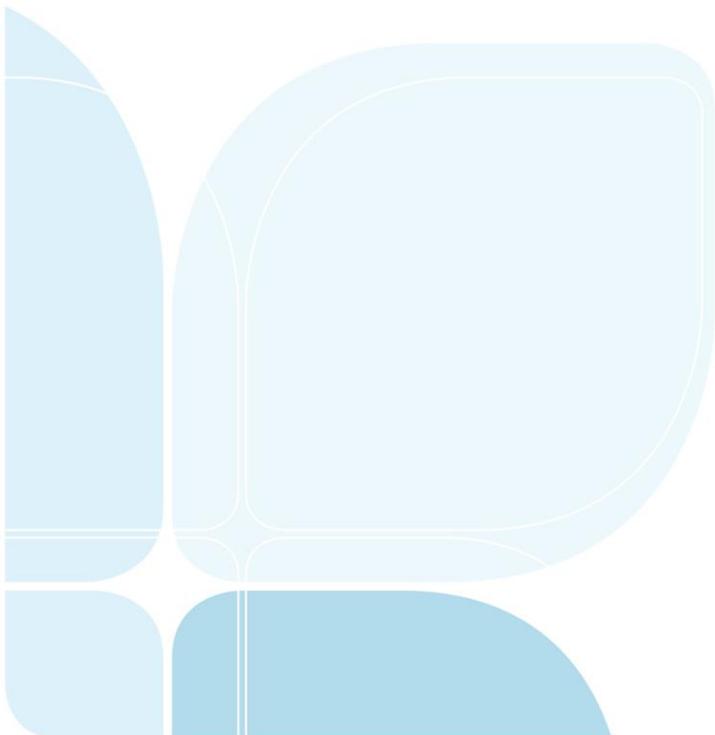




Local Land
Services

Congewai and Quorrobolong Catchments Water Quality and Catchment Survey (2021)

Hunter Local Land Services



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Disclaimer: The information contained in this publication is based on knowledge and understanding at the time of writing April 2022. However, because of advances in knowledge, users are reminded of the need to ensure that information upon which they rely is up to date and to check currency of the information with the appropriate officer of Local Land Services or the user's independent adviser.

Executive Summary

Hunter Water Corporation (Hunter Water) in partnership with Hunter Local Land Services (Hunter LLS) has invested in the Paxton Catchment Improvement Program (CIP) to reduce nutrient and sediment loads entering waterways within the Congewai & Quorrobolong catchments.

This report presents the findings of a web-based survey and interviews with landholders who participated in the Paxton CIP. The report also includes the findings from a web-based survey of urban residents in the Congewai and Quorrobolong catchments.

The core objective of the survey was to assess beliefs about water quality in the catchment and the identification of practice changes and landscape impacts attributable to landholder participation in the catchment improvement program.

A total of 93 landholders were sampled from within the Congewai and Quorrobolong Catchments and 115 urban residents were sampled from the three towns of Ellalong, Paxton and Millfield.

SURVEY OF LANDHOLDERS IN THE CATCHMENT

The average property size was 20 hectares, with 80% of landholders owning or managing properties of 50 hectares or less. Forty-five percent of landholders used their property for lifestyle or hobby farming, with 42% of landholders also using their property for livestock production.

Landholders had owned their property for an average of 8 years and 23% of landholders indicated they did not usually live on their property.

Creeks on properties

Congewai Creek (28%) and Sandy Creek (22%) were the two most common creeks found on landholder properties, with 24% of landholders indicating there were no creeks on their property.

The two most frequently reported 'uses' of creeks were an appreciation of the creeks aesthetic value and the use of the creek for livestock drinking water.

Amongst landholders with a creek on their property, 30% indicated they had changed the way they used creeks over the past five years, with the most common change being to reduce livestock access to creeks through either fencing or off stream watering.

Water quality in creeks

Eighty-two percent of landholders rated the water quality in their creeks in the last 12 months as average or better and for a typical year, 88% of landholders reported the quality as average or better.

Amongst those landholders able to identify the water quality in creeks five years ago, 73% rated the water quality five years ago as average or better. When landholders directly compared the current water quality in the creek on their property to five years ago, 38% indicated it was better now; 38% indicate it was the same as five years ago; and 24% indicated the water quality was now worse than it was five years ago.

Landholders who believed the water quality was now better than it was five years ago made this judgement because of the increased vegetation and ground cover on creek banks and the reduction in erosion and livestock using the creeks. Those who believed the water quality was worse now when compared to five years ago believed this was because of the increase in sediment and reduced creeks flows.

Over two thirds (70%) of all landholders believed Hunter LLS should be primarily responsible for managing or improving the water quality in creeks in the catchment, with 58% of landholders also indicating property owners should be responsible for the water quality in creeks.

Riparian protection

Forty-four percent of landholders indicated they had undertaken riparian, or creek bank protection and enhancement works on their property in the past five years and of these landholders, 89% believed the riparian protection they had undertaken had been of benefit to them.

The two primary benefits of undertaking riparian protection works were seen as improving the stability of creek banks (76%) and improving native vegetation and other natural resources (71%).

Of those landholders undertaking riparian works, 54% had changed the way they used or valued creeks, with the most common change being that cattle no longer used the creeks or accessed creek water.

Riparian protection funded by Hunter Local Land Services

Of those landholders who had undertaken riparian protection in the last five years, a third had done so with funding provided by Hunter LLS, with 83% of these landholders receiving funding under the Paxton CIP

Of those landholders who received funding from Hunter LLS, 94% received funding for the installation of fences to exclude stock from accessing creek banks and 61% received additional project funding for planting native vegetation.

Fifty-nine percent of those landholders who received funding from Hunter LLS believed that the creek bank protection or enhancement that they had undertaken had improved the water quality in the creek and an additional 24% were unsure and believed the water quality of the creek may improve in the future.

Riparian protection not funded by Hunter Local Land Services

Of those landholders who had undertaken creek bank protection on their property in the past five years, a third had undertaken activities, including primarily weed control, that were not funded by Hunter LLS.

Fifty-nine percent of landholders indicated that activities they had undertaken that were not funded by Hunter LLS had likely improved the water quality in the creek.

Funding for riparian protection

Across all landholders, 40% indicated they were aware that funding was available for creek bank protection through the Hunter LLS Paxton CIP. A third of these landholders became aware of the Paxton CIP funding through a local community group and a third became aware of the funding through neighbours or friends.

Amongst landholders with a creek on their property, a third indicated they would be interested in applying for funding for creek bank protection and enhancement in the future, with three-quarters of these landholders interested in obtaining funding for weed control and over half interested in funding for revegetation of creek banks and soil erosion control.

Participation in Hunter Local Land Services events

Across all landholders, a third had participated in events hosted by Hunter LLS in the last five years, with the most commonly reported events being those associated with creek bank management and grazing management.

A quarter of landholders reported that the creek bank protection or enhancement they had undertaken was done as a direct consequence of their attendance at a Hunter LLS event.

Seventy percent of landholders reported that prior to undertaking creek bank protection or enhancement they had received advice or direction from Hunter LLS staff.

Although 60% of landholders indicated they had made changes to how they managed their property because of their participation in Hunter LLS events, an additional 24% also indicated they had as yet not made changes but were planning to do so in the future.

SURVEY OF URBAN RESIDENTS

Equal numbers of urban residents lived in the three towns of Ellalong, Paxton and Millfield, with two-thirds of all urban residents living in town for less than six years.

Congewai Creek (64%), Sandy Creek (54%), Sweetmans Creek (49%) and Quorrobolong Creek (47%) were the most known creeks in the catchment, with over 80% of urban residents indicated the health of creeks was 'important' or 'very important' to them.

Two-thirds of urban residents had visited at least one creek in the catchment in the last 12 months, with walking (61%) and the appreciation of the creek's aesthetic value (48%) the two most common 'uses' of creeks identified by urban residents.

Most urban residents (86%) indicated the water quality in the creeks they had visited in the last 12 months was average or better, however two-thirds of urban residents described the creeks as 'moderately disturbed with some farming and land clearing in the area'.

Just over a third of urban residents were aware of the water quality in the creeks five years ago and 90% indicated the water quality in the creeks they had visited five years ago was either average or better.

Although based on a small sample size, most urban residents who were aware of water quality in the creeks five years ago and now, believed the water quality was now either the same or better (57%) when compared to five years ago.

Many urban residents indicated that if accessing water in the creeks, they would use it for watering gardens and plants (51%) or swimming (47%), with fewer residents indicating they would use the water for drinking (7%) or consuming food produced by the water (18%).

Two-thirds of urban residents believed either Hunter Water (67%) or the Local Council (66%) should be primarily responsible for managing or improving water quality in creeks in the catchments.

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Introduction

Since 2016, Hunter LLS has been engaged by Hunter Water to deliver the Paxton CIP to improve water quality in the creeks in the Congewai and Quorrobolong catchments, upstream of the Hunter Water Paxton wastewater treatment works. To do this, Hunter LLS has provided technical and property management advice to landholders, the co-ordination and delivery of grant funding, and individualised support to landholders for funded activities and projects.

Projects funded under the Paxton CIP included regenerating and enhancing native vegetation through weed control and native revegetation, in combination with fencing stock from riparian native vegetation, installation of off stream watering for livestock, and soil erosion works.

Hunter LLS in collaboration with Hunter Water has undertaken a survey of landholders and urban residents in the Congewai and Quorrobolong catchments. The survey assessed beliefs about water quality amongst landholders and urban residents and changes in beliefs, attitudes, and practices as a consequence of landholder participation in the Catchment Improvement Program.

Objectives

The core objectives of the survey were to:

- Assess water quality and use in the catchments;
- Identify practice changes attributable to projects implemented by Hunter LLS and Hunter Water;
- Identify attitudes and beliefs about riparian management;
- Understand beliefs about biophysical changes (impacts) to riparian conditions and water quality; and
- Identify attitudes underlying land management practice change and the adoption of new practices.

Methodology

There were two core components to the survey methodology which included (i) a survey of landholders and (ii) a survey of urban residents.

Questionnaire design

The questionnaire was developed through discussions with Hunter LLS and Hunter Water staff.

The questionnaire was designed as a web-based questionnaire with specific questions developed for landholders and urban residents. Hard copy versions of the questionnaire were available if requested.

The questionnaire focused on several core areas of interest which included:

1. The characteristics of survey respondents, including property characteristics;
2. Beliefs about the water quality of creeks;
3. The identification of riparian or creek bank protection and enhancement activities;
4. Funding for riparian or creek bank protection and enhancement; and
5. The extent and type of participation in Hunter LLS events.

The questionnaire used in the survey is presented in Appendix A.

Survey sampling and implementation

Using the LLS FARMS database and LandMap, which includes LLS customer information and property details, letters were sent on the 10th of September 2021 to 472 landholders in the catchment (see Figure 1) asking for their participation in the web-based survey. A reminder email was sent to 256 landholders on the 11th of October 2021.

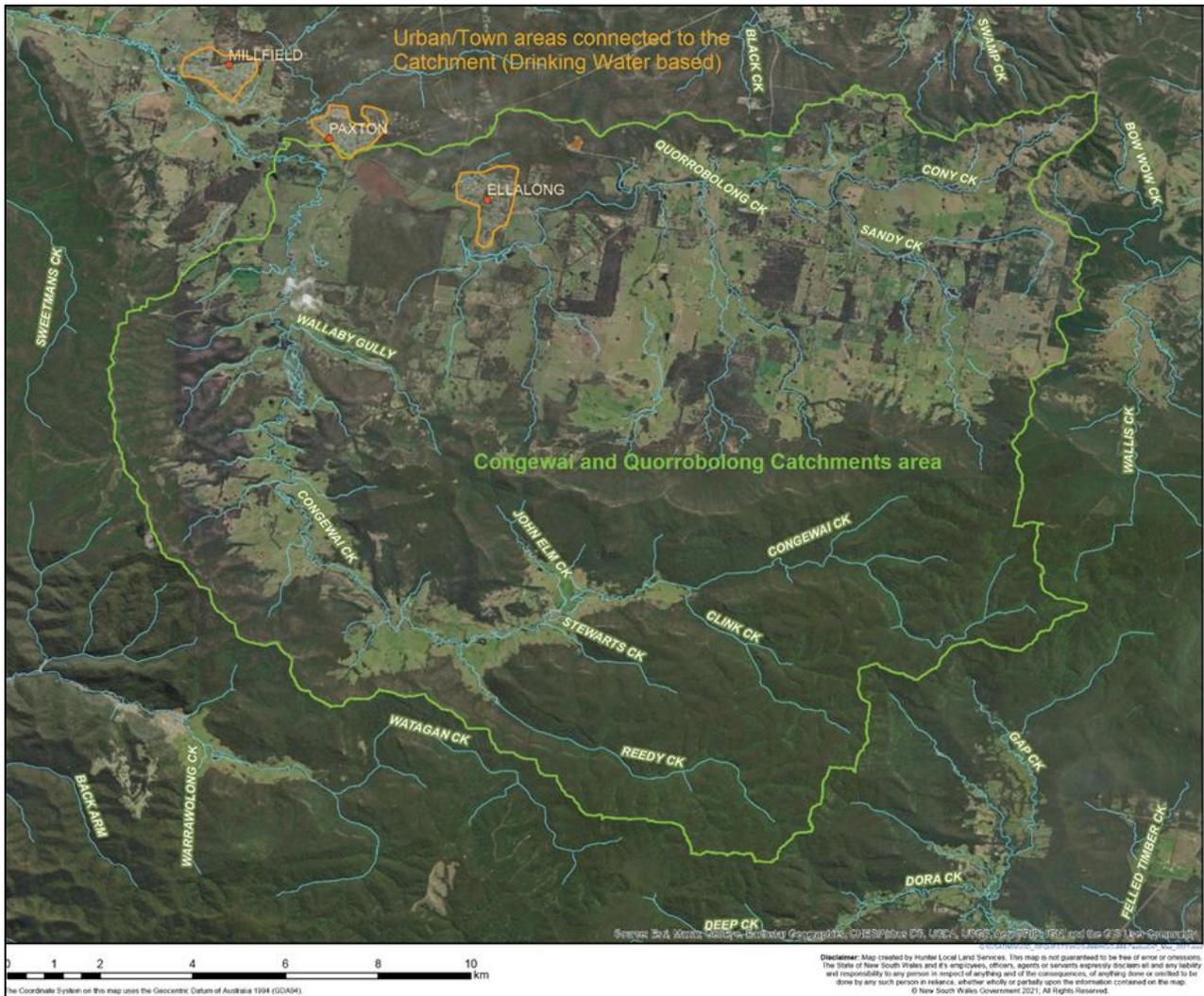


Figure 1. Congewai and Quorrobolong catchments

Hunter LLS also promoted the landholder survey through social media posts on the Hunter LLS website and Facebook page.

Urban residents were informed of the opportunity to participate in the survey through direct communication, social media and advertising. On the 8th of September 2021, 1,496 letters were posted to Hunter Water customers of Congewai, Ellalong, Millfield, Paxton and Quorrobolong asking for their participation in the survey. In addition, the urban survey was promoted to residents through a paid advertisement in the Cessnock Advertiser (8th September 2021), an editorial in the Cessnock Advertiser (22nd September 2021), and a newsroom article on the Hunter Water website (14th September 2021)¹.

Hunter Water also promoted the survey to urban residents through Facebook and Instagram, which included paid geotargeting (paying for posts to appear in relevant geographical areas) and contact through Facebook and Instagram to specific pages and/or people asking them to assist by sharing or mentioning the survey.

¹ See <https://www.hunterwater.com.au/news/hunter-water-encourages-feedback-on-five-year-paxton-project>

A total of 93 questionnaires were completed by landholders and 115 questionnaires were completed by urban residents.

Analysis of survey data

The analysis of survey data included frequency tables which were used to describe responses to all survey questions. It is important when interpreting tables to read the footnote of the table as this will assist in the accurate interpretation of the table.

The questionnaire included several questions which allowed people to provide multiple answers or responses. For instance, in identifying which creeks were on their property, people may have identified one or any number of creeks. Similarly, when landholders described how they used creeks on their property they may have described several different uses.

Tables based on the analysis of multiple responses have been identified in the footnote of each table. In these tables a single person may be included in multiple rows of the table if they have provided multiple responses to the question. In these tables it is important not to sum across the rows of the table so as to avoid double counting of individuals who may be reported in multiple rows.

Although the total sample included 93 landholders and 115 urban residents, the analysis of specific questions may be based on a sample which is somewhat lower than the total sample size. This is due to people being unable or unwilling to answer the question.

Survey of landholders

The survey of landholders included all respondents to the survey who indicated their property was 'a rural property within the Congewai and Quorrobolong catchments'.

Property and landholder characteristics

Amongst all landholders the average property size was 20 hectares or 48 acres. As shown in Table 1, 51% of landholders owned or managed properties of 20 hectares or less and 80% owned or managed properties of 50 hectares or less.

Table 1: "How large is your property?"

Hectares	Count	Percent	Cumulative Percent
1 - 10	18	26.1	26.1
11 - 20	17	24.6	50.7
21 - 30	6	8.7	59.4
31 - 40	8	11.6	71.0
41 - 50	6	8.7	79.7
51 - 60	4	5.8	85.5
61 - 70	1	1.4	87.0
71 - 80	0	0.0	87.0
81 - 90	0	0.0	87.0
91 - 100	1	1.4	88.4
101 +	8	11.6	100.0
Total landholders	69	100.0	
Median hectares			19.5

Source: EBC (2021).

Table 2 shows that a large percentage of properties were used for either lifestyle or hobby farming (45%) or livestock production (42%).

Table 2: "What best describes what your property is used for?"

Response	Count	Percent
Lifestyle or hobby farming	42	45.2
Livestock production (e.g., cattle, sheep, horses)	39	41.9
Conservation or wildlife refuge	21	22.6
Natural bushland	20	21.5
Horticulture	6	6.5
Carbon farming	1	1.1
Recreation (e.g., swimming, picnics, fishing)	1	1.1
Other uses	6	6.5
Total landholders	93	100.0

Note: Other uses included "native seed collection"; "charity"; "horse agistment"; "mental health" and "short stay accommodation". This is a multiple response table in which a respondent may be included in multiple rows.

Source: EBC (2021).

Seventy-seven percent (77%) of landholders indicated they usually lived on their property (Table 3).

Table 3: “Do you usually live on your property full-time?”

Response	Count	Percent
Yes	70	76.9
No	21	23.1
Total landholders	91	100.0

Source: EBC (2021).

As shown in Table 4, landholders had owned their property for an average of 8 years. Only 19% had owned their property for over 21 years.

Table 4: “How many years have you owned your property?”

Years	Count	Percent	Cumulative Percent
1 - 2	8	9.3	9.3
3 - 4	13	15.1	24.4
5 - 6	19	22.1	46.5
7 - 8	5	5.8	52.3
9 - 10	8	9.3	61.6
11 - 12	5	5.8	67.4
13 - 14	1	1.2	68.6
15 - 16	4	4.7	73.3
17 - 18	2	2.3	75.6
19 - 20	5	5.8	81.4
21 +	16	18.6	100.0
Total landholders	86	100.0	
Median years			7.5

Source: EBC (2021).

Creeks on properties

Congewai Creek (28%) and Sandy Creek (22%) were the two most common creeks that were identified on landholder properties (Table 5). Approximately a quarter of all landholders (24%) indicated there were no creeks on their property.

Table 5: “Which creek (and their tributaries) is on your property?”

Response	Count	Percent
Congewai Creek	25	28.4
Sandy Creek	19	21.6
Cony Creek	8	9.1
Quorrobolong Creek	8	9.1
John Elm Creek	3	3.4
Wallaby Gully Creek	3	3.4
Bowwow Creek	2	2.3
Black Creek	1	1.1
Black Arm Creek	1	1.1
Clink Creek	1	1.1
Dora Creek	1	1.1
Gap Creek	1	1.1
Reedy Creek	1	1.1
Stewarts Creek	1	1.1
Warrawol Creek	1	1.1
Sweetmans Creek	0	0.0
Wallis Creek	0	0.0
Watagan Creek	0	0.0
Another creek not identified above	7	8.0
No creeks are on my property	21	23.9
Total landholders	88	100.0

Note: This is a multiple response table in which a respondent may be included in multiple rows.

Source: EBC (2021).

Amongst those landholders who indicated there was a creek on their property (Table 5), Table 6 shows the two most frequently reported uses of these creeks were an appreciation of the creeks aesthetic value (43%) and the use of the creek for livestock drinking water (31%).

Table 6: “How do you use the creek on your property?”

Response	Count	Percent
Appreciation of its aesthetic value	30	42.9
Livestock have access to the creek for drinking water	22	31.4
Conservation purposes, including vegetation and wildlife management	20	28.6
Livestock have access to water drawn from the creek	19	27.1
Creek crossings for stock and vehicles	18	25.7
Use the water for plants and gardens	10	14.3
Swimming	9	12.9
Irrigation	8	11.4
Fishing	7	10.0
Use the water for domestic purposes	2	2.9
Use the water for pastures	2	2.9
Use the water for drinking	1	1.4
Other uses	1	1.4
Don't use the creek in any way	9	12.9
Total landholders	70	100.0

Note: Percentages based on those landholders who reported a creek on their property.

Other uses included: “aquatic biodiversity protection vital connection when water flows - reduced dramatically over last 3 decades”.

This is a multiple response table in which a respondent may be included in multiple rows.

Source: EBC (2021).

Amongst those landholders with a creek on their property, 30% indicated they had changed the way they used creeks over the past five years (Table 7)

Table 7: “Have you changed the way you use creeks in the Congewai or Quorrobolong Catchment over the past five years?”

Response	Count	Percent
Yes	21	30.0
No	49	70.0
Total landholders	70	100.0

Note: Percentages based on those landholders who reported a creek on their property.

Source: EBC (2021).

The most common change to the use of creeks in the last five years focussed on reducing livestock access to creeks through either fencing or off stream watering (Table 8).

Table 8: “Describe how you have changed the way you use the creeks”

Response	Count	Percent
Limited or less use of creeks by livestock	7	50.0
Fenced the creeks out	6	42.9
Used for off stream watering	4	28.6
Vegetation rehabilitation	3	21.4
Improved vehicle crossings	1	7.1
Protected riparian zone	1	7.1
Reduced erosion	1	7.1
Wildlife corridors	1	7.1
Total landholders	14	100.0

Note: Percentages based on those landholders who reported a creek on their property and who had changed the way they had used the creek in the last five years.

This is a multiple response table in which a respondent may be included in multiple rows.

Source: EBC (2021).

Water quality in creeks

Landholders rated the water quality in their creeks in the last 12 months as slightly above average with a median score of 6.00 and with 82% of landholders scoring the water quality as 5 or better (Table 9).

Table 9: “...in the last 12 months, how would you rate the usual water quality in the creek on your property?”

Response	Count	Percent	Cumulative percent
10 (extremely good)	1	2.2	2.2
9	3	6.7	8.9
8	9	20.0	28.9
7	7	15.6	44.5
6	4	8.9	53.4
5 (average)	13	28.9	82.3
4	2	4.4	86.7
3	4	8.9	95.6
2	1	2.2	97.8
1	0	0.0	97.8
0	1	2.2	100.0
Total landholders	45	100.0	
Median score			6.00

Note: Percentages based on those landholders who reported a creek on their property.

Source: EBC (2021).

Amongst landholders with creeks on their property, 61% were aware of the water quality in their creeks five years ago (Table 10).

Table 10: “Were you aware of the water quality in the creek on your [property five years ago?”

Response	Count	Percent
Yes	38	61.3
No	24	38.7
Total landholders	62	100.0

Note: Percentages based on those landholders who reported a creek on their property.
 Source: EBC (2021).

When landholders were asked to think back five years ago and rate the water quality in their creeks, the median water quality score was 5.5, with 73% of landholders reporting the water quality was average or better (Table 11). There was no statistically significant difference (Median Test), between the rating of water quality five years ago (Table 11) and in the last 12 months (Table 9).

Table 11: “...thinking back five years ago, how would you rate the usual water quality in the creek on your property?”

Response	Count	Percent	Cumulative percent
10 (extremely good)	3	10.0	10.0
9	3	10.0	20.0
8	5	16.7	36.7
7	3	10.0	46.7
6	1	3.3	50.0
5 (average)	7	23.3	73.3
4	2	6.7	80.0
3	4	13.3	93.3
2	1	3.3	96.6
1	1	3.3	100.0
0	0	0.0	100.0
Total landholders	30	100.0	
Median score			5.50

Note: Percentages based on those landholders who reported they were aware of the water quality in the creek on their property five years ago.
 Source: EBC (2021).

Table 12 shows that in 'a typical year' the water quality in creeks was rated with an average score of 7 on a 10-point scale, with 88% of landholders judging the water quality as average or better.

There was no statistically significant difference (Median Test) between the rating of water quality five years ago (Table 11) and in a typical year (Table 12)

Table 22: "...in a typical year, how would you rate the usual water quality in the creek on your property?"

Response	Count	Percent	Cumulative percent
10 (extremely good)	2	3.9	3.9
9	3	5.9	9.8
8	10	19.6	29.4
7	11	21.6	51.0
6	5	9.8	60.8
5 (average)	14	27.5	88.3
4	2	3.9	92.2
3	3	5.9	98.0
2	0	0.0	98.0
1	1	2.0	100.0
0	0	0.0	100.0
Total landholders	51	100.0	
Median score			7.00

Note: Percentages based on those landholders who reported a creek on their property.

Source: EBC (2021).

Table 13 indicates that when landholders directly compared the current water quality in the creek on their property to five years ago, 38% indicated it was better now; 38% indicate it was the same as five years ago; and 24% indicated the water quality is now worse than it was 5 years ago.

Table 33: "If you compare the water quality of the water in the creek on your property now to 5 years ago, would you say the water quality is...?"

Response	Count	Percent
A lot better	3	8.1
Somewhat better	11	29.7
The same	14	37.8
Somewhat worse	4	10.8
Worse	5	13.5
Don't know	0	0.0
Total landholders	37	100.0

Note: Percentages based on those landholders who reported they were aware of the water quality in the creek on their property five years ago

Source: EBC (2021).

Those landholders who reported the water quality was now either ‘a lot better’ or ‘somewhat better’ when compared to five years ago (Table 13), were also asked why they believed the water quality was better now than it was five years ago (Table 14).

As shown in Table 14 most landholders believed the water quality was now better than it was five years ago because of the increased vegetation and ground cover on creek banks and the reduction in erosion and livestock using the creeks.

Table 44: “Why do you think the water quality is better?”

Response	Count	Percent
Increased vegetation on creek banks	6	42.9
Increased ground cover on creek banks and near creeks	5	35.7
Reduced erosion of creek banks	4	28.6
Reduced number of livestock accessing the creek	4	28.6
A reduction in sediment	3	21.4
Increased water flow in the creek	3	21.4
An increase in water life (inc. fish and birds)	2	14.3
Less mining in the area	2	14.3
Reduced agricultural runoff through changed grazing practices	2	14.3
Less wastewater in the creek	0	0.0
Reduced use of fertilisers	0	0.0
Reduced waste, litter or rubbish in the creek	0	0.0
Other reasons	1	7.1
Total landholders	14	100.0

Note: Other reasons included: “carp and water less clear”.
Percentages based on those landholders who reported the water quality in creeks on their property was either ‘a lot better’ or ‘somewhat better’ than five years ago.
This is a multiple response table in which a respondent may be included in multiple rows.

Source: EBC (2021).

Although based on a low sample count, landholders who believed the water quality was worse now when compared to five years ago believed this was because of the increase in sediment and that there was less water flow in the creeks (Table 15).

Table 55: “Why do you think the water quality is worse?”

Response	Count	Percent
An increase in sediment	3	37.5
Less water flow in the creek	3	37.5
Reduced vegetation on creek banks	2	25.0
Reduced water life (inc. fish and birds)	2	25.0
An increase in waste, litter or rubbish in the creek	1	12.5
Increased erosion of creek banks	1	12.5
More wastewater in the creek	1	12.5
Increased agricultural runoff through changing grazing practices	0	0.0
Increased number of livestock accessing the creek	0	0.0
Increased use of fertilisers	0	0.0
More mining in the area	0	0.0
Reduced ground cover on creek banks and near creeks	0	0.0
Other reasons	5	62.5
Total landholders	8	100.0

Note: Other reasons included: “upstream management poor and increased traffic and previously unknown weeds due to soils/fill being brought in. incl by council”, “feral deer also accessing water kept fenced off to stock”; “mosquito fish are everywhere and there is always a huge amount of suspended sediment in the creek presumably due to a combination of carp in the creek and run-off from the road and surrounding properties”; “carp”.
Percentages based on those landholders who reported the water quality in creeks on their property was either ‘somewhat worse’ or ‘worse’ than five years ago.
This is a multiple response table in which a respondent may be included in multiple rows.

Source: EBC (2021).

Table 16 shows that many landholders made judgements about water quality based on the visual characteristics on the water in the creek (72%) and more specifically the colour of the water (52%).

Table 66: “On what basis do you make judgements about water quality?”

Response	Count	Percent
I have seen the water in the creek	43	71.7
The colour of the water	31	51.7
The plants or aquatic animals in the creek	20	33.3
Smell or odour	14	23.3
Rubbish or litter in or near the creek	8	13.3
Heard about it from neighbours or friends	5	8.3
Read about water quality in the creeks in the newspaper or other media	3	5.0
Don't know	3	5.0
Other	13	21.7
Total landholders	60	100.0

Note: Other included: “cattle drinking the water”; “cattle will now drink the water”; “damage done by carp”; “lack of algae”; “I have done my part for the project. Upstream has not changed at all for both creeks”; “cattle still have access to both creeks upstream”; “observation, natural filters, external advice, drought has definitely had an impact on the level of biodiversity”; “tasted it on occasion”; “the Wallaby Gully Creek only runs during heavy rain”; “turbidity from carp is the big issue”; “water is only there after rain”; “water quality testing using stream watch kit with Congewai Valley Landcare Group”. Percentages based on those landholders who reported a creek on their property. This is a multiple response table in which a respondent may be included in multiple rows.

Source: EBC (2021).

Over two thirds (70%) of landholders believed Hunter LLS should be primarily responsible for managing or improving the water quality in creeks in the catchment, with 58% of landholders also indicating property owners should be responsible for the water quality in creeks (Table 17).

Table 77: “Who do you think should be primarily responsible for managing or improving water quality in creeks in the catchments?”

Response	Count	Percent
Hunter Local Land Services	57	70.4
Property owners	47	58.0
Hunter Water	29	35.8
Local Council	27	33.3
State or Australian Government agencies	18	22.2
No one	2	2.5
Other	6	7.4
Total landholders	81	100.0

Note: Other included: “combination of above we all have part to make the environment better”; “communities”; “do not increase building on properties in area for dirt bike users who do not care about the land around as they enjoy digging up the area and noisy”; “each community area, like Quorrobolong has a community of people who could nominate as a spokesperson for their area”; “everyone is responsible”; “I don't think it should fall to any one party”. Percentages based on all landholders. This is a multiple response table in which a respondent may be included in multiple rows.

Source: EBC (2021).

Riparian protection

Forty-four percent of landholders indicated they had undertaken riparian, or creek bank protection and enhancement works on their property in the past five years (Table 18).

Table 88: “In the past five years have you undertaken any riparian or creek bank protection and enhancement works on your property?”

Response	Count	Percent
Yes	27	44.3
No	34	55.7
Total landholders	61	100.0

Note: Percentages based on those landholders who reported a creek on their property.

Source: EBC (2021).

Of those landholders who had undertaken riparian protection, 89% believed the riparian protection they had undertaken had been of benefit to them (Table 19).

Table 99: “Has undertaking creek bank protection or enhancement been beneficial to you?”

Response	Count	Percent
Yes	23	88.5
No	3	11.5
Total landholders	26	100.0

Note: Percentages based on those landholders who reported they had undertaken riparian or creek bank protection and enhancement works on their property in the past five years.

Source: EBC (2021).

The two primary benefits of undertaking riparian projection works (Table 20) were improving the stability of creek banks (76%) and improving native vegetation and other natural resources on the property (71%).

Only two landholders provided a description of why riparian works were not of benefit to them. They included, “the water flows downstream where I believe it has been extracted for other property owners use including dust suppression for road works” and that it was “too early to see any benefit”.

Table 20: “Why has it been beneficial to you?”

Response	Count	Percent
Improved the stability of the creek banks	16	76.2
Improved the native vegetation and natural resources on my property	15	71.4
Reduced sediment entering the waterway	11	52.4
Improved the visual appearance of my property	10	47.6
Increased the resilience of my creek to cope with flood events	9	42.9
Improved the productivity of my property (i.e., weight gains, carrying capacity)	2	9.5
Increased the value of my property	2	9.5
Made my livestock healthier	2	9.5
Other benefits	4	19.0
Total landholders	21	100.0

Note: Other included: “benefits to stock movement”; “better fencing”; “I have been able to control the creek direction changes on the flats during flooding, however, there has been a potential creek direction change of Sandy Creek from my flats to the very edge of Sandy Creek Rd under my fence line that worries me”.

Percentages based on those landholders who reported creek bank protection or enhancement had been beneficial.

This is a multiple response table in which a respondent may be included in multiple rows.

Source: EBC (2021).

Table 21 shows that since undertaking riparian works over half of all landholders (54%) had changed the way they used or valued creeks in the catchment.

Table 21: “Since undertaking creek bank protection or enhancement, have you changed the way that you use or value the creeks in the Congewai or Quorrobolong Catchments?”

Response	Count	Percent
Yes	14	53.8
No	12	46.2
Total landholders	26	100.0

Note: Percentages based on those landholders who reported they had undertaken riparian or creek bank protection and enhancement works on their property in the past five years.

Source: EBC (2021).

The most common change associated in the use of creeks by landholders was that cattle no longer used the creeks or accessed creek water (Table 22).

Table 22: “In what way has your use of the creeks in the Congewai or Quorrobolong Catchments changed?”

Response	Count	Percent
Cattle no longer use creeks or creek water	7	63.3
Awareness of needs of native species	1	9.1
Concerned about destruction of other waterways (e.g., bridgeworks, threatened species)	1	9.1
Increased awareness of biodiversity	1	9.1
Increased awareness of erosion and prevention	1	9.1
Stock management	1	9.1
Total landholders	11	100.0

Note: Percentages based on those landholders who reported they had changed the way they used or value the creeks in the Congewai or Quorrobolong Catchments

This is a multiple response table in which a respondent may be included in multiple rows.

Source: EBC (2021).

Riparian protection funded by Hunter Local Land Services

Of those landholders who had undertaken riparian protection in the last five years (Table 18), two thirds (67%) had done so with funding provided by Hunter LLS (Table 23).

Table 23: “In the past five years did you receive any funding from Hunter LLS for riparian or creek bank protection and enhancement?”

Response	Count	Percent
Yes	18	66.7
No, I applied for funding but did not receive funding	2	7.4
No, although I was interested, I decided not to seek funding	3	11.1
No	4	14.8
Total landholders	27	100.0

Note: Percentages based on those landholders who reported undertaking riparian or creek bank protection and enhancement on their property in the last five years.

Source: EBC (2021).

Of the seven landholders who did not seek funding (Table 23), two (29%) did not seek funding as they didn't want to restrict their livestock's access to the creek or creek bank areas (Table 24).

Table 24: “Was one of the reasons you did not apply for funding because you didn't want to restrict your livestock's access to the creek or creek bank areas?”

Response	Count	Percent
Yes	2	28.6
No	5	71.4
Total landholders	7	100.0

Note: Percentages based on those landholders who reported they did not seek funding from Hunter LLS for riparian or creek bank protection and enhancement on their property in the last five years.

Source: EBC (2021).

As shown in Table 25, other reasons landholders did not apply for funding included that they didn't have enough time to apply for funding (43%) and they were not aware funding was available (43%).

Table 25: “What reasons did you have for not applying for funding?”

Response	Count	Percent
I didn't have enough time to apply for funding	3	42.9
I wasn't aware of the funding	3	42.9
Drought or bushfire delayed making the changes I wanted to make	1	14.3
I didn't want to work with Hunter LLS or Hunter Water	1	14.3
I needed more information or advice	1	14.3
Did not see any financial benefit for my property	0	0.0
Flooding delayed making the changes I wanted to make	0	0.0
I am still considering what to do in the future with my property	0	0.0
I don't see managing environmental areas as a priority	0	0.0
I needed to organise additional funding	0	0.0
Don't know	0	0.0
Other	3	42.9
Total landholders	7	100.0

Note: Percentages based on those landholders who reported they did not seek funding from Hunter LLS for riparian or creek bank protection and enhancement on their property in the last five years.

Other included: “After seeing the mess of cut down privet left on the creek bank and in the creek, which blocked the creek after flooding, we would not deal with those people again”; “privacy a priority”.

This is a multiple response table in which a respondent may be included in multiple rows.

Source: EBC (2021).

Eighty-three percent of landholders who received funding from Hunter LLS in the past five years, received that funding under the Hunter LLS Catchment Improvement Program (Table 26).

Table 26: “Did you receive funding under the Hunter LLS Paxton Catchment Improvement Program?”

Response	Count	Percent
Yes	15	83.3
No, I applied for funding but did not receive funding	1	5.6
No, although I was interested, I decided not to seek funding	0	0.0
No	0	0.0
Don't know or unsure	2	11.1
Total landholders	18	100.0

Note: Percentages based on those landholders who reported they obtained funding from Hunter LLS for riparian or creek bank protection and enhancement on their property in the last five years.

Source: EBC (2021).

Of those landholders who received funding from Hunter LLS (Table 23), 94% received funding for the installation of fences to exclude stock from accessing creek banks and 61% received funding for planting trees and shrubs on creek banks (Table 27).

Table 27: “What creek bank protection or enhancement did you undertake?”

Response	Count	Percent
Installation of fences to exclude stock from accessing creek banks	17	94.4
Planting trees and shrubs on creek banks	11	61.1
Changes to stock grazing management to reduce nutrient runoff	9	50.0
Weed control	8	44.1
Installation of off stream watering (inc. troughs and pumps)	6	33.3
Soil erosion control	2	11.1
Other	1	5.6
Total landholders	18	100.0

Note: Percentages based on those landholders who reported they obtained funding from Hunter LLS for riparian or creek bank protection and enhancement on their property in the last five years.

Other included: “slowing the water flow by not removing fallen trees and allowing more she oaks to grow along the creek”. This is a multiple response table in which a respondent may be included in multiple rows.

Source: EBC (2021).

Fifty-nine percent of those landholders who received funding from Hunter LLS believed that the creek bank protection or enhancement that they had undertaken had improved the water quality in the creek and an additional 24% were unsure and believed the water quality of the creek may improve in the future (Table 28).

Table 28: “In the time since you undertook the creek bank protection or enhancement do you think it has improved the water quality in your creek?”

Response	Count	Percent
Yes	10	58.8
No	3	17.6
No, but may in the future	4	23.5
Unsure	0	0.0
Total landholders	17	100.0

Note: Percentages based on those landholders who reported they obtained funding from Hunter LLS for riparian or creek bank protection and enhancement on their property in the last five years.

Source: EBC (2021).

Riparian protection *not funded* by Hunter Local Land Services

Of those landholders who had undertaken creek bank protection or enhancement works on their property in the past five years, two thirds (68%) had undertaken activities that were not funded by Hunter LLS (Table 29).

Table 29: “In the past five years have you undertaken any creek bank protection or enhancement on your property that was *not funded* by Hunter LLS? This may include activities you funded yourself or were funded from other sources.”

Response	Count	Percent
Yes	17	68.0
No	8	32.0
Total landholders	25	100.0

Note: Percentages based on those landholders who reported undertaking riparian or creek bank protection and enhancement on their property in the last five years.

Source: EBC (2021).

Creek bank protection and enhancement that was not funded by Hunter LLS primarily included weed control activities (Table 30)

Table 30: “What creek bank protection or enhancement did you undertake?” (*activities not funded by Hunter LLS*)

Response	Count	Percent
Weed control	11	64.7
Changes to stock grazing management to reduce nutrient runoff	8	47.1
Planting trees and shrubs on creek banks	7	41.2
Installation of fences to exclude stock from accessing creek banks	6	35.3
Soil erosion control	4	23.5
Installation of off stream watering (inc. troughs and pumps)	2	11.8
Other	3	17.6
Total landholders	17	100.0

Note: Percentages based on those landholders who reported undertaking riparian or creek bank protection and enhancement on their property in the last five years that was not funded by Hunter LLS.

Other included: “slow water flow by not removing fallen trees and allowing more she oaks to grow along the creek”; “ensure multiple sediment catchments remain, removing rusted harmful historical barb wire fencing nearby”; “works to improve creek crossings and access for vehicles while maintaining ability for creeks to flood and flow correctly. Boundary fencing at both creek pinch points require constant repair after flooding”.

This is a multiple response table in which a respondent may be included in multiple rows.

Source: EBC (2021).

Fifty-nine percent of landholders indicated that activities they had undertaken that were not funded by Hunter LLS had likely improved the water quality in the creek (Table 31)

Table 31: “In the time since you undertook the creek bank protection or enhancement do you think it has improved the water quality in your creek?” (*not funded by Hunter LLS*)

Response	Count	Percent
Yes	10	58.8
No	4	23.5
No, but may in the future	2	11.8
Unsure	1	5.9
Total landholders	17	100.0

Note: Percentages based on those landholders who reported undertaking riparian or creek bank protection and enhancement on their property in the last five years that was not funded by Hunter LLS.

Source: EBC (2021).

Funding for riparian protection

Across all landholders 40% indicated they were aware that funding was available for creek bank protection through the Hunter LLS Paxton Catchment Improvement Program (Table 32)

Table 32: “Were you aware that funding was available for creek bank protection through the Hunter LLS Paxton Catchment Improvement Program (where funding was provided in partnership with Hunter Water)?”

Response	Count	Percent
Yes	32	39.5
No	49	60.5
Total landholders	81	100.0

Source: EBC (2021).

Of those landholders who were aware funding was available (Table 32), a third became aware of the Paxton Catchment Improvement Program funding through a local community group and a third became aware of the funding through neighbours or friends (Table 33).

Table 33: “How did you become aware of the Paxton Catchment Improvement Program funding?”

Response	Count	Percent
From a local community group (e.g., Landcare)	10	31.3
From neighbours or friends	10	31.3
From a staff member at Hunter LLS	9	28.1
At a Hunter LLS event	8	25.0
Hunter LLS advertising in newsletters or internet	6	18.8
Media and advertising	3	9.4
Other	1	3.1
Total landholders	32	100.0

Note: Percentages based on those landholders who were aware funding was available for creek bank protection through the Hunter LLS Paxton Catchment Improvement Program.

Other included: “I work at Hunter Water and have been involved in the project”.

This is a multiple response table in which a respondent may be included in multiple rows.

Source: EBC (2021).

Amongst landholders with a creek on their property, a third (62%) indicated they would be interested in applying for funding for creek bank protection and enhancement in the future (Table 34).

Table 34: “Would you be interested in applying for funding for creek bank protection and enhancement in the future?”

Response	Count	Percent
Yes	37	61.7
No	23	38.3
Total landholders	60	100.0

Note: Percentages based on those landholders who reported a creek, or its tributaries was on their property.

Source: EBC (2021).

Of those landholders interested in applying for funding in the future, approximately three-quarters of landholders were interested in obtaining funding for weed control (72%) with 53% interested in funding for planting trees and shrubs on creek banks and soil erosion control (Table 35).

Table 35: “What type of activities would you like to obtain funding for?”

Response	Count	Percent
Weed control	26	72.2
Planting trees and shrubs on creek banks	19	52.8
Soil erosion control	19	52.8
Installation of fences to exclude stock from accessing creek banks	18	50.0
Installation of off stream watering (inc. troughs and pumps)	15	41.7
Changes to stock grazing management to reduce nutrient runoff	8	22.2
Other	5	13.9
Total landholders	36	100.0

Note: Percentages based on those landholders who reported they would be interested in applying for funding for creek bank protection and enhancement in the future.
Other included: “better creek crossings”; “carp control”; “getting rid of the carp”; “measures to slow water flow in the creek”; “some batter earthworks to prevent change in creek direction of Sandy Creek during flooding”.
This is a multiple response table in which a respondent may be included in multiple rows.

Source: EBC (2021).

Participation in Hunter Local Land Services events

Across all landholders, a third (31%) had participated in events hosted by Hunter LLS in the last five years (Table 36).

Table 36: “In the past five years have you participated in any events (e.g., workshops, field days, training) hosted by Hunter LLS?”

Response	Count	Percent
Yes	25	31.3
No	50	62.5
Don’t know	5	6.3
Total landholders	80	100.0

Source: EBC (2021).

The most common events hosted by Hunter LLS in which landholders participated (Table 37) were events about creek bank management (46%) and grazing management (38%).

Table 37: “What was the Hunter LLS event about?”

Response	Count	Percent
Creek bank management	11	45.8
Grazing management	9	37.5
Weed management	6	25.0
Biodiversity	5	20.8
Revegetation	5	20.8
Soil management	3	12.5
Threatened species	3	12.5
Farm planning	2	8.3
Management of pest animals	2	8.3
Other	4	16.7
Total landholders	24	100.0

Note: Percentages based on those landholders who reported they had participated in events hosted by Hunter LLS in the past five years.

Other included: “cane toads”; “fencing”; “information booth at Tocal field days”.
This is a multiple response table in which a respondent may be included in multiple rows.

Source: EBC (2021).

A quarter of landholders (23%) reported that the creek bank protection or enhancement they had undertaken was done as a direct consequence of their attendance at a Hunter LLS event (Table 38)

Table 38: “Was the creek bank protection or enhancement undertaken as a direct result of your attendance at a Hunter LLS event?”

Response	Count	Percent
Yes	6	23.1
No	20	76.9
Total landholders	26	100.0

Note: Percentages based on those landholders who reported undertaking riparian or creek bank protection and enhancement on their property in the last five years

Source: EBC (2021).

Seventy percent of landholders reported that prior to undertaking creek bank protection or enhancement they had received advice or direction from Hunter LLS staff (Table 39).

Table 39: “Prior to undertaking the creek bank protection or enhancement did you receive any individual advice or direction from Hunter LLS staff, such as a property visit, property assessment or a request for assistance?”

Response	Count	Percent
Yes	19	70.4
No	8	29.6
Total landholders	27	100.0

Note: Percentages based on those landholders who reported undertaking riparian or creek bank protection and enhancement on their property in the last five years.

Source: EBC (2021).

Although 60% of landholders indicated they had made changes to how they managed their property because of their participation in Hunter LLS events, an additional 24% also indicated they had as yet not made changes, but were planning to do so in the future (Table 40).

Table 40: “Have you changed your property management practices because of your participation in Hunter LLS event(s)?”

Response	Count	Percent
Yes	15	60.0
Not yet, but I am planning to make changes	6	24.0
No, not planning to make changes	4	16.0
Total landholders	25	100.0

Note: Percentages based on those landholders who reported they had participated in events hosted by Hunter LLS in the past five years.

Source: EBC (2021).

The two main reasons landholders gave for not making changes to their land management practices as a result of their participation in a Hunter LLS event (Table 41) were that they didn't have the equipment or materials (50%) and that they had not had the time to make the changes (40%).

Table 41: "Why haven't you changed your management practices?"

Response	Count	Percent
I don't have the equipment or materials	5	50.0
Have not had the time	4	40.0
Already undertaking the practices	2	20.0
Difficult to apply on my property	2	20.0
I don't have the skills required	2	20.0
No need or requirement	2	20.0
Too costly or expensive	2	20.0
I need more information or advice	1	10.0
Lack of people to help	1	10.0
Other	1	10.0
Total landholders	10	100.0

Note: Percentages based on those landholders who reported they not yet made changes or were not intending to make changes to their property management practices.

Other included: "Only had the property for less than a year".

This is a multiple response table in which a respondent may be included in multiple rows.

Source: EBC (2021).

The type of changes landholders made to the management of their property are shown in Table 42, with the two most frequently reported changes being riparian fencing (23%) and removing stock access to waterways (23%).

Table 42: "What changes did you make?"

Response	Count	Percent
Riparian fencing	3	23.1
Removing or reducing stock access to waterways (inc. off stream watering)	3	23.1
Pest and/or weed management	2	15.4
Planting trees	2	15.4
Revegetation of creek banks	2	15.4
Rotational grazing	2	15.4
Erosion control (inc. contour ripping)	1	7.7
More cows	1	7.7
No longer use barbed wire	1	7.7
Pasture improvement	1	7.7
Plantation formation	1	7.7
Restrict cattle access to critical areas	1	7.7
Stock water usage	1	7.7
Total landholders	13	100.0

Note: Percentages based on those landholders who reported they had made changes to their property management practices because of their participation in Hunter LLS events.

This is a multiple response table in which a respondent may be included in multiple rows.

Source: EBC (2021).

Survey of urban residents

Equal numbers of urban residents lived in the three towns of Ellalong, Paxton and Millfield (Table 43).

Table 43: “In which town do you usually live?”

Response	Count	Percent
Ellalong	42	37.5
Paxton	34	30.4
Millfield	34	30.4
Other town or location	2	1.8
Total urban residents	112	100.0

Note: Other town or location included “Cessnock” and “Greta Main”.

Source: EBC (2021).

Residents had lived an average of 5 years in the town, with two-thirds of all urban residents living in town for less than six years (Table 44).

Table 44: “ How many years have you lived in this town?”

Years	Count	Percent	Cumulative Percent
1 - 3	41	37.3	37.3
4 - 6	27	24.4	61.7
7 - 9	10	9.1	70.8
10 - 12	6	5.5	76.3
13 - 15	7	6.4	82.7
16 - 18	6	5.5	88.2
19 - 21	0	0.0	88.2
22 - 24	3	2.7	90.9
25 - 27	1	0.9	91.8
28 - 30	1	0.9	92.7
31 + years	8	7.3	100.0
Total urban residents	110	100.0	
Median years lived in town			5.0

Source: EBC (2021).

Congewai Creek (64%), Sandy Creek (54%), Sweetmans Creek (49%) and Quorrobolong Creek (47%) were the most commonly known creeks in the catchment (Table 45).

Table 45: “Do you know of any of these creeks in the catchment area?”

Response	Count	Percent
Congewai Creek	66	64.1
Sandy Creek	56	54.4
Sweetmans Creek	50	48.5
Quorrobolong Creek	48	46.6
Dora Creek	37	35.9
Black Creek	34	33.0
Wallaby Gully Creek	34	33.0
Watagan Creek	33	32.0
Wallis Creek	18	17.5
Reedy Creek	16	15.5
Gap Creek	15	14.6
Black Arm Creek	9	8.7
Cony Creek	8	7.8
Bowwow Creek	5	4.9
Stewarts Creek	5	4.9
Clink Creek	4	3.9
John Elm Creek	4	3.9
Warrawol Creek	2	1.9
Another creek not identified above	8	7.8
No, I don't know of any of these creeks	7	6.0
Total urban residents	103	100.0

Note: This is a multiple response table in which a respondent may be included in multiple rows.

Source: EBC (2021).

Over 80% of urban residents indicated the health of creeks was 'important' or 'very important' to them (Table 46).

Table 46: “Using the following scale, rate how important the health of the creek(s) is to you”.

Response	Count	Percent
Not at all important (1)	2	2.1
Unimportant	7	7.3
Somewhat unimportant	8	8.3
Somewhat important	1	1.0
Important	22	22.9
Very important (6)	56	58.3
Total urban residents	96	100.0
Median score		6.0

Note: Percentages based on those urban residents who knew of and were able to identify a creek in the catchment area.

Source: EBC (2021).

Two-thirds (65%) of urban residents had visited at least one creek in the catchment in the last 12 months (Table 47).

Table 47: “Have you used or visited any of the creeks you identified in the last 12 months?”

Response	Count	Percent
Yes	64	64.6
No	35	35.4
Total urban residents	99	100.0

Note: Percentages based on those urban residents who knew of and were able to identify a creek in the catchment area.

Source: EBC (2021).

Walking (61%) and the appreciation of the creek’s aesthetic value (48%) were the two most common ‘uses’ of creeks identified by urban residents (Table 48).

Table 48: “How did you use any of these creeks?”

Response	Count	Percent
Walking	38	61.3
Appreciation of its aesthetic value	30	48.4
Picnics	18	29.0
Fishing	16	25.8
Swimming	8	12.9
Livestock use it	7	11.3
Boating	4	6.5
Pumping water	3	4.8
Other use	4	6.5
Total urban residents	62	100.0

Note: Percentages based on those urban residents who had used or visited creeks in the last 12 months.
This is a multiple response table in which a respondent may be included in multiple rows.

Source: EBC (2021).

Most urban residents (86%) indicated the water quality in the creeks they had visited in the last 12 months was average or better (Table 49).

Table 49: “...in the last 12 months, how would you rate the usual quality of the water in the creeks you have visited?”

Response	Count	Percent	Cumulative percent
10 (extremely good)	1	1.8	1.8
9	5	8.8	10.6
8	12	21.1	31.7
7	8	14.0	45.7
6	7	12.3	58.0
5 (average)	16	28.1	86.1
4	5	8.8	94.8
3	0	0.0	94.8
2	3	5.2	100.0
1	0	0.0	100.0
0	0	0.0	100.0
Total urban residents	57	100.0	
Median score			6.00

Note: Percentages based on those urban residents who had used or visited creeks in the last 12 months.

Source: EBC (2021).

In describing the water quality in creeks they had visited (Table 50), two-thirds of urban residents (64%) described them as ‘moderately disturbed with some farming and land clearing in the area’.

Table 50: “How would you describe the water quality of these creeks?”

Response	Count	Percent
pristine (high conservation value, not disturbed)	7	11.9
moderately disturbed (e.g., some farming and land clearing in the area)	38	64.4
highly disturbed (highly cleared and very polluted)	9	15.3
Don't know	5	8.5
Total urban residents	59	100.0

Note: Percentages based on those urban residents who had used or visited creeks in the last 12 months.

Source: EBC (2021).

Just over a third of urban residents (40%) were aware of the water quality in the creeks five years ago (Table 51).

Table 51: “Were you aware of the water quality in any of the creeks 5 years ago?”

Response	Count	Percent
Yes	23	39.7
No	35	60.3
Total urban residents	58	100.0

Note: Percentages based on those urban residents who knew of and were able to identify a creek in the catchment area.
 Source: EBC (2021).

The creeks in which most urban residents were aware of the water quality five years ago (Table 52) included Stewarts Creek (67%), Reedy Creek (50%), Black Arm Creek (44%) and Wallaby Gully Creek (44%).

Table 52: “What creeks were you aware of the water quality 5 years ago?”

Response	Count	Percent
Stewarts Creek	12	66.7
Reedy Creek	9	50.0
Black Arm Creek	8	44.4
Wallaby Gully Creek	8	44.4
Wallis Creek	6	33.3
John Elm Creek	3	16.7
Dora Creek	2	11.1
Bowwow Creek	1	5.6
Congewai Creek	1	5.6
Cony Creek	1	5.6
Gap Creek	1	5.6
Sandy Creek	1	5.6
Warrawol Creek	1	5.6
Black Creek	0	0.0
Clink Creek	0	0.0
Quorrobolong Creek	0	0.0
Sweetmans Creek	0	0.0
Watagan Creek	0	0.0
Another creek not identified above	6	33.3
No, I don't know of any of these creeks	3	16.7
Total urban residents	18	100.0

Note: Percentages based on those urban residents who were aware of the water quality in creeks five years ago..
 This is a multiple response table in which a respondent may be included in multiple rows.
 Source: EBC (2021).

Ninety percent of urban residents indicated the water quality in the creeks they had visited five years ago was either average or better (Table 53).

Table 53: "...five years ago how would you rate the usual quality of the water in the creeks you have visited?"

Response	Count	Percent	Cumulative percent
10 (extremely good)	0	0.0	0.0
9	0	0.0	0.0
8	1	5.0	5.0
7	4	20.0	25.0
6	5	25.0	50.0
5 (average)	8	40.0	90.0
4	2	10.0	100.0
3	0	0.0	100.0
2	0	0.0	100.0
1	0	0.0	100.0
0	0	0.0	100.0
Total urban residents	20	100.0	
Median score			5.50

Note: Percentages based on those urban residents who were aware of the water quality in creeks five years ago.
Source: EBC (2021).

Although based on a small sample size, most urban residents who were aware of water quality in the creeks five years ago and now, believed the water quality was now either the same or better (57%) when compared to five years ago (Table 54).

Table 54: "If you compare the quality of the water in these creeks 5 years ago to now, would you say the water quality is..."

Response	Count	Percent
A lot better	0	0.0
Somewhat better	7	30.4
The same	6	26.1
Somewhat worse	5	21.7
Worse	4	17.4
Don't know	1	4.3
Total urban residents	23	100.0

Note: Percentages based on those urban residents who were aware of the water quality in creeks five years ago.
Source: EBC (2021).

Table 55 shows a range of different attributes given by urban residents for the improvement in water quality over the past five years.

Table 55: “Why do you think the water quality is better?”

Response	Count	Percent
Increased water flow in the creek	3	42.9
Increased ground cover on creek banks and near creeks	2	28.6
Increased vegetation on creek banks	2	28.6
Increase in water life (inc. fish and birds)	2	28.6
Less mining in the area	2	28.6
Reduced erosion of creek banks	2	28.6
A reduction in sediment	1	14.3
Less wastewater in the creek	1	14.3
Reduced agricultural runoff through changed grazing practices	0	0.0
Reduced number of livestock accessing the creek	0	0.0
Reduced use of fertilisers	0	0.0
Reduced waste, litter or rubbish in the creek	0	0.0
Other reasons	0	0.0
Total urban residents	7	100.0

Note: Percentages based on those urban residents who believed the water quality in creeks was now a lot better or somewhat better than five years ago.
This is a multiple response table in which a respondent may be included in multiple rows.

Source: EBC (2021).

Amongst urban residents who believed the water quality had become worse over the past five years, an increase in sediment, less water flow, reduced water life and more wastewater in the creeks were common attributions for the belief in declining water quality (Table 56).

Table 56: “Why do you think the water quality is worse?”

Response	Count	Percent
An increase in sediment	4	57.1
Less water flow in the creek	4	57.1
Reduced water life (inc. fish and birds)	4	57.1
More wastewater in the creek	3	42.9
Increased erosion of creek banks	2	28.6
Reduced vegetation on creek banks	2	28.6
Increased agricultural runoff through changing grazing practices	1	14.3
Increased number of livestock accessing the creek	1	14.3
Increased use of fertilisers	1	14.3
More mining in the area	1	14.3
Reduced ground cover on creek banks and near creeks	1	14.3
An increase in waste, litter or rubbish in the creek	0	0.0
Other reasons	1	14.3
Total urban residents	7	100.0

Note: Percentages based on those urban residents who believed the water quality in creeks was now worse or somewhat worse than five years ago.
Other reasons included: “European carp infestation, non-native Australian mainland birds”
This is a multiple response table in which a respondent may be included in multiple rows.

Source: EBC (2021).

Eighty percent of urban residents indicated they made judgements about water quality based on having seen the water in the creeks. This was further reinforced by two-thirds of residents also indicating that their judgements of water quality was based on the colour of the water (Table 57).

Table 57: “On what basis do you make judgements about water quality in these creeks?”

Response	Count	Percent
I have seen the water in the creek	49	86.0
The colour of the water	37	64.9
The plants or aquatic animals in the creek	20	35.1
Smell or odour	16	28.1
Rubbish or litter in or near the creek	22	38.6
Heard about it from neighbours or friends	3	5.3
Read about water quality in the creeks in the newspaper or other media	6	10.5
Don't know	0	0.0
Other	4	7.0
Total urban residents	57	100.0

Note: Percentages based on those urban residents who knew of and were able to identify a creek in the catchment area. Other included: “wildlife presence”; “birds using the creek/vegetation and signs of animal use”; “I really want to stress the littering and rubbish issue”; “fish quality, carp numbers, rubbish”.

Source: EBC (2021).

Many urban residents indicated that if they were to use water in the creeks (Table 58), they would use it for watering gardens and plants (51%) or swimming (47%), with fewer residents indicating they would use it for drinking (7%) or consuming food produced by the water (18%).

Table 58: “In typical year, if you had access to the water in these creeks, would you...”

Response	Count	Percent
Use it for watering gardens and plants	29	50.9
Use it for swimming	27	47.4
Use it for livestock	20	35.1
Eat fish caught in this water	18	31.6
Consume food produced with this water	10	17.5
Use it for drinking if it was filtered using household filters	8	14.0
Use it for drinking	4	7.0
None of the above	9	15.8
Total urban residents	57	100.0

Note: Percentages based on those urban residents who knew of and were able to identify a creek in the catchment area. This is a multiple response table in which a respondent may be included in multiple rows.

Source: EBC (2021).

Two-thirds of urban residents believed either Hunter Water (67%) or the Local Council (66%) should be responsible for managing or improving water quality in creeks in the catchments (Table 59).

Table 59: “Who do you think should be primarily responsible for managing or improving water quality in creeks in the catchments?” (*Urban residents only*)

Response	Count	Percent
Hunter Water	61	67.0
Local Council	60	65.9
Hunter Local Land Services	54	59.3
Property owners	37	40.7
State or Australian Government agencies	26	28.6
No one	0	0.0
Other	5	7.0
Total urban residents	93	100.0

Note: Other included: “all of above”; “all residents that reside within an area that inhabits natural water flow”; “everyone”; “everyone that uses the creeks or their catchment areas”; “include nearby residential houses with runoff”.
This is a multiple response table in which a respondent may be included in multiple rows.

Source: EBC (2021).

Appendix A:
Questionnaire

Congewai and Quorrobolong Catchments: Water Quality and Catchment Survey 2021

(untitled)

LOGIC Show/hide trigger exists.

1. Is your property....

- located in a town or urban area (e.g., Paxton, Millfield, Ellalong (or other town))
- a rural property within the [Congewai and Quorrobolong Catchments](#)

Property and landholder characteristics

Page entry logic:

This page will show when: #1 Question "Is your property...." is one of the following answers ("a rural property within the [Congewai and Quorrobolong Catchments](#)")

2. How large is your property? (*record acres **or** hectares*)

Acres *or*

Hectares

3. What best describes what your property is used for? (*you may tick more than one box*)

- carbon farming
- conservation or wildlife refuge
- horticulture
- lifestyle or hobby farming
- livestock production (e.g., cattle, sheep, horses)
- natural bushland
- recreation (e.g., swimming, picnics, fishing)
- other uses (*please describe*)

4. Do you usually live on your property full-time?

- Yes
- No

5. How many years have you owned your property (*record one year if you have owned your property less than one year*)

 years

Creeks on your property

Page entry logic:

This page will show when: #1 Question "Is your property...." is one of the following answers ("a rural property within the [Congewai and Quorrobolong Catchments](#)")

LOGIC Show/hide trigger exists.

6. Which creek (and their tributaries) is on your property? *(you may tick more than one box. You may want to refer to the map of the Congewai and Quorrobolong Catchments)*

- Black Creek
- Black Arm Creek
- Bowwow Creek
- Clink Creek
- Congewai Creek
- Cony Creek
- Dora Creek
- Gap Creek
- John Elm Creek
- Quorrobolong Creek
- Reedy Creek
- Sandy Creek
- Stewarts Creek
- Sweetmans Creek
- Wallaby Gully Creek
- Wallis Creek
- Warrawol Creek
- Watagan Creek
- Another creek not identified above**
- No creeks are on my property**

LOGIC Hidden unless: #6 Question "Which creek (and their tributaries) is on your property? (*you may tick more than one box. You may want to refer to the map of the Congewai and Quorrobolong Catchments*)" is one of the following answers ("Black Creek", "Black Arm Creek", "Bowwow Creek", "Clink Creek", "Congewai Creek", "Cony Creek", "Dora Creek", "Gap Creek", "John Elm Creek", "Quorrobolong Creek", "Reedy Creek", "Sandy Creek", "Stewarts Creek", "Sweetmans Creek", "Wallaby Gully Creek", "Wallis Creek", "Warrawol Creek", "Watagan Creek", "**Another creek not identified above**")

7. How do you use the creek on your property? (*you may tick more than one box*)

- I don't use the creek in any way**
- appreciation of its aesthetic value
- conservation purposes, including vegetation and wildlife management
- creek crossings for stock and vehicles
- fishing
- irrigation
- livestock have access to the creek for drinking water
- livestock have access to water drawn from the creek
- swimming
- use the water for domestic purposes
- use the water for drinking
- use the water for pastures
- use the water for plants and gardens
- Other use (*specify*)

LOGIC: Show/hide trigger exists. Hidden unless: #6 Question "Which creek (and their tributaries) is on your property? *(you may tick more than one box. You may want to refer to the map of the Congewai and Quorrobolong Catchments)*" is one of the following answers ("Black Creek", "Black Arm Creek", "Bowwow Creek", "Clink Creek", "Congewai Creek", "Cony Creek", "Dora Creek", "Gap Creek", "John Elm Creek", "Quorrobolong Creek", "Reedy Creek", "Sandy Creek", "Stewarts Creek", "Sweetmans Creek", "Wallaby Gully Creek", "Wallis Creek", "Warrawol Creek", "Watagan Creek", "**Another creek not identified above**")

8. Have you changed the way you use creeks in the Congewai or Quorrobolong Catchment over the past five years?

- Yes
- No

LOGIC: Hidden unless: #8 Question "Have you changed the way you use creeks in the Congewai or Quorrobolong Catchment over the past five years?" is one of the following answers ("Yes")

9. Describe how you have changed the way you use the creeks.

Water quality of the creeks on your property

Page entry logic:

This page will show when: #1 Question "Is your property...." is one of the following answers ("a rural property within the [Congewai and Quorrobolong Catchments](#)")

LOGIC: Show/hide trigger exists. Hidden unless: #10 Question "Were you aware of the water quality in the creek on your property five years ago?" is one of the following answers ("Yes")

14. If you compare the quality of the water in the creek on your property now to 5 years ago, would you say the water quality is...

- A lot better
- Somewhat better
- The same
- Somewhat worse
- Worse
- Don't know

LOGIC Hidden unless: #14 Question " If you compare the quality of the water in the creek on your property now to 5 years ago, would you say the water quality is..." is one of the following answers ("A lot better", "Somewhat better")

15. Why do you think the water quality is better? *(you may tick more than one box)*

- a reduction in sediment
- an increase in water life (inc. fish and birds)
- increased ground cover on creek banks and near creeks
- increased vegetation on creek banks
- increased water flow in the creek
- less mining in the area
- less wastewater in the creek
- reduced agricultural runoff through changed grazing practices
- reduced erosion of creek banks
- reduced number of livestock accessing the creek
- reduced use of fertilisers
- reduced waste, litter or rubbish in the creek
- Other reasons (specify)

LOGIC Hidden unless: #14 Question " If you compare the quality of the water in the creek on your property now to 5 years ago, would you say the water quality is..." is one of the following answers ("Somewhat worse","Worse")

16. Why do you think the water quality is worse? *(you may tick more than one box)*

- an increase in sediment
- an increase in waste, litter or rubbish in the creek
- increased agricultural runoff through changing grazing practices
- increased erosion of creek banks
- increased number of livestock accessing the creek
- increased use of fertilisers
- less water flow in the creek
- more mining in the area
- more wastewater in the creek
- reduced ground cover on creek banks and near creeks
- reduced vegetation on creek banks
- reduced water life (inc. fish and birds)
- Other reasons (specify)

LOGIC: Hidden unless: #6 Question "Which creek (and their tributaries) is on your property? (*you may tick more than one box. You may want to refer to the map of the Congewai and Quorrobolong Catchments*)" is one of the following answers ("Black Creek", "Black Arm Creek", "Bowwow Creek", "Clink Creek", "Congewai Creek", "Cony Creek", "Dora Creek", "Gap Creek", "John Elm Creek", "Quorrobolong Creek", "Reedy Creek", "Sandy Creek", "Stewarts Creek", "Sweetmans Creek", "Wallaby Gully Creek", "Wallis Creek", "Warrawol Creek", "Watagan Creek", "**Another creek not identified above**")

17. On what basis do you make your judgements about water quality? (*you may tick more than one box*)

- heard about it from neighbours or friends
- I have seen the water in the creek
- read about the water quality in the creeks in the newspaper or other media
- rubbish or litter in or near the creek
- smell or odour
- the colour of the water
- the plants or aquatic animals in the creek
- Don't know
- Other (*specify*)

Participation in Hunter Local Land Services (LLS) workshop or training events

Page entry logic:

This page will show when: #1 Question "Is your property...." is one of the following answers ("a rural property within the [Congewai and Quorrobolong Catchments](#)")

LOGIC: Show/hide trigger exists.

18. In the past five years have you participated in any events (e.g., workshops, field days, training) hosted by Hunter LLS?

- Yes
- No
- Don't know

LOGIC: Hidden unless: #18 Question "In the past five years have you participated in any events (e.g., workshops, field days, training) hosted by Hunter LLS?" is one of the following answers ("Yes")

19. What was the Hunter LLS event(s) about? (*you may tick more than one box*)

- biodiversity
- creek bank management
- farm planning
- grazing management
- management of pest animals
- revegetation
- soil management
- threatened species
- weed management
- Other (*specify*)

LOGIC: Show/hide trigger exists. Hidden unless: #18 Question "In the past five years have you participated in any events (e.g., workshops, field days, training) hosted by Hunter LLS?" is one of the following answers ("Yes")

20. Have you changed your property management practices because of your participation in Hunter LLS event(s)?

- Yes
- Not yet, but I am planning to make changes in the future
- No, not planning to make any changes

LOGIC: Hidden unless: #20 Question "Have you changed your property management practices because of your participation in Hunter LLS event(s)?" is one of the following answers ("Not yet, but I am planning to make changes in the future", "No, not planning to make any changes")

21. Why haven't you changed your management practices? (*you may tick more than one box*)

- already undertaking the practices
- difficult to apply on my property
- have not had the time
- I don't have the equipment or materials
- I don't have the skills required
- I need more information or advice
- lack of people to help
- no need or requirement
- too costly or expensive to implement
- Other (*specify*)

LOGIC: Hidden unless: #20 Question "Have you changed your property management practices because of your participation in Hunter LLS event(s)?" is one of the following answers ("Yes")

22. What changes did you make?

Riparian or creek bank protection or enhancement

Page entry logic:

This page will show when: #1 Question "Is your property...." is one of the following answers ("a rural property within the [Congewai and Quorrobolong Catchments](#)")

LOGIC: Show/hide trigger exists.

23. Were you aware that funding was available for creek bank protection through the Hunter LLS Paxton Catchment Improvement Program (where funding was provided in partnership with Hunter Water)?

- Yes
- No

LOGIC: Hidden unless: #23 Question "Were you aware that funding was available for creek bank protection through the Hunter LLS Paxton Catchment Improvement Program (where funding was provided in partnership with Hunter Water)?" is one of the following answers ("Yes")

24. How did you become aware of the Paxton Catchment Improvement Program funding? *(you may tick more than one box)*

- at a Hunter LLS event
- from a local community group (e.g., Landcare)
- from a staff member at Hunter LLS
- from neighbours or friends
- Hunter LLS advertising in newsletters or internet
- media and advertising
- Other *(specify)*

LOGIC: Show/hide trigger exists. Hidden unless: #6 Question "Which creek (and their tributaries) is on your property? *(you may tick more than one box. You may want to refer to the map of the Congewai and Quorrobolong Catchments)*" is one of the following answers ("Black Creek", "Black Arm Creek", "Bowwow Creek", "Clink Creek", "Congewai Creek", "Cony Creek", "Dora Creek", "Gap Creek", "John Elm Creek", "Quorrobolong Creek", "Reedy Creek", "Sandy Creek", "Stewarts Creek", "Sweetmans Creek", "Wallaby Gully Creek", "Wallis Creek", "Warrawol Creek", "Watagan Creek", "**Another creek not identified above**")

25. In the past five years have you undertaken any riparian or creek bank protection and enhancement works on your property?

- Yes
- No

LOGIC: Show/hide trigger exists. Hidden unless: #25 Question "In the past five years have you undertaken any riparian or creek bank protection and enhancement works on your property?" is one of the following answers ("Yes")

26. In the past five years did you receive any funding from Hunter LLS for riparian or creek bank protection and enhancement?

- Yes
- No, I applied for funding but did not receive funding
- No, although I was interested, I decided not to seek funding
- No

LOGIC: Hidden unless: (#25 Question "In the past five years have you undertaken any riparian or creek bank protection and enhancement works on your property?" is one of the following answers ("Yes") AND #26 Question "In the past five years did you receive any funding from Hunter LLS for riparian or creek bank protection and enhancement?" is one of the following answers ("Yes"))

27. Did you receive funding under the Hunter LLS Paxton Catchment Improvement Program?

- Yes
- No, I applied for funding but did not receive funding
- No, although I was interested, I decided not to seek funding
- No
- Don't know or unsure

LOGIC Hidden unless: (#25 Question "In the past five years have you undertaken any riparian or creek bank protection and enhancement works on your property?" is one of the following answers ("Yes") AND #26 Question "In the past five years did you receive any funding from Hunter LLS for riparian or creek bank protection and enhancement?" is one of the following answers ("Yes"))

28. What creek bank protection or enhancement did you undertake? (*you may tick more than one box*)

- changes to stock grazing management to reduce nutrient runoff
- installation of fences to exclude stock from accessing creek banks
- installation of off stream watering (inc. troughs and pumps)
- planting trees and shrubs on creek banks
- soil erosion control
- weed control
- Other riparian works (specify)

LOGIC Hidden unless: (#25 Question "In the past five years have you undertaken any riparian or creek bank protection and enhancement works on your property?" is one of the following answers ("Yes") AND #26 Question "In the past five years did you receive any funding from Hunter LLS for riparian or creek bank protection and enhancement?" is one of the following answers ("Yes"))

29. In the time since you undertook the creek bank protection or enhancement do you think it has improved the water quality in your creek?

- Yes
- No
- No, but may in the future
- Unsure

LOGIC: Show/hide trigger exists. Hidden unless: #26 Question "In the past five years did you receive any funding from Hunter LLS for riparian or creek bank protection and enhancement?" is one of the following answers ("No, although I was interested, I decided not to seek funding", "No")

30. Was one of the reasons you did not apply for funding because you didn't want to restrict your livestock's access to the creek or creek bank areas?

- Yes
- No

LOGIC: Hidden unless: #30 Question "Was one of the reasons you did not apply for funding because you didn't want to restrict your livestock's access to the creek or creek bank areas?" is one of the following answers ("Yes")

31. Why didn't you want to restrict your livestock's access to the creek or riparian areas?

LOGIC Hidden unless: #26 Question "In the past five years did you receive any funding from Hunter LLS for riparian or creek bank protection and enhancement?" is one of the following answers ("No, although I was interested, I decided not to seek funding", "No")

32. What reasons did you have for not applying for funding? (*you may tick more than one box*)

- did not see any financial benefit for my property
- drought or bushfire delayed making the changes I wanted to make
- flooding delayed making the changes I wanted to make
- I am still considering what to do in the future with my property
- I didn't have enough time to apply for funding
- I didn't want to work with Hunter LLS or Hunter Water
- I don't see managing environmental areas as a priority
- I needed more information or advice
- I needed to organise additional funding
- I wasn't aware of the funding
- Don't know
- Other (*specify*)

LOGIC Show/hide trigger exists. Hidden unless: #25 Question "In the past five years have you undertaken any riparian or creek bank protection and enhancement works on your property?" is one of the following answers ("Yes")

33. In the past five years have you undertaken any creek bank protection or enhancement on your property that ***was not funded*** by Hunter LLS? This may include activities you funded yourself or were funded from other sources.

- Yes
- No

LOGIC: Hidden unless: #33 Question "In the past five years have you undertaken any creek bank protection or enhancement on your property that **was not funded** by Hunter LLS? This may include activities you funded yourself or were funded from other sources." is one of the following answers ("Yes")

34. What creek bank protection or enhancement did you undertake? (*you may tick more than one box*)

- changes to stock management and/or grazing to reduce nutrient runoff
- installation of fences to exclude stock from accessing creek banks
- installation of off stream watering (inc. troughs and pumps)
- planting trees and shrubs on creek banks
- soil erosion control
- weed control
- Other works (*specify*)

LOGIC: Hidden unless: #33 Question "In the past five years have you undertaken any creek bank protection or enhancement on your property that **was not funded** by Hunter LLS? This may include activities you funded yourself or were funded from other sources." is one of the following answers ("Yes")

35. In the time since you undertook the creek bank protection or enhancement do you think it has improved the water quality in your creek?

- Yes
- No
- No, but may in the future
- Unsure

LOGIC: Hidden unless: #25 Question "In the past five years have you undertaken any riparian or creek bank protection and enhancement works on your property?" is one of the following answers ("Yes")

36. Was the creek bank protection or enhancement undertaken as a direct result of your attendance at a Hunter LLS event?

- Yes
- No

LOGIC: Hidden unless: #25 Question "In the past five years have you undertaken any riparian or creek bank protection and enhancement works on your property?" is one of the following answers ("Yes")

37. Prior to undertaking the creek bank protection or enhancement did you receive any individual advice or direction from Hunter LLS staff, such as a property visit, property assessment or a request for assistance?

- Yes
- No

LOGIC: Show/hide trigger exists. Hidden unless: #25 Question "In the past five years have you undertaken any riparian or creek bank protection and enhancement works on your property?" is one of the following answers ("Yes")

38. Has undertaking creek bank protection or enhancement been beneficial to you?

- Yes
- No

LOGIC Hidden unless: #38 Question "Has undertaking creek bank protection or enhancement been beneficial to you?" is one of the following answers ("Yes")

39. Why has it been beneficial to you? (*you may tick more than one box*)

- improved the native vegetation and natural resources on my property
- improved the productivity of my property (i.e., weight gains, carrying capacity)
- improved the stability of the creek banks
- improved the visual appearance of my property
- increased the resilience of my creek to cope with flood events
- increased the value of my property
- made my livestock healthier
- reduced sediment entering the waterway
- Other benefits (*specify*)

LOGIC Hidden unless: #38 Question "Has undertaking creek bank protection or enhancement been beneficial to you?" is one of the following answers ("No")

40. Why has it not been beneficial to you?

LOGIC Show/hide trigger exists. Hidden unless: #25 Question "In the past five years have you undertaken any riparian or creek bank protection and enhancement works on your property?" is one of the following answers ("Yes")

41. Since undertaking creek bank protection or enhancement, have you changed the way that you use or value the creeks in the Congewai or Quorrobolong Catchments?

- Yes
- No

LOGIC Hidden unless: #41 Question "Since undertaking creek bank protection or enhancement, have you changed the way that you use or value the creeks in the Congewai or Quorrobolong Catchments?" is one of the following answers ("Yes")

42. In what way has your use of the creeks in the Congewai or Quorrobolong Catchments changed?

LOGIC Show/hide trigger exists. Hidden unless: #6 Question "Which creek (and their tributaries) is on your property? (*you may tick more than one box. You may want to refer to the map of the Congewai and Quorrobolong Catchments*)" is one of the following answers ("Black Creek", "Black Arm Creek", "Bowwow Creek", "Clink Creek", "Congewai Creek", "Cony Creek", "Dora Creek", "Gap Creek", "John Elm Creek", "Quorrobolong Creek", "Reedy Creek", "Sandy Creek", "Stewarts Creek", "Sweetmans Creek", "Wallaby Gully Creek", "Wallis Creek", "Warrawol Creek", "Watagan Creek", "**Another creek not identified above**")

43. Would you be interested in applying for funding for creek bank protection and enhancement in the future?

- Yes
- No

LOGIC: Hidden unless: #43 Question "Would you be interested in applying for funding for creek bank protection and enhancement in the future?" is one of the following answers ("Yes")

44. What type of activities would you like to obtain funding for? (*you may tick more than one box*)

- changes to stock grazing management to reduce nutrient runoff
- installation of fences to exclude stock from accessing creek banks
- installation of off stream watering (inc. troughs and pumps)
- planting trees and shrubs on creek banks
- soil erosion control
- weed control
- Other (*specify*)

Living in town

Page entry logic:

This page will show when: #1 Question "Is your property...." is one of the following answers ("located in a town or urban area (e.g., Paxton, Millfield, Ellalong (or other town))")

45. In which town do you usually live?

- Paxton
- Ellalong
- Millfield
- Other town or location

46. How many years have you lived in this town?

 years

Creeks in the Congewai and Quorrobolong Catchments

Page entry logic:

This page will show when: #1 Question "Is your property...." is one of the following answers ("located in a town or urban area (e.g., Paxton, Millfield, Ellalong (or other town))")

LOGIC Show/hide trigger exists.

47. Do you know of any of these creeks in the catchment area? (you may tick more than one box. You may want to refer to the map of the *Congewai and Quorrobolong Catchments*)

- Black Creek
- Black Arm Creek
- Bowwow Creek
- Clink Creek
- Congewai Creek
- Cony Creek
- Dora Creek
- Gap Creek
- John Elm Creek
- Quorrobolong Creek
- Reedy Creek
- Sandy Creek
- Stewarts Creek
- Sweetmans Creek
- Wallaby Gully Creek
- Wallis Creek
- Warrawol Creek
- Watagan Creek
- Another creek not identified above**
- No, I don't know of any of these creeks**

LOGIC Hidden unless: #47 Question "Do you know of any of these creeks in the catchment area? (you may tick more than one box. You may want to refer to the map of the *Congewai and Quorrobolong Catchments*)" is one of the following answers ("Black Creek", "Black Arm Creek", "Bowwow Creek", "Clink Creek", "Congewai Creek", "Cony Creek", "Dora Creek", "Gap Creek", "John Elm Creek", "Quorrobolong Creek", "Reedy Creek", "Sandy Creek", "Stewarts Creek", "Sweetmans Creek", "Wallaby Gully Creek", "Wallis Creek", "Warrawol Creek", "Watagan Creek", "**Another creek not identified above**")

48. Using the following scale, rate how important the health of the creek(s) is to you.

Not at all important	Unimportant	Somewhat unimportant	Somewhat important	Important	Very important
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

LOGIC Show/hide trigger exists. Hidden unless: #47 Question "Do you know of any of these creeks in the catchment area? (you may tick more than one box. You may want to refer to the map of the *Congewai and Quorrobolong Catchments*)" is one of the following answers ("Black Creek", "Black Arm Creek", "Bowwow Creek", "Clink Creek", "Congewai Creek", "Cony Creek", "Dora Creek", "Gap Creek", "John Elm Creek", "Quorrobolong Creek", "Reedy Creek", "Sandy Creek", "Stewarts Creek", "Sweetmans Creek", "Wallaby Gully Creek", "Wallis Creek", "Warrawol Creek", "Watagan Creek", "**Another creek not identified above**")

49. Have you used or visited any of the creeks you identified in the last 12 months?

- Yes
- No

LOGIC: Hidden unless: #49 Question "Have you used or visited any of the creeks you identified in the last 12 months? " is one of the following answers ("Yes")

52. How would you describe the water quality of these creeks?

- pristine (high conservation value, not disturbed)
- moderately disturbed (e.g., some farming and land clearing in the area)
- highly disturbed (highly cleared and very polluted)
- Don't know

LOGIC: Show/hide trigger exists. Hidden unless: #47 Question "Do you know of any of these creeks in the catchment area? (you may tick more than one box. You may want to refer to the map of the *Congewai and Quorrobolong Catchments*)" is one of the following answers ("Black Creek", "Black Arm Creek", "Bowwow Creek", "Clink Creek", "Congewai Creek", "Cony Creek", "Dora Creek", "Gap Creek", "John Elm Creek", "Quorrobolong Creek", "Reedy Creek", "Sandy Creek", "Stewarts Creek", "Sweetmans Creek", "Wallaby Gully Creek", "Wallis Creek", "Warrawol Creek", "Watagan Creek", "**Another creek not identified above**")

53. Were you aware of the water quality in any of the creeks 5 years ago?

- Yes
- No

LOGIC Hidden unless: #53 Question "Were you aware of the water quality in any of the creeks 5 years ago? " is one of the following answers ("Yes")

54. What creeks were you aware of the water quality 5 years ago? *(you may tick more than one box. You may want to refer to the map of the Congewai and Quorrobolong Catchments)*

- Black Creek
- Black Arm Creek
- Bowwow Creek
- Clink Creek
- Congewai Creek
- Cony Creek
- Dora Creek
- Gap Creek
- John Elm Creek
- Quorrobolong Creek
- Reedy Creek
- Sandy Creek
- Stewarts Creek
- Sweetmans Creek
- Wallaby Gully Creek
- Wallis Creek
- Warrawol Creek
- Watagan Creek
- Another creek not identified above**
- No, I don't know of any of these creeks**

LOGIC: Show/hide trigger exists. Hidden unless: #53 Question "Were you aware of the water quality in any of the creeks 5 years ago? " is one of the following answers ("Yes")

55. If you compare the quality of the water in these creeks 5 years ago to now, would you say the water quality is...

- A lot better
- Somewhat better
- The same
- Somewhat worse
- Worse
- Don't know

LOGIC Hidden unless: #55 Question "If you compare the quality of the water in these creeks 5 years ago to now, would you say the water quality is..." is one of the following answers ("A lot better", "Somewhat better")

56. Why do you think the water quality is better? *(you may tick more than one box)*

- a reduction in sediment
- increased ground cover on creek banks and near creeks
- increased vegetation on creek banks
- increased water flow in the creek
- increase in water life (inc. fish and birds)
- less mining in the area
- less wastewater in the creek
- reduced agricultural runoff through changed grazing practices
- reduced erosion of creek banks
- reduced number of livestock accessing the creek
- reduced use of fertilisers
- reduced waste, litter or rubbish in the creek
- Other reasons (specify)

LOGIC Hidden unless: #47 Question "Do you know of any of these creeks in the catchment area? (you may tick more than one box. You may want to refer to the map of the *Congewai and Quorrobolong Catchments*)" is one of the following answers ("Black Creek", "Black Arm Creek", "Bowwow Creek", "Clink Creek", "Congewai Creek", "Cony Creek", "Dora Creek", "Gap Creek", "John Elm Creek", "Quorrobolong Creek", "Reedy Creek", "Sandy Creek", "Stewarts Creek", "Sweetmans Creek", "Wallaby Gully Creek", "Wallis Creek", "Warrawol Creek", "Watagan Creek", "**Another creek not identified above**")

59. In typical year, if you had access to the water in these creeks, would you... (*you may tick more than one box*)

- consume food produced with this water
- eat fish caught in this water
- use it for drinking
- use it for drinking if it was filtered using household filters
- use it for livestock
- use it for swimming
- use it for watering gardens and plants
- None of the above

LOGIC Hidden unless: #47 Question "Do you know of any of these creeks in the catchment area? (you may tick more than one box. You may want to refer to the map of the *Congewai and Quorrobolong Catchments*)" is one of the following answers ("Black Creek", "Black Arm Creek", "Bowwow Creek", "Clink Creek", "Congewai Creek", "Cony Creek", "Dora Creek", "Gap Creek", "John Elm Creek", "Quorrobolong Creek", "Reedy Creek", "Sandy Creek", "Stewarts Creek", "Sweetmans Creek", "Wallaby Gully Creek", "Wallis Creek", "Warrawol Creek", "Watagan Creek", "**Another creek not identified above**")

60. On what basis do you make your judgements about water quality in these creeks? (you may tick more than one box)

- heard about it from neighbours or friends
- I have seen the water in the creek
- read about the water quality in the newspaper or other media
- rubbish or litter in or near the creek
- smell or odour
- the colour of the water
- the plants or aquatic animals in the creek
- Other (*specify*)
- Don't know

Responsibility for managing water quality

61. Who do you think should be primarily responsible for managing or improving water quality in creeks in the catchments? *(you may tick more than one box)*

- Hunter Local Land Services
- Hunter Water
- Local Council
- No one
- Property owners
- State or Australian Government agencies
- Other *(specify)*

Contact information

62. Your information will be put in a draw to win one of 20 \$50 EFTPOS vouchers for completing the survey, could you please provide your contact information below. (If you do not wish to be placed in the draw for the EFTPOS vouchers leave all contact details blank)

We will always group responses and all individual data will still be confidential to Hunter Water and Hunter LLS.

Our policies in relation to the privacy of information we collect can be found at:

- *Hunter Local Land Services: <https://www.regional.nsw.gov.au/privacy/privacy-management-plan>*
- *Hunter Water: <https://www.hunterwater.com.au/contact-us/privacy-statement>*

First Name

Last Name

Town

Email Address

Phone Number

LOGIC Hidden unless: #1 Question "Is your property...." is one of the following answers ("a rural property within the [Congewai and Quorrobolong Catchments](#)")

63. The survey reference number is a unique three digit number found on letters sent to landholders from Hunter Local Land Services in the catchments area. This is located at the top of your survey letter. If you cannot locate this or have not been provided a number, please leave this blank.

Survey Reference Number

64. May we contact you by email or phone to discuss in more detail the benefits or changes you have described in this survey?

- Yes
- No