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REPORTS

Wima Chert: ~12,000 Years of Lithic Resource Use on California's Northern Channel Islands

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On the Northern Channel Islands, artifacts made from Wima chert, a previously undocumented siliceous rock extensively used by Native Americans to make stone tools, have been found in archaeological sites dating from ~12,000 years ago to historic times. Ranging from true cherts to siliceous shales, Wima clasts appear to be derived from concretions eroding from bedrock outcrops in the Monterey Formation, as well as from cobbles found in modern and ancient beach and alluvial deposits. Unlike the mostly translucent Tuqan, Cico, and Santa Cruz Island cherts, Wima cherts are opaque, with colors ranging from brown, reddish-brown, and yellowish-brown to white, gray, greenish-gray, and black. Some of these colors overlap with those of Franciscan cherts from the mainland, but Wima cherts do not appear to attain the purity, luster, or redder and greener hues found in high-quality Franciscan cherts. A few Paleocoastal projectile points and crescents were made from Wima chert, but the lower quality of most clasts appears to have restricted their use primarily to the production of expedient core and flake tools. Nonetheless, archaeologists should be careful in identifying the source of chipped stone artifacts from Northern Channel Island sites made from opaque cherts with these colors and characteristics..

On California's Northern Channel Islands (NCI), the trade, control, and production of chipped stone raw materials have long been of interest to archaeologists. Since the late nineteenth century, the islands were thought to be largely devoid of local chert sources, except for Santa Cruz Island (SCRI) outcrops heavily used in the Late Holocene by the Island Chumash for the intensive production of microblades used to make Olivella shell beads (e.g., Arnold 1987, 2001; Glassow 1980; Hudson and Blackburn 1987:29; Kennett 2005; King 1976; Perry and Jazwa 2010; Pletka 2001; Rick et al. 2008; Schumacher 1877). For decades, archaeologists assumed that SCRI chert was the only source of high-quality toolstone on the NCI, with artifacts made from other high-grade cherts or chalcedonies (i.e., Monterey or Franciscan cherts) imported from mainland sources. In the past 15 years, however, research on San Miguel Island has shown that high-quality Cico and Tuqan (Monterey) cherts were locally available and had been widely used by island residents for at least 12,000 years (Erlandson et al. 1997, 2008, 2011). A lower quality chalcedonic chert source has also been identified in both geological and archaeological contexts on Anacapa Island (Rick 2006). These discoveries suggest that archaeologists working on the NCI and adjacent mainland should be careful in analyzing and interpreting raw material types found in archaeological sites.

In this paper, we report another distinctive type of chert widely used by Channel Islanders for millennia. Called Wima chert after one variant of the Chumash name for Santa Rosa Island (a.k.a., Wi'ma, Wimal, Uima; see Applegate 1975; Glassow et al. 2010:3.9; King 1975:174), artifacts made from it have recently been identified in NCI archaeological sites ranging in age from ~12,000 years ago (cal B.P.) to the early historic period. Here, we provide some geographic and archaeological background to contextualize our study before summarizing what we currently know about the geological origins and distribution of Wima

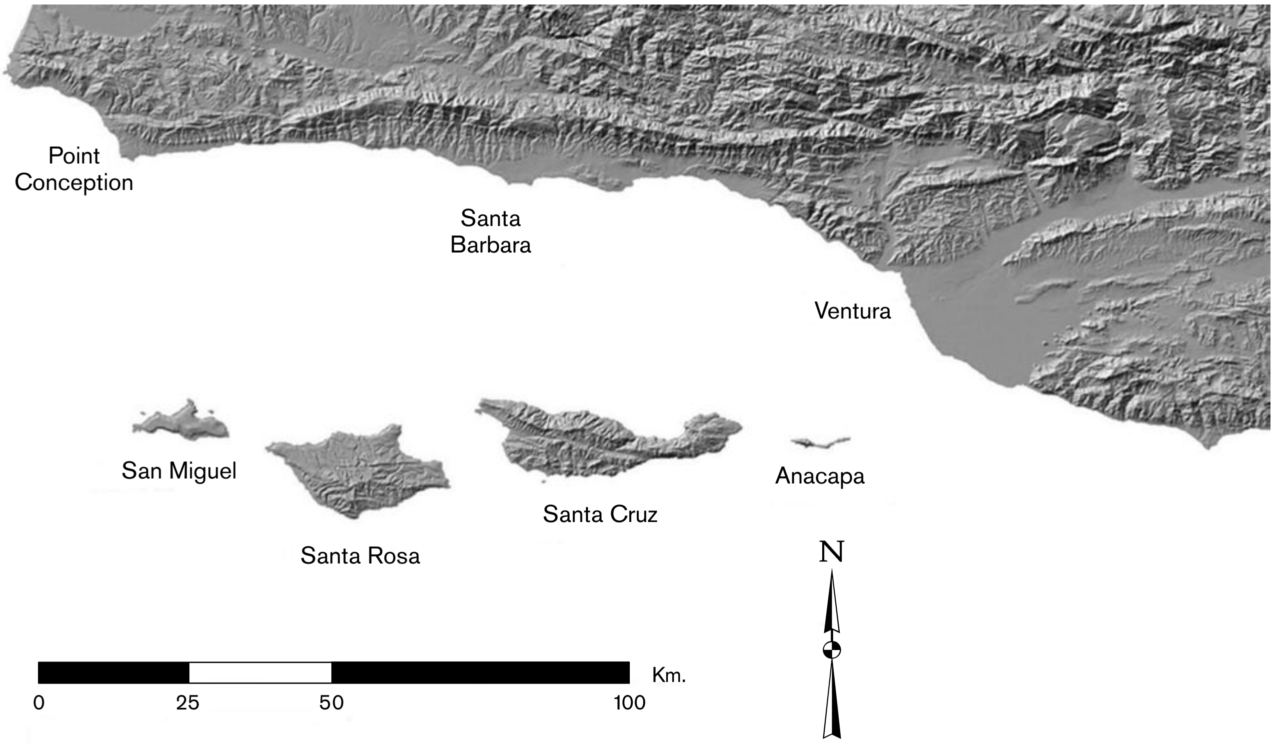

Figure 1. Map of the Santa Barbara Channel region.

chert. We describe the physical characteristics of Wima chert, as well as the temporal and spatial distribution of Wima chert artifacts found in archaeological sites on the NCI. In concluding, we discuss the implications for understanding the deep history of lithic resource use by Channel Islanders and the archaeological study of exchange between the Island Chumash and their mainland neighbors.

DEFINING WIMA CHERT

Background

Located 44 km. off the Santa Barbara Coast (Fig. 1), Santa Rosa Island is the second largest of the four Northern Channel Islands at 24 km. long, 16 km. wide, and ~217 km.^{2} in land area. Despite its substantial size, Santa Rosa Island is just a remnant of the much larger Santarosae Island that united all four NCI from the Last Glacial Maximum (LGM) until about 9,000 to 10,000 years ago (Orr 1968; Porcasi et al. 1999). Since the LGM, Kennett et al. (2008:2530) have estimated that roughly 75 percent of Santarosae's land area—primarily lowland habitats—has been lost to postglacial sea level rise (Fig. 2). This marine transgression appears to have submerged sources of chert and other minerals that once were available on land. Evidence for this comes from the occurrence of Tuqan chert on San Miguel and Santa Rosa islands, where no bedrock outcrops have been found but where cobbles occur in raised Pleistocene beach deposits and in alluvium containing reworked marine cobbles (Erlandson et al. 2008). Since a great deal of San Miguel and Santa Rosa is now covered by dunes and alluvium, it is also possible that bedrock exposures of tool-quality cherts may exist above sea level.

Today, the Santa Rosa Island landscape consists of a mountainous core with maximum elevations reaching 484 m., surrounded by a series of raised marine terraces separated by steep escarpments that mark ancient shorelines and sea cliffs (Schoenherr et al. 1999:275). The island is composed primarily of Late Cretaceous, Tertiary, and Quaternary rocks of marine and volcanic origin (see Norris 2003:64; Weaver 1969). From east to west, the island is bisected by the Santa Rosa Island fault (Dibblee and Ehrenspeck 2002:118), with broad marine terraces to the north but higher and more rugged topography

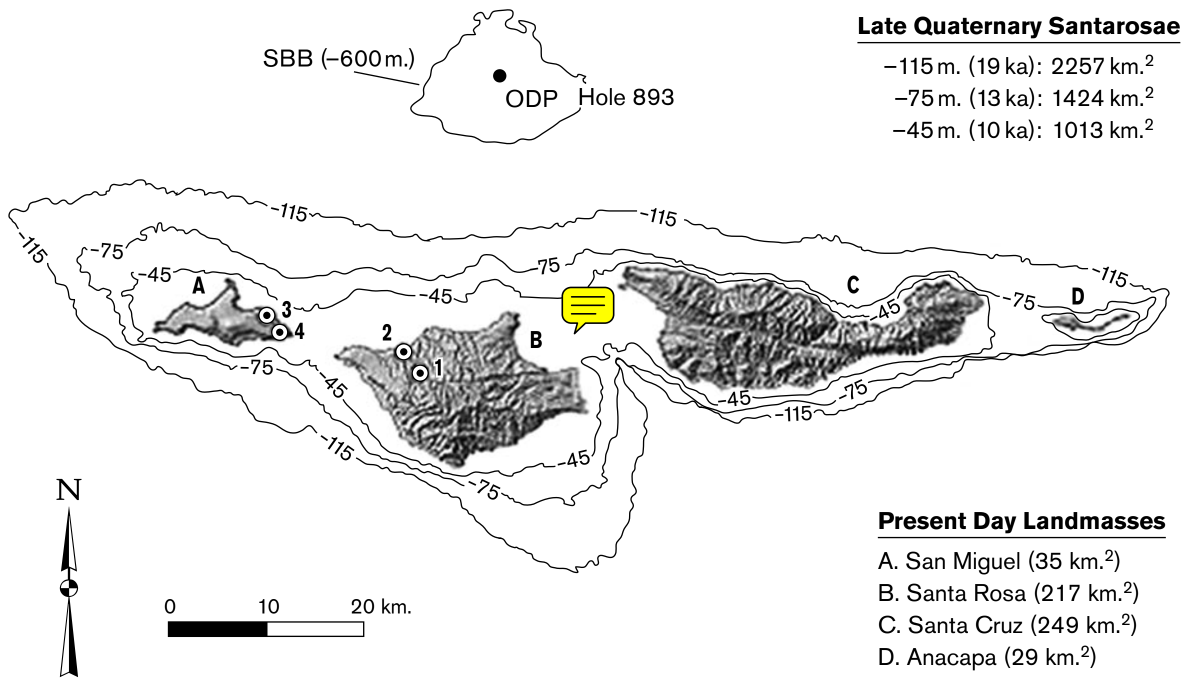

Figure 2. Map of the Northern Channel Islands today and the approximate extent of paleoshorelines from the Last Glacial Maximum to ~ 10,000 cal B.P. (adapted from Kennett et al. 2008).

to the south of the fault. As noted above, parts of the island contain extensive alluvium and sand dunes, both ancient and modern, which obscure the bedrock geology, except where it is exposed in sea cliffs, canyon walls, and other escarpments. Considerable geological work has been done on Santa Rosa Island (e.g., Dibblee and Ehrenspeck 1998, 2002; Dibblee et al. 1998; Orr 1967; Weaver 1969; Weigand 1998), but such studies rarely provide the level of detail required by archaeologists to identify specific rock outcrops used by prehistoric peoples. The large size, ruggedness, and remoteness of the island make a comprehensive geoarchaeological survey for toolstone sources on the island a long-term project that will take years to complete.

For most of the twentieth century, Santa Rosa Island was privately owned, and access for archaeological research was limited. The most extensive program of archaeological work on the island was conducted by Phil Orr of the Santa Barbara Museum of Natural History, who worked extensively on the islands from the 1940s to the 1960s. After 10 years of survey and excavation focused primarily on Santa Rosa Island's northwest coast, Orr (1956:78) stated that "no good native material for making chipped stone implements occurs on the island." Twelve years later, in describing the evidence for a Pleistocene occupation of Santa Rosa, Orr (1968:57) was more ambiguous, stating that the island contains "no natural gravel beds, flint, or obsidian deposits suitable for the making of chipped stone tools," but that a "native rock which has been used for tools is a semi-consolidated yellow to gray chert that forms the most abundant artifacts of the Pleistocene and also occurs in the Recent Indian middens." In a subsequent passage, Orr (1968:58) noted that "[o]ccasionally a piece of water-worn chert occurs which chips readily into a chopper or scraper, though the material is quite soft.... It is this material which forms the greatest number of recognizable artifacts; others are the several igneous or metamorphic chips, the amorphous minerals occurring only as chips, and two pieces of limestone. None of these rocks occur naturally on the Island and they could only have arrived there by being carried by man."

From these quotes it appears that Orr initially believed that no quality cherts or other toolstone existed on Santa Rosa Island, but that he may have later recognized that a soft and semi-consolidated yellow or gray siliceous shale/

chert was found locally on Santa Rosa Island. However, his descriptions are limited, vague, and ambiguous, and include a later comment that none of the described rock types occur naturally on the island. Although he clearly understood that the geography of Santa Rosa Island had changed dramatically since the late Pleistocene, he did not mention the possibility that quality toolstone outcrops might once have been available on the now submerged lowlands of Santarosae. As his excavations were focused primarily on the northwest coast of Santa Rosa, where Wima chert artifacts seem to be found in lesser quantities, Orr may not have grasped the local abundance and full range of quality and colors represented in Wima chert and higher-grade siliceous shales.

Origins and Distribution of Wima Chert

Since Santa Rosa Island was incorporated into Channel Islands National Park in 1986, a wider range of archaeological surveys and excavations has been conducted (see Glassow et al. 2010; Erlandson et al. 2011; Johnson et al. 2002; Kennett 2005; Rick 2009). For the past 10 years, we have been investigating a series of sites spanning the past 12,000 years to document the nature of settlement and subsistence patterns, and the technological and ecological changes that have occurred on the island through time (e.g., Erlandson et al. 2011; Rick 2009; Rick et al. 2005). Many of these sites have produced chipped stone artifacts made from local metavolcanic and quartzite cobbles, Cico or Tuqan cherts from island sources, bladelets that appear to be made from Santa Cruz Island cherts, and smaller quantities of materials such as obsidian, Franciscan chert, and fused shale generally believed to have been imported from mainland sources. In documenting these raw material types, we have also noted the presence of numerous cores, large flake tools, tool-making debris, and occasional formal tools made from opaque cherts that clearly differ from documented Channel Island chert sources. The characteristics of Wima chert are described in greater detail below, but its opacity, lower silica content, and range of colors are easily distinguished from the distinctively purer and darker Tuqan (Monterey) cherts and the typically translucent Cico and Santa Cruz Island cherts or chalcedonies.

Wima chert artifacts have been found in archaeological sites widely distributed on Santa Rosa Island, from the west to the east ends and on the north and south coasts. Wima cherts appear to be associated with or derived from the Miocene Monterey Formation, which has been mapped by geologists as occurring in extensive and widely scattered exposures on Santa Rosa, including substantial outcrops near the west end of the island but in even larger areas in the southeast quadrant of the island (Dibblee and Ehrenspeck 1998, 2002:118; Dibblee et al. 1998; Norris 2003:64). So far, we have only been able to directly examine a small percentage of the geological exposures of the Monterey Formation on Santa Rosa Island.

During 2004-2006 surveys of Old Ranch Canyon on southeast Santa Rosa, Rick (2009:25) noted the presence of small and heavily weathered bedrock exposures of granular, low quality, opaque cherts in tan and yellowish colors. Artifacts of similar materials were found in nearby sites dated to the Middle Holocene (Wolff et al. 2007). In 2008, Erlandson and Rick found Wima chert artifacts in a wider array of colors (red, brown, buff, etc.) in two Paleocoastal sites located on the bluffs overlooking the southwest coast of Santa Rosa Island, one of them located in the vicinity of Miocene Monterey shale outcrops that contained *in situ* beds of siliceous shale similar to the lower quality Wima artifacts. In 2010, we noted numerous artifacts made from higher quality Wima cherts in archaeological sites in the vicinity of Skunk Point on southeastern Santa Rosa Island, suggesting that geological sources of Wima chert may be present in the area. We found numerous cores and large flake tools made from Wima chert, for instance, in dated Early and Middle Holocene sites (SRI-666, SRI-667) located in this area. This led to a broader search of local beaches and raised marine terraces in the Bechers Bay and Skunk Point areas, many of which were covered by dune deposits, alluvium, or thick vegetation that limited visibility. Nonetheless, our geoarchaeological reconnaissance identified an extensive cobble sheet behind the beach near the south end of Bechers Bay (Southeast Anchorage) that contained cobbles of Wima chert. Eroding exposures of Monterey shale bedrock nearby also had *in situ* concretions of siliceous or cherty shales (Rick 2009:25). Raised Last Interglacial beach deposits in the area also contained cobbles of siliceous shale and Wima chert that fractured conchoidally. Whole Wima chert cobbles observed in these modern or ancient beach deposits were up to 15 cm. in diameter.

Since we first became aware of this distinctive type of tool-quality chert and cherty shale, we have also found artifacts made from Wima cherts and siliceous shales in archaeological sites dated to the Terminal Pleistocene, Late Holocene, and early Historic periods, including sites distributed from the western to the eastern ends of the island, as well as the north and south coasts (Table 1). A few Wima chert artifacts have also been identified in Paleocoastal sites at Cardwell Bluffs on eastern San Miguel Island, which was still connected to Santa Rosa (or Santarosae) during the Terminal Pleistocene. Radiocarbon dating of these sites documents a history of human use of Wima chert on Santa Rosa and San Miguel islands for at least 12,000 years and suggests that its use on Santa Rosa Island was extensive. If bedrock exposures or submerged beach deposits containing Wima clasts are located off the east coast of Santa Rosa, we might also expect to find Wima chert artifacts in archaeological sites on western Santa Cruz Island.

Not surprisingly, archaeological examples of Wima chert tend to be of higher quality than the cobbles or bedrock exposures we have found in geological sources, especially those artifacts made or struck from stream or beach-rolled cobbles. This may be related to a combination of geological and cultural factors. First, it may result from the greater resistance to erosion of higher quality siliceous rocks on high-energy cobble beaches, where softer siliceous shales are less likely to be preserved. Subjecting chert clasts to the high-energy wave action of island beaches also tends to destroy those cobbles containing numerous internal fractures, resulting in beach cobbles that are relatively pure and malleable, with well-developed conchoidal fracture. The higher quality of archaeological samples may also be the result of the selection of the harder and purer chert cobbles by Native Americans for transport back to their villages, campsites, and workshops. Finally, the higher quality of archaeological samples may be due to the systematic application of thermal pretreatment to some Wima chert artifacts. Controlled heat treatment experiments at the University of Oregon suggest that the quality of Wima chert is enhanced by exposure to temperatures of 350 to 400 degrees C.

Physical Characteristics of Wima Chert

Because the significance of Wima chert was only recognized recently, there is still much to be learned about its distribution in Channel Island archaeological sites, as well as in modern and ancient beach and alluvial deposits. What can be said at this point is that Wima cherts are opaque rather than translucent, and that they range from cherts to high-grade siliceous shales

Table 1

THE AGE AND CONTEXT OF WIMA CHERT ARTIFACTS IDENTIFIED IN NORTHERN CHANNEL ISLAND SITES

Sites Number	Age (cal B.P.)	Artifacts and Context
CA-SRI-85	Historic/Late Holocene	Wima flakes observed in 2010 on surface around house pits.
CA-SRI-2	1,000–Historic	Wima flakes found in excavation units.
CA-SRI-209	5,300–4,200	Wima flakes from surface and excavation units.
CA-SRI-192	5,930–2,300	Flakes and flake tools found on surface and in bulk sample.
CA-SRI-191	6,100–4,200	Flakes, cores, and flake tools eroded on surface.
CA-SRI-667	~6,600–4,400	Numerous cores and flakes found in multicomponent site.
CA-SRI-61	7,000–2,800	Numerous cores, flakes, and flake tools on eroded surfaces.
CA-SRI-77	7,600–7,300	Flakes and cores in buried Early Holocene shell midden.
CA-SRI-687	7,700–7,500	Flakes and flake tools on surface of deflated site and midden.
CA-SRI-666	8,250–7,800	Numerous cores and flakes on surface; debitage in bulk samples.
CA-SRI-26	~11,600	Flakes and a crescent found in situ in buried Paleocoastal midden.
CA-SRI-512	~11,700	Flakes found in situ in buried Paleocoastal midden.
CA-SMI-678	~12,100–11,400	Channel Island Barbed point made from Wima chert.
CA-SMI-701	~11,700	Cores and flakes of Wima chert present on deflated surface of multi-component site, associated with Amol points and crescents.

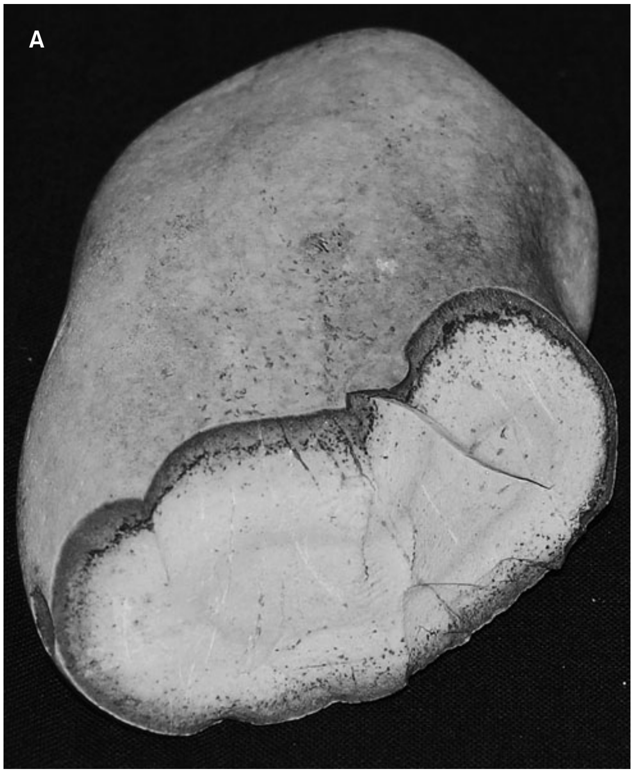

Figure 3. Photographs of (A) Wima chert cobble (WG-01) and (B) microscopic (x20) view of distinctive micro-inclusions in a Wima chert matrix (photos by N. Jew).

with Mohs hardness values ranging from 7 to 6. They come in a variety of colors, with brown, reddish-brown, and yellowish-brown varieties dominant, but white, gray, grayish-green, olive, and black specimens have been observed in geological or archaeological samples (Table 2). Archaeological specimens suggest that the full range of Wima cherts may have come from a mixture of cobble deposits and bedrock outcrops, as many (but not all) cores and large flakes or chunks contain cobble cortex. As is the case with island Cico and Tuqan cherts, many of the cobble cores made from Wima chert have a weathering rind with a different color than the interior (Fig. 3A).

A careful examination of numerous geological and archaeological specimens also shows that Wima cherts often have distinctive micro-inclusions or pits (Fig. 3B). These are barely visible to the naked eye, but they can be readily observed under low-power magnification with a hand-lens or microscope. In many cases, the inclusions are spherical and darker than the matrix. In others the contents of the inclusions seem to have decayed, leaving tiny craters, pits, or voids in the rock matrix. More research is needed to identify whether these dark inclusions are organic or crystalline (or both) in nature, but they did not react to HCl or heat that would destroy carbonates and many organics. Although the micro-pits and inclusions do not appear to significantly interfere with the suitability of Wima chert for fashioning artifacts, they may contribute to a slightly greater granularity of the matrix that may have limited its use for manufacturing projectile points and other formal chipped stone artifacts. We have found a few Paleocoastal projectile points or crescents made from Wima chert (see Erlandson et al. 2011, Fig. 3, in center of far right column), but the lesser quality of most clasts appears to restrict their use primarily to the production of expedient core and flake tools.

Controlled lab experiments on geological samples and study of a Paleocoastal artifact assemblage from CA-SRI-512 suggest that geological samples of Wima chert respond to thermal treatment, and that Paleocoastal peoples intentionally heat-treated Wima chert on Santarosae. Geological samples covered in sand and gradually heated to temperature peaks of 350-400 degrees C exhibited redder hues, increased luster, and improved brittleness and malleability than unheated control samples. If Wima cherts were regularly heat-treated by the Island Chumash, archaeological specimens may have higher frequencies of reddish hues and lustrous surfaces than those found in geological contexts. Even after heat-treatment, however, Wima cherts tend to be less glossy or lustrous than Tuqan, Cico, or Santa Cruz Island cherts, which all appear to have a higher silica content.

Table 2

COLOR AND OTHER CHARACTERISTICS IN GEOLOGICAL AND ARCHAEOLOGICAL SAMPLES OF WIMA CHERT

Catalog #	Locality (CA-)	Sample Type	Munsell Color (Primary)	Munsell Color (Secondary)	Other Features
WG-01	Bechers/Skunk Pt.	Geological	10YR 8/3.5: very pale brown	2.5Y 8/4: pale yellow	black inclusions
WG-02	Bechers-Skunk Pt.	Geological	10YR 5/1.5: gray/grayish brown	2.5Y 3/N: very dark gray	pitted depressions
WG-03	Bechers-Skunk Pt.	Geological	2.5YR 2.5/N: black	–	–
WG-04	Bechers-Skunk Pt.	Geological	10R 3/1: dark reddish gray	7.5YR 5/N:- gray	–
WG-05	Bechers-Skunk Pt.	Geological	2.5Y 3/N: very dark gray	2.5Y 2/N: black	pitted depressions
WG-06	Bechers-Skunk Pt.	Geological	10YR 3/4: dark yellowish brown	10YR 7/4: very pale brown	black inclusions
WG-07	Bechers-Skunk Pt.	Geological	10YR 5/3: brown	2.5Y 7/2: light gray	black inclusions
WG-09	SRI-706	Surface: flake	5YR 6/3.5: light reddish brown	10R 4/2.5: weak red	black inclusions
WG-10	SRI-161	Surface: flake	2.5Y 3/N: very dark gray	–	–
WG-11	SRI-161	Surface: flake	10YR 6/2: light brownish gray	–	black inclusions, pits
WG-12	SRI-161	Surface: flake	5YR 4/4: reddish brown	–	black inclusions
WG-13	SRI-161	Surface: flake	10YR 5/2: grayish brown	10YR 4/1: dark gray	black inclusions, pits
WG-14	SRI-161	Surface: flake	2.5Y 7/4: pale yellow	5Y 6/1.5: gray/light olive gray	black inclusions, pits
WG-16	SRI-161	Surface: flake	2.5YR 5/5: reddish brown/red	10R 5/6: red	black inclusions, pits
WG-18	SRI-161	Surface: flake	2.5Y 6/N: gray	–	black inclusions
666-01	SRI-666E	Surface: debitage	2.5YR 3/N: very dark gray	–	black inclusions, pits
666-02	SRI-666E	Surface: flake tool	5YR 6/3: light reddish brown	5YR 8/1: white	black inclusions, pits
666-04	SRI-666E	Surface: biface	10YR 8/4: very pale brown	2.5Y 5/N: gray	black inclusions, pits
666-06	SRI-666E	Surface: uniface	10YR 8/1: white	10YR 6/6: brownish yellow	black inclusions
666-09	SRI-666E	Surface: debitage	5YR 5/2 : reddish gray	2.5YR 7/2: light gray	black inclusions, pits
666-11	SRI-666E	Surface: uniface	7.5YR 7/2: pinkish gray	10YR 7/2: light gray	black inclusions
666-21	SRI-666M	Surface: flake tool	5YR 5/1: gray	7.5YR 5/4: brown	micro-inclusions
666-23	SRI-666M	Surface: flake tool	10YR 7/2: light gray	10YR 6/4: light yellow brown	micro-inclusions
666-24	SRI-666M	Surface: uniface	5YR 4/1: dark gray	2.5Y 7/4: pale yellow	micro-inclusions, pits
666-26	SRI-666M	Surface: uniface	10YR 6/2: light brownish gray	10YR 7/2: light gray	pitted depressions
666-29	SRI-666	Surface: drill	5Y 5/2.5: olive gray/olive	–	micro-inclusions
666-30	SRI-666	Surface: drill	5Y 5/3: olive	–	micro-inclusions
666-31	SRI-666	Surface: flake tool	7.5YR 4/2: brown/dark brown	–	micro-inclusions
666-33	SRI-666	Surface: uniface	10YR 5/3: brown	10YR 7/3: very pale brown	micro-inclusions, pits
666-34	SRI-666	Surface: flake tool	10YR 6/3: pale brown	7.5YR 5/4: brown	micro-inclusions, pits
666-35	SRI-512	Surface: biface	5Y 6/3.5: pale olive	–	micro-inclusions, pits
512-09	SRI-512	Surface: CIB point	10YR 5/1: dark gray	–	micro-inclusions, pits
512-295c1	SRI-512	Surface: debris	5YR 6/3: light reddish brown	–	pitted depressions
512-295c3	SRI-512	Surface: debris	5YR 6/2: pinkish gray	5YR 5/3: reddish brown	black inclusions
512-295c4	SRI-512	Surface: debris	2.5Y 8/3: white/pale yellow	5YR 3/1: very dark gray	pitted depressions
512-306a	SRI-512	Surface: debris	10R 2.5/2: very dusky red	–	pitted depressions
512-316b	SRI-512	U1/0–10 cm.: debris	7.5YR 4/N: dark gray	10R 4/2: weak red	micro-inclusions, pits
512-323a1	SRI-512	U3/0–10 cm.: flake	5YR 5/4: reddish brown	5YR 5/2: reddish gray	micro-inclusions, pits
512-331d1	SRI-512	U3 level 2: flake	5YR 4/2: dark reddish gray	–	micro-inclusions
512-331d2	SRI-512	U3 level 2: flake	10YR 6/4: light yellowish brown	10YR 5/4: yellowish brown	micro-inclusions
512-331d3	SRI-512	U3 level 2: flake	10YR 7/3: very pale brown	–	micro-inclusions
512-343c3	SRI-512	U3 level 3: flake	2.5Y 4/2: dark grayish brown	–	micro-inclusions, pits
512-458a1	SRI-512	U2/10–20 cm.: flake	7.5YR 3/2: dark brown	–	pitted depressions
512-497a1	SRI-512	U5/level 3: debris	10YR 6/2: light brownish gray	7.5YR 4/2: brown/dark brown	–
512-497a2	SRI-512	U5/level 3: flake	10R 5/2: weak red	2.5YR 4/2: weak red	micro-inclusions
512-497a3	SRI-512	U5/level 3: flake	7.5YR 8/2: pinkish white	–	pitted depressions
512-508	SRI-512	Surface: flake tool	5YR 5/2: reddish gray	10R 4/3: weak red	pitted depressions
512-511a2	SRI-512	U5/level 2: debris	5YR 3/1: very dark gray	5YR 4/2: dark reddish gray	micro-inclusions, pits
512-511a3	SRI-512	U5/level 3: flake	2.5YR 4/2: weak red	–	micro-inclusions, pits

DISCUSSION AND CONCLUSIONS

Although a great deal is known about Channel Island resources and exchange prior to historic times (see Arnold 2004; King 1976; Rick et al. 2001), fundamental research is still needed on the distribution and nature of major mineral commodities used by the Chumash and their ancestors in the Santa Barbara Channel (Erlandson and Braje 2008) and southern California areas. In the last 15 years, four previously undocumented sources of chert have been identified on the NCI (Erlandson et al. 1997, 2008; Rick 2006), including Wima chert. In our view, the systematic inventory of mineral sources on the islands has been inhibited by an uncritical acceptance of fragmentary ethnohistoric records collected in the late nineteenth and early twentieth centuries as fully representative of the deeper past, despite the fact that most of these accounts were collected more than a century after Island Chumash villages and trade routes were abandoned. Another problem is the tendency for scholars, including ourselves, to uncritically accept and repeat earlier statements based on partial archaeological knowledge, even though we have been trained as scientists to test hypotheses and question our existing assumptions.

Our documentation of Wima chert, along with its long-term and relatively widespread human use on western Santarosae Island, broadens the availability of technologically important mineral resources on the NCI, further undermining the notion that they were marginal human habitats compared to the adjacent mainland. At this point, artifacts made from Wima chert cobbles have been identified primarily in Santa Rosa Island sites dating from the Terminal Pleistocene to historic times, demonstrating that such chert was widely used by island residents for at least 12,000 years. As we have become aware of the full range of variability in Wima cherts, however, we have found additional examples in Paleocoastal sites on eastern San Miguel Island, and it seems likely that Wima chert artifacts will also be identified in some Santa Cruz Island sites. Further research is clearly needed to fully understand both the geological and archaeological distributions of Wima chert.

The quality of Wima chert, as does that of other island and mainland cherts, varies significantly, ranging from that of true cherts to higher-grade siliceous shales. In general, the quality of Wima chert does not seem to match the finer varieties of Cico, Franciscan, Monterey, SCRI, or Tuqan cherts from the Santa Barbara Channel region. As a result, it appears that Wima chert was used primarily to make expedient core and flake tools. A few Channel Island Barbed points and crescents made from Wima chert suggest that it was sometimes used to make more formal artifact types, probably after being heat-treated. Nonetheless, the generally lower quality of Wima chert clasts suggests that its use would be more limited on San Miguel and Santa Cruz islands where consistently higher quality cherts were available. These same factors suggest that Wima chert artifacts should only rarely be found in archaeological sites along the mainland coast, where high quality Franciscan and Monterey cherts were available.

Addressing such issues may be complicated by the fact that the macroscopic appearance of some artifacts made from Wima chert is similar to Franciscan chert varieties generally believed to come from mainland sources in the Santa Ynez Valley or along the Santa Barbara Coast. Further study is needed to determine the full range of overlap between Wima and Franciscan cherts, and whether such variations can be distinguished macroscopically, microscopically, or geochemically, especially when a cobble cortex is not present. Because there are Sespe Formation rocks on Santa Rosa Island—which on the mainland contain cobbles of Franciscan chert—further reconnaissance is also needed to be certain that island artifacts made from Franciscan chert were not made locally. Until such studies can be completed, the visual overlap between many artifacts made from island and mainland cherts suggests that archaeologists working in Chumash territory should be cautious in identifying the sources of many chert artifacts and in reconstructing ancient exchange and mobility patterns.

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