The South Dade Watershed Project

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INTRODUCTION

At significant milestones in time, we take a look at ourselves, our surroundings, and our relationship to one another; and if everything follows the way it has in the past, we rethink what we do, what we are, and why. It is this process that separates us from the birds and bees, the rocks, the geology, the air, the elements -- we learn!

As the Millenium approaches, there has never been a more desperate time to learn than now. As we look to the future of our children and grandchildren -- those whose lives will be affected by the plans we make or don't make today -- we are reminded of an old, but true, tale: in the Orient a master of pottery made clay and buried it for his great-grandchildren. This simple act assured their future. Without this planning there would be no clay, no livelihood, no future generations. It is perhaps an over simplification to say, but what isn't planned for the future, our children will not have.

Over the last hundred years there has been a notable lack of vision in planning for our country's future. As a people, we have changed from primarily a rural to an urban society. During this time we have created the worst urban sprawl since the beginning of settlements. The irony is that virtually no one wanted this sprawl, yet the roads we build today promise only to produce more of the same.

Perhaps in a world of unlimited land and unlimited resources we could sustain unlimited sprawl. However, South Florida is clearly limited by both the availability of land and the availability of water. This truth is realized today in times of drought and in times of flooding -- yet more and more people migrate to South Florida everyday.

What then are our plans for tomorrow? How will we resolve this conflict of land, water, and future growth?

THE NEW CONSTRUCT

In the past there was a false perception of unlimited natural resources. Their apparent abundance, combined with the seemingly limitless abilities of technology, was seen as sufficient to control the consequences of boundless growth. When an environmental problem arose, a technological solution was sought.

In recent years we have begun to recognize that there are limits to all resources and that technological solutions often cause problems greater than those they were intended to solve.

We have begun to experience the negative effects of our unbridled growth. These effects have been revealed in significant ways: inflation, higher taxes, energy and fuel shortages, and water scarcity. They have been revealed even more significantly in the breakdown of whole biological systems threatening the extinction of species and degradation of the very environment we came to live within. Examples include the dramatic decline in the number of wading birds and the threatened extinction of the Florida Panther in the Everglades; the algae blooms and the “Dead Zones” -- areas virtually devoid of life -- in Florida Bay; and the sick coral reefs of the Florida Keys. These are clear signs that human activities have begun to infringe on the processes of nature; the natural production, cycling, and recycling of materials and energy is being short circuited; more is being taken from the environment than is being returned; “natural capital” is declining.

Today, faced with limited resources, we can ill afford to apply technology indiscriminately. Instead, we must discover how to do more with less and how to successfully design with nature -- to ecologically design our human-made communities to take full advantage of the "free work" of natural systems.

To achieve an interactive network of humanity and nature -- a landscape that has a “place” for both the needs of humans and the functions of nature -- requires that planning and design re-orient themselves from providing "more" to a view that there are limits. It then becomes the responsibility of science, planning, and design to discover these limits and work within them. We must put form to a “common vision” and develop incremental strategies on how to get from "here" to "there."

What then are the critical elements in the South Florida landscape that must be taken into account to avoid calamity? What must be repaired and protected to prevent the continued decline in environmental quality and community quality of life? Once we have this information, we can begin to envision how we might incorporate development and environment into one system -- what must be undone, and what must be added. It is the mission of the New Construct to understand the science of the region, and to design within the limits imposed by both the natural environment and economics. The South Dade Watershed Project seeks to apply this understanding to the community of South Dade.

THE SOUTH DADE WATERSHED PROJECT

Watershed Interactive Network

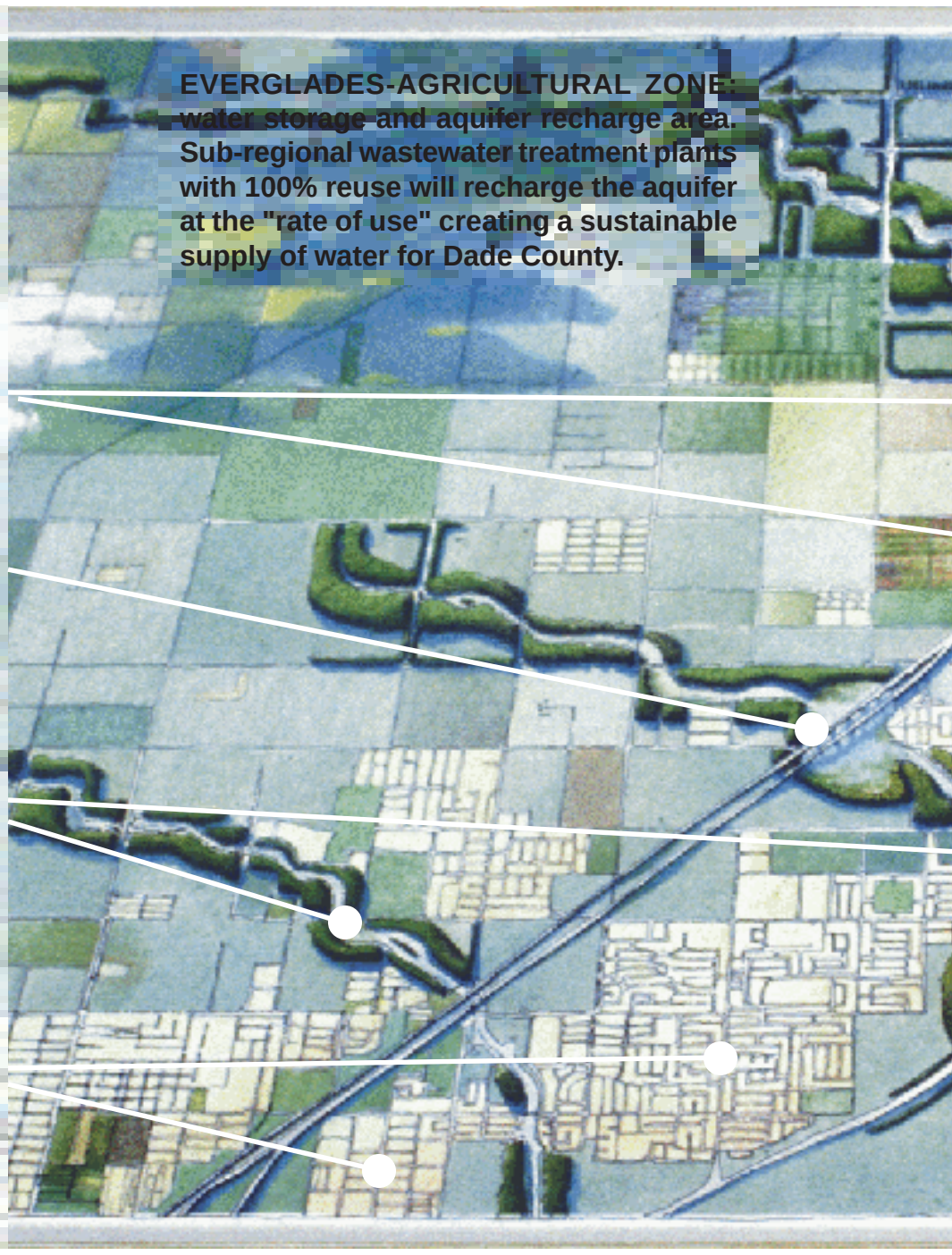
Daniel Williams, FAIA

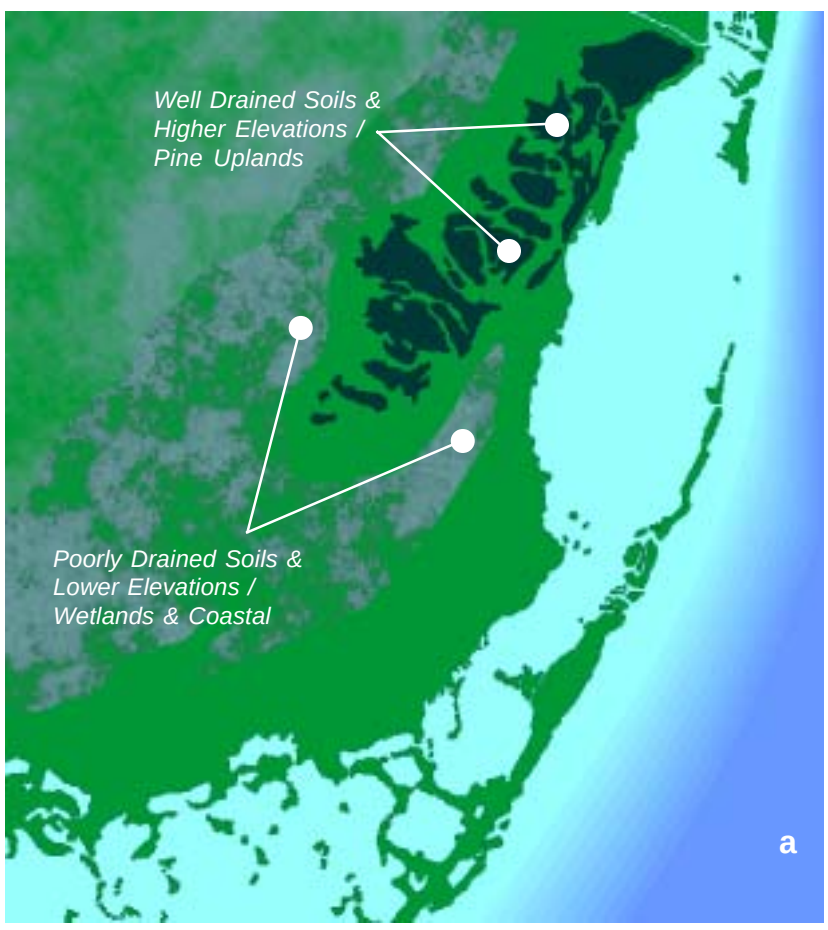
- **Re-create the historic wetland sloughs for the collection, storage, and biological clean-up of stormwater. This restores the regional image and identity while providing for future water resource needs.**

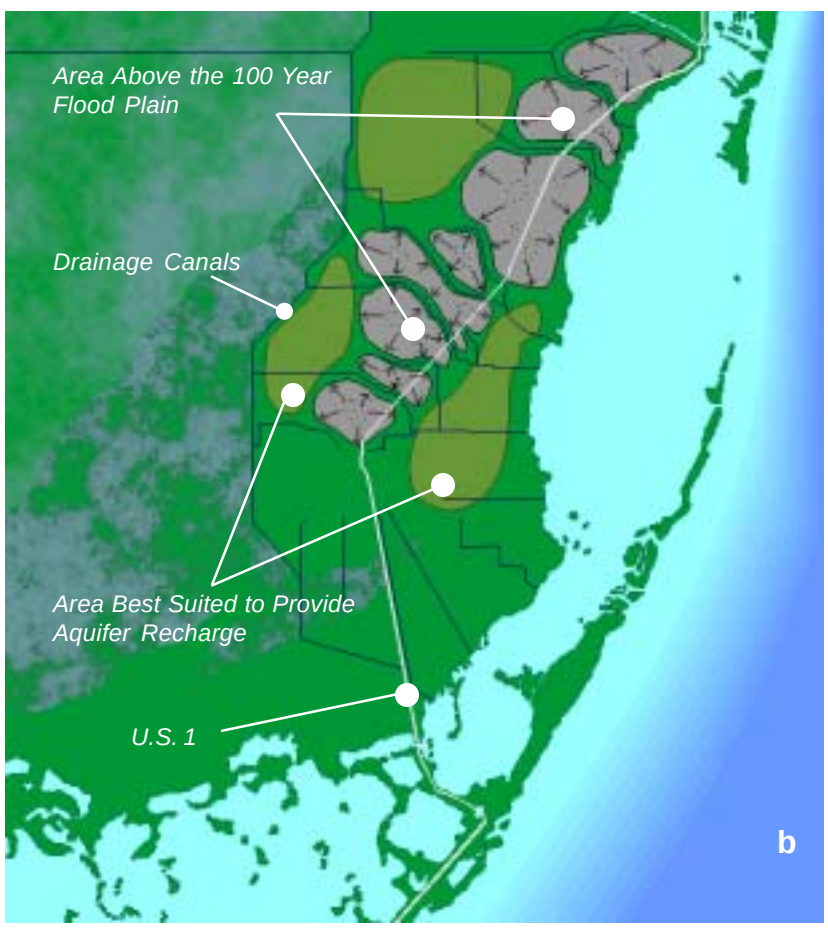
- **Create water storage areas within communities which will recharge local wellfields - storing more water locally than we do today, and providing for our future.**

- **Linear storage areas combine the recreational and aesthetic benefits of "greenways and blueways" with water resource objectives. These "hydric parks" flood to protect the community while creating amenities and recreational areas that define neighborhoods and communities.**

- **The greatest potential for additional water storage lies within the coastal ridge. The development of neighborhood "hydric parks" increases local aquifer recharge, reduces local flooding, and enhances community identity.**

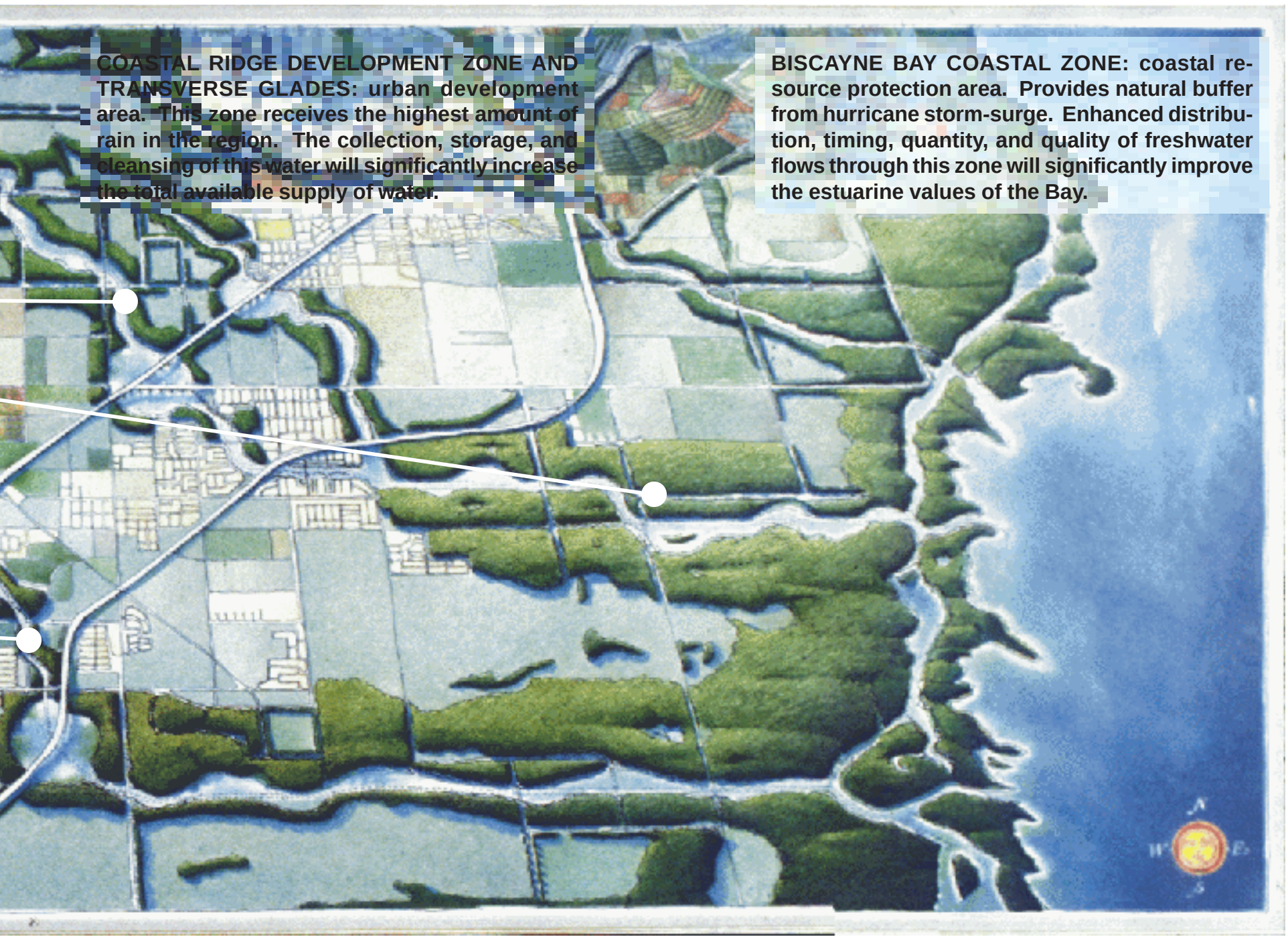


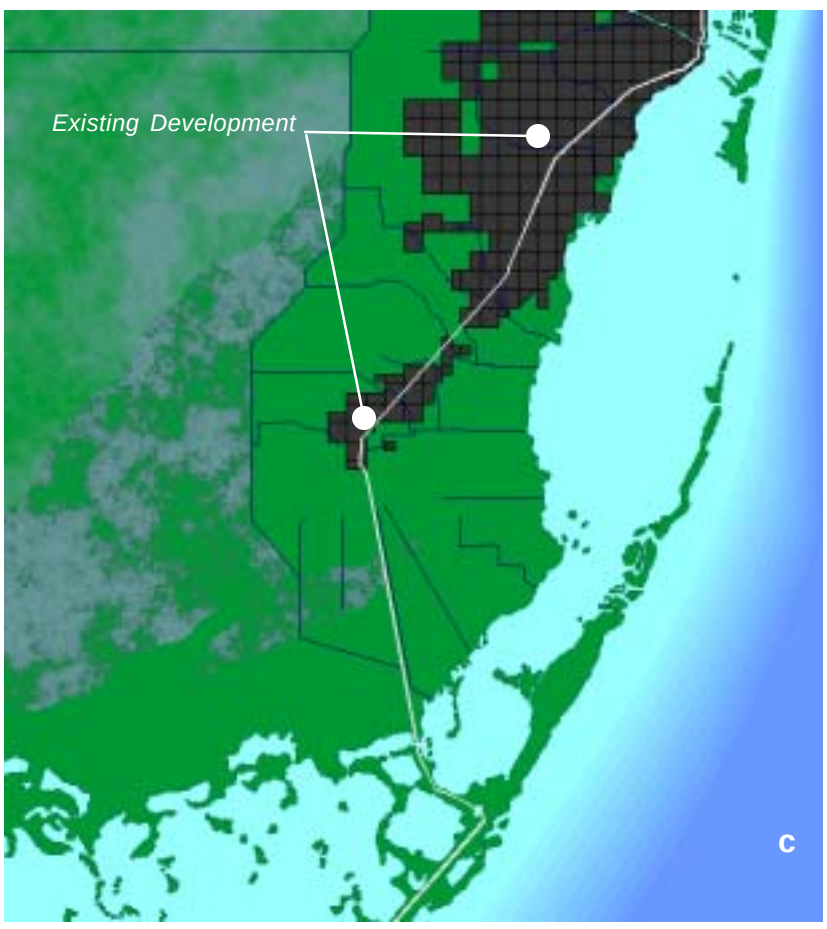


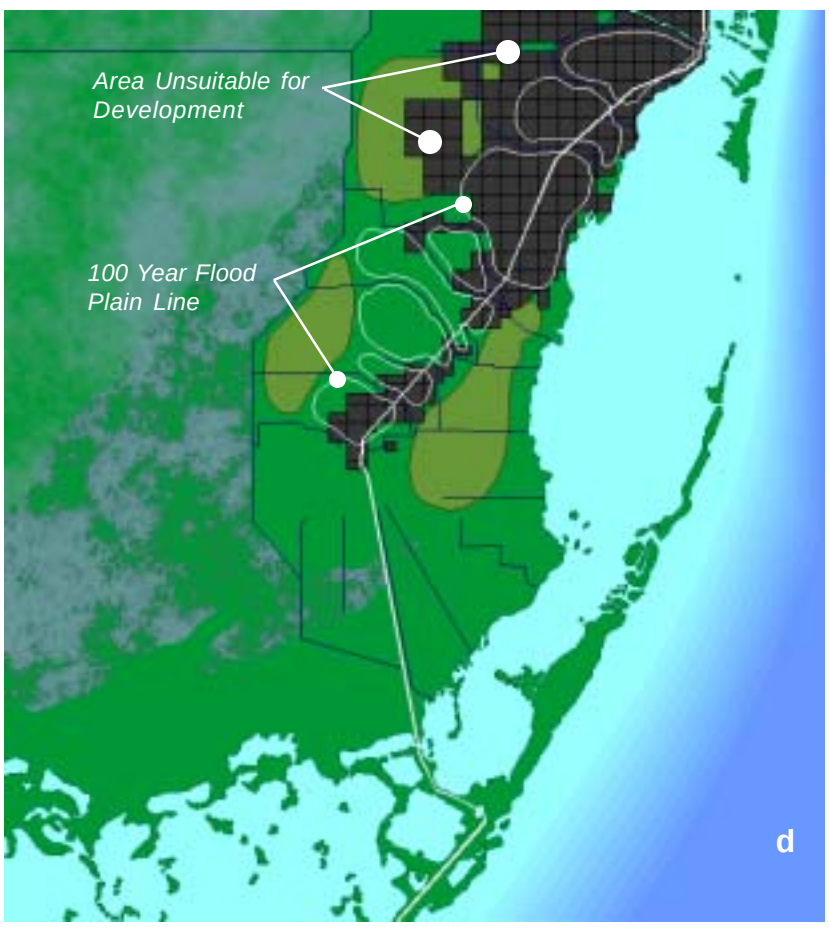


A REGIONAL SYSTEMS APPROACH TO SUSTAINABLE DEVELOPMENT

The above images explain a regional systems approach to establishing a proper "fit" between landuse and water. In the first image (**a**) we have consolidated the information from the 1943 Davis Vegetation Map to differentiate well-drained and poorly drained soils. The dark (black) areas, representing the "higher" well-drained soils of the coastal ridge, are more suitable for development. The lighter areas, representing the "lower" poorly drained soils of the Everglades, the transverse glades, and coastal marsh, are not suitable for development. The above image (**b**) shows how the land and water interact naturally in South Dade. The darker areas represent the areas located along the coastal ridge that are at elevations above the 100-year flood plain. The arrows show how stormwater flows off the coastal ridge, from areas of higher land elevation, to areas of lower land elevation. This water eventually flows to the drainage canals and ultimately Biscayne Bay. The light areas, located on either side of the coastal ridge, are open pervious/porous areas that provide critical water recharge to the Biscayne Aquifer.







These next two images show the existing pattern of development (**c**) and some of the conflicts that exist between the natural land form and our man-made environment. In both images, the existing development is shown as a dark (brown) grid; the drainage canals, cutting through the coastal ridge, are shown as black lines; and highway U.S. 1, running along the coastal ridge, is shown as a white line. The next image (**d**) overlays the 100 year flood plain on the existing development grid. As can be seen, much of the development in South Dade has occurred in areas that are less suitable for development. These areas include historic Everglade wetlands, valuable coastal marshes, and critical recharge areas for public wellfields. Continued development within these areas will cause more local flooding, pave over critical aquifer recharge areas, and destroy valuable natural resources.

Given the limited land area that is suitable for development and the water resource limits of South Dade, how do we create a system that will insure the viability of the region in the face of predicted population growth? (cont. on next page)

THE WATERSHED INTERACTIVE NETWORK, THE "WIN" VISION

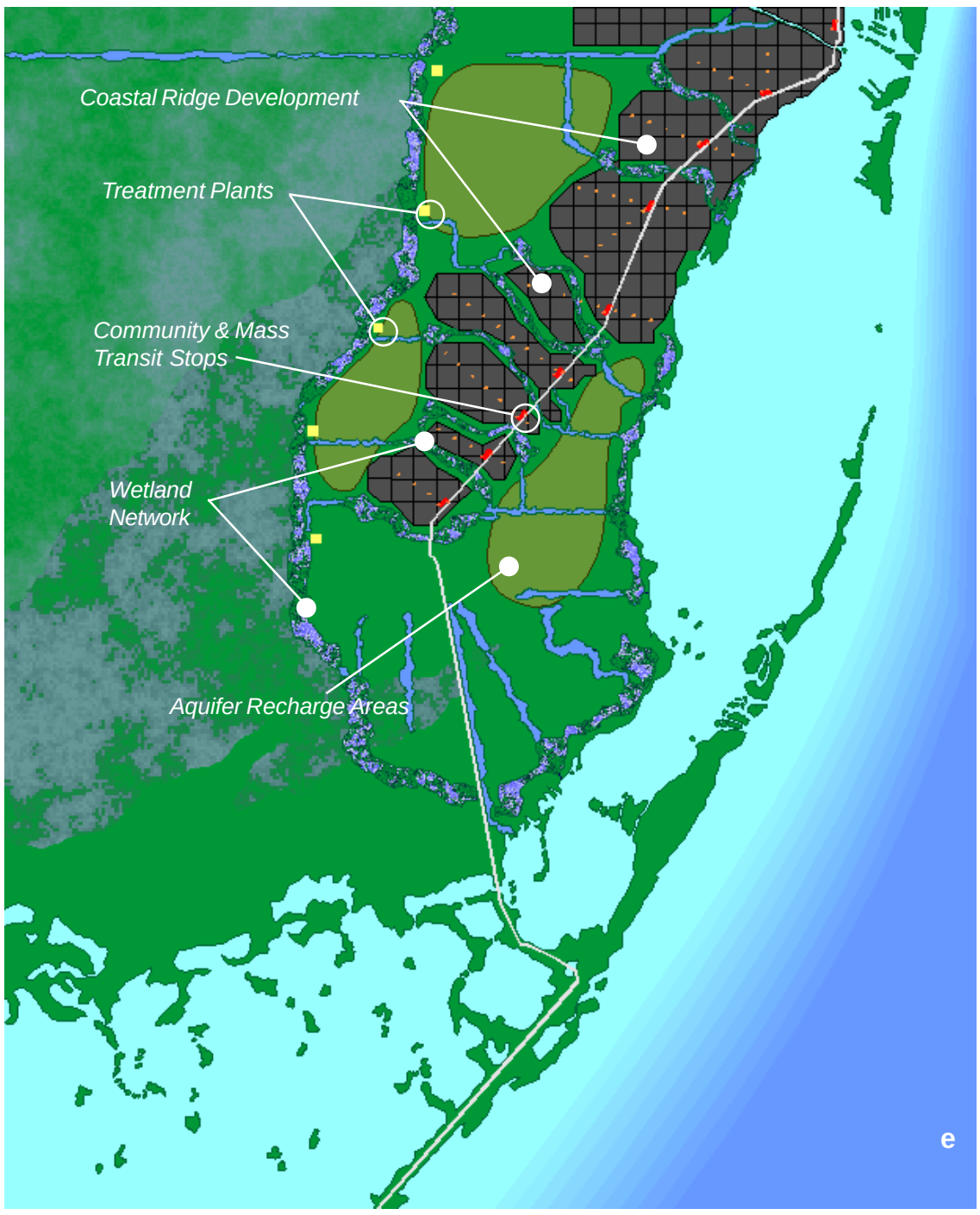
Using the physical features of South Dade as a guide -- the soils, topography, vegetation and hydrology -- and our knowledge of their interactive connections, we can re-create the historic hydrologic functions of the region. This approach, illustrated in the final image (**e**), is designed to use the workings of nature to efficiently collect, store, clean-up, and distribute water for all users -- urban, agricultural, and natural.

This image shows the canals replaced by broad wetland systems similar to what had historically typified the transverse glades. These topographic low points are an integral part of the region's natural flood protection. The north-south canal, separating the developed part of Dade County from the Everglades, is expanded to provide valuable storage and cleansing of water. This will improve the quality of water while preserving a sustainable water supply for future users. The coastal canals become "spreader" canals to enhance the distribution, timing, quantity, and quality of that water which flows to Biscayne Bay while protecting the biological food chain, and supporting sport fishing and eco-tourism.

The light squares in west Dade represent sub-regional wastewater treatment plants that will provide for 100% reuse of the waste effluent. This requires enhanced water quality treatment, provided by technology supplemented with natural cleansing of the water in the newly created wetland areas. By ultimately recycling this water to the aquifer we can replenish much of the water that we use everyday without extensive use of pumping and other fuel driven systems.

In this plan, open pervious land uses that provide valuable recharge to the aquifer, are preserved. This will also provide for the preservation of the agriculture and quality of life that exists in the Redland today. To support this objective, development must be directed to the higher ground of the coastal ridge. Mass transit and community based transit centers, the lighter (gray) dotted lines within the developed areas, must be established. These will encourage the development of tightly knit communities with strong regional connections, and reinforce the opportunity to provide for our future water needs.

Collectively, then, these graphics describe the Watershed Interactive Network, the "WIN" Vision (illustrated on the preceeding page).



PRINCIPLES FOR SUSTAINABLE WATER RESOURCE PLANNING

- **The total rainfall within the region is that region's water budget** -- supplies from outside the region are “borrowed or leased” and cannot be counted on during drought or after build out. The aquifer “storages” allow us to average the variations in rainfall and should not be used to calculate the allocation of water for public use.
- **Each landuse must spatially contribute its share to the region's water budget** -- the post development hydrologic conditon must equal the pre-development hydrologic condition, *i.e.*, the loss of recharge that is associated with “typical” development must be restored and protected.
- **Stormwater, greywater and wastewater must be recycled and recharged at a rate comminserate with use** -- the storage and recharge of such must be achieved at the regional, community, and neighborhood scale.
- **The location of surface and groundwater storage areas for water resource sustainability must be integrated in urban and community design** -- the development of “hydric parks” and the preservation of open space will create strong edges for communities and create a sense of “place” while restoring recharge area lost to increased urban impervious surfaces.

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