

ANALOG FORESTRY – A RESTORATIVE AGRICULTURE TECHNIQUE

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(Study tour, Heather Mitchell Fellowship 2013)

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Objectives

- ▣ To more fully understand the principles and processes used in Analog Forestry
- ▣ Build relationships with key members of International Analog Forestry Network
- ▣ Compare Analog Forestry and Permaculture to determine design considerations and key differences
- ▣ Pass the knowledge gained on Analog Forestry to landcare groups in Victoria

What is Analog Forestry?

- ▣ Analog Forestry is a silvicultural system that seeks to create a **tree-dominated ecosystem** that is **analogous to the original mature forest** in architectural structure and ecological function. (www.analogforestrynetwork.org)
- ▣ Creates **ecologically stable and socio-economically productive landscapes**
- ▣ **Produces** a range of useful and marketable goods and services from the forest

The International Analog Forestry Network – IAFN

- ❑ A.F. initially developed in California and Guatemala in 1975 as a response to the destruction of natural habitat by conventional forestry and agriculture
- ❑ idea: *synthesis* between tradition and science, based on the traditional 'home gardens' of tropical Asia
- ❑ concepts were tested on the ground in Sri Lanka in 1983
- ❑ The International Analog Forestry Network was created in 1995 .



Restoring the planet's life-support



Building knowledge.....

- ❑ How to bring back biodiversity and build healthy soils



- and provide the services of natural forest ecosystems, reflecting their true value.

Restoring the planet's life-support



and support...

- In marketing the value and functions of natural products, whether it be medicinal, nutritional, ecological or commercial



- value-added certification systems, such as Forest Garden Products and Participatory Guarantee Systems

Restoring the planet's life-support



What is a Forest? – Part 1

- Forests are tree dominated ecosystems displaying the seral dynamics of ecosystem maturity and possessing tree crown cover (stand density) of more than 20% of the area (FAO 1990 Forest Resources Assessment, Rome)
- UN Convention on Biodiversity 1998 defines “ecological systems with a minimum of 10% crown cover of trees and/or bamboo, generally associated with wild flora and fauna and natural soil conditions and not subject to agricultural practices”
- In terms of biomass, tree species account for over 80% of a forest.
- Biodiversity is the expression of the complexity of patterns produced by that biomass. Therefore, the identity of a forest is best expressed by its biodiversity.

What is a Forest? – Part 2

Tree species of a forest account for less than 1% of the biodiversity of such formations and help in maintaining total biodiversity.

99% of the biodiversity of a forest are in things other than trees :

- ▣ Animals
- ▣ Insects
- ▣ Bushes and small plants
- ▣ Epiphytes
- ▣ Vines
- ▣ Mosses and Lichens
- ▣ Fungi and Microorganisms

Healthy Soil

- ▣ A teaspoon can contain 1-2 kilometres of fungal hyphae and 1-2 billion bacterial cells
- ▣ Soils “...may contain 20 000 kilograms of micro-organisms per hectare – as much or greater than the mass of most agricultural plants standing on the surface of that same area of land” (Australian and New Zealand Environment and Conservation Council and Biological Diversity Advisory Committee Government, 2001).

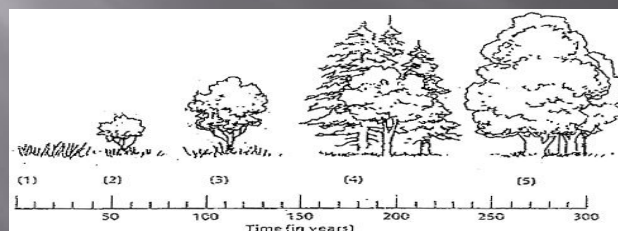
How does a forest form?

□ Community Succession

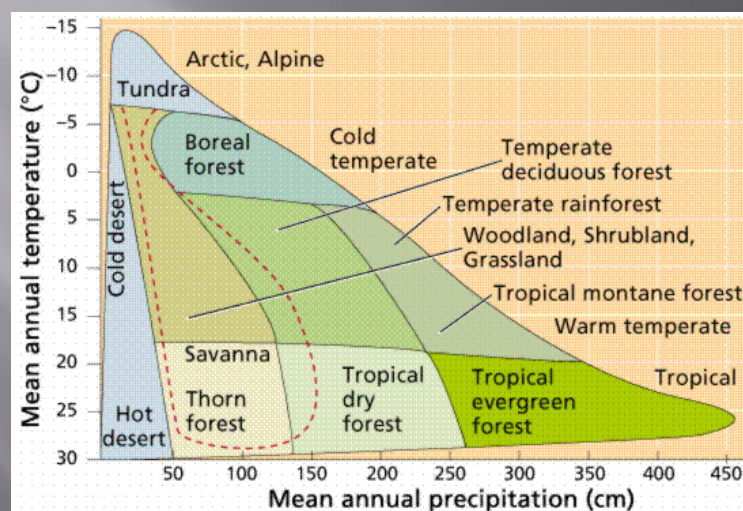
- The presence of new species can moderate the environment allowing others to establish
- Colonisation of species will continue to climax state

□ Time

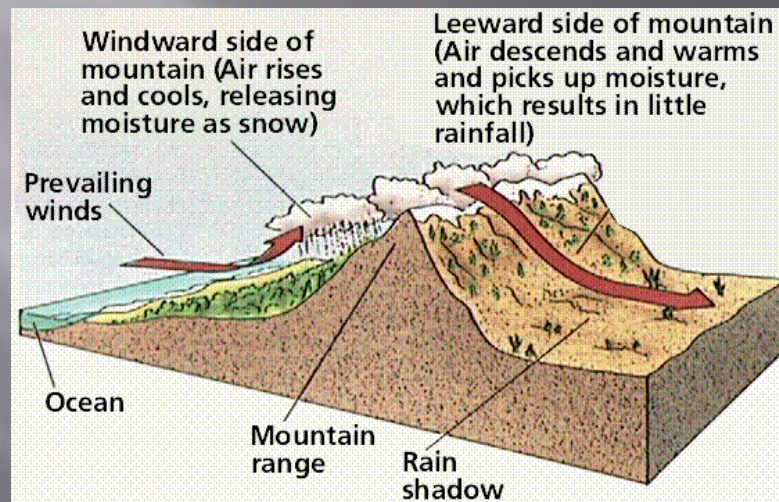
- Temperate = 4 phases: 10, 80, 300, 700 – 2000 years
- Biomass increases linearly for 1st 40 years



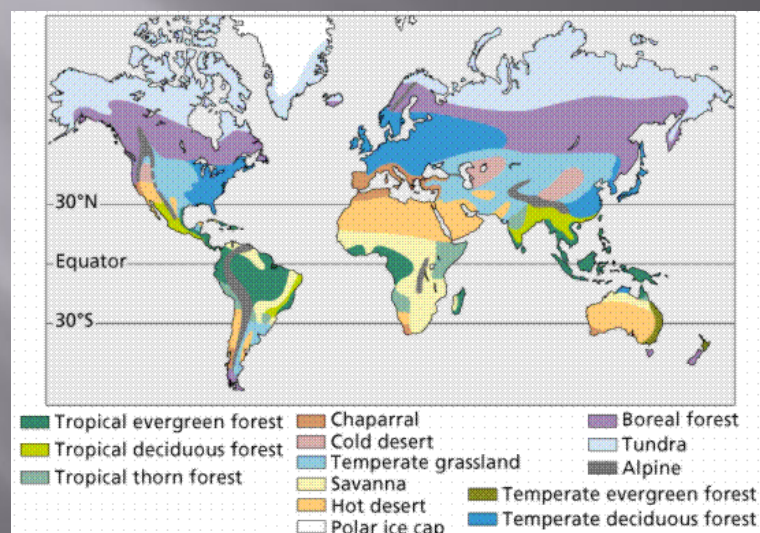
Relationship of Temperature and Rainfall to ecosystem type



Influence of Topography



Ecosystem Zones



Costa Rica – La Finca

- ▣ Covers 94 hectares
- ▣ Established over 35 years ago from agricultural land
- ▣ Produces commercially viable commodities:
 - cut-flowers, herbs, spices, essential oils, timber
- ▣ Produces ecosystem services:
 - clean water, stable soils and ameliorated climate
- ▣ Aspects of AF compared with Natural Forest in structure and function



Vertical layers

Canopy

Understorey (5 – 12m)

Medium shrub layer (3 - 5m)

Small shrub layer (1 - 3m)

Ground layer



Slide provided by Stephen Murphy 2012

Analog Forest Design

- ▣ Whole Farm Plan and Evaluate Flows
- ▣ Map the forest using Physiognomic Formulae
 - F1 = Natural Mature Forest
 - F2 = Disturbed/ Degraded Forest
- ▣ Perform a Gap Analysis
- ▣ Determine options based on Environmental, Economic and Social considerations
- ▣ Ecological Value Assessment
- ▣ Output = Analog Forest design

Mapping the forest patch

- ▣ Growth Form
 - Basic growth forms
 - Broadleaf evergreen = B
 - Broadleaf deciduous = D
 - Needleleaf evergreen = E
 - Aphyllous (no leaves) = O
 - Semi-deciduous (B+D) = S
 - Mixed (D+E) = M
 - Special growth forms
 - Climbers = C
 - Bamboos = B
 - Leaf Characteristics
 - Hard (sclerophyll) = h
 - Succulent = k
- ▣ Structural categories
 - Height
 - 8 = greater than 35m
 - 7 = 20-35m
 - 6 = 10-20m
 - 5 = 5-10m
 - 4 = 2-5m
 - Coverage
 - Continuous (over 75%) = c
 - Interrupted (50-75%) = I
 - Patchy (25-50%) = p
 - Rare (6-25%) = r
 - Sporadic (1-6%) = b
 - Almost absent (<1%) = a

Physiognomic Formulae

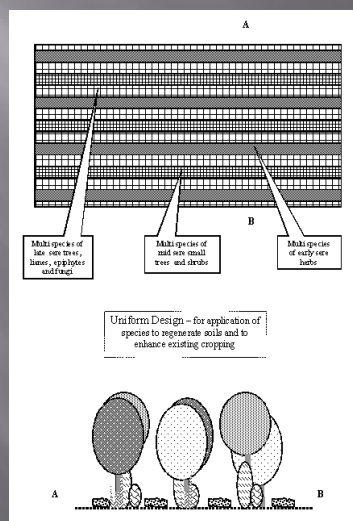
- ▣ F1 (Natural Forest):
B7i, D5c, win; H2p; L7i; C5p; V4b; X45r
- ▣ F2 (Disturbed Site):
B5r, win; H2p.
- ▣ Gap Analysis
B7i, D5c; L7i; C5p; V4b; X45r
- ▣ Select species that are:
 - 1) Keystone species
 - 2) Provide economic return
 - 3) Meet cultural paradigm of landholder

Keystone species

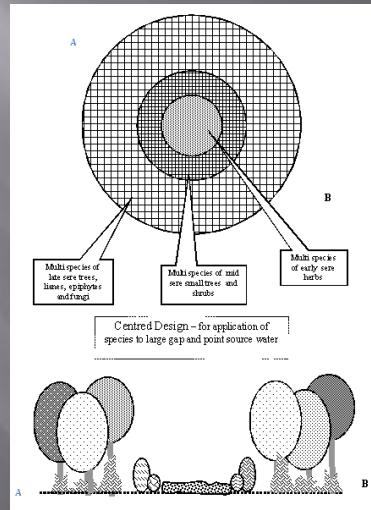
- ▣ Black Wattle, *Acacia mearnsii*
- ▣ 8-25m x 6-10m (tall shrub – small tree)
 - Builds Soil – roots / nitrogen fixation / shedder
 - Supports many organisms across trophic levels
 - Tolerates a range of soils and conditions
 - Excellent habitat (food and shelter for many species).

Food plant for caterpillars of native butterflies and moths, which in turn form food source for insect eating birds such as scrub wren. Many species of beetle and their larvae feed on foliage. Critical feed and shelter tree for possums and gliders. It is an important structural component for nesting bird species along streamside vegetation

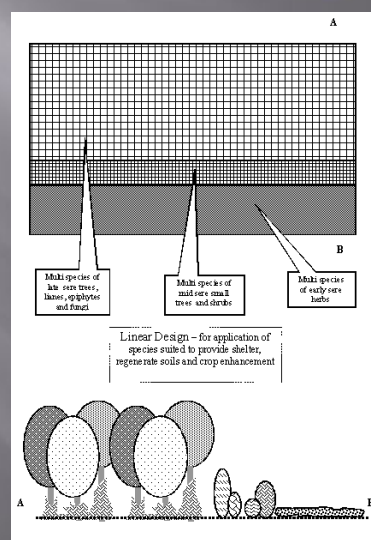
Uniform Design



Centred Design



Linear Design



Services and products

Species	Name	Size	Values	Element
<i>Acacia implexa</i>	Lightwood	5-15m x 4-10m	H, E, N, S, IS	Environmental
<i>Acacia mearnsii</i>	Black Wattle	8-25m x 6-10m	F, Tc, Tf, P, E, S, N, H, SF	Environmental / Economic / Social
<i>Acacia melanoxylon</i>	Blackwood	5-30m x 4-15m	F, Tf, P, E, S, N, H	Economic
<i>Adiantum aethiopicum</i>	Common Maidenhair	10-45cm tall	H	Environmental
<i>Allocasuarina verticillata</i>	Drooping She oak	4-11m x 3-6m	Tc, H, F, SF, IS	Environmental / Economic
<i>Bursaria spinosa</i>	Sweet Bursaria	3-10m x 1-5m	Pp, H, IS, Tf	Environmental
<i>Eucalyptus viminalis</i>	Manna Gum	10-50m x 8-15m	Tc, H, F	Economic
<i>Helichrysum bracteatum</i>	Golden everlasting	0.2-1m x 0.3-1m	H, CFp, IS	Social / Economic

Commodity product codes:

F - Fuel;
Tc - Timber for construction;
Tf - Timber for furniture;
P - Pharmaceuticals;
Pp - Pharmaceuticals potential;
SF - Stock feed;

Cp - Culinary or condiment potential;
C - Culinary or condiment;
CFp - Cut Foliage / Flower potential;
CF - Cut Flower or Foliage;
IS - Indigenous Seed
He - Herb.

Functional product codes:

E - Erosion control or prevention;
S - Shelter;

N - Nutrient enhancement;
H - Wildlife Food Source

Symbolism

Legend



Orientation



Overstory



Blackwood



Understory



Shrubs



Sedges, grasses

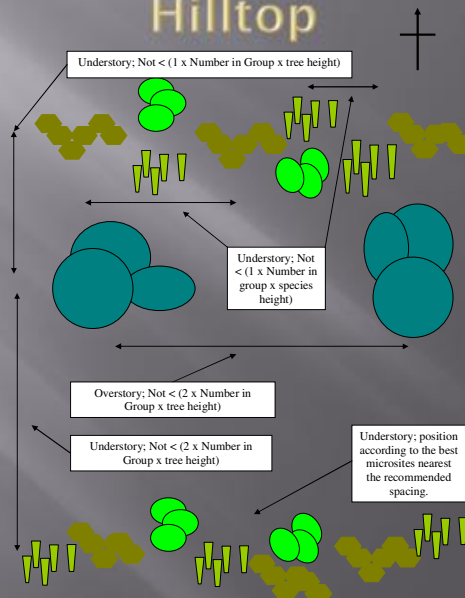


Reeds, ferns

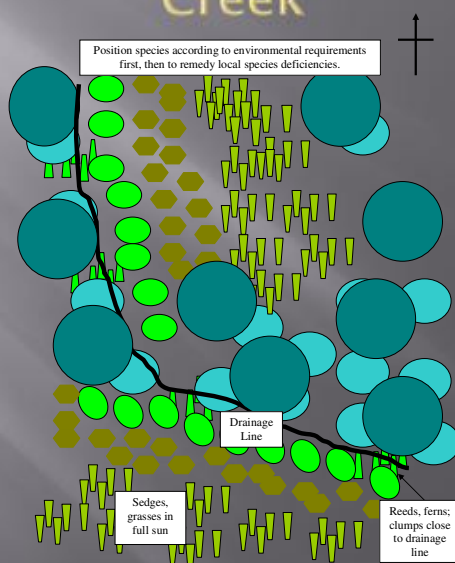
Height = anticipated total height at maturity

For all plant species include associated notes, profiles, textures, hanging plant relevant animals & food attractants

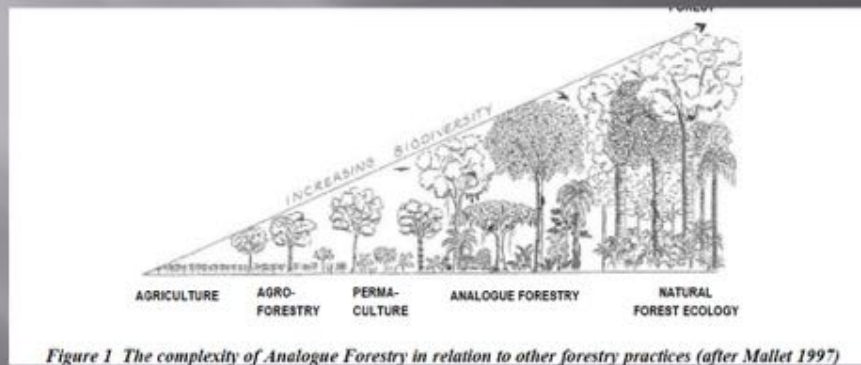
Analog Forestry Grouping - Hilltop



Analog Forestry Grouping - Creek



Complexity of production systems









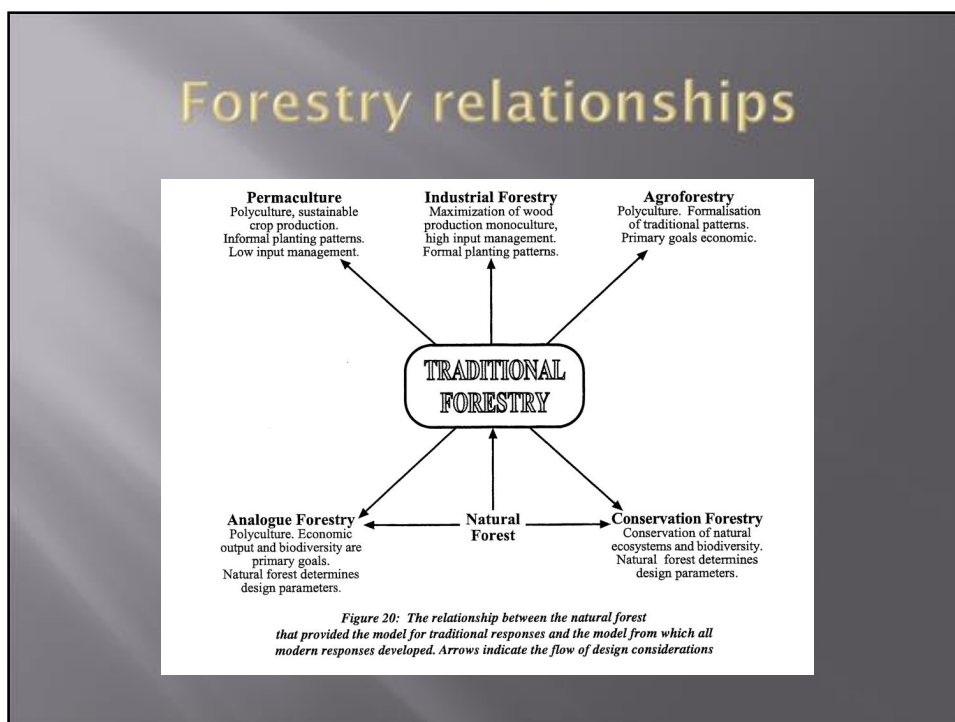




Flowers



Tumeric



Comparison of Analog Forestry versus Permaculture

ANALOG FORESTRY

- ▣ Biodiversity Imperative in design (constructed based on mature forest)
- ▣ Incorporates range of economic products based on landholder and forest structural design requirements
- ▣ Whole farm planning

PERMACULTURE

- ▣ Cultural imperative in design (constructed based on agriculture)
- ▣ Incorporates a range of economic products based on home and market needs
- ▣ Utilitarian aspects incorporated







Work Together

- ▣ Species selected is site specific
- ▣ Make connections with NRM bodies
- ▣ A cluster of farmers = strength
 - Support and sharing resources
 - Joint marketing



How do we farm for future generations?

- ▣ Sustainability needs system-based approach
- ▣ Social, Economic and Environmental values
- ▣ Farms can incorporate blueprint of forest to maximise production
 - Use standard models (linear design best start)
 - ▣ Integrate as whole farm plan with ecology focus
 - Incorporate products into shelterbelt
 - ▣ Furniture timber, bush tucker, fruits/nuts
 - Select products based on farmers interest
 - ▣ Dinner cooked on AGA stove = grow firewood

Outcomes

- ▣ Knowledge of processes of Analogue Forestry greatly increased
- ▣ Moorabool Landcare Network is full member of IAFN
- ▣ Workshop on AF schedules for 28th, 29th and 30th April 2014 with Milo Faries (Chair IAFN) facilitating
- ▣ Project “Analog Forest Fire Retardant Design” under discussion with Kate Roberts from Roberts Evaluation (expected start 2014/15).

