wetlandcare australia

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Environmental TRUST

Wetlands and Agricultural Drainage: Delivering Clean Water

The Need for Wetlands ….

Wetlands are amongst our most important, endangered and under-valued environments. Termed the “kidneys” of our waterways, they act to filter out pollutants and improve water quality. Wetlands containing tall reeds and rushes act to trap and immobilize water containing pollutants.

Wetlands also help to trap and utilise nutrients such as phosphorous and nitrogen, converting them to valuable food to sustain birds, fish and frogs. Wetlands act as storage basins for floodwater providing slow water release. They also provide valuable drought reserve for grazing stock.

More than 75% of commercial fish species require estuarine wetlands to complete part of their lifecycle. Many local and migratory birds also utilise wetlands as breeding and roosting sites.

Prior to human impact on coastal floodplains of northern NSW, approximately 80% of the floodplain was wetland, the other 20% floodplain rainforest. Settlement by humans has greatly impacted wetland distribution, with now only 20% wetlands left on our floodplains.

Healthy wetlands, vital for clean water

The Need for Drainage….

In order to utilise the productivity of NSW coastal floodplains, farmers constructed a network of drains. These drains allowed the conversion of swampy land into productive agricultural land. Both grazing and cropping was enhanced through the removal of floodwater. The drains also reduced the incidence of water logging, increased land access and use of machinery, and helped to reduce health risks to both stock and humans. The drainage systems also helped protect property from flood damage.

Since the advent of constructed drainage in NSW coastal floodplains, drainage networks have become so widely used that there is very little wetland areas left that are not impacted by drainage.

Although initially beneficial to farming, constructed drainage has led to many environmental impacts that were not anticipated.

Floodplain drainage, used to increase the amount of farmable land on floodplains

Floodplain History: Wetlands v's Drainage

Early drainage schemes were constructed in the 1860s to make way for agricultural land. These drains were constructed with a shovel or with horse and scoop and contained very rudimentary floodgates. Due to the limited available manpower and lack of machinery the extent of drainage was limited, and natural wetlands were still abundant.

Dragline used to construct drain at Killick Creek, Kempsey NSW

However, by the 1960s the demand for more productive land and the increased availability of earthmoving machinery, combined with extensive government subsidised drainage schemes led to large increases in the amount and density of drainage. Increased technology allowed drains to be dug deeper, more rapidly, and in previously inaccessible land.

Drainage was extended from the productive floodplain areas into to backswamps, leaving only a small portion of wetlands unaffected by drainage. The increased drainage meant that floodwater could now be drained from the floodplains in approximately 6 days instead of the 100 days it traditionally would have taken.

Drains today are commonly deeper than the early drainage systems, and often heavily floodgated.

The Problem With Drainage

Poor water quality associated with drainage has been attributed to a large number of fish kills

Increases in drainage intensity began to impact the environment, and was considered the beginning of major water quality problems in our waterways. Deep drains tapped into acid groundwater, allowing it to be flushed into rivers and streams. Deep drains also promoted the formation of de-oxygenated water (black water), which is unable to support aquatic life.

Drainage of wetlands removed their filtering capacities, preventing the improvement of water quality before water moves downstream. It also prevented the steady release of nutrient laden water containing micro-organisms necessary to support the estuarine food web.

Almost all drains on coastal floodplains contain floodgates. These floodgates compound water quality problems in drains, and are also physical barriers to prevent fish and other animals moving up into the drains and wetlands.

All of these factors, combined with the now rapid time it takes for floodwaters to be drained have meant that water of very poor quality is rapidly transported to rivers and streams. Numerous fish kills have been attributed to the drainage of poor quality water into natural water ways. Further associated problems include the reduction of fish growth rates, promotion of fish disease, reduction in oyster production and impacts on prawn stocks.

Discharge of poor quality water through artificial drainage can have disastrous effects on coastal river health.

Finding a Balance

The realisation of the adverse affects of extensive draining on the environment has lead to a push to change drainage practices. Best practice drain maintenance guidelines have been adopted by council and the sugar industry to prevent discharge of poor quality water into water ways.

Deep drainage has produced the most water quality problems. In many cases drains were dug deeper than they needed to be, and the current trend is to re-design drainage in backswamp areas. In some cases this has required filling in of deep drains and the construction of new wide, shallow dish drains that do not tap into the acid groundwater.

Increasing numbers of landholders have realised the benefits of having wetlands on their property. Sugar growers and grazers are being encouraged to consider returning marginal agricultural land to wetlands. This not only helps to improve water quality discharges from farms, but may also reduce farming costs.

A constructed wetland on marginal cane land – helping to improve water quality and provide fish habitat while reducing farming costs.

Some landholders have installed secondary water control structures at the edge of their backswamps to allow water storage in wetlands at the end of the wet season. This not only helps to restore the beneficial capacities of wetlands, but also promotes maximum vegetation growth in the summer as a source of fodder for stock.

Further Reading

Johnston et al. (2003) Restoring The Balance – Guidelines for Managing Floodgates and Drainage Systems on Coastal Floodplains. NSW Agriculture. Grafton NSW.

Smith, R. (2003) Coastal Backswamps: Restoring their values. WetlandCare Australia, Ballina NSW.

Wetland**Care** Australia (2003) Wetland Information Kit. Wetland Information for Managers. Wetland**Care** Australia. Ballina, NSW.

Secondary water control structure holding water on wetland areas

Fencing and planting of shade-providing vegetation along drains that run through levees to river is now encouraged. The shade prevents excess plant and algal growth, reducing the amount of clogging in drains and removing the need to spray.

Fencing out stock can markedly improve waterway health and water quality. Note the stock damage to the right of the fence and healthy vegetation to the left where cattle has been excluded

Drains can be cleared of excess vegetation with a 'reed bucket'. This bucket is attached to excavators when clearing drains as a means of reducing the exposure of acid sulfate soils from the drain bottom.

Wetland**Care** Australia is leading the way to encourage landholders to actively manage their marginal farmland as wetlands, including the provision (and assistance in application) of grants for fencing, revegetation and weeding, as well as the provision of stewardship payments and other financial incentives.

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