Fell Moss Options for Wetland Meadow

Philip Sage 12th July 2023

Report Overview

This report will assess the options for creating wetland meadow at Fell Moss and the constraints associated with them as well as the benefits. It will look at a number of key factors that include:

Hydrology

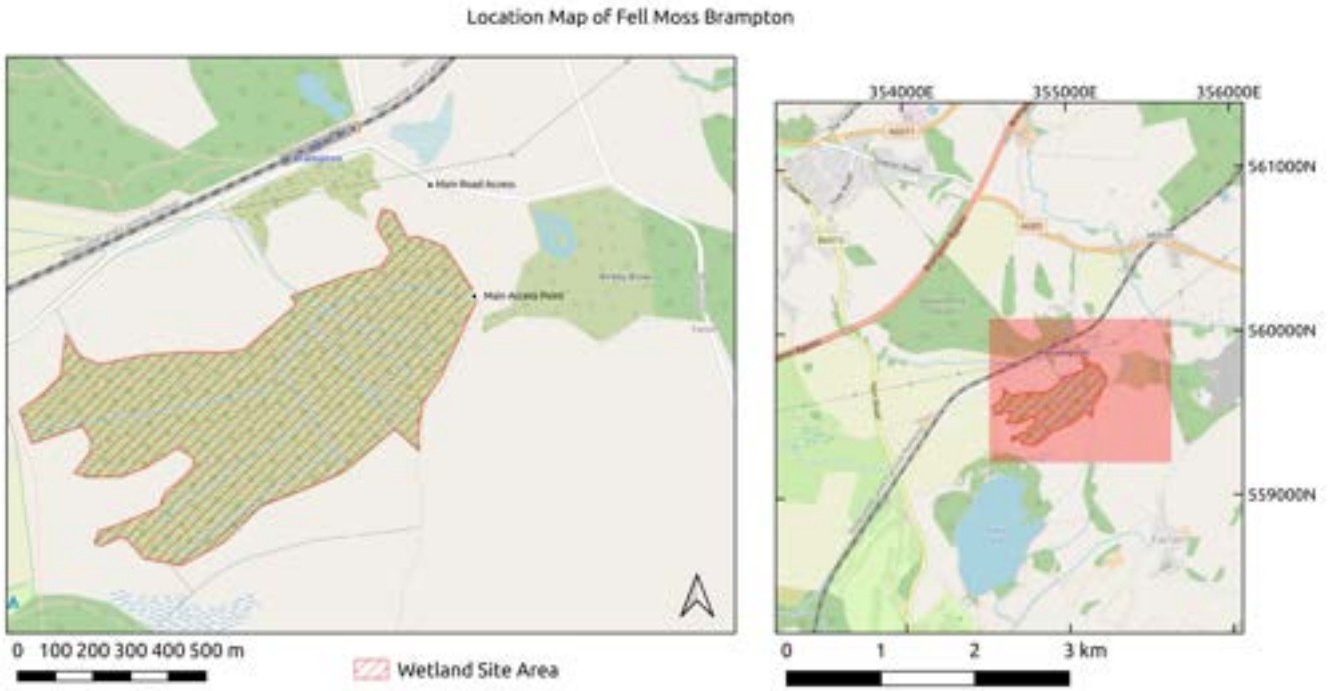
Biodiversity

Income potential

Long term management

Fell Moss

Fell Moss is located 2 miles south-east of Brampton Cumbria on Fell Farm, Tarn Road. The site consists of approximately 48.5ha of rough grassland with central stream fed via natural spring head. The site is sheltered on the south side from a steep bank with oak woodland with adjacent fields currently used for grazing. Access to the site is via field gate from Tarn road.



Site Details:	10th July 2013
Address: Fell Farm, Tarn Rd. Brampton, Cumbria. CA8 1HN Owner: Alan Bowman Area: 48.5 ha	Philip S. Sage

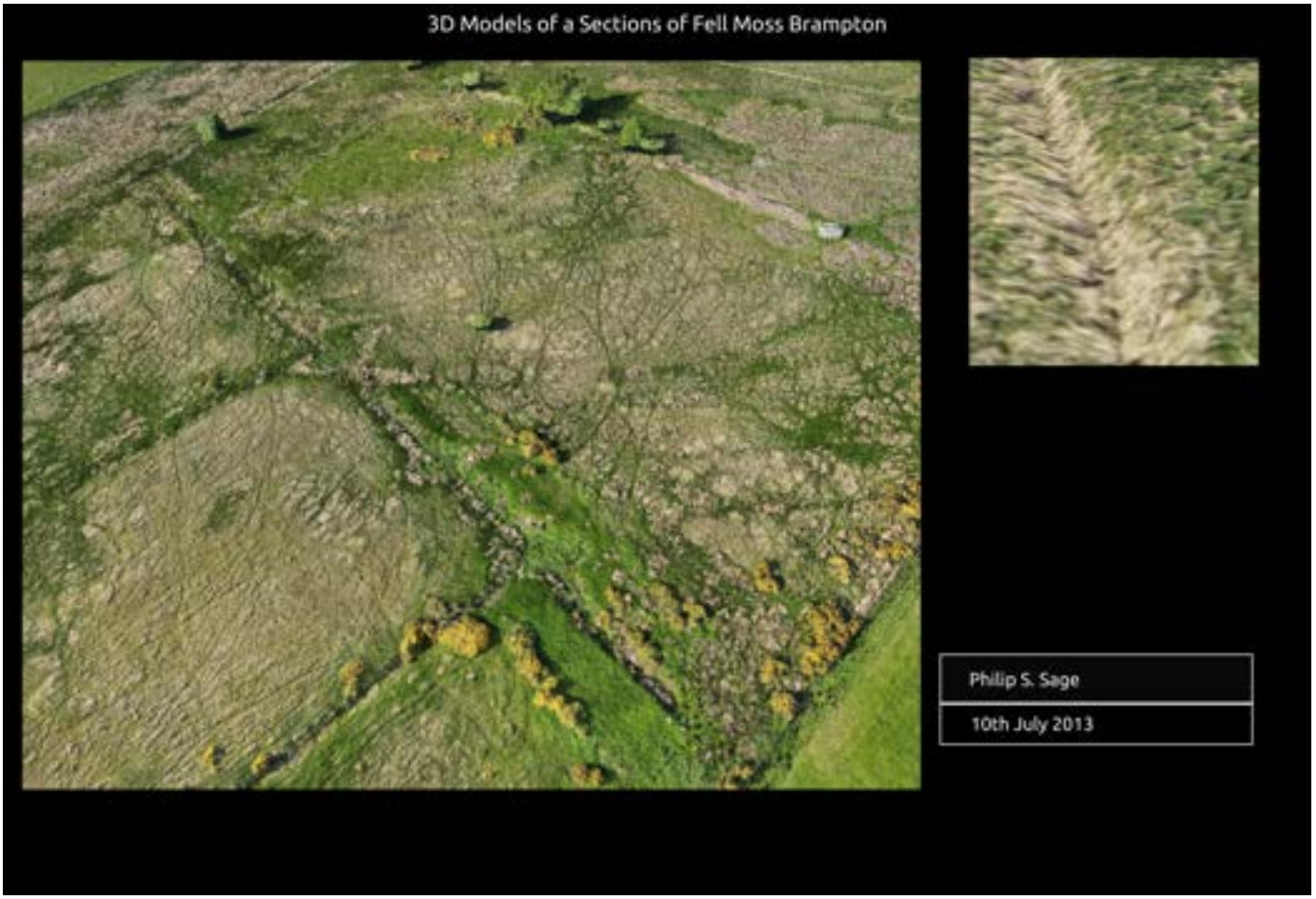
Importance of Wetland Meadows

Wetland meadows are a specific type of wetland ecosystem characterised by herbaceous vegetation, including grasses, sedges, and wetland plant species. They occur in areas with saturated soils or shallow water tables, creating a unique habitat for diverse flora and fauna.

Wetland meadows serve as essential habitats for a wide range of plant and animal species, contributing to the overall biodiversity of an area. They provide a diverse array of food and shelter, supporting the survival and reproduction of various organisms. By preserving wetland meadows, we can help protect endangered species and maintain a healthy ecosystem.

Wetland meadows are valuable ecosystems that provide numerous benefits to farmers and the environment. They enhance biodiversity, improve water quality, and offer opportunities for sustainable agricultural practices through integrated practices. Key part of this is the utilisation of ecosystem services to help enhance and manage the landscape.

Converting this area into a wetland meadow provides an opportunity to enhance biodiversity, improve water quality, and diversify on Fell Farm. By selecting appropriate conversion methods, and engaging with appropriate partners the project can successfully transform the site into vibrant and ecologically valuable wetland meadows.



Ecosystem Services

The site provides a range of ecosystem services including:

Water Filtration and Purification: Wetland meadows act as natural filters, trapping sediments, and removing pollutants from water as it flows through their vegetation and soil. They help improve water quality by reducing nutrient and sediment loads, protecting downstream ecosystems, and providing clean water resources.

Flood Regulation and Water Storage: Wetland meadows play a vital role in flood regulation by acting as natural sponges, absorbing excess water during heavy rainfall and releasing it slowly over time. They help reduce the risk of downstream flooding and serve as important water storage reservoirs during wet periods.

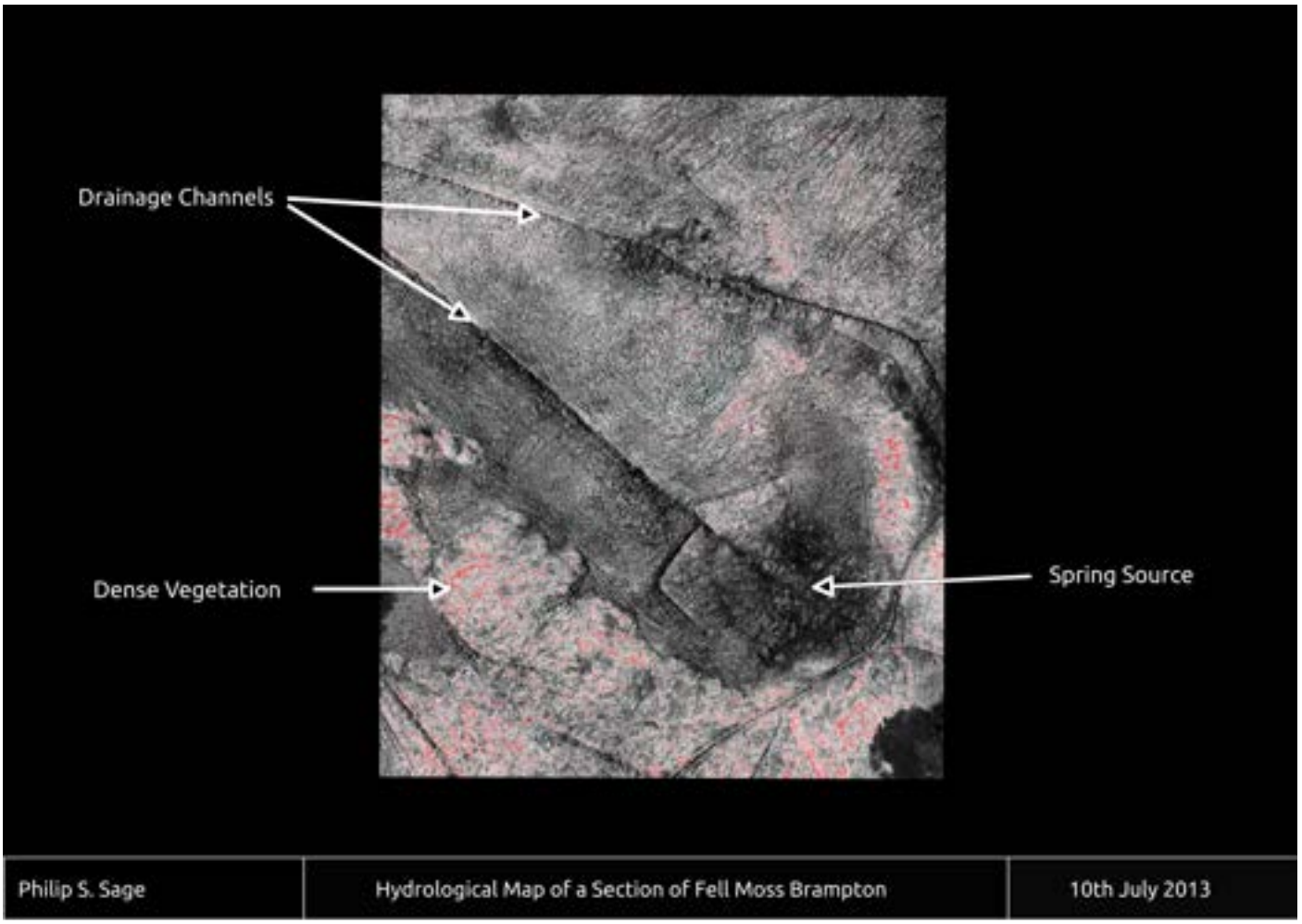
Carbon Sequestration: Wetland meadows have significant carbon sequestration potential. They accumulate organic matter in their soil, contributing to carbon storage and helping to mitigate climate change by removing carbon dioxide (CO^2) from the atmosphere.

Biodiversity Support: Wetland meadows provide habitats for a diverse range of plant and animal species, including rare and specialized wetland species. They support biodiversity by offering nesting sites, food sources, and shelter for various wildlife, including birds, insects, amphibians, and mammals.

Recreation and Aesthetics: Wetland meadows offer opportunities for recreational activities, such as bird watching, nature walks, and photography. They provide aesthetic value, attracting visitors and contributing to cultural and recreational services for local communities.

Water Management

Manipulating water flow patterns through the use of bunds, ditches, and channels can help recreate the wetland hydrology necessary for wetland meadow development. Implementing measures such as constructing water control structures or installing dams can help retain water within the wetland meadow, ensuring consistent moisture levels for plant growth. In areas where there is unsuitable soil or poor water retention, excavating depressions can create wetland pockets. These depressions can be filled with water, encouraging wetland vegetation growth. Ponds and Ditches: Constructing ponds or ditches can provide additional water sources and encourage wetland plant colonisation.

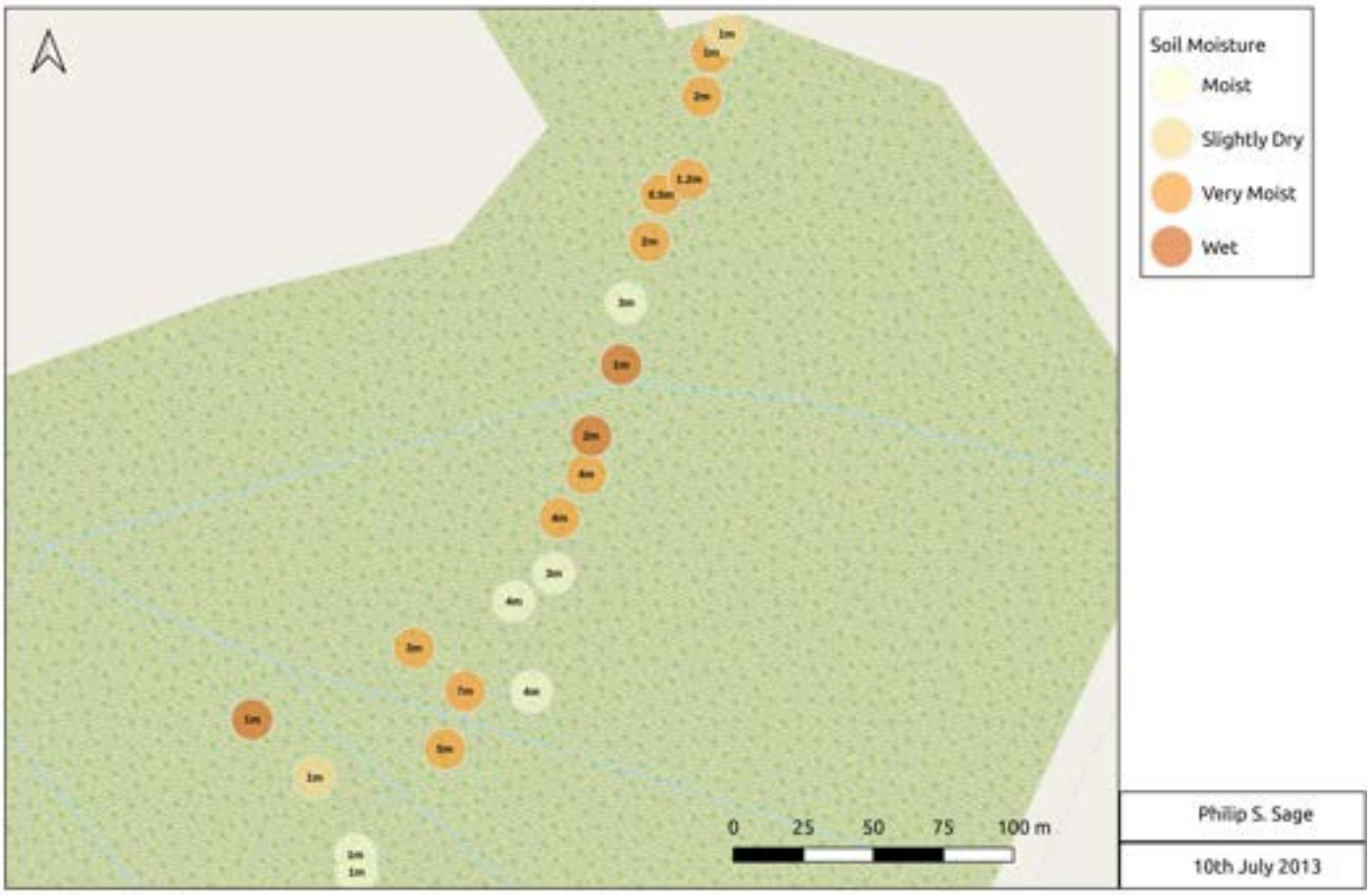


Soils

The site is actively showing signs of good soil retention with depths of soils between 1m to 7 m in depth. The soil is acidic and predominately consists of mix of peat loam soils with patches of sandy loam. Peat loam is a soil type that contains a significant proportion of both organic matter (peat) and mineral particles (loam). As a consequence the soil typically have a higher organic matter content compared to regular loam soils due to the presence of peat. This high organic matter content contributes to improved water-holding capacity, increased nutrient retention, and enhanced soil fertility. The mineral particles in the soil provide structure and stability to the soil, improving drainage and nutrient availability.

The soil surveyed showed that soil moisture varied across the site with some areas visibly showing slower rates of decomposition due to more anaerobic conditions.

Soil Depth and Moisture Fell Moss Brampton



Species Diversity

Suitable plant species is crucial for the successful establishment of a wetland meadow. Native wetland plant species are generally preferred as they are well-adapted to the local environment. Consider species that provide ecological benefits, such as improving soil health, attracting pollinators, and supporting local wildlife populations. Management of the plant species on the site can be done by allowing natural plant succession to occur can gradually transform rough grazing areas into wetland meadows. There is an option to enhance the current species diversity by the introduce and plant wetland-specific vegetation species suited to the local environment and desired wetland type. Consider using plugs, seedlings, or seeds of native wetland plants to establish a diverse plant community.

List of dominate species on Fell Moss

Common.Name	Botanical_Name	Notes
Hedge Bedstraw	Galium mollugo	
Yarrow	Achillea millefolium	
Herb-Robert	Geranium robertianum	
Elder	Sambucus nigra	
Germander Speedwell	Veronica chamaedrys	
Sessile Oak	Quercus petraea	
Stinging Nettle	Urtica dioica	
White Clover	Trifolium repens	
Meadow buttercup	Ranunculus acris	
Marsh Violet	Viola palustris	
Greater Bird’s-foot-trefoil	Lotus pedunculatus	check for hollow stem
Smooth Meadow-grass	Poa pratensis	

Common.Name	Botanical_Name	Notes
Willowherb	Epilobium spp.	check if hoary
Corn Spurrey	Spergula arvensis	
Broad-leaved Dock	Rumex obtusifolius	
Marsh Thistle	Cirsium palustre	
Heath Bedstraw	Galium saxatile	
Common Bent	Agrostis capillaris	
Heath Spotted-orchid	Dactylorhiza maculata	
Angelica	Angelica sylvestris	
Tormentil	Potentilla erecta	
Gorse	Ulex europaeus	
Bramble	Rubus fruticosus	
Lesser Stitchwort	Stellaria graminea	
Creeping buttercup	Ranunculus repens	
Lesser Spearwort	Ranunculus flammula	
Yorkshire-fog	Holcus lanatus	
Soft rush	Juncus effusus	
Yellow Rattle	Rhinanthus minor	
Bracken	Pteridium aquilinum	

Options for land conversion

Creating a wetland meadow involves implementing physical interventions to establish the necessary hydrological and ecological conditions for wetland vegetation to thrive. The specific methods used can vary depending on the site characteristics and desired outcomes. Here are some common physical interventions involved in creating a wetland meadow:

Overall the site has naturally diverse topography consisting of gentle slopes, hillocks, and drainage streams. The site naturally contours south to north and the spring flows across the site in this direction exiting to the lower southern end into adjacent woodland area.

Hydrological Restoration may be required to manipulate water flow patterns, this could include the constructing ditches, channels, or bunds to mimic natural wetland hydrology. These may be linked to a system of sluices, or pipes to regulate water levels within the wetland meadow. These structures can help control water levels, facilitate water movement, and maintain the desired moisture conditions. To increase the water holding potential of the site which is critical long term to ensure the maintenance of the wetland meadow habitat the use of shallow depressions should be considered. The use of this will be determined

once the level of water retention of the site is agreed.

While converting rough grazing into a wetland meadow can offer numerous benefits, it is important to consider the potential downsides and disadvantages associated with this conversion. Here are some common challenges and considerations:

Cost and Investment

Loss of Grazing

Transition Period

Uncertain Market Demand

Maintenance and Management

Ecological Challenges

Conversion to a wetland meadow can involve significant upfront costs. Expenses may include site preparation, excavation, water management infrastructure, planting materials, and ongoing maintenance. Farmers need to carefully assess the financial feasibility and potential return on investment before proceeding with the conversion.

Conversion to a wetland meadow may result in the loss of grazing land for livestock. This reduction in available grazing area can impact livestock management and potentially require adjustments to herd size, stocking rates, or alternative grazing arrangements.

The establishment and maturation of a wetland meadow take time. It can take several years for wetland vegetation to become fully established and for the ecosystem to stabilise. During this transition period, there may be reduced productivity and limited economic returns.

Uncertain Market Demand: The market demand for wetland-related products and services, such as eco-tourism, organic produce, or ecological services, may vary depending on the region. Farmers need to assess the local market demand and ensure there is sufficient demand or suitable marketing strategies in place to generate income from the wetland meadow.

Maintenance and Management: Wetland meadows require ongoing maintenance and management. Tasks such as controlling invasive species, managing water levels, and monitoring ecological health need to be regularly performed to ensure the wetland meadow’s success. Adequate resources, time, and expertise must be allocated to manage these tasks effectively.

Ecological Challenges: Wetland meadows are complex ecosystems, and their successful establishment requires careful consideration of ecological factors. Challenges may include the need for specific hydrological conditions, potential risks of invasive species colonization, and maintaining the balance between wetland plant diversity and undesirable vegetation dominance.

Income

Generating income through wetland meadow can be achieved through various avenues.

Sustainable income is key in achieving any successful land transformation projects therefore it is important to examine the options.

Agri-tourism and Recreation

Eco-friendly Products and Services:

Ecological Services and Partnerships:

Grant Programs and Subsidies:

Community Supported Agriculture

Carbon Credits and Environmental Offsets

Carbon

Wetland Carbon

Wetland meadows contribute to carbon sequestration and help mitigate climate change. Explore opportunities to participate in carbon credit programs or environmental offset schemes that compensate farmers for their ecosystem services.

Soil carbon refers to the organic carbon content found in soil. It improves soil water-holding capacity, nutrient retention, and promotes soil aggregation, enhancing soil quality and productivity. It is a critical component of soil health and plays a vital role in the carbon cycle and mitigating climate change. Soil carbon is closely linked to nutrient cycling. It provides a food source for soil organisms, including bacteria, fungi, and microorganisms, which break down organic matter and release nutrients that are essential for plant growth.

Soil acts as a reservoir for carbon, storing significant amounts of carbon dioxide from the atmosphere. This helps mitigate climate change by reducing greenhouse gas concentrations.

Carbon Markets

Soil carbon credits are a market-based approach to incentivise and reward practices that enhance soil carbon sequestration. The concept of soil carbon credits is based on the idea that farmers or land managers who implement practices that increase soil carbon levels can earn credits for the carbon sequestered in their soil. These credits can then be sold to entities seeking to offset their carbon emissions or fulfill regulatory requirements.

The principles of soil carbon credits involve the following:

A baseline measurement will be established to determine the initial soil carbon levels on the land before any carbon-enhancing practices are implemented. This baseline serves as a reference point for calculating the additional carbon sequestered through specific management practices.

From the initial survey the approximate volume of viable soil is between 480,000m^3 and 1,940,000m^3>. To establish the carbon credit potential it is necessary to ascertain the weight of soil per m^3 and the percentage of carbon within it[1].

Regular monitoring and verification of soil carbon levels are necessary to ensure that the claimed increase in soil carbon is accurate and reliable. This involves sampling and analysing soil to assess carbon content and changes over time. Credit Generation and Certification: Once the additional soil carbon is verified, credits can be generated based on the amount of carbon sequestered. These credits are typically certified by recognised standards and can be traded or sold on carbon markets. Carbon Offsetting and Trading: Soil carbon credits can be purchased by companies or individuals seeking to offset their carbon emissions. The credits represent the carbon sequestered by the soil, effectively balancing out the emissions generated elsewhere.

With shifting trends towards the environment and its role as form of incoming it is important to understand the role farmers can play in this setting The promotion of fell moss to wetland meadow would benefit Fell Farm both directly and indirectly.

Directly would be through income from partnerships, carbon credits, other income options. Indirectly by improving the habitat diversity of the site and increasing species populations on the site the will be benefits to the wider farm. This approach of using agroecology has been shown to reduce costs to the farm as there is reduce use of chemicals

Soil carbon credits provide economic incentives for farmers and land managers to adopt sustainable land management practices that promote soil health and carbon sequestration. They contribute to climate change mitigation efforts by rewarding practices that enhance soil carbon stocks, improve agricultural sustainability, and promote ecosystem resilience. User

Converting the site into a wetland meadow has the potential to increase the carbon credit value due to the following step-by-step considerations:

Wetland meadows are known for their high carbon sequestration potential. The establishment of a wetland meadow involves creating conditions favorable for the accumulation of organic matter in the soil. Wetland vegetation, including grasses, sedges, and other wetland plant species, contribute to the organic carbon content through their root systems and aboveground biomass. This increased carbon sequestration potential can positively impact the carbon credit value.

The additional carbon sequestered as a result of the wetland meadow conversion can be calculated by comparing the measured soil carbon content post-conversion with the baseline measurement. The difference represents the additional carbon sequestered due to the conversion process.

It is important to note that the actual carbon credit value will depend on several factors, including the scale of the wetland meadow, the carbon sequestration potential of the specific site, and market conditions. The site of the fell farm offers an opportunity to create a diverse habitat that would not only provide improved ecosystem services but also a resource that could offer long term sustainable income potential.

It is important to be aware of both the disadvantages and advantages of promoting fell moss as a wetland meadow habitat.

Conclusions and Recommendations

The site is suitable for conversion and management as a wetland meadow provided continued monitoring and maintenance to help ensure the long-term success and sustainability of the project.

By recognizing and harnessing the ecosystem services offered by wetland meadows, we can enhance their overall value and contribute to the sustainable management of the landscape. It is crucial to prioritize the preservation and restoration of these ecosystems, as they play a significant role in supporting biodiversity, improving water quality, and facilitating sustainable agricultural practices. However for this to be achievable it is vital that the site is able to produce sustainable income for Fell Farm.

Identify and control invasive plant species that can outcompete or disrupt the establishment of native wetland plants. Manual removal, herbicide application, or other appropriate control methods may be necessary to manage invasive species.

Regular monitoring is essential to evaluate the progress of the wetland meadow creation and identify any issues or necessary adjustments. Monitoring can include assessing vegetation establishment, water levels, and ecological indicators. Ongoing maintenance tasks may include controlling invasive species, adjusting water levels as needed, managing grazing activities, and removing accumulated sediments or debris

Community linkage would enhance funding options for site as this opens up avenues such as lottery funding and other community based grants.

It is recommended that a species survey is undertaken on the site establish both the baseline species composition and baseline diversity. This could be conducted by volunteers or external specialist.

Clarify the specific objectives for the area and its intended use in relation to the broader farm management plan and conservation goals.