Introduction to web-based trading platform
Environmental information + Rural property mapping tool = PES platform
Management Tools
Free web tools to help assess, record and manage woodland resources for owners, managers, and educators.

register now  see the tools
drawing instructions

- **Edit** a boundary by dragging the square points.
- **Snap** a point to another boundary by dragging it near.
- **Delete** a point by right-clicking, or double-clicking on it.
- **Move** the label by dragging it.
- **Save** your edits by clicking the save changes.
Woodland Management Plan

1. Details

Management Plan Details

<table>
<thead>
<tr>
<th>Management Plan Name</th>
<th>My Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Business Reference Number</td>
<td></td>
</tr>
<tr>
<td>Local Authority Code</td>
<td></td>
</tr>
<tr>
<td>Forest Reference Code</td>
<td></td>
</tr>
<tr>
<td>Management Plan Area (hectares)</td>
<td></td>
</tr>
<tr>
<td>Forest Commission Reference</td>
<td></td>
</tr>
</tbody>
</table>

Felling Operations Table

<table>
<thead>
<tr>
<th>Species</th>
<th>Er</th>
<th>Area (ha)</th>
<th>Total Volume (m³)</th>
<th>Tree Height (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ash</td>
<td>4.27</td>
<td>110.3</td>
<td>105.9</td>
<td>5.0</td>
</tr>
<tr>
<td>Birch</td>
<td>4.27</td>
<td>110.3</td>
<td>105.9</td>
<td>5.0</td>
</tr>
<tr>
<td>Beech</td>
<td>4.27</td>
<td>110.3</td>
<td>105.9</td>
<td>5.0</td>
</tr>
</tbody>
</table>

Management Objective:

- Removal of selected trees to improve forest health and diversity.

Management Strategy:

- Thinning and selective felling to enhance wood quality.

Inventory

- Ash: 4.27 ha
- Birch: 4.27 ha
- Beech: 4.27 ha
- Mixed: 4.27 ha

Operations Map

- Thinning
- Coppicing
- Clearfelling
- Plantation Maintenance
myForest tools

**Woodland Manager**

myForest Woodland Manager enables you to map and manage your woodlands.

If you are a Woodland Owner, Woodland Agent or Forest Education provider register — for free — to start using myForest.

- read more
- register

**Business Directory**

The myForest directory allows you to search our database for wood-using businesses near you.

You can place your own listing in the directory for free.

- add your listing
- view directory

**Woodland Star Rating**

Woodland Star Rating is a self evaluation tool designed to help people understand the best approach to woodland management.

The tool is based on the UK Forestry Standard.
Emphasis on organising and presenting user friendly tools
NaturEtrade creating a marketplace for ecosystem services

A LIFE+ project funded by the EU

register as a landowner

register as a purchaser
demo searchable purchaser map
Land owner / manager

Ecosystem services (bundled)

- Carbon – Coming Soon
- Soil Erosion – protection
- Water flow regulation
- Pollination
- Recreation amenity

easy mapping and legal boundaries

present metrics to investors

a single maintenance obligation to supply bundled ecosystem services
Search criteria

Search for ecosystem service

- Carbon – above Ground
- Soil Erosion – protection
- Water flow regulation
- Pollination
- Recreation amenity

Geographic search

- County: United Kingdom
- Region: Oxfordshire
- Post code: OX14 4TA
<table>
<thead>
<tr>
<th>Distance</th>
<th>Carbon</th>
<th>Soil</th>
<th>Water regulation</th>
<th>Pollination</th>
<th>Amenity</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 miles</td>
<td>95 units</td>
<td>68 units</td>
<td>24 units</td>
<td>82 units</td>
<td>41 units</td>
</tr>
<tr>
<td>7 miles</td>
<td>52 units</td>
<td>43 units</td>
<td>71 units</td>
<td>38 units</td>
<td>82 units</td>
</tr>
<tr>
<td>20 miles</td>
<td>88 units</td>
<td>56 units</td>
<td>90 units</td>
<td>71 units</td>
<td>39 units</td>
</tr>
<tr>
<td>24 miles</td>
<td>50 units</td>
<td>78 units</td>
<td>13 units</td>
<td>79 units</td>
<td>23 units</td>
</tr>
</tbody>
</table>
Search criteria

Search for ecosystem service

- Carbon – above Ground
- Soil Erosion – protection
- Water flow regulation
- Pollination
- Recreation amenity

Geographic search

- County
- Region
- Post code
<table>
<thead>
<tr>
<th>Distance</th>
<th>Carbon</th>
<th>Soil</th>
<th>Water regulation</th>
<th>Pollination</th>
<th>Amenity</th>
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<tr>
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<td>5 miles</td>
<td>95 units</td>
<td>68 units</td>
<td>24 units</td>
<td>62 units</td>
<td>41 units</td>
</tr>
<tr>
<td>7 miles</td>
<td>52 units</td>
<td>43 units</td>
<td>71 units</td>
<td>38 units</td>
<td>82 units</td>
</tr>
</tbody>
</table>
Environmental vs. engineered: hypothetical example for a water company situated by river in Shillingford, should they invest in forest cover in the upstream catchment area to reduce diffuse pollution or invest in water purification plant?
NaturEtrade creating a marketplace for ecosystem services

Search results

Distance: 5 miles

Carbon: 95 units  Soil: 68 units  Water regulation: 24 units  Pollination: 82 units  Amenity: 41 units

Contract

Background:

A. Ecosystem Services are essential to sustaining human well-being, however ecosystem services have not commonly been an object of private-market transactions owing to intrinsic market failures such as lack of information, high transaction costs, and "free-riding". As a result, where ecosystem services are recompensed, it is almost exclusively via government incentives or charitable donation.

B. NaturEtrade has been developed to, where possible, overcome these market failures allowing private markets for ecosystem services to develop, while simultaneously supporting improved ecosystem service provision by government and charities.

C. This document forms the contractual basis to enable an agreement for a payment for ecosystem services to take place between an Offeror (the individual or organisation that owns a defined area of land) and the Payer (the individual or organisation that intends to fund the provision of Ecosystem Services from the defined area of land).

D. On completion of an agreement, the Offeror will assign the rights to the Payer to claim payment for a quantified set of Ecosystem Services to flow from the defined area of land over an agreed period of time.

E. Intermediary – Role to be decided upon in terms of Governance and contractual arrangements between parties.

Monitoring
Step-by-step guide to system use
Objective 1:

Provide land manager with easily accessible Ecosystem Service information relating to their rural property

Process takes under 5 minutes
NaturEtrade creating a marketplace for ecosystem services

A LIFE+ project funded by the EU

register as a landowner

register as a purchaser
demo searchable purchaser map
NaturEtrade creating a marketplace for ecosystem services

A LIFE+ project funded by the EU

register landowner account

first name

last name

e-mail

password

repeat password

I agree to the terms and conditions

register
Managers can zoom in on the area where their property is situated......
South Oxfordshire
With one click the rural property boundary appears
(no need for complicated / inaccurate mapping)
One click to receive Ecosystem Service information for selected land area.
NaturEtrade creating a marketplace for ecosystem services

Maintenance of verified ecosystem service provision attributable to a NaturEtrade transaction

Certificate issued: 21/3/2016
NaturEtrade purchaser: Company XYZ
Landowner: Alistair Yeomans
Period: 21/3/2016 to 21/3/2019
Transaction amount: £500 pa × 3 = £1500
County: UK
Region: South West England
Polygon name: Compartment 1
Polygon area: 172.76 ha

Land cover

<table>
<thead>
<tr>
<th>Land cover class</th>
<th>Area at start of transaction period 01 Jan 2016</th>
<th>Area at end of transaction period 01 Jan 2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trees</td>
<td>153ha</td>
<td>137ha</td>
</tr>
<tr>
<td>Natural grassland</td>
<td>86ha</td>
<td>79ha</td>
</tr>
<tr>
<td>Scrub</td>
<td>11ha</td>
<td>17ha</td>
</tr>
<tr>
<td>Total</td>
<td>150ha</td>
<td>107ha</td>
</tr>
</tbody>
</table>

Land cover change observed by satellite during the transaction period was compliant with the goal of preventing loss of high biodiversity and ecosystem service land cover classes.

Ecosystem service provision in the polygon in the transaction period (01 Jan 2015 - 31 Dec 2015)

<table>
<thead>
<tr>
<th>Service</th>
<th>Total provision</th>
<th>Provision per unit area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon in AGEE</td>
<td>407 tCO₂</td>
<td>0.67 tCO₂/ha</td>
</tr>
<tr>
<td>Soil erosion protection</td>
<td>31 t</td>
<td>0.2 t/ha</td>
</tr>
<tr>
<td>Water flow regulation</td>
<td>8000 l/ha</td>
<td>9.98 l/ha</td>
</tr>
<tr>
<td>Pollination</td>
<td>4120 l/ha</td>
<td>41.2 l/ha</td>
</tr>
<tr>
<td>Recreational amenity</td>
<td>312 l/ha</td>
<td>31.2 l/ha</td>
</tr>
</tbody>
</table>

Avoided loss of ecosystem service provision in the polygon in the year 2015 attributable to this transaction

<table>
<thead>
<tr>
<th>Service</th>
<th>Total provision</th>
<th>Provision per unit area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon in AGEE</td>
<td>51 tCO₂</td>
<td>0.05 tCO₂/ha</td>
</tr>
<tr>
<td>Soil erosion protection</td>
<td>11 t</td>
<td>0.11 t/ha</td>
</tr>
<tr>
<td>Water flow regulation</td>
<td>800 l/ha</td>
<td>0.8 l/ha</td>
</tr>
<tr>
<td>Pollination</td>
<td>824 l/ha</td>
<td>8.24 l/ha</td>
</tr>
<tr>
<td>Recreational amenity</td>
<td>36 l/ha</td>
<td>0.36 l/ha</td>
</tr>
</tbody>
</table>

[DRAFT certificate]
Managers can also easily look at environmental information on a ‘slippy map’.
Integrated Land registry data makes process of mapping very quick (one click) and is a legal property boundary.

Managers can add adjacent fields one at a time.
Objective 2:

Create a trading platform for land managers to trade ES with payers of ES

Use of integrated cadastral data (INSPIRE) as the legal property boundary for purposes of a
Land owner sets price and description of property.

- **Area**: 173.76 ha
- **Price per year**: £500
- **Over**: 3 years

**Description**: Lowland broadleaved woodland surrounded by wild flower meadow.
Search for properties willing to receive payment for Ecosystem Service

Search by postal code / location
Environmental vs. engineered: hypothetical example for a water company situated by river in Shillingford, should they invest in forest cover in the upstream catchment area to reduce diffuse pollution or invest in water purification plant?
List of rural properties registered on NaturEtrade. Prospective payer can view services offered and choose which rural property to enter into a trade with........
Compartment 1

Lowland broadleaved woodland surrounded by wild flower meadow.

Ownership: private
Area: 15 ha
Carbon in AGB: 406 tons
Soil erosion: 20 tons
Protection: 6000 litres
Water flow: 4120 units
Regulation: 3012 units
Pollination: 500
Recreational: 3 years
Amenity: 5 years

Price per year: 500
Contract length: 3 years

Purchase
Agreement

1. Definitions and interpretation

In this agreement:

"Agreement" means this agreement (including the schedule) and any amendment to it from time to time;

"Commencement date" means the date that this agreement is signed.

"Confidential information" means:

a) all information whether technical or commercial disclosed by any party under or in connection with an Agreement; and

all information concerning the existence and term of this agreement and the arrangements contemplated by this Agreement.

"the Offeror" means:

Any individual, company, institution or agency that offers the ecosystem services that are attributed to a defined area of land on a property for which the individual, company, institution or agency maintains legal tenure for the duration of any NaturEtrade agreement.
Payment system

NaturEtrade payments will be on a quarterly basis and triggered by NaturEtrade’s Monitoring, Reporting and Verification technology.

By purchasing the services you are agreeing to 3 quarterly payments of £500 to Farmer Giles.

In the event of an area of land not meeting the level of ecosystem services set out in the agreement the payment will not be made and you will be notified.

Please enter your bank account details here

- sort code
- account number

PAY NOW
NaturEtrade will act as a monitoring, reporting and verification system based on the legal land boundaries. The terms and conditions of the trade (tick box) will set out the obligation of the land manager and check compliance periodically (until the contract ends).
The value of ecosystem services

Alexander Teytelboym
Otto Poon Research Fellow
INET at Oxford Martin School
University of Oxford

22 April 2016
Private value of natural capital
Social value of natural capital
Externality
Price of natural capital

Demand

Exploitation of natural capital
Price of natural capital

Exploitation of natural capital

Demand

Private cost of use
Price of natural capital

Exploitation of natural capital

Private cost of use

Social cost of use

Demand

Externality

Current price

Current use

Exploitation of natural capital

Current price

Externality

Demand
Price of natural capital

Demand

Optimal price

Current price

Optimal use

Current use

Exploitation of natural capital

Social cost of use

Private cost of use

Natural capital is overexploited
Annual cost of global environmental damage? 11% of world GDP. And investors need to sort it out.
Value of UK natural capital, £bn

- Outdoor recreation, 1,353
- Energy reserves, 135
- Mineral reserves, 14
- Agricultural land and timber, 52
- Water for public supply, 11
- Net GHG sequestration, 8
- Other, 71

Office of National Statistics; Natural Capital Committee
How to protect natural capital

• Regulation
• Subsidies
• Payments for ecosystem services
• Offsetting
Regulation

• Rules: e.g. Greening Payment in CAP
• Bans: e.g. protected species, national parks

• Cons: does not allow for economic trade-offs; does not reveal scarcity; does not account for differences in farmers’ costs; slow to react
Government subsidies

- Activity-based
- Outcome-based
  - Non-competitive: e.g. MEKA-B4 in Germany
  - Competitive: e.g. BushTender auctions in Australia

- Cons: needs revenues
Payment for ecosystem services: beneficiary pays

- Usually voluntary: water and forestry
- Bargaining or competitive (auctions)
- Common in developing countries e.g. Costa Rica
- Cons: perverse incentives, costly assessment, enforcement, monitoring
**Bilateral agreements** involve a single (typically downstream) water user compensating one or more parties for activities that deliver hydrological benefits to the payer.

- Nestlé Waters (formerly Vittel)
- New York City-Catskills Watershed Protection Program

**Voluntary compensation** refers to activities funded by companies and other organizations seeking to mitigate for their own impacts on watershed services voluntarily. “Mitigation” is not always intended as offsetting, i.e., outcomes paid may not be exact matches for impacts biophysically, temporally, or spatially.

- Bonneville Environmental Foundation’s Water Restoration Certificates
- Coca Cola’s “Replenishment” payments in the Paw-Paw River watershed

**Instream buyback programs** involve governments or NGOs that act in the public interest by buying or leasing water use rights in existing water markets, which are not used but instead set aside to ensure a minimum level of flows and protect wildlife and habitats.

- Restoring the Balance in the Murray-Darling Basin
**Offsetting:** polluter pays

Avoid, minimize, restore then offset.

• Voluntary: e.g. BioCom in the Netherlands
• Regulatory: e.g. wetland offsets and conservation banking in the US

• Cons: incommensurability, enforcement, monitoring
Who are the buyers:

- utilities, agricultural producers,
- local governments,
- hotels and golf clubs,
- housing developers.
Why NaturEtrade will succeed

• Strong and clear **property rights** in the UK
• **Simple** contract = “maintain the land”
• Strong **enforcement and monitoring**
• Low **transaction costs** thanks to satellites
• **Additionality** = mitigate risk of destruction
• **All the ingredients of a successful market!**
A marketplace for ecosystem services

Alexander Teytelboym
Otto Poon Research Fellow
INET at Oxford Martin School
University of Oxford

22 April 2016
What’s important in a good market

- Find the best transactions out here
- Transactions happen quickly
- Participating is easy and safe
- Participants return to transact again
Ads posted, Saturday 16th April

**Professional Self-Employed Gardener - Required 1 Day a week**
I am looking for a Professional Self-Employed experienced Gardener to assist with the lawns in a beautiful Cotswold garden. The Garden consists of:
Temporary
Burford, Oxfordshire

**Self-propelled cylinder lawn mower**
Self-propelled petrol lawnmower in good condition can be seen working With manual buyer collects
Didcot, Oxfordshire

**Qual cast lawn mower**
Qualcast Lawnmower. Full Working order. Collection from Stonesfield or can deliver if local to me for a little fuel money. Call or Text on 07885 224886.
Woodstock, Oxfordshire

**Sit on lawn mower**
Sit on lawn mower, new battery all in working order 40inch cut 16.5hp Briggs and Stratton engine, £600
Banbury, Oxfordshire
<table>
<thead>
<tr>
<th>Landowner</th>
<th>Offer: £400</th>
<th>Landowner</th>
<th>Offer: £500</th>
<th>Landowner</th>
<th>Offer: £750</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alistair</td>
<td></td>
<td>Beccy</td>
<td></td>
<td>David</td>
<td></td>
</tr>
</tbody>
</table>


Landowner Alistair
Offer: £400
Paid: £400

Buyer Kathy
Value: £500

Landowner Beccy
Offer: £500

Landowner David
Offer: £750
Landowner Alistair

Offer: £400
Paid: £400

Buyer Kathy
Value: £500

Landowner Beccy

Offer: £500
Paid: £500

Buyer Gill
Value: £1250

Landowner David

Offer: £750
Paid: £750

Buyer Peter
Value: £1500
Current payment system = Gumtree

- **Benefits:**
  - Transactions are immediate
  - Complete certainty for buyers and sellers

- **Drawbacks:**
  - Landowners might set the offer prices too high as most they can get is the offer price
  - Buyers who are *early* get a great deal.

- Ensure high compliance, iron out problems before moving on
<table>
<thead>
<tr>
<th>Type</th>
<th>Countax C300h Ride On Lawn Mower</th>
<th>Petrol lawn mower</th>
<th>PETROL LAWN MOWER - GWO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Garden Tractor</td>
<td>£193.00</td>
<td>£79.00</td>
<td>£35.00</td>
</tr>
<tr>
<td>Lawn Tractor</td>
<td>25m left (Today 1)</td>
<td>38m left (Today 16:51)</td>
<td>40m left (Today 16:53)</td>
</tr>
<tr>
<td>Condition</td>
<td>5 bids</td>
<td>9 bids</td>
<td>1 bid</td>
</tr>
<tr>
<td>New</td>
<td>Collection only: Free</td>
<td>Collection only: Free</td>
<td>Collection only: Free</td>
</tr>
<tr>
<td>New other (see details)</td>
<td>needs tlc,great project.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seller refurbished</td>
<td>25m left (Today 16:41)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Used</td>
<td>28m left (Today 16:41)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>For parts or not working</td>
<td>25m left (Today 16:41)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Price</td>
<td>£50.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>£ to £</td>
<td>28m left (Today 16:41)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Format</td>
<td>Auction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Item location</td>
<td>Default</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Default</td>
<td>30m left (Today 16:51)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>UK Only</td>
<td>38m left (Today 16:51)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>European Union</td>
<td>40m left (Today 16:53)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Worldwide</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Landowner</td>
<td>Reserve: £1000</td>
<td>Landowner</td>
<td>Reserve: £500</td>
</tr>
<tr>
<td>------------</td>
<td>----------------</td>
<td>------------</td>
<td>----------------</td>
</tr>
<tr>
<td>Alistair</td>
<td></td>
<td>Beccy</td>
<td></td>
</tr>
</tbody>
</table>

NaturEtrade: creating a marketplace for ecosystem services

A LIFE+ project funded by the EU
Landowner
Alistair
Reserve: £1000
Highest bid: £1,300

Landowner
Beccy
Reserve: £500
Highest bid: £450

Landowner
David
Reserve: £750
Highest bid: £950

Buyer Kathy

Buyer Gill

Buyer Peter
Next stage = eBay stage

• **Benefits:**
  • Landowners can get a much better deal
  • Can honestly set a reserve price
  • Buyers can bid honestly
  • More successful transactions

• **Drawbacks:**
  • Transactions are not immediate
  • Gill may really want Beccy and David’s plots *together*, but David’s auction ended before Beccy’s and Kathy outbid her.
Ofcom announces details of 2016 spectrum auction

26 October 2015

High-capacity spectrum could be used for mobile broadband, such as 4G

Ofcom has today confirmed plans for releasing valuable new airwaves that could be used to meet the growing demand for mobile broadband services.
<table>
<thead>
<tr>
<th>Landowner</th>
<th>Reserve: £</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alistair</td>
<td>1000</td>
</tr>
<tr>
<td>Beccy</td>
<td>500</td>
</tr>
<tr>
<td>David</td>
<td>750</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Buyer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kathy</td>
</tr>
<tr>
<td>Gill</td>
</tr>
<tr>
<td>Peter</td>
</tr>
</tbody>
</table>
Landowner Alistair
Reserve: £1000
Highest bid: £1,500

Landowner Beccy
Reserve: £500
Highest bid: £950

Landowner David
Reserve: £750
Highest bid: £975

Buyer Kathy

Buyer Gill

Buyer Peter
Next stage = London bus stage

- **Benefits:**
  - Landowners can get the best possible deal
  - Buyers can enter into contracts with many landowners simultaneously
  - Can honestly set a reserve price
  - Buyers can bid honestly

- **Drawback:**
  - Auction runs and ends for everyone at the same time
Evolution of NaturEtrade