

December 14, 1982

To: Pat Lodge  
Copy to: Ed Clark

From: Tom Fraser *TJF*

Subject: Offstream Reservoir Yield

Attached are comments about the methodology used in the draft document. It appears that the dependable yield may be overestimated.

I believe that your best course of action lies in the area of consumption and modifications that occur in real world conditions. A companion document is needed as J.B. Butler has suggested.

js  
Attach.



The University of Tennessee  
INSTITUTE OF AGRICULTURE

Agricultural Experiment Station  
P.O. Box 1071  
Knoxville, Tennessee 37901

December 10, 1982

Dr. Tom Fraser  
Laboratory Director  
Environmental Quality Laboratory Inc.  
Port Charlotte Industrial Park  
1009 Tamiami Trail  
Port Charlotte, Florida 33952

Dear Tom:

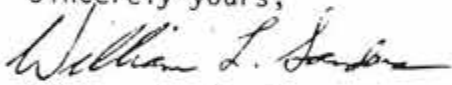
As per your request, I have reviewed "Offstream Reservoir Yield Analysis: Peace River/Fort Ogden Reservoir."

The following comments are offered: The most serious criticism, which I have of the methodology which was used in this document, is that statistics were calculated from the long term data (i.e. means, standard deviations, correlation coefficients among adjacent months) but were used in the simulations as if they were parameters. Since errors are associated with the statistics, the magnitudes of which can be relatively large especially for standard deviations and correlation coefficients, and since no allowance was made for these errors in the simulations, I suspicion that the estimates of the 95 percent dependable yields are biased upward. (For example, if a 95 percent dependable yield is reported as 12 mgd, I suspicion that the true 95 per cent dependable yield is <12.)

I am also bothered by the fact that the flows for the two creeks were estimated for the "missing years" from simple regression analyses (after log transformations). These estimated flows will have on expectation less variance than actual data. Thus, when used in the simulation study in lieu of actual data, bias in the estimated 95 percent dependable yields can be expected.

Over-all I think the approach used in this study is realistic, however I think the authors do need to evaluate the magnitude of bias introduced in their estimates of dependable yields.

I hope these comments are useful. If you have questions, don't hesitate to call.

Sincerely yours,  
  
William L. Sanders

Environmental Quality Laboratory Inc.



October 27, 1982

Dr. William Sanders  
Institute of Agriculture  
The University of Tennessee  
P. O. Box 1071  
Knoxville, TN 37916

Dear Bill:

Please take a look at the enclosed document on yield analysis Peace River/Fort Ogden Reservoir. In this report, SWFWMD has stated various assumptions, then built a model and produced some simulated results suggesting a predictable outcome.

I would like you to examine the statistical/mathematical assumptions and procedures with respect to how these place limits on the interpretation of the outcome. What are the implications of 100 synthetic traces of a single 50-year flow period? Are there better ways to approach this type of planning? What effect does transferring flows for Horse and Joshua Creeks have on the analysis? These two creeks supply about 20% of the Peace River flow. Why is 49 years considered adequate and 30 not adequate? Since a log transformation of the synthetic trace showed better fits (by months?--why not by year?) than any other, what are the implications of apparently returning to the normal distribution for estimating the yield for each 50-year period and the probability? Do 100 synthetic traces, in fact, provide a distribution on which real-world probabilities exist? Are there confidence limits associated with such predictions? If the historical 50-year period is the only real data, can we calculate probabilities that assume a form more reliable than those from the synthetic or are both too short a period to provide estimates with good probabilities and confidence limits?

I may or may not have asked the appropriate questions, but you should be able to pursue the general line of questions.

Sincerely,

ENVIRONMENTAL QUALITY LAB., INC.

Thomas H. Fraser, Ph.D.  
Laboratory Director

js  
Encl.

# Offstream Reservoir Yield Analysis

1. Indentured all assumptions and resulting limitations

1962

34

- A. Reservoir size (3)
- B. Inlet length (2)
- C. Pump size (2)
- D. Inlet velocity (5)
- E. Flow demand (95% from tributaries)

2. Model building

- A. Reservoir synthetic atmosphere in inlet basin in a lake
  - 1. use a two dimensional system
  - 2. use a synthetic distribution with lateral mixing in space and time from tributaries
  - 3. use best fit distribution to generate 100 synthetic monthly flows of 30 years <sup>each</sup> in length
- B. set limit based on 1 H-E.
- C. Reservoir state full
- D. Run 100 synthetic flow periods

3. Transfer of flow from Reservoir - Missing flow

- a. Horse Creek
- b. Yellow Creek
- c. use experimental data from 1962 after removing some reservoir points



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Over-all I think the approach used in this study is realistic, however I think the authors do need to evaluate the magnitude of bias introduced in their estimates of dependable yields.

I hope these comments are useful. If you have questions, don't hesitate to call.

Sincerely yours,

William L. Sanders

To: Distribution

From: Eric Myers

Subject: SWFWMD Hearing for "Water Shortage" Declaration

Attached for your information is a letter and advisory indicating that the District is considering implementing a water shortage for surface water users south of SR. 60. One consequence of this may be mandatory water use restrictions.

Distribution

C. Fancher  
T. Fraser  
M. Maurer  
G. Mojiron  
J. Peralta  
D. Peters  
G. Pfersich  
N. Roen  
B. Wilcox

# SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT



2379 BROAD STREET, BROOKSVILLE, FLORIDA 33512-9712  
PHONE (904) 796-7211 SUNCOM 684-0111

BRUCE A. SAMSON, Chairman, Tampa Wm. O. STUBBS, JR., Vice Chairman, Dade City  
MARY A. KUMPE, Secretary, Sarasota DONALD B. DUMBERT, Treasurer, Wauchula  
DONALD R. CRANE, JR., Assistant Secretary, St. Petersburg MICHAEL ZAGORAC, JR., Assistant Treasurer, Belleair  
WALTER H. HARKALA, Plant City JACK STRAUGHN, Winter Haven JAMES P. TAFT, Crystal River

GARY W. KUHL, Executive Director STEPHEN A. WALKER, General Counsel  
JAMES M. HARVEY, Deputy Executive Director



January 25, 1985

Mr. Eric Myers  
General Development Utilities, Inc.  
1111 South Bayshore Drive  
Miami, Florida 33131

Re: Water Shortage Advisory

Dear Mr. <sup>Eric</sup> Myers:

A rainfall deficit has been experienced throughout the District since August 1984, and surface and ground water levels have continued to decline. This situation is expected to continue for an undetermined period of time.

The rainfall deficit is currently having its greatest impact on surface water bodies. This has become a matter of urgency in the southern part of the District where stream flows have declined significantly, which are the primary source of water supply in some areas. Public supply reservoir augmentation with ground water has become necessary at some activities.

At its January 9, 1985 meeting, the District Governing Board reviewed hydrologic conditions, and issued a Water Shortage Advisory for that area of the District south of State Road 60, for surface water users. A copy of the attached advisory is being published in appropriate newspapers.

At its February 6, 1985 meeting, the Governing Board will again review hydrologic conditions, and will then consider if conditions necessitate declaring a "Water Shortage" for surface water users deriving water from rivers in the area south of State Road 60.

Since you have a District permit for withdrawal of surface water, decisions by the Governing Board concerning a "Water Shortage" may affect your activity. Accordingly, you may wish to attend the February 6 meeting at our Brooksville office. The meeting begins at 9:00 a.m.

Sincerely,

WILLIAM D. COURSER  
Director, Resource Regulation Department

WDC:THL:eab  
Attachment

cc: Governing Board Members G. W. Kuhl S. A. Walker

Southwest Florida Water Management District  
NOTICE OF HEARING TO CONSIDER  
WATER SHORTAGE DECLARATION

The Governing Board of the Southwest Florida Water Management District on January 9, 1985, issued WATER SHORTAGE ADVISORIES calling for voluntary reductions in demand upon surface water sources in the area of the District south of State Road 60, and voluntary water conservation throughout the District.

The Governing Board further determined that it would review hydrologic conditions and determine at its February 6, 1985, monthly meeting whether it should declare a water shortage in accordance with its Water Shortage Plan, Chapter 400-21, Florida Administrative Code.

NOTICE IS HEREBY GIVEN THAT at its February 6, 1985 meeting, the Governing Board will review hydrologic conditions reports and will consider if conditions necessitate declaring a "Water Shortage" in the District south of State Road 60. If a "Water Shortage" is declared a subsequent public hearing will be held to consider whether water use restrictions should be imposed. Further notice will be published respecting the date, time and place for the public hearing.