APPLICANT'S HANDBOOK:

AGRICULTURAL SURFACE WATER MANAGEMENT SYSTEMS
CHAPTER 40C-44, F.A.C.

Dec. 27, 2010

ST. JOHNS RIVER WATER MANAGEMENT DISTRICT
4049 Reid Street
Palatka, FL 32177-2529
(386) 329-4500

TABLE OF CONTENTS

PART I

POLICY AND PROCEDURES

1.0 Introduction

1.1 Policy

The District's policy is to assist those affected by the Agricultural Surface Water Management System rule (chapter 40C-44, F.A.C.) to understand the program and complete the applications.

1.2 Purpose

The purpose of this handbook is to provide applicants, potential applicants, and others who are interested, with information and guidance regarding the Agricultural Surface Water Management System permitting program. The handbook is a summary of procedures. The final determination of appropriate procedures to be followed will be made by reference to chapters 120 and 373, F.S., and chapters 40C-1, 40C-4, 40C-40 and 40C-44., F.A.C. Specific rule citations are given in the handbook, when appropriate, for further reference.

1.3 Organization of Handbook

This handbook is divided into four parts which provide information regarding the programs, policy and procedures (Part I), criteria used in permit evaluation (Part II), methodologies which have been found to be useful in designing systems to meet the specified criteria (Part III), and supplemental materials such as relevant statutes and rules (Part IV).

If an applicant or potential applicant has any questions about these procedures or wishes to have District staff assistance in interpreting them or in completing an application, he is encouraged to contact:

Department of Resource Management
St. Johns River Water Management District
975 Keller Road
Altamonte Springs, FL 32714
(407) 659-4800

or

Department of Resource Management
St. Johns River Water Management District
4049 Reid Street
Palatka, FL 32177-2529
(386) 329-4500

Unless otherwise specified, the term "District" in this handbook refers to the St. Johns River Water Management District. The term “DEP” refers to the Department of Environmental Protection or to its predecessor the Department of Environmental Regulation. Florida Statutes are abbreviated as "F.S." Rules under the Florida Administrative Code are abbreviated as " F.A.C."

1.4 Applicable Statutes and Rules

The Agricultural Surface Water Management System permit application process is governed by chapters 373 and 120, F.S., and chapters 40C-1, 40C-4, 40C-40, and 40C-44, F.A.C., and is affected by chapters 62-1, 62-3, 62-302, 62-4, and 62-40, F.A.C. Copies of these statutes (abridged) and rules are included in this handbook and should be consulted for a comprehensive understanding of the application process.

1.5 General Description of Rule

The rule requires either a standard general or individual environmental resource agricultural system permit for existing systems with pumped discharges, if the capacity, either individually or cumulatively, is 10,000 GPM or greater. These pumps typically drain large citrus groves, improved pasture, or muck farms, which produce sod or vegetables on organic soils. The pumps may be significant sources of pollution, due to their erosive velocities and ability to drain water faster and to a greater depth than gravity drained agricultural operations.

The rule also authorizes the District to require an individual permit for existing pumped or gravity drained agricultural operations, on a case by case basis, if the discharge causes or contributes to a violation of state water quality standards. New agricultural stormwater management systems below the chapter 40C-4, F.A.C., permit thresholds, which were formerly regulated under chapter 40C-42, F.A.C., may qualify for a standard general permit pursuant to this rule.

The rule establishes performance standards for agricultural discharges which are required to obtain a permit. To prevent adverse impacts to the quality of

the receiving water body, the discharge cannot cause or contribute to a violation of state water quality standards, must not exceed 20 mg/l BOD or TSS (domestic waste limits formerly applied to industrial waste under the delegated DEP program), and must comply with pollutant limitations established pursuant to a SWIM plan or chapter 62-40, F.A.C.

The rule contains water quality practices, which are presumed to provide reasonable assurance that the performance standards will be met when implemented as described in the rule. The water quality practices are more appropriate for agriculture than those which are currently used for urban projects and frequently applied to agriculture. The water quality practices include reduction of discharge volume by improved water table control and on-site recycling, implementation of a comprehensive Conservation Plan including nutrient and pesticide management plans, and installation of a treatment system using wet detention reservoirs or other equivalent alternatives

Under this rule, permits for operation and maintenance are permanent. However, the rule allows modification or revocation of the permit if the permittee does not comply with the permit requirements or if monitoring indicates that the system does not comply with the performance standards.

Agricultural operations which are required to obtain a chapter 40C-4 permit, must comply with the performance standards and water quality practices contained in this rule, in order to meet the District's water quality criteria.

1.6 Explanation of Thresholds, Exemptions, Standard General or Individual Permits

Permits are required for activities which exceed certain "thresholds" (see section 3.2). Activities below these thresholds are considered to have a minor impact on water resources and are not regulated.

Although certain activities may exceed a threshold, the District may elect to "exempt" them in the rule from a requirement to obtain a permit, usually because the activity is regulated by another agency or permit process (see section 3.4.2). Other exemptions are established by the Florida Legislature in the statute which created the water management districts (see section 3.4.1).

A "standard general permit" is available for smaller or typically low-polluting agricultural activities which follow specific requirements.

An "individual permit" is applicable to agricultural operations which have a higher potential to cause pollution. An individual permit is more complicated and flexible. Agricultural surface water management systems which are

required to obtain a permit, and do not qualify for a standard general permit, are required to obtain an individual permit.

2.0 Definitions

The following definitions are used by the District to clarify its intent in implementing its permitting programs pursuant to part IV, chapter 373, F.S. Many of these definitions are derived directly from chapter 373, F.S., and are reproduced here for the convenience of applicants.

(a) Abandon or Abandonment - Cessation of use and maintenance activities or responsibility for a system, or part of a system. (subsection 40C-4.021(1), F.A.C.).

(b) Alter - Means to extend a dam or works beyond maintenance in its original condition, including changes which may increase or diminish the flow or storage of surface water which may affect the safety of such dam or works (subsection 373.403(7), F.S.).

(c) Appurtenant Work - Any artificial improvements to a dam which might affect the safety of such dam or, when employed, might affect the holding capacity of such dam or of the reservoir or impoundment created by such dam (subsection 373.403(2), F.S.).

(d) Aquatic Preserve - Those areas designated in part II, chapter 258, F.S. (subsection 40C-4.021(4), F.A.C.).

(e) Artificial Structure(s) - Any object constructed or installed by man which has a water management effect, including, but without limitation thereof, dikes, levees, embankments, ditches, canals, conduits, channels, culverts, and pipes.

(f) Closed System - Any reservoir or works located entirely within agricultural lands owned or controlled by the user and which requires water only for the filling, replenishing, and maintaining the water level thereof (subsection 373.403(6), F.S.).

(g) Conceptual Approval Permit - A surface water management permit issued by the District, approving the concept of a master plan for a surface water management system, which is binding upon the District and the permittee (subsection 40C-4.021(6), F.A.C.).

(h) Construction - Any activity including land clearing, earth-moving or the erection of structures which will result in the creation of a system (subsection 40C-4.021(7), F.A.C.).

(i) Coral - Living stony coral and soft coral (subsection 40C-400.021(3), F.A.C.).

(j) Creation - The establishment of new wetlands or surface waters by conversion of other land forms.

(k) Dam - Any artificial or natural barrier, with appurtenant works, raised to obstruct or impound, or which does obstruct or impound, any of the surface waters of the state (subsection 373.403(1), F.S.).

(l) Direct Hydrologic Connection - A surface water connection which occurs on an average of 30 or more consecutive days per year. In the absence of reliable hydrologic records, a continuum of wetlands maybe used to establish a direct hydrologic connection.

(m) Discharge - To allow or cause water to flow.

(n) Drainage basin- A subdivision of a watershed (subsection 373.403(9), F.S.).

(o) Dredging - Excavation, by any means, in surface waters or wetlands, as delineated in subsection 373.421(1), F.S. Excavation also means the excavation, or creation, of a water body which is, or is to be, connected to surface waters or wetlands, as delineated in subsection 373.421(1), F.S., directly or via an excavated water body or series of water bodies (subsection 373.403(13), F.S.).

(p) Ecological value - The value of functions performed by uplands, wetlands and other surface waters to the abundance, diversity, and habitats of fish, wildlife, and listed species. These functions include, but are not limited to, providing cover and refuge; breeding, nesting, denning, and nursery areas; corridors for wildlife movement; food chain support; and natural water storage, natural flow attenuation, and water quality improvement, which enhances fish, wildlife and listed species utilization. (subsection 373.403(18), F.S.)

(q) Endangered Species - Those animal species which are listed in section 39-27.003, F.A.C., and those plant species which are listed as endangered in 50 Code of Federal Regulations 17.12.

(r) Enhancement - Improving the ecological value of wetlands, other surface waters, or uplands that have been degraded in comparison to their historic condition.

(s) Estuary - A semi-enclosed, naturally existing coastal body of water which has a free connection with the open sea and within which seawater is measurably diluted with fresh water derived from riverine systems (subsection 373.403(15), F.S.).

(t) Existing nesting or denning - As used in subsection 12.2.7, this phrase refers to an upland site which is currently being used for nesting or denning, or is expected, based on reasonable scientific judgement, to be used for such purposes based on past nesting or denning at the site.

(u) Filling- The deposition, by any means, of materials in surface waters or wetlands, as delineated in subsection 373.421(1), F.S. (subsection 373.403(14), F.S.).

(v) Floodway - The permanent channel of a stream or other watercourse, plus any adjacent floodplain areas that must be kept free of any encroachment in order to discharge the 100 year flood without cumulatively increasing the water surface elevation more than a designated amount (not to exceed one foot except as otherwise established by the District or established by a Flood Insurance Rate Study conducted by the Federal Emergency Management Agency (FEMA)).

NOTE: The one foot increase cited above is used in the determination of the floodway itself and is not meant to allow subsequent increase in the 100 year flood elevation, once the limits of the floodway have been so set. That is, in order to determine that portion of the floodplain which will be designated as the floodway, one begins at the outer limits of the floodplain and assumes full development inward, toward the river or stream channel, on both sides of the flood hazard area, until the point is reached where development will cause the 100 year flood elevation to rise by one foot. The area remaining between this boundary and the channel is the floodway, and because any further development here would necessarily increase the 100 year flood elevation by more than one foot, no such development can be permitted.

(w) Hydrologically Sensitive Area - Wetlands and those geographical areas which are specifically designated as hydrologically sensitive areas by the Board because of the importance of the hydrology and hydraulics of the area in meeting the Legislative policy contained in section 373.016, F.S. (subsection 40C-4.021(15), F.A.C.).

(x) Impervious - Land surfaces which do not allow, or minimally allow, the penetration of water; included as examples are building roofs, normal concrete and asphalt pavements, and some fine grained soils such as clays.

(y) Impoundment - Any lake, reservoir, pond, or other containment of surface water occupying a bed or depression in the earth's surface and having a discernible shoreline (subsections 373.403(3) and 373.019(14), F.S.).

(z) Incidental Site Activities - The following activities in uplands which are conducted as part of the construction of a system proposed in an environmental resource permit application: land clearing; grading;

excavation of borrow areas for on-site grading; erosion and sediment control measures; road and building subgrade construction (excluding foundation construction); unpaved access road construction; utility installation; fence installation; construction trailer installation; and other similar activities.

(aa) Isolated Wetland - Any wetland without a direct hydrologic connection to a lake, stream, estuary, or marine water.

(bb) Lagoon- A naturally existing coastal zone depression which is below mean high water and which has permanent or ephemeral communications with the sea, but which is protected from the sea by some type of naturally existing barrier (subsection 373.403(16), F.S.).

(cc) Listed Species - Those animal species which are endangered, threatened or of special concern and are listed in sections 39-27.003, 39-27.004, and 39-27.005, F.A.C., and those plant species listed in 50 Code of Federal Regulation 17.12, when such plants are found to be located in a wetland or other surface water (subsection 40C-4.021(19), F.A.C.).

(dd) Littoral Zone - In reference to stormwater management systems, this phrase shall mean that portion of a wet detention pond which is designed to contain rooted aquatic plants.

(ee) Maintenance or Repairs - Means remedial work of a nature as may affect the safety of any dam, impoundment, reservoir, or appurtenant work or works, but excludes routine custodial maintenance (subsection 373.403(8), F.S.).

(ff) Mitigation - An action or series of actions to offset the adverse impacts that would otherwise cause a regulated activity to fail to meet the criteria set forth in sections 12.2 - 12.2.8.2. Mitigation usually consists of restoration, enhancement, creation, preservation, or a combination thereof.

(gg) Mitigation bank - A project permitted under section 373.4136, F.S., undertaken to provide for the withdrawal of mitigation credits to offset adverse impacts authorized by a permit under part IV of chapter 373, F.S. (subsection 373.403(19), F.S.)

(hh) Mitigation banker or banker - An entity that creates, operates, manages, or maintains a mitigation bank pursuant to a mitigation bank permit.

(ii) Mitigation credit - A standard unit of measure which represents the increase in ecological value resulting from restoration, enhancement, preservation, or creation activities. (subsection 373.403(20), F.S.)

(jj) Mitigation service area - The geographic area within which mitigation credits from a mitigation bank may be used to offset adverse impacts of activities regulated under part IV of chapter 373, F.S. (subsection 373.403(21), F.S.)

(kk) Mitigation bank permit - a permit issued to a banker to construct, operate, manage and maintain a mitigation bank.

(ll) Operate or Operation - To cause or to allow a system to function.

(mm) Other surface waters - Surface waters as described and delineated pursuant to section 62-340.600, F.A.C., as ratified by section 373.4211, F.S., other than wetlands (subsection 40C-42.021(21), F.A.C.).

(nn) Other Watercourses - Any canal, ditch, or other artificial watercourse in which water usually flows in a defined bed or channel. It is not essential that the flowing be uniform or uninterrupted (subsection 373.019(12), F.S.).

(oo) Permanent Pool - That portion of a wet detention pond which normally holds water (e.g., between the normal water level and the pond bottom).

(pp) Preservation - The protection of wetlands, other surface waters or uplands from adverse impacts by placing a conservation easement or other comparable land use restriction over the property or by donation of fee simple interest in the property.

(qq) Project Area - The area being modified or altered in conjunction with a proposed activity requiring a permit (subsection 40C-4.021(22)).

(rr) Regional Watershed - A watershed as delineated in Appendix M.

(ss) Regulated activity - The construction, alteration, operation, maintenance, abandonment or removal of a system regulated pursuant to part IV, chapter 373, F.S.

(tt) Remove or Removal - Cessation of use and maintenance activities for a system, or part of a system, accompanied by elimination of all or part of the system (subsection 40C-4.021(23), F.A.C.).

(uu) Reservoir - Any artificial or natural holding area which contains or will contain the water impounded by a dam (subsection 373.403(4), F.S.).

(vv) Restoration - Converting back to a historic condition those wetlands, surface waters, or uplands which currently exist as a land form which differs from the historic condition.

(ww) Seawall- A manmade wall or encroachment, except riprap, which is made to break the force of waves and to protect the shore from erosion (subsection 373.403(17), F.S.).

(xx) Stormwater management system- A system which is designed and constructed or implemented to control discharges which are necessitated by rainfall events, incorporating methods to collect, convey, store, absorb, inhibit, treat, use, or reuse water to prevent or reduce flooding, overdrainage, environmental degradation, and water pollution or otherwise affect the quantity and quality of discharges from the system (subsection 373.403(10), F.S.).

(yy) Stream - Any river, creek, slough, or natural watercourse in which water usually flows in a defined bed or channel. It is not essential that the flowing be uniform or uninterrupted. The fact that some part of the bed or channel shall have been dredged or improved does not prevent the watercourse from being a stream (subsection 373.019(11), F.S.).

(zz) Surface Water - Water upon the surface of the earth, whether contained in bounds created naturally or artificially or diffused. Water from natural springs shall be classified as surface water when it exits from the spring onto the earth's surface (subsection 373.019(10), F.S.).

(aaa) Surface Water Management System or System - A stormwater management system, dam, impoundment, reservoir, appurtenant work, or works, or any combination thereof. The terms "surface water management system" or "system" include areas of dredging or filling, as those terms are defined in subsections 373.403(13) and 373.403(14), F.S. (subsection 40C-4.021(26), F.A.C.).

(bbb) Threatened Species - Those animal species listed in section 39-27.004, F.A.C., and those plant species which are listed as threatened in 50 Code of Federal Regulations 17.12.

(ccc) Total Land Area - Land holdings under common ownership which are contiguous or land holdings which are served by common surface water management facilities (subsection 40C-4.021(27), F.A.C.).

(ddd) Traversing Work - Any artificial structure or construction that is placed in or across a stream, or other watercourse, or an impoundment (subsection 40C-4.021(28), F.A.C.).

(eee) Watershed- The land area which contributes to the flow of water into a receiving body of water (subsection 373.403(12), F.S.).

(fff) Wetlands - Those areas that are inundated or saturated by surface or ground water at a frequency and a duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soils. Soils present in wetlands generally are classified as hydric or alluvial, or possess characteristics that are associated with reducing soil conditions. The prevalent vegetation in wetlands generally consists of facultative or obligate hydrophytic macrophytes that are typically adapted to areas having soil conditions described above. These species, due to morphological, physiological, or reproductive adaptations, have the ability to grow, reproduce, or persist in aquatic environments or anaerobic soil conditions. Florida wetlands generally include swamps, marshes, bayheads, bogs, cypress domes and strands, sloughs, wet prairies, riverine swamps and marshes, hydric seepage slopes, tidal marshes, mangrove swamps and other similar areas. Florida wetlands generally do not include longleaf or slash pine flatwoods with an understory dominated by saw palmetto. (subsection 373.019(17), F.S.) The landward extent of wetlands is delineated pursuant to sections 62-340.100 through 62-340.550, F.A.C., as ratified by section 373.4211, F.S., (subsection 40C-4.021(30), F.A.C.)

(ggg) Wet Detention - means the collection and temporary storage of stormwater in a permanently wet impoundment in such a manner as to provide for treatment through physical, chemical, and biological processes with subsequent gradual release of the stormwater.

(hhh) Works - All artificial structures, including, but not limited to, canals, conduits, channels, culverts, pipes, and other construction that connects to, draws water from, drains water into, or is placed in or across the waters in the state (subsection 373.403(5), F.S.).

3.0 Activities Requiring a Permit

3.1 Date of Implementation

Chapter 40C-44, F.A.C., became effective on August 11, 1991. The rule was amended on October 20, 1992, and October 3, 1995.

Pumped agricultural operations, which have a valid Industrial Waste permit or consent order issued by DEP or the District, can continue to operate according to the terms of the permit or consent order until it expires. Ninety days prior to the expiration date of the permit or consent order, the agricultural operation must apply for a chapter 40C-44 permit or, if they also have a MSSW permit issued prior to June 1, 1988, must apply to modify the MSSW permit. [40C-44.031(1)(a)(b)(c), F.A.C.]

3.2 Permits Required

3.2.1 A standard general or individual environmental resource agricultural system permit is required prior to the undertaking of any activity described in section 3.3, if the activity exceeds the following thresholds:

(a) incorporates pumped discharges from an existing agricultural surface water management system, when:

(1) the pumps are stationary or portable facilities, and

(2) the pump(s) have a capacity, either individually or cumulatively, of 10,000 GPM or greater. [40C-4.041(1)(a), F.A.C.]

(b) causes or contributes to a violation of state water quality standards in waters of the state, when:

(1) the discharge is pumped or gravity drained, and

(2) the District has considered the following information on a case-by-case basis:

a. water quality monitoring data collected by the District or other agency,

b. the size of the agricultural operation and the amount of stormwater and associated wastewater reaching waters of the state, relative to the size and nature of the immediate drainage basin,

c. the means of conveyance of stormwater and associated wastewater to waters of the state,

d. characteristics of the site including the slope, vegetation, rainfall and other factors related to the likelihood or frequency of discharge of stormwater and associated wastewater to waters of the state,

e. the status, results and recommendations of available basin-specific studies, including those conducted as part of a Surface Water Improvement and Management Plan or pursuant to chapter 62-40, F.A.C., and

f. the existence of mixing zones, variances or site specific alternative criteria granted by DEP pursuant to chapters 62-4 and 62-302, F.A.C. [40C-44.041(1)(b), F.A.C.]

(c) proposes construction, maintenance and operation of new agricultural surface water management systems, or alteration of existing systems, which drain an agricultural area greater than 2 acres and are not required to obtain a permit pursuant to chapters 40C-4 or 40C-40, F.A.C. [40C-44.041(2), F.A.C.]

This threshold covers systems which are below the MSSW thresholds and which were required formerly to obtain permits under chapter 40C-42, F.A.C. In order to consolidate agricultural permitting, these activities have been transferred to this chapter.

3.2.2 The District will not issue separate permits for parts of a system, except for a system which is to be constructed in phases.

3.3 Activities Authorized by Permit

An individual or standard general environmental resource agricultural system permit must be obtained for any surface water management system which exceeds the thresholds listed in section 3.2.1 of this handbook. Such permit is to be obtained as:

(a) Authorization to maintain and operate an existing system.

(b) Authorization to construct prior to the construction of a proposed system.

(c) Authorization to alter prior to the alteration of an existing system.

(d) Authorization to operate the entire system prior to the construction or operation of a proposed system or alteration of an existing system.

(e) Authorization to maintain prior to the maintenance or repair of a proposed system, or alteration of an existing system, except for routine custodial maintenance.

(f) Authorization to abandon prior to the abandonment of an existing system.

(g) Authorization to remove prior to the removal of an existing system.

3.4 Exemptions

3.4.1 Florida Statutes specifically exempt certain activities from the requirements of chapter 40C-44, F.A.C. These statutory exemptions are discussed below:

(a) Subsection 373.406(2), F.S., states that "Nothing herein, or in any rule, regulation or order adopted pursuant hereto, shall be construed to affect the right of any person engaged in the practice of agriculture, silviculture, floriculture or horticulture to alter the topography of any tract of land for purposes consistent with the practice of such occupation. However, such alteration may not be for the sole or predominant purpose of impounding or obstructing surface waters."

In determining whether an exemption is applicable to a person engaged in the occupation of agriculture, silviculture, floriculture or horticulture, the following questions must be addressed:

1. Is the proposed topographic alteration consistent with the practice of agriculture, silviculture, floriculture or horticulture?

2. Is the proposed topographic alteration for the sole or predominant purpose of impounding or obstructing surface waters?

If the first question is answered "yes", and the second is answered "no", then an exemption under section 373.406(2), F.S. is available. The exemption is construed as set forth in the Conference Committee Report on CS/CS/HB 1187, Journal of the House of Representatives, May 29, 1984, page 734 and Journal of the Senate, May 28, 1984, Page 475.

In determining consistency with the practice of agricultural occupations, the District will refer to the following publication: "A Manual of Reference Management Practices for Agricultural Activities (November, 1978)". The following practices described in the manual are considered as having impoundment or obstruction of surface waters as a primary purpose, and, therefore, are not exempt:

1. Diversion, when such practice would cause diverted water to flow directly onto the property of another landowner

2. Floodwater Retarding Structure

3. Irrigation Pit or Regulating Reservoir

4. Pond

5. Structure for Water Control

6. Regulating Water in Drainage Systems

7. Pumping Plant for Water Control, when used for controlling water levels on land.

Other practices which are described in the manual and which are constructed and operated in compliance with Soil Conservation Service standards and approved by the local Soil and Water Conservation District are presumed to be consistent with agricultural activities. Practices which are not described in the manual are presumed to be inconsistent with the practice of agriculture and a permit is required for the construction, alteration, operation, maintenance, removal or abandonment of a system, subject to the thresholds. See Appendix H for a complete listing of agricultural practices described in the manual. A copy of the manual may be obtained by contacting the District headquarters.

(b) Subsection 373.406(3), F.S., states that "Nothing herein, or in any rule, regulation or order adopted pursuant hereto, shall be construed to be applicable to construction, operation or maintenance of any agricultural closed system. However, Part II of this Chapter (Chapter 373) shall be applicable as to the taking and discharging of water for filling, replenishing, and maintaining the water level in any such agricultural closed system. This Subsection shall not be construed to eliminate the necessity to meet generally accepted engineering practices for construction, operation, and maintenance of dams, dikes, or levees."

3.4.2 In addition to the statutory exemptions, chapter 40C-44, F.A.C., provides for the exemptions listed below:

(a) Concentrated Animal Feeding Operations with a valid permit issued by the DEP pursuant to chapter 62-670, F.A.C., provided that:

(1) For dairy farms, the permitted design incorporates a high intensity use area, from which the stormwater runoff is centrally collected for storage and disposal by land application, or is treated prior to discharge.

(2) For egg production facilities, the permitted design prevents the discharge of process wastewater and stormwater runoff to surface waters, except in the event of a storm greater than a 25 year, 24 hour event.

(3) For any concentrated animal feeding operation which does not incorporate a high intensity use area, the permitted design includes provisions to treat stormwater and associated wastewater from adjacent animal loafing and feeding areas; manure pits; animal watering systems; washing, cleaning or flushing pens; or other pollutant sources, so that discharges through the surface water management system from the operation will not cause or contribute to a violation of water quality standards in waters of the state. [40C-44.051(1), F.A.C.]

(b) Animal Feeding Operations, which do not discharge except in the event of a storm greater than a 25 year, 24 hour event and therefore are not Concentrated Animal Feeding Operations, pursuant to chapter 62-670, F.A.C. [40C-44.051(2), F.A.C.]

The exemptions for certain animal feeding operations, whose activities have been reviewed by DEP, and which provide treatment of their pollutant sources, are placed in the rule to minimize overlap between the District and the DEP. Only those areas of a Concentrated Animal Feeding Operation for which treatment has been provided, according to a DEP permit, are exempt. Likewise, only those areas of an Animal Feeding Operation which have facilities to retain the 25 year, 24 hour storm event are exempt. For areas which may be a pollutant source and for which treatment or retention is not provided, such as adjacent pastures or haylands, the District may require an individual permit on a case-by-case basis, as stated in section 3.2 of this handbook.

(c) Privately owned or operated agricultural surface water management systems lying within the boundaries of an active water control district that has obtained a chapter 40C-44 permit. [40C-44.051(3), F.A.C.]

The following is a list of active water control districts within the St. Johns River Water Management District:

1. Delta Farms Water Control District
2. Elkton Water Control District
3. Fellsmere Water Control District
4. Florahome Water Control District
5. Hastings Water Control District
6. Indian River Farms Water Control District
7. Ranger Water Control District
8. Sebastian River Water Control District
9. Sixteen Mile Creek Water Control District
10. South Brevard Water Control District
11. St. Johns Water Control District
12. Zellwood Drainage and Water Control District

(d) Agricultural surface water management systems which are implementing one or more of the following practices under the District's Best Management Practices Cost-Sharing Program: SJ1 (Backflow Prevention), SJ5 (Pump Platform Fuel and Oil Containment) or SJ6 (Pesticide Mixing and Storage Area Containment). [40C-44.051(4), F.A.C.]

(e) Minor alterations, as described in section 3.5, of new or existing agricultural surface water management systems which have a permit under chapters 40C-4, 40C-40, or 40C-44, F.A.C. [40C-44.051(5), F.A.C.]

This exemption applies to agricultural operations which propose minor alterations and which have obtained permits under the referenced rule chapters for their activities, and is intended to prevent repetitive permit modifications. For example, if the permit requires implementation of a Conservation Plan, but the Conservation Plan recommends installation of small water control structures which were not included in the original permit, no modification of the permit is necessary if the proposed activity is a minor alteration.

(f) Agricultural surface water management systems, which are required to obtain a permit as described in section 3.2.1(c), provided they have a Consumptive Use Permit which requires that they obtain, implement and maintain a Conservation Plan. [40C-44.051(6), F.A.C.]

This exemption is intended to minimize duplicative permitting for small agricultural operations such as ferneries or nurseries. It applies to agricultural operations, <40 acres, which propose to construct or modify a surface water management system. If they have a valid Consumptive Use Permit, which requires that they obtain, implement and maintain a Conservation Plan, as defined in Section 2(i), then they do not have to obtain a permit under Chapter 40C-44, F.A.C. under this exemption, the standard general permit requirements described in Section 10.2.2.(a) have been transferred to a Consumptive Use permit condition.

3.5 Minor Alterations

3.5.1 Minor alterations are those alterations of existing agricultural surface water management systems which do not increase the peak discharge rate and total discharge volume (when applicable), alter off-site storage and conveyance capabilities of the water resource, adversely affect hydrologically related environmental functions, or increase the off-site pollutant loading. [40C-44.071(2), F.A.C.]

3.5.2 The following activities are presumed to be minor alterations:

(a) regrading or contouring of ditches and other conveyance systems necessary to implement a management practice recommended by a Conservation Plan.

(b) installation of new internal ditches or other conveyance systems necessary to implement a management practice recommended by a Conservation Plan.

(c) installation of internal water control structures necessary to implement a management practice recommended by a Conservation Plan.

(d) modification or expansion of existing detention ponds within previously diked areas, provided that public safety concerns related to levee failure are addressed, no floodplain encroachment occurs, and impacts to wetlands do not require a permit pursuant to section 40C-4.041, F.A.C.

(e) construction of new detention ponds within previously diked areas, provided that public safety concerns related to levee failure are addressed, no floodplain encroachment occurs, and impacts to wetlands do not require a permit pursuant to section 40C-4.041, F.A.C. [40C-44.071(3), F.A.C.]

3.5.3 The District's determination that the conceptual plans are consistent with chapter 373, F.S., and chapters 40C-4, 40C-40, and 40C-41, F.A.C., will provide the applicant with an assurance that the concepts upon which his designs are based can provide for systems which will not be harmful to the water resources of the District and will not be inconsistent with the overall objectives of the District.

4.0 Application Preparation

4.1 Pre-application Conference

4.1.1 At the applicant's request, District staff will arrange for and participate in a pre-application conference. At a pre-application conference, the staff will be prepared to discuss with the applicant such information as:

(a) application completion, processing and evaluation procedures;

(b) information which will be required for evaluation of the application;

(c) the criteria which will be used in evaluation of the application;

(d) other hydrological, environmental or water quality data.

4.1.2 To schedule a pre-application conference, potential applicants should contact:

Department of Resource Management
St. Johns River Water Management District
975 Keller Road
Altamonte Springs, FL 32714
(407) 659-4800

4.2 Forms and Instructions

4.2.1 The form for application for an Individual Environmental Resource Agricultural System permit, form 40C-44.900(1), has been adopted as a rule in section 40C-44.900, F.A.C. A copy of the form is included in Appendix C of this handbook. This form should be used in the application for an individual permit for construction, operation, maintenance, alteration, removal, or abandonment of new or existing systems which do not qualify for a standard general permit.

4.2.2 The form for application for a Standard General Environmental Resource Agricultural System permit, form 40C-44.900(2) has been adopted as a rule in section 40C-44.900, F.A.C. A copy of the form is included in Appendix C of this handbook. This form should be used in the application for a standard general permit for construction, operation, alteration, maintenance, removal or abandonment of new or existing systems.

4.2.3 The form for application for a Standard General Environmental Resource Agricultural System permit, for an agricultural operation which already has a valid operation permit or consent order, form 40C-44.900(3), has been adopted as a rule in section 40C-44.900, F.A.C. A copy of the form is

included in Appendix C of this handbook. This form should be used for agricultural operations which intend to maintain and operate the existing system and demonstrate compliance with the performance standards, and, therefore, qualify for a standard general permit. [40C-44.055(2), F.A.C.]

4.3 Permit Processing Fee

4.3.1 A non-refundable permit processing fee as specified by chapter 40C-1, F.A.C., is required for the processing of each application for individual or standard general permits or for a permit modification, and must be submitted concurrently with the filing of an application. An application submitted without the fee will not be Considered complete.

The current permit processing fees are:

Individual	$1500
Standard General	$ 500
Standard General (<40 acres)	$ 250

4.4 Checklist for Application Completeness

The following items must be submitted at the time of an application:

(a) the appropriate application form with all spaces filled in (submit three copies);

(b) detailed engineering plans and recent aerial photographs as requested on the application form (submit three copies);

(c) a current location map with the property boundaries clearly indicated (submit three copies);

(d) additional information requested at the pre-application conference as described in section 4.1 above; and

(e) the application fee.

5.0 Procedure for Processing Individual Environmental Resource Agricultural System Permits

5.1 Procedures Required

5.1.1 The District is required to follow certain procedural guidelines set forth in chapter 120, F.S., the Florida Administrative Procedures Act. These guidelines provide rules of procedure and public visibility for all District activities which affect the public; this includes the procedures to be followed in reviewing and acting on permit applications. Additionally, the District has adopted chapter 40C-1, F.A.C., Organization and Procedure, which describes the District's organization and sets forth the specific procedures of the St. Johns River Water Management District.

5.1.2 This section provides a brief overview of the procedures which the District will follow in receiving, processing, and acting on a permit for an individual permit. It is not a substitute for chapter 120, F.S., or chapter 40C-1, F.A.C.; but is rather to be considered a brief explanation of District procedures which conform to chapter 120, F.S., and chapter 40C-1, F.A.C.

5.1.3 Chapter 120, F.S., (abridged), and chapter 40C-1, F.A.C., are attached as appendices in Part IV.

5.2 Initial Receipt

5.2.1 When the individual permit application form is completed and signed, it must be delivered to one of the following District offices:

Department of Resource Management
975 Keller Road
Altamonte Springs, FL 32714

Department of Resource Management
525 Community College Parkway
Palm Bay, FL 32909

Department of Resource Management
4049 Reid Street
Palatka, FL 32177-2529

Department of Resource Management
7775 Baymeadows Way, Suite 102
Jacksonville, FL 32256

In order to be processed in a timely manner, the application must include all supporting documentation, and the appropriate permit processing fee.

5.2.2 The District will then conduct a review of the application to determine completeness.

5.3 Request for Additional Information

5.3.1 The first step of this review process is to determine if all the technical data required on the application form have been provided. In those cases where the information provided is not complete, the District staff will request that the additional information be supplied, and will inform the applicant as to the reason that such information is required.

5.3.2 If the application is determined to be incomplete, the District will request the necessary additional information within 30 days after the receipt of the application. The District will take action on the application within 90 days after the requested information has been received. Such requests for additional information will be accompanied by citation to a specific rule pursuant to section 373.417, F.S.

5.3.3 If an applicant requires more than 120 days in which to complete an application, the applicant may notify the District in writing of the circumstances and for good cause shown, the application shall be held in active status for additional periods commensurate with the good cause shown. As used herein, good cause means a demonstration that the applicant is diligently acquiring the requested information, and that the additional time period requested is both reasonable and necessary to supply the information.

5.3.4 If, within the given time frame, the applicant does not submit the requested information (which was requested within 30 days after receipt of the application) the application may be prepared for administrative denial in accordance with section 40C-1.1008, F.A.C. In such instances, the applicant will be mailed or delivered a notice of the intent to take such action at a minimum of 14 days prior to the meeting at which the Board will consider denial. The applicant may request an administrative hearing pursuant to chapter 120, F.S., chapter 28-106, F.A.C., and rule 40C-1.1007, F.A.C., to dispute the necessity of the information required. The applicant may present evidence to the Board stating why the permit application should not be denied. Administrative denial pursuant to this procedure is not a determination of the merit of an application and does not preclude reapplying at a later time.

5.4 Staff Evaluation

5.4.1 When the application is complete, the staff will commence the technical review of the application. Criteria used in the evaluation are defined and discussed in Part II of this handbook.

5.4.2 All review will be completed and the application will be approved or denied within 90 days after the complete application is received.

5.4.3 The goal of the permit evaluation procedure is to assure that the proposed design is consistent with the standards and criteria for evaluation. If the reviewer determines that the design as submitted in the application is inconsistent with the standards and criteria, the District staff will endeavor to assist the applicant in submission of changes in design that will correct the deficiencies in the original application where possible. The responsibility for changing permit application and designing corrections remains that of the applicant.

5.4.4 The applicant will be given a minimum of 14 days notice when the staff's review is complete and the application has been scheduled for District action on the application. This notice includes the place, date and time of the meeting, and a copy of the staff report which recommends approval or denial. The applicant is advised to read the report carefully. If any part of the report is in error, or if the applicant does not agree with the staff's recommendation, the applicant should contact the District staff as soon as possible. The 14 day period is provided to allow the staff and applicant an opportunity to resolve any concern which may have been identified.

If the 14 day period is not sufficient or the applicant is still dissatisfied with the staff's position, the applicant by waiving the ninety day time frame, has the option of requesting that the District staff take additional time to meet with the applicant to further discuss the application, the applicant’s position, and the staff’s position.

5.4.5 Notification to Public for Input

Once the District receives an application, notice of such application will be provided to those persons who have previously filed a written request for notification of pending applications affecting a designated area. Such notice will be sent by regular mail.

5.4.6 Objections

(a) In order for the District staff to properly evaluate any information which interested persons may submit regarding an application, these persons should contact the District within 14 days of the date of receipt of the notice of receipt of application and provide their objections, comments or information regarding the specific application in writing.

(b) Notice of intended agency action will be provided to the applicant and to persons who have requested notice as required by section 120.60, F.S.

(c) An applicant or a person whose substantial interests may be determined by the intended agency action may request an administrative hearing in accordance with chapter 120, F.S., chapter 28.106, F.A.C., and section 40C-1.1007, F.A.C. Making a written objection or appearing at a Board meeting does not make a person a "party" for chapter 120, F.S., purposes.

5.5 Regulatory Meeting

5.5.1 The Governing Board of the St. Johns River Water Management District meets once a month to act on permit applications that have not been delegated to District staff to approve. (See the District's Statement of Agency Organization and Operation at floridaswater.com for a listing of these regulatory delegations.) At each regulatory meeting, the Board has copies of the staff reports, which contain a staff recommendation for approval or denial, and which were provided to them several days before the meeting to allow time for review. When applications are presented to the Board for action, the Board invites comments from the applicants, District staff, interested persons, or local governments who may be affected by the application, and members of the general public. However, if no requests to speak concerning an application are made at the meeting, the application may be presented to the Governing Board on a consent agenda and therefore may not receive individual consideration.

5.5.2 Upon presentation of an application, the Board will either approve the application, approve the application with modifications, deny the application, or continue the application for consideration at a later date within applicable time frames established by provisions of chapter 120, F.S.

6.0 Procedures for Processing Standard General Environmental Resource Agricultural System Permits

6.1 Procedures Required

6.1.1 The District is required to follow certain procedural guidelines set forth in chapter 120, F.S., the Florida Administrative Procedures Act. These guidelines provide rules of procedure and public visibility for all District activities which affect the public; this includes the procedures to be followed in reviewing and acting on permit applications. Additionally, the District has adopted chapter 40C-1, F.A.C., Organization and Procedure, which describes the District's organization and sets forth the specific procedures of the St. Johns River Water Management District.

6.1.2 This section provides a brief overview of the procedures which the District will follow in receiving, processing, and acting on a notification of intent to undertake an activity under the provisions of a general permit. It is not a substitute for chapter 120, F.S., or chapter 40C-1, F.A.C.; but is rather to be considered a brief explanation of District procedures which conform to chapter 120, F.S., and chapter 40C-1, F.A.C.

6.1.3 Chapter 120, F.S., and chapter 40C-1, F.A.C., are attached as appendices in Part IV.

6.2 Standard General Permits

6.2.1 District standard general permits differ from individual permits in that they are granted by rule to all systems which meet certain requirements.

6.2.2 These requirements are:

(a) The systems must meet certain threshold requirements described in section 3.2 of this handbook, [40C-44.041, F.A.C.]; and

(b) The systems must be designed, constructed and operated in accordance with District design criteria described in section 10.2.2 of this handbook, [40C-44.055, F.A.C.]; and

(c) The person who seeks a standard general permit must submit a complete application for a standard general environmental resource agricultural system permit to the District at least 30 days prior to undertaking the activity which would otherwise require an individual permit and must receive District authorization prior to proceeding.

6.2.3 If, upon District staff review, one of the following factors is present, an individual permit will be required:

(a) the system exceeds specified threshold requirements; or

(b) District staff holds a reasonable doubt that District criteria for evaluation are met; or

(c) a substantial objection has been filed with the District in accordance with the provisions of subsection 6.5.6.

6.2.4 Upon determination that one of the factions listed in subsection 6.2.3 is present, District staff will notify the applicant that an individual permit is required, and the provisions of subsection 5.0 will be followed. Substantial objection means a written statement directed to the District regarding a permit which identifies the objector, concerns hydrologic or environmental impacts of the proposed activity, and relates to applicable rule criteria.

6.3 Initial Receipt

6.3.1 When the application for a standard general permit is completed and signed, it must be delivered to one of the District offices listed in section 5.2.1. In order to be processed in a timely manner, the application must include all supporting documentation, and the appropriate permit processing fee.

6.3.2 District staff will then review the application for a standard general permit to determine that all necessary information is included. If the application does not contain all of the required information or fee, the necessary additional information or fee will be requested from the permittee within 30 days of receipt of the application by the District. The application is then reviewed and evaluated using the criteria discussed in Part II of this handbook.

6.4 Request for Additional Information

6.4.1 The first step of this review process is to determine if all the technical data needed for a complete review of the application has been provided. In those cases where the information contained in the submitted application for a standard general permit is not complete, the District staff will request that the additional information be supplied, and will inform the applicant as to the reason that such information is required. Such requests for additional information will be accompanied by citation to a specific rule pursuant to section 373.417, F.S.

6.4.2 If the standard general permit application is determined to be incomplete, the District will request the necessary additional technical information within 30 days after the receipt of the application. The District will take action on the application within 30 days after the requested information has been received.

6.4.3 If an applicant requires more than 120 days in which to complete an application, the applicant may notify the District in writing of the circumstances and for good cause. As used herein, good cause means a demonstration that the applicant is diligently acquiring the requested information, and that the additional time period requested is both reasonable and necessary to supply the information.

6.4.4 If, within the given time frame, the applicant does not submit the requested information or fee (which was requested within 30 days after receipt of the application) the permittee will be notified that the application is being upgraded to an individual application and prepared for a recommendation of denial pursuant to section 40C-1.605, F.A.C. No additional permit fee will be required in this event.

6.5 Staff Evaluation

6.5.1 Once the standard general permit application is complete, the staff will begin technical review of the application. Criteria used in the evaluation are defined and discussed in Part II of this handbook.

6.5.2 When the technical staff has completed its review, the standard general permit and staff evaluation are reviewed by the Director of the Department of Resource Management to determine that the evaluation is consistent with the criteria listed in Part II.

6.5.3 The final staff evaluation will include a determination that the described system either meets the criteria for obtaining a standard general permit or that it apparently does not. If a standard general permit application apparently does not meet those criteria, then the application will be processed as an application for an individual permit and the applicant will be so notified, and provided a written explanation of the need for an individual permit.

6.5.4 All reviews of standard general permit applications will be completed and the applicant notified of the determination within 30 days after receipt of the complete application and receipt of timely requested additional information.

6.5.5 For those systems which meet the criteria, an authorization to begin construction or to continue maintenance and operation will be provided. For those systems which do not apparently meet the criteria for a standard general permit, notification that the system will require an individual permit will be provided.

6.5.6 Notification to Public for Input

At the time the District has received a standard general permit application for construction, it will provide public notice that the application has been filed. Such public notice will be sent by regular mail to those people who have previously filed a written request for notification of pending applications the affected area.

Notice of receipt of an application which includes construction will be posted on the District website at floridaswater.com in the District headquarters and in each permitting office. For operation and maintenance of existing agricultural operations, pursuant to section 40C-44.055(2), F.A.C., no notice of receipt of an application is required.

For the District staff to properly evaluate any information which interested persons may submit, these persons should contact the District within 14 days of receipt of notice of the application if they have questions, objections, comments, or information regarding the proposed system.

6.5.7 Objections

A substantial objection as defined in section 6.2.4 will automatically cause the application for a standard general permit to be considered an application for an individual permit. Substantial objections must be filed with the District within 14 days of posting of the notice of application. The applicant will be notified that an objection has been received and that the procedures for application for an individual permit must be followed. No additional fee will be required for standard general permit applications which are upgraded to individual status as a result of objections as described above.

7.0 Permits

7.1 Operation and Maintenance

7.1.1 Responsibility for Operation and Maintenance

The entity responsible for operation of the system (owner, lessee, public body, etc.) must be identified. If the responsible entity is not the owner, the following will be required:

(a) If the operation entity is to be a public body, such as a water control district, a preliminary letter of acceptance from the public body shall be submitted. A final letter of acceptance by the governing body is required before an operation or maintenance permit can become effective.

(b) If the entity is a lessee, the lessee must provide a copy of the lease agreement, and a separate document stating that the lessee will be responsible for maintenance and operation.

7.1.2 Operation and Maintenance Requirements

(a) The permittee is required to provide for periodic inspections of the surface water management system to insure that the system is functioning as designed and permitted.

(b) The following operational maintenance activities shall be performed on all permitted systems on a regular basis or as needed:

(1) Removal of trash and debris from the surface water management system,

(2) Inspection of culverts, culvert risers, pipes and screwgates for damage, blockage, excessive leakage or deterioration,

(3) Inspection of pipes for evidence of lateral seepage,

(4) Inspection of flapgates for excessive backflow or deterioration,

(5) Removal of sediments when the storage volume or conveyance capacity of the surface water management system is below design levels,

(6) Stabilization and restoration of eroded areas,

(7) Inspection of pump stations for structural integrity and leakage of fuel or oil to the ground or surface water, and

(8) Inspection of monitoring equipment, including pump hour meters and staff gauges, for damage and operational status.

(c) The permittee shall maintain and operate the Conservation Practices contained in the Conservation Plan, consistent with current SCS standards, specifications and guidelines.

(d) In addition to the practices listed in subsection (b) above, specific operational maintenance activities are required, depending on the type of permitted system, as follows:

(1) Overland flow systems shall include provisions for:

a. Mowing and removal of clippings, and

b. Maintenance of spreader swales and overland flow areas to prevent channelization.

(2) Spray irrigation systems for reuse/disposal shall include provisions for:

a. Inspection of the dispersal system, including the sprayheads or perforated pipe for damage or clogging, and

b. Maintenance of the sprayfield to prevent channelization.

(3) Treatment systems which incorporate isolated wetlands shall include provisions for:

a. Stabilization and restoration of channelized areas, and

b. Removal of sediments which interfere with the function of the wetland or treatment system.

(4) Systems in Class I waters shall include provisions for inspection and maintenance of valves for wells which discharge from an aquifer which contains greater than 250 mg/l of chloride.

(e) If the system is not functioning as designed and permitted, operational maintenance must be performed immediately to restore

the system. If the operational maintenance measures are insufficient to enable the system to meet the performance standards of this chapter, the permittee must either replace the system or construct an alternative design. A permittee must apply for and obtain a modification prior to constructing such alternative design. [40C-44.069, F.A.C.]

7.2 Transfers

7.2.1 The District must be notified in writing, within 30 days of any sale, conveyance, or other transfer of a permitted system or facility or within 30 days of any transfer of ownership or control of the real property at which the permitted system is located. All transfers of ownership or transfers of a permit are subject to the requirements of chapter 40C-1, F.A.C.

7.3 Related Permits

7.3.1 Application to construct, alter, or maintain a system must include application for any related permit required to operate a system.

7.3.2 Agricultural operations which are required to obtain a chapter 40C-4 or chapter 40C-40 permit, must comply with the performance standards and water quality practices contained in chapter 40C-44, F.A.C., in order to meet the District's water quality criteria. Additional special conditions, which will be applied in this case, are listed in Appendix I. When an individual permit is required pursuant to chapter 40C-4, the time frames of chapter 40C-4 shall apply to the issuance of a chapter 40C-44 permit.

7.3.3 For permits which include construction, the permit for operation and maintenance will be granted with a condition that the operation and maintenance permit becomes valid upon satisfactory completion of the permitted construction or alteration (as demonstrated by the submission of certified as-built plans) and compliance with all conditions of the permit.

7.4 Duration

7.4.1 The permit which is granted will include a specified period for which the permit is valid. Unless revoked or modified, such period is:

(a) generally five years for permits to construct, alter, or remove a system; and

(b) permanent for permits to operate, maintain, or abandon a system.

7.4.2 The designed duration for permits to construct, alter, abandon, or remove, will be dependent upon the facts and circumstances of each situation. These include:

(a) size of a proposed system; and

(b) anticipated amount of time required to complete the proposed activity.

7.4.3 Permits expire at 11:59 pm on the date indicated on the permit conditions unless an application is made pursuant to chapter 40C-1, F.A.C., for an extension on or before the date of expiration. Application for an extension should be made by writing to:

Department of Water Resources
St. Johns River Water Management District
4049 Reid Street
Palatka, FL 32177-2529

7.4.5 If an application for re-issuance is made prior to expiration, the permit remains in effect until the District takes action on the application.

7.4.6 The District may revoke or modify a permit in accordance with the provisions of section 373.429, F.S., and chapter 40C-1, F.A.C. The following constitutes grounds for modification or revocation:

(a) Consistent noncompliance with permit conditions.

(b) Consistent noncompliance with state water quality standards.

(c) Noncompliance with approved wasteload allocations, developed pursuant to a Surface Water Improvement and Management Plan or other state or District program, when adopted by District rule, such that the operation has become inconsistent with the objectives of the District, as set forth in section 9.0 of the Applicant's Handbook: Agricultural Surface Water Management Systems, or

(d) Noncompliance with a pollutant load reduction goal when adopted by District rule, such that the operation has become inconsistent with the objectives of the District, as set forth in section 9.0 of the Applicant's Handbook: Agricultural Surface Water Management Systems.

For the purposes of this section of the rule only, the District will consider "consistent noncompliance with state water quality standards" to be violations of state water quality standards for 2 consecutive quarters of 3 or

more parameters or violations of state water quality standards for 4 consecutive quarters of 1 or more parameters.

7.5 Enforcement and Inspection

7.5.1 Chapter 373, F.S. provides for the enforcement of District rules by administrative and civil complaint. In addition to the authority of the District to enforce, the District has the authority to obtain the assistance of county and city officials in the enforcement of the rules (see sections 373.603 and 373.609, F.S.) A person who violates District rules or refuses to comply with a District order may be subject to criminal prosecution as set forth in section 373.403, F.S.

7.5.2 One condition of each permit will be that District authorized staff, upon proper identification, will have permission to enter, inspect and observe the system to insure compliance with the approved plans and specifications included in the permit.

7.6 Compliance

7.6.1 Permit conditions routinely require installation of monitoring equipment and reporting of monitoring data. Other conditions, as directed by the District, may be placed on permits. Noncompliance by performing activities which have not been authorized by permit and are not exempt, or by failure to adhere to permit conditions is subject to the appropriate legal action (see section 7.5.1).

7.6.2 Forms

Compliance forms, used to report monitoring data, are contained in Appendix J.

7.6.3 Water Quality Monitoring

Water quality monitoring is required by both standard general and individual permits. Standard general permittees are required to analyze samples for the parameters listed in Table 1 (Appendix I). Agricultural operations which obtain individual permits will be required to analyze samples for the parameters listed in Table 1, and may be required to perform additional analyses based on site specific conditions.

Samples must be analyzed by a laboratory certified by the Florida Department of Health and Rehabilitative Services (DHRS). The DHRS program divides laboratories into two categories: drinking water and environmental water analysis. A list of certified private laboratories is

contained in Appendix K. The permittee should select a laboratory certified for environmental water analysis.

7.6.4 Pump Hour Monitoring

Pump hour monitoring is required by both standard general and individual permits. Pump hours are monitored by the installation of pump hour meters on each drainage pump, and submission of quarterly reports.

7.6.5 Pond Stage Monitoring

Monitoring of pond stages is required by both standard general and individual permits. A staff gauge referenced to National Geodetic Vertical Datum (NGVD) must be installed and maintained in each pond. Staff gauges are made of metal or plastic with graduated lines. They can be purchased from survey equipment suppliers or field equipment supply catalogs, such as Forestry Suppliers or Ben Meadows. The USDA Soil Conservation Service may be able to provide assistance in the installation and surveying of staff gauges.

Water levels must be recorded a minimum of 3 non-consecutive days per week, or as an alternative, once a week and daily during pump operation. More frequent monitoring may be required for individual permits, depending on pump capacity, amount of freeboard, etc. Reports of water levels must be submitted to the District quarterly.

PART II

CRITERIA FOR EVALUATION

8.0 Criteria for Evaluation

8.1 Purpose

The criteria which are explained in this part are those which have been approved by the Governing Board for use by District staff in evaluating Environmental Resource Agricultural System permit applications. The criteria are used in evaluating applications for individual permits as well as standard general permits. The staff recommendation on permit approval for any permit will be based upon a determination of whether the system meets the criteria for evaluation.

8.2 Source of Criteria

The criteria for evaluation have been developed from guidelines established in chapter 373, F.S. (Water Resources Act of 1972); chapter 403, F.S., (Environmental Control); chapter 62-40, F.A.C. (State Water Policy); chapter 40C-4, F.A.C., (Environmental Resource Permits: Surface Water Management Systems), chapter 40C-40 (Standard General Environmental Resource Permits), chapters 62-3 and 62-302, F.A.C. (Water Quality Standards), this handbook, and through permitting decisions of the District. Copies of chapter 373, F.S., (abridged), chapter 62-40, F.A.C., chapters 40C-4 and 40C-40, F.A.C., are contained in the appendices in Part IV of this handbook.

8.3 Statutory Criteria

8.3.1 In order to obtain a permit, an applicant must give reasonable assurance that:

(a) The construction or alteration of any dam, impoundment, reservoir, appurtenant work or works will not be harmful to the water resources of the District.

(b) The operation or maintenance of any dam, impoundment, reservoir, appurtenant work or works will not be inconsistent with the overall objectives of the District and will not be harmful to the water resources of the District.

(c) The abandonment or removal of any dam, impoundment, reservoir, appurtenant work or works will not be inconsistent with the overall objectives of the District.

8.4 State Water Quality Standards

State water quality standards are contained in chapters 62-3, 62-4, 62-302, 62-520, and 62-550, F.A.C. (Appendix L). The standards are set by DER, not by the District. Discharges from the agricultural surface water management systems can not cause or contribute to a violation of state water quality standards in waters of the state, as set forth in chapters 62-3, 62-4, 62-302, 62-520, and 62-550 F.A.C., including any antidegradation provisions of sections 62-4.242(1)(a) and (b), 62-4.242(2) and (3), and 62-302.300, F.A.C., and any special standards for Outstanding Florida Waters and Outstanding National Resource Waters set forth in sections 62-4.242(2) and (3), F.A.C.

8.4.1 Surface Water Quality Standards

State water quality standards for surface waters are contained in chapters 62-4 and 62-302, F.A.C. The standards apply at the point of mixing with waters of the state. For the purposes of this rule, violations must be projected, based on monitoring results at the pump inlet or pond outfall and sound scientific rationale, or observed at the edge of the "boil" caused by the pump or weir discharge.

8.4.2 Groundwater Quality Standards

State water quality standards for groundwater are contained in chapter 62-520, F.A.C. Section 62-520.400, F.A.C., specifies minimum criteria for groundwater. In addition to the minimum criteria, Class G-I and G-II groundwater must meet primary and secondary drinking water quality standards for public water systems established pursuant to the Florida Safe Drinking Water Act, which are listed in sections 62-550.310 and 320, F.A.C.

Only the minimum criteria apply within a zone of discharge, as determined in section 62-28.700, F.A.C. A zone of discharge is defined as a volume underlying or surrounding the site and extending to the base of a specifically designated aquifer or aquifers, within which an opportunity for the treatment, mixture or dispersion of wastes into receiving ground water is afforded. Stormwater facilities generally have a zone of discharge 100 feet from the site boundary or to the installation's property boundary, whichever is less.

9.0 Overall Objectives of the District

9.1 Objectives

9.1.1 To obtain a permit for operation, maintenance, removal or abandonment of a system, each applicant must give reasonable assurance that such activity will not:

(a) Endanger life, health, or property;

(b) Be inconsistent with the maintenance of minimum flows and levels established pursuant to chapter 40C-8, F.A.C.;

(c) Adversely affect the availability of water for reasonable beneficial purposes;

(d) Be incapable of being effectively operated;

(e) Adversely affect the operation of a Work of the District established pursuant to section 373.086, F.S.

(f) Adversely affect existing agricultural, commercial, industrial, or residential developments;

(g) Cause adverse impacts to the quality of receiving waters;

(h) Adversely affect natural resources, fish and wildlife;

(i) Increase the potential for damages to off-site property or the public caused by:

(1) Floodplain development, encroachment or other alteration;

(2) Retardance, acceleration, displacement or diversion of surface water;

(3) Reduction of natural water storage areas;

(4) Facility failure;

(j) Increase the potential for flood damages to residences, public buildings, or proposed and existing streets and roadways; and

(k) Otherwise be inconsistent with the overall objectives of the District.

9.1.2 Because a system may result in both beneficial and harmful effects in terms of various individual objectives, in determining whether the applicant has provided evidence of reasonable assurance of compliance with subparagraph

40C-44.301(l)(a), the District shall consider a balancing of specific effects to show the system is not inconsistent with the overall objectives of the District.

10.0 Harm to the Water Resources of the District

10.1 Harm to the Water Resources Standards

10.1.1 The Governing Board has delineated the following performance standards which must be met to demonstrate that the proposed activity will not be harmful to the water resources of the District and will not cause adverse impacts to the quality of the receiving waters:

(a) Discharges from the agricultural surface water management system shall not cause or contribute to a violation of water quality standards in waters of the state, as set forth in chapters 62-3, 62-4, 62-302, 62-520, and 62-550, F.A.C., including any antidegradation provisions of sections 62-4.242(1)(a) and (b), 62-4.242(2) and (3), and 62-302.300, F.A.C., and any special standards for Outstanding Florida Waters and Outstanding National Resource Waters set forth in sections 62-4.242(2) and (3), F.A.C.

(b) The surface water management system shall be designed, operated, and maintained to provide a level of treatment so that discharges will not contain more than 20 mg/l BOD or 20 mg/l of total suspended solids.

(c) In addition to paragraphs (a) and (b) above, the applicant is advised that discharges from the agricultural surface water management system will be required to comply with a waste load allocations developed pursuant to a Surface Water Improvement and Management Plan or other state or District program, or a pollutant load reduction goal, pursuant to chapter 62-40, F.A.C., when said allocation or goal is adopted by District rule [40C-44.065, F.A.C.]

10.1.2 To obtain a standard general or individual permit for construction, alteration, operation, or maintenance of a system, each applicant must give reasonable assurance that such activity is not harmful to the water resources by meeting the following standards:

(a) Adverse water quantity impacts will not be caused to receiving waters and adjacent lands;

(b) Surface and ground water levels and surface water flow will not be adversely affected;

(c) Existing surface water storage and conveyance capabilities will not be adversely affected;

(d) The system must be capable of being effectively operated;

(e) The activity must not result in adverse impacts to the operation of Works of the District established pursuant to section 373.086, F.S.; and

(f) Hydrologically-related environmental functions will not be adversely affected;

10.2 Harm to the Water Resources Criteria

10.2.1 It is presumed that a system meets the standards listed in subsection 10.1.2 if the system meets the criteria required to obtain a chapter 40C-4 or 40C-40, F.A.C. permit.

10.2.2 Standard General Permits

For the following types of systems qualifying for a standard general permit, it is presumed that compliance with the criteria specified in section 10.2.2 will provide reasonable assurance that the system will comply with chapter 62-40.420(4)(a), F.A.C., and the performance standards described in section 10.1.1:

(a) Small agricultural operations (greater than 2 acres, but below permit thresholds for chapters 40C-4 and 40C-40, F.A.C.), if they have obtained a Conservation Plan, implemented the Conservation Plan within 180 days of permit issuance, and maintained the Conservation Plan. [40C-44.055(1), F.A.C.]

(b) Existing agricultural operations which are applying for a chapter 40C-44, F.A.C., permit prior to the expiration of a valid Industrial Waste permit or consent order (section 3.1), provided they:

(1) Continue to maintain and operate the surface water management system, and associated treatment system, as previously permitted or authorized by consent order, and

(2) Demonstrate compliance with the performance standards described in subsections 40C-44.065(1) and (2), F.A.C., based upon data collected in compliance with monitoring conditions. If the District staff determines that the compliance monitoring data does not demonstrate compliance with the performance standards, staff will notify the applicant, in writing, of the specific pollutant or pollutants for which treatment will be required in order to obtain an individual permit. [40C-44.055(2), F.A.C.]

(c) Minor alterations, described in section 3.5, provided the applicant provides reasonable assurance, through plans, test results or other information, that the activity is a minor alteration [40C-44.055(3), F.A.C.]

(d) Surface water management systems which drain an agricultural operation of less than 120 acres, which do not contain a concentrated animal feeding operation, which implement a Conservation Plan within 180 days of permit issuance, and which maintain the Conservation Plan, provided the permittee satisfies the following monitoring conditions:

(1) The permittee must maintain hour meters, in operating order, on each drainage pump. If the hour meters are not installed at the time of permit issuance, they must be installed within 60 days of the issuance of the permit. Reports of pump operating hours for each pump must be submitted to the District quarterly, using forms provided in the handbook.

(2) The permittee must maintain a staff gauge, referenced to NGVD, in each detention pond. If the staff gauges are not installed at the time of permit issuance, they must be installed within 60 days of the issuance of the permit. Water levels must be recorded a minimum of 3 nonconsecutive days per week, or as an alternative, once a week and daily during pump operation. Reports of water levels for each pond must be submitted quarterly to the District using forms provided in the handbook.

(3) The permittee must monitor the water quality on a quarterly basis at each discharge point from pumps or pond outfalls to waters of the state. If no discharge has occurred during a particular quarter, no sampling is required. Water samples must be analyzed for the parameters listed in Table 1 (Appendix I). Samples must be analyzed by a laboratory certified by the Florida Department of Health and Rehabilitative Services.

(4) If, after five years of water quality monitoring, the permittee demonstrates that the data collected represents steady state conditions and is adequate to project future compliance with state water quality standards, the District shall amend the monitoring conditions by reducing the frequency of monitoring or the number of parameters monitored, or eliminating such requirements.

(5) If, after five years of water quality monitoring, the District notifies the permittee in writing that discharges from the surface water management system have not complied with the performance standards described in subsections 40C-44.065 (1) and (2), F.A.C., then the permittee must apply for an individual permit. [40C-44.055(4), F.A.C.]

(e) Surface water management systems which drain an agricultural operation which do not contain a concentrated

animal feeding operation, which have obtained a Conservation Plan, implemented the Conservation Plan within 180 days of permit issuance, maintain the Conservation Plan, and which have not been issued an Industrial Waste permit or consent Order, provided the permittee satisfies the monitoring conditions described below:

(1) The permittee must maintain hour meters, in operating Order, on each drainage pump. If the hour meters are not installed at the time of permit issuance, they must be installed within 60 days of the issuance of the permit. Reports of pump operating hours for each pump must be submitted to the District quarterly, using forms provided in the handbook.

(2) The permittee must maintain a staff gauge, referenced to NGVD, in each detention pond. If the staff gauges are not installed at the time of permit issuance, they must be installed within 60 days of the issuance of the permit. Water levels must be recorded a minimum of 3 nonconsecutive days per week, or as an alternative, once a week and daily during pump operation. Reports of water levels for each pond must be submitted quarterly to the District using forms provided in the handbook.

(3) The permittee must monitor the water quality on a quarterly basis at each discharge point from pumps or pond outfalls to waters of the state following implementation of the Conservation Plan or within 180 days of permit issuance, whichever occurs sooner. If no discharge has occurred during a particular quarter, no sampling is required. Water samples must be analyzed for the parameters listed in Table 1 (Appendix I). Samples must be analyzed by a laboratory certified by the Florida Department of Health and Rehabilitative Services.

(4) If, after five years of water quality monitoring, the permittee demonstrates that the data collected represents steady state conditions and is adequate to project future compliance with state water quality standards, the District shall amend the monitoring conditions by reducing the frequency of monitoring or the number of parameters monitored, or eliminating such requirements.

(5) If, after one year of water quality monitoring, the District notifies the permittee in writing that discharges from the surface water management system have not complied with the performance standards described in sections 40C- 44.065 (1) and (2), F.A.C., then

the permittee must apply for an individual permit. [40C-44.055(5), F.A.C.]

10.2.3 Individual Permits

For systems which are required to obtain an individual permit, it is presumed that implementation of the water quality practices listed in section 10.2.5 will provide reasonable assurance that the system will comply with chapter 62-40.420(4)(a), F.A.C. and the performance standards described in section 10.1.1. The water quality practices or other alternatives shall be implemented to the extent necessary to comply with the performance standards described in section 10.1.1. In some cases, the implementation of these practices may not result in compliance with the performance standards for issuance of an individual permit. In those cases, the applicant shall provide for implementation of such additional water quality practices and/or treatment methodologies as necessary to provide reasonable assurance that the discharge will comply with the performance standards described in section 10.1.1.

10.2.4 Discharge to Class I, Class II, or Outstanding Florida Waters

New and existing systems which discharge to Class I, Class II or Outstanding Florida Waters shall be required to provide an additional level of treatment to provide reasonable assurance of compliance with section 10.1.1. Direct discharges to Outstanding Florida Waters shall provide an additional 50% of the applicable treatment volume.

10.2.5 Water Quality Practices

(a) Reduce the volume of stormwater and associated wastewater discharged to waters of the state by:

(1) Implementing management practices designed to reduce the volume of water discharged off-site, including Water Table Control in Open Channels, Irrigation Land Leveling and Irrigation Water Management, and

(2) Maximizing on-site recycling to satisfy irrigation, freeze protection and pest control needs. The applicant may demonstrate maximum reuse by using all the practically available water from reservoir storage prior to using groundwater.

(b) Implement and maintain a Conservation Plan, which includes a Nutrient Management Plan and Pesticide Management Plan.

(c) Provide treatment of the pollutants generated by the agricultural operation. The treatment method required depends on the intensity of land use and associated pollutants.

(1) Wet detention ponds, designed and operated in accordance with paragraphs (2) or (3) below, are presumed to satisfy the requirements of paragraphs (a)(2) and (c) for those portions of an agricultural operation described below:

a. Citrus, row crop, sod, hayland or improved pasture which discharge to Class I, Class II, or Outstanding Florida Waters, or

b. Citrus, row crop, sod, hayland or improved pasture on predominantly organic soils. For the purposes of this handbook, organic soils are listed as mucks, peats or mucky fine sands in the Soil Conservation Service county Soil Surveys.

(2) Detention ponds which are part of an existing surface water management system, and which comply with following design and performance criteria are presumed to provide treatment.

a. Wet detention treatment volume is equal to the first inch of runoff.

b. The permanent pool volume provides an average residence time of 21 days during the wet season (June through October). This volume may be determined by estimating 13.82% of the wet season average runoff. The permanent pool volume should be recycled.

c. No more than half the treatment volume is drawn down in the first 60 hours following a storm event, but at least half of the treatment volume is discharged within 72 hours following a storm event.

d. Pond depths below the water control elevation shall not exceed an average of 5 feet or a maximum of 10 feet, unless the applicant affirmatively demonstrates that the deeper depths will not cause anaerobic conditions in the water column.

e. For ponds where interior borrow canals are likely to result in short-circuiting of flows between the inlet and outlet, the

effective flow path shall be increased by adding diversion structures such as canal plugs or baffles.

(3) Detention ponds proposed as part of a new surface water management system which are designed, constructed and operated in accordance with the following design and performance criteria are presumed to provide treatment.

a. Wet detention treatment volume is equal to the first inch of runoff.

b. The permanent pool volume provides an average residence time of 21 days during the wet season (June through October). This volume may be determined by estimating 13.82% of the wet season average runoff. The permanent pool volume should be recycled.

c. No more than half the treatment volume is discharged in the first 60 hours following a storm event, but at least half of the treatment volume is discharged within 72 hours following a storm event.

d. Pond depths below the water control elevation shall not exceed an average of 4 feet or a maximum of 10 feet, unless the applicant affirmatively demonstrates that the deeper depths will not cause anaerobic conditions in the water column.

e. The treatment volume should not cause the pond level to rise more than 18 inches above the control elevation unless it is demonstrated that the littoral zone vegetation can survive at greater depths and that the pond area ratio (drainage area/pond area) is still sufficient to provide adequate treatment.

f. The pond design shall incorporate a littoral zone or an alternate method to promote sedimentation. Littoral zone shall be gently sloped (6:1 or flatter) to a point 2-3 feet below the bleed-down or control elevation and extend to the top of the treatment volume. The littoral zone and vegetation should be concentrated at the inflow (adjacent to the sump, if required) and at the outfall.

g. The alignment and location of inlets and outlets shall be designed to maximize flow paths in the pond. The pond shall have a length to width ratio of a minimum of 2:1. If short

flow paths are unavoidable, the effective flow path should be increased by adding diversion barriers such as islands, peninsulas or baffles to the pond. Inlet structures should be designed to dissipate the energy of water entering the pond. Pumped inflows must provide a sump to promote sedimentation and reduce water velocities.

h. Pond design must include permanent access for maintenance.

i. The bleed-down orifice invert elevation shall be at or above the estimated wet season water table elevation. If the orifice is proposed to be set below the wet season water table elevation, groundwater inflow must be considered in orifice drawdown calculations, calculation of average residence time, and estimated normal water level. For ponds with pumped inflows, the applicant must demonstrate that the water table of wetlands within the drainage area will not be significantly lowered.

(4) Other water quality practices in lieu of wet detention, such as overland flow, vegetative filters and detention in isolated wetlands, are presumed to satisfy the requirements in section (c) for low intensity agricultural operations such as rough or semi-improved pasture, when the practice(s) is designed, operated and maintained using accepted engineering principles.

In evaluating the design of overland flow systems or vegetative filters, District staff will use as guidelines the engineering standards and specifications adopted under the District's Best Management Practices Cost-Share Program. The criteria contained in section 40C-42.0265, F.A.C., will be used as guidelines for evaluating the design of isolated wetland treatment systems.

(5) Agricultural surface water management systems may incorporate overland flow, vegetative filters and detention in isolated wetlands as water quality practices. Existing canals and conveyance systems may be incorporated into a wet detention treatment system, when appropriate. The applicant must provide reasonable assurance, through plans, test results or other information, that the practice will provide an adequate level of treatment to meet the performance standards in section 10.1.1.

(d) Applicants who propose to satisfy the performance standards in section 10.1.1 by employing a treatment methodology or device other than those described in sections 10.2.5(a)-(c), may seek approval for an equivalent alternative through the District's individual permit process.

10.2.6 Agricultural surface water management systems requiring a permit which will be located in the Lake Apopka Hydrologic Basin or which will discharge water to Lake Apopka or its tributaries, must comply with the requirements of subsection 40C-41.063(8), F.A.C., and Section 11.7, Applicant's Handbook: Management and Storage of Surface Waters.

10.2.7 Agricultural surface water management systems requiring a permit that will be located within the Wekiva Recharge Protection Basin must comply with the requirements of paragraph 40C-41.063(3)(a), F.A.C., and Section 11.3.1, Applicant's Handbook: Management and Storage of Surface Waters.

PART III

METHODOLOGIES, DESIGN AIDS AND DESIGN EXAMPLES

The design methodologies described in Part III are suggested as useful approaches to calculating the information required for surface water management system design. They are only suggested methodologies; other reliable design techniques may be utilized.

11.0 Methodologies for Calculating Water Budgets

11.1 Description of Water Budgets

A water budget is an accounting of water movement onto, within, and off of an area. Developing a water budget provides an overall view of sources with excess water and sources with water needs. A management plan can be devised to link excess water to water needs. On-site storage in canals and reservoirs allows this link to span over time.

On-site reuse reduces the offsite loading of nutrients and is considered a treatment practice. Water use efficiency is increased by reuse, resulting in less offsite water needed to meet onsite water demands.

All agricultural operations must implement a Conservation Plan which addresses reuse. Individual permittees are required to maximize on-site recycling to satisfy irrigation, freeze protection and pest control needs. (Section 10.2.5, A.H.)

The purpose of developing a water budget is to quantify the reduction in offsite discharge by reuse for a typical year. Individual components of supply, storage, use, and movement must be estimated on a monthly basis for an average year. Each component value should be representative of the unique situation of the soil, crop, operation, and management.

The following parameters are used to calculate water budgets. Examples of a water budget using these parameters are included at the end of Section 12.

11.2 Reservoir and Canal Storage

Canals and reservoirs provide storage of excess water until the water is needed. For both types of water bodies, any volume above the downstream control elevation is assumed to be discharged downstream.

For the water budget, only the volume which can be moved from storage to a point of need should be considered recyclable. The recyclable volume is dependent on the most limiting feature of the flow path, e.g. pump inlet, reservoir bottom, culvert inverts, field topography.

Secondary canals and field ditches can normally be omitted without affecting the accuracy of the water budget.

11.3 Rainfall

Average monthly rainfall depths can be found in the District's Technical Publication SJ 86-4, "Rainfall Analysis for Northeastern Florida; Part II: Summary of Monthly and Annual Rainfall Data" and Weather Bureau publications entitled "Climatic Summary of the United States", and the "Annual Summaries of Climatological Data". The District's Technical Memorandum; "30 Year Mean; Blaney - Criddle; Supplemental Irrigation Requirement" provides average monthly rainfall depths for at least one location in each county. Average rainfall depths should represent a minimum of 30 years of rain gage data collected by NOAA stations or other reliable sources.

11.4 Effective Rainfall

Effective rainfall (R_E) is the precipitation retained by the soil to meet evapotranspiration requirements. It does not include precipitation lost to deep percolation below the root zone nor to surface runoff.

Since there are no records of effective rainfall available, the effective portion of the precipitation must be estimated from the total precipitation.

SCS analyzed 50 years of rainfall data at each of 22 stations to develop a method to estimate the monthly effective rainfall. Based on their findings, the monthly effective rainfall can be calculated by:

$$R_e = (0.70917\ R^{0.82416} - 0.11556)(10^{0.02426u})\ (F)$$

where:
R = average effective monthly rainfall, in.;
R_e = average total monthly rainfall, inches;
u = monthly evapotranspiration, inches;
F = soil water storage factor.

The soil water storage factor is estimated by:

$$F = (0.531747 + 0.295164D - 0.057697D^2 + 0.003804D^3\ )$$

where D is the net application dearth or the usable soil water storage in inches. Typical net application depths for Florida soils range from 1.5 inches for sandy soils, soils with naturally shallow water tables, or soils planted with shallow rooted crops to 4.0 inches for well drained loamy soils used to grow deep rooted crops.

In situations where the rooting dearth is limited by shallow water tables, the effective rainfall must be adjusted to account for the upflux of water from the water table to the root zone. The net application depth should be based on the average rooting depth (i.e. average water table depth plus the depth of water which is capable of moving up into the root zone by capillary action.

The average monthly effective rainfall, R_e , cannot exceed the average monthly rainfall, R, or average monthly evapotranspiration, u. If the estimated R_e exceeds either, then R must be reduced to the smaller of the two. USDA-NRCS publication Irrigation Water Requirements; Technical Release No. 21 discusses this procedure in greater detail.

11.5 Evapotranspiration (Potential and Actual)

Potential Evapotranspiration (PET) is the depth of water evaporated from the soil plus the transpiration from plants assuming the transpiration is not limited by soil water availability. PET may be calculated by any well documented method. The District recommends using the Blaney - Criddle method, as described in USDA-SCS Technical Release No. 21, revised September, 1970. This method utilizes mean monthly temperatures, daylight hours, and crop coefficients. Monthly PET is determined by :

$$u = (0.0173t - 0.314) (k_{c)} (t * p/100)$$

where:
u = monthly PET, inches;
t = mean monthly air temperature, ^{o}F.;
k_c = coefficient reflecting the growth stage of the crop; and
p = monthly percentage of daylight hours in the year.

The Blaney-Criddle method assumes full vegetative cover. Examples of crops with full vegetative cover are pasture grasses and corn. Monthly PET for citrus is usually reduced by a factor of 0.80 to account for non-complete vegetative cover.

Actual evapotranspiration (AET) is the evaporation from the soil plus transpiration from plants. Plant transpiration may be limited by the availability of soil water. under irrigation systems capable of distributing water frequently and uniformly over the field, the actual evapotranspiration is assumed to be equal to the potential evapotranspiration.

11.6 Evaporation from the Reservoir

M.A. Kohler (1959) reported the average annual lake evaporation ranges from 45 inches per year near the District's northern border to 48 inches per year near the District's southern border. Average monthly lake evaporation data may be available

for a few sites, but is unavailable for the majority of the District. A record length of at least 20 years should be used calculate average monthly evaporation.

If lake evaporation data is not available for a lake near the project site, the average annual evaporation can be estimated from Figure 11-1. Average Annual Lake Evaporation (inches), from “Evaporation Maps for the United States”. Monthly lake evaporation can be estimated by proportioning the annual evaporation similarly to the distribution of monthly pan evaporation for a nearby location. Pan evaporation is published in "Climatological Data: Florida" by the NOAA Climatic Data Center, Asheville, North Carolina. Summary of the pan evaporation data for northeast Florida locations is given in Table 11-1.

In the monthly water budget, surface evaporation from the reservoir must be completely satisfied for prior to allocating reservoir water for irrigation.

11.7 Net Irrigation Required

The net irrigation required (NIR) is the depth of supplemental water above precipitation, stored soil moisture, or groundwater, that is required to allow plants to transpire without limitation due to the lack of available water. This volume must be determined for each field with a different crop or fields under different planting dates. Monthly NIR values for a typical year are computed by:

$$NIR = (PET - R_e) \times A$$

where:

NIR = monthly net irrigation volume, ac-in.;
PET = monthly potential evapotranspiration, inches;
R_e = monthly effective rainfall, inches;
A = field acreage.

If R_e is greater than the PET, then NIR is equal to zero since all of the water required to meet PET is supplied by precipitation.

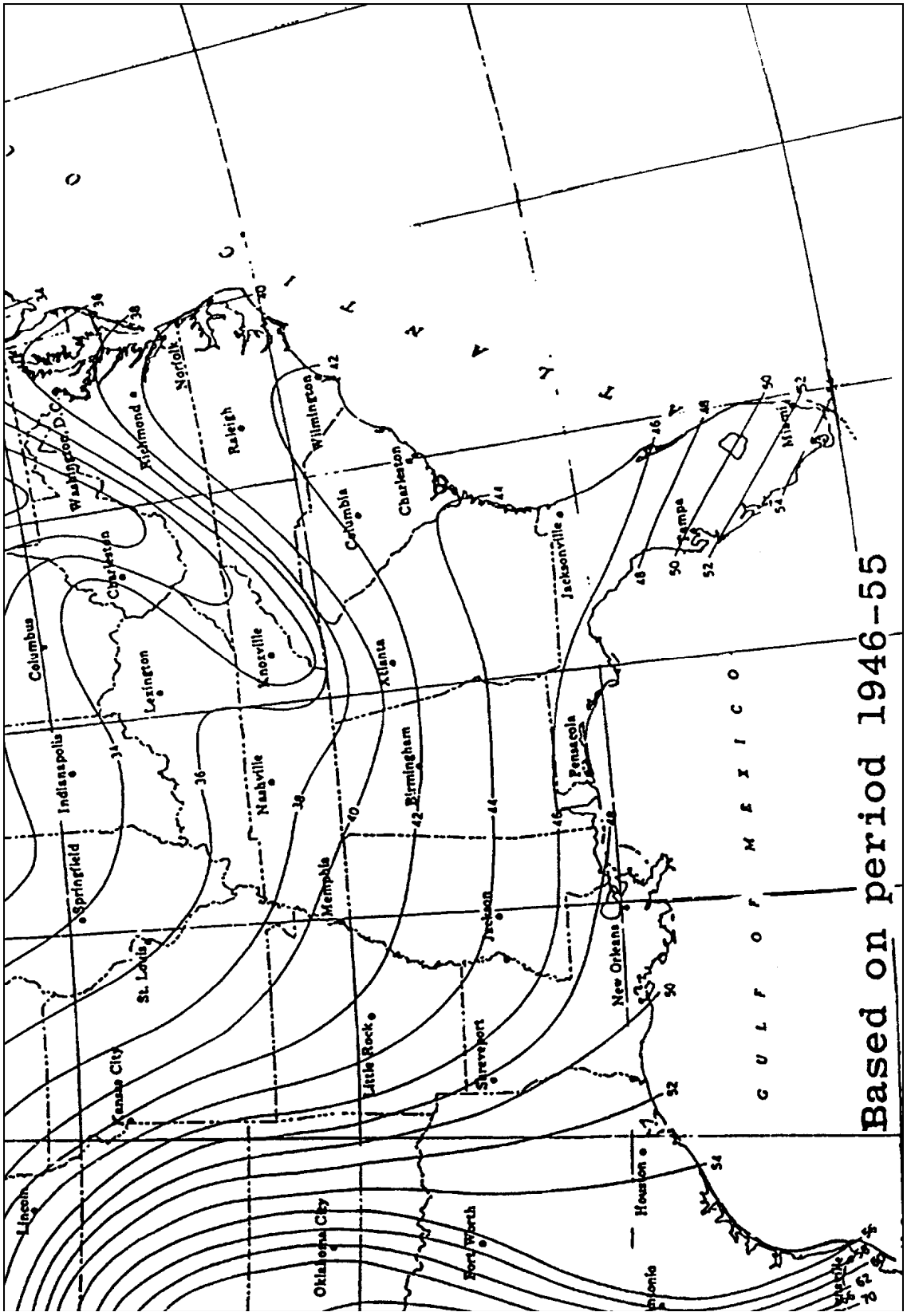

Figure 11-1. Mean Annual Lake Evaporation, inches (from "Evaporation Maps for the U.S.")

Table 11-1. Mean monthly pan evaporation and percent of annual pan evaporation

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
						Gainesville (1953–1990)							
Mean	2.93	3.64	5.52	6.94	7.92	7.51	7.10	6.57	5.66	4.92	3.49	2.74	64.94
%	4.51	5.61	8.50	10.69	12.20	11.56	10.93	10.12	8.1	7.58	7.37	42..	100.00
						Lake Alfred (1965–1990)							
Mean	3.54	4.30	6.42	7.69	8.70	7.80	7.76	7.39	6.56	5.69	4.12	3.29	73.26
%	4.83	5.87	8.76	10.50	11.87	10.65	10.60	10.09	8.95	7.77	5.62	4.49	100.0
						Lake City (1965-1990)							
Mean	3.04	3.65	5.04	6.83	7.78	7.57	7.55	6.80	5.90	5.05	3.70	3.04	65.95
%	4.61	5.53	7.64	10.36	11.80	11.48	11.45	10.31	8.94	7.66	5.61	4.61	100.0
						Lisbon (1960–1990)							
Mean	2.47	3.16	5.07	6.55	7.40	6.81	6.78	6.24	5.21	4.38	2.83	2.37	59.27
%	4.16	5.33	8.55	11.05	12.49	11.49	11.44	10.53	8.79	7.39	4.78	4.00	100.0
						Vero Beach (1952–1990)							
Mean	3.40	4.09	5.79	6.88	7.63	7.25	7.17	6.83	6.04	5.44	3.89	3.22	67.63
%	5.03	6.05	8.56	10.17	11.28	10.72	10.60	10.10	8.93	8.05	5.75	4.76	100.0

Taken from "Climatological Data: Florida" by the NOAA Climatic Data Center, Asheville, North Carolina.

11.8 Gross Irrigation Required

The gross irrigation required (GIR) is the depth of water that must be supplied to provide the NIR. Losses due to evaporation, deep seepage, and leaks in the irrigation distribution system plus the non-uniformity of applied water reduces the efficiency of the irrigation system.

Less efficient irrigation systems require more water to be distributed to meet the NIR. The total water volume required, which must be supplied by the surface water or groundwater source, is:

$$GIR = NIR / I_e$$

where:

GIR = monthly gross irrigation volume, acre-in.;
NIR = monthly net irrigation volume, acre-in.
I_e = irrigation efficiency, as a decimal

Typical application efficiencies for different types of irrigation systems are listed in Table 11-2.

All water supplied by the reservoir to meet the GIR is considered reuse and represents a reduction in the potential offsite discharge volume.

11.9 Other Water Sources (Groundwater and Off-Site Surface Water)

Groundwater and off-site surface water sources need to be identified and the volume from these sources has to quantified. If these other water sources are used to meet NIR, then the additional water would not increase the volume entering into the reservoir or being discharged off-site. If these other contributing water sources are providing water for freeze protection, nematode control, or soil oxidation control, then this volume, adjusted for any evaporation or deep seepage losses, must be routed to the reservoir.

In order to maximize reuse of stormwater as required by section 40-44.066(1)(b), all available water in the reservoir must be used prior to using groundwater or offsite surface water sources unless it is impractical due to specific circumstances.

Table 11-2: Irrigation system irrigation efficiencies*+

Sprinkler Irrigation Systems		
System Type	***Range***	***Average***
Solid Set Systems	0.70 - 0.80	0.75
For Container Nurseries	0.15 - 0.50	0.20
Guns		
Portable Guns	0.60 - 0.70	0.65
Traveling Guns	0.65 - 0.75	0.70
Center Pivot and Lateral Move Systems	0.70 - 0.85	0.75
Periodic Move Laterals	0.65 - 0.75	0.70
Hand-Move or Portable		
Lateral End-Tow Systems		
Side-Roll Systems		
Side-Move Systems		
Micro Irrigation Systems		
Drip or Line Source		
Systems Surface	0.75 - 0.90	0.85
Subsurface	0.75 - 0.95	0.85
Spray Systems	0.70 - 0.90	0.80
Bubbler Systems	0.70 - 0.85	0.80
Subirrigation (Seepage) Systems		
Open Field Ditch Systems		
Open Field Conveyance Systems		
Flow Through	0.20 - 0.70	0.50
Tailwater Recycle	0.30 - 0.80	0.60
Semi-Closed Conveyance Systems		

Flow Through	0.30 - 0.70	0.50
Tailwater Recycle	0.40 - 0.80	0.60
Subsurface Conduit Systems	0.40 - 0.80	0.60

System Type	*Range*	*Average*
Surface (Flood) Systems		
Crown Flood Systems	0.25 - 0.75	0.50
Continuous Flood (Paddy) Systems	0.25 - 0.75	0.50

*****Irrigation system application efficiencies for well-designed and well-managed irrigation systems in Florida.
[+]Taken from IFAS Bulletin 247, Efficiencies of Florida Agricultural Irrigation Systems; June 1988, by Smajstrla, A.G., et al.

11.10 Volume of Water Entering the Reservoir

Reservoir storage recharge is a combination of all stormwater runoff (RO) from the fields plus any off-site water entering the project area which is not used to meet the PET. Minimum RO volume from a field is the non-effective rainfall amount minus seepage loss and may be calculated by:

$$RO = (R - R_e) \times A - S_1$$

where:

RO = monthly runoff from rain, acre-inches;
R = monthly rainfall, inches;
R_e = monthly effective rain, inches;
A = field acreage;
S_1 = deep and lateral seepage losses, acre-inches.

Seepage losses must be quantified using standard methods.

11.11 Volume of Water Discharged Off-site

The maximum water stage in the reservoir is assumed to be the lowest control elevation of the discharge structure(s). Any storage volume over this stage will be discharged off-site.

11.12 Seepage to/from the Reservoir/Farm

Seepage between the reservoir and agricultural fields can normally be neglected since the water is still within the system. Typical reservoir designs are not conducive for offsite groundwater to seep into the reservoir. Seepage from the reservoir can normally be neglected unless the surface water elevations or groundwater elevations in the offsite areas adjacent to the reservoir are more than 1.5 feet lower than the

reservoir control elevation. If this is the case, the outgoing seepage can be estimated by a form of Darcy's law:

$$Q = (- Kah/L) \times W \times days$$

where:

Q = seepage flow, ft^3/month;
K = effective hydraulic conductivity, ft/day;
a = vertical area of flow per foot of perimeter, ft^2/ft
h = average hydraulic head, feet;
L = average seepage flow length, feet;
W = length of perimeter seepage face, feet;
days = number of days in the month

Darcy's law can also be used to estimate the seepage onto the fields from off-site or the seepage from the fields to off-site areas.

11.13 Reduction in Volume Discharged by Reuse

The reduction in the off-site discharge is equal to the volume of water returned from the reservoir to the fields to meet NIR or provide freeze protection, nematode control, or soil oxidation control. The yearly percent reduction of off-site discharge can be estimated by comparing the difference between the volume which would have been discharged offsite if the reservoir was not present and the volume discharged offsite with the volume which would have been discharged offsite if the reservoir was not present. This relation may be mathematically represent as:

$$RD = [1 - (VD / PVD)] \times 100$$

where:

RD = reduction of offsite discharge, %
VD = estimated volume discharge offsite, ac-ft
PVD = estimated volume discharged offsite if no water was recycled onsite, ac-ft

12.0 Methodologies and Design Guideline for Wet Detention Systems

12.1 Description of Wet Detention Systems

One of the most common systems used for treatment of stormwater and associated waste water from agricultural operation is a wet detention system. A wet detention system is a wet pond with sufficient storage volume to accept a relative large volume of excess water over a short time period and release the volume over a long period of time. Primary advantages of a wet detention system over other treatment systems are: 1) wet detention systems generally have the best treatment efficiency; and 2) wet detention systems normally require the least amount of maintenance. Agricultural operations using wet detention system receive additional benefits. First, the wet detention system is a source of water for irrigation, freeze protection or soil pest control. Second, the pond storage capacity is capable of attenuating large storm events. Thus, the drainage capacity of the cropped land may be increased to provide a higher level of protection from excess water, while not increasing the peak rate of offsite discharge from the pre-developed condition.

There are several components in a wet detention system which must be properly designed to achieve the level of treatment required by chapter 40C-44, F.A.C.

12.2 Treatment Volume

The minimum wet detention treatment volume is equal to the first inch of runoff. However, for systems discharging into Class I, Class II, or Outstanding Florida Waters, they may be required to: 1) Pre-treat the runoff prior to discharge into the wet detention pond; and 2) increase the treatment volume by fifty percent (50 %).

The maximum depth of the treatment volume is eighteen inches.

12.3 Recovery Time

No more than half the treatment volume may be discharged in the first sixty hours following a storm event, but at least half the treatment volume must be discharged within 72 hours following a storm event.

The portion of the treatment volume discharged in the first sixty hours is calculated by assuming the water stage is at the top of the treatment volume. A popular means of meeting this requirement is to use an orifice. The orifice equation is modified to solve for A (area of the orifice) as follows:

$$Q = CA(2gh)^{1/2}$$

$$A = Q / C(2gh)^{1/2}$$

where:

Q = average rate of discharge for the first sixty hours (cfs);
A = orifice area, minimum (sq. ft.);
g = gravitational constant (32.2 ft/sec^2);
h = average hydraulic head; determined by the water depth from the center line of the orifice to the midpoint between the top of the treatment volume and the water stage when half the treatment volume has been released;
C = orifice coefficient (usually assumed = 0.6).

For large wet detention systems, a weir type of bleeddown structure is more applicable. Similar to calculations for using an orifice, the weir equation is solved to determine the length and/or shape of the weir. The basic horizontal weir equation is:

$$Q = CLh^m$$

where:

Q = average rate of discharge for the first sixty hours (cfs);
L = length of the crest, (feet); (omitted from equation for "V" notched weirs:
h = average hydraulic head; determined by the water depth from the crest of the weir to the midpoint between the top of the treatment volume and the water stage when half the treatment volume has been released:
m = the exponent 'm' is dependent upon the shape of the weir opening;
C = a coefficient dependent on the type of the crest and the approach conditions.

Weir openings may be rectangular, trapezoidal, triangular, or a special shape to give desired head-discharge relationship. Consult standard hydraulic handbooks and references for detailed discussions of weirs.

Orifice/weir size may be determined by trial and error using computer models (i.e., Advanced ICPR, PONDS, BRN) to simulate the reservoir drawdown.

After the bleeddown orifice/weir size has been determined, the structure should be checked to determine if at least half of the treatment volume will be recovered within 72 hours.

12.4 Minimum Bleeddown Size

Bleeddown devices with any dimension four inches or smaller or less than a 20 degrees for a "V" notched weir must include a device to eliminate clogging. Such devices include baffles, grates, pipe elbows, etc.

12.5 Permanent Pool

The permanent pool (storage below the bleeddown structure) must have sufficient volume to provide an average residence time of 21 days during the wet season (June through October). This volume is determined by estimating 13.82% of the wet season runoff for the post-permitted condition. Thus, the minimum permanent pool volume (PPV) required is:

$$PPV = (area)(RO\ coef.)(rainfall)(0.1382)/12$$

where:

PPV = the permanent pool volume, acre-ft.;
area = acreage of the drainage basin;
RO coef. = average runoff coefficient for the drainage basin;
rainfall = normal rainfall depth from June 1st to October 31, inches;

Rainfall during the wet season can be estimated from Figure 12-1 (copied from the District's Technical Publication 90-3 "Rainfall analysis for NE Fla. Part V: Frequency analysis of wet season and dry season rainfall".

Runoff coefficients may be determined using the SCS Runoff Curve Numbers and the mean annual 24-hour maximum rainfall event. Curve numbers are selected based on proposed land use, hydrologic condition, and hydrologic soil group. Technical publication No. SJ 85-5, "A Guide to SCS Runoff Procedures" and SCS Technical Release 55; "Urban Hydrology for Small Watersheds" are excellent references for curve numbers and calculation procedures. A weighted average curve number is determined. Assuming the initial abstraction is twenty percent of "S", the SCS runoff equation is

$$RO = (P - 0.2S)^2 / (P + 0.8S)$$

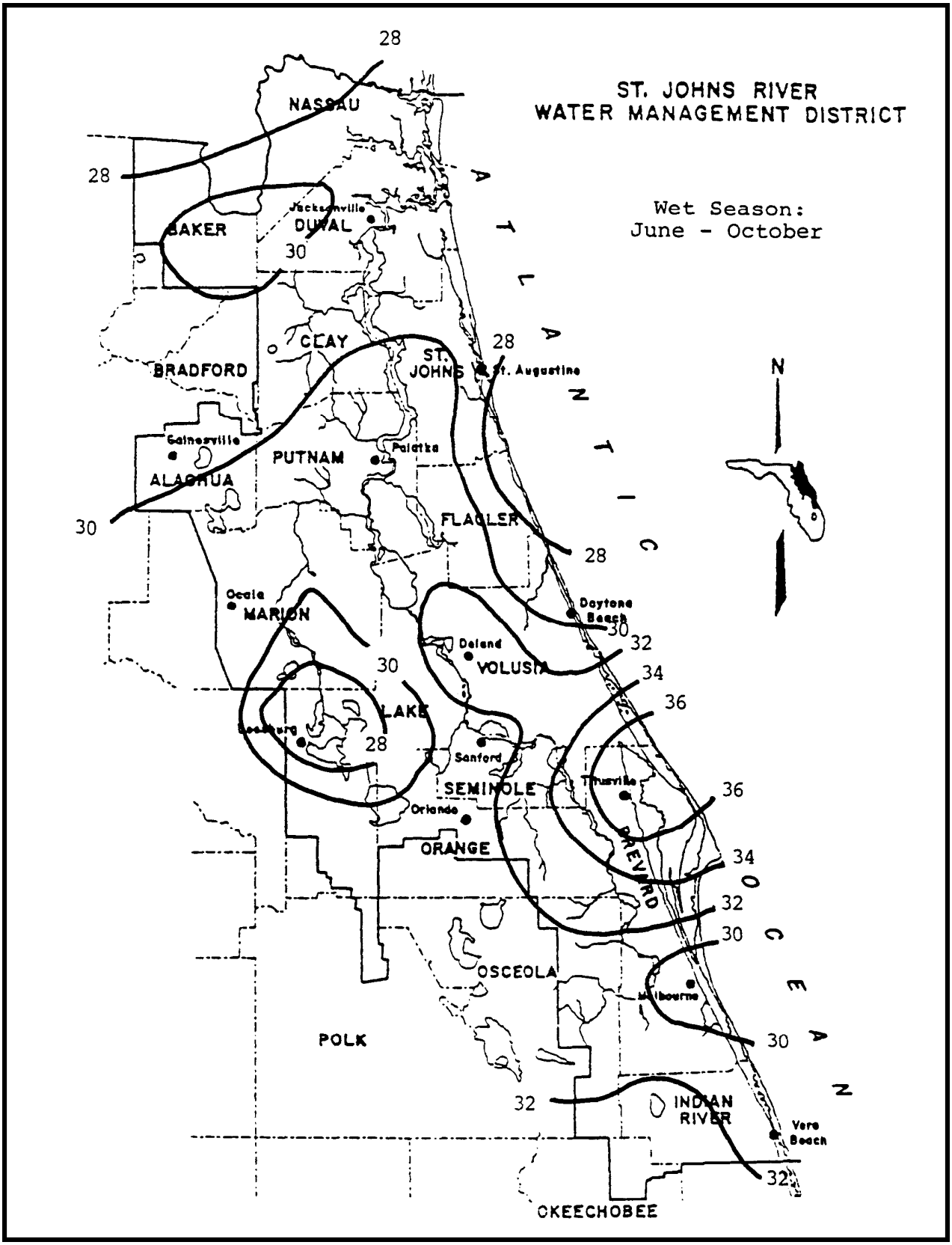

Figure 12-1. Wet Season Normal Rainfall, inches

where:
RO = runoff (inches);
P = rainfall (inches);
S = potential maximum retention after runoff begins (inches),

S is related to the soil and cover conditions of the field through the curve number (CN) by

$$S = (1000 / CN) - 10$$

Runoff coefficients are based on design rainfall event (P) equal to the mean annual 24 hour maximum storm event. This storm event ranges from 4.0 inches near Gainesville to 5.2 inches near the Atlantic coastline (see Figure 12-2).

$$\text{Runoff coefficient} = RO / P.$$

An alternate method to determine the runoff volume is to develop a water budget for a typical year (see Section 11). From the water budget, the total runoff volume is determined by summing runoff from all land uses, including the reservoir, during the wet season.

For the different counties within the District, the District has modeled the water budget for the most common agricultural land types assuming generalized conditions (Technical Memorandum, "30 Year Mean, Blaney - Criddle, Supplemental Irrigation Requirements"). For most projects, the District's results are acceptable for determining the runoff coefficient for agricultural areas.

12.6 Littoral Zone

Wet detention ponds must promote sedimentation of suspended solids. Littoral zones are an excellent method to promote sedimentation and provide additional water quality treatment. Design of littoral zones must include the following:

a. The littoral zone shall be gently sloped (6H:1V or flatter) to a point 2 - 3 feet below the bleeddown or control elevation and extend to the top of the treatment volume. The littoral zone and vegetation should be concentrated at the inflow and at the outfall.

b. The treatment volume must not cause the pond level to rise more than 18 inches above the control elevation unless it is demonstrated that the littoral zone vegetation can survive at greater depths.

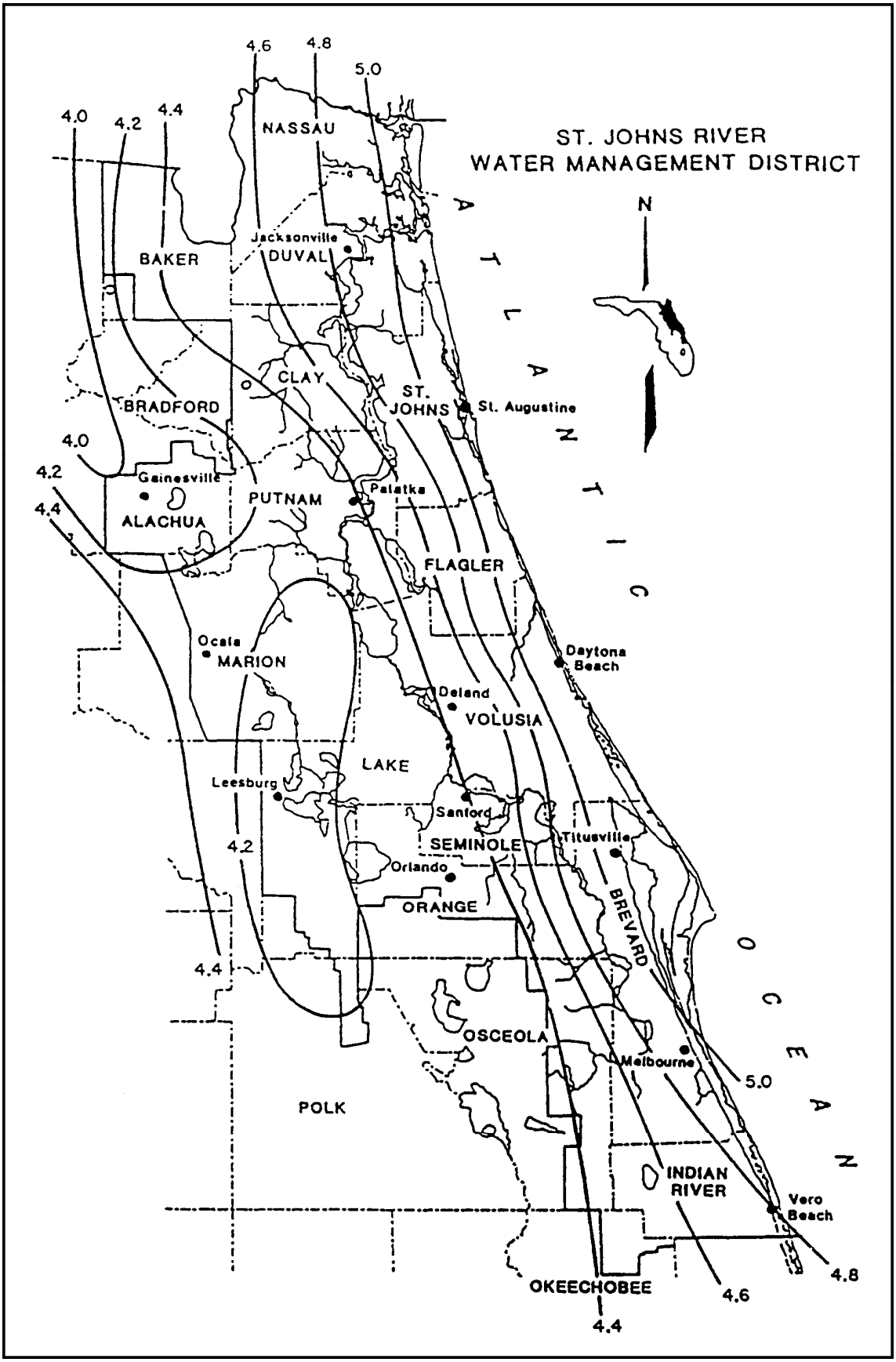

Figure 12-2. Mean Annual 24-hour Maximum Rainfall for N.E. Florida, inches

12.7 Alternatives to Littoral Zones

Sedimentation of suspended solids discharged into the wet detention pond may be encouraged by providing a sump area near the inlet or increasing the permanent pool volume.

Sumps should be designed to remove particles 0.1 mm and larger in diameter and provide sufficient storage volume to store all of the expected sediments collected over a ten year period. The design should allow for easy removal of the collected sediments. A sump area must be provided for each inflow.

Increasing the permanent pool volume by 1/2 inch over the drainage basin may be used as an alternative to a littoral zone. Pond depth must be consistent with section 12.8.

12.8 Maximum Depth

New wet detention systems shall be designed so that the permanent pool does not exceed a maximum dearth of 10 feet or an average depth of 4 feet below the invert of the bleeddown device unless the applicant affirmatively demonstrates that the deeper depths will not cause anaerobic conditions in the water column. The permanent pool depth in existing wet detention systems should not exceed an average of 5 feet or a maximum of 10 feet, unless the applicant affirmatively demonstrates that the deeper depths will not cause anaerobic conditions in the water column.

12.9 Flow Path

Wet detention ponds shall be designed to maximize the flow path through the pond by having an average length to width ratio of at least 2:1. The alignment and location of inlets and outlets should be designed to maximize flow paths in the pond. If short paths are unavoidable, the effective flow path should be increased by adding diversion barriers such as islands, peninsula, or baffles to the pond. Inlet structures shall be designed to dissipate the energy of water entering the pond.

Interior borrow canals or existing ditches within the wet detention pond must not short circuit the flow path through the pond. The effective flow path should be increased by adding diversion structures such as canal plugs. Canals running parallel to the primary flow direction in the reservoir or toward the outlet must be plugged at least every 300 feet. All other canals must be plugged at least every 500 feet unless the plugging will create dead spots within the reservoir. Top of plugs should be at least 6 inches higher than the surrounding area with a minimum top width of 20 feet in the direction of the canal/ditch flow. Side slopes must be sufficiently flat to resist sloughing if the pond is drained.

12.10 Groundwater and Tailwater Consideration

Wet detention ponds should be designed so that bleeddown structure invert elevations are at or above the estimated post-development average water table elevation and above the

anticipated post-development wet season tailwater elevation. If the structure is proposed to be set below the average water table elevation, ground water inflow must be considered in the drawdown calculations, calculations of average residence time, and estimated normal water level.

12.11 Return Structure for Water Reuse

Gravity structures used to return water from the wet detention pond to the farm should be sized to provide the expected maximum daily reuse amount when the pond has 1/2 of the required permanent pool volume. The recyclable volume must be maximized by placing the return structure inverts below the bottom of the reservoir or 2 feet below the lowest land to receive the recycled water.

12.12 Discharge Structure Capacity and Erosion Control

Discharge structures must be designed to gradually release the treatment volume by a bleeddown device as described in section 12.3. Water above the treatment volume may be discharged at a higher rate. Under no circumstance should the cumulative discharge rate exceed the estimated pre-development peak discharge rate.

All pipe passing through the sides of the pond must be fitted with anti-seepage collars which extend a minimum of two feet perpendicular from the pipe.

Discharge characteristics must be provided for each discharge structure. Data may be provided in graphic or tabular form with maximum head increments of 0.25 feet. The data should be inclusive for water stages from the structure's invert to the design high water level. Discharge values should consider tailwater. If flood events are capable of creating controlling tailwater conditions, discharge data should include tailwater conditions ranging from no tailwater conditions to the maximum tailwater condition, with a maximum tailwater increment of 0.5 feet.

12.13 Design High Water Level

The design high water level is to be determined for pumped systems in the Upper St. Johns River Hydrologic Basin and the Ocklawaha River Hydrologic Basin by modeling the 25 year 96 hour storm through the pond. All other systems must model the 25 year 24 hour storm through the pond.

As an alternative to modeling the required storm event, the applicant may estimate the design high water level by adding the stage at which the peak discharge out of the pond is equal to the peak discharge into the pond plus the rainfall depth of the design storm event. Maximum peak discharge from the pond based on a stage equal to the design high water level can not exceed pre- development peak discharge.

12.14 Dike Freeboard

To address public safety concerns, a minimum 1.5 foot freeboard should be provided above the maximum high water level. If the farm and pond is surrounded by an existing dike, then the freeboard on the farm side of the pond may be reduced to 1.0 foot.

12.15 Maintenance Access

Detention basins must be designed to accommodate maintenance equipment access and to facilitate regular maintenance, mowing, and vegetation control.

12.16 Wet Detention Design - Example

Given: Sod/vegetable farm proposed near Sanford (Class III receiving waters) Project area = 240 acres; Proposed land use - 75 acres of sod on Class B soils (Curve number = 69); 150 acres of vegetables on Class C soils (Curve number = 76, for straight rows / crop residue cover); 15 acres of wet detention pond (~6% of area); Off-site drainage area = 40 acres of fair pasture on Class C soils (Curve number = 79). Design tailwater elevation = 65.0 ft. Wet Season groundwater elevation = 66.0 ft.

Design Calculations for Wet Detention Reservoir:

Step 1. Treatment volume.

The District requires a treatment volume equivalent to 1 inch of runoff over the drainage basin.

Treatment Volume = (280 acres)(1 inch) / 12 in/ft = 23.33 ac-ft

For reservoirs with littoral zones, the treatment volume depth cannot exceed 18 inches (1.5 feet).

Minimum reservoir acreage = 23.33 ac-ft = 15.6 acres x 1.5 feet

Assume the reservoir is 15.6 acres at the bottom of the treatment volume, the invert of the bleeddown structure.

Step 2. Control structure elevation.

Set the bleeddown opening at or above the wet season groundwater elevation and the design tailwater elevation. Therefore, set the invert elevation at 66.0 feet.

Set an overflow weir at the top of the treatment volume storage to discharge runoff volumes greater than the treatment volumes. Provide adequate freeboard above the maximum water stage.

Step 3. Permanent Pool

Permanent pool volume (volume below the discharge control elevation) must provide an average 21 day residence time during the wet season (June - October). From Figure 12-2, the wet season rainfall for Sanford is 31 inches.

The runoff coefficient is calculated from SCS Runoff Curve Numbers using the mean annual 24 hour maximum storm event. From Figure 12-1", the design storm is 4.4 inches.

$$\text{Runoff coefficient} = RO/P = \text{Runoff/mean annual rainfall depth}$$
$$= (P - 0.2S)^2/(P + 0.8S) / P$$

where $S = (1000/CN) - 10$

Parcel	Curve No.	S	RO coef.	Area	RO coef. x Area
Sod	69	4.49	0.349	75	26.14
Vegetable	82	2.20	0.579	150	86.83
Pasture	79	2.66	0.521	40	20.84
Pond	100	0.00	1.000	15	15.00
				280	148.81

Average Runoff Coefficient = 148.81/280 = 0.531

21 day residence time during the wet season = 21 days/153 days

$$\text{Minimum permanent} = \frac{(280 \text{ ac})(0.531)(31 \text{ inches})(21/153)}{12 \text{ in/ft}} = 52.8 \text{ ac-ft pool volume}$$

The average permanent pool depth can not exceed 4 feet for new wet detention reservoirs, and is based on the water surface area at the control elevation of the discharge structure. Thus,

Average Permanent = 52.8 ac-ft/15.6 acres = 3.38 feet. OK.
Pool Depth

Step 4. Pond Size

The reservoir must have a length to width ratio of at least 2:1, and promote sedimentation. For this example, a littoral zone will be used to promote sedimentation. Thus, the interior side slopes must be 6H:1V or flatter to a depth of 2 to 3 feet below the control elevation.

Reservoir Width = $((15.6 \text{ ac} * 43560 \text{ ft}^2/\text{ac})/2)^{0.5}$ = 583 ft
Reservoir Length = 2 * W = 2 * 583 ft = 1166 ft.

A 583 ft. x 1166 ft. reservoir with 6H:1V side slopes down to a maximum reservoir depth of 4.0 feet will provide 58 ac-ft of storage. Inlets and outlets must be located to maximize flow path and eliminate any dead spots.

Step 5. Size the control structure

The drawdown requirement is that no more than half the treatment volume can be discharged in the first 60 hours following a storm event, but at least half the treatment volume is discharged with 72 hours. For this example, a rectangular orifice with a height of 9 inches, 0.75 feet, will be used to recover the upper half of the treatment volume within 60 hours. Recovery of the bottom half of the treatment volume will be based on weir flow through the rectangular orifice.

The orifice equation is modified to solve for A (area of orifice) as follows:

$$Q = CA(2gh)^{0.5}$$
$$A = Q / (C(2gh)^{0.5})$$

where:

Q = average rate of discharge, cfs.
A = orifice area (sq. ft.)
g = gravitational constant (32.2 ft/sec.^{2})
h = depth of water above the flow line (center) of orifice, feet
C = orifice coefficient (usually assumed = 0.6)

By setting "h" equal to the average depth between two stages and calculating the average flow rate of the treatment volume drawdown during the interval, the orifice area can be determined.

$$h = ((h_1 + h_2)/2) - h_c$$

where:

h_1 = initial stage = 1.5 feet;
h_2 = depth when half the treatment has been released = 0.75 feet;
h_c = orifice center line depth = 0.75 feet.

To solve the orifice equation, the average rate of discharge, Q, must be determined first:

Q = (23.3 ac-ft/2)(43560 sq. ft/ac)/(60 hrs(1 hr/3600 sec)) = 2.35 cfs.

Solving the orifice equation for this example:

h = (1.5 ft + 0.75 ft.)/2) - (0.75 ft./2) = 0.75 feet

Therefore:

$$A = 2.35 \text{ cfs}/\{0.6[(2)(32.2 \text{ ft/sec}^2)(0.75 \text{ ft})]^{1/2}\}$$

$$A = 0.564 \text{ sq. ft.}$$

The width (W) of the orifice = orifice area/orifice height

$$W = 0.564 \text{ sq. ft.} / 0.75 \text{ ft.} = 0.75 \text{ ft. or } 9 \text{ inches.}$$

Additional Steps.

In a typical design, the applicant would have to design the following:

1. Sedimentation promotion by use of a littoral zone, sedimentation sumps, or additional permanent pool volume.

2. Alignment of inlets and outlets to promote mixing and maximize flow path; and

3. Overflow weir to safely pass the design storm event(s) at pre-development peak discharge rates.

12.17 Water Budget Calculations - Example

Given:

Citrus grove proposed near Titusville (Class III receiving waters) Project area = 240 acres; Proposed land use - 224 acres of citrus grove irrigated by micro-irrigation systems; fair condition; 80 acres on Class B soils (Curve number = 65) and 144 acres on Class C soils (Curve number = 76). A 16 acre wet detention pond will be constructed on Class C soils. Off-site drainage area = 40 acres of fair pasture on Class C soils; Curve number = 79. Design tailwater elevation = 65.0 ft. Wet Season groundwater elevation = 66.0 ft. Reservoir control elevation = 66.0 feet.

The following assumptions were made to provide the most accurate and realistic management of the water:

1. The volume of water entering the pond is totaled for the month prior to any water being distributed.

2. Use of pond water is prioritized as follows: i) evaporation; ii) irrigation; iii) offsite discharge.

3. The volume of water remaining at the end of the month in excess of the permanent pool volume is discharged offsite.

4. None of the treatment volume may be used to meet evaporation or irrigation requirements.

5. Only the permanent pool volume above the return structure invert elevation may be recycled to the farm as irrigation water.

Components of the water budget are described below.

Column A. Month - Start the year with a month in which the reservoir is expected to be full. October is usually a good month to start with since it is the last month of the wet season.

Column B. Reservoir stage at the beginning of the month. It is assumed to be equal to the control elevation for the first month. Based on stage vs storage volume relationship and column C.

Column C. Reservoir volume at the beginning of the month (B.O.M.). For the first month, it is assumed to equal the permanent pool volume and must equal the End of the Month Reservoir Volume (column T) for the last month of the budget. For other months, the B.O.M. volume is equal to the E.O.M volume of the previous month.

Column D. Monthly rainfall volume falling on the pasture. Estimated by multiplying monthly rainfall depth (column AA) by pasture acreage.

Column E. Monthly potential evapotranspiration volume for the pasture. Estimated by multiplying monthly potential evapotranspiration rates (column BB) by pasture acreage. Potential evapotranspiration rates were calculated using the Modified Blaney-Criddle Method.

Column F. Actual evapotranspiration volume from the pasture. Estimated by multiplying monthly effective rainfall (column CC), the only water source for the pasture, by the pasture acreage.

Column G. Runoff volume from the pasture routed to the pond. This volume is calculated by multiplying the pasture acreage by the difference between the rainfall and effective rainfall (column AA - column CC). Values were divided by 12 to convert acre-inches to acre-feet.

Column H. Monthly rainfall volume falling on the citrus grove. Estimated by multiplying monthly rainfall depth (column AA) by citrus acreage.

Column I. Monthly potential evapotranspiration volume for the citrus. Estimated by multiplying monthly potential evapotranspiration rates (column DD) by citrus acreage. Potential evapotranspiration rates were calculated using the Modified Blaney-Criddle Method.

Column J. Actual evapotranspiration volume from the citrus. Actual evapotranspiration volume cannot exceed the potential evapotranspiration volume (column I) nor may it exceed

the sum of effective rainfall multiplied by the citrus acreage plus the Net Irrigation Volume (column L).

Column K. Net Irrigation volume provide to the citrus acreage. This volume may not exceed the Net Irrigation Required for citrus (column EE) times the citrus acreage nor may this volume exceed the pond water available for irrigation multiplied by the expected irrigation efficiency. An irrigation efficiency of 0.75 was selected for the micro-irrigation system of this example (see Table 11-2).

Column L. Gross Irrigation volume provided to the citrus grove from the pond. This volume is calculated by dividing the Net Irrigation volume (column L) by the irrigation efficiency.

Column M. Lost Irrigation is the volume of water which is provided to meet the irrigation demands of the citrus grove, but was lost due to evaporation, deep seepage, lateral seepage, etc. This volume is the difference between column M and column L.

Column N. Runoff volume from the citrus grove routed to the pond. This volume is calculated by multiplying the citrus acreage by the difference between the rainfall and effective rainfall (column AA - column FF). Values were divided by 12 to convert acre-inches to acre-feet.

Column O. Precipitation volume falling on the pond. This volume is calculated by multiplying the pond area by the monthly rainfall (column AA).

Column P. Pond Evaporation volume. This volume is calculated by multiplying the pond area by the evaporation rate from an open water body (column GG). Evaporation must be satisfied prior to any water being used for irrigation or being discharged offsite.

Column Q. Maximum Pond Volume - Pond Evaporation is computed by summing the B.O.M. Pond Volume (column C) and the runoff volumes routed to the pond (columns G & N) minus the pond evaporation (column P).

Column R. Pond Volume - Irrigation is the Maximum Pond Volume (column Q) minus the Gross Irrigation Volume (column L).

Column S. Overflow from Pond is the pond volume (column R) in excess of the permanent pool volume.

Column T. End of the Month Pond Volume is the smaller value of the pond volume (column R) and the pond permanent pool volume.

Column AA. Rainfall depths used should represent the mean value for 20 years or longer. Values used for this example were taken from SJRWMD Technical Memorandum, "30 Year Mean, Blaney - Criddle, Supplemental Irrigation Requirements". SJRWMD's Technical Publication SJ 86-4, Rainfall Analysis for Northeast Florida, Part II, "Summary of Monthly and Annual Rainfall Data" gives long term rainfall average for 43 sites in northeast Florida.

Column BB. Potential Evapotranspiration rate for pasture estimated by the Blaney - Criddle Method using crop growth stage coefficient Figure No. 17.

Column CC. Effective Rainfall for the pasture acreage estimated by the Soil Conservation Service method. A net irrigation depth of 2 inches was used assumed based on type "C" soils. Mean monthly rainfall depths (column AA) were assumed.

Column DD. Potential Evapotranspiration rate for citrus estimated by the Blaney - Criddle Method using crop growth stage coefficient Figure No. 10. The coefficients reported in Figure No. 10 assumes complete field cover. Since it is impractical to have 100% field cover by the trees, the potential evapotranspiration rate was corrected using a factor of 0.84.

Column EE. Net Irrigation Required is the additional depth of water required by the crop to allow the crop to transpire without limitation due to insufficient available water. This depth is equal to the potential evapotranspiration rate (column DD) minus the effective rainfall for the citrus grove (column FF), but can not less than zero.

Column FF. Effective Rainfall for the citrus acreage estimated by the Soil Conservation Service method. A net irrigation depth of 2 inches was used assumed based on type "B" and "C" soils. Mean monthly rainfall depths (column AA) were assumed.

Column GG. Monthly pan evaporation. Values were selected for the closest location site from Table 11-1.

Column HH. Pond Evaporation for individual months were estimated by distributing the annual lake evaporation, estimated as 46 inches from Figure 11-1, based on the fraction of monthly pan evaporation (column GG) to the annual pan evaporation. For example, the pond evaporation for October would be:

(2.47 inches/ 59.27 inches) x 46.0 inches = 1.92 inches.

Column II. The Volume routed to the pond is the sum of runoff from the pasture, sum of column G, and runoff from the groves, sum of column N. A 46 percent reduction of the offsite discharge is expected for the agricultural operation. This reduction results from reuse of the pond water and evaporation from the pond. This reduction is estimated from the ratio of volume discharge to the potential discharge volume, which the volume routed to the pond:

WATER BUDGET EXAMPLE

A Month	B B.O.M. Pond Stage (ft)	C B.O.M. Pond Vol. (ac-ft)	D Rainfall Pasture (ac-in)	E P.E.T. Pasture (ac-in)	F A.E.T. Pasture (ac-in)	G Pasture to Pond (ac-in)	H Rainfall Citrus (ac-in)	I P.E.T. Citrus (ac-in)	J A.E.T. Citrus (ac-in)	K Net Irr. Citrus (ac-ft)	L Gross Irrig. Citrus (ac-ft)	M Lost Irr. (ac-ft)	N Citrus to Pond (ac-ft)	O Rainfall Pond (ac-in)	P Pot. Pond Ev. (ac-in)	Q Theor. Max. Vol – Evap (ac-ft)	R Pond Volume –Irrg (ac-ft)	S Overflow from Pond (ac-ft)	T E.O.M. Pond Volume (ac-ft)
Oct.	66.0	54.2	214	183	130	7.0	1196	741	741	5.2	7.0	1.7	43.1	85	31	108.9	101.9	-47.7	54.2
Nov.	66.0	54.2	89	109	54	2.9	497	506	506	17.5	23.4	5.8	16.8	36	39	73.6	50.2	0.0	50.2
Dec.	65.7	50.2	81	65	47	2.8	452	358	358	8.0	10.7	2.7	15.9	32	63	66.3	55.6	-1.4	54.2
Jan.	66.0	54.2	78	58	45	2.7	435	352	352	8.2	11.0	2.7	15.1	31	81	67.9	56.9	-2.7	54.2
Feb.	66.0	54.2	122	57	57	5.4	681	305	305	0.0	0.0	0.0	31.4	49	92	87.3	87.3	-33.1	54.2
Mar.	66.0	54.2	128	140	79	4.1	719	605	605	15.3	20.4	5.1	24.8	51	85	80.4	60.0	-5.8	54.2
Apr.	66.0	54.2	81	191	56	2.1	455	737	737	37.3	49.8	12.4	13.8	32	84	65.8	16.0	0.0	16.0
May	63.6	16.0	130	262	94	3.0	728	959	814	29.0	38.7	9.7	21.8	52	77	38.7	0.0	0.0	0.0
June	62.5	0.0	251	292	174	6.4	1404	1057	1057	17.9	23.9	6.0	46.9	100	65	56.3	32.4	0.0	32.4
July	64.6	32.4	305	326	215	7.5	1707	1183	1183	13.1	17.4	4.4	56.7	122	54	102.2	84.8	-30.6	54.2
Aug.	66.0	54.2	280	303	194	7.2	1568	1111	1111	14.6	19.4	4.9	52.6	112	35	120.4	101.0	-46.8	54.2
Sept.	66.0	54.2	300	247	190	9.2	1678	932	932	0.0	0.0	0.0	62.2	120	29	133.1	133.1	-78.9	54.2
		Totals	2057	2234	1334	60.3	11520	8846	8701	166.2	221.6	55.4	401.1	823	736	1000.8	779.2	-247.0	44.3

0 = PASTURE W.B. 0 = CITRUS W.B 0 = POND W.B.
ACRES -> 40 AC OF PASTURE 224 ACRES OF CITRUS 16 AC OF POND

	AA Rainfall	BB P.E.T.	CC Eff. Rain	DD P.E.T.		EE N.I.R.	FF Eff. Rain	GG Pan. Evap.	HH P.E.	II
Oct.	5.34	4.57	3.25	3.31	Irr. Coeff. = 0.75	0.29	3.03	2.47	1.92	Volume routed to the Pond (ac-ft) = 461
Nov.	2.22	2.72	1.36	2.26		0.94	1.32	3.16	2.45	
Dec.	2.02	1.62	1.17	1.60		0.43	1.17	5.07	3.93	
Jan.	1.94	1.46	1.12	1.57		0.44	1.13	6.55	5.08	% Reduction of offsite discharge = 46
Feb	3.04	1.43	1.43	1.36		0.00	1.36	7.40	5.74	
Mar	3.21	3.51	1.97	2.70		0.82	1.88	6.81	5.29	
Apr	2.03	4.77	1.40	3.29		2.00	1.29	6.78	5.26	
May	3.25	6.56	2.36	4.28		2.21	2.08	6.24	4.84	
June	6.27	7.30	4.34	4.72		0.96	3.76	5.21	4.04	
July	7.62	8.15	5.37	5.28		0.70	4.58	4.38	3.40	
Aug.	7.00	7.58	4.84	4.96		0.77	4.18	2.83	2.20	
Sept.	7.49	6.17	4.74	4.16		0.00	4.16	2.37	1.84	
Totals	51.43 (Inches)	55.84 Pasture (inches)	33.35 Pasture (inches)	39.49 Citrus (inches)		9.56 Citrus (inches)	29.94 Citrus (inches)	59.27	46.00 Pond (inches)	= Estimated annual lake evaporation

12.18 References

Florida Dept. of Transportation, "Drainage Manual, Volume 2 - Procedures", Tallahassee, FL, 1987.

Kohler, M.A., T.J. Nordenson, and D.R. Baker., "Evaporation Maps for the United States", Technical Paper No. 37, U.S. Weather Bureau, Washington, D.C., 1959.

Jenab, S.A., Rao, D.V., Clapp, D., "Rainfall Analysis for Northeastern Florida; Part II: Summary of Monthly and Annual Rainfall Data", Technical Publication SJ 86-4, St. Johns River Water Management District, Palatka, FL, 1986.

National Oceanic and Atmospheric Administration, "Annual Summaries of Climatological Data" NOAA, Asheville, North Carolina, 1990. Soil Conservation Service, 1972. National Engineering Handbook, Section 4, Hydrology, pp. 8.1-8.6; USDA-SCS, Washington, D.C.

Rao, D.V., "24-Hour Rainfall Distributions For Surface Water Basins Within the St. Johns River Water Management District, Northeast Florida", Technical Publication SJ 91-3, St. Johns River Water Management District, Palatka, FL, 1991.

Rao, D.V., "The Mean Annual, 10-Year, 25-Year, and 100-Year Flood Profiles for the Upper St. Johns River Under the Existing Conditions", Technical Publication 85-3, St. Johns River Water Management District, Palatka, FL, 1985.

Rao, D.V., and Clapp, D., "Rainfall Analysis for Northeast Florida; Part IV: 24-Hour to 96-Hour Maximum Rainfall for Return Periods 10 Years, 25 Years, and 100 Years", Technical Publication SJ 88-3, St. Johns River Water Management District, Palatka, FL, 1986.

Smajstrla, A.G., B.J Boman, G.A. Clark, D.Z. Haman, D.S. Harrison, F.T. Izuno, and F.S. Zazueta, "Efficiencies of Florida Agricultural Irrigation Systems", Bulletin 247, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, 1988.

St. Johns River Water Management District, "30 Year Mean; Blaney - Criddle; Supplemental Irrigation Requirement", Technical Memorandum.

Soil Conservation Service, Urban Hydrology for Small Watersheds, Technical Release No. 55, USDA-SCS, Washington, D.C., 1986.

Soil Conservation Service, Computer Program for Project Formulation Hydrology, Technical Release No. 20, USDA-SCS, Washington, D.C., 1982.

Soil Conservation Service, Irrigation Water Requirements, Technical Release No. 21, USDA-SCS, Washington, D.C., 1970.

Suphunvorranop, T., "A Guide to SCS Runoff Procedures", Technical Publication SJ 85-5, St. Johns River Water Management District, Palatka, FL, 1985.

PART IV - APPENDICES

Appendix A - Chapter 40C-44, F.A.C.
Appendix B - Chapters 40C-1, 40C-4, and 40C-40, F.A.C.
Appendix C - Application Forms
Appendix D - Chapter 373, F.S.
Appendix E - Chapter 120, F.S.
Appendix F - Sections 403.021/403.031(12)/403.812-403.8135, F.S.
Appendix G - Chapter 62-40, State Water Policy
Appendix H - Agricultural Practices
Appendix I - Additional MSSW Special Conditions and Table 1
Appendix J - Compliance Forms
Appendix K - DHRS Certified Laboratories
Appendix L - Chapters 62-3, 62-302, and 62-4, F.A.C.

Appendix A - Chapter 40C-44, F.A.C.

Environmental Resource Permits:
Agricultural Surface Water Management Systems

http://floridaswater.com/rules/pdfs/40C-44.pdf

Appendix B — Chapters 40C-1; 40C-4; and 40C-40, F.A.C.

Chapter 40C-1: Organization and Procedure
http://floridaswater.com/rules/pdfs/40C-1.pdf

Chapter 40C-4: Environmental Resource Permits: Surface Water Management Systems
http://floridaswater.com/rules/pdfs/40C-4.pdf

Chapter 40C-40: Standard General Environmental Resource Permits
http://floridaswater.com/rules_archive/pdfs/40C-40.pdf

Appendix C - Application Forms

Individual Environmental Resource Agricultural Systems Permit Application, Form No. 40C-44.900 (1)

http://floridaswater.com/permitting/forms_archive/40C44901.pdf

Standard General Environmental Resource Agricultural Systems Permit Application, Form No. 40C-44.900 (2)

http://floridaswater.com/permitting/forms_archive/40C44902.pdf

Standard General Environmental Resource Agricultural Systems General Permit Application, Form No. 40C-44.900(3)

http://floridaswater.com/permitting/forms_archive/40C44903.pdf

Appendix D - Chapter 373, F.S.

Water Resources Act

http://www.leg.state.fl.us/Statutes/index.cfm?App_mode=Display_Statute&URL=Ch0373/ch0373.htm

Appendix E - Chapter 120, F.S.

Administrative Procedure Act

http://www.leg.state.fl.us/Statutes/index.cfm?App_mode=Display_Statute&URL=Ch0120/ch0120.htm

Appendix F – Chapter 403

Sections 403.021/403.031(12)/403.812-403.8135, F.S.

http://www.leg.state.fl.us/Statutes/index.cfm?App_mode=Display_Statute&URL=Ch0403/ch0403.htm

Appendix G - Chapter 62-40, F.A.C.

State Water Policy

http://www.dep.state.fl.us/legal/legaldocuments/rules/shared/62-40.pdf

Appendix H - Agricultural Practices

APPENDIX H

AGRICULTURAL PRACTICES

Following is a brief description of conservation practices. Detailed information is in Natural Resources Conservation Service Field Office Technical Guides. Practices 52 to 66 are not NRCS Conservation Practices, but are recognized Best Management Practices for agriculture.

1. Access Road - A road constructed to minimize soil erosion while providing needed access.

2. Brush Management - Management and manipulation of brush to improve or restore a quality plant cover to reduce sediment and improve watershed quality.

3. Chiseling and Subsoiling - Loosening the soil to shatter restrictive layers and thereby improve water and root penetration.

4. Conservation Cropping System - Growing crops in combination with needed cultural and management measures to improve the soil and protect the soil during periods when erosion occurs.

5. Contour Farming - Farming sloping land in such a way that all operations are done on the contour in order to reduce erosion and control water.

6. Critical Area Planting - Planting vegetation to stabilize the soil and reduce damage from sediment and runoff to downstream areas.

7. Crop Residue Use - Using plant residues to protect cultivated areas during critical erosion periods.

8. Debris Basin - A barrier or berm constructed across a waterway or at other suitable locations to form a silt or sediment basin.

9. Deferred Grazing - Postponing grazing or resting grazing land for a prescribed period to improve hydrologic conditions and reduce soil loss.

10. Diversion - A channel with a supporting ridge on the lower side constructed across the slope to divert water and help control soil erosion and runoff.

11. Fencing - Enclosing an area of land with fencing to exclude or control livestock.

12. Field Border - A border or strip of permanent vegetation established as field edges to control soil erosion.

13. Field Windbreak - A strip or belt of trees established to reduce soil blowing.

14. Firebreak - Strips of bare land to protect soil, water and plants from damage by fire.

15. Floodwater Retarding Structure - A structure providing for temporary storage of floodwater and for its controlled release.

16. Grade Stabilization Structure - A structure to stabilize the grade or to control erosion in natural or artificial channels.

17. Grassed Waterway or Outlet - A natural or constructed waterway or outlet shaped and established in vegetation to safely dispose of water and runoff in order to prevent soil erosion.

18. Irrigation Water Conveyance - A pipeline constructed to prevent erosion, loss of water quality and quantity; or to convey water for livestock use.

19. Irrigation Pit or Regulating Reservoir - A small storage reservoir constructed to regulate or store a supply of water until it can be used beneficially.

20. Irrigation Water Management - Determining and controlling the rate, amount, and timing of irrigation water application to soil for plant needs in order to minimize soil erosion and control water quality and quantity.

21. Lined Waterway or Outlet - A waterway or outlet with an erosion resistant lining to provide for safe disposal or water runoff without erosion. Applicable to situations where unlined or grassed waterways would be inadequate.

22. Livestock Exclusion - Excluding livestock from an area to maintain soil and water resources.

23. Minimum Tillage - Limiting the number of cultured operations to produce a crop and also prevent soil damage.

24. Mulching - Applying plant residues or other suitable materials to the soil surface in order to reduce water runoff and soil erosion.

25. Pasture and Hayland Management - Proper treatment and use of pastureland or hayland to protect the soil and reduce water loss.

26. Pasture and Hayland Planting - Establishing forage plants to adjust land use, produce high quality forage and reduce erosion.

27. Planned Grazing Systems - A system in which two or more grazing units are alternately rested from grazing in a planned sequence to improve forage production and for watershed protection.

28. Pond - A water impoundment made by constructing a dam or by excavating a pit.

29. Pond Sealing or Lining - Installed fixed lining or impervious materials or soil treatment to prevent excessive water loss and thereby creating a pond.

30. Prescribed Burning - Using fire under condition where the intensity of the fire is controlled for a quality plant cover to reduce sediment and improve watershed quality.

31. Proper Grazing Use - Grazing non-woodland areas at an intensity which will maintain enough vegetative cover to conserve soil and water resources.

32. Proper Woodland Grazing - Grazing woodland areas at an intensity which will maintain adequate cover to conserve soil and water resources.

33. Pumping Plant for Water Control - A pumping facility installed for controlling water levels on land or to provide a water supply for livestock.

34. Range Seeding - Establishing adapted plants on rangeland to prevent excessive soil and water loss; and to produce more forage.

35. Regulating Water in Drainage Systems - Controlling removal or impoundment of water, primarily through the operation of water control structures.

36. Streambank Protection - Stabilizing and protecting banks of streams, lakes, estuaries or excavated channels against scour and erosion by vegetative or structural means.

37. Stripcropping - Growing crops in a systematic arrangement of strips or bands to reduce water and wind erosion.

38. Structure for Water Control - A structure in a water management system that controls the direction or rate of flow, or maintains a desired water surface elevation in a natural or artificial channel.

39. Subsurface Drain - A conduit, such as tile, installed beneath the ground surface and which collects and/or conveys water.

40. Terrace - An earth embankment, channel or a combination ridge and channel constructed across the slope to reduce erosion and sediment content in runoff water.

41. Tree Planting - Planting trees to conserve soil and moisture, or protect a watershed.

42. Trough or Tank - A trough or tank installed to provide drinking water for livestock at selected locations to bring about protection of vegetation and water resources.

43. Waste Management System - A planned system to manage waste in a manner which does not degrade air, soil or water resources.

44. Waste Storage Pond - An impoundment made by excavation or earthfill for temporary storage of animal or other agricultural waste.

45. Waste Storage Structure - A fabricated structure for temporary storage of animal or other agricultural waste.

46. Waste Treatment Lagoon - An impoundment made by excavation or earthfill for biological treatment of animal or other agricultural waste.

47. Waste Utilization - Using agricultural or other wastes on land in an acceptable manner while maintaining or improving soil, water and plant resources.

48. Well - A well constructed or improved to provide water for livestock and other agricultural uses.

49. Woodland Improved Harvesting - Systematically removing some of the merchantable trees from an immature stand or all the trees from a designated part of a woodlot to encourage the regeneration and normal development of a new stand.

50. Woodland Improvement - Improving woodland by removing unwanted trees to fully use the potential of a site for production while protecting soil, water and plant resources.

51. Woodland Site Preparation - Treating areas to encourage natural seeding of desirable trees or to permit reforestation by planting.

52. Artificial Barriers - Fencing, boardwalks, earthen banks and similar items that provide temporary protection for highly erodible areas.

53. Biological Control for Pests - Use of natural enemies as a factor in controlling pests.

54. Correct Pesticide Container Disposal - Follow federal regulations on pesticide container disposal and education on proper methods.

55. Correct Usage of Pesticides - Maximizing incorporation of pesticide into the soil and use of low soluble materials that are less subject to drift and volitalization.

56. Cultural Practices Effect on Pests - Using cultural practices, such as elimination of host sites and adjustment of planting schedules, to partly substitute for pesticides.

57. Filter Strips - Establish and maintain a filter strip of lush vegetation between non-point sources of pollution and water courses.

58. Insect Attractants - Trapping insects by use of insect attractants.

59. Land Absorption Areas and Use of Natural Wetland Systems - Providing an adequate land absorption area downslope from polluted areas to absorb plant nutrients in the soil and through plant utilization.

60. Shade Areas - Provide shade, using trees or artificial shelters at locations to lessen the need for animals to enter water for relief from heat.

61. Resistant Crop Varieties - Use of plant varieties that are resistant to diseases, insects and nematodes to solve pest problems.

62. Salt, Mineral and Feed Supplement Site Location - Locating feeders a reasonable distance from streams and water courses and disperse for proper grazing use.

63. Slow Release Fertilizer - Utilizing slow release fertilizers to minimize possible nitrogen losses on soils subject to leaching.

64. Soil Testing and Plant Analysis - Testing to determine how much and rates of fertilizer needed.

65. Timing and Placement of Fertilizers - Timing and placement of fertilizers for maximum utilization by plants and to minimize leaching or movement by surface erosion.

66. Water Supply Dispersal - Locating waterers a reasonable distance from streams and water courses and disperse for proper grazing use.

*SOURCE: Department of Environmental Regulation, "A Manual of Reference Management Practices for Agricultural Activities," (November 1978).

Appendix I - Additional MSSW Special Conditions and Table 1

APPENDIX I

Agricultural Surface Water Management System
Special Conditions

40. The permittee must maintain hour meters, in operating order, on each drainage pump. If hour meters are not installed at the time of permit issuance, they must be installed within 60 days of the issuance of the permit. Reports of pump operating hours for each pump must be submitted to the District quarterly, using forms provided by the District.

41. The permittee must maintain a staff gauge, referenced to NGVD, in each detention pond. If the staff gauges are not installed at the time of permit issuance, they must be installed within 60 days of the issuance of the permit. Water levels must be recorded a minimum of 3 consecutive days per week or, as an alternative, once a week and daily during pump operation. Reports of water levels for each pond must be submitted quarterly to the District using forms provided by the District.

42. The permittee must monitor the water quality on a quarterly basis at each discharge point from pumps or pond outfalls to waters of the State. If no discharge has occurred during a particular quarter, no sampling is required. Water samples must be analyzed for the parameters listed in Table 1. Water samples must be analyzed by a laboratory certified by the Florida Department of Health and Rehabilitative Services.

43. If, after five years of water quality monitoring, the permittee demonstrates that the data collected represents steady state conditions and is adequate to project future compliance with state water quality standards, the District shall amend the monitoring conditions by reducing the frequency of monitoring or the number of parameters monitored, or eliminating such requirements.

44. If, after five years of water quality monitoring, the District notifies the permittee in writing that discharges from surface water management systems have not complied with the performance standards described in subsections 40C-44.065(1) and (2), F.A.C., then the permittee must apply for an individual permit.

45. If, after one year of water quality monitoring, the District notifies the permittee in writing that discharges from the surface water management system have not complied with the performance standards described in sections 40C-44.0656(1) and (2), F.A.C., then the permittee must apply for an individual permit.

TABLE 1
Water Quality Monitoring Program
(Class I Waters)

Parameters	**Storet#**	**Unit**
pH	400	s.u.
Water Temperature	10	Deg. C.
Total Suspended Solids	530	mg/l
Turbidity	82079	NTU
B.O.D. (5 day)	310	mg/l
Total Ammonia (as N)	610	mg/l
Nitrate-Nitrite (as N)	630	mg/l
Total Kjeldahl Nitrogen	625	mg/l
Total Phosphorus (as P)	665	mg/l
Dissolved Oxygen	300	mg/l
Chloride	940	mg/l
Total Dissolved Solids	70300	mg/l

TABLE 1
Water Quality Monitoring Program
(Class II or III Waters)

Parameters	**Storet#**	**Unit**
pH	400	s.u.
Water Temperature	10	Deg. C.
Total Suspended Solids	530	mg/l
Turbidity	82079	NTU
B.O.D. (5 day)	310	mg/l
Total Ammonia (as N)	610	mg/l
Nitrate-Nitrite (as N)	630	mg/l
Total Kjeldahl Nitrogen	625	mg/l
Total Phosphorus (as P)	665	mg/l
Dissolved Oxygen	300	mg/l

Appendix J - Compliance Forms

Sample Condition Compliance Forms

http://floridaswater.com/permitting/forms_archive/ag_cond_forms.pdf

Appendix K - DHRS Certified Laboratories

Florida Department of Health Certified Laboratories

http://www.floridadep.org/labs/qa/dohforms.htm

Appendix L - Chapters 62-4, and 62-302, F.A.C.

http://www.dep.state.fl.us/legal/legaldocuments/rules/shared/62-302.pdf

http://www.dep.state.fl.us/legal/legaldocuments/rules/shared/62-4.pdf