

## I. INTRODUCTION

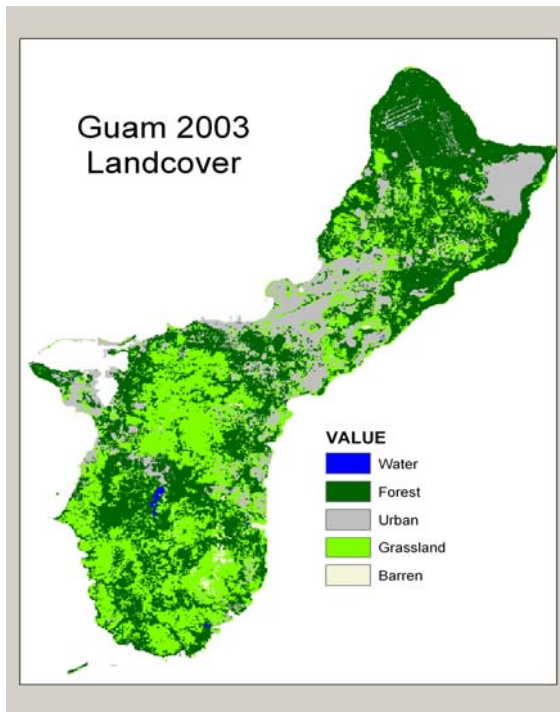
This plan will guide the delivery of the Urban & Community Forestry Program in Guam by the Division of Forestry and Soil Resources Division, Guam Department of Agriculture, over the next five (5) years.

Guam is located at thirteen degrees north latitude and 144 degrees longitude or in the western part of the Pacific Ocean. This location places Guam in typhoon alley which ravage the Pacific yearly. This poses a unique challenge in providing the proper planting and maintenance of trees in the urban environment to mitigate the effects of these storms on the trees and associated water run-off.

Guam is experiencing great challenges in promoting economic growth and simultaneously maintaining a healthy and sound ecosystem. Resource managers are faced with the responsibility of making tough decisions affecting multiple land use. Picturesque landscapes that once dominated the island's interior and coastal areas are no longer common. Uncontrolled development in the last few decades has caused serious ecological damages to the environment. The newly created urban sprawls and the associated run-off are affecting Guam's coral reef preserves.

The U&CF program will be promoting responsible stewardship through community activities and projects in addressing the urban issues facing Guam.

## II. GUAM'S URBAN AREAS



**In 1998, the Guam Water Planning Committee (WPC) developed a Clean Water Action Plan, prioritizing the island's 20 watersheds, one major watershed is the northern Guam aquifer, over 40% of northern Guam is classified as urban.**

**The map shows the land cover types for the island, the forested areas are also broken into different types, where the forested areas in central Guam are non-native species basically Lueceana (tangan-tangan). The grasslands are a result of the wildfire problems that plague the island. The map shows a significant amount of urban areas and interface.**

**The U&CF program would concentrate activities to mitigate storm run-off, protect the northern aquifer, increase tree cover in communities and protect the coral reef marine preserves.**

### III. Urban Forest Uses and Values - Concerns, Issues, Problems and Threats

In 1998, the Guam Water Planning Committee (WPC) developed a Clean Water Action Plan, prioritizing the island's 20 watersheds. The Northern Watershed (in particular, the Tumon-Yigo Sub-basin) was identified as 1 of 3 high priority watersheds. The importance of the Northern Watershed is based on 2 main factors: it is a sole source aquifer that provides the island with 80% of its drinking water; and the Tumon-Yigo Sub-basin drains into Tumon Bay, which is the center of the island's tourism-based economy and a marine protected area. Guam's urban areas are situated above the Northern Watershed.

In conjunction with the resolutions passed by the U.S. Coral Reef Task Force at their October 2002 meeting in Puerto Rico, Guam's local coral reef task force is in the process of developing strategies to address five (5) focus areas: overfishing, land-based threats (i.e. sedimentation, runoff), lack of public awareness, recreational misuse and overuse, and global climate change/bleaching/disease.

This and the following are major issues that will need to be addressed in the U&CF program:

1. Wildland/Urban Interface Management and associated Water Quality problems.
2. Rapid urbanization and subdivision development.
3. Urban Forest Health Concerns related to tree disease, pests, improper tree planting, typhoons, water and storm run-off capacity.
4. Water quality, priority watershed area rehabilitation, storm water run-off and the Clean Water Act.
5. Enhance and sustain urban watersheds, wildlife habitat, forest health, recreational and native resource values of urban forests, reducing risks associated with wildfire, disease, and the encroachment from urban landscaping of invasive non-native plant species into native forests.
6. Enacting legislation and policies for tree ordinances and maintenance requirements.
7. The current and future impact of stormwater runoff in Tumon Bay; specifically, the water quality of the shoreline and coral reef ecosystem. In addition to natural drainage patterns for this watershed, two decades of urban infrastructure development within the villages of Tumon and Harmon have resulted in voluminous amounts of stormwater runoff flowing into Tumon Bay. The impact of stormwater runoff being channeled directly into Tumon Bay has seriously degraded the marine bay's water quality, coral reef and shoreline ecosystem.
8. Development and associated infrastructure

The northern half of the island of Guam is a limestone plateau, containing the island's sole source aquifer. The aquifer provides drinking water to 80% of island residents. Tumon Bay is located downstream from the Tumon-Yigo Sub-basin of this northern watershed. The bay is a marine protected area, due to its diverse coral reef ecosystems. However, it is also the center of Guam's multi-million dollar tourist industry, containing large hotels, restaurants, and tourist-related businesses. There are also a series of

sinkholes within the sub-basin, which discharge into the bay. These sinkholes are primarily interspersed throughout a heavily-developed, commercially-zoned area called the Harmon Industrial Park. Both the Harmon and Tumon areas have seen an increase in flooding and urban runoff that threaten the health of the northern watershed and increase non-point source water pollution in the bay.

#### IV. URBAN FORESTRY GOALS

- A. Enhance the environment by planting trees along roadsides, parks, school grounds and areas further inland to satisfy Clean Water Act requirements.
- B. Use more local species, such as, *Intsia bijuga* (ifit), the island's territorial tree in promoting local culture awareness.
- C. Strengthen relationships within the community through a cooperative island-wide tree planting campaign.
- D. Provide communities the opportunity to get involved in making Guam a better place to live by promoting tree planting.
- E. Involvement with the Guam Visitors Bureau in promoting tourism by greening Tumon and all island communities, through the Tourist Attraction Projects village beautification program.
- F. Address storm water problems in urban areas through green infrastructure.
- G. The Urban and Community Forestry Program will provide technical assistance to organizations, socio-civic clubs, associations and communities in:
  1. Planning and organization of community tree planting projects.
  2. Technical assistance in the establishment of community tree nurseries.
  3. The planning and establishment of Urban and Community Forests.
  4. Assist in recommending trees for Urban settings.
  5. Offer planting stock for use in community Forestry projects.
  6. Assist in identifying eco-tourism projects and activities.
  7. Advising the public on the proper care and maintenance of trees in an urban environment.
  8. Educational school visits and field trips.
- H. Providing Media, technical and educational materials promoting Urban Forestry Practices.
- I. Requiring and maintaining International Society of Arboriculture (ISA) tree standards for Guam. To include the following:
  - ANSI A300 – 2001 Standard Practices (Pruning).
  - ANSI Z133.1 – 2000 Safety Standard
  - ANSI A300 Pruning Standard
  - ANSI A300 Fertilization Standard
  - ANSI A300 Support Systems Standard
  - Best Management Practices: Tree Pruning
  - Best Management Practices: Tree and Shrub Fertilization
  - Best Management Practices: Tree Support Systems
- J. Marine Preserve and Coral Reef Protection from urban run-off through urban forestry best management practices.

- K. Promoting Tree City USA for island villages.
- L. Institute certified tree line clearing program for the Guam Power Authority.

IV. THE URBAN FORESTRY ADVISORY COUNCIL

The Council will assist in administering the Urban & Community Program on Guam. The Committee will meet quarterly to advise F&SRD on program planning, implementation and policy issues.

Guam Urban Forestry Council

Peter Bautista USDA-NRCS Guam Field Office 494 W. Rt. 8, Suite 101 Barrigada, Guam 96913	Roland Quitugua University of Guam College of Agriculture and Life Sciences	Larry Perez, Director Public Works
Jackie Flores USDA-NRCS Guam Field Office 494 W. Rt. 8, Suite 101 Barrigada, Guam 96913	Trina Leberer Nature Conservancy	Joseph Acfalle Urban Forester, Dept. of Agriculture
David Limtiaco, Forestry Chief, Dept. of Agriculture	Celestino Aguon Chief of Aquatic & Wildlife Department of Agriculture	Office of the First Lady of Guam Joann Camacho (incumbent)
Belmina Soliva, Forester I, Dept. of Agriculture	Francis Damian Coastal Zone Management Bureau of Planning	Office of the Lt. Governor of Guam Kaleo Moylan (incumbent)
Nora Camacho, Urban Planner Hagatna Restoration and Redevelopment Authority	Tom Morrison, Director of Parks and Recreation	Gerry Perez, Manager Guam Visitors Bureau
Mayor's Council of Guam	Joseph Tuqueuro Forester II, Dept. of Agriculture	Mike Gawel, Guam Environmental Protection Agency

V. PROJECTS FOR IMPLEMENTATION

Project Title

**Ypao and Matapang Beach Park Guam Urban Forestry Demonstration Project**

Project Summary

The Guam Urban Forestry Demonstration Project involves a three-pronged approach to improving water quality and coral reef ecosystem health in the Tumon Bay Marine Preserve: community education, vegetative buffers on demonstration plots, and production of a guide to best management practices for alleviating urban storm-water runoff.

Project Abstract

The Guam Urban Forestry Demonstration Project will serve to educate the community on the effects of urban storm-water runoff on adjacent coral reef ecosystems and involve them in a potential solution to this threat. The project will focus on the Ypao and Matapang Beach Park. Tamuning, which has been recently awarded Tree City USA,

will participate in tree planting efforts on plots identified in both beach parks ( both are located in Tamuning).

The products that will result from this project include increased public awareness of the effects of urban storm-water runoff on the health of adjacent coral reefs, through highly-visible, vegetative barrier, demonstration plots and the production of a guide to urban best management practices in controlling urban runoff. The plots will also be used to leverage investment of businesses in the area in similar urban reforestation projects. The project will serve as a template for future mitigation on urban related development and its effect on the reef. The community will be able to see that both development and a healthy marine environment can co-exist.

### Partner Groups

#### Government Partners:

Natural Resource Conservation Service, Guam Power Authority and Guam Public Works, Guam Water Planning Committee, U.S. Forest Service

#### Proposed Private Partners:

Hilton Hotel, Guam Holiday Inn, Ada Water Factory, Peter Melyan (a local tour coordinator to arrange for tree planting by tourist groups), Boy/Girl scout troops(volunteer labor paired up with Japanese or Korean tourists)and the Guam Hotel & Restaurant Association.

### Project Need

Tumon Bay is a marine protected area, due to its diverse coral reef ecosystems. However, it is also the center of Guam's multi-million dollar tourist industry, containing large hotels, restaurants, and tourist-related businesses. The Tumon areas have seen an increase in flooding and urban runoff that threaten the health of the coral reef, erode the beach and increase non-point source water pollution in the bay. However, the relationship between the built environments of Tumon, and the health of Tumon Bay are poorly understood by the community.

### Objectives

- A. Increase community awareness of urban storm-water runoff impacts to Tumon Bay from the built environments of central Guam through print and electronic media (radio, TV and newspaper), brochures and village meetings.
- B. In partnership with the Guam Urban & Community Forestry Program (U&CFP), solicit 500 community volunteers to establish demonstration plots in Ypao and Matapang Parks for storm-water mitigation, vegetative barriers, and tree plantings in order to showcase ways to minimize the effects of development and associated runoff on adjacent coral reefs through the use of green infrastructure.
- C. Publish and distribute 1,500 copies of an urban best management practice guidance document (working title: Planning, Establishing and Managing

Vegetative Barriers for Storm-water Runoff Control) to contractors, landscapers, and homeowners.

## Methodology

1. Identify sites and what urban forestry practices to use. Design demonstration project.

Tumon, from Hilton Hotel to Holiday Inn Hotel

2. Prep planting sites by tree trenching and installing root barriers and other planting hardware to protect the hardscapes, i.e., sidewalks, utilities.
3. Plant 500 to 1,000 large caliper tree seedlings for the demonstration projects.

## Research/Management Implications

Convert research results into financial terms to stimulate community investment in trees and proper development to conserve the environment.

Areas of Research:

Energy Conservation

Air Quality

Mitigating Runoff

Storm water management and environmentally friendly landscapes

## Evaluation

Success will be measured by increased participation in the U&CF Program by developers and communities. The number of trees planted, growth and survival rates will be monitored. Water quality in Tumon Bay is monitored regularly by the Guam Environmental Protection Agency, and success will also be measured by a reduction in bay closures due to polluted waters.

## Media and Public Outreach Project

Public outreach and media campaign on Urban Forestry projects and the results from the project will be communicated to the public in the following ways:

1. Multiple K-57 AM Talk Radio contacts (morning, afternoon, and environmental presentations).
2. Pacific Daily News Lifestyle articles.
  - a. Benefits of storm-water runoff mitigation plantings.
  - b. Planning community tree planting projects.
3. KUAM television news reports.
  - a. Pre-planting.

- b. Post-planting.
- 4. Distribution of 1,500 copies of Planning, Establishing and Managing Vegetative Barriers for Storm-water Runoff Control via the Guam Contractor Association; the University of Guam, College of Agriculture and Life Sciences; The Guam Department of Agriculture, Division of Forestry and Soil Resources, and the U.S. Department of Agriculture, Natural Resources Conservation Service.

#### Mission and Goals of Projects

1. Establishing the Ypao and Matapang Beach Parks by planting trees will serve to enhance the environment by mitigating the effects of storm water run-off on the reef.
2. The demonstration projects and the island-wide education campaign will help to strengthen relationships within the community.
3. All sectors of the community will have the opportunity to take ownership in making Guam a better place to live by protecting the surrounding coral reef.

### **Communication**

#### OBJECTIVES:

1. The public will be aware of the island's U&CF Strategic Plan and available programs.
2. The public will be aware of the importance of community forests.
3. Technical information and skills will be provided to the public.

#### ACTIVITIES & TIMELINE

- . Attend at least (2) Mayor's Council monthly meeting.
- . Communicate with individual village Mayoral Office.
- . Encourage partnership with non-profit organizations (Parent Teacher Organization, Boy/Girl Scouts of America, N.H.S., N.J.H.S., and other environmental interest groups).
- . Publication and distribution of local U&CF brochures.
- . Technical training provided to (20) key individuals within the community. Trained people will be used as group leaders in various tree-planting projects. The University of Guam will be asked to provide basic tree maintenance workshops for a selected group of people. The U&CF forester will be involved in providing information as well.
- . Local media will be contacted to cover tree-planting events.

### **5. Strategic Direction**

#### OBJECTIVES:

1. Insuring all segments of the community will be represented in the strategic planning and oversight of the implementation of the program.
2. Strategic direction will be consistent with national direction and will meet national program requirements (for a plan & council representing government, non-profit & private interests).

## **6. Community Planting Projects**

### **OBJECTIVES:**

1. The island's natural beauty will be enhanced through community participation.
2. Mutual interest on the environment will foster respect and togetherness among people within the community.
3. Selected tree species will promote an awareness of the importance of preservation of the local culture. This will increase an appreciation for one's own culture.

## **7. Wildland Urban Inter-Face (WUI) Fire Management Project**

The project involves Guam Forestry in planting green belts of Acacia trees that have minimal fire spread characteristics. Located on primarily ridge tops and adjacent to urban interface areas the Acacia trees will act as a vegetative fuel break breaking up the highly flammable Swordgrass types that currently dominate the areas. These fuel breaks will be placed in strategic locations near urban interface communities.