

Sussex Otters & Rivers Project (SORP)

Part of Water for Wildlife UK



How to Create and Manage Reedbeds

What is a reedbed?

Reedbeds are wet habitats, dominated by Common reed, a perennial and flood-tolerant grass that grows to over 2m height. In the UK most extensive reedbeds are found in river floodplains and low-lying coastal areas. Two distinct reed habitats exist:



Reed swamp - Flooded all year round and usually a monoculture of common reed © S McIntyre



Reed fen - Periodically flooded, botanically diverse reed-dominated community containing many tall herbs © S McIntyre

A number of threatened species rely directly or indirectly on reedbeds. These include water voles, otters, water shrews, bitterns, harvest mice etc. (See APPENDIX I at back of advice sheet for further details).

Why are reedbeds important?

Reedbeds have been identified by the UK Biodiversity Steering Group Report as a priority for conservation. They are amongst the most important habitats for birds in the UK, including six nationally rare Red Data Book Birds (bittern, marsh harrier, crane, cetti's warbler, savi's warbler and bearded tit),

Why would I want to restore reedbeds?

- As wildlife refuges for a number of endangered, rare and uncommon species
- For Birdwatching
- For treating sewage and areas of poor water quality
- For Game shooting
- To act as buffer strips to filter soil and run off from arable fields
- As bankside protection from erosion by wind, water and waves
- For the production of thatching material

Why have reedbeds declined?

Traditional uses of reedbeds i.e. for thatching have declined in some areas however, reedbed decline is mainly due to the destruction of wetlands. For instance between 1960 and 1980 over 60% of the wetlands in Sussex were intensively drained (Sussex Wildlife Trust, 2000). Under 50 hectares of reedbed remain in Sussex.

Historical management of reedbeds

Reed beds were traditionally managed by reed cutters who used the reed for thatching material. This sustainable system provides a rotational harvest of reed while preventing the build-up of dead material and drying out of the habitat. The demand for good quality thatching reed currently outstrips supply and much of the UK's thatching reed is currently imported from abroad.



Traditional cottage being thatched © M. Harrington

How to establish a reedbed

What size and shape should my reedbed be?

When designing the size and shape of your reedbed, consider long term management implications and physical restrictions. For example, larger reedbeds are more attractive for sustainable commercial reed cutting. Changes in local soils and slopes may restrict the area where reed will grow and survive, Reedbed sewage treatment systems require a specific area of reed to clean a specified amount of water to a particular standard (These can be calculated before building your reedbed).

Any size reedbed is beneficial to wildlife. However certain species require larger reedbeds of up to 25ha eg bittern and marsh harrier. Open water within a reedbed encourages more birds, fish and invertebrates. Reedbeds do not have to be large. Small reedbeds are valuable, as are multiple small stands within any area. Fringing reed, ie reed close to open water, is more vigorous and supports higher populations of wildlife, and the creation of 50-100 m fringes around ditches, ponds and lakes can have enormous benefits. The more natural your reedbed, the lower your habitat management and maintenance costs will be.

REMEMBER - Drier, raised areas and space may be required for stock or machinery access etc

Where should I put my reedbed?

Reedbeds can be created anywhere there is:

- 1) A reliable water supply, with some flow, and up to 300 mm of water depth in spring
- 2) Sufficient low, level ground or ground with very shallow gradients
- 3) Access for management such as harvesting, cutting and landforming
- 4) An available, vigorous reed source
- 5) Somewhere where cattle can seasonally poach and graze reeds

Establishment of reed can be achieved on most soil types, though it is easier on clays and silts which retain water more easily. Once established, reed will spread to water up to 1m deep at around 1.5m per year.

What is the best way to establish reeds and reedbeds?

Natural expansion

This is the simplest and cheapest option for establishing reed and for wildlife, a slowly developing reedbed is often more beneficial. In many locations, reed will automatically re-establish itself once water levels are suitable and/or intensive grazing and mowing management of low lying fields is ceased. Shallow flooding low-lying land with an existing reed resource, eg in ditches, provides an ideal source from which reed can spread naturally. Expansion rates vary greatly, and are likely to be affected by temperature, soil type, land form and water depth.

Planting

Planting seedlings usually has a success rate of over 90%. Reed taken from local sites with similar conditions invariably grows more successfully. Planting when water levels are 5cm above the surface is best.



Reed in ditches will often expand out into field margins if water levels and grazing conditions are right

What do I need to consider before creating a reedbed?

Do you want a man made/managed or a natural reedbed?. If you want a natural reedbed, look for areas on your land where reeds occur naturally. It is very likely that a small change (raising) of water levels in these areas will encourage reeds to spread naturally. Reeds prefer to grow in water from 5cm – 1m deep but will also tolerate damp soils with water around 5cm below the surface.

You also need to consider the following:-

1) Water supply and management

An adequate water supply during the summer is essential for establishing and maintaining a wet reedbed. Reedbeds also like variation in water levels throughout the year. Despite being a wetland plant, dry periods allow management and encourage the oxidation of litter build-up, making nutrients available and prolonging the life of the reedbed. Young reed plants are vulnerable to dehydration and drowning and during sowing or planting they require damp soil. After young plants have shooted, water levels can be raised, but the top 1/3 of the plants must be above the surface of the water. Older reeds can 'breathe' in relatively deep water.

Drainage channels, dams, sluices, and wind pumps can increase water supply and control. However this can be costly. Where possible, natural reedbeds are best. Treatment of poor quality water by reedbed systems is now a feature of some new British nature reserves, eg Barn Elms. Reedbeds are ideal to buffer against water quality problems, eg nutrient rich water from sewage treatment works. **NOTE: Any changes to existing watercourses on in-stream structures may require Land Drainage Consent from the Environment Agency.**



Varied land levels create a more diverse reedbed for wildlife

2) Preparing soil for reed planting

When reed plants are young, controlling competing vegetation helps reeds establish. Stripping and removing vegetation and litter if you are land forming is ideal. Flooding land for a short period will kill most terrestrial plants, especially after rotovation or ploughing which exposes seeds. Rushes however, benefit from rotovation and each piece of chopped root will grow, so only rotovate if the land can be flooded immediately afterwards. Reed should be introduced as soon as water levels are suitable.

3) Land Forming to help reeds establish

On many sites there will be a minimal need for land forming (at least initially). Reeds will naturally tend to occur in the lowest areas of floodplains or wetlands. However, where land levels are too uniform/flat (i.e. where fields have been ploughed), they have been raised by silting or artificial means, or they are naturally too high, the first stage of creating a new reedbed is to profile soil to create the desired shape, land levels, and open water networks.

Not all land should be low. Having some raised areas will create variations in water depth in the reedbed. Surplus soil from excavating open water areas can be used to create islands that are less prone to flooding and which provide dry land for wildlife at times of high water. If land forming when commercial reed harvesting be aware that too much variation in water depth leads to reed of variable quality and can make harvesting difficult.

NOTE: If land forming within 8m of a main river, you may require consent from the Environment Agency. Land forming must not compromise flood movement or storage.

I need to plant my reedbed. How do I choose between reed seeds, plants or roots ?

Planting rhizomes (the roots of the reed plant) can be as (or more) effective as using seed or rooted plants.

Sourcing plant material

Try to use plants obtained from close to your planting site and if harvesting seeds, try and take seed heads (panicles) from a local seed source. **CAUTION. Transporting reeds from other areas can introduce invasive plants. Once introduced to a site, invasive plants are often impossible to remove.**



Parrot's feather (*Myriophyllum aquaticum*) – one of the non-native invasive plants which reproduce from root fragments © T Renals

When should I plant my reedbed?

Planting is best done as early as possible after the last frost. Planting any later leaves reeds vulnerable to competition from other plants:

For soil containing rhizomes

Excavation and spreading are best carried out in winter (Nov to Feb).

For turf transplanting

Work is best carried out in winter during draw-down of water levels.

For actively growing shoots

Dig rhizomes in late winter/early spring before shoots emerge. Optimal planting period is May/June, when shoots are green with 2-4 leaves or immediately after harvesting.

For planting rhizome fragments

Planting should be undertaken in March/April.

For planted stem cuttings

Timing of planting influences success, with 40% take in April compared to 25% in July and only 2% in August. Plant after late spring frosts.

Potential problems with establishing reed

Excessive flooding or drought can cause problems with reed establishment and some peaty or acidic soils are less favourable for reed growth. The only problem generally experienced with reed establishment however is that newly sprouted reed is palatable to a variety of grazing animals, (eg deer, ducks, geese, rabbits and livestock).

Fencing is essential where grazers are present in numbers, though alternatives may be considered:

Over-planting may compensate for grazing losses, but is expensive.

Aerial netting to keep wildfowl off planted areas is possible but makes weeding very difficult.

Minimise the area of open water, perhaps by phased planting as levels are slowly raised.

Sow strips of grass amongst reed. These will be grazed preferentially but can be removed by flooding later.

Deep marginal ditches can be constructed restricting access to newly planted areas.

Trees and tall vegetation (eg existing reed or hedgerows) inhibit geese from flying into small areas and unsettle feeding birds by reducing visibility and increasing the risk of predation

Consider active deterrence of problem birds (i.e. geese) during the vital first year of vegetation establishment. i.e. through fencing, covering with blackthorn cuttings etc.



A reedbed can be a haven for wildlife.

Further details of ways of establishing reed can be found in APPENDIX 2 of this leaflet

Can I get grant aid to plant a reedbed?

Landowners can claim grant payments under the new Environmental Stewardship schemes (particularly Higher Level Stewardship). Free advice and help with grant funding may also be available from SORP, the Environment Agency, Natural England/Defra etc.

I have created a reedbed – How do I manage it?

Reedbeds in deep water need no management but in most cases, a reed bed needs cutting, grazing or management each year to maintain a mosaic of vegetation at different stages of growth. Reedbed management is often aimed at increasing structure and diversity and preventing the invasion of scrub and the eventual natural succession to wetland carr/wet woodland habitats (although you may wish to allow this natural succession to occur, it will depend on whether you are receiving grant money for your reedbed and what the stipulations of the grant are). Allowing some patches of scrub and wet woodland to develop in drier areas does however provide niche habitats for more species.

Typical management practices include:

- Managing the water table. Water levels can often be controlled by using dams, sluices and flexi-pipes on in and out-flowing streams and ditches. These will need consent from the Environment Agency if on existing watercourses.
- Removing reeds to prevent decomposition, build up of litter and nutrient-enrichment and to keep some reed young and healthy. This can be done by:
 - Controlled burning – although this is quite destructive to wildlife.
 - Scrub control – coppicing or root removal of scrub.
 - Seasonal grazing, usually with hardy cattle.
 - Machine cutting – of different compartments in different years.
- Managing compartments or different areas of reeds on a 4–7 year rotation to prevent the build-up of nutrients and dead plant material.
- Using heavy plant to create and maintain areas of open water.



Grazing with hardy breeds can help create diversity and structure in reedbeds © Knepp estate

Further information on managing reedbeds can be found in the *Wetland Restoration Manual* (Wildlife Trusts, 2001) on the RSPB website, and in the *Wet grassland guide* (RSPB, 1997)

NOTE

If clearing reeds then be aware that storing cut reeds on site can cause localised nutrient enrichment and decreased plant diversity/water quality on a site. Where possible, reeds should be burned/composted off-site or, if suitable, cut for thatching.

Useful contacts:-

Sussex Otters and Rivers Project

(01273) 497555

www.sussexotters.org

Environment Agency

Ask for your local Fisheries, Recreation and Biodiversity Team 0870 506 506

www.environment-agency.gov.uk

South East Reedbed Project

01273 775333

Sussex Reedbed Habitat Action Plan

www.biodiversitysussex.org

Natural England

0845 600 3078

www.naturalengland.org.uk/regions/southeast/contacts.htm

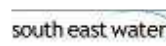


Reedbeds are important habitat for the endangered water vole © C Burdon

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SORP promotes the sustainable management of Sussex rivers and the restoration of wetland habitats for people and wildlife, and in particular the Otter, Water vole and Black poplar. SORP is a partnership between Sussex Wildlife Trust, South East Water, Environment Agency and Southern Water Services



APPENDIX I - Wildlife benefits of reedbeds

Importance of reedbeds for wildlife in the UK

Reedbeds are a nationally scarce habitat, and dependent wildlife is often scarce. Reed swamps support characteristic communities of uncommon birds and invertebrates and reed fen habitats are more important for their diversity of plant and invertebrate interest.

Many species which live in and utilise reedbeds have declined. These include:-

Plants	Birds
Cowbane	Bittern
Greater Spearwort	Marsh harrier
Greater water parsnip	Bearded tit
	Savi's warbler
Insects	Cetti's warbler
Red Leopard moth	Reed bunting
	Crane
Mammals	
Water vole	Amphibians and Reptiles
Otter	Grass snake
Water shrew	Common frog
Harvest mouse	Common toad
	Newt species inc. great crested
Fish & Eels	

Reedbeds provide important habitat niches in a number of ways

Group/species	General requirements
Breeding birds	Bittern require fish stocks and hunt along the reed/open water interface in shallow water in reedbeds >20 ha, with 20% open water and at least 600 m of reed edge per hectare.
Fish	Reed-fringed shallow water and open water with abundant aquatic plants provide important food and cover for juveniles. Connectivity with other waterbodies helps with recruitment of eels and other species.
Invertebrates	All stages of reedbed succession support important invertebrate communities. Maximum diversity occurs in areas of reedbed which have a dry litter layer. Over 23 Red data book species have been recorded in reedbeds.
Amphibians and reptiles	Amphibians use well-vegetated water bodies within the reedbed. Grass snakes can be abundant in reedbeds, using piles of cut vegetation to lay their eggs.
Mammals	Reedbeds can host high densities of harvest mouse, which feed on invertebrates in the summer and seed during the winter. Other mammal species such as water vole prefer good cover of a range of aquatic plants, otters use reedbeds as holts and hovers and for food i.e. amphibian stocks.
Aquatic flora	Ditch and water body profiles can create abundant niches for submerged macrophytes and emergent vegetation.

APPENDIX 2 – Methods of planting reeds

Spreading soil containing rhizomes (roots)

This involves transferring the top 300-500 mm of soil from an existing area with reeds to a prepared site. The following points should be considered:

- Soil should be spread at least 250 mm deep and can be flooded by up to 200 mm of water.
- Ensure that the soil containing rhizomes does not dry out.
- Minimise the handling of the soil to avoid damaging rhizomes.
- Use soil immediately if possible - do not store for long periods.

This method has the advantage that litter, soil living invertebrates and plants of conservation value are also introduced to the site. The disadvantage is that this method is only practical over small areas as 2,500 m³ of material is required per hectare, It can however be made to go further by establishing in a patchwork.



A digger and bucket can be used to lift turfs containing reed roots

Turf transplant

Small reedbeds can be created by transplanting root 'turfs' of common reed in winter into shallow areas of water. This is an easy method of establishing reeds, particularly if you are already clearing ditches of reed on your land with a digger and bucket. Place clods just above the water table in damp ground. Complete turves can also be cut by hand with a spade. The following pointers may help:

- Larger turves contain more undamaged material and will establish a reedbed more quickly.
- By positioning 1m² turves at 10 m spacing (100/ha) full cover is possible within one year.
- By positioning 1m² turves at 25 m spacing (25/ha) full cover is possible in 3-5 years.
- Water levels can be up to 500 mm deep providing turves have long, intact reed stems attached.
- Land forming/soil preparation is less critical, providing some flooding occurs to suppress competition.
- When transported or stored turves should not be stacked, as this damages aerial stems and rhizomes.

Rhizome (root) fragments

Planting individually cut root fragments is labour intensive and has variable success but the following may help:

- Separate rhizomes from soil, using a high pressure hose.
- Use intact rhizomes with at least one internode (the thickened band on the rhizome), bearing a bud.
- Plant in wet soil and follow with shallow flooding leaving part of the rhizome exposed to the air.
- Plant rhizomes at an angle with one end above the surface.
- Planting should be undertaken at a density of 4-10 rhizome per metre squared. Expect 20-25% losses.
- Rhizomes 200-400 mm long with actively growing shoots can be used and are more tolerant of flooding

Planting stem cuttings

Planting cut reed shoots in soft soil, especially in nutrient rich soil is often successful. The method can be quick and simple. Helpful hints include:-

- Harvest reed stems locally, cutting as low as possible, into 20-50 cm lengths, with 2-6 nodes (thickenings on the stem)
- Trim the leaves from the upper stem to reduce the need for water whilst the stem roots
- Keep stem bases wet, plant as soon as possible into soil covered by 10-20 mm of water
- Plant stem cuttings so that a node is close to the soil surface (new roots develop at the nodes)
- Plant at densities of 10-15 cuttings per metre square
- Water levels must not overtop the stems during the winter following planting, as this will kill them **(dead reed stems act as a snorkel in winter!)**
- Successful stems initially look dead but soon send out roots and shoots



Reed node with new shoot

Planting pot-grown material

Planted seedlings can survive adverse weather conditions and in good bed conditions success rates approach 100%. Planting pot-grown seedlings of known origin is the most reliable method of reedbed establishment, but if you have to grow your own plants this can be labour intensive and therefore expensive. Buying nursery grown material is also expensive, although costs are reduced if buying in bulk for large-scale projects.

It can be more cost-effective to grow your own reeds. Pot-grown plants can be individually dibbed-in. Plant individual seedlings at densities of 4 per m². This takes around 540 person hours per hectare. Nuclei of plants can be established in areas with relatively stable water levels, from which reed can naturally spread out.

Growing your own reed from seed (panicles)

Harvesting and growing reeds from seed can be easy but be aware that not all seed heads contain viable seed.

Collect 10 panicles (seed heads) in November/December (when seed is mature and panicles dry).

Chop into small pieces with a pair of scissors, directly into a blender.

Add about 80 ml of water.

Operate blender in short bursts until separation of material is evident.

Pour through a coarse sieve, to remove debris, into a large bowl. Seed will settle to the bottom.

Pour off the water/debris to leave the seed behind.

Place seed on filter paper and dry at room temperature.

Count seeds.

Incubating at 28-30°C by day (12 hours) and 15-17°C by night (12 hours).

Seeds should germinate in as little as 36 hours.

You now have a choice. You can either harvest panicles in winter and stored in a cool, dry place until they can be sown in spring.

OR you can collect the seed and start to grow your own reeds.



Reed Panicle or seed head

Growing your own reed

This can be time consuming and is more successful in a greenhouse or polytunnel if sufficient water supply is available, Once seeds have been harvested from reed panicles:-

- Use seedling trays, recycled plastic pots or trays with soil to a 20mm depth.
- Make sure pots/holders have holes in the bottom as seedlings are supplied with water from below by capillary action.
- Use a fine, rich compost or soil and water before adding shredded/blended seeds or panicles.
- Press reed material firmly into soil, and water again.
- Water seedling AT LEAST once daily from below (you may need to create bays covered with polythene to allow watering from below).
- Germination takes roughly 7 days and seedlings are ready for planting out after about 6 weeks.