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«Гомельский государственный университет
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М. В. АММОН

**FORESTRY:
READ AND DISCUSS IN ENGLISH**

**ЛЕСНОЕ ХОЗЯЙСТВО:
ЧИТАЕМ И ОБСУЖДАЕМ НА АНГЛИЙСКОМ**

Практическое пособие

для студентов 1 курса
специальности 1-75 01 01 «Лесное хозяйство»

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Практическое пособие предназначено для обучения студентов 1 курса специальности «Лесное хозяйство» чтению текстов профессиональной направленности, а также умению общаться на профессиональные темы.

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ПРЕДИСЛОВИЕ

Представленное вашему вниманию практическое пособие предназначено для чтения на английском языке и обсуждения прочитанного для студентов неязыковых специальностей. Аутентичные тексты, вошедшие в состав издания, отвечают развитию современной науки, а также требованиям программы по английскому языку для студентов высших учебных заведений.

Основной целью практического пособия является развитие у студентов навыков чтения профессионально-ориентированных текстов, что крайне необходимо современным специалистам, а также общения на профессиональные темы, развитие навыков аннотирования и реферирования специальной литературы.

Издание состоит из 12 разделов, каждый из которых включает текст или несколько текстов для чтения и упражнения для развития лексико-грамматических навыков говорения. Оригинальные тексты по темам разделов, а также комплекс упражнений, входящие в настоящее практическое пособие, отвечают принципам современной коммуникативной методики.

При отборе текстов внимание было уделено тому, чтобы каждый текст носил профессиональный характер и был насыщен лексикой, связанной с профессиональной деятельностью будущих специалистов в области лесного хозяйства.

Активный лексический минимум определяется предложенными темами.

UNIT 1

FORESTS, RAINFALL AND WATER AVAILABILITY

Ex. 1. Read the text.

Forests play a large role in regulating fluxes of atmospheric moisture and rainfall patterns over land. Earth's land and ocean surfaces release water vapor to the atmosphere. On continental surfaces, this process is aided by forests and other vegetation through evapotranspiration (ET) – evaporation from soil and plant surfaces and transpiration of water by plants. The resulting atmospheric moisture is circulated by winds across the Earth's continents and oceans. The upwind and cross-continental production and transport of atmospheric moisture – “precipitation recycling” – can, in the appropriate circumstances, promote and intensify the redistribution of water across terrestrial surfaces.

On average, at least 40% of rainfall over land originates from ET, with greater contributions in some regions such as the Rio de Plata river basin, where ET from the Amazon forest contributes more than 70% of rainfall. Transpiration contributes a large share of terrestrial ET, thereby producing a part of the water vapor available for rainfall.

Because water use is intrinsically local, conventional definitions of the water balance are typically bounded by the catchment. However, the terrestrial production of atmospheric moisture through ET represents the principal continental contribution to catchment water balance. ET, which is transboundary and even transregional in character, thus transcends traditional definitions of the catchment water balance. Precipitation recycling, though neglected in most public discourse and water management policy-making, is key to understanding the availability of water in downwind locations.

The impacts of forest-derived ET can be seen in satellite observations of rainfall: over most of the tropics, air that passes over forests for ten days typically produces at least twice as much rain as air that passes over sparse vegetation. Higher relative humidity has likewise been found to raise the likelihood of precipitation. A 10% rise in relative humidity can lead to two-to-three times the amount of precipitation. Satellite observations further suggest European forests are a major influence on cloud formation, and thus sunshine/shade dynamics and rainfall.

Forest loss and degradation reduce ET, with important implications for rainfall thousands of kilometers downwind. Changes in Earth's surface albedo, temperature, ET and surface roughness also alter moisture and heat fluxes between terrestrial surfaces and the atmosphere. These observations have led climate modelers to predict large-scale deforestation will reduce rainfall in some regions by as much as 30%.

Trees and forests contribute to the intensification of rainfall through the biological particles they release into the atmosphere, which include fungal spores, pollen, bacterial cells and biological debris. Atmospheric moisture condenses when air becomes sufficiently saturated with water and much more readily when suitable surfaces, provided by aerosol particles (condensation nuclei), are present. Some volatile organic compounds, 90% of which are also biological in origin, become oxidized and sticky in sunlight and attach to any (mainly biological) particles, thereby growing to sizes that enhance condensation. In the Amazon forests, potassium-salt rich particles with clear biological origins also appear to be directly linked to cloud formation and precipitation.

Some bacteria inhabiting plant surfaces are particularly effective in facilitating the freezing of water at temperatures near 0 °C, the warmest temperatures known for naturally occurring atmospheric ice nuclei. Freezing of cloud droplets is often a crucial step in the formation of rain in temperate regions, otherwise freezing would not occur until clouds reach -15 °C or cooler. Such cold temperatures do not always occur in low-lying, moisture-laden clouds, making biological ice nuclei a potentially limiting factor for rainfall, particularly in a warming climate.

Deforestation can thus impact rainfall for reasons beyond its impact on precipitable water. And the combination of warming and altered rainfall patterns due to climate change can lead to feedback effects on remaining vegetation, reduced biomass accumulation, drought, die-off and fires. Forest and land fires resulting from the increased incidence of drought, agricultural land conversion, clearing and other causes likewise play havoc with rainfall. Aerosol particles from fires can scatter solar radiation, disrupt water vapor uplifting, alter regional circulation and otherwise disrupt rainfall patterns.

Useful vocabulary:

fluxe – поток

moisture – влага

vapor – пар

evapotranspiration – суммарное испарение

precipitation – осадки

catchment – дренаж, водозбор

transcend – выходить на пределы
upwind – против ветра
downwind – подветренный
sparse vegetation – редкая растительность
humidity – влажность (воздуха)
likelihood – вероятность
albedo – альbedo, отражательная способность поверхности
fungal spores – грибковые споры
pollen – пыльца
debris – мусор
saturate – насыщать
organic compounds – органические соединения
inhabit – обитать
alter – изменять
drought – засуха

Ex. 2. Finish the sentences.

- 1 On average, at least 40% of rainfall over land originates from _____.
- 2 Satellite observations suggest European forests are _____.
- 3 Atmospheric moisture condenses when air becomes _____.
- 4 Freezing of cloud droplets is often a crucial step in _____.
- 5 Forest and land fires resulting from _____.

Ex. 3. Make up your own sentences using the following words and expressions.

Atmospheric moisture; water balance; availability of water; forest loss; relative humidity; surface roughness; organic compounds; die-off and fires.

Ex. 4. Answer the following questions.

- 1 Do forests play a large role in regulating fluxes of atmospheric moisture?
- 2 What is evapotranspiration?
- 3 Does the largest rainfall contribution come from the Amazon forest or the Kaingaroa forest?
- 4 How can the impacts of forest-derived ET be seen?
- 5 Forest loss and degradation reduce ET, do they?

Ex. 5. Speak about:

- 1) precipitation recycling;
- 2) water balance;

- 3) satellite observations of rainfall;
- 4) forest loss and degradation;
- 5) forest and land fires.

UNIT 2

FORESTS WATER TRANSPORT SYSTEM

Ex. 1. Read the text.

Due to prevailing wind patterns, atmospheric moisture from both oceanic evaporation and evapotranspiration (ET) from forest, vegetation and soil surfaces is transported across planetary surfaces. Little uncertainty surrounds the basic idea that atmospheric moisture is transported from one location to another and is important for downwind precipitation. With increasing deforestation, locations further from upwind coasts are likely to feel the strongest impact of change in land-atmosphere interactions and to experience reduced predictability, extent and quantity of rainfall. In borderline regions, reduced predictability, seasonal timings and feedback effects may even trigger a switch from wet to dry climates. Given time, reforestation can presumably reverse many of these impacts.

Forests may, however, play an even more extensive role in the transport of moisture. The biotic pump theory suggests the atmospheric circulation that brings rainfall to continental interiors is driven and maintained by large, continuous areas of forest beginning from coasts. The theory explains that, through transpiration and condensation, forests actively create low pressure regions that draw in moist air from the oceans, thereby generating prevailing winds capable of carrying moisture and sustaining rainfall far within continents. Moreover, considerations of the surface pressure gradients created by the processes of evaporation and condensation, as highlighted in the biotic pump concept, may lead to improved predictions of large-scale climates compared to atmospheric circulation models which only consider temperature effects. Reliable rainfall in the continental interiors of Africa, South America and elsewhere may thus be dependent on maintaining relatively intact and continuous forest cover from the coast.

A corollary of the biotic pump theory has further crucial implications for planetary air circulation patterns: if airflow patterns that move toward continental interiors are dependent upon the presence of forests, then their removal may foretell significant changes or wind pattern reversals. Reforestation and the restoration of degraded forest landscapes may however re-activate such pumps, returning rainfall to continental interiors.

The atmospheric moisture generated by terrestrial ET clearly represents an important quantity available for precipitation. Loss of forest cover is therefore expected to reduce the reliability of rainfall. Potential impacts on large-scale atmospheric circulations remain unknown but are a cause for concern, with potentially important implications for weather patterns at local, regional and continental scales.

At all scales, upwind, extra-basin impacts represent the principal contribution of atmospheric moisture to downwind, within-basin precipitation. Upwind terrestrial ET, primarily promoted by forest cover, can have a substantial impact on within and across catchment water availability. All or most catchments are thus naturally linked.

Recognition of connectivity would lead to an improved awareness of when and how land-atmosphere interactions can provide atmospheric moisture and distribute it across regional and continental terrestrial surfaces. Both down- and upwind, as well as down- and upstream, interactions are important for adequately understanding and ultimately managing potential change in water availability.

We can no longer ignore teleconnections between areas that produce atmospheric moisture and those that receive this moisture as a principal source of precipitation. We urgently require better knowledge about areas that provide higher ratios of ET production and recycling relative to annual rainfall and are thus key to the promotion of terrestrial rainfall.

Useful vocabulary:

evaporation – испарение

borderline – пограничный

feedback – ответная реакция

biotic pump theory – теория биотического насоса

corollary – следствие

reliability – достоверность

large-scale – крупномасштабный

recognition – признание

Ex. 2. Finish the sentences.

- 1 With deforestation, locations further from upwind coasts are_____.
- 2 The biotic pump theory suggests _____.
- 3 Reforestation and the restoration of degraded forests may _____.
- 4 Both down- and upwind, down- and upstream, interactions are _____.
- 5 We urgently require better knowledge about _____.

Ex. 3. Make up your own sentences using the following words and expressions.

Increasing deforestation; atmospheric circulation; evaporation and condensation; weather patterns; teleconnections between areas; terrestrial rainfall.

Ex. 4. Answer the following questions.

- 1 What can lead to a switch from wet to dry climates?
- 2 What does biotic pump theory suggest?
- 3 How do forests create low pressure regions?
- 4 What does reliable rainfall in the continental interiors of Africa, South America depend on?
- 5 What can lead to an improved awareness of when and how land-atmosphere interactions can provide atmospheric moisture?

Ex. 5. Speak about:

- 1) biotic pump theory;
- 2) reliable rainfall;
- 3) land-atmosphere interactions;
- 4) connections between areas that produce atmospheric moisture and those that receive this moisture.

UNIT 3

BORDERS FOREST TRUST

Ex. 1. Read the text:

The Scottish Borders is one of 32 council areas of Scotland. The region's landscape once featured mainly native woodland, including several historic forest areas, but over time deforestation had left only small fragments and lone trees.

In the early 1990s, there was a long-term project started by a passionate group of volunteers to encourage the rich diversity of wildlife present in the area before human influence held away. It has also become as a symbol of the power of individuals to help reverse environmental degradation and inspiration for future generations to vigilance.

Instigated at a time when only 0.26% (1,200 hectares) of the terrain in the Scottish Borders was recorded as supporting ancient and semi-natural woodland, the initiative was well received. The mountaineer, Sir Chris Bonnington, CBE, commented: "What a superb idea! The natural

forest which has been stripped away from almost the whole of Scotland is rich in its own wild fauna and flora, such a delight to walk through and gaze upon. To have a complete valley reforested would not only be a joy in itself but also a wonderful example of what could be achieved over a much wider area.”

The project’s initiators were instrumental in establishing the environmental charity, Borders Forest Trust. Dr Jane Rosegrant, director, explained: “Formed in 1996, the organisation initially undertook work on other people’s land. We’ve probably planted as many trees on other people’s land as we have on our own – over 1,500,000 across all types of sites.”

Landscapes across the Scottish Borders have benefitted from projects of variable size engendered by cooperation between landowners, tenants and Borders Forest Trust. Regenerating ancient woodlands is one priority but the group has also concentrated its efforts on creating riparian woodlands and conserving and expanding juniper scrub. Through a combination of natural regeneration and planting, over fifty new native woodlands of varying sizes are reported to have been established. Woodlands designed specifically to aid the emblematic but now rare black grouse are also beneficial to a number of other important upland species.

1st January 2000 saw the Borders Forest Trust achieve one of the goals of its founders. The charity celebrated the millennium in memorable fashion by finalising the purchase of Carrifran – an impressive but deforested 1,600-acre glacial valley found in the sparsely populated uplands lying between the small towns of Moffat and Peebles.

Sixteen years on, some 600,000 trees and shrubs – grown from seed collected from selected local sources by a volunteer workforce, have been methodically planted to resemble as closely as possible the natural woodland patterns once seen in the glen and the plateau that lies above it.

Carrifran today stands as a tribute to the aspirations of a determined group of twentieth-century visionaries. Visitors to the wildwood experience the imposing valley’s upland characteristics alongside the pleasurable sights, sounds and smells offered by healthy woodlands at varying stages of maturity. What’s more, its remote atmosphere is heightened by a glimpse of past human activity in its challenging confines.

Millennia have passed since a skin-clad hunter stalked prey in the boggy area now known as Rotten Bottom. When his bow snapped, he hurled it into the morass, where it was preserved by the peat’s tannins for six thousand years before discovery. Examined by experts, the ancient weapon proved to be the oldest of its kind ever discovered in

Britain. Jane Rosegrant admitted: “In terms of our own land, it was ambitious of Borders Forest Trust to buy Carrifran. But because of that initial vision and the people who made it happen, we were inspired to buy Corehead Farm and, more recently, 1,800 hectares of the Talla and Gameshope Estate.” Borders Forest Trust is now responsible for 3,000 hectares of the ‘Wild heart of Scotland’.

Corehead was once part of the historic Ettrick Forest, but after centuries of grazing, its woodlands have been significantly reduced to pockets and heather moorland. The hill farm’s holding encompasses not only Hart Fell Shoulder and the source of the River Annan, but also the intriguingly named Devil’s Beef Tub. Once used by quarrelsome Border Reivers to hide stolen cattle, the breathtaking corrie now attracts the admiration of tourists.

Intended to become an educational resource demonstrating the ways in which biodiversity, ecosystem services and farming can flourish together, Corehead Farm is administered as a community-engaged, sustainably managed endeavour that integrates the restoration of native woodlands, wetlands and heathlands with a traditionally managed sheep farm. Almost 200 hectares of new native woodland have been created by volunteers, contractors and school groups in recent years.

Founder member and long-term trustee, the eminent zoologist and conservationist, Philip Ashmole, is in no doubt as to the charity’s achievements: “Borders Forest Trust provides the best – and indeed almost the only – vehicle for energising the grass-roots campaign to restore both our lost native woodlands and some echo of the lost woodland culture associated with the ancient Ettrick Forest. For two decades the Trust has shown how much can be achieved by a small organisation with a clear and ambitious vision, combined with practical competence.”

Useful vocabulary:

diversity – разнообразие

hold away – распространиться

vigilance – бдительность

tenant – арендатор

riparian – прибрежная полоса

juniper scrub – можжевельник

black grouse – тетерев

glen – лощина, узкая долина

boggy – болотистый

morass – трясина

grazing – пастбище

heathlands – пустоши

heather moorland – вересковая пустошь

corrie – кресловина, особенно в горах Шотландии

Ex. 2. Finish the sentences.

1 Landscapes across the Scottish Borders have benefitted from _____.

2 The charity celebrated the millennium in memorable fashion by _____.

3 Examined by experts, the ancient weapon proved to be _____.

4 The hill farm's holding encompasses _____.

5 Almost 200 hectares of new native woodland have been created by _____.

Ex. 3. Make up your own sentences using the following words and expressions.

Reverse environmental degradation; ancient and semi-natural woodland; environmental charity; volunteer workforce; skin-clad hunter.

Ex. 4. Answer the following questions.

1 Where is The Scottish Borders situated?

2 Who started the Borders Forest Trust and what is their aim?

4 What are the main projects started by the Borders Forest Trust?

5 Why does the hill farm at Corehead have such a strange name?

6 What is Carrifran?

Ex. 5. Speak about:

1) wild heart of Scotland;

2) Devil's Beef Tub;

3) glacial valley found in the sparsely populated uplands;

Ex. 6. Find examples of direct speech in the text and change them into indirect.

UNIT 4

BRASH WAYS WITH BIOMASS

Ex. 1. Read the text.

Seedling conifers are planted, they establish and grow and then half a century later towering trees are felled and harvested for timber, but what about the considerable amount of brash left behind on the clear-fell

site? Leaving this amount of debris strewn across a site is not a viable option if restocking is planned and moreover represents a shocking waste of a valuable energy-generating commodity. Here is a range of options how to deal with brash after felling and timber extraction.

Raking up the brash into bonfires for burning on site would be the least expensive, but the most primitive way, although ironically it would leave behind the lowest carbon footprint. Let's give it up right away for a number of obvious reasons.

The first option involves driving an AHWI mulcher onto the site to chew up all of the brash – the tops of trees and side branches, bracken and tree stumps – with this now primary processed biomass left on site to decompose.

However, the disadvantage of this particular option is that a mat of brash would remain to make regeneration of heather and grass difficult, thus defeating the whole object of the exercise. Stumps would only be taken off at ground level which means that if any ground disturbance occurred in the future, tree stumps would still be there to impede operations.

The second option presented would additionally bring in a power pack excavator with stump grinder attachment to rid the site of tree stumps. This is an important consideration for heathland restoration sites in relation to future ground cover management because it allows managers the option of mowing. Cattle and sheep are used for ground cover management on some sites, as are New Forest ponies, but there seems to be a lack of livestock available to achieve this.

The third and final option on the table, purely because it presents an opportunity to dispose of brash on site by controlled incineration in an air burner, with brash raked up and fed into the burner. All of the brash can't be picked up and taken off site as bales and delivered conveniently to power stations for biomass burning. With this the only remaining decision is the choice of stump grinder to be used on site. The sole job of this device is to drive attachments on the end of the stick – in this case a stump grinder head.

The actual methodology involves laying the brash out in windrows with the harvester (as usual) but not then running over the brash with the harvester or forwarder (unusual), baling the brash, forwarding the brash bales, grinding the stumps and then finally tidying the site with a quick pass with the mulcher and a set of harrows behind a quad bike.

Scots pine is not the easiest of conifers, or indeed of any tree, to wrap into a bale because, unlike the springy stems of, say, spruce, birch and hawthorn, Scots pine stems are brittle and liable to break. This

meant that more care has to be taken to ensure the formation and production of a tight bale.

Useful vocabulary:

brash – грудa обломков
seedling conifers – саженцы хвойных пород
timber – лесоматериалы
site – участок
restocking – пополнение запасов
rake up – сгребать
carbon footprint – углеродный след
mulcher – измельчитель
bracken – папоротник-орляк
stump – пень
decompose – разлагаться
impede – затруднять
ground cover – грунтовое покрытие
livestock – домашний скот
incineration – сжигание
brash bailer – кусторез
grinder – дробилка
harrow – борона
quad bike – квадроцикл
springy stems – упругие стебли
spruce – ель
birch – береза
hawthorn – боярышник

Ex. 2. Finish the sentences.

- 1 Leaving this amount of debris strewn across a site is not a viable option if _____.
- 2 Stumps would only be taken off at ground level which _____.
- 3 Cattle and sheep are used for ground cover management, but _____.
- 4 Scots pine is not the easiest of _____.

Ex. 3. Make up your own sentences using the following words and expressions.

leave the carbon footprint; burning on site; left to decompose; regeneration of heather and grass; tree stumps; excavator with stump grinder; controlled incineration; brittle and liable to break.

Ex. 4. Answer the following questions.

- 1 What is the full harvesting cycle?
- 2 How does stump grinder work?
- 3 Why isn't Scots pine the easiest of conifers?

Ex. 5. Speak about:

- 1) burning on site;
- 2) stump grinder methodology;
- 3) Scots pine.

UNIT 5

A TASTE OF FORESTRY IN FINLAND

Ex. 1. Read the text.

When flying into Finland it is abundantly clear how important the forestry industry is, judging by the vast areas of trees growing all over the country. In fact, Finland is Europe's most densely forested country, with 75 per cent of its land area, or 22.8 million hectares, covered by forest. On top of the two million hectares of nature reserves, a significant percentage of the 50,000 agricultural farms in the country own their own private forests that are harvested sustainably. Official figures show the annual growth of Finland's forests is around 110 million cubic metres and in the region of 55 to 70 million cubic metres are harvested each year or die of natural causes. In total, Finland shipped US\$57.8 billion worth of goods around the globe in 2016, down by eight per cent since 2009 when the Great Recession kicked in, and down by 3.1 per cent from 2015 to 2016. During that year wood was the seventh most important export commodity for Finland, accounting for US\$2.9 billion or five per cent of the total exports. Paper was the number-one export from Finland, raising US\$8.3 billion or 14.4 per cent and wood pulp was the tenth, accounting for US\$2 billion or 3.5 per cent of exports. Finland's top ten exports accounted for almost three-quarters (73.5%) of the overall value of its global shipments.

From a continental perspective, 64.7 per cent of Finnish exports by value were delivered to other European trade partners, while 14.7 per cent were sold to Asian importers. This is a indication of how important the forestry is to this Scandinavian country, sandwiched in between Sweden and Russia.

An added element to the forestry in Finland is the abundance of peatland areas and subsequently peatland vegetation. The climate in Finland is cold and humid. The target is to establish some 2,000 plants per hectare. Typically, young woods are hand trimmed twice to remove unwanted shrub before first harvester thinning. Many farmers add some fertilizer to speed up the pine growth. On the logging site, the owner is thinning a 40-year-old pine forest. The target is to leave some 700 pines per hectare, which will be thinned again in about 15 years down to 500 pines per hectare.

Typically, both thinning harvests produce 50 to 100 cubic metres of wood. The final clear cut will be done when the trees are about 70 to 80 years old. This is the most valuable timber. The yield at final cut varies typically from 350 to 500 cubic metres. Sometimes, the workers get to work on woods which were never trimmed or thinned within the production cycle. Such woods produce about the same as wellmaintained woods in final cut.

Also, it takes longer to reach maturity if you don't thin the woods. Therefore, the landowner loses the production of the two thinning cuts and waits longer for payback. There is a clear incentive to manage your woods professionally.

Useful vocabulary:

densely – плотно

sustainably – устойчиво

kick in – ворваться

wood pulp – древесная масса

peatland – торфяник

fertilizer – удобрение

yield – урожай

Ex. 2. Finish the sentences.

- 1 Finland is Europe's most _____.
- 2 Finland's top ten exports accounted for _____.
- 3 The climate in Finland is _____.
- 4 The final clear cut will be done _____.
- 5 It takes longer to reach maturity if _____.

Ex. 3. Make up your own sentences using the following words and expressions.

Die of natural causes; abundance of peatland areas; cold and humid climate; add some fertilizer; speed up the pine growth; final cut; manage the woods professionally; valuable timber.

Ex. 4. Answer the following questions.

- 1 What is the number-one export from Finland?
- 2 Who is the biggest Finnish trade partner?
- 3 What is the most valuable timber in Finland?

Ex. 5. Speak about:

- 1) Europe's most densely forested country;
- 2) the climate in Finland;
- 3) woods thinning methodology.

UNIT 6

MAPLEASH COPSE – AN IRREPLACEABLE ANCIENT WOODLAND

Ex. 1. Read the text.

Southern England's undulating landscape is famous for countless 'chunks of enchantment,' with frail fragments of English history scattered across the ancient woodlands. Venturing into these masterpieces of history and ecology is always an exciting privilege, especially visiting Mapleash Copse in East Berkshire.

Mapleash Copse has a long history, and its secrets are revealed in its name. Common ash and field maple are still important components, but 'copse' provides the clue to its centuries-old origins. Copse generally means a small woodland, in terms of area, but historically it specifically described a thicket of trees small in stature, thus so because they were coppiced.

Mapleash Copse is nationally famous for biodiversity: crab apples, oak, ash and beech. Rowan came into the woodland about 100 years ago. Contemporary conservationists in southern England have planted the tree with abandon despite a natural range confined to northern England and Scotland. Common beech continues to suffer at the hands of conservationists north and west of a line from the Wash to south-east Wales, where they are not considered native, although beech thinning in Mapleash is for balanced biodiversity and not puritanical reasons.

Looking at the range of broadleaves, including holly, hazel, ash, oak, sweet chestnut, field maple, rowan and crab apple, one may wonder what few tree species Mapleash lacked. The presence of towering Douglas fir and western red cedar is refreshing for biodiversity and encouraging birds like the goldcrest that colonise where conifers prevail.

Mapleash Copse has eight compartments, or coupes, comprising hazel coppice at various stages of a 7–8-year cycle, shaded by oak and ash standards. First stop is the south end of coupe 1, where stools were coppiced in autumn/winter 2013–14 and now sported three years of growth. Rods were three metres tall with an average five cm CBH (circumference at breast height). This coupe contained young oak trees and hazel has a nurse effect to push up these young oak trees. There also can be observed a high frequency of ash, including coppice stools, some 70 to 80 years old, and many saplings.

The north end of coupe 1, coppiced in 2014–15, is now sporting two years' growth comprising 2-metre-high rods measuring 3–4 cm CBH. Coppice growth and development had been helped during 2016 by the natural failure of a huge spreading oak tree, leaving a nice open canopy for maximum growth of the hazel understorey. The tree was removed as part of the ongoing programme of felling and thinning, with a couple of young oaks taken from elsewhere in the woodland planted as replacements.

Next stop is coupe 3, last cut in 2009–10, now with six years' growth of rods up to 5 m tall and 10–12 cm CBH. Charles explained that home-grown hazel coppice is up against stiff competition from Polish imports arriving as 26-inch spars, already twisted for immediate use and much cheaper.

The final coupe had been cut the previous year, which allowed us to see how layering is used to propagate hazel, filling the gaps to exclude bracken and bramble. Up to five rods on each stool are selected and cut two thirds of the way through to leave a tongue or hinge, which allows the rod to be laid across the ground with living attachment to the stool.

The number of rods laid down depends on the size of the gap between adjacent stools. Five might be used if the gap is very large but more usually one to three. Rods are pegged using a hazel crook and will root and shoot where they make contact with the ground. Layering helps to exclude bramble and bracken, although each have uses as nectar plants and cover for butterflies.

All in all visiting Mapleash Copse is an wonderful opportunity to see outstanding and clearly irreplaceable woodland, as well as learning a good lesson in measured woodland management.

Useful vocabulary:

copse – роща, лесной участок
frail – слабый
venturing – углубляясь
ash – ясень
field maple – полевой клен
thicket – заросли
coppice – подрезать
rowan – рябина
holly – стрелист
hazel – орешник
sweet chestnut – сладкий каштан
Douglas fir – Дугласская пихта
red cedar – красный кедр
goldcrest – королек
rod – ствол
circumference – окружность
sapling – саженец
understorey – подлесок
propagate – размножать
hinge – стержень
peg – прикреплять колышком

Ex. 2. Finish the sentences.

- 1 Copse generally means _____.
- 2 Rowan came into the woodland _____.
- 3 The presence of towering Douglas fir and western red cedar is _____.
- 4 The number of rods laid down depends on _____.
- 5 Visiting Mapleash Copse is an wonderful opportunity to _____.

Ex. 3. Make up your own sentences using the following words and expressions.

Thicket of trees; nurse effect; stiff competition; propagate hazel; long history; plant the tree; nectar plants; irreplaceable woodland; woodland management.

Ex. 4. Answer the following questions.

- 1 What are the typical trees for Mapleash Copse?
- 2 How many copses are there?
- 3 What is coppice methology?

- 4 How do they propagate hazel?
5 Why is Mapleash Copse irreplaceable?

Ex. 5. Speak about:

- 1) biodiversity at Mapleash Copse;
- 2) measured woodland management;
- 3) your native irreplaceable woodland.

UNIT 7

INNOVATION IN PLANT BIOSECURITY

Ex. 1. Read the text.

A few miles to the north-east of the city of York, just off the A19 Scarborough road, is the research and development centre of the Food and Environment Research Agency – aka Fera. Within the confines of the high-security perimeter fence, and housed within the 80 acres of the manicured campus, are a series of cutting-edge research facilities and some 350 of the nation's leading scientific brains. This is the venue, every year in spring, for a gathering on Innovation in Plant Biosecurity.

With over 150 delegates from ten different countries, and a star-studded lineup of speakers, the event brings together natural and social scientists, policymakers, frontline practitioners and industry leaders to learn and share news and views on the latest advances in plant biosecurity, the challenges faced and the potential solutions to them. This major gathering bring together plant health professionals and invasive-species experts from across Great Britain and beyond, to discuss novel strategies for improving plant biosecurity and to establish a sustainable knowledge exchange.

To put things into context – and as if foresters and arborists need reminding – our forests, woods and trees are under threat from an escalating list of pests and diseases. Many of these threats are alien; historically absent from the UK but introduced from overseas. Some of these threats may land on these shores naturally as wind-borne or drifting insects from continental Europe; an alternative and probably more common pathway is through human activity, especially trade, through the movement of infected plants or the shipping of goods associated with infested timber.

These cases illustrate that current biosecurity measures are vulnerable and that more needs to be done to improve our nation's

biosecurity and protect our plants and trees – both cultivated and in the wider environment.

The benefits of boosting biosecurity include fewer losses from plant pests and disease through robust prevention, early detection and effective mitigation. There are a number of ways in which biosecurity innovations can be visualised and brought about. Those are echoed in the four main themes or questions posed at the conference:

- Emerging risks

How can we learn about new threats sooner, what can be done in the additional time and how beneficial is it? Novel plant diseases present numerous serious issues for human wellbeing, be it in forestry, agricultural, environmental or regulatory scenarios. An introduced pathogen in one country or even continent that results in an emerging disease may already have been endemic, widespread, hidden and innocuous. A disease that had disappeared from the plant pathology radar long since may re-emerge. Genetic change through hybridisation, new encounters or chance mutation can happen. In some cases, a new disease may even be caused by a pathogen unknown to science.

- Movement and borders

How can we work with the growing scale and complexity of trade movements to minimise risk? Protecting trees and other plants from pests and diseases is pivotal for the economy, the environment and human health. Increasing trade between nations means that plants here are at a heightened threat from the spread of harmful organisms. Nobody can eliminate all risks but the UK has and is evolving stringent plans to deal with threats and take swift action should they be detected.

- Behaviours

How can we understand, influence and guide matters to adjust biosecurity behaviours by the many and diverse stakeholders? Plant biosecurity is a sector where human behaviour plays a major role. It embraces a whole range of disciplines across the social sciences, arts and humanities as well as interdisciplinary approaches that address these conundrums or perhaps put forward alternative pertinent questions or answers.

- Technology

How can scientists produce tools that are needed and will be used effectively? New, smart technologies are being developed and applied across a range of diagnostic sectors. Many are finding applications that enhance plant.

These and number of other questions has shown that biosecurity is a major risk and player in modern life and will continue to be challenging in forestry in the future.

Useful vocabulary:

aka (abbr) – also known as

confine – граница

manicured – ухоженный

cutting-edge – передовой

venue место – встречи

arborist – лесовод

pest – вредитель

infested timber – зараженная древесина

robust prevention – надежная профилактика

bring about – осуществлять

endemic – свойственный определённой географической местности

innocuous – безвредный

re-emerge – возникнуть вновь

stakeholders – заинтересованные стороны

conundrum – головоломка

Ex. 2. Finish the sentences.

1 This major gathering bring together ____.

2 Many of these threats ____.

3 The benefits of boosting biosecurity include ____.

4 Novel plant diseases present numerous serious issues for ____.

5 Increasing trade between nations means ____.

6 Plant biosecurity is a sector where ____.

Ex. 3. Make up your own sentences using the following words and expressions.

Natural and social scientists; plant biosecurity; invasive-species experts; knowledge exchange; foresters and arborists; infected plants; emerging risks; minimise risk; evolve stringent plans; interdisciplinary approach; smart technologies.

Ex. 4. Answer the following questions.

1 Where does the conference on innovations in plant biosecurity take place?

2 Who is usually involved in this event?

3 Why are biosecurity issues so actual?

- 4 What are the ways for alien plant threats to appear in the UK?
- 5 How can we work with the growing scale and complexity of trade movements to minimise risk?
- 6 What does increasing trade between nations mean for biosecurity?
- 7 How can smart technologies help with biosecurity?

Ex. 5. Speak about:

- 1) major plant biosecurity issues;
- 2) overseas plants pests and diseases in the UK;
- 3) emerging risks in biosecurity;
- 4) movement and borders in biosecurity;
- 5) biosecurity behaviours;
- 6) biosecurity measures in Belarus.

UNIT 8

THE ROYAL FORESTRY SOCIETY: MANAGING WOODS FOR THE FUTURE

Ex. 1. Read the text.

The UK has one of the best climates for growing trees and yet, traditionally, owners and managers have been planting a narrow palette of tree species. Just five species (oak, ash, beech, sycamore and birch) make up 77 per cent of broadleaved woodland in England. 80 per cent of the conifer woodlands are comprised of only four species. That makes many woodlands particularly vulnerable to widespread damage from disease, as Dutch elm disease, *Phytophthora ramorum* and ash dieback have demonstrated. But it also makes them vulnerable to predicted changes in climate, to environmental changes or to rampant pest damage.

The Royal Forestry Society's (RFS) Hockeridge and Pancake Wood, a 74-hectare wood on the edge of the Chilterns AONB, is different to many established woodlands.

Thanks, in part, to the foresight of previous owner, Mary Wellesley, who gifted the woods to the society, it is unusual in having 22 species of maturing commercial timber trees and 30 or more specimen trees. The wood is a mix of PAWS (Planted Ancient Woodland Sites) and ASNW (Ancient Semi-Natural Woodland). Some subcompartments contain a mixture of native and introduced broadleaves such as *Nothofagus* (Southern beeches) and conifers.

It is a popular local destination for dog walkers and others. The RFS manages it as a showcase, multipurpose woodland with four key management objectives to:

- practise sound silviculture to maximize timber quality and growth;
- generate income from sustainable woodfuel, timber production and grants to fully cover the costs of management over a rolling five-year period;
- maintain the unique character (species and habitat diversity) for public access, engagement and education;
- ensure the safety of motorists and woodland users.

To improve the resilience of the woodland to pests, diseases and environmental change, the RFS is working towards a greater genetic diversity by sourcing saplings of the same species with different provenances and by encouraging a more uneven age structure through natural regeneration and plantings.

In 2016 a major thinning/harvesting exercise was carried out by Tilhill Forestry, changing proportions of trees in many areas of the woodland. For instance, in some subcompartments where conifers had served their purpose as a nurse, they were harvested both to provide timber income and to leave more light for more broadleaved species.

With the help of volunteers from the Chiltern Society, tree species planted included small-leaved lime (*Tilia cordata*), Wild cherry (*Prunus avium*), English oak (*Quercus robur*), Western red cedar (*Thuja plicata*), Field maple (*Acer campestre*), hazel (*Corylus avellana*) and Wild Service tree (*Sorbus torminalis*).

The RFS believes woodlands must pay for themselves. Many woodlands become neglected when timber prices fall and costs of management to their owners outweigh income. While woodfuel has helped boost the bottom line for many woodlands in recent years, that has not always been the case and may not be again in the future.

Monies from timber and woodland products pay for ongoing management at Hockeridge and Pancake Wood. Increased diversity of species, age and provenance also helps future-proof the woodland against future trends for specific timber products. All timber extracted found a ready market for sawlogs, woodfuel or woodchip. Some selected compartments were left unthinned to provide educational value.

Over the years, clear fell areas have been treated differently for education purposes. There are four clear felled compartments in the wood, two of which have been left to regenerate naturally. One of these is currently silver birch scrub with some emerging Norway spruce, the other is regenerating with ash and sycamore.

Hockeridge and Pancake Wood has so far proved resilient to the diseases which have devastated commercial woodlands elsewhere. Larch, which is present in small quantities, has not been affected by Phytophthora.

Corsican pine has had varying levels of red band needle blight and had in many cases become oversize. One compartment was clear felled for its timber value and other trees in remaining compartments – many remnants of storm windblow events – were also harvested to recoup their timber value.

Around 10 per cent of the woodland is ash, so ash dieback (which is present nearby) would have limited impact on the woodland composition as a whole.

In a world of uncertain climatic and environmental changes, retaining and extending a broad mix of species in the wood will help overall resilience remain high should new tree diseases enter the UK.

Useful vocabulary:

beech – бук

sycamore – явор

broadleaved woodland – широколиственный лес

Dutch elm disease – болезнь голландского вяза

ash dieback – смертельная болезнь ясеня

specimen – образец

silviculture – лесоводство

woodfuel – древесное топливо

resilience – устойчивость

sapling – саженец

provenance – происхождение

small-leaved lime – мелколистная липа

Western red cedar – западный красный кедр

Wild Service tree – рябина глоговина

monies – денежные суммы

sawlog – пиловочник

woodchip – щепы

clear felled – срубленный

silver birch scrub – серебряная береза кустарниковая

Norway spruce – норвежская ель

larch – лиственница

Corsican pine – корсиканская сосна

Ex. 2. Finish the sentences.

1 That makes many woodlands particularly vulnerable to _____.

- 2 It is a popular local destination for _____.
- 3 With the help of volunteers from the Chiltern Society, tree species planted included _____.
- 4 Increased diversity of species, age and provenance also helps _____.
- 5 Hockeridge and Pancake Wood has so far proved _____.

Ex. 3. Make up your own sentences using the following words and expressions.

Broadleaved woodland; damage from disease; changes in climate; sound silviculture; timber production; thinning/harvesting exercise; volunteer; become neglected; boost the bottom line; diversity of species; resilient to the diseases.

Ex. 4. Answer the following questions.

- 1 What makes the woodlands in the UK particularly vulnerable to widespread damage from disease?
- 2 How many tree species are there in the Royal Forestry Society's (RFS) Hockeridge and Pancake Wood?
- 3 What do abbreviations PAWS and ASNW mean?
- 4 What are the Royal Forestry Society objectives?
- 5 Is Hockeridge and Pancake Wood attractive for visitors?
- 6 What does the Royal Forestry Society do to improve the resilience of the woodland to pests, diseases and environmental change?
- 7 Does the RFS believe that woodlands must pay for themselves?
- 8 Why do many woodlands become neglected?
- 9 How can woods be used in education?

Ex. 5. Speak about:

- 1) tree diversity in the UK;
- 2) the Royal Forestry Society objectives;
- 3) The Royal Forestry Society management strategy.

UNIT 9

BORING BEECH TREES IN WILTSHIRE

Ex. 1. Read the text.

Inside the dark beech groves of an iconic ancient woodland in Savernake Forest one may observe researchers from Cardiff University take sawdust samples and full-length cores from a selection of the

forest's huge beech trees, to ascertain the identities and distributions of fungi across the radial spectrum of sapwood and heartwood.

These are maiden trees, big by any stretch of the imagination, with huge trunks and equally large foliar canopies. Most are post-maturity and many are approaching their sell-by date, which for maiden woodland beech will usually come in when trees approach two-hundred years of age. The overpowering shade cast in beech woodland due to the unique attachment and display geometries of individual leaves, and their overlapping dispositions, is well documented. This is almost certainly one of the darkest woodlands you may see, with the forest floor essentially bereft of anything living and visible, instead covered by a deep and crispy tannin-rich litter of beech leaves.

Postgraduate student Emma Gilmartin, in the final year of her PhD degree at Cardiff University, had come down to South Wales with a BSc degree in biology from Sheffield University. In the interim, she completed a one-year Master's degree in conservation and land management. This included a fascinating research project assessing grassland management in relation to breeding populations of the twite. Assisting Emma is Ed Pyne, who has just completed the first year's study of a BSc degree in biology, also at Cardiff University.

The techniques designed and developed by Emma, now used to carry out her research, are among the most innovative over the last 45 years. Emma's achievements duly deserve the accolade 'sophisticated in their simplicity'. This requires Emma to get right to the very heart of the beech tree, extracting samples of material, identifying and describing the spatial and temporal distribution of microbial participants linked to the ageing and veteranisation of beech trees. Emma is achieving these goals using a range of everyday items including handdrills, household bleach and drinking straws, which, when integrated into Emma's methodology, provide powerful research tools.

Ed used a light hammer and small wood chisel to carefully remove a 5 x 5 cm square of bark from the first beech tree, just deep enough to remove the cambial layer. The next stage is to drill into the exposed white wood at each of the four corners to extract sawdust samples for laboratory identification of fungi using DNA analysis.

Drilling would need to be done using a sterilized drill bit, but the difficult-to-overcome part is how to stop fungal contamination from outside of the tree getting into the sample during the drilling operation, and subsequently during transfer of the sawdust sample into a secure and sterile container for transport to the laboratory.

Emma suggests some of the fungi she expects to find along the 35 cm radial profile of the inner wood, some of which would be contributing to degeneration, natural ageing and veteranisation. She lists *Ganoderma adspersum* (shelf fungus), *Ganoderma pfeifferi* (Beeswax bracket fungus) and *Pholiota aurivella* (golden scalycap).

This non-destructive method can be used to assess the number of growth rings, age the tree and relate this to the onset and progress of staining, which is of course one of the factors affecting the marketability of beech timber and the prices secured for saw logs.

Emma's choice of beech is bang on because the way things are going, *Fagus sylvatica* could soon be the only climax high forest native or naturalised tree not down or out due to exotic insect pests and diseases. The use of beech trees for timber rather than firewood has clearly gone out of fashion, with grey squirrel damage helping to reduce or even curtail new beech planting in many areas of the country.

Useful vocabulary:

grove – роща

sawdust – опилки

ascertain – определять

sapwood – заболонь

heartwood – сердцевина

foliar canopies – листовенные навесы

sell-by date – срок реализации товара

litter – подстилка, мусор

Master's degree – степень магистр

BSc (Bachelor of Science) – бакалавр наук

PhD (Doctor of Philosophy) – доктор философии

interim – промежуток

twite – горная чечётка

linnet – коноплянка

come across – сталкиваться

ageing – старение

handdrill – ручная дрель

household bleach – бытовой отбеливатель

chisel – долото

bark – кора

fungal contamination – грибковое заражение

firewood – дрова

Ex. 2. Finish the sentences.

1 In the interim, she completed a one-year Master's degree in _____.

- 2 Emma uses a range of everyday items including _____.
- 3 The next stage is to drill into _____.
- 4 This non-destructive method can be used to _____.
- 5 Emma's choice of beech is bang on because _____.

Ex. 3. Make up your own sentences using the following words and expressions.

Take sawdust samples; deep and crispy tannin-rich litter; beech groves; ancient woodland; sawdust samples; carry out the research; grey squirrel; firewood; timber.

Ex. 4. Answer the following questions.

- 1 What is sell-by date for beech trees?
- 2 What tools do Emma and Ed use to conduct their research?
- 3 Where can we use Emma's non-destructive method?
- 4 What is difficult-to-overcome part of Emma's research?
- 5 Why did Emma choose beech for her research?

Ex. 5. Speak about:

- 1) Emma's methodology;
- 2) Emma's education;
- 3) the advantages of beech wood.

UNIT 10

30 YEARS AFTER THE STORM

Ex. 1. Read the text.

Nobody who was around at the time could ever forget the Great Storm, and the colossal damage inflicted on our woodlands. On that one night, in mid-October 1987, at least 22 people died after winds of 120 miles an hour battered the South, damaging 15 million trees and changing some woodlands for eternity.

So, what could possibly be worse? For some campaigners the answer to that question is easy – grey squirrels. New research has worked out that the damage they cause has cost the taxpayer a staggering £600 million, since the storm, because the replacement trees have been destroyed by the squirrels.

After the storm there was a huge replanting programme across England, but one area in West Sussex – about the hardest hit by the

storm – provides a classic case study of the havoc that grey squirrels can cause to replacement trees.

On 10 October, West Sussex landowners Sir Adrian and Lady Baillie hosted members and supporters of the European Squirrel Initiative, together with foresters, landowners, farmers and representatives of a range of rural organisations, for a seminar and open day at the Lydhurst Estate, Warninglid, to demonstrate the irreversible damage done by grey squirrels on unmanaged woodland.

Sir Adrian and Lady Baillie acquired Lydhurst, which lies adjacent to their Freechase Estate, last year and the current plan is to restore the woodland to native mixed broadleaf over the next twenty to thirty years, restoring it to its place in an Area of Outstanding Natural Beauty.

The visitors were shown how grey squirrels attacked native species – especially oak, beech and sweet chestnut, and particularly at 10–40 years old, when they are most vulnerable – in the quest for food. Their goal, as they dig into and erode the tree bark, is phloem, the living tissue that transports food and water from the roots as a vital part of photosynthesis. Without this essential life force, the tree will ultimately die.

“If we don’t do something to protect our trees from grey squirrels now, we simply will not have this beautiful landscape, the landscape we want to preserve, in 100 years’ time,” said Sir Adrian.

On 10 October, to mark the 30th anniversary of the storm, the campaign group, the European Squirrel Initiative (ESI), met to examine the current contrast between the two woods. The group’s verdict was clear: “The contrast between these two woods is alarming.

It shows that without proper grey squirrel control, our landscape is about to change forever and the high forest we enjoy today will be lost to future generations.”

ESI is a privately funded charity, formed in 2002 by a group of conservationists, foresters and farmers, and aims to restore the native red squirrel and to protect the natural environment by removing the impact of the alien grey squirrel in Europe.

After a welcome by EIS chairman George Farr, squirrel expert Charles Dutton, senior forestry manager of Pryor & Rickett Silviculture, opened the meeting by demonstrating the financial as well as the physical cost of this grey squirrel damage.

For Charles, the concerns date back over 30 years. He is the author of a comprehensive tome called *The Grey Squirrel Management Handbook* which is still available. He told the ESI’s seminar audience of foresters and estate officials that it was just as well most oaks were planted before the greys arrived. Had that not happened he really did

wonder if we'd have any left. Now the search was on in earnest for a solution. But, he wondered, "Are we any further forward?" And, he admitted, he doubted if there had been any real progress in recent years, despite over 30 years of research.

But, he asked, "What could be done?" One obvious solution was to shoot the vermin with airguns. In the US – the grey squirrels' native home – over two and a half million are shot each year, and this may be part of the reason why there is much less damage to trees by grey squirrels there.

Other methods include fertility control, better traps and, more recently, a lure to make trapping more effective.

Charles Dutton told the audience all were under research, but it might take many years to come to fruition. He added that damage by grey squirrels costs the grower, taxpayer and conservationist a fortune. According to Defra, the loss of timber equates to £14 million a year and costs the lives of 15% of woodland birds.

He concluded, "I believe that we are at a golden age for solving the pest problem for the benefits of tree growers, countryside lovers and conservationists."

Useful vocabulary:

batter – громить

taxpayer – налогоплательщик

havoc – опустошение

lure – приманка

fruition – осуществление

costs a fortune – стоить целое состояние

equate – приравнивать

tissue – ткань

Ex. 2. Finish the sentences .

- 1 New research has worked out that _____.
- 2 Grey squirrels' goal, as they dig into and erode the tree bark, is _____.
- 3 Without proper grey squirrel control _____.
- 4 Charles Dutton is the author of _____.
- 5 Damage by grey squirrels costs _____.

Ex. 3. Make up your own sentences using the following words and expressions.

Unmanaged woodland; quest for food; essential life force; grey squirrel; replacement trees; dig into the tree bark; living tissue; come to fruition.

Ex. 4. Answer the following questions.

- 1 When did the Great Storm take place?
- 2 What disaster is even worse than the storm?
- 3 What is European Squirrel Initiative?
- 4 What are the methods to stop the vermin?
- 5 Where is the grey squirrel from?

Ex. 5. Speak about:

- 1) the grey squirrel disaster;
- 2) anti-grey squirrel methodology;
- 3) Charles Dutton's research.

Ex. 6. Find examples of direct speech in the text and change them into indirect.

UNIT 11

10 FORESTS AND WOODS TO VISIT IN THE UK

Ex. 1. Read the text.

The woods are lovely, dark and deep, but I have promises to keep, and miles to go before I sleep. If you go down to the wood today, you're likely to find stories to tell, stunning trees, and winding paths to explore and enjoy. The British forests and woodland are a real thing of beauty, and they're just waiting for your family adventures. So if you're looking for a family day out this year, why not check out some of these?

Grizedale, Cumbria

In the heart of the Lake District, you'll find one of the most beloved areas of woodland in the UK. Grizedale is a firm favourite with many families, because there is so much to do. Here you'll find walking trails, cycle trails, horse riding, mountain bike trails, sculptures to discover and play areas for the kids, places to go star gazing plus much more.

Galloway Forest Park, Dumfries & Galloway

Britain's biggest forest park, Galloway Forest is often referred to as the 'highlands of the lowlands'. With over 300 square miles of beauty on display, there's plenty to do and see. As well as ancient woodland,

stunning scenery, fantastic walks and cycle trails, Galloway Forest is also a registered dark skies park. Due to its remote nature, the skies above the park are fantastic for stargazing.

Hackfall Wood, North Yorkshire

Ancient woodland in the Ripon area of North Yorkshire which has recently been brought back to former glories. The wood features lovely walks, ancient temples and even a feature fountain to be discovered.

Brechfa Forest, Wales

Located near the Brecon Beacons and Cambrian Mountains, Brechfa Forest is a stunning area of ancient woodland that offers up trails for all the activities you could hope for, including: walking, mountain biking and horse riding. Like so much of the Welsh woodland, Brechfa Forest is especially good for mountain biking, with trails for all abilities on offer.

Ashdown Forest, East Sussex

One of the largest areas of free access space in the South East of England. Ashdown Forest is located in the High Weald area of Outstanding Natural Beauty, but is more famous for the 1000 acre wood which was the birthplace of the Winnie the Pooh stories and proves popular with fans hunting out areas from the books. Ashdown Forest is also a great area for walking and horse riding.

Tollymore Forest Park, Northern Ireland

Northern Ireland's very first state forest park, Tollymore sits at the bottom of the Mourne Mountains and near the coast. The Shimna river is a feature throughout the forest with 16 bridges of varying age crossing it throughout. There are 4 main walking routes in the forest of different lengths for you to try. Tollymore is also renowned as a fantastic picnic spot.

Kielder Forest, Northumberland

The largest man-made forest in England, Kielder Forest surrounds Kielder Village and Kielder Water reservoir making it a particularly picturesque and popular location. Bursting at the seams with activity for the whole family, the forest is ideal for walking, fishing, cycling, mountain biking, there's even dark skies events for budding astronomers.

Puzzlewood, Gloucestershire

Puzzlewood is an area of woodland within the Forest of Dean. Arguably one of the most magical looking areas of woodland in the UK, Puzzlewood features moss covered rocks with twisting and turning tree

routes aplenty. It's said that Puzzlewood was one of J.R.R. Tolkien's inspirations when creating the forests of Middle Earth in the Hobbit books. Puzzlewood does feature a small entry charge, but there is plenty for the whole family to discover on a day trip.

New Forest, Hampshire

We love the New Forest, and it's because it's such a stunning, family friendly area of the UK. There's so much to see and do in New Forest, it's no surprise it's becoming a popular holiday destination for young families. One thing that makes New Forest stand out on this list, is that it's the home to the New Forest ponies, which are (in a sense) wild, in that they're allowed to roam free around the forest.

Sherwood Forest, Nottinghamshire

Arguably the most famous forest in the UK? We'd say so. While it's certainly not to the scale of some forests on this list, Sherwood Forest does come with its own legend in Robin Hood. While there, why not hunt out the Major Oak (pictured above) which is said to be between 800–1000 years old and the spot where Robin Hood and his Merry Men slept, it was also voted 'Tree of the year'. Sherwood Forest was once a royal hunting reserve, and as with other forests like it has vast areas of open space as well as woodland areas.

This is obviously just a glimpse into the green world of the UK forests and woodland, if there's one thing that they all have in common it's that they're begging to be explored. Whether you like walking, cycling or family days out, our woodland areas have what you are looking for.

Useful vocabulary:

stargazing – созерцание звезд

entry charge – плата за вход

Ex. 2. Finish the sentences.

- 1 In Grizedale you'll find _____.
- 2 Britain's biggest forest park is _____.
- 3 Like so much of the Welsh woodland, Brechfa Forest is _____.
- 4 Ashdown Forest is also a great area for _____.
- 5 The largest man-made forest in England is _____.
- 6 Kielder Forest is ideal for _____.

Ex. 3. Read the texts and match them with the appropriate titles.

- 1 Ideal place for mountain lovers.
- 2 The forest with lots of disused mines and miners tracks.

- 3 Walking with English classics.
- 4 The forest under permanent restoration.
- 5 Royal hunting forest in London outskirts.

A) Puck's Glen offers the enchantment that many look for in a forest walk. Part of the Argyll Forest Park and named after the mischievous sprite in William Shakespeare's 'Midsummer Nights Dream', Puck's Glenn is a home to a real magical feel. A dark atmosphere of moist undergrowth and moss covered walls make for a stunning setting, and a walk through the gorge will lead you past waterfalls and more.

B) A beautiful area of ancient woodland, once a royal hunting forest that is easily accessed from London. The Hainault Forest country park features a lake, orienteering course and even a petting zoo, making it an ideal spot for families. This area of woodland is also part of the three forests trail that has an 8 mile section which takes in Epping Forest, Hainault Forest and Hatfield Forest all in the area.

C) A coniferous and mixed woodland on the southern side of Teign Valley, near Dartmoor National Park. Fingle Woods is part owned by the National Trust and Woodland Trust and is always undergoing restoration to improve what is there. There are miles of walking routes around the woodland to enjoy and it's well worth a visit.

D) The most popular forest location in the Tweed Valley, a real mountain biking mecca for those looking for an adventure on two wheels. The forest features mountain biking trails of all grades and difficulties, and if you don't have a bike of your own – you can hire them there! If mountain biking isn't your thing, Glentress also offers some lovely walks, taking in the River Tweed and through lush woodland.

E) An area of forest located within Snowdonia National Park that encompasses the village of Betws-y Coed, Gwydir forest proves popular with walkers and cyclists alike. The forest hosts many disused mines and miners tracks, which make up cycle tracks and walking routes to enjoy. The forest is divided by rivers and features a number of lakes, meaning there's always something to look out for on your walk.

Ex. 4. Make up your own sentences using the following words and expressions.

Walking trails; horse riding; walking; fishing; cycling; mountain biking; adventure on two wheels; petting zoo.

Ex. 5. Answer the following questions.

- 1 Why are British forests popular with families?
- 2 What activities are offered in the UK forests?
- 3 Is stargazing possible in the forests?
- 4 What forest features a small entry charge?
- 5 What is the heart of the Lake District?

Ex. 6. Speak about:

- 1) the birthplace of the Winnie the Pooh stories;
- 2) one of J.R.R Tolkein's inspirations when creating the forests in the Hobbit books;
- 3) the UK forest activities;
- 4) any forest from the top 10.

UNIT 12

NEW ZEALAND'S FOREST ECOSYSTEMS

Ex. 1. Read the text.

New Zealand's forest ecosystems support a diverse array of flora and fauna. Today, indigenous forest is found mainly at higher altitudes; much of what remains in coastal and lowland areas is in small and isolated fragments. Logging and land clearance have completely destroyed much of the country's native forest and its associated biodiversity. The greatest threats to native forests come from damage caused by invasive species, the fragmentation of forest habitats, and the lack of intact forest buffers.

In pre-human times, New Zealand's land mass was blanketed by forests. Where trees could grow, they did – once covering nearly 80 percent of the total land area of this country. These forests had been in a process of continual change over countless millennia due to climate cycles, new species arrivals and disturbance events, such as volcanic eruptions. However, the most rapid changes have occurred in the last 700 years of human occupation. Today, indigenous forests cover just over seven million hectares, or approximately 25 percent of the total land area, and have been extensively impacted through land clearance, logging and as a result of the effects of invasive species.

New Zealand's land mass is home to some unique forest ecosystems; including kauri forests, kahikatea swamp forests, pōhutukawa forests and mixed broadleaved forests. These support a diverse array of flora and fauna that evolved in the almost complete absence of land mammals. Most of New Zealand's indigenous land birds inhabit forest or shrub land.

Logging and land clearance have completely destroyed much of the country's indigenous forest and its associated biodiversity. Forest

clearance has had the greatest impact on lowland forests, significantly reducing some forest types.

Trees

Forests in New Zealand are typically made up of either mixtures or pure stands of broadleaved, conifer and beech species. The two most common forest types are conifer-broadleaved forest and beech (*Nothofagus*) forest.

Conifer-broadleaved forest in temperate, lowland areas, are the tallest and most complex of New Zealand's forests. At higher altitudes trees tend to be shorter and floristically poorer than the lowland equivalents. There is a huge diversity of species found within this class of forest.

Beech forests cover just under three million hectares of New Zealand and consist of one or more beech species. Beech is the dominant forest cover on the main mountains of the North Island and much of the western South Island, but is absent in most of Northland, near the Manawatu Gorge and in central Westland. Beech forests are generally found at higher elevations where the climate is colder and wetter, growing seasons are shorter, and soils are less fertile. In these areas beech forest replaces conifer-broadleaved forests.

Other flora

Beneath the forest canopy a tier of smaller trees, including tree ferns and nikau palms (which are the southern-most palm species in the world) are found. These then give way to a layer of saplings, shrubs and groundcovers. New Zealand has a very rich diversity of mosses living in the forest habitats.

Historically, fungi have not been well studied, but in terms of species their numbers significantly outweigh plants. Over 900 species have been recorded growing with the four species of indigenous beech. New Zealand has more than 500 species of liverwort and 13 species of hornwort.

Ferns are mostly found in moist forest areas where there is plenty of water. For a temperate country, New Zealand has an unusually high number of ferns, with approximately 200 species. It is thought that around 40 per cent of these are found only in this country. The silver fern (*Cyathea dealbata*), also known as ponga, is a national symbol of New Zealand. The ferns found in the forest ecosystems can range in size from just a few millimetres long to huge tree ferns.

Large leaf-like lichens are also common in forests as they like to grow on the damp environments found in tree trunks. A large foliose lichen, *Menegazzia pertransita*, grows on the trunks of beech trees in the wet areas of Fiordland. Lichens are also found growing on decaying logs and stumps on the forest floor, as well as on the leaves of trees as epiphylls.

Lianes are various climbing and woody vines that are commonly found within New Zealand's forests. Epiphytic plants grow on another plant or object, obtaining moisture from the air, or from the dampness on the surface of their hosts. Common epiphytes within forest ecosystems include the perching lily *Collospermum hastatum* and the bamboo orchid *Earina mucronata*.

Useful vocabulary:

indigenous – местный

coastal – береговой

lowland – низменность

intact forest buffers – неповрежденные лесные буферы

kahikatea swamp forests – болотные леса кахикатеа

logging – лесозаготовка

forest canopy – лесной полог

tree ferns – древовидный папоротник

moss – мох

liverwort – печеночный мох

hornwort – роголистник

foliose lichen – листовенный лишайник

woody vine – древесная лоза

bamboo orchid – бамбуковая орхидея

Ex. 2. Finish the sentences.

1 The most rapid changes in New Zealand's forests have occurred in ____.

2 Most of New Zealand's indigenous land birds ____.

3 The two most common forest types are ____.

4 Beech forests are generally found at ____.

5 New Zealand has an unusually high number of ____.

Ex. 3. Make up your own sentences using the following words and expressions.

Indigenous forest; biodiversity; forest buffers; volcanic eruption; large leaf-like lichens; moist forest areas; climbing and woody vines.

Ex. 4. Answer the following questions.

1 What are the greatest threats to native forests in New Zealand?

2 Did New Zealand's flora and fauna evolve in the almost complete absence or presence of land mammals.

3 What plant is a national symbol of New Zealand?

4 What tree is the dominant forest cover on the main mountains of

the North Island and much of the western South Island, but is absent in most of Northland?

5 What are Epiphytic plants growing in New Zealand?

6 What are New Zealand's unique forest ecosystems?

Ex. 5. Speak about:

1) New Zealand's forests in pre-human times;

2) the human role in New Zealand forests destruction;

3) New Zealand's common trees;

4) other New Zealand's flora.

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