RIVER DEE & CLIMATE CHANGE

The main stem of the River Dee is around 126 kilometres long. The River Dee and its tributaries are designated and protected as a Special Area of Conservation for its international importance for Atlantic salmon, freshwater pearl mussel and Eurasian otter.

EFFECTS OF CLIMATE CHANGE ON THE RIVER DEE

Increased larger-scale flooding can transport invasive non-native species (INNS) downstream and allow greater colonisation. It can also alter the river morphology significantly which impacts wildlife.

Changes in the climate can make it difficult for native species to thrive but make it easier for INNS to establish.

Loss of other species which plants depend on for their seed dispersal/pollination can mean less survival, and more vigorous plants and INNS can establish in niches left behind, and this leads to loss of biodiversity.

INVASIVE NON-NATIVE SPECIES AND THE RIVER DEE

INNS currently present along the River Dee in Aberdeen;

Giant hogweed (*Heracleum mantegazzianum*)
Himalayan balsam (*Impatiens glanulifera*)
White butterbur (*Petasites albus*)
Japanese knotweed (*Fallopia japonica*)
American Skunk cabbage (*Lysichiton americanus*)

The most problematic species of INNS on the Dee are currently Himalayan Balsam and Giant hogweed. The problem was exacerbated by Storm Frank in 2015 and the River Dee Trust have been involved in control.

White butterbur (*Petasites albus*)

FURTHER INFORMATION ABOUT THE RIVER DEE

Dee Catchment Partnership Riverbank Resource Box Teachers Folder 2015 Part 1 - The River Dee Story
Scottish Invasive Species initiative
River Dee Trust on INNS
Invasive species and climate change

KAIMHILL ECOLOGY

RIVER DEE & CLIMATE CHANGE

A red squirrel in a pine tree

RED SQUIRRELS

As you walk between the conifers of Allan Park, look out for squirrel nibbled cones on the path or on low tree stumps. Red squirrels have been seen in the park in recent years. The red squirrel is native to Scotland whereas the grey squirrel originates from North America and is believed to have been first released in England in 1876 and introduced to Aberdeen in the 1970s.

DID YOU KNOW?

- Red squirrel and grey squirrel feeding signs cannot be told apart.
- A squirrel will usually sit on a tree stump or mound whilst eating to ensure they have a good view to look out for predators.
- Squirrel eaten cones have a frayed appearance where scales have been removed. Wood mice eaten cones have smoother shafts without the frayed ends.
- Squirrels build football sized nests called dreys, often against the trunk or at forks in branches in trees.

A squirrel drey

EFFECTS OF CLIMATE CHANGE ON SQUIRRELS

- Forest planting and species composition may change as rainfall changes, affecting the feeding opportunities for squirrels. The forecast is for drier summers in the eastern and south-eastern lowlands of Scotland.
- Storms may result in localised loss of squirrel habitat and reduce availability of food.

Squirrel feeding station

FURTHER INFORMATION ABOUT RED SQUIRRELS

Saving Scotland's Red Squirrels
Naturally Scottish - Red Squirrels

RIVER DEE & CLIMATE CHANGE

An otter on the River Dee

EURASIAN OTTER

Otters are mainly nocturnal although daytime sightings, particularly on the River Don in Aberdeen, occur. Otters occur at very low population densities, with the average home range size of a female being around 20 km of watercourse and that of a male, around 32 km. Otter holts (their shelters) can be found in natural cavities close to bank side amongst roots of trees, under boulders, piles of sticks, in unused badger setts or within man-made structures such as culverts and drain structures. Due to the size of otter territories and their sleeping and hunting habits you are more likely see otter field signs whilst walking alongside the River Dee than the otters themselves.

DID YOU KNOW?

- Spraint is the name given to otter droppings. Otters often deposit these in prominent locations to mark their territory and they can vary widely from blobs to tarry smears to more cylindrical droppings about 6-8 cm long and 1 cm in diameter with bits of bones from fish and other prey items visible. Old spraints which have dried out can look like cigar ash.

Otter spraints

- Otters are able to adjust the curvature of their eye lens so that during bright daylight they are able to see as clearly below water as they are able to see out of the water.
- Prints may be visible on sand or mud and are usually about 5 to 7 cm wide, with four or five toes arching around the pad asymmetrically (the smallest toe is not always visible).
- It is an offence deliberately or recklessly to capture, injure or kill an otter; to disturb it while it is occupying its breeding/resting places; or to obstruct access to its breeding/resting places. It is an offence to damage or destroy breeding sites/ resting places.

Otter prints on sand

EFFECTS OF CLIMATE CHANGE ON OTTERS

- Increases in water temperature will mean that less energy is required to compensate from loss of heat when in the water and fewer prey items would be required for this.
- Floods can drown dependent young otters in holts or wash them away from their mothers.

FURTHER INFORMATION ABOUT OTTERS

Ecology of the European Otter

KAIMHILL ECOLOGY

RIVER DEE & CLIMATE CHANGE

ATLANTIC SALMON

The high proportion of the river Dee accessible to salmon has resulted in it supporting the full range of life-history types found in Scotland, with sub-populations of spring, summer salmon and grilse (salmon which have returned after a year feeding at sea) being found. The River Dee supports a significant proportion of Scotland's salmon resource.

DID YOU KNOW?

- Salmon from Scottish rivers migrate to feeding grounds around Greenland and the Faroes and remain for one or two (or possibly as many as four) years feeding before returning to the river of their birth.
- At the beginning of the migration the young salmon (smolt) weighs around 100 g but on its return after a year the salmon (grilse) will weigh around 3.5 kg although it is not uncommon (particularly those which have spent more than one winter at sea) for salmon to be much heavier with a River Dee record salmon caught in 1884 weighing 25.8 kg!
- Atlantic salmon can leap as much as 3 m from the water as they try to pass obstacles on their migration upstream.
- Female salmon excavate a 'redd' in a gravel bed by using a swishing action of their tail, and lay eggs into the redd and produce around 1,100 eggs per kilogram of body weight.

EFFECTS OF CLIMATE CHANGE ON SALMON

- Flood events can result in eggs being washed away or being smothered by silt washed off the land, killing the eggs.
- Lower water levels can result in increased water temperature and less dissolved oxygen in the water.
- The upper reaches of the River Dee catchment are particularly exposed so are vulnerable to extremes of temperature, therefore projects for Atlantic salmon has included planting compartments of trees alongside watercourses provide cooler shaded areas.

FURTHER INFORMATION ABOUT ATLANTIC SALMON

Naturally Scottish - River Runners
To The Journey's End: The Lifecycle of the Atlantic Salmon (video 31 minutes and 7 seconds)
Ecology of the Atlantic Salmon (IN106)

KAIMHILL ECOLOGY

RIVER DEE & CLIMATE CHANGE

FRESHWATER PEARL MUSSEL

Freshwater pearl mussels are similar in shape to marine mussels and are named because they occasionally contain a pearl. Pearl fishing has historically (and continues to be although illegal) a major reason for declines in numbers. It has been estimated that around 1.3 million freshwater pearl mussels are found in the River Dee. Freshwater pearl mussels have a complex lifecycle which relies upon young salmon or trout to host their larval stage by attaching harmlessly to the young fish gills for almost a year before dropping off and hopefully landing in suitable sand or gravel where they will grow. Attaching to fish allows mussel populations to hitchhike upstream so that populations are not lost from being washed downstream over time.

DID YOU KNOW?

- Freshwater pearl mussels provide an important service for water quality. Adult mussels filter around 50 litres of water per day and removing organic particles.
- Freshwater pearl mussels are male or female and typically reach sexual maturity at around 12-15 years of age. Adult shells reach between 6.5 and 15 cm in length.
- Freshwater pearl mussels are one of the longest living invertebrates known with mussels reaching more than 100 years old.
- Because of the dependence of the larval stage of freshwater pearl mussels on young salmon, conservation actions for protecting and enhancing Atlantic salmon habitats also benefit freshwater pearl mussels conservation.
- It is an offence to intentionally or recklessly kill, injure, take or disturb freshwater pearl mussels or their habitat. It is also illegal to possess their shells if found.

EFFECTS OF CLIMATE CHANGE ON FRESHWATER PEARL MUSSELS

- Although freshwater pearl mussels can re-bury themselves or move slowly across sandy sediments, they are vulnerable to both floods and silt being washed from the land as a result of flooding.
- Localised droughts can dry the river bed out and low water levels can cause the impacts of pollution to be worse on mussel beds.
- Climate change impacts on Atlantic salmon should also be considered to be climate change impacts on freshwater pearl mussels.

FURTHER INFORMATION ABOUT FRESHWATER PEARL MUSSELS

Naturally Scottish – River Runners
Pearls in Peril
Ecology of the Freshwater Pearl Mussel (IN102)