

SETTLEMENT LOCATION DETERMINANTS: AN EXPLORATION OF SOME  
NORTHWEST COAST DATA

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The relevance of the following study of west coast data to east coast archaeology at the moment lies more in method than in conclusions. The work constitutes a first step in probing the logic of settlement location on the central portion of the Northwest Coast. Perhaps ultimately this logic can be stated in the form of an equation which, minimizing historical factors, will take into consideration several elements. These should include attributes of the locality itself such as flat ground, drainage, availability of potable water, suitability for landing watercraft, and accessibility for inter-regional trade. Also included should be proximity to food resources such as land and sea mammals, migratory and non-migratory birds, intertidal bivalves, bottom fish, and especially the anadromous fish. On the Northwest Coast one would expect that the anadromous salmon would have been of paramount importance in determining settlement location. However, the following study seems to show that on the Central Coast the massive food potential of the runs of spawning salmon has little specific local effect on archaeological site distributions.

From a distance of some 5000 km it is difficult to say what implications these findings may have for the study of East Coast settlement distributions. One would not expect that the relative importance of the various food resources on the two coasts would be exactly the same. Shellfish availability on the two coasts, although not yet systematically measured, may well be similar. One

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suspects that the cod and other bottomfish, extant in immense numbers on the Northeast Coast, may actually have been more available for harvest given aboriginal watercraft and tackle in the protected calmer waters of the Northwest Coast. Certainly the aboriginal salmon fishery on the Northwest Coast far outweighs in food value the fish harvest possible with similar technological devices on the Northeast Coast.

For the archaeologist on either coast the significance of food remains found in archaeological sites seems to be getting more and more difficult to assess as zooarchaeologists become more deeply mired in problems of sampling and as ethno-archaeologists discover the innumerable ways that dietary habits can get translated into archaeological remains. Perhaps subsistence in the archaeological record can be better studied by taking a wider view of food resources over an entire region. When looked at in this way it is clear that foods are rarely uniformly distributed. Archaeological surveys show that evidence of human use of a region is also unevenly distributed. The question asked in this study is: to what extent does variation in resource distribution relate to variation in the distribution of archaeological sites?

In the last decade an extensive, if not particularly impressive, archaeological and ethnological literature has accumulated around the theme of "catchment analysis." In the author's opinion, catchment studies are most profitably applied to groups of fixed location, such as farmers, and to peoples whose food storage and preservation practices are so weakly developed that the food obtained on a given day is usually eaten on that day. Simplistic catchment studies seem to work least well with peoples having efficient long range transportation, a long-term food storage capability, and a custom of inter-group exchange that can vastly broaden access to regional resources. These three traits, of course, are characteristic of the Northwest Coast. Taking them into consideration one might well predict that significant resources could be found outside of easy commuting distance of archaeological site concentrations. Thus, the potential for conventional "catchment" type studies on the Northwest Coast may be limited. But how can this be tested? One approach is to look at the resource base in the vicinity of a single large site. Croes and Hackenberger (1981) at the Hoko River site have been conducting a meticulous assessment of the marine and terrestrial resources within a one day commuting distance. At the Crescent Beach site Ham (1981, pers. com.) has been surveying the complex intertidal resources on the adjoining beach for comparison with his excavated samples. These are important studies but both focus only on single sites and thus cannot take full cognizance of seasonal transhumance, trade and storage.

On the Central Coast we have an archaeological survey sample that is large and reasonably complete. Unfortunately we have few quantifiable measures of the distributions of aboriginal food resources in this region. In fact, on both the east and west coasts the quality of biological inventories and assessments lags far behind that of archaeological survey. It would be most desirable to relate the full complex of food resources throughout the whole central coast study area to the total archaeological site distribution. But, with the exception of the salmon, the scarcity of biological data makes this impossible. Coastal ethnographies emphasize the preminence of salmon in coastal subsistence. The contemporary commercial fishing industry on the west coast is heavily dependent upon this valuable resource. For this reason federal agencies have been keeping detailed records of spawning streams. In fact, spawning counts for 46 salmon streams on the Central Coast have been recorded over the last 20-40 years. The number of individuals of each salmon species has been tallied each year for each stream and entered into voluminous stream catalogues. Thus, we have available on a region-wide basis detailed and reliable data albeit for only a single resource.

To address the question of the relationship between the distribution of archaeological sites and the distribution of this resource I began with the analysis of the fishery data from the inner or eastern half of the central B.C. coast, essentially the area eastward from Fisher Channel (Fig. 1). An assumption is that the relative productivity of the various streams today is similar to what it was in late prehistoric times. The analysis asks this question: to what degree are the number and kind of archaeological features in the vicinity of salmon spawning streams correlated with the modern food productivity of those streams? The potential food yield of a stream is figured by calculating a mean tonnage for each stream. This is done by multiplying the mean number of fish of each of the five salmon species as counted over a 20-40 year period by average weight for each species.

The "vicinity" of each stream is defined as a 5 km radius. This amounts to a paddle of one or two hours in a canoe or a walk taking about the same time, in other words, the range within which it is possible to travel out, collect the resource, and return in one day.

Correlation coefficients relating these mean salmon weights to the number of archaeological features within a 5 km radius of each of the counted streams on the eastern portion of the Central Coast were computed (Table 1).

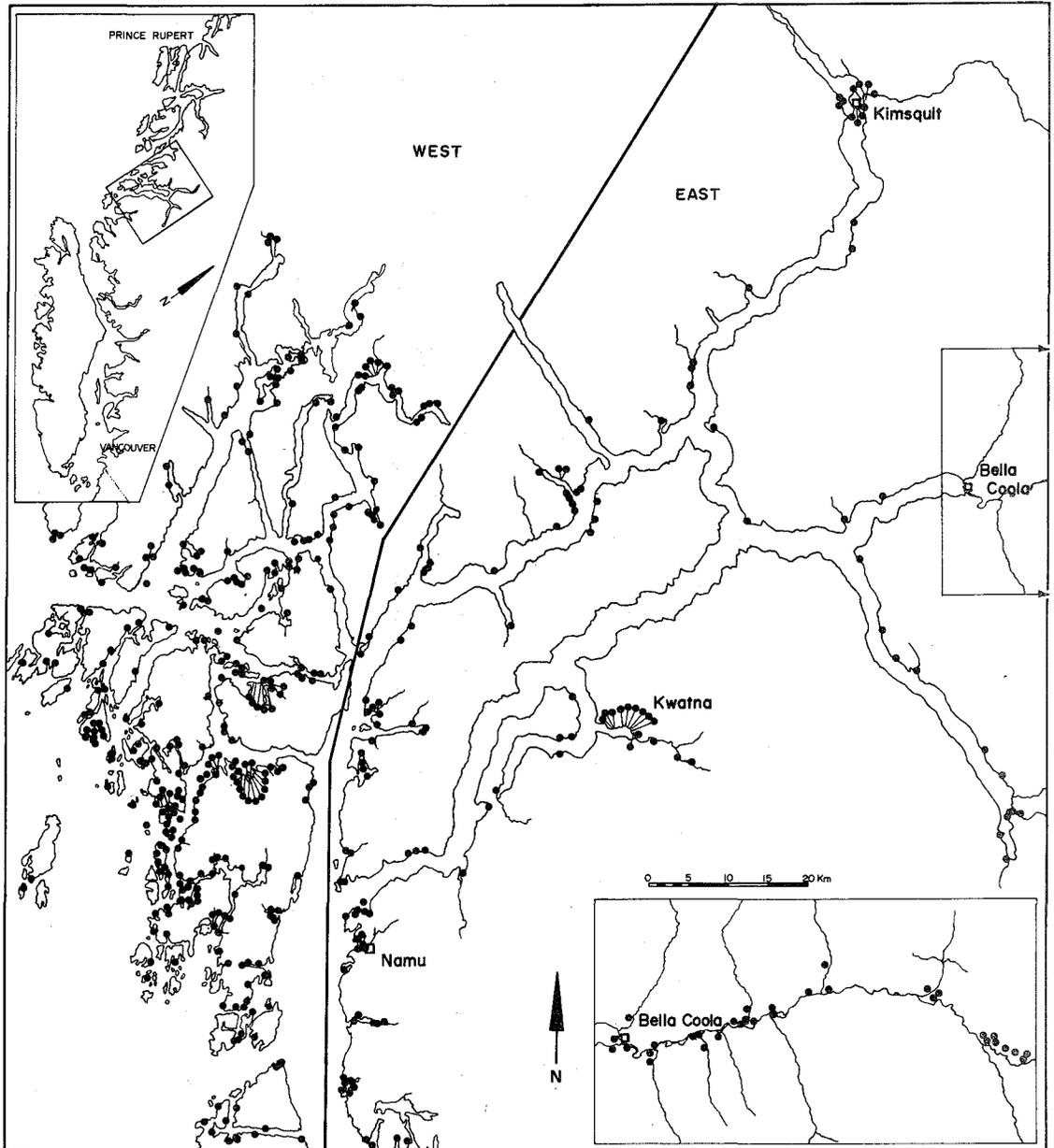


Figure 1. Archaeological sites on the central portion of the British Columbia coast. Eastern and Western halves of the study area are indicated.

Table 1. Correlation coefficients showing the degree to which the numbers of archaeological features in the vicinity of salmon spawning streams varies with the food productivity of those streams as measured by the mean tonnage of fish returning to spawn.

<u>Archaeological Features</u>	<u>Mean Tonnage</u>	
	<u>East</u>	<u>West</u>
Pictographs	.39	-.13
Middens	.27	-.23
Burials	.01	-.07
Fish traps	.72	-.04
Historic artifacts	.23	.01
Wooden structures	-.07	-.05
Intertidal artifacts	.06	.05
Surface artifacts	.72	-.16
House pits	.63	-.13
Other architecture	.29	-.16
Petroglyphs	.75	-.15
Total Features	.52	-.23

It was not surprising to see that these figures indicate moderate positive correlations suggesting some "attraction" effect of salmon upon settlement. A second look brought into focus two reasons for doubting this interpretation. The eastern portion of the central coast is characterized by high terrain relief (Fig. 2). In the fjord landscape most of the shoreline is steep and beachless. Almost all of it is unsuitable for camps or villages. Localities suitable for settlement are largely limited to the deltas and lower reaches of rivers. Thus, areas suitable for settlement are quite fortuitously associated with salmon spawning streams. Probably an even more important factor contributing to the spuriously high correlation are the rich oolachin runs in the inner coast rivers. The oolachin arrive almost six months after the salmon have gone from the rivers and thus provide a major and timely replenishment of food stocks. Haggarty has recently emphasized that resource diversity is the key to understanding nootkan settlement concentrations on Vancouver Island (Haggarty and Inglis 1981). I would further add that in the Bella Coala area resource timing and duration are of similar if not greater importance. Thus, on the inner coast the apparent correlation between salmon tonnage is spawning streams and the number of associated archaeological features in fact reflects the combined effects of terrain and the presence of two major food resources occurring in the same place but six months apart.



Figure 2. View along Dean Channel on the central portion of the British Columbia coast. The fjord landscape predominates along the eastern or inner portions of this part of the coast and is characterized by steep terrain and the near absence of beaches or other land forms suitable for habitation.

On the western (Bella Bella) portion of the central coast we are free of the complicating factors of terrain and availability of oolachin in the spring. The terrain on the west is much flatter (Fig. 3). Localities suitable for settlement are ubiquitous and are not limited to the vicinity of salmon spawning streams. By expanding the analysis to include the western area, the survey sample is also greatly increased (Fig. 1). Calculating Person's  $r$  values relating archaeological features and salmon tonnage for streams in this area we get results showing no correlation at all or even a slight negative relationship (Table 1). How is this rather surprising result to be explained? Certainly Pomeroy's exhaustive analysis of the historical and ethnographical records for the western portion of the Central Coast has shown that when aboriginal band territories can be reconstructed and plotted on maps no territory is complete without at least one good salmon spawning stream (Pomeroy 1980). The work of Donald and Mitchell (1975) has also substantiated the importance of access to productive spawning streams in determining a band's status. Yet, the correlations fairly clearly show that, when factors of terrain can be held constant, there is little statistical evidence of a relationship between the amount of harvestable salmon in a stream and the number of archaeological features in its vicinity. Certainly this does not mean that the salmon were an unimportant food resource. Rather it shows that when other factors are held constant, immediate proximity to salmon spawning streams was not an important determinant of site



Figure 3. Fish trap site on Troup Passage on the outer or western portion of the Central Coast of British Columbia. In this area of low terrain relief localities suitable for habitation are numerous.

location. Why should this be? It must be remembered that the duration of many of the spawning runs is actually quite brief. Often it was possible to harvest a significant portion of a group's annual salmon needs in only a few weeks. The small streamside camps resulting from this activity tend to have low archaeological visibility. In addition the relatively brief stays by small groups would also result in fewer non-occupational archaeological features such as rock art.

If the salmon resource is not responsible for dictating specific intra-regional archaeological site distributions what is? Do these results mean that within a region (or within a band's territory) another resource or combination of resources properly weighted will constitute the determinative part of the settlement location equation? Or is it all influenced by something apart from resources such as accessibility for trade or other more complex historical factors?

By way of conclusion there should be an important lesson in this. If one were doing archaeological research on the central coast employing a simplistic "catchment" approach and operating in an ethnographic vacuum the fact that the intra-regional distribution of archaeological features does not seem to show any tendency to reflect variations in distribution of salmon might well result in a conclusion that salmon were not an important food resource. Only the richness of the ethnographic record can prevent such a error and can show the limitation of simplistic interpretative schemes.

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