

## Natural Resources Conservation Service Caribbean Area

# Riparian Forest Buffer

## Conservation Practice Standard 391, Practice Specifications

### SCOPE

This specification serves as a guide for planning the selection and installation of a **Riparian Forest Buffer, Code 391**. It contains a list of considerations for the applicant and the NRCS requirements and constraints of this practice. It provides information and guidance for clients to: select plant species, determine plant spacing, prepare furrows or holes for planting, plant trees and shrubs, implement plant protection and cultural treatments to ensure adequate survival and growth of plants, and maintain plants in a riparian area. This document will be given to all producers who apply for NRCS financial and technical assistance to install a **Riparian Forest Buffer**.

Procedures, technical details and other information listed below provide additional guidance for carrying out selected components of the **Riparian Forest Buffer, Code 391**. This material is referenced from the conservation practice standard for the named practice and supplements the requirements and considerations listed therein.

The **Riparian Forest Buffer** is an area of vegetation adjacent to and up-gradient from watercourses or water bodies that begins at the top of the bank and extends land-ward a minimum of 15 feet. The minimum width may be wider than 15 feet to achieve the desired purpose (s).

### DEFINITION

A **Riparian Forest Buffer** is an area of predominantly trees and/or shrubs located adjacent to and up-gradient from watercourses or water bodies.



*Figure 1. NRCS Caribbean Area – Riparian Forest Buffer*



**Natural Resources  
Conservation Service  
Caribbean Area**

**Riparian Forest Buffer**  
Conservation Practice Standard 391, Practice Specifications

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**PURPOSE**

This practice is applied to support one or more of the following purposes:

- Create shade to lower or maintain water temperatures to improve habitat for aquatic organisms.
- Create or improve riparian habitat and provide a source of detritus and large woody debris.
- Reduce excess amounts of sediment, organic material, nutrients and pesticides in surface runoff and reduce excess nutrients and other chemicals in shallow ground water flow.
- Reduce pesticide drift entering the water body.
- Restore riparian plant communities.
- Increase carbon storage in plant biomass and soils.

**CONDITIONS WHERE PRACTICE APPLIES**

Riparian forest buffers are applied on areas adjacent to permanent or intermittent streams, creeks, lakes, ponds, and wetlands. They are not applied to stabilize stream banks or shorelines.

**GENERAL**

This specification provides guidance for the installation of the practice **Riparian Forest Buffer (391)**. Guidance may include information not directly addressed in the standard. Site specifications for the installation, operation and maintenance of the practice shall be prepared for each field or treatment unit in accordance with the requirements in the Conservation Practice Standard and the guidance in this Specification.

**SITE PREPARATION**

A precondition to implement **Riparian Forest Buffer (391)** is appropriately prepared sites. Planting sites shall be properly prepared based on the soil type and vegetative conditions.

If site preparation is needed, consider applying conservation practice Tree/Shrub Site Preparation- (Code 490). Tree/shrub site preparation is the treatment of areas to improve site conditions for establishing trees and/or shrubs. This practice is used to encourage natural regeneration of desirable woody plants and to permit artificial establishment of woody plants. Methods of site preparation include hand site preparation using hand tools (e.g. trimmers, lawn mower, shovels, garden hoe, machetes, pickaxes), and biological control (cattle, sheep and goats). For this practice, **avoid using pesticides**. Implement the hand site preparation method. Mulch may be used for weed control and moisture conservation for new plantings on all sites, particularly those with pronounced growing season moisture deficits or invasive, weedy species. Refer to Mulching (Code 484) for installation procedures.

## Natural Resources Conservation Service Caribbean Area

# Riparian Forest Buffer

## Conservation Practice Standard 391, Practice Specifications

### PLANTING IN THE RIGHT PLACE

When planting a riparian forest buffer, avoid overhead utility lines such as power and phone, and plant only small shrubs or trees (less than 15 feet high at maturity). Do not plant over or beside underground utilities such as sewer or potable water systems or pipelines. Plant only shrub species under overhead lines (see Figure 1).

The recommended distance for tree planting near overhead lines depends on the voltage of the electric line and the utility company's easement for the line(s). On average, for a 38 kv electric line (most common line) the distance to plant a tree should be between 25 feet to 50 feet, depending on mature tree height as shown in the table below:

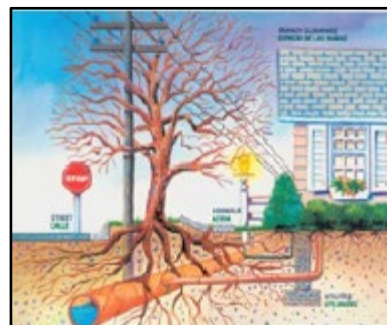


Figure 2.A Tree Planting Guide for Puerto Rico and other Caribbean Countries, USDA Forest Service.

Mature Tree Height (feet)	Recommended horizontal distance from power lines (feet)
15-30	25
30-50	50
>50	>50

Do not plant trees near houses, buildings or structures. In urban areas select the tree with correct root-growth pattern in order to avoid the tree from causing problems like cracking and heaving of curbs and sidewalks.

### Local Regulations for the Caribbean Area

According to PR DNER (*Reglamento Numero 7656 de la Junta de Calidad Ambiental: "Reglamento para el Control de los Desperdicios Fecales de Animales de Empresas Pecuarias"*), the established distance from the water body is 16.4 feet (5 meters) from the edge of the stream. For the USVI, according to DPNR (US Virgin Islands Code Title 12, Chapter 3. Trees and Vegetation Adjacent to Watercourses (§§ 121 — 125) the distance is 25 feet from the edge of the stream.

### SPECIES SELECTION AND SPACING

#### Species Selection

Table 1 in the Appendix includes the list of woody plant species (trees and shrubs) commonly associated with and suited to riparian areas. This table is a guide and not intended to exclude other species appropriate for riparian areas. Refer to Tree/Shrub Establishment (Code 612) for tree planting specifications. Ecological Life Zones are listed for each plant to assist with the selection

## Natural Resources Conservation Service Caribbean Area

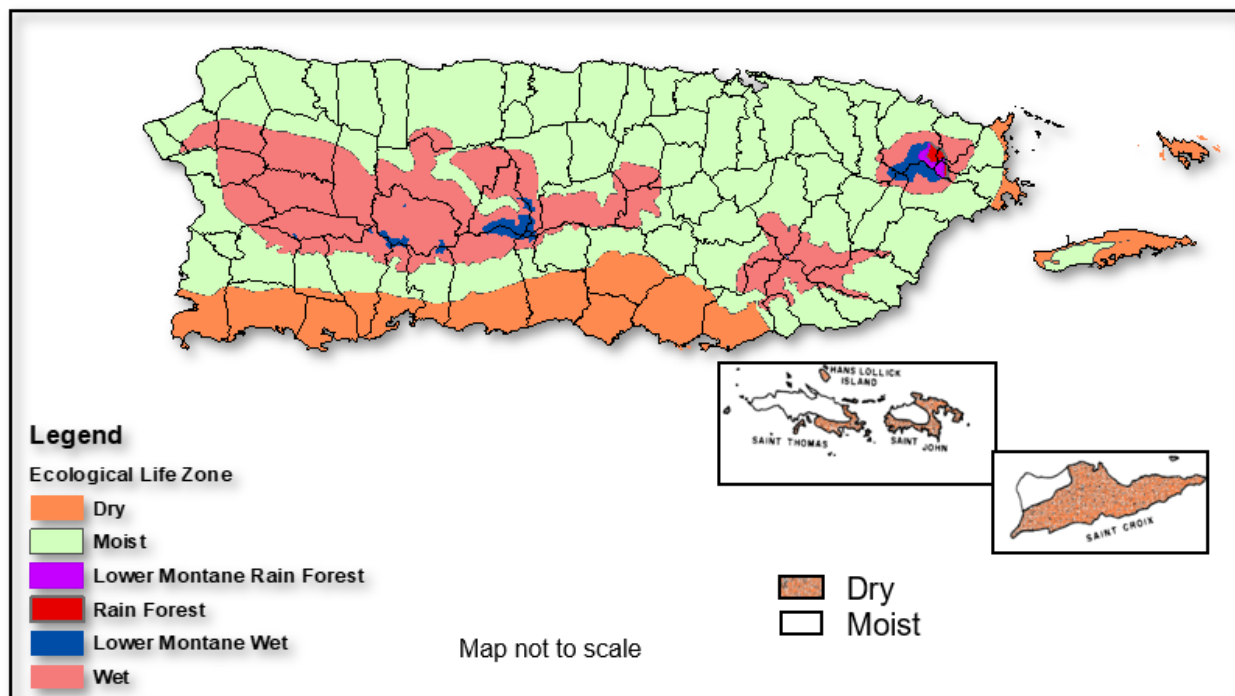
# Riparian Forest Buffer

## Conservation Practice Standard 391, Practice Specifications

and design process for establishing new buffers. Ecological life zones, described by Ewel & Withmore, 1973, for Puerto Rico and the U. S. Virgin Islands, are major climatic divisions and define the conditions for ecosystem functioning (see Figure 2).

Natural regeneration may be used to establish a buffer if the following conditions exist:

- There is an adequate natural seed source of desired species in adjacent areas,
- Site conditions are favorable for establishing the desired number and distribution of seedlings within a specified time period, and
- Noxious or invasive species are not likely to jeopardize the stand.



*Figure 3. PR and USVI Ecological Life Zone. Source: Ecological Life Zones for Puerto Rico and the U.S. Virgin Islands, Ewel & Whitmore, 1973.*

### Species Spacing

Potential mature height, canopy spread, trunk flare and root space are all important factors to consider before deciding the planting distance. Know what the tree will look like as it nears maturity. Heights may be estimated based on performance of the individual species (or comparable species) in nearby areas on similar sites. See Table 2 for density specifications.

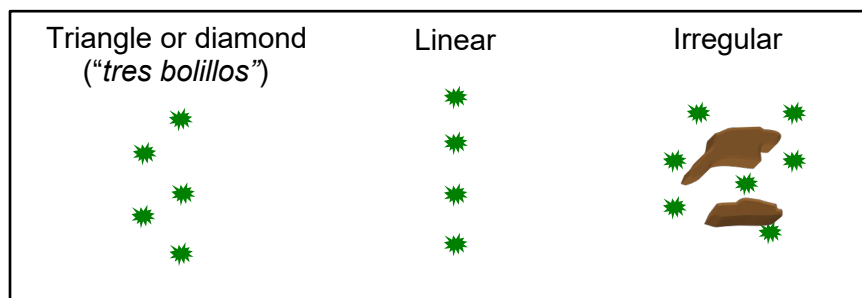


**Natural Resources  
Conservation Service  
Caribbean Area**

**Riparian Forest Buffer**  
Conservation Practice Standard 391, Practice Specifications

Table 2. Planting density specifications	
Plant Types/Typical Heights:	Plant-to-Plant Spacing:
Shrubs less than 10 feet	1.5 to 4 feet
Shrubs and trees from 10 to 40 feet	6 to 10 feet
Trees greater than 40 feet	10 to 18 feet

## BUFFER WIDTHS



*Figure 4. Planting pattern.*

There is wide variation in buffer widths, depending on desired function.

The minimum width to implement this conservation practice is 15 feet. However, to reduce excess amounts of sediment, organic material, nutrients and pesticides in surface runoff and reduce excess nutrients and other chemicals in shallow ground water flow, the minimum width must be at least 35 feet. This distance is measured horizontally on a line perpendicular to the water body beginning at the normal line, bank-full elevation, or the top of the bank as determined locally.

The landowner or participant can implement a wider buffer following the recommendations of the NRCS Field Office, the PR Department of Natural and Environmental Resources (PRDNER) or the USVI Department of Planning and Natural Resources (DPNR).

The riparian forest buffer is an area of vegetation adjacent to and up-gradient from watercourses or water bodies that begins at the top of the bank and extends land-ward a minimum of 15 feet. Trees and shrubs in buffers can be planted in a triangle or diamond (“tres bolillos”) pattern. All trees should be planted at the same distance from each other (see Figure 3).

Mature height, canopy spread, root space and planting patterns are all important factors to consider before deciding the planting distance between trees. Know what the tree will look like as

## Natural Resources Conservation Service Caribbean Area

## Riparian Forest Buffer

### Conservation Practice Standard 391, Practice Specifications

it reaches maturity. The distance between rows and trees defines the Tree Planting Pattern, such as triangle or diamond (“*tres bolillos*”), linear and irregular.

- **Triangle or diamond** (“*tres bolillos*”) pattern: vegetation is planted in zigzags; all individuals are the same distance from each other except for grasses, which can be planted closer.
- **Linear**: vegetation is planted in a linear design without any other outline; all individuals are the same distance from each other except for grasses, which can be planted closer.
- **Irregular**: used when obstacles such as rocks are present or when the landform does not provide for regular arrangement.

For natural appearance, plant trees in a random pattern complying with the minimum width. If shrub species are available, it is desirable to intercrop the trees with shrubs species to maximize the bare soil area coverage and increase the probability of success of the conservation practice.

### PROTECTION FROM LIVESTOCK

This practice shall be protected from livestock grazing and trampling to the extent necessary to ensure that it will perform the intended purpose(s). Use conservation practice Fence (Code 382) to protect riparian forest buffers. Generally, this occurs when this practice is planned to be implemented in pasturelands or where livestock such as goats, sheep, horses, cattle, etc. are present or can access the riparian area. The fence must be installed at least 6 feet from the riparian area to exclude animals (see Figure 4).

### SELECTION AND CARE OF PLANTING MATERIAL

Care in handling and planting of seeds, cuttings or seedlings will ensure that planted materials have an acceptable rate of survival.

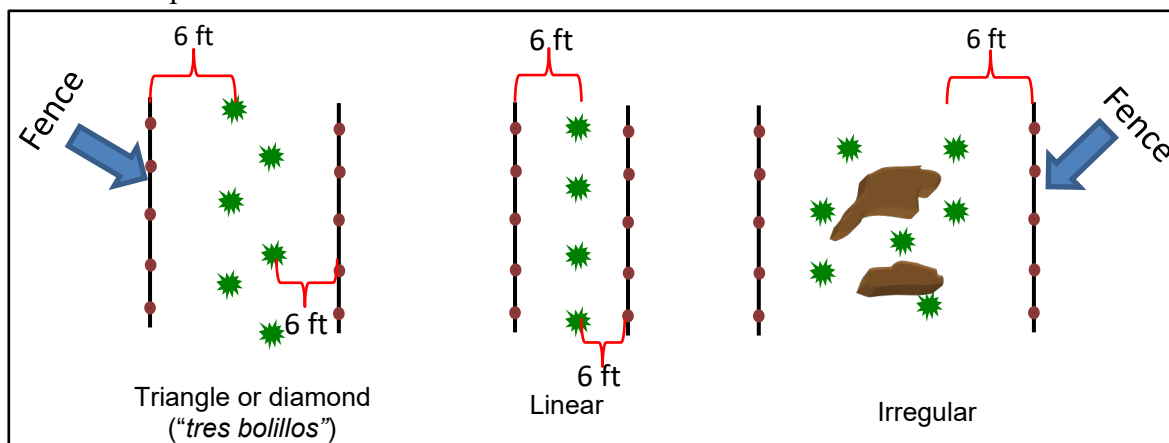


Figure 4. Distance recommended for the installation of a fence to protect vegetation from animals.



**Natural Resources  
Conservation Service  
Caribbean Area**

**Riparian Forest Buffer**  
Conservation Practice Standard 391, Practice Specifications

---

Only viable, high-quality and adapted planting stock or seed should be used. Do not plant trees that have scrapes on the bark.

Plant trees and shrubs that have a height between 2 and 4 feet and avoid planting material taller than the desirable size because it will decrease the survival rate.

Keep roots of planting stock moist at all times before planting. Cuttings may be rooted in pots or beds, and then transplanted. Unrooted cuttings may be planted directly depending on the species, available moisture and other conditions. Consider using a rooting hormone to enhance rooting percentage. If the roots are tangled or compacted, cut a portion of the roots with scissors or a sharp knife before planting.

## **PLANTING**

Considerations to choose the right planting sites:

- Soil type (drainage, fertility and texture);
- Periodic flooding;
- Amount of available sunlight;
- Existing plant competition; and
- Exposure/aspect/orientation of the terrain.

Selection of planting technique and timing will be appropriate for the site and soil conditions.

Planting should be done as early in the wet season as possible. Avoid planting on hot, windy days.

If individual planting holes are dug through sod or untilled ground, make them as large as practicable and clear a 3-4-foot diameter circle outside of the hole at the time of planting. Dig a planting hole that provides plenty of room for the roots. The hole's diameter should be 2 times the pot diameter and have the same depth.

Remove the tree from the container and always pick it up by the root ball, never by the trunk.

Place the tree in the hole at the same depth it grew in the nursery and make sure the trunk is straight (See Figure 5). All material (root ball out of the container) should be completely buried; exposed material will act as a wick, drawing water out of the planting hole.

Refill the hole with the same soil removed from the hole. Settle the soil by watering as you refill the hole with soil to eliminate air pockets. Do not place soil on top of the root ball and stamp earth firmly above the root zone.

Mound up soil 6 inches high, 2 feet out from the trunk to form a ring or basin to hold water. This

## Natural Resources Conservation Service Caribbean Area

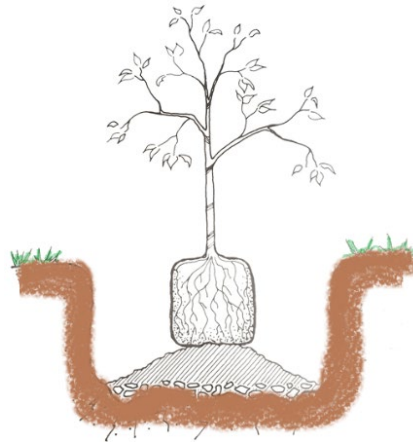
# Riparian Forest Buffer

## Conservation Practice Standard 391, Practice Specifications

will keep the water where it is needed instead of running off the surface.

Place a 3-inch layer of mulch around each tree to prevent water loss. Consider applying the practice Mulching (Code 484), if appropriate.

Stake newly planted trees **only if needed**. Trees usually do better if they can become established without staking, but in many cases, trees need staking to protect the trunk from equipment, to anchor the root system against the wind, or to support a limber trunk in an upright position. Place one or two 2x2 wooden stakes and keep them as short as possible, but long enough so the tree stands up right. Tie the tree at only one level. The trunk and branches should not be allowed to rub against stakes. Use an old garden hose with wire running through it, nylon bands or other nonabrasive material, and wrap loose enough to allow for trunk growth. Use stakes for the shortest possible time (usually one year).



*Figure 5. Image adapted from: “Árboles para uso urbano en Puerto Rico e Islas Vírgenes”, USDA Forest Service. General Technical Report SO-57. December 1985. (Correct position or way to plant a tree/shrub.)*

## OPERATION AND MAINTENANCE

Continuous maintenance of young trees, shrubs and grasses is key for vegetation survival and health. Plants will be maintained by different methods, depending on type, until maturity. Monitor vegetation establishment for at least 6 months to ensure survival.

Competing vegetation must be controlled until the riparian forest buffer becomes established. Control should continue beyond the establishment period, if necessary.

Supplemental planting may be required when survival is too low to produce a continuous riparian area.





**Natural Resources  
Conservation Service  
Caribbean Area**

**Riparian Forest Buffer**  
Conservation Practice Standard 391, Practice Specifications

---

**Watering**

Watering is the key for plant survival. Learn your vegetation's water requirements to determine the frequency of watering. Water each tree thoroughly at planting and every two days during dry periods. Once the tree, shrub or grass is established, watering the vegetation every week will be enough. Remember, water thoroughly and more frequently during warm days and drought season. Water deeply to promote healthy root development. Keep watering during the next 6 months after planting, if necessary.

**Fertilizing and treatment of pests and diseases**

Fertilizing is the answer to nutrient deficiencies. Fertilizer application is based on a soil test and the practice Nutrient Management (Code 590). If you notice that your tree's leaves are yellow, its development is slow, or a pest or disease is affecting the tree, consult PRDNER, DPNR, an Extension Service Specialist or NRCS field office.

**FREQUENTLY ASKED QUESTIONS**

***1. What species are recommended to plant in a Riparian Forest Buffer?***

Table 1 lists the recommended species to plant in a Riparian Area.

***2. Can Riparian Forest Buffers be implemented in cropland or in pasturelands?***

Riparian Forest Buffers can be implemented in the following land uses: croplands, forestlands, pasturelands, protected lands, farmsteads, developed and associated agricultural lands.

***3. Can a Riparian Forest Buffer be planned on the boundary of a property?***

Yes.

***4. Do I need to protect the Riparian Forest Buffer from livestock and wildlife? How I can protect it?***

Yes, a fence must be installed to protect a Riparian Area from livestock.

***5. Can I plant shrubs in a Riparian Forest Buffer?***

Yes, shrubs should be planted in conjunction with trees if available.

***6. What is the minimum width for a Riparian Forest Buffer?***

The minimum width for Riparian Area is 15 feet. This can be achieved by planting a single line of trees with fences installed on both sides at a 6-foot distance from the trees and shrubs. The preferred planting pattern is "Tres bolillos," but depends on the landowner's objectives.

***7. Does this practice require pruning?***

No, pruning is not typically necessary for a Riparian Forest Buffer.



**Natural Resources  
Conservation Service  
Caribbean Area**

**Riparian Forest Buffer**  
Conservation Practice Standard 391, Practice Specifications

---

***8. What other practices are recommended to plan with a Riparian Forest Buffer?***

**Associated Practices**

Some conservation practices may be applied alone and others in combination with other supporting Caribbean Area conservation practices.

The following practice is required where livestock are present:

- Fence (382)

The following practices are recommended:

- Tree/Shrub Pruning (660)
- Tree/Shrub Site Preparation (490)
- Upland Wildlife Habitat Management (645)

***9. What are the distances established by local government regulations for PR and USVI to establish this practice adjacent to a water body?***

According to PR DNER (*Reglamento Número 7656 de la Junta de Calidad Ambiental: “Reglamento para el Control de los Desperdicios Fecales de Animales de Empresas Pecuarias”*), the established distance from the water body is 16.4 feet (5 meters) from the edge of the stream. For the USVI, according to DPNR (US Virgin Islands Code Title 12, Chapter 3. Trees and Vegetation Adjacent to Watercourses (§§ 121 — 125), the distance is 25 feet from the edge of the stream.



**Natural Resources  
Conservation Service  
Caribbean Area**

**Riparian Forest Buffer**  
Conservation Practice Standard 391, Practice Specifications

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**REFERENCES**

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11. Something to grow on; <http://www.ag.auburn.edu>.
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## Natural Resources Conservation Service Caribbean Area

## Riparian Forest Buffer

Conservation Practice Standard 391, Practice Specifications

### APPENDIX:

Table 1. Recommended species for Riparian Forest Buffers (Code 391) for each life zone in the Caribbean Area

Scientific	Spanish	English	Subtropical Lower Montane Wet Forest	Subtropical Wet Forest		Subtropical Moist Forest				Subtropical Dry Forest	
			Volcanic	Moist Serpentine	Volcanic	Sedimentary Moist Volcanic	Limestone	Moist Alluvial	Ultramaphic	Dry Alluvial	Volcanic limestone
<i>Acrocomia aculeata</i>	Palma de corozo										
<i>Aiphanes minima</i>	Palma de Coyo	Coyure ruffle palm					x	x			
<i>Alchornea latifolia</i>	Achiotillo	Dove-wood	x	x	x	x	x	x			
<i>Andira inermis</i>	Moca	Cabbege angelin		x	x	x	x	x	x	x	x
<i>Annona glabra</i>	Corazón cimarrón										
<i>Avicenia germinans</i>	Mangle negro	Black mangrove						x		x	
<i>Bourreria succulenta</i>	Palo de vaca										
<i>Buchenavia tetraphylla</i>	Granadillo	Yellow olivier			x		x				
<i>Terminaliabuceras</i>	Ucar	Black-olive / Gre Gre		x		x	x	x	x	x	x
<i>Bursera simaruba</i>	Almácigo	Turpentine-tree		x		x	x	x	x	x	x
<i>Byrsonima lucida</i>											
<i>Byrsonima spicata</i>	Maricao	Hogberry	x	x	x	x	x		x		
<i>Calophyllum antillanum</i>	Maria	Santa-maria / Galba		x	x	x	x	x			
<i>Calyptanthes sintenisii</i>	Limoncillo de monte										
<i>Calyptanthes krugii</i>	Limoncillo										
<i>*Casearia arborea</i>	*Rabo de Ratón	*Casearia		x		x	x	x			
<i>Casearia decandra</i>	Tostado	Wild honey-tree	x		x	x	x	x			
<i>Casearia guianensis</i>	Cafeillo / Palo Blanco	Wild-coffee		x	x	x	x				x
<i>Casearia sylvestris</i>	Cafeillo	Wild-coffee		x	x	x	x	x	x	x	x
<i>Cedrela odorata</i>	Cedro Hembra	Spanish cedar	x	x	x	x	x	x	x	x	x

**\*Species not native to the USVI. Species with (\*) are not recommended to plant in USVI.**



# Natural Resources Conservation Service Caribbean Area

# Riparian Forest Buffer

Conservation Practice Standard 391, Practice Specifications

Scientific	Spanish	English	Subtropical Lower Montane Wet Forest	Subtropical Wet Forest		Subtropical Moist Forest				Subtropical Dry Forest	
			Volcanic	Moist Serpentine	Volcanic	Sedimentary Moist Volcanic	Limestone	Moist Alluvial	Ultramaphic	Dry Alluvial	Volcanic limestone
<i>Ceiba pentandra</i>	Ceiba	Silk-cotton tree		x		x	x	x	x	x	x
<i>Chrysobalanus icaco</i>	icaco	Coco Plum									
<i>Chrysophyllum argenteum</i>	Lechecillo	Milky-iron	x	x	x	x	x	x			
<i>Chrysophyllum cainito</i>	Caimito	Star-apple	x	x	x	x	x	x	x	x	x
<i>Chrysophyllum oliviforme</i>	Caimito de perro										
<i>Citharexylum caudatum</i>	Péndula de sierra										
<i>Citharexylum fruticosum</i>	Péndula	Pasture fiddlewood					x	x	x	x	x
<i>Clusia rosea</i>	Cupey	Wild-mammee	x	x	x	x	x	x	x	x	x
<i>*Coccoloba pubescens</i>	*Moralón	*Leather-coat tree		x			x	x		x	
<i>Coccoloba rugosa</i>	Ortegón	Tie-tongue				x				x	
<i>Coccoloba sintenisii</i>	Uvero de monte										
<i>Cojoba arborea</i>	Cojoba			x			x	x	x	x	
<i>Colubrina arborescens</i>	Abeyuelo										
<i>Conocarpus erectus</i>	Mangle Botón	Buttonwood					x	x		x	
<i>Cordia alliodora</i>	Capá Prieto	Onion cordia	x	x	x	x	x	x	x	x	x
<i>Cordia borinquensis</i>	Capá cimarrón, Muñeco										
<i>Cordia laevigata</i>	Capa Colorado	Red manjack				x	x	x	x	x	x
<i>Cordia sulcata</i>	Moral	White manjack	x	x	x	x	x	x			
<i>Cupania americana</i>	Guara	Candlewood-tree		x	x	x	x	x			
<i>Cyrilla racemiflora</i>	Palo Colorado	Swamp cyrilla	x		x	x	x	x	x		
<i>Dacryodes excelsa</i>	Tabonuco	Candlewood			x	x					
<i>Dendropanax arboreus</i>	Pollo	Galipee	x	x	x	x	x	x			
<i>Erythroxylum areolatum</i>	Indio										
<i>Eugenia biflora</i>	Hoja menuda	Stopper		x		x	x	x			
<i>Eugenia domingensis</i>	Guasábara										
<i>Eugenia monticola</i>	Birigi, Hoja menuda										
<i>Faramea occidentalis</i>	Café Cimarron	False-coffee	x	x	x	x	x	x			x
<i>Garcinia portoricensis</i>	Palo de cruz										

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## Natural Resources Conservation Service Caribbean Area

## Riparian Forest Buffer

Conservation Practice Standard 391, Practice Specifications

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<i>Genipa americana</i>	Jagua	Genipa		x	x	x	x	x			
<i>Guapira fragans</i>	Corcho	Black mampoo		x			x	x		x	x
<i>Guarea glabra</i>	Guaraguaillo										
<i>Guarea guidonia</i>	Guaraguao	American muskwood		x		x	x	x			
<i>Guazuma ulmifolia</i>	Guacima	Jacocalalu		x	x	x	x	x	x	x	x
<i>Hieronyma clusioides</i>	Cedro macho		x	x	x	x	x	x			
<i>Homalium racemosum</i>	Caracolillo	Acoma		x	x	x	x	x	x		
<i>Hymanaea courbaril</i>	Algarrobo	West Indian locust	x	x	x	x	x	x	x	x	x
<i>*Inga laurina</i>	*Guama	*Sweetpea	x	x	x	x	x	x		x	
<i>Inga vera</i>	Guaba	White sweetpea	x	x	x	x	x	x			
<i>Laguncularia racemosa</i>	Mangle blanco	White mangrove					x	x		x	
<i>Licaria triandra</i>	Palo de misanteco										
<i>*Lonchocarpus heptaphyllus</i>	*Retama	*Lancewood		x	x	x	x	x		x	
<i>Magnolia splendens</i>	Laurel Sabino	Magnolia	x		x						
<i>Manilkara bidentata</i>	Ausubo	Balata	x	x	x	x	x	x			
<i>Manilkara pleeana</i>	Zapote de costa, Mameyuelo										
<i>Miconia impetioilaris</i>	Camasey de costilla										
<i>Miconia racemosa</i>	Camasey de felpa		x	x	x	x	x	x			
<i>Miconia sintenisii</i>	Camasey		x	x	x	x	x	x			
<i>Miconia tetrandra</i>	Camasey										
	Camasey	Camasey	x	x	x	x	x	x			
<i>Miconia* prasina</i>	Camasey blanco	Sardine	x	x	x	x	x	x			
<i>Micropholis garciinifolia</i>	Caimitillo verde										
<i>Micropholis guyanensis</i>	Caimitillo Leche prieta										
<i>*Thespesia grandiflora</i>	*Maga	*Purple haiti-haiti		x		x	x	x			
<i>Myrcia splendens</i>	Hoja menuda	Punchberry	x	x	x	x	x				

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## Natural Resources Conservation Service Caribbean Area

## Riparian Forest Buffer

Conservation Practice Standard 391, Practice Specifications

Scientific	Español	English	Subtropical Lower Montane Wet Forest	Subtropical Wet Forest		Subtropical Moist Forest				Subtropical Dry Forest	
			Volcanic	Moist Serpentine	Volcanic	Sedimentary Moist Volcanic	Limestone	Moist Alluvial	Ultramaphic	Dry Alluvial	Volcanic limestone
<i>Nectandra coriacea</i>	Laurel avispillo	Jamaican nectandra		x		x	x	x		x	x
<i>Ocotea floribunda</i>	Laurel Espada	Black sweet-wood	x		x		x	x			
<i>Ocotea leucoxylon</i>	Laurel Geo	Loblolly sweet-wood	x	x	x	x	x	x			
<i>Petita domingensis</i>	Capa Blanco	Petita		x		x	x	x	x	x	
<i>Phlebotaenia cowellii</i>	Árbol de violeta, Violeta										
<i>Picramnia pentandra</i>	Guarema										
<i>Pilocarpus racemosus</i>	Acetillo	Palu-cayente		x			x	x	x	x	x
<i>Pimenta racemosa</i>	Malagueta	Bay-rum-tree					x	x	x	x	x
<i>Pisonia subcordata</i>	Corcho blanco										
<i>Poitea florida</i>	Retama San José										
<i>Phlebotaenia cowellii</i>	Violeta	Violet tree			x	x	x	x	x	x	x
<i>Prestoea acuminata</i>	Palma de Sierra	Sierra palm	x		x	x					
<i>Pterocarpus officinalis</i>	Palo de Pollo	Swamp bloodwood		x	x	x	x	x	x		
<i>Quararibaea turbinata</i>	Garrocho	Sweizzle-stick tree	x	x	x	x	x	x			
<i>Rhizophora mangle</i>	Mangle rojo	Red mangrove						x		x	
<i>Roystonea borinquena</i>	Palma Real	Royal palm		x			x	x			
<i>Schaefferia frutescens</i>	Cafeillo, Jiba										
<i>Sideroxylon foetidissimum</i>	Tortugo amarillo										
<i>Sideroxylon salicifolium</i>	Sanguinaria										
<i>Simarouba tulae</i>	Acetillo falso o cimarrón										
<i>Sloanea berteriana</i>	Motillo										
<i>Spondias mombin</i>	Jobillo	Yellow mombin / Hog Plum		x			x	x		x	
<i>Tabebuia heterophylla</i>	Roble Blanco	Pink manjack Pink Cedar		x		x	x	x	x	x	x
<i>Tetragastris balsamifera</i>	Masa	Gommier		x	x	x	x	x	x		

**\*Species not native to the USVI. Species with (\*) are not recommended to plant in USVI.**



## Natural Resources Conservation Service Caribbean Area

## Riparian Forest Buffer

Conservation Practice Standard 391, Practice Specifications

Scientific	Español	English	Subtropical Lower Montane Wet Forest	Subtropical Wet Forest		Subtropical Moist Forest				Subtropical Dry Forest	
			Volcanic	Moist Serpentine	Volcanic	Sedimentary Moist Volcanic	Limestone	Moist Alluvial	Ultramaphic	Dry Alluvial	Volcanic limestone
<i>*Thespesia grandiflora</i>	*Maga	Purple haiti-haiti		x		x	x	x			
<i>*Thouinia portoricensis</i>	*Serrasuela /Ceboruquill									x	x
<i>Trema micrantha</i>	Guacimilla	Florida trema	x	x	x	x	x	x			
<i>Vitex divaricata</i>	Higuerillo	White fiddlewood		x		x	x	x	x	x	x
<i>Zanthoxylum flavum</i>	Aceitillo	Yellow-sanders/Satinwood	x	x	x	x	x	x	x	x	x
<i>Zanthoxylum martinicense</i>	Espino Rubial	White-prickle	x	x	x	x	x	x			
<i>Zanthoxylum monophyllum</i>	Palo rubio, Espino rubial										

### Additional information related to recommended species provided above:

Species availability for Caribbean Area will be subject to commercial and private nurseries stock inventory. Please check with nurseries before making a recommendation for a specific species.

The recommended trees and shrubs provided in the lists above are not exclusive. Other native trees and shrubs could be considered. Consult with NRCS for further guidance.

Some species from the above table (“*Recommended tree species for Riparian Forest Buffer for each Ecological Life Zone in the Caribbean Area*”) do not show the Ecological Life Zone due to the lack of information at the moment of developing this document. Consult with NRCS for further guidance if needed.

The number of native shrubs species recommended in this document is low because the Agency and partners are working on a comprehensive list of native shrubs to be recommended by conservation practices. An updated version of the table provided above will be available when the comprehensive list of native shrubs is finished.



## Natural Resources Conservation Service Caribbean Area

## Riparian Forest Buffer

Conservation Practice Standard 391, Practice Specifications

### Important note for US Virgin Islands:

*Genipa americana* is only found on St. Thomas and St. John and is not very common. Do not use this species on St. Croix.

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**Additional note:** Species availability for Caribbean Area will be subject to commercial and private nurseries stock inventory. Please check with nurseries before making a recommendation for a specific species.