The concept of temporal components was emphasized by David A. Fredrickson to his students in his teachings and by example. He stressed the importance of linking research questions with effective field sampling techniques and of adjusting methods, given findings, to effectively identify and sample discrete temporal components. Ultimately, if you have not identified single-component areas using all available data sets, you usually cannot adequately address most other research issues, because there are no comparative data with which to work. When you have identified temporal components, component-associated data should be the focus of analysis and discussion.

This paper presents various definitions of temporal components, a short background on the concept, field methods to identify them using four project examples, how to document them, and finally, how to solve problems that commonly occur. It was originally presented as part of the tribute symposium to David A. Fredrickson and focuses on his influence in establishing the importance of temporal control during field excavations and analysis.

The main points of the paper are that temporal components are identified by:

- examining horizontal and vertical site structure,
- analyzing temporal indicators in the field, and
- adjusting field methods to findings.

Temporal components should be:

- adequately documented, and
- the focus of site analysis.

DEFINITIONS

Beardsley (1948, 1954) and Heizer (1949) used roughly similar definitions of temporal components: an archaeological record of human occupancy at a single locality during a specific period of time. Fredrickson (White et al. 2002:45) had an all-inclusive definition: “temporally related aggregates of artifacts, features, and other residues, representing the material remains produced during a specific time span of residence or other use at a specific location, and found associated with a definable horizontal/vertical fraction of a site or landform.” The most recent is from Kelly and Thomas’s (2013:163) text book: “a stratum or set of strata that are assumed to be culturally homogenous” and are site-specific.

BACKGROUND

In the 1970s-1980s, when Fredrickson initiated and expanded the cultural resources management program at Sonoma State, he stressed the importance of linking research questions, objectives, site-specific constraints, field sampling methods, and management needs. He consistently encouraged more effective sampling techniques: shallow-unit transect sampling for horizontal stratigraphy, deep control units for vertical stratigraphy, and the necessity to adjust methods given findings.
This site is located on the west side of San Ramon Creek in Contra Costa County. Highway construction had destroyed much of the cultural deposit, including hundreds of burials, and excavation occurred while construction was under way (Fredrickson 1965). The channel sidewall showed a complex stratigraphy, so Fredrickson consulted with a UC Berkeley soils geomorphologist. They observed that the floodplain had aggraded and progressively migrated west, with three distinct occupation layers present in the channel sidewall (Figure 1). Construction crews opened large exposures at each stratum with controlled excavation blocks placed in each (Figure 2).

This important excavation resulted in the identification of the first full Early-Middle-Late sequence for central California; it documented change over time in cultural affiliation, trade, and use of flaked stone materials; it demonstrated that Middle Horizon cultures developed in the East Bay; and it was the early basis for Fredrickson and Bennyhoff’s taxonomic framework.

SITE CA-LAK-510 – 1981-1982

LAK-510 is a large, complex site near Cache Creek and Clear Lake in Lake County. It was being impacted by both a private subdivision and Caltrans road construction. Survey and testing identified sparse and dense lithic scatters and a midden deposit, and integrated research issues and sampling strategies were based on those data. White and Fredrickson worked out a comprehensive component-based fieldwork program and field lab analysis (White 1984). Surface collection corridors and surface transect units were used to sample the widespread lithic scatters (Figure 3), while deep trenches focused on the midden (Figure 4).

Results from the LAK-510 excavations included identification of stratigraphically distinct occupation/use that extended from Paleo-Indian to Late Prehistoric times, and of considerable variability in component assemblages, including past site functions, settlement systems, and exchange (e.g., occupation versus resource capture). It was also identified that the North Coast Range’s southern and northern cultures were not in sequence.

PILOT RIDGE – 1983

The Pilot Ridge project included 13 shallow, ridge-top sites at 4,500-6,000 ft. elevation, in Humboldt County (Hildebrandt and Hayes 1983). It was a phased data recovery, with initial excavations of
1-x-2-m units to 10 cm covering 3,000 m (Figure 5). Over 500 diagnostic points and clustered hydration rims were used to identify single-component areas. Data recovery entailed broad exposures in temporally distinct areas (Figure 6).

With component identification and a large assemblage, a projectile point typology was developed, along with temporally significant artifacts and a diachronic subsistence/settlement model. It was also found that the places with the highest artifact density were the most temporally mixed, and were therefore avoided during data recovery.

**SHASTA I-5 – 1985**

Four prehistoric sites in the Sacramento River Canyon were being impacted by Caltrans highway upgrades along Interstate 5 (Basgall and Hildebrandt 1989). Prehistorically, this was a marginal area along a major cultural corridor. Excavations were undertaken in a staged approach, starting with extensive exploratory backhoe excavation based on test data that helped to define and integrate the stratigraphy (Figure 7), followed by selective recovery to efficiently obtain temporally diagnostic and functional artifacts, and ending with intensive fine-grained strategies, once temporal components were identified (Figure 8).

The collected assemblage included over 20,000 tools, more than 200,000 flakes, as well as an extensive faunal and floral sample. The three identified periods of human occupation each showed variance in chronological markers, features, and lifeways, but also with similar activities noted throughout the
sequence. While early Holocene points and hydration were identified, they could not be associated with archaeologically visible deposits, emphasizing the idea that all archaeological aspects (temporal indicators, site structure, and integrity) need to be present for a temporal identity.

**DOCUMENTING TEMPORAL COMPONENTS**

A detailed discussion of how temporal components are identified is important. It must include a complete description of site structure, temporally diagnostic artifacts and other dating analyses (radiocarbon, obsidian hydration), and the associated assemblage, and offer a detailed rationale for component designations. Data can be visually presented in charts (Figure 9), tables (Table 1), or bullets (Figure 10), and should always include good stratigraphic profiles (Figure 11).

**PROBLEM SOLVING**

Identifying components requires careful planning and analysis along many dimensions. It starts with well-thought-out fieldwork, but most importantly, fieldwork has to adjust to findings. Testing is often more important than data recovery, as it is during initial testing that the potential for discrete, intact components is recognized; data recovery simply focuses on single-component areas. If test data are insufficient, a phased data recovery is necessary.

A common problem is conflicting temporal data, where, for example, a central coast site may have radiocarbon dates ranging between 5445 and 4860 cal B.P., supported by Large Side-Notched projectile points and *Olivella* rectangular L2b beads, but with hydration data of 1.8-0.2 microns indicating a much younger deposit. One can say that hydration simply does not work and toss it out; identify the variables that
could affect the hydration data (depth, type of obsidian, size of sample); or interpret the data as they stand, which might indicate a late use of obsidian in a separate component.

Another issue is what to do with mixed data or the “cool stuff” outside the component. Unfortunately, unless it is extremely unique, it should just be called mixed residual, and documented as such. It does not help to know the different biface stages or types of flake tool wear, for example, if they cannot be compared across time and space.

Regarding the length of time of a viable component, obviously the shorter the better. But comparisons can still be made if a component dates within a single, identified regional cultural period, and even a mix of adjacent periods can be compared to those that are older and younger.

**SUMMARY**

- If you have not identified temporal components, you usually cannot adequately address any other research issues (e.g., culture history, subsistence and settlement change, trade/exchange) because you have no comparative data.
- Study the soil; use a geomorphologist.
- More is not necessarily better; sometimes it is the richest deposits that are the most mixed.
- Clearly identify your components and use only component-associated data for detailed analyses.

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Figure 5. Surface transect units at Pilot Ridge used to find temporally diagnostic artifacts.
Figure 6. Broad exposure in temporally distinct area at Pilot Ridge.
Figure 7. Exploratory backhoe excavations along Interstate 5, Shasta County.
Figure 8. Large exposure of single component area for the Shasta I-5 project.
Figure 9. Schematic showing units, depths, and data that delineate the identified temporal components.
Table 1. Tabulated data identifying temporal components.

<table>
<thead>
<tr>
<th>LOCUS</th>
<th>PROVENIENCE</th>
<th>STRATUM</th>
<th>VOLUME (m³)</th>
<th>¹⁴C DATES (cal B.P.)</th>
<th>MEAN (µ)</th>
<th>RANGE (µ)</th>
<th>S.D.</th>
<th>C.V.</th>
<th>PROJECTILE POINTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>E92, E94, E101</td>
<td>I</td>
<td>1.9</td>
<td>-</td>
<td>4.2²c</td>
<td>3.0-5.2</td>
<td>0.7</td>
<td>0.2</td>
<td>1 SN Dart</td>
</tr>
<tr>
<td>E</td>
<td>E140-E150</td>
<td>I, Bw</td>
<td>4.6</td>
<td>1880</td>
<td>3.4</td>
<td>2.5-6.0</td>
<td>0.8</td>
<td>0.2</td>
<td>1 CS Dart</td>
</tr>
<tr>
<td>E</td>
<td>E126-E128</td>
<td>II</td>
<td>3.6</td>
<td>-</td>
<td>3.7</td>
<td>3.3-4.6</td>
<td>0.5</td>
<td>0.1</td>
<td>1 LS Dart, 1 SN Dart, 1 DSN</td>
</tr>
</tbody>
</table>

Recent Prehistoric II

| D     | S25, S32-S34 | I       | 4.7         | -                     | 2.4³c    | 0.9-4.1   | 0.4  | 0.2  | 3 DSN; 1 CTW; 2 Arrow-size |

Notes: a Statistical outlier of 1.8 µ removed; b Statistical outliers of 5.2 µ and 12.0 µ removed; c Includes test phase results
s.d. = standard deviation; c.v. = coefficient of variation; µ = microns; CS= Contracting-stem; LS = Large-stemmed; SN = Side-notched; DSN = Desert Side-notched; CTW = Cottonwood.

Figure 10. Bulleted list showing data used to identify temporal components.
Figure 11. Example of a well-labeled, clear stratigraphic profile.