

STATE OF FLORIDA
DIVISION OF ADMINISTRATIVE HEARINGS

FLORIDA WILDLIFE FEDERATION,)
INC.; ENVIRONMENTAL)
CONFEDERATION OF SOUTHWEST)
FLORIDA, INC.; and SAVE OUR)
CREEKS, INC.,)
)
Petitioners,)
)
vs.) Case No. 03-3532RP
)
DEPARTMENT OF ENVIRONMENTAL)
PROTECTION,)
)
Respondent.)
_____)

FINAL ORDER

This case was heard by David M. Maloney, Administrative Law Judge of the Division of Administrative Hearings on July 27 and 28, 2004, in Tallahassee, Florida.

APPEARANCES

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STATEMENT OF THE ISSUE

In a Notice of Proposed Rulemaking published on September 5, 2003, the Department of Environmental Protection ("DEP" or the "Department") proposed amendments (the "Proposed Rule") to an existing rule, Florida Administrative Code Rule 62-304.700.

The Proposed Rule establishes a Total Maximum Daily Load ("TMDL") for Total Phosphorus ("TP") for a number of streams (referred to in this proceeding as the Nine Northern Tributaries) in the Lake Okeechobee Basin and addresses other related matters.

The issue in this proceeding is whether the Proposed Rule is an invalid exercise of delegated legislative authority.

PRELIMINARY STATEMENT

On September 26, 2003, Florida Wildlife Federation, Inc., Environmental Confederation of Southwest Florida, Inc., and Save Our Creeks, Inc. ("Petitioners"), filed a petition at the Division of Administrative Hearings ("DOAH"). The petition invoked the jurisdiction of DOAH under Section 120.56, Florida Statutes, to determine whether the Proposed Rule is an invalid exercise of delegated legislative authority.

The petition was assigned Case No. 03-3532RP. On October 6, 2003, the undersigned was designated as the administrative law judge to conduct the proceeding and two days

later, at the request of the parties, the case was set for hearing to commence in January 2004.

Prior to the date scheduled for final hearing, the case was placed in abeyance pursuant to a joint request of the parties. The case remained in abeyance until February 2004 when it was set for final hearing the following April. Continued twice thereafter, final hearing eventually commenced on July 27, 2004.

At final hearing, Petitioners called two witnesses: Jean Marie Boyer, Ph.D., an expert in the field of water quality analysis relating to nutrient loading and the field of data analysis and modeling for the purpose of TMDL development; and, Jerry Edward Brooks, Deputy Director of DEP's Division of Water Resources Management. Over the course of the proceeding, Petitioners offered into evidence 43 exhibits. They are identified in the record as Petitioners' Exhibits 2-4, 7, 8, 10-14, 16, 17, 18-20, 23-25, 29, 30, 33, 38, 39, 43, 46, 47, 55-A, 66, 67, 83, 84, 85, 86-A, 86-C, 86-D, 86-E, 86-F, 88, 90, 95, 97, 98, and 100. With the exception of Petitioners' Exhibit 100 (excluded because of a failure during discovery on the part of Petitioners), Petitioners' exhibits were admitted.

The Department called three witnesses. Jan Mandrup-Poulsen was accepted as an expert in the fields of Florida water quality standards, the impaired waters rule, the development of TMDLs, surface water quality, and water quality data assessment.

Russel Brant Frydenborg was accepted as an expert in the fields of biology, aquatic ecology (including Lake Okeechobee Basin flora and fauna), the evaluation of water quality and biological data (including statistical evaluation of aquatic biological communities), application of scientific principles to experimental design, and the reference stream approach in the establishment of water quality criteria. The Department recalled Mr. Brooks. At the behest of the Department, Mr. Brooks was accepted as an expert in water resource program administration, the implementation of the Florida Watershed Restoration Act (the "TMDL Program" or the "TMDL Act"), the implementation of the Lake Okeechobee Protection Plan statute (the "Protection Statute"), and Florida water quality standards.

During its case-in-chief, the Department offered 10 exhibits: Department's Exhibits 1-10. All were admitted into evidence.

The parties timely filed their Proposed Final Orders on October 22, 2004. This Final Order follows.

FINDINGS OF FACT

Lake Okeechobee

1. Of the freshwater bodies located wholly within the forty-eight contiguous states in the continental United States, Lake Okeechobee (the "Lake") is the second largest.

2. Given its size, it is not surprising that the Lake is a water source of great import to its region. It provides drinking water for lakeside cities and towns in South Florida and is a potential backup water supply for the urban communities of Florida's southeast coast. The Lake supplies irrigation water for the Everglades Agricultural Area ("EAA") and in times of drought, it serves as a critical supplement to the rain upon which the Everglades, an ombrotrophic system, is dependent. Home to one of the nation's prized bass and speckled perch fisheries, the Lake is also an "economically important commercial fishery." Petitioners' Ex. 12, p. 9.

3. Most significantly to this proceeding (one involving the application of Florida's water resources and environmental control laws), Lake Okeechobee is a key component of Central and South Florida's Kissimmee-Okeechobee-Everglades ecosystem which extends from the chain of lakes at the headwaters of the Kissimmee River in the north to Florida Bay in the south. As such, it has had tremendous ecological value in the past. Despite significant detrimental changes in the Lake's hydrological regime and water quality since the early 1900s, the Lake continues to "provide[] habitat for a wide variety of wading birds, migratory waterfowl, and the federally-endangered Everglades Snail Kite." Id.

4. The Lake suffers from major impacts due to hydrologic modifications. In the making since the days of the Great Depression, these include the construction of the Herbert Hoover Dike prior to World War II and the installation of a system of canals and levees built following congressional authorization just after the war in 1948. The latter was part of a comprehensive water resources project undertaken by the United States Army Corps of Engineers and known as the Central and Southern Florida Project for Flood Control (the "C&SF Project").

5. Whether producing water levels too high or too low, the changes in hydrology brought about by mankind over the past century have led to various impacts that have been significantly detrimental to the ecology of the Lake and the surrounding area.

6. Aside from hydrologic modifications, there have been other factors that have led to significant impacts detrimental to the Lake and its ecology. Excessive nutrient loading is one of them. Nutrient loading has occurred because of the conversion of much of the land around the Lake to agriculture, cattle ranches and dairy farms. The conversion is described in the Lake Okeechobee Surface Water Improvement and Management (SWIM) Plan, Planning Document dated February 28, 2003, prepared by the Lake Okeechobee Division of the Northern District Restoration Department of the South Florida Water Management District (the "SWIM Planning Document"):

To the north [of the Lake], dairy farms and beef cattle ranching became the major land uses, while to the south, sugarcane and vegetable farming increased rapidly. These land use changes resulted in a large increase in the rate of nutrient (nitrogen and phosphorus) inputs to the lake, and detrimental changes occurred in the lake's water quality.

Id. at 10. The inputs of phosphorus and their impact is also described in the SWIM Planning Document. Pertinent to this proceeding, in particular, the document describes the phosphorus inputs north of the Lake and their impacts:

Phosphorus inputs from the northern watershed increased dramatically, and can be traced primarily to the animal agricultural activities in that watershed. Loads (concentrations times flow) of total phosphorus to the open water region of the lake nearly tripled between the early 1970s and mid-1980s, and coincident with this trend, the concentration of phosphorus in the lake itself increased from below 40 to over 100 parts per billion (ppb). Blooms of blue-green algae became more common, with particularly large blooms covering more than 40 percent of the lake surface in the 1980s.

Id. at 10-11.

The Nine Northern Tributaries

7. Among the rivers, streams, creeks, canals and sloughs that comprise the Lake Okeechobee Basin are nine tributaries to the north: Taylor Creek, Nubbin Slough, the S-135 Canal, Mosquito Creek, Otter Creek, Lettuce Creek, Henry Creek, Myrtle

Slough, and Chandler Hammock Slough (the "Nine Northern Tributaries").

8. Located in sub-basins (the S-191, S-133, S-135, and S-154 Basins) within the Lake Okeechobee Basin, the Nine Northern Tributaries contribute between five and fifteen percent of the annual water flow into the Lake. All are plagued by nutrient pollution that consists mainly of excess nitrogen and phosphorus.

9. The Nine Northern Tributaries were relatively unpolluted prior to agricultural development in the area. In the aftermath, the environments in their respective watersheds have been profoundly altered by pollution.

10. The pollution has been especially dramatic with regard to phosphorus. For example, phosphorus levels in the area were lower than 60 parts per billion ("ppb") in 1953. In recent years, phosphorus levels for most basins in the Lake Okeechobee water levels have been double and triple 1953 levels. In some cases phosphorus levels have been at even greater multiples of 1953 levels. One of the higher examples is the Taylor Creek/Nubbin Slough Basin where the level of phosphorus for the period 1990-1994 was 602 ppb, an increase ten-fold over that forty years earlier.

11. Between nitrogen and phosphorus (and all other pollutants, for that matter), phosphorus is the pollutant of primary concern in the Nine Northern Tributaries.

Designated Uses

12. In 1967, Florida adopted Chapter 403, entitled "Florida Air and Water Pollution Control Act" (the "Pollution Control Act.") Ch. 67-436, Laws of Fla. The Pollution Control Act recognized that water bodies serve multiple beneficial uses that must be protected to promote the public welfare. Water quality standards were adopted for this purpose.

13. Chapter 403 established a policy to "conserve the waters of the state and to protect, maintain, and improve the quality thereof for public water supplies, for the propagation of wildlife, fish, and other aquatic life, and for domestic, agricultural, industrial, recreational, and other beneficial uses." § 403.021(2), Fla. Stat. The Pollution Control Act empowered the Department to "develop . . . a grouping of water into classes . . . in accordance with the present and future most beneficial uses," and to "establish . . . water quality standards for the State as a whole or for any part thereof[.]" § 403.061(10) and (11), Fla. Stat.

14. In 1968, the Department of Air and Water Pollution Control (one of DEP's predecessor agencies) promulgated regulations enumerating five classes of beneficial uses to be

protected. The Rule enumerating the five classes can now be found at Florida Administrative Code Rule 62-302.400. Water bodies not specifically identified in the Rule are listed as Class III on the basis of the designated uses "Recreation, Propagation and Maintenance of a Healthy, Well-Balanced Population of Fish and Wildlife." Fla. Admin. Code R. 62-302.400(1) and (12).

15. The Nine Northern Tributaries are all Class III waters. See Department's Ex. 4.

16. The import of a Class III designation was described at hearing by Mr. Mandrup-Poulsen:

The designated uses is intended as a way to describe quickly and easily to those in the profession, and to the public, as to what the intent and the use of that water body ought to be.

So that for Class [III], for example, . . . we would intend to protect those [so designated] to ensure that they have a healthy and well-balanced natural population of fish and wildlife

(Tr. 195-196)

17. "Water quality criteria" were adopted for each class to protect the uses in that class and all higher numbered classes. Fla. Admin. Code Ch. 28-5 (1968). Since then, the Department has updated the criteria and added a narrative nutrient criterion that applies to Class III waters:

(48)(b) Nutrients - in no case shall nutrient concentration of a body of water be altered so as to cause an imbalance in natural populations of aquatic flora and fauna.

Fla. Admin. Code R. 62-302. The phrase "imbalance in natural populations of aquatic flora and fauna" for this narrative criterion, however, has not been defined by rule.

18. The nutrient criterion also requires that the nutrient level be "limited as needed to prevent violations of other standards contained in this chapter." Fla. Admin. Code R. 62-302.

Phosphorus in Florida and Imbalance of Flora and Fauna

19. There is a wide range of natural nutrient conditions in the state of Florida especially with regard to phosphorus.

20. Phosphorus is common in Florida soils. In fact, some Florida soil is so rich in phosphorus that it is the site of phosphate mines, where phosphorus is mined for use in fertilizers and for other purposes.

21. The presence of such large amounts of phosphorus is due to a combination of factors. Limestone formations, the base of Florida rock, and shallow reef systems inundated by marine waters over millions of years led to a sedimentary deposit system laden with phosphorus in the land mass that is Florida.

The sedimentary system is now composed of phosphatic sands and clays.

22. Soils laden with phosphorus contribute phosphorus to adjacent water bodies as part of a natural process independent of human activities.

23. The presence of so much phosphorus in Florida soils and its natural leaching into water bodies poses a problem for the scientist asked to determine when phosphorus has created an imbalance in natural flora and fauna especially when other factors contribute to imbalance.

24. There is no question, however, that there is too much phosphorus in the Nine Northern Tributaries and Lake Okeechobee to maintain a balance of natural flora and fauna and that the presence of this phosphorus is largely the result of human activity and disturbance. The Florida legislature, moreover, has said so. See Finding of Fact 36. The question for the investigator in pursuit of a TMDL for TP, such as the Department in this proceeding, is how much phosphorus can these water bodies tolerate before imbalance is reached. Another way of looking at the problem with regard to the streams at issue in this proceeding is: at what concentration level does TP allow the streams to sustain a healthy population of aquatic flora and fauna so as to avoid phosphorus impairment?

Phosphorus Impairment

25. The Nine Northern Tributaries were included on the list of impaired surface waters adopted by the Department through Secretarial Order issued August 28, 2002. They are central to this proceeding because they are the subject of the Proposed Rule by virtue of their identification in the Proposed Rule as "[o]ther waterbodies in the Lake Okeechobee Basin" subject to a TMDL set at "an annual median TP [total phosphorus] concentration of 0.159 mg/L." See Notice of Proposed Rulemaking, September 5, 2003, OR-1, Department's Exhibit No. 5, p. 3.

26. Like the Nine Northern Tributaries, Lake Okeechobee has also been determined to be impaired due to the presence of excessive phosphorus. It is not an exaggeration to deem the Lake profoundly polluted by phosphorus. Concentrations have risen from 40 ppb in the early 1970s to 145 ppb in 2000.

27. The Lake receives phosphorus both from external (such as the Nine Northern Tributaries) and internal sources. A large percentage of the lake bottom that was formerly covered in sand is overlain by organic mud, estimated to contain over 30,000 metric tons of phosphorus. Mud sediment accumulation and phosphorus deposition have increased significantly in the last 50 years. Phosphorus in the water column in the Lake,

therefore, has an external and an internal source as well: sediment and deposition on the lake bottom.

28. Over time, elevated phosphorus loadings from external and internal sources have intensified the eutrophication of the Lake. Eutrophication is apparent to the eye by the presence of widespread algal blooms. The algal blooms, in turn, have caused die-off of macro-invertebrate communities due to toxic byproducts of algal decay. Dense blooms of algae, moreover, adversely affects the quality of drinking water.

29. As part of the commencement of the restoration process in the hope of overcoming the eutrophic nature of the Lake, the Department has adopted a phosphorus TMDL of 140 metric tons for the Lake. Atmospheric deposition will account for 35 metric tons of phosphorus entering the lake externally every year. The TMDL for the Lake, therefore, requires that phosphorus from surface water loading not exceed a maximum of 105 metric tons per year (the difference between the Lake's TMDL of 140 metric tons and the 35 metric tons contributed by precipitation and other contributions from the atmosphere). This limitation on surface water loading applies to the Nine Northern Tributaries and other surface waters in the Lake Okeechobee Basin.

Phosphorus Impairment in the Okeechobee Basin

30. The Lake Okeechobee Basin is heavily impacted by phosphorus. Streams within the basin are likely to be impacted

by phosphorus as opposed to streams that meet reference conditions, that is, that are under minimal impacts, as explained, below.

31. If the Lake is ever to be restored it is critical that the phosphorus that is introduced from external sources (other than atmospheric deposition) be reduced.

External Phosphorus Load Reduction

32. Four "major issues" critical to the restoration of the Lake Okeechobee ecosystem have been identified by the SWIM Planning Document. This proceeding is concerned with one of them: "[e]xternal loads of phosphorus [that] must be substantially reduced." Petitioners' Ex. 12, p. 10.

33. Two enactments of the Florida Legislature address or relate to phosphorus pollution in the Lake and the Nine Northern Tributaries: the most recent, passed in 1999, is the Florida Watershed Restoration Act¹; the other, passed in 1987, codifies the Lake Okeechobee Protection Program.²

The Lake Okeechobee Protection Program

34. Unique among watersheds in the State, Lake Okeechobee is specially protected by the Legislature through the Lake Okeechobee Protection Program (the "Protection Program"). Under the Protection Program, the Legislature's goal is to provide "a reasonable means of achieving and maintaining compliance with

state water quality standards" in conjunction with Section 403.067, Florida Statutes. See § 373.4595(1)(g), Fla. Stat.

35. The "findings and intent" section of Section 373.4595, Florida Statutes (the "Protection Statute") bearing the catchline, "Lake Okeechobee Protection Program," sets out both the import of Lake Okeechobee to the State as well as the hydrological and water quality impacts the Lake has suffered due to the use of land in its watershed and construction of the C&SF Project. Section (1)(c) announces, moreover, the Legislature's finding "that improvement to the hydrology and water quality of Lake Okeechobee is essential to the protection of the Everglades." The statute goes on to declare "it . . . imperative for the state, local governments and agricultural and environmental communities to commit to restoring and protecting Lake Okeechobee and downstream receiving waters," Section 373.4595 (1)(d), Florida Statutes, and to develop and implement immediately a "watershed-based approach to address these issues." Id.

36. With regard to phosphorus, the Legislature, in the Protection Statute, "finds that phosphorus loads from the Lake's watershed have contributed to excessive phosphorus levels in the Lake and downstream receiving waters and that reduction in phosphorus levels will benefit the ecologies of the systems."

§ 373.4595 (1)(e), Fla. Stat. This finding is supported by Petitioners' Exhibit 43, a page from the Lake Okeechobee SWIM Plan, in which it is stated: "Phosphorus is of particular concern in this system because it is an essential element that contributes to eutrophication in Lake Okeechobee [citations omitted]. Phosphorus within the Lake's water column increased dramatically from 40 ppb in the early 1970s to 145 ppb in 2000 [reference omitted]."

37. Toward reducing phosphorus levels, the Protection Statute references a technical publication,³ South Florida Water Management District's Publication 81-2. See § 373.4595(1)(f), Fla. Stat. The technical publication is also referred to in Petitioners' Ex. 43, which describes attempts at phosphorus load reduction to the Lake that took place from the early 1980s to the early 1990s:

A phosphorus load reduction goal was developed to restore the ecological condition of Lake Okeechobee. This goal requires a 40 percent reduction in phosphorus loading to the lake based on the data collected from 1973 to 1979 (Federico et al., 1981). Tributary phosphorus limitations were based upon reaching an in-lake phosphorus concentration of 40 ppb by July 1992 as recommended by a modification of the Vollenweider (1976) nutrient loading model, described in SFWMD Technical Publication 81-2 (Federico et al., 1981). As controls within the basin surrounding Lake Okeechobee increased, a noticeable decline in the phosphorus load to the lake occurred from 1983 to 1993 [reference

omitted].^[4] Despite this load reduction, no reduction of phosphorus occurred within the lake [reference omitted]. This in part was attributed to the huge amount of phosphorus that has accumulated over decades in sediments within this shallow lake [reference omitted]. As the external loads have declined, internal loads from the sediments have become more significant, acting as a buffer to the system and preventing the phosphorus concentration in the water column from declining.

Petitioners' Ex. 43 (emphasis added).

38. Recent data demonstrate the phosphorus pollution problem in Lake Okeechobee. The five-year moving average of the long-term phosphorus load to Lake Okeechobee (that includes an atmospheric load of 35 metric tons per year) was 554 metric tons as of 2002. According to the January 1, 2004, Lake Okeechobee Protection Plan, this included the "smallest measured historical load (169 Mtons in 2000), due to the worst drought in recent history; and the largest measured load in the past decade (780 metric tons in 1998) that was a very wet year " Petitioners' Ex. 14, p. 4.

39. The Protection Statute also references the Legislature's call in 1999 for "subsequent phases of phosphorus load reductions [to be] determined by the total maximum daily loads [TMDLs] established in accordance with s. 403.067": "Florida Watershed Restoration Act," (or the "TMDL Act").

The Florida Watershed Restoration Act

40. Originally passed in 1999 as Chapter 99-223, Laws of Florida, the Florida Watershed Protection Act, in its present form⁵ (the "TMDL Act") declares "that the waters of the state are among its most basic resources and that the development of a total maximum daily load program for state waters as required by s. 303(d) of the Clean Water Act [citation omitted], will promote improvements in water quality throughout the state through the coordinated control of point and non-point sources of pollution." § 403.067(1), Fla. Stat.

41. The TMDL Act requires the Department to "submit periodically to the United States Environmental Protection Agency (the "USEPA") a list of surface waters for which total maximum daily load assessments will be conducted."
§ 403.067(2), Fla. Stat.

42. The parties' descriptions of the requirements of the TMDL Act are in accord:

In short, the [TMDL] Act requires the Department to formulate a prioritized list of "impaired waters" (i.e., that fail to meet water quality standards) to develop TMDLs for the listed impaired waters, and to allocate pollution load reductions so as to restore all impaired waters to water quality standards. §403.067, Fla. Stat.

Petitioners' Proposed Final Order, pp. 9-10.

Through the TMDL Act, the Legislature directed the Department to develop a

methodology to identify waters of the state that were failing to meet the state's water quality standards due to pollutants. Using that methodology, the Department has been directed to assess the waters of the state and list as impaired those waters that fail to meet water quality standards because of a particular pollutant. Once those waters and causative pollutants have been identified, the Department is to establish a TMDL.

Respondent's Proposed Final Order, pp. 11-12.

TMDLs

43. Defined as "the sum of the individual wasteload allocations for point sources and the load allocations for nonpoint source and natural background," the statutory definition of TMDLs in the chapter of the Florida Statutes that contains the TMDL Act continues, "[p]rior to determining individual wasteload allocations and load allocations, the maximum amount of a pollutant that a water body or water segment can assimilate from all sources without exceeding water quality standards must first be calculated." § 404.031(17), Fla. Stat.

44. This definition was simplified at hearing by the Department's expert in the "development of total maximum daily load, DEP's Watershed Assessment Section Administrator Jan Mandrup-Poulsen. Mr. Mandrup-Poulsen testified that a TMDL, "is quite simply the amount of a pollutant that can be assimilated by a water body without causing the water body's designated use to be exceeded." (Tr. 194)

45. As explained in a draft publication of the USEPA's Region 4 office, TMDL formulation is a process that:

establishes the allowable loadings of pollutants or other quantifiable parameters for a waterbody based on the relationship between pollution sources and in-stream water quality conditions, so that states [such as Florida] can establish water quality based controls to reduce pollution from both point and non-point sources and restore and maintain the quality of their water resources [citation omitted].

Petitioners' Ex. 3, p. 2.

46. Establishment of the amount of a pollutant that a water body can receive without exceeding water quality standards is not the end of the TMDL process for the Department. With the establishment of a TMDL, the Department is also required to "account for seasonal variations and include a margin of safety that takes into account any lack of knowledge concerning the relationship between effluent limitations and water quality." § 403.067(6)(a)2., Fla. Stat. This is what the Department has set about to do for TP in the Lake Okeechobee Basin through its Proposed Rule.

The Proposed Rule

i. An Amendment to the Existing Rule

47. The existing rule is Florida Administrative Code Rule 62-304.700 (the "Existing Rule"). The Existing Rule sets the TMDL for total phosphorus ("TP") in Lake Okeechobee at 140

metric tons. Atmospheric loading to Lake Okeechobee is considered to be 35 metric tons. That leaves 105 metric tons as the total amount of phosphorus that can flow into the Lake annually from surface sources such as the Nine Northern Tributaries. The 140-metric ton total phosphorus TMDL is to be met by the year 2015.

48. Presently entitled "Total Maximum Daily Loads in the Southeast Florida District," the Proposed Rule will change the title of the Existing Rule to "Lake Okeechobee Basin TMDLs."

49. In addition to a revision of the numbering scheme in the Existing Rule, the Proposed Rule adds the proposed TMDL (the "Proposed TMDL") for TP in the Nine Northern Tributaries expressed as a concentration level: 0.159 mg/L.

ii. 0.159 mg/L

50. In collaboration with the USEPA, the Department calculated the Proposed TMDL for TP in the Nine Northern Tributaries as "an annual median TP concentration of 0.159 mg/L." The Proposed Rule, § (2)(a).

51. The Proposed Rule makes no allocation between point sources and non-point sources. The TMDL is allocated entirely to nonpoint sources because "there are currently no permitted point sources in the watershed." The Proposed Rule, § (2)(a)2.

52. The Margin of Safety for the TMDL, required by the TMDL statute to be included in the TMDL's calculation,⁶ is declared to be "implicit."

53. The following contains the textual amendments proposed by the Proposed Rule as they appear in the Proposed Rule's Notice of Proposed Rulemaking. They are underscored because they are new language added to the Existing Rule:

(2) Other Waterbodies in the Lake
Okeechobee Basin

(a) Other waterbodies in the Lake
Okeechobee Basin include Chandler Hammock
Slough, Nubbin Slough, Mosquito Creek,
Lettuce Creek, Henry Creek, S-135 Canal,
Myrtle Slough, Taylor Creek, and Otter
Creek. The Total Maximum Daily Load for
these waterbodies is an annual median TP
concentration of 0.159 mg/L, and is
allocated as follows:

1. the Wasteload Allocation for point
sources is not applicable because there are
currently no permitted point sources in the
watershed.

2. the Load Allocation for nonpoint
sources is an annual median TP concentration
of 0.159 mg/L, and

3. the Margin of Safety is implicit.

(b) As tributaries to Lake Okeechobee, the
load from these other waterbodies in the
Lake Okeechobee Basin must also be
consistent with the TP TMDL for Lake
Okeechobee, above.

Notice of Proposed Rulemaking, published September 5, 2003, OR-
1, Tab 5, p. 3.

The Challenge to the Proposed Rule

54. On September 26, 2004, pursuant to Section 120.56, Florida Statutes, the Petitioners filed at DOAH their petition to invalidate the Proposed Rule.

55. The petition was amended several times. The petition at issue in the proceeding is the Second Amended Petition to Invalidate Proposed Rules. It was filed June 24, 2004, just more than one month before final hearing commenced.

56. By virtue of the filing of the petition by the three Petitioners challenging the Department's rules, there are four parties to this proceeding: Florida Wildlife Federation, Environmental Confederation of Southwest Florida, Inc., Save Our Creeks, Inc., and the Department.

Identification of the Parties

i. Florida Wildlife Federation

57. Florida Wildlife Federation ("FWF"), one of the three Petitioners in this case, is a Florida not-for-profit corporation with its principal place of business in Tallahassee, Florida. It has approximately 14,000 members throughout the state. Its purpose is to promote the preservation, management, and improvement of Florida's fish, wildlife, soil, water and plant life. Lake Okeechobee is a particular focus of FWF as well as the adverse affects of past management practices in the Lake's watershed that threaten the continued existence of the

Lake. On behalf of its members, FWF has participated and continues to participate in legal and administrative challenges to defend and otherwise support rules that protect Lake Okeechobee. The organization also brought the civil action that resulted in a Consent Decree that requires promulgation of a TMDL for TP in the Nine Northern Tributaries.

58. A substantial number of FWF members reside near Lake Okeechobee. They use and enjoy the waters of the Lake and the waters of the Nine Northern Tributaries. They observe and enjoy wildlife that rely on these waters for habitat. If the Proposed Rule is not determined to be invalid, there will be continuing adverse impacts to the waters of Lake Okeechobee and the Nine Northern Tributaries.⁷ These impacts will substantially affect a substantial number of FWF's members in their ability to observe, study and enjoy the waters and wildlife of the Lake Okeechobee basin.

ii. Environmental Confederation of Southwest Florida, Inc.

59. Environmental Confederation of Southwest Florida, Inc. ("ECOSWF"), the second of the three Petitioners, is a Florida not-for-profit corporation with its principal place of business in Sarasota, Florida.

60. It has approximately 100 members. They are business entities, governmental agencies and other organizations, and

individuals who live in South Florida. Organized for the purpose of conserving natural resources in Southwest Florida, ECOSWF has participated in numerous legal challenges with the aim of preserving Florida's waters.

61. The members of ECOSWF use and enjoy the waters of Lake Okeechobee and the Nine Northern Tributaries. They also observe and enjoy the wildlife that depend upon the waters for habitat. If the proposed rules are not determined to be invalid, there will be continuing adverse impacts to the waters of the Nine Northern Tributaries and the Lake.⁸ These impacts will substantially affect a substantial number of ECOSWF's members in their ability to observe, study, and enjoy the waters and wildlife of the Nine Northern Tributaries and the Lake.

iii. Save Our Creeks, Inc.

62. Save Our Creeks, Inc. ("SOC"), the third of the Petitioners, is a Florida not-for-profit corporation with its principal place of business in Moore Haven, Florida.

63. It has about 100 members who reside primarily in South Florida. Organized to preserve Fisheating Creek and other South Florida water bodies for the use and enjoyment of the public and for their natural resource value, SOC has participated in legal actions with the aim of preserving the environmental integrity of South Florida's rivers, streams, and lakes. A substantial number of SOC's members use and enjoy the waters of Lake

Okeechobee and its tributary waters of the Nine Northern Tributaries and also observe and enjoy the fish and wildlife depend upon these waters for habitat.

iv. Department of Environmental Protection

64. The Department is the state agency authorized to adopt TMDLs through rulemaking under Chapter 403. See §§ 403.061 and 403.067, Fla. Stat.

Standing

65. The parties stipulated to facts related to the standing of Petitioners. See Exhibit 4 to the Pre-hearing Stipulation, paragraphs 5-7.

The Elements of the Challenge or Petitions

66. The Petitioners' challenges may be divided broadly into two categories. The first of these is that the derivation by the Department of the Proposed TMDL for TP in the Nine Northern Tributaries (0.159 mg/L.) was so flawed as to render the Proposed TMDL arbitrary and capricious ("Flawed Derivation"). The second is that the Proposed TMDL contravenes the provisions of the Lake Okeechobee Protection Program because it has been set prior to the allocation among sources in the water basin, a condition precedent to the establishment of the TMDL in the view of Petitioners, allowed by the TMDL Act ("The Lake Issue").

67. The first of these two categories of the challenge is further sub-divided into discreet elements as shown in the findings below. Before addressing the two main categories of Petitioners' challenge, however, there is a preliminary matter to be addressed: the Department's decision to reject water quality modeling results when water quality modeling is the only statutorily-recognized method for developing a TMDL.

68. The Department's decision to forego water quality modeling and accept the method eventually followed for development of the Proposed TMDL must be understood in context. The context includes the TMDL Law, a lawsuit filed against the USEPA, and the various methods for establishing a TMDL.

The Law, the Lawsuit and the Methods

69. In Subsection (1) of the TMDL Act, the Legislature declares "that the development of a total maximum daily load program for state waters as required by s. 303(d) of the Clean Water Act [citation omitted] will promote improvements in water quality throughout the state through the coordinated control of point and nonpoint sources of pollution." § 403.067(1), Fla. Stat.

70. Before 1998, the Department had not extensively implemented the TMDL requirements of the Clean Water Act. As a result of a lawsuit against the USEPA, however, a consent decree was entered by USEPA and Earthjustice, the plaintiff in the

lawsuit and organization that has some relationship with the Petitioners (the "Consent Decree"). Under the Consent Decree, USEPA agreed to require the Department to evaluate the Nine Northern Tributaries for TMDL development for nutrients by 2002. The USEPA followed through on its agreement under the decree and imposed the requirement for TMDL nutrient development by 2002 on the Department.

71. In the same year that the Consent Decree was entered, 1999, the Florida Legislature passed the TMDL Act.

72. Subsection (6) of the TMDL Act, bearing the catchline "CALCULATION AND ALLOCATION," imposes at its outset requirements on the Department before development of a TMDL for any water body or water segment determined to be impaired. The requirements include coordination with other groups to determine the data required, the methods of collection and analysis, and requirements for quality control:

Prior to developing a total maximum daily load calculation for each water body or water body segment on the list specified in subsection (4), the department shall coordinate with applicable local governments, water management districts, the Department of Agriculture and Consumer Services, other appropriate state agencies, local soil and water conservation districts, environmental groups, regulated interests, and affected pollution sources to determine the information required, accepted methods

of data collection and analysis, and quality control/quality assurance requirements.

§ 403.067(6)(a)1., Fla. Stat.

73. The Department coordinated with groups that had data concerning the Nine Northern Tributaries. In the words of Mr. Mandrup-Poulsen, "[t]he Department considered all readily available data. The primary provider of data . . . is the South Florida Water Management District." (Tr. 204) The Department gave notice by publication on June 27, 2003, of three public workshops in Tallahassee, Perry, and Okeechobee, Florida, and public comment periods on "draft total maximum daily loads . . . for . . . the Northern Tributaries to Lake Okeechobee (nutrients and dissolved oxygen)." Department's Ex. 2. The notice set a period for acceptance of public comment on the draft TMDLs through July 31, 2003, and announced placement of the draft TMDLs on the Department's web site.

74. The TMDL Act endorses only one principal method of analysis of TMDL data: water quality modeling.⁹ The TMDL Act, however, does not restrict the method of analysis to water quality modeling. In fact, there are at least three other methods that are valid, albeit not endorsed statutorily by the Florida Legislature.

75. These methods are set out in a publication of the Office of Water and the Office of Science and Technology of the

USEPA bearing a date of July 2000. The publication is entitled "Nutrient Criteria Technical Guidance Manual" (the "Guidance Manual.")

76. Before involving itself with the three methods in the Guidance Manual or any other method not statutorily-recognized, DEP, as to be expected from the legislative endorsement, attempted to use water quality modeling. This attempt was not merely because of the statutory endorsement. Aside from being statutorily-recognized, water quality modeling was the method "routinely use[d by DEP] in developing maximum daily loads." (Tr. 197) Water quality modeling, moreover, is DEP's "standard operating procedure," id., and a method that the Department has used successfully on a number of occasions and one that, as of the date of final hearing, it continues to use.

77. Water quality modeling requires a great deal of data. In pursuit of data collection and other activities required by water quality modeling, the Department pursued the development of TMDLs for TP in the Nine Northern Tributaries "for many months and at great expense both in personnel time and contractual time." Id. Nonetheless, on the basis of the water quality modeling results, the Department was "unable to come to a scientifically defensible conclusion." Id.

Approaches to the Development of the TMDL

78. According to Mr. Mandrup-Poulsen, in developing the TMDL for TP, the Department was not looking for a level of phosphorus that would or would not cause an imbalance in flora and fauna. Instead, the focus was "to ensure that [the Department] had evidence sufficient to support the fact that the concentrations in the TMDL were protective, conservative, and did allow for a healthy population of fish and wildlife." (Tr. 197) Presumably, this would be at a level below the concentration level at which imbalance would occur and, therefore, would comply with the narrative criterion.

79. After the inability to reach a scientifically defensible conclusion on the basis of water quality modeling, the Department attempted alternative approaches. The first post-water quality modeling attempt was by way of an "Artificial Neural Network." (Tr. 198)

80. The employment of a "Neural Network" required the Department to recognize certain realities. For example, the Class III criterion for dissolved oxygen ("DO") of 5.0 milligrams per liter mg/L, at present, is not achievable in the part of the watershed in which the Nine Northern Tributaries are located. Mr. Mandrup-Poulsen, the administrator of the Watershed Assessment section in the Bureau of Watershed Management within the Department's Division of Water Resource

Management, therefore, set the DO criterion at a much lower level for purposes of the Neural Network approach. The criterion selected for DO was 1.5 mg/L.

81. The selection of such a low numeric value for DO was criticized by the USEPA. In a document entitled "EPA Comments on FEDP's Nutrients and DO TMDL for the Northeast Tributaries to Lake Okeechobee [the Nine Northern Tributaries]," the EPA wrote,

Please explain how the minimum DO requirement of 1.5 mg/l was selected. The DO water quality criterion for Class III fresh water in Florida is "Shall not be less than 5.0 mg/L. Normal daily and seasonal fluctuations above these levels shall be maintained." (See Section 62-302.530(31), F.A.C.) Pursuant to 40 CFR §130.7(c)(1), "TMDLs shall be established at levels necessary to attain and maintain the applicable narrative and numerical WQS..." If FDEP's intent is to change the DO water quality criterion for these water bodies from 5.0 mg/L to 1.5 mg/L, then a Site Specific Alternative Criterion (SSAC) must be developed through Florida normal administrative process or the State must explain how the target properly implements water quality standards. Otherwise, the stated goal of the TMDL must be to attain the 5.0 mg/L DO water quality criterion.

Petitioners' Ex. 86D, para. 5 (emphasis added). The selection of 1.5 mg/L for DO was also criticized by the South Florida Water Management District as "arbitrary," see Petitioners' Ex. 86-E, page stamped 002178, and as without "acceptable justification . . . because it will not support a well-balanced

community . . . of fish." Id. at pages stamped 002175 and 002176.

82. The Department was not unaware that the DO level selected was far below the level necessary to sustain Class III water uses. Being so far below the Class III criterion referred-to by USEPA, the 1.5 mg/L., was not intended by DEP to be a replacement criterion. In Mr. Mandrup-Poulsen's view, it "was the floor . . . as low as [one should] go with this particular approach [the Neural Network approach.]" (Tr. 200)

83. The Neural Network Approach yielded a value of 115 ppb for TP in the Nine Northern Tributaries, a lower numeric value, and hence more protective, than the Proposed TMDL of 159 ppb. Rulemaking was initiated to establish a TMDL of 115 ppb. A draft of the rule was presented at a public hearing on July 8, 2003.

84. The value produced disagreement within DEP or as it was put in an internal DEP memorandum dated July 14, 2003, "among ourselves (DEP)." Petitioners' Ex. 96A, stamped 002063. Written evidence of the dissension is the following which appears in another memorandum internal to DEP, dated July 14, 2003, that is attached to the first July 14 memorandum: "c) It is highly unlikely that tributary concentrations of 0.115 mg/l will result in the Lake meeting its TMDL requirement, and as such will require the eventual lowering of these tributary

TMDLs. Using a DO criteria of 2.0 or 2.5 mg/l might result in a tributary TP concentration more amenable to Lake restoration." Petitioners' Ex. 86-A, second page, stamped 002064, (emphasis added).

85. The 0.115 mg/L concentration level produced by the Neural Network Approach also yielded the contradictory result that to improve the DO level necessary to sustain fish and other aquatic biota would require the addition of more phosphorus to the Nine Northern Tributaries.¹⁰ Such an outcome was neither scientifically supportable nor acceptable to the Department and so the Neural Network Approach was rejected and its concentration level abandoned. Proceedings to propose the 0.115 mg/L in rule, accordingly, were halted.

86. Driven by USEPA-imposed requirements under the deadline set by the Consent Decree and with the results of the Neural Network Approach having proved unsatisfactory, the Department made a second attempt at water quality modeling. This attempt, just as the first, proved to be scientifically indefensible. The process was described in more detail by Mr. Mandrup-Poulsen at hearing:

The Department had a comment period that extended for 30 days, and our modeling efforts were made known to both the public and to EPA.

EPA was very much involved with the model development process. They were concerned

because, again, they have a consent decree with Earthjustice that they were obligated to report to a judge whether they were generating the TMDLs per the consent decree and the time line in that consent decree.

When the results were not satisfactory for either of those two approaches [water quality modeling and the Neural Network approach], we had advised EPA that we would continue to pursue the water quality modeling contract, and had hoped that we would be able to get improvements on that model.

We provided as much data as we could, and we continued to provide our expertise to Dr. Bottcher and his staff [the water quality modelers] in hopes that we would get a better outcome.

(Tr. 202) The continued resort to the water quality modeling method failed again to yield a better outcome.

87. The Department alerted the USEPA that its models were not producing scientifically defensible results. With the Consent Decree deadline looming, the USEPA, therefore, encouraged the Department to take an approach referred to as the "Reference Stream Approach."

88. In actuality, the USEPA's role was more than mere encouragement. Personnel from USEPA made the calculations that produced the Proposed TMDL on the basis of data submitted to USEPA by the Department. This data involved streams, most of which were initially identified by the Department, as described in more detail below.

89. Mr. Mandrup-Poulsen's expression of this arrangement was that the Department "evaluated [the work of the USEPA] and then produced [the Proposed] TMDL in September of 2003." (Tr. 203) In other words, while the USEPA performed the calculations used to determine the 75th percentile, the Department evaluated that work, so as, in essence, to adopt the calculations of USEPA as its own in support of the Proposed TMDL derived by the 75th Percentile Method.

90. The value ultimately derived for the Proposed TMDL, therefore, was the result of collaboration between USEPA and the Department or as the Department put it in one of its reports, "[f]or this TMDL [the Proposed TMDL], the Department worked with the Environmental Protection Agency (EPA) to determine a target TP concentration using a reference stream approach." Petitioners' Ex. 2, p. 4.

91. Mr. Mandrup-Poulsen's concessionary opinion of the Proposed TMDL is that while it is not based on the highest quality model it is based on "the best science available at the time." (Tr. 203, (emphasis added)) He believes it provides the protection necessary "to begin the restoration process" id., for the Nine Northern Tributaries. (Id. (emphasis added))

92. He sees the Proposed TMDL as supported by three factors: (1) a guidance manual published by the USEPA; (2)

support by USEPA's technical staff; and (3) "multiple layers of management review." Id.

93. In its Proposed Recommended Order, the Department describes the Reference Stream Approach as follows: "The reference stream approach is one of the USEPA's recommended approaches for the development of nutrient criteria. The approach examines the phosphorus concentrations in healthy streams and designat[es] the 75th percentile of phosphorus concentrations in these reference streams as a target in the stream to be remediated." Respondent's Proposed Recommended Order, pp. 25-26.

94. In fact, the USEPA's Reference Stream Approach is more complicated than the Department's position in this proceeding would lead one to believe. The Department's over-simplification of the Reference Stream Approach is plain from reading of the source extolled by the Department as support for the Proposed TMDL: the "Nutrient Criteria Technical Guidance Manual" for "Rivers and Streams" published in July of 2000 by the USEPA's Offices of Water and Science and Technology (the "Guidance Manual.")

The Guidance Manual

95. Chapter 7 of the Guidance Manual was admitted into evidence as Petitioners' Ex. 16. Entitled "Nutrient and Algal Criteria Development," the chapter "addresses the details of

developing scientifically defensible criteria for nutrients and algae." Petitioners' Ex. 16, Page 93.

96. Three approaches are provided by the Guidance Manual for use by states in deriving numeric criteria related to nutrients for streams in their eco-regions. These are described in the Guidance Manual as: "(1) the use of reference streams, (2) applying predictive relationships to select nutrient concentrations that will result in appropriate levels of algal biomass, and (3) developing criteria from thresholds established in the literature." Id.

97. The Department did not attempt to derive a TMDL for TP in the Nine Northern Tributaries using either the second or the third approach offered by the Guidance Manual. The USEPA encouraged the first approach, the use of reference streams. The Department provided stream data to the USEPA and then USEPA calculated a phosphorus concentration level based on that data. (An extended discussion of the way this data was provided by the Department - a part of Petitioners' case - takes place below.) The USEPA, however, with the Department's concurrence or acquiescence, did not follow the complete methodology under the Reference Stream Approach. It followed only part of the methodology.

98. Petitioners challenge the method used to derive the Proposed TMDL because it entailed only part of the entire, more

involved, methodology. In their view, the Department's acceptance of a concentration level determined by USEPA's calculations under only part of a methodology renders the Proposed TMDL arbitrary.

99. The Guidance Manual bears out Petitioners' assertion that the method used to derive the Proposed TMDL was, indeed, only a part of a more comprehensive methodology.

100. The Guidance Manual's discussion of the Reference Stream Approach under the heading, "**Using Reference Reaches to Establish Criteria**," see Petitioners' Ex. 16, Page 94, takes up the better part of four pages of the publication, i.e., pages 94 through 97.

101. As a preliminary matter, the use of reference streams Reference Stream Approach, "requires identification of reference reaches for each established stream class based on either best professional judgement (BPJ) or percentile selections of data plotted as frequency distributions." Id.

102. The process of identifying reference streams "allows the investigator to arrange the streams within a class in order of nutrient condition (i.e., trophic state) from reference, to at risk, to impaired." Id.

103. The Guidance Manual warns that when minimally-disturbed streams are rare in an ecoregion, "[c]riteria developed using reference reach approaches may require

comparisons to similar systems in States or Tribes that share the ecoregion so that criteria can be validated." Id.

104. Thus, the manual recognizes a difference between streams that exhibit reference conditions ("reference streams") and other streams that are too degraded or impaired to qualify as reference streams and, in methods using the latter types of streams, indicates the import of comparative review for purposes of validation. The difference between "reference" streams and streams that do not exhibit "reference conditions" is apparent from the definition of reference reaches or reference streams provided by the manual: "relatively undisturbed stream segments that can serve as examples of the natural biological integrity of a region." Id. Furthermore, the manual refers to reference streams elsewhere as "acknowledged to be in an approximately ideal state for a particular class of streams." Petitioners' Ex. 16, Page 95. Reference streams, therefore, do not include degraded streams or streams that are degraded even if they are the "least" impacted in an impacted region.

105. This definition is crucial to the Petitioners' case. The reference streams chosen, as discussed below, did not meet the Guidance Manual's definition. Rather than being "relatively undisturbed stream segments" that serve as "examples of the natural biological integrity of a region," or that are "in an approximately ideal state," the reference streams chosen by the

Department were "the least impacted streams for that stream class" within the area of the Nine Northern Tributaries, an area that has been greatly impacted.

Use of Reference Reaches

106. The Guidance Manual offers three methods of using reference reaches (the "Three Reference Streams Methods") to derive a numeric value for nutrients. They are:

1. Characterize reference reaches for each stream class within a region using best professional judgement and use these reference conditions to develop criteria (the "BPJ Method").
2. Identify the 75th percentile of the frequency distribution of reference streams for a class of streams and use this percentile to develop the criteria ([reference omitted]) (the "75th Percentile Method").
3. Calculate the 5th to 25th percentile of the frequency distribution of the general population of a class of streams and use the selected percentile to develop the criteria ([reference omitted]) (the "25th Percentile Method").

Petitioners' Ex. 16, Page 94. The three methods are not three separate methodologies, however; the latter two, the "percentile" methods, are part of one methodology that is more comprehensive than either of the two percentile methods, alone.

107. Under this comprehensive methodology, as a preliminary step, "a reference condition may be selected using

either of two frequency distribution approaches." Petitioners' Ex. 16, Page 95.

108. In the first of the two frequency distribution approaches, the 75th Percentile Method:

a percentile is selected (EPA generally recommends the 75th percentile) from the distribution of primary variables of known reference systems (i.e., highest quality or least impacted streams for that stream class within a region). As discussed in Chapter 3, primary variables are TP, TN, chl a, and turbidity or TSS. It is reasonable to select a higher percentile (i.e., 75th percentile) as the reference condition, because reference streams are already acknowledged to be in an approximately ideal state for a particular class of streams [reference omitted].

Id. (emphasis added)

109. The second of the two frequency distribution approaches, the 25th Percentile Reference Stream Method is also described in the Guidance Manual:

[It] involves selecting a percentile of (1) all streams in the class (reference and non-reference) or (2) a random sample distribution of all streams within a particular class. Due to the random selection process, an upper percentile should be selected because the sample distribution is expected to contain some degraded systems. This option is most useful in regions where the number of legitimate "natural" reference water bodies is usually very small, such as highly developed land use areas (e.g., the agricultural lands of the Midwest and the urbanized east or west coasts.) The EPA recommendation in this case is usually the

5th to 25th percentile depending upon the number of "natural" reference stream available. If almost all reference streams are impaired to some extent, then the 5th percentile is recommended.

Id. (emphasis added) (Although described as involving selection of a 5th to 25th percentile, for shorthand purposes, this second percentile method is referred-to in this order as the "25th Percentile Method Reference Stream Method.")

110. There is a critical distinction between stream data used under the two percentile methods. Under the 75th Percentile Method, the streams are to exhibit reference conditions, that is, they are to be minimally impacted or in an approximately ideal state for their class. Data used for the 75th Percentile Method should not include data from streams that are impacted or degraded or the least-impacted for a region that is heavily impacted. The 25th Percentile Method, on the other hand, is expected to use data from streams that have been impacted since it uses data from the general population of streams in a region. This population would include impacted, degraded streams or, in a region that is heavily impacted, some of the least-impacted streams as well as more impacted streams. If the streams were generally impacted or impacted to a great extent, then the percentile chosen to derive a numeric value would not be the 25th percentile, but a lower percentile with a

range that reaches as low as the fifth percentile if the general population is sufficiently impacted.

111. Ultimately, the Guidance Manual points out, the 75th Percentile Method and the 25th Percentile Method are "only recommendations" because the "actual distribution of the observations should be the major determinant of the threshold point chosen." Id. An example is given in the Guidance Manual of when the 75th Percentile Method produces a concentration level of 20 ppb and the 25th Percentile Method produces a level of 25 ppb. "Because there is little distinction [in such a case], the Agency may select either 20 [ppb], 25 [ppb], or the intermediate 23 [ppb]" Id.

112. Each state is cautioned, however, to "similarly calculate reference conditions initially using both approaches [the 75th Percentile Reference Stream Method and the 25th Percentile Reference Stream Method] to determine which method is most protective." Id. Once the calculations are made, the Guidance Manual is clear: "[t]he more conservative approach is recommended for subsequent reference condition calculations." Id. In other words, the State is to choose the lower value produced by the two methods when deriving a TMDL.

Margin of Safety

113. The margin of safety contained in the Proposed Rule (one that is implicit in the Proposed TMDL) is viewed favorably

by DEP because it used the "75th Percentile Method" to establish the TMDL. Since the concentration of TP theoretically could be higher, that is at a level in excess of the 75th percentile derived from the method, the Department's view of the Proposed TMDL is that it is a conservative one.

114. The Department's view depends, however, on the validity of using only the 75th Percentile Method to establish the Proposed TMDL and not deriving a value based on the 25th Percentile Method for purposes of comparison and selection of the more protective value. It also depends on the validity of the streams chosen as the reference streams for the purposes of data collection.

115. In addressing the selection of reference streams by DEP for use in deriving the Proposed TMDL, it is useful to understand the background that preceded the selection of the reference streams as well as historical information about phosphorus in Florida waters.

Historical Information

116. Historical information plays a role in the analysis of appropriate nutrient levels in water bodies. Numbers for historical phosphorus levels inform the analysis or, as Dr. Boyer put it at hearing, gives the investigator "another piece of evidence as to what . . . that system had been before and what could be achieved now." (Tr. 93)

117. Two pieces introduced into evidence by the Petitioners comprise the historical evidence in the record of this proceeding. One, not quite two decades old, is more recent, a 1986 USEPA publication for guidance to the states; the other is a report submitted to the Florida Geological Survey more than half a century ago. The report sums up the analysis of phosphorus data collected prior to many of the drastic changes in land use in the State that have contributed to so much of the problem decried by the Florida Legislature that the Proposed TMDL is intended to address.

118. The report regarding phosphorus in Florida water bodies in the mid-20th Century was referred-to in the record as the "Odum Report."

i. The Odum Report

119. On January 9, 1953, Howard T. Odum of the Department of Biology at the University of Florida submitted a report (the "Odum Report") to the Florida Geological Survey. Entitled "Dissolved Phosphorus in Florida Waters," it appears as Part I in a 1953 Report of Investigations and Miscellaneous Studies published by the State through the State Board of Conservation and the Florida Geological Survey.

120. Mean values of phosphorus in Florida streams are divided into two categories by the report: those in the Phosphate District where "streams are enormously laden with

phosphorus" and those elsewhere under the category of "Other."
See Petitioners' Ex. 20, p. 13. Data was collected from 18
streams in the Phosphate District and from 44 "other" streams.

121. In the "Phosphate District," the mean value was 0.876
micrograms per liter or 876 ppb; in the "Other" streams the mean
value is listed as 0.046 micrograms per liter or 46 ppb. Id.

122. The Department considered the historical data of the
Odum Report but gave it short shrift for several reasons:
first, the data set is "very limited." (Tr. 206) Second,
"collected back in the fifties, [it] might not have met the
quality assurance that we would expect for data [today]." Id.
Third, the data refers to "dissolved" phosphorus which is a
fraction of total phosphorus and therefore a subset of the data
needed to establish a TMDL for TP or "total" phosphorus.

123. Most significantly, in the Department's view, the
data does not assist in the Department's inquiry to "find values
that are still protective of the designated use" (tr. 207) that
is, a value that is higher than the historical value but one
that will still support the designated use.

ii. 1986 USEPA Document

124. On May 1, 1986, the Office of Water Regulations and
Standards for the USEPA published a guidance document entitled
"Quality Criteria for Water 1986." See Petitioners' Ex. 19. It
stated that "[t]o prevent the development of biological

nuisances and to control accelerated or cultural eutrophication, total phosphates as phosphorus (P) should not exceed 50 [ppb] in any stream at the point where it enters any lake or reservoir, nor 25 [ppb] within the lake or reservoir." Id.

125. As with other historical reporting, the 1986 Statement by the USEPA has been rejected by the Department. This time the rejection is on the ground that "it is very difficult to generalize. There is a very strong need to assess on a case-by-case basis the capacity of each water body as it enters into a different water body." (Tr. 210)

Background Provided by Mr. Frydenborg

126. Russell Frydenborg, the Department's expert in aquatic ecology (among other fields), was not involved in the selection of the Five Reference Streams. He was the main witness for the Department, however, in defense of their selection, largely on the basis of a post-proposal inquiry he conducted to confirm the validity of the Proposed TMDL. In addition to testifying about his after-the-fact justification, he provided background by way of testimony that included the Department's experience with reference streams and the Nine Northern Tributaries, in general.

127. A Reference Stream Approach for establishing numeric criteria for nutrients had never been used prior to its use in this case.

128. A reference site approach was used to set a phosphorus concentration level for the water bodies in the Everglades. It is an approach similar to the approach used for the Proposed TMDL.¹¹ But a reference site approach and a reference stream approach are not precisely the same. Streams are "a whole different type of beast." (Tr. 241) For example, unlike a lake or a standing body of water, "stream biology is very dependent upon flow regime." (Tr. 246) Artificial channelization of a stream affects its habitability for biota. As explained by Mr. Frydenborg:

[O]nce you channelize a stream and take out its bends, . . . you will eliminate vast quantities of habitat that the organisms can be able to colonize . . . [Y]ou'll destroy [habitat] when you channelize, and you destroy the hydrologic regime as well. [There will no longer be] microhabitats within the stream where you have different areas of different flow. [It will cause the organisms] to catastrophically drift.

(Tr. 247) Bank stability is another factor important to stream evaluations. Erosion can cause sediment flow into a stream system and bring unwanted sand, silt, muck and organic debris that will cover the substrates and keep them from being suitable for macroinvertebrate colonization. The state of riparian buffer systems has an impact on stream ecological health particularly in cases of human encroachment. Likewise the riparian vegetation zone, particularly leaf-litter fall

originating within the zone, has an impact on ecological stream health. The impact is detrimental when the zone is disturbed by human activities.

Selection of the Reference Streams by DEP

129. Data from five reference streams (the "Five Reference Streams") were used in deriving the Proposed TMDL by the 75th Percentile Method. The Five Reference Streams are Fish Slough, Cypress Slough, Fort Drum Creek, the Northwest Fork of the Loxahatchee River (the "NW Fork") and the North Fork of the Loxahatchee River (the "North Fork").

130. With the exception of Fish Slough, the reference streams were initially identified by an Environmental Manager in the Department: Julie Espy.

131. Ms. Espy was not called by the Department to the witness stand to explain at hearing the identification of the reference streams. Her deposition was introduced into evidence, however, by Petitioners because the circumstances surrounding the identification of these four streams (the "Four Reference Streams") inform their claim that the process for the derivation of the Proposed TMDL was arbitrary and capricious.

132. Ms. Espy was a logical person to have assisted in the selection of reference streams. Her duties includes the supervision of algal and freshwater macroinvertebrate taxonomy

groups, the management of freshwater data and filed assessments and sampling of rivers, wetlands, lakes, canals, and streams.

133. The data she manages, moreover, is collected for various programs that include TMDL programs. All in all, in her words, they include "Everglades, TMDL, small projects, like restoration projects [and] monitoring. Some of it is method development data." Petitioners' Ex. 90, p. 7.

134. Ms. Espy was a logical choice to choose reference streams based on experience with programs and the types of data she managed. Yet, when asked to identify streams in the area in which the Nine Northern Tributaries are located, Ms. Espy was not informed of the purpose of the identification.

135. The request was made by USEPA when Ms. Espy was contacted in mid-2003 by "David Melgaard from EPA." Id. at 10. Prior to the request by Mr. Melgaard, no one from the Department had requested or ordered that she participate in the development of the Proposed TMDL. When Mr. Melgaard asked about some "six or seven" (id. pp. 10-11) specific streams in the area of Lake Okeechobee, that included Fish Slough and Cypress Slough, he did not inform Ms. Espy why she had been contacted or the use to which the information would be put.

136. Mr. Melgaard suggested that she search in Ecoregion 75(d). Canals were excluded because they "don't act the same as a stream echo system. With all the hydrological modification,

the SCI metrics [for canals] . . . don't work the same [as for streams]." Id. at 11-12.

137. The following colloquy took place in Ms. Espy's deposition when she was asked the basis of her recommendation for the Four Reference Streams:

Q What were you looking at in making these recommendation?

A I was using our GIS coverage. We have data layer that includes all of our biological stations, so that one thing I looked at, because it also had the ecoregion coverage, so I could see spatially the proximity of the sites and that type of thing.

Q What else were you looking at?

* * *

A That's all I was looking at. He was just asking me for sites.

Q You were not making an assessment about the appropriateness of the stream for any purpose?

A No.

Q You were strictly identifying streams that were in proximity --

A Biological samples -- where biological samples had occurred.

I might add, that at the time that I requested this, he did not approach me with we are looking for streams for the Lake Okeechobee tributary TMDL. I was totally unaware of why he was asking for the information. I really didn't have any context to base that on.

Q Have you ever visited any of these streams

A I went --

Q I mean prior to the site visit that took place in April [of 2004].

A No.

Q At the time you were making these suggestions to EPA had you ever visited any of these streams?

A No.

Id. at 13-15.

138. On August 18, 2003, Ms. Espy sent an e-mail message to Mr. Melgaard. The message listed the Four Reference Streams. Ft. Drum Creek and Cypress Slough were listed as "closest to the Fish Slough site" (Petitioners' Ex. 90, Ex. 2.); the "NW Fork of the Loxahatchee River" and the "North Fork of the Loxahatchee River" were described as "further away, but . . . very good (biologically). They've been sampled numerous times but may be too large to compare to the others." Id. After informing Mr. Melgaard that they were in "ecoregion 75d," the message from Ms. Espy stated as she later confirmed at her deposition, "I haven't been to any of these sites." Id.

139. Following the transmission of the message to EPA, Ms. Espy received an e-mail message from Mr. Melgaard. See Petitioners' Ex. 90, Ex. 3. It asked her to "ask the biologists from that area if comparing nutrient levels in the reference

streams to those in the North Okeechobee Tribs is appropriate considering all the hydrological modifications in the Lake O [Lake Okeechobee] area." Id. Ms. Espy spoke to Mark Thompson, a biologist from the Department's southeast district office but Mr. Thompson "wasn't very familiar with any of the sites." Ms. Espy did not check with anyone else. She relayed the outcome of her inquiry to EPA but was not asked any further about the Four Reference Streams prior to the publication of the Proposed Rule in September 2003.

140. In October of 2003, approximately 6 weeks after the publication of the Notice of Proposed Rulemaking with regard to the amendments to the Existing Rule that establish the Proposed TMDL, Dan Scheidt of Region 4 of the USEPA, sent an e-mail message (the "October 2003 E-Mail Message") to Ms. Espy:

Julie-

I am trying to follow up and close the loop on proposed stream TP reference sites for the S-191 basin. There are 5 reference sites proposed for S-191 basin TP: these four along with Fish Slough:

[Code and No. IDs omitted]	Ft. Drum Creek
[" " " " " " " "]	Cypress Slough
[" " " " " " " "]	NW Fork of the Loxahatchee River
[" " " " " " " "]	North Fork of the Loxahatchee River

For which of these sites does FDEP have bio data that confirms that these are in fact

reference sites, i.e., there is no impairment due to nutrients.
Thanks

Ex. 4 attached to Petitioners' Ex. 90.

141. Not surprisingly, since the rule amendment containing the Proposed TMDL had been published more than a month earlier, Ms. Espy did not respond promptly to Mr. Scheidt.

142. At the time of her identification of the Four Reference Streams for USEPA, Ms. Espy had not been involved in the selection of Fish Slough as the fifth reference stream. Nor did she have any familiarity with Fish Slough. Of the Four Reference Streams she identified for USEPA, Ms. Espy was familiar at the time she suggested them with only two: the NW Fork and the North Fork. Her familiarity was based on receipt of "samples from those two sites on a few occasions in the laboratory." (Petitioners' Ex. 90, p. 15). The basis of her familiarity was described in this way: "I was familiar with analyzing the samples, putting the data into the database and what those results were." Id. When the streams were recommended Ms. Espy had not examined their SCI scores nor the data that supported the scores.

143. Ms. Espy had never looked at any bio assessment data with regard to the reference streams prior to December 16, 2003.

144. In response to the USEPA October E-mail Message, however, Ms. Espy eventually provided Stream Condition Index

("SCI") scores. The entirety of the scores consisted of one score for Fish Slough, one score for Cypress Slough, six scores for Fort Drum Creek, 15 for the North Fork of the Loxahatchee and 16 for the Northwest Fork of the Loxahatchee. These scores were compiled from the statewide biological database.

145. The scores were sent to USEPA in a November 2003 e-mail message. In her e-mail message, Ms. Espy wrote to Mr. Scheidt at USEPA:

Attached find the macroinvertebrate data we have for these sites [the Four Reference Streams]. These data are the Stream Condition Index scores for these sites. I would not say that because these sites have good SCI scores they have NO impairment for nutrients. These sites are just the best available for that area in the state.

Ex. 4, 3rd page, attached to Petitioners' Ex. 90 (emphasis added). This message is consistent with the Department's position that the Five Reference Streams are "least impacted in the region," a status to be distinguished from the requirement that streams be minimally impacted or in a nearly ideal state to qualify as reference streams.

146. Ms. Espy does not believe that the SCI scores confirm that there is no impairment due to nutrients to the Four Reference Streams because "[t]he SCI isn't necessarily a tool that is used just to point out or indicate nutrient impairment." (Petitioners' Ex. 90, p. 23).

Mr. Frydenborg's After-the-Fact Efforts

147. Mr. Frydenborg visited the Nine Northern Tributaries in order to collect data for purposes of supporting the Proposed TMDL after the Proposed Rule was published and challenged by Petitioners.

148. The collection effort, as expected, revealed widespread hydrologic modification in the area of the Nine Northern Tributaries. The majority of the sites visited in the area had unacceptable, that is, "very low" (tr. 252) habitat scores. The habitat and the hydrology of the sites led Mr. Frydenborg to conclude that no matter what improvement was made to water quality with regard to TP, "you wouldn't get very good biological communities." Id. The only potential exception among the Nine Northern Tributaries is Mosquito Creek.

Mosquito Creek

149. Among the Nine Northern Tributaries, Mosquito Creek had the best habitat. Under a recalibrated Stream Condition Index ("the New SCI"), conducted by the Department, it scored a 102, just below the threshold level of 105 that is considered optimal. The scores for the other Nine Northern Tributaries ranged from 21 to 69. Mosquito Creek also enjoyed the best hydrologic score ("7") while the others all scored 9 or 10, indicating that the others enjoyed very few natural hydroperiods

but rather suffered with impaired hydroperiods, "completely human-controlled." (Tr. 253)

150. Mr. Frydenborg's assessment of Mosquito Creek does not square precisely with an earlier assessment conducted by the Department in 1999 and summarized in Petitioners' Ex. 25.

151. Petitioners' Exhibit 25 is an Ecosummary of Mosquito Creek prepared by the Department's Southeast District's Assessment and Monitoring Program. Issued in September of 1999, it describes Mosquito Creek in much the same way as Mr. Frydenborg at hearing but with a few differences:

Despite water quality problems, the creek has beautiful stretches with luxurious aquatic and riparian vegetation and an extensive and populous benthic invertebrate community, all thriving on the excessive nutrient load. Native vegetation such as maple, cypress, willow, and oak dominate the canopy while noxious and rank growths of exotics (water hyacinth, water lettuce, wild taro, and pepper trees) clog the water surface and understory. A diverse assemblage of aquatic insects, worms, and mollusks utilize the nutrient enriched water.

Petitioners' Ex. 25, 1st page (emphasis added).

152. The exhibit refers to the historical use of the watershed for dairy and beef cattle production. Although data was limited, the exhibit reflected the finding that "water quality in the creek appears to be improving." Id. This was attributed to best management practices and changes in land use

away from dairy and beef cattle production. "Nevertheless," the document states, "water quality continues to be poor." Id. From 1992 to 1998, TP averaged 0.728 mg/l, or over seven times what an acceptable limit might be" Id.

153. The document describes "Type II Error" that occurs with regard to environmental assessments:

Contrary to its obvious water quality impairment (which includes very high phosphorus and nitrogen nutrient concentrations and chronically low dissolved oxygen), Mosquito Creek scored very highly (33 or "excellent") during a 1994 biological dipnet macroinvertebrate assessment using FDEP's SCI method. This misleading evaluation may have occurred due to the good habitat and flow present at the Mosquito Creek site, and illustrates the potential danger of employing "cookie-cutter" environmental assessment approaches. An incorrect assessment such as this is called a "Type II Error" wherein a polluted stream is deemed to be in "excellent" condition.

* * *

Failure to avoid "Type II Error" may result in a false public perception about the true condition of a polluted waterway.

Petitioners' Ex. 25, 2nd page.

154. The exhibit further warns of the effects of the excessive nutrient loading in the creek on Lake Okeechobee:

Although Mosquito Creek is but a small tributary to Lake Okeechobee, many such sources combine to exacerbate the Lake's problems. Heavy loads of nutrients have resulted in massive algal blooms which can deplete dissolved oxygen levels and cause

fishkills. The type of algae that make up these blooms can include those which produce toxins. These Harmful Algal Blooms (HABs) can sicken, kill, and even be carcinogenic to a wide variety of organism.

Id.

155. The exhibit, as far as its attribution of Type II error to the assessment of Mosquito Creek as "excellent" was dismissed by the Department at hearing. The exhibit was authored by a chemist who "has not passed the stream condition audit". It failed in Mr. Frydenborg's view to consider, moreover, that excessive nutrient loading may not cause poor biological health when there are other factors that would allow biological health despite excessive nutrients such as shading and the darkness of the water that would prevent the penetration of light.

156. The exhibit pointed to other indicators of poor biological health, that in the opinion of the author of Petitioners' Exhibit 25 were overlooked:

While the macroinvertebrate fauna collected from Mosquito Creek was diverse, it included many species tolerant to pollution that opportunistically exploited the conditions which pollution caused. Thus air-breathing taxa were common in Mosquito Creek (they can tolerate low dissolved oxygen). The exotic bivalve, *Corbicula fluminea*, was extremely abundant, but was under-reported by the dipnet method. This species thrives in areas receiving high nutrients, filtering abundant suspended organic materials that

result from the over-growth of plants fertilized by runoff.

Id. Whatever Mosquito Creek's status, the eight other tributaries among the Nine Northern Tributaries have major problems as all parties to this proceeding agree and as further described by Mr. Frydenborg at hearing.

Problems Associated with the Nine Northern Tributaries

157. A major problem for most of the Nine Northern Tributaries is that hydrologic modifications, such as ditching and draining, create a "spike in [the] hydrograph." Id. In rain events, they endure large influxes of water that cause turbulent flow and scouring to the stream system. The result is that the stream's ability to support benthic macroinvertebrate communities is severely reduced.

158. At bottom, an improvement in TP concentrations for the Nine Northern Tributaries is not anticipated by the Department to lead to a normally-expected biological community because major improvements in stream habitat and hydrologic regime are also required. This expectation by the Department, however, is not supported by a Use Attainability Analysis.

Use Attainability Analysis

159. A "Use Attainability Analysis" was not done on the Nine Northern Tributaries to determine if they could attain Class III uses.

160. A structured scientific assessment of the factors affecting the attainment of use, a Use Attainability Analysis has been adopted by the federal government.

161. The Department conducted such an analysis of the Fenholloway River, polluted by a the point source of a pulp mill. But there was no evidence that the Department had conducted such an analysis on streams polluted by non-point sources as in the case of the Nine Northern Tributaries. Certainly, Mr. Frydenborg has never been involved in such an analysis.

162. Without having conducted a Use Attainability Analysis, the Department nonetheless continues to anticipate that an improvement in TP concentrations in the Nine Northern Tributaries will not serve to attain Class III uses.

DEP Reaction to the Rule Challenge

163. The record does not reflect any response other than the SCI data provided by Ms. Espy to USEPA's request for "bio data that confirms that these are in fact reference sites, i.e., there is not impairment due to nutrients." When this Rule Challenge was filed at DOAH, however, Mr. Frydenborg was asked by Mr. Brooks to visit the sites of the Reference Streams and the Nine Northern Tributaries to "collect some additional data so that we had an objective evaluation" (Tr. 244) He visited the Nine Northern Tributaries and three of the Five

Reference Streams in April of 2003. He was accompanied by Ms. Espy.

164. They spent two days visiting all of the Nine Northern Tributaries but, according to Ms. Espy, we're only able to spend time at two of the reference streams and "drive-by . . . one other." (Petitioners' Ex. 90, p. 38). The reference streams not visited, according to Ms. Espy, were Fish Slough (this may be because Mr. Frydenborg knew from an earlier visit that it would not qualify as a reference stream in its present state, see Finding of Fact 165) and the Northwest Fork of the Loxahatchee. They drove by the North Fork of the Loxahatchee and actually spent time at Cypress Slough and Fort Drum Creek.

165. Mr. Frydenborg, whether with Ms. Espy or not, did visit Fish Slough at some point. (It may be inferred from his testimony that he saw Fish Slough on the April 15-16, 2003 visit.) He was asked about it in the context of the April 15, 2003, trips taken by him and Ms. Espy:

Q [C]an you describe what you saw when you visited the reference streams?

A Well, when I went to Fish Slough, I immediately determined that it is not a reference site currently. It had a completely channelized system with [no] riparian zone. There were exotic plants in the water. I believe there was hydrilla. . . . I would not characterize the condition of Fish Slough as a reference community today.

Gary Ritter [of the water management district] . . . was along with me. I said, "Gary, this is a bad reference site," and he said, "Well, there have been some changes in the basin around 1995," and I believe that the Department used pre-1995 data for that site because it currently would not qualify as a reference site.

(Tr. 263-264)

166. In apparent reliance on Mr. Ritter's statement and its interpretation of the statement, the Department used pre-1995 data for Fish Slough in the calculations for the derivation of the Proposed TMDL. This is noted in the report issued by the Department through its Watershed Assessment Section on September 16, 2003. The report introduced into the record by Petitioners, describes its purpose as "[to] represent[] the efforts to develop a . . . TMDL for . . . TO for impaired waterbodies within the Lake Okeechobee Basin"

Petitioners' Ex. 2, pg. 1. With regard to the present status of Fish Slough as not an appropriate reference stream the report states,

It should be noted that the entire data record was not used for each station. For Fish Slough, which is within the Lake Okeechobee Watershed and which has a similar soil and topography there were phosphorus data back to 1986. However, land use changes and increased agricultural activity in the watershed since 1996 have led to the concern that Fish Slough may no longer be suitable as a reference site. For this reason, only the Fish Slough data for 1986-1995 were used to determine the TP target.

Using this shorter period of record, there were 490 TP samples for these five streams and the 75th percentile value for TP is 0.159 mg/L.

Petitioners' Ex. 2, p. 4, emphasis added. The decision to accept Fish Slough as a reference stream prior to 1996 was made on the basis of Mr. Ritter's statement and the suggestion of Kim Shugar, who, like Mr. Ritter, has been involved in water quality restoration work in South Florida. Neither Mr. Ritter nor Ms. Shugar testified at hearing, however, as to the basis of their belief. Nor with one exception is there any evidence of record that Fish Slough was a reference stream prior to 1996. That exception is the following testimony of Mr. Frydenborg:

Well, I did the habitat and the hydrologic index, and, interestingly, the LDI, the Landscape Development Intensity Index I believe was around 2.2 for Fish Slough, and that data that we have that's a complete data set for the State of Florida was like 1996 data. So I guess that is an independent way of confirming that at that point there was a relatively benign land use at Fish Slough ...

See Respondent's Proposed Recommended Order, para. 91, p. 34.

167. Otherwise, Mr. Frydenborg disclaimed any knowledge of whether Fish Slough would have qualified as a reference stream prior to 1996: "I really don't have the knowledge to be able to tell you what it [Fish Slough] was like before 1995" (Tr. 267) Without doubt, however, it is "not an acceptable reference site today" Id. Infested with exotic plants

such as hydrilla, Fish Slough, is a completely channelized system with no riparian zone.

168. At Cypress Slough and Fort Drum Creek, Mr. Frydenborg and Ms. Espy "walked the system probably 200 or 300 meters down from the road crossing and then [conducted] a 100-meter stretch assessment within that." (Petitioners' Ex. 90, p. 39).

169. The 100-meter stretch assessment was described at hearing by Mr. Frydenborg:

You pull a tape measure out and you flag the site every ten meters so you can get an accurate map of the habitats, and then you do a series of evaluations. There's eight procedures that you go through for the habitat assessments.

(Tr. 245) The procedures which measure "habitat parameters" (see Department Exs. 7 and 9) include an examination of substrate diversity and substrate availability. Substrate in Florida are "snags, leaf packs, root materials, aquatic vegetation" (id.) and may include limestone rock. The habitat parameters also include an examination of water velocity, habitat smothering (affects of sand or silt accumulation), the degree of artificial channelization, bank stability, riparian zone buffer, and riparian zone vegetation.

170. The vegetation in a riparian zone is crucial to a stream's trophic system, particularly its leaf litter fall. The

contribution by leaf-producing organisms in the riparian zone to stream habitat was stressed by Mr. Frydenborg at hearing:

They shed their leaves periodically, and that's a very important source of habitat because organisms . . . live in those leaf packs, and [they are] also a source of organic matter that is naturally found in the systems [O]rganisms . . . called shredders . . . move in and cut . . . the leaf litter into smaller pieces and produce usable organic matter that then ... [serves] the whole community[.] [At] the base of the food web . . . the organisms . . . eat the native algae . . . the diatoms . . . the leaf litter[.] [For] aquatic macrophytes or aquatic plants in the system, [its] a source of organic production . . . used as food throughout . . . the trophic system[.] . . . [I]t is [the source of] energy [that] moves from one level to the next [within healthy stream habitat]

(Tr. 248)

171. In addition to the eight procedures for habitat assessment, Mr. Frydenborg also calculated a hydrologic modification score on a form he developed as an off-shoot of USEPA's Human Disturbance Gradient. The form had been used in the recalibration of the Old SCI that led to the New SCI. See Finding of Fact 171 below. The calculation revealed "widespread hydrologic modification in that northeastern tributary area" (tr. 251) the area of the Nine Northern Tributaries.

172. Optimum habitat scores are in excess of 105. Eight of the Nine Northern Tributaries had scores below 69,

"unacceptable habitat scores, very low." (Tr. 252) The exception with the highest score was Mosquito Creek.

173. With regard to the Reference Streams, no SCI scores were calculated on the April, 2003 trip. No samples of the reference streams were taken because Mr. Frydenborg and Ms. Espy "didn't feel there would be sufficient time before the hearing was scheduled" (Petitioners' Ex. 90, p. 42) to analyze any such samples. Instead, Mr. Frydenborg and Ms. Espy, as they had done with regard to the Nine Northern Tributaries conducted "habitat assessment and hydrologic scoring" (tr. 261) for the two Reference Streams they visited: Fort Drum Creek and Cypress Slough. The scores for the two are found on Department Exhibit 9. The exhibit consists of three documents for each of the Reference Streams: a "Stream/River Habitat Sketch Sheet," a "Physical/Chemical Characterization Field Sheet," and a "Stream/River Habitat Assessment Field Sheet." See Department Ex. 9. The latter sheet scores the stream on the eight habitat parameters that are included in the habitat assessment.

174. Fort Drum Creek received a hydrologic score of five, "in [the] moderate range of disturbance" (Tr. 264) Its habitat score was "125." The Stream/River Habitat Assessment Field Sheet has four categories for each habitat parameter. They are "Optimal," "Suboptimal," "Marginal" and "Poor." The creek received optimal scores in four of them: habitat

smothering, artificial channelization, riparian buffer zone width and riparian zone vegetation quality. It received suboptimal scores in three habitat parameters: substrate diversity, water velocity, and bank stability and a marginal score in substrate availability which indicates that the creek has only "6% to 15% productive habitat". Department's Ex. 9, p. 3.

175. Cypress Slough received a slightly higher score of 127. Although it had only a marginal score of "8" in substrate availability indicating something less than 15% of productive habitat, Mr. Frydenborg described the segment of the slough in which the assessment was made as a "tropical paradise . . . [with] a beautiful riparian zone [and] nice habitats." (tr. 266) The description matches the maximum optimal scores Cypress Slough received for artificial channelization, bank stability, riparian buffer zone width and riparian zone vegetation quality. With regard to the three other habitat parameters, substrate diversity, water velocity and habitat smothering, the slough received suboptimal scores.

176. Assessments were not taken at the Northwest and North Forks of the Loxahatchee because eight previous samplings had been taken that produced data for habitat assessment and hydrologic scoring had been done of them during the recalibration process of the SCI.

177. In the end, the Department was satisfied with the Reference Streams used for purposes of data in calculating the 75th percentile of TP because of two reasons: (1) their high 1996 Stream Condition Index Scores and (2) their proximity to the Lake Okeechobee basin.

178. In the Department's view, the Proposed TMDL should protect the Nine Northern Tributaries from imbalance "because that is what is represented in the reference site population data." (Tr. 270)

179. That view was confirmed for the Department by three analyses that Mr. Frydenborg conducted after the Proposed TMDL was challenged by Petitioners.

180. The first analysis used cases "where there was an SCI score of good, and in conjunction with [that], on that day, a total phosphorus of greater than 159" (Tr. 134) Out of a total of 629 scores available, only 7 qualified in the analysis. Dr. Boyer, Petitioners' expert witness, explained that the analysis was scientifically invalid because it ignored the high variability of phosphorus data over time, ignored the existence of additional SCI scores (New SCI scores) for the same streams in which the streams received only "fair" or "poor" assessments, and ignored the existence of data showing that there was only one stream that had a phosphorus reading of over

159 ppb which also had a consistent New SCI scores of "good."

As Dr. Boyer explained:

[T]his site is Little Orange [Creek]
[I]t also has TP values of 29 and 39 on
different days. There is a lot of
variability in the data. So to come to the
conclusion that this site is good because on
one day it had a high TO and it scored good
is invalid

(Tr. 137)

181. The second analysis was a regression analysis, a statistical tool, that showed no relationship between total phosphorus and biological health of a system. The Department again used an approach that employed only the phosphorus level on the day the SCI score was taken and not all the data over a period of time. The approach is invalid. It inappropriately uses point data rather than all available data.

182. The third analysis examined all "good" SCI scores in the Peninsular Region that had a phosphorus reading the same day and took the 75th percentile of the phosphorus data. It then examined all "good" and "fair" SCI scores in the same region that had a phosphorus reading the same day and took the 75th Percentile of the phosphorus data. These two produced 75th percentiles of 243 ppb and 230 ppb. Dr. Boyer criticized the third analysis because "the text category . . . were not what's used of the new method [the New SCI]." (Tr. 146) Under the new method "it dropped several goods into the fair categories and

several fairs into the poor category." Id. The analysis also suffered from point phosphorus data rather than all data available for a stream as required under the USEPA's 75th Percentile Method. The limitation of the data set, moreover, because of the point data used rather than all data, produced a result with a large confidence level that fell anywhere between 31 ppb and 441 ppb, hardly a confirmation of the Proposed TMDL.

183. If one categorizes the streams according to their New SCI rating (good, fair, poor and very poor), and takes a mean of the phosphorus data, an entirely different conclusion is reached about the relationship between TP and biological health. The mean phosphorus for good systems is 31 ppb, for fair 88 ppb, for poor 141 ppb and very poor is 193 ppb. Maximum phosphorus for a good system would be 78 ppb. One concludes from this analysis that there is a definite relationship between TP and the health of a biological system. As Dr. Boyer put it, "you're not going to find a . . . system . . . that's consistently good that has high phosphorus." (Tr. 145)

184. The New SCI assesses ten metrics of macroinvertebrate community health. The ten metrics "represent a category of biological attributes so that you can get the best holistic data set [for] an accurate evaluation of the biological community." (Tr. 302) The New SCI also is based on a Human Disturbance

Gradient ("HDG"). At the end of the calculation, a stream falls into one of four categories: good, fair, poor or very poor.

185. The scores span a scale from 1 to 100 with 100 being the best. A score of 73 and above qualifies a stream as "good." Of "[t]he sites that got zero on the Human Disturbance Gradient . . . , no observable type of human disturbance . . . , only about 25 percent . . . exceeded . . . 73" The remainder fell into the fair category, an indication that a rating of "fair" may not indicate impairment, according to Mr. Frydenborg. Petitioners' Ex. 98, a publication of DEP's bearing a revision date of February 1, 2004, however, indicates otherwise in its description of the SCI category "Fair:" "Significantly different from natural conditions; 20-30% loss of Ephemeroptera, Trichoptera and long-lived taxa; 40% loss of clinger and sensitive taxa; percentage of very tolerant individuals double." Petitioners' Ex. 98, p. 21 of 32, (emphasis added).

186. In addition to testifying about the reference streams, Mr. Frydenborg explained why the Department did not calculate a TMDL under the 25th Percentile Method recommended by the USEPA. The Department regarded the recommendation of that method as a disservice by the USEPA.

"Disservice by the USEPA?"

187. As discussed above, the Guidance Manual published by the USEPA suggests that in addition to the "75th Percentile

Reference Stream Approach" that the Department should have also applied the 25th Percentile Method and compared the results as part of a comprehensive and protective "frequency distribution" methodology. After comparing the results from the two methods, USEPA recommends selecting the lower result in order to ensure that a TMDL is protective.

188. The 25th Percentile Method was conducted by the USEPA in its Ecoregion XII, described in a document published in December of 2000 by the USEPA's Office of Water as encompassing "the southeast corner of Georgia (excluding the immediate coastline) and a large segment of central and Gulf of Mexico coastal Florida." See Petitioners' Ex. 17, p. 7. This Ecoregion is primarily north of Ecoregion XIII, which is the Southern Florida Coastal Plain. Maps in the document show that Lake Okeechobee is in Ecoregion XIII, but the Nine Northern Tributaries are located in Ecoregion XII. Ecoregion XII contains a sub-ecoregion, sub-ecoregion 75. Testimony at hearing indicated that the Nine Northern Tributaries are at the southernmost end of Sub-ecoregion 75.

189. Employing the 25th Percentile Method, the reference conditions for both "aggregate Ecoregion XII streams" and "level III ecoregion 75 streams" with regard to total phosphorus were 40 ppb or 0.040 mg/L. See Petitioners' Ex. 17, Table 2 and 3,

at pp 13 and 14, respectively. Also see id. "Executive Summary," pp. vi and (tr. 92).

190. The concentration level of 40 ppb (or 40 micrograms per liter) produced by USEPA for streams in the Nine Northern Tributaries ecoregion using the 25th Percentile Method was rejected by the Department for purposes of proposing a TMDL for TP in the Nine Northern Tributaries. Despite the USEPA recommendation in the Guidance Document, the Department does not have faith in the 25th Percentile Method for establishing a level at which imbalance occurs. It views USEPA as having done a "huge disservice . . . to the states when they promulgated [the Guidance Document that recommends employment of the 25th Percentile Method]." (Tr. 286)

191. At hearing, Mr. Frydenborg described the Department's view of the flaw in the 25th Percentile Method for establishing imbalance. In his words, the 25th Percentile Method takes, "sites of completely unknown quality - - they could all be excellent quality biologically, no imbalances whatsoever, and by arbitrarily selecting the lower 25th percentile, [it] automatically [makes] any site above that impaired with no evidence to support that there is actually imbalances of biological communities" (Tr. 286) While theoretically, the 25th Percentile Method could use streams with "excellent" biological quality, that is, streams that were impacted at most

minimally, the description of the method in the Guidance Manual makes clear that the precise opposite is the case; the method will typically use streams that are degraded. The potential for degraded streams to be used by the 25th Percentile Method is precisely why the USEPA methodology that employs the 25th Percentile Method recommends that an even lower percentile, down to the fifth percentile, be considered for obtaining a nutrient value for setting a numeric criteria.

192. The method in which one would expect only streams of excellent biological quality to be used is the 75th Percentile Method. This is why the 75th Percentile Method, in contrast to the 25th Percentile Method, is described by the USEPA as "the preferred method to establish a reference condition." Id. at 10. A discussion of the comparison of the two indicates that while the 75th Percentile Method is preferred, the hope is that the two methods will produce similar values for a reference condition:

EPA's Technical Guidance Manual for Developing Nutrient Criteria for Rivers and Streams describes two ways of establishing a reference condition. One method is to choose the upper 25th percentile (75th percentile [the 75th Percentile Method]) of a reference population of streams. This is the preferred method to establish a reference condition. The 75th percentile was chosen by EPA since it is likely associated with minimally impacted conditions, will be protective of designated uses, and provides management flexibility.

When reference streams are not identified, the second method is to determine the lower 25th percentile of the population of all streams within a region [the 25th Percentile Method]. The 25th percentile of the entire population was chosen by EPA to represent a surrogate for an actual reference population. Data analyses to date indicate the lower 25th percentile from an entire population roughly approximates the 75th percentile of the population for a reference population [citations to case studies in Minnesota and Tennessee omitted]. New York State has also presented evidence that the 25th percentile [method] and the 75th percentile [method] compare well based on user perceptions of water resources [citation omitted].

Id. This discussion also shows that values with a variance from 40 ppb (as produced by USEPA for the Ecoregion in which the Nine Northern Tributaries are located employing the 25th Percentile Method) and 159 ppb (produced by the Department in collaboration with USEPA in employing the 75th Percentile Method) are unexpected. It also explains why the USEPA in the Reference Stream Approach urges that when the values produced by the 75th Percentile Method and the 25th Percentile Method are at a sufficient variance that the lower, more protective, value be chosen for purposes of deriving a TMDL for a nutrient.

A Numeric Value at Great Variance

193. When a frequency distribution analysis produces a value that is at great variance with another frequency distribution analysis, it causes the scientific investigator to

pause in progress toward the goal. Instead of attempting to proceed toward the ultimate goal of arriving at a numeric criterion, the next step for the investigator is to determine the cause for the variance between the analyses. This is particularly true when the analysis with the higher value is at odds as well with other data, such as historical data.

194. The step for determining the basis of the discrepancy between values produced by various analyses was described by Dr. Boyer at hearing when asked, "What would you do if you found one [a value] that was totally different from the others?"

(Tr. 94) Dr. Boyer answered that it would require the scientific investigator to re-examine the result, "either the data are bad or [the] analysis is wrong," id., or the investigator did not account for some factor. While a result at great variance with other results would not necessarily mean that the result was inaccurate, it is a "red flag," id., that requires re-examination.

195. The high value in the Proposed TMDL is indeed a "red flag." It calls into question the streams chosen by the Department as reference streams for the 75th Percentile Method. The legitimacy of the reference status of the streams chosen by the Department was cast into further doubt by the testimony of Petitioners' witness whose fields of expertise include water

quality analysis relating to nutrient loading: Jean Marie Boyer, Ph.D.

Dr. Boyer's Testimony

196. As referenced above, Fish Slough, at the time of hearing, would not have qualified as a reference stream because of impacts. Whether it was one or not prior to 1996, the end date for Fish Slough data used by the Department for derivation of the Proposed TMDL, is less than clear from the record. The Department relied on statements from water management district personnel. None of those personnel testified at the hearing in this proceeding. There was no other evidence in the proceeding, documentary or otherwise, to support Fish Slough's reference stream status prior to 1996 aside from Mr. Frydenborg's reference to a LDI reading that exceeded the range into which a reference stream would have fallen.

197. It is Dr. Boyer's opinion, moreover, that none of the Five Reference Stream supporting the Proposed TMDL are legitimate reference streams, in part, because of the scores received on the Old SCI and the New SCI.

198. In her opinion, Cypress Slough, furthermore, is more than minimally-impacted so that it does not qualify as a reference stream. Located in the proximity of several dairy farms from which it receives direct drainage, Cypress Slough is "impacted and it is disturbed." (Tr. 102) When the initial SCI

report was prepared it was not on the "preferenced stream list." Id. It is listed as "fair" on the New SCI with a modification score of 6.

199. Fort Drum Creek is "less disturbed than Fish Slough or Cypress Slough" id., but still Dr. Boyer "wouldn't consider [Fort Drum Creek] minimally impacted" Among six RSCI scores, Fort Drum Creek received 5 "fairs" and 1 "good." It was explained at hearing, that a rating of "fair" on the New SCI does not necessarily mean that the stream is more than "minimally impacted." On the Land Development Index, however, Fort Drum Creek scores a 2.9, a number that is higher than "zero to two [which is] considered a good number for the Landscape Development Index." (Tr. 103) The LDI, therefore, indicates that Fort Drum Creek does not qualify as a reference stream.

200. The Northwest Fork of the Loxahatchee (the "Northwest Fork") appears to be in pretty good shape" to Dr. Boyer, except that "there is development upstream." Id. Under the New SCI, the Northwest Fork is shown to be "in very poor shape." (Tr. 104) This is because its "macroinvertebrate community isn't in very good shape." Id.

201. The North Fork of the Loxahatchee (the "North Fork") is in a state park and does not have development upstream but under the New SCI "it hasn't done very well" Id.

202. Dr. Boyer's opinion, at least so far as three of the streams (Fish Slough, Cypress Slough, and Fort Drum Creek) are concerned, is supported by evidence of record that pre-dated the Proposed Rule and this challenge.

203. A report dated May 31, 1996, that relates the development of the SCI, described as "a primary indicator of ecosystem health and to identify impairment with respect to the reference (or natural) condition" (Petitioners' Ex. 29, Executive Summary, p. 2) was admitted into evidence as Petitioners' Ex. 29.

204. The report in Chapter 3 entitled the "Selection and Geographic Distribution of Reference Sites," id., p. 5, states:

Reference stream sites have been sampled by FDEP since summer 1992, using standardized biological methods and habitat evaluations at each site. Reference sites were chosen to represent the least impaired streams throughout Florida.

* * *

FDEP sample reference streams in all nine subcoregions from 1992 to 1994.

* * *

For inclusion in the reference stream database, sites had to be wadeable (first-to-third order), meet reference criteria of minimal disturbance, and have a drainage within the subcoregion.

Id. at 5-7. (Emphasis added) Twelve reference sites are listed from Subcoregion 75d, the subcoregion in which the Nine

Northern Tributaries and the Five Reference Streams are located. Of the twelve, only two are any of the Five Reference Streams: the NW Fork the North Fork of the Loxahatchee River. See id. at 7-9.

205. Dr. Boyer's opinion is also supported, at least in part, by the updated SCI, re-calibrated in 2004 (the "New SCI") referred to in Petitioners' Ex. 46B as the "New SCI." (The 1996 SCI is referred to as the "Old SCI.")

206. Cypress Slough, in a modified state hydrology-wise, rated only "Fair" under the New SCI whereas it had an excellent rating under the Old SCI.

207. Fort Drum Creek, in contrast to its scores in the "excellent" range under the Old SCI, had five "fair" scores, ranging from 53.0 to 59.9 under the New RSCI and only one "good" "score" under the New SCI.

208. Under the Old SCI, the Northwest Fork of the Loxahatchee received 14 "excellent" scores and 3 "good" scores. Under the New SCI, it received 2 "very poor" scores, 8 "poor scores" and 7 "fair" scores. It received no "good" scores based on 17 ratings. See Petitioners' Ex. 46B.

209. A similar result, although not as dramatic as in the case of the Northwest Fork, applied to the North Fork of the Loxahatchee. Whereas it had received 8 scores of "excellent," 5 scores of "good" and only one of "poor" under the Old SCI, under

the New SCI, it had 7 scores of "poor," 6 scores of "fair" and only one of "good." See id.

210. Mr. Frydenborg did not conduct stream habitat assessments on the two forks of the Loxahatchee that served as reference streams because "[w]e were running out of time that day," (tr. 266) and because he felt he had sufficient data otherwise. The assertion is odd when one considers that Mr. Frydenborg and Ms. Espy conducted habitat assessments of all of the Nine Northern Tributaries, declared impaired by the Department. Dispatched to conduct habitat assessments in the wake of the challenge to the Proposed Rule, it seems that Mr. Frydenborg would have chosen to spend time on the Five Reference Streams rather than the Nine Northern Tributaries if time were an issue.

Elaboration on Frydenborg Opinion

211. It is Mr. Frydenborg's opinion that the Proposed TMDL is a valid number from the perspective of protection of the resources for a number of reasons. In his view, there "might be a potential issue with phosphorus when it gets above . . . 250 micrograms per liter" (Tr. 269) Nonetheless, he has observed levels of above 250 micrograms where no imbalance of flora and fauna occurred because of flow characteristics and prevention of light penetration by shading associated with

canopy or dark water caused by tannins leaching from leaf litter.

212. One such example is Flat Creek next to Torreya State Park. It always receives an "excellent" on the SCI and its phosphorus levels average 244.

213. Another reason Mr. Frydenborg believes the Proposed TMDL to be protective is that "nutrients are so complicated. We don't have a real clear cause-and-effect relationship between . . . nutrient concentration in a stream . . . [and] imbalance."
(Tr. 269)

214. Mr. Frydenborg summed up his thoughts on the contribution that reducing phosphorus in the Nine Northern Tributaries would make:

Well, I guess the better way to think of it would be is, if you were somehow magically able to reduce phosphorus in those areas to make it an exceedingly low amount . . . it's my professional opinion, due to the other modifications in those sites, with the exception of Mosquito Creek, that you would not see any improvements in biological health because they're already significantly stressed for these other factors. I think that's the best way to look at it . . . I'm not saying we shouldn't try our best to reduce the phosphorus in those systems . . . but . . . if we're able to reduce that phosphorus, I wouldn't expect to see an actual beneficial environmental effect.

(Tr. 281-282) Mr. Frydenborg stressed that the Proposed TMDL is adequate because "it's similar to the reference conditions in that particular area." (Tr. 282), (emphasis added).

215. Mr. Frydenborg also responded on behalf of the Department to Dr. Boyer's assertion that the 75th Percentile Approach required the use of reference streams identified in the 96 Stream Condition Index located in Sub-ecoregion 75D: the eastern flatwoods region that is on the eastern side of the state. This sub-ecoregion was described as "up in Orlando all the way south of Jacksonville, south of Clay County anyway, ... but only on the eastern side of the state." (Tr. 291)

216. The Nine Northern Tributaries are located in the "very southern extent" of Sub-ecoregion 75D. South of them is another sub-region associated with the Everglades where there is "a paucity of streams . . . maybe even no natural streams . . . south of Lake Okeechobee for the original Stream Condition Index." (Tr. 292)

217. "Non-metric multidimensional scaling" (tr. 290), a statistical tool, was used to analyze how predictive the sub-regions were in showing the differences in populations of the aquatic communities. Because of the lack of differences among certain sub-ecoregions, the analysis led to an aggregation of them with the result that the State could be divided into three bio-regions: "the Panhandle, the peninsula, and the northeast."

Id. This analysis shows that there is no basis for using a particular sub-ecoregion. With respect to the water basin in which the Nine Northern Tributaries are located, "leav[ing] that immediate geographic basin for TMDL purposes" (id.) would lead to an evaluation of peninsular sites, that is, an evaluation of one of the three bioregions into which the State divides rather than an evaluation of any one sub-ecoregion. An evaluation of peninsular sites, is similar what the Department did in developing the TMDL for TP in the Nine Northern Tributaries. It took "the sites that are unimpaired in the new [re-calibrated] SCI and looked at the phosphorus levels there." Id.

218. There are differences between the northern end of Sub-ecoregion 75 and the southern end climatologically. The main reason to reject limiting candidate streams for use in the Reference Stream Approach to those in Sub-ecoregion 75, however, is that it is more appropriate to use an aggregate of "the entire sub-region," that is, the Peninsula Bio-region. The bio-region includes the southern end of Sub-ecoregion 75 but does not include the northern end of Sub-ecoregion 75.

219. The phosphorus levels of the peninsula, according to Mr. Frydenborg, have a 75th percentile of 243 ppb.

220. Using Peninsular Florida streams to calculate a 75th percentile of TP contrasted dramatically with Dr. Boyer's approach. According to Dr. Boyer, the three approaches she

recommended produced concentration levels of around 57 ppb ("historical" levels), 40 ppb (the 25th percentile of all reference streams in ecoregion XII) and 73.5 ppb (the 75th percentile of reference streams she chose in subecoregion 75d.¹²) Dr. Boyer would be comfortable with a "73.5 part" TMDL for TP in the Nine Northern Tributaries because of "the data behind it." (Tr. 126)

221. Between Mr. Frydenborg's defense of the Proposed TMDL and Dr. Boyer's defense of 73.5 ppb using reference streams, there is no question that Dr. Boyer's is superior. Her use of reference streams in the same ecoregion as the Nine Northern Tributaries makes sense because those reference streams were minimally impacted. Mr. Frydenborg's attack on Dr. Boyer's choice of reference streams for the 75th Percentile Method shows a fundamental misunderstanding of the concept of reference streams. Mr. Frydenborg and the Department have chosen to use as reference streams, streams that are not minimally impacted but rather that are the least impacted in Peninsular Florida, an area heavily impacted when it comes to excess phosphorus.

222. The Guidance Manual demonstrates that the Department either does not understand the type of streams to be used in the 75th Percentile Method and the 25th Percentile Methods or, for some reason, has confused them.

223. The 75th Percentile Method uses reference streams, that is, streams that are minimally impacted or approximately ideal in natural biology. In contrast, in its employment of the 75th Percentile Method, the Department chose streams that were least impacted in a heavily impacted region. The 25th Percentile Method, on the other hand, uses streams that are both in reference and non-reference condition. Data from degraded streams may be used to calculate a proposed value under the latter method. The more degraded the streams and the greater the number of degraded streams used to produce data for the 25th Percentile Method, the lower that actual percentile used to propose a TMDL. If the data is from a sufficient number of degraded streams then the fifth percentile should be used to produce a TP value. In contrast, Mr. Frydenborg rejected the 25th Percentile Method because it might have used data from only excellent streams - streams the Department should have used in calculating the 75th percentile to propose a TMDL for TP in the Nine Northern Tributaries. In point of fact, the 25th Percentile Method, not designed to be limited to streams of excellent condition, would almost assuredly not use data confined to production from streams of excellent condition.

The Lake Issue

224. In enacting the Protection Statute, the Legislature directed that the Protection Program should be implemented

through a variety of programs, that is, unlike the TMDL Act, the Protection Program should not be solely regulatory:

This program shall be watershed-based, shall provide for consideration of all potential phosphorus sources, and shall include research and monitoring, development and implementation of best management practices, refinement of existing regulations, and structural and nonstructural projects, including public works.

§ 373.4595(1)(j), Fla. Stat.

225. The intent of the Legislature that the approach of the Protection Program be a multi-faceted one is reiterated specifically with regard to phosphorus. Under the Protection Statute's subsection (3), entitled "LAKE OKEECHOBEE PROTECTION PROGRAM," which details the specifications for the implementation of the Protection Program, there is a specification with regard to phosphorus reduction:

The Lake Okeechobee Watershed Phosphorus Control Program is designed to be a multifaceted approach to reducing phosphorus loads by improving the management of phosphorus sources within the Lake Okeechobee watershed through continued implementation of existing regulations and best management practices, development and implementation of improved best management practices, improvement and restoration of the hydrologic function of natural and managed systems, and utilization of alternative technologies for nutrient reduction. The coordinating agencies shall facilitate the application of federal programs that offer opportunities for water quality treatment, including preservation,

restoration, or creation of wetlands on agricultural lands.

§ 373.4595(3)(c), Fla. Stat.

226. The Legislature made its intent clear that phosphorus reduction in the Lake is dependent on federal projects as well as the TMDL Program:

It is the intent of the Legislature that the Lake Okeechobee Protection Program be developed and implemented in coordination with and, to the greatest extent practicable, through the implementation of the Restudy project components and other federal programs in order to maximize opportunities for the most efficient and timely expenditures of public funds.

§ 373.4595(1)(k), Fla. Stat. (emphasis added) These federal efforts include projects conducted by the United States Army Corps of Engineers.

227. The Department's understanding from its reading of the Protection Statute is that it rely as much as possible on projects conducted by the United States Army Corp of Engineers in its efforts to reduce the phosphorus load in and to Lake Okeechobee. The Department's plan to reduce phosphorus loads, therefore, calls for reductions in phosphorus loading through TMDLs placed on the Nine Northern Tributaries and other tributaries to the Lake as well as through federal projects.

Lake Okeechobee TMDL

228. As a result of the 1999 Consent Decree between USEPA and Earthjustice, the Department established a TMDL for Lake Okeechobee in August, 2001. The TMDL set an "in-lake" target restoration goal of 40 ppb total phosphorus for Lake Okeechobee based upon an examination of "pre-impact" phosphorus concentration data. The data was from studies that used "chlorophyll a" as an indicator of algal biomass which in turn acted as a surrogate for excessive nutrient concentration, and studies that examined the algal response to in-lake phosphorus concentrations.

229. Upon comparing the results of these analyses, the Department determined that the total annual phosphorus load that would meet the 40 ppb restoration goal was 140 metric tons (the "Lake Okeechobee TMDL"). The Lake Okeechobee TMDL includes 35 metric tons from atmospheric deposition. Excluding the 35 metric tons of atmospheric deposition load of total phosphorus leaves 105 metric tons as the maximum load that is allowed from surface water inflows into the lake.

230. The September 16, 2003, report of the Department admitted into evidence as Petitioners' Exhibit 2 recognizes that the Proposed TMDL cannot be inconsistent with the Lake Okeechobee TMDL. It also claims that the Proposed TMDL is consistent with the Lake Okeechobee TMDL because the Proposed

TMDL will only allow 19.05 metric tons of TP to enter the Lake, well below the 105 metric tons allowed from surface water inflows under the Lake Okeechobee TMDL :

This TMDL is specifically designed to protect the designated uses of the water bodies within the S-191 watershed [the watershed in which the Nine Northern Tributaries are located]. However, the load from these water bodies, as tributaries to Lake Okeechobee, must also be consistent with the TP TMDL for Lake Okeechobee in order to be adequately protective of the designated uses of the lake.

Based on the Lake Okeechobee TMDL documentation, the total load for water discharged to the lake from all tributaries must not exceed 105 tonnes [metric tons] on an annual average basis. To determine whether the concentration-based TMDL for the tributaries is consistent with the lake TMDL, the Department calculated the load from the tributaries using a concentration of 0.159 mg/L and an average discharge of 97,154 acre feet (the average flow for 1995-2000). Using these numbers, the allowable load is 19.05 tonnes, which well below the allowable load to the lake.

Petitioners' Ex. 2, pp. 6-7

231. In keeping with the legislative intent and the observations of the Department, the Proposed Rule requires that the Proposed TMDL be consistent with the TMDL for TP for Lake Okeechobee: "As tributaries to Lake Okeechobee, the load from these other waterbodies in the Lake Okeechobee Basin must also be consistent with the TP TMDL for Lake Okeechobee, above." Proposed Rule, Section (2)(b).

232. Under the TMDL Act, allocations of load may be between sources or basins so that the burden of reduction may fall on one source or basin more than on another:

The allocations may establish the maximum amount of the water pollutant from a given source or category of sources that may be discharged or released into the water body or water body segment in combination with other discharges or releases. Allocations may also be made to individual basins and sources or as a whole to all basins and sources or categories of sources of inflow to the water body or water body segments. Allocations shall be designed to attain water quality standards

§ 403.067(6)(b), Fla. Stat. (emphasis added).

233. In an August 2001 report entitled "Total Maximum Daily Load for Total Phosphorus Lake Okeechobee, Florida," prepared by the Department and submitted to the USEPA, it was reported that a restoration target of 40 ppb TP for the lake was suggested by certain studies. After discussion of the "different analysis methods" that "all encompass the 40 ppb concentration target," the report states that "if 40 ppb is met at the eight pelagic¹³ stations (which represent the mid-lake) we can expect total phosphorus concentrations of below 40 ppb in the near-shore during certain years." Petitioners' Ex. 13, p. 32 of 53. Petitioners interpret this to be the setting by the Department of a restoration target of "40 ppb in-lake." Petitioners' Proposed Recommended Order, p. 50.

234. The Department conceded during hearing that "you do, in fact, need to achieve an average of 40 ppb [inflow concentration into the lake]." (Testimony of Mr. Brooks, tr. 358). The Department argued vigorously, however, that the Proposed TMDL at 159 ppb does not necessarily violate a target restoration for the lake of 40 ppb or an average inflow concentration of 40 ppb. This is because future treatment works, in the words of Mr. Brooks, "are going to, in fact, affect both concentration and volume delivered to the lake.

And depending upon where those go, those are going to have a very significant effect in terms of how you balance to achieve that overall 40."

Id.

235. The issue is directly addressed by the Protection Statute. It requires the water management district in cooperation with other coordinating agencies and the United States Army Corps of Engineers to develop an implementation plan for Phase II of the Lake Okeechobee Construction Plan by January 1, 2004. See §.373.4595(3)(b)2., Fla. Stat. The implementation plan is required to:

[i]dentify Lake Okeechobee Construction Project facilities to be constructed to achieve a design objective of 40 parts per billion (ppb) for phosphorus measured as a long-term flow weighted average concentration, unless an allocation has been

established pursuant to s. 403.067 for the
Lake Okeechobee total maximum daily load.

§ 373.4595(3)(b)2.a., Fla. Stat. (emphasis added).

236. Petitioners present evidence that the actual loading from the Nine Northern Tributaries would be 33.44 metric tons of TP per year because the Department's calculation failed to account for discharges from tributaries in certain sub-basins. Whether the annual load from the Nine Northern Tributaries is the higher number posited by Petitioners or the lower number of approximately 19 metric tons claimed by the Department, the load is substantially below the 105 allowed by the Existing Rule.

237. Petitioners also claim that the Proposed TMDL, 159 ppb, almost four times the 40 ppb limit for average lake inflows, is invalid because it could not lawfully become effective until the Department has met its legal obligation to offset the Nine Northern Tributaries load with reductions from other sources so that the average load expressed as a concentration level meets the target of 40 ppb.

CONCLUSIONS OF LAW

Jurisdiction

238. The Division of Administrative Hearings has jurisdiction over the parties to and the subject matter of this proceeding. § 120.56, Fla. Stat.

Standing

239. Petitioners have standing to initiate this proceeding.

Burdens of Going Forward and of Proof

240. Petitioners have the burden of going forward under a petition that states "with particularity the objections to the proposed rule and the reasons that the proposed rule is an invalid exercise of delegated legislative authority."

§ 120.56(2)(a), Fla. Stat. Petitioners met the burden of going forward through the testimony of Dr. Boyer and the documentary evidence Petitioners introduced into evidence in the opening phase of the hearing.

241. Once Petitioners met the burden of going forward, the Department "then has the burden to prove by a preponderance of the evidence that the proposed rule is not an invalid exercise of delegated legislative authority as to the objections raised." See Southwest Fla. Water Management District v. Charlotte County, 774 So. 2d 903, 908, (Fla. 2d DCA 2001)("[n]othing in section 120.56(2) requires the agency to carry the burden of presenting evidence to disprove an objection alleged in a petition challenging a proposed rule. Instead a party challenging a proposed rule has the burden of establishing a factual basis for the objections to the rule, and then the agency has the ultimate burden of persuasion to show that the

proposed rule is a valid exercise of delegated legislative authority."), citing St. Johns River Water Management District v. Consolidated Tomoka, 717 So. 2d 72, 76 (Fla. 1st DCA 1998).

242. A rule may not be declared invalid on any other ground without impermissibly extending the authority of the administrative law judge. See Schiffman v Department of Professional Regulation, Board of Pharmacy, 581 So. 2d 1375, 1379 (Fla. 1st DCA 1991)("An administrative agency has only the authority that the legislature has conferred it by statute.") Thus, a proposed rule may not be invalidated simply because the administrative law judge believes it is not the wisest or best choice. See Board of Trustees of Internal Improvement Fund v. Levy, 656 So. 2d 1359, 1364 (Fla. 1st DCA 1995)("The issue before the hearing officer in this [rule challenge] case was not whether the Trustees made the best choice . . . or whether their choice is one that the appellee finds desirable"); Dravo Basic Materials Co., Inc. v. State, Department of Transportation, 602 So. 2d 632, 634 (Fla. 2d DCA 1992) ("It is not our task, however, to write the best rule for DOT. That was not the task of the hearing officer."); cf. Rollins v. Pizzarelli, 761 So. 2d 294, 299 (Fla. 2000)("An interpretation of a statutory term cannot be based on this Court's own view of the best policy.")

243. In 1996, the Legislature made comprehensive changes to the APA. See Ch. 96-159, Laws of Fla. Among others, it amended Section 120.56(2) to shift the burden of proof in challenges to proposed rules from the petitioner to the agency. Those changes, however, did not negate the previously existing degree of deference to be accorded agencies in rulemaking. For example, in Board of Podiatric Medicine v. Florida Medical Association 779 So. 2d 658 (Fla. 1st DCA 2001), the court upheld an agency's definition as a "proper exercise of the Board's delegated legislative authority, [i]n light of the broad discretion and deference which is accorded an agency in the interpretation of a statute which it administers, and because such an interpretation should be upheld when it is within the range of permissible interpretations[" Id. at 660. (Citations omitted) (Emphasis added).

244. Similarly, where the statute is complex and contains technical or scientific terms not susceptible to precise definition, the administrative law judge may not reject the reasonable interpretation of those terms by the agency responsible for implementing the statute, for to do so would defeat the Legislature's intent to leave to the sound discretion of the agency the responsibility of clarifying and fleshing out the terms. See Wallace Corp. v. City of Miami Beach, 793 So. 2d 1134, 1140 (Fla. 1st DCA 2001).

245. When reviewing scientific determinations made by an agency within its area of special expertise "at the frontiers of science," the administrative law judge should be particularly deferential. See Island Harbor Beach Club, Ltd. v. Department of Natural Resources, 495 So. 2d 209, 223 (Fla. 1st DCA 1986) ("The complexity of the scientific and technical issues in this case and the consequent deference necessarily given to DNR's expertise vividly illustrate the limited role an appellate court can play in resolving disputes arising out of an administrative agency's exercise of delegated legislative discretion in respect to technical matters requiring substantial expertise and 'making prediction . . . at the frontiers of science.' . . . The legislature's use of scientific terms and words of art in the organic statute, without setting forth more precise definitions, has compelled us to accord considerable--if not extraordinary--deference to DNR's interpretation of those terms and its selection of scientific techniques and methodologies to be employed in carrying out its statutory responsibilities.") (Citations omitted.)

Objections Raised

246. As stated in the findings of fact in this Order, Petitioners placed on the record two over-arching objections to the Proposed Rule.

247. The first is that the establishment of a TMDL for TP in the Nine Northern Tributaries at 0.159 mg/L., is invalid because the process by which the TMDL was derived was arbitrary and capricious as defined by Chapter 120: "A rule is arbitrary if it is not supported by logic or the necessary facts; a rule is capricious if it is adopted without thought or reason or is irrational." § 120.52(8)(e), Fla. Stat.

248. The second is that the Proposed Rule will allow loading of total phosphorus into Lake Okeechobee prior to the allocation required among sources in the Lake Okeechobee Basin. The loading, moreover, so the argument goes, is inconsistent with the Lake's TP TMDL and so the Proposed Rule is arbitrary and capricious. Furthermore, Petitioners contend, the loading of TP to the Lake allowed by the Proposed Rule contravenes the requirements of the Protection Statute.

249. With regard to the first objection, the Department has not sustained its burden of proof.

250. With regard to the second objection, the Department has carried its burden of proof.

0.159 mg/L

251. The Proposed TMDL for TP in the Nine Northern Tributaries, that is, 0.159 mg/L., is arbitrary and capricious.

252. The evidence placed on the record by Petitioners' calls into question at every turn the process that the Department followed in deriving the Proposed TMDL.

253. When Ms. Espy selected the Four Reference Streams for USEPA she did not know the purpose of their selection. After the calculations had been run by the USEPA and a Notice of Rulemaking for the Proposed TMDL had been published, the USEPA was still uncertain as to whether the data it had used had come from legitimate reference streams.

254. Fish Slough, the stream in the Five Reference Streams not selected by Ms. Espy is unquestionably not a reference stream today. The Department did not produce evidence that Fish Slough was a reference stream prior to 1996 aside from water management district personnel hearsay and the testimony that the slough's score on the LDI was 2.2. But that score is outside the range of "good," zero to two, under the LDI.

255. Not only did the water management district personnel upon whose statements the Department relied not testify at hearing, no one testified at hearing who selected the reference streams and the data that related to them or conducted the calculations that were undertaken to produce the Proposed TMDL.

256. Mr. Mandrup-Poulsen, the person in charge at the Department of the TMDL effort, testified at the hearing, but he did not participate in the selection of the streams or the

calculation of their data that led to the Proposed TMDL. Furthermore, he claimed as support for the Proposed TMDL, the USEPA Guidance Manual.

257. The Guidance Manual is plainly not support for the method use to derive the Proposed TMDL. It clearly and convincingly demonstrates that the method used to derive the Proposed TMDL is arbitrary and capricious. The Proposed TMDL was derived by calculations using only the 75th Percentile Method. The Guidance Manual's complete methodology employing frequency distribution data requires that the 25th Percentile Method be followed as well and then, after comparison of the results calculated by the two percentile methods, that the lower, more protective, value be chosen.

258. It is a point in the Department's favor that the calculations that led to the Proposed TMDL were performed by USEPA. One would think USEPA would have followed its own carefully prescribed methodology for using frequency distribution data or would have had a logical basis for any departure. It may be inferred, however, that USEPA, with the Consent Decree deadline looming, was in as much a rush, in the wake of the failures of the water quality modeling and the Neural Network Approach, to produce a TMDL for TP for the Nine Northern Tributaries, as was the Department.

259. The Department's explanation for rejecting the 25th Percentile Method, at best, was weak, and otherwise compounded its problems in defending against that charge that the process was arbitrary and capricious. The Department's explanation indicated that the Department either did not understand the Reference Stream Approach or, inexplicably, had confused reference streams with the general population of streams. Contrary to the Department's basis for the rejection of the 25th Percentile Method, that the employment of such a method by use data only from streams of excellent biological quality, it is the 75th Percentile Method that should use such streams. The 25th Percentile Method as described by the Guidance Manual would likely include degraded streams, precisely the opposite from what the Department posited in its explanation for why it believed the USEPA had done a disservice to the states by including the method in its methodology.

260. Of the reference streams chosen by the Department, while the evidence was mixed overall, there was no competent evidence to support the use of data from Fish Slough prior to 1995. Furthermore, it was not proven that Cypress Slough and Fort Drum Creek are reference streams. Even the reference status of the NW Fork and the reference status of the North Fork were called into question.

261. Finally, the value selected for the Proposed TMDL does not square with the historical data. Nor, at nearly four times the value, does it square with the 40 ppb produced by the 25th Percentile Method. The Department's rejection of the historical data was not without reason but the tremendous variance between the proposed TMDL and the value produced by the 25th Percentile Method (a value supported by the historical data) indicates that the TMDL derivation process had gone awry at some point. Had the Department paused to look for a problem in its process, it is likely that it would have concluded that the streams used as reference streams, while least-impacted for the area, were not minimally impacted or streams with true reference conditions.

262. Instead of the examination called for by scientific method, the Department conducted a flawed process. Its after-the-fact attempts to prop up the process were not successful, nor could they have been; the evidence demonstrates that the process was flawed from the beginning with the selection of the reference streams through the moment at which the numeric value for TP in the Nine Northern Tributaries was derived.

The Lake Issue

263. It is clear from the Protection Statute that regulation of total maximum daily loads of phosphorus is an integral component of a comprehensive protection effort for Lake

Okeechobee and downstream receiving waters, including the Everglades. The effort is intended to be watershed-based, provide consideration of all potential phosphorus sources, and include research and monitoring.

264. As the Protection Statute stresses, water quality standards in the Lake and downstream receiving waters, are to be achieved

through a phased, comprehensive, and innovative protection program to reduce both internal and external phosphorus loads to Lake Okeechobee through immediate actions to archive the phosphorus load reductions set forth in Technical Publication 81-2 and long-term solutions based upon the total maximum daily loads established in accordance with s. 403.067 [the TMDL Act].

§ 373.4595(1)(j), Fla. Stat.

265. The TMDL Act requires the allocation of loads among point and non-point sources. See § 403.067(6)(b), Fla. Stat. The Proposed Amendment does so. It allocates all TP load to non-point sources since there are no permitted point sources in the watersheds of the Nine Northern Tributaries.

266. In contrast, the Act allows allocations among waterbody sources within a water basin, but it does not require allocations among such waterbody sources. Nor does the Act require that any such allocation be made prior to the setting of a TMDL for any pollutant in any waterbody source or set of sources. See id.

267. Whether the load to the Lake from Nine Northern Tributaries contributes 19 metric tons or 33 metric tons, the load will not, in and of itself, cause the Lake's load of 140 metric tons to be exceeded.

268. The Department allowance of the load from the Nine Northern Tributaries may be predicated on the hope that it will obtain reduction in phosphorus loads at other inflows or through other means that will be necessitated by its allowance of such a large load from the Nine Northern Tributaries. But regardless of the hope and whatever realistic difficulties it may encounter, at this moment, the Proposed Rule does not contravene the Protection Statute because the allowance will not cause the Lake's load to exceed 140 metric tons.

269. Petitioners posit that the statute requires that the allocation to all sources precede the setting of a concentration level that will produce a certain load at any one source or set of sources. To the contrary, the Protection Statute merely allows for allocation of loads that may be different at different sources over time. It does not require that the allocation be complete before any one source is assigned a TMDL.

270. It may be that the Proposed TMDL will make it very difficult to achieve the appropriate load to the Lake and it may require that the loads from other sources within the Lake Okeechobee Basin be extremely low. It was not established by

this record, however, that loads at other sources would be impossible to achieve or that it would be unrealistic to achieve them in the wake of the Proposed TMDL for the Nine Northern Tributaries.

271. There is nothing arbitrary or capricious or that contravenes the Protection Statute about setting a TMDL for TP for the Nine Northern Tributaries that will result in TP load to Lake Okeechobee in a range from 19 to 33 metric tons.

272. The Department proved by a preponderance of the evidence in this proceeding that the loading into the Lake allowed by the Proposed TMDL is neither arbitrary or capricious nor in contravention of the Protection Statute.

SUMMARY

The Department met its burden of proof with regard to the Lake Issue. It did not do so, however, with regard to the derivation of the Proposed TMDL. The process used to derive the Proposed TMDL was flawed; the Proposed Rule is arbitrary and, therefore, an invalid exercise of delegated legislative authority.

ORDER

The amendment to Florida Administrative Code Rule 62-304.700 proposed by the Department of Environmental Protection in the Notice of Proposed Rulemaking published September 5, 2003, is determined to be an invalid exercise of delegated legislative authority.

DONE AND ORDERED this 22nd day of March, 2005, in Tallahassee, Leon County, Florida.



DAVID M. MALONEY
Administrative Law Judge
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Filed with the Clerk of the
Division of Administrative Hearings
this 22nd day of March, 2005.

ENDNOTES

1/ § 403.067, Fla. Stat.

2/ § 373.4575, Fla. Stat.

3/ South Florida Water Management District's Technical
Publication 81-2.

4/ Petitioners' Ex. 85 shows that the "Average Annual P Load (1991-2000)(Mtons)" was 433.09. This was interpreted by Dr. Boyer as "the total average annual P load over the period 1991 to 2000 [to have been] about 433 metric tons." (Tr. 77)

5/ Last amended by Ch. 2003-265, § 10, Laws of Fla., see OR-1, tab 1.

6/ § 403.067(6)(a)2., Fla. Stat.

7/ On this point, there is no disagreement between the parties. See Respondent's Proposed Final Order, para. 16, at p. 9: "Should the proposed rules be found valid, there will be continuing adverse impacts to the waters of the Nine Northern Tributaries and Lake Okeechobee which will substantially affect a substantial number of FWF's members in their ability to observe, study and enjoy the waters and wildlife of the Lake Okeechobee basin."

8/ See Respondent's Proposed Final Order, para. 19, pp. 9-10.

9/ "The analysis may include mathematical water quality modeling using approved procedures and methods."
§ 403.067(6)(a)1., Fla. Stat.

10/ This anomaly was due to the fact that turbulent flow during rain events causes increases in dissolved oxygen. These same rain events would add phosphorus to the Nine Northern Tributaries because they would cause non-point sources of phosphorus, such as cattle fecal material, to run into the streams with storm-water runoff. Following the turbulent flow, "the hydrology of the system retreats so that you start getting . . . stagnant conditions" (Tr. 259) At such a time, phosphorus levels, phosphorus having been assimilated by aquatic plants and algae, will drop and so will dissolved oxygen levels with oxygen not having been added by the turbulence. The hydrologic modification by humans, ditching, diking and control structures, create increased turbulence.

11/ (Tr. 240)

12/ The Tomoka River, Little Orange Creek, Jim Creek, the Big Econlockahatchee, the Oklawaha and Orange Creek.

13/ Over the open surface area of the lake as distinguished from the shoreline. See Webster's New World Dictionary, Second College Edition, p. 1049, in which "pelagic" is defined as "of the ocean surface or the open sea, esp. as distinguished from coastal waters."

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NOTICE OF RIGHT TO JUDICIAL REVIEW

A party who is adversely affected by this Final Order is entitled to judicial review pursuant to Section 120.68, Florida Statutes. Review proceedings are governed by the Florida Rules of Appellate Procedure. Such proceedings are commenced by filing the original notice of appeal with the Clerk of the Division of Administrative Hearings and a copy, accompanied by filing fees prescribed by law, with the District Court of Appeal, First District, or with the District Court of Appeal in the Appellate District where the party resides. The notice of appeal must be filed within 30 days of rendition of the order to be reviewed.