



Turtle Mound, Canaveral National Seashore (Volusia County) post-1938 photo, Florida State Archives

### **Shell Mound**

**Description:** Shell mounds are small hills, usually in coastal locations, composed entirely of shells (clams, oysters, whelks) discarded by generations of Native Americans which support an assemblage of calciphilic plant species. Archeological evidence indicates they were occupied at the time Europeans first landed in Florida. Several are now surrounded by mangroves, evidence that they were built when sea level was lower than today. Originally there were many such shell mounds along coastal lagoons and at the mouths of rivers (and even inland along the St. Johns River), but most were destroyed for road building in the early part of the last century (Small 1929; Stalter and Kincaid 2004).

A rich calcareous soil develops on the deposited shells which supports a diverse hardwood forest on undisturbed mounds. Central Florida mounds are often characterized by tropical species occurring north of their normal range. On Turtle Mound at Canaveral National Seashore in Volusia County tropical trees such as white stopper (*Eugenia axillaris*), sea torchwood (*Amyris elemifera*), wild lime (*Zanthoxylum fagara*), false mastic (*Sideroxylon foetidissimum*), inkwood (*Exothea paniculata*), and lancewood (*Ocotea coriacea*) were recorded at or near their northern range limits in 1971 (Norman 1976). Freezes eliminated or reduced the populations of many of these by the time the

mound was re-sampled several decades later (Norman and Hawley 1995; Stalter and Kincaid 2004), illustrating that the tropical flora of these northern mounds is in constant flux. Shell mounds on the Cedar Keys in Levy County on the Gulf coast are also northern outposts for tropical species most likely brought in by migrating birds. Tropical species found on these Keys such as white stopper, Florida swampprivet (*Forestiera segregata*), snowberry (*Chiococca alba*), and saffron plum (*Sideroxylon celastrinum*) are all species whose fruits are eaten by migrating birds (Laessle and Wharton 1959; Johnson and Muller 1992). Shell mounds in the Florida Panhandle, i.e. on St. Vincent Island and on St. Joseph peninsula, support temperate canopy trees such as live oak (*Quercus virginiana*) and cabbage palm (*Sabal palmetto*) as well as calcium-loving temperate species not found in nearby maritime hammocks on sand, including soapberry (*Sapindus saponaria*) and Carolina buckthorn (*Rhamnus caroliniana*; Johnson et al. 1992). Even south of Tampa and Cape Canaveral, the species composition of shell mound forests tends to be more strictly tropical than that of maritime hammocks on sandy substrates in the same region, with white stopper, Florida swampprivet, strangler fig, saffron plum, and gumbo limbo being the most commonly encountered woody species (Cole 1975).

**Rare Species:** Rare plant species found on shell mounds include iguana hackberry (*Celtis iguanaea*), spiny hackberry (*Celtis pallida*), southern lip fern (*Cheilanthes microphylla*), aboriginal prickly apple (*Harrisia aboriginum*), yellow hibiscus (*Pavonia spinifex*), and terrestrial peperomia (*Peperomia humilis*).

**Characteristic Set of Species:** saffron plum, soapberry, snowberry, white stopper

**Range:** Shell mounds are found along the coast throughout Florida and range westward and northward along the coastlines of the southeastern U.S. In the 1920s botanist John Kunkel Small noted the tropical flora on large shell mounds at Port Orange (1922), Hobe Sound (1922), Horti Point on the south end of Merritt Island (1927), Marco island (1928), and at the mouths of the Sebastian River (1927), Crystal River (1928), and Caloosahatchee River (1921). As mentioned, most of these were destroyed for road building. Three of the mounds Small described, Turtle and Green Mounds (1923) near New Smyrna and Madira Bickel Mound (1921) near Tampa Bay, are preserved in State or Federal parks. Others are features in larger parks, including St. Joseph Bay State Buffer Preserve, Cedar Keys National Wildlife Refuge (North Key and Seahorse Key), Cayo Costa State Park, Charlotte Harbor Preserve State Park (Josselyn Island), Ding Darling National Wildlife Refuge (Wulfert Hammock), and Coconut Point Park (Brevard County).

**Natural Processes:** The uniquely tropical flora of Central Florida shell mounds is in constant flux, with species being periodically exterminated by freezes and subsequently re-colonizing, most likely via bird dispersal.

**Community Variations:** North Florida shell mounds have some temperate hammock species such as live oak and cabbage palm, plus calcium-loving temperate species such as soapberry, Carolina buckthorn, and sugarberry (*Celtis laevigata*). Central Florida shell mounds may have a combination of tropical and temperate canopy species with tropical understory species, including white stopper, snowberry, and marlberry (*Ardisia escallonioides*). Further south shell mounds have a predominantly tropical flora in both the canopy and understory.

**Associated Communities:** Shell mounds may have vegetation similar to tropical or temperate types of maritime hammock, but differ in that they grow on pure shells rather than sand or sand mixed with shell fragments.

**Management Considerations:** Soil disturbance on shell mounds from old home sites, clearings, potholes from illegal digging, etc. can allow exotic species such as Brazilian pepper (*Schinus terebinthifolius*) and Australian pine (*Casuarina equisetifolia*) to invade. They require patrolling to prevent further loss of the historical resource.

**Exemplary Sites:** Canaveral National Seashore (Turtle Mound; Volusia County), Tomoka State Park (Volusia County), Green Mound Archaeological Site (Volusia County), Cedar Keys National Wildlife Refuge (North Key; Levy County), Madira Bickel Mound State Archeological Site (Manatee County), Mound Key Archeological State Park (Lee County)

**Global and State Ranks:** G2/S2

**Crosswalk and Synonyms:**

Kuchler	90/Live oak - Sea oats 105/Mangrove 112/Southern Mixed Forest
Davis	1/Coastal Strand 9/Mangrove Swamp Forests and Coastal Marshes
SCS	1/North Florida Coastal Strand 2/South Florida Coastal Strand 14/Tropical Hammocks 19/Mangrove Swamp 11/Upland Hardwood Hammocks
Myers and Ewel	Coastal Strand
SAF	73/Southern Redcedar 89/Live Oak 105/Tropical Hardwoods
FLUCCS	425/Temperate Hardwood 426/Tropical Hardwoods 427/Live Oak

Other synonyms: shell midden, Indian midden, Indian mound

**References:**

Cole, D.P. 1975. Vegetational analysis of selected coastal Indian shell mounds in Florida. Thesis, University of South Florida, Tampa.

Johnson, A.F., and J.W. Muller. 1992. An assessment of Florida's remaining coastal upland natural communities: southwest Florida. Unpublished report submitted to the Florida Department of Environmental Protection. Florida Natural Areas Inventory, Tallahassee, Florida.

Johnson, A.F., J.W. Muller, and K.A. Bettinger. 1992. An assessment of Florida's remaining coastal upland natural communities: panhandle. Unpublished report

- submitted to the Florida Department of Environmental Protection. Florida Natural Areas Inventory, Tallahassee, Florida.
- Laessle, A.M., and C.H. Wharton. 1959. Northern extensions in the recorded ranges of plants on Seahorse Key and associated Keys, Levy County, Florida. *Quarterly Journal Florida Academy of Sciences* 22:105-113.
- Norman, E.M. 1976. An analysis of the vegetation at Turtle Mound. *Florida Scientist* 39:19-31.
- Norman, E.M., and S.S. Hawley. 1995. An analysis of the vegetation at Turtle Mound, Volusia County, Florida: twenty years later. *Florida Scientist* 58:258-269.
- Small, J.K. 1921. Old trails and new discoveries: a record of exploration in Florida in the spring of 1919. *Journal of the New York Botanical Garden* 22:25-40; 49-64.
- Small, J.K. 1922. The botanical fountain of youth: a record of exploration in Florida in April 1920. *Journal of the New York Botanical Garden* 23:117-133; 139-154.
- Small, J.K. 1923. Green deserts and dead gardens: a record of exploration in the spring of 1921. *Journal of the New York Botanical Garden* 24:193-247.
- Small, J.K. 1927. Among floral aborigines: a record of exploration in Florida in the winter of 1922. *Journal of the New York Botanical Garden* 28:1-40.
- Small, J.K. 1928. Botanical fields, historic and prehistoric: a record of exploration in Southeastern Coastal Plain in the spring of 1923. *Journal of the New York Botanical Garden* 29:149-209; 223-235.
- Small, J.K. 1929. *From Eden to Sahara: Florida's Tragedy*. Privately printed by author (re-printed in 2004 by Seminole Soil and Water Conservation District), Sanford.
- Stalter, R., and D. Kincaid. 2004. The vascular flora of five Florida shell middens. *Journal of the Torrey Botanical Society* 93-103.