

Federal Regulatory Weed Risk Assessment Beach Vitex (*Vitex rotundifolia* L. f.).
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Abstract. Beach Vitex, a woody vine introduced from Korea in the mid-1980s as an ornamental and dune stabilization plant, has become a serious threat to natural plant and animal communities along the Carolina Coast. It currently occupies 200+ ocean front properties in North Carolina and South Carolina, with a total estimated acreage of about 17 acres. It also occurs in Hawaii. In 2005, a Federal Weed Risk Assessment was conducted to ascertain if Beach Vitex should be listed as a Federal Noxious Weed under the Plant Protection Act of 2000. Beach Vitex was ranked as high in habitat suitability (it is expected to grow in at least five U.S. hardiness zones). It was ranked as high in spread potential after establishment (copious seeding and vegetative runners that are spread by near shore waves and currents). It was ranked as medium in economic importance due to its expected impact on the value and marketing of ocean front properties, as well as federal beach renourishment properties. It was ranked as high in environmental importance due to its documented impacts on native dune vegetation, and degrading of sea turtle habitat. All together, this gives Beach Vitex an Overall Risk Score of High. Since Beach Vitex is already established in the U.S., it was given a Likelihood of Introduction Score of High. The Overall Pest Risk Potential of Beach Vitex Score of High was derived from a combination of the Likelihood and Consequences of Introduction scores. Based on its high Overall Pest Risk Potential score, and its limited distribution in the United States, it is recommended that Beach Vitex be officially listed as a Federal Noxious Weed. This would prohibit further introductions and interstate movement except under permit. Once it is officially listed, it will automatically be listed as a State Noxious Weed in North Carolina, South Carolina, and a number of other states that automatically listed Federal Noxious Weeds under their state weed laws.

Introduction. Beach Vitex is a woody vine in the Verbena Plant Family that was first introduced from the beaches of Korea to the southeastern United States by scientists at the North Carolina State University Arboretum, in the mid-1980s, as a dune stabilization and ornamental plant (9). Beginning in the mid-1990s, officials with the Corps of Engineers became concerned about Beach Vitex spreading from large plantings at beach front properties along the South Carolina coast – posing a threat to native dune plants, degrading sea turtle nesting habitat, and impacting multi-million dollar federal beach renourishment projects (12) (T. Socha, Corps of Engineers, Personal Communication, 1996). In 2003, the South Carolina Beach Vitex Task Force, comprised of 16 federal, state, and local agencies, was established to address the problem. To date, the task force has documented about 125 sites planted with Beach Vitex in coastal communities of Horry, Georgetown, and Charleston Counties in South Carolina (averaging 3,000 sq. feet each). In North Carolina, the plant has been documented in beach communities in New Hanover, Pender, and Onslow Counties. Refer to the Task Force Website for an update on efforts to address Beach Vitex (<http://www.beachvitex.org/>).

Based on the native distribution of the plant from Korea and Japan to Malaysia, and Australia (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11), Beach Vitex occupies a very small percentage of its potential ecological range in the United States. However, it is expected that the plant would grow well in coastal communities throughout the southeastern U.S. from Virginia to Florida, and west to Texas.

In 2005, the U.S. Geological Survey, National Wetlands Research Center, and the Mississippi State University GeoResources Institute cooperated in conducting a qualitative risk assessment following the USDA APHIS Weed Risk Assessment Process to determine if Beach Vitex should be listed as a Federal Noxious Weed. Under international agreements, a signatory country can only prohibit importation of quarantine pests. A quarantine pest is defined as “a pest of potential economic importance to the area endangered thereby and not yet present there, or present but not widely distributed and being officially controlled” (13, 14). Federally listed noxious weeds may not be imported into the United States or moved interstate without a special permit. The assessment completes Stages 1 and 2 of the weed risk analysis process as described below.

Materials and Methods.

IPPC guidelines (13, 14) describe the three stages in Pest Risk Analysis including Pest Risk Assessment Initiation, Pest Risk Assessment, and Risk Management Planning. Following the APHIS Weed Risk Assessment Template, eight steps were followed in completing stages one and two of the Pest Risk Analysis process, including:

Stage 1 - Initiate the Process. Step 1: Document the Initiating Event; Step 2: Identify previous risk assessments; and Step 3: Establish the identify of the weed.

Stage 2: Conduct the Assessment. Step 4: Verify quarantine pest status; Step 5: Assess Economic and Environmental Consequences; Step 6: Assess Likelihood of Introduction; Step 7: Determine Pest Risk Potential; and Step 8: Document the Assessment with Literature Citations.

Results and Discussion. Beach Vitex meets the definition of a quarantine significant pest because it is an invasive plant of foreign origin that poses a threat to coastal dune plants and animals communities, could have a negative impact on beach front property values, and currently occupies a fraction of its potential ecological range in the U.S. (13). Currently, it is being controlled by a number of land owners and municipalities along the Carolina Coast. In 2005, rules prohibiting further planting of Beach Vitex on coastal dunes were enacted by the South Carolina Office of Coastal Resource Management. In addition, local ordinances prohibiting further planting of Beach Vitex were passed by a number of municipalities along the Carolina Coast, including Edisto Beach, Folly Beach, and Pawleys Island (South Carolina), as well as Caswell Beach and Baldhead Island (North Carolina).

Summary of Pest Risk Potential Rankings

I. Consequences of Introduction	II. Likelihood of Introduction	III. Pest Risk Potential = (II + III)
A. Habitat Suitability = 3		
B. Spread Potential After Establishment, Dispersal Potential = 3		
C. Economic Impact = 2		
D. Environmental Impact = 3		
CUMULATIVE RISK ELEMENT SCORE = 11 = HIGH (3)	HIGH = 3	HIGH

Scores: High = 3; Medium = 2; Low = 1; Negligible = 0

Based on its native range in the Pacific Rim of eastern Asia, Beach Vitex is expected to grow and reproduce in a minimum of five U.S. hardiness zones. This was the rationale for ranking it **high in habitat suitability**. It was ranked as **high in spread potential after establishment** because it produces copious amounts of seeds, produces runners that grow up to 10 m per year, and it roots at the leaf nodes (13). Viable stem fragments and seeds are spread along beaches by ocean waves and near shore currents (Task Force Observations). It will also be spread artificially as an ornamental plant unless the plant is regulated. Beach Vitex was **ranked as medium in economic importance** because it is expected to have a negative impact on the value and marketing of infested ocean front properties. There is also concern about the negative impacts of Beach Vitex on multi-million dollar beach renourishment projects that are being conducted to protect such properties. Beach Vitex was **ranked as high in environmental importance** because it forms monocultures that totally crowd out native dune plants [e.g., sea oats (*Uniola paniculata*) and the federally endangered sea beach amaranth (*Amaranthus pumilus*)] (13). In addition, it degrades sea turtle nesting habitat with dense foliage and impenetrable, wiry roots. All together, this gives Beach Vitex an **Overall Risk Score of High**. Since Beach Vitex is already established in the U.S., it was given a **Likelihood of Introduction Score of High**. The **Overall Pest Risk Potential of Beach Vitex Score of High** was derived from a combination of the Likelihood and Consequences of Introduction scores.

Impact of Listing Beach Vitex as a Federal Noxious Weed. Listing Beach Vitex as a Federal Noxious Weed would prevent further importations of the plant from other countries (except into Hawaii, where it is considered native by some people), and prohibit interstate movement of except under permit. In addition, it would automatically be listed as a State Noxious Weed in certain states, including North and South Carolina (states that automatically list all Federal Noxious Weeds under their own weed laws). This would effectively stop commercial sale of the plant, and provide a strong impetus for eradicating the plant before it has a chance to spread far and wide.

The amount of land infested by Beach Vitex is still incredibly small. To date, about 125 populations (averaging 3,000 sq. feet each) have been documented in South Carolina. If a similar number of populations are found in North Carolina, this would give a total infestation of about *17 acres*.

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Photo Captions:

1. Beach Vitex in Flower.
2. Beach front property at DeBordieu Beach, Georgetown County, S.C., following Hurricane Ophelia, in the Fall of 2005. Three beach vitex plants planted in 1995 on the front dune of this property have formed a monoculture that has totally replaced native sea oats and other native plants. This photo illustrates that no plant, including Beach Vitex can prevent sand dune erosion in extreme storm events.
3. Dune underwash and erosion around a Beach Vitex planting at DeBordieu Beach, S.C. Summer, 2004.
4. More dune erosion around a mature Beach Vitex planting at DeBordieu Beach, S.C. December, 2005.