Wildlife Facilitated by Beavers

Be a Citizen Scientist for Beavers in Wales

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WELSH BEAVER PROJECT

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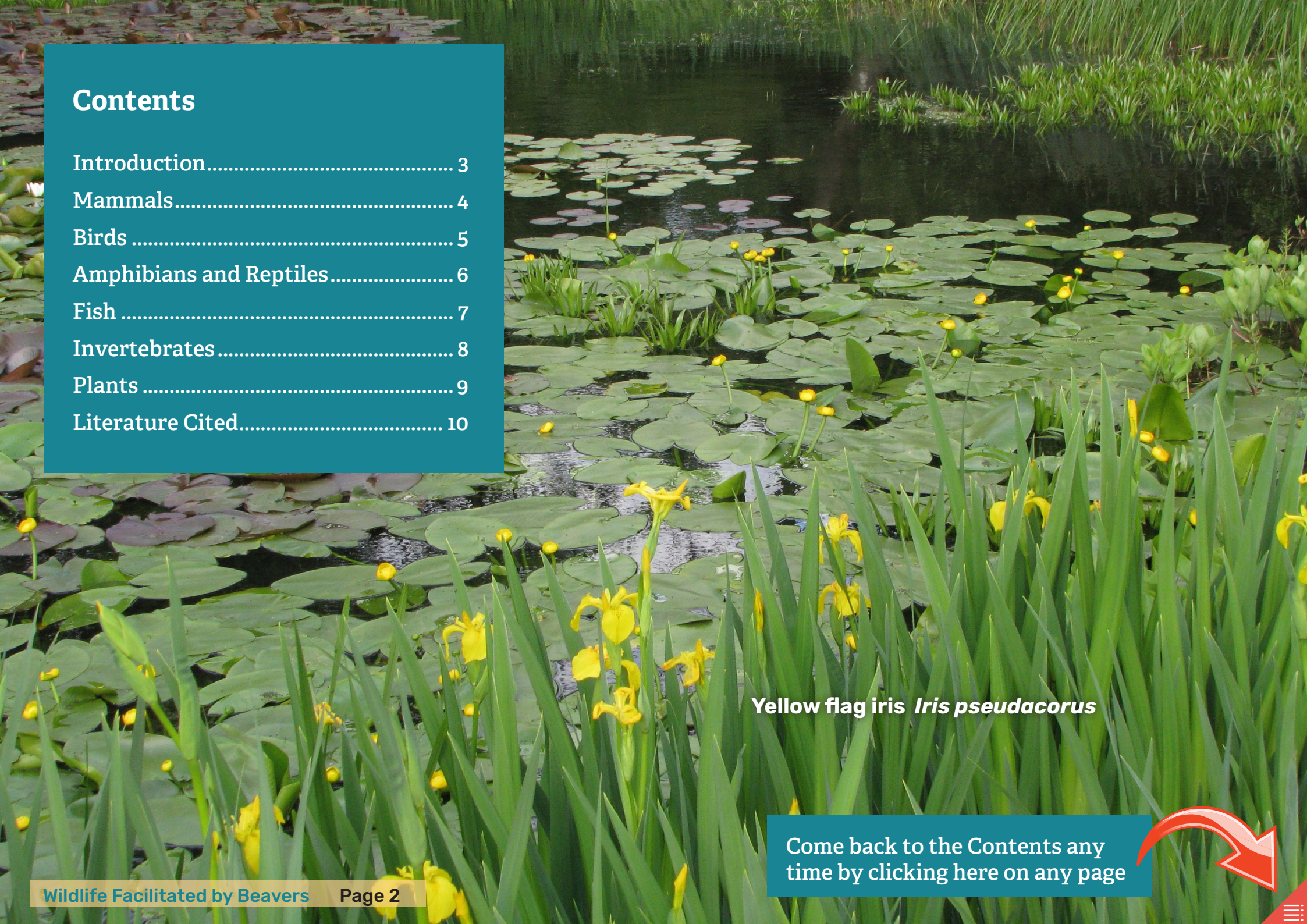
Contents



Yellow flag iris *Iris pseudacorus*

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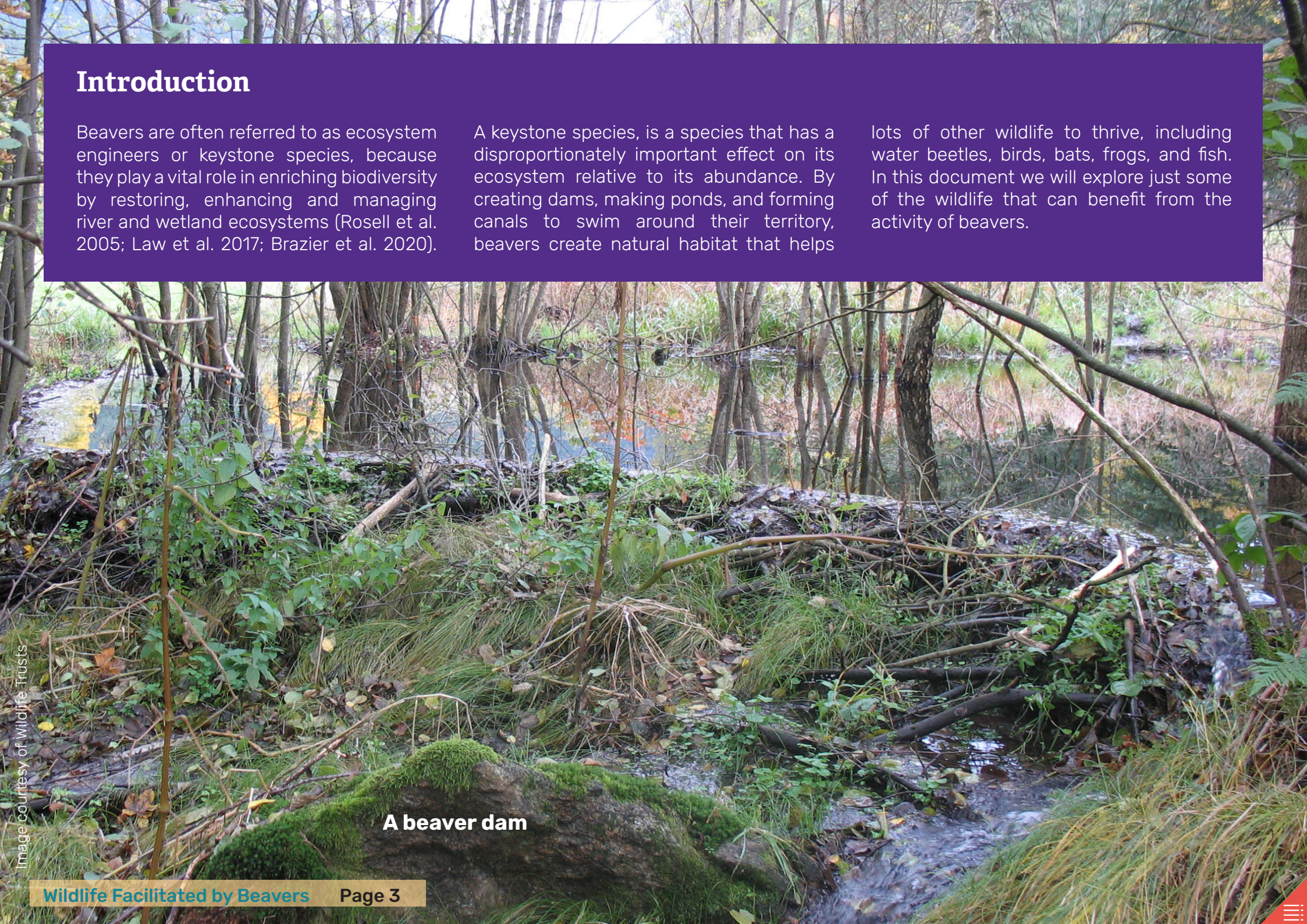
Introduction

Beavers are often referred to as ecosystem engineers or keystone species, because they play a vital role in enriching biodiversity by restoring, enhancing and managing river and wetland ecosystems (Rosell et al. 2005; Law et al. 2017; Brazier et al. 2020). A keystone species, is a species that has a disproportionately important effect on its ecosystem relative to its abundance. By creating dams, making ponds, and forming canals to swim around their territory, beavers create natural habitat that helps lots of other wildlife to thrive, including water beetles, birds, bats, frogs, and fish. In this document we will explore just some of the wildlife that can benefit from the activity of beavers.



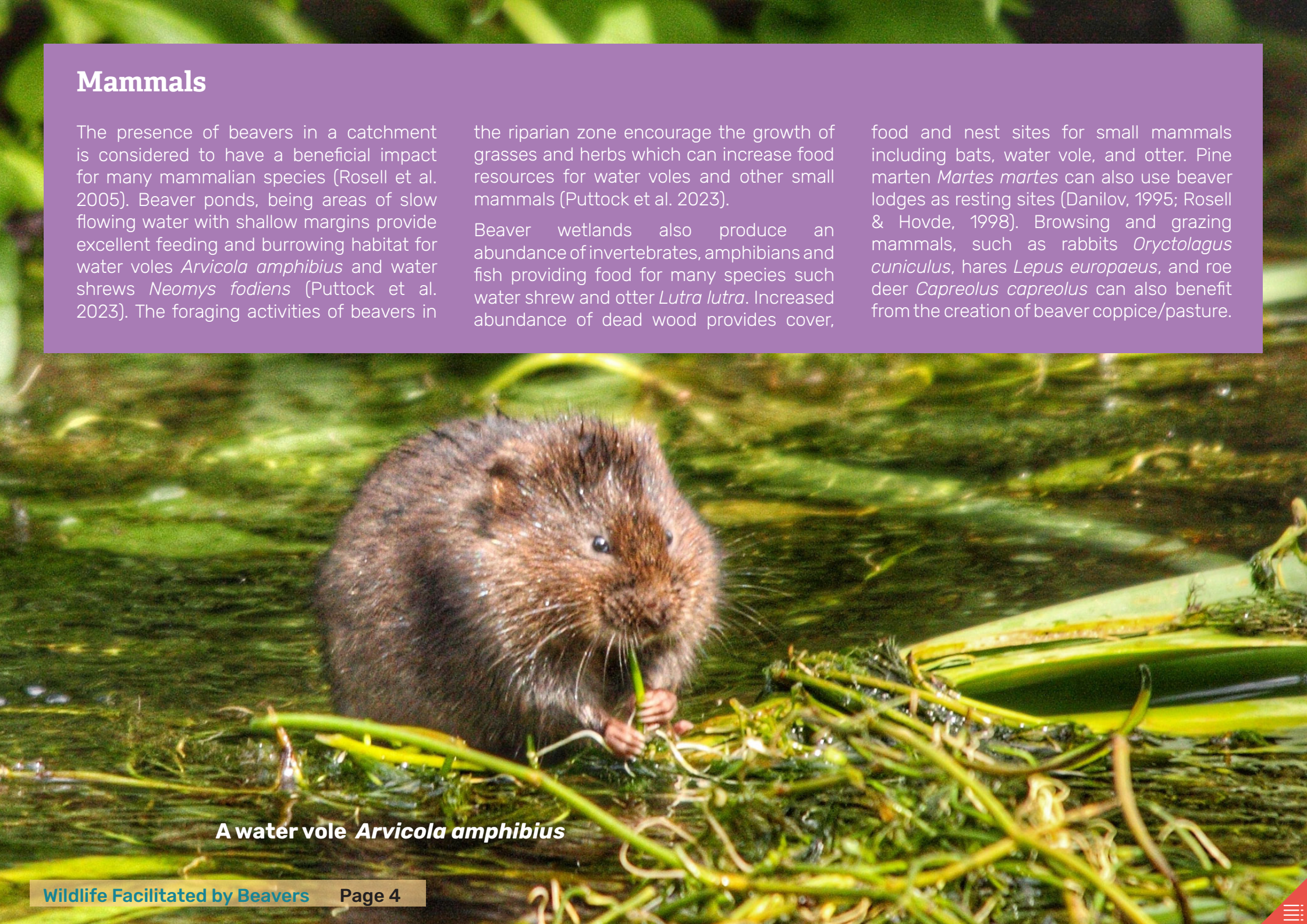
A beaver dam

Image courtesy of Wildlife Trusts

Mammals

The presence of beavers in a catchment is considered to have a beneficial impact for many mammalian species (Rosell et al. 2005). Beaver ponds, being areas of slow flowing water with shallow margins provide excellent feeding and burrowing habitat for water voles *Arvicola amphibius* and water shrews *Neomys fodiens* (Puttock et al. 2023). The foraging activities of beavers in the riparian zone encourage the growth of grasses and herbs which can increase food resources for water voles and other small mammals (Puttock et al. 2023).

Beaver wetlands also produce an abundance of invertebrates, amphibians and fish providing food for many species such water shrew and otter *Lutra lutra*. Increased abundance of dead wood provides cover, food and nest sites for small mammals including bats, water vole, and otter. Pine marten *Martes martes* can also use beaver lodges as resting sites (Danilov, 1995; Rosell & Hovde, 1998). Browsing and grazing mammals, such as rabbits *Oryctolagus cuniculus*, hares *Lepus europaeus*, and roe deer *Capreolus capreolus* can also benefit from the creation of beaver coppice/pasture.



A water vole *Arvicola amphibius*

Birds

Beaver habitat management, especially dam and pool creation is beneficial for many bird species. Beaver ponds produce an abundance of invertebrates providing food for birds species (Rosell, 2005; Stringer & Gaywood, 2015). Likewise, increases in amphibians and fish resulting from beaver activity also provide food for certain bird species such as kingfishers *Alcedo atthis*, goosander *Mergus merganser* and grey heron *Ardea cinerea*. Studies have shown significantly more species and increased bird abundance at sites where beavers are active than at other comparable sites lacking beavers (Medin 1990; Grover & Baldassarre, 1995; Brown et al., 1996). Beavers also create and manage habitats in ways that benefit water birds, providing increased opportunities for nesting, roosting and foraging (e.g. Arner & Hepp, 1989; Dieter & McCabe, 1989; Nummi, 1992; Nummi et al., 2005). Changes to vegetation abundance and structure also provide greater protection from predators for ground-nesting birds (Carr, 1940; Nummi & Hahlota 2008) and the coppice re-growth is beneficial to many species including songbirds (e.g. Reese & Hair, 1976; Longcore et al., 2007). Standing dead trees provide sites for perching, feeding and nesting for various species such as woodpeckers, owls and other bird species (Carr, 1940; Gibbs et al., 1991; Hilfiker,1991; Grover & Baldassarre, 1995; Stringer & Gaywood, 2015).

A great spotted woodpecker *Dendrocopos major*

Amphibians and Reptiles

Beaver ponds with their abundant invertebrate populations and vegetation provide excellent habitat for amphibians such as frogs, toads and newts (France, 1997; Metts et al. 2001; Cunningham et al. 2006; Gurnell et al. 2008; Brazier et al. 2020) with a wide range of species benefiting from beaver habitats (Dalbeck et al. 2020).

Reptile abundance and diversity have been found to be significantly higher at beaver ponds compared with impounded streams (Metts et al. 2001). Beaver ponds also provide excellent hunting opportunity for grass snakes *Natrix helvetica*, which can also use beaver lodges as nesting habitat.

A more open riparian canopy can also provide more basking opportunities for reptile species such as adder *Vipera berus*, grass snake, slow-worm *Anguis fragilis*, and common lizard *Zootoca vivipara*.

A common toad *Bufo bufo*

Fish

The foraging and damming activity undertaken by beavers creates a mosaic of habitats along stream corridors, creating ponds, increasing levels of woody debris and increasing light levels (Brazier et al. 2020). This leads to a greater abundance and diversity of plants and invertebrates on which fish populations depend (Rolauffs et al., 2001), whilst providing cover from predators, such as fish-eating birds, otters and mink *Neovison vison* (Brazier et al. 2020). Beaver dams can help to stabilise water flow in rivers, trap silt and organic matter, improving conditions for fish (Pollock et al., 2003; Malison, Eby, & Stanford, 2015; Bouwes et al., 2016; Osipov et al., 2018; Snodgrass & Meffe, 1998; Puttock et al. 2017; Brazier et al. 2020).

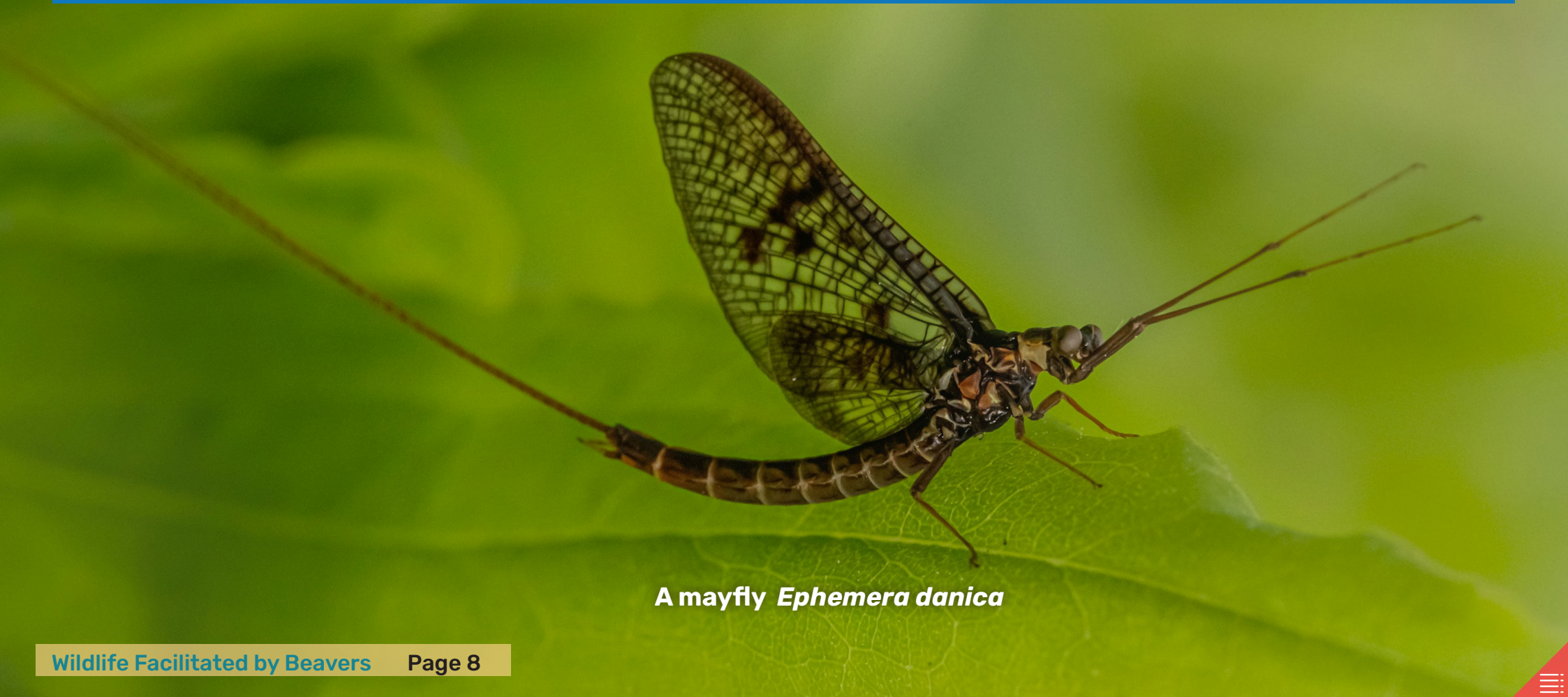
Beaver ponds can also provide refuges for fish during low-flow and cold conditions, as well as deeper water to enable fish to better evade avian predators (Hägglund & Sjöberg, 1999; Bylark et al. 2014; Brazier et al. 2020).

The interactions between beaver activity and fish can be complex, but evidence has shown that beavers generally have an overall positive impact on fish populations (Kemp et al. 2012; Stiftelsen Norsk Institutt For Naturforskning NINA, 2017). In low flow conditions beaver dams may pose a temporary barrier for migratory fish such as salmon *Salmo salar* and trout *Salmo trutta*, but this is often rectified when water flow and water levels increase. There are also a range of management options that can be undertaken if a beaver dam is shown to be causing an issue. Beaver dams are often built on smaller streams and tributaries rather than across major rivers, and a beaver dam will often contain channels around and over the dams, which can provide passage for a range of fish species (Bouwes et al., 2016; Bylak & Kukuła, 2018; Malison & Halley, 2020; Virbickas et al. 2015).

A three-spined stickleback *Gasterosteus aculeatus*

Invertebrates

Beaver activity can have a significant effect on invertebrate species, with beaver ponds, dams and side channels benefitting both pond (lentic) and stream (lotic) living species (Brazier et al. 2020). Increased aquatic and terrestrial deadwood provides living and breeding habitat for aquatic and terrestrial invertebrates (Rosell et al. 2015; Brazier et al 2020). Localised increases in riverbank light levels and plant diversity as a result of beaver coppicing may also encourage a wider diversity and abundance of invertebrate species (Gurnell et al. 2008; Jones et al. 2012). A study on streams in central Europe showed an overall increase in macro invertebrate numbers and diversity in response to beaver activity with only a few groups showing a negative impact (Rolauffs et al. 2001). Research from Germany has also demonstrated that invertebrates, such as Odonata (dragonflies and damselflies) can benefit from the activity of beavers. Studies have shown beaver sites hosting significantly higher number of dragonfly species compared with non-beaver habitats (Shloemer et al. 2012; Meßlinger, 2014; Meßlinger, 2019).



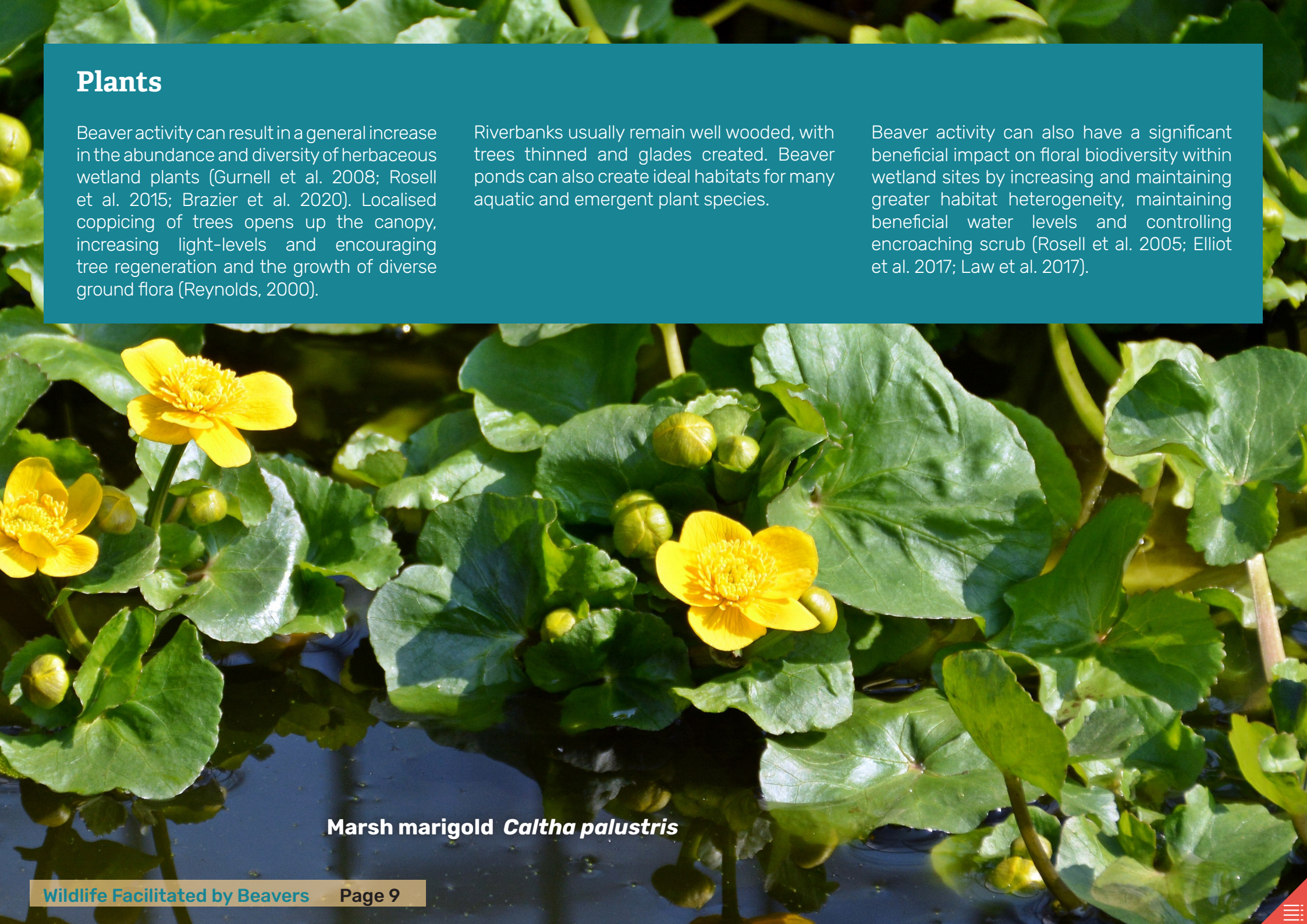
A mayfly *Ephemera danica*

Plants

Beaver activity can result in a general increase in the abundance and diversity of herbaceous wetland plants (Gurnell et al. 2008; Rosell et al. 2015; Brazier et al. 2020). Localised coppicing of trees opens up the canopy, increasing light-levels and encouraging tree regeneration and the growth of diverse ground flora (Reynolds, 2000).

Riverbanks usually remain well wooded, with trees thinned and glades created. Beaver ponds can also create ideal habitats for many aquatic and emergent plant species.

Beaver activity can also have a significant beneficial impact on floral biodiversity within wetland sites by increasing and maintaining greater habitat heterogeneity, maintaining beneficial water levels and controlling encroaching scrub (Rosell et al. 2005; Elliot et al. 2017; Law et al. 2017).



Marsh marigold *Caltha palustris*

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A grass snake *Natrix helvetica*

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A beautiful demoiselle damselfly *Caleopteryx virgo*

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A beaver feeding on a tree trunk

Image courtesy of Aw Martinius

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North Wales Wildlife Trust

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We're part of a national network of 46 Wildlife Trusts across the UK. We campaign to protect wildlife and habitats both locally and nationally.

North Wales Wildlife Trust is a driving force for nature conservation – and we want you to be part of it!

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