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## Summary and Conclusions

There are five major plant community-types found in the study area in Croatan National Forest. These community types are defined by floristic composition in terms of diagnostic species with restricted distributions or frequent occurrence in the community-type. The five communities are:

1. Xeric Longleaf Pine-Oak
2. Longleaf Pine Savanna
3. Pocosin
4. Bottomland Forest
5. Loblolly Pine-Hardwoods

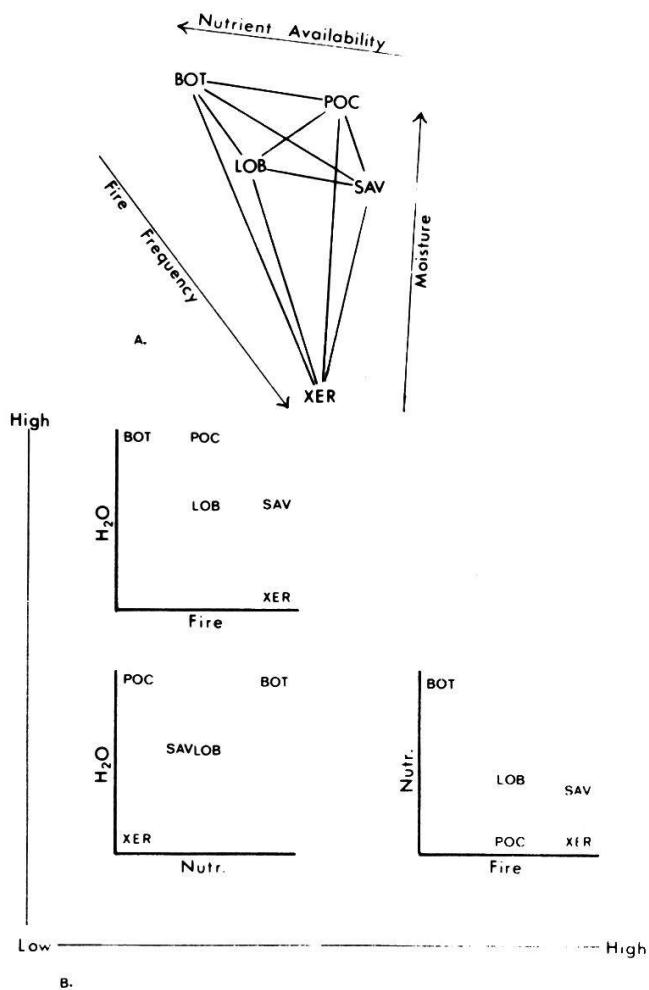
The diagnostic species (the differential species and species with a constancy class of five) for each type are shown in Table 3.

The areal extent of the community-types is shown in the vegetation map (Fig. 5). Comparison of the vegetation map with the maps of the surface geology and soils (Fig. 3 and Fig. 4 respectively) shows that there are definite correlations between the distribution of plant communities and the geology and soils. In the Newport Barrier region, which corresponds to the Newport Sand facies of the Flanner Beach formation, a wide range of soil types supports vegetation ranging from Xeric Pine-Oak to Bottomland Forest and Pocosin. In the Newport Backbarrier Flat region, or the Beard Creek Facies, histosols support a large expanse of shrub bog known as Lakes Pocosin.

Xeric Longleaf Pine-Oak is largely restricted to the deep, excessively drained sands of the Kureb soil and Longleaf Pine Savanna is found on the sandy ground-water podzols of the Leon series, as well as some of the better drained loamy soils. The very poorly drained upland soils with the black surface horizons generally support Pocosin and the histosols of the Dare and Ponzer series always do so. Bottomland Forest grows in the mucky soils along the major drainage-ways, generally mapped as Johnston-Muckalee soils. The Loblolly Pine-Hardwoods are found in loamy to clayey soils such as the Goldboro-Autryville and Leaf soils.

There are three habitat factors of major importance in determining the vegetation pattern seen in the study area and in the southeastern coastal plain in general. These are availability of nutrients, water relations, and fire. The diagram showing the floristic similarity of the community-types (Fig. 6) can be regarded as an informal ordination of the communities. In Figure 8 the ordination is related to gradients of the three primary environmental factors. Even though the habitat factors are not independent of one another it can be seen that each one influences the distribution of the communities.

The Xeric Longleaf Pine-Oak and the Bottomland Forest community-types are found at opposite extremes of the three environmental gradients and show the lowest floristic similarity of any pair of communities. The Xeric Pine-Oak habitat is the driest and most nutrient-deficient, and the vegetation is burned frequently, although possibly not as often as the Longleaf Pine Savanna. The Bottomland Forest shares the hydric extreme with Pocosin and rarely experiences fire. Nutrient availability is highest in the Bottomland Forest based on levels of extractable nutrients and relatively high pH. The Loblolly Pine-Hardwoods is found at an intermediate position on all three gradients and shows the highest mean floristic similarity with the other community-types.



**Figure 8. Relationships of community-types to environmental gradients.**  
 a) Informal ordination of the five major plant community-types (based on floristic similarity as in Fig. 6) related to important environmental gradients. Some relationships are not shown properly due to the projection in two dimensions. SAV is actually in an intermediate position on the nutrient gradient and XER is found no higher, and possibly lower, than SAV on the fire gradient. b) The actual position of the communities on the environmental gradients. (XER = Xeric Longleaf Pine-Oak, SAV = Longleaf Pine Savanna, POC = Pocosin, BOT = Bottomland Forest, LOB = Loblolly Pine-Hardwoods.)

**Abb. 8. Beziehungen zwischen den Vegetationstypen und den Standortsgradienten.**  
 a. Ordination der fünf Hauptvegetationstypen (hinsichtlich der floristischen Ähnlichkeit wie in Abb. 6) in bezug auf die wichtigen Standortsfaktoren. Verschiedene Beziehungen können nicht genau aufgezeigt werden, weil die Darstellung nur zwei Dimensionen hat. Die *Pinus palustris*-Savanne (SAV) nimmt eigentlich eine mittlere Stellung auf dem Nährstoff-Gradienten ein und der *Pinus palustris*-*Quercus*-Trockenwald (XER) ist auf keinen Fall höher, wahrscheinlich aber tiefer auf dem Feuer-Gradienten als die Savanne. b. Stellung der Vegetationseinheiten auf den Standortsfaktoren-Gradienten. (XER = *Pinus palustris*-*Quercus*-Trockenwald, SAV = *Pinus palustris*-Savanne, POC = Pocosin-Vegetation, BOT = Auenwald, LOB = *Pinus taeda*-Hartholzwald.)

In terms of the three environmental gradients, the Savanna differs strongly from the Pine-Hardwoods only in having fires with high frequency. The Pocosin community is found at the hydric extreme of the moisture gradient but differs from the Bottomland Forest by being extremely poor in nutrient availability and by burning with moderate frequency.

The Pocosin community-type (Table 4) shows a range of variation from Short Pocosin with the lowest growth of shrubs and poor growth of *Pinus serotina*, through the Tall Pocosin with better growth, to Bay Pocosin which is dominated by hardwood tree species, including *Persea borbonia*. The hydrology of the Pocosin was not studied but it may prove that patterns of water movement are more important than fire or soils in the differentiation of shrub-bog vegetation.

The plant communities of the research area are representative of much of the vegetation of the North Carolina coastal plain and are similar in composition and structure to communities found from southeastern Virginia to northern Florida. The floristic relations of the community-types in the research area in terms of diversity and similarity of composition are comparable to those found in north central Florida. The affinity of vegetation of the research area to more southern regions is also evidenced by the presence of a number of species with southern distributions which are uncommon in North Carolina; including *Asclepias pedicellata*, *Litsea aestivalis*, *Peltandra sagittaeifolia*, and *Pinguicula pumila*.

## Zusammenfassung

### Analyse der Vegetation der Küstenebene in Croatan National Forest.

Es werden 5 Hauptvegetationstypen im Untersuchungsgebiet des Croatan National Forest unterschieden. Diese Vegetationstypen sind durch die Kombination von typischen Arten gekennzeichnet, die auf diese Vegetationen beschränkt sind oder sehr häufig darin vorkommen. Die 5 Vegetationseinheiten sind:

1. *Pinus palustris-Quercus-Trockenwald*
2. *Pinus palustris-Savanne*
3. *Pocosin-Vegetation*
4. *Auenwald*
5. *Pinus taeda-Hartholzwald*

Die typischen Arten für jede Vegetationseinheit (Differential-Arten und Arten mit einer Stetigkeit von 5) sind in der Tabelle 3 zusammengestellt.

Die Verbreitung der Vegetationseinheiten ist auf der Vegetationskarte (Abb.5) zu sehen. Ein Vergleich der Vegetationskarte mit der geologischen und der Bodenkarte (Abb. 3 und 4) zeigt, dass zwischen Vegetationsverbreitung und Geologie und Boden eindeutige Beziehungen vorhanden sind. In der Newport Barrier-Gegend, welche der Newport Sand-Fazies der Flanner Beach-Formation entspricht, tragen eine weite Spanne von verschiedenen Bodentypen Vegetationen, die von der Föhren-Eichen-Trockenwald- bis zum Auenwald und zur Pocosin-Vegetation reichen. In der Newport Backbarrier-Ebene oder in der Beard Creek-Fazies wachsen weite Strauchsümpfe, die als Lakes-Pocosin bezeichnet werden.

Der *Pinus palustris-Quercus-Trockenwald* ist größtenteils auf die tiefgründigen, übermäßig durchlässigen Sande des Kureb-Bodens beschränkt. Die *Pinus*