

# How to grow a mangrove forest



## A recipe for losing beaches and filling in estuaries



### Ingredients

Take:

- 1 sheltered coastal water body in any tropical to temperate zone
- a rolling to steepish surrounding catchment (1 metric catchment = 1 imperial watershed)

Add:

- a large quantity of forest clearance
- quite a bit of farming
- a few areas of forest, ideally on the steepest land
- a concentrated area of urban development
- several major roads and causeways

### Method

Start by removing the original forest – this gives you a good start by releasing a pulse of sediment into your estuary or embayment before you add your farmers.

Add your farmers. For best results, use cropland farmers – this will give you a steady supply of sediment from the land into the water (this is where you want your mangroves) that can equate to around 200 times the rate from the original forest. Grassland is fine if you can't get crops, but in many places, will only yield about 10 times more sediment than the forest.

Once the farmers are settled in, sprinkle your forestry up in the steeper areas to maximise runoff. While the sediment yield is only intermittent, it's not bad at around 500 times more sediment than we started with, so this will make a good contribution to your mangroves.

Now, add your urban development. Each new subdivision will only expose the soil for a short time, but you can have two bites of this cherry: firstly, make sure the major construction works expose as much soil to rain as possible and don't add too much in the way of erosion and sediment controls. This should yield quite a decent dose of sediment to your waterway that could get up to around 2,000 times the rate from the original forest (which of course we have already carefully removed). While this will tail off as the area is grassed down and the individual lots go on sale, you will get another quite good dose of sediment once the builders come in and open up each site for house foundations, driveways and services.

Over this time, gradually put in your highways all the way around your waterway, and make sure to put causeways across your estuarine inlets – they are just great for keeping in all that lovely sediment we've just added.

Let stand for some time. You will see results within two or three years as mangrove seedlings start springing up on the areas where your fine sediments have settled out on the intertidal flats.

However, the best results are obtained over a hundred or more years, by which time you could have a mangrove forest that has crept over your sandy beaches and extended well out into your harbour and over the shellfish beds further out.

This recipe is simple enough for all to use. Advanced chefs – follow the tips on the next page!



Clare Feeney is a sustainability strategist who helps organisations of all types grow their sustainability capability. She can help you grow jobs, increase profits and improve the environment – and have fun along the way! You can find out more at [www.clarefeeney.com](http://www.clarefeeney.com) and contact her at [clare@clarefeeney.com](mailto:clare@clarefeeney.com).

## Extra for experts

**Farmers:** Farm tracks are a great sediment source. Widen them periodically and don't put too much aggregate on them: runoff will pick up more sediment if they are bare. Races are pretty good sources, too – and if you keep long grass well away from the downhill side, especially at the lowest point, sediment will be able to get straight into the stream where it can head off down to the harbour very quickly.

**Croppers:** Regularly cultivate your soil to a great depth – this will dry it out and break up larger clods, making it easier for runoff to mobilise soil particles and get them down to the harbour for your mangroves. And wherever you can, run your machinery downslope so runoff can speed up.

**Pastoral farmers:** The simplest way to get good sediment runoff is to get your stock into your waterways – on no account should you fence them off or plant the stream banks. A good bit of overgrazing will also help, especially when grass growth is poor over winter or in dry weather.

**Foresters:** While you may only fell every 20-30 years, you can still make a great contribution if you use minimal erosion and sediment controls on your roads, haul routes, skidders and platforms, especially if you don't use cables on your steep land, fell right to stream edges and put your machinery through them.

**Urban developers:** As indicated in the main recipe, you have two chances to maximise sediment runoff from your developments. However further variations are possible by sticking to the good old-fashioned methods of land development with major land recontouring and cut to fill. Try to avoid the new trend for water sensitive urban design and low impact development – it just doesn't give the yield we want.

**Roading engineers:** Opt for long causeways around your harbour wherever you can: they are not only cheaper than bridges, they will restrict the tidal flow much more, creating sheltered areas where sediment runoff from the whole catchment can more easily settle. Take a look at an air photo to see the difference they can make. Rural roads in particular are also great sources of sediment when you don't re-gravel them too often. Avoid armouring or putting check dams in your roadside drains, so that the water can build up speed: this helps it erode out more soil and transport it more rapidly into the harbour.

### Seriously, though –

Estuaries are vital coastal ecosystems that support significant inshore and offshore commercial, customary and recreational fisheries. In the temperate to tropical waters where they are found, mangroves play an invaluable role, providing shelter in a nutrient-rich environment for many species of fish, including **residents** that spend all their life there, **mobile** fish that come and go between ocean and estuary, **transitory** fish that enter them for short periods of feeding or breeding and **migratory** fish passing out to sea from streams or up to streams from the sea.

But this is little consolation to people who live on or use estuaries and who over time have seen the loss of sandy or shelly beaches and offshore shellfish banks as fine sediment smothers them, enabling the mangroves to establish. It is even less consolation to know that the spread of mangroves is our own fault, the result of poor land use practices arising from past ignorance and the drive for development.

Environmental regulators are becoming more receptive to community desires to halt mangrove spread or remove them to restore swimming beaches – but locals, picking up seedlings is very different from picking up a chainsaw: do get the approvals you need before doing anything major.

### Call to action for communities and catchment managers

There is no point removing mangrove seedlings or trees unless we also cut off the artificially elevated supply of sediment that allows them to establish. The work starts from the ridge tops down, and it is the role of every land user to keep soil on the land where it belongs. Every catchment management plan needs to set up or beef up soil conservation and erosion control programmes in the watershed to progressively reduce the loads of sediment to the harbours, to support the community's removal efforts.

### To find out more:

Go to the Auckland Council website at <http://bit.ly/1pAMPUo> to find TP (Technical Publication) 325, 'The New Zealand mangrove: review of the current state of knowledge'.



Clare Feeney is a sustainability strategist who helps organisations of all types grow their sustainability capability. She can help you grow jobs, increase profits and improve the environment – and have fun along the way! You can find out more at [www.clarefeeney.com](http://www.clarefeeney.com) and contact her at [clare@clarefeeney.com](mailto:clare@clarefeeney.com).