A preliminary underwater survey of Legoe Bay, Lummi Island, Washington

Daniel L. Boxberger
Department of Anthropology, Western Washington University Bellingham, WA 98225, USA

Introduction
In April and May of 1984 a crew of archaeology students* under the direction of Daniel L. Boxberger, Instructor, Department of Anthropology, Western Washington University, began an investigation of the underwater remains of an ancient Coast Salish fishing station located near Village Point, Lummi Island, Washington (45 WH 94). The purposes of this project were twofold: (1) to develop and test methodology whereby underwater field surveys of reef net sites may be conducted, and (2) to gather data concerning the extent and antiquity of this particular method of fishing, i.e. 'reef netting'.

The results of this project were much less than anticipated but worthwhile information was collected relative to the pursuit of similar, future projects. The following report will outline the methodology developed and discuss the relevance of the data collected.

Reef netting
By far the most important economic activity of the Straits branch of the Coast Salish of the North-west Coast Culture area prior to white contact was reef netting. Reef netting is a unique method of fishing designed to intercept the annual runs of sockeye salmon during their migratory pass through North Puget Sound and the Gulf of Georgia on their way to the Fraser River watershed in Canada, where they spawn.

The runs generally pass through the Lummi Island area in July and August. There are no streams in Puget Sound which support significant runs of sockeye, and the reef net represents a highly specialized technique that perhaps developed from more widespread methods used in the Northwest Coast Culture Area. This adaptation was designed to gain access to an otherwise unavailable resource (Kew, 1976: 13-14).

In brief, the reef net was designed to simulate an underwater reef. A long net (the 'lead') resembling a ladder, was strung from anchors on the bottom to the surface at an angle, and often bunches of surf grass were attached. The sockeye salmon, generally coming in schools, would see this lead net and mistaking it to be the ocean bottom, would follow it up into an ever-narrowing net. At the end of the lead the fish would pass into another, smaller net strung between two canoes (see Fig. 1). The captain would give the order and the crew would begin hauling the net, swinging the canoes together and dumping the captured fish into one or the other canoe. The fish would then be taken to shore where the women would prepare them for drying. When properly processed the fish would be stored away for winter use.

The reef net gear had to be made anew each year, the crew members and their female kin each making a section of the net which the captain joined together. The nets were made of cedar and/or willow fibre. The anchors also had to be set anew each year and therefore the remains of the anchors are the artifacts that may be discovered using systematic underwater survey techniques.

Suttles (1951: 167) describes the traditional method of setting of the reef net anchors.

Setting the anchors was called 'dropping rocks' (K'engailes). It was a strenuous undertaking that required the cooperation of the whole crew and perhaps several crews. It also required a careful study of the tides.

*The highly capable and energetic crew consisted of: Peter Harvey, head diver; Pat McCutcheon and Mark Jones, divers; Lynne Stretch, Mary Erwin, and James Sterling, ground crew.

0305-7445/85/030211 + 06 $03.00/0 © 1985 The Nautical Archaeology Trust Ltd.
because it was easiest and most economically done at the lowest tide before the run.

The anchors were large beach rocks that each took two to four men to lift. The crew tied cedar-withe ropes around each rock and made them into a ring. They put planks across two canoes and loaded the rocks onto them. The captain stood off and supervised the setting of the anchors. They dropped the line with only one rock on it first; then when the captain gave the word that the position was right, they slipped the line through the rings of other rocks and slid them down the line until it held. It took 10 or 12 rocks for each anchor.

There were at least 10 reef net sites at Village Point recorded ethnographically and very likely many more prior to white contact. Village Point was the second largest of the twenty or so reef net sites in the San Juan and Gulf Islands, only second to Point Roberts in the number of gears that fished there.

Every reef net site had an owner who inherited the right to the site from either his father's or his mother's line. The owner would retain a crew from six to twelve men and the season's catch would be divided evenly among them with the site owner keeping a slightly larger share for himself (Suttles, 1951: 160). Being a reef net owner was a highly prestigious position and generally only upper-class individuals would have claim to a site. Present day Lummi still know who has rights to which site, although the Lummi Tribe outlawed the individual ownership of fishing locations in the 1930s (Boxberger, 1980: 51).

The catch was distributed to everyone who participated. A single day's catch might be a considerable number of fish. J. A. Kerr (1917: 60) reports that as many as 3000 fish might be taken in a single run of the tide and Rathbun reports of reef net gears at Lopez Island that were said to be capable of taking an incredible number of fish.

There is a small but productive reef inside of Iceberg Point at the southern end of Lopez Island, on which a few nets are used, and where daily catches of 3000 to 4000 salmon are sometimes made (Rathbun, 1900: 315).

Given the estimate of at least thirty reef net
gears in total, at the time of contact, a minimum labour force of one hundred and eighty men would be required to operate the gears (using the lesser number of six in Suttles’ estimate of crews consisting of six to twelve men.)

The United States government estimate of the Lummi population in 1854 was seven hundred. It is therefore safe to assume that most, if not all, of the Lummi participated in and benefited from the reef net fishery (assuming half the population was female and half the male population was too young or too old to participate in reef net fishing). These numbers definitely illustrate the economic importance of reef netting to the Lummi traditionally.

The Lummi signed the Treaty of Point Elliott with representatives of the United States government on 22 January 1855. Article 5 of that treaty guarantees the Indian signators the right to fish ‘at all usual and accustomed places’ (Boxberger, 1979: 125). Several of the Lummi who signed the treaty were reef net site owners, and the Lummi who were present at the treaty negotiations asserted that the Lummi signators had received assurances that they would continue to hold the rights to their fishing grounds and stations, including their reef net locations (Boxberger, 1979: 39).

The Lummi utilized the Village Point reef net fishery virtually unhindered until the 1880s when commercial fish traps began to appear in the area. A few Lummi continued to reef net after the traps rendered the sites useless and more reef netted after traps were outlawed in 1934, even though the more productive sites had been taken by whites (see Boxberger, 1980; 1983). The last Lummi operated gear was in the 1950s but some Lummi continued to fish non-Indian gear until the early 1970s. By the 1930s anchors made from cement blocks had largely replaced stone anchors although there are unconfirmed reports of some individuals (both Indian and non-Indian) utilizing anchor stones as late as the 1940s.

Methodology
After preliminary meetings on 31 March and 5 April 1984, it was decided to conduct a test dive to delineate the area SCUBA divers would be most likely to locate reef net anchor stones. Dives began on 8 April 1984. Discussions with white and Indian informants had narrowed the search to the area just west of the Village Point Marina (see Fig. 2). The divers entered the water from the beach and proceeded southerly encountering the first anchor stones approximately 50 m off shore. The divers continued for over 60 m (15 m in depth) reporting that the anchor stones continued.

Further preliminary dives were made to the westward (around Village Point) and to the eastward (directly in front of the marina) in Legoe Bay proper. No anchor remains were located to the west and those located to the east were of a lesser extent than discovered in the initial dive. It was then decided to conduct the first survey in the area of the initial dive.

For a base line, rope was marked with plastic ribbon at 5 m intervals. It took six dives to place the base line, stake it down and sight it in. Some problems encountered included poor visibility (often as low as 1 1/2m), extremely strong currents, and short dive time (approx 30 min). Once the base line was in place a 5 x 5 m grid was constructed of one inch white PVC pipe. Holes were drilled at 1 m intervals along four sides such that twine could be strung through the holes thereby producing 1 m grids in which to locate the anchor stones.

The grid was moved along the base line in such a way that alternate areas could be sketched by the divers. It was found that two sometimes three, units could be completed in a dive, depending upon the number of stones located within the grid area. Sketch boards were made of 1/4 inch white plastic on which the grid outlines were permanently drawn. Wax pencils were found to work well for sketching although they tended to deteriorate rapidly underwater.

The base line was 13 intervals (65 m) long and by 6 May only 7 intervals had been plotted. The unanticipated and inordinate amount of time was taken merely preparing the base line in order to begin recording the anchor stones and then in coping with the particular environmental conditions.

In order to sight in the base line, buoys were placed to mark the end points. Two ground stations were set (see Fig. 2) and sited in to an adjacent USGS bench mark. Brunton compasses were used to site in the buoys and later transit readings were made to cross check the compass readings.

It was found, towards the end of the project,
Figure 2. Sketch plans of site and project area.
that the base line was deteriorating and becoming fouled with seaweed. The sketches were completed before the line became totally useless but the line, after the intervening winter months, will undoubtedly no longer be in place. Therefore an iron re-bar was placed at each end of the base line for future reference.

A cursory review of published material on underwater archaeology (Bass, 1966; Taylor, 1969; Muckelroy, 1980) was of assistance in developing the methodology for this project. Most of the work in underwater archaeology has dealt with shipwrecks, not with the remains of fishing devices in an underwater area that was of concern in this project, but similar types of conditions were encountered. The method described above is similar to that outlined by Wilkes (1971:162–164) and was found to be adequate for the purpose and will be employed in any subsequent stages of the project.

Comments on the nature and extent of the reef net area

The accompanying plan show the data gathered during the preliminary phases of the project. It is clear that the stones fall into recognizable patterns although specific individual locations cannot as yet be delineated. It is suggested that the long history of activity in the area, first from commercial fishing operations and more recently from modern reef netting may have disturbed the remains.

It is interesting to note that the stones appear to be somewhat angular in shape. This would make sense in terms of the manner in which they were used. Suttles reports that the stones were tied around with cedar-withe ropes and it would seem likely that the rope would stay in place better on rectangular stones. This appears to be the shape that was selected. Measurements have shown that the stones fall within a narrow size range. Of 202 measureable stones (out of 209 stones within the survey area) the median width was 0.35 m and the median length was 0.55 m out of a length range of 0.35 m to 1.70 m.

It is difficult to say, with any degree of certainty, to what extent the area about Legoe Bay was utilized by traditional reef netters. The survey area was extremely limited and further work is needed to ascertain the extent of the traditional fishing grounds. It would be useful
to coordinate future underwater work with land-based excavations at the adjacent archaeological site (45 WH 94) to place the underwater component into context with the habitation area of the reef net fishermen.

It is inappropriate, at this time, to hazard a guess regarding the antiquity of reef netting based on the limited data available. Far fewer stones were found on the bottom than would be anticipated had the reef net method considerable antiquity. However, it must be noted that the anchors are located in an area with an unstable bottom. Anchor stones of considerable age are likely to have sunk out of site. To test this hypothesis a one-metre probe was used in random places within the grid and, without exception, every probe located stones beneath the surface of the sea bottom. Therefore, it would be difficult, if not impossible, to ever determine the actual number of anchor stone remains. However, those stones that can be located will give an idea of the extent of the area utilized by the traditional reef net fishermen.

Conclusions
Further work is definitely needed to document the extent of the traditional reef net fishery at Legoe Bay and the other reef net fishing sites. Rozen (1981) conducted preliminary survey work at Point Roberts and also suggested that systematic underwater surveys are in order. With the knowledge gained from this preliminary project further research should proceed much more quickly. Because the Legoe Bay reef net fishery was the second largest it should be possible to survey the majority of the other reef net locations in far less time. Test excavation of adjacent archaeological sites could yield valuable information concerning the traditional use of these unique fishing locations and it is hoped that further work will include land-based research as well.

References
Bass, G. F., 1966, Archaeology under water. NY.
Contributions to aquaculture and fisheries, occasional paper 1, Lummi College of Fisheries, Lummi Island.
Kew, J. E. M., 1976, Salmon abundance, technology, and human populations on the Fraser River watershed. Paper presented at the Northwest Anthropological Conference, Simon Fraser University, Burnaby, BC.
Muckelroy, K., 1980, Archaeology under water. NY.