New research released in April 2012 by the National Park Service and published by archeological experts at Sonoma State University contradicts claims by the Drakes Bay Oyster Company (oyster company) that its commercial non-native oyster production provides a substitute for ecological functions formerly provided by extirpated native oysters that grew naturally. This claim has been a cornerstone of the company’s aggressive campaign to extend commercial use of the Drakes Estero wilderness at Point Reyes National Seashore. The Anthropological Studies Center at Sonoma State examined Native American harvest sites around Drakes Estero and concluded that native oysters did not play a significant role in the ecology of the estuary, which has had a muddy substrate unsuitable for oyster habitat for thousands of years. This conclusion confirms that the oyster company’s operations artificially modify the Estero’s natural ecology, and are inconsistent with the estuary’s natural, historic ecological baseline.

The Sonoma State report corrects a major research gap in the 2009 National Research Council report on Drakes Estero, an issue that was acknowledged by the Research Council. The Sonoma State report was based on laboratory analysis that supplemented fieldwork, and concluded that “the absence of other prehistoric sites in the area containing quantities of native oyster shells makes it unlikely that Drakes Estero was a habitat for a large oyster population in prehistory.”

This study and its October 2011 Addendum are consistent with ethnographic data showing that the Miwok harvested native oysters at only a few places, all outside of the Estero. The Sonoma State studies also correlate with U.S. Geological Survey studies showing only minimal potential habitat for oysters in the Estero, and with coring studies showing the present habitats of the Estero have likely been consistent for thousands of years.

The oyster company has claimed that its cultivation of millions of non-native oysters continues the past practices of the Native American Miwok Indians despite 1) the company’s conversion of major portions of the estuary to non-native species, 2) the company’s use of motorized boats that disturb marine mammals and birds, and 3) the company’s littering of the National Seashore beaches with thousands of pieces of its plastic debris. The oyster company’s illusion of cultural stewardship was previously shattered by a 2007 letter (see attached) wherein the Miwok Tribe requested that the National Park Service “take immediate steps to begin the process of returning Drakes Estero to its natural state.”

Interior Secretary Ken Salazar is tasked this year with determining whether to uphold the 1976 Congressional designation of marine wilderness protection for Drakes Estero or roll it back to allow the continued unnatural, industrial-scale private use of this public trust resource that has never been under private ownership. Park policies and wilderness laws clearly support protection of this ecologically rich, deservedly designated marine preserve. The archeological studies recently released by the Park Service add further support to this conclusion.
Background Information and Timeline Regarding:
2011 Sonoma State University Archeological Study
2009 National Research Council Report on Drakes Estero

Since 2006, National Park Service science has maintained that Drakes Estero was naturally a soft-bottomed estuary without the hard substrate necessary to support significant numbers of native oysters and in 2007, the NPS stated: "The presence of a reported nine million oysters and one million clams within an area that would not have these resources naturally is itself enough to demonstrate an alteration of natural conditions."\(^2\)

In 2008, the National Research Council was asked to review NPS science and prepare a report on the ecological impacts of shellfish farming in Drakes Estero, the West Coast’s only Congressionally designated marine wilderness area.

The NRC prepublication draft, officially released in early May 2009,\(^3\) stated that the Olympia oyster, native to West Coast estuaries with rocky substrates, was also once abundant in Drakes Estero (despite its relative lack of rocky substrate). This NRC conclusion of historically abundant native oysters directly contradicted the earlier NPS conclusion that no such abundance could have existed the Estero.

The NRC stated that its conclusion was “evidenced by the mounds of its shells in the Coast Miwok midden near the on-land facilities of DBOC and other shell middens excavated around Drakes Estero (Stewart and Praetzellis, 2003).”\(^5\)

But the Sierra Club commented on the NRC draft on May 7, 2009: “we reviewed...the Stewart and Praetzellis (2003) study [and] do not find the evidence in that study that [the draft NRC report] claim[s] to have found.” In response, the final NRC Report stated, “The prepublication of this report erroneously cited a paper by Stewart and Praetzellis (2003). The paragraph has been edited to correct this error.”

However, the NRC “correction” simply omitted the references to the other shell middens and the Stewart and Praetzellis study, but retained the same conclusion that the deleted references supposedly evidenced. Thus, and despite the lack of evidence, the final May 2009 NCR report still concluded that “NPS does not acknowledge the changing ecological baseline of Drakes Estero, in which native Olympia oysters probably played an important role in structuring the estuary’s ecosystem for millennia.”

On June 1, 2009 the NPS responded to the NRC with a professional archeologist summary that concluded: “On the basis of the current archeological record, it cannot be asserted that O. lurida [the native oyster] is represented in any abundance at the archeological shell midden of

\(^1\) Drakes Estero: A Sheltered Wilderness NPS 2006.
\(^3\) A draft of National Research Council Report (NRC) on Drakes Estero was hacked off the NRC computers and passed to DBOC supporters in March 2009, but was not available to other interested parties until just days before the final version was scheduled for release in May 2009. This exceptionally brief review period for NPS and the environmental community has had consequences that continue to impact scholarly discussion of these issues.
\(^5\) http://www.library.spscc.ctc.edu/electronicreserve/anth280/9HubbardNeaShellfishFinalPaper.pdf
Drakes Estero. Any assumption to the contrary is not supported by the archeological data...If we assume [as did the NRC report] that the Coast Miwok inhabitants of Drakes Estero made regular use of all edible molluscan species that were readily available to them, then we would have to conclude that the O. lurida population of the estero was small to nil.”

That NPS archeological review was shortly followed by a June 16, 2009 letter from NPS to NRC stating “NPS can find in the literature cited in the report no specific documentation for the claim that Olympia oysters were present in any meaningful numbers within historic and recent prehistoric time in Drakes Estero...Archaeological studies of middens in the vicinity of the estero suggest that oysters were not much utilized by the inhabitants at the time, which may indicate that, at most, oysters were rare and local.” Thus the NPS letter characterized the NRC claim as “entirely speculative” and requested that the NRC “take the necessary steps to remedy these flaws.”

In response to this evidence demonstrating the lack of evidence underlying the NRC conclusion, Dr. Colglazier, Executive Officer, National Academy of Sciences, in a 7/6/09 mail to the National Parks Conservation Association, wrote: “there may be merit in having the committee consider... (1) What additional information is available to evaluate whether the native Olympia oyster was once part of the Drakes Estero ecosystem... and (2) How does this...affect the assessment of ecological baseline conditions in Drakes Estero?”

But the NRC review did not occur, so in its August 11, 2009 letter, a follow-up NPS letter to the NRC was exceptionally straightforward: “[NPS] review finds this [NRC] conclusion to be improbable and indefensible, because there is little factual evidence to support the assumptions on which it is based. Close examination of the sources cited in the NRC report reveals that the authors failed to research adequately the historical (and archeological) basis of their claims. Instead of consulting primary records, the report’s authors relied on secondary sources which were misleading or otherwise unreliable, although they may have supported the author’s own presuppositions. A more thorough-going and critical review of the historic records reveals nearly the opposite of what the NRC claims...This failure to employ professionally-acceptable standards of historic research calls in to questions the NRC report’s effectiveness...”

Yet again, no reassessment by the NRC occurred. In the intervening three years, DBOC has repeatedly relied on the NRC’s unsubstantiated conclusion about the Estero’s ecological baseline to attack Park Service science and claim that the currently cultivated oysters are an ecological substitute for the supposedly extirpated native oysters.

In 2010, the Park Service engaged archeological experts at Sonoma State University to fill in archeological information missing from the NRC report thus produce more accurate picture of
the Estero’s prehistory ecology than in the final NRC report. In 2011, Sonoma State researchers produced three archeological research reports (March draft, July peer reviewed, and October addendum).

The new Sonoma State research, based on laboratory analysis that supplemented fieldwork, concluded that “...the absence of other prehistoric sites in the area containing quantities of native oyster shells makes it unlikely that Drakes Estero was a habitat for a large oyster population in prehistory.” Thus the available scientific evidence directly contradicts the NRC report and supports the June 1, 2009 NPS archeological summary by concluding that native oysters did not play a significant role in the Estero’s ecological history.

The new research follows from the prior referenced June 2009 NPS archeological summary that found a virtual lack of oyster shells in 15 of the 17 middens around Drakes Estero, but noted that the reported presence of oyster shells at the two remaining sites required further research due to recent disturbances that may have mixed in modern oyster shells. The June NPS summary also noted that its survey of sites in Tomales Bay and elsewhere was limited.

The Sonoma State University studies thus fill these remaining data gaps in the June 2009 NPS study using laboratory analysis that can better differentiate between native and introduced oyster species and radiocarbon dating that can distinguish between modern native oyster shells and pre-European native oyster shells.

The new studies increase the prior estimates of native oysters in Tomales Bay and note that the available archeological evidence makes clear the difficulty of distinguishing in the field the difference between native and non-native oyster shells, but “given the number of sites documented as containing oyster shells, it can be inferred that Olympia oysters were available for the Coast Miwok to harvest in Tomales Bay.”

The new studies also confirm that the oyster shells observed at CA-MRN-242, one of the two sites investigated and the largest in Drakes Estero, are pre-European native oysters, but these represent only about 8.5% of the total native shells collected. Furthermore, the presence of trade goods (obsidian) at this site suggests to the researchers that the native oysters were likely brought from afar rather than harvested locally, given that 15 of the other sites around Drakes Estero contain little to no oyster shells.

The second of the study’s investigated sites (CA-MRN-296, the site described in the NRC report), is highly disturbed, having been bulldozed, removed for fill and used to dump modern oyster shells. Here, the authors conclude, “there is likely a greater proportion of non-native than

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7 SSU October 2011.
native oysters shell in the deposit” but note that it is not possible to identify of almost half of the oyster shells. Identification was further confounded by the know presence of cultivated European oysters (Ostrea edulis), which share the same genus as the native oyster (Ostrea lurida). The study states “Olympia oysters are a larger constituent of the prehistoric deposit than initially determined... [which] is an anomaly on the prehistoric landscape of Drakes Estero. As summarized by Rudo (2009) and Konzak and Praetzellis (2011:20-22), with the exception of CA-MRN-296 and CA-MRN-242, the archeological sites around Drakes Estero are not known to contain deposits of oyster shell, while oyster shell can be found along Tomales Bay.”

Despite the new studies finding more oysters at this one site closest to Tomales Bay (which leads the authors to theorize that the native oysters were brought there from Tomales Bay), the overall count of pre-historic native oyster shells considering all of the 17 sites around the Estero remains low, which is consistent with the ethnographic, geological, and coring evidence documented in these new studies.

Thus, the new studies concluded that all available evidence “make it unlikely that Drakes Estero was a habitat for a larger oyster population in prehistory.” This conclusion, supported by “all available evidence” contradicts the 2009 NRC conclusion that was supported by no apparent evidence.

These new studies expose the lack of any scientific foundation supporting DBOC’s repeated attacks on the lack of oysters in the ecological baseline of the Park Service Draft EIS and makes clear that the cultivation of millions of non-native oysters represents an artificial modification to the ecology of Drakes Estero that cannot be justified on the basis of claims of operations continuity.

Recent Oyster Company Complaints Must Be Rejected

The oyster company recently made new complaints about the Sonoma State University archeological study in response to the National Park Service’s request for additional information subsequent to the Atkins peer review of the Draft EIS. Below is a summary of each new oyster company complaint and a substantive response to them. All complaints are found to be specious and without merit.

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7 Id.
8 Id.
9 Id.
10 Drakes Bay Oyster Company, June 5, 2012 letter to the National Park Service.
11 Point Reyes National Seashore, April 6, 2012 letter to Drakes Bay Oyster Company.
**DBOC Assertion #1:** Based on the NPS-funded Sonoma State University Draft EIS archeology report and the Atkins peer review, the NPS failed to provide the California Department of Fish & Game harvest records from the 1950’s and the 1960’s to the SSU archeological researchers because those harvest records show that large numbers (hundreds of thousands) of native Olympia oysters were harvested from Drakes Estero.

**Response:** The Draft EIS did in fact reference\(^{12}\) these Cal Fish & Game department records as the source of their information. These records do not reflect DBOC’s assertion that "hundreds of thousands" of native oysters were harvested from Drakes Estero in the 1950s and 1960s. To the contrary, these records show only a few thousand native oysters harvested in the Estero during that timeframe. Further, the records did not make clear whether these were from planted stock, from wild sources, or were from “ship-and-dip” oysters purchased from a separate source.

**DBOC Assertion #2:** The NPS used the aforementioned error in a single letter from DBOC to the California Coastal Commission to seriously misinform the Draft EIS and the Atkins peer review.

**Response:** The DBOC letter is referenced in the Draft EIS,\(^{13}\) which states that, “European flat oysters, native to Europe, have been included in the commercial shellfish operations lease since 1979 and are permitted in the 2008 SUP. DBOC does not currently cultivate this species. According to records submitted by DBOC to Cal Fish & Game, DBOC has never sold or planted European flat oysters. The last record of European flat oysters being sold at the site is from April 1968 (CDFG 2011c). Small numbers of this species still existed within Drakes Estero as of January 2008, when DBOC advised that these are remnants of prior plantings by JOC.\(^{14}\) DBOC’s January 30\(^{th}\) 2008 letter to the California Coastal Commission cited Section 3.2.7 of the Consent Order, which states that DBOC may cultivate European flat oyster but only in the defined “cultivation area.” DBOC’s 2008 letter also states that, “Small numbers of European flat oysters (Ostrea edulis) and Kumamoto oysters (Crassostrea sikamea), which were planted by the Johnson’s Oyster Company prior to 2005, still exist within the cultivated area.”

**DBOC Assertion #3:** A key conclusion made by an Atkins peer reviewer, depending exclusively on the that [sic] single error, is inaccurate. The Atkins reviewer was led to believe that Johnson Oyster Company cultured European flat oysters (an Edulis oyster), and then made his conclusion that these cultured species can be mistaken for the native Olympia oysters (an Edulis oyster) in the shell midden located on-farm at DBOC.

**Response:** It appears that DBOC wants to now claim that all the 2011 Sonoma State University (SSU) archeological study’s unidentifiable "edulis" shells are actually all Olympia and none European. If so, then that would roughly double the percentage of "native" oyster shells in midden MRN 296 (behind DBOC’s on-shore operations), but would make no difference in the SSU conclusion that the combined findings from all 15 middens around the Estero show an insignificant likelihood that native oysters formed any significant part of the natural (prehistoric) ecological baseline of the Estero.

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\(^{13}\) See Draft EIS, pages 176-177.

\(^{14}\) DBOC 2008b xviii: Letter from Drakes Bay Oyster Company to California Coastal Commission on January 31, 2008 regarding CCC-07- CeaseandDesist-04 Drakes Bay Oyster Company.
Furthermore, DBOC is confused: the Atkins review speaks to the concern about any new proposed cultivation of European Oysters “which have escaped aquaculture where introduced,” and impacts from possible remnant populations in the Estero, based on DBOC’s 1/31/08 letter, because the “longer a species is grown in an area, the greater the probability that it will escape.” The separate (but correct) statement that the two edulis species can be hard to distinguish is in the SSU Report, not the Atkins Review.

DBOC Assertion #4: Sonoma State reported that the carbon dating of all Edulis oyster shell from Drakes Estero middens was shown to be pre-historic and therefore could not have come from JOC operations.

Response: The "all" to which DBOC refers is 2 samples from the Home Ranch "Trade Center" midden (MRN 294) and two from the "DBOC midden" (MRN 296). But this DBOC statement begs the question: if “hundreds of thousands” of native oysters were harvested in the 1950s and 1960s as DBOC claimed, then those shells would have been disposed of in MRM 296. However, they were not found there, and the sample size of 2 does not provide any support for DBOC’s assertion.

DBOC Assertion #5: Had the Atkins peer reviewer been given the correct information that the large numbers of native Olympia oysters in this midden were prehistoric, and that JOC never cultured European Flat oysters, it is almost certain that the reviewer would have refuted the Draft EIS assertion that these millions of native oysters were carried by Native Americans from Tomales Bay to the shores of Drakes Estero.

Response: This DBOC statement assumes that the unquantified number of native oysters in MRN 296 equals "millions." But even if none of these purported “millions” resulted from the claimed “hundreds of thousands” harvested by JOC (i.e. everything in the midden is pre-historic), this ignores that the midden may have been in use for several hundred years (the 4 radio carbon dates from the Estero range from 1600 BP to 2230 BP, or 630 years); e.g. 1587 native oysters carried from Tomales Bay to the Estero once every year for a big, annual festival for 630 years equals 1 million oysters in the MRN 296 midden. Thus the SSU conclusion that the virtual absence of native oyster in all of the other Estero middens (more distant from Tomales Bay) far outweighs even “millions” of native oyster shells at the Estero site nearest Tomales Bay (MRN 296). DBOC’s assertion fails due to illogic and failure to assess factual information derived from the archeological studies.

DBOC Assertion #6: Because NPS failed to provide the oyster midden study in time for the public’s review and comment during the deEIS public comment period, NPS misinformation remain unchallenged by the public.

Response: Prior NPS studies reached the same conclusions on which the DEIS baseline of abundance of native oysters was established, namely that there were very few present in Drakes Estero. The new 2011 SSU studies, referenced in the DIES, show nothing different and only confirm the prior studies and the Park Service’s basis for holding that the historic ecological

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16 See Atkins, p. 68.
baseline of Drakes Estero contained very few native Olympia oysters.