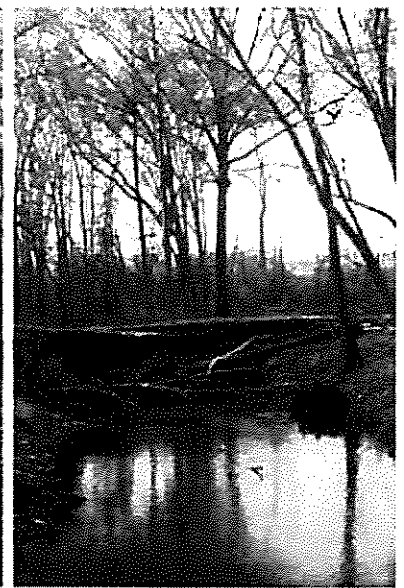


# SILVICULTURE Best Management Practices



Florida Department of Agriculture and Consumer Services  
Adam H. Putnam, Commissioner

# Acknowledgements

In the Fall of 1991, a 22 member Technical Advisory Committee began a process to review and revise the Silviculture Best Management Practices for Florida. That process which is currently on going includes many hours of study, much debate and discussion, and visits to the field, all of which contributed to and are reflected in this revision of the BMP Manual. In that regard, this Manual represents the Committee's collective best efforts to establish and maintain sound, responsible, guiding principles for silviculture operations in the State of Florida.

For commitment and numerous contributions toward the development of this document, the following agencies, organizations or companies, are most gratefully acknowledged:

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# Foreword

## Introduction

This manual establishes the Best Management Practices (BMPs) for silviculture operations in Florida. These practices are designed as the minimum standards necessary for protecting and maintaining the State's water quality as well as certain wildlife habitat values, during forestry activities. As such, they represent a balance between overall natural resource protection and forest resource use.

**In addition, these practices were developed specifically for silviculture and are intended to be applied on all such operations. However, they are not intended for use during tree removal or land clearing operations associated with development or other activities that have non-forestry objectives.**

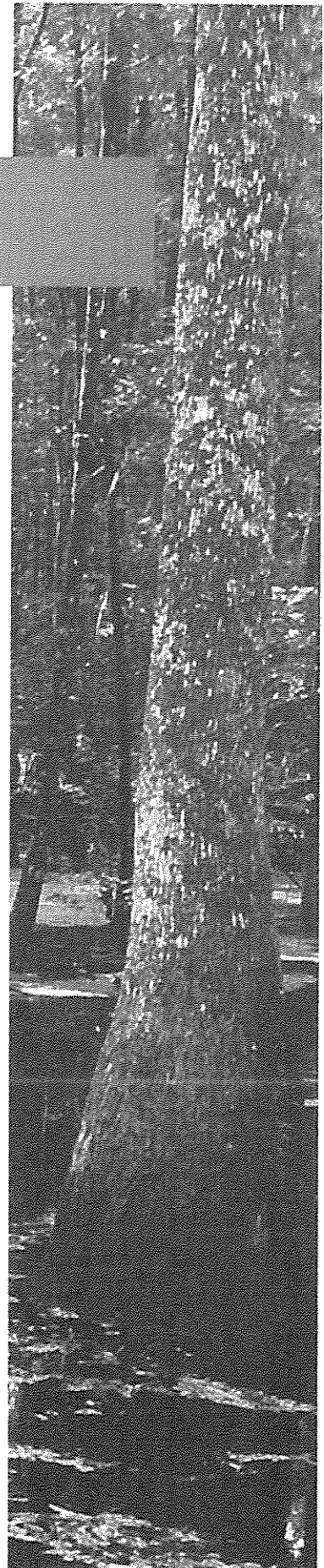
Best Management Practices for Silviculture in Florida were first established in the mid 1970's in response to the Federal Clean Water Act of 1972. Those original BMPs were designed exclusively to protect Florida's streams and lakes from potential sources of pollution associated with forestry activities.

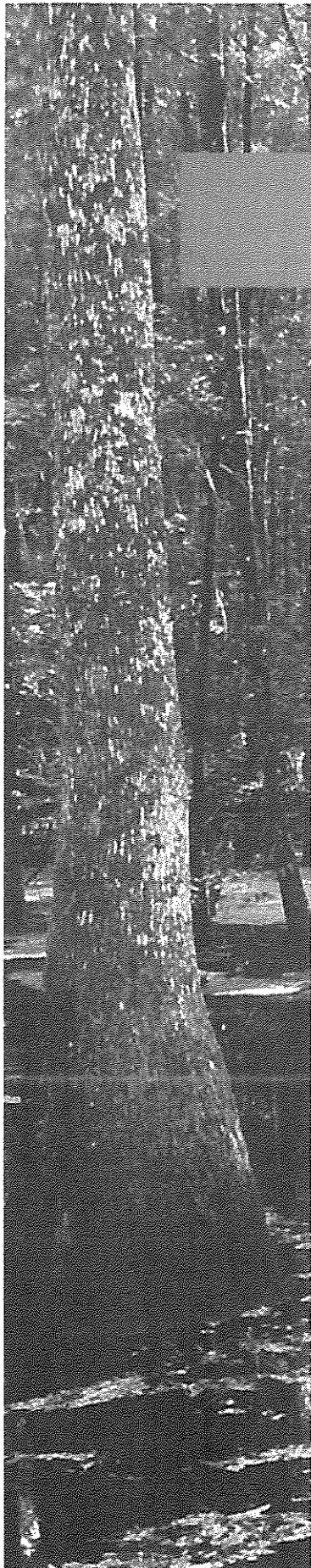
In 1991, Florida's Agriculture Commissioner established a BMP Technical Advisory Committee which included representatives from state and federal government, university, forest industry and environmental groups. This committee was directed to review the existing BMP Manual and revise the practices where necessary to reflect the scientific, social and economic changes that have taken place since the original BMP development.

With this revision, some of the original practices have been retained as part of the continuing strategy to achieve water quality goals. However, many of these practices have been expanded to address additional water resource features such as sinkholes, smaller lakes, canals and wetlands. In addition, general ecological considerations and wildlife habitat values have been included in specific BMP objectives, resulting in expanded versions of original BMP concepts such as Special Management Zones, as well as new ones such as BMPs for wetlands, and cypress harvesting.

Although many of the relationships between silviculture activities and impacts to natural resources have been well quantified, many others have not. Consequently, as significant new information has become available, it has been incorporated into the practices in this Manual. To that end, the BMP Technical Advisory Committee will continue to meet biennially, in concert with BMP compliance monitoring, to evaluate the status and progress of BMP implementation and effectiveness.

Because of the extensive revisions to this document, some of the technical terms used in the Manual have specific definitions that may differ from conventional or traditional meanings. The reader is strongly advised to review the Glossary of terms prior to reading the Manual or implementing the practices.





## ***BMP Monitoring and Regulatory Requirements***

Since 1981 the Florida Forest Service has monitored BMP implementation by conducting a biennial Compliance Survey. Like BMPs in general, the Survey has traditionally been heavily oriented toward forestry activities involving intensive pine management, near streams and lakes. With the new and expanded practices in this Manual, BMP compliance monitoring was also revised. Following the development of this Manual in 1993, a BMP Monitoring Task Force revised the Compliance Survey making it compatible with the new BMPs, and more technically and statistically sound. The revised Survey was first used in 1995 and includes significant procedural changes such as a numerical scoring system for determining BMP compliance, special criteria for identifying a significant risk to water quality, and an expansion of the Survey into all Florida counties. The Survey has determined a statewide, long-term average of 94% compliance with silviculture BMPs.

In addition, a BMP Effectiveness Study was completed using the Survey as a measure of BMP compliance and using stream bio-assessment techniques to measure water quality. The study concluded that where silviculture BMPs were properly applied water quality, aquatic habitat and overall stream ecosystem health were protected.

The BMPs in this Manual are intended for implementation on all silviculture operations regardless of whether or not the operation is subject to other regulatory standards or permits. Anyone who desires to conduct silviculture activities that are not in compliance with this Manual must necessarily seek and obtain a permit from the appropriate local, state and/or federal government agency prior to conducting the operation. In addition, the maintenance of State water quality standards is required during all silviculture operations.

For the purposes of this Best Management Practices Manual, the cutting and removal of timber and associated activities to prepare land for development are not considered silviculture (see Glossary) and are controlled by other governmental permitting processes.

# Special Management Zones

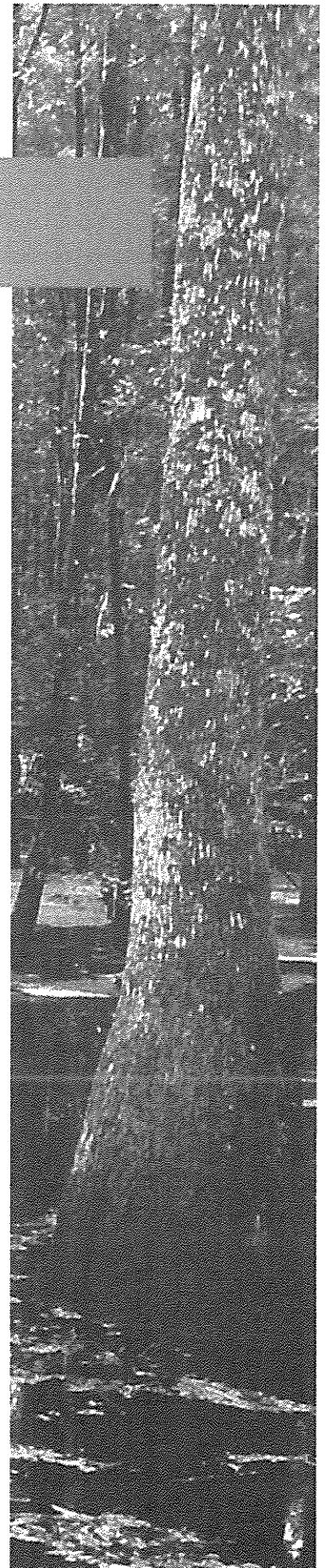
## Introduction

The Special Management Zone (SMZ) is a BMP which consists of a specific area associated with a stream, lake, or other waterbody that is designated and maintained during silviculture operations. The purpose of the SMZ is to protect water quality by reducing or eliminating forestry related inputs of sediment, nutrients, logging debris, chemicals and water temperature fluctuations that can adversely affect aquatic communities. SMZs provide shade, streambank stability and erosion control, as well as detritus and woody debris which benefits the aquatic ecosystem in general. In addition, the SMZ is designed to maintain certain forest attributes that will provide specific wildlife habitat values. Snags, den and cavity trees as well as mast producing trees, left in the SMZ, are necessary to meet habitat requirements for certain types of wildlife.

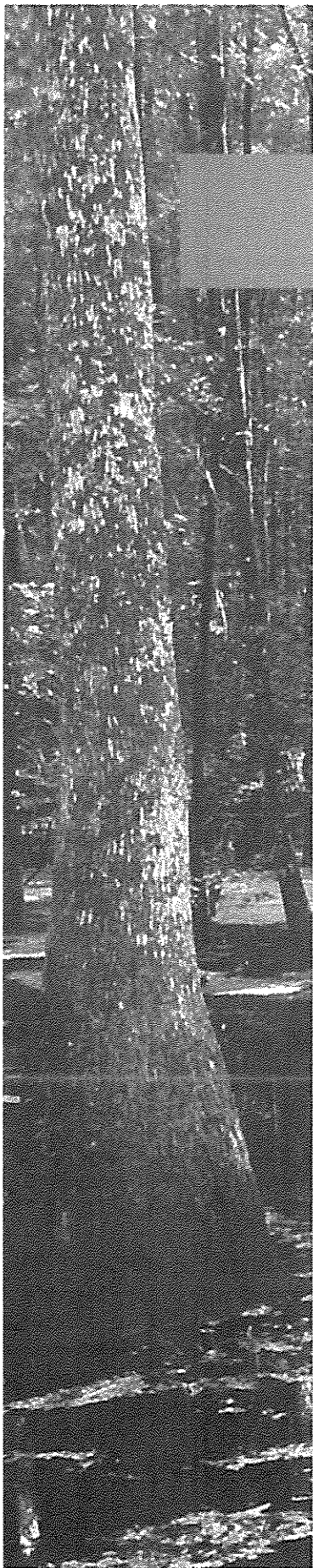
As described in the following sections, the SMZ is subject to specific criteria, that defines operational restrictions, and special management objectives. In addition, the SMZ has a specific width which is based on the size and type of waterbody involved, and on the Site Sensitivity Class (SSC). The SSC is based on the local soil type and slope percent, which indicate the general potential for erosion and sedimentation. For determining the SSC, Florida soils have been classified as A, B or C, with A being stable and C being highly erodible. Percent ground slope has also been classified as 1 through 6, with 1 being relatively flat and 6 being very steep (Appendices 2 and 3).

The SSC for a given site is a combination of soil and slope percent and is expressed as A1 through C6. For example, an A1 site would have stable soils and flat topography, whereas a C6 site would have highly erodible soil and steep slopes. Likewise, the SMZ width associated with an A1 site would be relatively narrow compared to the SMZ associated with a C6 site (Appendix 1).

The Special Management Zone has three principal components - the Primary Zone, the Secondary Zone and the Stringer. One or more of these components may apply on a given forestry operation, depending on the SSC and on the type and size of waterbodies on site. The following sections provide a detailed description of the three SMZ components and the practices that are acceptable or prohibited within each one. Practices that are acceptable within all components of the SMZ include direct seeding, hand planting or machine planting on the contour of the land, prescribed burning for site preparation on slopes less than 18%, and basal application of herbicides and insecticides.







## **Primary Zone**

The Primary Zone applies to perennial streams, perennial lakes, sinkholes with perennial water, Outstanding Florida Waters (OFW), Outstanding National Resource Waters (ONRW), Class I Waters, and in some cases wetlands (see Wetlands Section). Although forestry activities are allowed, this Zone has significant timber harvesting restrictions, and varies in width from 35 to 200 feet per side, depending on the type and size of the waterbody (see Appendix 1 and Application of SMZs). The Primary Zone provides water quality protection to adjacent waterbodies by maintaining shade, and by reducing the disturbance to ground cover vegetation and leaf litter. In addition, this Zone also provides important wildlife habitat values particularly for those species that require snags, cavities, tall trees and other characteristics generally associated with older and less disturbed forest conditions.

Selective timber harvesting and other forestry operations are allowed in the Primary Zone, subject to the specific management criteria listed below. However, selective harvesting within this Zone is intended to be conducted in conjunction with harvesting of a specific adjacent area. In addition, forestry operations, particularly harvesting and skidding, within the Primary Zone should exercise special precautions to maintain as much of the natural forest condition as possible. A decision not to harvest at all within this Zone may provide additional natural resource benefits.

### **Primary Zone • Management Criteria**

- A) Clearcut harvesting is prohibited in the Primary Zone except for special conditions described in Appendix 11.
- B) Clearcut harvesting is always prohibited within 35 feet of all perennial waters and within 50 feet of all waterbodies designated as OFW, ONRW or Class I Waters.
- C) Selective harvesting may be conducted to the extent that 50% of a fully stocked stand is maintained. The residual stand should conform to the following:
  - 1) Trees should be left to maintain the approximate proportion of diameter classes and species present prior to harvesting, except that oaks (other than water oaks) and den trees may be favored. However, in mixed pine/hardwood forests the residual stand may be composed of up to 90% hardwood and 10% pine, and den trees may be favored.
  - 2) Repeated entry into a harvested Primary Zone in short time intervals for additional harvesting is prohibited.
  - 3) No trees will be harvested in stream channels or on the immediate stream bank.
- D) Special emphasis should be given to the following, within the Primary Zone of the SMZ:
  - 1) Protection of very large trees and/or old trees.
  - 2) Protection of snags and cavity trees.

- 3) Protection of trees where any part of the canopy overhangs the water.
- E) The following forestry activities are prohibited within the Primary Zone of the SMZ:
- 1) Mechanical site preparation.
  - 2) Loading decks or landings, and log bunching points.
  - 3) Main skid trails, except to approach a designated stream crossing.
  - 4) Aerial application, mist blowing or operational application (See Glossary) of pesticides or fertilizer, including any drift from nearby applications.
  - 5) Cleaning spray equipment or discharging rinse water from pesticide or fertilizer applications.
  - 6) New road construction except when crossing a waterbody.
  - 7) Site preparation burning on slopes of 18% or greater.
  - 8) No plowed pre-suppression firelines.

### **Secondary Zone**

The Secondary Zone applies to all intermittent streams, intermittent lakes and sinkholes with intermittent water. In addition, for perennial waterbodies, OFWs, ONRWs and Class I Waters, the Secondary Zone may apply as an “add-on” to the Primary Zone (Figure 1 and Appendix 1).

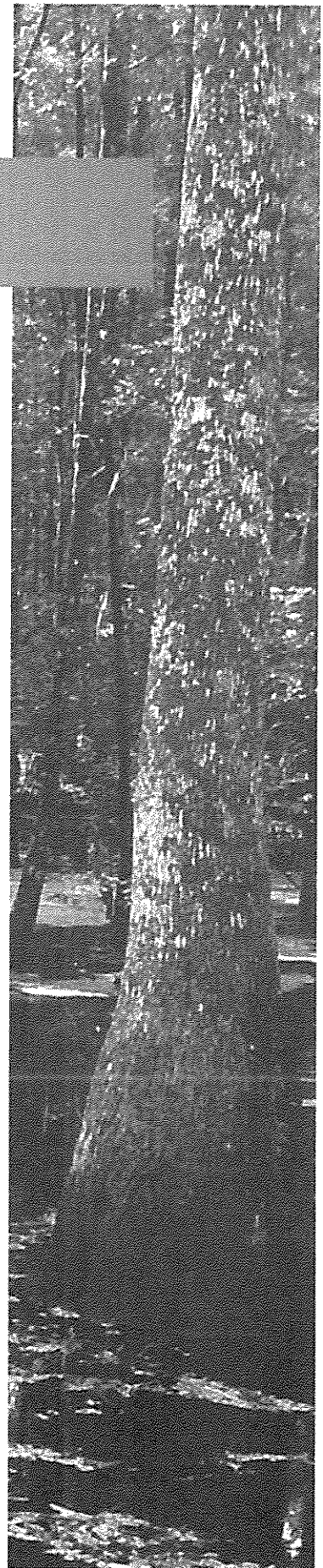
For intermittent waterbodies, the Secondary Zone is always at least 35 feet wide on each side of a stream or around the circumference of lakes and sinkholes. Depending on the SSC, the width of the Secondary Zone for intermittent waterbodies may be as much as 300 feet (See Figure 2 and Appendix 1).

The SSC is used to determine the width of the Secondary Zone, in the case of intermittent waters, as well as the necessity for the Secondary Zone, in the case of perennial waters, OFWs, ONRWs and Class I waters. Generally, the more erodible the soil and the steeper the slope, the wider the Secondary Zone, and/or the wider the entire SMZ. Appendix 1 lists the SSC for all combinations of soil and slope conditions, and provides the width requirements for the applicable Special Management Zone under each condition.

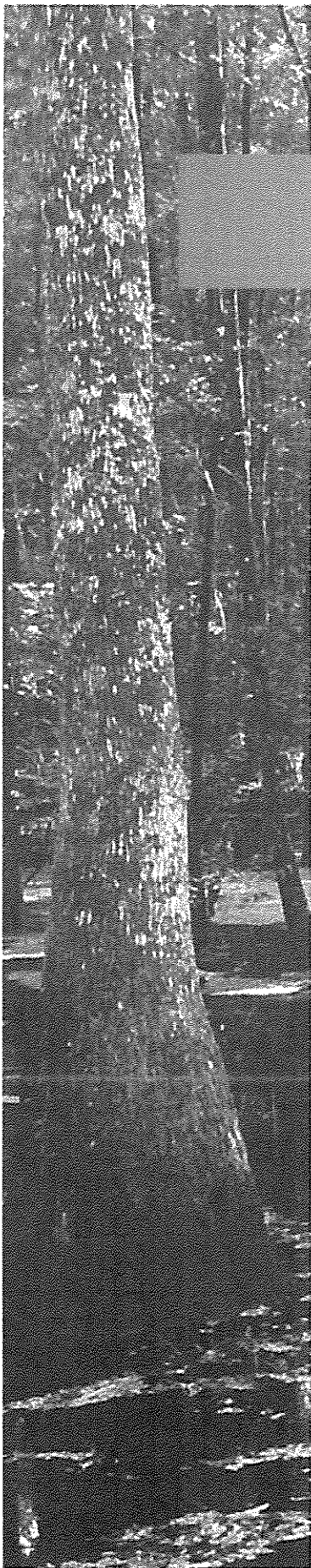
The Secondary Zone has **no timber harvesting limitations** - unrestricted selective harvesting and clearcut harvesting are both permissible anywhere within the Secondary Zone. However, the following operational restrictions apply:

#### **Secondary Zone • Operational Restrictions**

- 1) No mechanical site preparation.
- 2) No main skid trails (except for stream crossings), loading decks or landings.
- 3) Do not clean spray equipment or discharge rinse water from pesticide and fertilizer applications.
- 4) No new road construction except for stream crossings.
- 5) No plowed firelines except during fire suppression.
- 6) No site preparation burning on slopes of 18% or greater.







## ***Stringer***

The Stringer applies only to intermittent streams, intermittent lakes and sinkholes with intermittent water, and is composed of trees left on or near the bank along both sides of these waterbodies. The Stringer can provide limited food, cover, nesting and travel corridors for a number of animals, especially birds.

Stringers are most beneficial when connected to larger Special Management Zones where they provide benefits to water quality by reducing the risk of sedimentation and bank damage. The presence of a Stringer provides a physical barrier, helping to ensure that heavy equipment operation in and around the water is minimal. Stringers also foster the use of designated crossings, and help equipment operators locate and identify streams and other water bodies during site preparation and skidding.

There are no specific requirements for species, size or spatial distribution of trees left in the Stringer. However, trees left in the Stringer should favor hardwood species, potential den trees and snags, and to the extent possible, provide a continuous, connected canopy except for designated stream crossings. All trees which occupy the immediate stream bank should be included in the Stringer.

## Application of SMZs: Perennial Streams

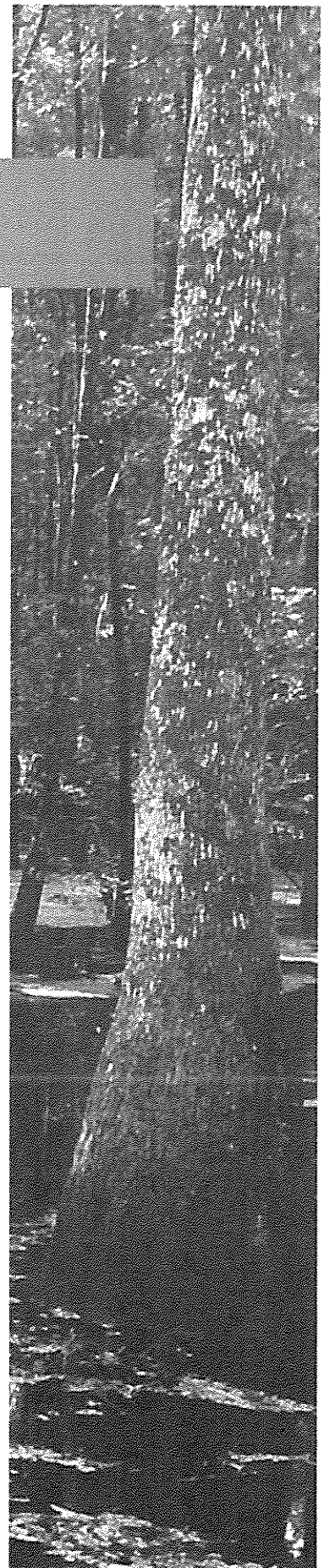
Perennial streams are those that have a well defined channel and maintain flow or continuous pools of water throughout most of the year under typical climatic conditions. This includes natural streams that have been altered by dredging and/or straightening (see Canal Section). For perennial streams, the overall Special Management Zone is composed of a Primary Zone and, depending on the SSC, possibly a Secondary Zone. The Primary Zone for perennial streams ranges in width from 35 to 200 feet, depending on stream width or type, as shown in Table 1. Primary Zone widths in Table 1 are given for one side of the stream only. However, the Zone is applied to both sides of the stream. In addition, where the stream is connected to the inflow and/or discharge point of a flowing wetland, the Zone extends an additional 50 feet beyond the defined channel into the wetland (Figure 4). The Primary Zone is measured from the stream, beginning at the break in slope at the top of the stream bank, out to the designated width. Stream width is the typical bank to bank width of the stream within the harvest unit, measured in feet.

**Table 1: Primary Zone Widths for Perennial Streams**

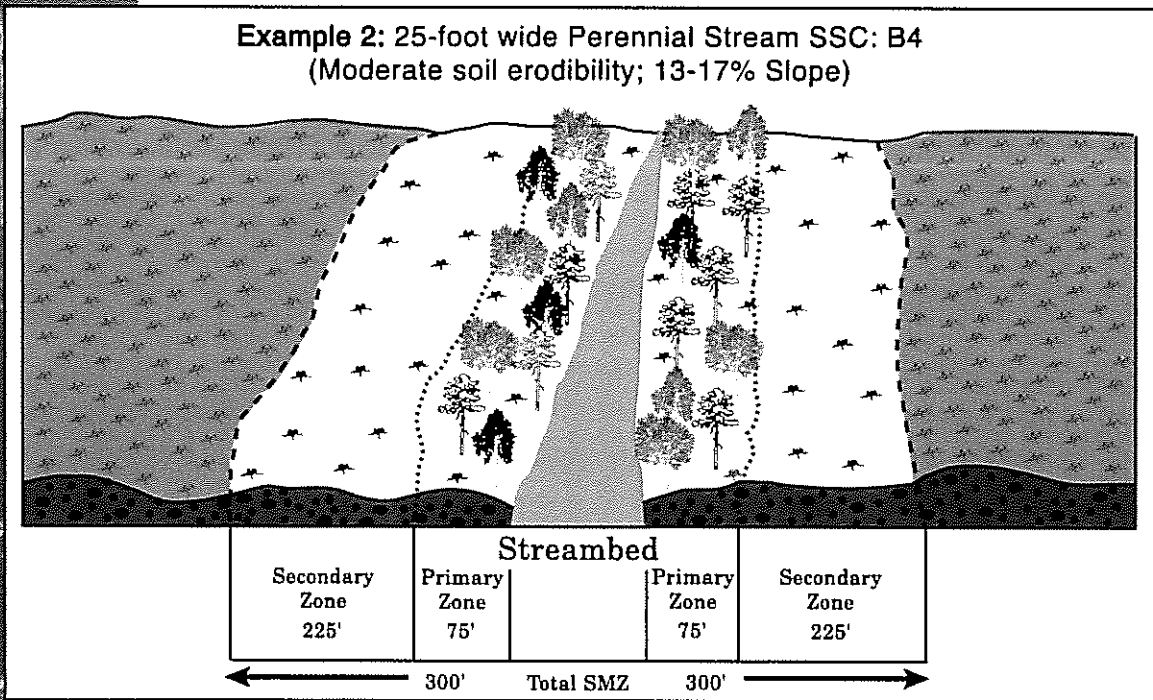
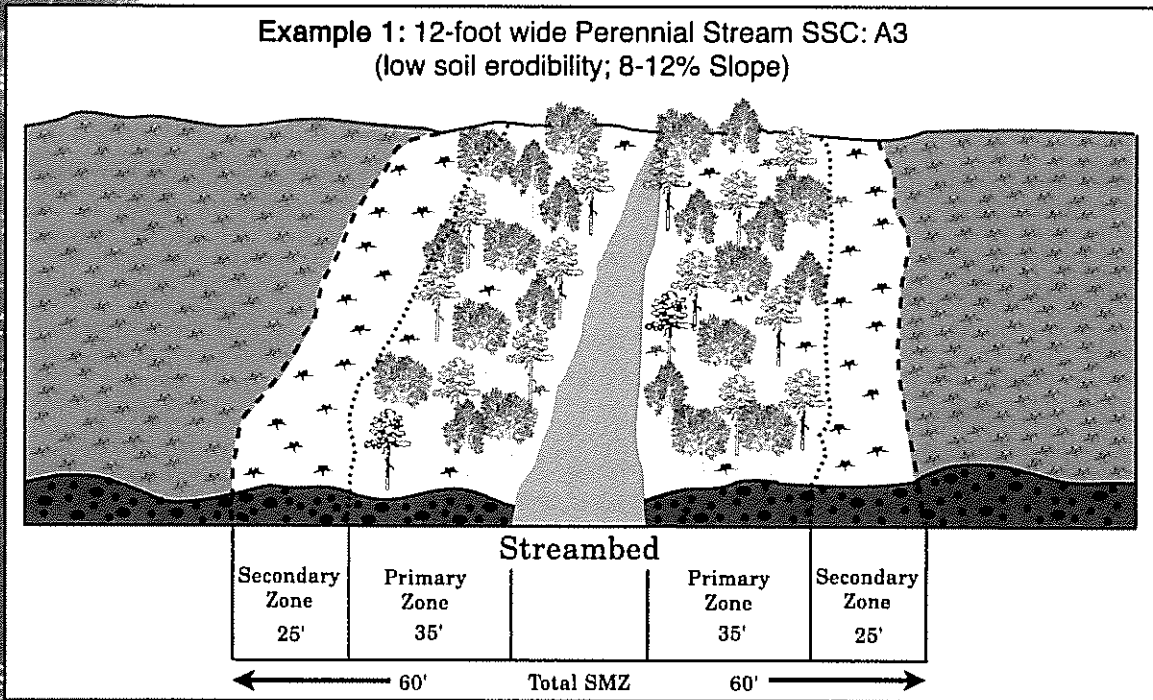
Stream Width/Type	Primary Zone
<20'	35' per side
20-40'	75' per side
>40'	200' per side
OFW	200' per side
Class I	200' per side
ONRW	200' per side

Selective timber harvesting is allowed within the Primary SMZ, consistent with the Primary Zone -Management Criteria. Clearcut harvesting is prohibited in the Primary SMZ, unless the operation qualifies as an **exception** as described in Appendix 11.

Depending on the SSC of the harvest unit, a Secondary Zone may also be required. If so, the Secondary Zone width is measured beginning at the outer boundary of the Primary Zone and continuing landward for the required distance as determined by the SSC (Appendix 1). Figure 1 shows examples of Primary and Secondary Zones on several different perennial streams, each with a different SSC. Note that where there is no Secondary Zone required, the Primary Zone is the total SMZ. Likewise, where the SSC is such that a Secondary Zone is required, the total SMZ width is the sum of the Primary Zone and Secondary Zone, up to a maximum of 300 feet.

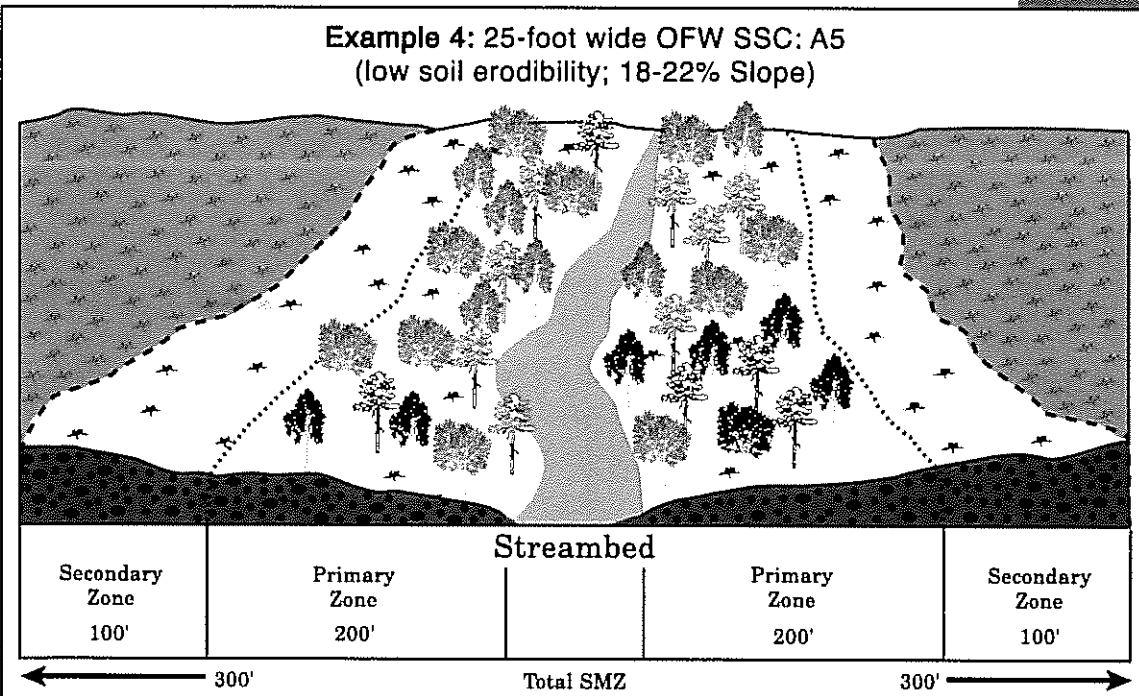
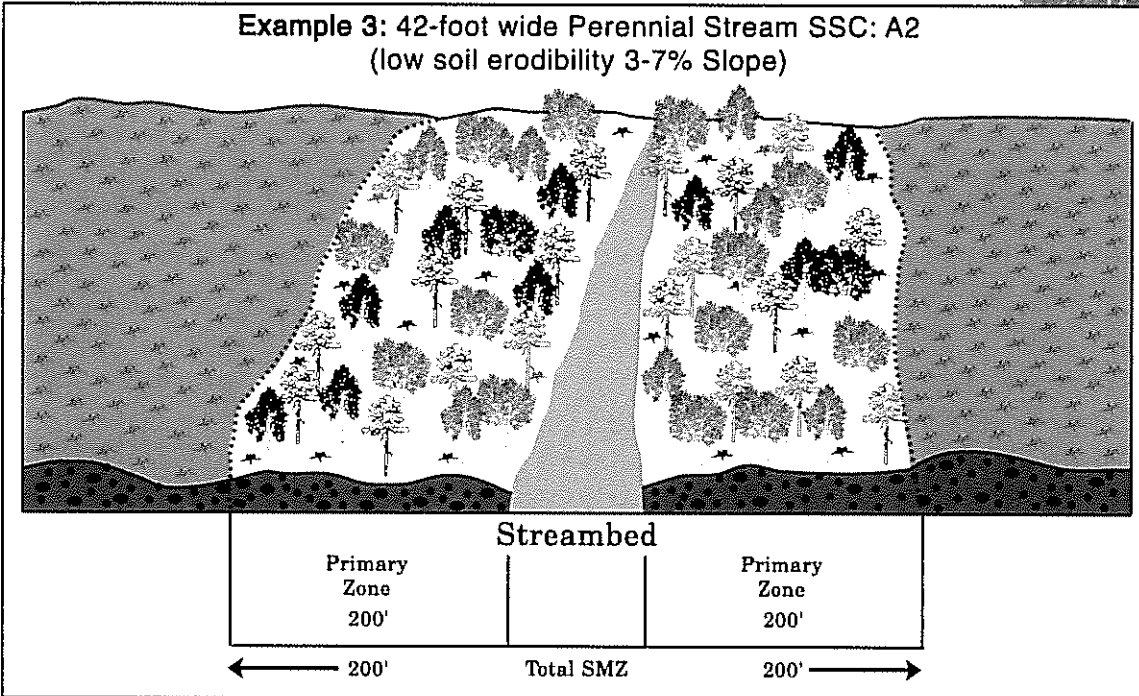


# Figure 1





# Figure 1 (continued)



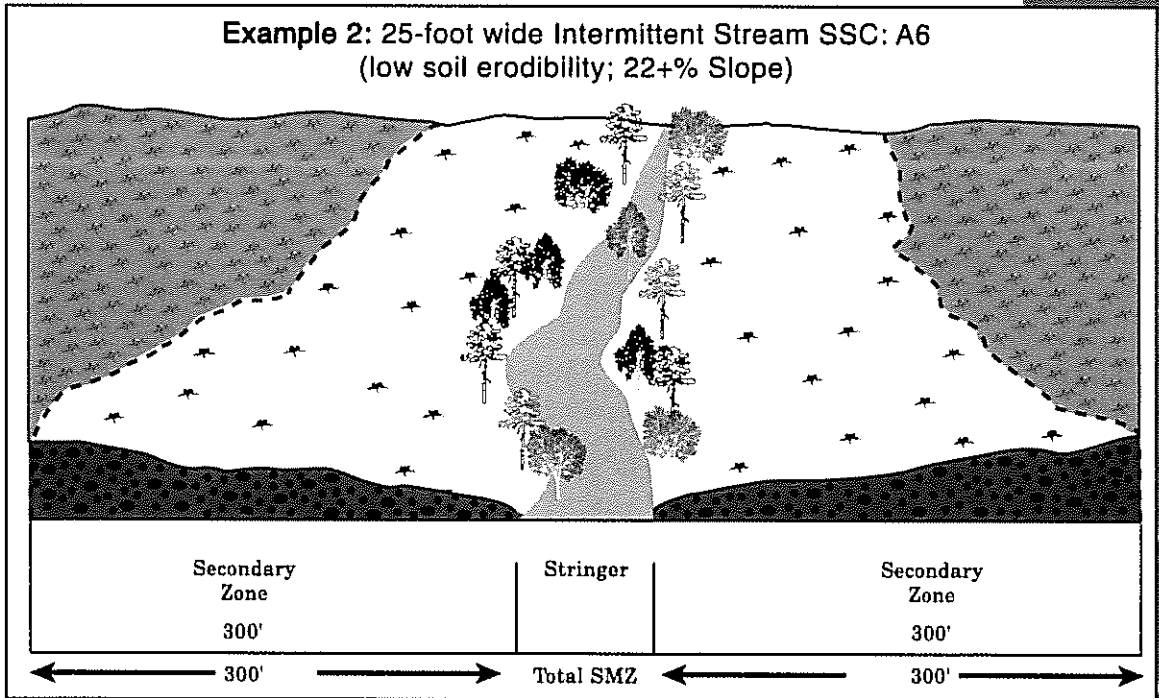
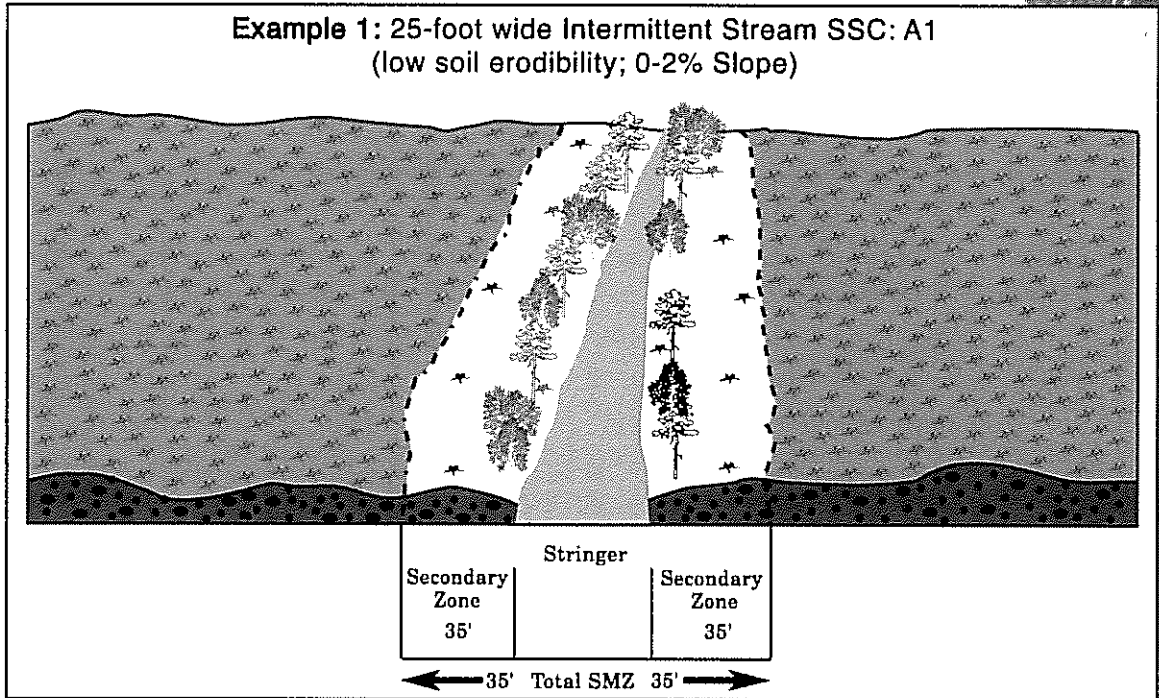


## Application of SMZs: Intermittent Streams

Intermittent streams are those that have a well defined channel but maintain only seasonal flow under typical climatic conditions. This includes natural streams that have been altered by dredging and/or straightening (see Canal Section). For all intermittent streams, the Stringer is required. The total SMZ for intermittent streams consists of the Stringer, which occupies the immediate stream bank, and the Secondary Zone. The Secondary Zone, like the Primary Zone, is measured from the stream, beginning at the break in slope at the top of the stream bank, out to the designated width. In addition, where the stream is connected to the inflow and/or discharge point of a flowing wetland, the Zone extends an additional 50 feet beyond the defined channel into the wetland (Figure 4).

All intermittent waterbodies are afforded a Stringer and a Secondary Zone of at least 35 feet, regardless of the SSC. However, depending on the SSC, an intermittent stream could have a Secondary Zone as wide as 300 feet (Appendix 1). Figure 2 shows examples of Secondary Zones on several different intermittent streams, each with a different SSC. Note that the total SMZ is composed of the Stringer and the Secondary Zone - no Primary Zone applies to intermittent streams.

# Figure 2





# Application of SMZs: Lakes, Sinkholes and Special Waters

## Perennial Lakes and Sinkholes

A Primary Zone of 35' applies to all perennial lakes that are 2 acres or larger in size, and to sinkholes that maintain perennial surface waters. This Zone is measured from the lake or sinkhole, beginning at the break in slope at the top of the shoreline, out to the designated width. In addition, a Secondary Zone may apply to these waterbodies depending on the SSC associated with the harvest unit (Table 2). The Secondary Zone, if required, would begin at the outer boundary of the Primary Zone and continue outward from the lake or sinkhole the specified distance (See Appendix 1).

## Intermittent Lakes and Sinkholes

A Stringer and a Secondary Zone of at least 35 feet apply to all intermittent lakes that are 2 acres or larger in size and to sinkholes that maintain intermittent surface waters (Figure 3). Depending on the SSC associated with the project site, the Secondary Zone could extend out as much as 300 feet (Appendix 1).

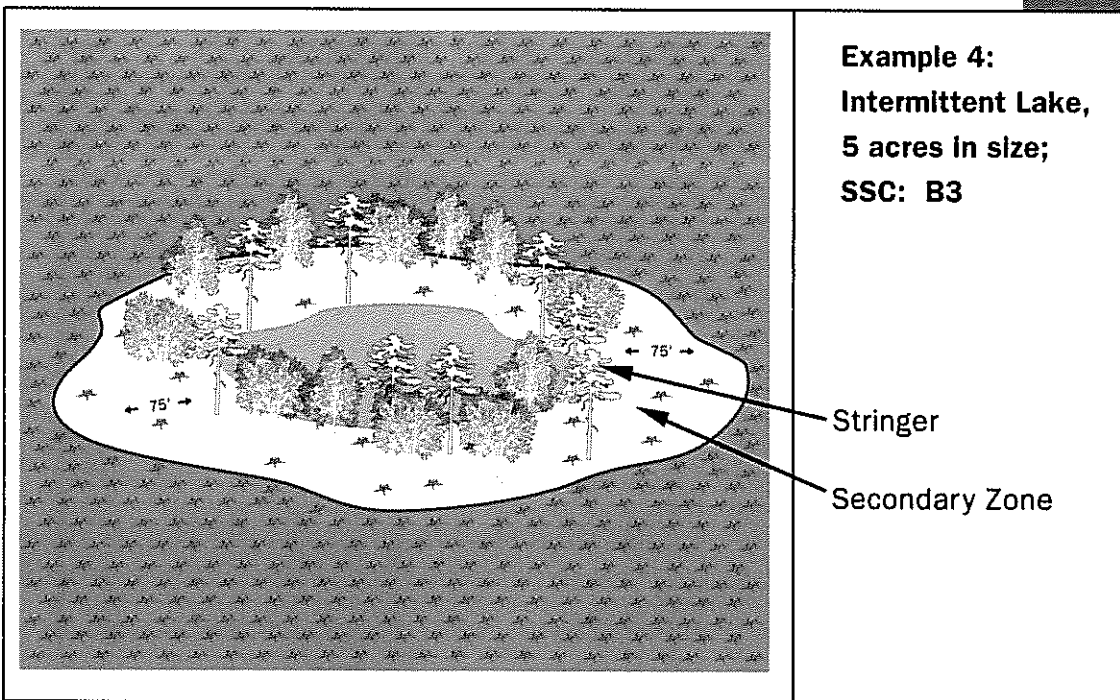
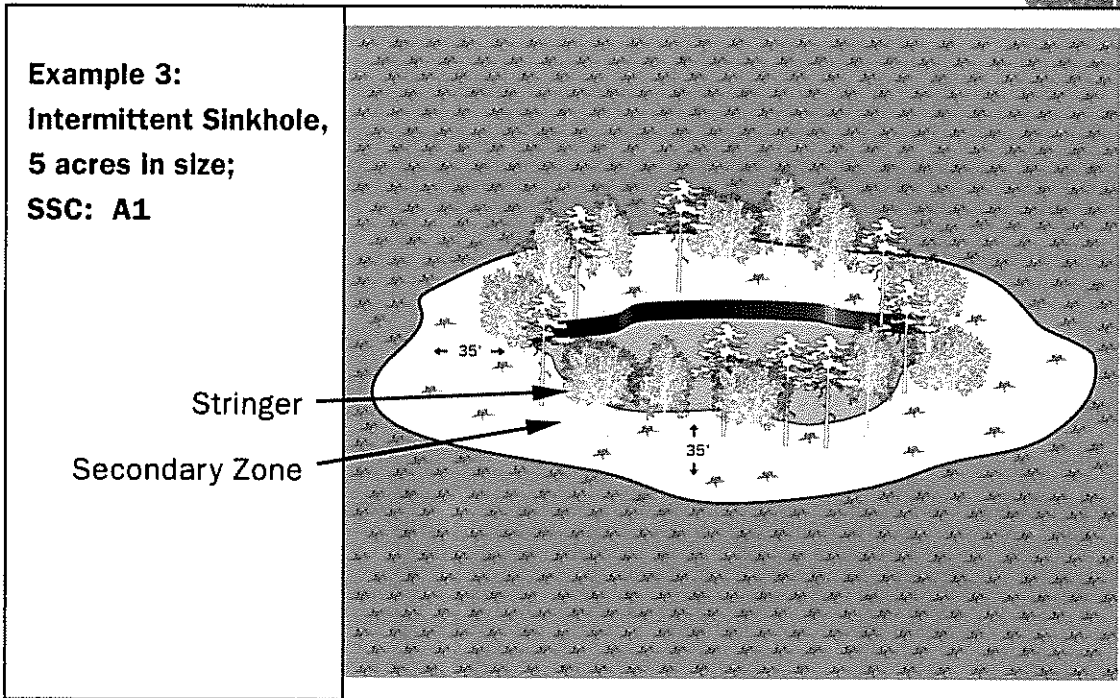
**Table 2: SMZ Widths for Lakes, Sinkholes & Special Waters**

	Perennial		Intermittent	
	Primary Zone	Secondary Zone	Primary Zone (Stringer)	Secondary Zone
Lakes	35'	varies with SSC	(Stringer)	min. 35'
Sinkholes	35'	varies with SSC	(Stringer)	min. 35'
OFW	200'	varies with SSC	200'	varies with SSC
ONRW	200'	varies with SSC	200'	varies with SSC
Class I	200'	varies with SSC	200'	varies with SSC

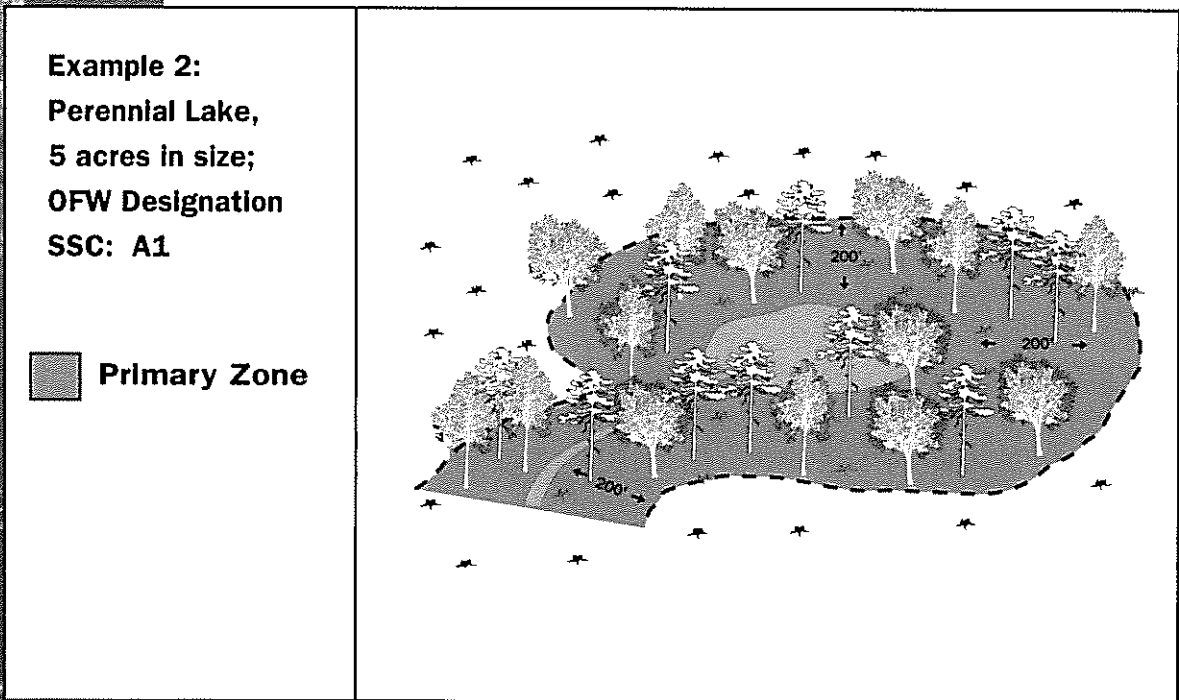
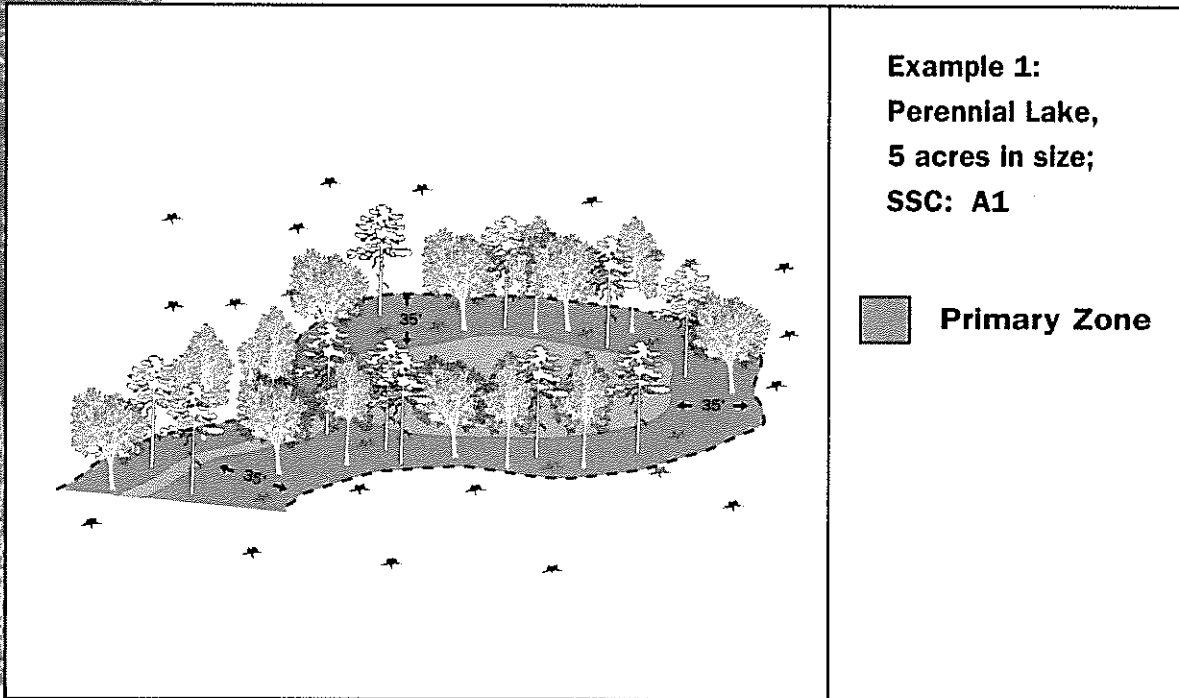
## Outstanding Florida Waters, Outstanding National Resource Waters and Class I Waters

Outstanding Florida Waters (OFWs) and Outstanding National Resource Waters (ONRWs) are waterbodies that have been identified as having unique and/or exceptional values and therefore are afforded extra protection from potential sources of pollution. Class I Waters are those that have been designated as a drinking water supply and are also afforded extra water quality protection. For these reasons, a 200 foot Primary Zone applies to all OFWs, ONRWs and Class I Waters, regardless of the type or size of the waterbody. A list and location of these waterbodies is provided in Appendix 4.

## Figure 2 (continued)



# Figure 3



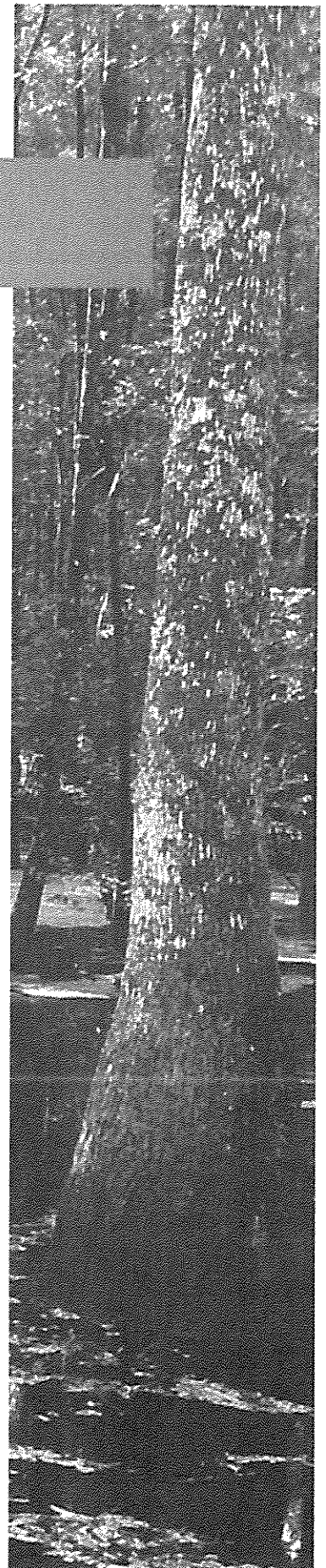


# Best Management Practices

## *Introduction*

The following sections of this Manual provide the listing and application of Best Management Practices established for silviculture operations in Florida. The BMPs are arranged by specific application to various land types, waterbody types, forestry activities and special conditions. It should be noted that the Special Management Zone concept, described in the previous section, is also a BMP and is frequently referenced under the various BMP applications.

The Best Management Practices in this Manual are generally presented as individual practices within a particular category. However, the basic BMP concept is the implementation of all practices that apply to a given forestry operation. In that regard, no single practice is designed to accomplish the total BMP objective. For example, applying the SMZ criteria to a stream within a forestry operation without regard for other applicable BMPs, could significantly reduce the effectiveness of the SMZ to protect water quality. On a given forestry operation, the effectiveness of any particular practice, as well as overall BMP effectiveness, is largely dependent upon the implementation of all applicable BMPs throughout all aspects of the operation.





## Application of BMPs: Public Lands

Unlike forest management on private lands, the need to derive economic return may not be the dominant force that leads to public land ownership or drives public land management. Often, the acquisition and management of public land has as its objective, to maximize ecological restoration, preserve existing natural resources and facilitate optimum public use.

When such is the case, the BMPs in this manual must be considered as minimum standards that, by themselves, will not always achieve public land management goals. Consequently, public land management agencies charged with developing and implementing management plans for public lands should do so in conformance with this Manual, and to the greatest extent practical, with the following enhancements:

Areas within the Special Management Zone designated as a Primary Zone should be managed as a no-cut zone. Any timber harvesting within these no-cut zones should be limited to operations that are in association with ecological restoration or wildlife habitat enhancement practices. However, isolated wetlands and intermittent streams on state forests shall be exempt from OFW derived Primary Zones. Each individual state forest, within the forest management plan, shall prescribe management practices for isolated wetlands and intermittent streams on a case by case basis.

The Special Management Zone is only one of the BMP concepts that may warrant additional consideration by land managers prior to implementation on public lands. Public land management agencies are advised and encouraged to augment the BMPs where appropriate, particularly on lands that are managed for non-forestry objectives. Protection of forested wetlands within these lands should be given special consideration.

In addition, such agencies should maintain environmental/ecological inventories of public lands and actively implement and study alternatives that exceed the BMPs in this manual. Results should be well documented to help facilitate future BMP revisions. Copies of enhanced management plans or any such studies should be forwarded to the Florida Department of Agriculture and Consumer Services, Florida Forest Service.

*Note: Public land management agencies must often adhere to specific legislative provisions or policies when developing and implementing management plans on certain public lands. In particular, the USDA Forest Service is constrained by the Clean Water Act, the National Forest Management Act, and National Environmental Policy Act to develop and implement a Land and Resource Management Plan that will govern management of certain federally-owned forested land. Similar constraints may occur in legislation that governs acquisition and management of lands owned or controlled by local, regional, or state agencies.*

*To the extent that adherence to these BMPs do not conflict with legislatively established management goals, objectives, requirements, or mandates, public agencies are required to incorporate these BMPs into management plans. In addition, to the greatest extent practical, public agencies are encouraged to incorporate the above BMP enhancements wherever applicable.*

## Application of BMPs: Wetlands

For regulatory purposes, wetlands are defined by the presence or absence of specific types of vegetation, soils and hydrologic conditions. However, it is not the intent nor within the scope of this Manual, to define wetlands for regulatory purposes or to use any particular regulatory definition. Wetlands, for the purpose of this Manual, are listed by type in Appendix 5.

In addition, areas of pine flatwoods may contain certain wetland types listed in this Manual, such as cypress ponds. However, for the purpose of this Manual, pine flatwoods are not considered wetlands. Conversely, the presence of pine species within swamps, sloughs or floodplains does not necessarily make these areas “pine sites.”

Because of the generally wet soil conditions associated with forested wetlands, some of these areas can be very sensitive to forestry activities, particularly during flooding or periods of soil saturation. For silviculture operations in general, wetlands are probably most susceptible to changes in hydrology or hydroperiod, which can result from improper forest road construction, logging operations, and certain types of site preparation activities.

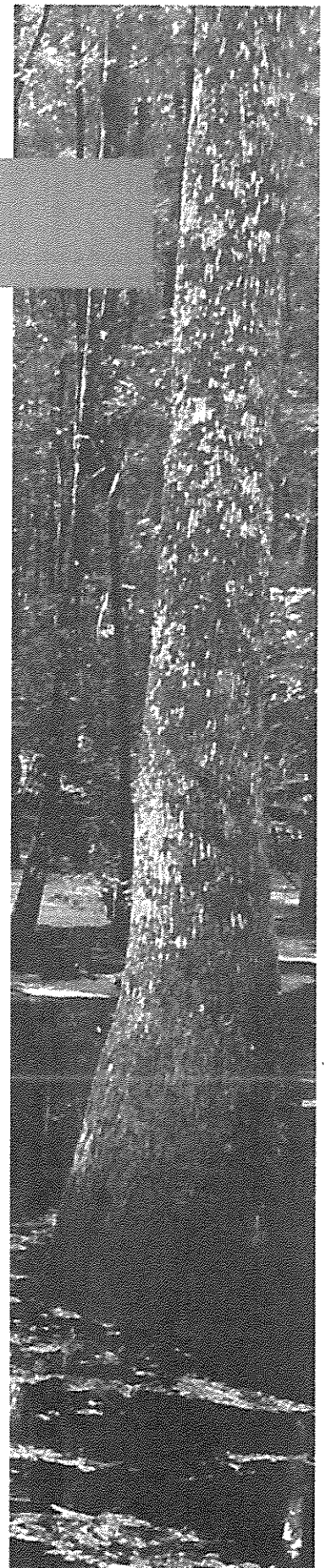
In general, the BMPs that apply to any other land type also apply to wetlands. For example, a stream within a wetland area would receive a SMZ, and a road or stream crossing constructed within a wetland would be required to apply the appropriate BMPs. However, because of the sensitivity of some types of wetlands to certain forestry related activities, the following special BMPs also apply.

### Drainage and Conversion

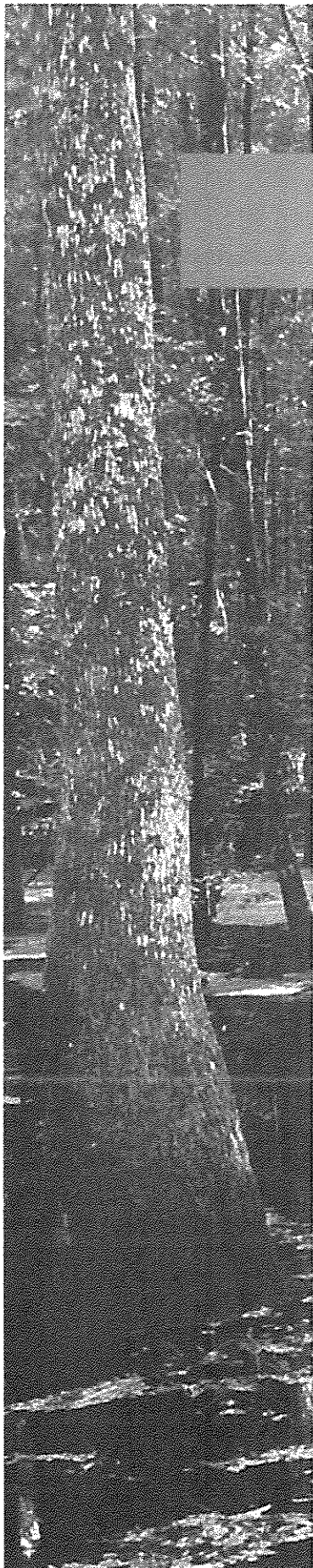
- Ditching in association with road construction and maintenance, fireline plowing or other activities in wetlands, must not significantly change the hydrologic condition of wetlands or the overall drainage pattern of the site.
- Do not significantly alter the natural drainage or flow patterns on forest lands immediately adjacent to wetlands, particularly isolated wetlands, such as cypress ponds or gum ponds. Logging slash must not be pushed into or piled around ponds or other isolated wetlands.
- Do not conduct intensive mechanical site preparation such as bedding, raking and windrowing in wetlands.
- Avoid fireline plowing in wetlands (see Fireline Construction).

### Roads

- When constructing roads in wetlands, refer to the Roads section of the manual in addition to the following BMPs.
- Avoid fill road construction, especially in floodplains or other wetlands







with flowing water. Roads constructed at ground level are less likely to restrict flowing water.

- Do not construct permanent roads in wetlands except to serve large and frequently used areas, provide access for a crossing, or provide fire protection.
- When crossing wetlands, insure that fill roads are properly and adequately culverted and do not act to impound or divert normal stormflow, flood flow or sheet flow (see Stream Crossings).

### Harvesting

- For harvesting timber in wetlands: **wetland area** means the acres of each contiguous wetland within a contiguous ownership; **selectively cut** means to harvest in accordance with the Management Criteria for the Primary Zone of the SMZ (see Special Management Zones); **leave trees** are large, mast producing and/or cavity trees that represent the older age classes within the stand. For stands where cypress trees are predominant, cypress trees should be selected for leave trees to the extent that safety and harvesting operations allow, and the number of leave trees per acre should be the upper limit of the ranges listed below. In addition, pond cypress trees should be cut at a point on the stem that approximates the average high water mark (except for skid trails or roads). The average high water mark can usually be identified by the water stain line, the lichen line or the area at which the stem begins to swell (buttress).

- A) Harvesting in a wetland area less than 200 acres must meet the following criteria:
  - 1) Retain all snags within the wetland area, to the extent that safety and harvesting operations allow; and,
  - 2a) Retain at least 3 to 5 leave trees per acre: if a wetland flow-way is present, leave trees should be left along it's center line; otherwise leave trees should be randomly distributed throughout the wetland; **or**,
  - b) Retain at least 10% of the harvest area as selectively cut: the 10% area may be left anywhere on-site. However, for wetlands with a well defined stream, an SMZ (as specified in the SMZ section) will be required for the stream, and may be used as part or all of the 10%; for flowing wetlands the 10% should be left along the center line of the wetland flow-way to the greatest extent possible.

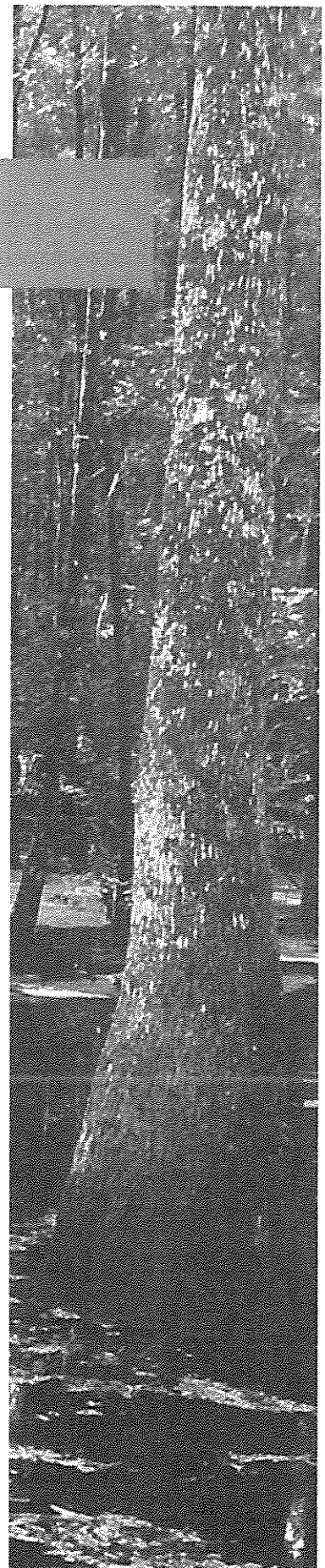
**Note: 2b) is the preferred option where it is applicable**

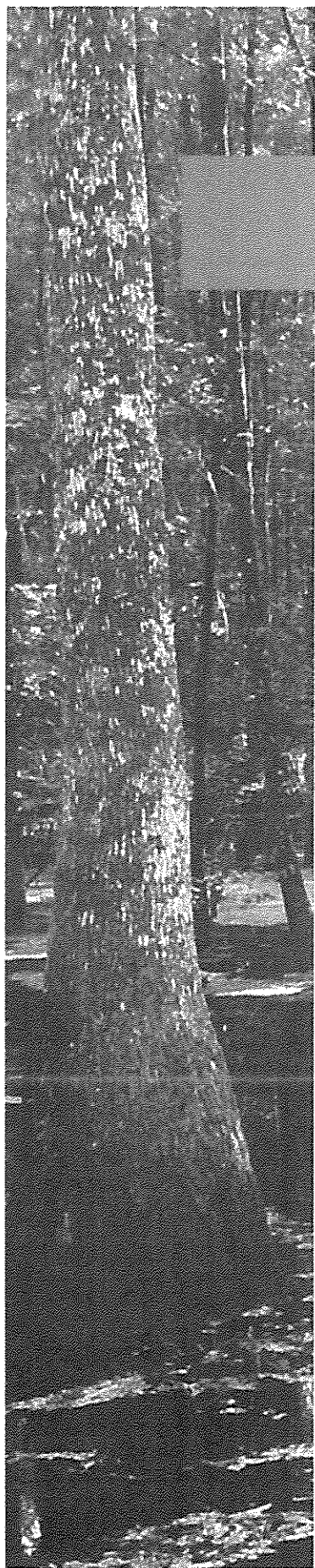
- B) Harvesting in a wetland area 200 acres and larger must meet the following criteria:
  - 1) Retain all snags within the wetland area, to the extent that safety and harvesting operations allow; and,

- 2) Retain at least 1 to 2 leave trees per acre: leave trees should be left along the center line of the wetland flow-way if applicable; otherwise leave trees should be randomly distributed throughout the wetland.
  - 3) Clearcut areas cannot exceed 160 acres in size.
  - 4) Clearcuts should be separated from any other clearcut by a 200' selectively cut buffer or by a 200' wide area which has an average tree height of at least 20 feet. However, multiple clearcuts within any 160 acre harvest unit may be separated by a 100 foot buffer. Limited timber harvesting is allowed within the 100 foot buffer provided that trees left in the buffer are equivalent to the number and size specified in the leave tree requirements described above. Under this scenario, the trees left in the 100 foot buffer will satisfy the "leave tree" requirements for the clearcut area associated with it, and no other leave trees would be required. For wetlands with a well defined stream(s), the Primary Zone left along the stream may be used to contribute toward the 200' requirement. For flowing wetlands, trees left along the center line of the wetland flow-way should be used to separate clearcut areas where applicable.
- C) A harvest unit which contains five or more small isolated wetlands, each less than two acres in size, must retain 20% of the number of isolated wetlands unharvested<sup>1</sup>. For example, if the harvest unit contains ten, two acre cypress ponds, eight may be clearcut and two must be left uncut until the regenerated stands on the other eight attain an average tree height of at least 20 feet.

### Skidding

- Minimize skidder and other heavy equipment operation in wetlands during wet conditions to avoid widespread excessive soil rutting. Although some minor rutting may occur in a typical wetland harvesting operation, skidders and other heavy equipment operations should be planned for dry seasons and/or dry periods as much as possible. When excessively wet harvesting conditions are unavoidable, low ground pressure equipment such as dual-tire skidders, tracked machines or special techniques such as "mat-logging" or "shovel-logging" should be employed where practical and economically feasible.
- To the greatest extent possible: forestry operations in wetlands which exhibit seasonal inundation or saturation should be limited to dry conditions only, and forestry operations in wetlands which are continually saturated or inundated should be limited to low-water conditions.
- When skidding in wetlands with organic soils, concentrate skid trails to as small an area as possible, and minimize the number of trails on a given site (see Timber Harvesting).





### **Mat (Shovel) Logging:**

- Minimize the width of skid trail mats – mats should not exceed 20 feet in width, on the average, except for sections of the trail where it is necessary for equipment to pass – in these sections the minimum width may be doubled.
- Minimize the number of skid trail mats – typically, trails should not be spaced closer than 200 feet, on the average. Where conditions prohibit tracked machines from operating off the mat, spacing may be reduced to 50 feet in order to minimize site disturbance. However, under no conditions should skid trail mats exceed 25% of the harvest area.
- Timber for skid trail mats should be laid down in the direction of the trail under normal conditions.
- Use only one layer of timber for skid trail mats, except where multiple layers are necessary to prevent site disturbance.
- Where multiple layers of timber are necessary to construct the skid trail mat, the bottom layer may be laid down perpendicular to the trail, and may exceed 20 feet in width to maximize weight distribution.
- Merchantable material in skid trail mats should be removed after logging operation is complete.
- For stream crossings with skid trail mats, refer to the stream crossing section of the BMP Manual.

**Note:** *Ditching and drainage activities as well as the placement of fill material in wetlands generally requires a permit from regulatory agencies. Individuals engaged in such activities are advised to contact the appropriate agency for specific guidance (Appendices 13 and 14). In addition, state water quality standards may apply to wetlands that are connected to streams, lakes, or other waterbodies.*

**Note:** *Typically, cypress planting is not necessary on a large scale basis; however, where site conditions or other factors conducive to natural regeneration of stands are limited, planting of cypress seedlings may augment reforestation efforts.*

*Retaining isolated wetlands that have the following characteristics may improve the habitat value for wetland dependent species within the landscape:*

*Intermittent surface water.*

*Wetland margin dominated by native wetland plants.*

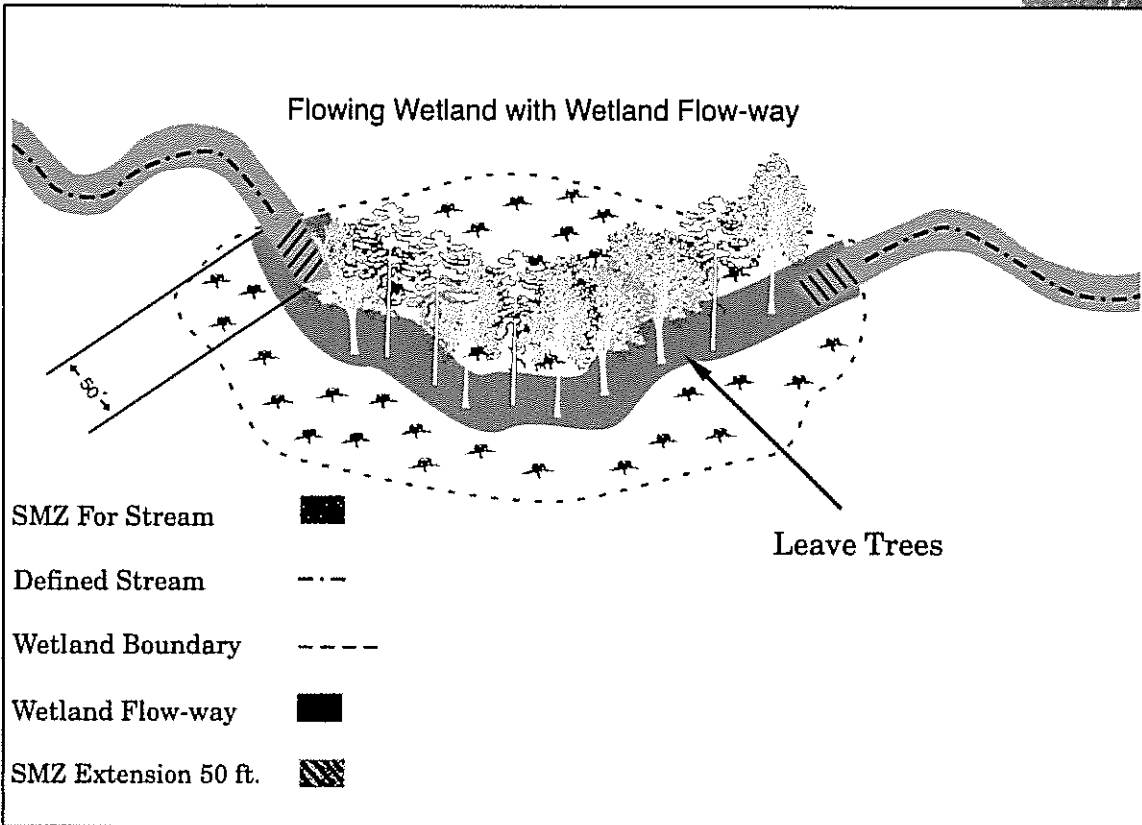
*High species and age class diversity in standing timber.*

*Presence of snags and den trees.*

*Unique plant communities.*

*Where natural hydrology is least disturbed.*

# Figure 4







## Application of BMPs: Canals

Best Management Practices for canals are designed to provide additional protection to Florida's water resources. Since canals are often connected to streams, lakes or other waterbodies, forestry activities adjacent to canals have the potential to impact water quality through such connections.

For the purposes of this Manual, the term canal does not include natural streams that have been hydrologically modified by dredging or straightening to enhance their efficiency to transport water. Although such "modified streams" may have been significantly altered, they are still geographically located to receive and transport storm water and thus are connected directly to other waters. In most cases, they continue to perform important natural stream functions particularly if they have associated wetlands. For these reasons, BMPs for modified streams (including SMZ criteria) are identical to those for any other naturally occurring perennial or intermittent stream, except for maintenance activities (see Canal Maintenance section).

Canals, for the purposes of this manual, are totally man-made and generally independent from natural drainage features. As artificial systems, canals exhibit only periodic and limited characteristics of natural streams and usually receive periodic maintenance. Canals do not include forestry road-side ditches or upland field ditches.

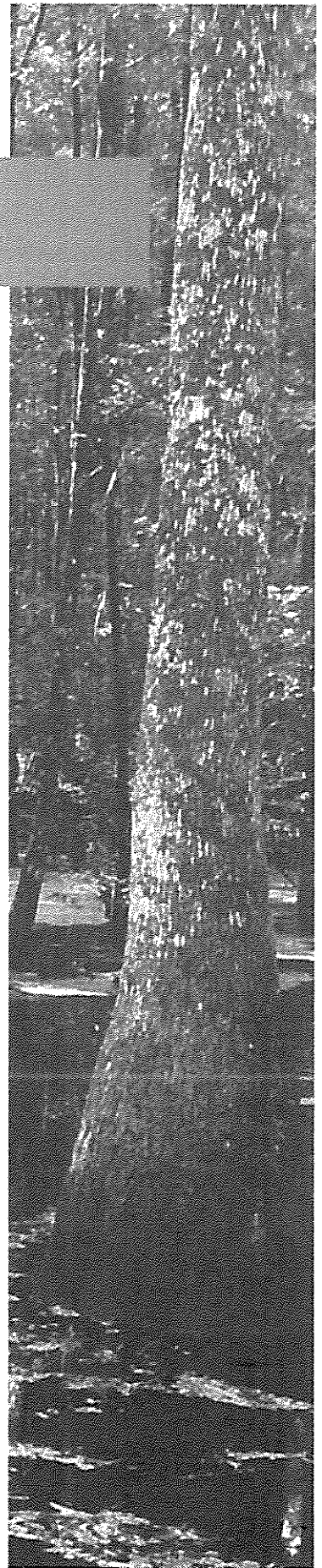
### ***BMPs for Canals***

- During normal silvicultural operations, do not operate heavy equipment within canals or in such a manner as to result in damage to the canal bank.
- Avoid canal crossings when possible. Where necessary, construct crossings in accordance with the Stream Crossings section of this manual.
- Do not conduct bedding, chopping or other site preparation activities in such a way that results in direct surface water discharge into a canal.
- Avoid dropping logging slash in canals; remove significant amounts of logging slash from canals.
- Do not discharge pesticides not approved for aquatic use, fertilizer, or other pollutants into canals. Do not dispose of chemical containers and/or equipment rinse water in canal waters.

### Canal Maintenance

- Maintenance for modified streams and canals should be minimized. When necessary, conduct canal re-dredging during periods of low flow. Minimize disturbance to canal banks and retain as much “streamside” vegetation as possible.
- Use appropriate erosion, sediment and turbidity control practices to reduce sediment transport.
- When conducting road maintenance adjacent to a canal, do not discharge road spoil on the canal-side of the road.

**Note:** *Before conducting canal maintenance, contact the appropriate regulatory agency(s) - such activities normally require authorization and/or permits (Appendix 13).*







## Application of BMPs: Sinkholes

Sinkholes are important waterbodies because geologically and hydrologically active sinks may form a direct connection between the land surface and groundwater with little or no filtration through soil layers. Consequently, any pollutants that enter a sinkhole have the potential to contaminate groundwater. Sinkholes support a unique combination of plants and animals that are very sensitive to pollution, temperature and sunlight changes and may depend on leaf litter and organic debris for food sources.

In addition to the water resource concerns for sinkholes, there are also safety concerns. Ground conditions near sinkholes may be very unstable geologically and prone to collapse. Heavy equipment operation in and around these areas could result in damage to or loss of equipment, structures, and physical harm to workers and operators.

### ***BMPs for Sinkholes***

- For sinkholes with perennial or intermittent open water, or which connect to an intermittent or perennial stream, apply the appropriate Special Management Zone to the sinkhole (See Application of SMZs).
- Do not place any debris, trash, or waste in any sinkhole or in any surface drainage feature that flows into a sinkhole.
- Avoid mechanical operations such as harvest or site preparation, fertilization, or pesticide use in sinkholes.
- When working adjacent to sinkholes, do not alter land surface slope to direct surface drainage into the sinkhole - apply mechanical site preparation such as bedding on the contour.

# Application of BMPs: Forest Roads

Forest roads represent the single greatest potential for severe, long term erosion and sedimentation from forestry activities. The nature of roads generally involves maintaining a “bare soil” condition on the road surface and periodic maintenance of both the surface and any associated ditches.

Permanent access roads are often accompanied by permanent drainage ditches or other drainage structures designed to transport stormwater. Serious road deterioration can result if ditch or drainage structure capacity is exceeded during storm events. This can lead to flooding of the road and surrounding area, scouring of the road and ditch surface, blowing out of roads and culverts, all of which may ultimately result in sediment delivery into streams or other waterbodies. To properly design, build, drain and maintain forest roads, the following BMPs are provided.

## ***BMPs for Forest Roads***

### **Road Planning**

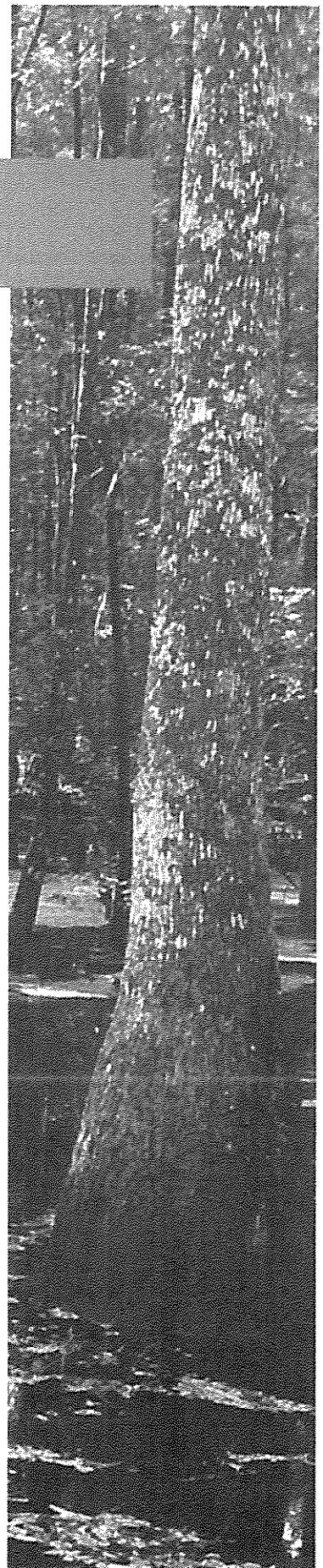
- Carefully plan the location and the desired drainage features before construction, using soil survey maps, topographic maps and aerial photographs.
- Plan construction activities for dry periods.
- New road construction is not permitted within the Special Management Zone, except for stream crossings.
- Minimize stream and wetland crossings. Roads will be less costly to build and maintain, equipment “down time” will be reduced and the water resource will be protected.

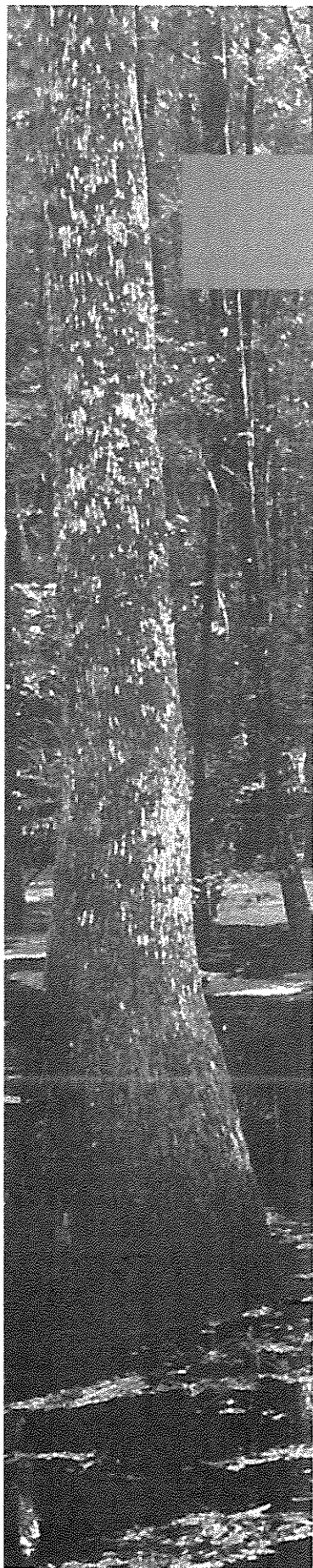
### **Road Construction**

- Avoid construction operations during wet conditions - If possible, complete construction several months before heavy usage. This will reduce surface scour and decrease sediment transport.
- Balance cuts and fills to maximize use of local material and to maximize roadbed stability.
- To reduce both road costs and disturbed surface area, minimize the road width consistent with the anticipated type and amount of traffic.
- For fill road construction, keep road shoulders at a gentle slope to minimize erosion and accelerate revegetation.
- Stabilize road banks and critical road segments using mulch, seed and fertilizer, or other methods to keep the road from washing and to keep sediment out of streams (Appendix 6).

### **Road Drainage**

- Drain road systems using culverts, cross ditches, turnouts, etc., to encourage long term stability, reduce maintenance, and protect water quality (Appendices 7, 8, and 9).





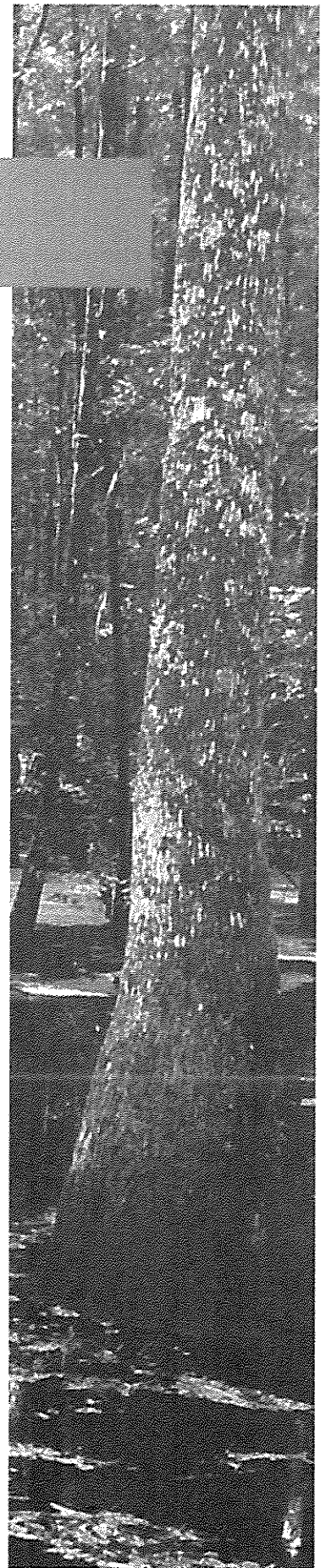
- Where applicable, use practices such as turnouts or ditch plugs, to reduce the volume and velocity of ditch flow.
- All road drainage practices that divert ditch flow or road surface runoff, must direct such flow onto vegetated areas where it can be adequately dispersed - do not direct ditch flow or road runoff into streams, lakes or other waterbodies.
- Use cross-drain culverts on roads where there is a need to direct ditch flow from one side of a road to the other, underneath the road surface.
- Use cross-ditches on roads where there is a need to channel ditch or road surface drainage from one side of the road to the other, over the surface of the road.
- Base the size of the culvert or cross-ditch on the road ditch size, type and slope of the road and the expected volume of water to be handled during storm events.
- Use water turnouts to periodically turn ditch flow out and away from the road, and onto an adjacent vegetated area for dispersal of road runoff and sediment. Vegetated areas used for water turnouts must be adequate in size and have sufficient ground cover to assimilate discharges.
- Use broad base dips on permanent roads for dispersion of road surface drainage in the absence of road ditches - the use of a broad base dip provides exceptional drainage and virtually unlimited trafficability. This road drainage practice is best suited for new road construction and on especially critical road segments designed for all-weather traffic and heavy use.
- Use water bars for temporary access roads, firelines and skid trails, where a physical barrier is needed to disrupt and disperse runoff and sediment. Since water bars vary from 1 - 3 feet in height, they are generally not suitable for high speed or heavy traffic loads, but can be used to effectively close a road to vehicular traffic.

#### **Road Maintenance**

- All drainage structures should be periodically checked and maintained, especially following excessive rainfall events. If signs of sediment and/or turbid discharges are present, take immediate corrective actions for any problem.
- Ditches and culverts should be kept free of major obstructions and ditches should be allowed to revegetate as much as is practicable.

- Close or restrict traffic on roads whenever possible - this will allow roads to stabilize and revegetate.
- Seeding and fertilizing, mulching or otherwise stabilizing critical segments of temporary and permanent roads will accelerate revegetation, ensure road utility in the future and protect nearby watercourses. Seeding rates and types are listed in Appendix 6.

**Note:** *Spacing recommendations for cross-drain culverts, cross-drain ditches, water turnouts, broad base dips and water bars have been computed for a wide range of road slopes and are provided in Appendix 7. Appendix 8 provides illustrations of the design and installation for each of these drainage practices.*







## Application of BMPs: Stream Crossings

Stream crossings represent the point at which a forest road or skid trail comes in contact with a waterbody. Consequently, some type of planned crossing is necessary to protect water quality. Careful consideration should be given to determining the type of crossing to be used, and in constructing the project. The principal objectives of a stream crossing are to provide a dry surface crossing even during periods of stormflow, and to provide adequate conveyance of flow beneath the road fill so that **impounding of flow does not occur**. BMPs for stream crossings are provided below.

### *BMPs for Stream Crossings*

#### In General

- Minimize the number of crossings on a given stream, and cross streams perpendicular to the flow at the most narrow section. This minimizes the area of disturbance and simplifies construction.
- Any erodible fill material or other areas normally exposed to flowing water should be stabilized with rip-rap, vegetation or other appropriate material following construction.
- Avoid planning construction of crossings for wet periods - avoid construction during high water conditions.

#### Culverts

The use of a culvert is the most common method for constructing stream crossings associated with forestry activities. Culverts are well suited for crossing both perennial and intermittent streams as well as other wet areas. However, several other types of stream crossings are also well suited for forestry related stream crossings under certain conditions.

- Place culverts in a section of the stream channel that is relatively straight and free from curves, meandering or major obstructions.
- Place the bottom of the culvert at the same elevation as the bottom of the stream, and at approximately the same slope.
- Keep the height of the entire structure (culvert plus fill) as low as possible to reduce the potential for impounding large areas of water.
- Use a culvert diameter that is sufficient to carry the normal flow expected. Culvert sizing for permanent installations should be based on the size and nature of the stream channel being crossed, or on the size and nature of the watershed above the crossing. Appendix 9 provides two possible methods for determining culvert diameter.
- When crossing broad channels or wetlands, several small culverts, spaced

throughout the crossing, are normally preferable to a single large one. This arrangement maintains a lower road surface elevation and does not artificially concentrate the flow into one small segment of the channel.

- For temporary stream crossings, a culvert may be sized to reflect seasonal flow conditions. For example, during normally dry periods a small culvert may provide adequate stormflow capacity on a temporary basis. However, a culvert sized under such conditions must be removed immediately following the activity, or replaced with a size that will accommodate normal year-round flows.
- Periodically inspect all culverts to prevent clogging, plugging and eventual failure. Remove any debris or sediment deposits that have the potential to cause culvert clogging.

### Hard Surface Crossings

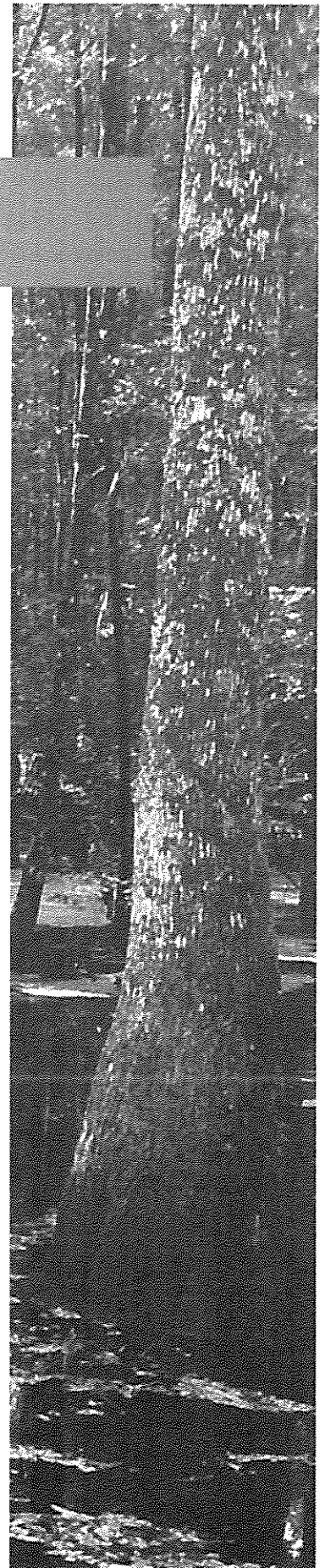
Hard surface crossings or fords are commonly used for stream crossings during forestry operations. These crossings consist of lining the stream channel with rock, brick, logs, concrete, or other such material. In some cases, the stream bottom may be naturally armored and may accommodate light traffic without artificial substrate.

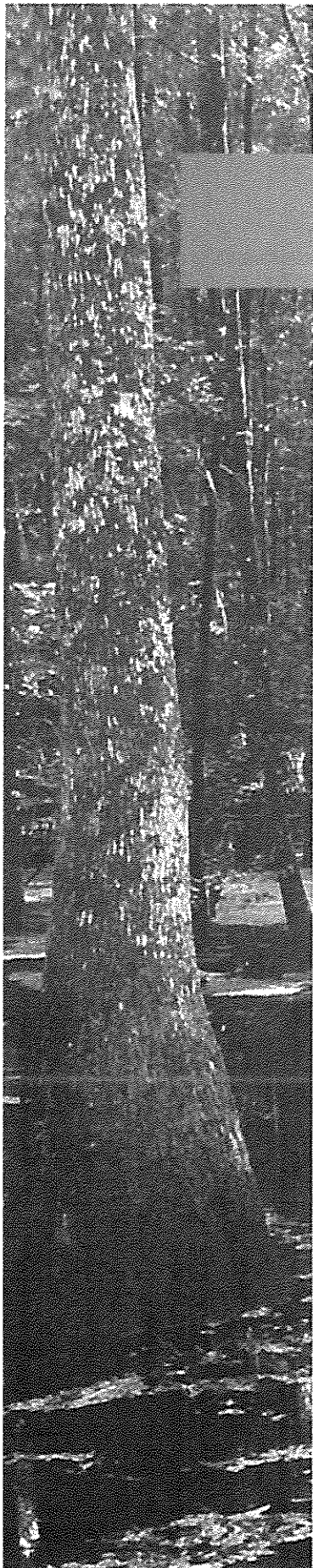
Hard surface crossings may be constructed on both perennial and intermittent streams, and offer some important advantages over culverted crossings. In many cases, a hard surface crossing may cost considerably less than a culvert crossing, depending on the availability of surfacing material. Also, hard surface crossings are virtually maintenance free and normally do not become clogged or plugged because they maintain the natural shape of the stream channel. This is a particularly important feature in areas with beaver populations.

The material used in hard surface crossings is relatively large and stable. Consequently, these type crossings usually do not fail or blow-out the way other structural crossings can. As long as the armoring material does not significantly impound flow or cause erosive currents, these crossings can accommodate normal streamflow while providing good access at very low risk to water quality.

The major disadvantage of hard surface crossings is the limited access during periods of high flow. For that reason, these crossings are best suited for relatively small, well defined channels that tend to have “flashy” stormflow characteristics. Also, hard surface crossings are usually not well suited for high speed, main haul-road applications.

- Use clean material that will not rapidly degrade and that is heavy enough to stay in place during high flow conditions, i.e., lime rock, railroad rock, bricks, etc.





- Do not use asphalt or other petroleum based materials.
- Do not construct a hard surface crossing on streams where the bottom is mucky, muddy or otherwise unstable, or if down-stream water quality standards violations occur under normal operating conditions.
- Do not use logs or logging slash as a permanent hard surface crossing material. Logs may be used to facilitate temporary crossings but must be removed from the channel upon completing the operation.
- Keep the height of the surfacing material at a minimum; hard surface crossings must not significantly restrict normal streamflow.

*Note: Make sure that crossings are in compliance with other standards and regulations that apply - all types of stream crossings may be subject to permitting by regulatory agencies.*

# Application of BMPs: Timber Harvesting

Timber harvesting activities should be conducted carefully, especially on steeper slopes and near streams, lakes, sinkholes, wetlands or other waterbodies. **When harvesting timber in close proximity to a waterbody, follow the specific criteria provided in the Special Management Zone section of this manual.** Depending on conditions, timber harvesting in these areas may be significantly limited.

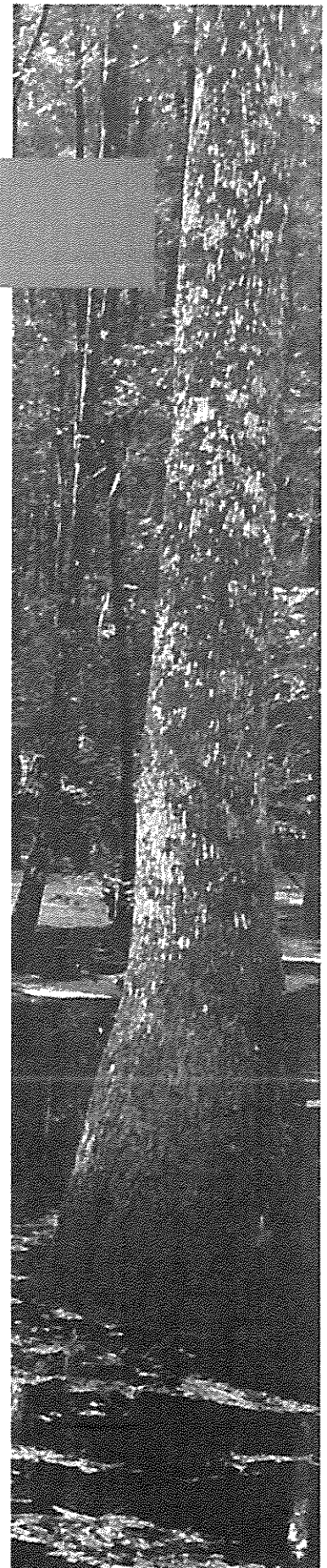
## *BMPs for Timber Harvesting*

### Skid Trails

- Locate skid trails along the contour whenever practical to promote revegetation and reduce soil erosion. If skidding must be done up or down the slope, the operator should skid uphill and avoid long, continuous skid trails.
- After skidding activities are complete, stabilize skid trails where necessary by installing water bars or similar structures at recommended intervals - seeding and fertilizing skid trails will accelerate stabilization on erodible soils and/or steep slopes.
- When skidding in muck or peat (organic) soils such as in swamps, bogs or similar wetlands, concentrate skidding to as few trails as possible - this will confine soil compaction to small areas.
- When skidding on mineral soils, such as in uplands, skidding should be dispersed so that soil compaction is minimal even in individual trails.
- Keep main skid trails out of all Special Management Zones except to approach a designated crossing.
- Keep loading decks or landings out of all Special Management Zones. In addition, keep all log bunching points out of the Primary Zone of the SMZ.

### Slash Disposal

- Logging slash, such as tops and limbs, which are incidental to timber harvesting activities may be left in place, as long as such material is not left in a waterbody.
- Remove logging slash from all waterbodies including both intermittent and perennial streams, lakes and sinkholes.
- Do not pile or push logging slash into cypress ponds or strands, swamps, marshes, grassy ponds, or waterbodies such as streams, lakes, sinkholes or similar water resource features.







## Application of BMPs: Site Preparation & Planting

Although site preparation activities are part of the reforestation operation, these activities can temporarily create large areas of bare soil. Depending on soil types and slope, mechanical site preparation in particular, may have the potential for significant erosion and sedimentation. For these reasons, mechanical site preparation may be restricted or prohibited near streams, lakes, sinkholes and other waterbodies. **When conducting site preparation activities near surface waters, follow the specific criteria provided in the Special Management Zone section of this manual.**

### ***BMPs for Site Preparation and Planting***

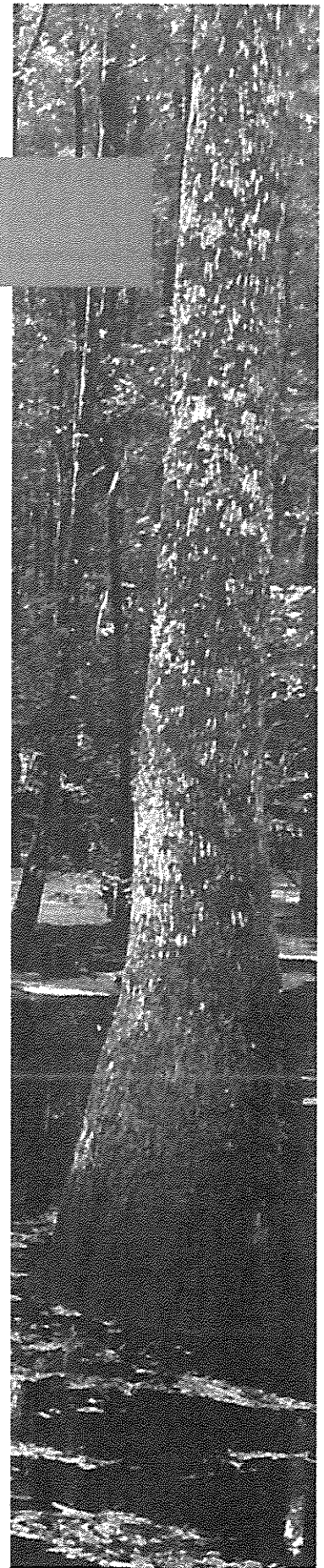
- Plan site preparation and planting procedures prior to timber harvesting activities.
- Select only the site preparation techniques that are necessary to establish seedlings and minimize vegetative competition - do not needlessly disturb the ground surface or expose the topsoil.
- Do not conduct mechanical site preparation within any part of the Special Management Zone.
- Do not conduct intensive mechanical site preparation such as bedding, raking and windrowing in wetlands.
- When chopping, pull chopper perpendicular to a waterbody to orient soil indentations along the contour (not necessary if chopping is followed by bedding or if the waterbody is separated from the chopped area by windrows or a similar barrier to overland flow).
- Arrange windrows and soil beds parallel to a waterbody or wetland in order to provide a barrier to overland flow, prevent concentration of runoff and reduce erosion.
- When using a blade to shear, push, or pile debris, keep the blade above the soil surface. This will minimize erosion and facilitate rapid site recovery and tree growth.
- Do not pile or push logging slash into cypress ponds or strands, swamps, marshes, grassy ponds, or waterbodies such as streams, lakes or similar water resource features.
- Do not conduct site preparation burning within the SMZ where slopes are 18% or greater.

## Application of BMPs: Fireline Construction

Fireline construction is an integral component of both fire suppression and prescribed burning. However, firelines can result in excessive erosion and water quality degradation. Lines plowed in wetlands can also result in excessive drainage and possibly conversion of wetlands to non-wetland systems. Extra precautions are necessary when constructing firelines near surface waters and wetlands.

### *BMPs for Firelines*

- Construct firelines only where necessary, making use of existing barriers such as roads, waterbodies, etc.
- Where possible, use alternatives to plowed lines such as harrowing, foam lines, wet lines or permanent grass.
- Do not plow lines through sensitive areas such as wetlands, marshes, prairies and savannas unless absolutely necessary. Avoid these areas or use alternative line construction methods.
- Maintain minimum plow depth at all times.
- When crossing waterbodies, raise the equipment to prevent connecting the line directly to the waterbody.
- Do not construct firelines which act as drainage systems, particularly those that might connect or drain isolated wetlands.
- Avoid constructing plowed firelines in the Special Management Zone, particularly the Primary Zone.
- Use water bars, turnouts and/or vegetation to stabilize firelines when erosion and sedimentation might otherwise result.
- When revegetating firelines, use native species when possible.
- Orient firelines along the contour wherever possible to prevent erosion and gullyng.
- Do not prescribe burn for site preparation purposes within the Special Management Zone when the slope of the site is 18% or greater (SSCs 5 and 6). Burning for ecological purposes on steep slopes is not restricted.





## Application of BMPs: Pesticide & Fertilizer Use

Pesticide and fertilizer application is a common silvicultural management technique in some areas of Florida. Pesticides and fertilizer are usually applied near tree planting time or shortly after. Occasionally, nitrogen fertilizer and some types of pesticides may be added later in the rotation.

These chemicals generally do not pose a threat to water quality as long as they are applied according to the label and in compliance with the following BMPs.

### ***BMPs for Pesticide and Fertilizer Use***

#### **Pesticides**

- Choose equipment that directs the chemical only to the target area. Misdirected or excessive amounts of pesticides are wasteful, expensive and can pose a serious threat to water quality and aquatic life.
- Do not conduct aerial application, mist blowing or operational application (See Glossary) of pesticides within the Primary Zone of the SMZ, including any drift from nearby applications.
- Do not leave pesticide containers on site - these should be rinsed and disposed of according to the directions on the label.
- Do not rinse spray equipment or discharge rinse water in waterbodies, wetlands or within the Special Management Zone.

#### **Fertilizer**

- Do not conduct aerial application, or operational application (See Glossary) of fertilizer or locate fertilizer transfer/loading areas within the Primary Zone of the SMZ, including any drift from nearby applications.
- Whenever practical, apply fertilizer to maximize the uptake of nutrients, which might otherwise move off-site; consider the use of slow release fertilizer when conditions are appropriate.

### ***Fertilizer Application Limits***

Good nutrient management is essential for healthy forest production and environmental protection. The key to success is identifying the needs of target plants and matching fertilization operations to those needs. One way to accomplish this is to develop and implement a nutrient management plan based on soil, water, plant and organic material sample analyses, along with expected or desired timber yields (see Florida Extension Service Circular 1230). This should result in fertilizer application rates that minimize the amount of available nutrients while optimizing growth and yield.

In addition, it should be understood that not all silviculture strategies require, or can benefit from, forest fertilization. Where forest fertilization is conducted, such operations should be planned and implemented with consultation from a knowledgeable professional, and in accordance with all applicable BMPs or other measures that reduce nutrient delivery to water resources.

To that end, the following BMP represents fertilizer application limits not to be exceeded during forest fertilization operations (these are not recommended rates of application):

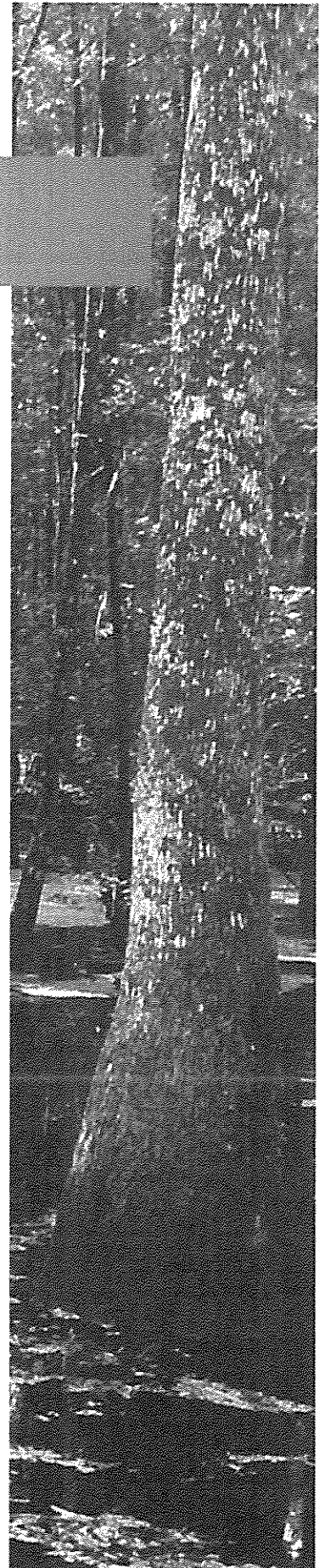
#### **Elemental Nitrogen**

- No more than a 1000 lbs/acre over any 20-year period.
- No more than 250 lbs/acre for any 3-year period.
- No more than 80 lbs/acre during the first 2-years of newly established plantations.

#### **Elemental Phosphorus**

- No more than 250 lbs/acre over any 20-year period.
- No more than 80 lbs/acre for any 3-year period.

**Note:** *Some pesticides require the applicator to be certified by the Florida Department of Agriculture and Consumer Services. Also, pesticide labels may have additional restrictions for application near open waters or wetlands. Read and follow the label. Failure to comply with requirements of pesticide labels can result in civil and/or criminal penalties under state and federal law.*







## Application of BMPs: Waste Disposal

Heavy equipment such as tractors, skidders and large trucks are commonly used in forestry activities. Consequently, routine maintenance activities including oil changes, often take place at the work site, i.e. "in the woods". Proper collection and disposal of used oil is necessary to prevent soil and water contamination and to promote oil recycling.

Florida Law prohibits the discharge of pollutants both on the ground and in waterbodies. Pollutants include petroleum products of all kinds, including used oil. The discharge itself and the failure to report the discharge may be subject to penalties under Florida Law and Federal Law. Discharges or spills should be reported in accordance with the requirements of the Department of Environmental Protection rules.

### ***BMPs for Waste Disposal***

#### **Used Oil**

- During equipment maintenance, used oil should be collected and stored until properly disposed.
- Do not discharge used oil or other pollutants on the ground, in sinkholes, or in waterbodies of any kind (including wetlands and canals).
- Do not mix used oil with other materials such as degreasing solvents, carburetor cleaners, etc. Such mixing may render the used oil unsuitable for recycling and therefore unacceptable at recycling centers.

#### **Solid Waste**

- Do not dispose of solid wastes, such as trash, litter, containers, etc. into waterbodies of any kind.
- Remove trash, litter and other solid wastes from project areas. In particular, remove and properly dispose of all chemical containers, hydraulic fluid and oil containers, oil filters, batteries, and tires.

**Note:** *For information concerning oil spill reporting requirements, contact the local Department of Environmental Protection office. There is a 25 gallon threshold for petroleum spills on pervious surfaces (soil): Less than 25 gallons - self clean up. Contaminated soil can be disposed of at any Class I landfill (typically this would be a county landfill). There would be a charge. Twenty-five gallons or more, call DEP from any telephone. This will reach the "State Warning Point", at which time the caller identifies the problem. For petroleum spills, DEP would send out a "response team" to handle the situation.*

**Note:** *Most counties in Florida maintain a used oil collection facility which will accept used oil and hydraulic fluid. Contact your County Landfill Operation for the nearest location of such a facility.*

## Application of BMPs: Wet Weather Operations

Creek and river floodplains and isolated wetlands are periodically inundated, which can result in large areas of flowing and/or “standing” water. Heavy equipment operation, such as skidding, in flowing water or in standing water that is contiguous with nearby flowing water is likely to cause the discharge of sediment or turbid runoff into waters of the State. Discharges of this nature can cause numerous problems to the water resource and may also constitute a State water quality standards violation.

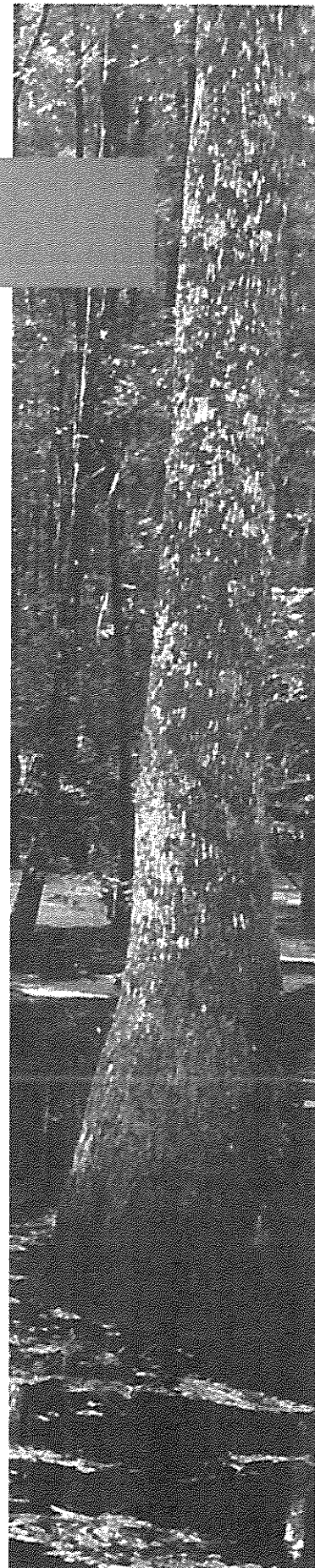
In addition, heavy equipment operation during flooded or saturated soil conditions can cause excessive rutting, which may result in significant soil compaction. If such rutting is widespread, overall reforestation of the site may be severely limited.

The best alternative for logging during wet weather conditions is to postpone the operation until drier conditions prevail. However, when operations must be conducted, the following BMPs apply.

### ***BMPs for Wet Weather Operations***

- Avoid heavy equipment operations, especially skidding, during flooded or wet soil conditions. Under certain conditions, special low-ground pressure equipment or other alternatives to conventional skidding may be necessary.
- Do not operate heavy equipment, especially skidders, in floodplains when they are flooded or during conditions of flowing or standing floodwater.
- Minimize skidder and other heavy equipment operation in wetlands during wet conditions to avoid widespread excessive soil rutting. Although some minor rutting may occur in a typical wetland harvesting operation, skidders and other heavy equipment operation should be planned for dry seasons and/or dry periods as much as possible.
- Confine skid trails to as small an area as possible when working in organic or muck soils, especially during wet conditions.

**Note:** *Wet weather forestry operations have the potential for creating water quality standards violations. Such operations that generate an offsite discharge of visibly turbid water above natural background levels, are likely to be in violation of State water quality standards.*





## Application of BMPs: Emergency Operations

In the event of a wildfire, insect or disease outbreak, exotic/invasive tree infestation, or other catastrophe, a Best Management Practice may be temporarily relaxed to aid fire suppression, to conduct appropriate salvage techniques, and to promote rapid site recovery. Harvesting guidelines which apply to Wetlands and the Special Management Zone may be relaxed to allow tree removal for the control of exotic/invasive trees and/or the salvage of damaged or downed timber.

### ***BMPs During Emergencies***

#### **Wildfire**

- Firelines, road construction and stream crossings will be unrestricted during emergencies, but stabilized according to Best Management Practices following the salvage and revegetation process (see Fireline Construction section).
- When necessary, mechanical site preparation techniques may be conducted within the Special Management Zone to help return the site to a productive, protective condition.

#### **Insect and Disease**

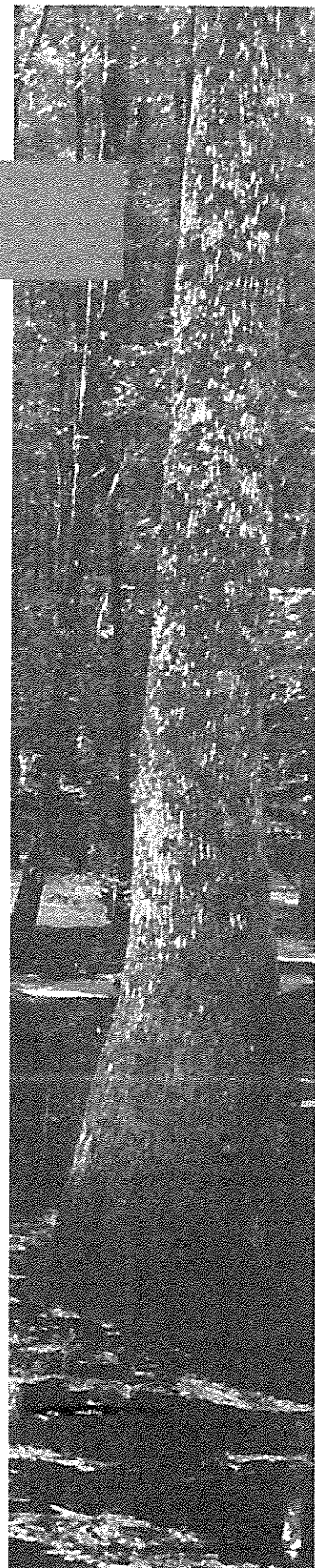
- During insect or disease epidemics, appropriate pesticides and/or harvesting may be used within the Special Management Zone to protect and maintain the health of the affected and surrounding forest.

#### **Exotic/Invasive Trees**

- For areas where exotic/invasive tree infestations are present, the exotic/invasive trees may be harvested without regard to the leave-tree criteria that would otherwise apply to Wetlands and Special Management Zones. BMPs other than the leave-tree criteria would still apply to the operation. This section does not apply to cultivated species such as eucalyptus.

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# Appendix 1 Site Management Recommendations • SSC A1

## SPECIAL MANAGEMENT ZONES (Each Side)

Stream Class	Primary (ft.)	Secondary (ft.)	Total SMZ (ft.)
<b>STREAMS</b>			
Intermittent (All)	Stringer	35	35
Perennial (<20 ft.)	35	none	35
Perennial (20-40 ft.)	75	none	75
Perennial (>40+ ft.)	200	none	200
OFW, ONRW, Class I Waters	200	none	200
<b>LAKES</b>			
Intermittent	Stringer	35	35
Perennial	35	none	35
OFW, ONRW, Class I Waters	200	none	200
<b>SINKHOLES</b>			
Intermittent	Stringer	35	35
Perennial	35	none	35

## ROAD CONSTRUCTION AND MAINTENANCE DRAINAGE RECOMMENDATIONS

Structure	Zone Width (ft.)	Treatments Allowed	Spacing (ft.)
Permanent Roads	0-300	Culvert or Cross Ditch	none
		Water Turnouts	200
		Broad-base Dips	none
Temp. Roads/Skid Trails	0-300	Water Bars	250
Firelines	0-300	Water Bars	250

## SITE SENSITIVITY CLASSIFICATION (SSC) INDEX

Soil Erodibility	K-Factor	Slope %					
		0-2	3-7	8-12	13-17	18-22	22+
Low	≤0.20	<b>A1</b>	A2	A3	A4	A5	A6
Moderate	0.21 - 0.27	B1	B2	B3	B4	B5	B6
High	≥0.28	C1	C2	C3	C4	C5	C6

# Appendix 1 Site Management Recommendations • SSC A2

## SPECIAL MANAGEMENT ZONES (Each Side)

Stream Class	Primary (ft.)	Secondary (ft.)	Total SMZ (ft.)
<b>STREAMS</b>			
Intermittent (All)	Stringer	45	45
Perennial (<20 ft.)	35	10	45
Perennial (20-40 ft.)	75	none	75
Perennial (>40+ ft.)	200	none	200
OFW, ONRW, Class I Waters	200	none	200
<b>LAKES</b>			
Intermittent	Stringer	45	45
Perennial	35	10	45
OFW, ONRW, Class I Waters	200	none	200
<b>SINKHOLES</b>			
Intermittent	Stringer	45	45
Perennial	35	10	45

## ROAD CONSTRUCTION AND MAINTENANCE DRAINAGE RECOMMENDATIONS

Structure	Zone Width (ft.)	Treatments Allowed	Spacing (ft.)
Permanent Roads	0-300	Culvert or Cross Ditch	200
		Water Turnouts	120
		Broad-base Dips	180
Temp. Roads/Skid Trails	0-300	Water Bars	135
Firelines	0-300	Water Bars	135

## SITE SENSITIVITY CLASSIFICATION (SSC) INDEX

Soil Erodibility	K-Factor	Slope %					
		0-2	3-7	8-12	13-17	18-22	22+
Low	≤0.20	A1	<b>A2</b>	A3	A4	A5	A6
Moderate	0.21 - 0.27	B1	B2	B3	B4	B5	B6
High	≥0.28	C1	C2	C3	C4	C5	C6

# Appendix 1 Site Management Recommendations • SSC A3

## SPECIAL MANAGEMENT ZONES (Each Side)

Stream Class	Primary (ft.)	Secondary (ft.)	Total SMZ (ft.)
<b>STREAMS</b>			
Intermittent (All)	Stringer	60	60
Perennial (<20 ft.)	35	25	60
Perennial (20-40 ft.)	75	none	75
Perennial (>40+ ft.)	200	none	200
OFW, ONRW, Class I Waters	200	none	200
<b>LAKES</b>			
Intermittent	Stringer	60	60
Perennial	35	25	60
OFW, ONRW, Class I Waters	200	none	200
<b>SINKHOLES</b>			
Intermittent	Stringer	60	60
Perennial	35	25	60

## ROAD CONSTRUCTION AND MAINTENANCE DRAINAGE RECOMMENDATIONS

Structure	Zone Width (ft.)	Treatments Allowed	Spacing (ft.)
Permanent Roads	0-300	Culvert or Cross Ditch	150
		Water Turnouts	100
		Broad-base Dips	140
Temp. Roads/Skid Trails	0-300	Water Bars	80
Firelines	0-300	Water Bars	80

## SITE SENSITIVITY CLASSIFICATION (SSC) INDEX

Soil Erodibility	K-Factor	Slope %					
		0-2	3-7	8-12	13-17	18-22	22+
Low	≤0.20	A1	A2	<b>A3</b>	A4	A5	A6
Moderate	0.21 - 0.27	B1	B2	B3	B4	B5	B6
High	≥0.28	C1	C2	C3	C4	C5	C6

# Appendix 1 Site Management Recommendations • SSC A4

## SPECIAL MANAGEMENT ZONES (Each Side)

Stream Class	Primary (ft.)	Secondary (ft.)	Total SMZ (ft.)
<b>STREAMS</b>			
Intermittent (All)	Stringer	300	300
Perennial (<20 ft.)	35	265	300
Perennial (20-40 ft.)	75	225	300
Perennial (>40+ ft.)	200	100	300
OFW, ONRW, Class I Waters	200	100	300
<b>LAKES</b>			
Intermittent	Stringer	300	300
Perennial	35	265	300
OFW, ONRW, Class I Waters	200	100	300
<b>SINKHOLES</b>			
Intermittent	Stringer	300	300
Perennial	35	265	300

## ROAD CONSTRUCTION AND MAINTENANCE DRAINAGE RECOMMENDATIONS

Structure	Zone Width (ft.)	Treatments Allowed	Spacing (ft.)
Permanent Roads	0-300	Culvert or Cross Ditch	125
		Water Turnouts	75
		Broad-base Dips	125
Temp. Roads/Skid Trails	0-300	Water Bars	60
Firelines	0-300	Water Bars	60

## SITE SENSITIVITY CLASSIFICATION (SSC) INDEX

Soil Erodibility	K-Factor	Slope %					
		0-2	3-7	8-12	13-17	18-22	22+
Low	≤0.20	A1	A2	A3	<b>A4</b>	A5	A6
Moderate	0.21 - 0.27	B1	B2	B3	B4	B5	B6
High	≥0.28	C1	C2	C3	C4	C5	C6



# Appendix 1 Site Management Recommendations • SSC A5

## SPECIAL MANAGEMENT ZONES (Each Side)

Stream Class	Primary (ft.)	Secondary (ft.)	Total SMZ (ft.)
<b>STREAMS</b>			
Intermittent (All)	Stringer	300	300
Perennial (<20 ft.)	35	265	300
Perennial (20-40 ft.)	75	225	300
Perennial (>40+ ft.)	200	100	300
OFW, ONRW, Class I Waters	200	100	300
<b>LAKES</b>			
Intermittent	Stringer	300	300
Perennial	35	265	300
OFW, ONRW, Class I Waters	200	100	300
<b>SINKHOLES</b>			
Intermittent	Stringer	300	300
Perennial	35	265	300

## ROAD CONSTRUCTION AND MAINTENANCE DRAINAGE RECOMMENDATIONS

Structure	Zone Width (ft.)	Treatments Allowed	Spacing (ft.)
Permanent Roads	0-300	Culvert or Cross Ditch	100
		Water Turnouts	50
		Broad-base Dips	120
Temp. Roads/Skid Trails	0-300	Water Bars	45
Firelines	0-300	Water Bars	45

## SITE SENSITIVITY CLASSIFICATION (SSC) INDEX

Soil Erodibility	K-Factor	Slope %					
		0-2	3-7	8-12	13-17	18-22	22+
Low	≤0.20	A1	A2	A3	A4	<b>A5</b>	A6
Moderate	0.21 - 0.27	B1	B2	B3	B4	B5	B6
High	≥0.28	C1	C2	C3	C4	C5	C6

# Appendix 1 Site Management Recommendations • SSC A6

## SPECIAL MANAGEMENT ZONES (Each Side)

Stream Class	Primary (ft.)	Secondary (ft.)	Total SMZ (ft.)
<b>STREAMS</b>			
Intermittent (All)	Stringer	300	300
Perennial (<20 ft.)	35	265	300
Perennial (20-40 ft.)	75	225	300
Perennial (>40+ ft.)	200	100	300
OFW, ONRW, Class I Waters	200	100	300
<b>LAKES</b>			
Intermittent	Stringer	300	300
Perennial	35	265	300
OFW, ONRW, Class I Waters	200	100	300
<b>SINKHOLES</b>			
Intermittent	Stringer	300	300
Perennial	35	265	300

## ROAD CONSTRUCTION AND MAINTENANCE DRAINAGE RECOMMENDATIONS

Structure	Zone Width (ft.)	Treatments Allowed	Spacing (ft.)
Permanent Roads	0-300	Culvert or Cross Ditch	75
		Water Turnouts	40
		Broad-base Dips	110
Temp. Roads/Skid Trails	0-300	Water Bars	30
Firelines	0-300	Water Bars	30

## SITE SENSITIVITY CLASSIFICATION (SSC) INDEX

Soil Erodibility	K-Factor	Slope %					
		0-2	3-7	8-12	13-17	18-22	22+
Low	≤0.20	A1	A2	A3	A4	A5	<b>A6</b>
Moderate	0.21 - 0.27	B1	B2	B3	B4	B5	B6
High	≥0.28	C1	C2	C3	C4	C5	C6

# Appendix 1 Site Management Recommendations • SSC B1

## SPECIAL MANAGEMENT ZONES (Each Side)

Stream Class	Primary (ft.)	Secondary (ft.)	Total SMZ (ft.)
<b>STREAMS</b>			
Intermittent (All)	Stringer	35	35
Perennial (<20 ft.)	35	none	35
Perennial (20-40 ft.)	75	none	75
Perennial (>40+ ft.)	200	none	200
OFW, ONRW, Class I Waters	200	none	200
<b>LAKES</b>			
Intermittent	Stringer	35	35
Perennial	35	none	35
OFW, ONRW, Class I Waters	200	none	200
<b>SINKHOLES</b>			
Intermittent	Stringer	35	35
Perennial	35	none	35

## ROAD CONSTRUCTION AND MAINTENANCE DRAINAGE RECOMMENDATIONS

Structure	Zone Width (ft.)	Treatments Allowed	Spacing (ft.)
Permanent Roads	0-300	Culvert or Cross Ditch	none
		Water Turnouts	150
		Broad-base Dips	none
Temp. Roads/Skid Trails	0-300	Water Bars	250
Firelines	0-300	Water Bars	250

## SITE SENSITIVITY CLASSIFICATION (SSC) INDEX

Soil Erodibility	K-Factor	Slope %					
		0-2	3-7	8-12	13-17	18-22	22+
Low	≤0.20	A1	A2	A3	A4	A5	A6
Moderate	0.21 - 0.27	<b>B1</b>	B2	B3	B4	B5	B6
High	≥0.28	C1	C2	C3	C4	C5	C6

# Appendix 1 Site Management Recommendations • SSC B2

## SPECIAL MANAGEMENT ZONES (Each Side)

Stream Class	Primary (ft.)	Secondary (ft.)	Total SMZ (ft.)
<b>STREAMS</b>			
Intermittent (All)	Stringer	60	60
Perennial (<20 ft.)	35	25	60
Perennial (20-40 ft.)	75	none	75
Perennial (>40+ ft.)	200	none	200
OFW, ONRW, Class I Waters	200	none	200
<b>LAKES</b>			
Intermittent	Stringer	60	60
Perennial	35	25	60
OFW, ONRW, Class I Waters	200	none	200
<b>SINKHOLES</b>			
Intermittent	Stringer	60	60
Perennial	35	25	60

## ROAD CONSTRUCTION AND MAINTENANCE DRAINAGE RECOMMENDATIONS

Structure	Zone Width (ft.)	Treatments Allowed	Spacing (ft.)
Permanent Roads	0-300	Culvert or Cross Ditch	200
		Water Turnouts	120
		Broad-base Dips	180
Temp. Roads/Skid Trails	0-300	Water Bars	135
Firelines	0-300	Water Bars	135

## SITE SENSITIVITY CLASSIFICATION (SSC) INDEX

Soil Erodibility	K-Factor	Slope %					
		0-2	3-7	8-12	13-17	18-22	22+
Low	≤0.20	A1	A2	A3	A4	A5	A6
Moderate	0.21 - 0.27	B1	<b>B2</b>	B3	B4	B5	B6
High	≥0.28	C1	C2	C3	C4	C5	C6



# Appendix 1 Site Management Recommendations • SSC B3

## SPECIAL MANAGEMENT ZONES (Each Side)

Stream Class	Primary (ft.)	Secondary (ft.)	Total SMZ (ft.)
<b>STREAMS</b>			
Intermittent (All)	Stringer	75	75
Perennial (<20 ft.)	35	40	75
Perennial (20-40 ft.)	75	none	75
Perennial (>40+ ft.)	200	none	200
OFW, ONRW, Class I Waters	200	none	200
<b>LAKES</b>			
Intermittent	Stringer	75	75
Perennial	35	40	75
OFW, ONRW, Class I Waters	200	none	200
<b>SINKHOLES</b>			
Intermittent	Stringer	75	75
Perennial	35	40	75

## ROAD CONSTRUCTION AND MAINTENANCE DRAINAGE RECOMMENDATIONS

Structure	Zone Width (ft.)	Treatments Allowed	Spacing (ft.)
Permanent Roads	0-300	Culvert or Cross Ditch	150
		Water Turnouts	100
		Broad-base Dips	140
Temp. Roads/Skid Trails	0-300	Water Bars	80
Firelines	0-300	Water Bars	80

## SITE SENSITIVITY CLASSIFICATION (SSC) INDEX

Soil Erodibility	K-Factor	Slope %					
		0-2	3-7	8-12	13-17	18-22	22+
Low	≤0.20	A1	A2	A3	A4	A5	A6
Moderate	0.21 - 0.27	B1	B2	<b>B3</b>	B4	B5	B6
High	≥0.28	C1	C2	C3	C4	C5	C6

# Appendix 1 Site Management Recommendations • SSC B4

## SPECIAL MANAGEMENT ZONES (Each Side)

Stream Class	Primary (ft.)	Secondary (ft.)	Total SMZ (ft.)
<b>STREAMS</b>			
Intermittent (All)	Stringer	300	300
Perennial (<20 ft.)	35	265	300
Perennial (20-40 ft.)	75	225	300
Perennial (>40+ ft.)	200	100	300
OFW, ONRW, Class I Waters	200	100	300
<b>LAKES</b>			
Intermittent	Stringer	300	300
Perennial	35	265	300
OFW, ONRW, Class I Waters	200	100	300
<b>SINKHOLES</b>			
Intermittent	Stringer	300	300
Perennial	35	265	300

## ROAD CONSTRUCTION AND MAINTENANCE DRAINAGE RECOMMENDATIONS

Structure	Zone Width (ft.)	Treatments Allowed	Spacing (ft.)
Permanent Roads	0-300	Culvert or Cross Ditch	125
		Water Turnouts	75
		Broad-base Dips	125
Temp. Roads/Skid Trails	0-300	Water Bars	60
Firelines	0-300	Water Bars	60

## SITE SENSITIVITY CLASSIFICATION (SSC) INDEX

Soil Erodibility	K-Factor	Slope %					
		0-2	3-7	8-12	13-17	18-22	22+
Low	≤0.20	A1	A2	A3	A4	A5	A6
Moderate	0.21 - 0.27	B1	B2	B3	<b>B4</b>	B5	B6
High	≥0.28	C1	C2	C3	C4	C5	C6

# Appendix 1 Site Management Recommendations • SSC B5

## SPECIAL MANAGEMENT ZONES (Each Side)

Stream Class	Primary (ft.)	Secondary (ft.)	Total SMZ (ft.)
<b>STREAMS</b>			
Intermittent (All)	Stringer	300	300
Perennial (<20 ft.)	35	265	300
Perennial (20-40 ft.)	75	225	300
Perennial (>40+ ft.)	200	100	300
OFW, ONRW, Class I Waters	200	100	300
<b>LAKES</b>			
Intermittent	Stringer	300	300
Perennial	35	265	300
OFW, ONRW, Class I Waters	200	100	300
<b>SINKHOLES</b>			
Intermittent	Stringer	300	300
Perennial	35	265	300

## ROAD CONSTRUCTION AND MAINTENANCE DRAINAGE RECOMMENDATIONS

Structure	Zone Width (ft.)	Treatments Allowed	Spacing (ft.)
Permanent Roads	0-300	Culvert or Cross Ditch	100
		Water Turnouts	50
		Broad-base Dips	120
Temp. Roads/Skid Trails	0-300	Water Bars	45
Firelines	0-300	Water Bars	45

## SITE SENSITIVITY CLASSIFICATION (SSC) INDEX

Soil Erodibility	K-Factor	Slope %					
		0-2	3-7	8-12	13-17	18-22	22+
Low	≤0.20	A1	A2	A3	A4	A5	A6
Moderate	0.21 - 0.27	B1	B2	B3	B4	<b>B5</b>	B6
High	≥0.28	C1	C2	C3	C4	C5	C6

# Appendix 1 Site Management Recommendations • SSC B6

## SPECIAL MANAGEMENT ZONES (Each Side)

Stream Class	Primary (ft.)	Secondary (ft.)	Total SMZ (ft.)
<b>STREAMS</b>			
Intermittent (All)	Stringer	300	300
Perennial (<20 ft.)	35	265	300
Perennial (20-40 ft.)	75	225	300
Perennial (>40+ ft.)	200	100	300
OFW, ONRW, Class I Waters	200	100	300
<b>LAKES</b>			
Intermittent	Stringer	300	300
Perennial	35	265	300
OFW, ONRW, Class I Waters	200	100	300
<b>SINKHOLES</b>			
Intermittent	Stringer	300	300
Perennial	35	265	300

## ROAD CONSTRUCTION AND MAINTENANCE DRAINAGE RECOMMENDATIONS

Structure	Zone Width (ft.)	Treatments Allowed	Spacing (ft.)
Permanent Roads	0-300	Culvert or Cross Ditch	75
		Water Turnouts	40
		Broad-base Dips	110
Temp. Roads/Skid Trails	0-300	Water Bars	30
Firelines	0-300	Water Bars	30

## SITE SENSITIVITY CLASSIFICATION (SSC) INDEX

Soil Erodibility	K-Factor	Slope %					
		0-2	3-7	8-12	13-17	18-22	22+
Low	≤0.20	A1	A2	A3	A4	A5	A6
Moderate	0.21 - 0.27	B1	B2	B3	B4	B5	<b>B6</b>
High	≥0.28	C1	C2	C3	C4	C5	C6



# Appendix 1 Site Management Recommendations • SSC C1

## SPECIAL MANAGEMENT ZONES (Each Side)

Stream Class	Primary (ft.)	Secondary (ft.)	Total SMZ (ft.)
<b>STREAMS</b>			
Intermittent (All)	Stringer	35	35
Perennial (<20 ft.)	35	none	35
Perennial (20-40 ft.)	75	none	75
Perennial (>40+ ft.)	200	none	200
OFW, ONRW, Class I Waters	200	none	200
<b>LAKES</b>			
Intermittent	Stringer	35	35
Perennial	35	none	35
OFW, ONRW, Class I Waters	200	none	200
<b>SINKHOLES</b>			
Intermittent	Stringer	35	35
Perennial	35	none	35

## ROAD CONSTRUCTION AND MAINTENANCE DRAINAGE RECOMMENDATIONS

Structure	Zone Width (ft.)	Treatments Allowed	Spacing (ft.)
Permanent Roads	0-300	Culvert or Cross Ditch	none
		Water Turnouts	150
		Broad-base Dips	none
Temp. Roads/Skid Trails	0-300	Water Bars	250
Firelines	0-300	Water Bars	250

## SITE SENSITIVITY CLASSIFICATION (SSC) INDEX

Soil Erodibility	K-Factor	Slope %					
		0-2	3-7	8-12	13-17	18-22	22+
Low	≤0.20	A1	A2	A3	A4	A5	A6
Moderate	0.21 - 0.27	B1	B2	B3	B4	B5	B6
High	≥0.28	<b>C1</b>	C2	C3	C4	C5	C6

# Appendix 1 Site Management Recommendations • SSC C2

## SPECIAL MANAGEMENT ZONES (Each Side)

Stream Class	Primary (ft.)	Secondary (ft.)	Total SMZ (ft.)
<b>STREAMS</b>			
Intermittent (All)	Stringer	60	60
Perennial (<20 ft.)	35	25	60
Perennial (20-40 ft.)	75	none	75
Perennial (>40+ ft.)	200	none	200
OFW, ONRW, Class I Waters	200	none	200
<b>LAKES</b>			
Intermittent	Stringer	60	60
Perennial	35	25	60
OFW, ONRW, Class I Waters	200	none	200
<b>SINKHOLES</b>			
Intermittent	Stringer	60	60
Perennial	35	25	60

## ROAD CONSTRUCTION AND MAINTENANCE DRAINAGE RECOMMENDATIONS

Structure	Zone Width (ft.)	Treatments Allowed	Spacing (ft.)
Permanent Roads	0-300	Culvert or Cross Ditch	200
		Water Turnouts	120
		Broad-base Dips	180
Temp. Roads/Skid Trails	0-300	Water Bars	135
Firelines	0-300	Water Bars	135

## SITE SENSITIVITY CLASSIFICATION (SSC) INDEX

Soil Erodibility	K-Factor	Slope %					
		0-2	3-7	8-12	13-17	18-22	22+
Low	≤0.20	A1	A2	A3	A4	A5	A6
Moderate	0.21 - 0.27	B1	B2	B3	B4	B5	B6
High	≥0.28	C1	<b>C2</b>	C3	C4	C5	C6

# Appendix 1 Site Management Recommendations • SSC C3

## SPECIAL MANAGEMENT ZONES (Each Side)

Stream Class	Primary (ft.)	Secondary (ft.)	Total SMZ (ft.)
<b>STREAMS</b>			
Intermittent (All)	Stringer	80	80
Perennial (<20 ft.)	35	45	80
Perennial (20-40 ft.)	75	5	80
Perennial (>40+ ft.)	200	none	200
OFW, ONRW, Class I Waters	200	none	200
<b>LAKES</b>			
Intermittent	Stringer	80	80
Perennial	35	45	80
OFW, ONRW, Class I Waters	200	none	200
<b>SINKHOLES</b>			
Intermittent	Stringer	80	80
Perennial	35	45	80

## ROAD CONSTRUCTION AND MAINTENANCE DRAINAGE RECOMMENDATIONS

Structure	Zone Width (ft.)	Treatments Allowed	Spacing (ft.)
Permanent Roads	0-300	Culvert or Cross Ditch	150
		Water Turnouts	100
		Broad-base Dips	140
Temp. Roads/Skid Trails	0-300	Water Bars	80
Firelines	0-300	Water Bars	80

## SITE SENSITIVITY CLASSIFICATION (SSC) INDEX

Soil Erodibility	K-Factor	Slope %					
		0-2	3-7	8-12	13-17	18-22	22+
Low	≤0.20	A1	A2	A3	A4	A5	A6
Moderate	0.21 - 0.27	B1	B2	B3	B4	B5	B6
High	≥0.28	C1	C2	<b>C3</b>	C4	C5	C6

# Appendix 1 Site Management Recommendations • SSC C4

## SPECIAL MANAGEMENT ZONES (Each Side)

Stream Class	Primary (ft.)	Secondary (ft.)	Total SMZ (ft.)
<b>STREAMS</b>			
Intermittent (All)	Stringer	300	300
Perennial (<20 ft.)	35	265	300
Perennial (20-40 ft.)	75	225	300
Perennial (>40+ ft.)	200	100	300
OFW, ONRW, Class I Waters	200	100	300
<b>LAKES</b>			
Intermittent	Stringer	300	300
Perennial	35	265	300
OFW, ONRW, Class I Waters	200	100	300
<b>SINKHOLES</b>			
Intermittent	Stringer	300	300
Perennial	35	265	300

## ROAD CONSTRUCTION AND MAINTENANCE DRAINAGE RECOMMENDATIONS

Structure	Zone Width (ft.)	Treatments Allowed	Spacing (ft.)
Permanent Roads	0-300	Culvert or Cross Ditch	125
		Water Turnouts	75
		Broad-base Dips	125
Temp. Roads/Skid Trails	0-300	Water Bars	60
Firelines	0-300	Water Bars	60

## SITE SENSITIVITY CLASSIFICATION (SSC) INDEX

Soil Erodibility	K-Factor	Slope %					
		0-2	3-7	8-12	13-17	18-22	22+
Low	≤0.20	A1	A2	A3	A4	A5	A6
Moderate	0.21 - 0.27	B1	B2	B3	B4	B5	B6
High	≥0.28	C1	C2	C3	<b>C4</b>	C5	C6



# Appendix 1 Site Management Recommendations • SSC C5

## SPECIAL MANAGEMENT ZONES (Each Side)

Stream Class	Primary (ft.)	Secondary (ft.)	Total SMZ (ft.)
<b>STREAMS</b>			
Intermittent (All)	Stringer	300	300
Perennial (<20 ft.)	35	265	300
Perennial (20-40 ft.)	75	225	300
Perennial (>40+ ft.)	200	100	300
OFW, ONRW, Class I Waters	200	100	300
<b>LAKES</b>			
Intermittent	Stringer	300	300
Perennial	35	265	300
OFW, ONRW, Class I Waters	200	100	300
<b>SINKHOLES</b>			
Intermittent	Stringer	300	300
Perennial	35	265	300

## ROAD CONSTRUCTION AND MAINTENANCE DRAINAGE RECOMMENDATIONS

Structure	Zone Width (ft.)	Treatments Allowed	Spacing (ft.)
Permanent Roads	0-300	Culvert or Cross Ditch	100
		Water Turnouts	50
		Broad-base Dips	120
Temp. Roads/Skid Trails	0-300	Water Bars	45
Firelines	0-300	Water Bars	45

## SITE SENSITIVITY CLASSIFICATION (SSC) INDEX

Soil Erodibility	K-Factor	Slope %					
		0-2	3-7	8-12	13-17	18-22	22+
Low	≤0.20	A1	A2	A3	A4	A5	A6
Moderate	0.21 - 0.27	B1	B2	B3	B4	B5	B6
High	≥0.28	C1	C2	C3	C4	<b>C5</b>	C6

# Appendix 1 Site Management Recommendations • SSC C6

## SPECIAL MANAGEMENT ZONES (Each Side)

Stream Class	Primary (ft.)	Secondary (ft.)	Total SMZ (ft.)
<b>STREAMS</b>			
Intermittent (All)	Stringer	300	300
Perennial (<20 ft.)	35	265	300
Perennial (20-40 ft.)	75	225	300
Perennial (>40+ ft.)	200	100	300
OFW, ONRW, Class I Waters	200	100	300
<b>LAKES</b>			
Intermittent	Stringer	300	300
Perennial	35	265	300
OFW, ONRW, Class I Waters	200	100	300
<b>SINKHOLES</b>			
Intermittent	Stringer	300	300
Perennial	35	265	300

## ROAD CONSTRUCTION AND MAINTENANCE DRAINAGE RECOMMENDATIONS

Structure	Zone Width (ft.)	Treatments Allowed	Spacing (ft.)
Permanent Roads	0-300	Culvert or Cross Ditch	75
		Water Turnouts	40
		Broad-base Dips	110
Temp. Roads/Skid Trails	0-300	Water Bars	30
Firelines	0-300	Water Bars	30

## SITE SENSITIVITY CLASSIFICATION (SSC) INDEX

Soil Erodibility	K-Factor	Slope %					
		0-2	3-7	8-12	13-17	18-22	22+
Low	≤0.20	A1	A2	A3	A4	A5	A6
Moderate	0.21 - 0.27	B1	B2	B3	B4	B5	B6
High	≥0.28	C1	C2	C3	C4	C5	<b>C6</b>

## Appendix 2 Soil Erodibility and K-Factors of Florida Soils

### Soil Erodibility Category A

Category	Soil Name	K-Factor	Category	Soil Name	K-Factor
A	Adamsville	0.10	A	Chipley	0.17
A	Alachua	0.17	A	Cocoa	0.17
A	Alaga	0.17	A	Copeland	0.17
A	Alapaha	0.17	A	Dade	0.17
A	Albany	0.17	A	Delks	0.17
A	Alpin	0.10	A	Delray	0.17
A	Americus	0.17	A	Eaton	0.17
A	Anclote	0.17	A	Eau Gallie	0.17
A	Apopka	0.17	A	Electra	0.15
A	Arredondo	0.17	A	Ellabelle	0.17
A	Arzell	0.10	A	Elred	0.17
A	Astatula	0.15	A	Eulonia	0.20
A	Astor	0.17	A	Eustis	0.17
A	Barth	0.17	A	Evinston	0.15
A	Basinger	0.10	A	Felda	0.17
A	Bibb	0.20	A	Floridana	0.17
A	Blanton	0.17	A	Fort Drum	0.20
A	Blichton	0.20	A	Fort Meade	0.17
A	Boca	0.20	A	Fox Worth	0.17
A	Bonifay	0.17	A	Fuquay	0.20
A	Bradenton	0.20	A	Gainesville	0.17
A	Broward	0.17	A	Goldboro	0.20
A	Canaveral	0.15	A	Hague	0.17
A	Candler	0.10	A	Hallandale	0.17
A	Cassia	0.15	A	Holopaw	0.15
A	Chaires	0.10	A	Huckabee	0.17
A	Charlotte	0.15	A	Hurricane	0.10
A	Chiefland	0.15	A	Immokalee	0.15

Category	Soil Name	K-Factor	Category	Soil Name	K-Factor
A	Johns	0.20	A	Matmon	0.20
A	Jonesville	0.17	A	Maxton	0.20
A	Jumper	0.20	A	Micanopy	0.20
A	Jupiter	0.17	A	Myakka	0.20
A	Kalmia	0.20	A	Newnan	0.10
A	Kanapaha	0.15	A	Ochopee	0.17
A	Kendrick	0.17	A	Ocilla	0.17
A	Kennansville	0.15	A	Oldsmar	0.20
A	Keri	0.17	A	Olustee	0.20
A	Kershaw	0.15	A	Ona	0.20
A	Klej	0.15	A	Orlando	0.15
A	Klej (Shallow Variant)	0.17	A	Orsino	0.17
A	Kureb	0.17	A	Ortega	0.10
A	Lake	0.15	A	Osier	0.15
A	Lakeland	0.17	A	Otela	0.10
A	Lakewood	0.15	A	Palm Beach	0.15
A	Leefield	0.20	A	Paola	0.15
A	Leon	0.20	A	Parkwood	0.20
A	Lochloosa	0.20	A	Pedro	0.17
A	Lucy	0.17	A	Pelham	0.20
A	Lutterloh	0.10	A	Pineda	0.17
A	Lynn Haven	0.20	A	Pinellas	0.17
A	Lynne	0.20	A	Placid	0.17
A	Magnolia	0.20	A	Plummer	0.17
A	Malabar	0.20	A	Poarch	0.20
A	Manatee	0.20	A	Pomello	0.17
A	Margate	0.17	A	Pomona	0.20
A	Marlboro	0.20	A	Pompano	0.15
A	Mascotte	0.20	A	Portsmouth	0.17



Category	Soil Name	K-Factor	Category	Soil Name	K-Factor
A	Red Bay	0.20	A	Surrency	0.20
A	Ridgeland	0.20	A	Tavares	0.17
A	Rimini	0.10	A	Tifton	0.20
A	Riviera	0.17	A	Toole	0.10
A	Rutlege	0.17	A	Troup	0.17
A	Satellite	0.15	A	Valkaria	0.15
A	Scranton	0.15	A	Wabasso	0.20
A	Sellers	0.15	A	Wacahoota	0.20
A	Smyrna	0.10	A	Wagram	0.15
A	Sparr	0.16	A	Wauchula	0.20
A	St Johns	0.20	A	Welaka	0.15
A	St Lucie	0.15	A	Winder	0.20
A	Stilson	0.20	A	Zuber	0.20

***Soil Erodibility Category B***

Category	Soil Name	K-Factor	Category	Soil Name	K-Factor
B	Archer	0.24	B	Eureka	0.24
B	Ardilla	0.24	B	Greenville	0.24
B	Boardman	0.24	B	Hannahatchee	0.24
B	Bowie	0.24	B	Myatt	0.24
B	Bushnell	0.24	B	Notcher	0.24
B	Carnegie	0.24	B	Panasoffkee	0.24
B	Chobee	0.24	B	Pantego	0.24
B	Cowarts	0.24	B	Peace River	0.24
B	Coxville	0.24	B	Rains	0.24
B	Cuthbert	0.24	B	Robertsdale	0.24
B	Elmeralda	0.24	B	Savannah	0.24
			B	Sunsweet	0.24
			B	Weston, dark subsoil	0.24

### **Soil Erodibility Category C**

Category	Soil Name	K-Factor	Category	Soil Name	K-Factor
C	Angie	0.32	C	Irvington	0.32
C	Bayboro	0.43	C	Izagora	0.32
C	Binnsville	0.37	C	Leaf	0.49
C	Bladen	0.32	C	Lynchburg	0.28
C	Blakely	0.37	C	Martel	0.28
C	Bluff	0.37	C	Meggett	0.32
C	Congaree	0.32	C	Norfolk	0.28
C	Dothan	0.28	C	Okitibbeha	0.32
C	Dunbar	0.28	C	Orangeburg	0.28
C	Duplin	0.32	C	Paisley	0.32
C	Esto	0.32	C	Pansey	0.32
C	Faceville	0.32	C	Perrine	0.32
C	Fellowship	0.28	C	Ruston	0.28
C	Flamingo	0.37	C	Sawyer	0.37
C	Flemington	0.32	C	Shubuta	0.28
C	Grady	0.37	C	Stough	0.28
C	Gritney	0.32	C	Susquehanna	0.28
C	Hialeah	0.37	C	Vaocluse	0.28
C	Iberia	0.37	C	Wahee	0.43

### **Not Applicable - Organic Soils**

Brighton	Montverde	Pamlico	Everglades	Oklawaha	Tomoka
Canova	Ocoee	Plantation	Lauderhill	Pahokee	Torry
Dania	Okeechobee	Sanibel	Micco		
Dorovan	Okeelanta	Terra Ceia			

## Appendix 3 Guide for Estimating Soil K-Factors

Soil Surface Texture	Hydrologic Soil Group			
	A	B	C	D
	<b>Estimated Soil Factor</b>			
Clays	0.24	0.28	0.32	0.37
Clay Loams	0.28	0.32	0.37	0.43
Loams	0.32	0.37	0.43	0.49
Sandy Loams	0.20	0.24	0.32	0.37
Sands	0.15-0.17	0.20	0.24	0.28

**Group A** Soils having high infiltration rates when thoroughly wetted. These consist chiefly of deep, well-to-excessively drained sands or gravels with a high rate of water transmission which produces a low surface runoff potential. The entire solum has a very low content of clay and typically includes loose sands through loamy sandy soils.

**Group B** Soils having moderate infiltration rates when thoroughly wetted. These consist chiefly of moderately deep to deep, moderately well-to-well drained soils with moderately fine to moderately coarse textures. These soils have a moderate rate of water transmission.

**Group C** Soils having slow infiltration rates when thoroughly wetted. These soils consist of two groups; (1) those with moderately fine to fine texture and a slow infiltration rate or, (2) those with a layer that impedes the downward movement of water. Both groups results in a slow rate of water transmission. These soils are "heavy", and range from silt loams through the silty clay loams.

**Group D** Soils having very slow infiltration rates when thoroughly wetted. These soils consist of (1) clay soils with a clay pan or clay layer at or near the surface of the ground or, (2) shallow soils overlaying nearly impervious materials.

## Appendix 3 Guide for Estimating Slope Category

Estimating Slope from Topographic Map Contours			
Slope		Number of Contour Lines within a 300 ft. Zone	
Category	Average %	5 ft. Contours	10 ft. Contours
<b>1</b>	0%	0	0
	2%	1	-
<b>2</b>	3%	2	1
	5%	3	-
	7%	4	2
<b>3</b>	8%	5	-
	10%	6	3
	12%	7	-
<b>4</b>	13%	8	4
	15%	9	-
	17%	10	5
<b>5</b>	18%	11	-
	20%	12	6
	22%	13	-
<b>6</b>	23%	14	7





## Appendix 4 Special Waterbodies

### ***Class I Waters in Florida***

*(Excerpted from 62-302.400, F.A.C.)*

Waterbodies that are designated for use as a potable water supply.

#### **1. Bay County**

Bayou George and Creek – Impoundment to source.

Bear Creek - Impoundment to source.

Big Cedar Creek - Impoundment to source.

Deer Point Impoundment – Dam to source.

Econfina Creek – Upstream of Deer Point Impoundment.

#### **2. Brevard County**

St. Johns River and Tributaries – Lake Washington Dam south through and including Sawgrass Lake, Lake Hellen Blazes, to Indian River County Line.

#### **3. Calhoun County**

Bear Creek.

Econfina Creek.

#### **4. Charlotte County**

Alligator Creek – North and South Prongs from headwaters to the water control structure downstream of SR 765-A.

Port Charlotte Canal System – Surface waters lying upstream of, or directly connected to, Fordham Waterway upstream of Conway Boulevard. Prairie Creek – DeSoto County Line and headwaters to Shell Creek.

Shell Creek -- Headwaters to Hendrickson Dam (east of Myrtle Slough, in Section 20, T40S, R24E).

#### **5. DeSoto County**

Horse Creek – From the northern border of Section 14, T38S, R23E, southward to Peace River.

Prairie Creek – Headwaters to Charlotte County Line.

#### **6. Gadsden County**

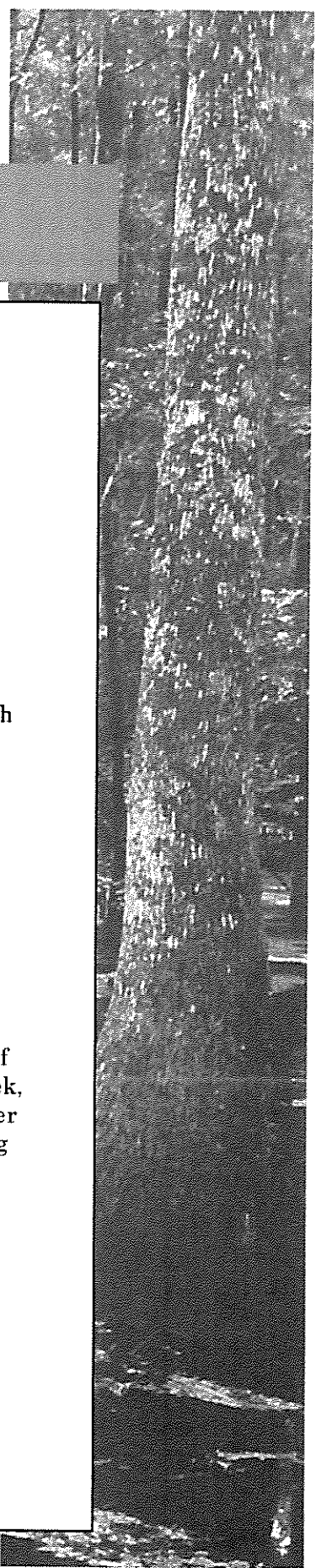
Holman Branch – SR 270-A to source.

Mosquito Creek – U.S. Highway 90 north to Florida State Line.

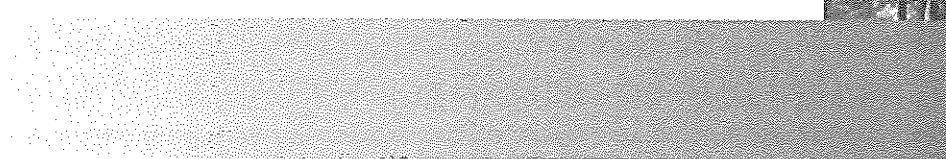
Quincy Creek – SR 65 to source.

- 7. **Glades County**  
Lake Okeechobee.
- 8. **Hendry County**  
Lake Okeechobee.
- 9. **Hillsborough County**  
Cow House Creek – Hillsborough River to source.  
Hillsborough River – City of Tampa Water Treatment Plant Dam to Flint Creek.
- 10. **Indian River County**  
St. Johns River and Tributaries – Brevard County Line south through and including Blue Cypress Lake to SR 60.
- 11. **Jackson County**  
Econfina Creek – Bay County Line to source.
- 12. **Lee County**  
Caloosahatchee River – E. County Line to South Florida Water Management District Structure 79.
- 13. **Manatee County**  
Manatee River – From Rye Bridge Road to the sources thereof, including but not limited to the following tributaries: the East Fork of the Manatee River, the North Fork of the Manatee River, Boggy Creek, Gilley Creek, Poley Branch, Corbit Branch, Little Deep Branch, Fisher Branch, Ft. Crawford Creek, Webb Branch, Clearwater Branch, Craig Branch, and Guthrey Branch.  
Lake Evers – (Ward Lake) and Braden River – City of Bradenton Water Treatment Dam to SR 675, excluding upland cut irrigation or drainage ditches and including the following tributaries:
 

	Tributary	Upstream Limit(s)
a.	Rattlesnake Slough	Lockwood Ridge Road in Section 28, Township 35 South, Range 18 East.
b.	Cedar Creek West Branch	Whitfield Avenue in Section 27, Township 35 South, Range 18 East.



- |  |   |
|--|---|
| Central Branch                             | Country Club Way in Section 34, Township 35 South, Range 18 East.   |
| East Branch                                | To a point where an east-west line tying 1200 feet south of the section line between Sections 23 and 26 (Township 35 South, Range 18 East) crosses the tributary. |
| c. Cooper Creek West Branch (Foley Branch) | South Boundary of Section 1, Township 36 South, Range 18 East.  |
| East Branch                                | East Boundary of Section 31, Township 35 South, Range 19 East.  |
| d. Nonsense Creek                          | To a point where an east-west line lying 800 feet North of the Section line between Sections 14 and 23 (Township 35 South, Range 18 East) crosses the creek.      |
| e. Hickory Hammock                         | To a point where an east-west line lying 1000 feet South of the section line between Sections 17 and 20 (Township 35 South, Range 19 East) crosses the creek.     |
| f. Wolf Slough                             | East Boundary of Section 16, Township 35 South, Range 19 East.  |
| g. Unnamed Tributary 1                     | To a point where an east-west line lying 2300 feet south of the section line between Sections 21 and 28 (Township 35 South, Range 19 East) crosses the tributary. |
| h. Unnamed Tributary 2                     | East Boundary of Section 14, Township 35 South, Range 19 East.  |
| i. Unnamed Tributary 3                     | West Boundary of Section 25, Township 35 South, Range 19 East.  |

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- j. Unnamed Tributary 4 To a point where north-south line lying 200 feet East of the section line between Sections 23 and 24 (Township 35 South, Range 19 East) crosses the tributary.

**14. Martin County**

Lake Okeechobee.

**15. Okeechobee County**

Lake Okeechobee.

**16. Palm Beach County**

Canal C-18 (freshwater portion).

City of West Palm Beach Water Catchment Area.

Clear Lake, Lake Mangonia, and the waterway connecting them.

Lake Okeechobee.

M-Canal – L-8 to Lake Mangonia.

**17. Sarasota County**

Big Slough Canal – South to U.S. 41.

Cooper Creek (Foley Branch) upstream to the South boundary of Section 1, Township 36 South, Range 18 East.

Myakka River – From the Manatee County line southwesterly through Upper and Lower Myakka Lakes to Manhattan Farms (north line of Section 6 T39S, R20E).

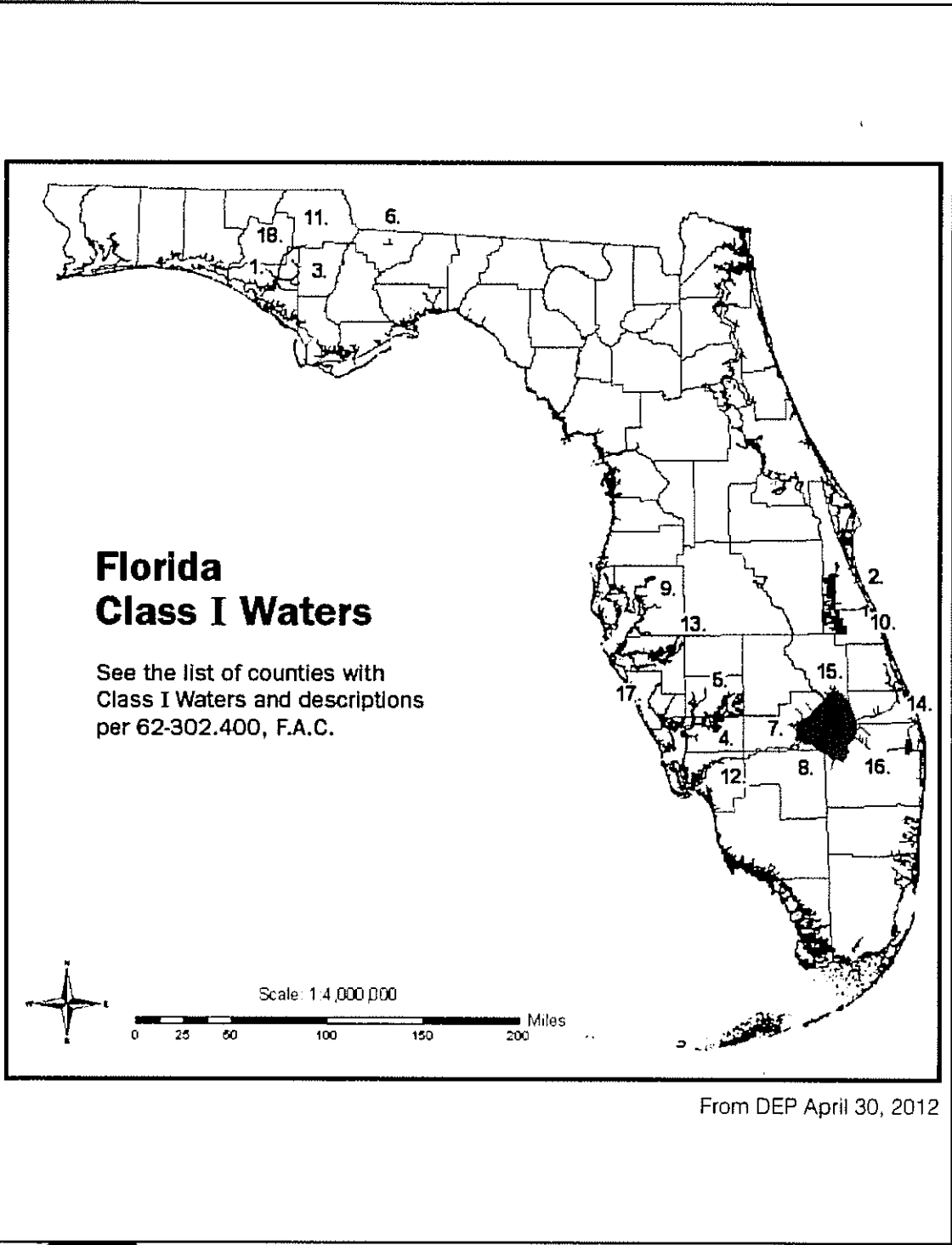
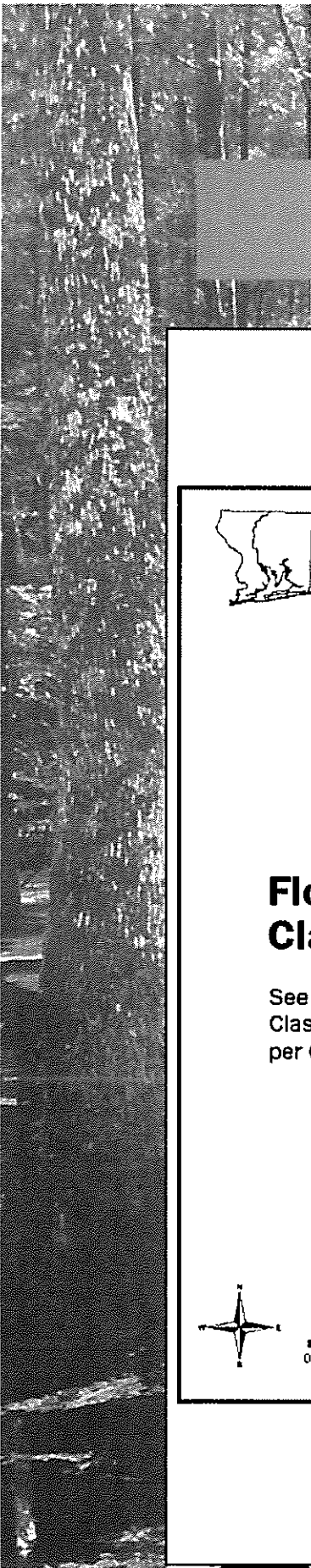
**18. Washington County**

Econfina Creek.

62-302.400, F.A.C.

April 30, 2012





**From 62-302, Surface Water Quality Standards 8-5-07  
List of OFWs from 62-302.700, F.A.C.:**

**(9) Outstanding Florida Waters:**

**(A) Waters within National Parks and National Memorials**

<b>National Park or National Memorial</b>	<b>County</b>
1. Biscayne National Park (as mod. 5-14-86; 8-8-94)	Dade
2. Dry Tortugas National Park (10-4-90)	Monroe
3. Everglades National Park (as mod. 8-8-94)	Monroe/Dade Collier
4. Fort Caroline National Memorial (8-8-94)	Duval

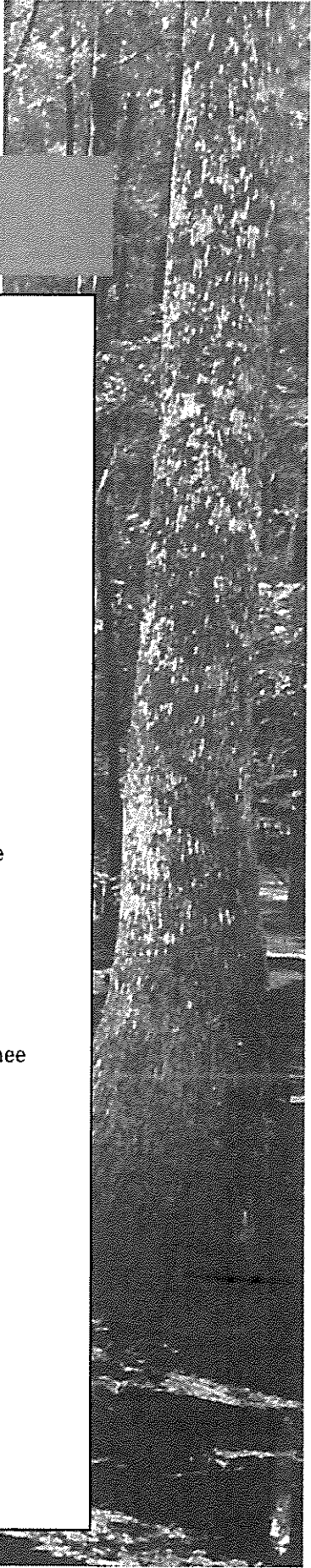
**(B) Waters within National Wildlife Refuges**

<b>Wildlife Refuge</b>	<b>County</b>
1. Archie Carr (8-8-94) Indian River/	Brevard
2. Caloosahatchee	Lee
3. Cedar Keys (as mod. 5-14-86, 4-19-88)	Levy
4. Chassahowitzka (as mod. 5-14-86, 4-19-88)	Citrus/Hernando
5. Chinsegut	Hernando
6. Crocodile Lake (12-1-82; as mod. 5-14-86, 4-19-88; 8-8-94)	Monroe
7. Crystal River (5-14-86; as mod. 10-4-90)	Citrus
8. Egmont Key	Hillsborough
9. Florida Panther (10-4-90; as mod. 8-8-94)	Collier
10. Great White Heron (as mod. 5-14-86, 4-19-88)	Monroe
11. Hobe Sound (as mod. 5-14-86, 4-19-88; 8-8-94)	Martin
12. Island Bay	Charlotte
13. J. N. "Ding" Darling (as mod. 5-14-86, 4-19-88; 8-8-94)	Lee
14. Key West	Monroe
15. Lake Woodruff (as mod. 8-8-94)	Volusia/Lake
16. Lower Suwannee (12-1-82; as mod. 8-8-94)	Dixie/Levy
17. Loxahatchee	Palm Beach
18. Matlacha Pass (as mod. 8-8-94)	Lee
19. Merritt Island	Volusia/Brevard
20. National Key Deer (as mod. 5-14-86, 4-19-88, 10-4-90; 8-8-94)	Monroe
21. Okefenokee (Florida Portion)	Baker
22. Passage Key	Manatee


- |   |                              |
|---|------------------------------|
| 23. Pelican Island (as mod. 8-8-94)                                   | Indian River                 |
| 24. Pine Island (as mod. 8-8-94)                                      | Lee                          |
| 25. Pinellas  | Pinellas                     |
| 26. St. Johns (including Bee Line Unit)<br>(as mod. 5-14-86, 4-19-88) | Brevard                      |
| 27. St. Marks (as mod. 10-4-90; 8-8-94)                               | Jefferson/ Wakulla<br>Taylor |
| 28. St. Vincent (including Pig Island Unit)                           | Franklin/Gulf                |

(C) Waters within State Parks, State Wildlife Parks, and State Recreation Areas

<b>State Park or State Recreation Area</b>	<b>County</b>
1. Amelia Island State Recreation Area (5-14-86)	Nassau
2. Anastasia State Recreation Area (as mod. 4-19-88)	St. Johns
3. Avalon State Recreation Area (4-19-88; as mod. 8-8-94)	St. Lucie
4. Bahia Honda State Park (as mod. 5-14-86)	Monroe
5. Bear Creek State Recreation Area (12-1-82)	Gadsden
6. Big Lagoon State Recreation Area (12-1-82; as mod. 5-14-86, 8-8-94)	Escambia
7. Big Talbot Island State Park (5-14-86; as mod. 4-19-88, 8-8-94)	Duval
8. Bill Baggs Cape Florida State Recreation Area	Dade
9. Blackwater River State Park	Santa Rosa
10. Blue Spring State Park	Volusia
11. Bulow Creek State Park (5-14-86; as mod. 4-19-88)	Flagler/Volusia
12. Caladesi Island State Park	Pinellas
13. Cayo Costa State Park (12-1-82; as mod. 5-14-86, 4-19-88, 10-4-90, 8-8-94)	Lee
14. Collier-Seminole State Park	Collier
15. Dead Lakes State Recreation Area	Gulf
16. DeLeon Springs State Recreation Area (5-14-86); as mod. 10-4-90)	Volusia
17. Delnor-Wiggins Pass State Recreation Area (12-1-82)	Collier
18. Don Pedro Island State Recreation Area (5-14-86); as mod. 4-19-88)	Charlotte
19. Dr. Julian G. Bruce St. George Island State Park (12-1-82)	Franklin

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20. Edward Ball Wakulla Springs State Park (4-19-88) Wakulla
  21. Falling Waters State Recreation Area Washington
  22. Faver-Dykes State Park St. Johns
  23. Florida Caverns State Park (as mod. 8-8-94) Jackson
  24. Fort Clinch State Park(as mod. 4-19-88; 8-8-94) Nassau
  25. Fort Cooper State Park (12-1-82) Citrus
  26. Fort Pierce Inlet State Recreation Area (12-1-82;  
as mod. 5-14-86) St. Lucie
  27. Fred Gannon Rocky Bayou State Recreation Area Okaloosa
  28. Gamble Rogers Memorial State Recreation Area  
at Flagler Beach Flagler
  29. Gasparilla Island State Recreation Area  
(5-14-86; as mod. 4-19-88, 10-4-90) Lee
  30. Grayton Beach State Recreation Area  
(as mod. 4-19-88) Walton
  31. Guana River State Park (5-14-86; as mod. 4-19-88) St. Johns
  32. Henderson Beach State Recreation Area (5-14-86) Okaloosa
  33. Highlands Hammock State Park (as mod. 8-8-94) Highlands/Hardee
  34. Hillsborough River State Park Hillsborough
  35. Homosassa Springs State Wildlife Park (10-4-90) Citrus
  36. Honeymoon Island State Recreation Area  
(12-1-82; as mod. 5-14-86) Pinellas
  37. Hontoon Island State Park Volusia/Lake
  38. Hugh Taylor Birch State Recreation Area Broward
  39. Ichetucknee Springs State Park Columbia/Suwannee
  40. John D. McArthur Beach State Park (12-1-82) Palm Beach
  41. John Pennekamp Coral Reef State Park  
(as mod. 5-14-86, 4-19-88) Monroe
  42. John U. Lloyd Beach State Recreation Area Broward
  43. Jonathan Dickinson State Park Martin
  44. Lake Arbuckle State Park (5-14-86) Polk
  45. Lake Griffin State Recreation Area Lake
  46. Lake Kissimmee State Park Polk
  47. Lake Louisa State Park (12-1-82) Lake
  48. Lake Manatee State Recreation Area (12-1-82) Manatee
  49. Lake Rousseau State Recreation  
Area (12-1-82) Citrus/Levy  
Marion



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- |  |                              |
|--|------------------------------|
| 50. Lake Talquin State Recreation Area (12-1-82;<br>as mod.5-14-86)              | Leon                         |
| 51. Little Manatee River State Recreation Area (12-1-82)                         | Hillsborough                 |
| 52. Little Talbot Island State Park  | Duval                        |
| 53. Long Key State Recreation Area   | Monroe                       |
| 54. Lovers Key State Recreation Area (5-14-86)                                   | Lee                          |
| 55. Manatee Springs State Park (as mod. 10-4-90)                                 | Levy                         |
| 56. Mike Roess Gold Head Branch State Park<br>(as mod. 5-14-86, 4-19-88; 8-8-94) | Clay                         |
| 57. Myakka River State Park  | Manatee/Sarasota             |
| 58. North Peninsula State Recreation Area<br>(5-14-86; as mod. 4-19-88, 10-4-90) | Volusia                      |
| 59. Ochlockonee River State Park   | Wakulla                      |
| 60. O'Leno State Park (as mod. 5-14-86)  | Alachua/Columbia             |
| 61. Oleta River State Recreation Area (12-1-82)                                  | Dade                         |
| 62. Oscar Scherer State Park (as mod. 8-8-94)                                    | Sarasota                     |
| 63. Peacock Springs State Recreation Area (4-19-88)                              | Suwannee                     |
| 64. Perdido Key State Recreation Area (12-1-82)                                  | Escambia                     |
| 65. Ponce de Leon Springs State Recreation Area                                  | Holmes/Walton                |
| 66. Port Charlotte Beach State Recreation Area<br>(12-1-82)                      | Charlotte                    |
| 67. Rose Sink (addition to Ichetucknee Springs<br>State Park) (1-9-06)           | Columbia                     |
| 68. St. Andrews State Recreation Area<br>(as mod. 5-14-86, 4-19-88)              | Bay                          |
| 69. Sebastian Inlet State Recreation Area  | Indian River<br>Brevard      |
| 70. Silver River State Park (4-19-88; as mod.<br>10-4-90; 8-8-94)                | Marion                       |
| 71. Suwannee River State Park (as mod. 10-4-90)                                  | Hamilton<br>Madison/Suwannee |
| 72. Three Rivers State Recreation Area   | Jackson                      |
| 73. T. H. Stone Memorial St. Joseph Peninsula<br>State Park                      | Gulf                         |
| 74. Tomoka State Park  | Volusia                      |
| 75. Torreya State Park   | Liberty                      |
| 76. Wekiva Springs State Park (as mod. 4-19-88)                                  | Orange/Seminole              |

(D) Waters within State Ornamental Gardens, State Botanical Sites, State Historic Sites, and State Geological Sites

**State Ornamental Gardens, State Botanical Site, State Historic Site, or State Geological Site**

	<b>County</b>
1. Alfred B. Maclay State Gardens	Leon
2. Devils Millhopper State Geological Site (10-4-90)	Alachua
3. Eden State Gardens	Walton
4. Fort Zachary Taylor State Historic Site (10-4-90)	Monroe
5. Indian Key State Historic Site (10-4-90)	Monroe
6. Key Largo Hammock State Botanical Site (5-14-86)	Monroe
7. Koreshan State Historic Site (10-4-90)	Lee
8. Lignumvitae Key State Botanical Site (5-14-86)	Monroe
9. Marjorie Kinnan Rawlings State Historic Site (10-4-90)	Alachua
10. Natural Bridge Battlefield State Historic Site (10-4-90)	Leon
11. Paynes Creek State Historic Site (10-4-90)	Putnam
13. San Marcos de Apalachee State Historic Site (10-4-90)	Wakulla
14. Washington Oaks State Gardens (as mod. 5-14-86)	Flagler
15. Windley Key Fossil Reef State Geological Site (10-4-90)	Monroe

(E) Waters within State Preserves, State Underwater Archaeological Preserves, and State Reserves

**State Preserve or State Reserve**

	<b>County</b>
1. Anclote Key State Preserve (12-1-82)	Pasco/Pinellas
2. Cape St. George State Reserve (12-1-82)	Franklin
3. Cedar Key Scrub State Reserve (12-1-82; as mod. 4-19-88)	Levy
4. Charlotte Harbor State Reserve (as mod. 4-19-88)	Charlotte
5. Crystal River State Reserve (5-14-86; as mod. 4-19-88)	Citrus
6. Fakahatchee Strand State Preserve (12-1-82; as mod. 5-14-86, 4-19-88, 10-4-90, 8-8-94)	Collier
7. Haw Creek State Preserve (12-1-82)	Flagler Putnam/Volusia
8. Lower Wekiva River State Reserve (12-1-82)	Lake/Seminole
9. Nassau Valley State Reserve (12-1-82)	Duval/Nassau
10. Paynes Prairie State Preserve (as mod. 10-4-90, 8-8-94)	Alachua
11. Prairie-Lakes State Preserve	Osceola

- |   |                     |
|---|---------------------|
| 12. River Rise State Preserve (12-1-82; as mod. 8-8-94)                       | Alachua<br>Columbia |
| 13. Rock Springs Run State Reserve<br>(5-14-86; as mod. 4-19-88)              | Orange              |
| 14. San Felasco Hammock State Preserve<br>(12-1-82; as mod. 5-14-86; 4-19-88) | Alachua             |
| 15. San Pedro State Underwater<br>Archaeological Preserve (10-4-90)           | Monroe              |
| 16. Savannas State Reserve (12-1-82;<br>as mod. 5-14-86, 10-4-90, 8-8-94)     | Martin/St. Lucie    |
| 17. St. Lucie Inlet State Preserve (12-1-82)                                  | Martin              |
| 18. Waccasassa Bay State Preserve<br>(12-1-82; as mod. 4-19-88)               | Levy                |
| 19. Weedon Island State Preserve (12-1-82)                                    | Pinellas            |
| 20. William Beardall Tosohatchee State Reserve (12-1-82)                      | Orange              |

(F) Waters within Areas Acquired through Donation, Trade, or Purchase Under the Environmentally Endangered Lands Bond Program, Conservation and Recreation Lands Program, Land Acquisition Trust Fund Program, and Save Our Coast Program

- | <b>Program Area</b>   | <b>County</b>   |
|---|-----------------|
| 1. Andrews Tract (5-14-86; as mod. 4-19-88; 8-8-94)               | Levy            |
| 2. Apalachicola Bay (8-8-94)                                      | Franklin        |
| 3. Barefoot Beach (12-1-82)                                       | Collier         |
| 4. Beker Tracts (10-4-90)   | Manatee         |
| 5. Big Bend Coastal Tract (4-19-88; as mod. 10-4-90)              | Dixie/Taylor    |
| 6. Big Shoals (4-19-88)   | Hamilton        |
| 7. B.M.K. Ranch (8-8-94)  | Lake/Orange     |
| 8. Bower Tract (5-14-86; as mod. 4-19-88)                         | Hillsborough    |
| 9. Caravelle Ranch (8-8-94)                                       | Putnam          |
| 10. Carlton Half-Moon Ranch (8-8-94)                              | Sumter          |
| 11. Catfish Creek (8-8-94)  | Polk            |
| 12. Chassahowitzka Swamp (5-14-86;<br>as mod. 4-19-88, 8-8-94)    | Hernando/Citrus |
| 13. Coupon Bight (10-4-90; as mod. 8-8-94)                        | Monroe          |
| 14. Crystal River (10-4-90)                                       | Citrus          |
| 15. Curry Hammock (8-8-94)  | Monroe          |
| 16. Deering Hammock/Estate (5-14-86);<br>as mod. 4-19-88, 8-8-94) | Dade            |

17. East Everglades (5-14-86)	Dade
18. Econfinia River (8-8-94)	Taylor
19. Emerson Point (8-8-94)	Manatee
20. Escambia Bay Bluffs (5-14-86)	Escambia
21. Estero Bay (8-8-94)	Lee
22. Florida First Magnitude Springs (8-8-94)	Levy
23. Ft. George Island (10-4-90)	Duval
24. Ft. Mose (8-8-94)	St. Johns
25. Ft. San Luis (5-14-86; as mod. 8-8-94)	Leon
26. Gateway (5-14-86)	Pinellas
27. Gills Tract (8-8-94)	Pasco
28. Green Turtle Beach (4-19-88)	St. Lucie
29. Guana River (5-14-86; as mod. 4-19-88)	St. Johns
30. <b>Homosassa Reserve/Walker Tract Withlacoochee State Forest</b>	Citrus
31. Indian River North Beach (5-14-86)	Indian River
32. ITT/Hammock (5-14-86)	Dade
33. Josslyn Island (10-4-90)	Lee
34. <b>Goethe State Forest</b>	Levy
35. Letchworth Mounds (8-8-94)	Jefferson
36. <b>Little Big Econ State Forest</b>	Seminole
37. Martin County Tracts (5-14-86)	Martin
38. Mashers Sands (5-14-86)	Wakulla
39. Miami Rockridge Pinelands (8-8-94)	Dade
40. Milton to Whiting Field (8-8-94)	Santa Rosa
41. North Beach (5-14-86)	Broward
42. North Key Largo Hammock (5-14-86; as mod. 4-19-88, 10-4-90, 8-8-94)	Monroe
43. Placid Lakes (8-8-94)	Highlands
44. <b>Point Washington State Forest</b>	Walton
45. Port Bougainville (10-4-90)	Monroe
46. Rainbow River/Springs (8-8-94)	Marion
47. Rookery Bay (10-4-90; as mod. 8-8-94)	Collier
48. Rotenberger (as mod. 4-19-88; 8-8-94)	Palm Beach
49. Saddle Blanket Lakes Scrub (8-8-94)	Polk
50. Save Our Everglades (10-4-90; as mod. 8-8-94)	Collier
51. Sea Branch (8-8-94)	Martin
52. <b>Seminole State Forest</b>	Lake
53. Snake Warrior Island (Oaks of Miramar) (8-8-94)	Broward



54. Spring Hammock (4-19-88; as mod. 10-4-90)	Seminole
55. Spruce Creek (4-19-88; as mod. 8-8-94)	Volusia
56. St. Martins River (8-8-94)	Citrus
57. Stark Tract (10-4-90)	Volusia
58. Stoney-Lane (10-4-90)	Citrus
59. Surfside Additions (5-14-86)	St. Lucie
60. Three Lakes/Prairie Lakes (as mod. 8-8-94)	Osceola
61. Topsail Hill (8-8-94)	Walton
62. <b>Jennings State Forest</b>	Clay
63. <b>Tiger Bay State Forest</b>	Volusia
64. Wacissa/Aucilla Rivers (10-4-90)	Jefferson/Taylor
65. Wekiva River Buffers (8-8-94)	Seminole
66. Westlake (5-14-86; as mod. 4-19-88)	Broward
67. Wetstone/Berkovitz (8-8-94)	Pasco
68. <b>Withlacoochee State Forest</b>	Sumter

(G) Waters within National Seashores

**National Seashores**

1. Canaveral	Brevard/Volusia
2. Gulf Islands	Escambia Santa/Rosa

(H) Waters within State Aquatic Preserves

**Aquatic Preserves**

1. Alligator Harbor	Franklin
2. Apalachicola Bay	Franklin
3. Banana River (as mod. 8-8-94)	Brevard
4. Big Bend Seagrasses	Wakulla/Taylor Jefferson/Dixie Levy

except for the following areas;

- a. Keaton Beach, Taylor County - Begin at 29°49'50" N. Lat., 83°35'24"W. Long. then west to 29°49'45", 83°35'50"; then south to 29°49'04", 83°35'48"; then east to 29°49'04", 83°35'24"; then north to the point of beginning.
- b. Steinhatchee, Taylor County - Begin at 29°40'35", 83°22'10"; then west to 29°40'35", 83°23'10"; then north to 29°41', 83°23'10"; then west to 29°41', 83°24'10"; then south to the Taylor County-Dixie County boundary; then eastward along the boundary to 29°39'55", 83°22'10"; then north to the point of beginning.

- c. Suwannee, Dixie County - Begin at 29°20'30", 83°08'10"; then west to 29°20'30", 83°08'25"; then south to 29°20'05", 83°08'25"; then southwest-erly along SR 349 to 29°19'51", 83°08'35"; then west to 29°19'51", 83°08'45"; then southwest-erly to 29°19'40", 83°09'12"; then south to 29°19'30", 83°09'12"; then northeasterly to 29°19'39", 83°08'53"; then southeasterly to 29°19'25", 83°08'41"; then southwest-erly to 29°19'20", 83°08'49"; then southeasterly to 29°19'14", 83°08'41"; then northeasterly along the bank of the Suwannee River to and along the bank of Demory Creek to 29°19'45", 83°08'10"; then north to the point of beginning.
- d. Cedar Key unincorporated airport area, Levy County - Begin at 29°08'26", 83°03'17"; then south to 29°07'34", 83°03'17", then northeasterly to 29°07'48", 83°02'33"; beginning northerly and tracing the corporate limit of Cedar Key to the point of beginning.
- e. Cedar Key unincorporated causeway area, Levy County - That portion of Section 20 lying within 1000 feet of the centerline of SR 24 and lying north of a line 500 feet northeast of and parallel to the northern corporate limit of Cedar Key.
- f. Cedar Key channel, Levy County - Begin at 29°08'58", 83°01'17"; then west to 29°08'58", 83°01'24"; then south to 29°08'05", 83°01'26"; then northeasterly to 29°08'08", 83°01'17"; then northerly to the point of beginning.
- g. Keaton Beach navigation channel, Taylor County - Begin at 29°49'02", 83°35'30"; then west to 29°49'02", 83°37'58"; then south to 29°48'45", 83°37'58"; then east to 29°48'45", 83°35'30"; then north to the point of beginning.
- h. Keaton Beach local channels, Taylor County - Begin at 29°49'01", 83°35'38"; then southeast to 29°48'55", 83°35'15"; then northeast to 29°48'59", 83°35'13"; then northwest to 29°49'06", 83°35'36"; then south west to the point of beginning. (10-29-86)

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|--|---------------|
| 5. Biscayne Bay (Cape Florida)         | Dade/Monroe   |
| 6. Biscayne Bay (Card Sound) (12-1-82) | Dade/Monroe   |
| 7. Boca Ciega Bay                      | Pinellas      |
| 8. Cape Haze                           | Charlotte/Lee |
| 9. Cape Romano-Ten Thousand Islands    | Collier       |
| 10. Cockroach Bay                      | Hillsborough  |
| 11. Coupon Bight                       | Monroe        |
| 12. Estero Bay (as mod. 4-19-88)       | Lee           |
| 13. Fort Clinch State Park             | Nassau        |
| 14. Fort Pickens State Park            | Santa Rosa    |
|  | Escambia      |

15. Gasparilla Sound-Charlotte Harbor (as mod. 10-4-90)	Charlotte/Lee
16. Guana River Marsh (8-8-94)	St. Johns
17. Indian River Malabar to Vero	Beach Brevard Indian River
18. Indian River Malabar to Vero Beach (additions), except those portions of Sebastian Creek and Turkey Creek upstream of U.S. Highway 1 (1/26/88)	Brevard Indian River
19. Indian River Vero Beach to Ft. Pierce (as mod. 10-4-90)	Indian River St. Lucie
20. Jensen Beach to Jupiter Inlet (as mod. 10-4-90)	Martin/Palm Beach/St. Lucie
21. Lake Jackson	Leon
22. Lemon Bay (4-19-88; as mod. 10-4-90)	Charlotte Sarasota
23. Lignumvitae Key	Monroe
24. Loxahatchee River-Lake Worth Creek (as mod. 8-8-94)	Martin Palm Beach
25. Matlacha Pass	Lee
26. Mosquito Lagoon	Volusia Brevard
27. Nassau River-St. Johns River Marshes	Nassau/Duval
28. North Fork, St. Lucie	St. Lucie Martin
29. Oklawaha River (10-4-90)	Marion
30. Pellicer Creek	St. Johns Flagler
31. Pine Island Sound	Lee
32. Pinellas County	Pinellas
33. Rainbow Springs (4-19-88)	Marion
34. Rocky Bayou State Park	Okaloosa
35. Rookery Bay (12-1-82; as mod. 11-24-87, 7-11-91)	Collier
36. St. Andrews State Park	Bay
37. St. Joseph Bay	Gulf
38. St. Martins Marsh (as mod. 8-8-94)	Citrus
39. Terra Ceia (5-22-86)	Manatee
40. Tomoka Marsh	Volusia/Flagler
41. Wekiva River (12-1-82)	Lake/Orange Seminole
42. Wekiva River Addition, except that portion of the	Lake/Seminole

St. Johns River between Interstate Highway 4 and  
the Wekiva River confluence (12-28-88)

Volusia


43. Yellow River Marsh

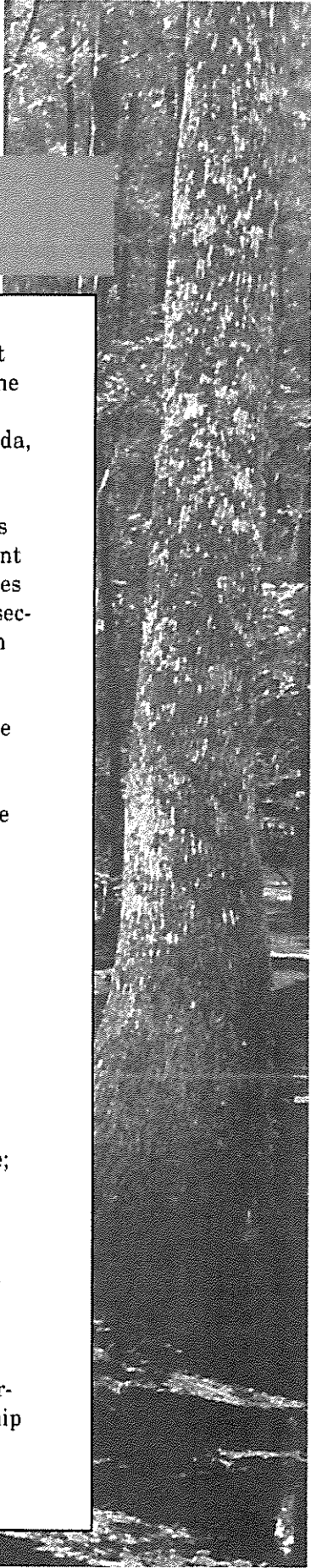
Santa Rosa


(I) Special Waters

1. Apalachicola River except for the following areas:
  - a. From a point 50 feet north of the northern boundary of the Jackson County Port Authority Slip, and including the slip itself, downstream to a point about four-tenths of a mile downstream, and specifically identified by navigation mile 103 on the 1982 U.S. Geological Survey Quadrangle Map of Sneads, Florida; and
  - b. From 850 feet downstream of the U.S. Army Corps of Engineers Blountstown Navigation Gage in Calhoun County, north to a point approximately 2,700 feet upstream of the Gage, and specifically identified by the line passing through 30°25'45" N. Lat. and 85°1'35" W. Long.; and 30°25'38" N. Lat. and 85°1'20" W. Long. (12-11-84).
2. Aucilla River
3. Blackwater River
4. Butler Chain of Lakes - consisting of Lake Butler, Lake Down, Wauseon Bay, Lake Louise, Lake Palmer (also known as Lake Isleworth), Lake Chase, Lake Tibet, Lake Sheen, Pocket Lake, Fish Lake, and the waterways which connect these lakes (3-1-84), and Lake Blanche and its connecting waterway (2-18-87).
5. Chassahowitzka River System including: Potter, Salt, Baird, Johnson, Crawford, Ryle, and Stevenson Creeks, and other tributaries to the Chassahowitzka River; but excluding artificial waterbodies, defined as any waterbody created by dredging, or excavation, or by the filling in of its boundaries, including canals as defined in Rule 62-312.020(3), F.A.C. (1-5-93).
6. Chipola River
7. Choctawhatchee River
8. Clermont Chain of Lakes - consisting of Lake Louisa (also known as Lake Louise), Lake Susan, Lake Crescent, Lake Minnehaha, Lake Winona, Lake Palatlahaha, Lake Hiawatha, Lake Minneola, Lake Wilson, Lake Cook, Cherry Lake, Lake Hunt, Lake Stewart, Lake Lucy, Lake Emma, and the waterways that interconnect Clermont Chain of Lakes (5-28-86).
9. Crooked Lake in Polk County including the area known as Little Crooked Lake and the connecting waterway between these waterbodies; less however, artificial waterbodies, defined as any waterbody created by dredging, or excavation, or by the filling in of its boundaries, including canals as defined in Section 62-312.020(3), F.A.C. (4-9-87).
10. Crystal River, including Kings Bay (2-1-83).



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11. Econlockhatchee River System - consisting of the Econlockhatchee River and the following tributaries:
    - a. Little Econlockhatchee River upstream to Michaels Dam in Jay Blanchard Park; and
    - b. Mills Creek upstream to Mills Lake; and
    - c. Southerly branch of Mills Creek upstream to Fort Christmas Road in Section 2, Township 22 South, Range 32 East; and
    - d. Silcox Branch (branch of Mills Creek) upstream to Lake Pickett; and
    - e. Long Branch upstream to the eastern section line of Section 34, Township 22 South, Range 32 East; and
    - f. Hart Branch upstream to the Old Railroad Grade in Section 18, Township 23 South, Range 32 East; and
    - g. Cowpen Branch upstream to the southernmost bifurcation of the creek in Section 20, Township 23 South, Range 32 East; and
    - h. Green Branch upstream to the western section line of Section 29, Township 23 South, Range 32 East; and
    - i. Turkey Creek upstream to Weewahootee Road in Section 5, Township 24 South, Range 32 East, and to the west section lines of Section 5, Township 24 South, Range 32 East, and Section 32, Township 23 South, Range 32 East; and
    - j. Little Creek upstream to the eastern section line of Section 22, Township 24 South, Range 32 East; and
    - k. Fourmile Creek upstream to the southern line of the NE1/4 of Section 28, Township 24 South, Range 32 East; and
    - l. Econlockhatchee River Swamp upstream to State Road 532;
    - m. but excluding all other tributaries and artificial water bodies, defined as any water body created by dredging, or excavation, or by the filling in of its boundaries, including canals as defined in Rule 62-312.020(3), F.A.C. (6-18-92).
  12. Estero Bay Tributaries including: Hendry Creek to State Road 865, Big Bayou, Mullock Creek to U.S. 41 (State Road 45); Mud Creek; Estero River (north and south branches) to I-75 Halfway Creek to State Road 41; Spring Creek to Business Route 41 (State Road 887, old State Road 41), and the unnamed south branch of Spring Creek in Sections 20 and 29; Imperial River to the eastern line of Section 31, Range 26 East, Township 47 South, Oak Creek, and Leitner Creek; except for Tenmile Canal and any artificial water bodies, defined as any water body created by dredging, or excavation, or by the filling in of its boundaries, including canals as defined in Rule 62-312.020(3), F.A.C. (10-4-90).

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13. Florida Keys, including channels as defined in Rule 62-312.020(4), F.A.C., and described as follows: Commence at the northeasterly most point of Palo Alto Key and run due north to a point at the center of the channel of Broad Creek as the point of beginning, thence due east to the eastern boundary of the jurisdictional waters of the State of Florida, thence meander southerly along said eastern boundary to a point due south of the westernmost point of the island of Key West; thence westerly, northerly and easterly along the arc of a curve three leagues distant from the westernmost point of the island of Key West to a point due north of the island of Key West; thence northeasterly three leagues distant from the most northerly land of the Florida Keys to the intersection with the boundary of the Everglades National Park; thence south easterly, northeasterly and northwesterly along the boundary of the Everglades National Park to the intersection with the Dade County - Monroe County line; thence northeasterly and easterly along the Dade County - Monroe County line to the point of beginning; less however, three areas:
    - a. Key West Sewage Outfall, being a circle 150 feet in radius from the point of discharge located at approximately 24°32'13" N. Latitude and 81°48'55" W. Longitude; and
    - b. Stock Island Power Plant Mixing Zone; being a circle 150 feet in radius from the end of the power plant discharge canal; and
    - c. Artificial waterbodies, defined as any waterbody created by dredging, or excavation, or by the filling in of its boundaries, including canals as defined in Rule 62-312.020(3), F.A.C. (5-8-85).
  14. Hillsborough River from Fletcher Avenue (State Road 582A) in Hillsborough County upstream to the Withlacoochee River Overflow in Pasco County, and the following tributaries:
    - a. Crystal Springs; and
    - b. Blackwater Creek westward of the Hillsborough - Polk County line; and
    - c. Cypress Creek, Thirteenmile Run eastward of Livingston Avenue, and Big Cypress Swamp upstream to and including the Cypress Creek Wellfield, as delineated in the maps entitled "Cypress Creek OFW Boundary Maps," incorporated herein by reference; and
    - d. Trout Creek upstream to Bruce B. Downs Boulevard (State Road 581);
    - e. but excluding all other tributaries as well as the proposed transportation corridor, which crosses Cypress Creek in Section 21, Township




27 South, Range 19 East, as identified in the Adopted 2010 Long Range Transportation Plan of the Metropolitan Planning Organization, dated May 26, 1993.

- f. A copy of the maps referenced in subparagraph c. above may be obtained from the Department of Environmental Protection, Bureau of Surface Water Management, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400 (4-12-95).
15. Homosassa River System including: Halls River, Turtle, Otter, Battle, and Price Creeks, and other tributaries to the Homosassa River; but excluding artificial waterbodies, defined as any waterbody created by dredging, or excavation, or by the filling in of its boundaries, including canals as defined in Rule 62-312.020(3), F.A.C. (1-5-93).
16. Kingsley Lake and Black Creek (North Fork) downstream to the northern line of Section 23, Township 5 South, Range 23 East, including all tributaries along this segment of Black Creek (11-8-90).
17. Lake Disston – Specifically including Lake Disston plus contiguous wetlands within the following areas: Township 14 South, Range 29 East, Sections 21, 20, 19, 18, 17, 16, 9, 8 and 7 in Flagler County; and Township 14 South, Range 28 East, Sections 13 and 24 in Volusia County except:
  - a. artificial water bodies defined as any water body created by dredging, or excavation, or by the filling in of its boundaries, including canals as defined in Rule 62-312.020(3), F.A.C.; and
  - b. any natural water bodies connected by artificial water bodies to the above-described system (4-4-01).
18. Lake Powell, Phillips Inlet, and all tributaries to Lake Powell as bounded by the following described line: Begin at the Northwest corner of Section 26, Township 2 South, Range 18 West; thence East to the Northwest corner of Section 29, Township 2 South, Range 17 West; thence South to the Northwest corner of the SW1/4 of Section 29, Township 2 South, Range 17 West; thence East to the West line of Section 27, Township 2 South, Range 17 West, thence South to the mean high water line of the Gulf of Mexico; thence meander Northwest along the mean high water line to the West line of Section 35, Township 2 South, Range 18 West; thence North to the point of beginning (8-18-91).
19. Lemon Bay Estuarine System - from Boca Grande Causeway northward to approximately two thousand feet northwest of the mouth of Alligator Creek, specifically identified as the East line of Section 31, Township 39 South, Range 19 East, including Placida Harbor, Gasparilla Pass, Kettle Harbor, Bocilla Lagoon, Bocilla Pass, Knight Pass, Stump Pass, Lemon Bay, Buck Creek upstream to County Road 775, Oyster Creek upstream

to County Road 775, Ainger (Rock) Creek upstream to County Road 775, and Godfrey (Godfried, Gottfried) Creek upstream to County Road 775; but excluding:

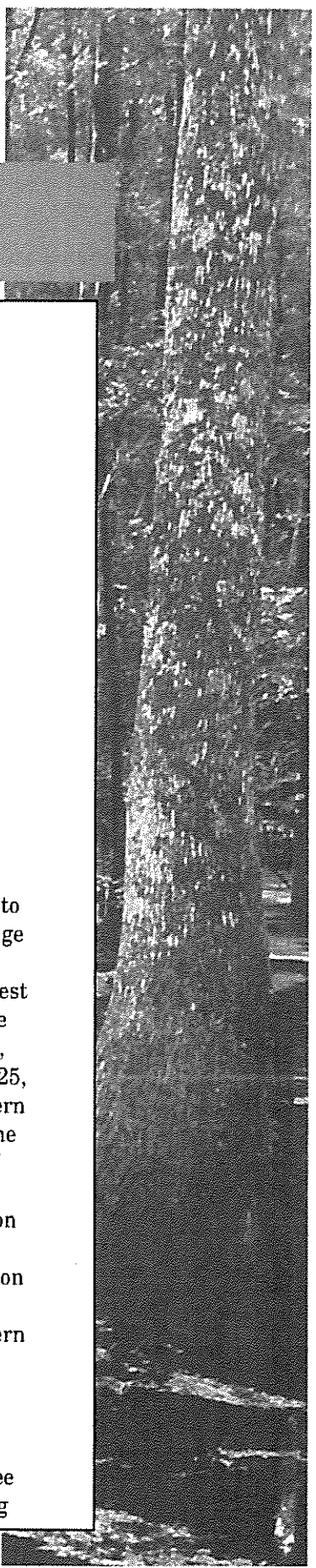
- a. Alligator Creek, Forked Creek, Lemon Creek, and all other tributaries; and
  - b. Artificial waterbodies, defined as any waterbody created by dredging, or excavation, or by the filling in of its boundaries, including canals as defined in Section 62-312.020(3), F.A.C. (4-29-86).
20. Little Manatee River - from its mouth to the western crossing of the river by S.R. 674, including Hayes, Mill and Bolster Bayous, but excluding South Fork, Ruskin Inlet and all other tributaries (10-1-82).
  21. Lochloosa Lake (including Little Lochloosa Lake, Lochloosa Lake Right Arm, and Lochloosa Creek upstream to County Road 20A) (12-15-87).
  22. Myakka River between State Road 771 (El Jobean Bridge) and the Charlotte - Sarasota County line, except for artificial waterbodies, defined as any waterbody created by dredging, or excavation, or by the filling in of its boundaries, including canals as defined in Rule 62-312.020(3), F.A.C. (4-19-88).
  23. Ochlockonee River
  24. Oklawaha River between the eastern line of Section 36, Township 15 South, Range 23 East, and Eureka Lock and Dam, including Turkey Creek, Strouds Creek, Dead River (the water body so named near Gores Landing), Cedar Creek, and Fish Creek, but excluding Marshall Swamp, the Dead River (the water body so named exiting Marshall Swamp), and all other tributaries (12-20-89).
  25. Orange Lake up to the U.S. Highway 301 bridge, the River Styx up to Camps Canal, and Cross Creek (4-9-87).
  26. Perdido River
  27. Rainbow River, including Indian Creek, but excluding all other tributaries (1-17-85).
  28. Santa Fe River System - consisting of the Santa Fe River, Lake Santa Fe, Little Lake Santa Fe, Santa Fe Swamp, Olustee Creek, and the Ichetucknee River below S.R. 27, but excluding all other tributaries (8-16-84).
  29. Sarasota Bay estuarine system - generally extending from Venice north to the Hillsborough - Manatee County line and specifically described as follows: Commence at the northern tip of Anna Maria Island and follow a line running to the southern tip of Egmont Key until intersecting the boundary between Hillsborough and Manatee Counties; thence run easterly and northeasterly along the county boundary until






intersecting the Intracoastal Waterway; thence proceed southerly until intersecting a line between the southern tip of Mullet Key and the western tip of Snead Island; thence proceed southeasterly along said line to the western tip of Snead Island; thence to De Soto Point; and thence westerly and southerly including all of the Sarasota Bay estuarine system southward to the northernmost U.S. Highway Business Route 41 bridge over the Intracoastal Waterway in Venice, including Anna Maria Sound, Passage Key Inlet, Perico Bayou, Palma Sola Bay, Long boat Pass, Sarasota Bay, New Pass, Big Sarasota Pass, Roberts Bay, Little Sarasota Bay, Dryman Bay, Blackburn Bay, Lyons Bay, Venice Inlet, Dona Bay upstream to the U.S. Highway 41 bridge, and Roberts Bay upstream to the U.S. Highway 41 bridge; less however, the following areas:

- a. All tributaries, including Palma Sola Creek, Bowlees Creek, Whitaker Bayou, Hudson Bayou, Phillippi Creek, Catfish Creek, North Creek, South Creek, Shakett Creek, Curry Creek; and
  - b. A circle 1500 feet in radius from the mouth of Whitaker Bayou; and
  - c. A circle 1500 feet in radius from the mouth of Phillippi Creek; and
  - d. Artificial waterbodies, defined as any waterbody created by dredging, or excavation, or by the filling in of its boundaries, including canals as defined in Rule 62-312.020(3), F.A.C. (4-29-86).
  - e. The designation shall not affect the consideration by the Department of an application for Site Specific Alternative Criteria for the discharge of the City of Bradenton's Municipal Sewage Treatment Plant being built under Department of Environmental Protection Construction Permit No. DC41-81224. The application will be processed under the regulations of the Department existing on February 18, 1986.
30. St. Marks River - except that part between Rattlesnake Branch and the confluence of the St. Marks and Wakulla Rivers.
  31. Shoal River
  32. Silver River (Marion County) (4-9-87)
  33. Spruce Creek upstream to State Road 40A, and the following tributaries:
    - a. Unnamed tributary upstream to the Southern section line of Section 4, Township 17 South, Range 33 East; and
    - b. Unnamed tributary upstream to the Northern section line of Section 20, Township 16 South, Range 33 East; and
    - c. Unnamed tributary upstream to the Northern section line of Section 23, Township 16 South, Range 32 East (right fork), and to the Western line of the NE 1/4 of Section 27, Township 16 South, Range 32 East; and

- 
- d. Unnamed tributary upstream to the Western section line Section 35, Township 16 South, Range 32 East; and
  - e. Strickland Bay; and Turnbull Bay and Turnbull Creek upstream to the Northwestern section line of Section 43, Township 17 South, Range 33 East;
  - f. and Murray Creek upstream to the Town of Ponce Inlet municipal limits; and
  - g. waters east from U.S. Highway 1 following the northerly and southerly municipal limits of the Town of Ponce Inlet to its intersection with the western boundary of the Intracoastal Waterway and including Rose Bay upstream to Nova Road (State Road 5A);
  - h. but excluding all other tributaries (7-11-91).
34. Suwannee River
  35. Tomoka River upstream to Interstate Highway 4; and the following tributaries:
    - a. Priest Branch upstream to the Western and Southern section lines of Section 6, Township 15 South, Range 32 East; and
    - b. Little Tomoka River and its tributaries as bounded by the following described line: Begin at the Southwestern point of confluence between the Tomoka River and the Little Tomoka River; thence meander upstream along the Little Tomoka River to the Western section line of Section 25, Township 14 South, Range 31 East; thence South to the Southwest corner of Section 25, Township 14 South, Range 31 East; thence West to the Southwest corner of Section 28, Township 14 South, Range 31 East; thence North to the Northwest corner of Section 28, Township 14 South, Range 31 East; thence East to the West section line of Section 25, Township 14 South, Range 31 East; thence South to the Northern shore of the Little Tomoka River; thence meander easterly to the confluence with the Tomoka River; thence South to the point of beginning; and
    - c. Groover Branch upstream to the Northern section line of Section 24, Township 14 South, Range 31 East; and
    - d. Misner's Branch upstream to the Northern section line of Section 29, Township 14 South, Range 32 East; and
    - e. Thompson Creek and Strickland Creek upstream to the Northern section line of Section 40, Township 14 South, Range 32 East;
    - f. but excluding all other tributaries (7-11-91).
  36. Wacissa River
  37. Wakulla River
  38. Weekiwachee Riverine and Spring System – consisting of the Weekiwachee Springs and River, Mud Springs and River, Jenkins Creek, Salt Spring



and Creek, the Weekiwachee Swamp, and all tributaries and contiguous wetlands within the following sections: Township 23 South, Range 17 East, Sections 2-9; Township 22 South, Range 17 East, Sections 20, 21, and 27-35, together with that portion of Section 19 that is southerly of CR 550 (Cortez Blvd.); Township 22 South, Range 16 East, Sections 25 and 36; including any and all waters, and wetlands contiguous to the tributaries located southerly of the north line of Section 25, Township 22 South, Range 16 East and westerly projection thereof and easterly of the west line of Section 36, Township 22 South, Range 16 East and northerly projection thereof, and easterly of a line through latitude 28° 32' 52" North, longitude 82° 39' 23" West, and through latitude 28° 31' 47" North, longitude 82° 39' 52" West (North American Datum of 1983). This OFW excludes artificial waters defined as any water body created by dredging, or excavation, or by the filling in of its boundaries, including canals as defined in subsection 62-312.020(3), F.A.C. (12-11-03).

39. Wekiva River System - consisting of the Wekiva River, Rock Springs Run and its tributary Sulphur Spring, the Little Wekiva River south to its confluence with the southernmost run of Sanlando Springs, Black Water Creek and Swamp (up to Lake Dorr), Lake Norris, Seminole Springs and Creek, Seminole Swamp, Sulphur Spring and Run, and Messant Spring and Creek, but excluding all other tributaries (12-28-88).
40. Wiggins Pass Estuarine Area and the Cocohatchee River System - the estuarine and marine waters from the Lee/Collier County line south ward through and including Water Turkey Bay to 50 feet north of S.R. 846 (Bluebill Ave.) 1995 right-of-way; the Cocohatchee River down stream from 50 feet West of U.S. 41 1995 right-of-way; and Wiggins Pass; but excluding maintenance dredging as authorized by Section 403.813(2)(f), F.S., in the following areas:
  - a) Wiggins Pass from the Gulf of Mexico eastward for 200 linear feet (as measured from the southwestern point of Little Hickory Island);
  - b) the channel (South Channel, Vanderbilt Channel), that connects Wiggins Pass with Vanderbilt Lagoon through Water Turkey Bay; and
  - c) East Channel (for purposes of this designation described as the East Channel from its confluence with South Channel to Vanderbilt Drive, including all waters surrounding the spoil islands know as Conklin Point and Island Marina) (7-16-96).
41. Withlacoochee Riverine and Lake System, including:
  - a. The Withlacoochee River downstream of State Road 33 in Lake County to eastern section line of Section 33, Township 16 South, Range 18 East; and

- b. The lower Withlacoochee River, from the Gulf of Mexico to the Cross Florida Barge Canal By-Pass Spillway, but not including that portion of the river between Lake Rousseau and the Cross Florida Barge Canal; and
- c. The Little Withlacoochee River; and
- d. Jumper Creek downstream of State Road 35, including Jumper Creek Swamp; and
- e. Gum Springs, Gum Slough (Dead River), and Gum Swamp; and
- f. Lake Panasoffkee, Outlet River, Little Jones Creek, Big Jones Creek, and Rutland Creek; and
- g. Shady (Brook, Panasoffkee) Creek downstream of State Road 468, including Warm Spring Hammock; and
- h. Lake Tsala Apopka;
- i. but excluding all other tributaries and artificial waterbodies, defined as any waterbody created by dredging, or excavation, or by the filling in of its boundaries, including canals as defined in Rule 62-312.020(3), F.A.C. (4-10-89).

(j) Waters within Rivers Designated Under the Florida Scenic and Wild Rivers Program, federal Wild and Scenic Rivers Act of 1968 as amended, and Myakka River Wild and Scenic Designation and Preservation Act

**River Segment**

**County**

- |   |                      |
|---|----------------------|
| 1. Loxahatchee National Wild and Scenic River Segment (5-14-86) | Martin<br>Palm Beach |
| 2. Myakka Florida Wild and Scenic River Segment (5-14-86)       | Sarasota             |
| 3. Wekiva Florida Scenic and Wild River Segment (12-1-82)       | Lake/Seminole        |

(k) Waters within National Preserves

**National Preserve**

**County**

- |  |                        |
|--|------------------------|
| 1. Big Cypress National Preserve as mod. 5-14-86, 4-19-88, 8-8-94) | Collier/Dade<br>Monroe |
| 2. Timucuan Ecological and Historic Preserve (8-8-94)              | Duval                  |

(l) Waters within National Marine Sanctuaries

**Marine Sanctuary**

**County**

- |                       |        |
|-----------------------|--------|
| 1. Key Largo          | Monroe |
| 2. Looe Key (12-1-82) | Monroe |

(m) Waters within National Estuarine Research Reserves



**National Estuarine Research Reserve**

1. Apalachicola (12-1-82; as mod. 5-14-86, 4-19-88)  
Gulf
2. Rookery Bay (as mod. 5-14-86, 4-19-88)

**County**

Franklin  
Collier

**(n) Certain Waters within the Boundaries of the National Forests****National Forest**

1. Apalachicola
  - a. Sopchoppy River (9-1-82)
  - b. Big Dismal Sink (9-1-82)
2. Ocala  
Marion
  - a. Alexander Springs (9-1-82)
  - b. Alexander Springs Creek (9-1-82)
  - c. Juniper Springs (9-1-82)
  - d. Juniper Creek (9-1-82)
  - e. Salt Springs (9-1-82)
  - f. Salt Springs Run (9-1-82)
  - g. Lake Dorr (9-1-82)
  - h. Lake Kerr (9-1-82)
  - i. Little Lake Kerr (9-1-82)
3. Osceola

**County**

Wakulla/Leon  
Franklin  
Putnam  
Lake  
Baker/Columbia

**(o). Outstanding National Resource Waters:**

- a. The Commission designates the following waters as Outstanding National Resource Waters:
  1. Biscayne National Park, as described in the document entitled "Outstanding National Resource Waters Boundary Description and Map for Biscayne National Park", dated June 15, 1989, herein adopted by reference.
  2. Everglades National Park, as described in the document entitled "Outstanding National Resource Waters Boundary Description and Map for Everglades National Park", dated June 15, 1989, herein adopted by reference.

## Appendix 5 Wetland Types

### COMMON WETLAND TYPES \*

Bay Heads  
Bogs  
Bottomland Hardwood Swamps  
Cypress Strand Swamps  
Cypress Domes  
Cypress Ponds  
Flag Ponds  
Freshwater Tidal Swamps  
Grass Ponds  
Gum Ponds  
Gum Swamps  
Hydric Hammock  
Pitcher Plant Bogs  
River & Creek Floodplain Swamps  
Sawgrass Marshes  
Seasonal Marshes  
Seepage Slopes  
Seepage Swamps  
Sloughs  
Strand Swamps  
Wet Prairie  
Willow Head

**\*NOTE:** For purposes of BMP implementation, Pine Flatwoods is not considered a wetland although sites of this nature may exhibit some of the same characteristics of the wetlands listed above.

## Appendix 6 Seeding Rates for Vegetative Stabilization Roads, Stream Crossings & Landings

Planting Dates and Seeding Rates		
Seed	Planting Dates	Seeding Rates per acre
		Broadcast (lb)
Aeschynomene	Mar. 30 - Jun. 30	6 - 8 (dehulled)
Pensacola Bahiagrass	Feb. 15 - Aug. 15	15 - 20
Common Bermudagrass	Feb. 15 - July 31	8 - 10
Arrowleaf Clover	Oct. 1 - Nov. 15	8 - 10
Crimson Clover	Oct. 1 - Nov. 15	20 - 26
Hairy Indigo	Apr. 1 - Jun. 30	6 - 8
Browntop Millet	Feb. 15 - Aug 15	5 - 10
Italian Ryegrass	Oct. 1 - Nov. 15	20-30

Source: E.E. Whitty and C.G. Chambliss, IFAS SSAGR 150 March 2005

### Fertilizer Application

Fertilizer	Lbs./Ac.
10-10-10	800
Limestone*	2000

Source: Carl DeFazio, Soil Conservation Service, 1977.

\*Where needed

**Example:** Multiply appropriate acreage value of road by the recommended seed mixture or fertilizer in Lbs./Ac.

**e.g.:** A section of 12 ft. wide by 750 ft. long road would require 4.2 lbs. of Pensacola Bahiagrass (0.21ac. X 20 lbs./ac.)

### Road Acreage Table

Road Length in Feet	Road Width in Feet				
	10	12	14	18	25
50	0.01	0.01	0.02	0.02	0.03
100	0.02	0.03	0.03	0.04	0.06
250	0.06	0.07	0.08	0.10	0.15
500	0.12	0.14	0.16	0.21	0.29
750	0.17	0.21	0.24	0.31	0.44
1000	0.24	0.28	0.32	0.41	0.58
1500	0.34	0.41	0.48	0.62	0.87
2000	0.48	0.56	0.64	0.83	1.15
5000	1.15	1.38	1.61	2.07	2.87
5280	1.21	1.45	1.70	2.18	3.04

Source: U.S.D.A. Forest Service

## Appendix 7 Drainage Structures

### Recommended Spacing for Drainage Structures

Drainage Systems	Site Sensitivity Class					
	A1	A2	A3	A4	A5	A6
<b>Permanent Roads</b>						
Culverts and Cross Ditches	None	200	150	125	100	75
Water Turnouts	200	120	100	75	50	40
Broad Base Dips	None	180	140	125	120	110
<b>Firelines, Skid Trails &amp; Temporary Roads</b>						
Water Bars	250	135	80	60	45	30

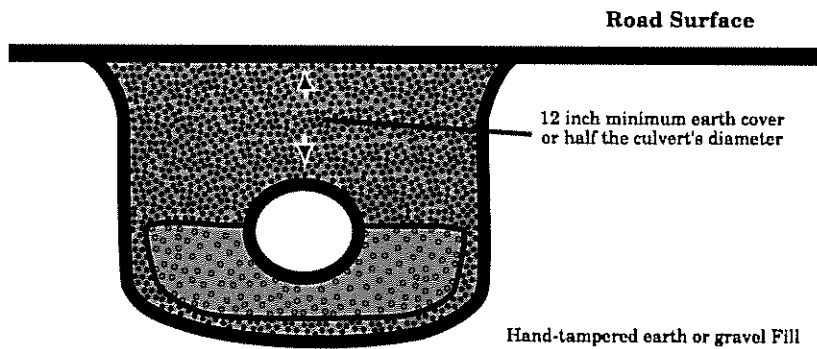
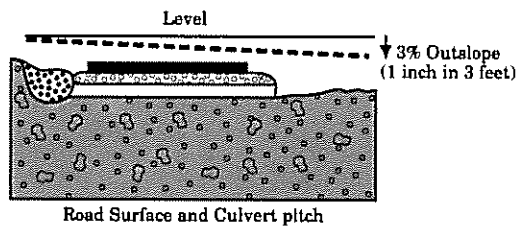
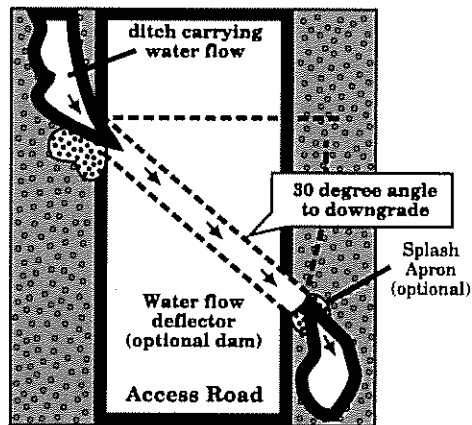
Drainage Systems	Site Sensitivity Class					
	B1	B2	B3	B4	B5	B6
<b>Permanent Roads</b>						
Culverts and Cross Ditches	None	200	150	125	100	75
Water Turnouts	200	120	100	75	50	40
Broad Base Dips	None	180	140	125	120	110
<b>Firelines, Skid Trails &amp; Temporary Roads</b>						
Water Bars	250	135	80	60	45	30

Drainage Systems	Site Sensitivity Class					
	C1	C2	C3	C4	C5	C6
<b>Permanent Roads</b>						
Culverts and Cross Ditches	None	200	150	125	100	75
Water Turnouts	200	120	100	75	50	40
Broad Base Dips	None	180	140	125	120	110
<b>Firelines, Skid Trails &amp; Temporary Roads</b>						
Water Bars	250	135	80	60	45	30

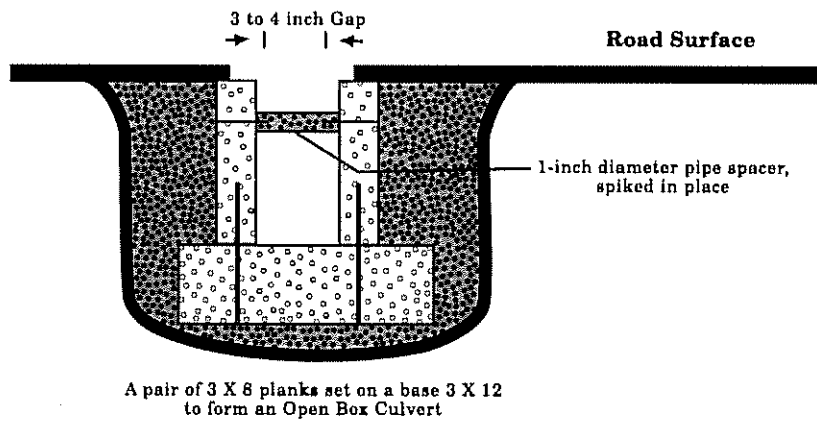
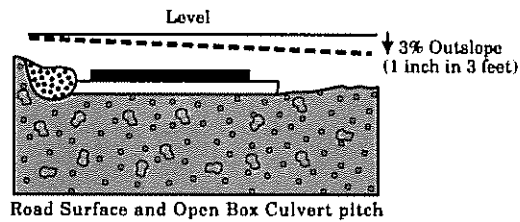
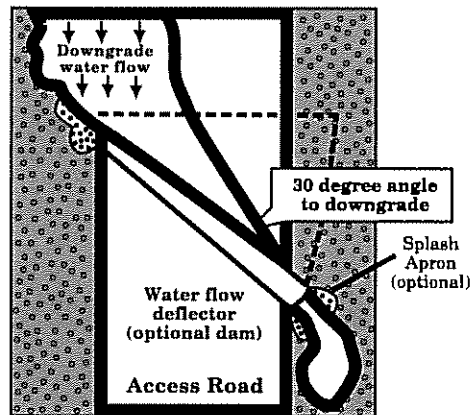


# Appendix 8 Access Roads

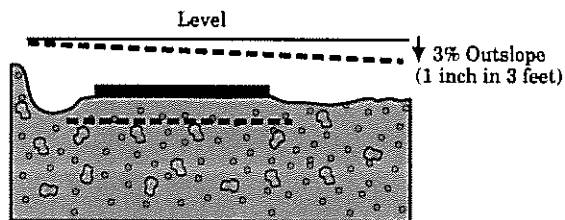
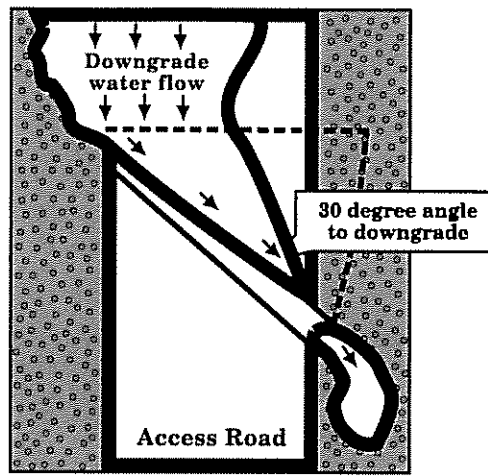
## Cross-drain Culvert



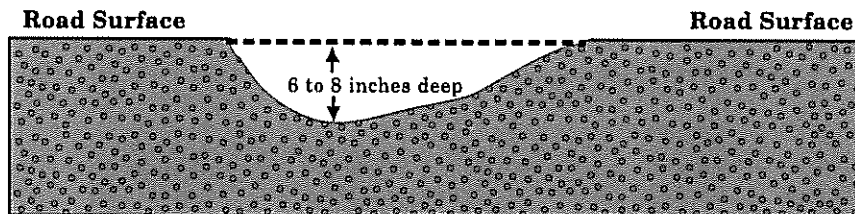
## Open Box Culvert



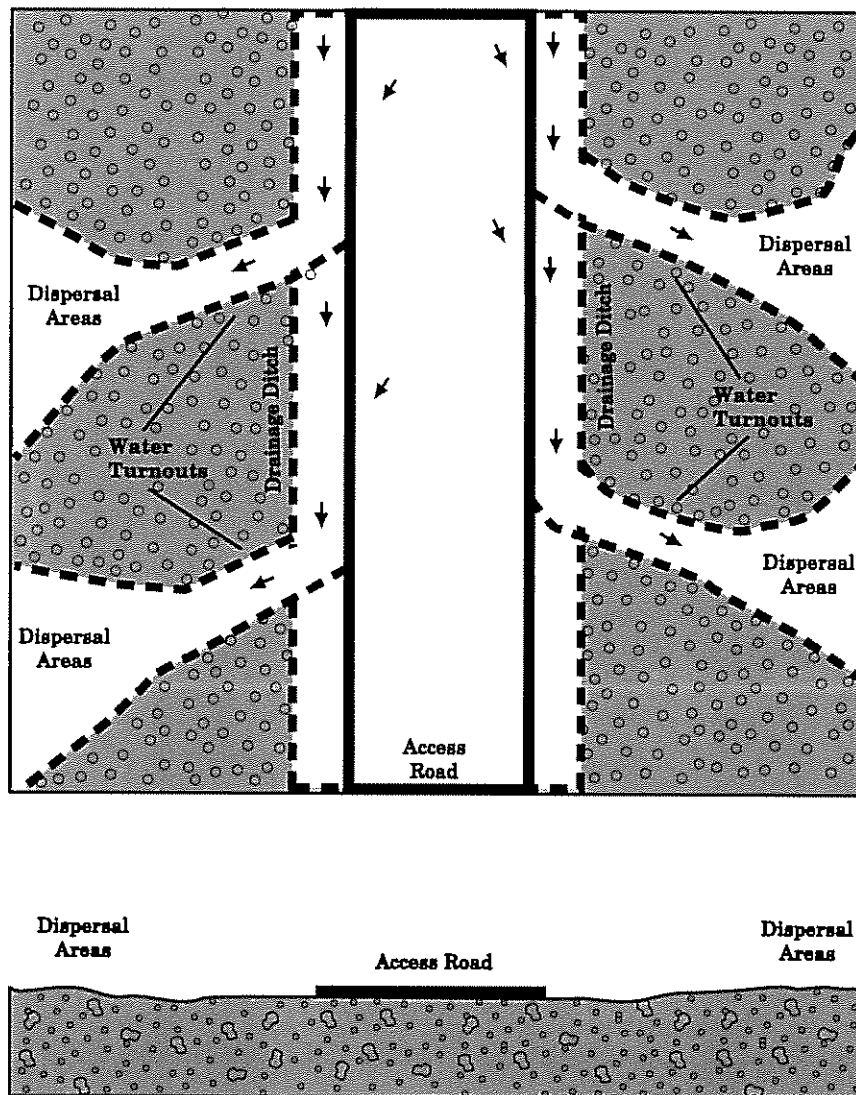
## Cross Ditch



Road Surface and Cross Ditch Pitch



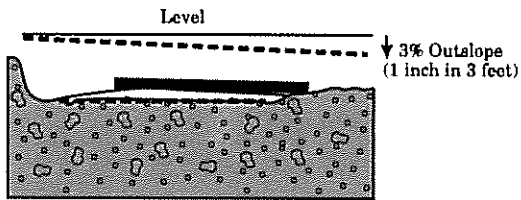
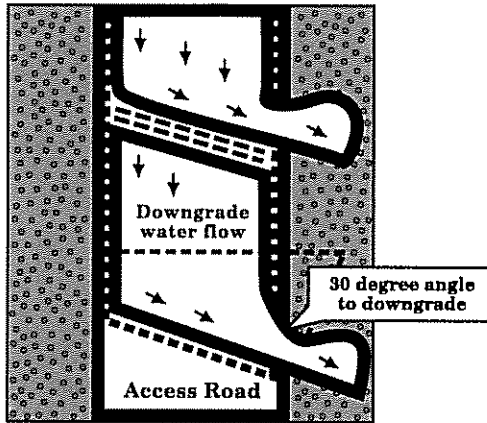
## Water Turnouts



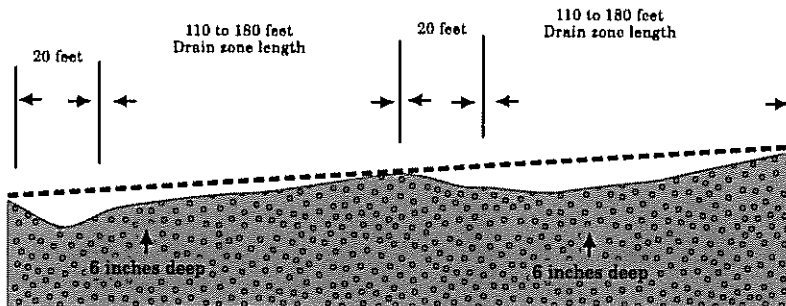


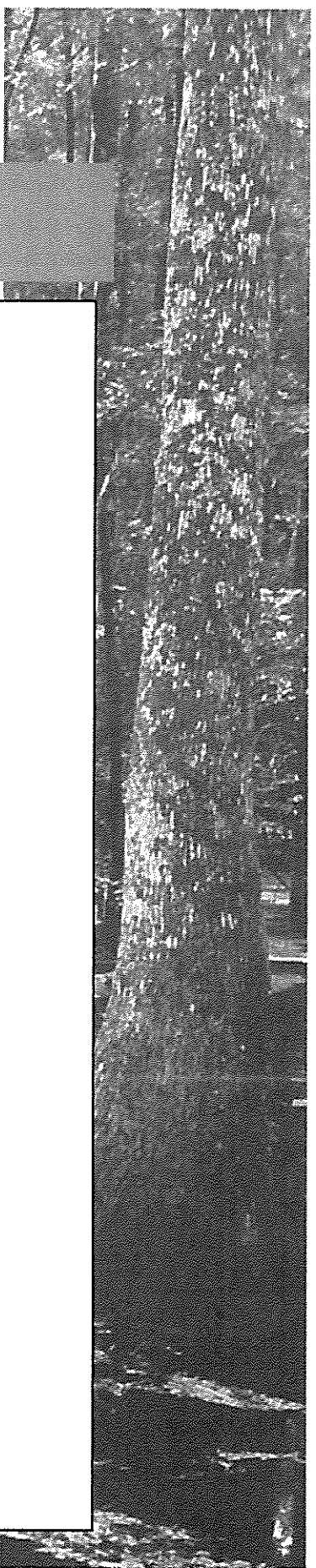


## Broad Base Dip

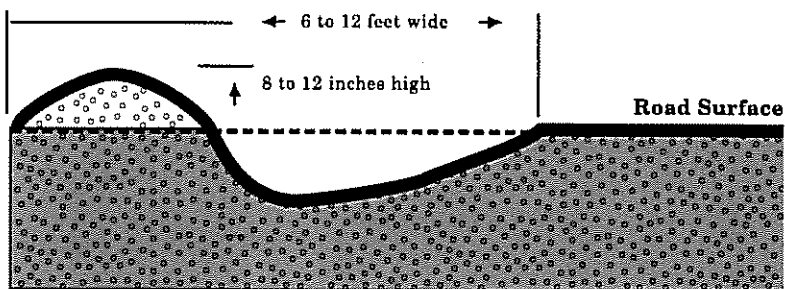
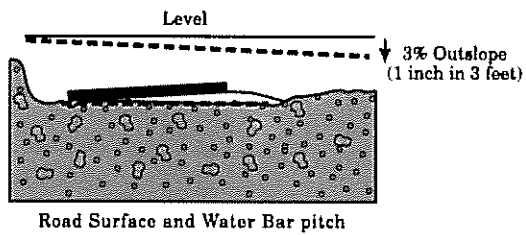
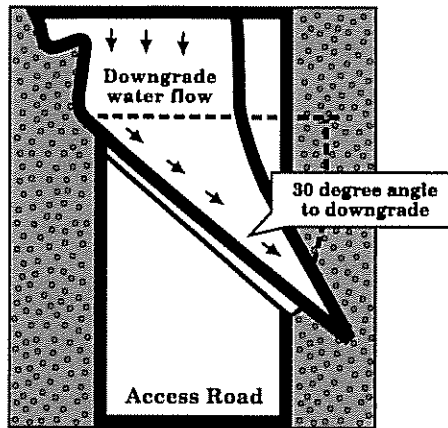


Road Surface and Broad Base Dip pitch





## Water Bar





## Appendix 9 Culvert Sizing

### **Stream Size/Site Condition Method**

#### **Procedure:**

- 1) Measure bottom channel width (W) and channel depth (D) from bottom to top of bank.
- 2) Determine whether slope upstream is flat, moderately or extremely hilly and refer to appropriate Table (A-C) on the following pages.

For areas with no perceptible change in elevation upstream of the culvert area, choose (FLAT) slope.

In moderately hilly areas, such as a rise of two (2) feet for every 100 feet of run, choose Moderate (MOD) slope.

In extremely hilly areas, with an approximate rise of ten (10) feet or more for every 100 feet of run, choose critical (CRIT) slope.

- 3) Read corresponding culvert size based on width and depth of stream channel.

#### **Assumptions:**

##### **Roughness factors:**

n = 0.030 for channel  
n = 0.024 for CMP culvert

##### **Slope:**

FLAT = 0.05%  
MOD = 2.00%  
CRIT = 10.00 %

Calculations assume corrugated Metal Pipes (CMP) which project slightly out of fill.

**Table A: Culvert Diameters (Inches) for Flat Conditions  
Slopes Upstream 0-0.05%**

Stream Width (Ft.)	Stream Depth (Ft.)							
	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0
<b>1</b>	12	12	-	-	-	-	-	-
<b>2</b>	12	12	18	24	-	-	-	-
<b>3</b>	12	15	18	24	30	36	-	-
<b>4</b>	12	18	21	27	33	36	42	-
<b>5</b>	12	18	21	30	36	42	48	54
<b>6</b>	12	21	24	33	42	42	54	60
<b>7</b>	15	21	24	36	42	48	60	60
<b>8</b>	15	24	30	36	42	54	60	2-48
<b>9</b>	15	24	33	42	48	54	60	2-54
<b>10</b>	18	27	36	42	48	60	2-42	2-54



**Table B: Culvert Diameters (Inches) for Moderate Hilly Conditions  
Slopes Upstream 2-10%**

Stream Width (Ft.)	Stream Depth (Ft.)							
	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0
<b>1</b>	12	21	-	-	-	-	-	-
<b>2</b>	15	27	36	48	-	-	-	-
<b>3</b>	18	33	42	54/2-42	54	3-54/4-42	-	-
<b>4</b>	21	36	48	2-48/3-36	3-48/4-42	4-48	*	-
<b>5</b>	27	42	54	2-48/3-42	3-48/4-42	4-54	*	*
<b>6</b>	30	42	60	2-54/3-42	4-48	*	*	*
<b>7</b>	30	48	60	3-48/4-42	4-54	*	*	*
<b>8</b>	33	54	2-54/3-48	3-54/4-48	4-54	*	*	*
<b>9</b>	36	54	2-54/3-48	3-54/4-48	*	*	*	*
<b>10</b>	42	60	3-48/4-42	4-54	*	*	*	*

\* Where flows were determined to cause the culvert size to exceed four 60-inch pipes, no size is provided. This table provides for most temporary installations in Northwest Florida. For larger sizes of channels, bridge works may prove more economical.

**Table C: Culvert Diameters (Inches) for Extreme Hilly Conditions  
Slopes Upstream > 10%**

Stream Width (Ft.)	Stream Depth (Ft.)							
	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0
<b>1</b>	15	30	-	-	-	-	-	-
<b>2</b>	21	42	54	2-54/3-42	-	-	-	-
<b>3</b>	27	48	2-48/3-42	3-48	4-54	*	-	-
<b>4</b>	33	54	2-54/3-42	3-54/4-48	*	*	*	-
<b>5</b>	36	60	2-60/3-48	4-54/5-48	*	*	*	*
<b>6</b>	42	60	3-54/4-48	*	*	*	*	*
<b>7</b>	42	2-48/4-36	3-54/4-48	4-60	*	*	*	*
<b>8</b>	48	2-54/3-48	4-54/5-54	*	*	*	*	*
<b>9</b>	54	2-60/3-48	4-60/5-54	*	*	*	*	*
<b>10</b>	54	3-54/4-48	*	*	*	*	*	*

\* Where flows were determined to cause the culvert size to exceed four 60-inch pipes, no size is provided. This table provides for most temporary installations in Northwest Florida. For larger sizes of channels, bridge works may prove more economical.

### Watershed Size Method

**Procedure:**

- 1) From Table D below, for the given watershed area, soil, and slope conditions, read corresponding drainage area i. e., cross-section area of pipe required for 2 1/2 inches of rainfall per hour.
- 2) Select culvert size from Table E (next page) that has **at least** the required area determined above.

**Table D: Drainage for 2 1/2 Inches/Hour Rainfall (Sq. Ft.)\***

Watershed Acres	Site Conditions (Soil Type & Slopes)				
		Steep (25%+)	Moderate (15-25%)	Gentle (0-15%)	Flatland
Soils	Impervious	Heavy	Moderate	Light	Sandy
10	3.4	2.6	1.9	1.2	0.7
20	5.8	4.3	3.2	2.0	1.2
30	8.0	5.9	4.4	2.8	1.6
40	9.9	7.3	5.4	3.5	2.0
50	11.6	9.7	6.4	4.1	2.3
60	13.4	10.1	7.4	4.7	2.7
70	15.0	11.2	8.3	5.3	3.0
80	16.6	12.4	9.2	6.3	3.3
90	18.2	13.6	10.1	6.3	3.6
100	19.7	14.7	10.8	6.8	3.9
200	33.2	24.9	18.4	11.7	6.6
300	45.7	33.6	27.1	15.8	9.0
400	56.0	42.0	30.5	19.5	11.2
500	66.8	49.4	36.6	23.2	13.2
1000	113.0	88.9	62.1	39.4	22.4

\*Modified from Talbot's Formula for a 2 1/2-inch/hr. rainfall event.

**Table E: Culvert Pipe Size Required for Drainage Area\***

X-Section Area (Sq. Ft )	Diameter (In.)	X-Section Area (Sq. Ft.)	Diameter (In.)
0.55	10	12.60	48
0.79	12	15.90	54
1.25	15	19.60	60
1.80	18	23.80	66
3.10	24	28.30	72
4.90	30	33.20	78
7.10	36	38.50	84
9.60	42	44.20	90

\*King's Handbook on Hydraulics, modified by Forestry BMP Handbook Technical Advisory Committee (Courtesy of Rayonier).

**Note:** For watersheds that require more than 44.2 square feet of pipe (a 90-inch pipe), multiple pipe combinations should be used to meet the requirements. It is generally preferable to use multiple pipes of the same size and the pipes should be spaced leaving a distance of 1/2 the pipe diameter between the pipes.

**For example,** if two 72-inch pipes are required, the pipes should be spaced 36 inches apart.



## Appendix 10 Special Management Zone Acreage

<b>Special Management Zone Acreage</b>			
<b>Stream Length (Ft.)</b>	<b>Area of Primary SMZ, Each Side (Acres)</b>		
	<b>35 Foot SMZ</b>	<b>75 Foot SMZ</b>	<b>200 Foot SMZ</b>
<b>25</b>	0.02	0.04	0.11
<b>50</b>	0.04	0.09	0.23
<b>75</b>	0.06	0.13	0.34
<b>100</b>	0.08	0.17	0.46
<b>200</b>	0.16	0.34	0.92
<b>300</b>	0.24	0.52	1.38
<b>400</b>	0.32	0.69	1.84
<b>500</b>	0.40	0.86	2.30
<b>750</b>	0.60	1.29	3.44
<b>1000</b>	0.80	1.72	4.59
<b>1500</b>	1.21	2.58	6.89
<b>2000</b>	1.61	3.44	9.18
<b>5000</b>	4.02	8.61	22.96
<b>5280</b>	4.24	9.09	24.24

**Note:** Where both sides of waterbody are owned by the same landowner, multiply acreage from Table by 2.

## Appendix 11

### Exceptions to Primary Zone Management Criteria



- 1) No individual tract or tracts-in-contiguous-ownership may be required to designate more than 10% of the total tract area as Primary Zone, provided that no clearcutting takes place within 35 feet of any perennial waterbody or within 50 feet of any OFW, ONRW, or Class I Water (See Exception #1).
- 2) No Primary Zone may be required beyond 35 feet from a perennial waterbody or 50 feet from any OFW, ONRW or Class I Water, where the trees have been traditionally managed for the purpose of pine production and, where there is an existing predominance of pine trees with no significant component of large sized or merchantable hardwood trees (See Exception #2).
- 3) Where Exceptions 1 or 2 do not apply, clearcut harvesting in the Primary Zone is permissible provided that no clearcutting takes place within 35 feet of any perennial waterbody or within 50 feet of any OFW, ONRW or Class I Water, and where :
  - a) The total acreage clearcut does not exceed 25% of the area designated as Primary Zone, and the number of acres clearcut are added-on to the Primary Zone, acre for acre. These additional acres added-on to the Primary Zone, must be directly connected to the Primary Zone boundary within the harvest unit, may not extend out beyond that boundary more than 200 feet, and must be managed in accordance with the Primary Zone - Management Criteria (See Exception #3a); or,
  - b) The basal area of overstory trees within the SMZ is 30 square feet per acre or less, and other hardwood species present are of such low quality (physiologically or ecologically) that total stand removal would provide a greater long term wildlife and/or forestry benefit. However, the total area clearcut under this exception may not equal more than 10% of the Primary Zone, and any given clearcut parcel must not be greater than 500' in length, as measured along the stream (See Exception #3b).

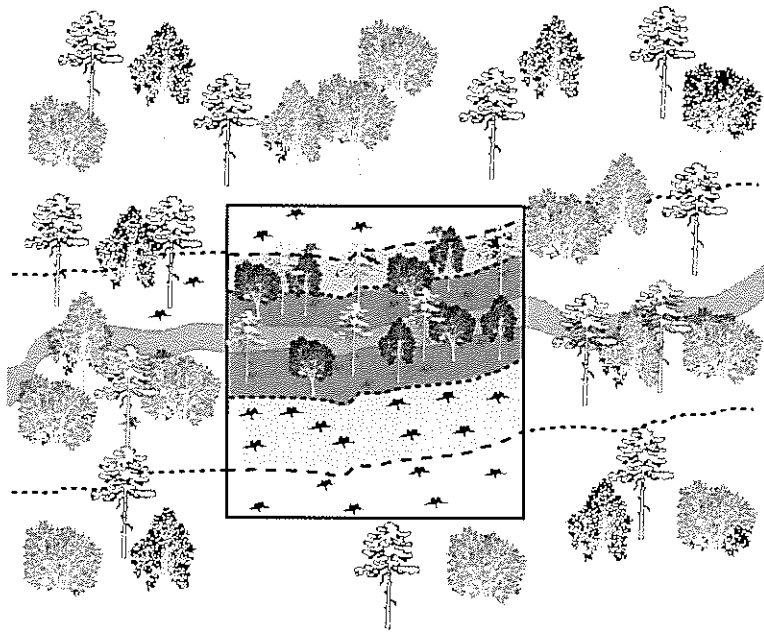
**\*See figures on following pages for examples of exceptions.**

Note: Exceptions 2 and 3 are applicable only to timber harvesting operations and do not apply to other forest operations including site preparation activities.

**Exception #1:**

If the required SMZ area exceeds 10% of the tract area, the SMZ may be reduced (down to 10%) by narrowing the SMZ width.

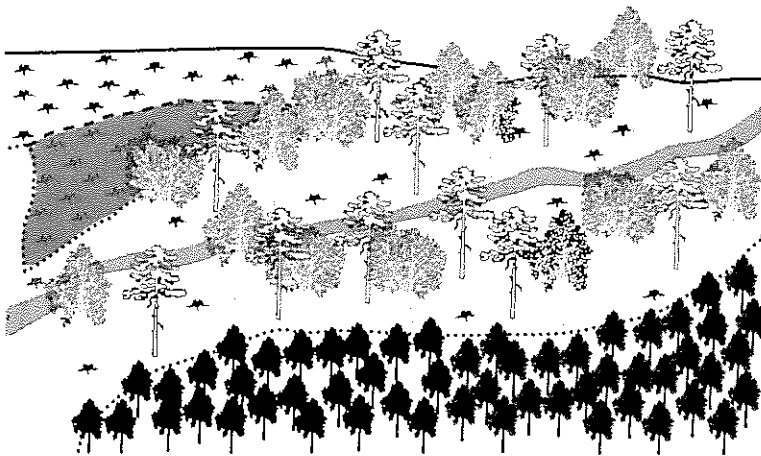
-  Reduced Primary SMZ
-  Original Primary SMZ



**Exception #2:**

In areas of existing pine management, the Primary SMZ is not required to be more than 35' wide (50' for OFW, ONRW and Class I waters)

-  Existing Pine Management Area




**Exception #3a:**

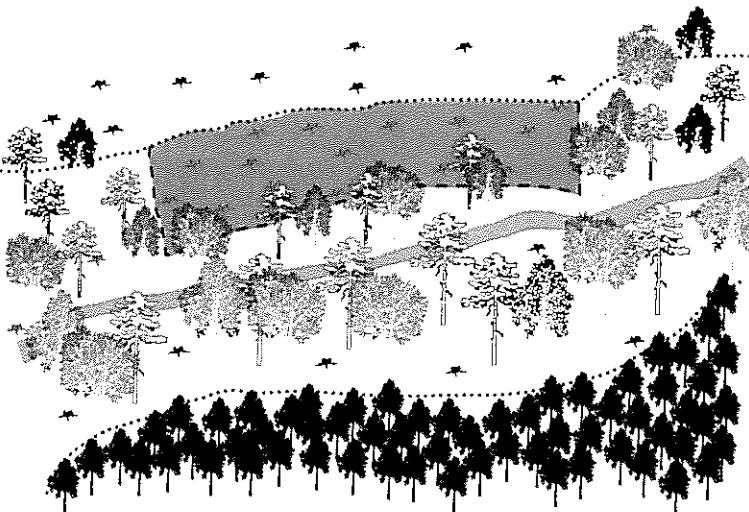
**A: Clearcut area within  
Primary SMZ: 2 acres**

**B: Area returned  
outside Primary SMZ: 2  
acres**



**Exception #3b:**

 **Low Quality  
Hardwood Area  
Clearcut within  
Primary SMZ**





## Appendix 12 Florida Forest Service Field Offices

FIELD UNIT	CENTER	AREA CODE	PHONE NUMBER
BFC	Blackwater Forestry Center (Munson)	850	957-6140
D-2	Chipola Forestry Center	850	872-4175
D-4	Tallahassee Forestry Center	850	681-5950
D-5	Perry District Office	850	838-2299
D-6	Suwannee Forestry Center	386	758-5700
D-7	Jacksonville District Office	904	266-5001
D-8	Waccasassa Forestry Center	352	955-2005
D-10	Bunnell District Office	386	446-6786

<b>FIELD UNIT</b>	<b>CENTER</b>	<b>AREA CODE</b>	<b>PHONE NUMBER</b>
<b>WFC</b>	<b>Withlacoochee Forestry Center (Brooksville)</b>	<b>352</b>	<b>797-4100</b>
<b>D-12</b>	<b>Orlando District Office</b>	<b>407</b>	<b>856-6512</b>
<b>D-14</b>	<b>Lakeland District Office</b>	<b>863</b>	<b>648-3163</b>
<b>D-15</b>	<b>Myakka River District Office (Bradenton)</b>	<b>941</b>	<b>751-7627</b>
<b>D-16</b>	<b>Okeechobee District Office</b>	<b>863</b>	<b>462-5160</b>
<b>D-17</b>	<b>Caloosahatchee Forestry Center (Ft. Myers)</b>	<b>239</b>	<b>690-3500</b>
<b>D-18</b>	<b>Everglades District Office (Ft. Lauderdale)</b>	<b>954</b>	<b>475-4120</b>



## **Appendix 13 Florida Water Management District Offices**

### **Northwest Florida Water Management District**

81 Water Management Drive  
Havana, Florida 32333-9700  
(850) 539-5999

### **Suwannee River Water Management District**

9225 County Road 49  
Live Oak, Florida 32060  
(386) 362-1001

### **St. Johns River Water Management District**

P.O. Box 1429  
Palatka, Florida 32178-1429  
(386) 329-4500

### **Southwest Florida Water Management District**

2379 Broad Street  
Brooksville, Florida 34604-6899  
(352) 796-7211

### **South Florida Water Management District**

P.O. Box 24680  
3301 Gun Club Road  
West Palm Beach, Florida 33406-4680  
(561) 686-8800

## **Appendix 14 U.S. Army Corps of Engineers District Offices**

**Big Pine Key Regulatory Office**  
CESAJ-RD-FT-B  
P.O. Box 1619  
Big Pine Key, FL 33043-0633  
(305) 872-3205

**Crystal River Regulatory Office**  
CESAJ-RD-NF-C  
P.O. Box 387  
Crystal River, FL 34423  
(352) 795-1078

**Fort Myers Regulatory Office**  
CESAJ-RD-FT-F  
2180 West First Street  
Fort Myers, FL 33901-3217  
(813) 694-3438

**Jacksonville Regulatory  
Division Field Operations Branch**  
CESAJ-RD-F  
P.O. Box 4970  
Jacksonville, FL 32232-0019  
(904) 232-2502

**Merritt Island Regulatory Office**  
CEDAJ-RD-FI  
2460 North Courtney Square Blvd.  
Courtney Square Building  
Suite 216  
Merritt Island, FL 32952  
(407) 453-7655

**Miami Regulatory Field Office**  
CESAJ-RD-FM  
8410 NW 53rd Terrace, Ste. 225  
Miami, FL 33166  
(305) 591-1302

**Palatka Regulatory Office**  
CESAJ-RD-FK  
P.O. Box 1317  
Palatka, FL 32178-1317  
(904) 325-2028

**Panama City Regulatory Field Office**  
CESAJ-RD-NC  
P.O. Box 151  
Panama City, FL 32402-0151  
(850) 763-0717

**Pensacola Regulatory Office**  
CESAJ-RD-FP  
160 Government Center  
Pensacola, FL 32501-5794  
(850) 436-8300

**Tampa Regulatory Field Office**  
CESAJ-RD-CT  
P.O. Box 19247  
Tampa, FL 33686-9247  
(813) 840-2908

**Vero Beach Regulatory Office**  
CESAJ-RD-CT-V  
2001 9th Avenue, Suite 212-C  
Vero Beach, FL 32960  
(407) 567-1496



# G I O S S a r y

**Basal Area** Forestry term used to refer to the density of a stand of trees, expressed in square feet/acre. On a per tree basis, the basal area is the cross-sectional area of the tree at breast height.

**Bedding** A technique whereby a small continuous ridge of surface soil is formed to provide an elevated planting area or seed bed. In Florida, it is used primarily on wet sites to improve soil drainage and aeration for seedlings.

**Borrow Pit** An active or abandoned excavation site to provide fill material necessary for forestry related activities such as road construction.

**Broad-Base Dip** A reversal in the grade of a permanent access road for the purpose of intercepting and diverting surface water flow without seriously impeding vehicular traffic.

**Cavity Tree (Den Tree)** Mature hardwood and softwood trees that are hollow and typically of the older age classes that are used by certain birds and other small wildlife species for shelter and habitat.

**Canal** A man-made waterbody; does not include natural streams that have been modified by dredging or straightening.

**Chopping** A mechanical treatment whereby vegetation is chopped by blades on a roller drum implement, pulled by tracked or rubber tired equipment. The "chopping" of this vegetation facilitates: more control of prescribed burning, decreases rough vegetation conditions, provides some level of control on competing vegetation, improves tree planting conditions.

**Class I Waters** Waterbodies that serve as sources of potable water supply; designated by the State for additional water quality protection.

**Clearcutting** A silvicultural system in which all merchantable timber is harvested within a specified area in one operation.

**Cross Ditch** A shallow depression built diagonally across a road or trail for the purpose of diverting water off the road surface.

**Cross-Drain Culvert** A metal, wooden, plastic or concrete conduit through which surface water runoff is directed underneath the road surface to the opposite side.

**Detritus** Natural woody debris such as leaves, branches, etc., provided by trees – serves as a food source for certain aquatic insects.

**Ditch Plug** Material used to partially or completely obstruct the flow of water in a ditch.

**Erodible Soils** Those soils identified as being subject to erosion based on soil texture, composition and topography.

**Erosion** The process by which soil particles are detached and transported by water, wind or gravity to some down slope.

**Fertilizers** Any substance or combination of substances used primarily as a source of plant nutrition or soil amendment.

**Firelines** Constructed barriers typically established by plowing and/or harrowing to contain fires within a specific area.

# G I O S S a r y

**Flowing Wetland** A wetland (listed in appendix 5) that has a surface connection to a well defined stream channel at one or more points, and has a definite stormwater inflow and/or outflow.

**Foam Line** Type of fireline that incorporates the use of fire-resistant foam material in lieu of, or in addition to, plowing or harrowing.

**Low Water Hard Surface Crossings (Fords)** Rock, brick, logs, and other stable materials place on the bottom of certain perennial or intermittent stream channels to accommodate traffic during periods of low water flow.

**Harrowing (Disking)** A mechanical means of scarifying the soil to reduce competing vegetation and to prepare a site to be seeded or used as a fire break.

**Harvest Unit** Refers to an area of specific size and location where timber harvesting operations are being performed.

**Haul (Spur) Roads** Temporary forest roads constructed to facilitate the transport of timber or other forestry related activities.

**Hydric Soils** Soils exhibiting a considerably wet nature, typically characterized by a dark color and associated with wetlands.

**Hydrology** The scientific study of the properties, distribution and effect of water on the earth's surface, in the soil and underlying rocks and in the atmosphere.

**Hydroperiod** Period of time during which soils, waterbodies, and sites are saturated.

**Impoundment Areas** Those areas within which water is stored by artificial means such as a dike or dam.

**Intensive Mechanical Site Preparation** Mechanized operations to control vegetative competition and facilitate forest seedling survival. Examples of intensive site preparation include the following individual operations or combinations of these operations: shearing with a K-G blade, raking, disking, harrowing, windrowing, bulldozing, bedding, and scalping.

**Intermittent Stream** A stream that has a well defined channel but maintains only seasonal flow under typical climatic conditions.

**K-Factor** An index representing the potential erodibility of a soil, by water, based on soil texture.

**Lake** A natural or artificial inland body of standing water which is contained within a discernable shoreline; and does not include active borrow pits or runoff retention/detention ponds.

**Leave Trees** Large mast producing and/or cavity trees which are representative of the older age classes of the stand and are considered valuable for wildlife, or related ecological purposes.

**Logging Debris** The unused and generally unmarketable accumulation of woody material, such as limbs, tops, cull logs and stumps, that remain as residue after timber harvesting.

**Mast-Producing Trees** Various species of trees considered valuable for the production of food for wildlife.

**Mat Logging** Sometimes referred to as "shovel logging" - a technique used on wet sites where logs are temporarily placed in skid trails, creating a log "mat" upon which the skidders operate.

# G I O S S a r y

**Modified Stream** A natural watercourse which has been dredged or straightened.

**Non-intensive Mechanical Site Preparation** Mechanized operations to control vegetative competition and facilitate forest seedling survival. Examples of non-intensive site preparation include the following individual operations or combinations of these operations: drum chopping, bush hogging, mulching, and gyro-track mowing.

**Non-Point Source (NPS)** Water pollution which is not traceable to any discrete or identifiable source, but rather is generated by activities within a diffuse treatment area.

**OFWs Outstanding Florida Waters** Waterbodies which exhibit unique characters in terms of quality and value designated by the State for additional protection from further pollution and degradation.

**ONRWs Outstanding National Resource Waters** Waterbodies which exhibit characteristics that meet specific water quality standards for national designation for protection from pollution and degradation.

**Operational Application** Method by which pesticides and fertilizer are applied, using commercial type equipment such as skidders or tractors and large boom equipment. Does not refer to hand-held spreaders or small scale equipment (4-wheelers).

**Perennial Streams** A watercourse that flows in a well-defined channel throughout the year under typical climatic conditions.

**Pesticides** Chemical substances, either liquid or granular, that are used for the control or eradication of undesirable insects, diseases, vegetation, animals and other organisms. Herbicides, Insecticides, Fungicides and Nematicides are all considered pesticides.

**Pollutants** Natural or man-made waste material that contaminates air, soil or water.

**Public Lands** Those lands which are wholly owned and managed by any unit of local, regional, state or federal government. Lands not wholly owned (i.e., lease, wildlife management agreement, easement, life estate, purchase agreement, etc.) may limit the terms of control by a unit of government.

**Raking** Component of site preparation in which non-merchantable trees, some stumps, roots, and logging slash are piled and/or pushed into individual piles or windrows by heavy equipment with rake-like blades.

**Refuse** Inorganic waste materials such as metal, rubber, plastic and glass.

**Regeneration** The young tree crop that either artificially (machine/hand planting) or naturally follows a stand of older trees.

**Rip-rap** Aggregate material placed on potentially erodible sites to reduce the impact of rain or surface runoff from these areas.

**Rotation** The period of time required to establish, grow, and harvest a crop of trees at a specified stage of maturity.

**Sediment** Soil particles which have been detached and transported by water during the process of erosion.

**Seed Tree Cut** Method of timber harvesting that provides for the natural regeneration of a site by leaving single, or small groups of seed-bearing trees distributed throughout the harvest area.

**Selection Cut** Removal of select trees within a forest stand based on some economic or physiological criteria. Generally results in uneven aged stands.

# G L O S S A R Y

**Shelterwood Cut** Removal of mature timber within a forest stand in a series of harvests which extend over a relatively short portion of the rotation in order to encourage the establishment of even-aged reproduction under the partial shelter of seed trees.

**Silviculture** A process, following accepted forest management principles, whereby the trees constituting forests are tended, harvested and reproduced.

**Site Preparation (Prescribed) Burning** The silviculture practice of using regulated fires to reduce or eliminate debris and vegetation in preparation for tree planting.

**Site Sensitivity Class (SSC)** An index of an area's susceptibility to erosion and sedimentation, based on soil type and slope.

**Skid** Moving of logs or felled trees from the harvest area to the loading point.

**Skidder** Heavy equipment designed for transporting logs and felled trees within the harvest area – operated on skid trails.

**Skid Trails** A temporary trail used only by logging equipment such as skidders, for the skidding of logs from the harvest area to the loading point.

**Slash** The unused and generally unmarketable accumulation of woody material, such as limbs, tops, cull logs and stumps, that remain as residue after timber harvesting.

**Slope** An index of the change in elevation of a land area. Often referred to as a ratio of rise over run; normally expressed in percent.

**Snag Trees** Typically isolated standing dead trees characterized by hollow trunks and/or limbs which may provide habitat for wildlife.

**Stand** A contiguous group of trees sufficiently uniform in species composition, arrangement of age classes and condition to be a homogeneous and distinguishable unit.

**Stringer** Narrow strip of trees with a more or less continuous canopy left on and/or near the banks of intermittent streams, lakes and sinkholes for purposes of stabilization, water quality protection, and wildlife habitat.

**Special Management Zone (SMZ)** An area of varying width adjacent to a watercourse in which special precautions are necessary to protect water quality and other natural resources.

**Swale** A manmade trench which has a top width to depth ratio equal to or greater than 6:1, or side slopes equal to or greater than 3 feet horizontal to 1 foot vertical, flows only following a rainfall event, has vegetation suitable for soil stabilization, stormwater treatment, and nutrient uptake, and is designed to take into account soil erodibility, soil percolation, slope, slope length, and drainage area so as to prevent erosion and reduce pollutant concentration of any discharge.

**Turbidity** An optical measurement of the relative clarity of water.

**Water Bar** A mound of soil built across a light-duty road, skid trail, or fireline, for the purpose of diverting surface water.

**Waterbody** Any river, creek, slough, canal, lake, reservoir, pond, sinkhole or other natural or artificial watercourse which flows within a defined channel or is contained within a discernable shoreline.

**Water Control Structure** Any structure used to regulate surface or subsurface water levels.



# G L O S S a r y

**Water Turnout** The extension of a road ditch into a vegetated area to provide for the dispersion and filtration of stormwater runoff.

**Wetland** For the purpose of this Manual, wetlands are not defined by any regulatory method, and consist of typical swamplands such as those listed in Appendix 5. The presence of pine trees doesn't necessarily indicate that a site is non-wetland, but pine dominated sites are not considered wetlands even though they may be "jurisdictional."

**Wetland Flow-way** That area of a flowing wetland where stormwater moves within variable dimensions instead of a well defined

channel. The area of flow in this case has enough general confinement to exhibit some stormflow characteristics, and is evidenced by, but not limited to: drift lines/racks, sediment deposits, soil and root scour, absence of litter/ground cover – all in a generally linear position.

**Wildfire** Any fire other than a controlled, prescribed fire.

**Windrow** Logging debris and unmerchantable woody vegetation, piled in rows on the contour of the land.