Promoting ‘Green Jobs’ in the Forest sector
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Applying the UNEP ‘Ecosystem Approach’

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The UNEP/CBD ‘Ecosystem Approach’: helps see the ‘bigger picture’

• The ‘Ecosystem Approach’ – First prepared for UNEP/CBD in 1997, also incorporated into Ramsar for the delivery of wetland conservation

• A set of 12 principles enabling the delivery of sustainable, social, economic and environment management of ecosystems

• Involves all relevant sectors of society and their impact on ecosystems

• Recognises that the objectives in the management of land, water and living resources are a matter of societal choice
It recognises a diversity of PERSPECTIVES as to how natural resources might be managed - reflecting individual and collective opinion.
“one of the penalties of an ecological education is that one lives alone in a world of wounds,”
Aldo Leopold

“I guess the underlying principle is that social and economic factors will override natural factors unless the public is educated to understand the relationship between nature and their own long-term welfare.”
Frederick Herbert (Herb) Bormann
Figure 4.1. Human-dominated ecosystems are parts of the overall global system. Ecosystem services are essential for the development and well-being of human society, but only a fraction of this work is covered by market prices or perceived by humans.

The ‘Ecosystem Approach’ concept considers the science of the ‘total environment’
‘The Global system’ is subject to a concatenation (inextricable linkage) of social, economic and environmental pressures

- **Social:** population growth, land ownership, health, community, cohesion, security, politics

- **Economic:** land and capital, labour, energy, maintenance, sustainability, materials, safety, commercialism

- **Environmental:** nutrient leakiness, carbon/nitrogen, biodiversity, pollution, aesthetics, zoonotic disease, epidemiology
Considering the past & present, Ireland – is a land de-forested and drained dry like no other in Europe.
Fire + Grazing + Deforestation + Grazing
Drainage + Grazing

For 10,000 years Ireland’s ecology is and has been fundamentally altered by Human activities!
Kerry mountains, SW Ireland
Forest cover
Ireland: 10 – 11%
Map of forest cover in RoI

Europe’s Forest Cover Map

Ireland: 11%
EU average: 40%.
Inspired by ‘lost’ biotypes (habitat types) and ecosystem functional analyses

Understanding human-generated impacts through taking an ‘ecosystem approach’

- Forest/woodland/trees
- Marshes, fens and bogs

- Ecosystem dynamics?
- Evolutionary biology?
- Reanimation (restoration)?

Earliest human Arctic occupation
(Earliest modern humans > 300,000 years)

Pitulko et al. 2016 have found evidence of human occupation (45,000 years ago) well within the Siberian Arctic (at 72°N) Science. 15 Jan 2016: Vol. 351, Issue 6270, pp. 260-263. DOI: 10.1126/science.aad0554
Reanimating wetland and riparian forest infrastructures

Using a ‘cut & fill’ approach – all relevant site characteristics and soils
The 2500ha catchment – 7km long, a north-south trending orientation, a complex geology (igneous and sedimentary) and variable topography – all requiring a site-specific ‘tailored’ approach – thus taking into account:

- topography
- location
- habitats
- soil-structure
- ancillary activities
- forgone-costs for each site’s landowner
Started in 1989 by attenuating water flow:
Anne Valley catchment, Co Waterford, S. Ireland

Catchment area = 2,500ha:

• 16 large (>1ha) integrated constructed wetland (ICW) systems
• C. 12.5 km re-profiled stream corridors
• C. 200ha forest plantation
• C. 20ha extant woodland
Inspiring the ‘Integrated Constructed Wetland’ (ICW) concept: an explicit integration of land and water resources for treating water

Integrated Constructed Wetlands (ICW) - are based on wetland reanimation & ecological engineering

> 100 ICWs
6 years of molybdate reactive phosphorus data: to (blue), midway (red) and from (green) an ICW in the Anne Valley treating farmyard drainage
Explicit integration provides:

- positive synergies,
- robustness and
- acceptability
- optimising, not maximising use of resources
The need for ‘new’ economies

Optimal

Maximal

Multiple purpose/benefits

Single purpose/limited use
Trees, woods, forests and wetlands regulate water flow & storage + carbon sequestration

They provide many ecosystem services and resources to form the basis for the ‘Green Economy’
Intercepting precipitation
(leaves, branches and stem, C. 40-60%)

Water storage
(interstitial soil structures, humus, fungal mycelium, >20+%)

Soil penetration
(10kg/cm²)
Level areas with tall, dense, emergent (helophytes) vegetation increases hydraulic impedance

Helophyte vegetation – intercepting, transpiring and evaporating precipitation

Vegetation roots & stems intercept through-flow support bio-films, and sequesters carbon
Intercepted water travels to wetlands, streams and rivers - vectoring pollutants

Dec. 25th
2015

Rainfall events > 1mm
31st Dec - 7.0 mm
5th Jan - 2.5 mm

Jan. 6th
2017
A question of ecological reanimation or restoration……?

**Ecological reanimation** focuses on facilitating bio-geo-chemical processes delivering self-managing (and self-facilitating) systems minimising ‘leakiness’ and entropy - sustainably.

**Ecological restoration** focuses on facilitating lost biological assemblages (within recent evolutionary time lines).
In 1960, in a letter to Robert Pierce, manager of the Hubbard Brook Experimental Forest, he suggested that the monitored watersheds would be ideal for the investigation of chemical budgets for whole forest ecosystems. In 1963, with the help of a grant from the National Science Foundation, and Dartmouth colleagues, G.E. Likens and Noye Johnson, and later Tom Siccama, he embarked on a biogeochemical study of Hubbard Brook ecosystems that became known as the Hubbard Brook Ecosystem Study.

Hubbard Brook science is now in a position to make land use recommendations that go with nature rather than against it. This is important to millions of people who live in New England and to people throughout the world as a set of general land-use principles.

For example, scientists at Hubbard Brook can offer advice to planners on land use questions such as these:

- Can water yields be increased in a sustainable, non-destructive way?
- How increased water yields can be gained without loss of biochemical quality?
- Would proposed vegetation management for water flow affect the release of carbon to the atmosphere and the problem of climate change?
- Would aesthetic qualities of the landscape be affected by changes in landscape management?
Reanimated forest and wetlands intercepting and treating overland water flow from agriculture
Water and woodland/forest - water and drainage managed with reanimated woodland and ponds
There is expanding interest in nature-based solutions – ecosystem function, services and application
Improved biodiversity
Builds public *empathy* for ‘nature’

Dunhill, Co. Waterford
Even peatland might be reanimated

5 year growth of sphagnum on HDPE plastic liner...
Textiles from wetland vegetation

Uses for wetland vegetation

In Ireland ‘‘holy’’ grass; in N. America as an insect repellent; in Poland it is known as ‘‘bison grass’’, used in herbal medicine and in the production of distilled beverages (e.g., Żubrówka, Wisent)

A house of reeds

Cultural and religious symbols

Food and other uses e.g. ‘‘light’’
Commercial forestry devoid of empathy with limited employment opportunity.
Forest/woodland corridor
20m wide
Societal needs

Clean Air, Water & Soil:
- EU:WFD
- BWD
- UWWD
- SD
- Etc.
- Ramsar (1971)
- UN:EP
- CBD
- Climate change

Sectoral wants

- Agriculture
- Development:
  - Urban
  - Rural
- Forestry:
  - Timber
  - Biomass
- Fishing
- Recreation
- Nature conservation

Reconciling bridge between needs and wants
The importance of applying ‘universal design’

- Sustainable
- Robust
- Soc.Econ.Env. coherent
- Effective
- Fit for purpose
- Aesthetic
- Attractive/Beautiful
- ‘In context’ - as if it had always been there
But what of restoring empathy and appreciation for ‘nature’? *It requires understanding* and to understand how something works; build it or rebuild it!

**Forest potential for employment needs to be demonstrated**
Forests can foster multiple use

- Agro-forestry, shelter and protection of agricultural crops and animals
- Timber from a diversity of species, volume, quality and special uses
- Recreation
- Foraging – fungi, fruits and plants
- Hunting and fishing
- Education and inspiration
- Social and a sense of place
Science is a complex business, as this map of journal cross-citations shows. Each node represents a sub-discipline and the lines represent the strength of similarity between the nodes. Image: Rafols, I. et al., Science overlay maps
Key factors for employment/ ‘jobs’ in a sustainable forest economy (‘multiple use’?)

• Remuneration for work done: appropriate, safe and honourable
• Recognising these jobs are not for everyone – partly because of competition, but also because people’s personalities and interests are different
• Timber and its products are largely seen as the main value product of forests – but there are many others: social/personnel services, secondary crops, woodland skills, timber diversity
• It’s a World of increasing (accelerating) technological development with both loss and gain of employment opportunity
• The power of awareness with creative thinking and innovation creates opportunity
• Forest economy (and many other nature-based resourced economies) are dominated by large corporate interests focused on monetary profit (e.g. share value) demanding consistency in supply and quality – a need for collaboration
Innovation + opportunity + collaboration = success

• The two most important words in any language: ‘WHAT’ & ‘IF’ - human endeavour and evolution: from ‘hunter-gatherer’ to ‘modern’ a continuous cycle of ‘what-if’ and innovation

• The forest ecosystem’s environment has many more opportunities for innovation than simple cropping/harvesting

• A diversity of opportunity is possible through social, economic and environmental engagement

• Perceptions and ‘illusions of understanding’ are best tested by experience: a need for cooperation and communication between the apprentice and the experienced is essential
SO ASKING WHAT IF ...........?

• land is used to reanimate forests and wetlands for human wellbeing?
• local soils are used to form micro ecosystems with little embedded cost?
• there an inter-linkage between forests and other land uses?
• a wider range of tree species are used to diversify products?
• there are changes in rotation and harvesting methods?
• no harvesting of some/all trees?
• if forests are combined with other uses?

......and many more....? 

Check out www.whatifwecchange.org
“Nature never did betray the heart that loved her.”

William Wordsworth, 1770 – 1850

“Thank you for your attention”