

# El Yunque National Forest Proposed Action Management Strategies



## **Proposed Action Outline**

- I. Introduction
- II. The Need to Change the Current Forest Plan - Why a plan is changed?
- III. The 1997 Management Concept
- IV. Propose Management Concept
  - a. Planning Level
  - b. Collaboration
  - c. Conservation Education – Environmental Literacy
  - d. Experimental Forest
  - e. Broad Landscape and Lands
  - f. Social- Economic
  - g. Recreation Settings
  - h. Recreation Operations
  - i. Recreation Connecting the Communities
  - j. Special Recreational Places in EYNF
  - k. Forging Strategic Partnerships for EYNF
  - l. Knowing Our Visitors, Community, Stakeholders and Other Recreation Providers
  - m. Providing the Right Information
  - n. Developing a Sustainable Financial Foundation
  - o. Developing Our Workforce.
  - p. Scenic Character
  - q. Cultural Resources
  - r. Infrastructure
  - s. Roads
  - t. Economic and Ecosystem Services
  - u. Wetland
  - v. Vegetation
  - w. Soil
  - x. Water
  - y. Flora
  - z. Wildlife
  - aa. Climate Change
- V. Monitoring Proposal
- VI. Conclusions
- VII. Appendices
  - a. 1997 Forest Plans Issues
- VIII. References
- IX. Glossary

## **List of Figures and Tables**

Map 1.0 - Designated Areas of EYNF

Map 2.0 - Location Map with Proclamation Limits

Map 3.0 - Research Sites in EYNF

Map 4.0 - Population Density Surrounding EYNF

Map 5.0 - Recreation and Vegetation Settings of EYNF

Map 6.0 - EYNF Watershed by Municipality

Table 2.0 – EYNF Drainage Area per Watershed in Hectares

## I. Introduction

The purpose of this document is to present actions for use in developing El Yunque National Forest (Forest) Management Plan. The last Forest Plan was approved in 1997. The National Forest Management Act of 1976 requires each national forest to develop a land and resource Management Plan (commonly referred to as a forest plan) and amends or revises the plan every 10 to 15 years.

This document utilizes information gathered during the El Yunque National Forest (EYNF) Assessment, review of key findings, identification of findings that trigger a need to change the plan and the results of community meetings. The assessment process and community meetings resulted in a new understanding of the forest's ecological, economic, and social conditions.

Planning for a national forest plan is an interactive process that includes three phases:

1. Assessment (36CFR 219.6)
2. Developing, amending, or revising a forest plan (219.7 and 219.13 CFR)
3. Monitoring (219.12 CFR)

Forest personnel evaluated the plan under the new guidance of the 2012 Planning Rule.

The draft assessment is available for public review at:

<http://www.fs.usda.gov/detail/elyunque/landmanagement/planning/?cid=stelprdb5411336>. The assessment report identified and considered relevant and existing information contained in a variety of studies, plans, monitoring reports, and other relevant information. The assessment helped to rapidly determine the sustainability of existing ecological, economic, and social conditions and trends in relationship to current land management. Topics addressed in the assessment looked at issues related to the Forest and the broader landscape. This document is the transition from the assessment to the forest plan development phase.

Forest plans are required to have plan components. Plan components are the core elements of plans, and all projects and activities must be consistent with plan components. Plan components are:

- Desired conditions
- Objectives
- Standards
- Guidelines
- Suitability of lands

Changing plan components requires a formal process of revision or amending the plan. The proposed actions in this document constitute a set of ideas to be used in the process.

## II. Evaluation Process used to determine a Need to Change the Current Forest Plan

After completion of the draft assessment the Interdisciplinary Team (IDT) and other specialist identified findings, which triggered a need for change. The set of findings are contained in *El Yunque National Forest Need for Change* document. The team used the following criteria for deliberations:

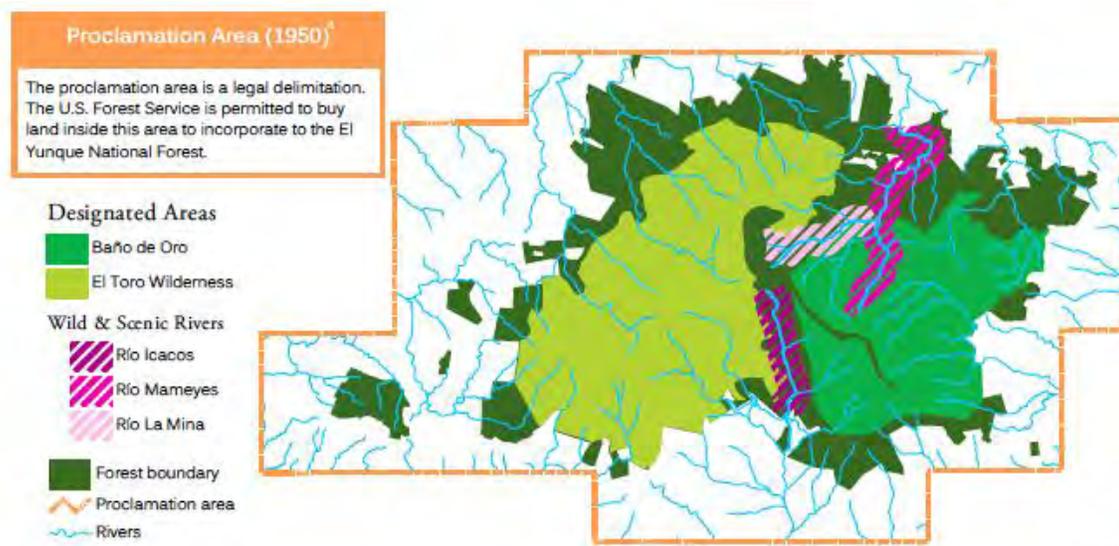
- Was the finding addressed in the 1997 Forest Plan?
- Have there been changes in law, policy, and regulation that apply to the finding?
- Is the finding relevant to current conditions or trends?
- Do the findings create the need to develop a specific monitoring protocol?

At the same time, a series of community meetings were conducted to share the assessment and the capture public concerns. Meetings were held in the municipalities of Naguabo, Fajardo, Las Piedras, Rio Grande and a forum was conducted in San Juan. The summary of the community comments is contained in the *Community Meeting Results* document.

### III. The 1997 Plan Concept – Where are we today?

In 1997, the Forest Service developed a management plan that considered several issues and management needs. The Forest Plan was issue driven. The 1997 management concept focused on a strong conservation approach. The planning strategy was for developing solutions to nine issues through plan components. The idea was to obtain a formal designation for the Research Natural Areas, Wild and Scenic Rivers, and Wilderness (Map 1.0). In addition, primary forest was protected through a series of plan components. The idea was to protect the unique ecological resource from different perspectives. Finally, the plan addressed the utilization of water, wildlife, and research. The social needs were addressed through recreation and access initiatives.

Map 1.0-Designated Areas of EYNF



The 1997 Plan issues considered were:

1. Demonstrating Timber Production While Assuring Compatibility with a Diversity of Other Forest Values
2. Recommendation of Areas for Congressional Designation of Wilderness
3. Recommendation of Areas for Congressional Designation of Wild, Scenic or Recreation Rivers
4. Protection of the Primary Forest
5. Providing Recreation Opportunities While Protecting the Ecological Values of the Forest

6. Protection of Wildlife While Conducting Other Forest Management Activities
7. Providing and Protecting the Forest's Water Quantity and Quality
8. Providing and Managing Appropriate Forest Access
9. Meeting the Needs of Tropical Forestry Research While Protecting the Forest's Environmental Values

In 2007, a Comprehensive Evaluation Report (CER) of the Plan was conducted. The purpose was to review the accomplishments of the plan and recommend changes. The CER's findings were:

1. Landownership – Desired conditions should state priorities clearly and emphasize the need for more partnerships.
2. Access Management – Desired conditions should address greenhouse gas emissions caused by vehicle traffic.
3. Facilities – Desired conditions should be updated to address minimizing construction practices that contribute to greenhouse gas emissions.
4. Socioeconomics – Monitoring should be developed to gather data on social and economic trends for future evaluations.
5. Special Uses and Communication Sites – Public-private partnerships may need to be increased. Climate change, sustainability, and green technology Standards and Guidelines should be incorporated into permit uses.
6. Recreation – Standards and guidelines for camping should be updated.
7. Scenery – Standards and guidelines should be updated using new Scenery Management System.
8. Heritage – Desired conditions should provide emphasis on preserving and stabilizing heritage resources. Management Direction should be updated to reflect current science.
9. Minerals – Desired conditions should be updated to reflect Management Direction for minerals.
10. Vegetative Communities – Desired condition and management direction should be updated to reflect current science.
11. Fish and Wildlife – Desired conditions should be updated to provide protection for species that may be affected by climate change.
12. Air – Management direction should be updated to reflect current science.
13. Research – Desired conditions should be updated to address disclosure of research activities and promote high priority research topics for study for forest.
14. Timber Demonstration – Management Direction should be updated to reflect current science.

In summary, ten years after the approval of the 1997 plan, the need to change plan components was identified. Furthermore, the approval of the Wilderness and Wild & Scenic Rivers laws represented quite an achievement in land allocation.

#### **IV. Proposed Management Concept**

The significant number of recommendations from the Comprehensive Evaluation Report, progress made on 6 of the 9 issues, and the assessment findings create an argument to change the plan. This section presents statements that constitute the basis for sustaining the development of a new plan. The statements represent proposed actions. They describe a vision on which internal and external stakeholders can rally around and reflect the uniqueness of the forest. The proposals address planning, collaborative, sustainability, social, economic and ecological needs. The ideas are

strategic and provide overall guidance to an organization. They are necessarily broad and general, focus on goals and outcomes, and are flexible and easily updated and changed. They are based on the roles and contributions of EYNF as well as the management challenges ahead.

The section is divided in planning level, collaboration & adaptive management, experimental forest, environmental literacy and education, social, economic and ecosystem services, and ecological subjects. The actions proposed include plan components and management processes.

### **A. Planning Level**

The 2012 Planning Rule defines sustainability as the capability to meet the needs of the present generation without compromising the ability of future generations to meet their needs. For purposes of this part, “ecological sustainability” refers to the capability of ecosystems to maintain ecological functioning; “economic sustainability” refers to the capability of society to produce and consume or otherwise benefit from goods and services including contributions to jobs and market and nonmarket benefits; and “social sustainability” refers to the capability of society to support the network of relationships, traditions, culture, and activities that connect people to the land and to one another, and support vibrant communities.

There is a need to reconsider the overall management area scheme used in the 1997 Plan. There is a fundamental need for the revised plan to address how forest management in all resource areas should be prioritized given varying levels of money and personnel likely to be available over the course of the planning cycle. Plans have historically overpromised what could be accomplished, with limited regard for fiscal realities. Yet there is also a desire to keep options open in case unexpected funds and/or capacity become available.

There is a need to develop a new plan that considers the Forest realities of reduced budget, increased use, changing climate and diverse social conditions.

There is a need to better recognize and potentially enhance the role of El Yunque National Forest in supporting local economies through a service-based economy focused on recreation and tourism.

There is a need to include plan direction regarding potential climate change effects such as increases in storm events, flooding, and other extreme weather.

There is a need to incorporate opportunities for working across boundaries to manage landscapes with adjacent land managers such as state and federal partners and other land management entities.

## Map 2.0 - Location Map with Proclamation Limits



The Proposed Actions are to:

- Define the broader landscape as the eight municipalities surrounding the planning unit. Develop desired future conditions for the broader landscape.
- Develop a management framework that displays the relationship among natural, social, and economic systems.
- Identify plan components that focus on sustainability.
- Modify the number, arrangement, and boundaries of the plan's management areas to reduce complexity and increase flexibility.
- Define new management area direction to reflect realistic expectations regarding the amount of work that can be achieved within a planning cycle.
- Align the plan to the current institutional capacity.
- Develop an integrated management strategy for lands within the municipalities of Ceiba, Naguabo, Las Piedras, and Juncos, which recognizes the unique sub-regional landscape, social, and economic conditions.
- Incorporate plan components that foster adaptation and mitigation to climate change.
- Design recreation opportunity and settings, which consider the role of adjacent communities as partners in the management of recreation sites.

## **B. Collaborative Adaptive Management**

The 2012 Planning Rule defines collaboration as a structured manner in which a collection of people with diverse interests share knowledge, ideas, and resources while working together in an inclusive and cooperative manner toward a common purpose. Collaboration, in the context of land management planning, falls within the full spectrum of public engagement described in the Council on Environmental Quality's publication: "Collaboration in NEPA—A Handbook for NEPA Practitioners" (<http://ceq.hss.doe.gov/ntf/>).

There is a need to better define the role of collaborative management. The development of non-government organizations, placed-based organizations and new protected areas outside the forest create greater opportunities to collaborate.

The Proposed Actions are to:

- Shift from Forest Service driven management priorities to a more collaborative management.
- Assist in the development of communities capacity to participate in various management activities in such areas as interpretation, recreation, economic development, conservation, restoration, research and monitoring.
  - Development and partnering with regional actors, currently engaged in conservation, management, and land use in a sustainable manner.
  - Facilitation of structures similar to a State Technical Committees to integrate agencies and concerned citizens for the promotion, request of support or funds for programs, and outreach of incentives programs that could be considered by private land owners in the boundary areas.
  - Plan monitoring initiatives with United States Geological Survey (USGS), University of Puerto Rico (UPR) and citizen scientist groups in the rivers that flow from El Yunque.
- Integration with other agencies and governmental entities.

## **C. Environmental Illiteracy and Education**

The Assessment process identified a gap in knowledge regarding forest planning and management among communities and the youth in particular. We believe assisting in closing such a gap would improve the public's capacity to participate in the forest's conservation and sustainability management. Concurrently, conservation education needs to be expanded beyond traditional Forest Service Programs by integrating schools and municipalities in the region and adapting educational and interpretation materials to the local context.

There is a need to promote opportunities with volunteers and partners that will provide conservation education regarding national forest management and ecosystem services.

The Proposed Action is to develop management strategies that will:

- Engage communities in forest restoration activities to sustain long-term change.
- Work with schools and communities to provide education about the role of forest management.
- Develop alternatives that expand outreach of information outside of the Forest.

- Use technology to better get our messages out.
- Increase engagement with tourism offices at the municipal level.
- Consider allocation of areas dedicated for open classroom education.
- Integrate and update all new ecological information and science for all interpretation programs and El Portal.
- Include ecosystem services in the educational information about the forest.

#### **D. Experimental Forest**

Tropical forests constitute approximately one-half of the world's forests, cycle as much as 40% of the atmospheric C, and harbor well over one-half of the world's tree species. These forests occur in a variety of environments and life zones, provide a wide range of products and services, and vary in their response to natural and anthropogenic disturbances. Future climate scenarios anticipate drying conditions, more intensive wind storms, rising sea levels, and greater oscillation of the intensity of climatic events.

Effectively managing tropical ecosystems in the face of multifaceted global change requires the understanding of ecological and social mechanisms that drive the function of forest systems from wild lands to inner cities. International Institute of Tropical Forestry research will continue its tradition of research with international applications based on a platform in Puerto Rico.

The new Research Working Unit Description focuses on understanding ecosystem dynamics in the face of global change across a gradient from wild lands to working lands to cities. A new emphasis on understanding societal and institutional interactions with the landscape will help us inform management and predict future states of tropical forests.

The Proposed Actions are to:

- Revise plan components to facilitate research implementation focusing on:
  - Tropical ecosystem dynamics at watershed and landscape scales,
  - Assessing effects of climate and land use change,
  - Working lands: where human and ecological systems interact.
- Coordinate with the Caribbean Landscape Conservation Cooperative and the USDA Southeastern Climate Change Hub the needs for technology transfer.
- Create or revise plan components for an Air Research Site located near East Peak.
- Integrate research needs and related standards and guidelines into the management direction for the Wilderness.

#### **E. Broader Landscape and Lands**

Forested areas represent the largest portion of land cover in the region surrounding the EYNF, and forested cover has increased over the past several decades. Nonetheless, urban cover is increasing at a much more rapid pace, resulting in landscape fragmentation and negative effects on the Forest and other natural areas in the Region. Moreover, many of the negative effects of urbanization are likely to be compounded in the context of global climate change.

There is a need to incorporate strategies directed to control urbanization expansion surrounding EYNF.

Land dedicated to farms in the region surrounding the EYNF, is decreasing, while also being increasingly parceled and fragmented. Agricultural lands represent an opportunity for conservation for growing food, provide for wildlife, and employment through recreation.

There is a need to develop strategies that foster forest-agricultural initiatives.

EYNF land ownership has remained stable in recent years, though priority acquisition areas remain largely unprotected on private lands.

There is a need to ensure plan direction that promotes land base contiguity where possible and effective management of isolated tracts when necessary.

Plan direction should promote the maintenance of existing arrangements and the pursuit of new opportunities for land acquisition and conservation across Forest boundaries by working with adjacent and interested public and private land managers, land owners, and other stakeholders within a landscape approach.

The EYNF has several designated land uses, which contribute to forest conservation and social-ecological sustainability. Special designated land uses within the EYNF include federally-designated experimental forest, research natural area, wild and scenic river segments, and wilderness area.

There is a need to update and/or clarify plan direction regarding the management of designated areas, including the Luquillo Experimental Forest, El Toro Wilderness Area, Wild and Scenic Rivers, and others to reflect new designations since 1997 and to enhance the ecological, economic and social sustainability of the Forest.

The EYNF encompasses over 30 miles of roads and 36 miles of trails, but given its popularity, there is frequent congestion and overcrowding of the Forest during high visitation periods in early spring and summer.

There is a need to provide continued maintenance and management to roads and trails in the Forest and for plan direction to promote new approaches for managing and maintaining roads and trails (e.g., transit system; partnerships for road and trail maintenance, management and maintenance prioritization). The Forest is a major service provider of water for the region. There is a need to integrate watershed management concepts by municipalities.

The Proposed Actions are to:

- Provide updated guidance for managing the Forest within the context of the larger landscape and for addressing local land use changes and the associated impacts on the Forest. For example, develop management strategies to find opportunities to include partnerships, collaborative efforts, and coalitions of support to promote sustainability and to solve existing and future challenges at the landscape level.
- Collaborate with Municipalities' Territorial Plan and Puerto Rico Land Use Plans by fostering an All Lands Regional perspective.
- Create a land acquisition plan that promotes conservation initiatives for protection of surrounding hills, stream corridors, riparian areas, Wild & Scenic Rivers corridors, and connections to the Gran Reserva de Noreste Rivers Reserve.

- Integrate lands programs to include conservation easements and other land conservation and restoration programs this means conservation easements could be pursued, also donation of lands from the private sector could be incorporated.
- Plan, develop and participate in agro-forestry initiatives with partners.
- Examine additional designations in the context of reducing management burden.
- Create plan direction that addresses roads and trails sustainability due to reduced maintenance funds, physical conditions, and climate change.
- Develop strategies for continued land ownership adjustments giving priority to lands that:
  - Help consolidate large blocks of existing NFS lands (as opposed to adding onto small or isolated blocks);
  - Protect resource values on adjacent, existing NFS land;
  - Contribute to the recovery of threatened or endangered species or aid in the protection of diverse species;
  - Enhance recreation, public access and protection of aesthetic values, especially those that provide public access to waterways; and Provide for the protection of important cultural resources.
  - Complement a designated special area such as a wilderness area or Wild and Scenic River.

## **F. Social-Economic**

The Regional population is large, dense, and growing, albeit at a slower pace than in decades past. Per capita and family wealth in the Region has increased over many decades, but only modestly outpacing inflation. Overall, poverty rates remain high among families and particularly, among children. Unemployment rates also are high, but slowly improving. Additionally, the regional population is aging, yet still maintains a significant portion that is young.

There is a need for plan direction to continue to provide a sustainable supply of goods and services to local and other populations, including the need to support community-based economic development and opportunities and to promote human health and well-being in and around the Forest. Plan direction also should update, adapt, or target the spectrum of recreation opportunities to better reflect current and projected demands and potential impacts from an aging population. Strategies should be directed to improve existing recreation opportunities and develop new services within a long-term vision.

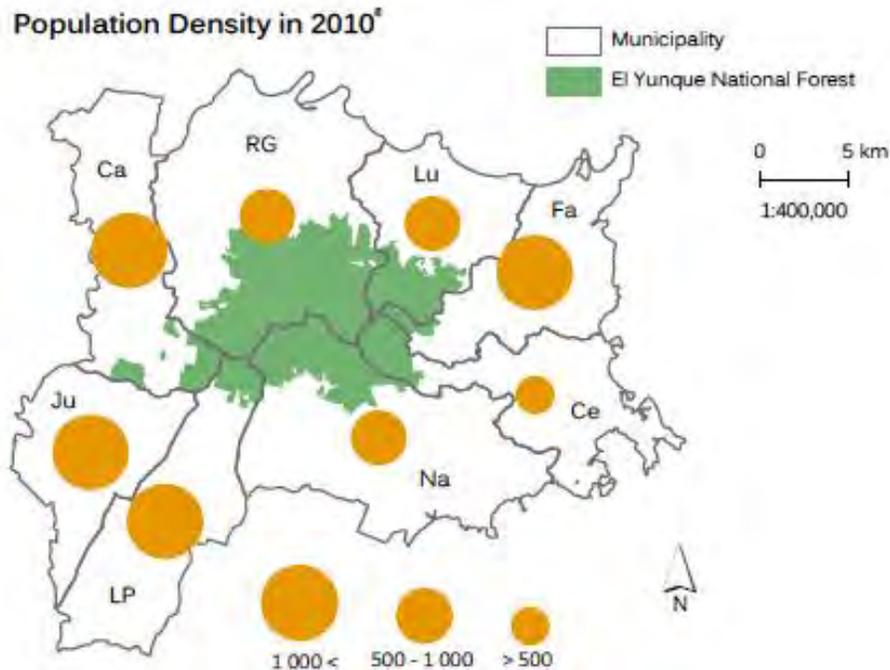
Per capita and family wealth in the Region has increased, but only modestly outpacing the Island's inflation, and unemployment rates, which are slowly improving. However, poverty remains high among families and, particularly, among children, and populations to the south of the Forest demonstrates the highest rates of poverty and unemployment. There is a need for plan direction to continue, and find new ways, to provide a sustainable supply of goods and services that lends support to local communities and their economies, while being consistent with achieving desired conditions. Plan direction should be responsive to changes in demands for facilities and services that result from changing demographics of local and other populations, as well as to differences in those demands within the region surrounding the forest.

The Proposed Actions are:

- Create recreational opportunities that consider regional population changes and new visitation patterns.

- Design a forest plan that supports community -based economic interests and promote human health and wellbeing.
- Collaborate with local communities to facilitate economic opportunities through our permit process.

Map 4.0 - Population Density Surrounding EYNF



## G. Recreational Settings

Public access to different parts of the Forest beyond the high visitation corridor have been limited. Access to recreation areas need to take into consideration carrying capacity.

The Proposed Actions are to:

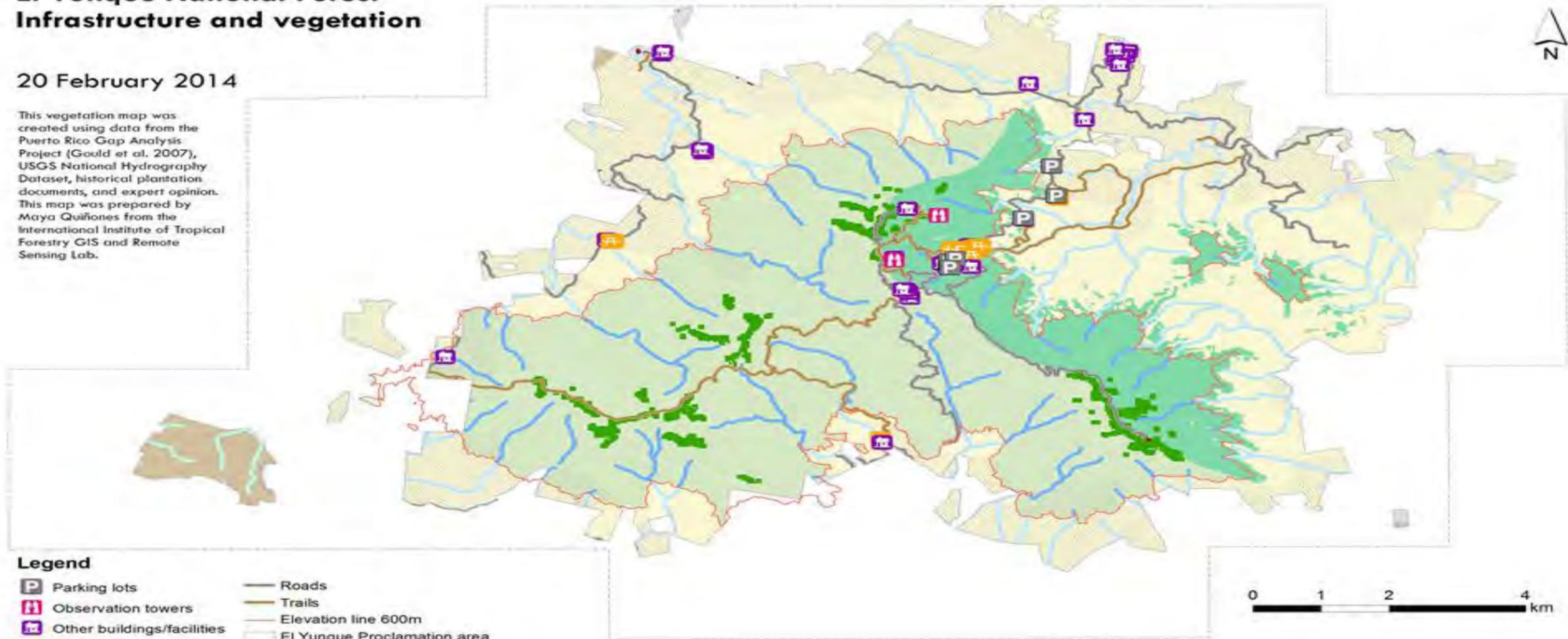
- Create new recreational opportunities at lower elevations.
- Use the recreational sustainability framework as a guide to developing plan components. Recreation uses should be managed looking at overarching principles that consider the interconnected social, economic, and ecological issues.
- Restore recreational settings that have been affected by climatic changes and inappropriate use to improve the quality of outdoor experiences. Resolve unmanaged recreation challenges through a planned and properly designed network of roads, trails, and facilities. Use educated citizen stewardship and partnerships, as well as field presence to provide quality recreation experiences, while reducing the effects of visitor use on the landscape.

Map 5.0 - Recreation and Vegetation Settings of EYNF

## El Yunque National Forest Infrastructure and vegetation

20 February 2014

This vegetation map was created using data from the Puerto Rico Gap Analysis Project (Gould et al. 2007), USGS National Hydrography Dataset, historical plantation documents, and expert opinion. This map was prepared by Maya Quiñones from the International Institute of Tropical Forestry GIS and Remote Sensing Lab.



### Legend

- Parking lots
- Observation towers
- Other buildings/facilities
- Picnic areas
- Roads
- Trails
- Elevation line 600m
- El Yunque Proclamation area

- Non forest - natural barrens, grasslands and shrubland
- Developed

### Forest types

#### M279 Caribbean Montane Humid Forest

##### G448 Caribbean wet montane forest group

- Mature Tabonuco and Sierra Palm montane forest
- Planted / secondary montane wet forest

#### M280 Caribbean Cloud Forest

##### G451 Caribbean montane cloud forest group

- Mature Elfin woodland montane cloud forest
- Mature Palo Colorado and Sierra Palm montane rain cloud forest
- Mature Palo Colorado and Sierra Palm montane wet cloud forest
- Planted / secondary montane wet cloud forest

#### M281 Caribbean Lowland Humid Forest

##### G454 Caribbean moist lowland submontane forest

- Planted / secondary submontane moist forest

#### Riparian forest

- Riparian montane cloud forest
- Riparian montane forest
- Riparian submontane moist forest

- Focus acquisition of rights-of-way and conservation easements that enhance access to recreation settings while protecting the scenery and sense of place that make each recreation setting special.
- Consider diverse transportation and access opportunities at a broader landscape.
- Update wilderness management direction to address the potential effects on wilderness from introduced species, urban encroachment/development near boundaries, or planned developed use.
- Review opportunities to provide for additional developed or group camping opportunities on the Forest and within the broader landscape.
- Review the underutilized and abandoned facilities on the forest to see if any could be suitable as camping areas or other co-management alternatives.
- Develop a trail system that is based on demand, safety, administrative operation, maintenance and ecological constraints, and co-management opportunities.
- Develop a Forest access strategy integrated with the regional elements such as tourism, recreation and existing protected areas while recognizing the opportunity to diversify access and alleviate high use on PR-191.
- Improve barrier free accessibility opportunities. Restore the condition and function of the recreation facilities and settings, expanding and adapting them to reflect the diversity of the culture, the abilities, family structure, and activities in our ever-changing society.
- Develop a management strategy to integrate and update new ecological information and science into the interpretation program.
- Develop a management strategy that includes ecosystem services as a part of the educational information about the Forest.

## **H. Recreational Operations**

Visitation to the EYNF continues to increase, creating more pressure on PR-191 Recreation Corridor. There is a need to develop Standards and Guidelines related to Forest crowding during high use periods.

The Proposed Actions are to:

- Incorporate administrative capacity elements such as bathroom, parking facilities, carrying capacity, and monitoring in providing for recreational opportunities.
- Develop plan direction to address recreation use capacity, which would consider elements such as hosting, parking, and quality of facilities.
- Reduce environmental footprints and serve as a model for our visitors and other providers by incorporating sustainable travel industry best practices in our operations and using “green technology” for facility and trail construction.
- Develop standards and guidelines that address waste management at developed recreation sites.
- Develop noise standard and guidelines through special use permits.

- Revise the standards and guidelines for the management of designated wild and scenic river segments. Additional direction is especially needed to address trash management and monitoring of uses and their effects.

### **I. Recreation Connecting the Communities**

The recreation facilities are concentrated along PR-191 North Recreational Corridor. These areas are deep inside the forest boundary and away from local communities. The forest has limited relationships with surrounding communities.

The Proposed Action is to develop management strategies that will:

- Develop and implement place-based recreation opportunities using collaborative processes to work with communities and other outdoor recreation and tourism providers within our regional destination areas.
- Develop a common vision to sustain the economic and quality of life benefits from recreation and tourism assets within these destinations.
- Connect urban areas and rural communities to the scenic attractions, historic places, and recreation opportunities.
- Evaluate community and state parks, and other federal, and local open space lands for connections with Forest lands to help meet the outdoor recreation and tourism demands for the area.

### **J. Special Recreational Places in EYNF**

El Toro Wilderness Law was signed in 2005. There is a need to update plan direction for managing wilderness. Particular management concerns include limited use, special use permitting, and control of non-native species.

The P.R. Planning Board passed a resolution asking local government to define a scenic route along P.R. Road 186.

The Proposed Actions are to:

- Develop plan components for the El Toro Wilderness Area that will address limiting use when necessary and the control of non-native species.
- Develop management components that would facilitate a PR 186 Scenic Route.

### **K. Forging Strategic Partnerships for EYNF**

Strategic partnerships are vital to providing sustainable recreation experiences.

The Proposed Action is to develop management strategies that will:

- Cultivate coalitions of recreation interest groups that will help provide recreational experiences, service activities, and environmental education for youth and adults that promote fitness, appreciation of nature and history, and citizen stewardship.

- Seek opportunities to expand the demographic diversity of our recreation visitors by strengthening relationships with new partners and non-traditional users.
- Streamline our partnership processes and increase our capacity to engage and support partners. These actions will contribute to a long-term sustainability and relevance to society of natural and cultural landscapes.

#### **L. Know Our Visitors, Community Stakeholders, and Other Recreation Providers**

Increased recreation use and interest in history and the natural world demand that managers know their current and potential visitors to anticipate demand, foresee their effects, and take proactive management actions that create inviting recreation environments that instill respect for natural and cultural resources.

There is a need to be responsive to changing trends in regard to services; activities and types of facilities desired by the public. There is a need to balance services with fiscal reality and environmental constraints.

The Proposed Actions and Management Strategies are to:

- Create a visitor use Monitoring Plan that will work closely with Research and Development to stay current with demographic shifts, changing values and demands, data sources, new technologies, and management tools.
- Continuously improve our community participation and collaboration skills using the best available scientific information to build long lasting partnerships and working relationships to move together toward sustainable conditions.
- Create a need to promote outdoor physical activities especially among youth due to the trends in demographics such as the expectation of an older and more ethnically diverse population.
- Support local cultures and economies, when planning recreation management on EYNF.

#### **M. Developing a Sustainable Financial Foundation**

The Recreation program cannot deliver sustainable environmental, social, and economic conditions if it is not built upon a sustainable financial foundation. It is unlikely that appropriated funds will ever meet the total program need for providing excellent recreation opportunities while protecting the land. Program delivery will be balanced on a base of appropriated funds through expanded capacity by utilizing user fees, volunteers, private providers, and partners in the nonprofit sector.

The Proposed Action is to develop management strategies that will:

- Evaluate the infrastructure investments and program costs. Those costs will be considered alongside available resources such as appropriations, fee revenue, partnerships, volunteers, and other service provider options to seek a sustainable and integrated base for the program.
- Develop new investment and program improvement criteria and evaluate where the capacity levels are to sustain existing facilities.

## **N. Scenic Character**

Visitors are drawn to the EYNF for its natural scenic beauty comprised of immensely diverse vegetation, steep landforms, clear streams, and waterfalls. Roads off-forest as well as most Forest roads, trails, and recreation sites have a high scenery viewing. Currently, about 60 percent of the Forest has natural scenic character, and about 39 percent has a naturally appearing scenic character. Forest visitors and adjacent landowners are sensitive to noticeable changes in the landscape whether they are human-caused or the result of natural processes.

The Proposed Action is to:

- Develop plan components using the Scenery Management System.

## **O. Cultural Resources**

Although the Forest administration has made good progress in the inspection and nomination of heritage resources, only a small number of potential candidate sites have been nominated. Maintenance of cultural assets faces a critical challenge as a consequence of reduced economic resources.

The Proposed Action is to develop management strategies that will:

- Integrate historic properties and heritage resources into the interpretation programs. Find ways to connect the public to historical and related heritage resources.
  - Information section for pre-contact and historical use.
  - Information section about CCC (Civilian Conservation Corps) and explanation of CCC Puerto Rican style (portal-in front of structures)
- Reuse historic properties potentially at:
  - Stone House, El Yunque Peak Quarters, Baño de Oro, Baño Grande
- Outsource outfitters programs that allow people to visit sites and increase monitoring possibilities.

## **R. Infrastructure**

The facilities program consists primarily of maintaining a variety of structures and associated utilities across EYNF that are used for recreation, administration, research, maintenance, storage, and other general management purposes. There are high numbers of vacant and abandoned structures in EYNF. There are opportunities for private and NGOs ventures. Strategies should be directed to promote local population to open new businesses.

The Proposed Action is to develop management strategies that will:

- Plan for reducing the backlog of accrued facility deferred maintenance, particularly those items associated with health and safety;

- Match the facility inventory with current management needs, including decommissioning and disposing of those facilities, which are no longer required.
- Reduce the operating and maintenance costs associated with the facility portfolio.
- Use vacant facilities for educational and interpretation programs.
- Provide opportunities for private investment and utilization of abandoned facilities.

## **S. Roads**

EYNF has a substantial backlog of road maintenance needs. A proposed management strategy is to reduce the maintenance level for some roads, as well as decommissioning unauthorized roads.

There is a need for new approaches for managing roads given the reality of limited maintenance funds combined with the public's desire for motorized access to the forest. This may include considering partnerships for road maintenance, establishing priorities for maintenance to minimize or mitigate resource damage, and promoting public safety. This could involve reducing service levels on little-used roads while retaining access for non-motorized uses. Direction could be reconsidered for when and in what circumstances roads are opened and direction for ensuring adequate drainage features in light of increasing storm events.

There is a need to update the plan to reduce the amount of anticipated road construction and reconstruction and include direction for closing out unneeded roads, including temporary roads and roads in environmentally or geologically hazardous locations.

The Proposed Actions are to:

- Develop a forest access strategy integrated with the regional context of tourism, recreation, and protected areas. Recognize the opportunity to diversify access and alleviate high use on PR-191. Create new management areas focused on integrated access.
- Consider making PR-191 south a management area that would address the area's hazardous conditions.
- Identify maintenance priorities that would include bridge safety, adequate signage, suitable stream crossings and any resurfacing or reconstruction needed to provide an overall road system that is useable and safe.
- Give priority to ecological sustainability, wetlands, and unique or common plant communities when considering closing or obliterating existing roads. Unauthorized travel ways would either be decommissioned or left to naturally re-vegetate. Decommissioning would focus on reducing resource effects and management costs.

## **T. Economic and Ecosystem Services**

Many of the major ecosystem services provided by El Yunque National Forest identified by all stakeholder groups include: clean water, habitat for flora and fauna, air purification, recreation, and scenic value.

Stakeholder groups such as scientists and forest managers identified certain ecosystem services that were not identified by the rest of the stakeholders. These ecosystem services were categorized into two

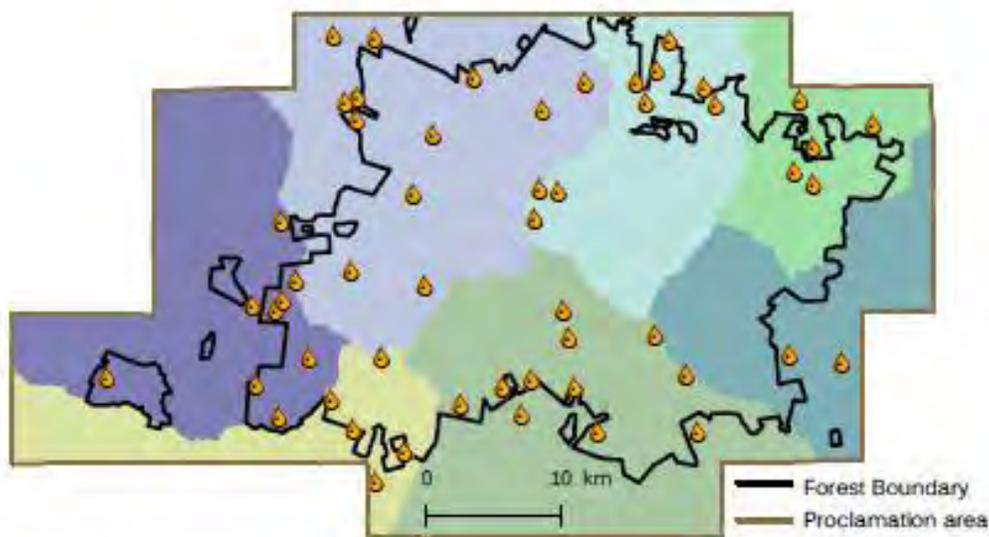
groups: regulating and supporting, and includes carbon sequestration, soil erosion control, nutrient cycling, soil formation, and maintenance of biodiversity.

The Proposed Actions are to:

- Integrate ecosystem services into the development of resource plan components.
- Consider the ecosystem services and connections that are created on and off the forest.
- Promote research and development of the ecosystem services that will create economic benefits now and in the future from the forest.

Map 6.0 - El Yunque National Forest Watershed and Water Intakes by Municipality

Table 2.0 - El Yunque Drainage Area per Watershed in Hectares



El Yunque Watersheds:



### U. Wetlands

The land above 600-900 meters of elevation contains the soil, vegetation, and hydrological elements of a functional wetland. The area covers 13,335 acres, which represent 47% of the land base. This is a forest condition not dealt with in the LMP of 1997.

The Proposed Actions are to:

- Develop plan components that protect the current condition.
- Identify the areas as wetlands.
- Identify management strategies and/or plan components to ensure wetlands are administered in accordance with management requirements.

## **V. Vegetation**

Vegetation classification using the National Vegetation Classification (NVC) System developed by the Federal Geographic Data Committee (FGDC) describes 15 vegetation types present at EYNF. The 1997 Plan was developed based on the four forest types. There is a need to review current management areas to consider new information.

The Proposed Actions are to:

- Develop plan components considering the new information about the 15 vegetation types found on the Forest.
- Develop management direction that will protect and conserve the Riparian areas.
- Identify suitable and non-suitable lands for anthropogenic uses.
- Identify plan components for the new vegetation types that are rare for PR and endemic to El Yunque National Forest.

## **W. Soils**

New soils maps identify a prevalence of hydric soils throughout the Forest. They cover 11,914 acres, which is 42% of the total forest area. There is a need to address hydric soils conditions, in particular, above the 600-meter elevation line.

The Proposed Actions are to:

- Develop plan components to protect the current condition.

## **X. Water**

Management strategies for water quality and quantity require an integrated approach to move toward our vision for healthy watersheds. The watercourses within EYNF provide many beneficial uses including recreation, fish and wildlife maintenance and in-stream flow or water level protection. There is a need to identify priority watersheds for restoration or maintenance, and bring forward plan direction that protects streams. There is a need to ensure that current direction is appropriate for addressing sedimentation concerns.

The Proposed Actions are to:

- Provide for the beneficial uses of water.
- Incorporate the Watershed Condition Framework in the plan.
- Maintain water quality on water runoff from national forest lands.
- Provide for watershed protection.

- Use BMPs that cross resource program areas and include such practices as establishing streamside buffer zones, restricting vegetation management activities in riparian zones and employing erosion control measures.
- Work with other federal and state agencies, research institutions and interested partners to collect data, monitor conditions and collectively address solutions on maintaining and improving water quality and flow.

## **Y. Flora**

There are an estimated total of 636 native and endemic plant species in the EYNF, for which their conservation status was evaluated and 51 species resulted in At-Risk Species. Application of the At-Risk Species criteria resulted in: Eight of these plant species are federally listed as endangered or threatened with extinction by the USFWS; while of these, the remaining 43 flora species are identified as potential Species of Conservation Concern.

The Proposed Actions are to:

- Change from using “Management Indicator Species” to now addressing the needs of the Species of Conservation Concern.
- Design a survey strategy to definitely determine the conservation status of the At-Risk species and to have a numerical update of all species, with priority given to the federally listed; in compliance with their recovery plan.
- Identify the management needs for the Species of Conservation Concern.
- Develop a restoration plan for the Pterocarpus areas at Puente Roto or other areas were possible.
- Use partnerships with cooperators or pertinent agencies to develop plans and strategies to increase the population number of those species at-risk.

## **Z. Wildlife**

There are an estimated total of 166 animal species found in the EYNF, which include: 32 species of snails and crustaceans (invertebrate species), 134 vertebrate species and about 11 orders of insects that include multiple families. Application of the At-Risk Species criteria resulted in:

- Five federally listed as endangered or threatened by the US Fish & Wildlife Service (USFWS), that includes the following: Puerto Rican Parrot, Puerto Rican Broad-winged and Sharp-shinned hawks, Puerto Rican Boa, and Elfin- woods warbler.
- Twenty three fauna Species of Conservation Concern resulted in: nine (9) species of coquies, two (2) species of anole lizards, one (1) bat species, three (3) bird species, five (5) species of fishes and two (2) species of freshwater shrimp and recent addition (1) one snail species.

Since the 1997 El Yunque National Forest Plan, new and better-defined ecosystem drivers for Forest Service policy such as climate change and invasive species has brought the need to address management concerns towards the viability of "At risk" fauna species.

There is a need to provide plan direction to better control the introduction and spread of invasive species on the national forest, including direction that would minimize the spread of invasive plants that may increase as a result of management activities.

There is a need to include direction for improving aquatic passage in streams where it is compromised. Direction should include restoring and expanding the range of native aquatic species and connectivity of fragmented populations.

The Proposed Actions are to:

- Change from Management Indicator Species to now addressing the needs of the Species of Conservation Concern.
- Modify the present Puerto Rican Parrot Management Situation Appendix; due to the fact El Yunque is no longer the preferred habitat for the parrot; but habitat management recovery for remaining populations will continue in the broader landscape capacity through interagency collaborative effort; in compliance with the recovery plan for the Puerto Rican Parrot.
- Address the information gap of the 9 Species of Conservation Concern Coquis; focusing in on habitat conditions to better develop management strategies.
- Identify Wildlife Stand Improvement areas for all terrestrial vertebrate species. Identify aquatic passage barriers. Manage broader landscape needs collaboratively with partners and State Agencies.
- Apply Wildlife Conservation Education messages that may be applied on a broad landscape level through collaborative efforts as ways to connect wildlife education with the public in a visible way.
- Implement Agro-forestry initiatives that have an economic component (for example, pollinators).
- Change current plan from an integrated pest management strategy to an invasive species management strategy in compliance with the executive order. Control mongoose, rat, feral cat and dog populations actively, in prioritized areas; and if needed, control invasive aquatic populations within the forest.
- Update the flight restriction over the forest in compliance with the new FAA guidelines for wildlife and wilderness conservation.

## **AA. Climate Change**

Climate change can significantly effect the management and sustainability of the EYNF and the surrounding communities, including the biological diversity, aquatic and terrestrial ecosystems, and recreational and economic opportunities.

Changing climate variability is expected to continue to lead to higher temperatures, more intense rainfall events, and longer periods of drought in the future. Collaboration on monitoring temperature and precipitation changes, which will determine any departure from projections used in the plan assessment. This will also effect the sustainability of the forest and the broader scale of the forest in a more general sense.

Extreme weather conditions are expected to be more common.

While change in climate may be gradual and long-term, disturbance from extreme weather events may drive rapid changes that require special monitoring attention and inform the possible need for adaptive management actions.

The Proposed Actions are to:

- Design an effective monitoring plan that is informed by the understanding of key resource system drivers and stressors to potential changes, as developed during the assessment and forest plan revision phases. Measures and indicators are identified at broad- and management-scales for key characteristics including source (partner), frequency, geographic scale, and information quality. Alerts are also particularly important, as they identify conditions that merit further evaluation. Finally, alerts are linked with possibilities for change, or potential adaptive management strategies.
- Update the land acquisition plan to promote conservation initiatives on stream corridors & riparian areas, Wild & Scenic Rivers corridors within the Proclamation Boundary, and GRNE CEN Rivers Reserve.
- Integrate lands programs to NGOs conservation easements and other land conservation and restoration programs.
- Collaborate with Municipalities' Territorial Plans. Collaborate to foster an All Lands Regional perspective.
- Develop integrated plan components that consider extreme weather condition effects on water resource use, wildlife habitat management, soil and water conservation, safety, recreation, invasive species and ecosystems services. Promote education, research and science-management partnerships with the use of new technology that will help with the monitoring of the forest towards adaptation and mitigation of the climate change

## V. Monitoring

The process for developing the plan monitoring program should start early in the planning process. The responsible official may start identifying potential monitoring questions and associated indicators in the assessment phase, but shall develop and select the monitoring questions and associated indicators during the plan development phase. The plan monitoring program consists of a set of monitoring questions and associated indicators to evaluate whether plan components are effective and appropriate and whether management is being effective in maintaining or achieving progress toward the desired conditions and objectives for the plan area.

The following are some possible monitoring questions to be considered in the development of the plan monitoring program:

### Plant and Animal Diversity

- What is the status of the key ecological conditions that contribute to the recovery of threatened and endangered species?
- What is the status of the key ecological conditions that help to conserve proposed and candidate species?
- What is the status of the key ecological conditions that help to maintain or enhance the populations of the species of conservation concern?

### Terrestrial and Aquatic Ecosystems

- What is the effect of Climate Change on the planning area?
- Are the Riparian Ecosystems being affected by management or outside forces?
- What is the status of the key characteristics of the terrestrial and aquatic ecosystems?
- What is the status of climatic conditions and cloud evaluation shifts?
- What are the effects on the forest stands because of timber removals?

### Scenic Resources

- Is the scenic value of the forest being maintained or enhanced?

### Recreation

- How are recreation activities affecting the forest, riparian, aquatic resources?
- How are the natural conditions affecting the recreational setting, opportunities and scenery?
- Is the plan meeting the recreational demands?

### Cultural Resources

- Have potentially reusable historic structures been assessed and refurbished for active use?

- Are the desired conditions being met through the integration of cultural/historic interpretation?

#### Social-Economic

- How are regional population changes affecting the management of the forest?
- How are the demands on the forest by the population changing?
- How are the characteristics of the population changing?
- What are the effects of implementing the forest plan on the social- economic conditions regional and island-wide?
- How effective are we in educating the public on other opportunities the forest provides?

#### Multiple-Uses

- Are the public demands for resources from the forest being met?

#### Environmental Literacy and Education

- Is the environmental literacy in the region improving?

#### Collaboration

- How effective are the collaboration activities in helping to implement the forest plan?
- Is the plan's implementation facilitating shared understanding and collaboration?

#### Water Monitoring

- How is the plan meeting the objectives of the Forest Watershed Condition Assessment?

#### Ecosystems Services

- How is the plan facilitating ecosystem services production?

#### Infrastructure

- How are infrastructure objectives being met?

## **VI. Conclusions**

A review of the proposed actions and management strategies leads us to identify major themes that will be considered in this planning effort using the principles of ecological, social and economic sustainability.

The major themes are:

- Develop a plan that introduces social and economic sustainability as part of a balanced solution.
- Improve collaboration at the local level and increase co-management opportunities.
- Create a new recreation, access, and tourism system.

- Increase environmental literacy in the local communities.
- Promote a stronger regional identity.
- Manage to enhance ecosystem services from the forest
- Improve the roads and trails
- Adaptation to climate change
- Align management and new research opportunities
- Revise Wilderness management direction
- Protect Montane Wetlands
- Address the management of At-Risk Species
- Adapt our planning and site specific activities to the conditions of the cloud layer.

## VII. Appendices

### A. Glossary of Terms

#### Glossary

##### 10.5 - Definitions

**All lands approach/Broader landscape.** An all-lands approach is a broader scale than typically undertaken by the Forest Service in land management planning. It would feature collaboration, engaging the public early and often to build a common understanding of the roles, values, and contributions of NFS lands within the broader landscape.

**Area of Influence.** An area influenced by the management of the plan area that is used during the land management planning process to evaluate social, cultural, and economic conditions. The area is usually a grouping of counties.

**At-Risk species.** Include federally recognized threatened, endangered, proposed, and candidate species, and species of conservation concern.

**Community of management:** Refers to a network of individuals and groups who share a concern for the improvement of management practices in the forest and collectively work and learn how to do it better through continuous discussion and interactions.

**Connectivity.** Ecological conditions that exist at several spatial and temporal scales that provide landscape linkages that permit the exchange of flow, sediments, and nutrients; the daily and seasonal movements of animals within home ranges; the dispersal and genetic interchange between populations; and the long-distance range shifts of species, such as in response to changing climate. (36 CFR 219.19)

**Conservation.** The protection, preservation, management, or restoration of natural environments, ecological communities, and species. (36 CFR 219.19)

**Conserve.** For purposes of § 219.9, to protect, preserve, manage, or restore natural environments and ecological communities to potentially avoid federally listing of proposed and candidate species. (36 CFR 219.19)

**Designated area.** An area or feature identified and managed to maintain its unique special character or purpose. Some categories of designated areas may be designated only by statute and some categories may be established administratively in the land management planning process or by other administrative processes of the Federal executive branch. Examples of statutorily designated areas are national heritage areas, national recreational areas, national scenic trails, wild and scenic rivers, wilderness areas, and wilderness study areas. Examples of administratively designated areas are experimental forests, research natural areas, scenic byways, botanical areas, and significant caves. (36 CFR 219.19)

##### Desired Conditions

**Disturbance.** Any relatively discrete event in time that disrupts ecosystem, watershed, community, or species population structure and, or, function and changes resources, substrate availability, or the

physical environment. (36 CFR 219.19)

**Disturbance regime.** A description of the characteristic types of disturbance on a given landscape; the frequency, severity, and size distribution of these characteristic disturbance types; and their interactions. (36 CFR 219.19)

**Ecological conditions.** The biological and physical environment that can affect the diversity of plant and animal communities, the persistence of native species, and the productive capacity of ecological systems. Examples of ecological conditions include the abundance and distribution of aquatic and terrestrial habitats, connectivity, roads and other structural developments, human uses, and invasive species. (36 CFR 219.19)

**Ecological integrity.** The quality or condition of an ecosystem when its dominant ecological characteristics (for example, composition, structure, function, connectivity, and species composition and diversity) occur within the natural range of variation and can withstand and recover from most perturbations imposed by natural environmental dynamics or human influence. (36 CFR 219.19)

**Ecosystem.** A spatially explicit, relatively homogeneous unit of the Earth that includes all interacting organisms and elements of the abiotic environment within its boundaries.

An ecosystem is commonly described in terms of its:

1. *Composition.* The biological elements within the different levels of biological organization, from genes and species to communities and ecosystems.
2. *Structure.* The organization and physical arrangement of biological elements such as, Snags and down woody debris, vertical and horizontal distribution of vegetation, stream habitat complexity, landscape pattern, and connectivity.
3. *Function.* Ecological processes that sustain composition and structure, such as energy flow, nutrient cycling and retention, soil development and retention, predation and herbivory, and natural disturbances such as wind, fire, and floods.
4. *Connectivity.* (see connectivity above) (36 CFR 219.19)

**Ecosystem diversity.** The variety and relative extent of ecosystems. (36 CFR 219.19)

**Ecosystem integrity.** See ecological integrity.

**Ecosystem services.** Benefits people obtain from ecosystems, including:

1. *Provisioning services,* such as clean air and fresh water, energy, fuel, forage, wood products or fiber, and minerals
2. *Regulating services,* such as long term storage of carbon; climate regulation; water filtration, purification, and storage; soil stabilization; flood control; and disease regulation
3. *Supporting services,* such as pollination, seed dispersal, soil formation, and nutrient cycling
4. *Cultural services,* such as educational, aesthetic, spiritual, and cultural heritage values,

recreational experiences, and tourism opportunities. (36 CFR 219.19)

**Habitat type.** A habitat type is considered to be a land or aquatic unit, consisting of an aggregation of habitats having equivalent structure, function, and responses to disturbance. Inherent capability of the plan area. The ecological capacity or ecological potential of an area characterized by the interrelationship of its physical elements, its climatic regime, and natural disturbances. (36 CFR 219.19)

**Invasive Species.** Under Forest Service Handbook 1909.12-zero code, the definition of an invasive species stems from Executive Order 13112 that an invasive species as “an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health.” The key is that the species must cause or be likely to cause harm and be exotic to the ecosystem it has infested before we can consider labeling it as “invasive”. An important notion for the El Yunque National Forest (EYNF) is the compliance with present planning policy and notion of effects; either direct, indirect or cumulatively to the conditions for those “at risk” species or desirable species. To create another term for the planning process the EYNF is terming invasive species as non-desirable species.

**Landscape.** A defined area irrespective of ownership or other artificial boundaries, such as a spatial mosaic of terrestrial and aquatic ecosystems, landforms, and plant communities, repeated in similar form throughout such a defined area. (36 CFR 219.19)

**Maintain.** In reference to an ecological condition: To keep in existence or continuance of the desired ecological condition in terms of its desired composition, structure, and processes. Depending upon the circumstance, ecological conditions may be maintained by active or passive management or both. (36 CFR 219.19)

**Mature future.** Mature forests occur where there are mature trees and a few large old trees. These stands typically have a history of selective logging and have forest ingrowth, but the mature and old trees they contain are structurally important for wildlife. Mature forest sites provide excellent buffers for old forests and have good potential for restoration to historical stand structure. In the study area, many stands were found to be at risk from catastrophic wildfire due to fuel build-up, and to forest ingrowth internally, and in adjacent forests.

### **Management Indicator Species**

**Multiple uses.** The management of all the various renewable surface resources of the National Forest System (NFS) so that they are utilized in the combination that will best meet the needs of the American people; making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions; that some land will be used for less than all of the resources; and harmonious and coordinated management of the various resources, each with the other, without impairment of the productivity of the land, with consideration being given to the relative values of the various resources, and not necessarily the combination of uses that will give the greatest dollar return or the greatest unit output, consistent with the Multiple-Use Sustained-Yield Act of 1960 (16 U.S.C. 528–531) (36 CFR 219.19)

**Native species.** An organism that was historically or is present in a particular ecosystem as a result of natural migratory or evolutionary processes; and not as a result of an accidental or deliberate introduction into that ecosystem. An organism’s presence and evolution (adaptation) in an area are determined by climate, soil, and other biotic and abiotic factors. (36 CFR 219.19)

**Novel forest.** Global anthropogenic activities are responsible for the modification of landscapes, creation of novel environments, and the movement of species across bio-geographic regions. A consequence of this activity is the mixing of native and introduced species and the formation of novel communities of plants and animals. (Lugo, A.E, Carlo, T. and Wunderle, J., 2012)

## **Novel Forest**

### **Objectives**

**Plan area.** The NFS lands covered by a plan. (36 CFR 219.19)

**Plan or land management plan.** A document or set of documents that provide management direction for an administrative unit of the NFS developed under the requirements of this part or a prior planning rule.

**Plant and animal community.** A naturally occurring assemblage of plant and animal species living within a defined area or habitat. (36 CFR 219.19)

**Recreation opportunity.** An opportunity to participate in a specific recreation activity in a particular recreation setting to enjoy desired recreation experiences and other benefits that accrue. Recreation opportunities include non-motorized, motorized, developed, and dispersed recreation on land, water, and in the air. (36 CFR 219.19)

**Recreation setting.** The social, managerial, and physical attributes of a place that, when combined, provide a distinct set of recreation opportunities. The Forest Service uses the recreation opportunity spectrum to define recreation settings and categorize them into six distinct classes: primitive, semi-primitive non-motorized, semi-primitive motorized, roaded natural, rural, and urban. (36 CFR 219.19)

**Restore.** To renew by the process of restoration. (36 CFR 219.19)

**Riparian Areas.** Three-dimensional eco-tones of interaction that include terrestrial and aquatic ecosystems that extend down into the groundwater, up above the canopy, outward across the floodplain, up the near-slopes that drain to the water, laterally into the terrestrial ecosystem, and along the water course at variable widths. (36 CFR 219.19)

**Scenic character.** A combination of the physical, biological, and cultural images that gives an area its scenic identity and contributes to its sense of place. Scenic character provides a frame of reference from which to determine scenic attractiveness and to measure scenic integrity. (36 CFR 219.19)

**Social learning:** “The collective action and reflection that takes place among both individuals and groups when they work to understand the relations between social and ecological systems; it is conceptualized as a process of transformative social change in which participants critically question and potentially discard existing norms, values, institutions, and interests to pursue actions that are desirable to them” (Cundill et al 2011:16)

**Species of conservation concern.** A species of conservation concern is a species, other than federally recognized threatened, endangered, proposed, or candidate species, that is known to occur in the plan area and for which the regional forester has determined that the best available scientific information indicates substantial concern about the species' capability to persist over the long-term in the plan area. (36 CFR 219.9(c))

## **Standards and Guidelines**

**Stressors.** Factors that may directly or indirectly degrade or impair ecosystem composition, structure or ecological process in a manner that may impair its ecological integrity, such as an invasive species, loss of connectivity, or the disruption of a natural disturbance regime. (36 CFR 219.19)

### **Suitability of Lands**

**Sustainability.** The capability to meet the needs of the present generation without compromising the ability of future generations to meet their needs. For purposes of this part, “ecological sustainability” refers to the capability of ecosystems to maintain ecological integrity; “economic sustainability” refers to the capability of society to produce and consume or otherwise benefit from goods and services including contributions to jobs and market and nonmarket benefits; and “social sustainability” refers to the capability of society to support the network of relationships, traditions, culture, and activities that connect people to the land and to one another, and support vibrant communities. (36 CFR 219.19)

**Sustainable recreation.** The set of recreation settings and opportunities on the National Forest System that is ecologically, economically, and socially sustainable for present and future generations.

**Viable population.** A population of a species that continues to persist over the long term with sufficient distribution to be resilient and adaptable to stressors and likely future environments. (36 CFR 219.19)

**Watershed.** A region or land area drained by a single stream, river, or drainage network; a drainage basin.

**Wild and scenic river.** A river designated by Congress as part of the National Wild and Scenic Rivers System that was established in the Wild and Scenic Rivers Act of 1968 (16 U.S.C. 1271(note), 1271-1287).

**Wilderness.** Any area of land designated by Congress as part of the National Wilderness Preservation System that was established in the Wilderness Act of 1964 (16 U.S.C. 1131-1136).