

Ecosystem Services :

Understanding the Full Value of Ecosystem Services

A NEW STUDY PROVES THE VALUE OF RIVER RED GUM COMMUNITIES AND NATURAL AREAS TO COTTON FARMS



Areas of native vegetation, in particular river red gum communities provide many benefits on cotton farms including carbon sequestration, erosion mitigation and biodiversity conservation.

Quantifying these ecosystem services in various native vegetation communities on the Lower Namoi Floodplain was studied by PhD student Rhiannon Smith of The University of New England.

Rhiannon says there are significant economic and environmental incentives for cotton producers to manage these and other non crop areas such as revegetated areas, natural wetlands and river frontage on farm.

Completing the research in June last year, Rhiannon said that non-crop ecosystems comprise a substantial proportion of many cotton farms and the likelihood that natural and revegetated areas will contribute significant income streams in the medium term through emerging markets in carbon and biodiversity is high.

“Ecosystem services generated on cotton farms are not only beneficial to production and the sustainability of each farm, but also benefit the wider community and may attract incentive payments for growers that can supply them (eg environmental stewardship payments from the Australian government) or become tradable assets (eg carbon sequestration),” Rhiannon said.

“Ecosystem services generated by native vegetation on cotton farms therefore have the potential to contribute directly to the farm’s income.”

Working in partnership with the Cotton CRC, CRDC and the Namoi CMA, Rhiannon's PhD research into ecosystem service provision across the lower Namoi floodplain involved research in native vegetation on 36 cotton properties between Boggabri and Walgett.

“Five different native vegetation communities, which are common on the Lower Namoi Floodplain, were studied: river red gum, coolibah, myall, black box and grassland,” explains Rhiannon.

“A meeting was held initially with local cotton producers and other stakeholders to discuss the ecosystem services considered of greatest importance for the research project.

“As a result the project focused on quantifying carbon sequestration, erosion mitigation and biodiversity conservation (birds and plants) on cotton farms and adjacent public land. Other important ecosystem services considered at the meeting included natural pest control, salinity mitigation, and forage production.”

Rhiannon’s research was some of the first in the world to evaluate several ecosystem services across a large study area with a variety of vegetation types and climatic conditions. It was also the first project to look at vegetation condition from an ecosystem service provision perspective.

“In Australia we often look at vegetation condition in the context of biodiversity conservation. My thesis looked at what attributes of vegetation are important in providing other ecosystem services that cotton growers or other landholders may be interested in,” she said.

Rhiannon explains that a patch of vegetation that may not be as valuable in terms of biodiversity conservation is likely to be providing other ecosystem services. Ecosystem service provision is also variable through time.

“For example, a patch of coolibah regrowth may not be considered valuable from a biodiversity conservation perspective but is valuable for carbon sequestration. The same patch of coolibah will increase in value for biodiversity conservation through time as the trees mature and hollows start to form.”

Some of the key findings of the research were that river red gum vegetation, on average, sequestered the most carbon (216 t C ha⁻¹), had the most stable soils as a result of high carbon content and ground cover and provided valuable habitat for biodiversity. River red gum vegetation was also more structurally complex, often with a well developed shrub layer which provided habitat to a unique bird community. Many of the bird species seen in river red gum sites were not seen anywhere else.

Woody vegetation, that is, large trees, sequestered the majority of the carbon, though soil carbon storage was also high where woody vegetation was contributing large amounts of litter to the soil.

It was also found that the most stable soils – those most able to resist erosion – were those with a high carbon to nitrogen ratio.

Rhiannon explains that a lot of the benefits from conserving a patch of native vegetation for ecosystem service provision are benefits that not only contribute to the farm’s bottom line but are also beneficial to the wider community.

“Many ecosystem service benefits extend well beyond the farm gate, including erosion mitigation, water purification and climate regulation,” she said.

“Cotton growers contribute substantially to regional biodiversity by maintaining native vegetation in regions where very little land is formally managed for conservation.

“By managing natural areas on farms for biodiversity and ecosystem service provision, growers are not only gaining benefits from ecosystem services but also demonstrating their commitment to active environmental stewardship and meeting their duty of care.

“The results of the thesis will assist property owners and managers understand some of the lesser recognised or contemplated values of natural and revegetated areas on-farm. It also provides targets for management to maximise vegetation condition for service provision in various ecosystems in agricultural landscapes.”

The cotton industry has supported Rhiannon Smith's research, which was some of the first in the world to evaluate several ecosystem services across a large study area with a variety of vegetation types and climatic conditions.