

Caribbean National Forest* National Wild and Scenic Rivers Environmental Assessment

*Name of Forest changed to El Yunque National Forest in March 2007



Comprehensive River Management Plan

CNF Land and Resource Management Plan Amendment 3

United States
Department of
Agriculture

Southern Region
Forest Service

El Yunque
National Forest

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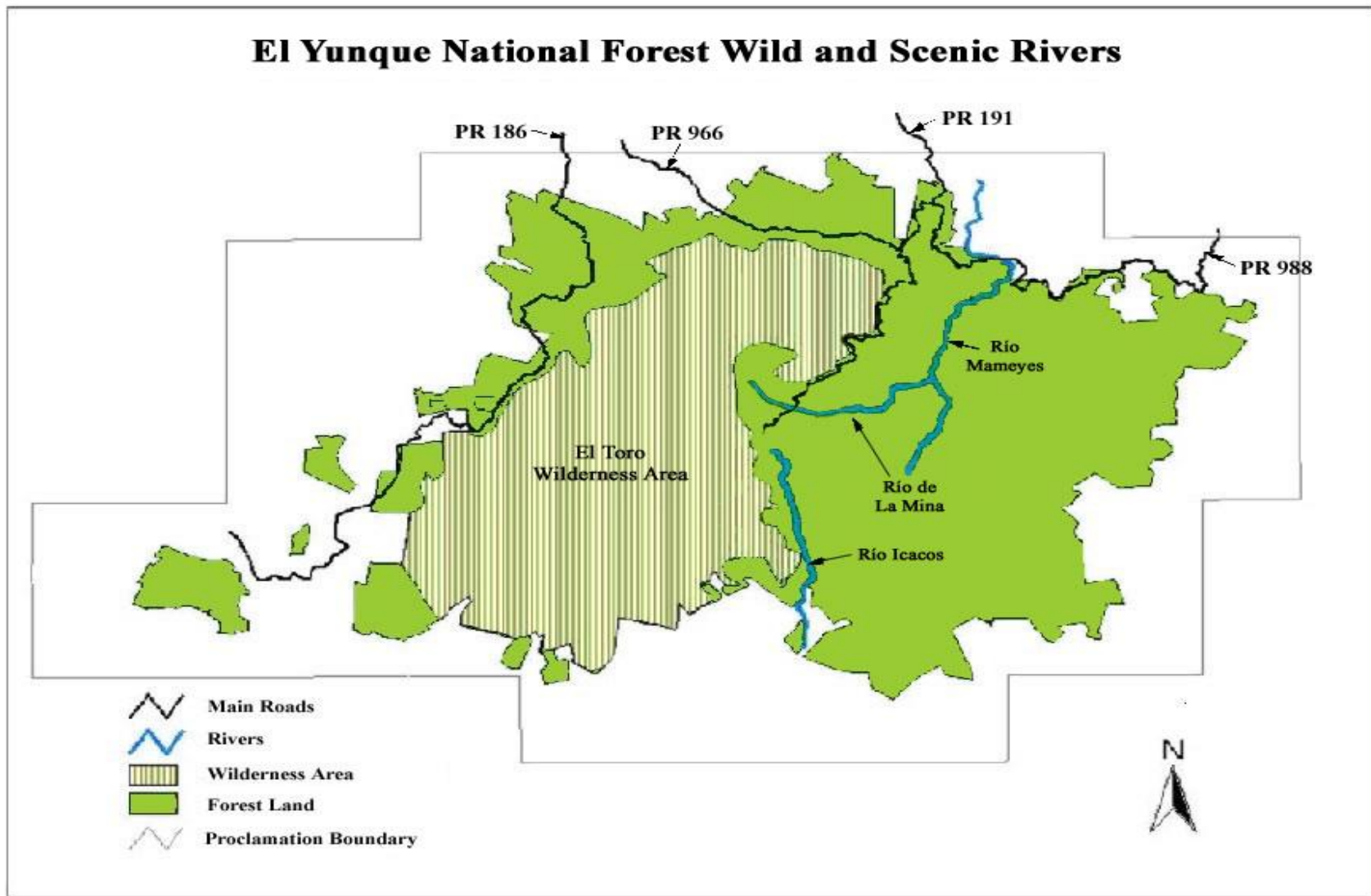
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Map 1. CNF Wild and Scenic River Corridor Map

Chapter 1: Purpose and Need for Action

Introduction

Congress designated portions of the Rio Mameyes, Rio de la Mina and Rio Icacos as National Wild & Scenic Rivers (NWSR) through the Caribbean National Forest (CNF) Wild and Scenic Rivers Act of 2002 (P.L. 107- 563 December 19, 2002). These rivers were added to the National Wild and Scenic River System under the authority of the Wild and Scenic River Act of 1968. This Act was passed “to select rivers of the Nation which possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar value, and to protect these values and the rivers in a free-flowing condition.”

This environmental assessment documents the analysis used to develop the required Comprehensive River Management Plan (CRMP) which outlines the direction intended to protect and enhance CNF Wild and Scenic River values and protect its free-flowing condition. This environmental assessment also amends the specific management direction for the three rivers from the CRMP into the Caribbean National Forest Land and Resource Management Plan (LRMP), which was approved in 1997.

The area being analyzed encompasses approximately 2,848 acres which are publicly owned and under the administration of the USDA Forest Service. The alternatives analyzed in this environmental assessment address the direction for management actions occurring on National Forest system lands.

Proposed Action

The proposed action is to approve the CRMP for the Wild and Scenic Rivers on the CNF and to amend the CNF's LRMP, incorporating the management direction presented in Alternative 2. The following is a general description of the proposed direction. A more detailed description of the direction can be found in Chapter 2, Alternatives.

All Segments

A variety of recreation opportunities are provided throughout the watershed. These activities will be dispersed as much as possible in order to alleviate potential overcrowding or use conflicts. Access points such as trailheads and parking lots are strategically located in the corridor and watershed to aid in the dispersal of recreation use. Interpretation of the Outstandingly Remarkable Values of the river's will be available in various forms to the public from low-key, off-site interpretive materials and technologies to interpretive displays and signs at appropriate locations. No type of watercraft or inflatable water play items will be allowed on any of the rivers.

Wild Segment

Management of the wild segment of the Rio Mameyes corridor will focus on protecting and preserving natural processes with minimal human influences. Access to the area is limited to Forest Service Road #27 (East Peak Road) which is outside of the Rio Mameyes corridor.

Scenic Segment

Management of the scenic segment of the Rio de la Mina and Rio Icacos corridors will be focused on maintaining and enhancing the near-natural environment. The riverbanks will be largely dispersed and

primitive and are accessible in places by trails or roads. Recreation management will be designed to provide a natural-appearing setting with limited improvements.

Recreational Segment

Management of the recreational segment of the Rio de la Mina and Rio Mameyes corridors will be focused on providing natural-appearing or culturally-influenced settings. The river may be readily accessible by trails and roads. Recreational activity will be established to protect the resource and complement the setting. Certain recreation controls will be implemented related to capacity and activities.

Purpose and Need for the Proposed Action

The purpose of this project is to fulfill the requirements of Section 3(d)(1) of the Wild and Scenic Rivers Act (WSRA) that states that “the Federal agency charged with the administration of each component of the National Wild and Scenic Rivers System shall prepare a comprehensive management plan to provide for the protection of river values. The plan shall address resource protection, development of lands and facilities and other management practices necessary or desirable to achieve the purposes of this Act. The plan shall be prepared, after consultation with State and local governments and the interested public within three full fiscal years after the designation.”

Decision to Be Made

Given the purpose and need, the Responsible Official (Forest Supervisor) will review the proposed action and the other alternatives in order to make the following decision:

- Select the No-action Alternative (deferring action); or
- Select an action alternative; or
- Select a modified action alternative.

Should a decision be made to select an action alternative or a modification of an action alternative, the actions would be documented in the Comprehensive River Management Plan and used to amend to the Caribbean National Forests Land and Resource Management Plan.

Summary of the Planning Context

The National Forest Management Act of 1976 requires the preparation of Forest Plans to direct management of each National Forest. The Caribbean National Forests Land and Resource Management Plan (Forest Plan) is the guiding document for National Forests lands located in northeastern Puerto Rico. The Forest Plan outlines Forest-wide direction and specific direction for Management Areas, portions of the Forest assigned similar management goals and objectives. The primary Forest Plan direction for the river corridors is included in the Forest-wide direction and Management Area 9 (Scenic and Recreation River Corridors) direction.

The Forest Plan will be amended as necessary to incorporate any new management direction that is identified as a part of the river management planning process.

Public Involvement

The Caribbean National Forest began the CRMP process on April 11, 2005, when a letter was mailed to approximately 100 individuals and/or organizations, soliciting comments concerning the development of the CRMP. This same information was used to develop a news release that was sent to area newspapers and posted on the CNF website, www.fs.fed.us/r8/caribbean.

The Forest received 7 written responses representing a variety of interests. Responses to the CRMP process were mostly supportive. See **Appendix B**

Issues

The following issues were identified by the public, the Forest Service, and other agencies through outreach efforts during the past year. The response to these issues will be evaluated in Chapter 3 – Environmental Consequences. During the process, major issues were identified as follows:

1. How to protect and enhance the Scenic, Recreational, Fish and Wildlife, Botanical, Historic and Cultural Values and resources of the River Corridors?
2. How to protect and enhance the free-flowing condition in the corridors?
3. How to protect and maintain water quality of wild and scenic rivers?
4. There were concerns related to types and distribution of recreational opportunities and activities allowed in the corridor.

Chapter 2: Alternatives

This section describes the alternatives the Forest Service considered. It also addresses the alternatives' effects on the issues introduced in Chapter 1.

Range of Alternatives

The range of alternatives developed and analyzed by the interdisciplinary team was driven by the purpose and need underlying the proposed action, and by the major issues responding to the proposed action. The alternatives are based on varying degrees of direction in the Forest Plan's guidelines, objectives and standards that will protect the Outstandingly Remarkable Values of Rio Mameyes, Rio de la Mina and Rio Icacos.

Alternative 1 (No Change in Management Direction)

This alternative allows for the application of the existing goals, standards, and guidelines that are present in the Caribbean National Forests Land and Resources Management Plan to the Wild and Scenic Rivers. The direction for Management Area 9 (Scenic and Recreation River Corridors) and for Wild and Scenic Rivers Management Direction would remain unchanged. The corridor boundary would be located approximately ¼ mile from the banks of the streams.

Pages 4-47 to 4-50 of the 1997 Revised Land and Resource Management Plan for the Caribbean National Forest state:

Wild and Scenic Rivers (Forest Wide Management Direction)

Desired Future Condition River segments recommended for designation as Wild, Scenic or Recreation have been formally designated by Congress. Management plans which emphasize protection of the rivers and their outstandingly remarkable values are developed and implemented.

Goals Manage recommended river segments to preserve their outstanding remarkable values that make them eligible. (See also Management Area 9)

Table 4-3. Wild, Scenic and Recreation River Recommendations

River	Classifications	Length Miles
Río Mameyes	Wild	2.1 miles
	Scenic	1.4 miles
	Recreation	0.9 miles
Río La Mina	Scenic	1.2 miles
	Recreation	0.9 miles
Río Icacos	Scenic	2.3 miles

Manage these rivers in such a manner as to protect and enhance the values for which they were found eligible for designation.

Wild segments will be kept free of impoundments, accessible only by trail. Maintain shorelines in an essentially primitive condition (free of structures and modifications of the waterway such as rip-rapping and channelization). Maintain current water quality.

Scenic segments will remain free of impoundments, have largely primitive shorelines, and be accessible only at certain points by roads.

Recreation segments may be paralleled by roads, have some development along shorelines, and have low intensity impoundments or diversion works, provided the waterway and its surroundings are generally natural in appearance.

Standards and Guidelines

- S 1. Develop management plans with specific management requirements for designated rivers after designation. Pattern specific directions after the generic management direction in Chapter 8.2 of the Land and Resource Management Planning Handbook (FSH 1902.12). Pending designation and the subsequent development of a river management plan(s), the following management direction will be implemented to ensure protection of the qualities that make the rivers eligible.

Wild Rivers

Timber

- S 1. Cutting of trees is not permitted except when needed in association with a primitive recreation experience (such as clearing for trails and protection of users) or to protect the environment (such as control of fire).

Water Supply

- S 2. All water supply dams and diversions are prohibited.

Hydroelectric

- S 3. No development of hydroelectric power facilities is permitted.

Power

Flood and Erosion Control

- S 4. No flood control dams, levees, or erosion control work is allowed.

Road Construction

- S 5. No roads or other provisions for overland motorized travel are permitted within 1/4 mile of the riverbank.

Recreation

Development

- S 6. Major public-use areas, such as large picnic areas, interpretive centers, or administrative headquarters are located outside the Wild Rivers area. Recreation developments are limited to trails and unobtrusive bridges and signs, and improvements necessary for resource protection.

Structures

- S 7. A few existing structures could be allowed assuming such structures are not incompatible with the essentially primitive and natural values of the river and its corridor. New structures are not allowed except in rare instances to achieve management objectives (e.g. structures and activities associated with fisheries enhancement programs could be allowed).

Scenic Rivers

<i>Timber</i>	S 1.	Timber demonstration is located at least 1/4 mile away from rivers suitable for Scenic River designation. Vegetation treatments for wildlife habitat improvement is allowed provided that such practices are carried on in such a way that there is not substantial adverse effect on the river and its immediate environment. The river should be maintained in its near natural environment.
<i>Water Supply</i>	S 2.	All water supply dams and major diversions, that would have a direct and adverse effect on the values for which the river area is included in the National System, are prohibited. Modest diversions are allowed only if there would be no direct and adverse effect on river values.
<i>Hydroelectric Power</i>	S 3.	No development of hydroelectric power facilities is allowed.
<i>Flood and Erosion Control</i>	S 4.	Flood control dams and levees are prohibited. Erosion control treatments can be implemented if they do not detract from river values.
<i>Road Construction</i>	S 5.	Roads should generally not be visible from the rivers suitable for Scenic River designation. No new road construction is permitted within 1/4 miles of such rivers.
<i>Recreation Development</i>	S 6.	Larger scale public use facilities, such as large picnic areas, public information centers, and administrative headquarters are well screened from rivers suitable for Scenic River designation. Modest and unobtrusive recreation facilities are permitted.
<i>Structures</i>	S 7.	New structures that would have a direct and adverse effect on river values are not allowed.

Recreation Rivers

<i>Timber</i>	S 1.	Timber demonstration is located at least 1/4 mile from rivers suitable for Recreation River Designation. Vegetation treatments for wildlife habitat improvement are allowed provided that such practices are carried on in such a way that there is not substantial adverse effect on the river and its immediate environment. Woody debris is allowed to remain along the river bed and its banks.
<i>Water Supply</i>	S 2.	Low dams, diversion works, rip rap, and other minor structures are allowed provided the waterway remains generally natural in appearance.
<i>Hydroelectric Power</i>	S 3.	No development of hydroelectric power facilities is allowed.
<i>Flood and Erosion Control</i>	S 4.	Flood control dams and levees are prohibited. Erosion control treatments can be implemented if they do not detract from river values.
<i>Road Construction</i>	S 5.	Paralleling roads could occur on one side of the river. There can be several bridges crossings and numerous river access points. New road construction is limited to access and parking for developed recreation sites.

<i>Recreation Development Structures</i>	S 6.	Picnic areas and trails constructed may be in close proximity to the river.
	S 7.	New structures are allowed for recreation use.

Page 4-104 of the Revised Land and Resource Management Plan for the Caribbean National Forest states:

Management Area 9 – Wild, Scenic and Recreation River Corridors

Desired Future Condition This management area is established to provide increased protection for river segments recommended for Wild, Scenic or Recreation River designation, where these rivers are outside other highly protective management areas (Wilderness and Research Natural Areas).
 These rivers and their corridors continue to exhibit the outstandingly remarkable characteristics that made them eligible for Scenic or Recreation River designation.

Goals

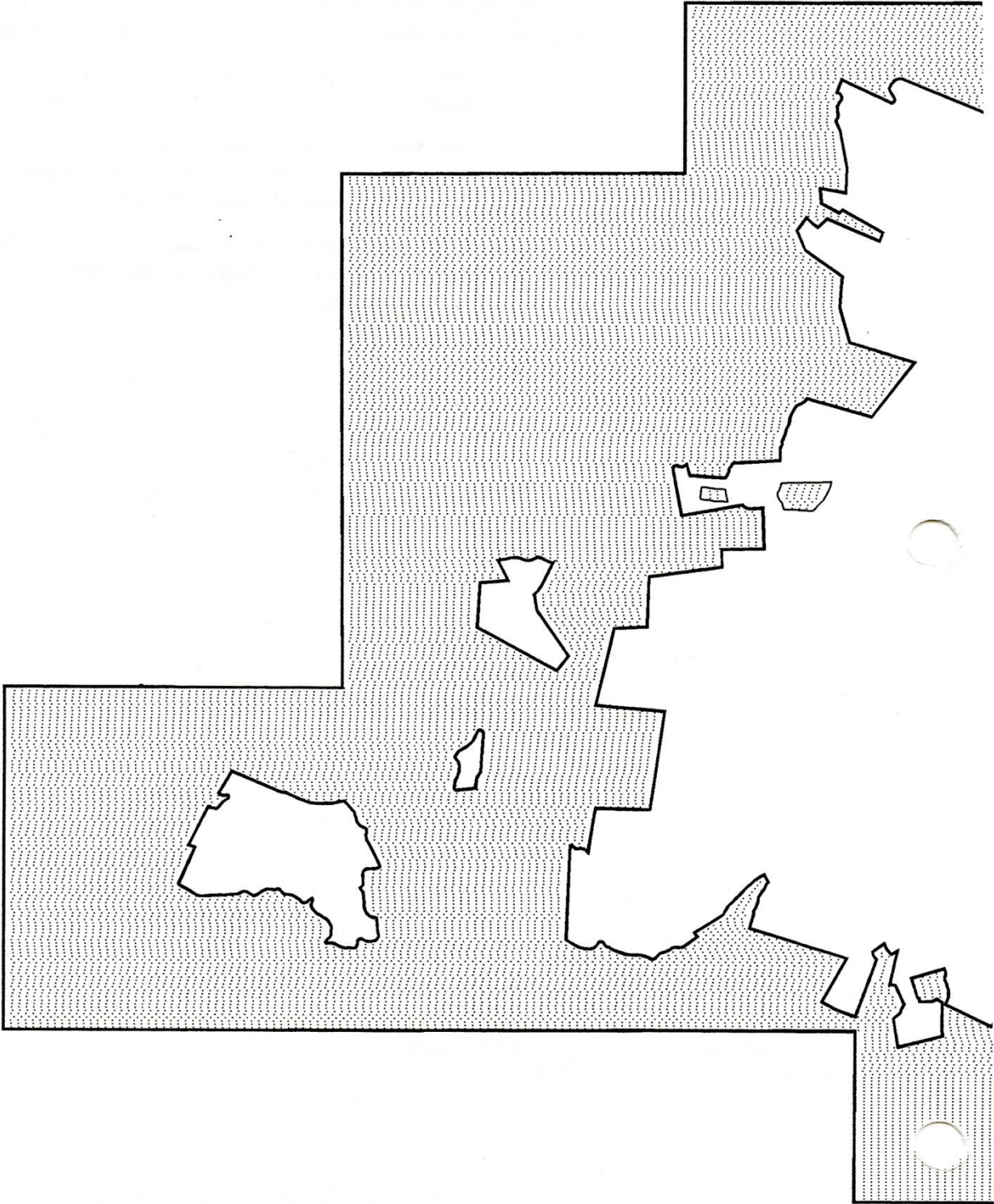
The Río Icacos remains free of impoundments above the existing hydroelectric facilities. Improve water quality of the Icacos by reducing sedimentation from landslides and PR 191.

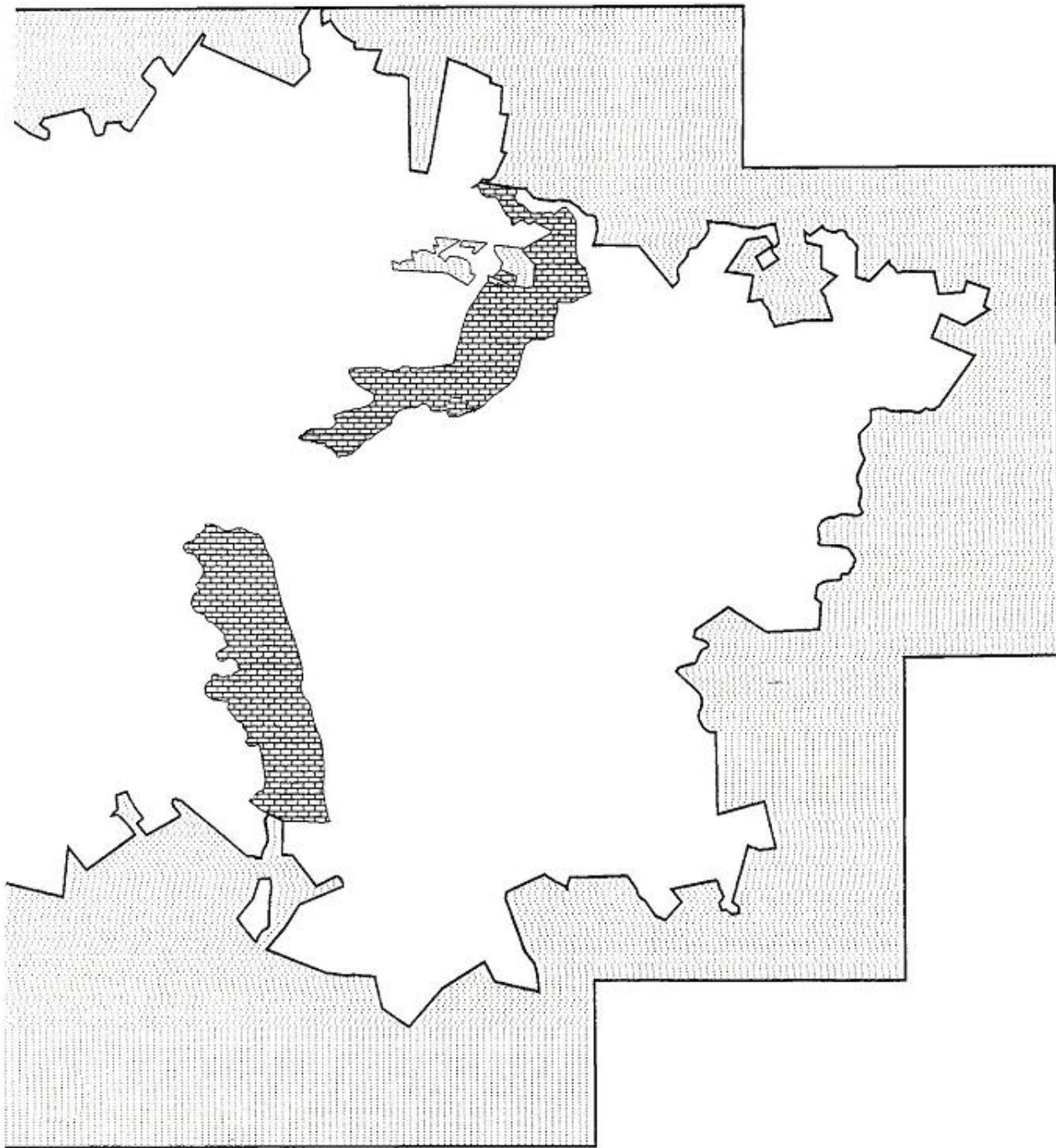
Improve recreation opportunities and water quality on the Río Mameyes by providing recreation facilities at Puente Roto.

Provide opportunities for treatment vs. control research to the extent such use does not detract from Scenic or Recreation River qualities. Recognize that the Rio Icacos corridor includes forest and soil types not available for experimental use elsewhere on the Forest.

Standards and Guidelines Río Icacos	S	1. Maintain ditches and culverts on the section of PR 191 closed to public traffic so as to reduce the incidence of concentration of water flow onto slopes prone to landslides.
	S	2. Stabilize areas of exposed soil caused by landslides as described in the watershed protection standards and guidelines.
Río Mameyes	G	1. Complete project design and NEPA analysis for a picnic area at Puente Roto. Reduce water quality impacts and improve recreation experience by providing improved parking, trails, garbage collection and toilets, to the extent funding permits.

FIGURE 1. MANAGEMENT AREA 9 - WILD/SCENIC/RECREATION RIVER CORRIDORS





Alternative 2 (Approve the CRMP for the Wild and Scenic Rivers on the CNF and to amend the CNF's LRMP)

This alternative would approve a CRMP based on EA findings and will amend the Forest Land Management Plan and Management Area 9 standards and guidelines to emphasize protection while managing developed and dispersed recreation of the WSR's Outstandingly Remarkable Values. Monitor over-concentration of uses in the river corridor at La Mina Falls and Puente Roto. Improve parking within the immediate river corridor but avoids over-concentration of uses. Provide an interpretive program and provide information and directional signing related to the WSR's. Monitor current water quality within the watershed. All resource management activities are restricted or modified to be compatible with the river resource. Adopt a corridor boundary, approximately ¼ mile from each stream bank, as the management boundary for the corridors in MA 9.

River Plan Goals

This plan establishes a more detailed set of goals, desired future condition, standard and guidelines for our rivers. These planning elements are included in the forest-wide direction for WSR and Management Area #9. The current LRMP direction will be amended. It will be named Forest Plan Amendment #3.

All River Segments

A variety of recreation opportunities will be available throughout the watersheds. These activities are dispersed in order to alleviate potential overcrowding or use conflicts. Access points such as trailheads and parking lots are strategically located in the corridor and watershed to aid in the dispersal of recreation use. Interpretation of the outstandingly remarkable values of the river's will be available in various forms to the public from low-key, off-site interpretive materials and technologies to interpretive signs at appropriate locations. Based on the topography, trail classification, the large boulders that are found along the river and its banks and the mostly isolated location of the rivers, No type of watercraft or inflatable water play items will be allowed on the rivers. For these same reasons horses, mountain bikes and ohv's are not allowed in all river segment.

Wild Segment

The Rio Mameyes is located in the *Baño de Oro Natural Area* which is a Research Natural Area. There are some research trails found in this natural area. Management of the wild segment will have limited access to persons doing research. All research must be properly permitted. The area will be managed to retain its general dispersed nature. Access is limited via Forest Service Road #27 (East Peak Road) which is outside of the river corridor. The limited access and activity in this area will basically allow nature to run its course without human intervention or interaction.

Scenic Segment

Management of the scenic segment of the river corridor will be focused on maintaining and enhancing the near-natural environment. The riverbanks will be dispersed and primitive, but may be accessible in places by trails. Recreation management will be designed to provide a natural-appearing setting. Research activity on or near these segments will be consistent free-flow and protecting river values for the visual impact they may cause. The Rio Icacos is more diverse than Rio de la Mina and Rio Mameyes because of its length and location. No developed facilities are found near these river corridors. The scenic segments are located in isolated areas and are not easily to get to. There

natural setting and isolation make them very attractive to those that are willing hike through challenging terrain.

Recreational Segment

Management of the recreational segment of the river corridor will be focused on providing recreation in natural-appearing or culturally-influenced settings.

A capacity study should be conducted to establish maximum capacity during high use periods. Puente Roto and La Mina Falls are heavily visited during holidays and summer weekends.

Parking areas should be delineated at Puente Roto and Angelito trailhead to establish and manage capacity at this areas. The feasibility of adding other improvements at the Puente Roto recreation area will be studied. Improvements could include sanitary facilities, picnic grills, tables, and picnic shelters.

Forest Plan Amendment # 3 Forest Wide Direction

Desired Future Condition River segments have been designated by Congress (CNF Wild and Scenic River Act, December 2002) as Wild, Scenic and Recreation rivers. These river segments will be managed to preserve their outstanding remarkable values and free-flowing conditions.

Wild Segment

The Rio Mameyes has the only Wild Segment and it originates in the *Baño de Oro Natural Area* which is a Research Natural Area. Management of the wild segment of the river corridor will be focused on protecting and preserving natural processes with minimal human influences and have limited access. Access to the area is limited to Forest Service Road #27 (East Peak Road) which is outside of the Rio Mameyes corridor and has controlled access.

Scenic Segment

Management of the scenic segment of the river corridor will be focused on maintaining and enhancing the near-natural environment. The riverbanks will be dispersed and primitive, but may be accessible in places by trails. Recreation management will be designed to provide a natural-appearing setting with limited improvements. Research activity on or near these segments will be monitored for the visual impact they may cause.

Recreational Segment

Management of the recreational segment of the river corridor will be focused on providing river-oriented recreation in

natural-appearing or culturally-influenced settings. The river may be readily accessible by roads and trails. Recreational activity will be established to protect the resource and complement the setting. Certain recreation controls will be implemented related to activities and accommodations. Recreational improvements such as trailheads and river access points are available at La Mina Falls at the end of Big Tree Trail, LaMina Trail, and at Puente Roto on PR 988.

Goals

All River Segments

Manage to maintain the unique characteristics and scenic values of the river corridors. Generally allow natural processes to determine the composition and distribution of plant species. Control invasive plants and species.

Manage streams for Mountain Mullet, River Shrimp and Goby where conditions are favorable. Identify where population inventories indicate self sustaining populations.

Scenic River Segments

Emphasize river oriented recreation opportunities favoring hiking, viewing wildlife and nature observation.

Manage use to provide a level of contact among visitors and impacts to the Outstanding Remarkable Values's that is consistent with the river classification. Implement the Limits of Acceptable Change (LAC) concept to monitor levels of use within the river corridor.

Recreation River Segments

Control and eradicate invasive fauna.

Emphasize river oriented recreation opportunities favoring hiking, viewing wildlife and nature observation.

Manage use to provide a level of contact among visitors and impacts to the Outstanding Remarkable Values's that is consistent with the river classification. Implement the Limits of Acceptable Change (LAC) concept to monitor levels of use within the river corridor.

Improve parking layout and access to river at Puente Roto

Improve public awareness and understanding of the Outstanding Remarkable Values of the three WSR's and the National Wild and Scenic River System.

Provide access for use and enjoyment of the rivers consistent with the river classification at Big Tree Trail, Angelito Trail, La Mina Trail and La Coca Trail.

Address capacity issues at La Mina Falls and Puente Roto

Table 4-3. Wild, Scenic and Recreation Rivers (Designated Dec. 2002)		
River	Classifications	Length Miles
Río Mameyes	Wild	1.6 miles*
	Scenic	1.4 miles
	Recreation	1.0 miles
Río de la Mina	Scenic	1.2 miles
	Recreation	0.9 miles
Río Icacos	Scenic	2.3 miles

*Corrected length.

Standards and Guidelines

- S 1. Develop management plans with specific management requirements for designated rivers after designation. Pattern specific directions after the generic management direction in Chapter 8.2 of the Land and Resource Management Planning Handbook (FSH 1902.12). Pending designation and the subsequence development of a river management plan(s), the following management direction will be implemented to ensure protection of the qualities that make the rivers eligible.

Wild Rivers

Timber

- S 1. Cutting of trees is not permitted except when needed in association with a primitive recreation experience (such as clearing for trails and protection of users) or to protect the environment (such as control of fire).

Water Supply

- S 2. All water supply dams and diversions are prohibited.

Hydroelectric Power

- S 3. No development of hydroelectric power facilities is permitted.

Flood and Erosion Control

- S 4. No flood control dams, levees, or erosion control work is allowed.

Road Construction

- S 5. No roads or other provisions for overland motorized travel are permitted within 1/4 mile of the riverbank.

Recreation Development	S 6. Major public-use areas, such as large picnic areas, interpretive centers, or administrative headquarters are located outside the Wild Rivers area. Recreation developments are limited to trails and unobtrusive bridges and signs, and improvements necessary for resource protection.
Structures	S 7. A few existing structures could be allowed assuming such structures are not incompatible with the essentially primitive and natural values of the river and its corridor. New structures are not allowed except in rare instances to achieve management objectives (e.g. structures and activities associated with fisheries enhancement programs could be allowed).
Visual Resource	G 1. Manage to maintain the unique characteristics and scenic values of the river corridors. G 2. Follow the Scenery Management System (SMS) guidance when implementing the Forest Plan.
Vegetation Management	G 3. Use native plant species where possible when restoring impacted sites. G 4. Allow woody debris to accumulate along river and shorelines to maintain natural character of river.
Wildlife and Fish Resource	G 5. Manage habitat of Mountain Mullet streams as a first priority. S 8. Trap and remove feral cats, dogs and mongoose. S 9. No hunting or fishing is allowed.
Geology	S10. No mining activity to occur. Rock extraction is prohibited.
Cultural Resources	G 6. Manage historic sites consistent with forest-wide standards. Stabilize and protect existing sites.

Scenic Rivers

Timber	S 1.	Timber demonstration is located at least 1/4 mile away from rivers suitable for Scenic River designation. Vegetation treatments for wildlife habitat improvement is allowed provided that such practices are carried on in such a way that there is not substantial adverse effect on the river and its immediate environment. The river should be maintained in its near natural environment.
Water Supply	S 2.	All water supply dams and major diversions, that would have a direct and adverse effect on the values for which the river area is included in the National System, are prohibited. Modest diversions are allowed only if there would be no direct and adverse effect on river values.
Hydroelectric Power	S 3.	No development of hydroelectric power facilities is allowed.
Flood and Erosion Control	S 4.	Flood control dams and levees are prohibited. Erosion control treatments can be implemented if they do not detract from river values.
Road Construction	S 5.	Roads should generally not be visible from the rivers suitable for Scenic River designation. No new road construction is permitted within 1/4 miles of such rivers.
Recreation Development	S 6.	Larger scale public use facilities, such as large picnic areas, public information centers, and administrative headquarters are well screened from rivers suitable for Scenic River designation. Modest and unobtrusive recreation facilities are permitted.
Structures	S 7.	New structures that would have a direct and adverse effect on river values are not allowed.
Visual Resource	G 1.	Manage to maintain the unique characteristics and scenic values of the river corridors.
	G 2.	Implement the Scenery Management System (SMS) when implementing the Forest Plan.
Vegetation Management	G 3.	Use native plant species where possible when restoring impacted sites.

G 4. Allow woody debris to accumulate along river and shorelines so as to maintain natural character of river.

Wildlife and Fish Resource

G 5. Manage habitat of Mountain Mullet streams a first priority.

S 8. Trap and remove feral cats, dogs and mongoose.

S 9. No hunting or fishing is allowed.

Cultural Resources

G 6. Manage historic sites consistent with forest-wide standards. Stabilize and protect existing sites

Geology

S10. No mining activity to occur. Rock extraction is prohibited.

Special Uses

S11. Limit land-based permits to groups of no more than 15 (including guides) from the date the CRMP is signed.

S12. Allow access to La Mina site and Rio de la Mina Trail only to guided tours by Special Use Permit.

Dispersed Recreation

G 6. Implement "Pack-it-in and Pack-it-out" and "Leave No Trace" concepts.

S13. Allow primitive camping at designated areas by permit only. No camping within 100 feet of rivers. Evidence of use to be noticeable but not dominant. No fires or fire rings allowed. Use only commercial cooking apparatus

S14. Only hikers permitted on trails. No horses, bikes or OHV's are permitted on trails.

S15. Tubes and rafts are not permitted in rivers.

Recreation Rivers

Timber

S 1. Timber demonstration is located at least 1/4 mile from rivers suitable for Recreation River Designation. Vegetation treatments for wildlife habitat improvement are allowed provided that such practices are carried on in such a way that there is not substantial adverse effect on the river and its immediate environment. Woody debris is allowed to remain along the river bed and its banks.

<i>Water Supply</i>	S 2.	Low dams, diversion works, rip rap, and other minor structures are allowed provided the waterway remains generally natural in appearance.
<i>Hydroelectric Power</i>	S 3.	No development of hydroelectric power facilities is allowed.
<i>Flood and Erosion Control</i>	S 4.	Flood control dams and levees are prohibited. Erosion control treatments can be implemented if they do not detract from river values.
<i>Road Construction</i>	S 5.	Paralleling roads could occur on one side of the river. There can be several bridges crossings and numerous river access points. New road construction is limited to access and parking for developed recreation sites.
<i>Recreation Development</i>	S 6.	Picnic areas and trails constructed may be in close proximity to the river.
<i>Structures</i>	S 7.	New structures are allowed for recreation use.
<i>Special Uses</i>	S 8.	Limit land-based permits to groups of no more than 15 persons (including guides).
	S 9.	Allow access to La Mina site and Rio de la Mina Trail only to guided tours by Special Use Permit.
<i>Geology</i>	S10.	No mining activity to occur. Rock extraction is prohibited.
<i>Dispersed and Developed Recreation</i>	G 1.	Emphasize river oriented recreation opportunities favoring hiking, viewing wildlife and nature observation.
	S 11.	Allow primitive camping at designated areas by permit only. No camping within 100 feet of rivers. Evidence of use to be noticeable but not dominant. No fires or fire rings allowed. Use only commercial cooking apparatus
	G 2.	Manage use to provide level of contact among visitors and impacts to the Outstanding Remarkable Values that is consistent with the river classification. The Limits of Acceptable Change (LAC) concept to monitor level of use within the river corridor.
	G 3.	Modify corridor boundary to include Quebradas Juan Diego and La Coca for the purpose of monitoring water

quality and minimize trash impacts at these sites.

- S12. Implement “Pack-it-in and Pack-it-out” and “Leave No Trace” concept.
- S13. Only hikers permitted on trails. No horses, bikes or OHV’s are permitted on trails.
- S14. Tube and rafts are not permitted in rivers.
- S15. Conduct site condition inventory to determine use patterns, site conditions and their specific limits to be monitored. Rehabilitate degraded sites and if necessary, relocate or restrict use at those sites.
- G 4. Limit use of music and sound equipment.
- S16. Prohibit BBQ grills within full bank stage at all river segments.
- S17. Prohibit glass containers within full bank stage at all river segments.
- S18. New development, bridge replacements, and landslides reconstruction will be designed to minimize disturbance of riparian areas.

Interpretation

- G 5. Improve public awareness and understanding of the Outstanding Remarkable Values of the three WSR’s and the National Wild and Scenic River System.
- S19. Focus wildlife interpretation on highly visible species.

Soil and Water

- G 6. Complete a water quality monitoring Plan.
- G 7. Monitor water quality above and below recreation segments.
- G 8. Stabilize dispersed recreation sites that have exposed and/or highly compact erodible mineral soil.

Trail Management

- G 9. Manage trails for hiking use only compatible with the LRMP and the Outstanding Remarkable Values of the corridors.
- S20. Provide access to for use and enjoyment of the rivers consistent with the river classification at Big Tree Trail , Angelito’s Trail, La mina Trail, and, La Coca Trail.

Modified Management Area 9 – Wild, Scenic and Recreation River Corridors

Desired Future Condition

This management area was established to provide increased protection for river segments designated Wild, Scenic or Recreation Rivers for the Rio Mameyes, Rio de la Mina and Rio Icacos. These river and their corridors will continue to exhibit the outstanding remarkable characteristics that made them Wild, Scenic and Recreation Rivers.

Goals – All Rivers

All rivers remain free of impoundments within the existing forest boundary. Periodically monitor all rivers to confirm their Outstandingly Remarkable Values are being maintained. Provide opportunities for treatment vs. control research to the extent such use does not detract from Wild, Scenic or Recreation River qualities. Recognize that the Icacos River corridor includes forest and soil types not available for experimental use elsewhere on the Forest.

Goals - Río Icacos

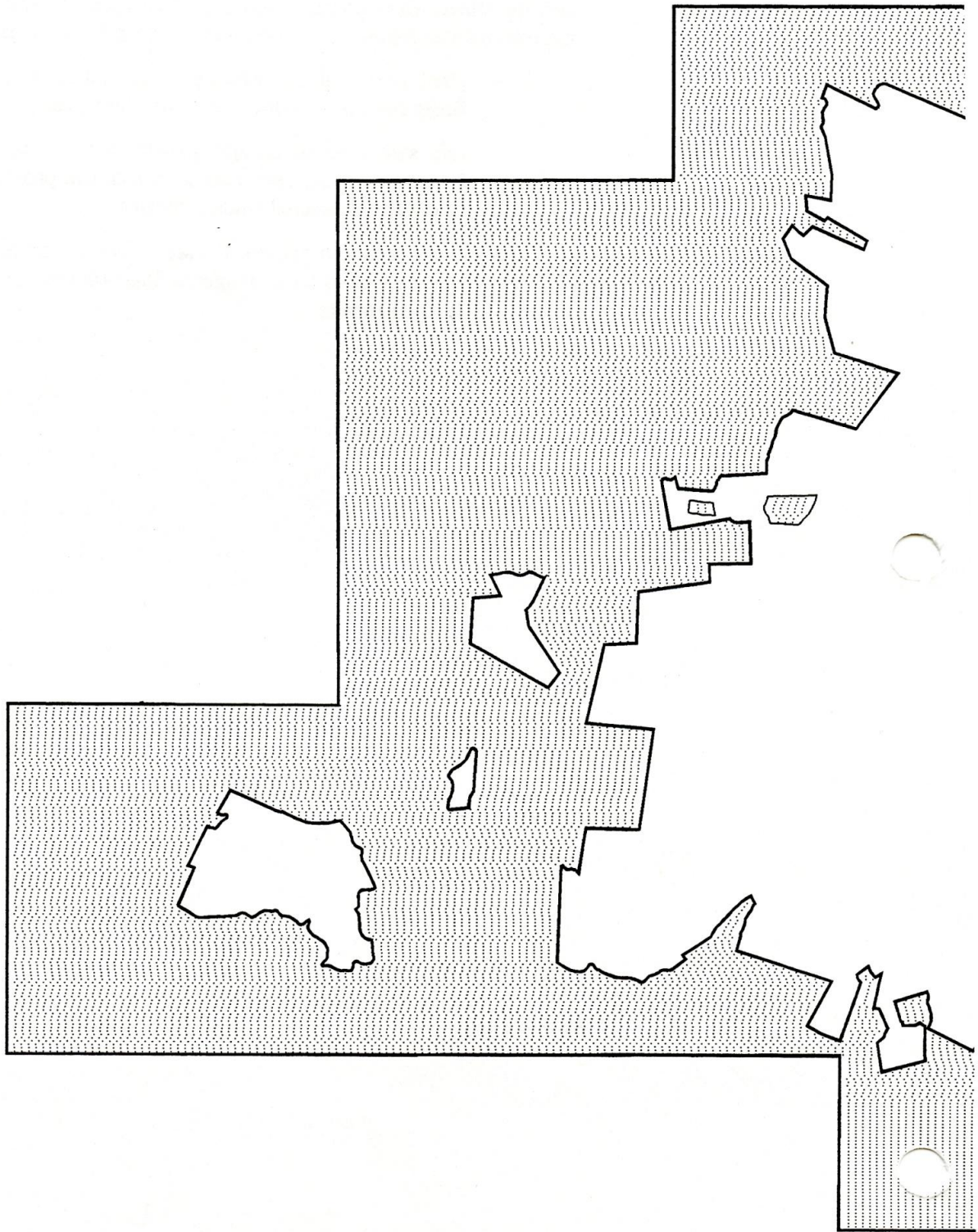
- S Access the river through natural openings found along PR 191 South.
- G Improve water quality by reducing sedimentation from landslides and PR 191.
- S Maintain ditches and culverts on the section of PR 191 closed to public traffic so as to reduce the concentration of water flow onto slopes prone to landslides.
- S Stabilize areas of exposed soil caused by landslides.

Río Mameyes

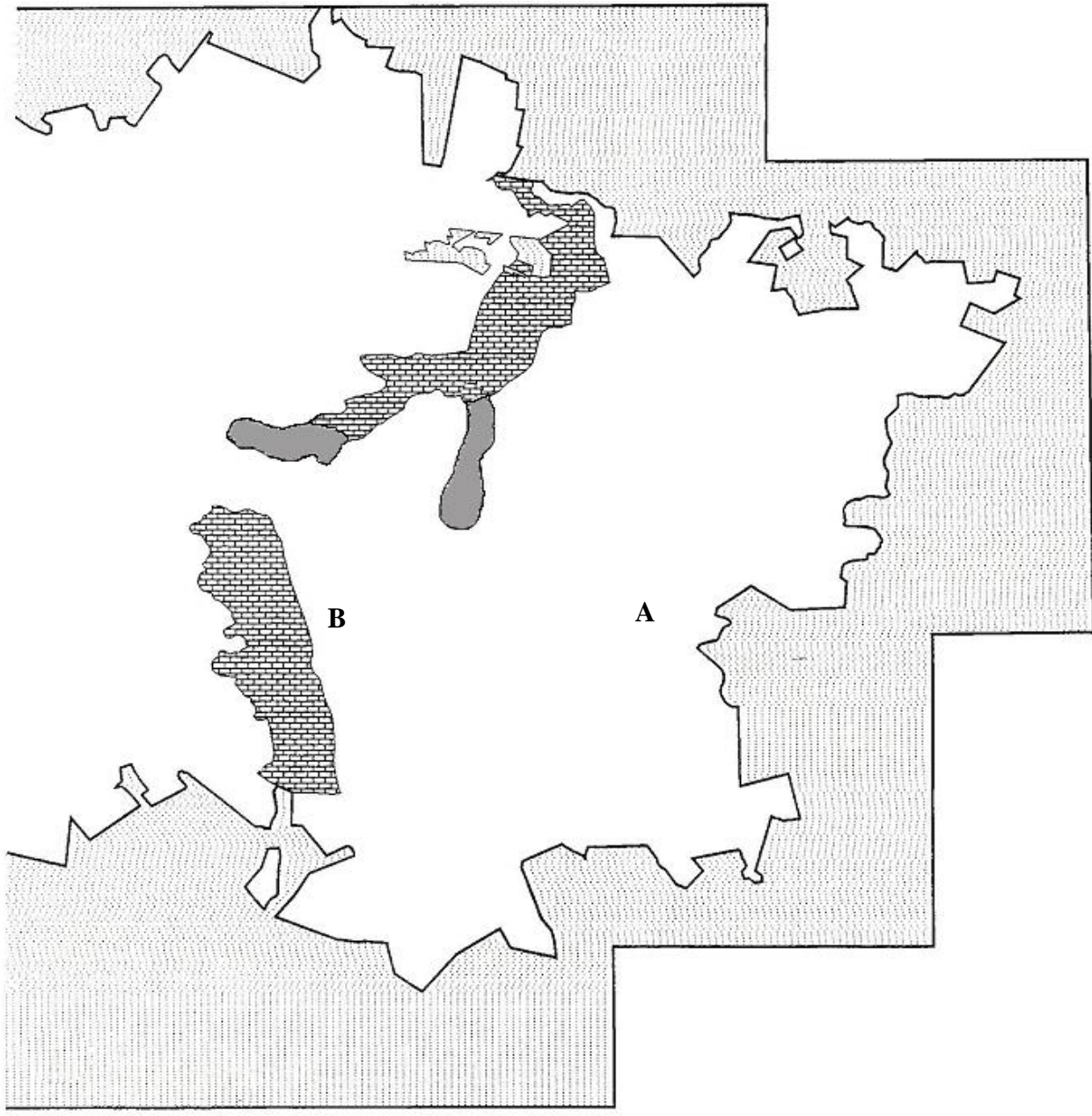
- G Improve recreation opportunities and water quality by providing facilities at Puente Roto.
- G Continue to provide garbage collection and periodic clean-up along the river bank at Puente Roto. Conduct a capacity study for Puente Roto
- G Improve the parking layout at Puente Roto.

- G Provide adequate signage and interpretation which emphasizes the concept of “Leave No Trace” and “Pack-It-In and Pack-It-Out”.
- Río de la Mina**
 - G Continue to provide garbage collection and periodic clean-up along the river banks.
 - G Conduct a capacity study for the La Mina Falls area.
 - G Modify Scenic Corridor boundary to include portions of Quebrada Juan Diego and Quebrada La Coca.

FIGURE 4-10. MANAGEMENT AREA 9 - WILD/SCENIC/RECREATION RIVER CORRIDORS (Revised)
GRAFICA 4-10. ZONA DE MANEJO 9 - CORREDORES DE RÍOS SILVESTRES/PANORÁMICOS/RECREACIONALES



Revised Management Area 9 (includes the Wild river segment of Rio Mameyes (A) and extend Recreation segment of Rio de la Mina (B))



Comparison of Alternatives by Issue

Issue/Activity	Alternative 1	Alternative 2
Types of Management Activities	Improvement of parking and other facilities adequate to protect corridor values.	Emphasis on enhancement of values and riparian restoration in corridor and address overcrowding and use impacts at La Mina Falls and Puente Roto.
Recreation Setting Characteristics	Meet ROS and VQO Setting parameters specified for each segment.	Meet ROS and SMS Setting parameters specified for each segment. Prioritize rehabilitation of impacted sites cause by landslides in Recreation and Scenic River Segments.
Type and Distribution of Facilities	Maintain existing facilities and parking.	Improve parking layout at Puente Roto and evaluate parking layout at Big Tree trailhead.
Diversity of Recreation Opportunities	Provide a wide range of opportunities.	Monitor recreation activities and establish guidelines for proper use of the recreation resources. Allow for properly permitted primitive camping in designated areas.
Conditions for Special Use Permits	Maintain current stipulations on existing permits.	Limit to commercial guided hiking permits for the Rio de la Mina Trail.
Education and Interpretation	Provide interpretation at visitor center and improved signage.	Wildlife interpretation will focus on habitat protection, species that wildlife viewers will have a high likelihood of seeing, and educating the public in the importance of wild and scenic rivers, water sheds, stream flow, safety and unique habitats. Incorporate the "Pack-it-in and Pack-it-out" concept to the interpretive message. Provide adequate signage related to activities that are allowed in or near the rivers.

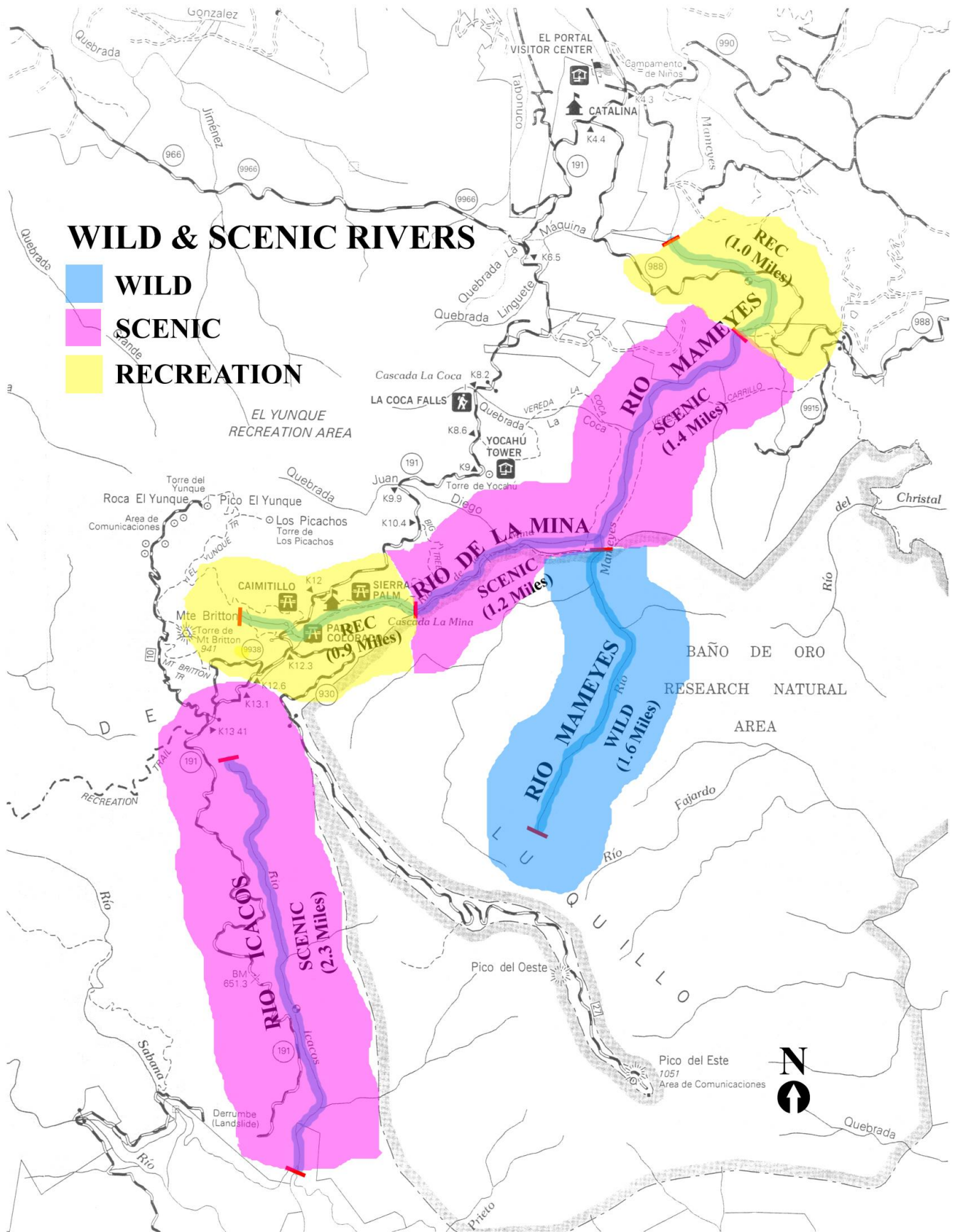
Chapter 3: Affected Environment & Existing Conditions

3.1 Physiography & Social setting

The corridors lie within two physiographic watersheds. The streams begin at the upper elevations of the Forest at over 2,000 feet. The Rio Mameyes and Rio de la Mina flow to the north and the Rio Icacos flow to the south. The Rio Mameyes has a steep drop of 1730 feet to 230 feet elevation at the Forest northern boundary. The Rio Icacos has a gentler drop of 682 feet to 450 elevation elevation at the Forest southern boundary.

The three rivers are bounded by steep, rugged slopes throughout their lengths, except for a segment of the Rio Icacos which are relatively flat with a moderate slope and sandy base. The flood plains are narrow at the rivers headwaters. From there they become wider and gentler

down stream. The floodplain becomes very wide and gentle once the streams leave the Forest boundary.



Map 2. Sections of CNF rivers for wild, scenic, and recreational designation.

3.1.1 Location

The WSR's originate in the upper elevations of the Caribbean National Forest. The Rio Mameyes and Rio de la Mina flow in a northerly direction and have outstanding scenic, biological, recreation and historic value while the Rio Icacos flows in a southerly direction and has outstanding scenic, historic and cultural values and ecological values. The Rio Mameyes watershed covers 6.88 square miles which equal to 15.7% of the Forest. Water quality is optimum within the study area of the upper segment, since the entire corridor is located in the Baño de Oro Natural Area and no development exist. Due to steep slopes, no significant flood plains occur. There are approximately 73 acres of riparian wetlands along the Rio Mameyes eligible segments. The Rio de la Mina is part of the Mameyes Watershed. The Rio de la Mina sub-watershed covers an area of 2.7 square miles which equals to 6.1% of the Forest. The Rio Icacos watershed covers an area of 1.2 square miles which equals to 2.9% of the Forest.

The wild and scenic river corridor includes the area extending the length of the river's and approximately ¼ mile in width from each bank of the creek. The area within the corridors totals approximately 2,848 acres which are all National Forest lands. This CRMP will outline management direction for the National Forest lands within these corridors. There are several tributaries flowing into the three rivers. They all vary in size and would be considered small creeks.

3.1.2 Social State, Land Ownership and Land-Use

There is little evidence of human development and activities throughout much of the river corridors. The upper sections are totally dispersed forest lands. Developments near the rivers only include recreation areas with picnic shelters, parking area, bathrooms and hiking trails. There is no private businesses within the proposed corridors.

The upper sections of all the rivers are in dispersed forest lands. The Recreation segment of the Rio de la Mina is in the Palo Colorado Recreation Area which is one of the most developed recreation areas of the Forest. Developments at Palo Colorado include a state road with one river crossing, a developed recreation area with picnic shelters, toilets, parking, trails and VIS Center. There are two CCC retaining pools, Baño Grande and Baño de Oro. Each has bathhouses which are not in use. Baño Grande is open for people to view the area but no swimming is allowed. Baño de Oro is closed to the public and is currently being evaluated as to future use of the site.

Human Modifications

Human modifications in the stream channel are identified as small vehicular and trail bridges. The Rio de la Mina has two water retention structures at Palo Colorado Recreation Area which are known as Baño Grande and Baño de Oro. These facilities were swimming pool areas constructed in the 1930's. The river flows under PR 191 at Km. 12.2 at the Palo Colorado Recreation Area

The Baño de Oro Trail (Trail #25) crosses Rio de la Mina about 100 meters below the rivers headwaters. Rio de la Mina has two trails that follow parallel to the river. In the Palo Colorado Recreation Area is Rio de la Mina Trail (Trail #12) which is in the Recreation Segment of the river. In the Scenic Segment of Rio de la Mina, La Mina Trail (Trail #24) a historic trail built in the 1930's also runs parallel to the river. The Rio Mameyes passes under the PR 988 at Punte Roto, a developed recreation area with parking a trash cans and a trash bin. Access is

provided to the rivers at these locations, otherwise, no substantial evidence of human activity is observed along the riverbanks.

An up-to-date inventory of in-stream structures will be compiled upon implementation of this CRMP and maintained thereafter. Existing cultural features are described in general terms in this document. The inventory of cultural and historic features on federal lands in the River Corridors will be updated over time.

Access

The majority of the river corridors are accessible by road or trail. PR 191 is closed to traffic at Km.13.3 do to a major landslide at Km.19.3 in the late 1960's. Along this road is the Scenic Segment of the Rio Icacos. Vehicular use of this road is by authorized personnel. The road is also used by hikers and for dispersed camping. The Rio de la Mina is accessible by several trails that cross or run parallel to the river. The Palo Colorado Recreation Area is located within the recreation segment of the river. Rio Mameyes also has some trails that run parallel to the river. Its headwaters are near FR # 27 known as East Peak Road. There is only one major road crossing of the Rio Mameyes and it occurs on PR 988 at Puente Roto, which is an dispersed recreation site.

3.1.3 Navigability and Riparian Rights

The Forest Service retains authority to regulate the use of the river's and National Forest lands on the shoreline whether segments are determined navigable or non-navigable. None of the three rivers are navigable due to the steep slopes, shallow depth, waterfalls and large boulders that are found throughout the river bed and their banks. The headwaters of all three rivers originate in the upper elevations of the Forest which means that the volume of water is very limited and increases as it gets close to the Forest boundary.

3.1.4 Free-Flowing Condition

The WSRA requires that, to be eligible for inclusion in the National System, a river or river segment must be free-flowing and, with its immediate environment, must possess one or more "Outstandingly Remarkable" scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values (i.e., it must have at least one resource important to the nation).

Free-flowing, as defined in Section 16(b) of the WSRA, is applied to "any river or section of a river," and means:

"...existing or flowing in natural condition without impoundment, diversion, straightening, rip-rapping, or other modification of the waterway. The existence, however, of low dams, diversion works, or other minor structures...shall not automatically bar its consideration for inclusion..."

The entire length of the three rivers, contain no dams, diversion structures, significant channeling or other modifications, or excessive rip-rapping, are free-flowing.

3.1.5 Stream Flows and Water Quality

Water flowing from the Forest is abundant and of high quality, and provides many benefits. The Forest furnishes water for municipal and domestic uses, electrical power generation, and

recreation. Water provides fish and wildlife habitat, and supports a lush tropical forest. The WSR segments of the three rivers are free-flowing with no artificial dams, channel diversions or other flow regulating structures. Because the entire watersheds are free flowing, stream-flow can fluctuate significantly with seasonal rainfall. Heavy rains occur throughout the year, but on average May is the wettest month and March the driest. Higher elevations, where the headwaters of the three WSR are located, have about 250 rainy days annually.

River	Average Stream Flows (cubic feet/second)	Resource Maintenance Flow Claimed (cubic feet/second)	Annual Quantity Claimed (acre feet)	Water Use during 1976	Year Water Use Began
Rio Icacos	61.8	8.6	9200	Maintenance of Ecosystems	1903
Rio Icacos	61.8	14.0	10,100	Research	1939
Rio Mameyes and La Mina	82.0	14.0	18,000	Recreation	1903-1962
Rio Mameyes and La Mina	82.0	28.3	21,000	Research	1949
Rio Mameyes and La Mina	82.0	35.0	25,500	Research	1939-1962

The Forest's streams are considered high quality waters that constitute an exceptional resource (EQB, 1990). Generally, the water meets or exceeds local water quality standards. Fecal coliform limits are being exceeded at Puente Roto (Rio Mameyes recreation segment) a heavily used dispersed water play sites on PR 988.

Field data collection was conducted to establish a water quality baseline on Puente Roto. The baseline parameters can be used to monitor water quality during and after construction of any improvements at the site which may include picnic shelters, bathrooms, and parking. The PR Department of Natural Resources is aware of the river designation. Their Rangers assist in providing support when water quality and water fauna is affected. Because the rivers are in Forest lands there is limited interest in developing partnerships with stakeholders outside the forest boundary. There is an interest to make the lower portion of the Rio Mameyes a WSR and is being pursued by camping association.

Water Quality Data at Puente Roto Crossing. (Rio Mameyes Recreation Segment)	
Quality Indicator	Baseline Data
Solids and other matter	Free of deleterious matter
Color	Free

Odor	Free
Turbidity	Clear
Temperature	25.47, No thermal discharge
Oil and Grease	No thermal discharge
PH	8.69, alkalinity
Dissolved oxygen	7.58
Conductivity	113.10
Salinity	0.03
Stage	1.80
Carbon Dioxide	4 ppm
Chlorides	44 ppm
Nitrate	Less than 0.2 ppm
Phosphate	Less than 0.2 ppm
Silica	20 ppm
Sulfide	Less than 0.2 ppm

The landslides on the Forest are known to occur with a high frequency. Landslides and water play recreation are the main contributors of sediment to the Forest's streams. The FS has been working in the stabilization of exposed areas caused by landslides. No restoration work is done on interior slides (slides located more than 100 feet away from roads or trails). Landslides are sources of non-point pollution (Section 319 of the Clean Water Act). Landslide restoration in certain cases requires use of mechanized equipment and special techniques. This work is necessary to reduce erosion and subsequently contamination of these waters. Any project work in river bed or bank must also be consistent with Section 7(a).

Other non-point source pollutant are the roads, bridges, and trails which have an effect on the water quality, recreation, wildlife and water consumption. Periods of high forest visitation could increase the variety and amount of pollutants such as oil, grease and chemicals caused by the automobiles (EPA, 2000). In terms of the water play, the FS goal is to improve recreation opportunities by working on the identification of the most visited areas. Rio de la Mina has two developed recreation areas that are in the scenic segment of Rio de la Mina. These are the Sierra Palm and Palo Colorado Recreation Area. This river also has two trails that come to a high visitation water play area called La Mina Falls; these trails are Big Tree and La Mina Trail. Also, Quebrada Juan Diego, tributary of Rio de la Mina, is a highly visited area for nature viewing and water play.

Residential and commercial developments affect the water quality and quantity as point-source pollutants outside the Forest which are beyond the Rio Mameyes Recreation boundary. There are frequent sewer drains into the lower portion of the Rio Mameyes. This condition affects water chemistry off-forest. The off-forest condition can have a negative impact on aquatic species migration in designated segments of Rio Mameyes.

Another point of pollution are the ranches, farms and golf courses which contributes fertilizer and other waste to the lower portions of the Rio Mameyes which is well beyond the recreation segment of the rivers. Runoff from ranches could contribute with unacceptable levels of bacteria, hormones, animal wastes, pesticides, herbicides, and fertilizers, as well as large amounts of sediment due to the proximity of the river.

3.2 Wildlife and Fisheries

The fauna of the Caribbean National Forest (CNF) is one of most distinguishable communities in the National Forest System. Species from the CNF exhibit traits unique only to tropical ecosystems. Tropical rain forests have the greatest diversity of species of all communities (Campbell, 1993). Both aquatic and terrestrial animal species on the Forest have many distinct characteristics that have evolved through interactions that promote specialization. The CNF boast a spectacular degree of biodiversity due to the range of species, which includes over 127 terrestrial vertebrates and 17 freshwater species. Biodiversity has been defined for this document as “the variety of life in an area, including the variety of genes, species, plant and animal communities, ecosystems, and the interactions of these elements (USDA Forest Service (b), 1997). Complex ecological processes that enable multiple species to exist are supported by healthy terrestrial ecosystems and waterways.

Within this network of species and biotic interactions some species are grouped together into meaningful management categories developed by land management agencies. Certain species that are in danger of extinction are categorized according to the severity of their status. Those classes are designated as proposed, endangered, threatened and sensitive collectively known as “PETS”. In the National Environmental Policy Act (NEPA) process all four mentioned categories are addressed in a Biological Assessment (BA). In this project area, which is the 3 river corridors, four endangered fauna species were addressed to ensure no adverse affects are committed to them or a significant part of their habitat. Requests for official determinations were sent to the U.S. Fish and Wildlife Service (USFWS). Refer to the BA for the determinations of effects for the proposed plan for management of the wild and scenic rivers of the CNF. Also included is the appendix is the concurrence letter from U.S. Fish and Wildlife Service - Boqueron Field Office on the designation of wild and scenic rivers on the CNF.

3.2.1 Proposed, Endangered, Threatened and Sensitive Species

PETS. (proposed, endangered, threatened and sensitive species) are managed cooperatively with the Puerto Rico Department of the Environment and Natural Resources, the U.S Forest Service and the U.S. Department of Interior Fish and Wildlife Service.

The following is a depiction of the PETS in the three rivers:

Rio Mameyes and Rio de la Mina

The Rio Mameyes provides important habitat for the Puerto Rican Boa, an endangered species. The endangered Broad-winged and Sharp-shinned Hawks, are known to occasionally use the area. No species of sensitive Coqui are known to occur, but the numerous waterfalls associated with this system could potentially support population of the web-footed Coqui. Suitable habitat also exists for the Regional sensitive species: Red Fruit Bat.

Rio Icacos

The Rio Icacos valley is not currently occupied by the Puerto Rican Parrot, but was historically an important use area, and is designated as “essential habitat” for the species’ recovery. The Rio Icacos is known to be inhabited by the Puerto Rican Boa. The Rio Icacos valley is occasionally visited by the endangered Broad-Winged Hawk, and possibly by the endangered Sharp-shinned Hawk. The sensitive Burrow Coqui is known to occur in the upper headwater areas. Suitable habitats exist for the sensitive Mottled and Web-footed Coquis and for the sensitive Red Fruit Bat.

Although there are no aquatic PETS species designated on the Forest, the topography associated with the Rio Icacos valley makes it a unique aquatic ecosystem. Whereas most Forest streams are steep in their upper reach, the upper Rio Icacos is a sinuous, low-gradient, slow moving stream characterized by fine substrates. It is one of only two such streams on the Forest.

3.2.2 Management Indicator Species

The Forest Plan establishes 12 animal Management Indicator Species (MIS) for the Forest: In the “Species Location” Table below there is a list of these species with general locations where each species may be found.

Common Name	Scientific Name	Forest Range
Puerto Rican Parrot	<i>Amazona vittata</i>	Forest interior
Sharp-shinned Hawk	<i>Accipiter striatus venator</i>	Forest-wide
Broad-winged Hawk	<i>Buteo platypterus brunnescens</i>	Forest-wide
Elfin Woods Warbler	<i>Dendroica angelae</i>	Cloud Forest region
Black-throated Blue Warbler	<i>Dendroica caerulescens</i>	Forest-wide
Tree-hole coqui	<i>Eleutherodactylus hedricki</i>	Mid-elevation sites
Warty Coqui	<i>Eleutherodactylus locustus</i>	Low to Mid-elevation sites
Burrow Coqui	<i>Eleutherodactylus unicolor</i>	Mid to high elevation sites
Yellow-bearded Anole	<i>Anolis gundlachi</i>	Forest wide
Goby	<i>Sicydium plumieri</i>	All Forest rivers
Mountain Mullet	<i>Agonostomus monticola</i>	Two major Forest rivers
River Shrimp	<i>Macrobrachium carpinus</i>	All Forest rivers

The only MIS that are not be found in the forest WSR corridors is the PR Parrot & Burrow Coqui . The remaining species are known to have stable populations throughout the forest in annual monitoring reports except for Sharp-shinned hawks, Broad-winged hawks, elfin-woods warblers, Black-throated blue warblers, and the Warty Coqui.

3.3 Vegetation

The tropical moist forests of Puerto Rico are characterized by their great diversity of plants, although somewhat less so than in continental tropical forest. More tree species occur on the

CNF than in all the other 155 National Forest combined; and none of these species occur on any other National Forest.

The Forest contains 5 ecological life zones: subtropical wet forest, subtropical rain forest, lower montane wet forest, lower montane rain forest, and a small area of subtropical moist forest. Its vegetation includes four major forest types: Tabonuco, Palo Colorado, Sierra Palm and Cloud Forest. Nearly one-third of the Forest's tree species are endemic to Puerto Rico and 10% are endemic to the Forest itself.

Rio Mameyes

Due to steep slopes, no significant flood plains occur on the propose segments of the river. There are approximately 73 acres of riparian wetlands along those segments. No endangered plant species are known to occur along the Mameyes River. Three sensitive plant species, *Laplacea portoricensis*, *Ternstroemia heptasepala*, and *Xylosma schwaneckeanum*, are known to occur in the area. The unique *Pterocarpus* forest occurs within the river corridor. Stands of this buttres-rooted tree are uncommon not only on the island but throughout the Caribbean. (source: Final EIS for the Revised Land and Resource Management Plan, Caribbean National forest and Luquillo Experimental Forest, Puerto Rico, 1997)

Rio de La Mina

Because of steep gradients and dense network of ephemeral channels, no significant flood plains are found in the proposed segment. Approximately 33 acres of riparian stable wetlands occur along the proposed segment. One endangered plant species, *Callicarpa ampla* is known to occur along this segment. Five Sensitive plant species are known to occur within the proposed corridor: *Conostegia hotteana*, *Marlierea sintenisii*, *Psidium sintenisii*, *Ternstroemia heptasepala* and *Xylosma schwaneckeanum*. (source: Final EIS for the Revised Land and Resource Management Plan, Caribbean National forest and Luquillo Experimental Forest, Puerto Rico, 1997)

Rio Icacos

There are 63 acres of flood plain conditions along the upper valley and approximately 37 acres of riparian wetlands along the proposed segment of the Rio Icacos. Endangered plants known to occur in the area are *Callicarpa ampla*, *Ilex sintenisii*, *Ternstroemia luquillensis*, and *Ternstroemia subsessilis*. The corridor provides unique habitats in which 15 species of Sensitive Plants are known to occur: *Brunfelsia portoricensis*, *Brachionidium cilolatum*, *Cordia wagnerorum*, *Eugenia eggertii*, *Laplacea portoricensis*, *Lindsaea stricta* var. *jamesoniiformis*, *Lepanthes dodiana*, *Lycopodium tenuicaule*, *Lycopodium wilsonii*, *Marlierea sintenisii*, *Myrica holdrigeana*, *Ravenia urbanii*, *Solanum woodburyi*, *Ternstroemia heptasepala* and *Xylosma schwaneckeanum*. The location and distribution of these sensitive plants has been mapped and periodically monitored. (source: Final EIS for the Revised Land and Resource Management Plan, Caribbean National forest and Luquillo Experimental Forest, Puerto Rico, 1997).

3.4 Historic and Cultural Resources

Typical heritage resources that might be encountered near the rivers include prehistoric petroglyphs, Spanish-era gold mines and coffee plantation sites, Civilian Conservation Corps (CCC) constructions, and historic farmsteads. The three river corridors each contain unique heritage resources. The Rio Icacos corridor has Civilian Conservation Corps projects and sites dating from the 1930s, including trails, work camps, PR Hwy, 191 as well as an earlier

hydroelectric dam and penstock beyond the south end of the corridor. The Rio Icacos also has pre-Columbian petroglyphs located downstream from the river corridor, and the potential for others within exist. There is one rock shelter within the Rio Icacos corridor, which has Spanish Colonial ceramics in association with flaked stone tools.

The Rio de la Mina probably derives its name from a mid-1800s Spanish Colonial period mining complex located within the Scenic section, or from a possibly earlier mining complex further upstream within the Recreation section of the river. A series of homestead sites of the former community of Florida are located within the Scenic sector. La Mina Trail (Trail #24) and most of the facilities in the Palo Colorado Recreation area including Baño de Oro and Baño Grande Bath House and Pools, Palo Colorado Picnic Area, several trails, highway PR191, and the now the defunct El Yunque Pavilion – all were constructed by the CCC in the 1930's; they are located within the Recreation sector of the Rio de la Mina corridor.

The Rio Mameyes also has homestead sites dating to the 1930's or earlier within the Scenic sector of the corridor. There is at least one abandoned house site within the Wild section of the upper Rio Mameyes, and several others within the Recreation sector. All three river corridors have high potential for as yet undiscovered heritage resources, particularly prehistoric petroglyph sites, Spanish Colonial period gold mines, 1900's homesteads, and additional features from the CCC years.

3.5 Outstandingly Remarkable Values

In addition to being free-flowing, the WSRA also requires that, to be eligible for inclusion in the National System, a river or river segment must possess one or more of the following Outstandingly Remarkable Values: Scenic, Recreational, Geological, Fish and Wildlife, Historic and Cultural, or other such as Ecological.

Description of Outstandingly Remarkable Values:

The diversity and distribution of Outstandingly Remarkable Values throughout the stream corridors and their high water quality create an overall high quality river environment of local and regional significance. The following values are those considered Outstandingly Remarkable for the Rio Mameyes, Rio de la Mina and Rio Icacos:

3.5.1 Scenic: The scenic quality of each of the rivers is distinct and unique. Scenery is one of the river's outstandingly remarkable values. The rivers offer a unique ban of riparian life, an outstanding variety of landforms and vegetative patterns and distinct water and geologic features that are typical of a tropical rain forest. The effect related to scenery will be assessed within the WSR corridor. Under the US Forest Service Scenery Management System the river systems are classified as a Distinctive Class A Landscape. Factors that influence this classification include land forms, vegetation patterns, water characteristics, topography of the land and foreground and background scenic views. Its not just the scenic views closes to the viewer but the panoramic view that appear periodically along the rivers. The current Forest Plan scenic values reflect the desire to maintain a high level of scenic integrity.

The headwaters of the Rio Icacos, Rio Mameyes and Rio de La Mina all occur in the upper elevations of the Forest in or near the Cloud Forest. The scenic qualities of landforms, vegetation, and streams within the WSR corridor are unique. The landforms are very steep with lush tropical vegetation. There is a variety of large boulders in the streams and along the

backs. The Sierra Palm is the dominate Palm species at the headwaters of the three rivers. As the rivers meander down stream large native tree species begin to appear. There is a wide range of different shades of green which is generated by the vast amount of trees varieties that are found in the CNF. Water flows vary from the headwaters where the water flow is hardly noticeable. As the streams become rivers, the amount of water increases and the flow becomes faster as the terrain becomes very steep. Water cascades down along the large boulders which create pools and small waterfalls. Views of the river corridor can be seen from along the edges of forest roads and trails, from within the watershed area, from the riverbank, and from within the river itself. The steep nature of the topography in the forest and the variety of trees types and sizes makes panoramic viewing of the rivers very challenging.

The streams and surrounding corridors have common characteristics. The rivers through their swales have a moderate to steep gradient and rapid pool flow characteristics with many cascades and small waterfalls. The swales are steep and wide with extensive exposed bedrock. The streambed is rocky with numerous large boulders. The Rio Icacos is the exception which has a sandy base and shore lines along the upper segments of the river. In its lower segment it becomes steep with huge rock outcrops as the other rivers.

3.5.2 Recreational:

The existing recreation use in the river corridors is hiking, biking, picnicking, scenic driving, and water play. These occur throughout the year. Water play and picnicking is of particular interest as a carrying capacity consideration because it is space-limited to relatively narrow areas. The variety of water play experiences along Rio Mameyes and Rio de la Mina can generally be divided into the following two sections:

Palo Colorado Recreation Area – Wading and Water play

From Baño Grande downstream to La Mina Falls (.9 miles) – Recreation Section.

Punte Roto – Swimming, Wading and Water play

This is the most well known water play area of the Rio Mameyes. From Angelito Trail downstream to Puente Roto (1.0 mile). Most of the water play use on Rio Mameys takes place at Puente Roto.

The heaviest use occurs in during the summer and winter months.

Other activities include viewing nature and wildlife, visiting recreation areas and historic sites (CCC projects) and hiking along the nature trails are the primary recreational uses in the Forest. Picnicking and primitive camping are also favorite recreation activities that occur in the forest. Palo Colorado Recreation Area receives the heaviest developed recreation use. This site has trails, picnic shelters, bathrooms, visitor information services, interpretive hikes and abundant parking. Rio de la Mina runs through the picnic area and people enjoy getting into the river at this location. At the end of the recreation segment of Rio de la Mina is located La Mina Falls which is at the end of Big Tree Trail. This site is also heavily visited year round. A different condition exists at Puente Roto which is a dispersed recreation site adjacent to the Rio Mameyes.

There is no boating or rafting on the rivers because they are too shallow and there are large boulders found throughout the rivers. Fishing and hunting is not allowed in the Forest. The Forest is a passive recreation site where the natural setting is the dominate element and people come to enjoy and be a part of the lush and passive tropical rain forest setting.

Existing parking areas are used to capacity many weekends throughout the year. Parking congestion can also occur during long weekends and during the summer, especially during the month of July. Parking along the road at designated overflow areas tends to slow traffic and add to congestion problems. Within Puente Roto parking is allowed in designated areas only. There is one access point for bathers to the river. Other accesses to the rivers edge occur on a number of steep user-created trails.

There is no Average Annual Daily Traffic count (AADT) for State Road PR 988 which leads to Puente Roto. Use is considerably higher weekends and during holidays. Land-based use such as picnicking, sightseeing, sunbathing, water play is actually considerably higher on most weekends. The constricted nature of the area makes the need evident to protect activities from over-crowding portions of the corridor.

3.5.2 Geologic: Elevation on the Forest range from 100 feet at the northern boundary, to 3,533 feet at El Toro Peak. Terrain ranges from gentle slopes in low elevations to rugged side slopes exceeding 60% in higher elevations, where vertical rock-faced cliffs are numerous. On the Forest's north slopes, (Rio Mameyes and Rio de la Mina) water courses drop rapidly at high elevations and more gradually below. The reverse is true on south slopes, (Rio Icacos) where most streams are less steep near their headwaters than further downstream. Geologic parent materials are of three basic types:

- Marine-deposited Cretaceous volcanic rocks, which are the most wide spread.
- Tertiary intrusive quartz diorites, which occur on the south side of the Forest.
- Quaternary unconsolidated alluvial deposits (sand, gravels, silts and clays) occurring along major water courses.

3.5.3 Soils:

Most nutrients necessary for plant growth are in the top 4 inches of the Forest's soils, as is typical of tropical rain forest. Most Forest soils are comprised of high percentages of clay (45-80%). Sandy textured soils are associated with the area of quartz diorite parent rock on the Forest's south side where the Rio Icacos is located. Intense rains and steep slopes make the Forest's soils highly erodible when vegetative cover is removed. The sandy diorite-derived soils lack cohesion, so they are particularly susceptible to erosion.

Montane wetlands occur on slopes where soils are shallow and poorly drained.

Evapotranspiration is low, and water does not drain rapidly. As a result, soils above 2,000 feet (600 meters) elevation are generally saturated with water, even on exposed slopes. The extreme wetness of the soils gives rise to bog conditions, including growth of sphagnum moss, superficial plant roots and accumulation of incompletely decomposed organic matter.

The Picacho-Utuado complex, 5 to 35 % slopes, is on hills and footslopes in mountain river valleys. This complex is characterized by dissected low hills and drainageways between steep side slopes and the adjacent alluvial lands. This unit receives water from the adjacent upper areas and from frequent rainfall.

Icacos	Mapping	Description
Scenic	Icacos Loam	Floodplain soils at middle elevations.
Scenic	Picacho-Utado Complex, 35 to 80% slopes	Mountain side soils at middle and upper elevations.
Scenic	Picacho-Utuado Complex, 5 to 30% slopes	Hills and foot slopes soils located in river valleys at middle and high elevations.
Scenic	Picacho-Ciales Complex, 5 to 35% slopes	Ridge top soils at middle elevations.
Scenic	Yunque cobbly clay, 40 to 80% slopes, extremely stony	Mountain canyons and side slopes soils.
Scenic	Zarzal very cobbly clay, 40 to 80% slopes	Mountain side slope soils lower elevations.

La Mina River	Mapping Unit	Description
Scenic	Picacho-Ciales Complex, 5 to 35% slopes	Ridge top soils at middle elevations.
Scenic	Yunque-Los Guineos-Moteado Complex, 5 to 30% slopes	Summit, ridgetops, and mountain side slopes at upper and middle elevations.
Scenic, Recreation	Yunque-Moteado Complex, 20 to 65% slopes	Mountain side slopes soils at middle and upper elevations.
Scenic	Guayabota-Yunque Complex, 30 to 60% slopes	Mountain side slopes soils at middle elevations.
Recreation	Palm-Yunque complex, 35 to 85% slopes, extremely stony	Mountain side slopes soils at upper elevations.
Recreation	Guayabota-Yunque complex, 30 to 60% slopes	Mountain side slopes soils at middle elevations.

Mameyes River	Mapping Unit	Description
Scenic	Zarzal – Cristal Complex, 20 to 60% slopes	Mountain side soils dominant at lower elevations.
Scenic, Recreation	Cristal-Zarzal Complex, 5 to 40% slopes	Mountain side soils dominant at lower elevations.

Scenic, Recreation	Zarzal very cobbly clay, 40 to 80% slopes	Mountain side soils dominant at lower elevations.
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3.5.4 Wild and Scenic River Classifications

There are three classifications of rivers, or river segments, in the National Wild and Scenic Rivers System—Wild, Scenic, and Recreational. Classification is based on the condition of the river and the adjacent lands at the time of designation. The CNF Wild and Scenic Rivers have one or more classifications for different segments of the rivers. (See map on page 25)

A. Wild River. The rivers should be free of impoundments. The shoreline should be essentially primitive with little or no evidence of human activity; however, the presence of a few inconspicuous structures is acceptable. There should be little or no evidence of past timber harvest and no ongoing timber harvest. The river area should be generally inaccessible except by trail. There should be no roads, railroads or other provision for vehicular travel; however, a few existing roads leading to the boundary of the river area are acceptable. Water quality meets or exceeds criteria of federally approved State standards for aesthetics, propagation of fish and wildlife normally adapted to the river, and primary contact recreation.

Rio Mameyes Wild Classification begins at its headwaters in the Baño de Oro Natural Area to the crossing point of Trail No. 24/11 (Rio de la Mina and Bisley Trails, approximately 500 feet upstream from the confluence with the Rio de la Mina), a total of approximately 1.6 miles.

B. Scenic River. The river should be free of impoundments. The shoreline should be largely primitive and dispersed with no substantial evidence of human activity; however, the presence of small communities, dispersed dwellings or farm structures is acceptable. Evidence of past or ongoing timber harvest is acceptable if the forest appears natural from the riverbank. The river area may be accessible in places by roads and roads may occasionally reach or bridge the river. The existence of short stretches of conspicuous or longer stretches of inconspicuous roads or railroads is acceptable. No criteria for water quality is prescribed in the Wild and Scenic Rivers Act. Poor water quality does not preclude classification provided a water quality improvement plan exists or is being developed.

Rio Mameyes Scenic Classification begins from the crossing point of Rio de la Mina Trail (Trail #24) and Bislay Trail (Trail #11) to the access point with Angelito Trail (Trail #7) bathing area (Charca Las Damas), a total of approximately 1.4 miles.

Rio Icacos Scenic Classification begins at its headwaters and moves south to the southern boundary of the CNF a total of approximately 2.3 miles.

Rio de la Mina Scenic Classification begins at La Mina Falls and moves North downstream to its confluence with the Rio Mameyes, a total of approximately 1.2 miles.

C. Recreational River. The river may have some development with substantial evidence of human activity. The presence of extensive residential developments and a few commercial structures is acceptable. Lands may have been developed for a full range of agricultural or

forestry uses and may show evidence of past or ongoing timber harvest. The river area may be readily accessible by roads or railroads. The existence of parallel roads or railroads on one or both banks and bridge crossings is acceptable. No criteria for water quality prescribed in the Act. Poor water quality does not preclude classification provided a water quality improvement plan exists or is being developed.

Rio de la Mina Recreational Classification begins at its headwater West of the Palo Colorado Recreation Area. It flows in an easterly direction crossing Baño de Oro Trail (Trail #25) and flowing through the Baño Grande Pool Area. The river crosses PR 191 at the Palo Colorado Picnic Area at Km.12.1. It flows through the picnic area and parallel to La Mina Trail (Trail #12) to La Mina Falls a total of approximately 0.9 miles. Palo Colorado and La Mina Falls are the most active recreation sites on the Forest. La Mina Falls is accessible by La Mina Trail (Trail #12) from the South and by Big Tree Trail (Trail #13) from the North. The Falls are located at the end of both trails making the Falls a favorite place to relax and enjoy the flora and fauna of this unique tropical setting.

Rio Mameyes Recreational Classification begins at the crossing with Angelito Trail (Trail #17) and flows north to Puente Roto which is the crossing point with PR 988 which flows to the northern boundary of the Forest. Puente Roto is a bridge crossing which has open areas near the road that are used as parking for bathers that enjoy cooling off in the different ponds that occur at this location. Puente Roto and Angelito Trail is used by residents who live in the surrounding communities (Sabana, Mameyes, Mata de Platano and Buena Vista Carrion) to the Forest.

Chapter 4: Environmental Consequences of Alternatives

4.1 Introduction

This chapter addresses the alternatives by how they relate to issues and by what environmental effects to expect to each resource area of the CNF. This document will use direct, indirect, and cumulative effects to display the most likely effects using the best available science. The direct effects are immediate and absolutely linked from the result of the actions. Indirect effects are the incidental consequences from the actions, they may be immediate or not long after the action is done. Cumulative effects is the long-term outcomes from the actions.

Complete alternatives are found in Chapter 2 of this document.

Alternative 1

This Alternative includes only the existing Standards and Guidelines outlined in the Forest Plan and in Management Area 9 that does not conflict with the protection or enhancement of the Outstandingly Remarkable Values for the river Corridors.

Alternative 2 (Preferred alternative)

This Alternative emphasizes the protection and enhancement of the Outstandingly Remarkable Values of the WSR's. Also it replaces new goals, directions, standards and guidelines to the Forest Plan specific to the WSR rivers and recreation sites located in the river corridors.

4.2 Comparison of Alternatives by Resource Areas

Issue/Activity	Alternative 1	Alternative 2
Recreation/ Social	Meet ROS and VQO Setting parameters specified for each segment. No effects to Social state due to rivers still with the CNF.	Emphasis on enhancement of values and riparian restoration in corridor and address overcrowding and use impacts at La Mina Falls and Puente Roto.
Scenery	Meet ROS and VQO Setting parameters specified for each segment.	Meet ROS and SMS Setting parameters specified for each segment. Prioritize rehabilitation of impacted sites cause by landslides in Recreation and Scenic River Segments.
Wildlife/ Fisheries	No significant impacts due to administrative nature of proposed actions. River sections are protected under Forest Plan	Improved administrative protection by adding another layer of management designations. Possible effects on MIS in the recreational sections from public use & development.
Vegetation	No significant impacts due to administrative nature of proposed actions. Rivers sections are protected under Forest Plan	Improved administrative protection by adding another layer of management designations. Possible effects in the recreational sections from public use & development.
Soils/Geology	No significant impacts due to administrative nature of proposed actions. Rivers sections are protected under Forest Plan	Prioritize rehabilitation of impacted sites cause by landslides in Recreation and Scenic River Segments. Possible effects in the recreational sections from public use & development.
Heritage Resources	No significant impacts due to administrative nature of proposed actions. Rivers sections are protected under Forest Plan	Improve administrative protection by adding another layer of management designations. Possible effects in the recreational sections from public use & development.

4.3 Comparison of Alternatives

Existing conditions for each resource area can be found in Chapter 3 of this document.

4.3.1 Effects on Recreation/Social aspects

Alternative 1 Direct and Indirect Effects:

A variety of future recreation opportunities would still be provided. The quality of recreation experiences at peak periods may decline as crowding increases in the WSR corridor.

Alternative 2 Direct and Indirect Effects:

Limiting recreational actions in the recreation river sections to the proposed amendment (Chapter 2) and prohibiting recreation developing management actions in the wild scenic areas would limit the types of activities that occur in the water and require compliance to the new WSR designation. Recreation opportunities would be managed for capacity and activities at the recreation segments of the rivers.

4.3.2 Effects on Scenery

Alternative 1 Direct and Indirect Effects:

The visual quality of National Forest lands will remain generally high. However, some sites and trails in the corridor will tend to be impacted by increased visitation. Soil loss, trampled vegetation, and congestion of vehicles are likely to be more evident in Alternative 1 than in Alternative 2.

Alternative 2 Direct and Indirect Effects:

Designating higher standards & guidelines for sceneries would change the type of management & recreation activities that would now need to contribute to the designation's intent allowed in the WSR corridors. Visual quality of the National Forest lands in the corridors would remain high. Soil loss and site impacts would be less evident because of an emphasis on special site protection.

4.3.3 Effects on Wildlife and Fisheries Resources

In the BA the risk analysis was conducted on the PETS species and were found to have "May effect, but not likely to adversely affects to the Puerto Rican (PR) Sharp-shinned hawk, PR Broad-winged hawk" and a May effect, but not likely to adversely affect the PR Boa, beneficial effects are expected" and a "No effects to the Endangered Plants" and a "No impacts to Desmarest's Fig-eating Bat or the Web-footed Coqui".

Alternative 1 Direct and Indirect Effects

Water quality problems may increase because of soil loss from stream banks and landslides. Point source pollution could slightly diminish aquatic habitat quality. Continued overuse of recreational sites from overcrowding at high visitor periods may contribute to periodic aquatic conditions degradation. A loss in the quantity or condition of aquatic habitat could result in downward trends in local fish and freshwater shrimp populations.

Alternative 2 Direct and Indirect Effects

The limitation of recreation activities and improving management activities that contribute to the new WSR designation will to improve water quality and aquatic habitat in the WSR corridor area. Emphasis on management activities and programs that contribute to the outstanding remarkable values in the watershed would provide stable terrestrial and aquatic conditions. Controlled public use at the recreational sites and areas has positive effects due to allowing natural conditions to remain intact. Any new recreational development within the recreation section of the WSR corridor will obviously have effects through manipulation of natural conditions and possible introductions of non-natural materials such as cement, metal and treated wood. New developments will be required to meet WSR requirements to keep in compliance with the new amendment

4.3.4 Effects on Botanical

Alternative 1 Direct and Indirect Effects

Trampling of plants would likely increase as recreation use intensifies over time on trails and recreation sites. Pathways created by river users would tend to increase. Key plant habitats identified in the present WSR would need prioritized attention to provide management actions to rehabilitate damaged areas.

Alternative 2 Direct and Indirect Effects

Limiting recreation and management activities that don't contribute to the new WSR will reduce the plant trampling. Plant communities would benefit from stream bank restoration and return many sections that are naturally damaged rapidly to natural conditions with emphasis on WSR requirements. Key plant habitats identified would be further protected from the designations and reduce manager's need to address human-induced problems. Any new recreational development within the recreation section of the WSR corridor will obviously have effects through manipulation of natural conditions and possible introductions of non-natural materials such as cement, metal and treated wood. New developments will be required to meet WSR requirements to keep in compliance with the new amendment

4.3.5 Effects on Soils/Geology

Alternative 1 Direct and Indirect Effects:

Soils & Geological resources would be protected, but in the face of increasing public use at recreation sites and trails will have adverse effects. Recreationists would trample in dispersed locations affect the consistency of soils. Soils may exhibit more impairment on trails and recreation sites through sedimentation entering the rivers from the heavy rainfall events. Minor damage to rocks may occur through fractions of rock walls or bed rock. Overall geology will not have significant impacts.

Alternative 2 Direct and Indirect Effects

Allowing only for recreation and management that would comply with the WSR amendment would provide positive effects for this resource. There would be more emphasis on the stabilization of soils in the event of landslides or other natural events. No mining within the WSR corridor would provide improve stability of soil resources. Any new recreational development within the recreation section of the WSR corridor will obviously have effects through manipulation of natural conditions and possible introductions of non-natural materials such as cement, metal and treated wood. New developments will be required to meet WSR requirements to keep in compliance with the new amendment.

4.3.6 Effect on Heritage and Cultural resources

Alternative 1 Direct and Indirect Effects

Sites would be protected and some limited interpretive services would be available to the public. Higher periodic public use may contribute to further deterioration of historic structures and raise program costs due to rehabilitation needs.

Alternative 2 Direct and Indirect Effects

Limitation of visitors to carry-capacities parameters will provide positive effects. There would be more interpretive opportunities in the La Mina cultural resource area promoting public education of the correct use of the resources. Prohibitions of destructive impacts would have the effects of retaining historic resources in good conditions.

4.3.7 Cumulative Effects on all resources areas

There are no long-term adverse cumulative effects to resources and users in the Wild and Scenic River corridors sections. Based on the more restrictive management directions

identified in Chapter 2, wild and scenic sections receive protections that preserve the outstanding remarkable values of the natural conditions. Some increase in recreational use may occur over time, but the proposed standards & guidelines will prevent adverse effects. Carry-capacity limitations will be beneficial for all resources areas.

There are no significant long-term effects, but there are potentially minor long-term adverse effects to the recreational sections because the new amendment would require the construction of new developments to meet future dispersed and developed recreation needs. A long-term concern is the impacts of any type of construction to the resource areas. These projects would need to undergo their respective National Environmental Policy Act (NEPA) process and would be treated individually.

As a result, the expected cumulative effects from this administrative proposed action will not be any greater than the direct effect disclosed above.

Appendix A: Recreation Carrying Capacity Evaluation

Factors to Consider in Evaluating Recreation Carrying Capacity

Several methodologies of addressing the recreational carrying capacity of rivers have been developed and generally focus on these factors:

Physical: Physical factors include river access and parking. The present level of parking isn't adequate to accommodate the peak weekend use.

Social: Social factors include any use conditions that may lead to negative recreation experiences of users such as overcrowding.

Ecological: Ecological factors include any components of the ecosystem that may be negatively affected by recreational use. The integrity of plant communities, the populations of rare plants, and wildlife and fish habitat are part of the Outstandingly Remarkable Values of the river corridor.

Appendix B: Public Involvement

Public involvement for the CNF Comprehensive River Management Plan began with a public notice and a scoping letter dated April 11, 2005. The letter was mailed to state and federal agencies, Mayors of the municipalities that border the Forest and local environmental groups.

The scoping letter was made available to the general public on the Forest internet Web site at www.fs.fed.us/r8/caribbean. Information was updated as the EA process progressed.

1. Unión de Abogados – Servicios Legales de Puerto Rico (Lawyers Union – Puerto Rico Legal Services)

- a. Record of Decision from the LRMP EIS (Pg. 13) – What is meant by “Dropping the proposal to designate the Forest a municipal watershed.” Does this mean that the water will no longer be available to towns?”
- b. LRMP (pg. 4-90) Research versus experiments in or near designated WSR.
- c. LRMP (pg. 4-47) Water needs of surrounding municipalities.
- d. LRMP (pg. 3-3) Management Area 8 – Timber Demonstration. Is it close to the WSR? **Many questions regarding this management area which are not directly relate to the CRMP.**
- e. According to the President of the “Colegio de Ingenieros”, Roberto Rexach Cintron, (Assoc. Press, April 3, 2005) “...for the last 20 years water from El Yunque has been bottled and sold”. Is the Federal Government selling water? **No.**
- f. Is the Wilderness designation related to the WSR? **No.**
- g. Requested that the comment period be extended. **No extended.**

2. Pedro Diaz – USGS Caribbean Water Science Center

- a. Concern regarding tributaries/streams that connect to La Mina River, specifically Juan Diego. **Will be monitored.**
- b. Concern regarding tributaries/streams that connect to Rio Icacos, specifically Rio Prieto, Rio Sabana and RioCubuy. **Connection occurs outside the Forest boundary.**
- c. Quebrada Juan Diego should be monitored as part of the La Mina River because of its recreational use and is crossed by PR 191. **Will monitors**
- d. The USGS streamflow stations for the Mameyes and Icacos River are available for this study if needed. Water quality sensors can be added to these stations if requested.

3. Frank Wadsworth, Volunteer – Int. Inst. Of Tropical Forestry

- a. Free flowing outside of Forest boundary? (Catadromous Aquatic Species)
- b. Recreation segments are not spelled out in the law.
- c. Rio La Mina needs to be monitored closely because of the septic systems located at Palo Colorado and Sierra Palm Recreation Areas. **Will be monitored.**
- d. When was the La Mina mine in use 1883? **Correct**
- e. Does “Consulting with the Commonwealth” mean not damming or polluting the lower portions of the Rio Mameyes? **Forest Service does not have jurisdiction of the rivers outside of the forest boundary.**
- f. The LRMP established management direction for the WSR. Will the CRMP establish new directions? **The CRMP will revise and update management practices.**

Appendix C: List of Preparers

Interdisciplinary Team

Jose R. Ortega – ID Team Leader (2005), Recreation Program Leader. He has a Bachelors Degree in Landscape Architecture from Kansas State University and has 16 years of experience with the Forest Service. He has worked as the Forest Landscape Architect and has participated in numerous Forest recreation projects and ID Teams.

Pedro Rios – Ecosystems Team Leader & re-examiner and NEPA rewriter (2010). He has a Bachelors Degree in Agriculture form the University of Puerto Rico at Mayaguez and a Masters Degree in Forestry from North Carolina State University. He has 20 years of experience with the Forest Service.

Felipe Cano – Forest Biologist & NEPA rewriter (2010). He has a Bachelors Degree in Wildlife Sciences from the University of Arizona and has 6 years of experience with the Forest Service. He has worked for the Forest Service in Arkansas, Tennessee and Utah.

Jeff Walker – Archeologist. He has Ph.D. in Anthropology from Washington State University and has 20 years of experience with the Forest Service. He has also worked for the Forest Service in Oregon and Idaho as an Archaeologist; has extensive experience in Cultural Resource Management and was State Archaeologist for the Puerto Rico State Historic Preservation Office. His area of expertise is lithic technology of the Caribbean.

Luis A. Rivera – Forester. He has a Masters Degree in Biology Education from the University of Puerto Rico, Rio Piedras Campus and a Master Degree in Forestry from Yale University at New Heaven, Connecticut. Has 23 years of experience with the Forest Service in the Caribbean National Forest.

Fernando Perez – Hydrology Trainee. He has a Bachelors Degree in Natural Sciences from the University of PR, Cayey campus. He has 2 years of experience with the Forest Service on the Caribbean National Forest.

Blanca Ruiz – Interpretive & Conservation Education Program Manager. She has a Masters Degree in Planning; a Master’s Degree in Social Work and a Bachelor’s Degree in Education, all from the University of Puerto Rico, Río Piedras. She has worked for the DNER of Puerto Rico. She has also worked as an Assistant Professor in the Graduate School of Social Work of the University of Puerto Rico and as a private consultant in planning and social research. She has worked for the last 12 years with the Caribbean National Forest.

Technical Assistance and Support

Manuel Ortiz – CNF Customer Service and Property Team Leader

Carolyn Pabon – CNF Planning and Administrative Team Leader

Carolyn Krupp – CNF Special Uses and Lands

Angel Tosca – CNF Office Automations Clerk

Aurea Moragon – CNF Web Site Manager

Deborah Caffin – R8 Wilderness and Dispersed Recreation Specialist

Jackie Diedrich – National Wild and Scenic Rivers Specialist

Paul Arednt - Regional Planner

Myrna Tirado – CNF Information Receptionist

Appendix D: US Fish and Wildlife Service Concurrence Letter