Submerged Lithic Tools Indicate Alternative Procurement Strategies

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ABSTRACT

The documentation of multiple lithic tool types from underwater locations contradicts the subsistence paradigm of later hunter-gatherer societies, in many regions. The variety of functions and cultural periods represented by these submerged materials support many researchers' suggestion of population replacement over time. As demonstrated by other archaeological evidence, changes are indicated through tool types, development of habitation areas, skeletal morphologies, and molecular (biological) indicators. Expansive water based food gathering strategies further add to these lines of investigation, advocating for population change over time. The content of this monograph, which was discussed after the papers presented at the Pre-Clovis in the Americas Conference, describes some of the differing patterns of subsistence that are represented by these underwater lithic assemblages.

At least five distinct time periods are represented by the lithic tools associated with underwater localities in western North America. It is probable that these materials represent distinct cultural phases, and that their presence underwater indicates differing food resource activities between ancient and recent populations. Similar observations occur for the eastern coast of the continent, with submerged findings extending from multiple Chesapeake Bay sites to areas offshore of Florida (Stanford and Bradley 2012; Hemmings and Adovasio 2012). While rising sea levels make the interpretation of some coastal sites difficult, water based tool usage is also evidenced at numerous interior sites, such as high mountain lakes. In these and some river sites that are far inland, it is less challenging to interpret the presence of tools, as ocean activity is not a factor.

Although it was initially assumed that the majority of the lithic materials were redeposited from terrestrial sites, there is increasing evidence that these artifact types were intentionally used in the water and at shoreline margins. The lithic assemblages discussed in this paper include projectile points, other biface tool types such as end scrapers and knives, and debitage. The materials range from basalt to CCS, with some minerals being from local resources and others classified as exotics.

Over a period of several years, there have been an increasing number of reports describing culturally modified materials from underwater environments. While organics are observed, the majority of the reports are of lithics (Adovasio 2012). When identifiable, many of the lithics are stylistically early. Cultural phases of the early types in the West include Windust, Haskett, and Lind Coulee. Older knife styles and crescents are also represented. Many early tool types are also well documented for the East coast (Stanford and Bradley 2012). While in the Northeast only large bipoints are currently documented from underwater, terrestrial assemblages include other early tool types such as scrapers made on blades (figure 1).[1] However, numerous lithic tool types are represented in underwater site assemblages to the South, as well as from inland waters in mid-western states and throughout much of the Great Basin (Smith, et al 2013; Bell 1980; Wisner 1997). The significantly greater time depth of the eastern sites, while not explored in this monograph, is considered elsewhere in this publication.

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[1] This may be due to the method of collection of the early bipoints, as they were recovered with seines having large spacing. As suggested recently by Dennis Stanford, the probability of recovering even slightly smaller, or differently shaped, materials is therefore eliminated (personal communication 2012; 2013).

Figure 1a. Two early bipoints from underwater New England sites. Internet images shown, with permission for publication by the Smithsonian Institution and Dennis Stanford.

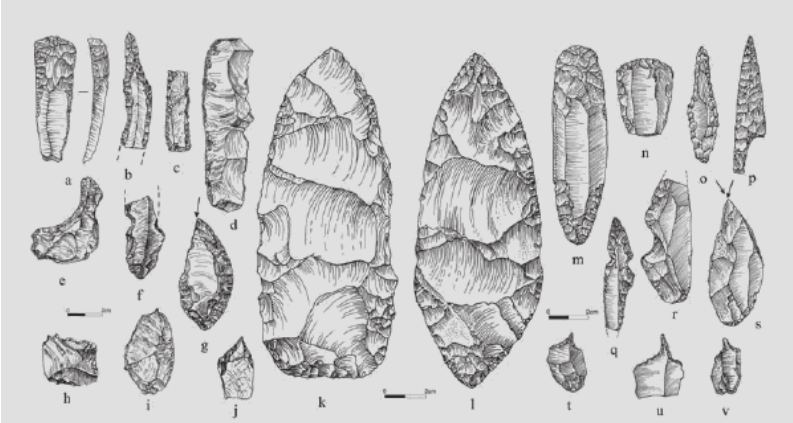

Figure 1 Clovis and Solutrean tools. a–k: Clovis; l–v: Solutrean; a, m–n: end scrapers on blades; b, o: borers; c: retouched bladelet; d: retouched blade; p: shouldered point; e, f, r: notches; g, s: burins; h–j, t–v: gravers. (a: Gault Site; b, c, j: Bostrum site; d, e: Simon Cache; f, g, i: Murray Springs; h: Blackwater Draw Locality 1; k: Fenn Cache; l: Solutré; m, q: Fourneau-du-Diable; n, r, s, t, u: Laugerie-Haute Ouest; o: Oulen; p: La Placard; v: La Riera.)

Figure 1b. East coast and other North American assemblages include large bi-points, gravers, and scrapers made on blades. Here, they are shown with selected early European material. Images courtesy of Dennis Stanford and Bruce Bradley. Not intended for duplication beyond this text.

The submerged early lithics are often isolated from more recent material, and the condition of the older specimens is consistently excellent (figure 2). Worn or battered objects represent a very small portion of the total number of early examples that are reported.

Figure 2. The styles and technologies demonstrated by these water-curated lithics are different, but the types are consistently early. The condition is excellent, with scars from transportation rarely observed. Identification courtesy of David Rice, specimen access courtesy of Mike Full.

Where the early bifaces differ is in their depositional environments. Many distinctive aquatic ecosystems, and vastly different elevations, are represented. Lithics have been reported from streams, rivers, estuaries, both low and high elevation lakes, and Pleistocene lakebeds. Site elevations extend from sea level to more than 9,500' msl (Stanford and Bradley 2012; Stenger 1993, 1988). Importantly, the lack of scarring from transportation is consistent among most of the lithics from every area. Inspection of the available material from all sites, and from all reported elevations, defines objects that have been well curated by their underwater environments. Primary deposition is represented by nearly every specimen.

More recent lithics have a higher frequency of damage. Stylistically, these materials predominately represent two different periods. These are ca. 3500-2500 yBP and 1000-500 yBP. Notably, the later specimens have only been reported from one lake and one river system in the Northwest. Data from other regions have not yet been collected.

Observations from the river identify 7 isolated bifaces of more recent types, made of several different materials. CCS predominates, but obsidian and other materials are also present. Represented are a knife, an exhausted core, a scraper, and four projectile points. Condition of the material varies, with some that are severely battered and/or rounded, but with a few specimens that are undamaged.

The assemblage from the lake had a very high frequency of lithics, from both early and late periods. As this recovery was the result of limited dredging, it is not possible to determine the temporal and spatial relationships of the excavated materials. However, several hundred specimens were contained in an initial sampling of an 8 m x 12 m area. When the area of investigation expanded, the total number of modified materials expanded to over 2,000. This location was approximately 150-250 m out into the water, offset from the low lying shoreline (Wessen 1983; 2012 personal communication).

Multiple tool types were identified within the dredge spoils from the lake. Most of these were processing tools rather than projectile points. Unifacially flaked small tools were documented, as were utilized flakes. Basalt was the dominant material among points, although CCS was represented. Debitage accounted for approximately 75% of the material, while 9% of the assemblage included small cutting and scraping tools. Cut bone was recorded in direct association with these lithics. This included both avifauna

and terrestrial fauna. Fish bone was also observed. Organics such as fish weirs and canoe tie-ups have also been identified within this body of water (Wessen 2013; Stenger and Hibbs 1991).

At three lakes containing only older material, the cultural deposits are evidenced a similar distance from the shoreline. These water resources are at high elevation, and do not have steep slopes or hillsides in the areas from which the assemblages were documented. The lithics are not broadly distributed over the lake bottoms, and the concentrations are heaviest about 150m out into the water. Notably, there are broad areas where no cultural materials are observed (Stenger 1995).[2]

A database was established to synthesize the information associated with the older and the more recent lithics from underwater areas in the Northwest. Projectile forms were the first bifaces to be reported. Thus, it was initially thought that these lithics reflected terrestrial hunting strategies, with bifaces carried into the water by either game or misaimed weapons that did not find their targets. As data accumulated, however, a number of tool types were identified. The non-projectile forms fit well with hunting strategy assemblages, but as processing tools (figure 3). Although they were often considered stylistically early, they were not the tools of procurement. Further, when classified by form/function, at least 85% of the specimens reflected processing activities.

Figure 3. Processing tools include knives, gravers, and crescents. These may have been utilized as multiple-purpose tools.

The data demonstrate several things. The three most consistent observations are that (1) a broad range of geographic areas and time periods are represented, (2) different cultural styles and technologies are indicated, and (3) several different activities are represented by these tool types.

The majority of the material could not have eroded out of nearby landforms. This is primarily because most of the lithics, regardless of type, were located a significant distance from shore, with no sharply angled banks in the area. The distant shorelines were neither steep nor backed by significantly higher hills. Further, while riverbank slumping may have been the source of a few of the bifaces, it would have been necessary

[2] Significant information on high and low elevation sites was shared by David Rice and Jorie Clark, but no reports were referenced at that time (2012).

for that cultural material to immediately settle into a protected environment to avoid the scarring that accompanies movement within the associated river systems.

It is important to note that the deposits of lithics are discrete. Clusters of material, or isolates that lack redepositional scarring, have been documented in areas where an adjacent 80,000 m^2 lack any cultural indicators (Wessen 2013, Stenger 1994).[3] These archaeological localities reflect intentionally selected use areas. Further, the elevation above sea level of the waterway is not a factor. It is now clear that these use areas are not geographic anomalies, nor are they regional. Similar observations of underwater lithics are now being reported from bodies of water across the country.

When the localities of the submerged lithics within Oregon were placed on a map, it was immediately clear that all four quadrants of the state were represented (figure 4). The distribution of sites, and the many elevations reported, made it clear that neither a proximity to the ocean nor a specific environment were factors in the establishment of these sites.

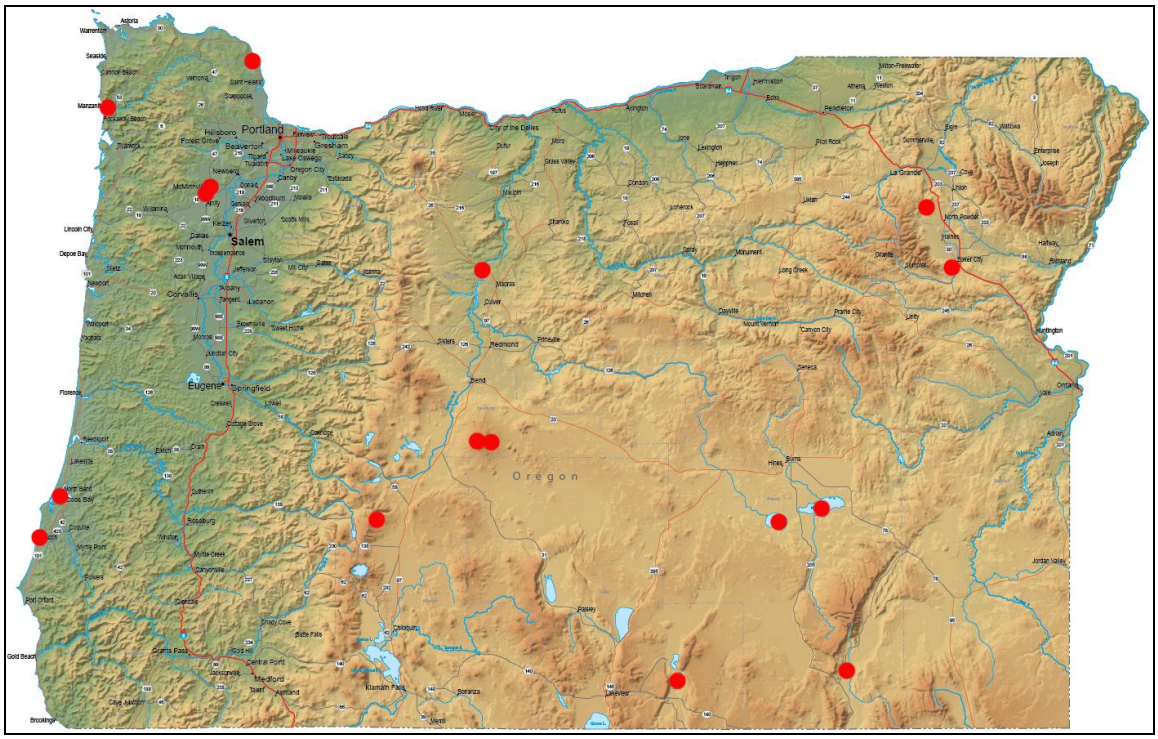

Figure 4. Map of Oregon, illustrating some of the locations of underwater lithics. Notably, every environment and elevation within the State is represented. Map courtesy of the Willamette Valley Pleistocene Project, and director, Mike full.

While late Northwest prehistory lacks proxies for the water based uses of most lithic tool types, the ethnographic and ethnohistoric records do demonstrate the use of projectiles over and into the water. There is little suggestion, however, of processing tools within that environment.[4] Yet when models from other areas are applied to the

[3] This discussion is also representative of high elevation lake beds from both Harney and Malheur counties, where early resources are known, but not yet listed in the database.

[4] Gathering activities continued to involve stone tools, although many of the forms changed over time.

submerged lithic assemblages from this region, the tool types represented can then be explained. In other cultures, the hunting of aquatic game is often accompanied by the processing of catches, *in situ*. The mending of catchment equipment also occurs. While this happens from boats and from pedestrian positions, both employ tools such as knives, drills, and scrapers.

One artifact type, specifically, may suggest alternative processing strategies. The crescent was probably a dual purpose tool. Phytoliths, retained on some edges, are residual to grasses and marsh plants, and were assumedly utilized in the collection and management of vegetation. However, the shape and often the edge wear of this tool type are also suggestive of use in the processing of water fowl.[5] The form of this tool lends itself to the cutting and scraping of ovate, or bird-form, carcasses. This type of function could occur both over water and on land, which helps explain the distribution of this tool type both in lakebeds and on inland environments. Thus, crescents exposed on relictual lakebeds at high elevation, and within terrestrial sites such as on the Channel Islands, may actually reflect the same functionality. Regardless of specific use, this is another example of a processing tool that has been documented from an aquatic environment, as well as one that is terrestrial.

Ignoring the division between terrestrial based hunting traditions and maritime subsistence methods allows the material to be considered without bias. This is especially important, when considering the preponderance of non-projectile lithics in assemblages from underwater. It is hoped that edge wear studies and blood protein analysis will provide further insight into this issue, and that researchers will continue to provide information on submerged lithic materials.

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[5] An article in the Journal of World Prehistory, published in 2013, discusses a use-relationship between waterfowl and crescents in, "Waterfowl and Lunate Crescents in Western North America: The Archaeology of the Pacific Flyway." Thanks to Jon Erlandson for forwarding this article.

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