CottonInfo Extension Activity Report

Part 1 - Summary Details

Please use your TAB key to complete Parts 1 & 2.

CRDC Project Number: **CSD2101**

Project Title: **Native Vegetation long term monitoring sites**

Project Commencement Date: **1st July 2020**
Project Completion Date: **30th June 2021**

Recognition of support: The Research Provider Cotton Seed Distributers acknowledges the financial assistance of the Cotton Research and Development Corporation in order to undertake this project.

Part 2 – Contact Details

Administrator: Mr James Quinn

Organisation: Cotton Seed Distributors

Postal Address: PO Box 117 Wee Waa NSW 2388

Part 3 – Final Report

(The points below are to be used as a guideline when completing your final report.)

Background

1. Outline the background to the project.

While some form of management in riparian and floodplain ecosystems on cotton farms is common, there remains amongst growers a lack of knowledge and understanding of the value and importance of ecosystem function and services and considerable uncertainty regarding what good condition looks like and the effectiveness of recommended biodiversity best management practices.

Over the past 12months this project has established 6 longterm native vegetation monitoring sites at locations where a recent or future land practice will occur that aims to improve biodiversity condition. The intension is to over the coming years track what activities were put in place, what the challengers and gains were for biodiversity and the farm business and to share this journey with other growers and consultants.

Objectives

2. List the project objectives (from the application) and the extent to which these have been achieved.

The aim of the CottonInfo long-term vegetation monitoring program is to capture and demonstrate vegetation change overtime that is occurring as a result of the implementation of BMP. These changes include, revegetation & regeneration, weed control, pest control and grazing restriction in riparian areas.

Despite the impacts of COVID on travel (NRM technical Lead and collaborating partners), 6 vegetation monitoring sites have been established where a practice change is currently or planned to be undertaken, one in each of the valleys listed below

Condamine – weed control and revegetation planned
McIntyre – revegetation planned
Gwydir – Cessation of grazing
Namoi – Revegetation undertaken
Macquarie – Cessation of grazing planned
Murrumbidgee – revegetation undertaken

A number of partnerships have been formed with regional NRM groups and Universities to assist REO's undertake the monitoring and assist landholders implement the land practice change (technical expertise and funding). These are listed in the table below.

Methods

3. Detail the methodology and justify the methodology used. Include any discoveries in methods that may benefit other related projects.

Outputs for first 12months

a. Setup of 6 vegetation monitoring sites across NSW & QLD which will be monitored seasonally over the next five years (2020-2025).
b. Condition assessments undertaken seasonally. Note the methodology used to undertake the condition assessment varies across sites depending on the partnerships formed with collaborating Universities and NRM groups (see table below)
c. Photo points established with seasonal photos taken.
d. Collaborate where possible with regional NRM bodies
e. At least 4 of the sites linked to land management practice change providing longer term impact change data.
f. 1 article about monitoring sites in industry publication Spotlight/NRM blog/regional newsletters

- ***Timing:*** Sites identified for assessments to start in Spring 2020. Sites assessment at least 3 times a year -seasonally (Spring, summer, autumn & winter). Longterm – 5years.
- ***CottonInfo resourcing required:*** Stacey Lead- assist in site selection, survey training and initial benchmarking/survey of sites where required. Each REO undertake seasonal monitoring.

Site selection:

- 1-2 sites (if doing 2 good to get contrast of management eg grazed and un-grazed)
- Remnant Native vegetation. Stacey to work with REO's to get a selection that includes some previous research sites (longer term data) and sites benchmarked at practice change (eg LLS/CMA incentive programs)
- Landholder must consent to share information (location & name can be confidential)
- Accessible and workable within REO's workplan commitments

Seasonally undertake:

- 50m Transect assessment using provided survey proforma
- Photographs taken at established permanent photo points

Equipment:

50m measuring tape, marking tape, 2 steel posts, survey proforma sheets, photo point establishment procedure, compass & GPS

Outcomes

4. Describe how the project's outputs will contribute to the planned outcomes identified in the project application. Describe the planned outcomes achieved to date.

Due to the outbreak of COVID 19 in 2020 the establishment of some of the monitoring sites was delayed as border closures made it difficult for Stacey Vogel (NRM Technical Lead) to access cross border regional sites to provide REO's the technical expertise and training required to establish the sites. In addition, the recent COVID outbreak in NSW restrictions on travel have made it difficult to undertake seasonal monitoring especially where being undertaken in partnership with Universities eg Southern NSW sites & Namoi.

The following resources were developed to assist the REO's setup the monitoring sites and are attached in Appendix 1

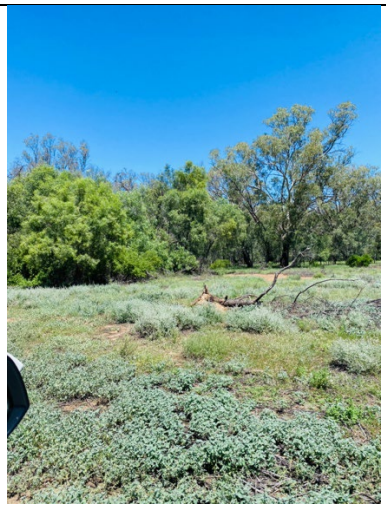
- Photo monitoring methodology and recording sheets
- Vegetation condition assessment methodology and recording sheets

Delays in establishing the monitoring sites as a result of travel restrictions imposed by COVID no extension has been done to date on the project. Due to delays caused by COVID in establishing the sites the Spotlight story on the Longterm native vegetation monitoring site has been rescheduled for the Summer 21/2022 edition of Spotlight Magazine.

The following monitoring sites have been established.

Catchment	**Land change & partnerships formed**	**Monitoring undertaken**	**Photos of site**
MacIntyre – "Farm 1"	Revegetation of an old cropping field planned. Contact made with Macintyre Alliance group & SEQ landscapes to provide support to 'Farm 1t' to access potential funding and technical support to undertake revegetation. SEQ present on site during 2nd monitoring.	Site established and baseline undertaken 2/11/2020 1st monitored 1/2/2021 2nd monitored 23/08/2021	 October 2020  February 2021

			 August 2021
Namoi Catchment "Farm 2" Wee Waa	Riparian revegetation undertaken. CR & Landcare partnership tubestock revegetation site. Undertake on-going mortality counts of trees & shrubs in partnership with UNE. See attached excel spreadsheet.	Site established Oct 2020 and photo taken December 2020.	 December 2020  Sep 2021
Condamine "Farm 3"	Weed control to promote native grasses and future revegetation of woody vegetation for habitat. Limited weed control undertaken to date.	Site established and baseline undertaken 12/10/2020 21/06/2020	 July 2020

			 July 2021
Macquarie "Farm 4"	Fencing to restrict stock access to riverbanks. Landholder seeking funding to cover cost of works	Site established and baseline undertaken 23.2.21	
Gwydir – 'Farm 5"	Removal of stock impacts on groundcover and under storey diversity and how increased diversity contributes to beneficials activity & presence Baselining undertaken in partnership with NWLLS and DWE. see	Site established & Baseline 25/09/2020	 Spring 2020

	attached excel spreadsheet		 Summer 2021
Murrumbidgee, Farm 6 or Coleambally Irrigation Scheme	Revegetation undertaken Partnering with UNE on a drone seeding & tubestock trial site planted Oct 2020. Post research project establishment rate monitoring.	Planting and initial baselining undertaken by UNE. Due to COVID and illness of technical staff member follow-up monitoring of site by UNE and REO has been postponed. At time of writing report initial benchmarking data from UNE was still being finalised.	

5. Please report on any:-

a) Feedback forms used and what the results were
b) The highlights for participants or key learnings achieved
c) The number of people participating and any comments on level of participation

Conclusion

6. Provide an assessment of the likely impact of the results and conclusions of the research project for the cotton industry. What are the take home messages?

The establishment of the monitoring sites has had the following benefits

- Regional NRM partnerships & networks established providing both REO's and landholders with technical NRM support and potential funding avenues
- Increased skills & knowledge of REO's in identifying non-cropping vegetation (native & exotic)

- Improved knowledge of what 'good' condition native vegetation looks like and how management practices can impact positively & negatively on condition

Extension Opportunities

7. Detail a plan for the activities or other steps that may be taken:

(a) To tell other CGAs/growers/regions about your project.
(b) To keep in touch with participants.
(c) For future projects.

- Story planned for Summer 21/22 edition of CRDC Spotlight Magazine, ongoing industry communication through Spotlight & CottonInfo enews on progress of sites as land practice change implemented overtime.
- Regional REO newsletter stories
- CottonInfo NRM resource sheets developed on impact of management on native vegetation condition
- Field days and workshops (Cotton Landcare Tech Innovations project – ecosystem services of native vegetation kayak trips Gwydir & MacIntyre)

Appendix 1: Vegetation Condition assessment methodology and record sheets developed for project

Photo monitoring: capturing change overtime

The aim of the CottonInfo long-term vegetation monitoring program is to capture and demonstrate vegetation change overtime that is occurring as a result of the implementation of BMP. These changes may include, but are not limited to; revegetation & regeneration, weed control, in-stream erosion control works, pest control where damage was previously occurring eg rabbits/pigs and re-watering of sites (diverting water/removing water diversions).


1996


1997


2003

This information sheet contains a step by step process for how to set-up a photo-monitoring site, take photos and record data overtime.

Equipment requirements: Camera, compass, GPS, 2 star picket posts, flagging tape and data recording sheet

Step 1: Choose a location

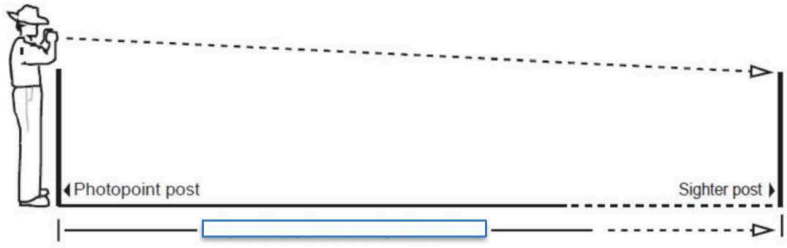
The photo-points will stay the same for the duration of the project therefore select a fixed location that is representative of the management issue you are trying to demonstrate.

Tips

- *Consider proximity to tracks or roads for future accessibility*
- *Consider potential vegetation regrowth that may obscure the clarity of future photos taken from the same location*
- *If possible, integrate the photo point with the transect monitoring site*

Step 2: Mark Location

Once you have decided on the location of the photo-point, drive two star-picket posts into the ground 20m apart, see diagram below. When choosing where to put these posts try to avoid east west or west east lines as the glare factor can limit what time of day these photos are taken. Once you have added posts to the sight, record a GPS point using a handheld GPS or smart phone.



Source: Grodecki & Van Willing, 2010

Tips

- *The position of the camera should be about 1.5m high and consistent each time you take a photo. You can rest the camera onto of post 1 if it is a suitable height, so take this into consideration when putting post 1 in.*
- *Mark the top of posts with flagging tape or paint so they are easily seen by farm machinery/vehicles*

Step 3: Take the photo

Standing at the photopoint post, frame the scene in the viewfinder of your camera so that the sighter post lies in the center circle of the viewfinder. Take two additional photos at 45degrees either side of post line (use your compass). Record the date and time of day that each photo is taken. For consistency take photos at the same time of day

Tips

- *Try to include a fixed reference object in the photo for future reference eg distinctive tree, fence post etc.*
- *Use the same camera and digital setting each time you take the photo*
- *Light cloudy days are ideal when sunlight is weaker and shadows from vegetation are less pronounced.*
- *Take along copies of the original photos for reference when returning to the photo-points to help match the field of view contents*
- *If the photo-point is the same line as the transect, consider taking photos of monitoring quadrants at the same point each time along the transect*

Step 4: Record Field data

It is important to record notes when you take each photo to explain what is being shown in the photo. Information for collection includes date, time, season, image number (from camera) and bearing. See Photo record sheet for what information to collect. It is also important to record seasonal information (wet/dry) or any land practice information which may be relevant to what the site is demonstrating.

Step 5: Repeat

Photo monitoring is most effective when images are captured using recurring timeframe. For this project we wish to capture any key seasonal changes in vegetation (annuals) therefore ideally take a photo at least twice a year - late spring/early summer and early winter.

Vegetation photo monitoirng data recording sheet					
Site ID				Date site established	
Date	Time	Season	Camera image number	Bearing	Notes

Vegetation condition assessment methodology

Adapted from the Namoi catchment riverine vegetation condition assessment Eco Logical Australia Pty Ltd 2009

Equipment: 2x Star picket, camera, GPS, 50m tape, flagging tape, vegetation condition assessment record sheet

Sampling steps

1. locate a suitable transect and using a GPS record the site co-ordinates
2. place a permanent marker at the start of the transect
3. take a bearing along anticipated transect line
4. run a 50m tape along the bearing line defining the transect and the plot position (10m either side) place another permanent marker 20m along the transect line.
5. meandering back to the start point within the confines of the baseplot (50mx20m), record number of mature native canopy species, number of regenerating native canopy species greater than 5cm in diameter at breast height (this could be more that the number of mature native canopy species), number of large tress, number of trees with hollows, length of fallen dead timber (diameter >10cm length and >50cm), and estimate canopy health to the nearest 10% as the proportion of the expected healthy canopy cover that is present.
6. record canopy species (including exotics) in order of abundance, and provide comments on structural characteristics of the vegetation (such as grassy or shrubby, woodland, forest or shrubland, and any other unusual features), and any other observations (such as seasonal conditions, feral animals, grazing).
7. take a photograph of the plot from the reference point, along the tape bearing
8. delineate a 20m x 20m subplot, starting at the reference point and record number of native shrub and small tree species >1m high (including mistletoes and epiphytes – eg orchids growing in trees) and number of native groundcover species
9. starting at a point 5m from the reference point along the 50m transect, estimate native canopy cover, native midstorey cover (>1m) and weed canopy and midstorey cover (<1m) within a 2.5m radius cylinder extending vertically upwards above the point – all cover scores to be measured as the proportion of sunlight prevented from reaching the ground by leaves and branches (ie projected foliage cover)
10. At 5m from the reference point along the 50m transect (point reached in step 11 above), delineate a 1x1m quadrant forward of the point and record the proportion of native groundcover, moss/lichen cover, weed cover, organic litter cover and rock/bare ground cover not occupied by moss/lichen, each expressed as a percentage to the nearest 5%. The five individual scores should add up to 100%.
11. repeat steps 11 and 12 at each 5m point along the transect, until 10 recordings have been completed (the last will be at the end of the transect). Rewind tape.

CottonInfo Vegetation Condition Assessment Record Sheet

Adapted from the Namoi catchment riverine vegetation condition assessment. Eco Logical Australia Pty Ltd 2009

Recorder/s..... Date.....
Property name_____
Owner_____
Previous management history of site_____

Location information_____
GPS Co-ordinates_____
Transect Bearing (°)_____
Photo/s taken: _____
Management/Seasonal conditions
_____

Baseplot (50x 20m)

Number of native canopy species – mature_____ regenerating (dbh >5cm)_____

Number of other large trees (incl. dead trees) _____

Number of trees with hollows (incl. dead trees)_____

Length of dead fallen timber (diameter >10cm & length >50cm)_____

Canopy health (% of expected canopy on good condition)_____ Reason_____

Canopy species (note order of dominance)_____

Subplot (20 x 20m)

Number of native shrub and small tree species (>1m high):_____
Number of native groundcover species: _____

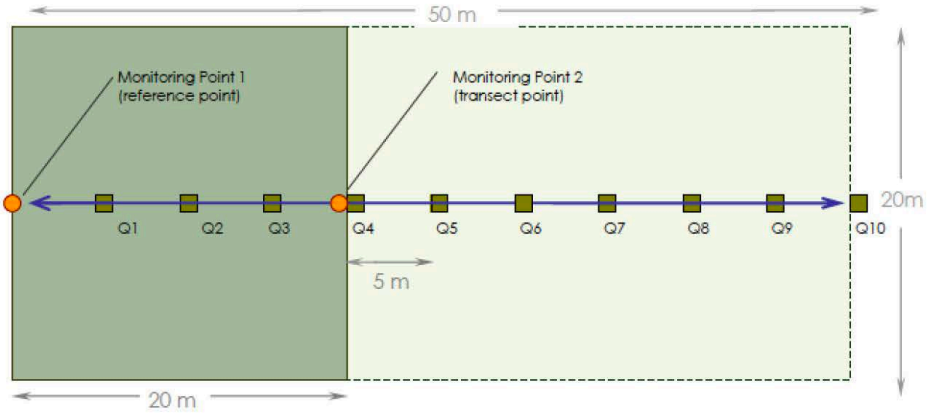
2.5m radius around points along transect

Projected foliage cover (%)	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
Native canopy										
Native midstorey >1m										
Weeds canopy & midstorey										

Quadrats (1 x 1m) along transect

Ground Cover %	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
Native groundcover (plants <1m)										
Weeds (plants <1m)										
Mosses and lichens										
Organic litter										
Rock/bare ground										
Total (%)	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Plot layout and dimensions:



	Baseplot	Number of native canopy (tree) species Number of regenerating native canopy (tree) species Number of large trees & number of trees with hollows Canopy health (i.e. health of tree foliage) Canopy species Length of dead fallen timber (logs)
	20 x 20m subplot	Number of native shrub and small tree species (> 1m high) Number of native groundcover species
↔	50m transect	Native canopy (tree) cover Native midstorey (i.e. cover of native shrubs/small trees >1m) Weed canopy/midstorey cover (i.e. cover of weeds >1m)
	1 x 1m quadrat	Native groundcover plants (< 1m) % cover Mosses and lichens % cover Weeds % cover Organic litter % cover Rock/bare ground % cover

Canopy projected foliage cover reference cards

Different leaf shapes shown in separate columns arranged from large to small. Most Australian vegetation is between 40 and 70% foliage cover.