

Maritime Forest/Shrub

Mid-Atlantic Coastal Plain

Maritime communities are found along barrier islands and the mainland North Carolina coast on stabilized upper dunes and flats protected from salt water flooding and the most extreme salt spray. Hydrology is variable and some of the Maritime Shrub communities are subject to heavy salt spray (Schafale and Weakley 1990). All of the barrier island maritime forest/shrub communities occur in very dynamic environments that are often disturbed or even permanently converted to other community types.

Maritime Shrub communities are found throughout the barrier islands and are dominated by dense shrubs, especially wax myrtle, yaupon holly, groundsel tree, red cedar and stunted live oak (Schafale and Weakley 1990). There are also often gaps containing grassy areas. Successional shrub communities have become more common on former grass dominated sites due to artificial building of dunes (Schafale and Weakley 1990). The natural community type is not uncommon on the barrier islands, but extensive natural examples are rare.

Canopies of Maritime Evergreen Forests are dominated by live oak, sand laurel oak, and loblolly pine. Understories are typified by shrubby woody growth, vines are important and common and the herb layer is sparse. These communities occur in sheltered parts of the barrier islands but are still subject to extremes of the maritime environment (Schafale and Weakley 1990). Sites that have been recently logged often are dominated by loblolly pine, and storm disturbance produces canopy gaps. These communities apparently burned historically at irregular intervals and understories have become denser, although natural fire was probably less frequent than in mainland forests (Schafale and Weakley 1990). These communities depend on the canopy for protection from salt spray.

The rare Maritime Deciduous Forest (Nags Head Woods is the best remaining example) is dominated by beech, American holly, loblolly pine and hickory. Shrubs and vines can be dense and there can be a moderate herb layer present. Maritime vegetation exposed to frequent salt spray during storms is stunted. These are the most sheltered communities of any barrier island sites, and are one of the rarest and most endangered natural communities in North Carolina (Schafale and Weakley 1990).

Coastal Fringe Evergreen Forests and Coastal Fringe Sandhill communities typically occur on the mainland adjacent to estuaries and barrier islands, although both community types are very rare due to developmental pressures, widespread fire suppression and limited range (Schafale and Weakley 1990).

These habitats are important breeding and migration stopover points for many migratory birds, and key breeding areas for declining populations of the eastern painted bunting (Hunter *et al.* 2000, Johns 2004). These communities are also important for some snake species for which we have little status, distribution or demographic information. Table 1 provides a list of priority species associated with this habitat for which there is conservation concern.

Table 1. Priority species associated with maritime forest/ shrub habitats.

Group	Scientific name	Common name	State status* (Federal status)
Birds	<i>Passerina ciris</i>	Eastern Painted Bunting	
Mammals	<i>Peromyscus leucopus easti</i>	White-footed Mouse	SC
Amphibians	<i>Bufo quercicus</i>	Oak Toad	SR
	<i>Desmognathus auriculatus</i>	Southern Dusky Salamander	
	<i>Scaphiopus holbrookii</i>	Eastern Spadefoot	
Reptiles	<i>Cemophora coccinea copei</i>	Northern Scarletsnake	
	<i>Heterodon simus</i>	Southern Hog-nosed Snake	SC
	<i>Lampropeltis getula getula</i>	Eastern Kingsnake	
	<i>Lampropeltis getula sticticeps</i>	Outer Banks Kingsnake	SC
	<i>Masticophis flagellum</i>	Eastern Coachwhip	SR
	<i>Micrurus fulvius</i>	Eastern Coral Snake	E
*Abbreviations E Endangered SC Special Concern SR Significantly Rare			

Location And Condition Of Habitat

The condition of these habitats in the state is extremely poor. Maritime forest is one of the most endangered habitat types in North Carolina, primarily due to coastal development, which has literally destroyed much of the maritime habitats. In many places where some assemblage of the habitat remains, houses and other structures are spread throughout. A map of this habitat is not provided due to scale issues.

Only one good example of Maritime Deciduous Forest remains at Nags Head Woods in Dare County; an additional example occurs in nearby Kitty Hawk Woods. Maritime Evergreen Forest is found throughout the barrier islands and good examples can be found at Buxton Woods, Theodore Roosevelt State Natural Area on Bogue Banks, and Bald Head Island. Maritime Shrub is found throughout the barrier islands, but good examples are rare. Some examples exist at Cape Hatteras National Seashore, Shackleford and Core Banks, Bear Island in Onslow County, Fort Macon State Park, Bogue Banks, and Fort Fisher.

Problems Affecting Species And Habitats

Residential and commercial coastal development leading to fragmentation and overall reduction of habitat is the single most important factor leading to the loss of this habitat. Almost all this habitat is high ground and suitable for development, and is found in areas close to the beach where human population growth is booming. The creation of numerous small clearings for houses will likely have far-reaching effects on the dynamics of these habitats (Schafale and Weakley 1990).

A lack of fire to maintain some variants of these habitats is also leading to successional changes in many of these sites. Burning is almost impossible to conduct in areas surrounded by homes. There are also feral animal impacts (horses, goats, cows, cats) on some of the barrier islands (e.g., Shackleford Banks). In addition, egg predators such as raccoons and foxes that typically did not inhabit most of the Outer Banks are now widespread because of the increased amount of food available now that people inhabit the area.

Species And Habitat Conservation Actions and Priorities For Implementation

In general, there is a need to better track the extent of maritime habitats: *how much is there? what is the condition of each site? how much development pressure is being exerted on each site?* This information should be integrated into our understanding of maritime forest wildlife species current status and distribution and how those distributions may have differed without such extensive coastal development.

Remaining coastal maritime habitats must be a priority for land acquisition efforts. Though coastal uplands are essentially the most costly areas to acquire in the state, it is essential to acquire remaining undeveloped maritime forests, both on barrier islands and on the mainland. In fact, maritime (coastal fringe) forests on the mainland are grossly under-protected. The Atlantic Coast Joint Ventures or South Atlantic Migratory Bird Initiative may be able to help coordinate such projects along with the North Carolina Coastal Land Trusts and The Nature Conservancy. Identified funding sources for acquisition include Coastal Wetlands Grants, Natural Heritage Trust Fund, Forest Legacy Grants, and Recovery Land Acquisition Grants.

Re-establishment of maritime forest habitats should also be pursued, including initiation of prescribed burning of appropriate maritime habitats, where possible. The presence of dense canopies are a key habitat element in maritime forests; many maritime forest-associated herpetofauna, and their prey, are adapted to survive under particular sun and shade regimes (Bailey *et al.* 2004). An attempt should be made to work with local governments to develop laws or ordinances that require certain amounts of native vegetation be retained, and buffers of vegetation be left along the sounds.

Priority Research, Survey, And Monitoring

- **Surveys**

- Conduct migration surveys to determine bird use, especially during the fall.
- Conduct small mammal surveys on barrier island systems to verify species status, distribution and community composition.
- Determine the status and distribution of amphibians and reptiles in maritime communities.

- **Monitoring**

- Continue long-term monitoring and banding work (currently being done by the US Geological Survey) on eastern painted buntings and support the goals and objectives of the Painted Bunting Working Group that involves Florida, Georgia, South and North Carolina.

- Establish MAPS and migration banding stations in this habitat type.
- Establish long-term monitoring of amphibians and reptiles, once survey data has been established.

- **Research**

Genetics

- Conduct cooperative research with western states to determine the genetic relationships between eastern and western painted buntings.
- Conduct genetics research on all “kingsnake” species.

Demographics and habitat use

- Initiate productivity and habitat use research eastern painted bunting (Norris and Elder 1982, Lanyon and Thompson 1986 and Kopachena and Crist 2000).
- Document the habitat selection and competition factors related to indigo bunting and painted bunting in these habitats (Kopachena and Crist 2000).
- Maritime forests in the far southeastern portion of the state historically supported eastern woodrats; consider those habitats as potential reintroduction sites.
- Examine demographics, population dynamics, and the specific habitat requirements of the white-footed mouse subspecies (listing is almost certain for the subspecies).
- Conduct habitat-use research on southern dusky salamander, eastern spadefoot, southern hog-nosed snake, eastern coachwhip, northern scarletsnake, kingsnakes and eastern coral snake to better determine habitat use patterns.

Supporting References

Bailey, M. A., J. N. Holmes, and K. A. Buhlmann. 2004. Habitat management guidelines for amphibians and reptiles of the southeastern United States (DRAFT). Partners in Amphibian and Reptile Conservation.

Hunter, W. C., L. Peoples, and J. Collazo. 2001. Partners in Flight bird conservation plan for the South Atlantic Coastal Plain. American Bird Conservancy.

Johns, M.E. 2004. North Carolina Bird Species Assessment. N.C. Partners in Flight.

Kopachena, J.G. and C.J. Crist. 2000. Macro-habitat features associated with painted bunting and indigo bunting in northeast Texas. *Wilson Bulletin* 112(1): 108-114.

Lanyon, S.M. and C.F. Thompson. 1986. Site fidelity and habitat quality as determinants of settlement pattern in male painted buntings. *The Condor* 88(206-210).

Norris, D.J. and W.H. Elder. 1982. Distribution and habitat characteristics of the painted bunting in Missouri. *Transactions of the Missouri Academy of Science* 16:77-83.

Pashley, D.N., C.J. Beardmore, J.A. Fitzgerald, R.P. Ford, W.C. Hunter, M.S. Morrison, K.V. Rosenberg. 2000. Partners in Flight: Conservation of the land birds of the United States. American Bird Conservancy, The Plains, VA.

Rich, T.D., C.J. Beardmore, H. Berlanga, P.J. Blancher, M.S.W. Bradstreet, G.S. Butcher, D.W. Demarest, E.H. Dunn, W.C. Hunter, E.E. Inigo-Elias, J.A. Kennedy, A.M. Martell, A.O. Panjabi, D.N. Pashley, K.V. Rosenberg, C.M. Rustay, J.S. Wendt, T.C. Will. 2004. Partners in Flight North American landbird conservation plan. Cornell Lab of Ornithology. Ithaca, NY.

Schafale, M. P., and A. S. Weakley. 1990. Classification of the natural communities of North Carolina, third approximation. N.C. Department of Environment and Natural Resources, Natural Heritage Program, Raleigh, NC.