

Habitat: A Landscape Architecture Perspective

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ABSTRACT

The recurrent view from Florida's roads suggests only limited success in addressing those thematic landscape concepts that structure habitat. Biodiversity, uneven age class, and suitable native understory are appropriate objectives that have been supplanted in human-generated landscapes by efforts too often decorative and garish: these gestures repeatedly fail to address sound landscape ecology tenets. Design and planting proposals are focused rather on issues of aesthetics and safety, with little attention to the opportunities that exist to develop landscape models. Thus, concern for issues of habitat quality -manifested in connectivity and diversity- are overlooked.

Efforts to introduce within proposed road corridors new landscape models that respond to the habitat demands of local fauna are too few and take place occasionally only as part of larger, primarily federally funded projects. Smaller projects in both scale and budget -for example, those within planned communities and along the edges and intersections of existing roads within urban, suburban, and rural settings- offer significant opportunity for habitat development, but such occur infrequently. These design objectives can also provide for community involvement,

creating service opportunities, enhancing community interaction, and fostering civic pride.

The design process for new, reconstructed, and/or relocated roads -historically "top down"- has become more recently an all-inclusive undertaking, reflecting the involvement of "grassroots stake-holders" and professionals. Such efforts frequently seek to include residents, users, and a cadre of multidisciplinary professionals dealing with a range of concerns from landscape architecture to zoology, from aesthetics to engineering, and from biology to limnology. These efforts embrace aspects of the landscape from pre-history and history through contemporary cultural land use patterns. They are concerned with a range of issues from slope stabilization and roadway edge conditions, to soil conservation and stream sedimentation, and from the preservation of native vegetation to methods of safe passage for fauna across transportation corridors. The preservation and protection of existing wildlife and their habitats, and the appropriate restoration, enhancement, reconnection, and of such habitats as may have previously existed, are primary and critical activities to this design process. These endeavors must also

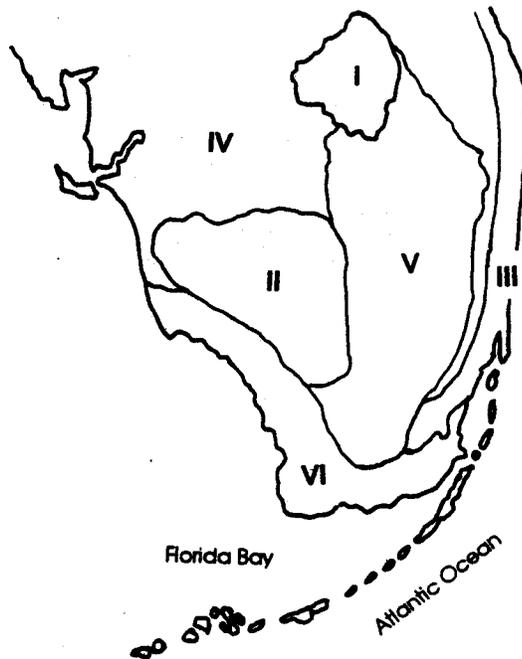
draw upon the information -or story- of the regional landscape in all of its manifestations and characterizations, to assure an appropriate response to cultural as well as scientifically grounded values. Music, literature, politics, community form and identity are all germane. For example, the works of Marjory Stoneman Douglas (*Florida: The Long Frontier*; and *The Everglades, River of Grass*), Zora Neal Hurston (*Dust Tracks on the Road*), Marjorie Kinnan Rawlings (*Cross Creek*; and *The Secret River*) and others, in connecting the vivid imagery found in Florida's literature with the reality of its environment, are examples of this objective.

There are too few archetypes in Florida today of roads conceived within a broad egalitarian concept embracing multi-disciplinary efforts. A litany of examples exist in which roads fail individually and collectively to respect both nature -habitat, connectivity, corridors- and culture -sense of place, community and cultural attributes. A new model is necessary for road design conceived to address not merely vehicular movement, but structured to address the functional value of the landscape as well.

History teaches us that this very landscape and its attributes that have for more than one hundred and fifty years drawn people to Florida, inherently offers more than the eye can see. It is a history of the land that circumscribes design objectives proved by the measure of time, that protect and guide efforts to enhance and elaborate upon the concept of habitat.

THE REGION

Dade County lies primarily within the physiographic province known as the Atlantic Coastal Ridge. This Ridge runs from the State's northern border with Georgia southward to rural Homestead, a distance of some 550 km. Smaller portions of the County are found within two other provinces: the Sandy Flatlands to the west of the Atlantic Ridge, and in some parts of The Everglades (Figure 1). The ridge ranges from 2.4 m

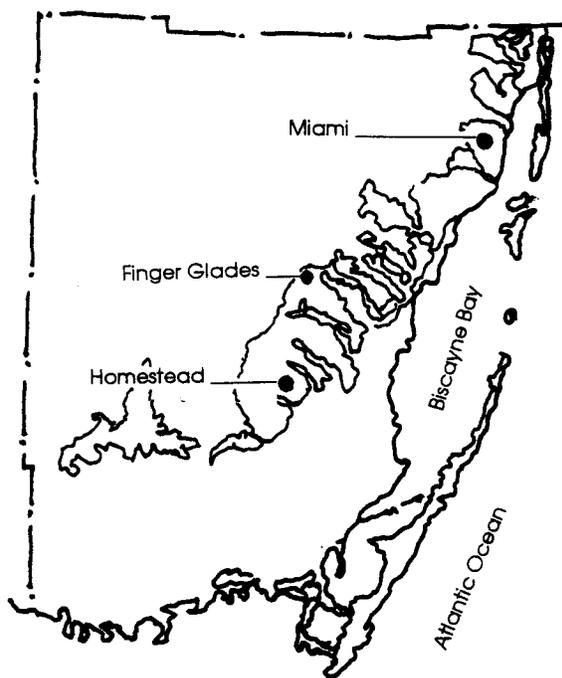


Scale 1" = 80 km

- | | |
|-------------------------------|-----------------------|
| I. Lake Okeechobee | II. Big Cypress Swamp |
| III. Atlantic Coastal Ridge | IV. Sandy Flats |
| V. The Everglades | |
| VI. Mangrove & Coastal Glades | |

Figure 1
Physiographic Provinces

to 3.0 m above sea level, and fades sharply east to the coastline and more gently to the west to The Everglades at an elevation approximately 1.5 m above sea level (Hoffmeister, 1974, pp 27-8). From this ridge, drainage historically occurred south and east through a series of finger glades (Figure 2) to Biscayne Bay, and south and west toward The Everglades and Florida Bay.



Scale 1" = 30 km

Figure 2

Dade County's Historic Finger Glades

Historically, Dade County was devoid of any large, significant soil deposits as the Miami Oolite of the Atlantic Coastal Ridge was often surficially exposed. Today this is no different. Of those soils that do exist to any

measurable depth, the most desirable soils in quantity and quality are found in the southwestern areas of the County. While these soils today support extensive agricultural activities, they originally demarked a varied vegetative distribution. Craighead (1971, pp 61-9) notes four soil categories, each of which delineated vegetative cover: rocky soils, sandy soils, marl soils, and organic soils.

Rocky soils were usually the highest and best-drained. Found within the limits of this soil were both pinelands and tropical hardwood hammocks. As increased demand for agricultural use grew, these rocky soils were expanded by the introduction and use of rock plowing machinery that rendered exposed pinnacle rock and limestone outcroppings more suitable for agricultural purposes. Gifford -in *Florida Keys, Soil Productivity* (Department of Agriculture, Tallahassee, 1946)- notes:

A good way to plant these rocky soils is to set little trees in the natural pot-holes in patches. Shelter trees should be left to yield humus and afford shelter against sun and wind, and to furnish homes for birds and other useful creatures.... We must not forget that limestone lands demand a covering of vegetation, yielding a constant supply of such litter.

Sandy soils are predominantly found in the northeastern portions of Dade County, while marl soils occur along the southeastern portions of Dade County, shoreward of the mangrove fringe. These marl flats are highly alkaline, generally composed of marine deposits of aragonite and calcite, and are up to

1.8 m in depth. Historically subject to tidal fluxes and eastward drainage, a variety of vegetation was common to these soils and dependent on their hydration, including saw grass, sedge, grasses and spike rushes. Inland marls supported a variety of "woody vegetation such as an abundance of cabbage palm" (Craighead, 1971). In the absence of fire and human disturbance, successional growth included jamaica dogwood, mahogany, gumbo limbo, the stoppers, live oak, mastic, and other tropical hardwoods, and their associated understory.

Organic soils were found primarily in patches, in the mangrove fringe and westward to The Everglades. They supported herbaceous plants, some tree species, and the tree islands common to The Everglades: the tear-shaped forms of the latter illustrate the direction of surficial water flows of The Everglades, from north and northeast to southwest. Along with these islands of tropical hardwoods, saw grass swamps, willow heads, cypress domes, sloughs, and custard apple swamps were found on these organic soils (Craighead 1971; Myers and Ewel 1990).

PATCHINESS AND FRAGMENTATION

With a population surging beyond two million, Dade County has become a patch quilt of land uses that contribute to its ecological fragmentation. The County finds itself -in part as a result of this diverse land use- in a situation both unique and disadvantageous. Unique because it lies between two

national parks -few seem to realize this- and disadvantageous because it suffers the costs associated with peninsula isolation and an expanding infrastructure, the latter driven by initial settlement and agricultural development, and more recently by suburbanization of rural areas to the south and west. It is the physical form and character of this infrastructure including roads, canals, utilities corridors, and the like -intended to support 500 new daily residents-

that in fact challenges the possibility of maintaining and restoring already-fragmented habitats. And with continued expansion, the opportunity to restore stable habitats, and to protect and enhance associated migration and colonization becomes ever more difficult.

The factors that delimit patchiness -including size, number (quantity), edge condition, shape, distance between self-same patches, relative spatial relationship, and surrounding-matrix variability (Harris 1984, p109; Forman 1986, p83-120)- have changed in south Dade County over the last century, as land use has moved from native undisturbed habitat, to agriculture, to increasingly dense housing. This has resulted in a transition from a landscape of continent-island patches to an ever more fragmented landscape in which a larger number of smaller patches create the archipelago model identified by Opdam et al. Over the last ten to fifteen years south Dade's landscape matrix has been relentlessly transforming to discontinuous, single family, small lot residential development. Understandably

associated with this change has been a continued reduction in the habitats that existed from the 1920's to the present (Figure 3). Over the last ten to fifteen years, the matrix has been relentlessly transforming from predomi-

nant agricultural use to single family, small lot residential development. Understandably associated with this on-going change has been a continued reduction in habitat over the last 70 years (Figure 3).

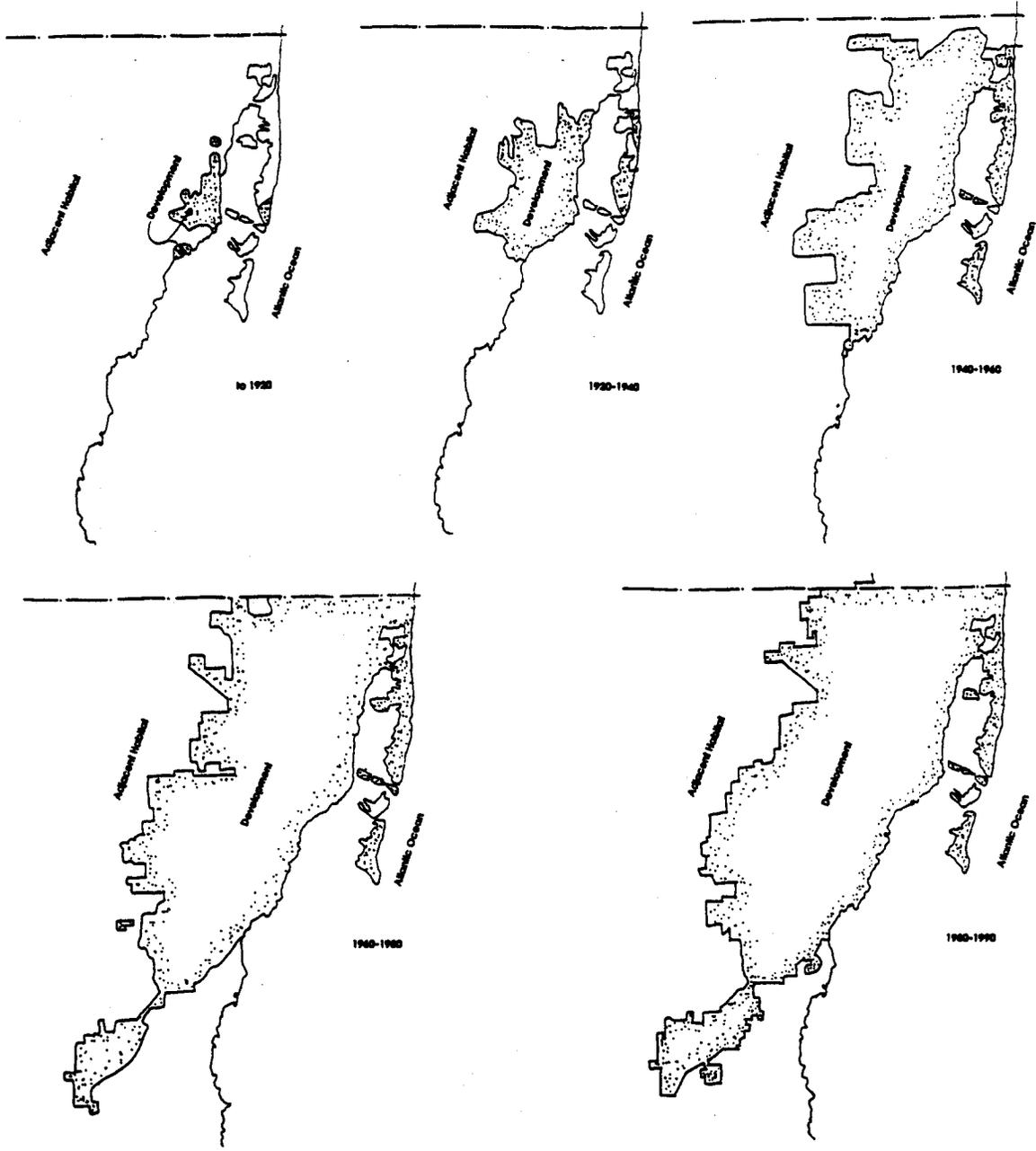


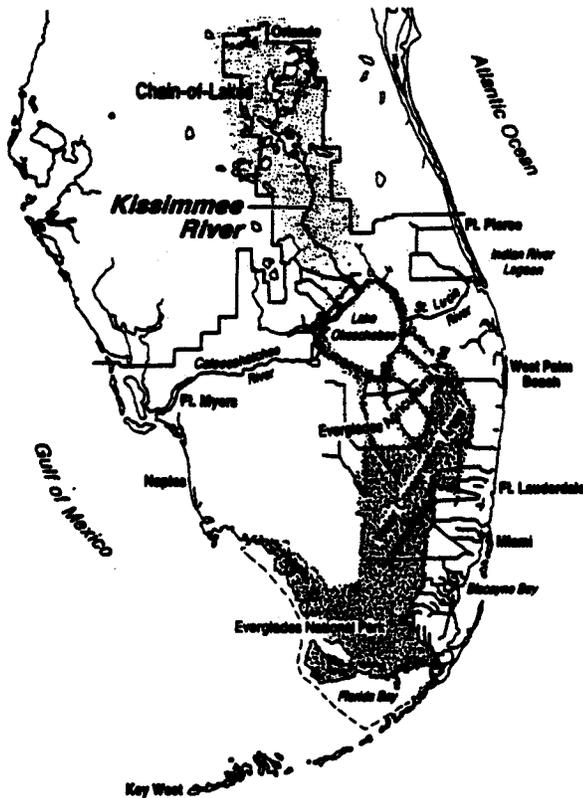
Figure 3
Urban Expansion & Concurrent Habitat Loss
Dade County

INFRASTRUCTURE FRAGMENTATION

Crisscrossing the County in almost random pattern are a series of broad excavated canals (Figure 4) that have replaced the historical drainage patterns that once included the finger glades. These changes have forever modified the traditional fluxes within the water regime. These canals, with their flood control gates and weir structures, have essentially created a new drainage system for South

Florida that is efficient during the "rainy season", but which lacks the inherent habitat value of a natural waterways system.

Coupled with these canals are a series of highways -including from east to west I 95; the Palmetto Expressway (State Road 826); and from north to south, The Florida Turnpike, the Palmetto Expressway, and portions of I 75, the Turnpike Extension, and the Don Shula Expressway. Older roads including Okeechobee Road, South Dixie Highway, and Krome Avenue that further fragment the landscape. As the result of suburbanization, canalization, and road and highway construction, Dade County is devoid of significant woodland or forest. It species diversity -both animal and plant- has been significantly diminished and it has become home primarily to small mammals and avian edge species, excluding of course those species whose habitat remains The Everglades.



No Scale

Figure 4
South Florida Water
Management District Canal System

PRESCRIPTIVE CONCEPTS

In an effort to develop prescriptions that will begin to address habitat fragmentation within an urbanizing Dade County, several projects are underway.

Habitat For Humanity Jordan Commons

This project -a planned residential community of 200 units- is being developed

with a linear buffer-greenway at its perimeter, ranging in width from 25' to 50'. Within an of rapid suburbanization, the buffer is seen as a gesture toward the installation of historical native vegetation. Its development and function as a habitat model will be monitored on an interval of six months for the next five years.

North Dade Greenways Project
Metropolitan Planning Organization
Dade County

This project involves a public participation process that seeks to develop a greenway network for the northern portions of Dade County, that will parallel the already-completed study for south Dade County. Particular emphasis is on canal corridor utilization, and the use of such public rights-of-way as habitat corridors. Additionally, detailed studies addressing connectivity within highway and road rights-of-way are also being explored.

South Dade's Landscape Ecology Program
Dade Community Foundation, Sponsor

This project is providing to forty at-risk and disadvantaged students in summer 1996, the opportunity to explore natural habitats that many of them may not otherwise experience first-hand. Students will be introduced to general concepts and ideas related to natural areas, and the concept of "habitat" will be explored. Field work will include observation, photography, and the recording of first-hand interests and impressions at several of Dade County's remaining natural areas, in-

cluding Castellow Hammock and Camp Owissabauer, both impacted by Hurricane Andrew.

Florida Turnpike Interchange
Western Terminus of State Road 836

On-going design studies addressing habitat reconnection, and including the development of wetlands. These proposals will be completed in Fall 1996, and submitted to the Florida Department of Transportation for consideration and subsequent implementation.

Florida Turnpike
Sound Attenuation with Landscape

On-going design studies addressing sound attenuation as habitat and adjacent residential concern. Development of several models for evaluation is on-going. These proposals will be completed in Spring 1997, and submitted to the Florida Department of Transportation for consideration and subsequent on-site testing and evaluation.

CONCLUSIONS

In urban and rapidly expanding areas, new solutions must be found to address habitat fragmentation. Linear infrastructure corridors such as roads and canals must be seriously evaluated for development as landscape linkages, and large areas in public ownership (parks for example) and private ownership (office parks and commercial sites for example) must be carefully evaluated as patches suitable for small species home ranges. Concerns for the limitations of patch

size and corridor width must give way to bold and intensive explorations of habitat reconstruction and restoration within urban environments, along Dade's roadway corridors and within the rights-of-way of its canals. Such efforts, though they cannot replicate historical natural ecosystems destroyed and modified over time, offer the opportunity to identify urban thresholds for species/habitat relationships. And, perhaps such restorations and replications will demonstrate unexpected and desirable outcomes.

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