

# Mangrove Beautiful

*Promoting Eco-Friendly Development Designs*



PROYECTO  
COSTAS LISTAS /  
SMART COASTS

**IKI**  
INTERNATIONAL  
CLIMATE INITIATIVE



## Foreword

This booklet is designed to showcase the versatility of mangroves as a landscape friendly plant. It also compliments our previous publication, “Everything Mangroves,” as a tool for next steps.

Here you will find outlined several working designs that are already in place, as well as new designs that can also be put in place. Remembering the resilience of mangroves and their adaptable nature, you might even come up with other ideas that will work for you. Just remember to contact someone who knows more about mangroves before you end up with a mess.

## Acknowledgements

This guidance document was written by Adrian Vernon in collaboration with Nadia Bood (WWF) and Tim Smith .

*The updated edition is made possible through the support of the Climate-Smarting Marine Protected Areas and Coastal Management in the Mesoamerican Reef Region ("Smart Coasts") project. This project is part of the International Climate Initiative (IKI). The Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) supports this initiative on the basis of a decision adopted by the German Bundestag.*

*Original © 2012  
Revised edition: 2023*

**WWF Mesoamerica**

## A Message From Adrian Vernon



For hundreds of years mangroves have made their homes along our coast and estuarine lagoons, adding great beauty to our coast, like an emerald shining in the mud. As much as its beauty could show, it did not reveal openly its true value, a

value that surpasses even the most valued of jewels, its ability to support vast life.

Mangrove forests are some of the most abundant places on earth, supporting vast numbers of mammals, reptiles, birds, crustaceans, mollusks, fish and invertebrates. All these lives share this ecosystem, each working its own part and obtaining what is necessary for life, supported by the mangroves.

As humankind has advanced and sought out new places to live, we have encroached on these harmless, helpful, vitally important ecosystems. We have started to develop these areas without consideration for the potentially devastating impacts it might have on our environment and our society.

Naturally functioning mangrove forests hold land in place, filter out waste (solid and liquid), break high winds and waves, produce oxygen, form land, act as nurseries to our marine fish stocks and the list continues.

We owe it to ourselves to look out for the interest of our mangroves. They are naturally beautiful, naturally helpful, naturally adaptable and naturally here. So I plea to you, as residents of this great country, to use the methods outlined in this booklet or inspire your own designs, and let's keep all of Belize, "Mangrove Beautiful."

# The Different Types of Mangroves

Here in Belize we are home to three types of mangroves and a very close associate. We have Red Mangroves, Black Mangroves, White Mangroves and their close associate, Button wood. These plants can all be found in some of the last places you would expect a plant to be, and they maintain functions only few people seem to appreciate.

Collectively, the mangrove forest is responsible for creating, holding and protecting land. Mangroves create oxygen above and below the sea. They trap and filter out solid and liquid waste, as well as sediment runoff, and prevent these from affecting our reefs and seas. The red mangroves also form one of the greatest marine nurseries. They are responsible for harboring hundreds of different species of marine creatures at juvenile stages.

**Red Mangroves:** These normally grow closest to the water, with large waxy leaves and a very intricate root structure. These are the mangroves responsible for the most protective activities. Their roots filter the water while trapping debris, help to hold land, and act as nurseries and the first shoreline buffer between high waves and winds.

**Black Mangroves:** These resemble more forest-like trees with a very dark trunk. Their leaves are long and at most times appear to be a dusty green, often covered in salt, which the plant disposed. These mangroves produce roots protruding out of the ground making it one of the best at holding the soil intact.

**White Mangroves:** These also resemble forest trees with grey stripping bark. They have more oval-shaped leaves, the stems waxed with a distinguishable red tint, and two minor holes at the base of each leaf, which are used to secrete the salt from the plant. Naturally, the plant tends to look like its struggling or diseased, however they make great places for snakes and raccoons to live. Where naturally occurring, these are found behind the black mangroves.

**Buttonwood: (Also Called Grey Mangrove)** Even though it is not really a mangrove, it is a very close associate and almost always occurs in areas where you find other mangroves. This plant gets its name from the ball-like bunches of seeds that resemble toggles or buttons. Buttonwood also grows to become a tree with bark like an oak; however, it is also the best adapted to hedging, and will remain a shrub if you continuously trim. Buttonwood has lush, light green leaves, elongated and pointed. They make great landscaping trees. These naturally occur at the back of the line, and they have the smallest seeds.

## Mangroves In Their Natural Order

When occurring in their natural order, mangrove forest are most effective in what they do naturally to help the environment. This order of function is even designed by the propagule/seed size. Red mangrove seeds can be up to one foot long, black mangroves seeds can get up to an inch in size, white mangroves produce seeds that are about a quarter inch, and buttonwoods have the smallest seeds, about one millimeter in size. Naturally, they will always follow this order when arriving at a new area of land, except where the roots of the red mangrove trap the seeds of others, and they grow up within the red mangrove area.

# Red Mangroves



# Black Mangroves



Black Mangrove Fruit



**Black mangroves produce roots that look like little spikes coming out of the ground, a feature that is vital for holding land in place.**

# White Mangroves



**Blossom & Fruits**



**Exposed Roots**

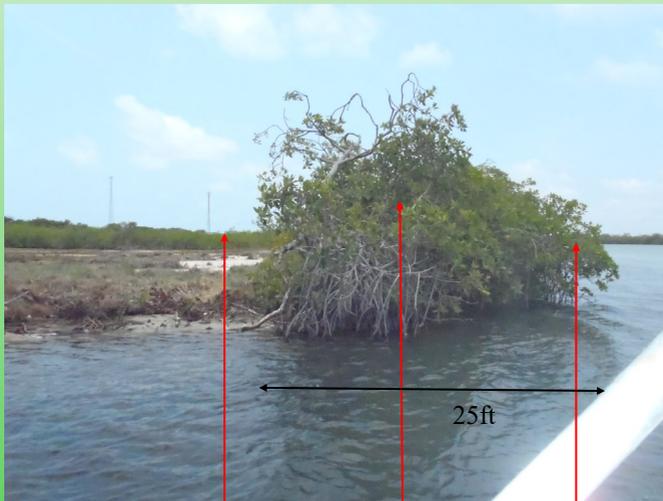
# Buttonwood



## *Leaving A Buffer Intact*

- 1) By leaving a buffer intact, we allow mangroves to continue to maintain their function of holding the land in place; keeping your land more stable.
- 2) Keeping older mangroves ensures that the nursery function is not destroyed.
- 3) An intact buffer will ensure that waste water filtration continues, thereby helping to maintain our beautiful coral reefs.
- 4) Keeping older mangroves means not having to start from scratch. They lend themselves perfectly to several different methods that we will discuss.

**Note:** Your buffer should be 66ft wide as required by law however, in cases where such is impossible, a decent buffer can be about 25 feet wide or wider.



**Inner edge**

**Mangroves**

**Outer edge**

## *Leaving A Buffer*



*Intact mangrove buffer maintained along coastal properties can serve to protect housing and infrastructure from storms and erosion.*

# *Trimming*

Almost every mangrove tree can take trimming. However, there might be different limitations that will determine how you want to trim each one. Each mangrove can be trimmed into beautiful hedges at different heights, but the best for hedging is the buttonwood. Basic hedging is the most common and the easiest trimming method. This basically involves keeping the trees cut to a certain height, depending on the type of mangrove.

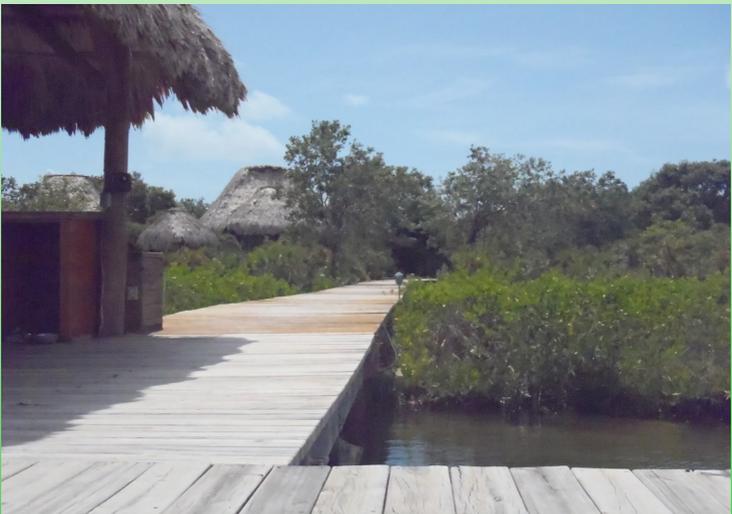
**Note:** You can only hedge dwarfed or replanted mangroves. In most cases of wild growing specimens, your mangroves will be too tall to lend themselves to hedging.



**A Planted Mangrove Hedge**

*This area was planted about four years ago, in a mix of buttonwood, red and white mangroves, and is maintained at a height of four feet.*

## *Trimming*



*Above: Mangroves used to stabilized waterways.  
Below: Mangrove area trimmed for a dock installation.*

## *Making A Path*

Take time when selecting an area to put in a path. You want to make sure that you will cause as little damage as possible. Once your area is selected, carefully remove foliage without touching the roots. After foliage is removed, start erecting your walkway, removing roots only where absolutely necessary. In an area with tall mangroves, trim the intermediate branches and any higher rise roots that may get in the way, as necessary. This method leaves you with a covered walkway.



A low narrow pathway

Trimmed Branches

Prop Roots



*Prioritize conservation of mangroves as much as possible, especially along windward or exposed locations. Mangroves on private properties can be placed within private reserves for long-term protection.*

## *Creating A Window*

Creating a view simply takes trimming; however, it takes careful trimming so as to not damage the plant in such a way that may cause it to die or become unproductive. This is most important when working with red mangroves, which are in most cases the mangroves you will be wanting a window through. Cut the wrong root, and it falls over. Cut the wrong branch, and it quits growing. So, it is very important to know what you are doing.



Remaining  
Foliage

Trimmed Area

Prop roots



Mangrove buffer along a resort property that has been trimmed to create windows for a sea view.

## *Putting In A Dock*

Putting in a dock like this one, behind the mangroves, improves the life of your structure while creating a more secure environment in which to keep your boats.

This can be achieved by creating a walkway along the side of your buffer or by trimming a path through your buffer. Either way works. This might be the only alteration you need to make to your mangroves. This then allows you to place a dock as close in or as far out as you like, and gives you great access to the water and all the beautiful creatures of the mangrove underworld.



**Tunnel**

**Ladder**

**Walkway**

**Main Dock**

## *Putting In A Dock*



Docks constructed through mangrove habitats with the main structure of the mangroves remaining intact.

## *Tunneling A Boat Way*

To create a tunnel with minimal damage to the mangrove select an area where the mangroves are the youngest or you may find an area with a small tidal creek or maybe the mangroves are already thinned. After selecting the area to place your tunnel, simply clear midway, down to the roots then dig the bottom to the appropriate depth according to your surroundings and needs. Continually maintain by trimming out intruding branches and roots. These attract Goliath Groupers, crocodiles and sometimes resting manatees.



Mangrove Buffer

Trimmed Tunnel

Development behind  
buffer

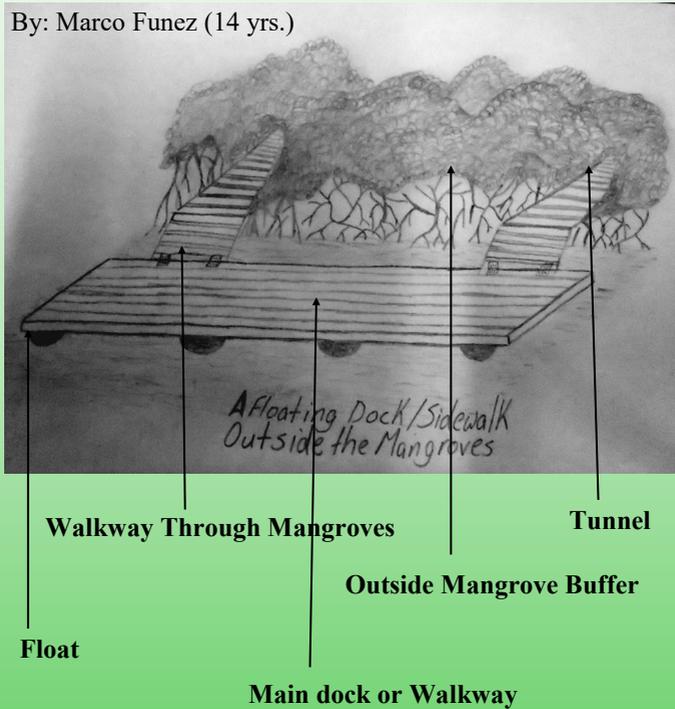
## *Tunneling A Boat Way*



## *Be Inventive - Docks*

Sometimes you will not be able to find any designs already in use that will work for you. In such cases, using your creativity and knowledge of your environment may be able to help. Let's consider the following designs:

By: Marco Funez (14 yrs.)



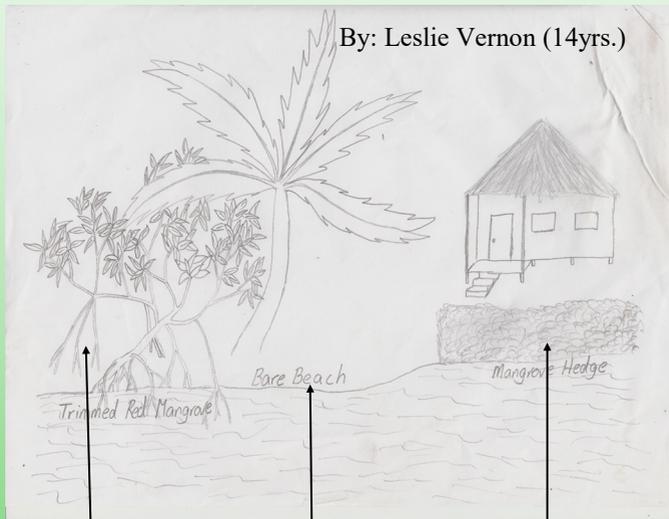
This design show a property that has used four designs to create a working model. We see trimming to create a view, putting in a walkway, placing a dock in front of the mangroves and leaving a buffer intact. This design gives a great space for relaxing and enjoying nature.

## *More Docks*



## *Be Inventive - Beach Side*

One of the main problems people face today is the issue of erosion, especially along their beaches. In order to fix this problem, many times we need to understand what might have caused the problem. In many cases, this brings us back to the area's original, natural state. If we take nature's example we can often times come up with a solution as is the case in the drawing below.



**Red Mangrove Patch**

**Buttonwood hedge**

**15—20ft Bare beach**

Our native beaches had plants of many varieties growing all the way into the water and leaving patches of bare beach. Using this design, we end up with a secure productive shoreline that retains its size and natural appeal.

## *Be Inventive*



## *Creating A Buffer*



As a landowner or developer, you might end up with bare shorelines, whether intentionally or un-intentionally, and later realize that this is not stable, environmentally friendly or beautiful. If this is the case, you can fix it by simply planting mangroves. Planting your own mangroves gives you the opportunity to decide what you want your area to look like and what mangroves you would like to use. Just remember to refer to your “Everything Mangroves” booklet for planting instructions and best results.



# *Mangroves & Climate Change*

Climate change will have significant impacts on people's knowledge, innovation and practices. Mangroves play a major role in the cultural and economic livelihoods of coastal communities, and provide risks reduction measures in combating our vulnerability to climate change. The ability of mangroves to withstand a broad range of environmental conditions make them crucial in adapting to climate change.

Strong links exist between healthy mangroves and coastal climate change resilience building. Actions needed to protect these important habitats include awareness and education efforts for mangrove conservation while emphasizing their traditional values through making reconnections with local communities. It is critical to rally public support for mangrove regulations, improvement in enforcement of existing legislation and political will to support management of these important coastal habitats.

We hope that the guidelines discussed herein provide some practical solutions for minimizing impacts to mangroves while promoting local adaptation needs to the adverse impacts of climate change.

## ***Key adaptation actions to safeguard mangroves:***

*Create and implement guidelines for coastal development to minimize impacts on mangroves. Such plans should include buffer zones behind mangroves to allow for natural migration. Plans should also take into account the important role that mangroves could play in protecting the coast under climate change scenarios in which sea level and storm activity increases. Finally, promote the use of best management practices to protect fisheries dependent on mangrove forests for part or all of the fishes' life cycle.*

WWF's mission is to stop the degradation of the planet's natural environment and build a future in which humans live in harmony with nature by:

- Conserving the world's biological diversity.
- Ensuring that the use of renewal natural resources is sustainable.
- Promoting the reduction of pollution and wasteful consumption.

