

Aquatic Ecosystem Connectivity Animation Narrative

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Australian Government



Queensland Government



Queensland
Wetlands Program

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Scene 1–introduction to connectivity

This narration was developed to be used with the YouTube aquatic ecosystem animation and helps explain key Aquatic Ecosystem Connectivity concepts in a format aimed at high school and university students <http://wetlandinfo.ehp.qld.gov.au/wetlands/ecology/landscape/>

Life on Earth has evolved in natural ecosystems. Some are dry and hot like deserts. Others may be wet and cold like Tasmania's rainforests.

As well as supplying food and shelter, ecosystems provide different habitats and connections that plants and animals need to complete their life cycle.

So plants and animals don't just depend on their habitats, they depend on the connections between these habitats as well.

0:37

Aquatic ecosystem connectivity looks at how the parts of the ecosystem, known as its components, connect.

If these connections are being used, this results in connectivity.

0:51

But, it's important to understand that just because connections have the potential to exist; it doesn't necessarily mean that actual connections occur.

1:02

Aquatic ecosystems rely on functioning biophysical processes like water movement, and the movement of nutrients and sediments, to keep them healthy and allow them to sustain plants and animals.

1:19

Aquatic ecosystem connections occur not just through water but also through air, over land or underground.

1:30

Connections can occur through the air when insects and birds fly between wetlands, or over land when mammals, reptiles and frogs move between wetlands, or through water in creeks, rivers and lakes when platypus, water rats and fish swim between wetlands.

1:50

Even in groundwater, there are tiny organisms called stygofauna that need connections underground.



1:58

Each species has different needs for connectivity at different stages of its life cycle.

So we need to understand each species' life cycle to know what type of connectivity is needed.

Scene 2—changing connectivity

2:17

Weather events such as floods, are part of the natural connections in ecosystems and species have evolved to deal with these different connectivity regimes.

These weather events are experienced by plants and animals as changes to water flows and water levels that affect their access to food and habitat.

2:38

Some species may take advantage of the drought and low-water flow events.

The Eel-tailed Catfish requires warm, slow-flowing water to build its rocky nest in the creek bed to breed.

High flow events at critical times can disrupt its breeding stage.

2:58

Some species need high flows to connect different isolated groups of fish so they mix and maintain their gene pools.

But some fish species have evolved in isolation and increasing connections to these populations can be detrimental.

3:17

During dry periods, nutrients collect on floodplains.

During a flood, water flows over the banks and provides a connection for the nutrients to enter the wetland or for species to move onto the floodplain and use these available nutrients.

Water flowing over the banks gives animals access to food and new breeding opportunities.

3:41

Barramundi use different fresh and saltwater habitats at different life cycle stages.

Movements between these habitats are triggered by floods. Young barramundi use the floodplains to move from mangroves into inland freshwater wetlands and the floodplains provide access to new food sources.

Scene 3—example of connectivity in action

4:06

Think about a floodplain where there is a lake and a river.

On the floodplain there is also a permanent man-made wetland, like a dam, linked to the lake by a strip of vegetation. Frogs use this vegetation as cover to access the lake habitat and feed on insects.

4:27

When the floodplain is inundated with water during a flood, populations of fish can move from the river to the lake where they breed.

After the water recedes the fish become isolated until the next flood.

So, the lake is an essential part of the ecosystem, allowing local species to thrive.

4:49

If the lake is drained, filled-in or developed, the breeding cycle of the fish will be disrupted and fish populations will decline.

The insect population of the lake habitat will disappear, removing a critical food source for the frogs. The frog population will decline.

Even though the physical connections of the flooded river and the vegetation are still intact, the critical lake habitat no longer exists.

Many of the ecological processes cannot take place because the connections have been broken.

Scene 4—human actions effecting connectivity

5:27

Biophysical processes can be altered by human actions.

5:34

Human structures such as road crossings, culverts, weirs and dams can alter hydrological connections and make it difficult for animals to move around and perform parts of their life cycles.

5:48

Fish often swim up and down rivers. Some need to swim upstream to breed. Others need access to the ocean.

5:58

Mangrove Jack is one species that spawns at sea on outer reefs. The larval fish then move into the estuaries and rivers to grow.

6:10

If we disrupt the processes between the different areas where animals breed, feed and grow, these species will suffer.

They may lose genetic diversity or become locally extinct.

6:23

When considering aquatic ecosystem connectivity, what happens on land can be just as important as what's happening in the water.

When native vegetation is cleared from a river bank, the river bank ecosystem for invertebrates, reptiles, frogs, birds and other animals is significantly affected. This affects connectivity when it stops species from moving between habitats.

6:53

Sometimes the connections outside what is considered normal may not be good or desirable.

For example, land clearing and floods can introduce pests and weed species into a habitat where they may out compete native species.

Scene 5—managing and restoring connectivity

7:10

Understanding processes that support connectivity lets us develop ways to improve the management of ecosystems that have been altered by human actions.

Sometimes factors like what happens up or downstream can have a big impact on a local ecosystem.

When considering what local ecosystems and connections are needed to support healthy populations, it's important not to lose sight of the bigger picture.

It's important to consider the whole catchment as different landscape features can have significant impacts on local connectivity.

And it's important to assess whether connections are actually happening. If we're not sure, we need to investigate more.

7:59

Surveys are a critical part of the field work that scientists undertake to manage catchments.

By conducting surveys, it might be shown that animal numbers have declined where the prediction says there should be a healthy population.

Or there might be healthy populations in areas which are predicted to have disrupted connectivity.

Working with local experts is another way to assess the reality of the situation as sometimes reality does not match the predictions.

Just because there is a potential for connectivity does not mean there is actual or realised connectivity.

Understanding and managing aquatic ecosystem connectivity is the first step to preserving our unique local environment for the future.

So, in a nut shell, wetlands are the great connections across the landscape—providing places for our enjoyment and relaxation and producing clean water and food for humans, industry and agriculture.

ENDS.