

AMS RADIOCARBON DATES FROM HUMAN BURIALS AT CA-NAP-399, NAPA VALLEY, CALIFORNIA, USA

Tsim D Schneider¹ • John Holson • Lori D Hager • Samantha S Schell • Lucian N Schrader III

Pacific Legacy, Inc., 900 Modoc Street, Berkeley, California 94707, USA.

ABSTRACT. This article presents a set of accelerator mass spectrometry (AMS) radiocarbon dates derived from human bone within burial contexts at CA-NAP-399 in Napa County, California, USA.

INTRODUCTION

This article presents a set of accelerator mass spectrometry (AMS) radiocarbon dates derived from human bone within burial contexts at CA-NAP-399 in Napa County, California, USA. Archaeological data recovery took place at CA-NAP-399 and three additional sites throughout 2007, 2009, and 2010. Following an approved treatment plan (Bartoy and Holson 2007), the primary objective at CA-NAP-399 was the total recovery of archaeological materials in advance of construction and landscape modifications relating to planned flood control measures along the Napa River, less than 2 km east of the city of St. Helena.

A total of 163 human burials, including 159 interments and 4 cremations, were lifted from CA-NAP-399 following California state law and conducted in a manner respectful to the wishes of the Mishewal Wappo Tribe of Alexander Valley, representatives of which were present during all excavations. The burials were lifted from a patchwork of 214 surface scrape (SS) units ranging in size from 3 × 3 m units to larger polygons measuring 25 m² or larger (Schneider et al. 2013). Horizontal and vertical provenience were maintained during and between field seasons using a site datum and multiple subdatums. With permission from the Mishewal Wappo, all burials and associated funerary artifacts were removed and then transported to Pacific Legacy's Berkeley office for bioarchaeological analysis by LD Hager and SS Schell under the agreement that all human remains and associated artifacts would be reburied at the completion of analysis.

As one line of evidence detailing the lives of ancestors who inhabited the Napa Valley, the Mishewal Wappo permitted sampling of human bone to directly date the human occupants of CA-NAP-399 using AMS ¹⁴C dating. We strived to select the smallest sample of bone possible; however, sample sizes varied depending on the skeletal element(s) available (bones were not damaged in the process of selecting ¹⁴C samples), the visible preservation of the bone (i.e. whether the bone appeared to have intact trabecular bone), and depending on sample size requirements for dating (2–10 g for unburned bone; 4–40 g for cremated bone). Only one non-human bone sample—a bone tool fragment from Burial 73—was dated. After selecting each sample, it was then weighed, wrapped in aluminum foil, labeled, and delivered to Beta Analytic Inc. (Miami, Florida, USA) for analysis. At the conclusion of the analysis, all used and unused portions of each sample were returned to each respective burial prior to reburial in May 2012.

Three samples failed because of an insufficient bone collagen sample size remaining after pretreatment at the Beta Analytic laboratory. Another two bone carbonate samples from two cremations failed owing to an inability to access datable carbon. All burial related artifacts—direct associations and items found within grave fill—are presented below and discussed by Schneider et al. (2013). With the exception of Beta-314678 (Burial 32), all of the AMS ¹⁴C ages indicate an Upper Archaic, or Middle Period, component at CA-NAP-399 ranging from 500 BC to AD 900 (2450–1050 BP) using the OxCal v 4.1 calibration program (Bronk Ramsey 2009) and IntCal09 calibration curve (Reimer et al. 2009). Seven burials date to the transitional period between the Early Period

1. Corresponding author. Email: tsiduncan@gmail.com.

(3000–500 BC, or 4950–2450 BP) and lower Middle Period called the Early/Middle Period Transition (2450–2150 BP; Milliken et al. 2007). Burial 32 (Beta-314678) produced a date of 150 ± 30 BP, or AD 1770–1830, which corresponds to the period of Spanish colonization in the San Francisco Bay area.

ARCHAEOLOGICAL SAMPLES

Beta-314676 **2040 ± 30 BP**
01HB10 **$\delta^{13}\text{C} = -19.6\text{‰}$**

Bone collagen from rib fragment (3.8 g) handpicked from Burial 10 in SS-1 at 165–182 cm below ground surface. CA-NAP-399 is in Napa County, California, ~25 km northwest of Napa, California (38°18'15"N, 122°17'55"W).

Comment: This sample produced a conventional ^{14}C age of 2130 ± 30 BP, or 350–320 cal BC (2300–2270 cal BP), 210–90 cal BC (2160–2040 cal BP), and 80–50 cal BC (2030–2000 cal BP) (2σ calibration following Talma and Vogel 1993). The date is associated with the lower Middle Period (500 BC to AD 430) in central California. The individual was interred with 17 obsidian bifaces, two edge-modified flakes, one bone awl, and an igneous pestle.

Beta-314677 **2000 ± 30 BP**
02HB28/29 **$\delta^{13}\text{C} = -19.3\text{‰}$**

Bone collagen from rib fragments (2.7 g) handpicked from Burial 28/29 in SS-16 at 199–214 cm below ground surface.

Comment: This sample produced a conventional ^{14}C age of 2090 ± 30 BP, or cal BC 200–40 (2140–1990 cal BP; 2σ calibration following Talma and Vogel 1993). The date is associated with the lower Middle Period (500 BC to AD 430) in central California. Two obsidian bifaces, one obsidian edge-modified flake, and one bird bone bead were discovered with this burial.

Beta-314678 **50 ± 30 BP**
03HB32 **$\delta^{13}\text{C} = -18.7\text{‰}$**

Bone collagen from a long bone fragment (3.1 g) handpicked from Burial 32 in SS-48 at 165–182 cm below ground surface.

Comment: This sample produced a conventional ^{14}C age of 150 ± 30 BP, or cal AD 1670–1780 (280–170 cal BP), cal AD 1800–1890 (160–60 cal BP), cal AD 1910–1950 (40–0 cal BP), and cal AD 1950 to post-1950 (0 cal BP to post-1950) (2σ calibration following Talma and Vogel 1993). One obsidian biface, two edge-modified flakes, one igneous handstone, and 251 glass trade beads are associated with this individual. Of the 251 glass beads, 243 are opaque white and white-on-white seed beads; eight beads are polychrome beads with red exteriors and translucent green interiors. A similar combination of white and red/green beads decorate some ethnographic baskets from other areas of central California (Bates 1982:25–8), which could indicate that the individual was interred with a basket. The eight polychrome beads could be cornaline d'allepo or "Hudson's Bay Company" beads, which appear in California during the second quarter of the 19th century (Ross 1990); however, assemblages of polychrome and opaque white glass beads are known from even earlier archaeological deposits at Spanish missions, which operated in the San Francisco Bay area from AD 1776 to the 1830s (Bennyhoff 1977:43–5). Excavation of Mission San Jose's 1809 chapel floor, for example, produced polychrome glass beads with red exteriors and translucent green interiors and opaque white glass seed beads in association with *Olivella biplicata* and clamshell beads (Dietz 1983). Glass trade beads are also reported from other archaeological sites in the Napa Valley (Heizer 1953).

Beta-314679 **1930 ± 30 BP**
04HB55 **δ¹³C = -19.0‰**

Bone collagen from long bone fragments (2.8 g) handpicked from Burial 55 in SS-57 at 126–140 cm below ground surface.

Comment: This sample produced a conventional ¹⁴C age of 2030 ± 30 BP, or 110 cal BC to cal AD 30 (2060–1920 cal BP) and cal AD 40–50 (1910–1900 cal BP) (2σ calibration following Talma and Vogel 1993). The date is associated with the lower Middle Period (500 BC to AD 430) in central California. This individual was interred with three obsidian bifaces, one obsidian edge-modified flake, and one bowl mortar.

Beta-314681 **2360 ± 30 BP**
06HB67 **δ¹³C = -19.5‰**

Bone collagen from femur fragments (4.7 g) handpicked from Burial 67 in SS-116 at 157–168 cm below ground surface.

Comment: This sample produced a conventional ¹⁴C age of 2450 ± 30 BP, or 760–680 cal BC (2710–2630 cal BP) and 670–410 cal BC (2620–2360 cal BP) (2σ calibration following Talma and Vogel 1993). This is the oldest ¹⁴C determination; the date is associated with the Early/Middle Period Transition (500–200 BC) in central California. This individual was interred with two obsidian bifaces and one edge-modified flake.

Beta-314682 **1890 ± 30 BP**
07HB70 **δ¹³C = -19.1‰**

Bone collagen from rib fragment (3.4 g) handpicked from Burial 70 in SS-153/155/157 at 180–216 cm below ground surface.

Comment: This sample produced a conventional ¹⁴C age of 1990 ± 30 BP, or 50 cal BC to cal AD 70 (2000–1880 cal BP; 2σ calibration following Talma and Vogel 1993). The date is associated with the lower Middle Period (500 BC to AD 430) in central California. This individual was interred with two obsidian bifaces.

Beta-314683 **2050 ± 30 BP**
08HB73 **δ¹³C = -20.1‰**

Bone collagen from bone tool fragment (6.3 g) found in direct association with Burial 73 in SS-141 at 158–179 cm below ground surface. The artifact is identified as an awl—one of two associated with this individual—manufactured from the metatarsal of a mule deer (*Odocoileus hemionus*).

Comment: This sample produced a conventional ¹⁴C age of 2130 ± 30 BP, or 350–320 cal BC (2300–2270 cal BP), 210–90 cal BC (2160–2040 cal BP), and 80–50 cal BC (2030–2000 cal BP) (2σ calibration following Talma and Vogel 1993). The date is associated with the lower Middle Period (500 BC to AD 430) in central California.

Beta-314684 **2100 ± 30 BP**
09HB73 **δ¹³C = -19.2‰**

Bone collagen from rib fragment (4.0 g) handpicked from Burial 73 in SS-141 at 158–179 cm below ground surface.

Comment: This sample produced a conventional ¹⁴C age of 2200 ± 30 BP, or 380–180 cal BC (2330–2130 cal BP; 2σ calibration following Talma and Vogel 1993). The dates from this individual and the associated bone tool (Beta-314683) are associated with the lower Middle Period (500 BC

to AD 430) in central California, and are further confirmed by several grave associations, including 60 *Olivella* shell beads. The *Olivella* beads include 31 Oval Saucer beads produced throughout the Middle Period and 19 Class C (Split Beveled, Split Drilled, and Split Oval) beads, which occur in the Early/Middle Period Transition and early Middle Period (Milliken 2009). The individual was also interred with a sandstone spindle (charmstone); two perforate, circular red abalone (*Haliotis rufescens*) ornaments with light edge incisions; and one perforate, triangular red abalone pendant. In addition to the bone awl discussed above (Beta-314683), two bone whistles collected in association with this individual were identified as Greater White-fronted Goose (*Anser albifrons*) and golden or bald eagle (Accipitridae) and confirm a pattern of heightened bone whistle manufacture during the Middle Period involving the production of bone whistles from goose, eagle, and other avian and mammalian species (Morejohn and Galloway 1983).

Beta-314685 **2090 ± 30 BP**
10HB79 **δ¹³C = -18.5‰**

Bone collagen from rib fragment (2.4 g) handpicked from Burial 79 in SS-142 at 176–191 cm below ground surface.

Comment: This sample produced a conventional ¹⁴C age of 2200 ± 30 BP, or 380–180 cal BC (2330–2130 cal BP; 2σ calibration following Talma and Vogel 1993). The date is associated with the lower Middle Period (500 BC to AD 430) in central California. This individual was interred with an obsidian contracting stemmed projectile point, two obsidian bifaces, 51 quartz crystals, one *Haliotis* pendant, and 14 *Olivella* beads.

Beta-314686 **2130 ± 30 BP**
11HB94 **δ¹³C = -19.0‰**

Bone collagen from rib fragment (2.8 g) handpicked from Burial 94 in SS-187 at 169–181 cm below ground surface.

Comment: This sample produced a conventional ¹⁴C age of 2230 ± 30 BP, or 390–200 cal BC (2340–2150 cal BP; 2σ calibration following Talma and Vogel 1993). The date is associated with the lower Middle Period (500 BC to AD 430) in central California. This individual was interred with 18 obsidian bifaces, one obsidian drill, one bone spatula, three bone awls, one bone atlatl spur, one bone whistle, and one charmstone.

Beta-314687 **2100 ± 30 BP**
12HB115 **δ¹³C = -18.9‰**

Bone collagen from rib fragment (3.5 g) handpicked from Burial 115 in SS-197 at 120–137 cm below ground surface.

Comment: This sample produced a conventional ¹⁴C age of 2200 ± 30 BP, or 380–180 cal BC (2330–2130 cal BP; 2σ calibration following Talma and Vogel 1993). The date is associated with the lower Middle Period (500 BC to AD 430) in central California. This individual was interred with five obsidian bifaces.

Beta-314688 **2060 ± 30 BP**
13HB130 **δ¹³C = -19.6‰**

Bone collagen from rib fragment (3.2 g) handpicked from Burial 130 in SS-201 at 140–148 cm below ground surface.

Comment: This sample produced a conventional ¹⁴C age of 2150 ± 30 BP, or 350–290 cal BC (2300–2240 cal BP), 230–220 cal BC (2180–2170 cal BP), and 210–110 cal BC (2160–2060 cal BP) (2σ

calibration following Talma and Vogel 1993). The date is associated with the lower Middle Period (500 BC to AD 430) in central California. This individual was interred with three obsidian bifaces and nine quartz crystals.

Beta-314689 **2140 ± 30 BP**
14HB148 **δ¹³C = -19.0‰**

Bone collagen from cranial fragments (2.1 g) handpicked from Burial 148 in SS-210 at 73–78 cm below ground surface.

Comment: This sample produced a conventional ¹⁴C age of 2240 ± 30 BP, or 390–340 cal BC (2340–2290 cal BP) and 320–200 cal BC (2270–2150 cal BP) (2σ calibration following Talma and Vogel 1993). The date is associated with the Early/Middle Period Transition (500–200 BC) in central California. This individual was interred with four bifaces and one quartz crystal.

Beta-314690 **2110 ± 30 BP**
15HB149 **δ¹³C = -19.6‰**

Bone collagen from rib fragment (4.6 g) handpicked from Burial 149 in SS-211 at 89–99 cm below ground surface.

Comment: This sample produced a conventional ¹⁴C age of 2200 ± 30 BP, or 380–180 cal BC (2330–2130 cal BP; 2σ calibration following Talma and Vogel 1993). The date is associated with the lower Middle Period (500 BC to AD 430) in central California. This individual was interred with seven obsidian bifaces and one vesicular basalt bowl mortar.

Beta-316475 **2190 ± 30 BP**
17HB56 **δ¹³C = -18.8‰**

Bone collagen from rib fragment (4.7 g) handpicked from Burial 56 in SS-76 at 142–162 cm below ground surface.

Comment: This sample produced a conventional ¹⁴C age of 2290 ± 30 BP, or 400–360 cal BC (2350–2310 cal BP), 280–260 cal BC (2230–2210 cal BP), and 240–240 cal BC (2190–2180 cal BP) (2σ calibration following Talma and Vogel 1993). The date is associated with the lower Middle Period (500 BC to AD 430) in central California. The date implies burial during the Early/Middle Period Transition (500–200 BC) in central California. This individual was interred with seven obsidian bifaces, one core tool, a mustelid jaw bone, and 114 quartz crystals.

Beta-317700 **2280 ± 30 BP**
18HB15 **δ¹³C = -19.0‰**

Bone collagen from left ulnar shaft fragment (8.0 g) handpicked from Burial 15 in SS-14 at 266–279 cm below ground surface.

Comment: This sample produced a conventional ¹⁴C age of 2380 ± 30 BP, or 520–390 cal BC (2470–2340 cal BP; 2σ calibration following Talma and Vogel 1993). The date is associated with the Early/Middle Period Transition (500–200 BC) in central California. This individual was interred with two obsidian bifaces.

Beta-317701 **2140 ± 30 BP**
19HB117 **δ¹³C = -19.2‰**

Bone collagen from right rib fragment (6.0 g) handpicked from Burial 117 in SS-196 at 154–167 cm below ground surface.

Comment: This sample produced a conventional ¹⁴C age of 2240 ± 30 BP, or 390–340 cal BC

(2340–2290 cal BP) and 320–200 cal BC (2270–2150 cal BP) (2σ calibration following Talma and Vogel 1993). This date and one C1 *Olivella* shell bead confirm burial during the lower Middle Period (500 BC to AD 430) in central California. A sandstone charmstone, 29 soapstone disk beads, five obsidian bifaces, and one igneous handstone were also discovered with this individual.

Beta-317702 **1930 ± 30 BP**
20HB139 **$\delta^{13}\text{C} = -19.2\text{‰}$**

Bone collagen from left rib shaft fragment (4.4 g) handpicked from Burial 139 in SS-202 at 150–169 cm below ground surface.

Comment: This sample produced a conventional ^{14}C age of 2030 ± 30 BP, or 110 cal BC to cal AD 30 (2060–1920 cal BP) and cal AD 40–50 (1910–1900 cal BP) (2σ calibration following Talma and Vogel 1993). The date is associated with the lower Middle Period (500 BC to AD 430) in central California. This individual was interred with four obsidian bifaces, one edge-modified flake, and one atlatl spur.

Beta-317703 **2290 ± 30 BP**
21HB156 **$\delta^{13}\text{C} = -19.4\text{‰}$**

Bone collagen from rib fragment (3.1 g) handpicked from Burial 156 in SS-201 at 70–87 cm below ground surface.

Comment: This sample produced a conventional ^{14}C age of 2380 ± 30 BP, or 520–390 cal BC (2470–2340 cal BP; 2σ calibration following Talma and Vogel 1993). The date is associated with the Early/Middle Period Transition (500–200 BC) in central California. This individual was interred with one obsidian biface.

Beta-317800 **N/A**
22HB86 **N/A**

Bone collagen from radius shaft fragment (3.6 g) handpicked from Burial 86 in SS-163 at 192–198 cm below ground surface.

Comment: A measured ^{14}C age and $\delta^{13}\text{C}$ value could not be obtained from this sample due to the presence of very small root hairs that had penetrated the bone fragment and resulted in a smaller sample size sufficient for AMS dating after purification and collagen extraction. The $^{13}\text{C}/^{12}\text{C}$ ratio available to calculate a conventional ^{14}C age was determined on a small aliquot of graphite; although it corrects the appropriate conventional ^{14}C age, it was not reported by Beta Analytic since it includes laboratory chemical and detector-induced fractionation. The sample produced a conventional ^{14}C age of 2430 ± 30 BP, or 750–690 cal BC (2700–2640 cal BP), 660–640 cal BC (2620–2590 cal BP), 590–580 cal BC (2540–2530 cal BP), and 570–400 cal BC (2520–2350 cal BP) (2σ calibration following Talma and Vogel 1993). The conventional age is associated with the Early/Middle Period Transition (500–200 BC) in central California. This individual was interred with one obsidian biface.

Beta-317801 **2110 ± 30 BP**
23HB116 **$\delta^{13}\text{C} = -19.4\text{‰}$**

Bone collagen from right rib fragment (6.1 g) handpicked from Burial 116 in SS-198 at 90–104 cm below ground surface.

Comment: This sample produced a conventional ^{14}C age of 2200 ± 30 BP, or 380–180 cal BC (2330–2130 cal BP; 2σ calibration following Talma and Vogel 1993). The date is associated with the lower Middle Period (500 BC to AD 430) in central California. This individual was interred with six obsidian bifaces and three charmstones.

Beta-321967

2290 ± 30 BP

26HB125

δ¹³C = -19.7‰

Bone carbonate from cremated long bone fragments (5.5 g) handpicked from Burial 125 in SS-200 at 161 cm below ground surface.

Comment: This sample produced a conventional ¹⁴C age of 2380 ± 30 BP, or 520–390 cal BC (2470–2340 cal BP; 2σ calibration following Talma and Vogel 1993). Like burials 15, 56, 67, 86, 148, and 156, the date from this cremation is associated with the Early/Middle Period Transition (500–200 BC) in central California and implies dual mortuary behaviors at this site during this time period.

ACKNOWLEDGMENTS

We thank the Mishewal Tribe of Alexander Valley, especially Earl, Denise, Dana, and Mark Couey, Scott Gabalon, and Vincent Salsedo; the City of St. Helena; California's State Water Resources Control Board; and Beta Analytic Inc.

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