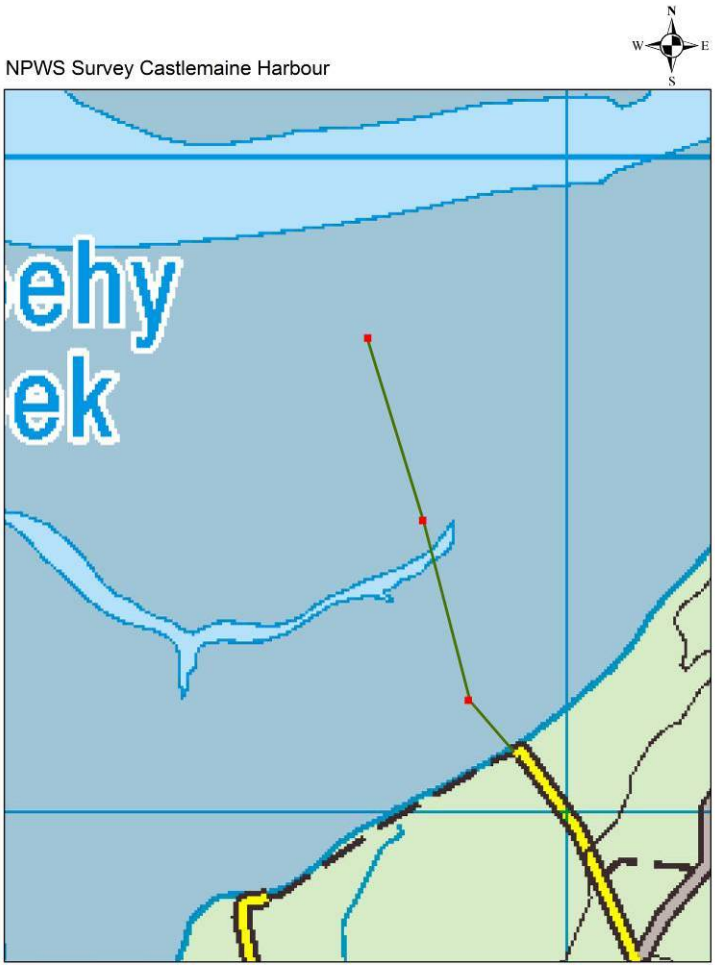


Figure 3.6.6: Transect 5, Castlemaine Harbour

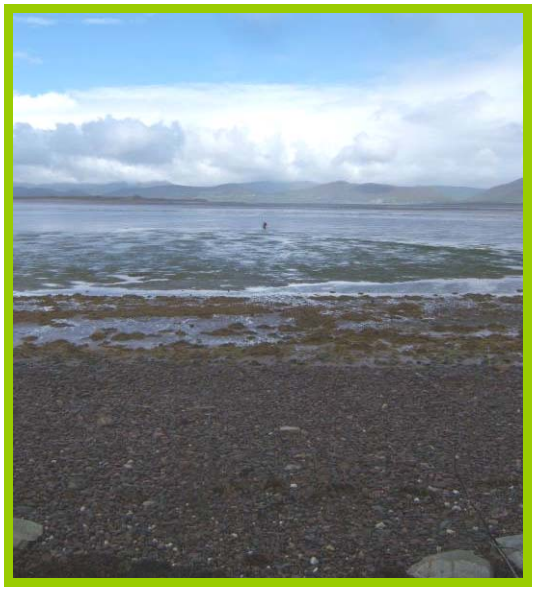


Plate 3.6.27: View down shore (North) across the shore at Castlemaine Harbour Transect 5. The *Zostera* bed is visible beyond the narrow channel the fucoid belt.

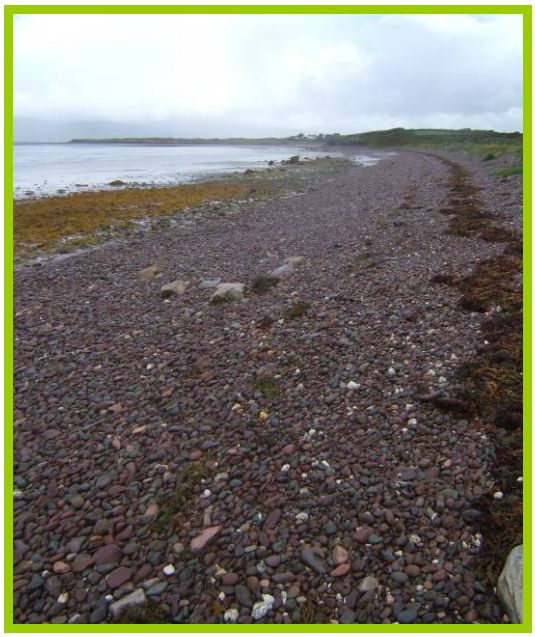


Plate 3.6.28: View east across the cobble shore at Castlemaine Harbour Transect 5.

Transect 5: Strand Line

	Orchestia gammarellus
Strand Line	317

The strandline at Transect 5 returned 317 specimens of a single species, *Orchestia gammarellus*.

T5 High

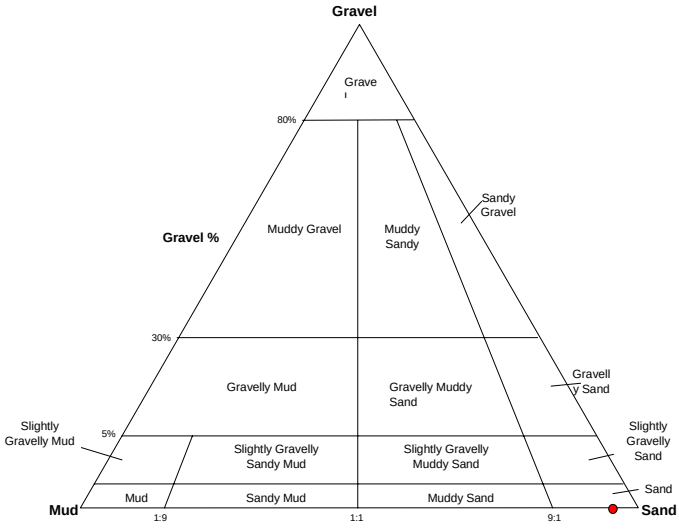
Overview of Site:

Shore Height Upper Shore
Substrate Very Well Sorted Fine Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	0%
Medium Sand	3.5%
Fine Sand	89.6%
Very Fine Sand	4.7%
Mud	2.1%

	% Loss on Ignition
T5 High	0.5%



Faunal Composition

	Obs (1m)	Dig 1m	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Hydrobia ulvae			111	105	192	112	115
Mytilus edulis				3			
Cerastoderma edule		4		1	2	2	
Angulus tenuis							1
Macoma balthica				1			1
Eteone longa						1	
Scoloplos armiger			2	1			
Pygospio elegans			1	4		2	2
Crangon crangon		1	1	1		1	4

Station Description

Distance from shoreline: 102m

This station was immediately adjacent to the lower extent of a *Zostera* bed which was present along the upper shore. The sediment at this station was classified as firm sand. In addition, standing water covered the entire shore at this height. The depth of the anoxic layer was 3-4 cm. There were occasional strands of *Enteromorpha* on the sediment present across the shore at this height. There were occasional *Cerastoderma edule* shells on the sediment surface. Four *C. edule* were found in the dig.

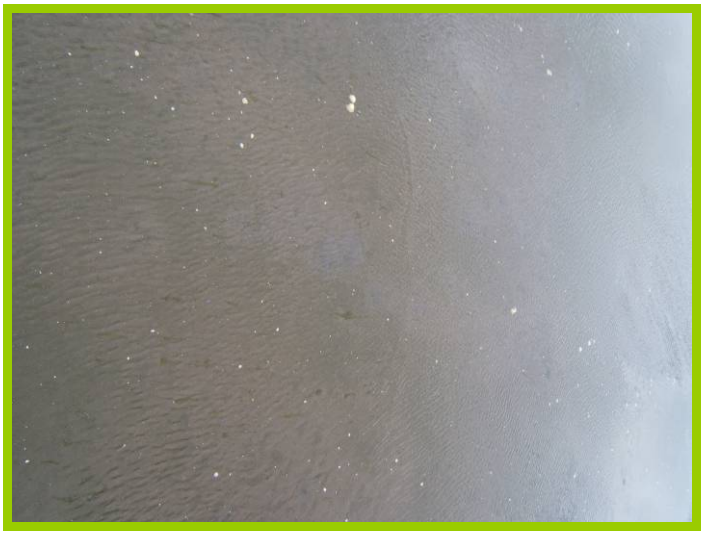


Plate 3.6.29: View of sediment at Castlemaine Harbour Transect 5 High.

T5 Mid

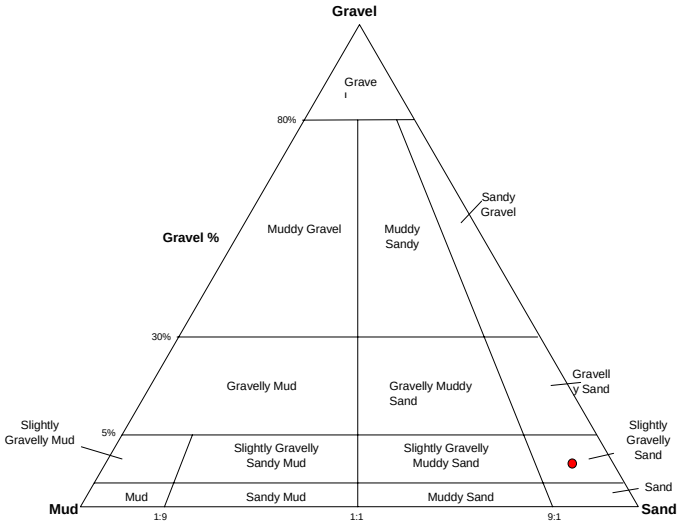
Overview of Site:

Shore Height Mid Shore
Substrate Moderately Sorted Slightly Gravely Sand

Granulometric Composition

	% Composition
Gravel	2.3%
Coarse Sand	0.8%
Medium Sand	35.9%
Fine Sand	56.4%
Very Fine Sand	2.4%
Mud	2.2%

	% Loss on Ignition
T5 Mid	0.4%



Faunal Composition

	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Cerastoderma edule	9		1			1
Angulus tenuis		1				
Glycera tridactyla		1	1	1		1
Nephtys hombergii					1	
Scoloplos armiger		3	2	1	4	6
Pygospio elegans		4	2	1	2	1
Scolelepis foliosa	1				1	
Spio martinensis		2	2			1
Ampelisca brevicornis		1	1	1	1	
Crangon crangon	1	2	1		1	

Station Description

Distance from shoreline: 375m

This sediment at this station was classified as rippled fine sand. The anoxic layer was present at a depth of 3-4cm. There was a significant amount of standing water present within this area, with ~60% of the sediment covered with a thin layer of standing water. There was a large amount of shells present on the sediment surface, and *Cerastoderma edule* was the most abundant species returned in the dig (9 specimens per square meter)

Plate 3.6.30: View of sediment at Castlemaine Harbour Transect 5 Mid.

T5 Low

Overview of Site:

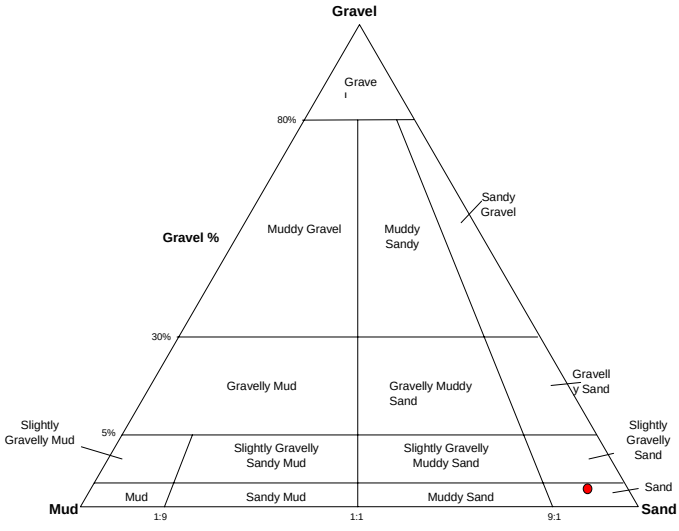
Shore Height Low Shore

Substrate Well Sorted Slightly Gravely Sand

Granulometric Composition

	% Composition
Gravel	0.4%
Coarse Sand	0.4%
Medium Sand	12.3%
Fine Sand	81.4%
Very Fine Sand	2.2%
Mud	3.3%

	% Loss on Ignition
T5 Low	0.3%



Faunal Composition

	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Angulus tenuis		1	2	4	3	3
Malmgrenia marphysae	2					
Glycera tridactyla	1					
Nephtys cirrosa		1	1	1		1
Nephtys hombergii				1	1	
Orbinia latreillei	12	1			1	
Scoloplos armiger	3	4	5	1	3	2
Pygospio elegans						1
Lanice conchilega	3					
Crangon crangon			1		1	1

Station Description

Distance from shoreline: 675m

This station was taken immediately adjacent to a deep channel at low water. Although there was a significant amount of intertidal visible on the other side of the channel, it was not possible to cross the channel as it was too deep. Sediment at this site was characterised as slightly gravely rippled sand. The anoxic layer at this site was 15cm deep. Standing water (20%) was present between the ripples on the sediment surface.

Plate 3.6.31: View of sediment at Castlemaine Harbour Transect 5 Low.

Castlemaine Harbour – Transect 6

Date: 28/10/2007

Transect Length: 1000m

Overview of Transect:

The shore at this location backed onto an old pier, with a band of *Ascophyllum nodosum* and *Fucus vesiculosis* immediately at the base of the pier. This area was immediately adjacent to very soft mud. The upper section of the shore crosses several small channels where the sediment becomes firmer. The shore level remained level across the transect, and the shore level dropped quickly at low water. The sediment became firmer with fine sand dominating from the lower mid-shore area. There was a large amount of shell debris on the sediment surface across much of the shore.

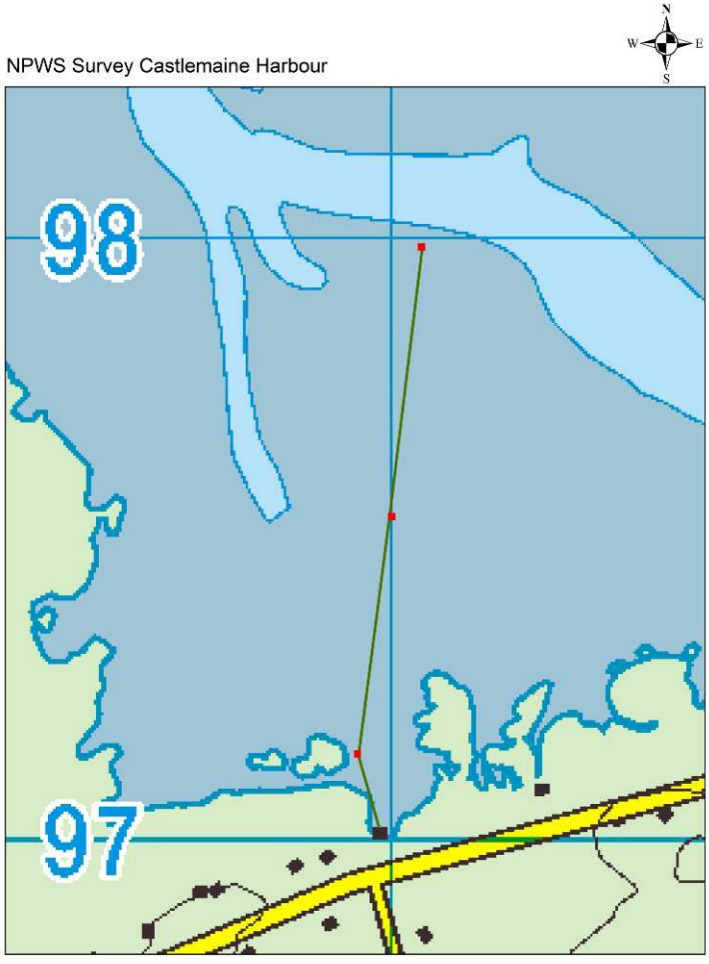


Figure 3.6.7: Transect 6, Castlemaine Harbour

Plate 3.6.32: View of pier wall and extensive *Ascophyllum nodosum* bed on mud present at the top of Transect 6 Castlemaine Harbour.

Plate 3.6.33: View of saltmarsh area which borders the upper part of the transect at Castlemaine Harbour Transect 6.

Transect 6: Strand Line

	Orchestia gammarellus
Strand Line	3

The strandline at Transect 6 returned 3 specimens of a single species, *Orchestia gammarellus.*

T6 High

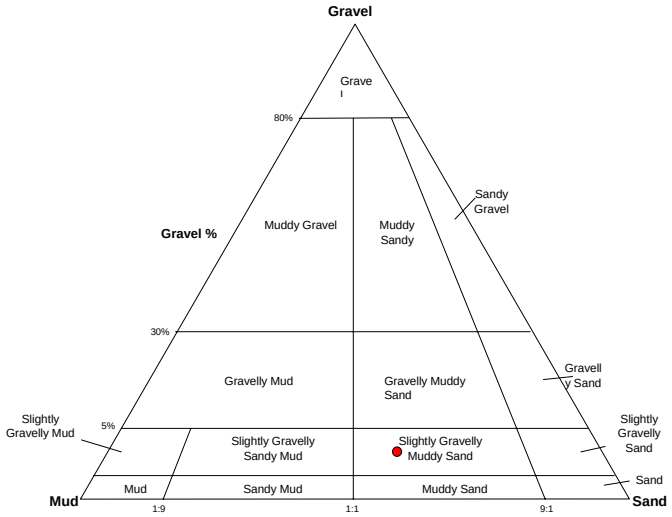
Overview of Site:

Shore Height Upper Shore
Substrate Slightly Gravely Muddy Sand

Granulometric Composition

	% Composition
Gravel	2.9%
Coarse Sand	0%
Medium Sand	0%
Fine Sand	20.8%
Very Fine Sand	36.8%
Mud	39.5%

	% Loss on Ignition
T1 High	5.0%



Faunal Composition

	Obs (1m)	Dig (0.25m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Hydrobia ulvae				1			5
Macoma balthica						1	
Scrobicularia plana		3	1	1			2
Nereis diversicolor		29	10	5	5	6	9
Nephtys hombergii		1			1		1
Tharyx sp. A		2	2	13	2	5	16
Arenicola marina	8	1					
Tubificoides benedii			2				
Carcinus maenas						1	
Corophium volutator			1				
Crangon crangon		3				1	

Station Description

Distance from shoreline: 135m

The sediment at this station was classified as gravely muddy sand. The anoxic layer was present at a depth of 1cm and a peat layer was present at 15cm depth. Occasional shells were present on the sediment surface. *Arenicola* casts were present on the sediment surface (8-12 per square meter). As the tide was coming in quickly at this location, only $0.2m^2$ was dug out for identification.

Plate 3.6.34: View of sediment at Castlemaine Harbour Transect 6 High.

T6 Mid

Overview of Site:

Shore Height Mid Shore
Substrate Poorly Sorted Muddy Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	0.1%
Medium Sand	0%
Fine Sand	38.9%
Very Fine Sand	36.9%
Mud	24.1%

	% Loss on Ignition
T6 Mid	2.5%

Faunal Composition

	Obs (1m)	Dig (0.25m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Hydrobia ulvae			12	7	5	47	2
Cerastoderma edule			1				
Macoma balthica			1	1			
Gastrana fragilis							1
Eteone longa			1	1			
Nereis diversicolor		3	1	2	1	1	3
Nephtys hombergii		3	1				
Polydora cornuta							1
Pygospio elegans			1	2	3		6
Tharyx sp. A		1	4	11	8	2	
Heteromastus filiformis						3	
Arenicola marina	5	1				1	1
Tubificoides benedii			2	1		1	

Station Description

Distance from shoreline: 535m

This sediment at this station was classified as muddy sand. The anoxic layer was present just below the sediment surface. A large proportion of the sediment was covered by a thin layer of standing water (70%). *Arenicola* casts were present on the sediment surface (5-7 per square meter, occasionally more). *Enteromorpha intestinalis* was present in small patches across the shore at this height. As the tide was coming in quickly at this location, only $0.2m^2$ was dug out for identification.

Plate 3.6.35: View of sediment at Castlemaine Harbour Transect 6 Mid.

Plate 3.6.36: View west along the mid shore at Castlemaine Harbour Transect 6 Mid

T6 Low

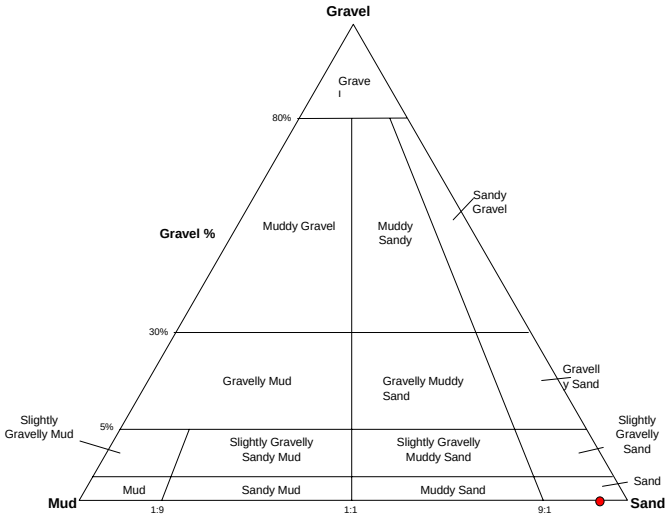
Overview of Site:

Shore Height Low Shore
Substrate Well Sorted Fine Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	0.2%
Medium Sand	0%
Fine Sand	88.3%
Very Fine Sand	8.1%
Mud	3.3%

	% Loss on Ignition
T6 Low	0.7%



Faunal Composition

	Dig 1m	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Hydrobia ulvae	2			2		
Cerastoderma edule		1				
Angulus tenuis				2		
Macoma balthica						1
Eteone longa						1
Nephtys hombergii	1				1	
Scoloplos armiger		2	3	3	2	8
Lanice conchilega	1					
Pagurus bernhardus					1	

Station Description

Distance from shoreline: 1000m

This station was taken immediately adjacent to the main channel at low water. Sediment at this site was characterised as firm rippled sand. The anoxic layer at this site was 15cm deep. A large amount of shell debris covered the sediment (*Cerastoderma edule*, *Mya arenaria* & *Mytilus edulis*).

Plate 3.6.37: View of sediment at Castlemaine Harbour Transect 6 Low.

Plate 3.6.38: View west along the low shore at Castlemaine Harbour Transect 6 Low

3.7 Bannow Bay

Sampling Area: Bannow Bay

Number of Transects: Three Transects (T1 – T3)

Site Map

Figure 3.7.1: Transect locations, Bannow Bay

Embayment	Transect	Shore Ht	Date	Easting	Northing
Bannow	Transect 1	High	11/09/2007	284226	111624
		Mid	11/09/2007	284436	111394
		Low	11/09/2007	284670	111156
	Transect 2	High	11/09/2007	282892	110700
		Mid	11/09/2007	283098	110507
		Low	11/09/2007	283493	110113
	Transect 3	High	12/09/2007	281636	108222
		Mid	12/09/2007	281305	108488
		Low	12/09/2007	281225	108593

Table 3.7.1: Sampling locations within Bannow Bay. Positions are given in Irish National Grid.

Bannow Bay – Transect 1

Date: 11/09/2007

Transect Length: 690m

Overview of Transect:

This site was located along the northern shore of Bannow Bay. The shore was backed by a cobble/gravel shoreline, along which a narrow Fucoid zone (10 – 15 meters) was present. A transect was taken from the corner of the nearby point to the low water mark in a southeast direction. The shore measured 690m at this point. The upper section of the shore was characterised by a narrow band (15m) of *Ascophyllum nodosum* and *Fucus vesiculosis* attached to boulder and bedrock interspersed with gravel and sand. Immediately adjacent to this *Ascophyllum*/*Fucus* zone was the extensive soft-sediment intertidal area. Between the low and mid area sites, an extensive diatom bed was visible, although diatoms were present throughout the course of the transect. The anoxic layer was present at a depth of approximately 1cm throughout the transect. There were no *Arenicola* casts throughout the length of the transect.

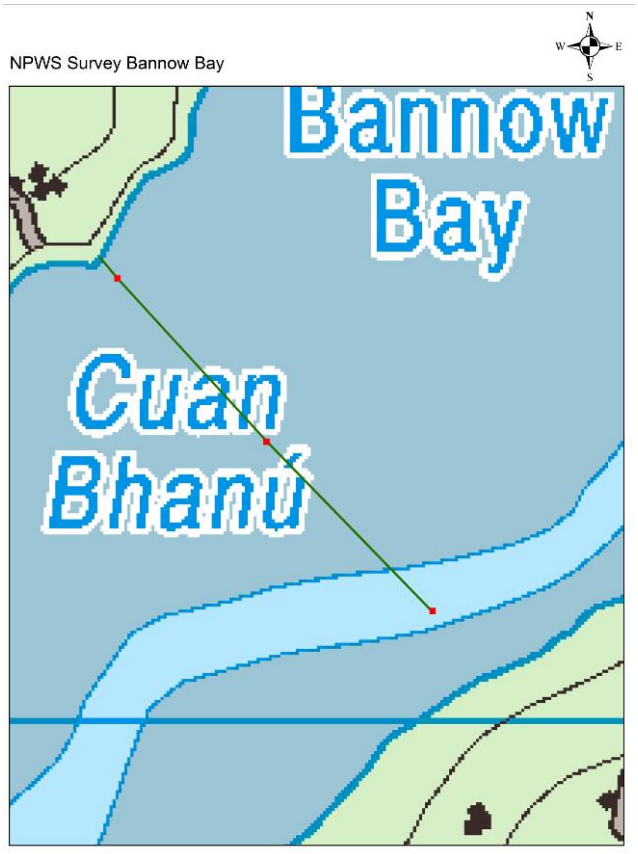


Figure 3.7.2: Transect 1, Bannow Bay

Plate 3.7.1: Bannow Bay, Transect 1. View up shore of transect from low water site.

Transect 1: Strand Line

	Orchestia gammarellus
Strand Line	274

The strandline at Transect 1 returned 274 specimens of a single species, *Orchestia gammarellus*.

T1 High

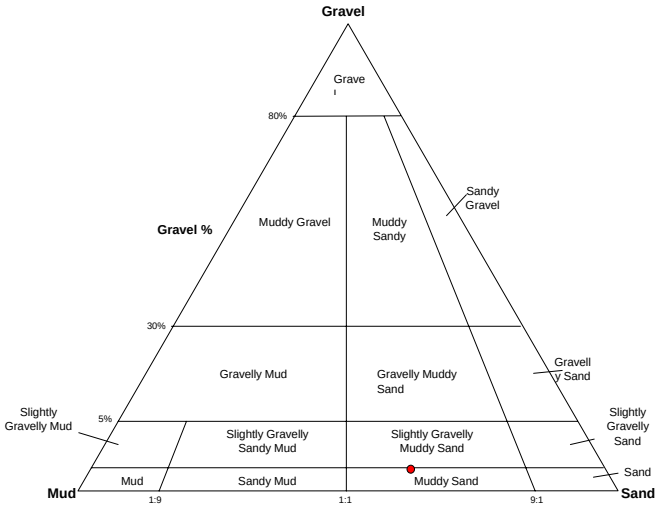
Overview of Site:

Shore Height Upper Shore
Substrate Slightly Gravely Muddy Sand

Granulometric Composition

	% Composition
Gravel	0.5%
Coarse Sand	0.1%
Medium Sand	0%
Fine Sand	18.1%
Very Fine Sand	45.2%
Mud	36.1%

	% Loss on Ignition
T1 High	5.6%



Faunal Composition

	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Hydrobia ulvae	4		1		2	3
Cerastoderma edule	4					
Macoma balthica					1	
Scrobicularia plana	112	5	4	5	5	7
Eteone longa	24	1	1	1	2	3
Glycera tridactyla			1			
Nereis diversicolor	316	33	26	20	25	20
Polydora cornuta	8	2	2	5		
Pygospio elegans	12		1	1	1	1
Streblospio shrubsolii	4	1	4	1	2	3
Ampharetidae			1	2		
Tubificoides benedii	48	6	1	6		4
Tubificoides pseudogaster				1	2	
Abludomelita palmata						1
Carcinus maenas		2	1	1		1
Crangon crangon		3	6	3	4	12
Orchestia gammarellus		1				
Cyathura carinata		1				

Station Description

Distance from shoreline: 35m

This station was located approximately 35m from the start of the transect. The sediment was characterised as muddy sand. Occasional *Enteromorpha* was evident on the sediment surface (5%). Diatoms were evident on the sediment surface.

Plate 3.7.2: Bannow Bay, Transect 1. Upper shore site showing diatoms on sediment surface.

Plate 3.7.3: Bannow Bay, Transect 1. View along upper shore site.

T1 Mid

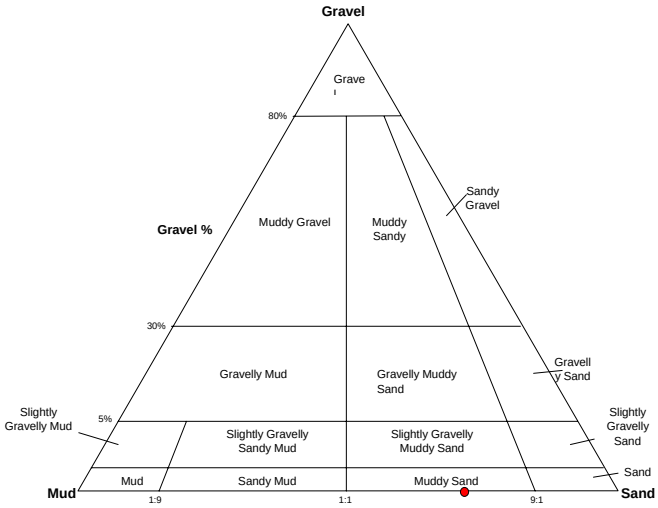
Overview of Site:

Shore Height Mid Shore
Substrate Poorly Sorted Muddy Sand

Granulometric Composition

	% Composition
Gravel	0.1%
Coarse Sand	0.2%
Medium Sand	0.6%
Fine Sand	45.2%
Very Fine Sand	28.2%
Mud	25.7%

	% Loss on Ignition
T1 Mid	3.0%



Faunal Composition

	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Hydrobia ulvae				1	4	2
Cerastoderma edule	4					1
Scrobicularia plana	204	3	6	8	7	4
Mya arenaria	4					
Eteone longa	4			1		
Nereis diversicolor	124	10	18	12	7	10
Nephtys hombergii					1	
Polydora cornuta		3		1	2	1
Pygospio elegans	4	4	3	2	2	1
Streblospio shrubsolii				1	1	
Heteromastus filiformis				1		1
Heterochaeta costata	20					
Tubificoides benedii		1	3	9	9	3
Tubificoides pseudogaster	4	1	1	7	7	
Carcinus maenas	4					
Crangon crangon	4					
Neomysis integer	4					
Cyathura carinata	4	2	2	2	4	3

Station Description

Distance from shoreline: 350m

This sediment at this station was dominated by muddy sand. The anoxic layer was present at 1 cm depth, and presented as a black layer. There was evidence of standing

water present on the sediment surface. No *Arenicola* casts were visible on the sediment surface, although a large number of *Scrobicularia plana* holes were visible. Diatoms were evident on the sediment surface.

Plate 3.7.4: Bannow Bay, Transect 1. View of sediment at mid-shore site.

Plate 3.7.5: Bannow Bay, Transect 1. View across shore at mid-shore height.

T1 Low

Overview of Site:

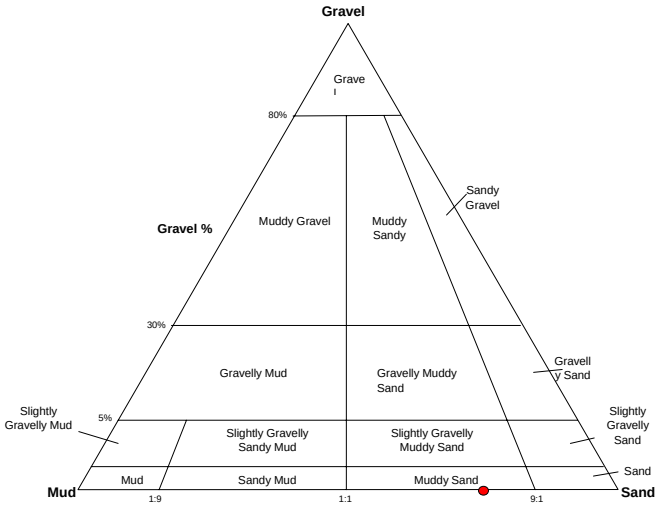
Shore Height Low Shore

Substrate Poorly Sorted Muddy Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	0%
Medium Sand	1.2%
Fine Sand	37.9%
Very Fine Sand	39.4%
Mud	21.5%

	% Loss on Ignition
T1 Low	3.4%



Faunal Composition

	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Scrobicularia plana	6				2	1
Nereis diversicolor	26		1	2		
Pygospio elegans				2		
Tubificoides benedii		2		1		
Neomysis integer			2	2	1	
Orchestia gammarellus					1	

Station Description

Distance from shoreline: 680m

The sediment at this station was characterised as muddy sand, with dead *S. plana* shells evident on the sediment surface. Bird tracks on the sediment surface indicated recent bird activity at the site. The anoxic layer was present at 1cm.

Plate 3.7.6: Bannow Bay, Transect 1. View of sediment at low-shore site.

Plate 3.7.7: Bannow Bay, Transect 1. View across the shore at low water.

Bannow Bay – Transect 2

Date: 11/09/2007

Transect Length: 900m

Overview of Transect:

This transect was located along the eastern shore of Bannow Bay and measured approximately 900m in length. The transect is backed by a 6 meter high cliff wall, bordering this is a gravel/cobble shoreline which extends 7 meters from the base of the cliff. Immediately below this is bedrock which is covered by a dense bed of *Ascophyllum nodosum* and *Fucus vesiculosis*. This *Ascophyllum*/*Fucus* bed measures approximately 21m in length. This then gives way to a muddy sand shoreline which extends to low water where fine sand dominates. *Arenicola marina* casts are present across all the shoreline, with numbers ranging from 1-2 per square meter along the upper reaches of the transect to 5-10 per square meter along the mid-shore section and 1-2 per square meter at low water. In addition, an extensive *Enteromorpha*/*Vaucheria* bed is present across the upper and mid sections of the transect. Evidence of oyster culture is present in this area, with oyster trestles visible within 50 meters of the transect at mid-shore.

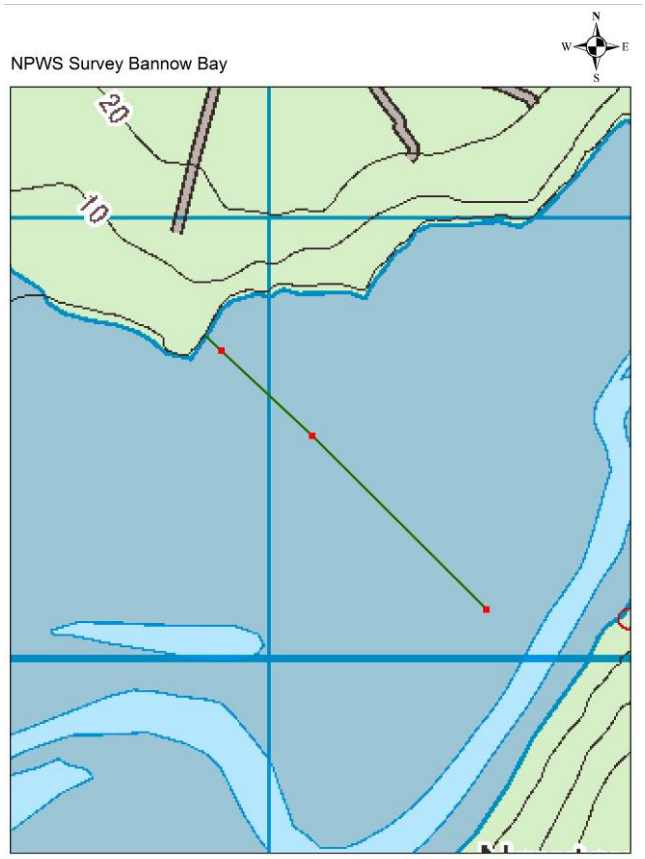


Figure 3.7.3: Transect 3, Bannow Bay

Plate 3.7.8: Bannow Bay, Transect 2. Cliff face present which backs onto Transect 2.

Plate 3.7.9: Bannow Bay, Transect 2. View down shore of Transect 2 across the *Asscophyllum/Fucoid* zone.

Transect 2: Strand Line

	Orchestia gammarellus
Strand Line	86

The strandline at Transect 2returned 86 specimens of a single species, *Orchestia gammarellus.*

T2 High

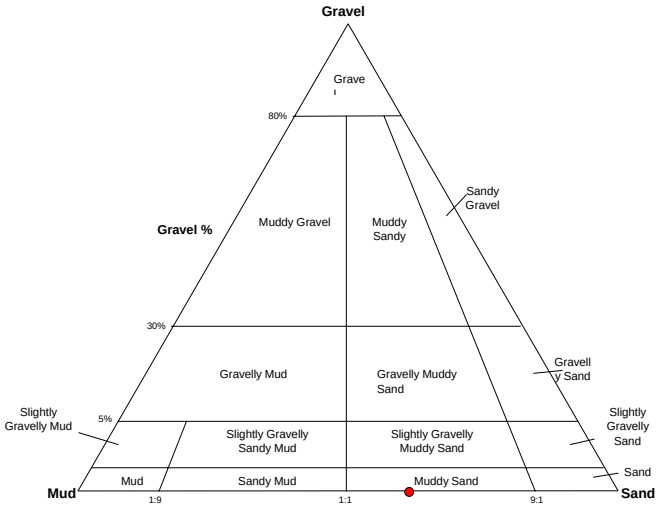
Overview of Site:

Shore Height Upper Shore
Substrate Poorly Sorted Muddy Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	0%
Medium Sand	1.1%
Fine Sand	26.8%
Very Fine Sand	34.8%
Mud	37.4%

	% Loss on Ignition
T2 High	9.2%



Faunal Composition

	Obs (1m)	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Hydrobia ulvae			3	2			
Alderia modesta			1		3		
Cerastoderma edule							1
Macoma balthica			1				
Scrobicularia plana		4	1	1			
Mya arenaria		2					
Nemertea indet.			1				
Arenicola marina	2						
Eteone longa		1	2			1	1
Nereis diversicolor		30	7	20	25	14	3
Nephtys hombergii		9	1			2	4
Polydora cornuta					1		1
Pygospio elegans		2	24	9	13	22	27
Capitella capitata (complex)				2			
Mediomastus fragilis							1
Manayunkia aestuarina				1	4		3
Paranais litoralis			2	4	2	1	1
Tubificoides benedii		9	22	8	10	40	13
Carcinus maenas		1					
Crangon crangon		2	2	1			
Gammarus locusta			2			1	
Neomysis integer			1	1			1

Station Description

Distance from shoreline: 45m

This station was located approximately 20 meters from the edge of the *Ascophyllum/Fucus* bed bordering the soft sediment. The sediment was muddy sand and covered with a thin layer of green algae, identified as *Vaucheria* sp. The anoxic layer was present just beneath the surface of the sediment and a strong sulphide smell was evident. The surface sediment structure was best characterised as a 'lunar landscape' with irregular patterns present on the sediment surface. Water coverage was 60%. *Arenicola* casts were present (1-2 per square meter) although no *Arenicola* were recovered in the 1m dig.

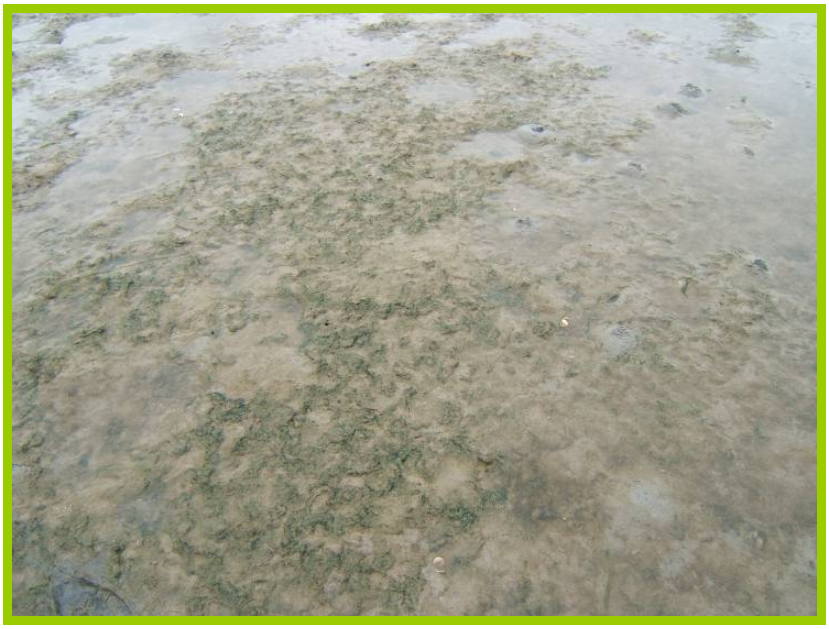


Plate 3.7.10: Bannow Bay, Transect 2. Upper shore site showing *Vaucheria* on the sediment surface.

T2 Mid

Overview of Site:

Shore Height Mid Shore
Substrate Poorly Sorted Muddy Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	0%
Medium Sand	0%
Fine Sand	61.2%
Very Fine Sand	18.1%
Mud	20.7%

	% Loss on Ignition
T2 Mid	1.8%

Faunal Composition

	Obs (1m)	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Hydrobia ulvae			3	2			
Cerastoderma edule		1			1		
Macoma balthica		2					
Scrobicularia plana					1		
Eteone longa			1		1	2	
Nephtys hombergii		7	1	3	2	4	2
Scoloplos armiger							4
Pygospio elegans			43	39	45	86	36
Arenicola marina	5-6	1					
Paranais litoralis			1		1		
Carcinus maenas						1	
Corophium volutator			1		1		
Gammarus locusta					1		

Station Description

Distance from shoreline: 340m

This sediment at this station was dominated by muddy sand. The anoxic layer was present between 1-2cm depth, and a strong sulphide smell was evident. There was a significant amount of standing water present within this area, with ~60% of the sediment covered with a thin layer of standing water. Oyster trestles were present 50 meters from the location of this sampling position, although there was no obvious influence of aquaculture activity on this sampling location. Similar to the upper shore

site, the sediment was covered with a thin layer of green algae, identified as *Vaucheria* sp. In addition, open cockle shells were present on the sediment surface. Diatoms were evident within the standing water. *Arenicola* casts were present (5-6 per square meter – occasionally more).

Plate 3.7.11: Bannow Bay, Transect 2. Mid shore site showing *Vaucheria* and cockle shells on the sediment surface.

Plate 3.7.12: Bannow Bay, Transect 2. Oyster trestles present along Transect 2.

T2 Low

Overview of Site:

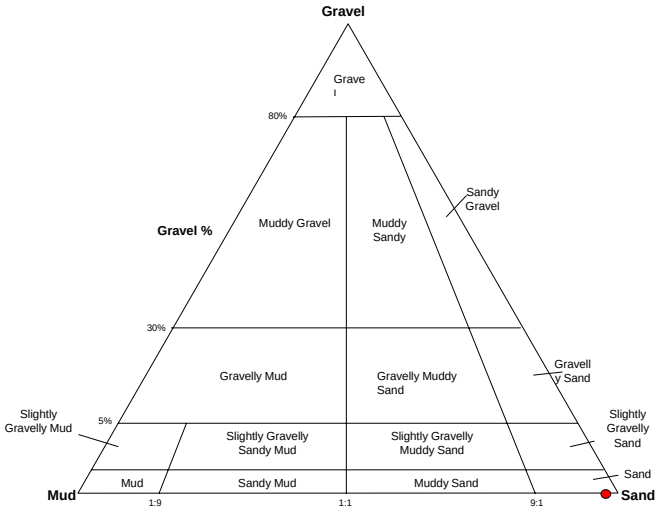
Shore Height Low Shore

Substrate Very Well Sorted Fine Sand

Granulometric Composition

	% Composition
Gravel	0%
Coarse Sand	0.2%
Medium Sand	2.0%
Fine Sand	91.5%
Very Fine Sand	4.8%
Mud	1.7%

	% Loss on Ignition
T2 Low	1.1%



Faunal Composition

	Dig (1m)	Rep A	Rep B	Cores Rep C	Rep D	Rep E
Hydrobia ulvae		2				
Cerastoderma edule					2	
Angulus tenuis	3			1		
Macoma balthica					1	
Glycera tridactyla	1					
Arenicola marina	2	2				
Nephtys hombergii	2		1	1	1	
Scoloplos armiger	2		4	4	1	3
Pygospio elegans						2
Spio martinensis			2		4	
Crangon crangon				1		

Station Description

Distance from shoreline: 890m

This station was present adjoining the main water channel which runs through Bannow Bay. The sediment was characterised as fine sand, with the anoxic layer present at 5cm depth. Large sand ripples were evident at this station, with standing water evident between the ripples. *Arenicola* casts were present (1-2 per meter).

Plate 3.7.13: Bannow Bay, Transect 2 Low water site showing sand ripples and extensive standing water between

Bannow Bay – Transect 3

Date: 12/09/2007

Length of Transect: 575 meters

Overview of Transect:

This site was located along the southern shore of Bannow Bay, running from Bannow Island in a northwest direction. The shore was backed by 2 – 3 meter raised soil cliff and agricultural land, with a gravel/cobble intertidal section 15 meters long adjacent to the cliff. This then gives way to a sand and gravel shoreline, which is dominated by the green algae *Enteromorpha intestinalis* and the fucoid *Fucus vesiculosis*. There is a wide channel (~1 meter deep) which crosses the transect at 35 meters. Immediately across this channel there is a gently sloping area which was characterised by sandy deposits over gravel. In areas where no sand was present, there were water pools in place. This area was dominated by Fucoids and *Enteromorpha*. At 220m to 270m along this transect, there was an area intensively covered by fucoids and *Enteromorpha*. Beyond this, there was an area of firm, dry sand which changed to an area of soft, dry sand with gravel at 390 meters. A raised gravel bank was present at 540 meters along the transect. From here there was a sloping bank to the main channel. *Lanice conchilega* tubes were evident across the low water shore level.

Figure 3.7.4: Transect 3, Bannow Bay.

Plate 3.7.14: Bannow Bay, Transect 3. Cliff face present which backs onto Transect 3.

Transect 3: Strand Line

	Orchestia gammarellus
Strand Line	216

The strandline at Transect 3 returned 216 specimens of a single species, *Orchestia gammarellus*.

T3 High

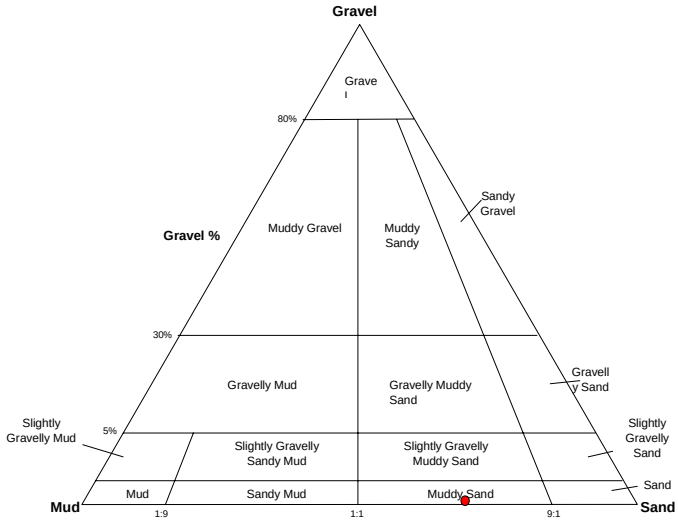
Overview of Site:

Shore Height Upper Shore
Substrate Poorly Sorted Slightly Gravely Muddy Sand

Granulometric Composition

	% Composition
Gravel	0.1%
Coarse Sand	1.4%
Medium Sand	19.6%
Fine Sand	45.5%
Very Fine Sand	5.1%
Mud	28.3%

	% Loss on Ignition
T3 High	1.5%



Faunal Composition

	Obs (1m)	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Angulus tenuis		5				1	
Macoma balthica		7	1				2
Scrobicularia plana			1				
Eteone longa			2			5	
Phyllodoce mucosa			2				
Glycera tridactyla				1		1	1
Nephtys hombergii		5	1				1
Scoloplos armiger		6	6	2	2	4	1
Pygospio elegans			9	12	23	4	14
Spio martinensis					1		
Capitella capitata (complex)				3		2	
Arenicola marina	15	3					
Tubificoides benedii				1			1
Carcinus maenas		4				2	

Station Description

Distance from shoreline: 20m

This station was immediately adjacent to the lower extent of a mixed *Enteromorpha*/*Fucus* zone present on cobble/boulders in mixed sediment and in close proximity to a channel which ran through the shore along the upper shore region. *Arenicola* casts were present in large numbers at this shore level (15 per square meter). The depth of the anoxic layer was 1cm at this height. There were large

amounts of *Fucus vesiculosis* and *Enteromorpha intestinalis* evident on the sediment surface attached to shells and stones.

Plate 3.7.15: View of sediment at Bannow Bay, Transect 3 high.

Plate 3.7.16: View across the high shore level at Bannow Bay, Transect 3 high.

T3 Mid

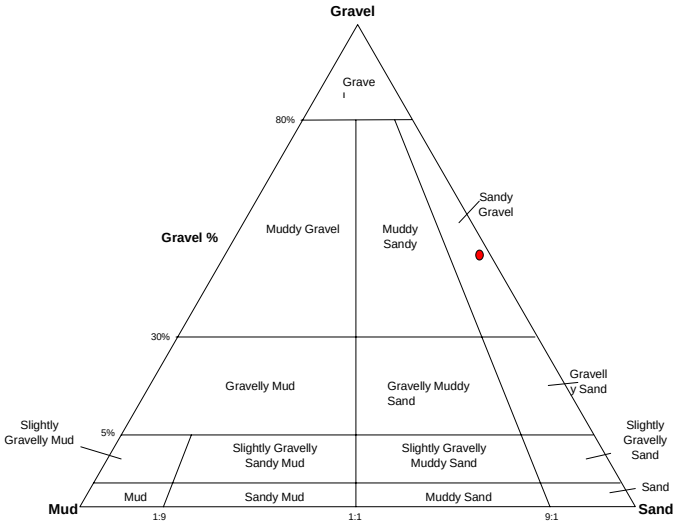
Overview of Site:

Shore Height Mid Shore
Substrate Poorly Sorted Sandy Gravel

Granulometric Composition

	% Composition
Gravel	50%
Coarse Sand	10.3%
Medium Sand	28.4%
Fine Sand	9.8%
Very Fine Sand	0.3%
Mud	1.2%

	% Loss on Ignition
T3 Mid	1.0%



Faunal Composition

	Obs (1m)	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Hydrobia ulvae						1	
Nucula nitidosa							1
Autolytus langerhansi				1			
Insect larva			1				
Gammarus locusta					2		1

Station Description

Distance from shoreline: 470m

The sediment at this station was characterised by sandy gravel. There was no evidence of fauna on the sediment surface at this location.

Plate 3.7.17: View of sediment at Bannow Bay, Transect 3 Mid.

Plate 3.7.18: View along the shore at Bannow Bay, Transect 3 Mid.

T3 Low

Overview of Site:

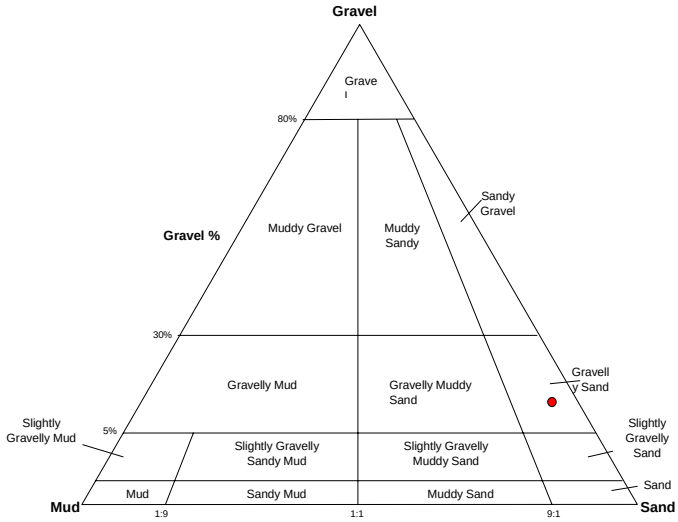
Shore Height Low Shore

Substrate Poorly Sorted Gravely Sand

Granulometric Composition

	% Composition
Gravel	13.6%
Coarse Sand	4.8%
Medium Sand	10.3%
Fine Sand	64.9%
Very Fine Sand	3.1%
Mud	3.3%

	% Loss on Ignition
T3 Low	0.9%



Faunal Composition

	Dig (1m)	Cores Rep A	Rep B	Rep C	Rep D	Rep E
Angulus tenuis		1				1
Scrobicularia plana						1
Malmgrenia marphysae					1	
Phyllodoce mucosa					2	
Eumida sanguinea			1			1
Nephtys hombergii				1	1	
Scoloplos armiger			1	4	1	
Capitella capitata (complex)		2			3	1
Heteromastus filiformis		1		3	1	1
Lanice conchilega			1		1	
Tubificoides pseudogaster			4		1	
Carcinus maenas					1	
Crangon crangon						1
Gammarus locusta		2	1		2	

Station Description

Distance from shoreline: 575m

This station was taken immediately adjacent to the main channel at low water. Sediment at this site was characterised as gravely sand. There was evidence of extensive *Lanice conchilega* tubes present on the sediment, although distribution of this fauna was patchy. No *Lanice conchilega* were present in the dig, although tubes were present in the area where the dig occurred. The site also had a relatively large

amount of *Enteromorpha intestinalis* present on the sediment surface. The depth of the anoxic layer at this site was 10 cm.

Plate 3.7.19: View of sediment at Bannow Bay, Transect 3 Low.

Plate 3.7.20: View along the shore at Bannow Bay, Transect 3 Low.

3.8 Notes on the fauna

The polychaetes and crustaceans found during the course of this survey would be considered common for Irish coastal waters, and nothing of note was found. However, two mollusc species were considered noteworthy. *Alderia modesta* would be considered rare, as there are only 20 or so records for the Island of Ireland. This species was found along the upper shore site of Bannow Bay. However, there are records of this species of mollusc occurring in Bannow Bay (2 occurrences). There are more records for *Gastrana fragilis*, but recent (post-1970) live records have been restricted to Galway Bay and along the southwest Cork coast. The remaining molluscan species would be considered common in Irish coastal waters.

4. References

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