



William J. Sutherland, Lynn V. Dicks, Silviu O. Petrovan and Rebecca K. Smith (dir.)

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## 8.12 Habitat restoration and creation

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## 8.12 Habitat restoration and creation

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### 8.12.1 General restoration

Based on the collated evidence, what is the current assessment of the effectiveness of interventions for general restoration of shrubland and heathland habitats?	
Likely to be beneficial	• Allow shrubland to regenerate without active management
No evidence found (no assessment)	• Restore/create connectivity between shrublands

#### Likely to be beneficial

##### ● Allow shrubland to regenerate without active management

Five before-and-after trials (two of which were replicated) in the USA, UK, and Norway, found that allowing shrubland to recover after fire without any active management increased shrub cover or biomass. One replicated, paired, site comparison in the USA found that sites that were allowed to recover without active restoration had similar shrub cover to unburned areas. One controlled, before-and-after trial in the USA found no increase in shrub cover. One before-and-after trial in Norway found an increase in heather height. One before-and-after trial in Spain found that there was an increase in seedlings for one of three shrub species. Two replicated, randomized, controlled, before-and-after trials in Spain and Portugal found that there was an increase in the cover of woody plant species. One before-and-after

study in Spain found that cover of woody plants increased, but the number of woody plant species did not. One replicated, before-and-after study in South Africa found that the height of three protea species increased after recovery from fire. One before-and-after trial in South Africa found that there was an increase in vegetation cover, but not in the number of plant species. One before-and-after trial in South Africa found an increase in a minority of plant species. Two before-and-after trials in the USA and UK found that allowing shrubland to recover after fire without active management resulted in a decrease in grass cover or biomass. One controlled, before-and-after trial in the USA found an increase in the cover of a minority of grass species. One before-and-after study in Spain found that cover of herbaceous species declined. One replicated, before-and-after study in the UK found mixed effects on cover of wavy hair grass. One controlled, before-and-after trial in the USA found no increase in forb cover. One replicated, randomized, controlled before-and-after trial in Spain found that herb cover declined after allowing recovery of shrubland after fire. *Assessment: likely to be beneficial (effectiveness 62%; certainty 60%; harms 0%).*

<https://www.conservationevidence.com/actions/1679>

No evidence found (no assessment)

We have captured no evidence for the following interventions:

- Restore/create connectivity between shrublands.

8.12.2 Modify physical habitat

Based on the collated evidence, what is the current assessment of the effectiveness of interventions for restoring shrubland and heathland habitats by modifying the physical habitat?	
Likely to be beneficial	<ul style="list-style-type: none"><li>• Add topsoil</li></ul>
Unknown effectiveness (limited evidence)	<ul style="list-style-type: none"><li>• Disturb vegetation</li><li>• Strip topsoil</li><li>• Remove leaf litter</li><li>• Add sulphur to soil</li></ul>



	<ul style="list-style-type: none"> <li>• Use erosion blankets/mats to aid plant establishment</li> <li>• Add mulch and fertilizer to soil</li> <li>• Add manure to soil</li> <li>• Irrigate degraded shrublands</li> </ul>
<b>No evidence found (no assessment)</b>	<ul style="list-style-type: none"> <li>• Remove trees/crops to restore shrubland structure</li> <li>• Remove trees, leaf litter and topsoil</li> <li>• Add peat to soil</li> <li>• Burn leaf litter</li> </ul>

## Likely to be beneficial

### ● Add topsoil

Two randomized, controlled studies in the UK found that the addition of topsoil increased the cover or abundance of heathland plant species. One replicated, site comparison in Spain found an increase in the abundance of woody plants. One randomized, controlled study in the UK found an increase in the number of seedlings for a majority of heathland plants. One controlled study in Namibia found that addition of topsoil increased plant cover and the number of plant species, but that these were lower than at a nearby undisturbed site. One randomized, controlled study in the UK found an increase in the cover of forbs but a reduction in the cover of grasses. *Assessment: likely to be beneficial (effectiveness 67%; certainty 45%; harms 0%).*

<https://www.conservationevidence.com/actions/1686>

## Unknown effectiveness (limited evidence)

### ● Disturb vegetation

One randomized, replicated, controlled study in the UK found that vegetation disturbance did not increase the abundance or species richness of specialist plants but increased the abundance of generalist plants. *Assessment: unknown effectiveness (effectiveness 0%; certainty 10%; harms 7%).*

<https://www.conservationevidence.com/actions/1727>

### ● **Strip topsoil**

Two randomized, replicated, controlled studies in the UK found that removal of topsoil did not increase heather cover or cover of heathland species. However, one controlled study in the UK found an increase in heather cover. One randomized, replicated, controlled study in the UK found that removing topsoil increased the cover of both specialist and generalist plant species, but did not increase species richness. One randomized, replicated, paired, controlled study in the UK found that removal of topsoil increased cover of annual grasses but led to a decrease in the cover of perennial grasses. One controlled study in the UK found that removal of turf reduced cover of wavy hair grass. One controlled, before-and-after trial in the UK found that stripping surface layers of soil increased the cover of gorse and sheep's sorrel as well as the number of plant species. *Assessment: unknown effectiveness (effectiveness 30%; certainty 25%; harms 3%).*

<https://www.conservationevidence.com/actions/1685>

### ● **Remove leaf litter**

One randomized, controlled study in the UK found that removing leaf litter did not alter the presence of heather. *Assessment: unknown effectiveness (effectiveness 0%; certainty 10%; harms 0%).*

<https://www.conservationevidence.com/actions/1688>

### ● **Add sulphur to soil**

One randomized, replicated, controlled study in the UK found that adding sulphur to the soil of a former agricultural field did not increase the number of heather seedlings in five of six cases. *Assessment: unknown effectiveness (effectiveness 2%; certainty 10%; harms 0%).*

<https://www.conservationevidence.com/actions/1691>

### ● **Use erosion blankets/mats to aid plant establishment**

One replicated, randomized, controlled study in the USA found that using an erosion control blanket increased the height of two shrub species. One replicated, randomized, controlled study in the USA did not find an increase in the number of shrub species, but one controlled study in China did find an increase in plant diversity following the use of erosion control blankets. The same study found an increase in plant biomass and cover. *Assessment: unknown effectiveness (effectiveness 30%; certainty 20%; harms 0%).*

<https://www.conservationevidence.com/actions/1692>

● **Add mulch and fertilizer to soil**

One randomized, controlled study in the USA found that adding mulch and fertilizer did not increase the seedling abundance of seven shrub species. The same study also reported no change in grass cover. *Assessment: unknown effectiveness (effectiveness 0%; certainty 10%; harms 0%).*

<https://www.conservationevidence.com/actions/1694>

● **Add manure to soil**

One replicated, randomized, controlled study in South Africa found that adding manure increased plant cover and the number of plant species. *Assessment: unknown effectiveness (effectiveness 30%; certainty 10%; harms 0%).*

<https://www.conservationevidence.com/actions/1695>

● **Irrigate degraded shrublands**

One replicated, randomized, controlled study at two sites in USA found that temporary irrigation increased shrub cover. *Assessment: unknown effectiveness (effectiveness 30%; certainty 10%; harms 0%).*

<https://www.conservationevidence.com/actions/1696>

**No evidence found (no assessment)**

We have captured no evidence for the following interventions:

- Remove trees/crops to restore shrubland structure
- Remove trees, leaf litter and topsoil
- Add peat to soil
- Burn leaf litter.

8.12.3 Introduce vegetation or seeds

Based on the collated evidence, what is the current assessment of the effectiveness of interventions for restoring shrubland and heathland habitats by introducing vegetation or seeds?	
Beneficial	• Sow seeds
Unknown effectiveness (limited evidence)	• Plant individual plants • Sow seeds and plant individual plants

	<ul style="list-style-type: none"><li>• Spread clippings</li><li>• Build bird perches to encourage colonization by plants</li><li>• Plant turf</li></ul>
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**Beneficial**

● **Sow seeds**

Five of six studies (including three replicated, randomized, controlled studies, one site comparison study and one controlled study) in the UK, South Africa, and the USA found that sowing seeds of shrubland species increased shrub cover. One of six studies in the UK found no increase in shrub cover. One replicated site comparison in the USA found in sites where seed containing Wyoming big sagebrush was sown the abundance of the plant was higher than in sites where it was not sown. One replicated, randomized, controlled study in the USA found that shrub seedling abundance increased after seeds were sown. One study in the USA found very low germination of hackberry seeds when they were sown. One replicated, randomized, controlled study in the USA found that the community composition of shrublands where seeds were sown was similar to that found in undisturbed shrublands. One randomized, controlled study in the UK found an increase in the cover of heathland plants when seeds were sown. One replicated, randomized, controlled study in South Africa found that sowing seeds increased plant cover. One replicated, randomized, controlled study in the USA found that areas where seeds were sown did not differ significantly in native cover compared to areas where shrubland plants had been planted. One controlled study in the USA found higher plant diversity in areas where seeds were sown by hand than in areas where they were sown using a seed drill. Two of three studies (one of which was a replicated, randomized, controlled study) in the USA found that sowing seeds of shrubland species resulted in an increase in grass cover. One randomized, controlled study in the UK found no changes in the cover of grasses or forbs. *Assessment: beneficial (effectiveness 70%; certainty 60%; harms 0%).*

<https://www.conservationevidence.com/actions/1698>



## Unknown effectiveness (limited evidence)

### ● Plant individual plants

One replicated, randomized, controlled study in the USA found that planting California sagebrush plants did not increase the cover of native plant species compared to sowing of seeds or a combination of planting and sowing seeds. One replicated, randomized, controlled study in South Africa found that planting *Brownanthus pseudoschlichtianus* plants increased plant cover, but not the number of plant species. One study in the USA found that a majority of planted plants survived after one year. *Assessment: unknown effectiveness (effectiveness 40%; certainty 20%; harms 0%).*

<https://www.conservationevidence.com/actions/1697>

### ● Sow seeds and plant individual plants

One replicated, controlled study in the USA found that planting California sagebrush and sowing of seeds did not increase cover of native plant species compared to sowing of seeds, or planting alone. *Assessment: unknown effectiveness (effectiveness 10%; certainty 10%; harms 0%).*

<https://www.conservationevidence.com/actions/1700>

### ● Spread clippings

One randomized, controlled study in the UK found that the addition of shoots and seeds of heathland plants did not increase the abundance of mature plants for half of plant species. One randomized, controlled study in the UK found that the frequency of heather plants was not significantly different in areas where heather clippings had been spread and areas where they were not spread. One replicated, randomized, controlled study in the UK found an increase in the number of heather seedlings, but not of other heathland species. One randomized, controlled study in the UK found that the addition of shoots and seeds increased the number of seedlings for a minority of species. One replicated, randomized, controlled study in South Africa found that plant cover and the number of plant species did not differ significantly between areas where branches had been spread and those where branches had not been spread. *Assessment: unknown effectiveness (effectiveness 30%; certainty 32%; harms 0%).*

<https://www.conservationevidence.com/actions/1701>

● **Build bird perches to encourage colonization by plants**

One replicated, controlled study in South Africa found that building artificial bird perches increased the number of seeds at two sites, but no shrubs became established at either of these sites. *Assessment: unknown effectiveness (effectiveness 10%; certainty 10%; harms 0%).*

<https://www.conservationevidence.com/actions/1702>

● **Plant turf**

Two randomized, controlled studies in the UK found that planting turf from intact heathland sites increased the abundance or cover of heathland species. One of these studies also found that planting turf increased the seedling abundance for a majority of heathland plant species. One randomized, controlled study in the UK found that planting turf increased forb cover, and reduced grass cover. One randomized, replicated, controlled study in Iceland found that planting large turves from intact heathland sites increased the number of plant species, but smaller turves did not. *Assessment: unknown effectiveness (effectiveness 62%; certainty 30%; harms 0%).*

<https://www.conservationevidence.com/actions/1703>