# The colonization of the Bahama archipelago: a reappraisal

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## Introduction

The archaeological study of the Greater Antilles has focused on *migration*, the movement of people across short or long distances (Anthony 1990), and *colonization*, the establishment of permanent or semipermanent settlements by migrants in a new homeland (Dillehay and Meltzer 1991: 288–9; Moran 1989: 20; see Rouse 1986: 1–18; 1992: 73–4, for differing definitions). As Siegel (1991: 79) has pointed out, the study of migration is fundamental for understanding when islands were occupied and whether cultural development was autochthonous or a result of additional population movements. The study of colonization is important for the same reasons. In the Bahamas, as in other parts of the Caribbean, it is necessary to view colonization and migration as interrelated events. Colonization requires migration; migration, however, does not necessarily result in colonization.

The recognition of sites or archaeological assemblages formed by migration and colonization and their differentiation from those produced by exploration, trade, exchange, invasion, or other forms of culture contact, constitutes a classic archaeological problem (Adams et al. 1978; Anthony 1990; Haury 1958; Rouse 1958, 1986, 1989, 1992). Moreover, colonization occurs in stages (Hudson 1969; Keegan and Diamond 1987; Moran 1989); discriminating them from sites produced through migration-related processes such as stop-overs, visits or return-migration, or from unsuccessful colonizations, presents similar challenges (Beaton 1991). Anthony (1990: 897) attributes problems of recognition and interpretation to a disciplinary misunderstanding of how migration works. Similarly, the application of poorly formulated models obscures our interpretation of the archaeological record.

The prehistoric settling of the Bahama archipelago represents the final episode of a 2000-year-long process of exploration, migration and colonization of the Lesser and Greater Antilles by ceramic-bearing horticultural cultures (Rouse 1986, 1992). The models which have been suggested to explain these events and processes vary in respect of the geographical origin of the first migrants, the date of the earliest migration and colonization, the site of the first settlement, the order in which the islands were settled, the direction and route of colonization, the magnitude of the colonization and the causal factors. Furthermore, these views have been constructed in the absence of a solid

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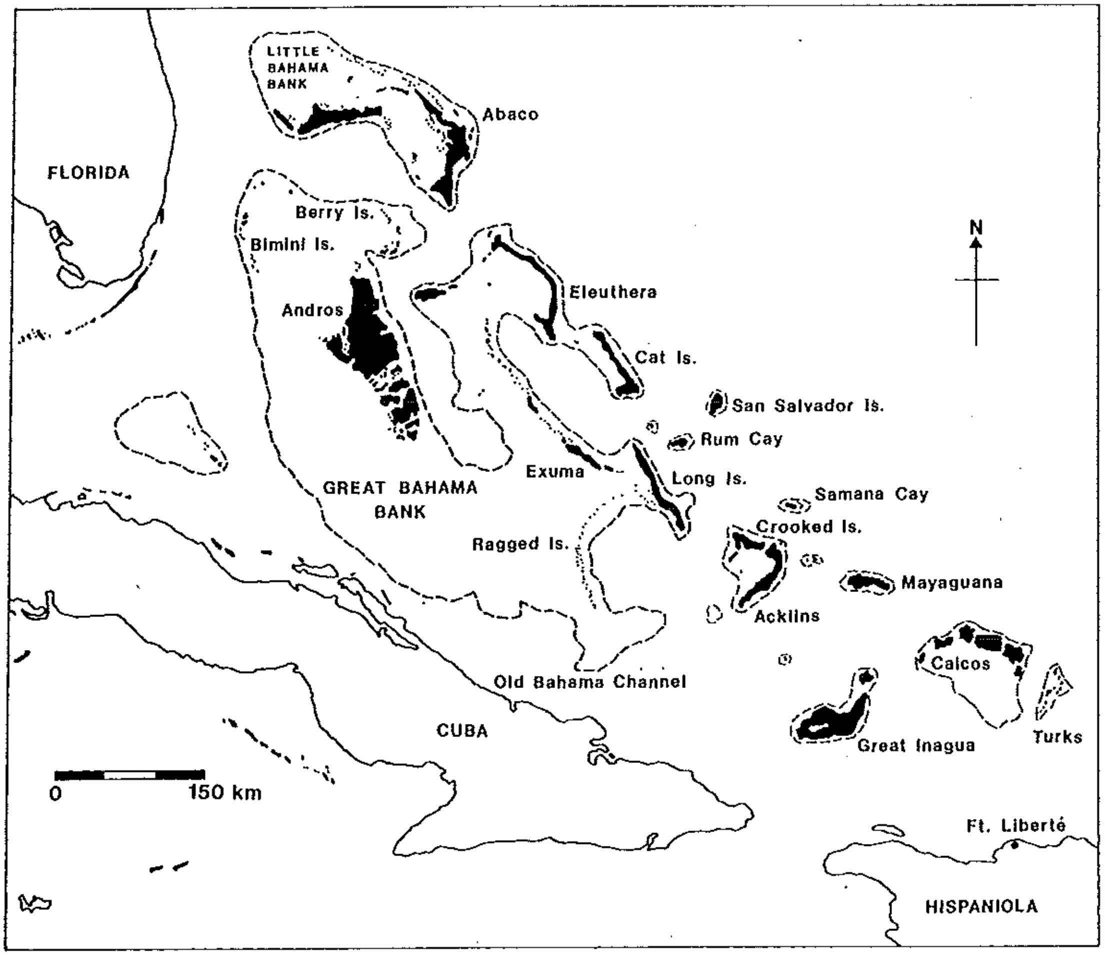


*Figure 1* The Bahama Archipelago.

chronological foundation, with incorrect assumptions about artifact variability, inadequate paleoecological data and an over-reliance on site information acquired from surface survey, as opposed to excavated data. In this paper we present an historical overview of the models, examine the accuracy of their assumptions and discuss their interpretive strengths and weaknesses. We then propose a new model for consideration and testing, developed from our appraisal of existing models, excavated material and paleoecological data which have recently come to light.

## Prehistoric migration and colonization of the Bahamas

The Bahama archipelago (Fig. 1) is comprised of the two modern island nations of the Commonwealth of the Bahamas and the Turks and Caicos Islands covering an area of

| BAHAMAS ARCHIPELAGO | | | | | | | REGIONAL ANNUAL RAINFALL PATTERNS (CM) | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| DISTRIBUTION OF ISLANDS, CAYS, BANKS, AND NONBANK ISLANDS | | | | | | | 125-150 | 100-125 | 75-100 | 62.5-75 |
| ISLAND/CAY NAME | LITTLE BAHAMA BANK | GREAT BAHAMA BANK | BIGHT OF ACKLINS | CAICOS BANK | TURKS BANK | NONBANK ISLANDS | NORTHERN ISLANDS (PINE) | NORTH CENTRAL ISLANDS | SOUTH CENTRAL ISLANDS | SOUTH-EASTERN ISLANDS |
| Grand Bahama<br>Abaco | ■ | | | | | | ■ | | | |
| Bimini<br>Berry Islands<br>Andros<br>New Providence<br>Eleuthera<br>Cat Island<br>Exumas<br>Long Island<br>Ragged Islands | | ■ | | | | | ■ | ■ ■ ■ | ■ | ■ |
| Conception Island<br>Rum Cay<br>San Salvador<br>Samana Cays<br>Plana Cays<br>Mayaguana | | | | | | ■ | | ■ | ■ | |
| Crooked Island<br>Acklins | | | ■ | | | | | | ■ | |
| Little Inagua<br>Great Inagua | | | | | | ■ | | | | ■ |
| West Caicos<br>Providenciales<br>North Caicos<br>Middle Caicos<br>East Caicos<br>South Caicos | | | | ■ | | | | | | ■ |
| Grand Turk | | | | | ■ | | | | | ■ |

*Table 1* Distribution of islands, cays, banks and rainfall by region in the Bahama Archipelago.

233–59,000 sq km (Blume et al. 1992: 83; Meditz and Hanratty 1989: 525). The Commonwealth of the Bahamas consists of about twenty-nine islands, 661 cays and 2387 rocks (Craton 1986: 11), while the Turks and Caicos Islands are composed of about forty islands and cays, as well as a number of uncounted rocks. The total land area for these two countries approaches 14,365 sq km (Bahamas: 13,935 sq kms; Turks and Caicos 430 sq kms) (Blume 1968); however, only about thirty-eight islands and cays are inhabited. Sealey (1985: Fig. 6.7; Table 6.1) divides the archipelago into four regions based on rainfall and evapotranspiration (Table 1). The south-eastern islands consist of the Inaguas, and the Turks and Caicos. The south-central islands include Exumas, Long Island, Acklins, Crooked Island and Mayaguana. The north-central islands are composed of Eleuthera, San Salvador and central and south Andros. The northern islands consist of Abaco, northern Andros, New Providence and Grand Bahama.

The routes, timing and explanation of prehistoric migration and colonization must take into account the archipelago's physical geography. The archipelago is composed of the carbonate Bahamas Platform, the top of which forms a lattice of islands, cays, rocks, sand pits and banks which are separated and inter-connected by a number of troughs and canyons forming a series of deep-water channels and passages that divide the shallow banks. These include: the Santaren Channel, Northwest and Northeast Providence Channels, the Tongue of the Ocean, Exuma Sound, Crooked Island Passage, the Mira-Por-Vos Passages, Mayaguana Passage, Caicos Passage, Turks Island Passage, Mouchoir Passage, Silver Bank Passage and Navidad Bank Passage. The islands and cays in the western half are clustered along the edges of the shallow Great and Little Bahama Banks. In the east, San Salvador Island, Conception Island, Rum Cay, Samana Cay, Crooked-Acklins group, Plana Cays, Mayaguana, Hogsty Reef, Great Inagua, Little Inagua, Caicos Islands and Turks Islands form twelve sets of stepping-stone islands and cays scattered across the deep ocean. The Crooked-Acklins group, the Caicos and the Turks constitute three island and cay complexes around the peripheries of smaller banks.

Until recently, the empirical foundation for migration and colonization of the Bahama archipelago was based on surface remains and limited test excavations, dependence on ceramic cross-dating and reliance on ceramic style. Each of these has proved problematic.

Although archaeological sites are visible from the surface, no surface site has yielded a chronometric date earlier than the AD 1100s (Berman and Gnivecki 1991: Table 1; Keegan 1991, 1993: 46). Dense vegetation cover, traditional Bahamian agricultural techniques, coastal erosion, later occupations and other physical, chemical and biotic disturbances conceal, remove, distort and cause the disintegration of surface remains (Keegan 1992a, 1992c; Schiffer 1987). Early sites are particularly vulnerable, as they have been subject to these processes several centuries longer than more recent sites. The Three Dog Site (SS 21) on San Salvador (Fig. 2), for example, contains both the earliest chronometrically dated evidence of occupation in the Bahama archipelago, as well as a Spanish Contact period component (Berman and Gnivecki 1991). Neither of these is evident from surface remains. The depth of the top of the culture-bearing stratum varies from 60–120 cm below the surface.

By confining areal coverage, test excavations often result in the absence of diagnostic or potentially datable materials, a limited range of artifacts and ecofacts, and a restricted configuration of site structure. These data, best acquired through systematic excavation,

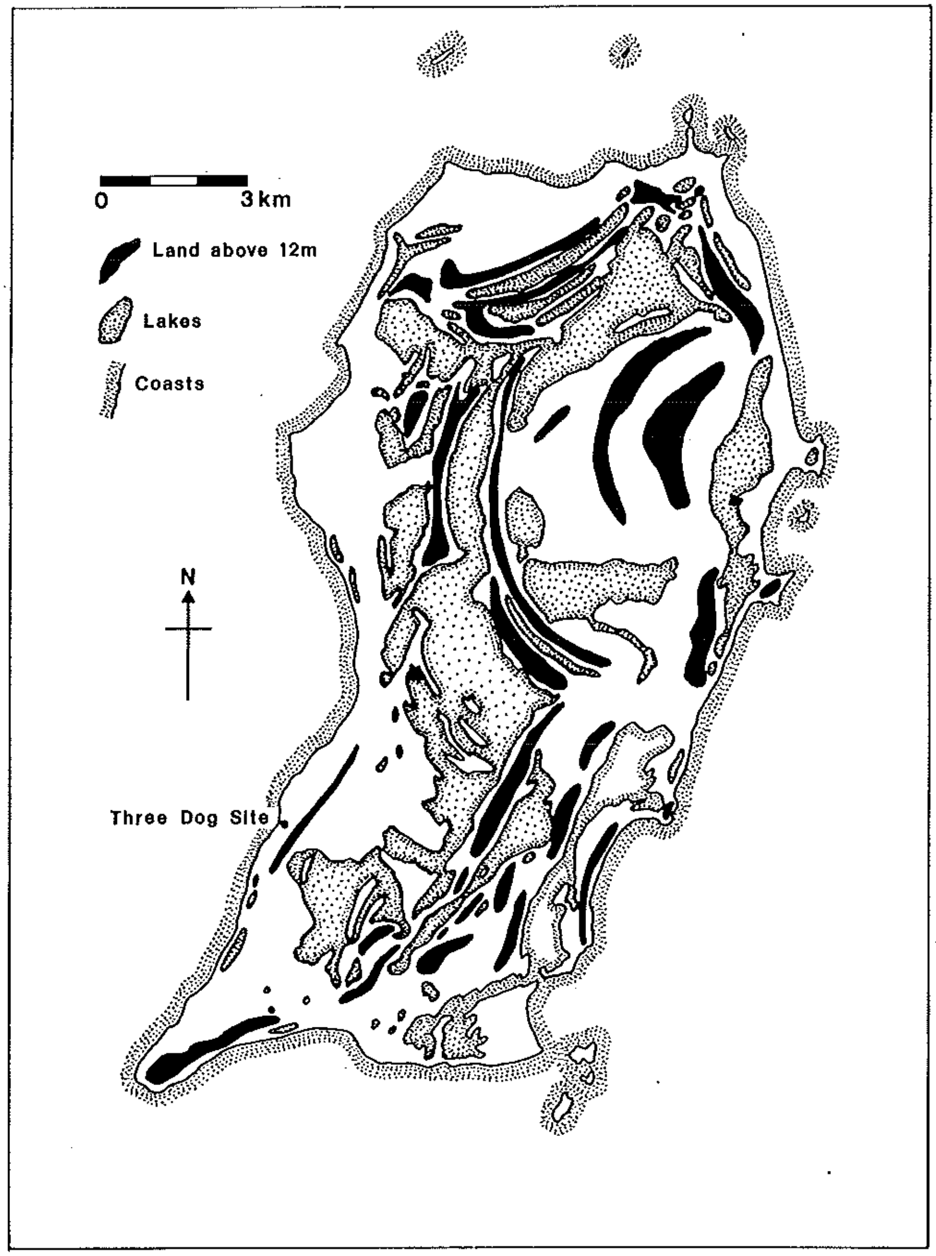


*Figure 2* San Salvador Island.

are important for constructing a typological framework in which to place sites temporally and functionally. Existing site typologies based on surface survey and limited excavation have proved inadequate classificatory devices which have led to confusion regarding the nature and timing of migration and colonization.

Cross-dating of non-local ceramics, believed to be from Hispaniola and Cuba, poses its own set of problems. First, the cross-dating of these wares with chronometric dates is neither worked out fully nor necessarily accurate. Second, as chronometric dates become available for these regions, new areal chronologies are developed (Rouse and Allaire 1978; Rouse 1992), often making previous ones obsolete. Third, publications from these countries are not widely accessible, so the work of North American archaeologists is not necessarily current with that of Antillean archaeologists. Fourth, until recently, colonization arguments were developed with few chronometric dates. A Bahamas chronology employing radiocarbon and thermoluminescence dates is being developed and should help to overcome the problems of temporal assignment (Berman and Gnivecki 1991). These dates, however, become meaningful when retrieved from systematically excavated sample units in association with a broad range of artifacts and ecofacts that can be used to understand cultural contexts.

Finally, geographical origin has been based on the presence of non-locally produced pottery on Bahamian sites (Sears and Sullivan 1978; Sullivan 1980, 1981; Keegan 1985, 1988, 1992a, 1992b, 1993). Non-local pottery contains igneous and metamorphic rock temper, in contrast to locally produced shell-tempered pottery. The argument assumes that sites representing earliest evidence of colonization contain only import sherds and that these 'imports' are from the closest Greater Antillean island. Thus, non-local pottery found at sites in the Turks and Caicos and Great Inagua are claimed to be from Hispaniola, while those sherds found in the central Bahamas are said to be from Cuba. Great Inagua, however, is almost equidistant from northeastern Cuba and northwestern Hispaniola. Non-local sherds have an almost equal chance of originating from either of the two islands. Moreover, the compositional differences between Cuban and Hispaniolan pottery are not well studied. Furthermore, the pottery associated with colonization – late Ostionan Ostionoid from northeastern Cuba and Meillacan Ostionoid from northwestern Hispaniola – is stylistically similar. Subtle differences exist (Tabio and Guarch 1966), but archaeologists studying the ceramics must have a solid knowledge of Cuban and Hispaniolan ceramics to observe these variations. Assigning origin on the basis of style and temper composition of non-local ceramics, given the current lack of knowledge about them, may lead to inaccurate conclusions. In the absence of petrographic and trace element analyses, it is difficult to pinpoint the source of these non-local sherds. Winter and Gilstrap's (1991) work suggests that non-local pottery found at archaeological sites in the Bahamas originates from both Hispaniola and Cuba; however, it is yet to be determined whether its presence in the archaeological record is due to trade, exchange, migration or colonization, since the sites from which the samples were drawn postdate the earliest evidence of entry and settlement of the archipelago.

## When, where, who?

The colonization debate involves contrasting views pertaining to the timing, source, location of the first permanent settlement, point of embarkation and travel route of the earliest ceramic-bearing peoples to the Bahama archipelago. Mainly, the controversy concerns the initial entry of these people, although Sears and Sullivan (1978), Keegan (1985, 1992a, 1993) and Berman and Gnivecki (1991) have proposed contrasting biogeographical models to explain subsequent migration and colonization. In this paper we will confine our discussion to the questions surrounding earliest migration and colonization.

Most investigators regard the Bahama islands as having been settled first by ceramic-bearing peoples, although Granberry (1993: 58) raises the possibility of an earlier occupation by pre-ceramic Redondan peoples. (He cites H. Krieger as the first to suggest this.) More data are needed to support such an hypothesis and, at the moment, most investigators dismiss the idea.

DeBooy was the first of a line of investigators to state that Haiti was the original homeland of the first ceramic-bearing settlers of the Bahamas (DeBooy 1912: 87–8; 1913). Almost fifty years later Granberry (1956: 132–3) also suggested that Haiti was the original source of the Bahamian Arawaks. Colonization was characterized by a 'double wave model' which consisted of two waves of stylistic influences associated with one or more associated migrations of people (Granberry 1956; Sears and Sullivan 1978: 6). The first wave was associated with the Meillacan Ostionoid (formerly Meillacoid) series, while the second wave was associated with the Carrier style of the Chican Ostionoid (formerly Chicoid) series. In this model, the Turks and Caicos were settled first by people from northern Haiti. Apparently, the Carrier style did not involve a migration of people into the central Bahamas, but rather just a diffusion of decorative techniques (Granberry 1956: 133). Some cultural influences emanating from eastern, central and south-central Cuba are acknowledged to have occurred (1956: 132–3). More recently, Granberry (1991: 5; 1993: 58) states that an Ostionan Ostionoid colonizing population came from northeastern Cuba around AD 800–900 and settled on Great Inagua. A later influx from both northeastern Cuba and northwestern Hispaniola followed. From Great Inagua, migration proceeded up to Little Inagua, then to the Ragged Islands, followed by the Jumento Cays, Long Island and the Exumas (Granberry 1991: 10).

Hoffman (1967, 1970) hypothesizes a pre-Meillacan Ostionoid (Meillac) movement into the Bahamas beginning after AD 700 and nearer to AD 900. He suggests that Hispaniola or the Virgin Islands served as the source area (1970: 17).

Winter, Granberry and Leibold (1985: 84, 89) suggest a date of AD 900 for the colonization of the Bahamas from north-central or northern Hispaniola. In their model, the Turks and Caicos were the first islands colonized. Additionally, they suggest that colonization might have also originated from Cuba (1985: 84–5, 89). The date for the latter is not given.

Sears and Sullivan (1978) and Sullivan (1980, 1981) argue that the Turks and Caicos were the first islands of the Bahama archipelago to be colonized. The colonists' origin was Hispaniola, Cuba or both (Sears and Sullivan 1978: 22–3). According to this view, Meillacan Ostionoid-bearing peoples first made seasonal visits to the central Caicos, then settled permanently within a century. The stylistic modes of the pottery found at these earliest sites indicate early-middle Meillacan Ostionoid affiliation, suggesting manufacture circa AD 750–900. At the time of this work, the Meillacan Ostionoid was indeed believed to have spanned this period; but it is now thought to fall in the range AD 900–1200 (Rouse 1982, 1992). If Rouse's dates are to be used in this argument, the settlement of the Turks and Caicos would date to the AD 900s and later.

Rose (1982: 142) advocates both Haiti and Cuba as source areas for the early peopling of the Bahamas. He conceptualizes three distinct migration routes and colonization episodes: first, the Caicos at about AD 800, settled by people from Hispaniola; second, the central islands (Long Island, Rum Cay, San Salvador, Cat Island) at AD 900 by people from Cuba; and, third, a migration originating from the Magens Bay region of the Virgin Islands as early as AD 900 (1987: 324).

Rouse (1989: 123) states that the Bahamas were settled between AD 800 and 1200. More recently, he expresses the belief that colonization occurred between AD 600 and 800 (1991 personal communication). Furthermore, he suggests that Ostionan Ostionoid peoples from western Haiti or eastern Cuba, rather than Meillacan Ostionoids, were the colonizers (1992: 101).

Keegan has contributed actively to the colonization question. Keegan and Maclachlan (1989: 614) state that people from Hispaniola began to settle the Bahamas by AD 800. Keegan (1985: 297, 1988, 1992a, 1993) and Keegan and Diamond (1987: 60) suggest that Meillacan Ostionoid people from Hispaniola settled Great Inagua around AD 600–800 and that it was the first island of the archipelago to be colonized. From Great Inagua, people radiated to the northwest and subsequently to islands lying on an east–west axis, successively colonizing them (Keegan 1985: 298, 1992a). When these statements were made, however, none of the sites on Great Inagua attributed to early colonization had been excavated or dated chronometrically. Recently, two of these sites yielded calibrated radiocarbon dates in the twelfth and fifteenth centuries (Keegan 1993: 46, 48). Keegan (1993: 34) acknowledges that such sites might be evidence of early colonization. In that case, colonization would have occurred on Great Inagua later than previously postulated. An alternative view is that these sites represent seasonal visits or satellite villages associated with Taino expansion from Hispaniola after AD 1100 (ibid.).

Keegan (1988: 5, 1992a: 52–3) uses the occurrence of non-local ceramics at sites in the central Bahamas to maintain his position that Great Inagua was settled from Hispaniola rather than from Cuba and that colonization occurred earlier on Great Inagua than elsewhere in the Bahamas. In order to make his claim, he states that central Cuba was not occupied until AD 1000–1200; he attributes the presence of non-local ceramics in the Bahamas to trade with central Cuba, but not with colonization. Recent archaeological work in Cuba indicates that by AD 450–950 ceramic-producing cultures were present in northern Cuba as far west as Matanzas (Febles and Rives 1991). Thus, contrary to Keegan's view, it is possible for northern Cuba to have been the source of Bahamian colonists. Furthermore, the presence of Arroyo del Palo sherds at the Three Dog Site (see below) demonstrates that people of the central Bahamas had cultural relations with Cuba prior to AD 1000.

Like other researchers, Keegan (1985, 1992a, 1993) believes that the locally made pottery found on Bahamian sites, known as Palmettan Ostionoid (formerly Palmetto ware), developed after the initial colonists had settled into their new environment. The use of the local red clay and shell temper, defining attributes of Palmettan Ostionoid, reflects adaptation to the Bahamas' carbonate geological environment, which lacks metamorphic and igneous materials. Keegan (1985, 1992a, 1993) uses these attributes to support the notion of a single source area, northern Hispaniola. The argument is based on the presumed technological and temporal unity of the Palmettan Ostionoid ware. According to him, multiple migrations from separate sources would have produced multiple wares (1992a, 1993: 10). Granberry and Winter (in press) have recently argued that Palmettan

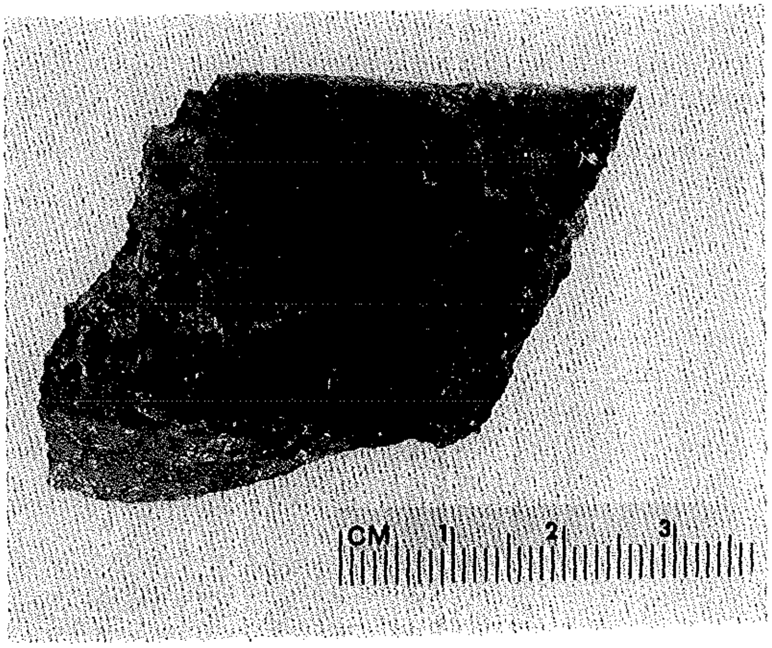


*Plate 1* Arroyo del Palo rim sherd from the Three Dog Site.

Ostionoid ware is not an homogeneous ware, but consists of several regional, technologically variant types. Such variation might also be due to temporal differences. For example, much of the local pottery found at the Three Dog Site is red-slipped and fired in a reduction environment and appears to mimic Arroyo del Palo pottery with which it is found. It differs from the ubiquitously distributed oxidized ware described for Cat Island (MacLaury 1970), Eleuthera (Sullivan 1974; Sears and Sullivan 1978), the Palmetto Grove Site (Hoffman 1967, 1970) which Gnivecki (1994) dates to cal. AD 1410 ± 80 (Beta-67064) and cal. AD 1483 ± 60 (Beta-66089), and the Turks and Caicos (Sears and Sullivan 1978). Palmettan Ostionoid may have arisen out of Arroyo del Palo, while later Palmettan Ostionoid developed from other traditions such as Meillacan Ostionoid from Hispaniola.

Recently Keegan (1993: 11–12) has conceded that the source of the colonists for the Bahamas remains 'an open question', recommending that archaeologists look to the Windward and Virgin Passage areas. Moreoever, he acknowledges that colonization could have occurred before the development of Meillacan Ostionoid pottery (1992a, 1993: 12).

Finally, Berman and Gnivecki (1991) argue for two migrations resulting in colonization: one as early as AD 600–800, attributed to late Ostionan Ostionoid peoples from northern Cuba who settled the central Bahamas, the other by Meillacan Ostionoid peoples from Hispaniola who colonized the Turks and Caicos in the tenth century and later. The data from which the earlier colonization is inferred are based on excavated material from the Three Dog Site (SS 21) (Berman and Gnivecki 1991; Berman in press a, in press b).

The archaeological assemblage and the chronometrically produced dates from this site's

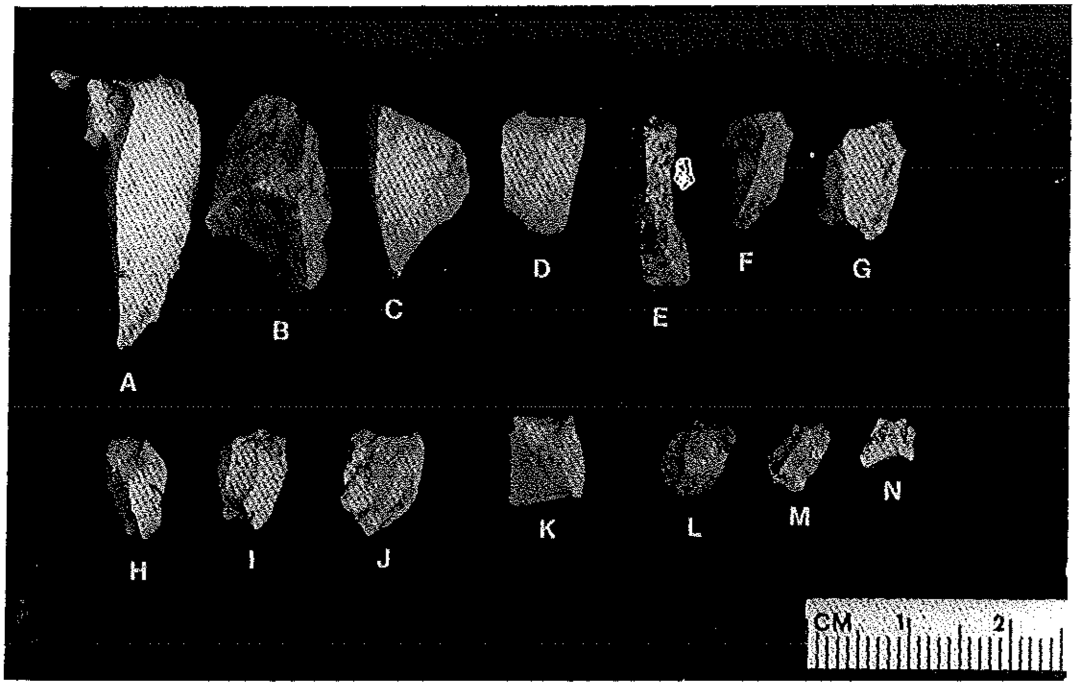


*Plate 2* Microlithic assemblage from the Three Dog Site. (Lithic Workshop: A–D, F–G, L; Midden: E, H–K, M–N).

early component support a pre-Meillacan Ostionoid origin from northern Cuba. Artifactual corroboration comes from the ceramics and lithics. Based on the macroscopic study of their technological and stylistic attributes (a trace-elemental analysis is under way), the non-local ceramics have been identified as Arroyo del Palo ware, a late Ostionan Otionoid ware from northern Cuba (Pl. 1). The earliest uncalibrated chronometric date for the Arroyo del Palo site is AD 980 ± 80 (Y-1556) (Tabio and Guarch 1966; Rouse and Allaire 1978: 470), but other sites containing Arroyo del Palo ceramics, believed to date to AD 450–950, have been found along the north coast of Cuba, as far west as Havana (Tabio 1991). Mejías, another Arroyo del Palo site in northeastern Cuba, dates to AD 930 ± 100 (SI-347, uncalibrated). Second, a chert bipolar microlith assemblage (Pl. 2) belonging to the Canímar-Aguas Verdes lithic complex of Cuba was recovered (Berman in press a). This complex, which dates to AD 450–950, is found in association with the earliest evidence of ceramics on Cuba (Tabio 1991: 6–7). It has been reported from several sites near Havana and in northeastern Cuba (Febles 1991a, 1991b, 1991c). Finally, the Three Dog site's chronometric dates support an Ostionan Ostionoid connection. The early occupation is represented by one TL date: 1500 ± 200 years before the present (Alpha-2871), and five wood-charcoal radiocarbon dates: cal. AD 685 ± 90 (Beta-26896); cal. AD 812, 847, 852 ± 100 (Beta-26894); cal. AD 883 ± 70 (Beta-55102); cal. AD 991 ± 70 (Beta-55103, CAMS 3549); and cal. AD 972 ± 65 (Beta-26138, ETH-4266).

Unfortunately, much of the site has eroded away, and thus its original size cannot be determined. Existing data suggest that it was a permanently occupied site. Excavation has revealed a midden and three discrete activity clusters where food preparation, cooking, pottery making, shell bead production, wood working, stone-tool knapping, sweeping, accidental loss of objects and discard took place (Berman 1992, in press a, in press b). One and possibly two lithic workshops as well as a pendant maker's or netsinker's toolkit, have also been found.

In summary, archaeologists fail to agree on when and where the earliest migration and colonization of the Bahamas took place. Recent statements suggest a growing consensus that the archipelago was settled between AD 600 and 800; but the location, the order in which the islands were settled and the cultural origin of the colonizers remain unresolved. Several of the investigators argue that the Bahamas was settled first by Meillacan Ostionoid-bearing peoples from northern Haiti, while others suggest that earliest colonization occurred from Cuba. Furthermore, there is debate as to whether the first islands settled were the Turks and Caicos, Great Inagua, the islands of the central Bahamas or a combination of them. Several investigators argue for multiple colonizations, and at least three also suggest a Virgin Islands source area. The data from the Three Dog Site suggest a late Ostionan Ostionoid migration from northern Cuba into the central Bahamas between circa AD 600 and 900.

## Causal factors

The causes of migration, although complex and difficult to recognize archaeologically, can be analyzed by three variables: push, pull and ease of transport (Anthony 1990). In the Bahama archipelago, migration and colonization must be understood together, so it is important to understand why migration, which resulted in colonization, took place. Migration is a response to negative home conditions (push factors), positive attractions in a new area (pull factors) and acceptable transportation costs between origin and destination (Anthony 1990; Lee 1966; Dillehay and Meltzer 1991). Although there is a diversity of opinion about the factors responsible for triggering migration and colonization of the Bahamas, archaeologists concur that they were purposeful and not the result of accidental voyaging. Furthermore, the majority of arguments suggests a combination of push and pull stimuli.

DeBooy (1912) suggested that the first migrants to the Bahamas fled Hispaniola to escape the ravages of the allegedly ferocious Carib, who were making their way northward to Hispaniola from the Lesser Antilles during the late fifteenth century. This interpretation was embraced later by historians such as Craton (1986). The view places the occupation of the Bahamas much later than the existing evidence suggests; the Island Carib are believed to have occupied the Lesser Antilles many years after the Bahamas were colonized. Furthermore, there is no evidence that the Island Caribs extended beyond the Windward Islands. Finally, the ferocity attributed to the Island Carib might have been a myth perpetrated by the Europeans to legitimize Indian slaving (Davis and Goodwin 1990; Hulme 1986: 45–87).

Sears and Sullivan (1978) and Sullivan (1980, 1981) propose a push and pull model which considers demographic and economic factors. They suggest that overpopulation in Hispaniola forced people out. The migrants were pulled to the Turks and Caicos by the economic opportunities afforded by the natural resources. Thus, the colonists supported themselves through the production, processing and export of dried conch and salt to Hispaniola. Neither of the push or pull factors in this argument has been verified. As Keegan (1988, 1992a, 1993) points out, salt probably did not become an important exchange item until the twelfth century, when increased Hispaniolan population growth raised demand for such commodities. Furthermore, other islands such as Great Inagua, Keegan's candidate for initial colonization, contained ample salt resources, making it unnecessary to seek them in the Turks and Caicos islands (1992a: 36; 1993). Furthermore, the demand for conch and salt, particularly during the postulated time of early settlement, remains untested. The view reflects the contemporary economic role of the Turks and Caicos, one that might not have existed prehistorically. Finally, the prehistoric demographic record of Hispaniola is relatively unstudied and thus we do not know the extent to which population pressure played a role in triggering migration and colonization of other lands.

Winter et al. (1985: 84–6) suggest several causal agents for the first wave of colonization; these include island propinquity, flamingo migrations and the availability of unexploited terrestrial and marine resources. The degree to which the demand for feathers, presumably for ceremonial head-dresses or emblems of rank, resulted in settlement of a new region, as opposed to the establishment of specialized procurement sites, awaits further examination.

Rouse (1982, 1986, 1989, 1992: 103) regards the colonization of the Bahama archipelago as part of a general westward Ostionoid expansion triggered by external factors, internal population growth and the exploitation of new resources. He recognizes, however, that these factors are still speculative and await serious investigation.

Keegan (1985, 1992a: 58–64; 1993: 10) emphasizes both push and pull factors, proposing a model in which Great Inagua provided an outlet to westward-expanding Haitian populations. It is argued that Great Inagua was attractive to horticultural populations because of its proximity, favorable climate, fertile soils, luxuriant vegetation and ample reserves of unexploited terrestrial and marine fauna, many of which were unavailable in northern Hispaniola. Although we do not know to what extent this depiction is accurate, palaeoclimatological data (Curtis and Hodell 1993: 145; Hodell et al. 1991: 792) suggest that, at around AD 950, a 1500-year-long dry period was coming to an end in the Caribbean. By not having been settled previously, Great Inagua would have been attractive to Hispaniolan migrants who would have experienced the cumulative effects of dry climate.

Berman and Gnivecki's model (1991) emphasizes pull factors of another sort. In their model, which parallels Sears and Sullivan (1978), migrants dispersed to and settled islands which were most climatically favorable to manioc and other forms of root-crop horticulture. Berman and Gnivecki (1991) suggest that certain islands might have been bypassed in favor of others which offered greater agricultural potential. Furthermore, they suggest that migrants selected islands whose flora and fauna resembled their point of origin. The weakness with this model is that it is just that – a model – which has not been tested sufficiently with archaeological and ecofactual data.

Finally, Keegan (1985, 1992a, 1993) and Keegan and Diamond (1987) deal with the transportation costs of migration and colonization routes. Their models stress the psychology of exploration (autocatalysis), transportation technology, navigational capabilities, conditions affecting maritime travel (such as currents, winds and waves) and island propinquity, size and configuration. When these factors are taken into consideration, landfall would have most likely taken place on Great Inagua when sailing from northwestern Haiti. Great Inagua is only 90 km from Ft. Liberte, Keegan's point of origin on Hispaniola, and it represents the largest island target to the north. Second, wind and oceanographic currents favor a Great Inaguan land fall. These include: the northwesterly Antilles Current flowing at 0.5–0.9 knots; east-to-west-trending winds; and wind periodicity which is seasonally variable in respect of direction and intensity. These factors increase the probability that travel would have been possible from Ft. Liberte, Haiti, 281 days per year.

While this model emphasizes the unidirectional ease of transport in reaching a destination (e.g. Great Inagua), the model does not sufficiently address the issue of return voyaging. This is an important component of maritime migration and colonization (Irwin 1990, 1992: 56–60) because it allows people to return with information concerning potential destinations. It also allows them to secure new supplies, replace used or lost items and pick up additional colonists, which they have ascertained are necessary for survival in the new region. Anthony (1990: 902) has noted that migration is highly related to previous moves; the success or failure of long-distance migration is dependent on the long-distance transmission of information concerning new lands. Furthermore, as Irwin (1990: 91; 1992: 57, 60–3) has pointed out, it is safer to travel in the direction from which one can most easily return in the case of not reaching one's destination, or in the event of a failed venture. Return voyages from Great Inagua to northern Haiti would be difficult for 281 days of the year due to the very same conditions that would favor voyaging there. Hence, in this model, return voyaging to northern Haiti is characterized by higher navigational risks and transport costs than the out-going voyage to Great Inagua.

In summary, a number of ideas have been proposed regarding the push and pull factors responsible for migration and colonization of the Bahama archipelago. Some of these models remain untested, while others have been disproved through excavation, chronometric dating and examination of archaeological remains.

## Migration and colonization of the central Bahamas

In the following section we present a model for migration and colonization of the central Bahamas by Ostionan Ostionoid migrants from northern Cuba by AD 600–900. This model suggests: an environmental push factor forcing people out of Cuba; the pull of unoccupied, mesic islands; and ease of transport afforded by island propinquity and configuration, currents, winds, transportation technology and bank (as opposed to ocean) navigation strategies (Gnivecki, in prep.).

According to paleoecological data from Lake Miragoane, Haiti, the Caribbean was characterized by a dry climate between circa 550 BC and AD 950 with the driest episode occurring between circa 550 BC and AD 450 (Curtis and Hodell 1993: 145; Hoddell et al. 1991: Table 2). As growing conditions changed, the horticultural populations inhabiting Cuba's north coast (Febles and Rives 1991; Tabio and Guarch 1966; Tabio and Rey 1979; Tabio 1991) would have experienced subsistence risks which would have increased substantially during this dry phase. Furthermore, a number of probable cultural responses would have encouraged migration into new lands such as the Bahamas. These include: more frequent clearing of new fields, lengthening of fallow periods, shortened length of settlement, increased mobility, lower investment in landscape modification, increased rates of deforestation and erosion, increased reliance on abandoned garden hunting, increased competition for land, increased rates of feuding and warfare, rise of ideological and ethnic markers and increased population pressure per unit of land, even under stable or low-growth demographic conditions. In this scenario, the combined effects of dry conditions, declining resources, demographic imbalances and unsuccessful cultural responses to the environment stimulated migration out of Cuba into more mesic environments found in the south-central and north-central Bahamas, but not into the xerophytic southeastern islands of the archipelago.

The south-central and north-central islands afforded several pull factors. First, the availability of unexploited terrestrial and marine resources must have been attractive to stressed populations. Second, sufficient conditions for root-crop horticulture – adequate rainfall, low evapotranspiration, sandy, well-drained soils and a growing season of sufficient duration (Berman and Gnivecki 1991; Sealey 1985; Sears and Sullivan 1978) – would have similarly been appealing.

In island settings, push and pull factors and transportation costs of migration are conditioned by whether the sea or ocean is viewed as a barrier or facilitator to maritime travel (Irwin 1992). The Great and Little Bahama Banks facilitate ease of maritime transport because they are characterized by relatively shorter inter-island distances and more compact island configurations than those of the non-bank ocean portions of the archipelago (Gnivecki, in prep.). However, the latter are not to be misconstrued as barriers; they can be (and were) traveled, although they possess higher transportation costs and associated navigation risks.

In the following sections it is argued that it was possible for Ostionan Ostionoid people to travel from northern Cuba to the central Bahamas by way of the Grand Bahama Bank at AD 600–900. Given the existing push and pull factors it was the most likely migration route leading to colonization. From Cuba the route would have followed the Ragged Island Range and the Jumento Cays to the islands of the central Bahamas. Smaller islands and cays were undoubtedly visited or skirted. Bypassed islands and cays might have functioned as resource banks, potential sources of marine and land fauna, land flora, water or raw materials. Archaeological remains have not been reported for these islands, but it is hypothesized that sites representing stopovers or visits will be present.

Irwin (1992: 47) and Lewis (1972: 212) have noted that differences in water color often function as navigational aids. The shallow Bahama banks are turquoise colored and stand in marked contrast to the adjacent deep blue ocean. Since most of the islands and cays are located near the periphery of the banks (Fig. 1 and Table 1), navigation can proceed by noting the color differences between the shallow banks and the ocean. Once a shallow bank is reached, one needs only to take care to avoid reefs, rocks and sandbars and spits.

Other natural phenomena contribute to easing transportation costs and risks while traveling the banks. One is the northwesterly-trending 0.5-knot current that flows across the Great Bahama Bank; another is the visibility, proximity and configuration of islands, cays, reefs and rocks that punctuate the bank edges. Additional maritime cues emanating from the environment include: foraging flights of endemic land-based birds (and their calls), cloud configurations, ocean swells distorted by land and reefs, underwater phosphorescence, drift objects, water breaking over the crests of reefs at low tide, island vegetation and topography and their associated color differences, and even the smells of land and reef (Lewis 1972). Moreover, the positions of sun, moon and stars as one moves north or south function as navigational guides (ibid.).

The combination of these factors allows for return voyaging as well. In general, when sailing up and down the eastern edge of the Great Bahama Bank, one sails cross-current and cross-wind in returning to Cuba, as opposed to directly into the current and wind for a large portion of the year when returning from the Inaguas or the Turks and Caicos to Hispaniola. Columbus's first voyage draws attention to this. For example, he was guided west from the Crooked-Acklins group to the Ragged Island chain (Islas de Arena, the Sandy Isles) on the Great Bahama Bank by the Lucayans on 25–8 October 1492 (Dunn and Kelley 1989: 115, 117; Morison and Obregon 1964: 41–2, 45). From there, he was guided south across the Old Bahama Channel to northern Cuba. In spite of their inability to speak Spanish, the Lucayans who sailed with Columbus could readily point in the directions of low-risk and low-cost transport.

Granberry's (1991: 9–10) toponymic examination of fifteenth- and sixteenth-century Lucayan island place-names also suggests possible origin points from which migration and colonization routes can be inferred. The Turks and Caicos and several of the southern islands have names which suggest an Hispaniolan source. Grand Turk translates into 'first small country'; Middle Caicos is 'western waters headland'; the Pine Cays are 'small western home'; Providenciales is 'western waters smaller land'; Mayaguana is 'lesser midwestern land'; while Acklins is 'large western land'. The Turks Banks translates to 'large northern basin'. Linguistically, Abaco and Bimini indicate a Cuban-source, while Great Inagua translates into 'small eastern land'. To Granberry this suggests a migration jumping-off point to the archipelago from northeastern Cuba. Alternatively, it may reflect geographical knowledge or trade and exchange routes with no bearing on migration routes. Finally, it is recognized that the Columbus log and toponymic designations are distantly removed in time from the periods under consideration. Nevertheless they are suggestive of a long tradition of inter-island navigation and voyaging.

In summary, a combination of factors contribute to the ease of transport via bank travel. These include: readability of closely spaced navigational aids and cues, ease and low risk of return, scale of inter-island distance and island configuration and different oceanographic conditions on the shallow banks that were more easily mastered or avoided than those of the deep ocean.

**Summary**

We propose that the colonization of the Bahama archipelago from the Greater Antilles was characterized by multiple migrations and colonizations that differed in time, origins, destination and causal agents. Among other factors, the meagerness of securely dated excavated sites dating to the proposed periods of earliest colonization, the lack of agreement on what an archaeological site or assemblage reflecting initial colonization should look like, and inadequate knowledge about local and non-local ceramics, have all unnecessarily confounded our views.

We argue that the central Bahama archipelago was settled in the seventh or eighth centuries from northern Cuba, so that by AD 800–900 or earlier, the north-central islands, such as San Salvador, were colonized. Emigration from Cuba, migration to the Bahamas and colonization of the islands were triggered by dry conditions in the Caribbean (circa 550 BC–AD 950). It is hypothesized that the migrants proceeded on a route which crossed the Old Bahama Channel and reached the Ragged Islands on the Great Bahama Bank, following the outline of the shallow turquoise blue waters. The Ragged Islands and Jumento Cays functioned as stepping-stones to Long Island, and the islands and cays beyond.

Support for this argument must come from systematic archaeological survey and excavation of unstudied areas, such as the Ragged Islands, Jumento Cays and parts of the Exumas. Sites along this route await to be discovered, bearing in mind that many will represent stopovers or visits and should not be interpreted as evidence of colonization, but as evidence of migration leading to areas where colonization took place. In the central islands, where archaeological sites have been found, early sites are expected to be discovered buried at depths comparable to those at the Three Dog Site. The current absence of evidence, however, is not to be interpreted as the evidence of absence (see Dillehay and Meltzer 1991: 288).

Great Inagua appears to have been settled sometime during the AD 1100s, while data from the Turks and Caicos suggest an earlier colonization which dated to the tenth century AD and later by Meillacan Ostionoid peoples (Sears and Sullivan 1978; Sullivan 1980, 1981; Keegan 1991, 1993). The reason why the Inaguas and the Turks and Caicos were not settled during the dry interval of 550 BC–AD 950 is that, even under contemporary conditions, these xerophytic islands suffer from high evapotranspiration losses. It might be inferred that, during the dry interval, they were as dry or even drier. Their later occupation may reflect a response to population pressure or growth in Hispaniola triggered by wetter conditions after AD 950. The later Meillacan Ostionoid expansion might also be related to the emergence of complex chiefdoms in the Greater Antilles and their expansion into the southern Bahama islands.

We reiterate that hypotheses of the sort proposed in this paper are in their infancy and require greater support through controlled excavation, chronometric dating, recovery of palaeoecological data, greater attention to ceramic variability and source analysis of recovered artifacts from sites located in all the regions of the Bahamas. In this way, the question of where, when and how migration and colonization took place will be answered and new models developed. The larger questions focusing on why such processes took place can then be addressed and competing hypotheses evaluated.

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## Abstract

*Berman, M. J. and Gnivecki, P. L.*

**The colonization of the Bahama archipelago: a reappraisal**

A number of colonization models have been proposed to explain the prehistoric peopling of the Bahamas archipelago from the Greater Antilles. Each varies in respect to place of origin, timing of migration and settlement, routes of movement, intentionality, settlement permanency and causal agents. The paper summarizes the evidence for each of the models. A new model which suggests that late Ostionan Ostionoid people from northern Cuba colonized the central Bahama archipelago circa AD 600–900 is presented. This model incorporates the articulation of palaeoclimatic push factors, economic pull factors, ease of transport factors and shallow bank navigation.