Mount Dutton Bay Jetty
Site Report
February 2006

Team 3
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Information:

Site Name: Mount Dutton Bay Jetty, Mount Dutton Bay, South Australia

Site Identifier: 16727

File Number: 3/08/193/0037

Site Location: The jetty site is located next to the Mount Dutton Bay woolshed, 1 Woolshed Drive (off of farm Beach Road in Wangary) , Mt Dutton Bay. The jetty is approximately 52 km North West of Port Lincoln and 18km North West of Coffin Bay (reference the pamphlet).

GPS Location: Northing – 6178655, Easting - 539636

Datum: UTM

Coordinate system: WGS 84

Longitude and Latitude: latitude – 135, 25.915' Longitude 34, 31.982'

Survey Dates: February 3rd, 4th, and 5th of 2006

Divers:
Liam Scanlon
Brandy Lockhart
Sharan Bhaskar
Aaron mior

Supervisors:
Jun Kimura
Amer Khan
Jen McKinnon

Introduction:

The Mount Dutton Bay Jetty was chosen as one of three sites, for the Flinders University Maritime Archaeology Field School of 2006. The field school was made up of three underwater groups, and one terrestrial group. Each of the three groups was given a 25 by 25 meter block to survey. Each of the three blocks contained a 25 meter portion of the Jetty, as well as a portion of the surrounding area. Our group was given the 25 meter portion of the jetty closest to shore. The objective of the Mount Dutton Bay Jetty project, of the Flinders University Maritime Archaeology Field School, was to conduct a non-disturbance survey of the jetty and its surrounding area.

Objectives

The objectives of Group 3 were determined in numerous discussions pertaining to the Mount Dutton Bay Jetty Project. The main objective of the Jetty Project was to determine a 25 by 25 meter grid of the jetty and plot its physical location, as well as define the cultural materials located around the jetty. Once this was done our next objective was to catalog artifacts and discuss their social context in relation to the jetty.

Site Location:

The Mount Dutton Bay jetty site is located next to the Mount Dutton Bay Woolshed, 1 Woolshed Drive (off of farm Beach Road in Wangary), Mt Dutton Bay, South Australia. The jetty is approximately 52 km North West of Port Lincoln and 18km North West of Coffin Bay (reference the pamphlet) (See appendix for map of area). The approximate location of the jetty is; Northing 6178655 Easting 539500.

The survey conducted begins at the 27th pylon along the jetty. This area extends 25m towards the sea, at 30 degrees compass bearing, and includes 5 sets of pylons. To visually locate the boundaries of the site along the jetty figures 1 and 2 can be utilized.

Figure 1. Transect visible from the Southern most extreme of the jetty site
Photo by: B. Lockhart, 2006

Figure 2. transect visible from the Northern most boundary of the site
Photo by: B. Lockhart, 2006

Figure 1 shows the alignment of the shore in the foreground with the center of the trees in the background. This transect is located at a bearing of 340 degrees, and indicates the far extremity of the site boundary along the jetty (see figure 1 of the appendix for a site map). Figure 2 illustrates the alignment of the same shore in the foreground with the edge of the first house. This indicates the location of the Northern most portion of the site along the jetty. This transect is along a bearing of 330 degrees

Historical Background:

The Mount Dutton Bay Jetty was originally used to load raw wool onto ketches for transport to market. The Jetty itself was constructed to replace an existing lightering system which had previously been the only way to move wool from shore to shipping. Price Maurice, a prominent pastoral pioneer, began establishing leases in 1854. Over the next 25 years he acquired numerous leases and established control over a vast area of the Eyre peninsular.

Figure 3. The lightering system used prior to the construction of the jetty (Khan 2006)

This rapid growth put pressure on the lightering system. In 1880, possibly as a result of new lease acquisitions in 1877, plans were draughted for the construction of a jetty in immediate proximity to his shearing facility. It is uncertain whether construction was

completed in the same year, but the Jetty was certainly functional by 1881. This allowed for the transport of processed wool directly from the shearing point to shipping, increasing the efficiency of the operation.

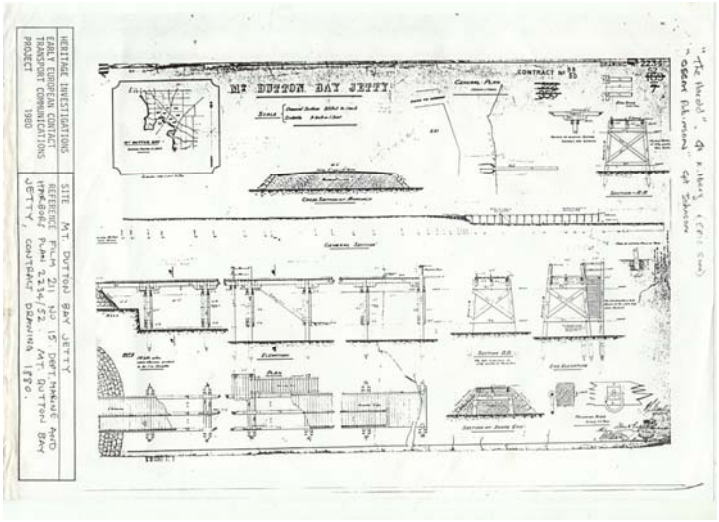

Figure 4. Mount Dutton Bay Jetty contract drawing, see also appendix

The jetty was originally constructed to a length of 82 meters but was lengthened in 1911-12 to 207 meters to allow for vessels of greater draught to access the wool supplies. The jetty continued to be used as a hub in the wool industry until 1954 when its commercial use came to a close. The Jetty continued to be used for non commercial activities such as fishing and boating until 1979 when it was badly damaged by fire. It was added to the state heritage register in 1983 and refurbished in 1986. (Khan 2006)

Figure 5. Historical photo (photographer unknown, 1963)

Throughout its working life and beyond the Jetty has provided an important linkage between land and sea and a focal point for commercial, recreational and social activity. It is still used today for leisure activities including fishing and boating.

Equipment

Dive equipment used included: BCD, regulators, dive computers and gauges, underwater knife, fins, boots, snorkel, mask, gloves, SCUBA tanks, and wet suits for cold water diving ranges from single piece 6mm to two piece 7mm.

Survey equipment used included: star pickets for baseline datum points, tent pegs for boundary of area surveyed, Sokkia Set 5F Total Station, GPS units (Garmin MAP76, Garmin 76, and Garmin 72), mallets to hammer datum and boundary points securely into the underwater environment, orange survey tape to identify datum and boundary markers,

lead lines to define the boundary of the survey area, 50m measuring tapes to run between the baseline datum points, 30m and 8m measuring tapes for surveying jetty pylons and artifacts located in the survey area, and underwater compasses.

Photographic equipment used included: Olympus C730 digital camera with Ikelite underwater housing, scale of a length of 25cm in 5cm increments, and a white plastic North arrow

Other equipment used included: mylar underwater writing sheets, pencils, laptop computers, and stainless steel carabiner clips.

Methods:

Mud Map: The initial process of surveying the Jetty was the creation of a mud map. This allowed a visualization of the structures and artifacts within the site boundaries. The mud map was used as a rough sketch of the area, there was a limited amount of information on the first mud map. As the survey progressed a variety of mud maps were created, each showing specific details, such as artifact locations, and areas of interest. The information from each mud map was entered into the original copy, allowing for an updated master mud map. The mud map was useful in planning the survey of the Jetty site.

Planning: A visualization of the site through the mud maps allowed a survey plan to be developed. The overall goal was loosely defined at the start of the project. As the project progressed the final goal became clearer, and the survey efforts became more focused. The planning sessions were an important process of the jetty survey, it allowed for the greatest amount of information to be recovered in an efficient manner. Planning sessions were held at the end of each day. This time was used to discuss the successes

and failures of the day's dives, as well as plan the dives of the next day. This process allowed goals to be clarified, and kept the project as a whole in a specific direction.

Baselines: The most important process to the jetty survey was to lay out two baselines. Each baseline was located on either side of the jetty, and ran parallel to it. The baselines were 25 meters long, and ran the length of the site. These baselines allowed the site to be divided into 3 sections, the first was the east third of the jetty, the second was the third located under the jetty, and the final third was the west side of the jetty (Fig 1).

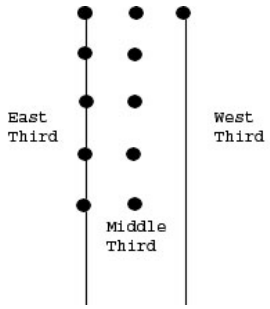

Figure 6. 3 portions of the jetty, and the two baselines (not to scale).

Each base line was used to measure and map the jetty and its surrounding area. All measurements of the jetty are tied into these two 25 meter baselines. The methods of measurements originated from the baseline, but the method varied with the situation.

Swim lines: Swim lines were performed to locate artifact scatter within the site area. Each buddy pair was given a portion of the jetty to inspect. Artifacts were then flagged with flagging pins, and noted on secondary mud maps. The location of artifacts was an important piece of information that allowed accurate planning on future dives.

Tri-lateration: Tri-lateration was used to measure the most crucial aspects of the jetty, the structure as a whole. All 11 pylons of the jetty were mapped by tri-lateration, as this was an extremely accurate method. The east base line was used to map all 11 pylons. This was done in two dive groups, each handling one portion of the jetty. The tri-lateration method was also used to map more permanent artifacts, such as large wooden planks. The tri-lateration method was complicated and required intensive planning before dives. One of the most successful methods was to use 2 divers, see Fig 2. One of the divers held a tape measure at the first measuring point on the baseline (P1). The other swam to the object being measured, and laid a tent peg at the point of measurement. Once the first measurement (M1) had been taken the diver swam back and the tape was moved to the second measuring point on the base line (P2). The diver then once again swam out and took the measurement (M2) to the peg that had been laid out at the point that was being measured. This method allowed two dive groups to perform their tasks in unison, and made dives more efficient.

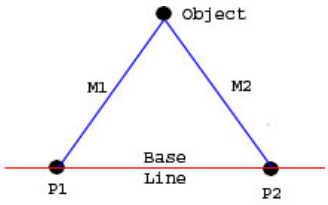

Figure 7. Tri-lateration measurement technique

Baseline offset: The baseline offset method was used to measure in less permanent artifacts, such as bottles. The baseline offset method was less accurate than the tri-lateration method, and could be performed quicker. The objects to be measured and the baseline they were to be measured from were chosen from the mud map, and were given an order of importance. The process of measurement was fairly simple and could

be accurate when the visibility was good. The process involved one member of a buddy pair swimming out with the end of the tape measure to a flagged artifact, see Fig 3. The other member held the tape measure to the base line (P1). Two measurements were taken, one on the intersection point of the baseline (P1), and the other was the distance to the artifact from the baseline (M1). These two measurements give a fairly accurate spatial representation of an object within the site boundaries. This method allowed for numerous artifacts to be measured in a fairly short period of time.

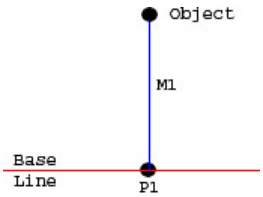

Figure 8. Baseline offset measurement technique.

Total Station: The Total Station was used to get accurate positions of key points along the jetty and the datum points, in relation to the Geodetic survey monument established in 1872. The total Station survey of the pylons and four datum points was performed by a pair of divers in conjunction with the terrestrial team. One diver was placed on the Jetty, and kept in communication with the terrestrial team, who operated the Total Station. The second diver was located in the water, holding the Prism pole. Total Station points were shot on all 11 pylons, and the four datum points. The measurements of the datum points gave us accurate spatial measurements for our baseline end points. This allowed all the artifacts measured from the baseline to be tied into the Geodetic survey monument of 1872. Since the surveyors coordinates are not available for the survey monument established in 1872, GPS coordinates were created to place UTM WGS84 coordinates on the control points.

The total station data was calculated using three control points located in relationship to the Jetty surveyed area. On February 5, 2006, three sets of GPS coordinates were surveyed on the total station control points at times of 12noon, 6pm, and 10pm. This was used to take an average of coordinates produced at different times of the day.

Three different types of GPS units were employed for the survey of the total station control points to aid in the accumulation of data which could then be averaged to produce an overall mean coordinate for each total station control point. The three GPS units employed were the Garmin MAP76, Garmin 76, and the Garmin 72. These single receiver GPS units have the WAAS capability to help correct for the atmospheric interference.

Using the bearings and distances produced from the total station data on February 5, 2006, and the averaged GPS coordinates for the total station control points, GPS coordinates in the datum of UTM, using the coordinate base of WGS 84 (Zone 53 H), were calculated by inputting the bearings and distances into a program called ICG, which is a land survey program designed to produce true coordinates in relationship to total station data. It should be noted that the total station distances were recorded as slope distances instead of horizontal distances, although since the measured distances are less than 200m the slope distances will be used in place of horizontal ground distances.

Using the UTM WGS84 coordinates calculated by using the survey program ICG, the coordinates were then inputted onto a scaled map of the survey area of Group 3 on the jetty proper using a mapping program called OziExplorer. Using the UTM WGS84 coordinates, the scaled map of the area was calibrated to produce a scaled map depicting all artifacts and jetty pylons surveyed. By moving the cursor on this map UTM WGS84 coordinates can be defined for any area on the scaled OziExplorer map provided.

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Photography: Photography was used to record artifacts and activity on the Jetty project. A photographic record of artifacts was made both on land and underwater. The artifact images underwater recorded their position in situ for future reference. The recovered artifacts were photographed on land in their cleaned state for posterity. There was also a photographic record made of activity on the Jetty site. Many of the images were taken by supervisors, as divers were performing their work. The images are meant to be an accurate representation of work performed on jetty site that can be reviewed by future researchers.

Deleted: GPS: The GPS system was used on multiple points along the jetty and on the geodetic survey monument. This gave a geographic location to all points gathered by the Total Station. The GPS unit was taken to the top of the jetty and placed over each pylon, as this was the optimal area for satellite reception. The information gathered by the GPS system gave the jetty and all artifacts recoded a global location.¶ ¶

Artifact recovery: The recovery of artifacts was a delicate process; it was designed to ensure that artifacts were returned to their original position. The only artifacts were those that could not be identified underwater, and had to be examined closely. The process required the original position be marked and noted, and that the artifact bag contained the necessary provenience. The original locations of the artifacts were marked by pin flags that contained the same provenience information as the artifact bag. The priority of the artifact recovery process was to gain necessary information while upholding the integrity of the site.

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Drawings and sketches: Maps and drawings were an important means by which information was recorded. Maps were created of all points that were measured by baseline offsets and tri-lateration. At the end of each day all the site measurements and data were compiled and transferred into a map format. This allowed for an accurate scaled representation of the site to be made. The scale maps provided information that

was necessary to plan and execute dives. They were also an integral part of understanding the jetty in context with its surrounding cultural materials. Much of the information used to compile the maps was derived from sketches made during field time. The rough sketches provided a reference for recovered data. In addition to this artifact drawings were made of all recovered artifacts. The drawing provided a detailed representation of artifacts that could not be stored for future reference. All drawings and sketches were a physical representation of the jetty site, and its surrounding area.

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Flora and Fauna:

The survey area is host to a variety of marine life, various species of mollosk and barnacles completely encrust virtually all standing timbers below the tidal line. The jetty and surrounding sea grass form an essential element of the local echo system. The intensity of flora and fauna around the jetty when compared to the adjacent area is testament to the role both the standing timbers and the site in general play in the maritime environment.

The presence of marine life appears to be largely non destructive and may in fact have a positive effect on the preservation of the timbers beneath the encrustation. The following species were noted in the survey area.

Table 1. Marine Flora and Fauna located at the Mount Dutton Bay Jetty site.

Marine Flora or Fauna	Description
Sea Grass	Sea Grasses formed a dense carpet over much of the survey area.
Crustaceans	Sand Crab, Blue Crabs and Hermit Crabs were all very much in evidence,

	particularly on and around the standing timbers.
Molluscs	Molluscs, of various types, formed a thick encrustation on virtually all standing timbers.
Fish	With the exception of small schools of bait, fish were not particularly active within the survey area.
Invertebrates	Jelly Fish were particularly in evidence and numerous divers sustained superficial stings. Blue Ringed Octopi were also an issue being present in large numbers and most particularly within broken bottles and jars within the survey area.

Figure 8. Typical crab found at the Mount Dutton

Figure 9. Sea grasses, and barnacles found at the jetty site

Figure 10. Octopus found at the jetty site

Results:

Table 1. Total dive hours on the Mount Dutton Bay Jetty project

Name	**Dive Hours**
Aaron Mior	10h 41min
Sharan Bhaskar	6h 43 min

Liam Scanlon	6h 29 min
Brandy Lockhart	10h 50min
Total	**34 hours 43 min**

* does not include snorkel times

Site Conditions:

The diving was conducted between the dates of February 2-5, 2006. During these days the weather and site conditions varied, but was generally good. Underwater visibility did not vary to a great extent, but factors affecting this included, silt from previous divers, tides, and wind conditions.

Table 7. Daily site conditions

Date	*Conditions*	*Temperature*	*Visibility*
Feb. 2, 2006	Sunny and Clear	19˚C	Good (3m)
Feb. 3, 2006	Cloudy and Rain	19˚C	Good (3m)
Feb. 4, 2006	Sunny and Clear	18˚C	Good (4m)
Feb. 5, 2006	Cloudy and Wind	18˚C	Good (4m)

Table 8. Tide tables during the survey

Date (2006)	Time of High Tide	Height of High Tide	Time of Low Tide	Hieght of Low Tide
Thursday Feb. 2	6:08am	1.49m	1:17pm	0.26m
	6:35pm	1.09m		
Friday Feb. 3			1:04am	0.39m
	6:20am	1.31m	1:20pm	0.27m
	6:51pm	1.20m		
Saturday Feb. 4			1:31am	0.49m
	6:30am	1.15m	1:18pm	0.24m
	7:15pm	1.28m		
Sunday Feb. 5			1:59am	0.62m
	6:33am	1.02m	1:19pm	0.20m
	7:44pm	1.31m		

Discussion:

Jetty Survey:

The survey of the jetty structure itself was primarily conducted to allow the construction of an accurate site plan, however it also provides insight into the history,

development and decay of the structure as well as its social significance. Clear evidence has been found of the 1960 survey work, most notably the widening of the existing structure. Construction and degeneration are also visible in associated artefact deposits. Evidence takes the form of construction materials such as concrete bolts and jetty timbers. Older deposits have likely been carried away by the current or concealed beneath the silt.

Artefact Analysis:

The examination of artefacts observed within the survey area can be broken down into two general categories. Analysis of individual artefacts and analysis of the artefact scatter as a whole. Both of these techniques allow conclusions to be drawn about the survey area and its usage.

Individual Artefacts:

The artefacts within the area vary dramatically in both size and usage. Predominantly the artefacts are of modern inception, a clear indication of continuing usage. A green glass bottle commonly associated with the Depression era (REFERENCE) continues to reinforce this conclusion. The survey also located a possible black glass bottle, potentially even older than the green glass bottle, this also demonstrates long term use of the Mount Dutton Bay jetty.

Numerous modern beer bottles and fishing equipment clearly show that the jetty has been used in more recent times for leisure activity. The survey did not uncover items which could indicate whether or not this has come about after the jetties commercial

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demise. It is possible that the jetty has always been used recreationally but due to lack of evidence this remains conjecture.

The survey also uncovered evidence of the evolution and decay of the jetty itself. Close investigation of the jetty revealed areas with remnants of green paint, the survey of the area underneath the jetty uncovered a timber with the same colour of paint attached to it (figure 11). Another example of construction and or degradation associated artefacts can be seen from the cement covered bolt recovered for illustration and photos (see figure ????). Observation of the pylons themselves clearly shows the decay, and subsequent refurbishing.

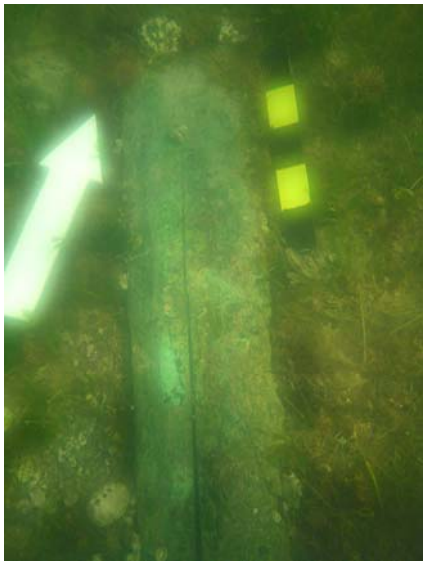

Figure 11. Plank with green paint matching traces on the jetty

Artefact Scatter:

The overall artefact scatter shows a clear clustering of artefacts in the south western corner of the survey area, while virtually nothing was sighted on the eastern portion of the jetty. This is however more likely indicative of a corresponding current

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rather than a deliberate discard pattern. A search for heavier and less current dependant items using metal detectors is one potential approach for ascertaining this.

Recommendations:

The Jetty's continued use, even in periods of official closure, is proof that it is already appreciated as a valuable social and cultural site within the local area. Measures to increase awareness of its historic significance could include increased signage and public information at and near the jetty. Increased integration with the current Woolshed heritage site would also prove beneficial as this would provide another avenue for information about the jetty to reach the wider public.

The overall condition of the site appear stable and in no immediate danger of rapid deterioration.

Reference section:

Khan, A. 2006, 'The Archaeology of jetties', paper presented at Flinders University Maritime Archaeology Field school, Mount Dutton Woolshed, 2nd – 14th February.

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<#>Compare artifacts discovered with those discussed in Marks book that are often associated with jetty sites¶
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<#>What type of jetty could this be, pile driven or screw driven? See Amer¶
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Appendix - ***Brandy***¶
site maps¶
artifact drawings¶
mud maps¶
photos¶
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