

**Archaeological Survey along Proposed Channel
Transects, La Bahia Grande Unit, Laguna Atascosa
National Wildlife Refuge**

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**With Appendix: Additional Intensive Survey at 41CF136, with Revised
Assessment and Recommendations**

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Abstract

An archaeological survey within the Bahia Grande Unit of the Atascosa National Wildlife Refuge was conducted by Coastal Environments, Inc. under contract with Ocean Trust. The survey, carried out under ARPA Permit No. LA-04-020, involved pedestrian inspection of ground along the center lines of proposed channel excavations. Where ground surface visibility was obscured by vegetation cover, hand-dug shovel tests were excavated to test for subsurface archaeological materials. The survey results indicate that low-lying mud flat areas are devoid of archaeological materials and sites. Remnants of an historic railroad bed and two prehistoric sites were found within the survey area, both situated at or above five feet above mean sea level on or within cumulic, eolian clay dune sediments. Both sites were previously recorded by A. E. Anderson, an avocational archaeologist from Brownsville, Texas. Site 41CF138 (Anderson Site #00.9) is on a clay dune that barely impinges on the right of way of proposed Channel A. This site was evidenced only by sporadic small burned clay nodules and scattered *rabdotus* land snail shells. Site 41CF136 (Anderson Site #2.7) was noted as a scatter of artifacts and fish otoliths that extended for some 500-600 meters along the eroded edge of clay dune sediments along the eastern shoreline of Bahia Grande. Inspection of the site indicated that these materials had eroded from a thin archaeological zone within the dune at 210-230 cm below the present surface. Materials collected include two Tortugas dart points, four shell artifacts, and 31 fish otoliths, mostly from black drum (*Pogonias cromis*). The range of materials found and their vertically discrete source within cumulic clay dune sediments initially suggested that this site might be eligible for listing on the National Register of Historic Places and as a State Archeological Landmark. However, further careful inspection of this site, requested by the U.S. Fish and Wildlife Service and discussed in the Appendix of this report, indicated that cultural materials are very diffuse within the source clay dune and that their relative concentration on the swash zone is merely the result of natural winnowing processes. Based on these observations, a revised conclusion is that subsurface excavation would produce little useful information and for this reason the site should not be considered likely to be eligible for the National Register. No further archaeological work is recommended. Materials collected are curated at the Texas Archeological Research Laboratory, The University of Texas at Austin.

Contents

Abstract.....	ii
Acknowledgements.....	iii
The Area.....	1
Geologic History.....	1
Archaeological Context.....	2
Archaeological Survey Field Methods and Findings.....	4
Shovel Tests.....	4
Pedestrian Ground Survey.....	14
Archaeological Sites.....	15
Historic Railroad Platform.....	15
41CF138, Anderson Site #00.9.....	15
41CF136, Anderson Site #2.7.....	18
Lithic Artifacts.....	18
Shell Artifacts.....	21
Fish Remains.....	22
Conclusions and Recommendations.....	23
APPENDIX: Additional Intensive Survey at 41CF136.....	30

Figures

1. Map of area containing proposed Channel A.....	5
2. Map of area containing proposed Channels B2, C1, C2, C3 and D.....	6
3. View of historic railroad platform, looking northwest.....	16
4. View of historic railroad platform, looking west.....	16
5. Historic railroad support pilings, looking west.....	17
6. Iron railroad spike on surface.....	17
7. View of Site 41CF136 on eastern shoreline of Bahia Grande.....	19
8. Closeup of erosional exposure, 41CF136.....	19
9. Lithic artifacts from 41CF136.....	20
10. Piece of pumice from 41CF136.....	21
11. Shell artifacts from 41CF136.....	22
12. Fish otoliths from 41CF136.....	23
A-1. Map of 41CF136.....	34
A-2. 41CF136: Interface between beach swash zone and clay dune.....	35
A-3. 41CF136: Eroded margin of clay dune.....	35
A-4. Artifacts from 41CF136.....	36

Table

1. Data on sediments and contents by arbitrary levels, shovel tests.....	7
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The Area

The Bahia Grande Unit of the Laguna Atascosa National Wildlife Refuge is part of the Rio Grande Delta area, both in terms of its biophysical environment and as an archaeological area. Topography is low and nearly flat, with the significant exception of the many clay dunes that are found along shorelines. Within the Bahia Grande Unit are almost entirely enclosed shallow lagoonal areas and associated wind-tidal flats (i.e., Bahia Grande, Laguna Larga and Laguna Madre). The surrounding level terrain, generally around 5 ft (1.5 m) or less above mean sea level (MSL), is part of the extensive sediment deposit that comprises the Rio Grande Delta. The many long, relatively narrow clay dunes are adjacent and parallel to the lagoonal shorelines and rise 5-10 m above the surrounding land surface.

Vegetation in the area is generally sparse, reflecting climatic aridity. With the exception of algae, the tidal flats are barren. Various grasses and salt-tolerant weeds are found on the level deltaic plain. Clay dunes support dense stands of scrub trees, most commonly mesquite. Margins of the clay dunes are extensively eroded, exposing geologic (and potentially archaeologically relevant) soil/sediment profiles.

Land animal species native to the district occur in all non-inundated areas. Terrestrial fauna particular to the study region include several species of snake, including the speckled racer (*Drymobius margaritiferus*), the black-striped snake (*Coniophanes imperialis*), and the Mexican hooknose snake (*Ficimia streckeri*). Also from the Tamaulipan zone only, the Texas tortoise (*Gopherus berlandier*) is known. There are also several species of lizards in this pronouncedly reptilian faunal assemblage. Amphibians are rare, however (even on the mud flats, due to frequent droughts), and include the black-spotted newt (*Notophthalmus meridionalis*). Mammals endemic and unique to the area tend to be small rodents, including the Mexican spiny pocket mouse (*Liomys irroratus*) and the Coue's rice rat (*Oryzomys couesi*).

Geologic History

The Bahia Grande Unit, as seen today, is the result of physical processes active since the end of the Pleistocene. During the last glacial maximum, ca. 20,000 years before present (b.p.), global sea level was 100 or more meters below its present position, and the Gulf shoreline was some 80 km east of its present location. The Rio Grande thus flowed in a broad valley eastward across the now-submerged continental shelf (Brown et al. 1980). As sea level rose during the Holocene (after ca. 11,000 b.p.), the lower reaches of the Rio Grande valley were inundated by transgressive marine waters, ultimately forming a long embayment that extended some 45 km inland from the present shoreline.

By the middle Holocene, the Rio Grande was depositing alluvial sediments and infilling the embayed valley and eventually creating prograding delta lobes that, at their maximum extent, reached some 15 km east of the present shoreline. As sea level reached its modern position by ca. 3,000 b.p., erosion by wave action reworked the deltaic lobes, pushing them landward. Wave action and longshore drift combined to deposit near-shore sediments that formed south Padre Island, which ultimately coalesced with northern Padre Island to largely separate lower Laguna Madre from the open Gulf of Mexico.

Simultaneously, the increasing sediment load of the Rio Grande Delta and near-shore marine sediments resulted in land subsidence and flooding of low-lying mainland areas such as the lagoonal flats of Bahia Grande. Low-energy sedimentation within the flats resulted in the accumulation of fine-grained clay and silt, and the area's frequent sustained winds transported a portion of these sediments landward to gradually form the numerous clay dunes that parallel lagoonal shorelines.

Significantly, Holocene sea-level rise was probably not a smooth, gradual process but rather occurred in a stepwise pattern, with periods of relatively rapid rise alternating with times of relatively stable sea level (e.g., Curray 1960; Frazier 1974; Paine 1990; Anderson and Thomas 1991). Geoarchaeological data from the central and upper Texas coasts suggests that periods of relatively stable sea level stillstand were conducive to estuarine sedimentation, creation of broad, vegetated shallows and high biotic productivity conducive to intensified human occupation and exploitation of the shoreline environment (Ricklis 1995; Ricklis and Blum 1997). Presently, there are insufficient data to determine if an analogous pattern operated over time on the lower Texas coast and the Rio Grande Delta area, partly due to a paucity of archaeological chronology and partly from a lack of systematic geomorphic and geoarchaeological investigation in the delta area.

Archaeological Context

Generally, the archaeological knowledge of the Rio Grande Delta area is very limited. Due to a paucity of sustained and systematic research in the area, basic topics such as prehistoric cultural chronology and patterns of human adaptation remain poorly defined. Key areas of investigation such as stratigraphic studies, intra-site patternings, zooarchaeological study of dietary and subsistence-economic patterns, and the long-term relationship between human adaptations and dynamically changing coastal and deltaic environmental zones have yet to be carried out. Only very general assumptions about lifeways can, therefore, be reasonably made at this time, most obviously that the native peoples of the area subsisted without agriculture, relying on hunting, plant gathering and, probably importantly, fishing, as recorded ethnohistorically by Euroamerican observers in the 18th century (see Salinas 1990).

Archaeological sites in the general area are known to cluster on natural levees along stream banks (e.g., Collins et al. 1989) and on/in clay dunes along the Laguna Madre shoreline and the many tidal inlets along the mainland shoreline (e.g., Prewitt 1974). The latter kind of site location is clearly typical of the Bahia Grande Unit, where numerous known sites, mostly recorded by A.E. Anderson in the 1920s, are situated on shoreline clay dunes.

Despite the generally poor archaeological understanding, the Rio Grande Delta and surrounding area has attracted some scholarly interest, albeit much of it speculative, over the years. Since the 1930s, it has been suggested that the Texas coast may have been a major avenue for the movement of cultural influence from the complex societies of pre-Columbian Mesoamerica into the Southeastern United States (e.g., Mason 1935). Cited as evidence for this were findings of Huastecan (northeastern Mesoamerican) pottery vessels at sites in the Rio Grande Delta, as well as occasional pieces of Mexican obsidian and artifacts of jadeite. More recently, Hester (1980, 1995) and others have

speculated on a trade network between the native hunting-gathering-fishing populations of the Delta area and lower Rio Grande and the intensively agricultural peoples of the Huastecan area (cf. Eckholm 1944; MacNeish 1958). Hester (1995) has suggested that the many marine-shell ornaments found in surface collections from the Rio Grande Delta may reflect intensive production and exchange for Huastecan pots, obsidian and limited quantities of jadeite ornaments.

The only consistently used cultural-historical term applied to prehistoric archaeology of the Texas portion of the Delta area is that of the "Brownsville Complex" (MacNeish 1958; Hester 1969, 1980, 1995; Bousman et al. 1990; Ricklis 1995; Ricklis and Weinstein 2005). Very generally, the term designates an assemblage of artifacts surface collected from area sites (mostly by A. E. Anderson between 1908 and the 1930s) and, to a more limited degree, reported from cemetery burials (e.g., Hester 1969, 1980), consisting of a variety of marine shell ornaments, tools manufactured from conches and other marine shells, bone beads and other ornaments, diminutive chipped stone tools such as scrapers and drills or perforators, and small, thin triangular and subtriangular arrow points. No indigenous ceramics are ascribed to the Brownsville Complex, though, as mentioned, sherds and some whole vessels of Huastecan pottery are reported in limited quantities. Generally the Brownsville Complex has been thought to fall into the Late Prehistoric period (after ca. A.D. 1000 or so), though recently acquired radiocarbon dates on certain human burials from the lower Rio Grande valley may establish a direct antecedent in the preceding Archaic period (T. Terneny, pers. comm. 2003). Aside from the information provided by extensive surface collection and a limited number of human burials, little is understood about the lifeways or adaptive patterns of the people who left behind the Brownsville Complex materials.

Earlier cultures are even less well understood. Occasional archaeological investigations (e.g., Prewitt 1974; Mallouf et al. 1977; Collins et al. 1989; Bousman et al. 1990; Eling et al. 1993) have produced evidence for human occupation during the Archaic period. Stone tools and dart point forms have been noted. A very limited number of radiocarbon dates have been reported from camp and burial sites that place occupation as far back as at least ca. 3,500 b.p. (e.g., Collins et al. 1989). Only very limited information on Archaic artifact assemblages and zooarchaeological data is available, though a generalized hunter-gathering, and in places fishing, subsistence economy appears to be indicated. Despite the limited data gathered on early subsistence practices, the potential for using analysis of fish otoliths for seasonality of fishing and shoreline site occupation was successfully tested at the Horse Island Site to the north of the Bahia Grande Unit (Eling et al. 1993). This analytical technique, which has proven highly useful farther north along the Texas coast (e.g., Ricklis 1996; Weinstein 2002) can surely be well utilized in the Rio Grande Delta.

At this point, then, the research issues in the Rio Grande Delta area that need investigation are quite fundamental, and it is the potential for a given archaeological site to address these issues that should form, in large part, the basis for site assessment of potential eligibility to the NRHP. These basic issues are:

1. Culture chronology, as evidenced by a definable sequence of archaeological material assemblages (i.e., specific artifact types and forms for discrete time periods).

2. Subsistence economic patterns and their continuity and change through time, as evidenced by specific strategies of resource exploitation and the interlinkage of these strategies with naturally changing/evolving environmental resource mosaics.
3. Settlement patterns, or how prehistoric peoples used and moved to and from preferred locations in their environment. This issue encompasses questions of intensity of site occupation and specific resource zones according to the relative abundances of key subsistence resources, the relative size of groups residing at specific kinds of sites within specific environmental zones, and the duration and periodicity/seasonality of occupations.
4. The origins and development of the Brownsville Complex, and its possible relationship to Mesoamerican cultures to the south.

Archaeological Survey Field Methods and Findings

The archaeological survey of transects along the proposed routes of channels A, B1-2, C1-3, and D on Bahia Grande in Cameron County, Texas were conducted over a week-long period in May of 2004 by for purposes of archaeological site detection, definition, or clearance (in the absence of archaeological material) for proposed channel cuts within the aforementioned transects.

Field methods for the survey consisted of a combination of ground surveillance of surfaces within 100 meters of the centerlines of the proposed channel cuts. Shovel tests were excavated along survey transects where ground-surface visibility was obscured by vegetation cover that was more than an estimated 30 percent of the surface. Observations of erosional banks and gullies were also made to detect the presence of buried archaeological materials.

Shovel tests

Areas of relatively low surface visibility due to vegetation cover were subjected to shovel testing so that the presence/absence of archaeological sites might be determined. Shovel tests were dug approximately 100-meter intervals along all survey transects as defined by the planned Bahia Grande channel cuts (A, B1-2, C1-3, and D), and dug to a depth of 100-120 cm below ground surface or to water table. Whichever was closest to the surface. Shovel tests reaching the modern water table were terminated where saturated conditions were encountered. Such conditions occurred exclusively in *Salicornia*- and *Batis maritima*-dominated, low-lying mud flats along Transect A.

Because of the consistently water-saturated conditions found along Transect A, no further shovel tests were placed in similar, low-lying mud-flat areas. Better-drained locales that would have been suited to prehistoric occupation, namely lomas (clay dunes), were scarcely intersected by the proscribed survey transect limits. Terrestrial flats

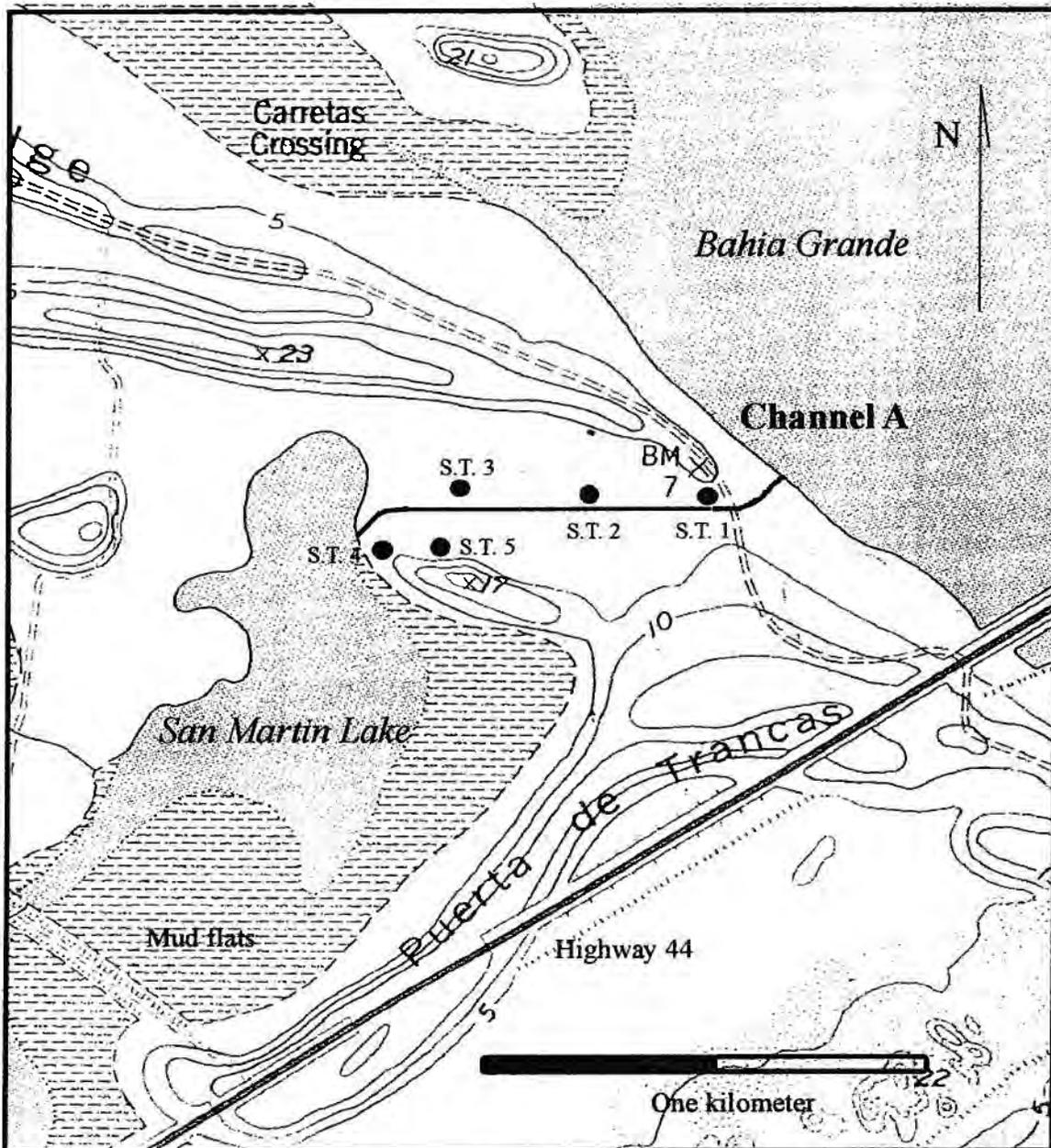


Figure 1. Map of that part of the Bahia Grande Unit containing proposed Channel A. Pedestrian survey was along both sides of the Channel centerline (shown as black line), and subsurface shovel test locations are indicated.

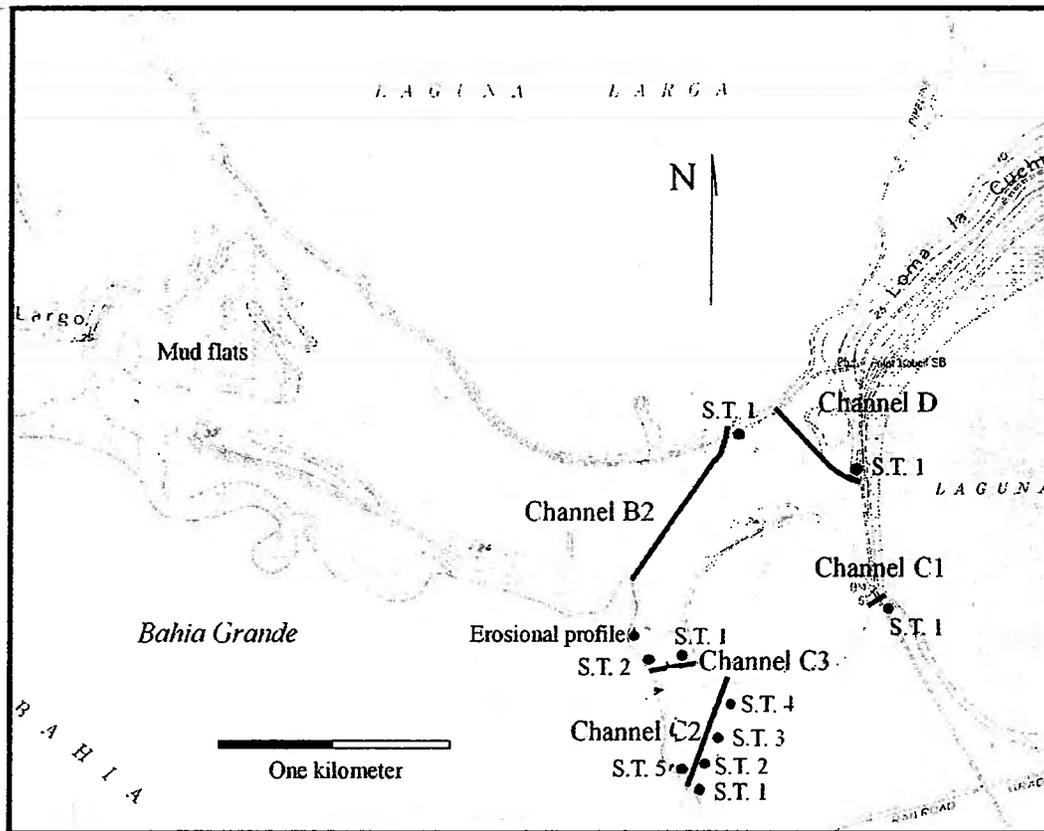


Figure 2. Map of the part of the survey area containing the proposed Channels B2, C1, C2 and C3, and D. Shovel test locations are shown (as numbered for each channel).. Erosional profile shown in Figure 8 is indicated.

vegetated by *Spartina* grassland, at elevations intermediate between the mud flats and lomas thus comprised the main topographic zone to be surveyed.

A uniformly high proportion of clay was found in all sediment deposits encountered during shovel testing (see Table 1). In order to ensure the recovery of small items, clay clasts were thoroughly broken-up with trowels, shaken (on ¼" screens), and then carefully picked through in order to retrieve any artifacts or ecofactual material. During this process, levels were differentiated arbitrarily at 20 cm depth intervals. Soils encountered during shovel testing were then described as to type (particle size) and color, after observations of clastic qualities and Munsell color values, respectively.

Upon completion, all shovel test profiles were photographed and assigned UTM coordinates by means of a GPS device. Shovel tests have been subsequently plotted on maps of survey transects A, B1-2, C1-3, and D designated according to relevant proposed channel (Figures 1 and 2). The minimal finds retrieved by this procedure are presented in Table 1. In short, shovel testing produced exclusively the scattered remains of land snails in what are probably natural ("background-level") quantities. No archaeological material was discovered during shovel testing.

Table 1. Data on sediment characteristics and contents by 20-cm arbitrary levels in hand-dug shovel tests.

Area: A

S.T. No.	Level	Sediment	Sediment Color	Contents
1	0-20 cm.	silty clay	10YR 5/3	none
	20-40 cm.	silty clay	10YR 5/3	none
	40-60 cm.	silty clay	10YR 5/3	none
	60-80 cm.	silty clay	10YR 5/3	none
	80-100 cm.	silty clay	10YR 5/3	none

Area: A

S.T. No.	Level	Sediment	Sediment Color	Contents
2	0-20 cm.	gleyed clay w/ traces of silt	10YR 4/1	none
	20-40 cm.	gleyed clay w/ traces of silt	10YR 4/1	none
	40-60 cm.	gleyed clay w/ traces of silt	10YR 4/1	none
	60+cm. water table	gleyed clay w/ traces of silt	10YR 4/1	none

Area: A

S.T. No.	Level	Sediment	Sediment Color	Contents
3	0-20 cm.	gleyed clay w/ traces of silt	10YR 4/1	none

	20-40 cm.	gleyed clay w/ traces of silt	10YR 4/1	none
	40-60 cm.	gleyed clay w/ traces of silt	10YR 4/1	none
	50+cm. water table	gleyed clay w/ traces of silt	10YR 4/1	none

Area: A

S.T. No.	Level	Sediment	Sediment Color	Contents
4	0-20 cm.	silty clay	10YR 5/3	none
	20-40 cm.	silty clay	10YR 5/3	none
	40-60 cm.	silty clay	10YR 5/3	none
	60-80 cm.	silty clay	10YR 5/3	none

Area: A

S.T. No.	Level	Sediment	Sediment Color	Contents
5	0-20 cm.	silty clay	10YR 5/3	none
	20-40 cm.	silty clay	10YR 5/3	none
	40-60 cm.	silty clay	10YR 5/3	none
	60-80 cm.	silty clay	10YR 5/3	none
	80-100 cm.	silty clay	10YR 5/3	none

Area: B1 West Channel

S.T. No.	Level	Sediment	Sediment Color	Contents
1	0-20 cm.	silty clay	10YR 5/3	8 shell fragments
	20-40 cm.	silty clay	10YR 5/3	4 shell fragments
	40-60 cm.	silty clay	10YR 5/3	2 shell fragments
	60-80 cm.	silty clay	10YR 5/3	none
	80-100 cm.	clay loam	10YR 3/2	none (buried soil horizon)

Area: B2

S.T. No.	Level	Sediment	Sediment Color	Contents
1	0-20 cm.	silty clay	10YR 5/3	4 rhabdotus fragments, 4 shell fragments
	20-40 cm.	silty clay	10YR 5/3	6 shell fragments
	40-60 cm.	silty clay	10YR 5/3	2 snail shells, 25 rhabdotus fragments, 2 shell fragments
	60-80 cm.	silty clay	10YR 5/3	1 rhabdotus fragment
	80-100 cm.	clay loam	10YR 3-4/2	32 rhabdotus fragments, 1 shell fragment (buried soil horizon)

Area: C1

S.T. No.	Level	Sediment	Sediment Color	Contents
1	0-20 cm.	silty clay	10YR 5/3	none

	20-40 cm.	silty clay	10YR 5/3	6 rabdotus fragments
	40-60 cm.	silty clay	10YR 5/3	8 rabdotus fragments
	60-80 cm.	silty clay	10YR 5/3	none
	80-100 cm.	clay loam	10YR 3/4-2	3 rabdotus fragments (buried soil horizon)

Area: C1

S.T. No.	Level	Sediment	Sediment Color	Contents
2	0-20 cm.	silty clay	10YR 5/3	none
	20-40 cm.	silty clay	10YR 5/3	3 rabdotus fragments, 2 shell fragments
	40-60 cm.	silty clay	10YR 5/3	4 rabdotus fragments
	60-80 cm.	silty clay	10YR 5/3	1 rabdotus fragment
	80-100 cm.	clay loam	10YR 3/4-2	none (buried soil horizon)

Area: C2

S.T. No.	Level	Sediment	Sediment Color	Contents
1	0-20 cm.	silty clay	10YR 5/3	none
	20-40 cm.	silty clay	10YR 5/3	none

	40-60 cm.	silty clay	10YR 5/3	none
	60-80 cm.	silty clay	10YR 5/3	none
	80-100 cm.	silty clay	10YR 5/3	none

Area: C2

S.T. No.	Level	Sediment	Sediment Color	Contents
2	0-20 cm.	silty clay	10YR 5/3	none
	20-40 cm.	silty clay	10YR 5/3	none
	40-60 cm.	silty clay	10YR 5/3	none
	60-80 cm.	silty clay	10YR 5/3	none
	80-100 cm.	clay loam	10YR 3-4/2	none (Buried A-Horizon)

Area: C2

S.T. No.	Level	Sediment	Sediment Color	Contents
3	0-20 cm.	silty clay	10YR 5/3	none
	20-40 cm.	silty clay	10YR 5/3	17 rabdotus fragments, 2 shell fragments
	40-60 cm.	silty clay	10YR 5/3	33 rabdotus fragments, 2 shell fragments
	60-80 cm.	silty clay	10YR 5/3	84 rabdotus fragments, 1 crab fragment, 1 shell fragment
	80-100 cm.	silty clay	10YR 5/3	7 rabdotus fragments, 2 snail

	100-110 cm.	clay loam	10YR 3-4/2	shells none (Buried A-Horizon)
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Area: C2

S.T. No.	Level	Sediment	Sediment Color	Contents
4	0-20 cm.	silty clay	10YR 5/3	2 shell fragments, 2 snail shells, 1 rabdotus fragment
	20-40 cm.	silty clay	10YR 5/3	4 crab fragments, 3 snail shells, 3 rabdotus fragments
	40-60 cm.	silty clay	10YR 5/3	54 rabdotus fragments, 4 snail shells, 2 crab fragments, 1 gypsum crystal
	60-80 cm.	silty clay	10YR 5/3	8 rabdotus fragments, 1 snail shell, 205 gypsum crystals
	80-83 cm.	silty clay	10YR 5/3	1 rabdotus fragment, 295 gypsum crystals
	83-100 cm.	silty clay	10YR 5/3	1 snail shell, 89 gypsum crystals
	100-120 cm.	clay loam	10YR 3-4/2	3 crab fragment, 4 gypsum crystals (Buried A-Horizon)

Area: C2

S.T. No.	Level	Sediment	Sediment Color	Contents
5	0-20 cm.	silty clay	10YR 5/3	none
	20-40 cm.	silty clay	10YR 5/3	none
	40-60 cm.	silty clay	10YR 5/3	none
	60-80 cm.	silty clay	10YR 5/3	none
	80-100 cm.	silty clay	10YR 3-4/2	none (Buried A-Horizon)

	100-120 cm.	clay loam	10YR 3-4/2	none (Buried A-Horizon)
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Area: C3

S.T. No.	Level	Sediment	Sediment Color	Contents
1	0-20 cm.	silty clay	10YR 5/3	none
	20-40 cm.	silty clay	10YR 5/3	39 shell fragments, 46 rabdotus fragments, 1 snail fragment, 3 gypsum crystals
	40-60 cm.	silty clay	10YR 5/3	32 shell fragments, 7 rabdotus fragments, 1 crab fragment
	60-80 cm.	silty clay	10YR 5/3	4 shell fragments, 3 rabdotus fragments
	80-100 cm.	silty clay	10YR 5/3	21 rabdotus fragments 152 gypsum crystals

Area: C3

S.T. No.	Level	Sediment	Sediment Color	Contents
2	0-20 cm.	silty clay	10YR 5/3	1 shell fragment, 2 rabdotus fragments
	20-40 cm.	silty clay	10YR 5/3	none
	40-60 cm.	silty clay	10YR 5/3	none
	60-80 cm.	clay loam	10YR 3-4/2	none (buried soil horizon)
	80-100 cm.	silty clay	10YR 5/4	none

Area: D

S.T. No.	Level	Sediment	Sediment Color	Contents
1	0-20 cm.	silty clay	10YR 5/3	none

20-40 cm.	silty clay	10YR 5/3	4 rabdotus fragments
40-60 cm.	silty clay	10YR 5/3	12 rabdotus fragments, 6 snail shells
60-80 cm.	silty clay	10YR 5/3	none
80-100 cm.	clay loam	10YR 3-4/2	2 snail shells (Buried A-Horizon)

A total of 15 shovel tests were dug during the course of archaeological survey at Bahia Grande. Although unproductive of archaeological materials, information on the nature of sediments in different landforms was obtained (see Table 1). Interestingly, a buried palaeosol was observable in a number of shovel tests as well as along erosional exposures of the strandline at Bahia Grande. The upper contact of this palaeosol is encountered relatively uniformly at a depth of 100-120 cm across the project area, and must reflect the sedimentary outcome of certain regional environmental conditions. These regional (paleo-) conditions most likely include the development of ground vegetation with a better-developed rhizosphere than that of today (preventing erosion and encouraging a "loamy" A-horizon development of relatively art color).

In addition to the definition of this extensive buried soil horizon, a uniformly silty clay matrix encountered in all shovel tests above the buried soil suggests that clay dune formation in the region has been relatively continuous since the formation of the palaeosol. Such sediments are the primary products of mud-flat erosion, which leads to eolian deposition into clay dunes or lomas.

Pedestrian Ground Survey

The ground surface along survey transects was visually inspected by the field crew, with participating individuals walking in parallel lines spaced at 10-meter intervals. Pedestrian ground survey on non-eroded, less-vegetated surfaces found no evidence of archaeological materials, except in the surface of one previously recorded site (Anderson site "# 00.9", or 41CF138, near Channel A), which may be heavily deflated. Surface exposures were also examined at the historic railroad recorded on the southern shore of Bahia Grande and photographs were taken of this feature (see Figures 3-6).

Importantly, all erosional exposures of deeper sediment deposits were visually inspected. Such exposures include rills and gullies, Bahia Grande shoreline banks, and the eroded edges of clay dunes found within the survey transects. This field procedure made possible the finding of site 41CF136 (see below).

From such an examination of erosional exposures, a significant finding during the pedestrian survey program was the relocation and definition of the Anderson site # 2.7" (site trinomial designation is 41CF136) within survey transect C2, along the eastern

strand-line of Bahia Grande. It was determined after cleaning and excavation into the cut bank of this site along the strand line exposure that materials deposited along the eastern Bahia Grande "beach" actually derived from a depth of two meters, and not from shallower, overlying sediments. This interpretation was confirmed by a complete absence of archaeological materials in the upper surface exposures, and by a similar absence of archaeological materials in 1.2-meter-deep shovel tests performed along the western aspect of the C2 Transect (namely, shovel tests 1 and 5, see below).

Archaeological Sites

Archaeological sites identified during the survey work include an already mapped historic railroad line partially preserved on the southern shore of Bahia Grande and two prehistoric sites already encountered by A. E. Anderson (#00.9 and #2.7, 41CF138 and 41CF136 respectively as recorded in site files at the Texas Archeological Research Laboratory).

Historic Railroad Platform

A photographic record was made of a historic railroad platform intersecting the southern shore Bahia Grande that consists of oak uprights and iron stakes (see photos, Figures 3-6). Preserved sections of the wooden uprights continue for a distance of several hundred meters into the middle of Bahia Grande.

41CF138, Anderson Site #00.9

The Anderson site #00.9 (41CF138) was briefly examined on the western edge of Transect A (Figure 1). The clay dune on which the site is located does not extend into the proposed channel right of way, as indicated by negative findings in Shovel test 1 within this transect. Remains observed on the surface of the site on the clay dune to the west of Channel A include rare small burned clay nodules and very common *Rabdotus* land snail shells which may reflect prehistoric food gathering and shell discard. The surface distribution of the latter remains suggests that the site (on the end of the clay dune) is significantly deflated. No time-diagnostic artifacts were discovered from the site.



Figures 3 and 4. *Top (Fig. 3), view of historic railroad support pilings, looking east from Bahia Grande shoreline. Bottom (Fig. 4), view of same looking west from shoreline toward Bahia Grande.*



Figures 5 and 6. *Top*(Fig. 5), historic railroad support pilings, looking west. *Bottom* (Fig. 6, one of the many iron railroad spikes lying on surface within the two rows of support pilings.

41CF136, Anderson Site #2.7

The A.E. Anderson site #2.7 (41CF136) was relocated and intensively examined by the CEI survey crew. Archaeological materials at 41CF136 were found along an approximately 400-500-meter north-south-trending line running along the strand of the eastern shore of Bahia Grande (Figures 7 and 8), centered south of the western terminus of the proposed Channel cut C2 (see Figure 2). This strand-line deposit was initially thought to have originated from some upper aspect of the erosional exposure formed along the strand, but intensive pedestrian survey along the entire shoreline failed to find any materials within the upper reaches of the exposed sediments, even though the strand itself was quite productive of artifacts of various classes (although *Rabdotus* land snail shells were most common). Shovel tests to a depth of 1.2 meters along the western aspect of Transect C2 also proved to be negative, indicating greater depth for the source of the exposed materials.

A complete vertical section of the erosional exposure was examined. In its upper aspect, a thin buried soil horizon was discovered at a depth of 1 meter, underlying a massive silty clay eolian sediment deposit. Below the soil horizon, sediment was a sandy clay. Importantly, a definitive *Rabdotus* lens and a lithic flake were found in situ 2.1 meters below the top surface of the erosional exposure, indicating that many of the archaeological remains strewn across the strand line at 41CF136 actually originate at this depth (suggesting considerable antiquity). This inference is further supported by the discovery of two well-made triangular Tortugas dart points from the 41CF136 strand, both of fine-grained, dark-brown chert (see Figure 9). Lithic tools and debitage collected from eroded surfaces at 41CF136 are discussed in detail below. At present, the stratigraphy (see Figures 8 & A-1) of the 41CF136 erosional profile can be summarized as follows:

1. Upper stratum (0-100 cm): silty clay, light brown (10YR5/3), contains no archaeological materials;
2. Buried soil horizon (100-120 cm): clay loam, dark brown (10YR3-4/2) in color, contains no archaeological materials;
3. Lower stratum (120-220 cm): sandy loam, light brown (10YR5/4) in color. Archaeological materials originating at approximately 210 cm below the surface include 2 chert Tortugas points, a small chert uniface, 6 pieces of chert debitage, 2 pieces of pumice, 31 fish otoliths, 2 sunray venus clamshell tool fragments, and a possibly modified whelk shell fragment.

Lithic Artifacts

Flaked stone artifacts recovered from 41CF136 include the two Tortugas points, a thin uniface, probably a scraper fragment, and six pieces of debitage. One of the Tortugas points is complete, while the other is a proximal or basal fragment. The complete specimen exhibits strong right-edge alternate edge beveling; the proximal fragment may also have had alternate beveling but the piece is too fragmentary for this to be determined.



Figures 7 and 8, *Two views of 41CF136 on the eastern shoreline of Bahia Grande. Top view (Fig. 7) is looking north along strandline on which were found artifacts and fish otoliths. Bottom view (Fig. 8) is a closeup of the eroded edge of clay dune sediments that contain the archaeological zone from which the materials had eroded, 210-230 cm below the upper surface.*

Tortugas points are extremely common in South Texas (Turner and Hester 1999; Prewitt 1995) and have been dated to as early as the sixth millennium b.p. (i.e., 3,000-4,000 B.C.; e.g., Hester 1980; Ricklis 1988). The type clearly was in use for a considerable time, since it has been dated at the Loma Sandia site in Live Oak County to as late as ca. 800-600 B.C. (Taylor and Highley 1995). The presence of two Tortugas points at 41CF136 indicates that the level from which the archaeological materials came represents an Archaic occupation, and a rough and tentative estimate of the possible time range of occupation would be ca. 6,000-2,000 b.p.

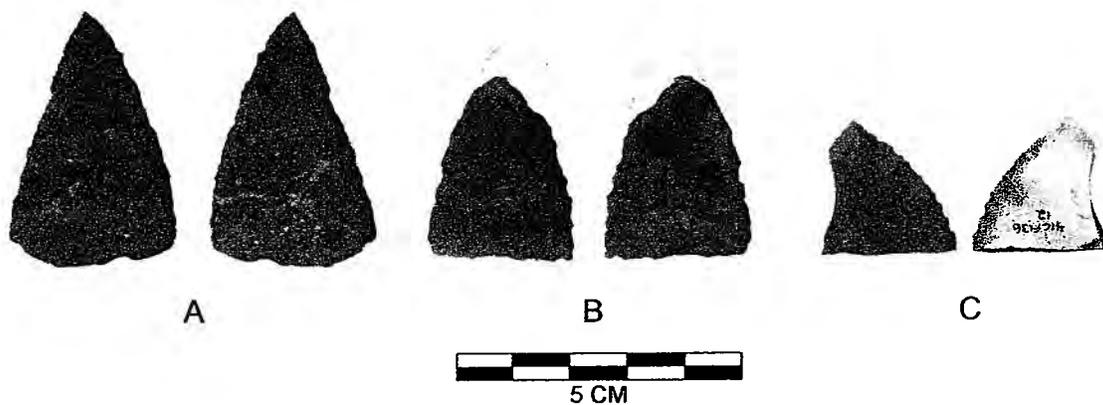


Figure 9. *Lithic artifacts from 41CF136. A, two faces of a Tortugas dart points; B, two faces of a Tortugas dart point with distal end broken off; C, retouched flake scraper fragment.*

The small uniface is a flake of brown chert on which one edge has been beveled by a series of short flake removals. This flaking created a plano-convex edge section that would have served well for scraping tasks.

The small sample of lithic debitage is instructive simply in terms of the scarcity of these materials. Since six flakes were recovered during our surface inspection along with three formal tools (2 dart points, 1 probable scraper), the flake-tool ratio at the site is a very low 2:1. Research conducted on the central Texas coastal to the north of the present project area indicated that such a low flake-to-tool ratio should be expected at sites located some considerable distance from the source of stone raw material used in tool production (Ricklis and Cox 1993). This should be expected in the Rio Grande delta wherein the local geology consists of fine-grained alluvial and deltaic sediments and chert cobbles would have had to be procured at some distance inland (see discussion by Tomka and Bousman 1991).

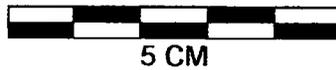


Figure 10. *Piece of unmodified pumice from 41CF136.*

The remainder of the lithic material from 41CF136 consists of two pieces of pumice, a light-weight volcanic rock that presumably washed up on Gulf of Mexico beaches. The two specimens from 41CF136, one cobble-sized (Figure 10) and the other pebble-sized, have no apparent use modifications and the shapes appear natural. The finding of shape-modified (i.e., flattened or faceted) pumice pieces at other archaeological sites along the Texas coast suggests that this material was sometimes used in abrading tasks (e.g., Ricklis 1994:83).

Shell Artifacts

Four shell artifacts (Figure 11) were found at 41CF136. Three specimens are fragments of sunray venus (*Macrocallista nimbosa*) clam shells with flaked edges, a common artifact form along the central and lower Texas coast (e.g., Prewitt et al. 1987; Ricklis 1995, 2004) where sunray venus shells were modified as scraping/cutting tools and served as a substitute raw material for chert or other flakable stone. The fourth artifact is a small rectangular piece of lightning whelk (*Busycon perversum*) shell that may have been artificially shaped; the weathering of this specimen precludes a confident assessment as to whether it was intentionally shaped.

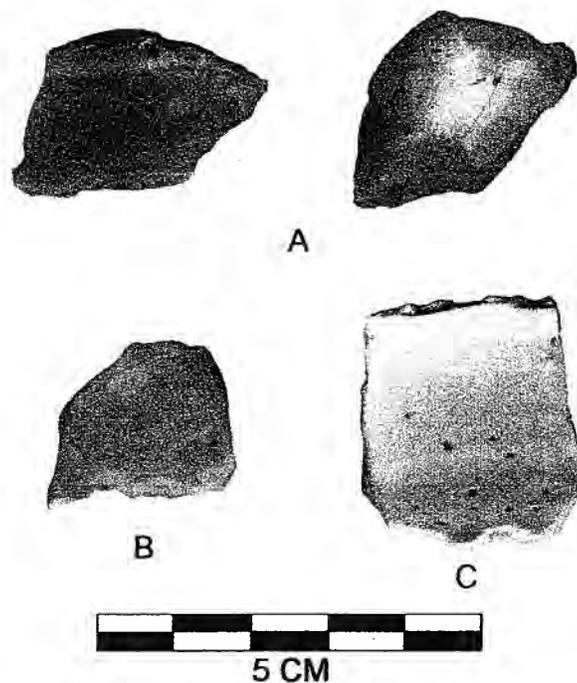


Figure 11. Shell artifacts from 41CF136. A, two sides of An edge-flaked sunray venus (*Macrocallista nimbosa*) clam shell; B, another edge-flaked Sunray venus shell; C, rectangular piece of lightning whelk (*Busycon perversum*) shell, possibly artificially shaped.

Fish Remains

No faunal bones were found at 41CF136, presumably due to decay over some undetermined long time since the site was occupied. However, an abundance of fish otoliths was found at the site, suggesting that fishing was a major, if not the primary, economic activity performed there. The distinctive morphology of these small objects (see Figure 12), comprised of calcium carbonate and protein, and which grow in fish skulls and aid in balance, allow identification of the species of fish. A total of 31 specimens were collected from the site, with the overwhelming majority (N=31, or 94%) representing black drum (*Pogonias cromis*), and the remainder representing redfish or red drum (*Sciaenops ocellata*) and spotted sea trout (*Cynoscion nebulosus*).

The near-pure assemblage of black drum at 41CF136 is suggestive of a somewhat specialized fishing camp function of the site in prehistory. Given the favorable conditions for black drum fishing during the Late Winter to Early Spring spawning season, it is likely that the seasonality of site occupation includes at least this portion of the year (e.g., Ricklis 1996; Eling 1993)). Significantly, the appearance of black drum, redfish and trout in the bahia also suggests that the Bahja Grande was a marine-influenced embayment during the period of site occupation.

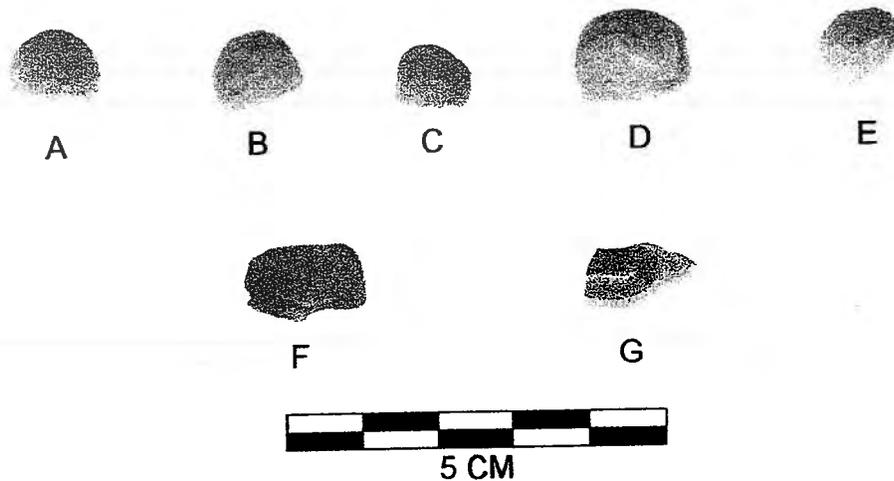


Figure 12. *Fish otoliths from site 41CF136. A-E, black drum (Pogonias cromis), F, redfish (Sciaenops ocellata); G, fragment of spotted sea trout (Cynoscion nebulosis) otolith.*

Conclusions and Recommendations

Careful surface inspection and shovel testing along the rights of way of the proposed Bahia Grande channels found no evidence of archaeological materials on low ground subject to tidal inundation. The two sites that were found during our survey are both located on/within ground that is at five or more feet in elevation above mean sea level; in both cases the containing sediment matrix consists of fine silty clays that accumulated through eolian deposition as clay-dune deposits. This is in keeping with expectations based on previously recorded information in the immediate area, especially the locations of archaeological sites recorded by A. E. Anderson which are commonly on the clay dunes or lomas that are common within the Rio Grande delta area. Inferably, these locations were preferred by prehistoric peoples for campsites because they provided well-drained ground that was above the reach of tidal fluctuations and thus suitable for habitation.

Site 41CF136, located on slightly elevated ground along part of the eastern shoreline of Bahia Grande produced a range of artifacts of stone and shell and a good-sized sample of fish otoliths. While our limited investigation of the site does not provide much data for interpretation, it can be inferred that the site represents a multi-functional occupation. The rather abundant fish otoliths suggest an economic importance for fishing activities, while the presence of flaked-stone dart points suggests that hunting activities were carried out from the site, as well. The edge-flaked sunray venus shells probably represent cutting and/or scraping tasks that were carried out at the site, while the few pieces of chert debitage indicate that stone tool production and/or rejuvenation (e.g., re-sharpening) was done there as well. The scattered small burned clay nodules may be eroded from hearth features. In short, the site is a sizeable one at which a range of

economic and technological activities were carried out, suggesting that it may have served as base camp for prehistoric peoples who were exploiting the locally available fish resources with some intensity.

41CF136 is the only prehistoric site encountered during our survey within any of the right of ways of any of the proposed channels. Indeed, the site appears to be more or less centered at the location of Channel C2 and extends, judging by surface finds, southward to the location of Channel C3. The site may also extend northward toward Channel B2, although no surface indication was found of this (see the Appendix for more information on the extent of this site).

Given that 41CF136 yielded diagnostic, typable dart points, shell tools, burned clay nodules (which probably represent on-site hearth features), and abundant fish remains in the form of species-diagnostic otoliths, it may have research potential for exploring the following key questions of archaeological significance:

1. The range of activities carried out by prehistoric people at a shoreline camp in the Rio Grande Delta area. As noted earlier, this question has yet to be addressed in the limited archaeological research conducted in the general surrounding area. Added investigation at the site could be expected to provide significant information on the full range of fish species exploited, the range of tool types used at the site (and, by inference, the range of activities carried out there), as well as the kinds of cultural features (e.g., hearths, pits, living/activity areas) that may be found at such a location.
2. Since the cultural material were observed to be eroding from a narrow zone of sediment at 210-230 cm below the present surface, it is probable that they represent a single, temporally discrete archaeological component. Recovery of organic materials such as bone, shell, or perhaps charcoal from hearth features would provide important information with which to place the dart points and other artifacts present within a regional chronological framework. As also noted earlier, a sound regional chronology has yet to be developed for the Rio Grande Delta area and such investigation would contribute significantly to this end.
3. In addition to contributing to the development of a regional cultural chronology, dating the occupation at 41CF136 would provide important information on paleoenvironmental history, which would in turn help to provide an environmental context for understanding the evolution of human ecological patterns in this area. The use of the site for more or less intensive fishing is an important clue to the kind of kind of aquatic environment adjacent to the site at the time of occupation. The presence of abundant otoliths of black drum and other species suggests a more open, marine-influenced environment than is presently the case. Dating the time of occupation would provide significant information on the age of this kind of environment, in which Holocene sea level rise had inundated low-lying areas to create bays that would sustain relatively high fish biomass prior to effective closure of the system from marine influence, as is the case today.

All of these factors combine to suggest that 41CF136 may be eligible for listing

on the National Register of Historic Places and for designation as a Texas State Archeological Landmark. Given the research potential of the site, it is recommended that proposed channel excavations C2 and C3 be routed so as to avoid impacts to the site, within the site boundaries shown in Figure 2. If this is not feasible, it is recommended that formal National Register eligibility testing be carried out prior to channel construction in order to (a) more precisely define the subsurface extent and bounds of the site, (b) to better define the range of materials and features that may be present in order to formally assess National Register eligibility.

Having stated this assessment, it must be noted that further examination of 41CF136, conducted at the request of David Siegel, U.S. Fish and Wildlife Service, showed the site to contain only extremely sparse archaeological material; the moderate abundance of materials found are from the swash zone at the base of the clay dune where they have been winnowed from their sediment matrix by wave action. This is discussed in the Appendix, which contains a revision of the assessment and recommendations stated above.

As the discussion in the previous pages show, no other potentially significant archaeological sites were located within any of the surveyed channel areas. Thus, no further work in these areas is recommended. No significant cultural resources appear to be susceptible to the effects of construction of Channels A, B2, C1 and D, and no further archaeological work is recommended at those locations.

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APPENDIX:

Additional Intensive Survey at 41CF136, with Revised Assessment and Recommendations

By
Robert A. Ricklis

Goals

Personnel, including this writer, from Coastal Environments, Inc. (CEI) spent the day of December 10, 2004, doing an intensive archaeological survey at site 41CF136. The goal of this work was to more precisely delineate the limits of the site. The site is the same as identified by A. E. Anderson in decades past and identified in Anderson's listing of sites as #2.7 (Anderson site files, as communicated by Tiffany Terneny, archaeologist with the U.S. Army Corps of Engineers, Galveston District). This site was relocated by CEI during its survey of proposed channel cuts in the Bahia Grande Unit in the summer of 2004 (see main body of text, this report). At that time it was determined that this site, marked by artifacts, shells and fish otoliths exposed by erosion, extended for several hundred meters along the eastern shoreline of Bahia Grande; based on the distribution of these materials, it was concluded that they had eroded from the eolian clay dune deposit that parallels the shore and had thus been left exposed along the beach line. It was concluded that the remains might represent a significant archaeological site (i.e., eligible for the National Register of Historic Places) and that it should be avoided by channel construction or, if avoidance is not possible, formally tested for NRHP eligibility prior to construction. The area of primary concern was where proposed Channel C3 intersects the site and the shoreline (see attached Figure 1). After receipt of the report on the survey, U.S. Fish and Wildlife Service determined that Channel C3 would be abandoned, thus avoiding any impact to this part of 41CF136 (David Siegel, pers. comm. 2004). Of some additional concern was the intersection of Channel C2 with the site and shoreline, since the southern limit of the site was not precisely defined in our first field session. Thus the primary goal of the presently reported fieldwork was to firmly establish the southern site limits, to determine if excavation of Channel C2 will affect significant archaeological deposits, and to assess whether formal testing should be done there.

Field Methods

The work reported here was conducted by means of surface reconnaissance. Although the option of subsurface investigation using a backhoe to be provided by the Wildlife Refuge was kept open, this was deemed unnecessary upon careful examination of the site. Two CEI archaeologists, Laurid Broughton and the author, walked the area along the shoreline and carefully examined (a) the eroded western margin of the pertinent

clay dune that contains the site and (b) the beach swash zone along which materials eroded from the dune are deposited and readily visible on the beach surface.

Results

The following key observations were made during this one-day survey session:

1. Abundant *Rabdotus* land snail shells are embedded within the sandy clay sediments of the clay dune and numerous such shells have been exposed by erosion and deflated onto the present beach (see Figure A-2). Approximately 125 meters north of the south end of proposed Channel C2, a distinct lens of *Rabdotus* shells is exposed within the eroded margin of the clay dune (see Figures A-1 and A-3), some 2.1 meters below the surface; this lens was noted in the original survey work and was reported as a probable source of much of the archaeological material found along the beach line (Ricklis and Albert 2004, p. 18) The abundance of *Rabdotus* shells may be attributable to their use as a food resource by prehistoric people who resided at 41CF136.
2. Numerous fish otoliths were collected along the beach. The absence of fish bone, which is far less resistant to decay than the otoliths, suggests considerable age for these items, which are believed to have eroded from the clay dune and thus to be archaeological materials reflective of prehistoric fishing and fish processing at 41CG136. Otoliths of black drum (*Pogonias cromis*) were by far the most common. Also found were specimens representing speckled sea trout (*Cynoscion nebulosis*) and redfish (*Sciaenops ocellata*). The numerical breakdown of specimens of these three species is as follows:
Pogonias cromis: 78
Cynoscion nebulosis: 4
Sciaenops ocellata: 1

While otoliths were found scattered along the beach line, black drum otoliths were especially concentrated (N=62 or 81% of the black drum otoliths collected) approximately 130 meters north of the Channel C2 line, adjacent to the eroded dune profile that contained the buried *Rabdotus* lens (see map, Figure A-1).

3. Artifacts of stone and shell were found along the beach 100 meters south of the Channel C2 center line (see Figure A-4). These include 2 distal fragments of flaked-chert dart points (which cannot be typed due to the absence of the diagnostic proximal or basal portions), a small, thin and bifacially retouched flake of light gray chert, a large flake of light gray chert with one bifacially flaked edge, and two fragments of edge-flaked sunray venus (*Macrocallista nimbosa*) clam shell.

It is important to note that this was the only area in which artifacts were observed. This is the same area from which were recovered two Tortugas dart points and edge-flaked sunray venus shell in our initial survey.

4. *Rabdotus* shells were abundantly scattered along the beach, presumably having been eroded from the nearby clay dune. Also fairly common were fragments of Atlantic cockle shell (*Dinocardium robustum*), a bivalve that may have been used for tools. Also, two shells of *Rangia cuneata* were found on the beach. This is a low-salinity, brackish water species whose presence here suggests that in the past, though not necessarily during the period(s) of site occupation, the aquatic environment was less saline; perhaps these uncommon rangia, which were heavily worn, reflect a period in the past when riverine freshwater discharge was in closer proximity to 41CF136 than at present.
5. While the overwhelming majority of the above-mentioned materials were found as lag on the beach, two otoliths (one redfish and one black drum) were found on the eroded wall of the clay dune margin, indicating that the dune sediments were in fact the original source of these materials which have been removed by erosion and effectively winnowed by wave action to be left along the beach swash zone. Also found on the dune margin was a small, oval nodule of pumice, a material that may have been gathered by prehistoric people for use as an abrading tool. A chert flake was found embedded in the clay dune at the level of the aforementioned *Rabdotus* lens during our initial survey (Ricklis and Albert 2004, p. 18)
6. Overall, a fair abundance of otoliths and a much more limited quantity of artifacts were recovered on the beach. On the other hand, such materials have been shown to be extremely sparse on or within the adjacent clay dune sediments from which they originated. Thus, in spite of the finding of multiple objects from 41CF136, it must be concluded that archaeological material within the site are extremely diffuse, and that this essentially characterizes the nature of the site.

Conclusions and Recommendations

The following conclusions are drawn, based on the above-listed observations:

1. 41CF136 is a fairly extensive site, but contains very sparse archaeological materials. The only relatively concentrated materials are found along the beach swash zone where they have been deposited by erosion. The sorting of materials by ongoing wave action has created a false impression of concentration, inferably because wave action in the swash zone has sorted relatively large and heavy materials such as otoliths and artifacts from their fine sand and clay matrices. In spite of careful inspection of the well-exposed eroded margin of the site itself (i.e., the shore-parallel clay dune), only two otoliths, one small piece of pumice and a chert flake (from the initial survey) were found there.
2. Fish otoliths and *Rabdotus* snail shells are extensively scattered along the beach at the margin of the clay dune, but artifacts have been found mostly 100-150 meters south of the Channel C2 line (Figure A-1), suggesting perhaps a degree of horizontal separation of specific activities at the site.

3. These most recent observations strongly suggest that the excavation of Channel C2 will not affect any significant buried archaeological deposits. The relative concentrations of (a) otoliths and (b) artifacts are found, respectively, 130 north and 100 meter south of the channel center line (see Figure A-1), beyond the proposed limits of ground disturbance that will be associated with channel construction. In any case, the materials actually remaining in the clay dune deposits at the site can be predicted to be too diffusely distributed to provide the kinds of quantifiable contexts and associations that would justify the time and resources required for meaningful data recovery through excavation of the site. The low potential for useful data recovery suggests that this site is probably not eligible for the National Register or for listing as a State Archeological Landmark. Based on the totality of our survey findings, it is recommended that no further archaeological work be done at 41CF136.

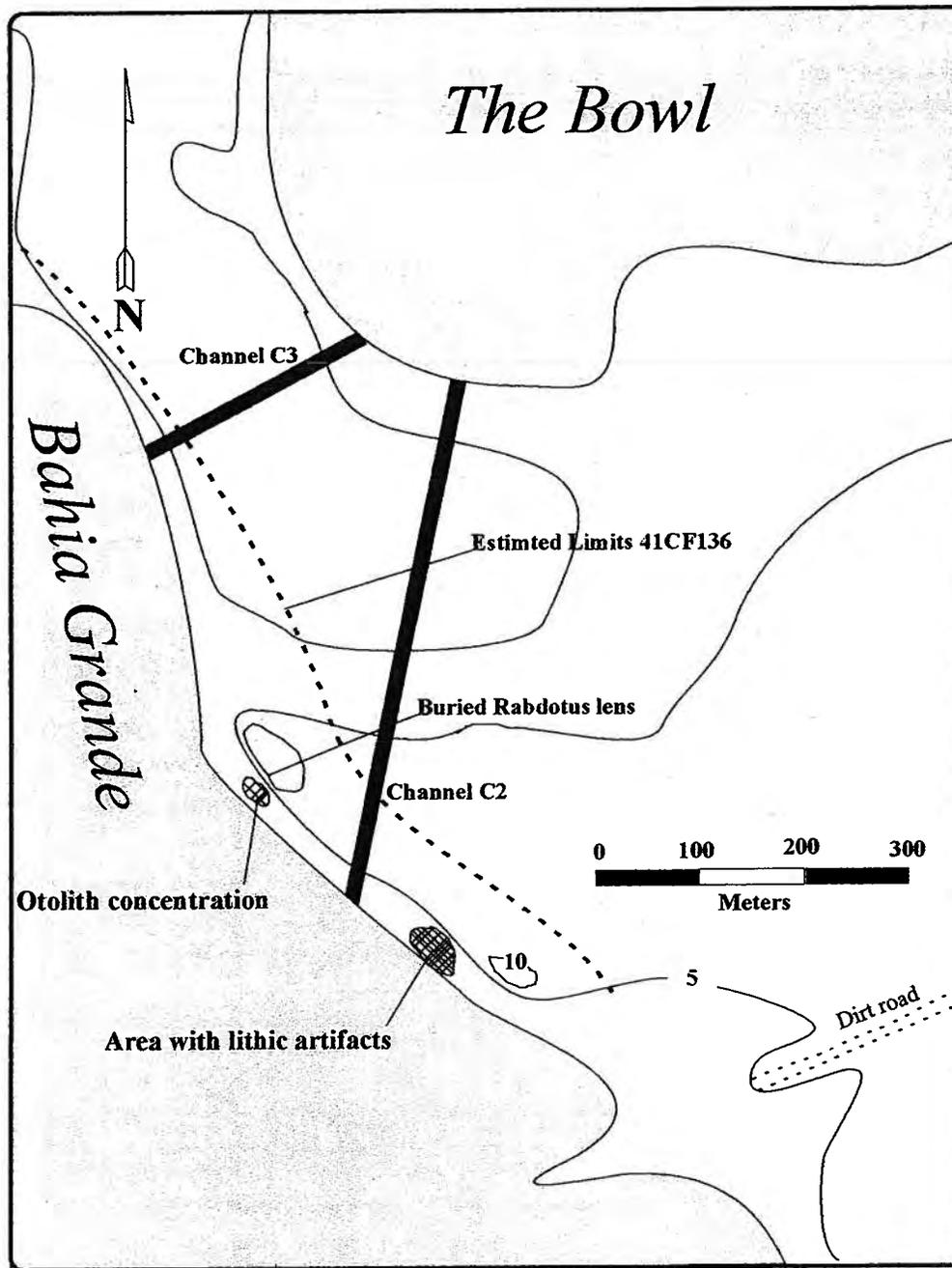


Figure A-1. Map showing location of 41CF136 and various locales discussed in text. Areas at/above the 5-foot contour are clay dunes.

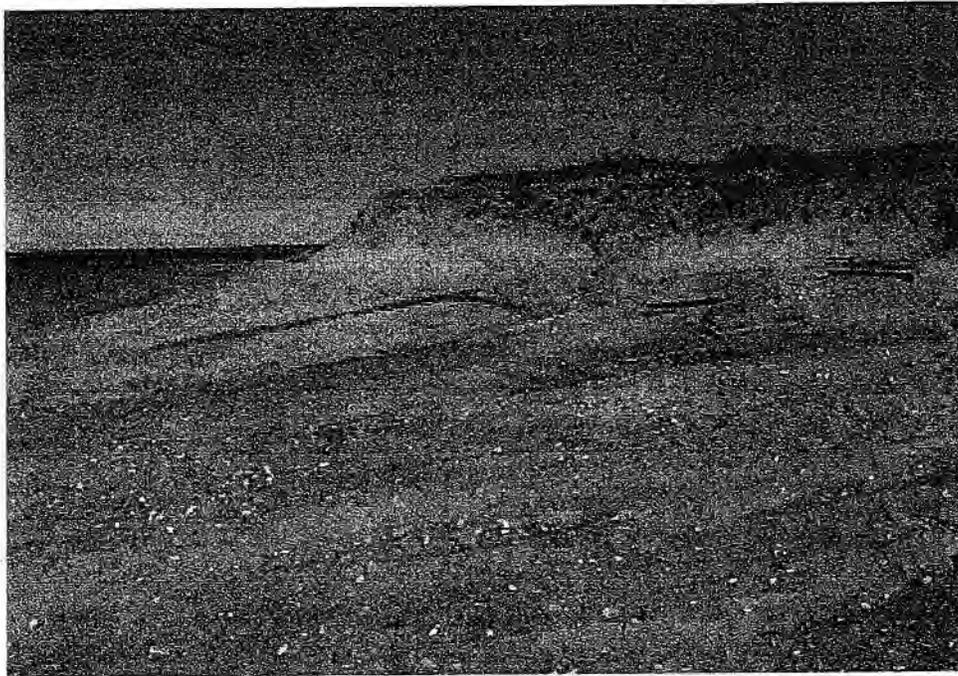


Figure A-2. 41CF136: *Interface between beach swash zone and eroded clay dune margin. Note abundance of Rabdotus land snail shells and other shells in on the wave-reworked sediments in the foreground.*



Figure A-3. 41CF136: *Eroded margin of clay dune. Notebook and trowel mark level of lens of Rabdotus shells (see Figure A-1 for horizontal location).*

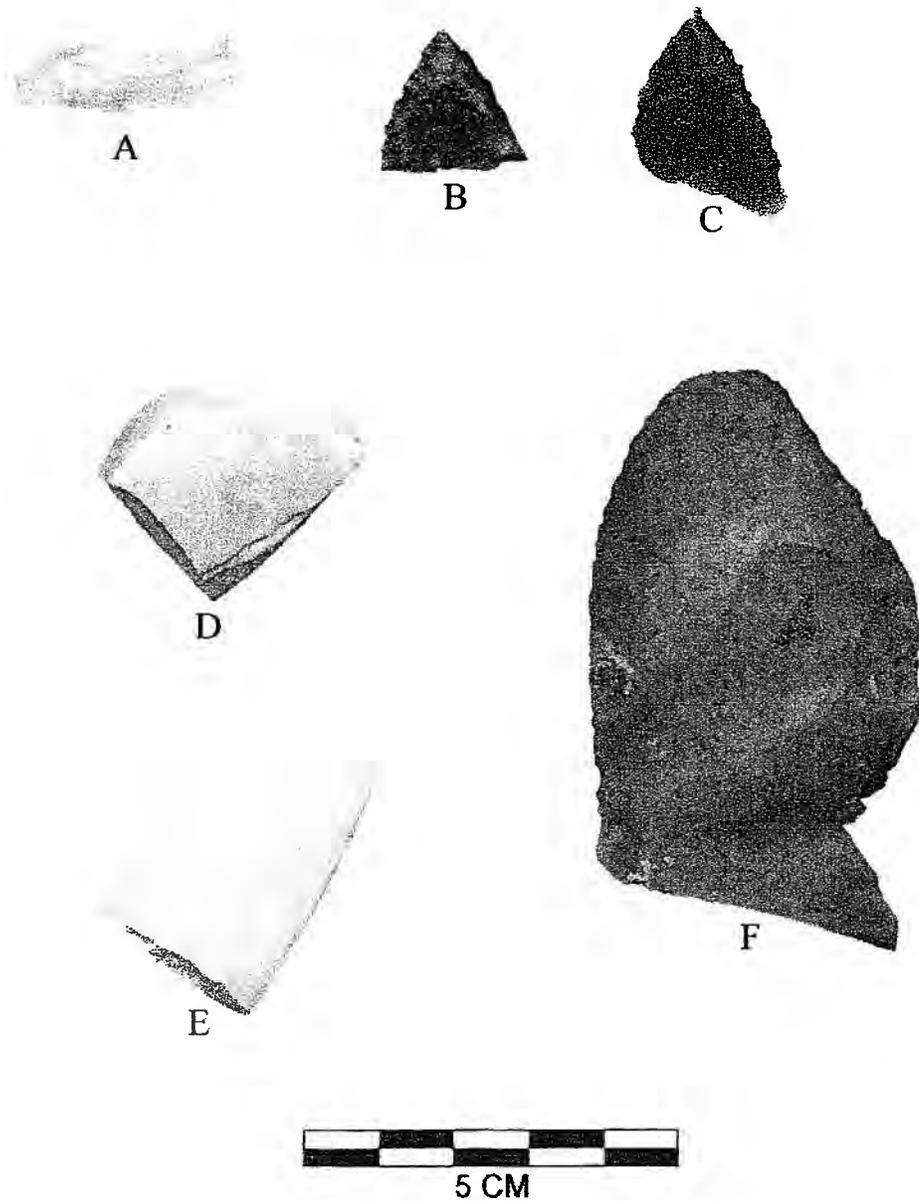


Figure A-4. *Artifacts from presently reported survey, 41CG136. A, edge-flaked chert flake; B, C, distal fragments of chert dart points; D, E, fragments of edge-flaked sunray venus clamshell; F, large chert flake with bifacial edge retouch.*

**Addendum: Additional Intensive Survey at 41DF136, Bahia Grande Units,
Atascosa National Wildlife Refuge**

By
Robert A. Ricklis

Goals

Personnel, including this writer, from Coastal Environments, Inc. (CEI) spent the day of December 10, 2004, doing an intensive archaeological survey at site 41CF136. The goal of this work was to more precisely delineate the limits of the site. The site is the same as identified by A. E. Anderson in decades past and identified in Anderson's listing of sites as #2.7 (Anderson site files, as communicated by Tiffany Terneny, archaeologist with the U.S. Army Corps of Engineers, Galveston District). This site was relocated by CEI during its survey of proposed channel cuts in the Bahia Grande Unit in the summer of 2004 (Ricklis and Albert 2004). At that time it was determined that this site, marked by artifacts, shells and fish otoliths exposed by erosion, extended for several hundred meters along the eastern shoreline of Bahia Grande; based on the distribution of these materials, it was concluded that they had eroded from the eolian clay dune deposit that parallels the shore and had thus been left exposed along the beach line. It was concluded that the remains might represent a significant archaeological site (i.e., eligible for the National Register of Historic Places) and that it should be avoided by channel construction or, if avoidance is not possible, formally tested for NRHP eligibility prior to construction. The area of primary concern was where proposed Channel C3 intersects the site and the shoreline (see attached Figure 1). After receipt of the report on the survey, U.S. Fish and Wildlife Service determined that Channel C3 would be abandoned, thus avoiding any impact to this part of 41CF136 (David Siegel, pers. comm. 2004). Of some additional concern was the intersection of Channel C2 with the site and shoreline; the southern limit of the site was not precisely defined in our first field session. Thus the primary goal of the presently reported fieldwork was to firmly establish the southern site limits, to determine if excavation of Channel C2 will affect significant archaeological deposits, and to assess whether formal testing should be done there.

Field Methods

The work reported here was conducted by means of surface reconnaissance. Although the option of subsurface investigation using a backhoe to be provided by the Wildlife Refuge was kept open, this was deemed unnecessary upon careful examination of the site. Two CEI employees, Laurid Broughton and the author, walked the area along the shoreline and carefully examined (a) the eroded western margin of the pertinent clay dune that contains the site and (b) the beach swash zone along which materials eroded from the dune are deposited and readily visible on the beach.

Results

The following key observations were made during this one-day survey session:

1. Abundant *Rabdotus* land snail shells are embedded within the sandy clay sediments of the clay dune and numerous such shells have been exposed by erosion and deflated onto the present beach (see Figure 2). Approximately 125 meters north of the south end of proposed Channel C2, a distinct lens of *Rabdotus* shells is exposed within the eroded margin of the clay dune (see Figures 1 and 3), some 2.1 meters below the surface; this lens was noted in the original survey work and was reported as a probable source of much of the archaeological material found along the beach line (Ricklis and Albert 2004, p. 18) The abundance of *Rabdotus* shells may be attributable to their use as a food resource by prehistoric people who resided at 41CF136.
2. Numerous fish otoliths were collected along the beach. The absence of fish bone, which is far less resistant to decay than the otoliths, suggests considerable age for these items, which are believed to have eroded from the clay dune and thus to be archaeological materials reflective of prehistoric fishing and fish processing at 41CG136. Otoliths of black drum (*Pogonias cromis*) were by far the most common. Also found were specimens representing speckled sea trout (*Cynoscion nebulosis*) and redfish (*Sciaenops ocellata*). The numerical breakdown of specimens of these three species is as follows:
Pogonias cromis: 78
Cynoscion nebulosis: 4
Scianenops ocellata: 1

While otoliths were found scattered along the beach line, black drum otoliths were especially concentrated (N=62 or 81% of the black drum otoliths collected) approximately 130 meters north of the Channel C2 line, adjacent to the eroded dune profile that contained the buried *Rabdotus* lens (see map, Figure 1).

3. Artifacts of stone and shell were found along the beach 100 meters south of the Channel C2 center line (see Figure 4). These include 2 distal fragments of flaked-chert dart points (which cannot be typed due to the absence of the diagnostic proximal or basal portions), a small, thin and bifacially retouched flake of light gray chert, a large flake of light gray chert with one bifacially flaked edge, and two fragments of edge-flaked sunray venus (*Macrocallista nimbosa*) clam shell.
It is important to note that this was the only area in which artifacts were observed. This is the same area from which were recovered two Tortugas dart points and edge-flaked sunray venus shell in our initial survey.
4. *Rabdotus* shells were abundantly scattered along the beach, presumably having been eroded from the nearby clay dune. Also fairly common were fragments of Atlantic cockle shell (*Dinocardium robustum*), a bivalve that may have been used as a tool. Also, two shells of *Rangia cuneata* were found on the beach. This is a

low-salinity, brackish water species whose presence here suggests that in the past, though not likely during the period(s) of site occupation, the aquatic environment was less saline; perhaps these uncommon rangia, which were heavily worn, reflect a period in the past when riverine freshwater discharge was in closer proximity to 41CF136 than at present.

5. While the overwhelming majority of the above-mentioned materials were found as lag on the beach, two otoliths (one redfish and one black drum) were found on the eroded wall of the clay dune margin, indicating that the dune sediments were in fact the original source of these materials which have been removed by erosion and effectively winnowed by wave action to be left along the beach swash zone. Also found on the dune margin was a small, oval nodule of pumice, a material that may have been gathered by prehistoric people for use as an abrading tool. A chert flake was found embedded in the clay dune at the level of the aforementioned Rabdous lens during our initial survey (Ricklis and Albert 2004, p. 18)
6. Overall, a fair abundance of otoliths and a much more limited quantity of artifacts were recovered on the beach. On the other hand, such materials have been shown to be extremely sparse on or within the adjacent clay dune sediments from which they originated. Thus, in spite of the finding of multiple objects from 41CF136, it must be concluded that archaeological material within the site are extremely sparse, and that this observation essentially characterizes the nature of the site.

Conclusions and Recommendations

The following conclusions are drawn, based on the above-listed observations:

1. 41CF136 is a fairly extensive site, but contains very sparse archaeological materials. The only relatively concentrated materials are found along the beach swash zone where they have been deposited by erosion. The sorting of materials by ongoing wave action has created a false impression of relative concentration, inferably because wave action in the swash zone has sorted relatively large and heavy materials such as otoliths and artifacts from their fine sand and clay matrices. In spite of careful inspection of the well-exposed eroded margin of the site itself (i.e., the shore-parallel clay dune), only two otoliths, one small piece of pumice and a chert flake (from the initial survey) were found there.
2. Fish otoliths and Rabdotus snail shells are extensively scattered along the beach at the margin of the clay dune, but artifacts have been found mostly 100-150 meters south of the Channel C2 line (Figure 1), suggesting perhaps a degree of horizontal separation of specific activities at the site.
3. These most recent observations strongly suggest that the excavation of Channel C2 will not affect any significant buried archaeological deposits. The relative concentrations of (a) otoliths and (b) artifacts are found, respectively, 130 north and 100 meter south of the channel center line (see Figure 1), beyond the proposed limits of ground disturbance that will be associated with channel

construction. In any case, the materials actually remaining in the clay dune deposits at the site can be predicted to be too diffusely distributed to provide the kinds of quantifiable contexts and associations that would justify the time and resources required for meaningful data recovery through excavation of the site. Based on the totality of our survey findings, it is recommended that no further archaeological work be done at 41CF136.

Reference Cited

Ricklis, Robert A. and Bruce M. Albert

2004 *Archaeological Survey along Proposed Channel Transects, La Bahia Grande Unit, Laguna Atascosa National Wildlife Refuge*. Submitted to Ocean Trust and the U.S. Fish and Wildlife Service, Albuquerque. Coastal Environments, Inc., Corpus Christi, Texas.

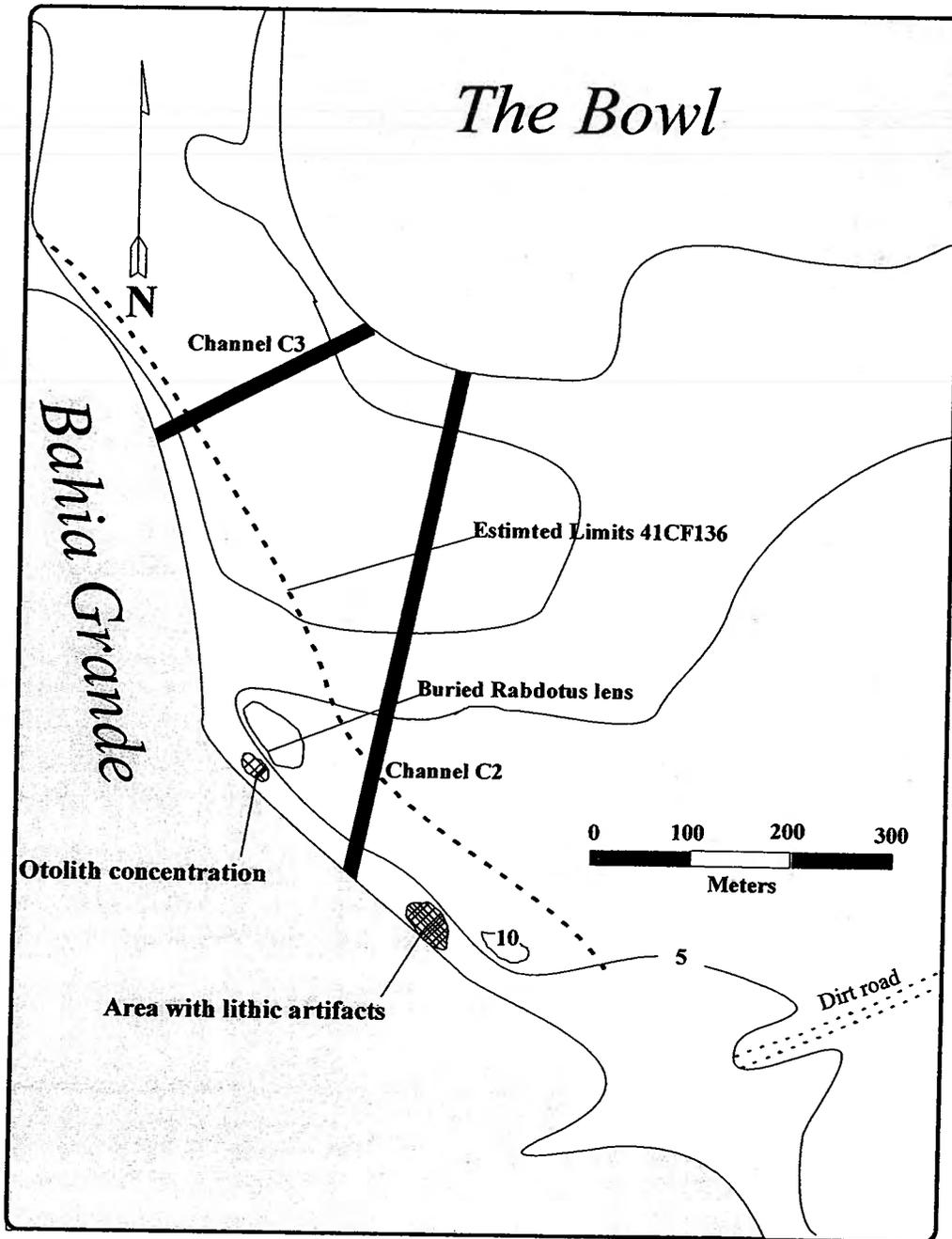


Figure 1. Map showing location of 41CF136 and various locales discussed in text. Areas at/above the 5-foot contour are clay dunes.



Figure 2. *Interface between beach swash zone and eroded clay dune margin. Note abundance of Rabdotus land snail shells and other shells in on the wave-reworked sediments in the foreground.*



Figure 3. *Eroded margin of clay dune. Notebook and trowel mark level of lens of Rabdotus shells (see Figure 1 for horizontal location).*

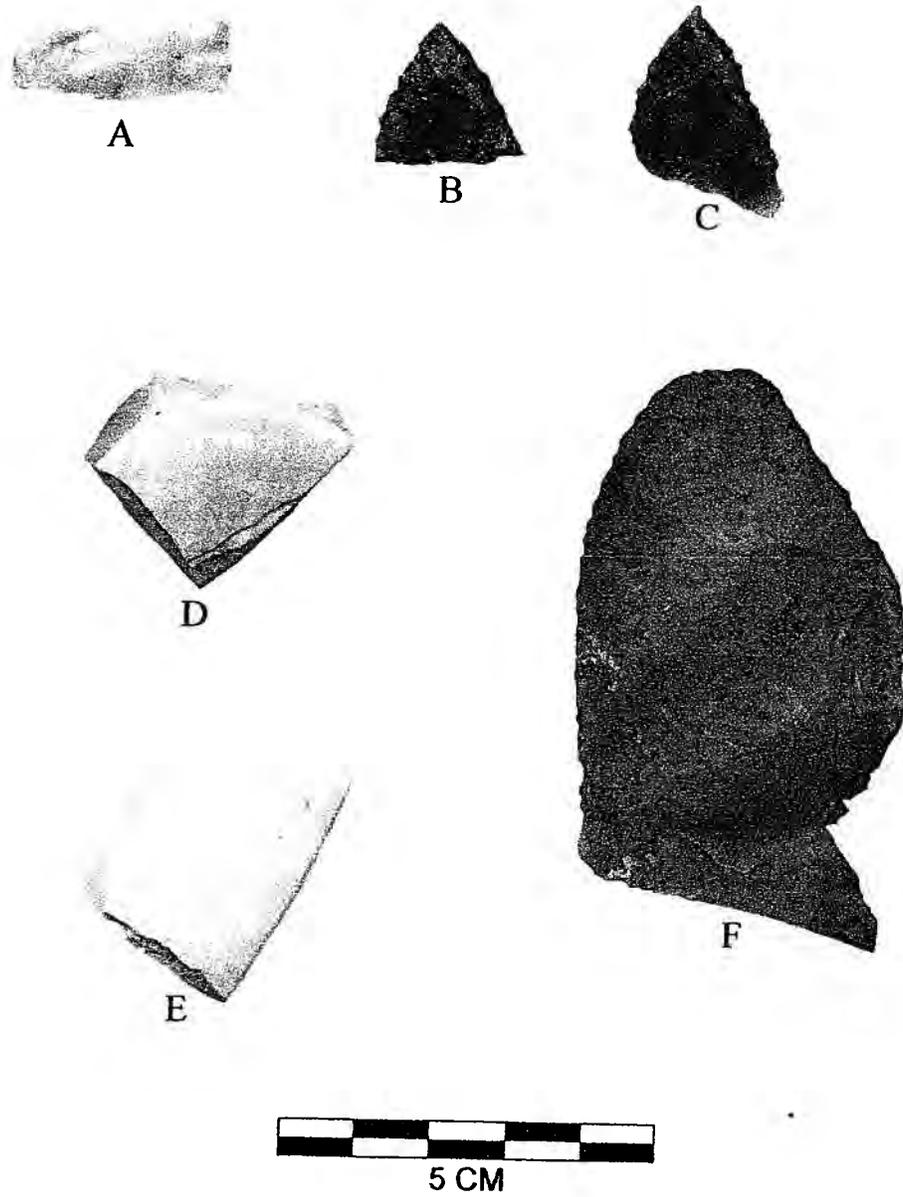


Figure 4. *Artifacts from presently reported survey, 41CG136. A, edge-flaked chert flake; B, C, distal fragments of chert dart points; D, E, fragments of edge-flaked sunray venus clamshell; F, large chert flake with bifacial edge retouch.*