Department of Environment and Heritage Protection

Love Queensland.
Let's keep it clean

South West Region Roadside Litter Prevention Pilot Project

Queensland Government

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How litter pollutes

The most visible indicators of pollution in our environment are littered and illegally dumped items. Every day across Queensland our parks, streets, forests and waterways are subjected to litter pollution. Litter adversely affects our community in a variety of ways from unsightly aesthetics, to high clean-up costs. It also has detrimental impacts on our environment and human health.

Unseen litter, Moonie Highway

From 2012 to 2014 the National Litter Index (NLI) has shown that Queensland has consistently been one of the most littered states in Australia (NLI, 2012, 2013, 2014 and 2015). According to these reports the most commonly littered areas have been highways and industrial sites, retail precincts and shopping centres, and beaches and car parks.

Highways in Queensland are highly littered. Beverage containers, cigarette butts and take away food packaging are the main items making up the litter stream on Queensland roads. This is further supported by a recent study from CSIRO[1] that revealed there is more litter in car parks and highways than in residential areas, parks and beaches.

The Queensland government is committed to working with businesses, local councils, state departments, private land owners, non-government organisations, schools, community groups and the public to encourage best practice in waste management.

Dealing with the issue of littering is everyone's responsibility and by working together we can reduce litter and decrease the substantial costs imposed on the community in terms of human health, environmental harm and diversion of money for clean-up activities that could otherwise be spent more productively elsewhere.

1 CSIRO, 'Sources, distribution and fate of marine debris'.

What's the problem in south west Queensland?

On 28 November 2013, the Queensland Murray Darling Committee (QMDC) hosted the first meeting of the newly formed Regional Waste Group (RWG). The RWG consists of six south west Queensland local governments and was formed with the achievable vision to collectively work on various waste issues to ensure regional and cost effective practices are delivered.

The RWG stakeholders are:

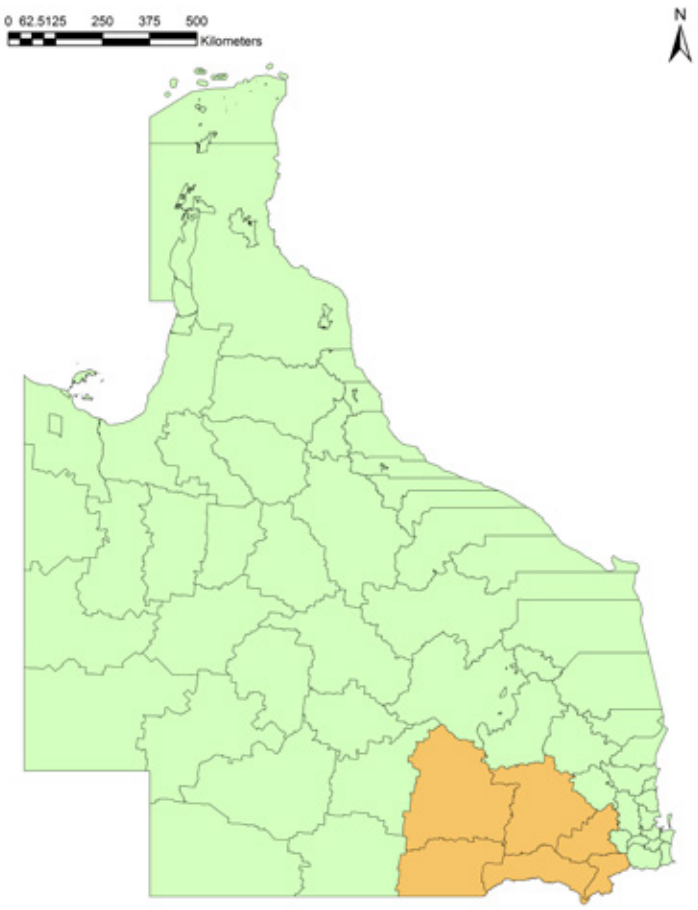
- Balonne Shire Council
- Goondiwindi Regional Council
- Maranoa Regional Council
- Southern Downs Regional Council
- Toowoomba Regional Council
- Western Downs Regional Council
- Queensland Murray Darling Committee

Significant problems relating to roadside litter were highlighted by this group, and further supported by the number of residential complaints received pertaining to littering and illegal dumping on major road ways and truck stops in the region.

Queensland has some 186,859km of public roads. To address the issue of, and concerns around high amounts of litter on highways, the Queensland Government implemented a pilot project to investigate behaviours and trial targeted options to reduce the incidences of roadside litter in the Darling Downs and Surat Basin areas (south west Queensland).

The target region covers a land area of 167,406km², which represents approximately 10% of the total land area of Queensland. This is represented in orange on the following map.

Project target area (orange)



Integral to the success of the project was the partnership between the Department of Environment and Heritage Protection (EHP) in collaboration with six south west local governments, the Queensland Murray Darling Committee (QMDC), the National Packaging Covenant Industry Association (NPCIA) and the Department of Transport and Main Roads (DTMR).

Stakeholder councils were aware of the significant long-term problem of roadside litter in the region, however the true extent of the problem had never been formally quantified. Initial stakeholder information relating to litter and littering behaviours was subjective and it was not seen by some councils as a priority problem.

Stakeholder and public perception of the cause of roadside litter was directed towards transient populations, particularly fly-in fly-out/bus-in bus-out staff from the mining sector.

The Department of Environment and Heritage Protection, along with the regional stakeholders, implemented a community-based social marketing project between August and October 2015 to reduce roadside littering in south west Queensland. As part of the project evaluation to determine the degree of success, litter audits were carried out before and after the intervention at the same sites within the project area and at reference control sites.

What's the plan?

The aim of the project was to minimise the incidences of roadside littering in the south west region driven by the adoption of best practice in waste management and delivery of tailored approaches utilising behaviour change methodology.

To achieve this, five main aspects were identified:

1

Understanding the problem

Stakeholders and locals were aware of the problem in the region; however much of the existing knowledge was anecdotal. Many litter based complaints attributed blame towards transient populations and mining workers rather than locals.

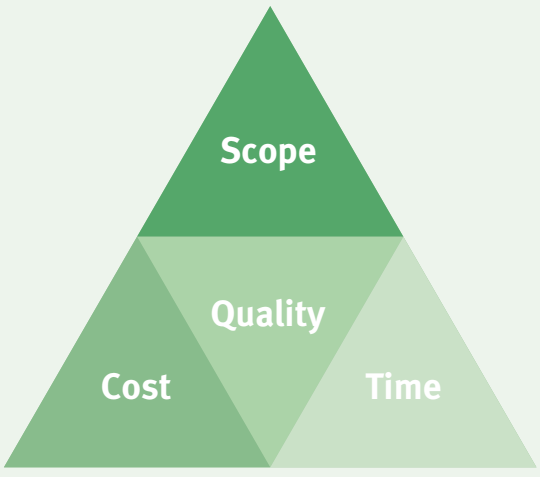
To fully understand the problem, extensive data collection was undertaken that catalogued and analysed the true extent of roadside littering in the region and informed the intervention approach.

2

Scope

The six local government boundaries within this study have extensive road corridors traversing the region.

Given the magnitude of scale of the region, the final scope of the project was guided by logistical considerations including recognition of the limited, untrained resources available and the extensive time restraints on sampling capacity due to the vast distances needing to be covered.



3

Approach

The aim of this study was to reduce littering behaviours by fostering long-term behavioural change leading to fewer incidences of roadside litter, using Community-Based Social Marketing (CBSM) methodology.

Community-Based Social Marketing is an approach to achieve broad sustainable behaviour change in communities through combining knowledge from psychology and social marketing.

To assist in the development of this project, the first of its kind in Queensland, leaders in the litter and illegal dumping field, Rob Curnow from Community Change and Paula Drayton from Resource Advisory Ltd, were engaged to provide expert support for the project.

Actions proposed to empower local communities to show their commitment to clean areas were threefold:

1. Increasing the community's ability to act by reporting littering incidents using Queensland's Litter and Illegal Dumping Online Reporting System (LIDORS).
2. Large scale clean-ups to improve aesthetic values and visual amenity in the region in order to help restore community pride and sense of place.
3. Increase community awareness of the importance of keeping places clean by understanding how litter adversely affects their lifestyle, including recreational activities such as fishing.

4

Measuring success

The need to measure performance was imperative for evaluating the success of the project. This included making sure that the methodology used to collection the data was able to be repeatable and of sufficient replication to detect change.

It was identified that litter counts, observations and attitudinal surveys were effective methods to measure the performance of the project.

5

Legacy

The key outcome of this pilot project was to leave a legacy to enable the region to continue this work.

Specifically the project aimed to enhance regional capacity by:

- adopting best practice data collection methodology
- providing local assessments to support the design and delivery of behaviour change strategies
- helping create a regional profile of litter to guide investment and management decisions for prioritising actions within a long-term focus.

Based on the finding of this project a roadside litter prevention toolkit is being delveloped for use across Queensland.

How did we go about solving the problem?

The first stage of the project was to discover the true extent of the problem across the region against a background where the extent of the problem was never formally quantified and the evidence available was inconsistent and highly variable.

Understanding the problem

The initial step in the collection of relevant data was to select the targets in the region through regional site visits and individual meetings with the six local councils. This work was undertaken by EHP and Community Change.

The meetings resulted in the generation of an extensive list of local sites, including litter hotspots and clean areas, and the identification of available resources, including the training needs of the stakeholders. This process was invaluable for determining suitable sites for litter assessments.

The information harnessed also provided an understanding of road users and potential survey locations to capture their views, as well as a way to refine and enhance the data collection process to target region specific issues.

The data collection methodology was built on, extended and refined from the Victoria Litter Action Alliance Roadside Litter Prevention Kit protocols, Resource Goulbourn Valley and Don't Mess with Texas data collection methodologies.

Information was collected through various channels, as outlined in Figure 1.

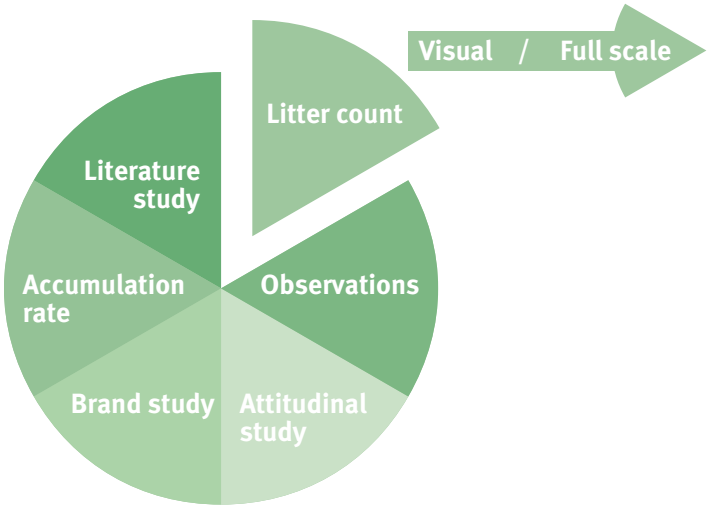
Utilising the expertise of Rob Curnow, Community Change, the sampling methodology was developed through preliminary assessments of the region's roads and through interviews with stakeholders to capture local knowledge.

Training in the litter audit methodology to on-ground regional staff and EHP Officers was provided by Rob Curnow using a modified version of the Clean Communities Assessment Tool (CCAT) methodology.

This training sought to ensure consistency of data collection by field staff to ensure data integrity, as well as build local capacity in roadside litter assessment. This knowledge could then be transferred across other locations.

Based on available resources and capacity six highways across the target region were selected for sampling: Barwon Highway, Carnarvon Highway, Cunningham Highway, Moonie Highway, New England Highway and Warrego Highway.

Figure 1. Data collection channels



Training field staff in Roma—Photo courtesy of Robert Curnow

Moonie Highway

Litter count criteria

The audit locations were determined by utilising information collected during the initial local government interviews and road way inspections, in tandem with available resources.

The locations were placed along six major traffic corridors through the region.

These traffic corridors were:

- **Warrego Highway** Toowoomba, Western Downs and Maranoa Regional Councils.
- **New England Highway** Toowoomba and Southern Downs Regional Councils.
- **Cunningham Highway** Southern Downs and Goondiwindi Regional Councils.
- **Barwon Highway** Goondiwindi Regional Council and Balonne Shire Council.
- **Moonie Highway** Balonne Shire Council and Western Downs Regional Council.
- **Carnarvon Highway** Balonne Shire Council and Maranoa Regional Council.

A criteria was built for the selection of each council site and was also applied in the control location of the Peak Downs Highway between Mackay and Winchester.

Site location criteria for the six target highways

Outside city or townships where the speeds zones are/or exceed 100 kilometres an hour

Areas where road users are reasonably expected to have access to the area

Both clean and dirty sites, with and without infrastructure to ensure representative sampling

Identified site types of roadsides, official and unofficial pull over areas, including:

- Road train coupling and decoupling bays
- Formal and informal rest areas
- Gravel pits, currently used and unused
- Heavy vehicle inspection sites

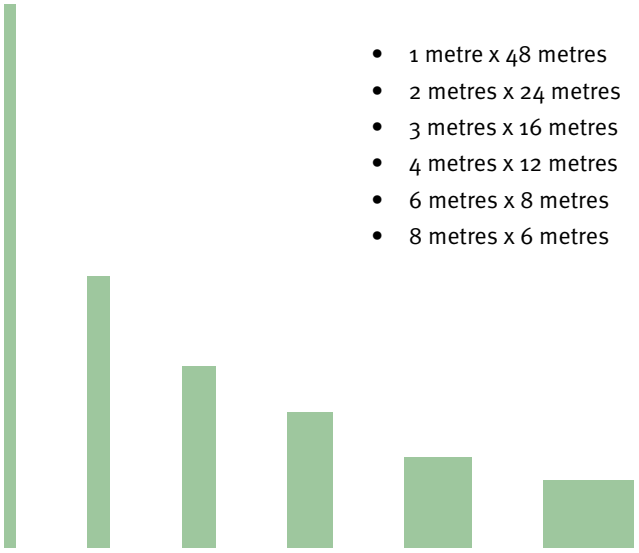
Distanced over the local government boundaries to adequately ensure a comparable sampling of each traffic corridor.

Litter counts

The sampling methodology for the litter count audits was based upon an audit count area of 48m^2, chosen as it can be easily calculated to suit various location types and landscapes.

The 48m^2 can be utilised for all locations as it can be adjusted to encompass:

- 1 metre x 48 metres
- 2 metres x 24 metres
- 3 metres x 16 metres
- 4 metres x 12 metres
- 6 metres x 8 metres
- 8 metres x 6 metres



Litter count areas

The litter audits were conducted ensuring a representative sample of the individual location's geographical aspects.

For example, if the area selected for audit had bitumen, grass, pits, flat land, raised land, valleys or gullies, the representative sample crossed all geographical aspects.

For locations with infrastructure, a further sampling rule was imposed. If the site had a bin, the sample needed to include the bin inside the 48m^2 count area. The contents of the bin were recorded for the pre- and post-intervention sampling.

The number of sites chosen ensured a comparable sample over each of the main traffic corridors, noting that the length of highways was highly variable.

For example, the longest of the highways, the Warrego Highway, crosses three local government boundaries and therefore it was necessary to carry out more audits to ensure a comparable outcome.

In total there were 68 sites in the target region and a further 12 sites in the control area. These sites were chosen based on the number of local governments available to support data collection and their boundary crossings of the traffic corridors. (Appendix One)

The control site was chosen to identify, compare and minimise the effects of potential events, such as weather, that could impact on the findings and result in misleading interpretations.

The Peak Downs Highway (between Mackay and Winchester in Isaac Regional Council) was chosen as the control site as it had features similar to some south west local governments, such as rural farming with mining.

Litter count audits used two methods: visual and full scale counts. (Appendix One)

The visual audits were conducted as a visual process only, where the litter was counted by sight and not collected. This method took into account any residual litter at the first sampling and then the residual plus or minus litter leaving or entering the site at subsequent sampling times (i.e. any gains and losses of litter in the site).

Official pull over location—rest area

Official pull over location—decoupling bay

Unofficial pull over location—gravel pit

Roadside

The full scale audits involved the counting and subsequent removal of surface litter to identify litter hidden beneath. This process allowed for the collection of data for small scale accumulation rates and the detection of any changes in litter amount.

The study highways are managed by the Department of Transport and Main Roads (DTMR). To ensure compliance with the Road Maintenance Traffic and Road Use Management Manual, a corridor permit was sought from DTMR.

The permit application outlined the process to be undertaken and the health and safety procedures necessary for conducting each audit. This information and the conditionsl of DTMR approval also formed part of the participant training.

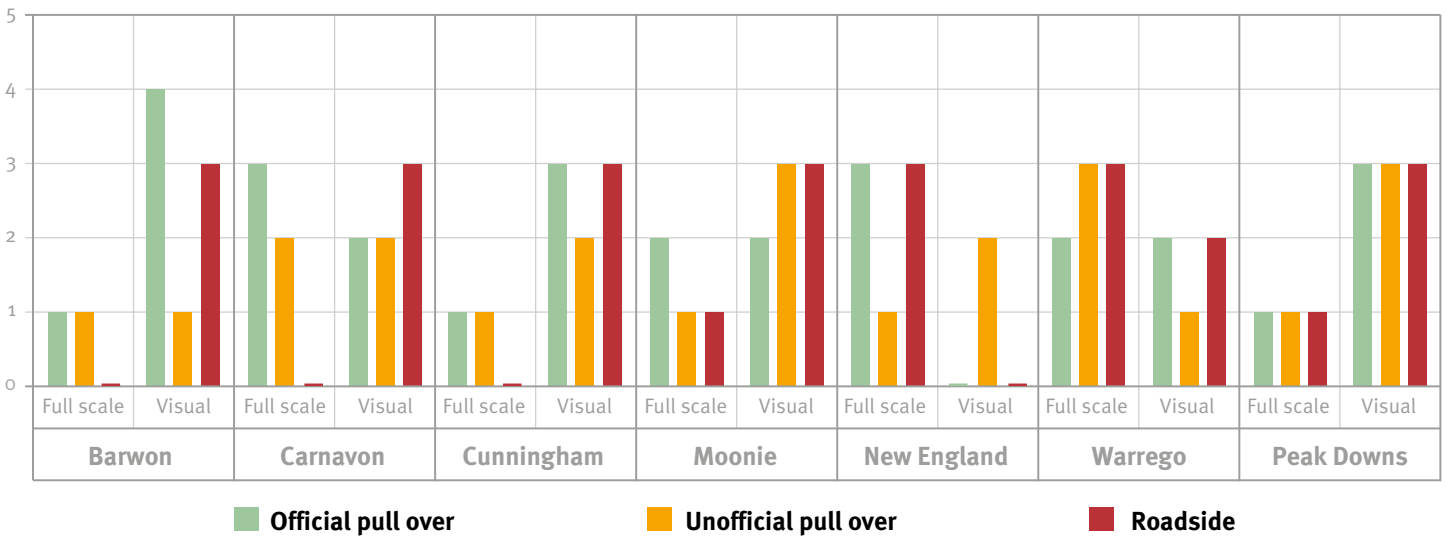
To allow for adequate evaluation of the program and to maintain consistency in data collection, training was conducted on the methodology with all participants that were involved in data collection activities. The training was conducted by Rob Curnow, Community Change in Roma prior to commencement of sampling.

The training was offered to the six local governments to enable their participation in the program and to build long-term capacity in the region. Four of the six local governments were able to attended, enabling them to take part in the data collection activities.

Over the life of the project, three samples were conducted (reconnaissance, pre-intervention and post-intervention). Each sampling replicated the locations and formats of the previous sampling period undertaken.

Due to logistical difficulties, data was not collected at all sampling sites. Figure 2 shows what data was collected for the target and control highways.

Figure 2. Litter count locations (highways and sites—official pull over, unofficial pull over and roadside) for each type of sampling method (full and visual)



Sample One
October 2014

79 litter audits

6 accumulation rate and brand studies

217 attitudinal surveys

Sample Two
July–August 2015

82 litter audits

(increased the volume of sample in the control site for comparability purposes)

Sample Three
January 2016

82 litter audits

7 accumulation rate and brand studies

(additional site on Warrego Highway included)

362 attitudinal surveys

Conducting a survey with a local gentleman who regularly cleans the roadside—New England Highway. Courtesy of Community Change

Conducting a survey—New England Highway. Courtesy of Community Change

Attitudinal survey

The attitudinal survey, developed by Rob Curnow of Community Change, was delivered by the trained participants. It was a non-judgmental, non-confrontational conversation with road users, and sought to collect information on the behaviours and attitudes of three main road user groups pre- and post-campaign.

These three main groups were:

- Truck drivers
- Locals (including fly-in fly-out workers)
- Grey nomads

The attitudinal survey data was collected by the Community Change team during their initial assessment in October 2014. The survey was conducted with people in and around roadsides with most surveys in target areas (187 in the target area and 30 in the control area).

Questions sought respondents' opinions on what they thought was littered, who was doing the littering, why they thought people littered and how they thought it could it be stopped.

Road users were approached in a number of situations to try and capture a broad range of views. When carrying out litter audits at official and unofficial pull over areas, motorists who had stopped in these locations were asked to take part in the survey.

Additional respondents were captured through conducting surveys in other pull over areas where no litter audits were undertaken and by seeking respondents from town centres.

The final attitudinal survey was completed by market research agency Colmar Brunton during January and February 2016. The survey was undertaken with 300 south west region local residents via telephone, 62 south west road users via intercept survey and a further 50 residents via telephone in the control area.

The results of the attitudinal survey in this report are based on the comparisons of the two collection periods, and additional questions in the second collection regarding the recall and effectiveness of the campaign.

The final survey collection research objectives were to:

1. Understand who litters, what and why, and if this had changed over time.
2. Determine whether attitudes towards littering have changed over time and to what extent this can be attributed to the campaign.
3. Determine whether public willingness to report roadside littering has changed over time.
4. Evaluate the impact, effectiveness and perceptions of the South West Region Roadside Litter Prevention campaign, as well as anti-littering campaigns in general.

Brand study and accumulation rate study

The brand study was conducted at seven roadside locations in the target region. One site was selected on each of the highways and an extra site was placed on the Warrego highway due to its length.

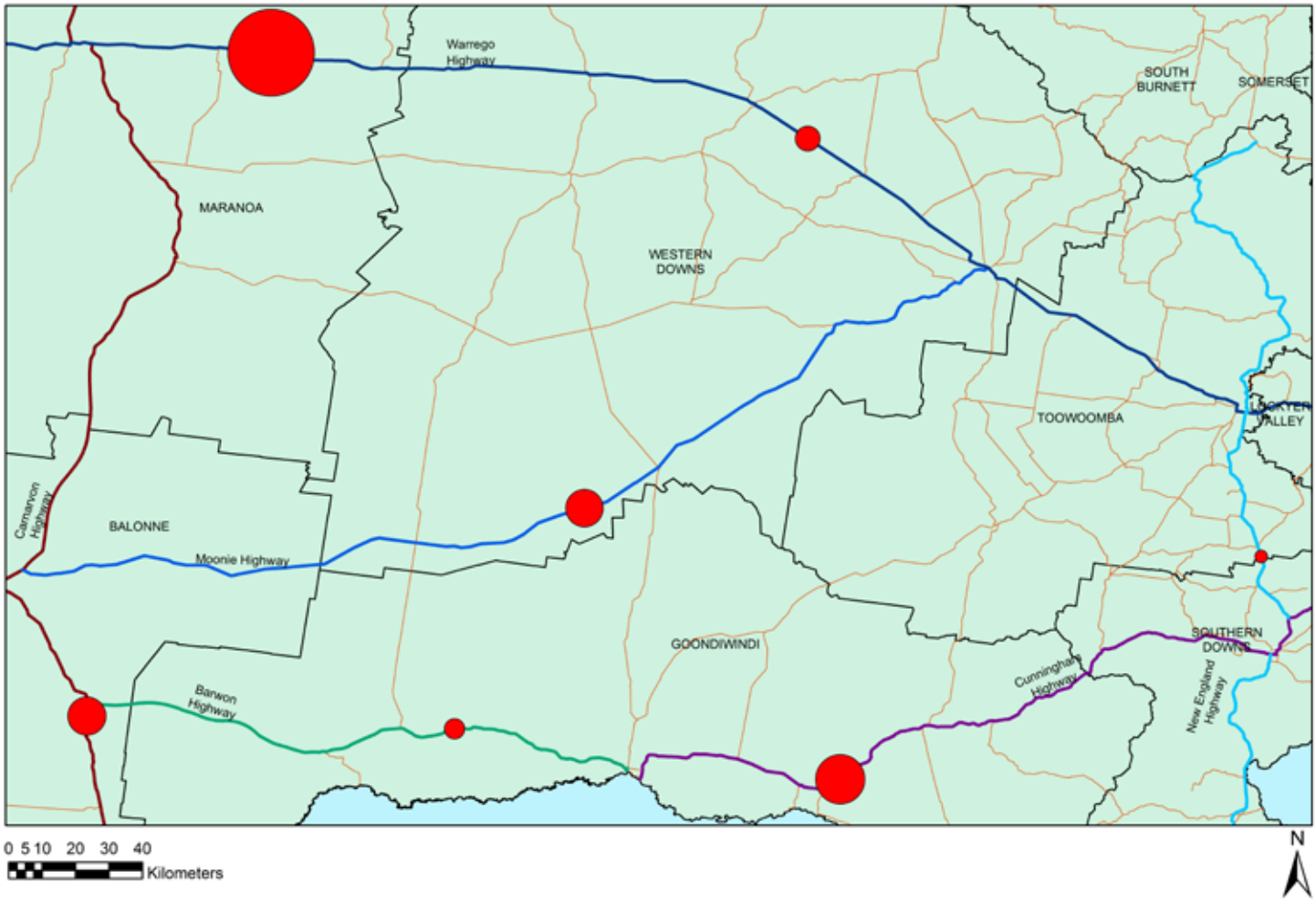
The study involved identifying and marking out a two kilometre area of roadside, where each littered item was picked up and catalogued by brand, litter type and materials type.

The collection was repeated four to five weeks from the initial collection and catalogued in the same format to determine the rate of accumulation at each of the locations.

Two studies of this type were undertaken over the course of the project. The pre-intervention collection was conducted in October 2014 and the post-intervention collection during January and February 2016.

To better understand the geographical locations of where this study took place, the below map identifies the sampling points with red dots. The size of the dots signifies the volume of accumulation at each site.

Accumulation rate study—highway collection points



Observations

At each site and sampling time, observations of the behaviours of road users were recorded.

The observations included such information as:

- photos
- initial impressions
- people using the areas and their actions or behaviours
- level of litter in the area being used.

Further, the Community Change team conducted observations of disposals when undertaking litter audits, roadside surveys and during travel within the council boundaries. General surveillance of vehicles in transit was also conducted for a driving distance of more than 2,000km.

Observation information included details of the items being consumed and disposed of and the characteristics of the individuals. Targets of these observations were people who were:

1. Consuming food or drink or smoking cigarettes while driving, or who were occupants of vehicles leaving drive-through take away food outlets (and who were followed for 15km).
2. Taking breaks while sitting, walking around and parked in vehicles at roadside stops where people were eating lunch, consuming drinks and smoking cigarettes.

Governance

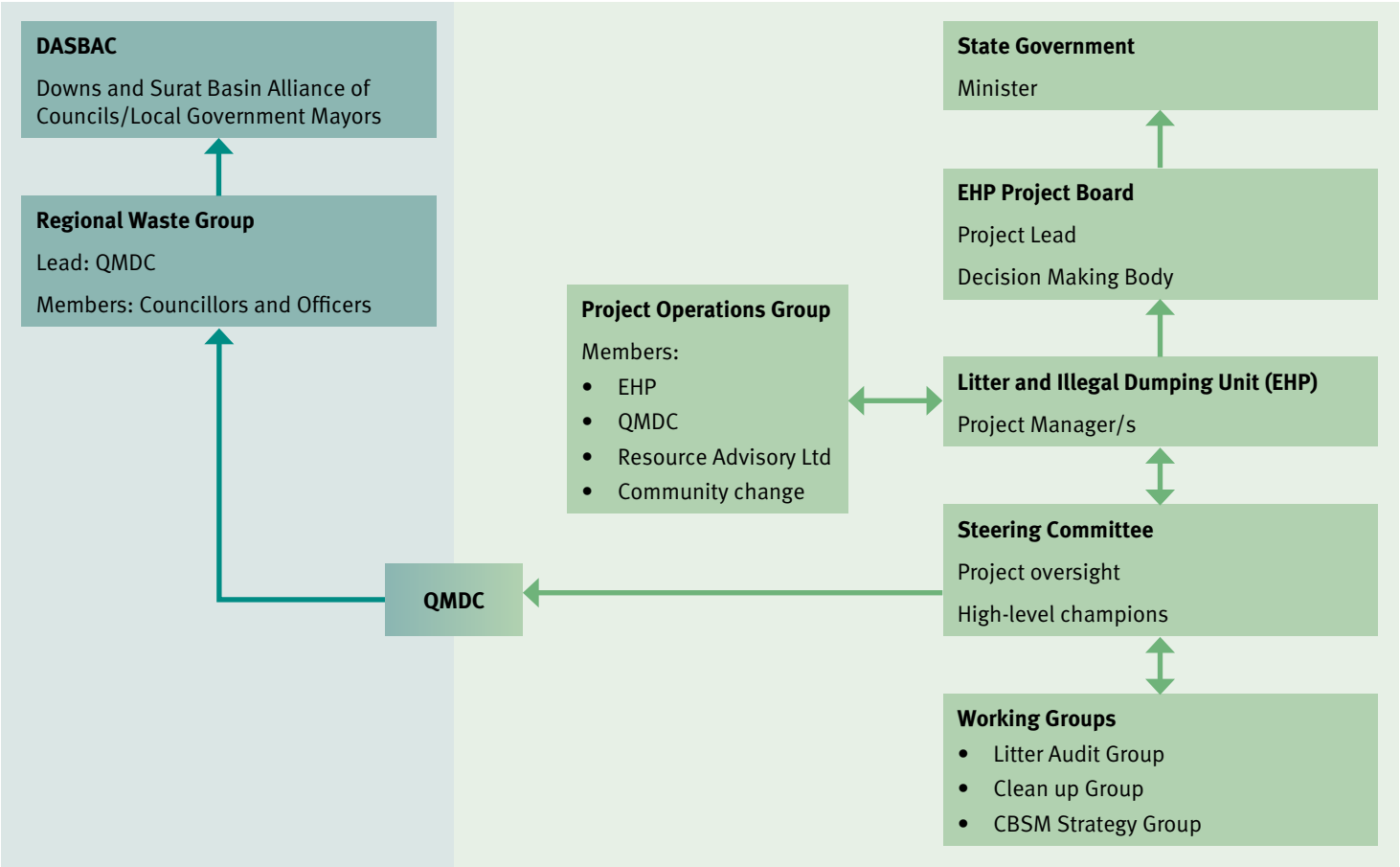
On project commencement, a governance structure was established and responsibilities, available resources and reporting requirements were agreed.

This structure assisted in determining the focus of the project and stakeholder relationship development and management.

Five of the seven stakeholders committed resources to undertake the auditing activities. Five Department of Environment and Heritage Protection (EHP) staff were offered as support for the short fall in resources as well as collecting data from the control location.

To support the project, particularly the development and release of the campaign, funding was secured through the National Packaging Covenant Industry Association. This funding along with the stakeholder in-kind funding and state allocations, both in-kind and monetary, allowed for the release and completion of the project's campaign across the region.

Governance structure

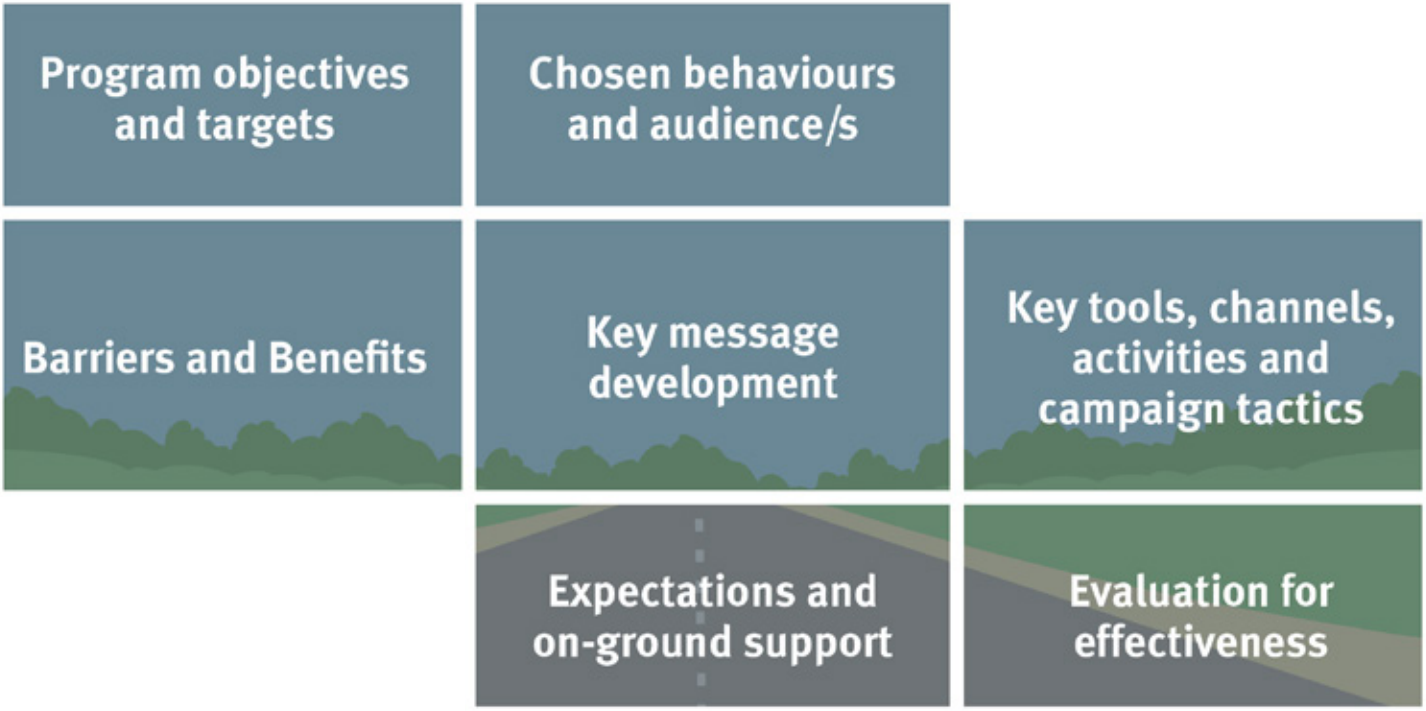


Love Queensland. Let's keep it clean

The campaign strategy was designed and implemented using the Community Based Social Marketing (CBSM) methodology. CBSM is an approach developed by Dr Doug McKenzie-Mohr to achieve broad sustainable behaviour change in communities through a combination of psychology and social marketing.

The litter prevention strategy was co-designed with stakeholders who participated in workshops held in March 2015. The workshops consisted of an introduction to CBSM, group analysis of the initial data collection findings, and co-creation of elements for the CBSM campaign.

The workshops covered the following:



Selecting behaviours

The target audience for the campaign was the first decision made by the stakeholders. The common assumption was that the cause of the litter on the roadsides was from transient populations including mining industry workers, truck drivers and travellers.

However, after analysing the initial data findings it was apparent that the littering was more likely a local source problem.

Stakeholders agreed to target local residents, acknowledging that this approach would be more likely to generate a longer lasting, consistent message in the region for best results.

Reporting is one way to empower the public to do something about littering as it increases the perception of risk that alleged offenders will be caught.

Residents generally were unlikely to report littering offences so it was agreed to utilise transient populations such as truck drivers and grey nomads to further support the community and the campaign, and increase the perception of risk to be caught.

Two behaviours were chosen for the campaign to target. These were:

1

To hold waste inside the vehicle until the person can dispose of the waste responsibly

2

To empower the community to reject littering behaviour through reporting offences

Barriers and benefits

The next step in the campaign design was to assess the barriers and benefits of the two selected behaviours. This process identifies ways in which the strategy can be tailored to effect successful outcomes by increasing the barriers to negative behaviour and increasing the benefits to do the right thing.

Behaviour	Barrier	Benefit
Encourage Positive Behaviours such as public reporting and generating a conversation about littering	**Decrease** the barrier that makes it hard to do the right thing ↓	**Increase** the benefit to the person for doing the right thing ↑
Discourage Negative Behaviours such as littering, not reporting, turning a blind eye	**Increase** the barriers that make it harder to do the wrong thing ↑	**Decrease** the benefits the person receives in doing the wrong thing ↓

Workshop participants were asked two questions for each activity identified.

For littering they were asked and responded as follows:

1. What makes it harder for a person to litter? (Barrier)

- risk of being caught
- fine/penalties
- being seen (embarrassment)
- having a clean environment
- caring for the community and town pride
- increased tourism
- appropriate infrastructure.

2. What makes it easier for a person to litter? (Benefit)

- a belief that litter is not a problem
- littering is anonymous/no one is around to see it
- you won't see it in the tall grass
- convenience/instant gratification of having a clean vehicle
- don't care/mindlessness/lack of motivation
- socially cool/previously unchallenged
- biodegradable – it's OK
- someone else will clean it up/not my responsibility
- inappropriate or lack of infrastructure
- parking accessibility for trucks
- existing dirty environment.

For reporting the stakeholders were asked and responded as follows:

1. What makes it hard for the person to report a litterer? (Barrier).

- a belief that litter is not a problem
- lack of passion
- unaware of community participation and cost (to community/lost opportunity)
- lack of shock/public outrage
- dobbing on mates/others
- no outcome received/their efforts wasted
- no reward or recognition for their contribution
- level of importance placed on the act
- confronting others, including personal safety
- difficulty of reporting/computer illiterate
- lack of information on:
  - how the system works
  - who to report to and where
  - bin stacking is actually littering
  - alternatives for computer illiterate people
- lack of, or overflowing infrastructure
- difficult to catch an offenders
- reporters are not anonymous/seen by offenders/seen in court
- not accepting responsibility through a belief that it is "not my job"
- council's responsibility.

2. What makes it easier for the person to report a litterer? (Benefit)

- benefits the environment, through:
  - reduced cost to farmers
  - better water quality
  - reduced harm to animals (birds)
  - better visual environment
  - recreational fishing (clean rivers and banks)
  - less plastic bags
- increases community pride/environmental value of the area
- excessive good Samaritan
- social norm
- a clean environment
- doing the right thing
- caring for the community/community pride/town pride
- having increased tourism
- better usage of public money
- reduction in fires generated from lit cigarettes and glass.

Developing strategies

A CBSM campaign is made up of a number of different strategies.

For this project, the various strategies were determined in line with the available resources, with a heavy focus on using existing resources such as community notice boards, council websites, social media accounts and existing annual events, in order to reduce costs while increasing the visibility and impact of the message.

Each strategy was reviewed for its effectiveness to:

- engage the community
- increase the risk or perception of risk of being caught
- encouraging the appropriate disposal of waste.

The identified potential strategies included: targeted advertising, project promotional information, editorials and articles, signage, banners and community engagement.

Campaign messages

With the focus on supporting the requirements of the region while retaining the ability to deliver a key message over a range of scales from small to very large, an overarching message was chosen that utilises sub-messaging to target specific waste types, audiences and behaviours across the state.

'Love Queensland. Let's keep it clean' was developed as the overarching message.

The three agreed sub-messages were:

- A road trip without litter, it starts here.
- You make a difference. Thank you.
- What does it really cost?

The first two sub-messages were utilised for this campaign.

Campaign strategies

The campaign strategies chosen for implementation by the stakeholders were:

- radio advertisements
- newspapers and magazine advertising and editorials
- roadside billboards
- small adverts included in the printing of the local free road maps (where available)
- website promotions, EHP, Councils and QMDC
- twelve Facebook posts, EHP, Councils and QMDC
- permanent DTMR road signs on target highways (60 across the region)
- engagement of the public at regional events
- engagement of regional businesses
- large scale community clean up events
- supporting collateral materials.

Campaign design workshop—St George

Campaign design workshop—Toowoomba

Campaign design workshop—Toowoomba

Campaign launch

The campaign was officially launched on 24 August 2015 to attract media activity and raise awareness of the campaign in the region.

The launch was held at Lions Park in Hodgsonvale, Toowoomba and comprised of:

- unveiling a permanent road sign
- roadside litter collection for visual media purposes
- gathering and recognition of the program partners
- media interview opportunities
- networking opportunities

Notable attendees included:

- Mr Jon Black, then Director-General, EHP
- Mayor Paul Antonio, Toowoomba Regional Council
- Southern Downs Regional Council's then Mayor Peter Blundell.

On the day major print and broadcast outlets were targeted. WIN TV, ABC Southern Queensland radio (via live telephone interview with Mr Jon Black), and The Toowoomba Chronicle newspaper were in attendance.

Media attendance was supported with a media pack that included collateral, a project factsheet and a media release.

Further exposure of the campaign launch was obtained, along with regional photographs, through local newspaper articles across the region.

The campaign ran for six months to February 2016. Throughout the campaign period, different forms of media were utilised to broadly circulate the message across the region.

Media included the installation of six roadside billboards, 61 newspaper advertising placements across six regional newspapers, 1,220 radio advertisements across eight regional radio stations, one regional map placement (print run of 40,000) and two yearly regional tourist magazines placements.

Collateral developed for the campaign was distributed through 11 tourist information centres, local businesses and council offices and libraries.

The collateral included:

- brochures
- business posters
- reporting notebooks
- windscreen stickers
- key rings
- business cards for reporting
- pull up banners for Councils, QMDC and EHP
- corflute signs for Councils, QMDC and EHP.

Social media posts on Facebook were also used to circulate the campaign messages. Twelve Facebook posts were developed and released through the EHP Facebook page as boosted posts to those social media users who identify as living within the target region post-codes.

These 12 posts were also supplied to the local governments and QMDC along with a schedule for release, so that the same message was being delivered at the same time.

Campaign Launch—Hodgesonvale, Toowoomba

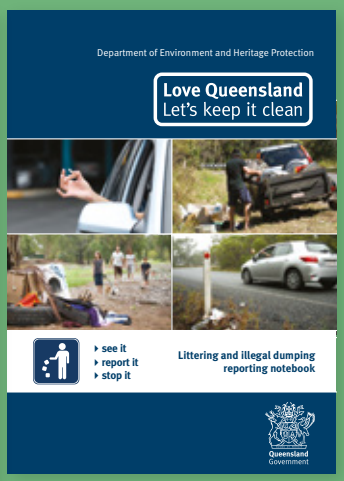
Promotional photo—Goondiwindi Regional Council

Promotional photo—Goondiwindi Regional Council

Campaign collateral material developed

Campaign billboard

Campaign poster



Campaign reporting notebook

Campaign reporting business card

Campaign promotional keyring

Facebook posts

Department of Environment and Heritage Protection, Queensland
September 21, 2015

Love Queensland. Let's keep it clean—Keep it in your car until you find a bin.

Like · Comment · Share

22 · Top Comments

Department of Environment and Heritage Protection, Queensland
March 4, 2016

Have you seen someone littering lately?
Littering and illegal dumping diminishes the use, enjoyment and value of our public place for residents and tourists.
If you witness someone littering, you can report them online at www.ehp.qld.gov.au
Love Queensland. Let's keep it clean.

Like · Comment · Share

[redacted] and 15 others · Top Comments

15 shares

Department of Environment and Heritage Protection, Queensland
January 4, 2016

You make a difference!
Thank you for jumping on board EHP's Love Queensland. Let's keep it clean campaign to tackle the problem of roadside litter.

Like · Comment · Share

[redacted] and 81 others · Top Comments

14 shares

Department of Environment and Heritage Protection, Queensland
October 19, 2015

Love Queensland. Let's keep it clean—put your litter in the bin.

Like · Comment · Share

[redacted] and 113 others · Top Comments

21 shares

Department of Environment and Heritage Protection, Queensland
November 30, 2015

Love Queensland. Let's keep it clean—report littering from vehicles www.ehp.qld.gov.au or call 13 QGOV

Like · Comment · Share

[redacted] and 133 others · Top Comments

51 shares

Department of Environment and Heritage Protection, Queensland
December 21, 2015

Love Queensland. Let's keep it clean—when reporting littering from car and other vessels, grab as many details as possible including:
• registration number—including state of registration
• date of incident
• time of incident
• place of incident... See More

Like · Comment · Share

[redacted] and 57 others · Top Comments

18 shares

Department of Environment and Heritage Protection, Queensland
October 5, 2015

Did you know that plastics and other rubbish dropped on land find their way into waterways all over Queensland?
Join the Love Queensland. Let's keep it Clean anti-litter campaign.

Like · Comment · Share

[redacted] and 76 others · Top Comments

27 shares

Visual prompts

To prompt road users to adopt best practice in waste disposal, a twin series of 60 permanent road signs were placed on the target highways across the region.

The placements of the signs were spread across the highways. They started approximately 30km outside of the major town centres and were placed in a pairing series approximately 3.5 to 5km apart.

The placement is to act as a message reminder for the road users to not litter and report litters.

Community engagement

Community engagement and support for the campaign was identified as crucial to its success. The QMDC, on behalf of the department, engaged over 120 local businesses to discuss the campaign, distributed information and supplied campaign materials.

The feedback from these businesses was very positive and many commented that it was a good initiative and that they were happy to participate. Further, many businesses have continued to display the campaign materials.

Clean up events were also used to engage the community. The QMDC worked with local Landcare groups and Origin Energy to carry out six roadside clean up events.

These clean ups resulted in approximately 17km of road being cleaned of 18 cubic metres of litter.

This equates to 75 wheelies bins of litter being collected over the distance of Warra to Brigalow on the Warrego Highway.

These road signs were DTMR approved official traffic signs that may now be purchased and used by all Queensland government bodies across the State.

Millmerran Litter Clean up. Photo courtesy of QMDC

Wilshire and Co—Inglewood. Photo courtesy of QMDC

Great Country Pies—Kerry Town. Photo courtesy of QMDC

Measuring success

Various approaches were incorporated into the project's methodology to ensure project success could be sufficiently measured.

To provide a comprehensive picture of the litter issues in south west Queensland, the project incorporated both qualitative and quantitative evaluation.

Qualitative

Qualitative data collection provided a greater understanding of the roadside litter problem, its complexity and context.

This qualitative data was collected through attitudinal surveys of road users and observations.

These were conducted in both the target and control locations during the initial data collection period and were replicated in the post-campaign period.

Quantitative

Quantitative data collection included the litter count audits, accumulation rate study and the brand study.

These collections were conducted at the initial baseline which allowed for a greater understanding of the waste type, material type and the potential behaviours associated with the litter.

The litter type data collected was extensive and therefore it was grouped into ten litter type categories. (Appendix Two)

These category groups were:

1. beverage containers
2. cigarettes
3. commercial items
4. food related products
5. hazardous waste
6. household items
7. retail items
8. roadwork
9. vehicle
10. other

This initial collection assisted in campaign development and indicated the long-term problem within the region.

These litter audits were replicated at the original count sites in the target and control locations both pre- and post-campaign.

Litter audits were also conducted on the Peak Downs Highway near Mackay as a control location. This highway was similar to the target region in both road users and natural environment.

This data provides information to analyse the campaign's effectiveness.

The accumulation rate and brand studies were also replicated post-campaign.

Data analysis of litter audits

Data was collected for the litter audits from a total of 82 sites over the seven highways.

Figure 2 (page 14) shows the number of litter count sites conducted on each highway for each collection type.

The data from the litter audits was analysed using both univariate (total litter counts) and multivariate statistics (litter counts by category).

In general, the visual audits were replicated at each highway (location) and site (roadsides, official pull overs and unofficial pull overs) allowing in-depth analyses at this scale.

Due to the absence of replicates for some site types on the New England Highway, this location was also excluded from the analyses.

In contrast, full scale audits were replicated at a regional level only precluding analysis of patterns at a site and highway level.

External expertise

Community Change and Resource Advisory Ltd were commissioned to:

1. Facilitate initial engagement and consultation with key stakeholders.
2. Undertake independent assessment of locations across the six local government target areas to contribute to baseline indicators of littering and provide the basis for refining data collection tools.
3. Deliver local capacity-building by conducting training with locals to transfer skills in roadside litter assessments, to enable them to complete baseline measures and use data to monitor, refine and assess a CBSM campaign to change roadside littering.
4. Conduct an immediate impact assessment to reconfirm baseline measures and detect any initial response to Stage One of the CBSM campaign.

Statistical analysis of each of the three litter collection audits was conducted on behalf of the department by Margaret Platell (PhD, Hons, BSc).

This allowed for fine tuning and adjustments to the data collections ensuring sufficient sampling.

Colmar Brunton was engaged to undertake and analyse the qualitative data collection of attitudinal surveys.

Legacy

An important aim of the project was to build local capacity in the delivery of litter prevention campaigns. Training, active participation in workshops, and access to collateral developed during the campaign all formed part of creating a legacy.


see it
report it
stop it

What were the results?

The results of this study are presented in three parts. Part one covers the findings for the litter audits, broken down into total counts, counts by highways and sites, litter category and material type for the pre- and post-intervention sampling periods. Also included in part one is a summary of the attributes collected at each sampling location.

Part two covers the findings for the behavioural and attitudinal surveys and part three covers the findings of the litter accumulation rates and branding study.

Litter audits

A total of 5,348 and 4,933 individual littered items from 27 litter types were collected pre- and post-intervention. This represents a comprehensive data set, providing a baseline for future work in the region.

Litter counts

No significant difference was detected before and after the intervention for total litter counts at sampling sites along the south west highways and the Peak Downs Highway near Mackay (control).

Litter counts at the sites belonging to the same highway were more similar as opposed to sites belonging to different highways.

Analyses of similarities (ANOSIM) using the data from individual sampling sites demonstrated that the variation in litter counts among the highways was statistically significant ($Global\ R = 0.09$, $p < 0.05$).

The Moonie Highway had the greatest quantity of litter followed by Warrego Highway, Peak Downs Highway, Cunningham Highway, Carnarvon Highway, and the Barwon Highway (Figure 3).

The Barwon and Carnarvon Highways had less litter than Peak Downs Highway. All other highways had a similar quantity of litter to the Peak Downs Highway.

For each highway, total litter counts varied between sites with the official pull over sites having higher amounts of litter compared to roadsides and unofficial pull over sites (Figure 4).

There was a decline in litter pre- and post-intervention at 25 of the sites, and an increase in litter at 21 of the sites (Table 1).

However, the magnitude of increase (average 113, range 5 to 250%) was on average greater than the magnitude of decrease in litter (average 35%, range 4.6 to 82%), (Table 1).

Figure 3. Average quantity of litter (+ standard error) for highways pre- and post-intervention. Data from visual survey only and New England Highway not included

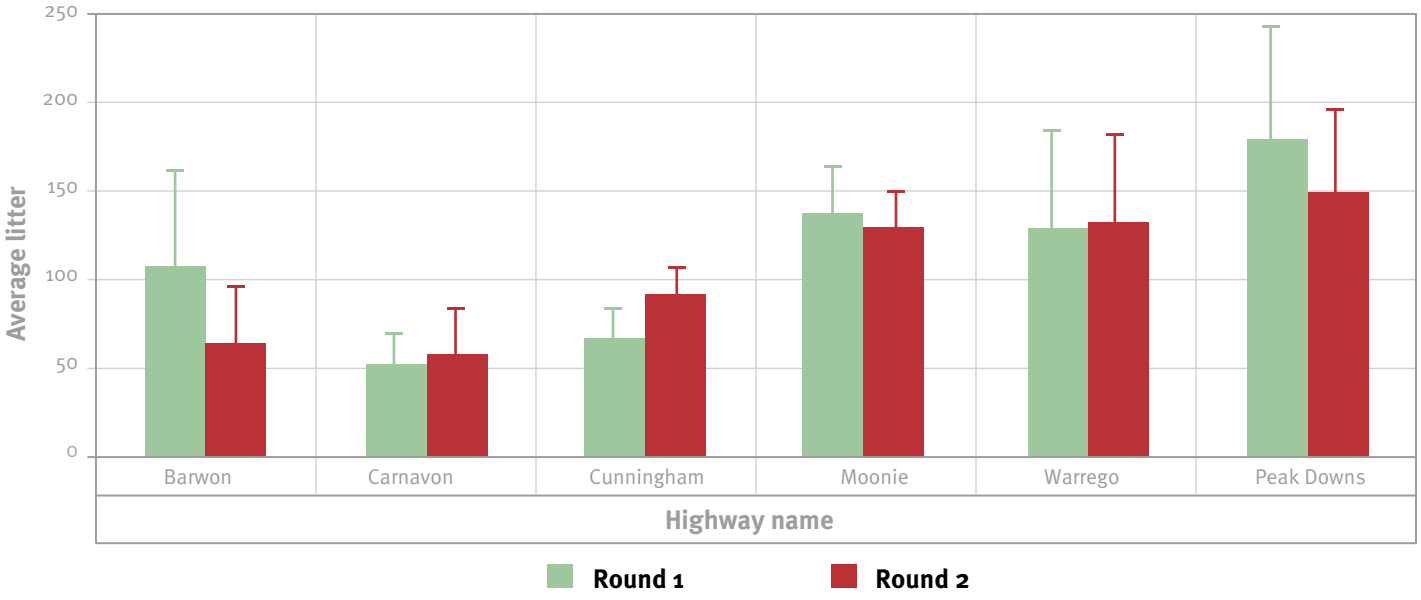


Figure 4. Average quantity of litter (+ standard error) for highways and sites. Data from visual survey only and New England Highway not included

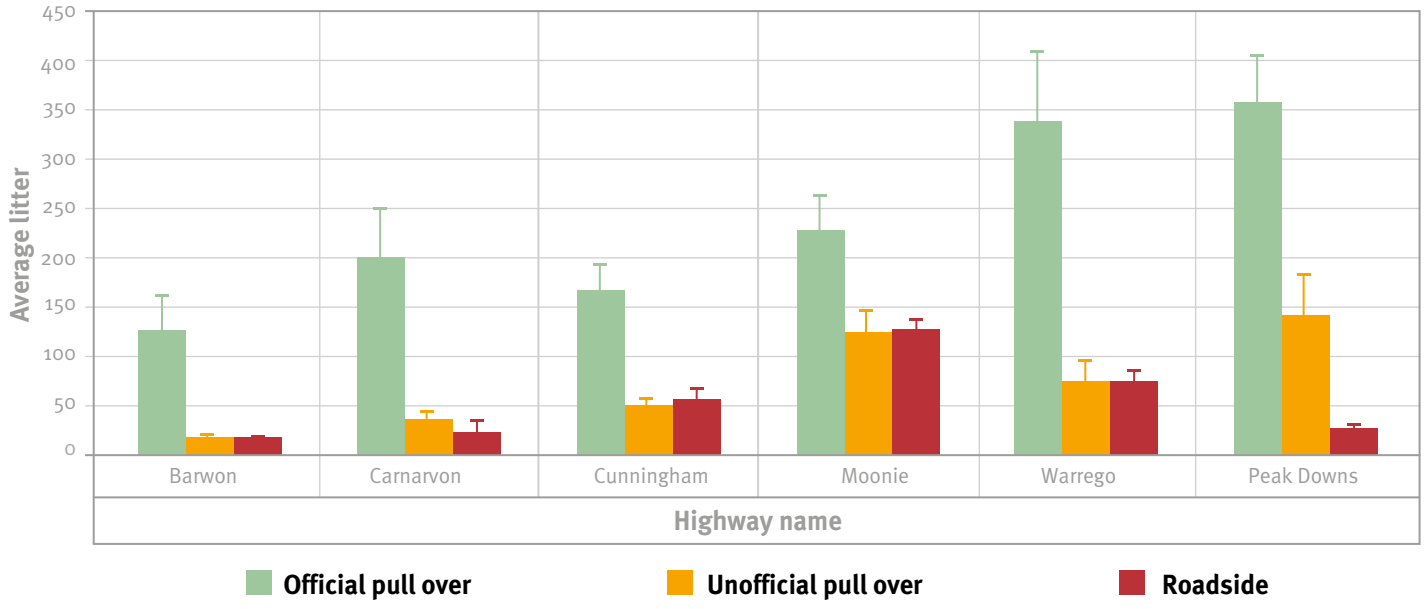


Table 1. The ratio of total litter from pre- and post-intervention sampling for the total litter count for the visual audit surveys

Highway	Site type	Ratio–decrease in litter					Ratio–increase in litter					
		0–0.2	0.2–0.4	0.4–0.6	0.6–0.8	0.8–1	1–1.2	1.2–1.4	1.4–1.6	1.6–1.8	1.8–2	>2
Barwon	Official pull over		1		3							
	Roadside			1							1	
	Unofficial pull over				1							
Carnarvon	Official pull over					1				1		
	Roadside		1	1								1
	Unofficial pull over					1						1
Cunningham	Official pull over				1		1		1			
	Roadside				1			1				1
	Unofficial pull over							1				1
Moonie	Official pull over					1	1					
	Roadside				1			1				1
	Unofficial pull over				1	2						
New England	Official pull over						1	1				
	Roadside			1								1
	Unofficial pull over		1	1								
Warrego	Official pull over			1		1						
	Roadside						1					1
	Unofficial pull over		1	1		1			1			1
Peak Downs	Official pull over			1								1
	Roadside				1	1						
	Unofficial pull over	no sites										

A ratio of less than 1 indicates a decrease in litter, whereas a ratio greater than 1 indicates an increase in litter.

Litter categories

The litter counts for each category pre- and post-intervention are presented in Table 2.

Table 2. Counts of items within each litter category

Litter category	Pre-intervention	Post-intervention
Beverage—alcohol	399	493
Beverage—container bits	968	1124
Beverage—non-alcohol	462	541
Chewing gum and lollies	234	191
Cigarettes	491	533
Clothing, rags, and work gear	78	54
Construction—tape, wood, cable and electrical	91	52
Container (box and bits)—non-food or beverage	80	78
Food wrap and film	249	161
Food, unidentified organic waste and human waste	160	92
Home waste and carpet	78	89
Industrial containers, metal pieces and nails	84	75
Medical waste, needles, hazards, Band-Aids, nappies and condoms	42	35
Newspapers, advertising, magazines, flyers and books	23	7
Cans and aerosol (non-beverage)	23	18
Package fillers, polystyrene and bubble wrap	57	9
Personal items, toys, sports gear and hair clips	7	13
Receipts, tickets and paper pieces	281	202
Retail bags, containers and packaging	111	60
Serviettes, tissues, condi packs and towelettes	97	120
Straps, strings, ties and rubber bands	109	148
Take away container pieces	131	198
Take away packs, plates, clams and bags—whole	175	94
Utensils, straws, sticks and bread ties—including pieces	49	59
Vehicle and roadwork debris	633	452
Wooden utensils and stirrers	0	7
Other	236	28
Total	**5348**	**4933**

Overall beverage and food related products were the most abundant category of litter found, followed by vehicle items, cigarettes, retail items, and commercial items (Table 2).

These six groups accounted for 87% and 92% of all litter collected pre- and post-intervention respectively.

A PERMANOVA analysis (Table 3) showed that the difference in litter counts by category between sites was not uniform for each highway and pre- and post-intervention sampling time periods, as indicated by the statistically significant result for this three way interaction ($P < 0.01$; highlighted in red).

Table 3. Results of PERMANOVA of litter composition pre-and post-intervention, highways and sites

Source of variation	Degree of freedom	pF – Statistic	P
Between pre- and post-intervention	1	0.96	Ns
Between highways	5	2.81	< 0.01
Between sites	2	7.06	< 0.01
Pre/post-sampling X highways	5	0.63	Ns
Pre/post-sampling X sites	2	0.72	Ns
Highways X sites	10	1.45	Ns
Pre/post-sampling X highways X sites	**10**	**0.57**	**< 0.01**

This pattern can be explained by examining pre- and post-intervention percentage differences of counts that are greater than 10% (i.e. dominant trends) for major litter categories by highways and sites within highways (Table 4).

The major litter categories that showed dominant trends were beverage (alcohol, non-alcohol and pieces), commercial items and vehicle items. Retail items, beverage—milk, food related products and cigarettes, in contrast, showed percentage differences pre- and post-intervention below 10% (Table 4).

Official pull over sites on the Barwon Highway showed a noticeable decrease in the number of alcoholic beverage containers and vehicle items post-intervention compared to other highways and sites within highways, while official pull over sites on the Cunningham Highway showed a noticeable increase in alcoholic beverage containers post-intervention (Table 4).

There was also a noticeable increase in the number of commercial items littered at official pull over sites on the Cunningham post-intervention compared to the other highways and sites within highways.

The number of non-alcoholic beverage containers at official pull over sites on the Barwon and Carnarvon Highways increased noticeably post-intervention compared to other highways and sites within highways (Table 4).

There was a decline in beverage pieces at official pull over sites on the Peak Downs Highway (control) post-intervention while the number of beverage pieces counted at roadside sites was noticeably higher post-intervention (Table 4).

This pattern was also true for the Warrego Highway.

At roadside sites on the Moonie Highway commercial items decreased noticeably compared to other highways and sites within highways post-intervention (Table 4).

Of interest was the fact that the number of cigarettes counted at sites and highways was similar pre- and post-intervention (Table 4).

The highest cigarettes numbers were counted at official pull over stops.

Table 4. Percentage differences of the main litter categories pre- and post-intervention

Highway	Location	Litter category								
		Beverage —Alcohol	Beverage —Milk	Beverage —non-alcohol	Beverage Pieces	Cigarettes	Food related products	Commercial items	Vehicle items	Retail items
Barwon	Official pull over	-14%	0%	10%	1%	-1%	-3%	2%	-24%	-3%
	Roadside	-2%	0%	0%	0%	0%	0%	1%	-1%	0%
	Unofficial pull over	-1%	0%	-1%	0%	0%	0%	0%	0%	0%
Carnarvon	Official pull over	-1%	-1%	14%	1%	1%	1%	0%	-1%	2%
	Roadside	0%	0%	-1%	-5%	0%	-1%	0%	0%	0%
	Unofficial pull over	0%	3%	2%	0%	0%	0%	1%	1%	3%
Cunningham	Official pull over	13%	9%	-5%	2%	-5%	-7%	10%	9%	7%
	Roadside	3%	0%	-1%	1%	0%	2%	0%	1%	6%
	Unofficial pull over	2%	0%	-1%	0%	7%	2%	1%	0%	1%
Moonie	Official pull over	2%	4%	-5%	0%	2%	-1%	4%	0%	-4%
	Roadside	-4%	0%	-3%	6%	-1%	0%	-14%	2%	3%
	Unofficial pull over	3%	-9%	-5%	-6%	-1%	1%	-1%	0%	-3%
Warrego	Official pull over	0%	-7%	-1%	10%	-2%	9%	-9%	2%	-3%
	Roadside	-1%	3%	0%	-2%	0%	-3%	1%	-1%	0%
	Unofficial pull over	-1%	1%	2%	-1%	2%	1%	2%	2%	1%
Peak Downs (control)	Official pull over	1%	-9%	-4%	-15%	-6%	-9%	4%	4%	-8%
	Roadside	0%	3%	0%	10%	2%	4%	-1%	4%	-3%
	Unofficial pull over	0%	0%	-1%	-2%	2%	2%	0%	0%	1%

Material type

Material type provides an overview of the proportion of littered items in the region that are toxic to human health and the environment. It also provides a summary of the impacts on productivity and biodiversity, effects on the community's values based on littered items being perceived as unsafe, dirty and uncared for, and opportunity lost for items that could be recycled.

The breakdown of material type by aluminium, aseptic, cardboard, foil, glass, metal, paper, plastic, polystyrene and those that were unidentifiable (unclassed) is shown in Table 5.

Information collected pre- and post-intervention have been summarised to show patterns.

The dominant material type for the region was plastic, followed by glass, making up 32% and 24% of the total, respectively.

This pattern was consistent across highways. These items, in many instances, can be recycled.

Aluminium can also be recycled. The percentage of aluminium making up the litter stream was generally low (around 4%) with the exception of some hotspots.

These included unofficial pull over sites on the Barwon and Carnarvon Highways (32% and 17% of the total respectively) and roadsides on the Barwon and Cunningham Highways (12% of the total for both highways).

Paper and cardboard are generally the most benign material types of the litter stream because they rapidly break down compared to other material types.

The percentage of the litter stream that paper and cardboard made up was low.

Unclassified items made up 17% of the total, ranging from 2% to 38% per cent at audit sites (Table 6).

Table 5. The percentage of the litter stream by material type for south west region highways pre- and post-intervention

Highway	Location	Material type									
		Aluminium	Aseptic	Cardboard	Foil	Glass	Metal	Paper	Plastic	Polystyrene	Unclassed
Barwon	Total	4%	0%	1%	3%	51%	6%	4%	20%	0%	10%
	Official pull over	3%	0%	2%	3%	53%	6%	4%	19%	0%	9%
	Roadside	12%	2%	0%	3%	33%	1%	1%	26%	0%	21%
	Unofficial pull over	32%	0%	0%	16%	0%	3%	13%	29%	0%	6%
Carnarvon	Total	4%	0%	3%	6%	15%	6%	10%	25%	1%	29%
	Official pull over	1%	0%	2%	7%	15%	9%	10%	18%	0%	38%
	Roadside	9%	0%	6%	7%	21%	0%	9%	38%	1%	9%
	Unofficial pull over	17%	1%	1%	3%	6%	1%	9%	40%	9%	13%
Cunningham	Total	6%	0%	4%	3%	16%	7%	11%	27%	0%	24%
	Official pull over	3%	0%	4%	4%	15%	9%	11%	26%	0%	28%
	Roadside	12%	0%	7%	1%	21%	2%	10%	33%	0%	13%
	Unofficial pull over	10%	1%	2%	4%	13%	10%	12%	24%	1%	25%
Moonie	Total	3%	0%	3%	6%	17%	4%	11%	37%	1%	17%
	Official pull over	2%	0%	3%	9%	2%	4%	13%	38%	0%	26%
	Roadside	3%	0%	1%	4%	41%	2%	7%	31%	2%	10%
	Unofficial pull over	5%	1%	5%	5%	13%	5%	12%	42%	0%	13%
Warrego	Total	2%	0%	7%	5%	20%	4%	10%	35%	2%	14%
	Official pull over	1%	1%	4%	5%	26%	5%	9%	35%	0%	14%
	Roadside	6%	0%	17%	9%	6%	0%	13%	32%	14%	2%
	Unofficial pull over	3%	1%	10%	3%	9%	2%	10%	37%	0%	25%
Peak Downs (control)	Total	4%	0%	2%	3%	26%	5%	5%	37%	1%	16%
	Official pull over	5%	0%	2%	3%	20%	7%	7%	36%	0%	19%
	Roadside	4%	0%	1%	3%	44%	2%	0%	37%	3%	6%
	Unofficial pull over	2%	0%	3%	7%	14%	2%	15%	35%	3%	19%
Grand total		**4%**	**0%**	**3%**	**4%**	**24%**	**5%**	**8%**	**32%**	**1%**	**17%**

Attributes of audit sites

The attributes of audit sites provides additional insights into understanding littering. Cleanliness of an area has been linked with littering, with the act of littering being described as contagious.

Understanding the amount of traffic and who might be using the road provides insights into who might or might not be contributing to litter on the roads.

The findings for both variables are described below.

Cleanliness

Cleanliness of the overall location and the audit site was recorded during the litter audits.

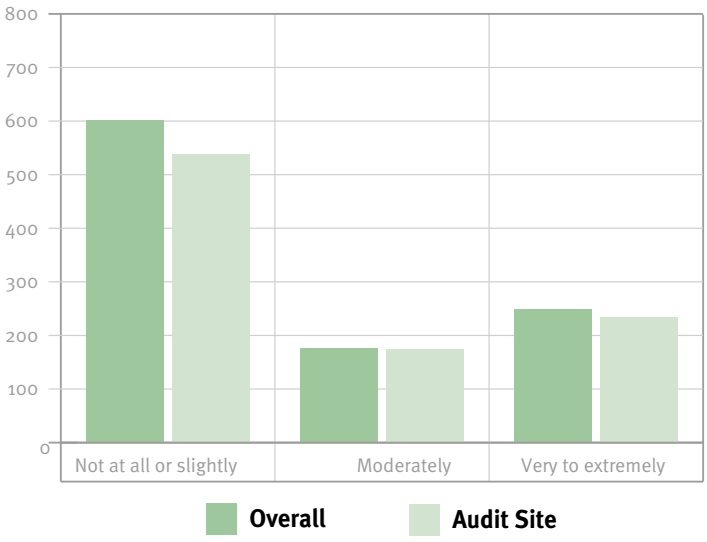
Over the pre- and post-intervention data collections the perceived cleanliness of the overall locations matched the level of littered items counted in the area, with the highest levels of litter located at the sites where the perceived cleanliness was rated as not at all or slightly.

This trend was consistent across the perceived cleanliness of all audit sites (Table 6) and the control audit sites (Figure 5).

Table 6. Cleanliness of all sampling sites pre- and post-intervention

Cleaniness overall	Pre-site total	Pre-average litter	Post-site total	Post-average litter
Not at all or slightly	25	142	26	111
Moderately	29	82	24	77
Very to extremely	13	46	18	64
Not supplied	1	137	0	86
Total	**68**	**407**	**68**	**337**

Figure 5. Average litter count against perceived cleanliness pre- and post-intervention for audit sites



Roadway usage

Traffic travelling on the same side as the audit location was counted for a period of five minutes at each audit site.

The vehicles using the highways were broken down into the following categories:

- passenger car
- 4WD/ute/van
- truck
- bikes
- pedestrian
- other

The amount of traffic on the highways decreased post-intervention compared to the pre-intervention counts. There was a 15% reduction in passenger vehicles and a 23% and 21% reduction in 4WD/ute/van and trucks categories respectively.

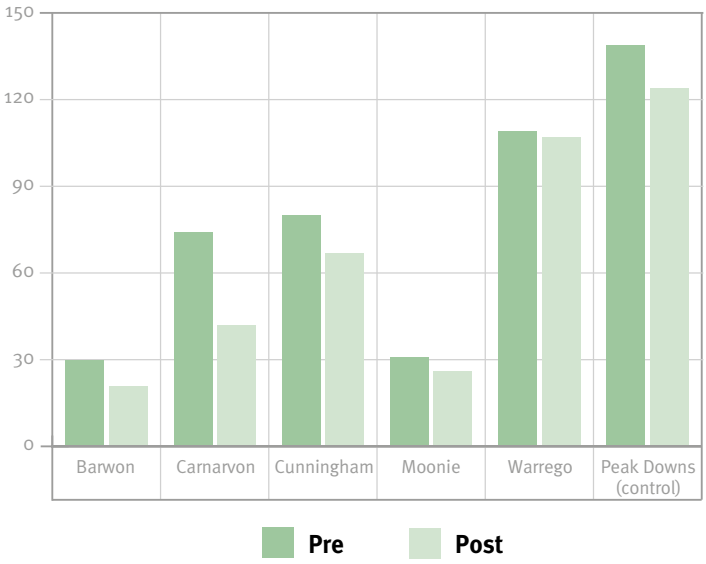
In the control location a different pattern of traffic was observed pre- and post-intervention. There was a 68% decrease of passenger vehicles and a nine and 22% increase in 4WD/ute/van and trucks categories respectively.

Comparison of the roadway usage over the south west highways indicated that the traffic reductions were similar apart from the Warrego Highway (Figure 6).

This may indicate a seasonal reduction in road usage in these areas; however, the more noticeable reduction of traffic on the Warrego Highway could be connected to the withdrawal of the mining industry in the Western Downs and Maranoa Regional Council areas.

A 30 and 37% reduction in 4WD/ute/van and trucks categories respectively pre- and post-intervention seems to support this hypothesis.

Figure 6. Roadway usage by highway pre- and post-intervention expressed as a total of audit sites per highway



Litter accumulation and branding study

Information was collected to answer the following questions:

- How much litter accumulates over time?
- Are there any dominant brands making up the litter stream?

The findings pre- and post-intervention are presented below.

Accumulation

The initial data collection of six sites during October and November 2015 (pre-intervention) identified that for the target region there was an accumulation rate of 14.01 pieces of litter per day (Figure 7).

The post-intervention collection in January and February 2016 for those six sites found that there was an accumulation rate of 13.55 pieces of litter per day per audit site (Figure 7).

An additional site was included in the second sampling period for the Warrego Highway because of its length. It was located 150km from the Warrego (1) site. This site alone showed an accumulation of 15.53 pieces of litter per day (Figure 7).

The accumulation rate for individual highways was variable between pre- and post-intervention collections and highways (Figure 8 and Figure 9).

The Carnarvon, Cunningham and Moonie highways showed an increase in litter accumulation post-intervention. The average increase at these sites was an extra 2.08 littered items per day from the pre-intervention collection (Figure 8).

In contrast, the Barwon, New England and Warrego (1) highways showed a decrease in litter accumulation post-campaign, with the average decrease being 2.24 littered items per day (Figure 9).

Accumulation rates were compared against the average recorded traffic in the area at the time of data collection (Figure 10). This comparison highlighted that there was a noticeable trend across the sites with an increase in accumulated waste correlating to a decrease in the volume of traffic, supporting previous findings around the interaction between being seen (visibility) and littering behaviour.

Warrego (1) site had an average of 27 vehicles while the Warrego (2) sites averaged 15, which is 44% less than the (1) site (Figure 10).

The accumulation of waste at these sites are dramatically was different with the Warrego (1) site having 92% less waste than the Warrego (2).

Figure 7. Daily accumulation of litter on south west highways before and after the campaign

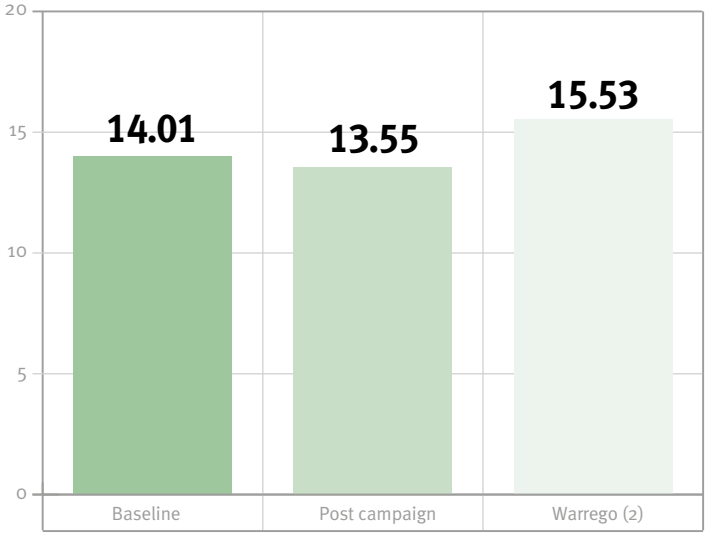


Figure 8. Highways showing an increase in accumulation of litter post-intervention

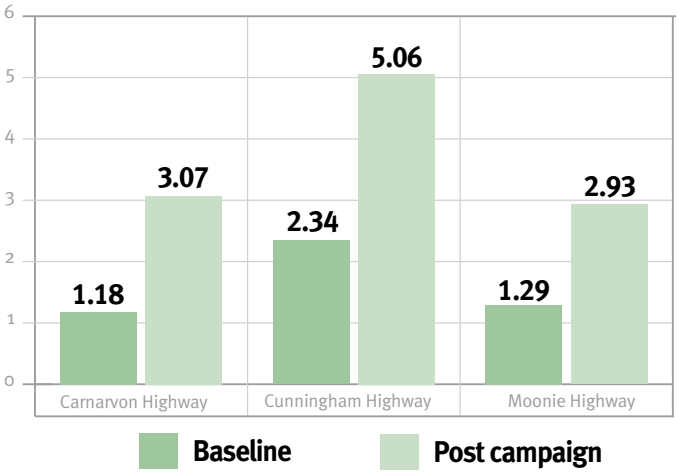


Figure 9. Highways showing a decrease in the accumulation of litter post-intervention

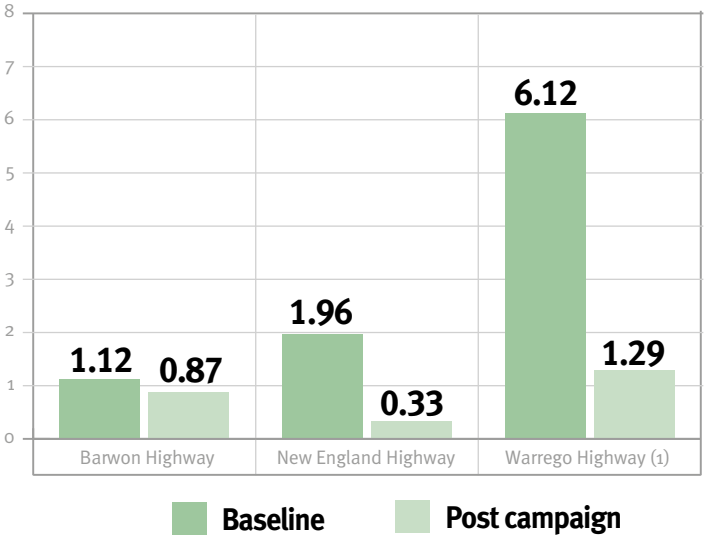
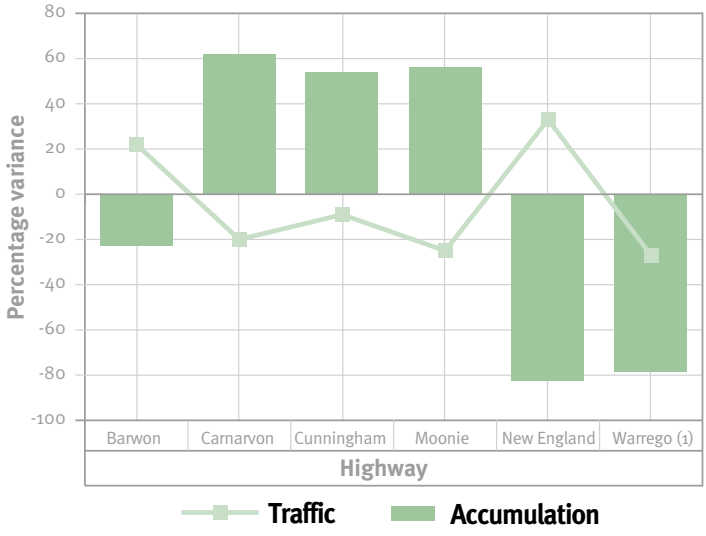


Figure 10. Average accumulation rate and traffic use for south west highways



Dominant brands in the litter stream

There were 25 brands identified in the branding study. The most commonly collected brands were associated with beverage containers (Figure 11), with the top five identifiable brands being Coca-Cola, XXXX, Bundaberg Rum, Dare and Ice Break.

The amount of beverage containers making up the total of identified brands in the final collection increased by 34% from the pre-intervention collection.

There was a large quantity of items classified as other, indicating that many of the items present were unidentifiable (Figure 11). This may be due to break up of the materials.

These beverage containers were further broken into:

- alcoholic beverage containers
- milk beverage containers
- non-alcoholic beverage containers.

Alcoholic beverage containers made up 28% of the total number of beverage containers at pre-intervention, increasing to 48% at final collection period.

Milk beverage containers made up 13% of the total number of beverage containers at pre-intervention, decreasing to 7% at the final collection period.

Non-alcoholic beverage containers made up 59% at pre-intervention, decreasing to 45% at the final collection period.

The following beverage container results are based on the most recent data collection conducted in the final collection period (post-intervention).

The majority of the milk beverage containers making up the final collection were Ice Break and Dare brands (Figure 12).

The highest branded non-alcoholic beverage containers were Coca-Cola followed by Red Bull and V (Figure 13).

Bundaberg Rum and XXXX beer made up the majority of alcoholic beverage containers in the post-intervention collection, 7% and 10% respectively. The rest of the identifiable alcoholic beverage container brands, making up approximately 1% each of the total were Corona, Jack Daniels, Johnnie Walker, Smirnoff, Tooheys, UDL and Victoria Bitter.

Seventy-nine per cent of the alcoholic beverage containers were listed under Other. This is due to missing labels making it impossible to identify them or the presence of partial pieces of broken bottles.

Figure 11. The percentage of brands by category making up the identified brands in the litter stream

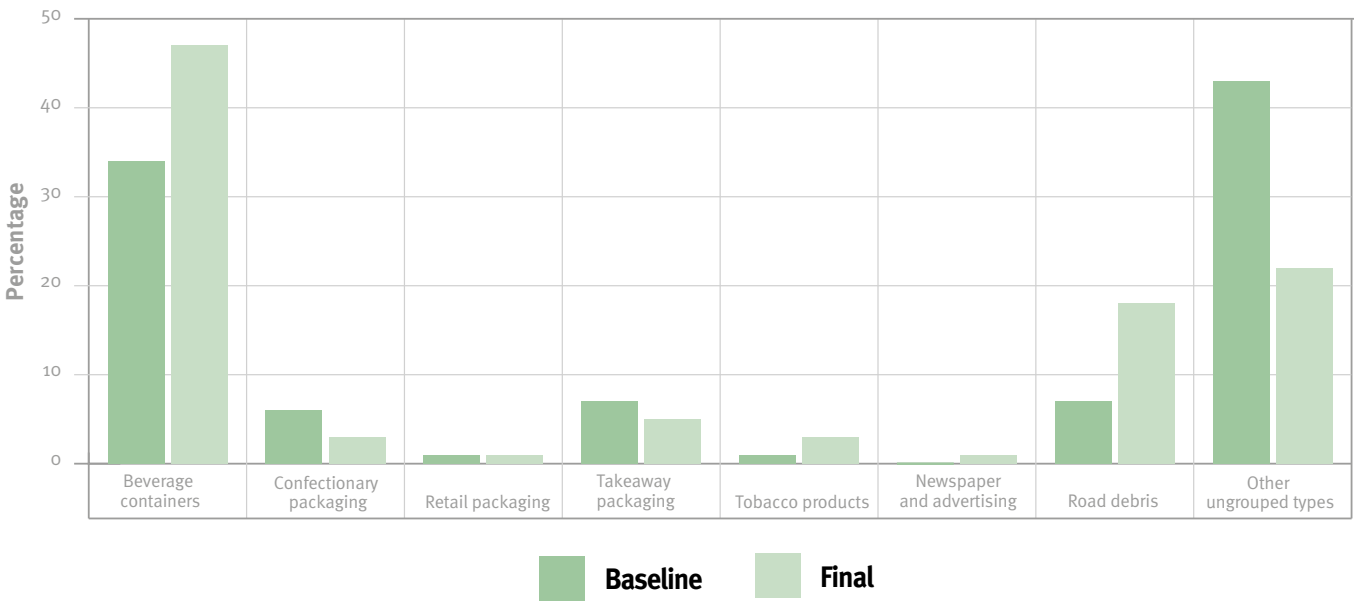


Figure 12. Brands of milk containers collected post-intervention

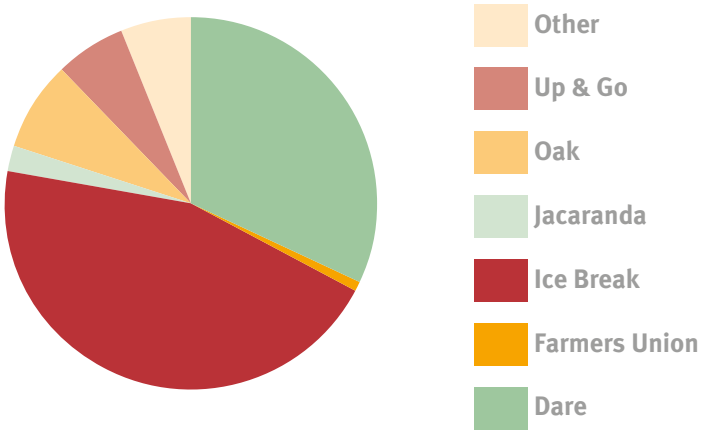
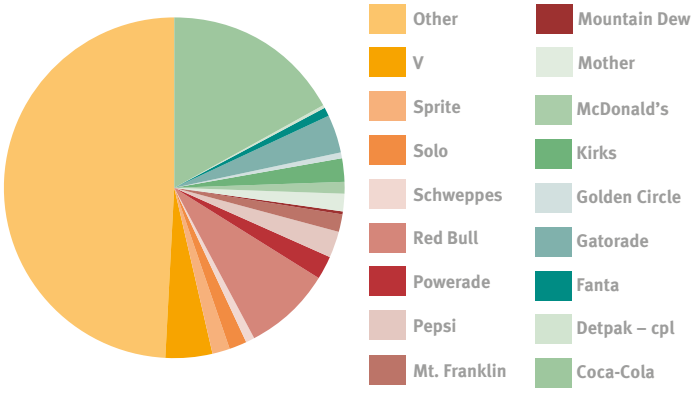


Figure 13. Brand of non-alcohol beverage containers, expressed as a portion of the total for the final collection



Attitudinal survey results

The following results are based on the comparison of the pre- and post-campaign attitudinal surveys completed by road users.

Who litters what and why

Thirty-five per cent of south west Queenslanders believe that anyone/everyone litters roadside. This is down from 50% at baseline survey, with 24% unsure about who litters south west roadsides.

Those in the control area are significantly more likely to believe that tourists/grey nomads litter roadsides (18%), as well as itinerants (14%).

Significantly more south west Queenslanders believe that drink containers and take away/food items are being littered now compared to the baseline.

- drink containers 72% from 50%
- take away/food items 55% from 45%.

Non-locals are significantly more likely to believe that drink containers (85%) and vehicle parts/tyres (27%) are being littered on roadsides, and significantly less likely to believe take away/food items are littered (35%).

Results are similar between south west Queensland and the control area, except tobacco products are believed to be littered less in the control area (4% from 15%).

The frequency of littering behaviours within the preceding three months is fairly similar between the two surveys.

There was a decline in the proportion of people who were in a vehicle and someone threw a can or bottle from that vehicle in the preceding three months, from 16% to 5%.

In 2016, 13% of south west Queenslanders said they have littered on a road, compared to 18% in 2014.

Throwing/dropping litter is still the most common type of roadside littering, however the proportion doing this has significantly declined from 70% down to 43%.

Accidental littering has significantly increased from 9% to 26%.

Seventy-one per cent continue to believe that littering occurs on south west roadsides because people are lazy or can't be bothered, while ignorance, not thinking or not caring continues to be the next highest reason littering occurs at 21%.

Littering perceptions and attitudes

The perceptions of the cleanliness of south west roadsides declined, particularly from those who believe the roads are very or extremely clean on the day (21% from 39%).

Nine in 10 south west Queenslanders interviewed believe that it is very or extremely important for road users not to litter, that the roadsides are clean, and that clean roadsides demonstrate a sense of local pride.

Although importance is still very high, the proportion who believe each of these statements is 'extremely' important significantly declined compared to the 2014 baseline.

One third of south west Queenslanders strongly agreed that it is everyone's responsibility to dispose of their waste appropriately.

They also strongly believed that anyone caught littering on roadsides should be fined, that littering on roadsides is harmful and that littering on roadsides is illegal.

Despite strong agreement with the importance of not littering and having consequences for offenders, south west Queenslanders are considerably less likely to act by reporting litterers or to believe that those who litter will be punished.

Only one in three would report someone littering and only one in five were confident they know how to report it.

However, despite some willingness to report littering on roadsides in south west Queensland, only one in 10 believed that litterers were likely to be caught and fined.

In 2016, significantly more south west Queenslanders would be willing to report someone littering.

The proportion who would be 'not at all' likely to report littering, confident in knowing how to report it and believe that offenders are likely to be caught and fined, is also now significantly lower.

Overall satisfaction with roadside litter prevention in south west Queensland declined since the baseline survey in 2014.

One third believed that CCTV, fines, reports and police are required to stop roadside litter in south west Queensland.

More than one in five also believed that education, information and signage (23%) and more bins that are easier/closer (23%) would help stop roadside litter.

Reporting roadside littering

Two in five south west Queenslanders said they would do nothing if they saw someone littering from a vehicle.

There was a very slight increase in the proportion of people who have ever reported someone for roadside littering in the target region since the baseline survey (6% from 4%), especially amongst those under 35 years (9%).

Litter reporting in the control area is 2%.

One in five were aware that littering from vehicles could be reported to EHP (22%), with awareness higher amongst those aged 18-34 years (30%).

The greatest deterrent to reporting littering from vehicles is a lack of knowledge of the social, economic and environmental impacts of littering and being unaware of how or who to report to (31%).

Another three in 10 attribute it to laziness or not caring (17%) or it being too much hassle or time consuming (13%).

Nearly one quarter said they would be more likely to report littering if there was more awareness of who to report it to and it could be done easily (23%).

Campaign effectiveness

Perceptions of anti-littering campaigns in general have significantly improved compared to the baseline survey, 23% from 7% at baseline.

In particular regarding anti-littering campaigns stopping littering behaviour by raising awareness, education and engagement was 49% up from 17%.

Non-locals were the most positive about anti-littering campaigns generally, not just in terms of their impact on raising awareness, educating and engagement (68%), but also regarding their impact on people responding and changing behaviour (23% compared to 7% of locals and 4% of the control area).

One third of Queenslanders are aware of the 'Love Queensland. Let's keep it clean' campaign when prompted, which is on par with prompted awareness of New South Wales Environmental Protection Agency's 'Don't be a Tosser' campaign.

Prompted awareness is highest amongst 18-34 year olds (49%), but significantly lower amongst those 35-54 years (25%).

Of all of the campaigns, prompted awareness is considerably higher for far more established and national campaigns, including Clean Up Australia Day (90%) and 'Do the Right Thing' (74%).

Three quarters of south west Queenslanders believed the campaign message is important, and their opinion of the campaign was also high.

There was a small shift in overall behaviour as would be expected for the short length of time the campaign has been running.

Of those surveyed in the target region that were aware of the campaign, 2 in 5 believed the key message is to report littering to EHP, while nearly half are unsure.

The most commonly recalled channel was outdoor advertising (billboards and signs on roadsides) (94%), followed by internet/ social media (29%).

Around half of the people surveyed indicated the campaign makes them think more favourably about the department (48%), more likely to report roadside littering (47%) and makes them think about their behaviour (44%).

The campaign has had a considerably higher impact on the perceptions of locals (the target audience of the campaign) compared to non-locals, particularly regarding making them more likely to report roadside littering (49% compared to 35%).

A significantly higher proportion of those who are aware of the campaign are 'very likely' to report someone they saw littering compared to those who are not aware of the campaign, (20% compared to 12%).

Public reporting

The Litter and Illegal Dumping Online Reporting System (LIDORS) was first introduced in 2011 with the introduction of the *Waste Reduction and Recycling Act 2011*.

The system allows members of the public to report litter and illegal dumping instances to the department for action.

From commencement to 29 February 2016 almost 12,000 reports were received, of which the target region contributed less than three percent of the reports per year.

A minor increase in public reporting was detected for the target region during the three month campaign period from November 2015 to January 2016.

Figure 14 shows the comparison of the monthly average number of reports since the public reporting system commenced and the total number of reports received during the campaign period.

There was a noticeable increase during the campaign period compared to the yearly average.

When comparing the whole-of-state trends for public reporting against the target region for the campaign period, the target region trends differ from the rest of the state.

Specifically, the rest of the state showed a decline in public reporting while the target region showed an increase.

Figure 14. Monthly comparison of south west litter reports for against campaign period

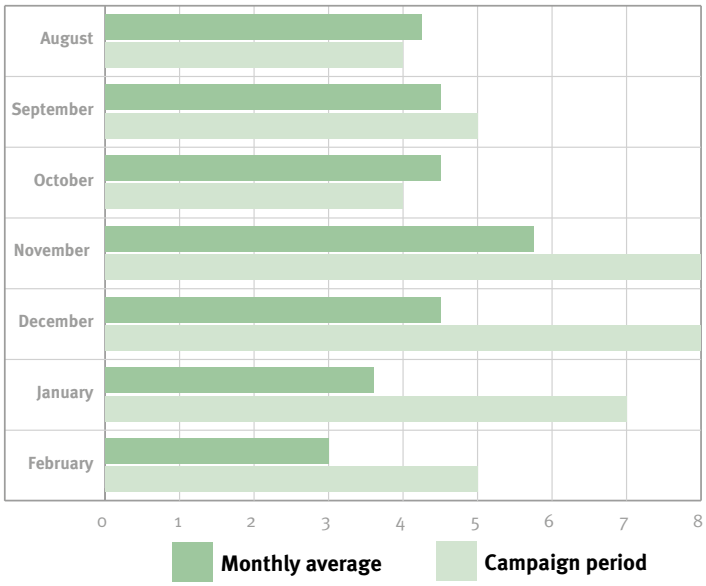
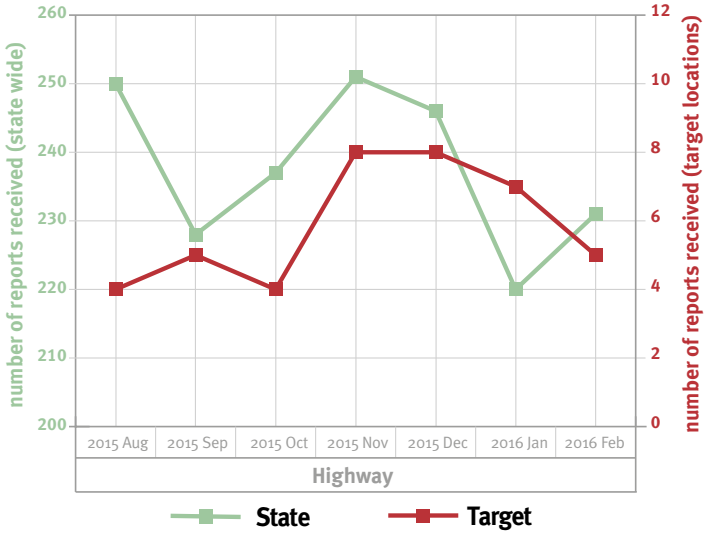


Figure 15. Public reporting comparison of the target region against whole-of-Queensland trends for the campaign period



Facebook

Eleven of the 12 Facebook messages posted reached a total of 94,674 Facebook users. The responses were generated through users liking, sharing or commenting on campaign related posts.

Below are the top five posts identified as receiving the most responses by the south west Queensland Facebook community.

Post-1:

South west Queensland councils, the Queensland Murray Darling Committee, and Australian Packaging Covenant have joined forces with EHP to say no to roadside litter.

Got to ehp.qld.gov.au to find out how you can help.

See it. Report it. Stop it

Post-2:

We support a litter free south west Queensland—if you love Queensland, help keep it clean.

Post-3

Tip#3—Love Queensland, Let's keep it clean—report littering from vehicles

www.ehp.qld.gov.au 13 QGOV

Post-4:

Tip #2—Love Queensland, Let's keep it clean—put your litter in the bin.

Post-5:

Did you know that plastics and other rubbish dropped on land find their way into waterways all over Queensland?

Join the Love Queensland. Let's keep it clean anti-litter campaign.

Learnings

The pilot South West Region Roadside Litter Prevention Project helped identify issues related to long-term litter along road corridors in south west Queensland.

As the pilot was the first of its kind in Queensland, there was a wide range of learnings and findings that support the continuation of the project within the region.

The project was regionally focused with the development of strong ties with stakeholders across the region integral to its success.

One of the intentions was to build capacity in the region, as such it was important to ensure stakeholder engagement and ownership as early as possible. Because of this, many of the actions undertaken in relation to data collection and campaign delivery were stakeholder driven.

The complexity of the involvement of different stakeholders, coupled with the need to ensure adequate coverage from each stakeholder group, led to the project's expansion over vast areas of land and cultural environments (city to rural aspects and behaviours).

This expanded the scope of the data collection across the chosen highways; the campaign design to suit varying audiences and differing cultures across the region; and the final delivery of the campaign.

Stakeholder engagement and vast travelling distances across the region were two of the main challenges for this project. These vast travelling distances became evident during the scoping of the target highways.

Another challenge faced was that Queensland differs greatly from other Australian states.

It is characterised by a population that is concentrated in the south east and along the coastal fringes. Lower populations can be found in regional areas such as the south west, with significant variation in population figures between regional councils within the south west (Figure 16).

Given its uniqueness, the methods and findings of other roadside anti-litter projects were often not transferrable to Queensland's environment and communities.

The delivery of this pilot relied on in-kind support from stakeholders. In many instances, stakeholder in-kind resources were limited due to competing priorities, this impacted on capacity to conduct litter audits and campaign delivery.

The vast distances participating officers were required to travel to ensure adequate regional coverage was also a barrier to delivery of litter audits.

The resource restrictions imposed on litter audits impacted on various aspects of the data collection, including the ability to detect changes pre- and post-intervention.

Data consistency and integrity is also an important consideration in measuring the performance of a project.

In this pilot, the project methodology was not strictly adhered to for the litter counts, with some site types having more sites than required, while others were missed out altogether.

Of the projected 78 sites for the target region a total of 70 sites were sampled appropriately (Table 7). The missing audit sites were attributed to resource constraints and the limited availability of audit site types on some highways.

Competing priorities for participating stakeholders servicing multiple departments within their organisations impacted on the timely delivery of the litter prevention campaign.

Improvements in the sampling design can be attributed to the reconnaissance survey conducted prior to the roll out of the pilot.

It also led to the most appropriate selection of audit sites based on safety requirements as required by the Department of Transport and Main Roads.

The total audit sites in the control location were amended from the baseline data collection of nine sites to 12 sites in the pre- and post-intervention periods.

This increase provided a better statistical representation of site types for statistical analysis.

Better data on traffic also resulted from consideration of the findings from the reconnaissance survey with an expansion of the vehicle categories.

Figure 16. Target region land mass and estimated population per regional council[2]

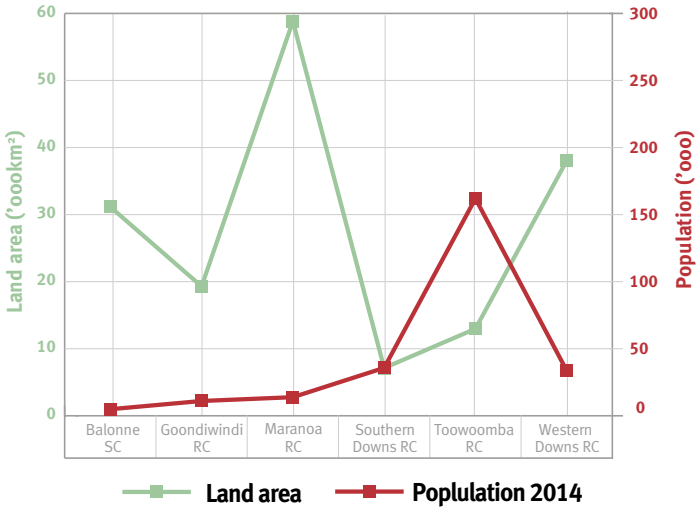


Table 7. Site comparison of proposed and actual audit sites

Site type	Proposed		Actual	
	Full scale	Visual	Full scale	Visual
Official pull over	7	19	12	14
Unofficial pull over	7	19	9	13
Roadside	7	19	8	14

2 Queensland Government Statistician's Office, Queensland Government. Local government areas of Queensland (land mass), Wikipedia.

What the data is telling us

Quantitative data

The litter audits showed that littering along highways in the south west region is a significant problem.

For example, when compared to the findings of the National Litter Index (NLI), a long-term data set of litter amounts across Queensland conducted by Keep Australia Beautiful, the south west region is 42 times higher than the Queensland average

The 2014/2015 NLI report indicated Queensland highways were averaging 67.7 pieces of litter per 1,000m^2, and the more recent preliminary findings for 2015/2016 report are showing a decline to 46.8 pieces of litter per 1,000m^2. These results are concentrated on locations in the south east of the state.

The results of the post-campaign data collection for this study showed an average of 1.96 pieces of litter per square metre or 1,969 pieces of litter per 1,000m^2.

Littered landscapes adversely affect community values such as sense of place and community pride.

They reduce visual amenity and aesthetic values.

Perceptions around personal safety are also negatively impacted. Consequently, the liveability of the region is significantly reduced, with flow-on impacts for business and real-estate investment in the region.

Highways represent the gateway into regional centres. A littered entry point presents a negative impression and may detract visitors from stopping and enjoying the touristic attractions on offer.

Quantifying what is thrown away in terms of material type provides insights into littered items that are toxic to the environment, including agricultural industries as well as items that are discarded that could be recycled.

Plastic was the most littered material type in the region.

Littered plastic items represent a product that is harmful to the environment. Plastic takes a long time to break down (estimates of up to 600 years plus), contains and attracts toxins, and is transported by wind and water into local waterways that ultimately connect with the ocean.

Plastic has been detected in over 600 species[3] of wildlife in the marine environment, causing death and injury through entanglement, starvation and tissue damage, amongst other negative effects.

The impact of discarded plastic on the terrestrial environment, agriculture and freshwater systems, including local fishing spots, is currently unknown.

Plastic, glass and aluminium represent items that can be recycled. Items of these material types carelessly discarded, represent an opportunity lost by throwing away a potential resource.

It also highlights an opportunity for regional councils to actively engage in the Container Refund Scheme currently being developed by the Queensland Government. The outcomes would be two-fold: potential revenue increase and recycling of items currently discarded, removing them from the litter stream thus reducing the quantity of litter on highways and other locations.

Understanding the material types of litter streams also provides evidence for items to target in future campaigns.

This is supported by an understanding of which brands were prevalent in the litter stream. Projects may encourage brand custodians to enter into collaborative partnerships to address the issue, as littering of their products is not in their best interest.

The findings from this pilot project, support previous results into littering behaviours.

Littering opportunities were again linked to seclusion (covert behaviour) associated with the length of the highway and how busy it was traffic wise.

Littering was also shown to be contagious, linked to areas that appeared dirty and uncared for and/or areas of bushland versus farms (perception of ownership).

The variation detected between highways and site types reflects the complexity of the issue where there are many contributing factors for the quantity of litter present at a given time.

This includes different waste management regimes by councils, road usage and types of users including seasonal trends such as holidays, weather patterns (relating to the rate of breakdown of some items such as paper) and disturbances such as fire and floods.

One item–cigarettes–didn't vary in quantity pre- and post-intervention. This may be because addiction and habit seem to be of greater influence on behaviour than the appropriate disposal of waste.

This suggests that a different approach would be needed to reduce the littering of cigarettes.

3 Chris Wilcox, Erik Van Sebille and Britta Denise Hardesty, University of California 2015, 'Threat of plastic pollution to seabirds is global, pervasive and increasing'

Influencing behaviours

Two messages, one around the appropriate disposal of waste and the second around reporting littering offences, were used to influence behaviours. These messages were conveyed using a variety of media.

Facebook proved to be the most cost effective distribution of information for the campaign. With 11 of the 12 Facebook message posts being monetised across the region, the reach that resulted was quite substantial (approximately 95,000 users) and obtained for a small cost.

A flow-on effect of this method was that many comments made on the posts were negative towards the act of littering, thus building a regional social norm that litter is not acceptable.

Reporting of littering increases the risk and/or perception of risk that a litterer will be caught.

Reporting littering also empowers community members concerned about the presence of littering to do something positive about it.

While there was not a dramatic increase in public reporting of littering in the target region, there was an observable increase when compared against whole of Queensland trends.

Littering is a notoriously difficult act to witness and therefore the small increase in reporting can be viewed as an extremely encouraging trend.

This supports the qualitative data around road users' knowledge and rejection of littering in the region.

A study conducted by P.Lally and colleagues (October 2010) into how habits are formed indicates that the time it takes for a person to form a new behaviour is highly variable, ranging from 18 to 254 days. [4]

Figure 17 shows a model of behaviour change starting at the pre-contemplation of having no recognitions of the need or interest in changing a specific behaviour, through adopting the new behaviour, to the maintenance of the ongoing new behaviour. [5]

The social awareness campaign showed promising results in behaviour change for the south west community.

Many of the target region residents displayed an increased awareness of the litter problem in the region due to the campaign and were showing signs of entering the behaviour change cycle (contemplation).

Pre-intervention, road users indicated a low level of awareness of the problem in the region and a lack of knowledge of how to and/or willingness to report littering offences (pre-contemplation).

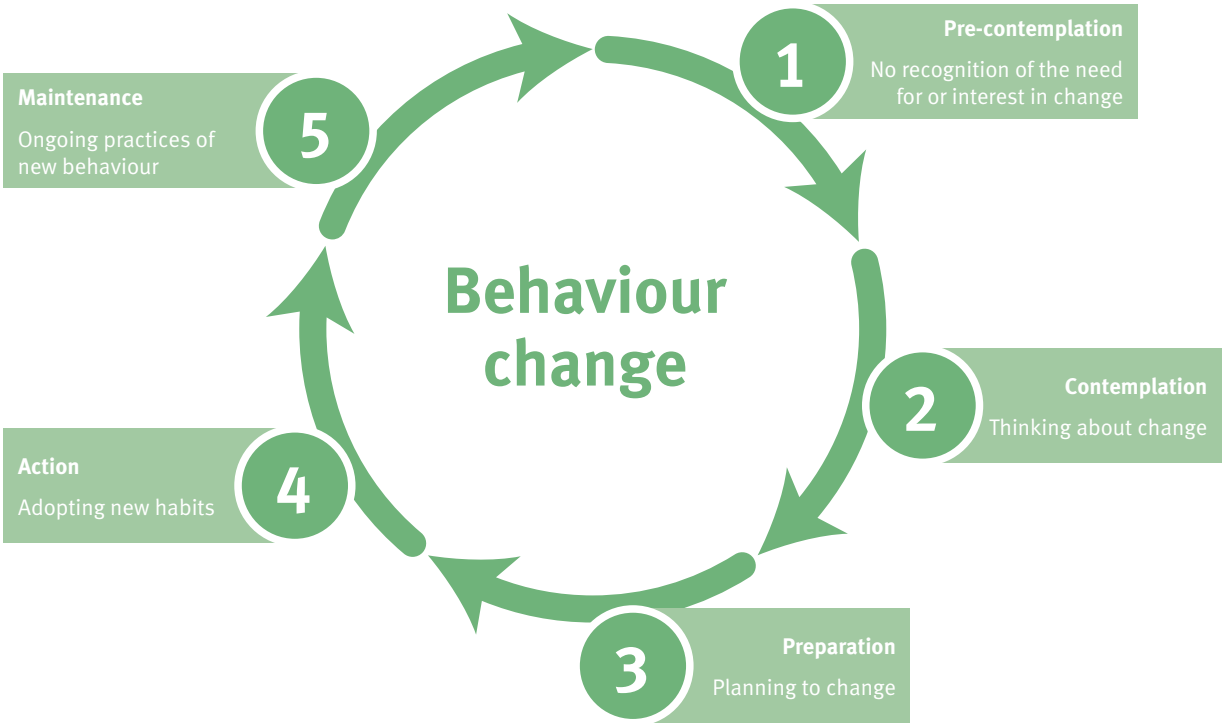
Survey participants said that clean roadsides were important for local pride, and an increased willingness to report littering along with a greater awareness of what is being littered supports the behaviour change campaign message.

There was overall support for a campaign, both in raising awareness and in regards to the impact on people responding and changing their behaviour (Preparation and Action).

The increased awareness of how to report was higher amongst those aged 18-34 years.

This may have been due to the exposure of the campaign through social media given the Facebook demographic outlined in 2014 showed that 48% of a total of 1.2 billion users were between 18 and 34 years old.[6]

Figure 17. The cycle of behaviour change



4 Phillippa Lally, Cornelia H. M. van Jaarsveld, Henry W. W. Potts, and Jane Wardle, 'How are habits formed: Modelling habit formation in the real world'

5 Prochaska, JO; Norcross, JC; DiClemente, CC. Changing for good: the revolutionary program that explains the six stages of change and teaches you how to free yourself from bad habits. New York: W. Morrow; 1994.

6 Jetscram, 'Social Media User Statistics & Age Demographics for 2014'

Conclusion

Litter on Queensland highways is a consistent long-term problem that requires long-term solutions.

It results in significant social, environmental and economic costs that impact on all Queenslanders.

The South West Region Roadside Litter Prevention Project and the 'Love Queensland. Lets keep it clean' campaign was the first of its kind in Queensland.

The project was developed not only to reduce littering in the region and encourage reporting but also to build value and capacity in the region that could inform long-term behaviour change actions.

There have been flow-on effects in Queensland as a direct result of the campaign material distributed throughout the region.

The Department of Transport and Main Roads based in Roma have adopted the campaign message and installed 20 permanent metal signs in official pull over locations with the 'Love Queensland .Let's keep it clean' message and artwork.

There is potential for further partnerships to be formed in the region and further into western Queensland.

Councils have contacted the department seeking campaign material, and requesting assistance in expanding the anti-litter message of the campaign.

A Roadside Prevention Toolkit is being developed to support the Love Queensland message for roll out across the state through local and state government bodies, and potentially NRM groups.

The Queensland Murray Darling Committee on behalf of the Regional Waste Group stakeholders has continued the program to further encourage anti-litter behaviours.

The Queensland Murray Darling Committee continues to use the comprehensive dataset collected as a platform for influencing change in the region.

Specifically, it is being used to refine the litter prevention message by targeting specific items as well as considering where to best invest effort for continuing the collection of data through litter audits.

In conclusion, the learnings of this pilot have assisted in developing a stronger and more streamlined roadside litter program for application across the state.

Where to from here?

Many lessons were learned during the project that can be applied to future projects and campaigns across Queensland.

These include:

1. A clear defined staged process set out in the project plan that can be promoted and planned with more understanding of the impacts such as time, distance and responsibilities of all stakeholders.
2. A stage specifically for engagement and building of new working relationships across stakeholders, ensuring that a strong structure of governance and ownership of the project is developed.
3. A reduced scope (i.e. the size of the region to be studied coupled with prioritisation of specific waste types and the associated behaviour) to assist in the best use of resources. An example from this study would be to target official pull overs and non-alcoholic beverage containers.
4. A comprehensive data platform on roadside litter to be used to guide the refinement of the information being collected, enabling it to be more directly focused on Queensland specific attributes.

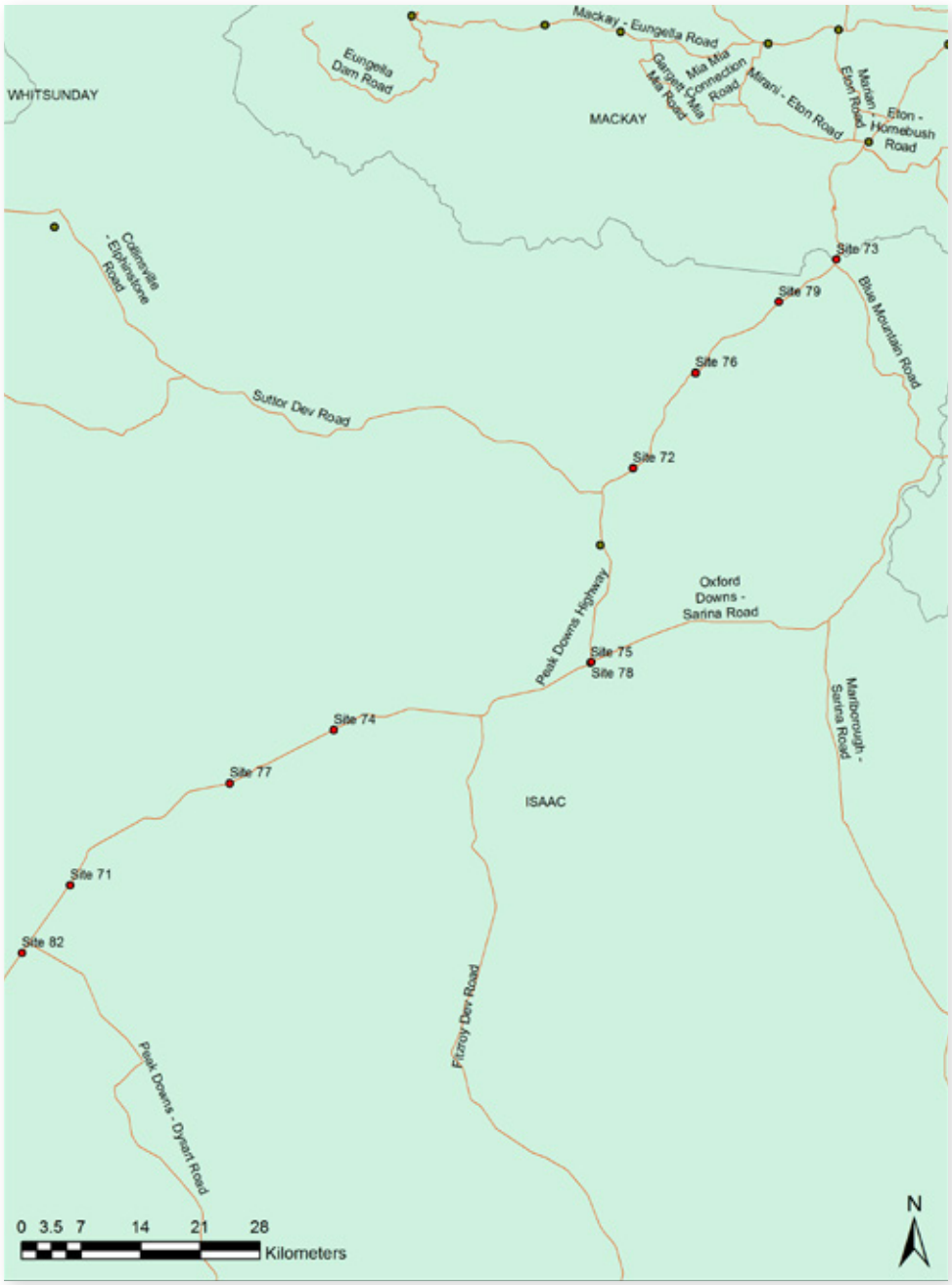

LOVE QLD

Appendix One

Audit site locations

South west region audit locations

Target region audit locations



Appendix Two

Litter categories

Category title	Litter type
Beverage	• Beverage—alcohol. • Beverage—milk. • Beverage—non-alcohol. • Beverage bits.
Tobacco products	• Cigarette butts. • Butts bits, packs, matches, lighters.
Commercial items	• Construction, tape, wood, cable, electrical. • Industrial containers, metal pieces, nails. • Straps, strings, ties, rubber bands.
Food related products	• Chewing gum. • Food wrap/film. • Lolly, ice cream, snack wraps. • Serviettes, tissues, condi packs, towelettes. • Take away container bits. • Take away packs, plates, clams, bags. • Utensils, straws, sticks, bread ties, bits. • Wooden utensils, stirrers.
Hazardous waste	• Food, goo, human waste. • Medical, needles, hazards, Band-Aids, nappies, condoms.
Household items	• Cans aerosol (non-beverage). • Clothing, rags, work gear. • Home waste, carpet. • Newspapers, adverts, magazines, fliers, books. • Personal, toys, sports gear, hair clips.
Retail items	• Containers, boxes and bits (non-food or beverage). • Package fillers, polystyrene, bubble wrap. • Receipts, tickets, paper pieces. • Retail item bags, containers, packaging.
Roadwork	• Roadwork debris, work gear, bits.
Vehicle items	• Rubber, tyres, bits, thongs. • Vehicle parts, screens, bits, bolts.
Other	• Other.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