



Fine dining from waterways



NATASHA CHILDS SERVES UP A FEAST OF INFORMATION ON WETLAND FOOD WEBS.

Rivers and wetlands are a haven for native wildlife. Where there's water, there's food... and a long list of wetland animals waiting to dine out on a menu of plants, insects, fish, frogs and more.

The aquatic food web begins at a microscopic level. Water triggers the release of vital nutrients and carbon from wetland soils and leaf litter. These essential elements are taken up by plants and tiny animals. They in turn become food for other wetland creatures, and so the food web grows. Water also plays an important role in transporting nutrients and carbon from floodplain to river channel and back again, providing food for water dependent plants and animals throughout the river system.

The NSW Office of Environment and Heritage (OEH) is working with communities to deliver water strategically in order to allow flows to flush floodplain areas and return vital nutrients and carbon back to the river system to support aquatic food webs.

Environmental Water Management Officer James Dyer said river regulation had significantly affected the frequency, length and volume of events that supply food to rivers.

“This has affected food supplies for native fish as well as many other native plants and animals throughout the river systems of New South Wales. The frequency and duration of high flows that reach out onto the floodplain have also been reduced. Less food, less often, has had a significant effect on native fish populations and invasive species like European carp have now moved in to compete for the limited resources available,” James said.

Water has several important roles in rivers and wetlands:

- Water in rivers **carries** sediments and other nutrients that help to feed water dependent plants and animals and enrich floodplain soils.
- Water also **triggers** the release of nutrients within the wetland, making essential elements available to plants and animals.
- Water **connects** the landscape, carrying these vital nutrients from one part of the river system to another.
- Water is also a form of animal **transport**, carrying juvenile fish into the relatively calm waters of wetlands where they eat and grow before returning to the river to repopulate other areas of the system.

Rivers of carbon

Rivers and wetlands rely on the movement of water to transfer carbon throughout the system and sustain the aquatic food web. Carbon is the basic building block of all living things. It is found in DNA, fats, proteins, starches and sugars that are critical for the growth and functioning of living creatures. Carbon incorporated into these types of molecules is referred to as ‘organic carbon’.

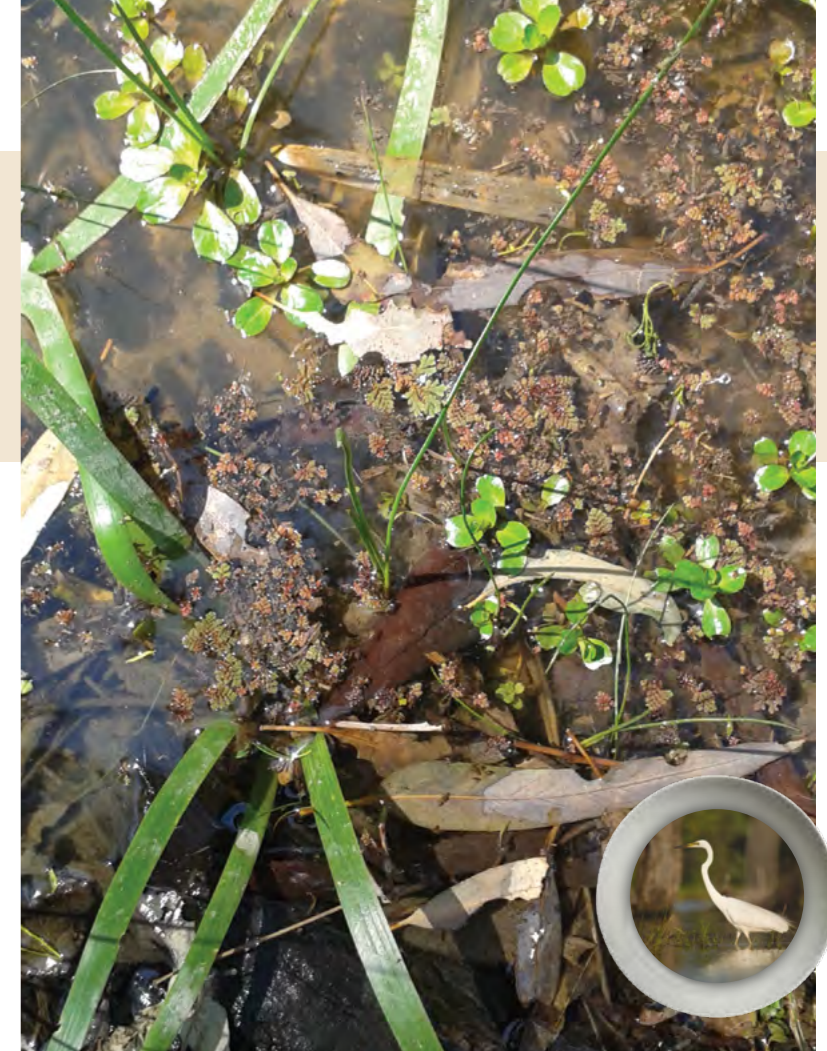
River regulation has altered the amount and pattern of carbon transfer within local river systems. This has affected food supplies for native fish and other wetland dependent animals.

How does carbon enter the wetland food web?

Dr Julia Howitt, a senior lecturer in chemistry at Charles Sturt University, said much of the organic carbon present in wetlands was formed by plants during photosynthesis, using carbon dioxide from the atmosphere.

“Water triggers the release of organic carbon from leaves, sticks, bark and grasses that have accumulated on the wetland floor. Some carbon will also be released from the soil. This carbon dissolves into the water where it is taken up by plants and animals,” Julia said.

“Fungi (such as mould) and bacteria in the water, begin to feed on the dissolved carbon and other nutrients released from the plant litter. A thin film of mould and bacteria begins to form on the leaf litter. This slimy substance is known as biofilm and may also include algae. As the biofilm continues to feed, it forms clumps which become a source of food for slightly larger organisms, and so the wetland food web begins to grow. Not all carbon is equally digestible. The presence of other nutrients and the temperature of the water will affect the speed at which the biofilm develops,” she said.



In wetlands, carbon may also be present as particles attached to fragments of soil, pieces of leaf, seeds or other fragments of plants or algae. These particles may be eaten directly by small wetland animals.

Rivers provide transport for carbon moving in and out of wetlands. Strategic flows and natural high-river events also allow juvenile fish to access these sites and move between the river and wetlands during the course of their lifecycle. These fish then become a source of food for birds, frogs and other fish.

It is a dynamic system that requires a ‘big-picture’ approach to ensure key populations of native wildlife, and the habitat they require, are connected and in peak condition to ensure a sustainable future.

FOR FURTHER INFORMATION

www.environment.nsw.gov.au/environmentalwater/what-is-it.htm

MAIN PHOTO: PELICANS ON THE WATER, D. HERASIMTSCHUK. SMALL PHOTOS (FROM LEFT): ALGAE, TOGETHER WITH BIOFILM ARE A SOURCE OF FOOD FOR TINY RIVER AND WETLAND CREATURES, Y. KOBAYASHI OEH; CLADOCERANS FEED ON THEM AND BECOME FOOD FOR SMALL FISH, Y. KOBAYASHI OEH; COPEPODS CONSUME ALGAE, BIOFILMS AND OTHER TINY ANIMALS AND ALSO BECOME FOOD FOR SMALL FISH, Y. KOBAYASHI OEH; BIOFILM FORMS ON SUBMERGED BRANCHES, J. COCK OEH; BONY BREEM, G. SCHMIDA.

MAIN PHOTO: AQUATIC VEGETATION FORMS PART OF THE WETLAND FOOD WEB, N. CHILDS OEH. SMALL PHOTOS (FROM LEFT): MURRAY COD ARE A TOP-ORDER PREDATOR IN THE FOOD WEB, N. CHILDS OEH, EGRET HUNTS FOR ITS DINNER, D. HERASIMTSCHUK.