

REPAIRING THE FLORIDA EVERGLADES

Arthur R. Marshall

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University of Miami
Center for Urban Studies
Division of Applied Hydrology

For ninety years canals have been built to drain fresh water from the Kissimmee-Okeechobee-Everglades Basin. The network of canals now intercepts large volumes of water from its historic southerly flow diverting it to tide water via much shortened routes. Pre-drainage observations indicate rainy season water levels in the lower Everglades have been lowered five feet or more.

Loss of this fresh water has eliminated rainy season flooding over half or more of the historic flood plain of the basin. (See map). The surface flood period has been shortened by weeks in the higher portions of the remaining basin and by months in the lower sawgrass Everglades and Everglades National Park.

Extensive changes in plant and animal populations have resulted from this "drying. Ground water levels have been markedly lowered -- especially in the dry seasons -- in the interior of the basin and around its periphery inducing increased salt intrusions; salinity concentrations in tidal waters are either raised, as in upper Florida Bay, or lowered, sometimes suddenly and drastically, as in the St. Lucie Estuary and south Lake Worth. There is some concern that South Florida's weather may have been altered though drainage to a condition in which drought induces drought.

The muck sponge retains water during the wet season and slowly releases it in the dry season -- and WE ARE LOSING THE MUCK. The mechanism of summer flooding and related growth of vegetation which produced the peat and muck beds of south Florida has essentially been destroyed. Exposure of the existing muckbeds to the atmosphere through drainage and tillage is eroding them rapidly. The reduction in surface flooding has shifted the muck "budget" from one of production and accumulation to one of consumption and rapid depletion. In the Okeechobee agricultural area, the thickness of the muck has been reduced by 5 feet over 44 years. Its remaining life is about 25 years, barring extensive muck fires. In the northern area of the Park a layer of muck formerly about one foot thick has virtually been eliminated within the past twenty years, exposing great areas of sharply eroded pinnacle rock.

We have proceeded with drainage on the near sacrosanct belief that such works would do no harm, or the resultant harm would be offset by the benefits. There are increasing reasons to doubt this, including the threats to the Park, a lengthy list of rare and endangered species, the foreseeable end of the muck, the threats of salt intrusion and the growing competition for water. While water supply is decreased by drainage, urbanization and farming of the drained land increase the demand for water.

Despite the growing shortage of water and associated environmental problems, the Florida Department of Natural Resources, the Florida Cabinet and most of the Florida Congressional delegation are at the moment pressing Congress to provide more funds -- the amount based chiefly on the premise that the Corps of Engineers should be allotted all the funds they can expend in a fiscal year.

Although the problems generated by drainage are environmental, ironically during the 90 year process, never have the hundreds of canal builders been required to prove that their works would not cause adverse environmental effects. Conversely, the few trained natural scientists who have been employed in the issues have always been expected to prove that more miles of canal would do harm -- an unreasonable expectation in view of the environmental complexities and the speed and massiveness of construction. There are many examples of inadequacies of this procedure.

In the 1950's, efforts of biologists and conservationists on behalf of the protection of the St. Lucie Estuary and the lower Kissimmee River were essentially rejected. The St. Lucie Estuary is now badly degraded and the Kissimmee ditch is an environmental catastrophe.

A threat of citizen injunction kept C-111 canal from being opened to the sea and forced the construction of a "plug", which is still unsatisfactory as it leaks in both directions. Furthermore, three more canals (C-109 and 110 which will drain into C-111, and C-108 to Card Sound) are now being dug nearby. These are in an area where ground water is now below sea level, salt has intruded in canals and agricultural wells must be lowered.

The public sees the Everglades water problem primarily as one of water quantity. It is also a problem of seasonality. We must aim to restore sheet flow over the land wherever possible over more months of each year. We have to think of the summer's water resupply as we do our paychecks. We must stretch the blessings of both to the pay and of the water as closely as we can to the day when replenishment occurs. It is a problem of time duration rather than simply one of static storage. Static storage of water from one rainy season to the next is possible only in Lake Okeechobee and only in limited amounts there.

A problem of equal magnitude is water quality. Most of the lakes of the Kissimmee are over-enriched. Lake Okeechobee is rapidly becoming so. While this condition spreads south toward the Everglades, an equivalent pollution onslaught threatens the Glades from the east.

The coastal canals in Palm Beach, Broward and Dade Counties are grossly polluted. Pumping of about half of this water to the Glades has been authorized by Congress. We do need the water.

Resolution of this twin pollution threat to the Glades is at least as essential as resolution of the water quantity-seasonality problem. Because the problems are inter-related, so are our suggestions for "repair". The following list is a guide to the kinds of corrective steps we much now take. All of them require elaboration including a heavy infusion of ideas from environmental professions.

1. Restore the quality of water in all the Kissimmee Lakes, as is now being attempted in Lake Tohopekaiga. This involves upgraded treatment or exclusion of all wastes, restoration of some semblance of natural water level fluctuations and intermittent drastic drawdowns to oxidize accumulated bottom ooze.
2. Reflood and restore some of the last marshes of the channelized lower Kissimmee River.
3. Slow the rate of Kissimmee run-off into Okeechobee.
4. Upgrade treatment of or exclude all wastes entering Lake Okeechobee.
5. Raise Okeechobee to the authorized 15.5 - 17.5 foot schedule. The authorized four-foot rise to 17.5 -21.5 if it could be accomplished, would destroy marshes in the northwest quadrant and release their bound-up nutrients into the lake waters. (c.f. the demise of Lake Apopka, which was triggered by the uprooting of marsh vegetation by a hurricane.)
6. Restudy the effect that the authorized diversion of water from Lake Okeechobee to the Martin County Canals would have on water supply to the Everglades including the Park and Palm Beach, Broward and Dade Counties, especially in DRY YEARS. This will require a critical decision as to which interests are to have priority. Had this plan been in operation this year, it would have been necessary to divert about 400-500,000 acre-feet of water for irrigation to the canals -- an amount which would lower Okeechobee about one foot. This situation is a microcosm of the problems generated from over-taxing the water resources. If the diversion to Martin County Canals is accomplished, will it lead to more growth and more demand?
7. State acquisition of the Fakahatchee Strand.

8. Federal acquisition of the Central drainage (subdrainage Area "C") of the Big Cypress Watershed. This is number one on the list of "Alternatives of Action" (in Report to the Secretary of Interior, Big Cypress Watershed.) There should be no drainage or interferences with sheet flow or other activities inconsistent with a National Recreation Area such as esthetic damages or risks of pollution. Remove the south half of Levee 28 and its canal, restoring natural flood flows between Conservation Area Three and Big Cypress.
9. Re-examine the hydrologic and water quality effects of Alligator Alley and the Miami Canal. The additional hydrologic effects of the new Pump Station S-140 and authorized Levee L-100 should be considered. There may be more reason to remove Alligator Alley than there is to make it an Interstate Highway.
10. Raise the minimum ground water levels throughout the Glades, the Park and South Dade. Canals which have drained the lowest lands in South Dade -- about five to ten percent of the area -- have dropped ground water levels under all the rest, and increased the risk of salt intrusion. A series of weirs in the canals might help.
11. Acquire the 38,000-acre triangle in the natural headwaters of the Shark Basin east of the Park as proposed by the Department of the Interior and re-design all associated project works in the vicinity to restore flow in that deeper basin.
12. Stop the construction of Canals C-108, 109 and 110.
13. Fill in Canal C-111 from U.S. Highway 1 to Barnes Sound.
14. Re-examine all existing or proposed drainage canals with a view toward eliminating those which are not needed.
15. Institute all possible means for reducing the extreme of flood and drought throughout the system so as to reconstitute as much as possible the historic attenuate wet period.
16. Develop and implement plans to restore coastal bays that have been damaged -- e.g., St. Lucie Estuary, Lake Worth and northern Biscayne Bay.
17. Request the Corps of Engineers to make a flood plain study of the watershed of the Big Cypress.
18. The problem of nutrients and other pollutants extends throughout the basin. The sources are sewage and industrial wastes, agriculture manures and certain crop residues, chemical fertilizers and pesticides. Some possible approaches are:
 - a. Determine the beneficial and detrimental aspects of septic tanks in regard to water conservation, nutrients and eutrophication potential, other chemicals and public health.
 - b. Locate all sources of pollutant inputs into the basin and develop plans for their harmless or beneficial disposal.
 - c. Face the reality of the existence of nutrients in sewage and agricultural wastes and develop means for keeping them out of the lakes, the conservation areas and the Park. As a general frame of approach, there could be used:
 - (1) On uplands by direct application (manure and plant residue) or by spray-irrigation on and fertilization of lawns, gardens, pasture, grasses, selected crops, or

- (2) On re-flooded glades lands for conversion via sawgrass or other native wetland plants into paper or peat into muck, or to grow ramie or rice, or
 - (3) In controlled and isolated upland ponds or nutrient interceptor canals to produce fish protein.
 - d. Seek the assistance of the Department of Defense in developing treated waste effluent recycling methods. DOD has large land tracts (Homestead Air Force Base and Avon Park Bombing Range), treatment plants and many professional people. The Corps of Engineers could construct sewage conveyance and treatment facilities if so directed by Congress.
 - e. Discontinue of persistent pesticides and replace them with environmentally acceptable alternatives, chemical or biological.
19. Find an upland location for any new jetport.
20. Evaluate constraints that the environment places on development -- urban and agricultural -- which depend upon the resources of the basin.

Demands on the Kissimmee-Okeechobee-Everglades basin are bound to increase. Even now the region requires large-scale rejuvenation, similar in magnitude to the renewals contemplated for stressed cities of the nation. One change in approach is that we must evaluate extreme conditions, such as those now occurring in respect to water, rather than relying on apparently benign averages, as we have done in the past.

South Florida is faced with accelerating impoverishment of its natural and human resources. The two are inseparable. Crowding, pollution and multiple corrosion of our habitat -- both urban and Everglades -- intensify the frustration, irrationality and apathy increasingly evident in our citizenry.

The stresses of overloading the south Florida environment reflect on the general populace. For this reason the principal criteria for adjudging and instituting solutions must be the public's interest.

We must change direction. Our exploitive and technological orientation much be re-directed in favor of more considerate uses of natural systems. They have an efficiency of their own as well as finite limits which we can no longer disregard. We do not control nature. Our intrusions into natural systems merely bring into play other sets of natural laws -- some favorable to man, some not.

The environmental problems of the Everglades are of such precipitous nature and so relevant to the broad public interest that no single agency of government has the perspective and authority to resolve them. If any is able to do so, that ability is not evident. Strong executive scrutiny, led by the Cabinet of Florida, is in order. An appointed board of appraisers, representing the public interest, should advise the Cabinet on these matters. The Cabinet should call a moratorium on all questionable construction until the effects of such construction are reviewed by the Board.

With such attitude and approaches, we can maintain and restore much of the Everglades, our overall environment and our eroded psyche.

Xerox:

Don Morgan
W.V. Storch
J.R. Maloy