Beerburrum Forest area pilot project

Reducing illegal dumping in natural areas

Queensland Government

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This report

This report summarises a community-based pilot project delivered by the Department of Environment and Science (the department) and stakeholders, aimed at addressing illegal dumping in natural areas and the behaviours associated with this issue.

This report outlines the project from firstly identifying an illegal dumping 'hotspot', learning more about the associated issues, trialling strategies to address illegal dumping, through to describing the results, learnings, and potential legacy.

Illegal dumping

Litter and illegally dumped wastes are the most visible indicators of pollution in the environment. Illegal dumping in particular results in aesthetically unappealing and potentially hazardous environments, and affects the community's enjoyment of public spaces.

This waste can also result in environmental harm, spread of pests and diseases, and can pose health risks to those using and working in the area.

Further, economic impacts to Queenslanders include clean-up expenses and potential losses to the agricultural and tourism sectors, and real estate values.

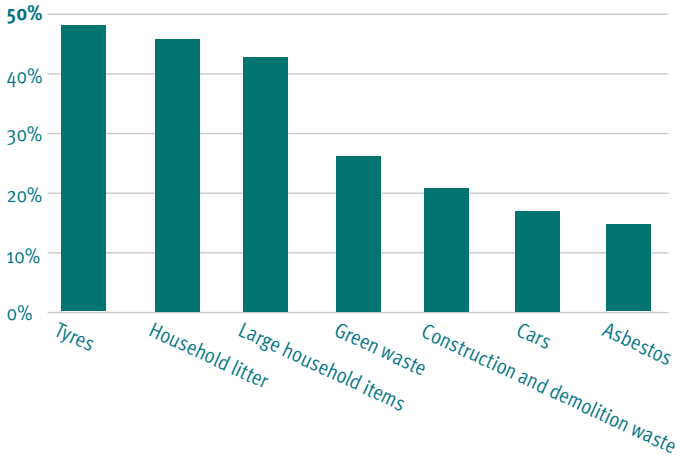
The *2017 Recycling and waste in Queensland report* presented data on, and trends in, waste disposal and recovery in Queensland. The report detailed costs to local governments totalling $18 million to clean up 8,500 tonnes of litter and illegally dumped waste during the 2016–17 financial year.

Fifty councils provided data on the types of litter and illegally dumped waste collected. The most common were tyres (reported by 48% of councils), household litter (46%), large household items including white goods, furniture and mattresses (42%), green waste (26%), construction and demolition waste (20%), cars (16%) and asbestos (14%).

The Queensland Government is committed to working with land managers, local councils and key stakeholders to address illegal dumping across the state. This is supported through *Queensland's Litter and Illegal Dumping Action Plan* (the plan). The plan was released by the department in October 2013, demonstrating the government's commitment to addressing the problem of illegal dumping through four core functions:

1. education and engagement with land and waterways managers and the community
2. reactive compliance and enforcement
3. proactive interventions in regional illegal dumping hot spots
4. littering and illegal dumping data and mapping.

Figure 1: The most common types of waste reported by councils



Beerburrum Forest area

Beerburrum Forest area is a significant property with an area of approximately 300km² of exotic pine plantation, open eucalypt forest, and rainforest that surrounds the peaks of the Glass House Mountains.

It is approximately 60km north of Brisbane and is located within Moreton Bay Regional Council (MBRC) and Sunshine Coast Council (SCC).

It is managed by HQPlantations under a 99-year lease (from 2010) granted by the Queensland Government. HQPlantations operates a soft and hardwood plantation which is also open to the public for responsible recreation.

The area is home to various native species of birds, marsupials, and reptiles, such as the vulnerable tusked frog, wallum froglet and glossy black-cockatoo. Other faunal populations include wild dogs and wild horses.

The area is enjoyed in a wide range of tourist and recreational uses, including:

- four-wheel driving
- trail-bike riding
- horse riding
- mountain-bike riding
- orienteering
- Glasshouse Mountains Lookout
- Coochin Creek camping and day use areas.

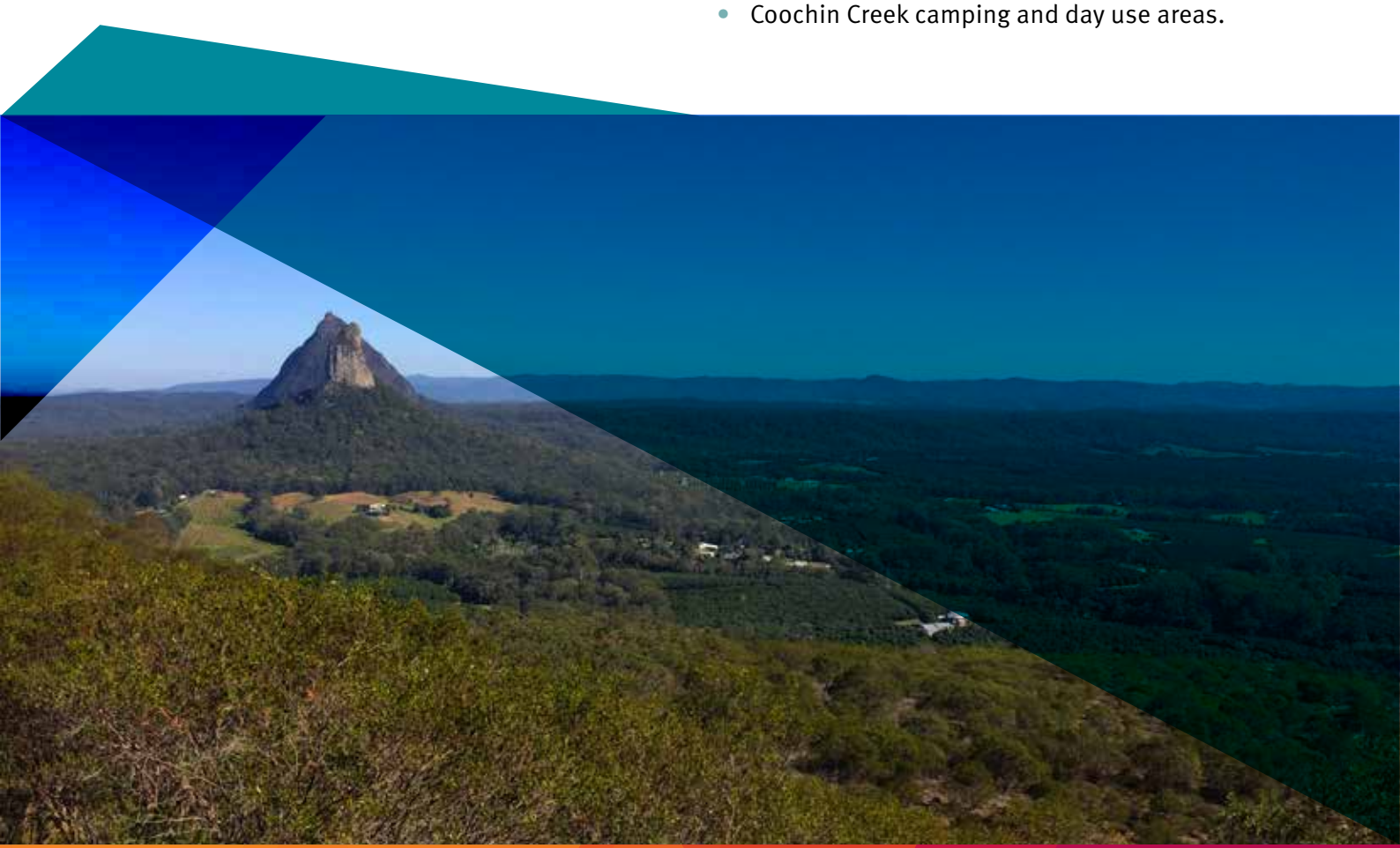
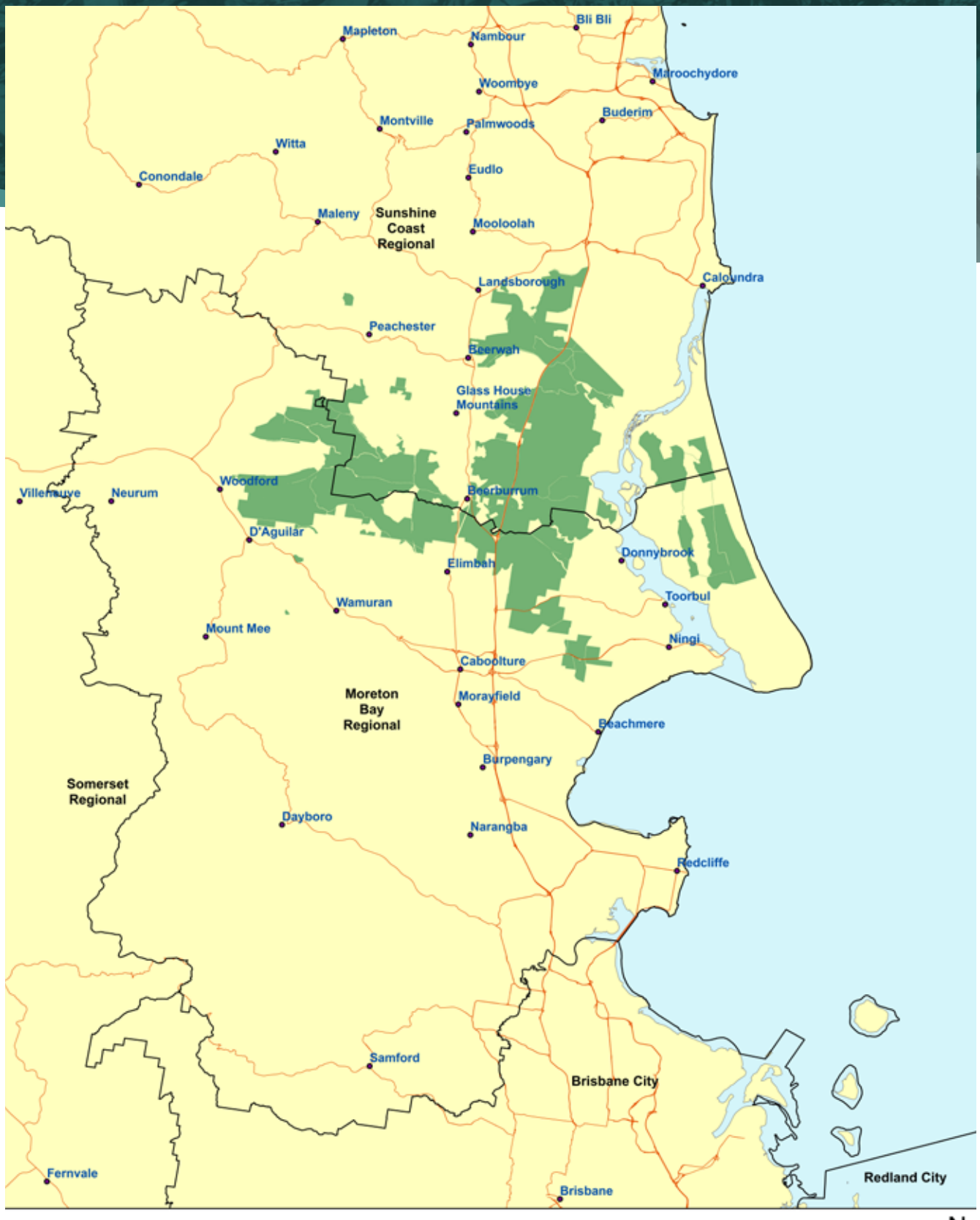


Figure 2: Map of project target area



What's the illegal dumping problem in the Beerburrum Forest area?

Beerburrum Forest area experiences numerous cases of illegal dumping, likely due to its size and many entry and exit points via council and State controlled roads. This is exacerbated by the vast network of roads within the area, including access tracks, compartment boundary tracks, and extraction tracks/fire lines.

The network of roads is approximately 2,300km in length—similar to the distance between Cairns and Sydney.

Other contributing factors include that a range of anti-social behaviours occur in Beerburrum Forest area, plus HQPlantations workers do not have regulatory powers under legislation like the *Waste Reduction and Recycling Act 2011* (WRR Act).

These road networks are used by local residents in the surrounding townships, and by the larger populated suburbs of Caboolture, Woodford, Beerwah, Landsborough, and Bribie Island.

The illegal dumping problem in Beerburrum Forest area was first brought to the department's attention in 2013.

In March 2013, the department coordinated a Clean Up Australia Day event in conjunction with HQPlantations at Beerburrum Forest area. The event attracted 49 volunteers and a total of 26 tonnes of waste was collected, including more than 150 tyres.

The initial response in addressing the issue relied heavily on investigations and follow-up compliance and enforcement activities.

Clean up Australia Day
Beerburrum Forest area
3 March 2013

Table 1: Number of department investigations received from HQPlantations

Year	DES investigations
From March 2012	20
2013	47
2014	24
2015	41
2016	30
2017	12

Data analysed from the department's illegal dumping investigations and clean-ups found the majority of illegally dumped waste consisted of household waste including furniture and general rubbish, followed by tyres and green waste.

Using compliance and enforcement to change behaviours had been labour-intensive and costly.

An initial desktop analysis into illegal dumping in natural areas found no case studies from either Australian or international jurisdictions.

With the continued illegal dumping occurring in the Beerburrum Forest area, this offered an opportunity to consider other strategies to reduce illegal dumping in natural areas, and alleviate the compliance effort and cost. This resulted in the department developing and trialling behaviour change strategies and interventions to address illegal dumping in natural areas.

Illegally dumped household waste

The objective

The objective of the Beerburrum Forest area Pilot Project was to work closely with key stakeholders to develop, deliver, and evaluate community-based interventions aimed at influencing behaviours contributing to illegal dumping in natural areas.

As a guide, available behaviour change methodologies were used, such as Doug McKenzie Mohr's Community-Based Social Marketing (CBSM) framework.

CBSM is an approach to achieve broad sustainable behaviour change in communities through combining knowledge from psychology and social marketing.

Illegally dumped tyres

Illegally dumped green waste

How did we deliver the project?

As there was little to no research on litter and illegal dumping in natural areas, the first stage of the project was to build an understanding of the extent of the problem, and the behaviours and attitudes of those living around, and using, the area.

1. Understanding the problem

Illegally dumped waste in Beerburrum Forest area has been a consistent land management issue for HQPlantations. Impacts include the costs of clean-up and disposal, increased risk management for forest operations due to track blockages, risks associated with dumped materials like asbestos and chemicals, as well as management of introduced pest species such as plants and weeds, and mosquitoes.

Anecdotal evidence was gathered from stakeholders to determine the historical understanding of the area and their view of the problem. This included the department's compliance officers who undertake enforcement action within the area, MBRC and SCC staff and HQPlantations as land managers for the forestry.

This anecdotal evidence highlighted a broad range of potential factors including the demographics of the community, the proximity and number of transfer stations (tips), frequency of kerbside collections, through to the potential impacts of the 'throw-away society' associated with cheaper goods with shorter lifecycles, e.g. furniture.

This evidence, along with investigation data, provided guidance on the design and implementation of a targeted evidence-based campaign.

The following CBSM framework was used as a guide for the project:

1. selecting behaviours
2. identifying barriers and benefits
3. developing strategies
4. piloting
5. broad-scale implementation and evaluation.

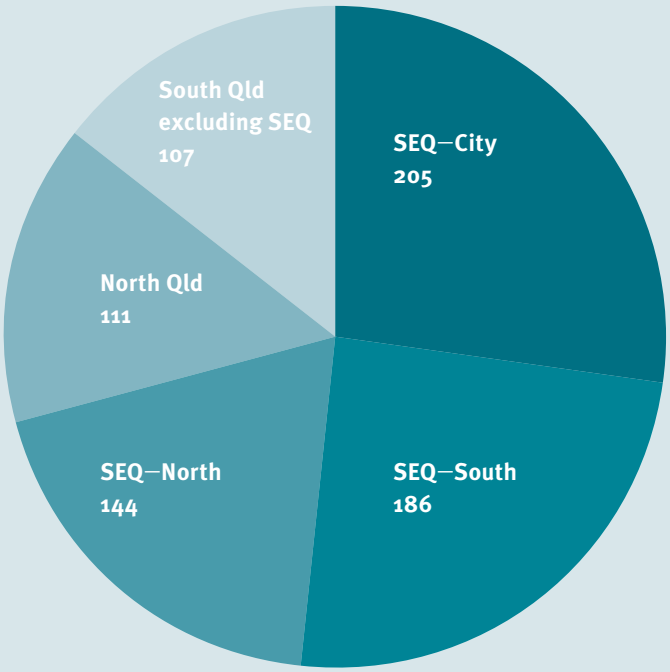
To assist with selecting the behaviours, identifying the barriers and benefits, and developing strategies, the department engaged Enhance Research to undertake market and social research to help inform appropriate intervention strategies, conducted at three scales:

- whole of population—Queensland
- Beerburrum area
- illegal dumping offenders.

Whole of population

Online surveys were conducted with 753 Queensland residents from five survey regions.

Figure 3: Survey respondents across Queensland regions



Five percent of those surveyed admitted to having illegally dumped at some time, with the main reason being: 'They didn't want to pay for disposal' (18%).

Other reasons (38%) included:

- 'couldn't get to the dump'
- 'didn't know it was illegal'
- 'going on holidays'
- 'lazy'
- 'no council clean-ups'
- 'no time'
- 'thought the builders would take it away'

From those admitting to illegal dumping, bushland and forested areas was the most popular location for illegal dumping (25%), other locations included:

- industrial bins (23%)
- footpaths (20%)
- roadsides (20%).

The main types of items dumped were garden/green waste (38%), furniture, household goods, clothing, toys (28%), followed by other (23%) comprising:

- barbecues
- car batteries
- exercise bikes
- paint residue
- tyres.

Of all respondents surveyed, 10% knew someone who has illegally dumped. When asked why these people illegally dumped their waste, they believed it was 'laziness/couldn't be bothered disposing of it properly' (38%), followed by 'cheaper/cost of tips/ disposing of rubbish' (27%).

While 40% of respondents were aware they can report people for littering or illegal dumping, there was some confusion over who they would report these offenders to.

It was commonly identified by respondents that the most effective message to help reduce littering and illegal dumping may involve increasing awareness of how much the penalties are, educating people on who to report illegal activities to, and how to properly dispose of items.

Of all media channels, television advertising was believed to be the most effective method of reaching the community, across all demographics surveyed.

Direct mail also featured prominently in the top media channels (particularly with those surveyed over the age of 60) and roadside billboards were a popular choice for younger people, and social media in rural areas.

Beerburrum population

Enhance Research conducted telephone surveys of 400 residents within the SCC and the northern portion of the MBRC (see Figure 4). Residential landline numbers were called at random and households invited to participate in the research.

The target population was people living in the immediate surrounding area to Beerburrum Forest area.

The survey sample was equally split between high risk (200) and low risk (200) areas to enable statistical comparison of perceptions, attitudes, and behaviours in the two areas.

The high-risk area comprised suburbs with higher proportions of identified illegal dumping offenders. The low risk area consisted of all other suburbs.

Insights

The community believed a combination of initiatives may assist in encouraging people to not litter or illegally dump items, including:

- **more enforcement of fines and penalties**
- **public identification of people who are caught**
- **increased social disapproval**
- **increased reporting by the community**
- **better maintenance of rubbish/litter bins**
- **increased fines and penalties**
- **more communication about the fines and penalties**
- **more communication about appropriate disposal.**

Insights

Residents were generally familiar with their nearest local tip location and what type of waste is accepted there.

The biggest barrier to correctly disposing of waste at the local tip was the ability to transport it.

The most common solution (to illegal dumping) suggested was kerbside collection, followed by increased penalties and no tip fees.

Educating children about correct disposal of waste items was believed to be more effective than a broader community approach.

Other initiatives considered to be largely effective were those that target people who illegally dump by increasing penalties and publicly identifying people.

There was very little awareness of the ability to report to the department (most believed it is to the council or police). Therefore, an awareness campaign about the correct channels for reporting may be more effective than simply encouraging the public to report.

Recognising local 'champions' of positive waste disposal behaviours was also identified as a powerful influence within the community.

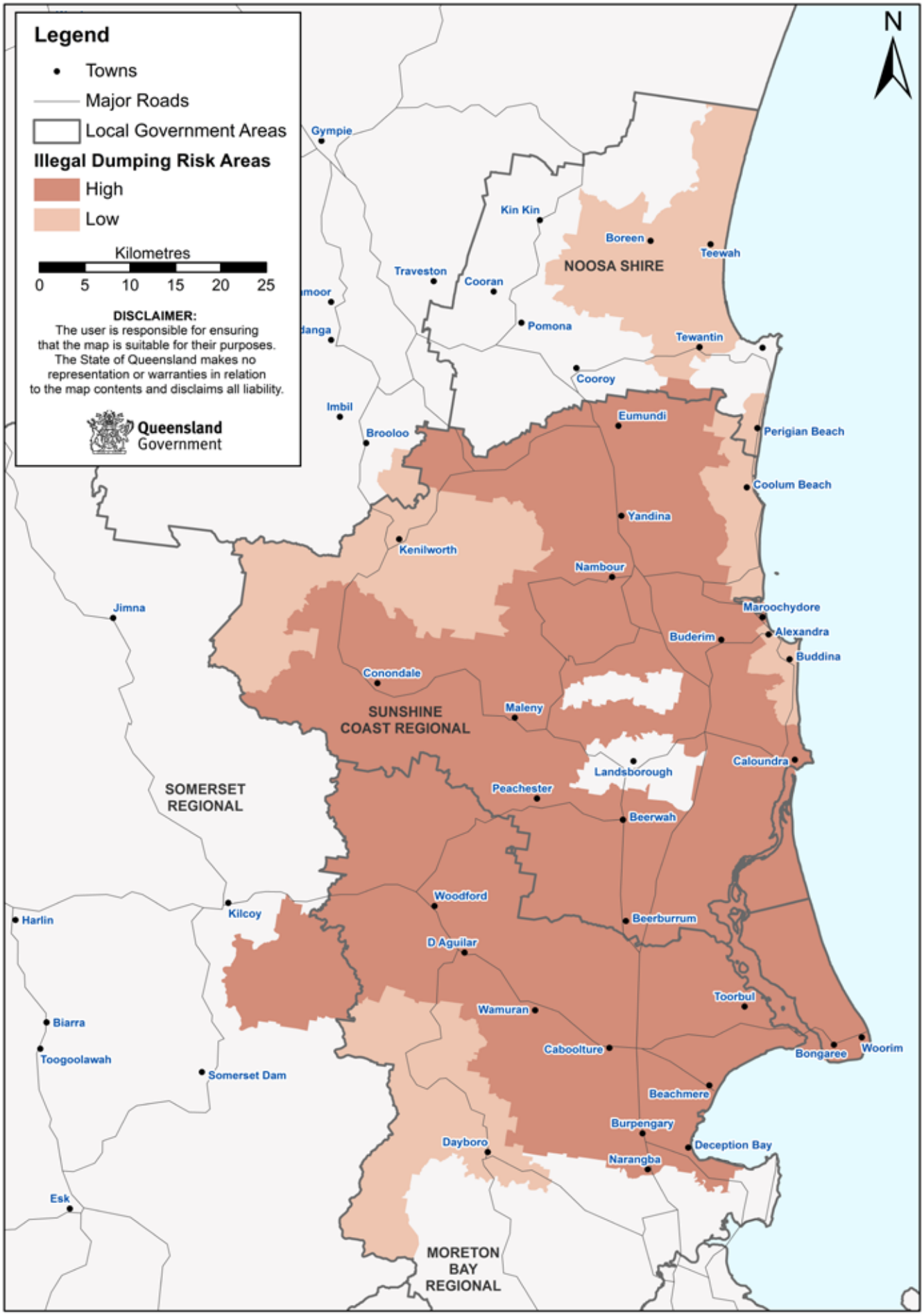
As with the whole of population survey, the communication channel most mentioned was television followed by newspaper and direct mail.

Illegal dumping offenders

For the department to further understand illegal dumping behaviour, Enhance Research conducted interviews with illegal dumping offenders identified from the compliance database.

The study was undertaken via in-depth telephone interviews conducted by senior Enhance Research personnel with offenders who had been previously contacted by the department and who had agreed to be interviewed. From 11 potential interviewees arranged, only eight were available for interview when contacted by Enhance Research.

Figure 4: High risk areas and low risk areas



Insights

Illegal dumping offenders tended to be influenced by the presence of other rubbish at the location, and often use this as self-justification. The act of illegal dumping seemed to be mainly a spur-of-the-moment, unthinking and uncommon behaviour amongst the offenders, rather than habitual behaviour. In some cases, perceived excessive charges for disposing waste at a council facility led to illegal dumping.

Disposal of green waste in forest areas was often regarded as being acceptable and even when made aware that it is illegal, some remained unconvinced.

Offenders perceived the chances of being caught are remote but have been or would be badly impacted by the fines.

Strategy workshop

Using the data collected, the department engaged Customised Marketing to facilitate a strategy development workshop with stakeholders to assist in selecting the behaviours, identifying the barriers and benefits, and developing strategies.

The workshop was hosted in Brisbane by the department in November 2014 with Crime Stoppers, HQPlantations, MBRC and SCC.

The workshop attendees identified six barriers:

1. too lazy (to dispose of waste appropriately)
2. cost of transporting waste to the tip and cost at the tip
3. lack of knowledge about where to report illegal dumping
4. perceived complications about transporting waste items
5. lack of knowledge about the local tip (opening hours, costs, etc.)
6. lack of social pressure, i.e. illegal dumping being socially acceptable in some clusters.

With a greater understanding of the beliefs and barriers, the following strategies were developed to reduce illegal dumping:

1. encourage the reporting of illegal dumping
2. discourage the behaviour of illegal dumping
3. encourage the appropriate disposal of waste.

Actions to support this included:

1. community engagement
2. media engagement (local and social)
3. prompts (signs, stickers, reporting books, pledge certificates)
4. paid advertising
5. community events.

2. Implementation

Integral to the overall success of this project was the relationship between the department and HQPlantations, in particular the need to work closely to deliver significant field-based components of the project including sign installations and field data surveys.

Outside resources were utilised to implement the following components:

1. Community engagement—Crime Stoppers
2. Signs— Roadtek, Department of Transport and Main Roads (TMR)
3. Expert elicitations—Griffith University.

Crime Stoppers began engaging the community in September 2015—distributing collateral and talking directly with community members in these target locations:

- Beerwah township
- Bribie Island Shopping Centre
- Caboolture Markets
- Glasshouse Mountains Lookout
- Woodford township.

Messaging and materials

Utilising the existing overarching message—*Love Queensland. Let's keep it clean.*—various sub-messages were developed to be used for signs and collateral material. This occurred through a consultative process of workshops and surveys. Six signs were designed that targeted specific behaviours.

Crime Stoppers distributed much of the project collateral during its community engagement activities.

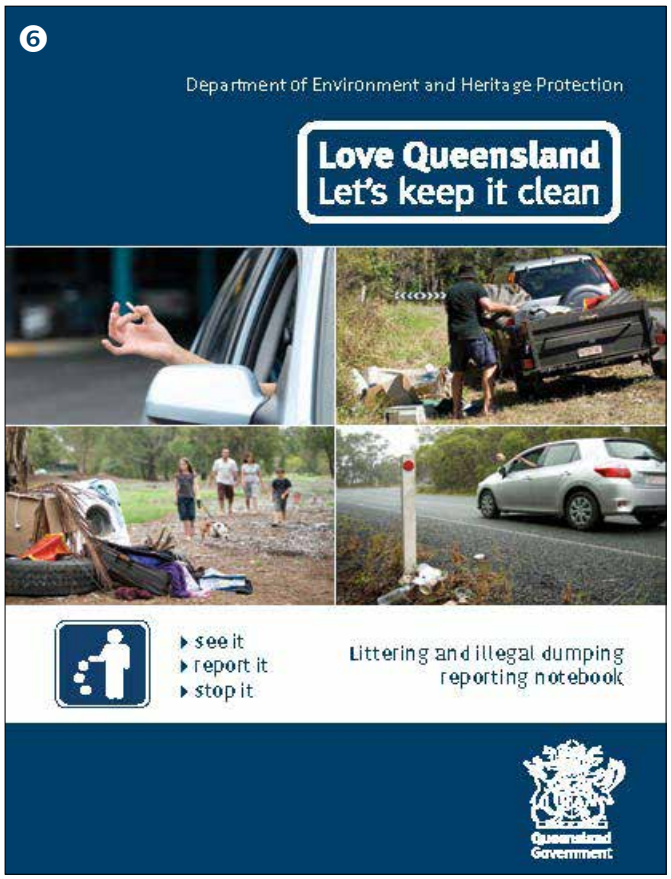


Figure 5: Brochure
Figure 6: Littering and illegal dumping reporting notebook
Figure 7: Vehicle console card
Figure 8: Window stickers
Figure 9: Keyring with light

Sign design

Trialling signs and measuring their level of success on reducing illegal dumping, was the central component of the project. Existing signs in Beerburrum Forest area consisted of a mixture of old timber signs through to corflute signs. Most of the existing signs were thought to be ineffective due to their size, location, and legibility.

Existing sign prior to the project


ubbish

To assist with their effectiveness, signs needed to be large, highly reflective, with short, simple, and easy-to-read text and imagery—to catch the attention of those passing by. The signs also needed to be durable, and low maintenance.

Sign installation

A mix of the six sign designs were installed in 60 locations across 19 logging areas (out of 28 in total) within Beerburrum Forest area.

Signs were installed in two stages: group one to the east (26 signs) was installed first followed by group two to the west (34 signs) at a later date.

This allowed for a rolling control, where:

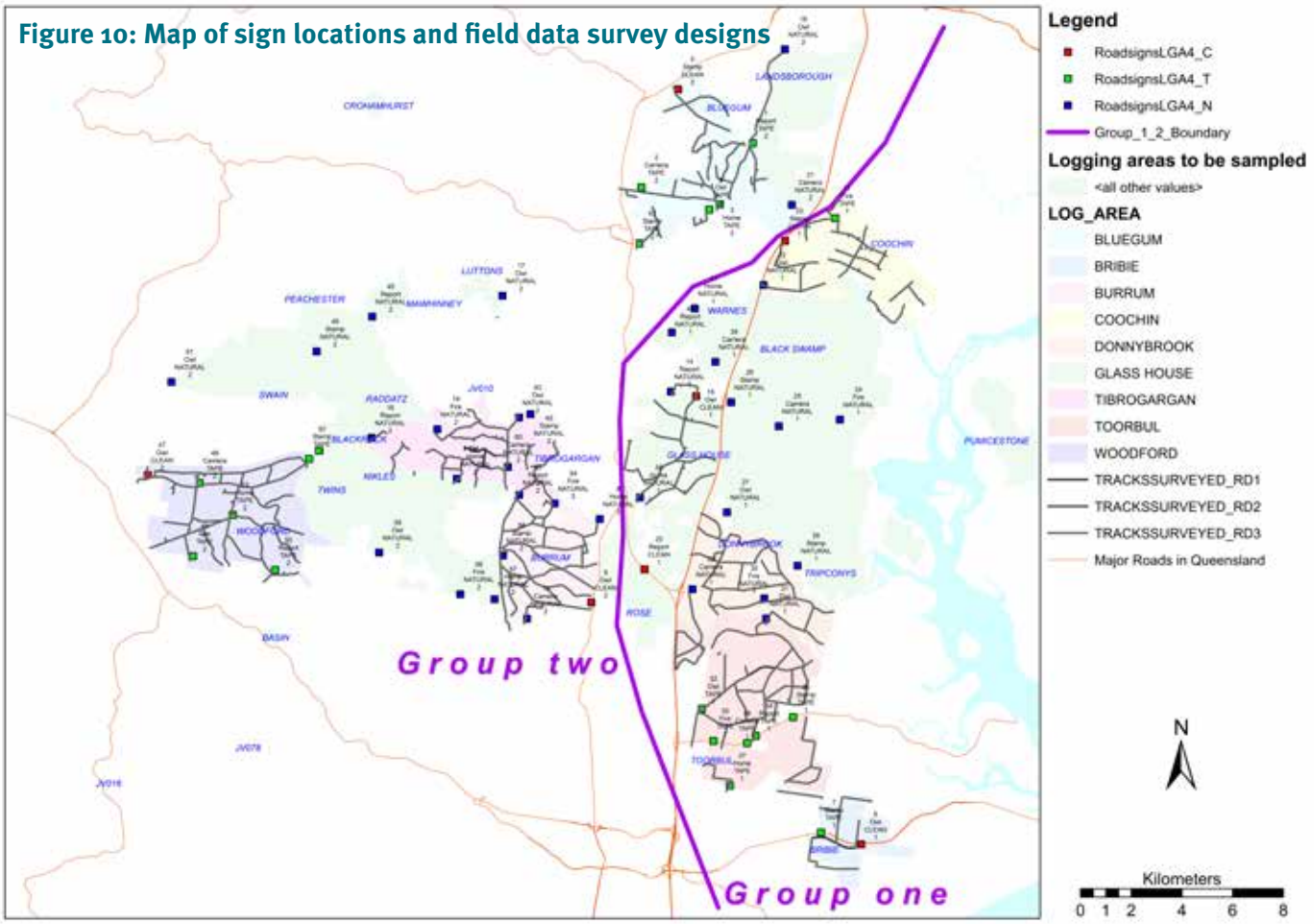
- both areas were surveyed without any signs installed
- then both areas were surveyed with only a group one signs installed
- then both areas were surveyed with both group one and group two signs installed.

This process and its timing is outlined in more detail below.

Figure 10 is a department map used for field work, summarising the logging areas that make up the Beerburrum Forest area, the sign locations, the logging areas surveyed, as well as the boundary between groups one and two.


LANCE
'S KEEP IT CLEAN
1
INCREASED SURVEILLANCE!
FINES OVER $1,800 APPLY
Take your waste to the tip.
2
ILLEGAL DUMPING?
YOU WILL BE CAUGHT!
FINE $1,800
LOVE QUEENSLAND. LET'S KEEP IT CLEAN
4
LOVE QUEENSLAND
DUMPING GREEN WASTE IS A FIRE HAZARD
TAKE YOUR WASTE TO THE TIP
LET'S KEEP IT CLEAN
5
LOVE QUEENSLAND
THANK YOU
for keeping my home clean.
LET'S KEEP IT CLEAN

Figure 10: Map of sign locations and field data survey designs



3. How to measure success

To ensure effective measurement of the performance of the project, evaluation tools were built into the project. This included Crime Stoppers reporting on the results from community engagement, Enhance Research reporting on intercept surveys with members of the public in and around Beerburrum Forest area, and statistical analysis by Griffith University on the impact of the signs based on the three rounds of data collected by department officers.

Griffith University

Griffith University was contracted to conduct two components of work to support the project:

1. to conduct expert elicitations to determine the 'dumpability' of a site, i.e. factors that contribute to waste being dumped at sites
2. to statistically analyse field data to determine the level of success the signs had in preventing illegal dumping.

This was on the basis that little was known about how interventions like signs may affect the amount, nature and spatial extent of illegal dumping in forests like Beerburrum Forest area.

There was also no baseline data that mapped the quantity, extent, and frequency of illegal dumping in any forest, including Beerburrum Forest area.

The elicitation process involved 18 hours of consultation with experts. Griffith University's approach was to treat illegal dumping sites as if they were a species distribution, characterising the focus as 'site dumpability'.

Experts ranged from state and local government officers, HQPlantations staff, and specialist recreational users (e.g. 4WD, horse riding). This is a similar process to characterising habitat suitability when mapping geographic distribution of plant and animal species.

It was acknowledged that illegal dumping of different kinds of waste have different motivations.

The field data surveys were complex, extensive, and logistically challenging. Stages consisted of:

1. **BASELINE DATA COLLECTION**—round one field data surveys, intermittently between 23 June and 22 July 2016
2. **INSTALLATION OF GROUP ONE SIGNS**—approximately between 16 August and 19 August 2016
   a. twenty-six (group one) signs installed onto posts on the eastern side of Beerburrum Forest area
   b. signs given approximately nine weeks take effect from 22 August 2016
3. **ROUND TWO FIELD DATA SURVEYS**—24 October to 3 November 2016
4. **INSTALLATION GROUP TWO SIGNS**—approximately between 1 November and 10 November 2016
   a. thirty-four (group two) signs installed onto posts on the western side of Beerburrum Forest area
   b. signs given eight weeks take effect from 14 November 2016
5. **ROUND THREE FIELD DATA SURVEYS**—10 January to 20 January 2017.

For example, dumping car bodies is associated with activities different to dumping green waste. Therefore, with the elicitation hours available, Griffith University focussed on the well-defined topic of household waste.

Field data collections

Further to the elicitation process, Griffith University statistically analysed the data collected by department officers during the three field data survey rounds.

A surveying methodology, including field data surveys, was developed to systematically record instances of illegal dumping in Beerburrum Forest area, to measure the effect of signs throughout the area.

Field data surveys of illegal dumping sites were conducted in nine logging areas, representative of all Beerburrum Forest area. Figure 11 demonstrates one of the tools used to shortlist logging areas—illegal dumping intensity mapping.

Field data surveys were designed to occur after the signs had time to have an effect, with a control as highlighted above. Three rounds of field data surveys were conducted:

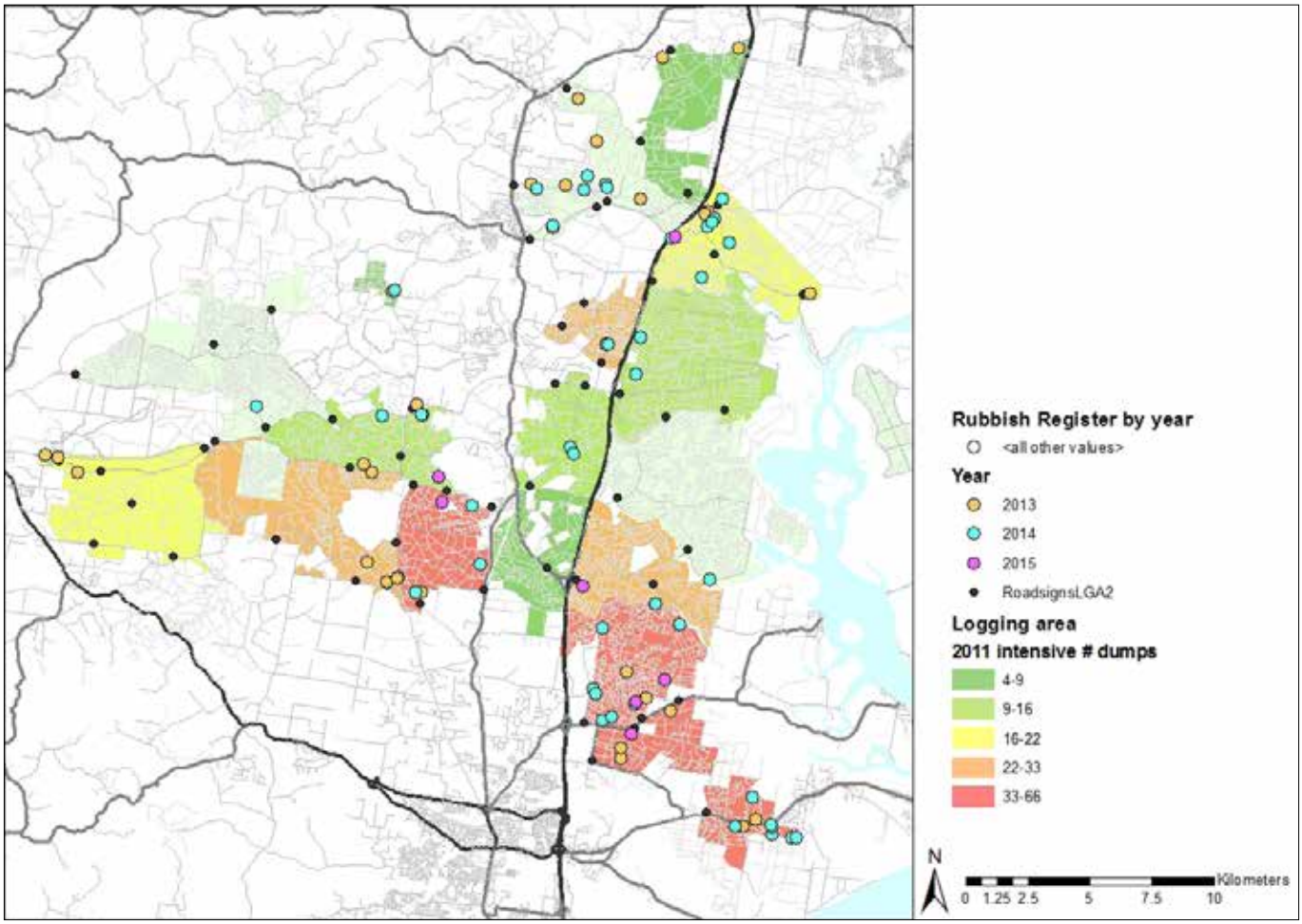
1. before any signs were installed
2. approximately nine weeks after group one signs had been installed
3. approximately eight weeks after group two signs had been installed.

Data collection

Illegal dumping is explained in the WRR Act as an amount of waste that is 200L or more in volume.

However, for the purpose of the field data surveys for this project, dumping was categorised as any material that could not be thrown easily from inside a moving vehicle. That is, a driver would need to leave the vehicle to physically dump the material. This enabled a simpler and more efficient categorisation of sites during field data surveys, by preventing the need for a volume measurement.

Figure 11: Map of logging area shortlisting for field data surveys



Examples of illegal dumping

Therefore examples of illegal dumping included furniture, multiple bags of household rubbish, vehicle tyres, and large piles of green waste. Examples of litter included individual food wrappers, cans, and single bags of rubbish.

After each round of the field data surveys were completed, all electronic data such as photos and videos were catalogued and saved. Hard-copy data sheets were entered into an Excel database. Department officers worked closely with Griffith University to finalise geographic information systems (GIS) layers, enabling the spatial analysis of layers including the dumping site points, the road layers, and the logging area layer.

Enhance Research

Enhance Research conducted intercept surveys with members of the public in and around Beerburrum Forest area, to find out more about the signs, previous Crime Stoppers community engagement, behavioural impacts, campaign awareness, and visitations.

The five locations where previous engagement had occurred were chosen:

1. Beerwah township
2. Bribie Island shops, near surf club
3. Caboolture Markets
4. Glasshouse Mountains Lookout
5. Woodford township.

Due to access issues, Bribie Island Shopping Centre was not chosen.

Department officer recording site characteristics

Results

Community engagement

Crime Stoppers reported that overall the engagement activities provided the community with a significant amount of exposure to the department's reporting systems.

The engagements provided clarification to the community on what constitutes littering and illegal dumping, and the process of reporting these offences to the department online or via the 13QGOV phone number. The response received from the public was very positive with over 1,616 people engaged throughout the course of the partnership activity.

The engagement activities were particularly popular with local residents who lived in/near Beerburrum Forest area, as well as those who use it for leisure (four-wheel driving, trail-bike riding, hiking, fishing, etc). These people were happy to see some action being taken in response to the issue and were also keen to learn about how they can go about reporting instances of littering and illegal dumping.

Using mobile devices, Crime Stoppers was able to guide 679 people through the process of public reporting. This education was supported by the distribution of collateral which included more than 1,200 information brochures and 969 reporting notebooks.

Many people commented on the usefulness of reporting notebooks, and said they would keep them in the car to assist future reporting, and took reporting notebooks to give to family members and friends—further spreading the message and generating conversations in the community.

Overall, people were very impressed with this resource and most indicated that they were keen to put it to good use.

Key rings were also popular with many people commenting that it was a great idea to have the light included.

There were many cases of people previously witnessing littering and illegal dumping incidents, including on dash cams. The main reason for inaction being a lack of knowledge of who to report the incident to. In some situations the person had unfavourable responses when reporting these incidents to local council or police, or having engaged the offender directly was met with aggression. In these situations people were generally pleased to learn about the online public reporting system and were happy to engage in a demonstration and to receive additional information/collateral.

The Crime Stoppers team also encountered people who had received a fine for littering, which seemed to deter them from littering again.

Some people also expressed concerns about reporting others. The main drawback being the requirement to provide personal details and potentially appear in court. Some people who described themselves as not being 'tech-savvy' to use the phone or online reporting platforms needed to be referred to the 13QGOV phone number to report littering or illegal dumping, while others spoke about the hesitation of 'dobbing someone in' or 'snitching'.

Others spoke of the need to complete too many sections of 'required information', which turned them off reporting.

Expert elicitation

Experts overwhelmingly agreed on two main factors characterising sites that were likely to attract dumping of household waste: seclusion and convenience—both relating to accessibility, but in opposite ways.

Seclusion occurs with reduced visibility in less accessible locations. Whereas convenience attracts dumping to sites with high accessibility, regardless of visibility, and is generally related to the proximity of waste facilities and transit corridors.

A limiting factor governing whether sites are candidates for dumping is the width of the road, since dumping of household waste typically involves a normal car, with or without a trailer.

Evaluation of illegal dumping field data

Three different statistical models were used to provide different perspectives on the data. The three models that were considered are:

1. regression—a broad-scale analysis that creates a score as a trade-off between the 'pluses' (those site characteristics that increase dumping) and the 'minuses' (that decrease dumping)
2. trees—a fine-grained analysis is provided by regression trees used to identify particular sets of characteristics that clearly lead to high or low levels of dumping
3. profile regression—this medium-grained analysis creates a profile of the kinds of site-changes that have different amounts of change in dumping (comparing pre and post intervention).

Examples of littering

Evaluation of the data using these three statistical models found that the signs reduced illegal dumping by 30 dumpsites per 100km.

Griffith University concluded that this evidence is suggestive but not extremely strong, and requires corroboration through further experimentation. This is to be expected from a first study of its kind that is limited to three sampling rounds.

There are several potential additional factors that might influence illegal dumping in the area that could be considered in a far larger project, e.g. socio-economics, waste collection services, and road/traffic network to name a few.

Community surveys

As outlined above, Enhance Research conducted intercept surveys to find out more about: the signs; Crime Stoppers community engagement; behavioural impacts; and awareness and visitation within the forestry area.

As indicated earlier, Crime Stoppers delivered public engagement activities between September 2015 and December 2015. Enhance Research conducted its intercept surveys between 2 February 2017 and 5 March 2017. It was preferable to conduct these surveys closely after the engagement activities and sign installations, however there were unforeseen delays associated with signs being rolled out.

In total, 425 people were interviewed across the five locations. Of which 361 (85%) respondents were from South East Queensland, and 64 (15%) were visitors (i.e. overseas, interstate, and other Queensland).

According to the results of the intercept surveys, respondents ranked the owl (eyes) sign as being the most effective at discouraging dumping of waste in and around Beerburrum Forest area.

In order of most to least effective, the following signs were ranked by respondents:

1. owl (eyes)
2. stamp (fine $1,800)
3. camera (surveillance)
4. fire
5. home (owl)
6. report.

Warnings of 'surveillance' and fines' (i.e. owl, stamp, and camera) are common reasons given for signs being seen as more effective than others. The imagery of the owl eyes is particularly effective, with many perceiving this sign as 'eye-catching' and somewhat 'threatening'. However, messages that are too 'soft' or seen to appeal to people's good nature (e.g. home) are deemed less effective than those communicating harsher consequences. Also, 'busy' signage (e.g. fire) with too much text is less likely to stand out and make an impact according to respondents.

Thirty-six (8%) respondents recalled seeing the Crime Stoppers displays unprompted. This result may be due to the length of time between the Crime Stoppers displays and the intercept surveys. A further 33 (also around 8%) respondents confirmed having seen the project's collateral materials when prompted. However, caution is needed in interpreting data with small base sizes of around 30 or less.

Information or messages recalled from the Crime Stoppers display was reasonable with around a quarter of those who recalled the display unprompted, with the main points being:

1. not to dump green waste
2. that dumping is bad for the environment
3. people who dump waste can be fined.

Among those who recalled information, these were the key themes that came to mind:

1. reporting littering and illegal dumping
2. taking waste to the tip.

Of the behavioural impacts from seeing the signs and materials, a total of 338 (80%) respondents said they would report illegal dumping in the future. However only 165 (39%) thought that the signs and materials would stop illegal dumping.

Of the total 425 respondents, 409 (96%) were aware that it is illegal to dump waste such as household goods in Beerburrum Forest area. However, there is less certainty about the illegality of dumping green waste, with 53 (12%) people unsure.

The most effective sign at discouraging dumping

The high level of awareness of repercussions of illegal dumping was also captured, with respondents saying:

Offenders can be fined
410 (96%) respondents

Illegal dumping can be reported
369 (87%) respondents

The department can investigate illegal dumping
319 (75%) respondents

When asked about the source of their knowledge in relation to illegal dumping repercussions, respondents attributed their awareness to:

Previous knowledge (e.g. I just knew that) about the illegality and possible repercussions of dumping waste in Beeburrum Forest area
322 (76%) respondents

Learned from an information session or similar
84 (20%) respondents

Signs in the forest
55 (13%) respondents

Friend or relative
38 (9%) respondents

Conclusion

Overall, the strategy that was developed and implemented to reduce illegal dumping in Beerburrum Forest area was successful. This is supported by a reduction in illegal dumping of 30 dumpsites per 100km due to the effect of signs. In addition, anecdotally, HQPlantations staff have reported fewer illegal dumping incidents, and the department's compliance officers have also received fewer illegal dumping reports for the area.

Therefore it is appropriate to replicate this strategy in similar areas.

Things to consider for your project

This pilot project attempted a different approach to address illegal dumping in natural areas, by way of community-based interventions aimed at influencing the associated behaviours.

Major components of the project were the first of their kind, for example:

- the style of designs and messages on signs
- the size and quality of signs
- the field data survey methodology and data analysis.

Therefore some unforeseen circumstances arose during the course of planning and delivering the project.

Below is a list of things to consider when implementing similar projects:

- develop partnerships wherever possible with local stakeholders
- assess land tenure and seek permissions before choosing sign locations
- assess underground infrastructure for sign locations
- include contingencies for unexpected delays, e.g. field work, data management, etc
- try to locate signs in locations to minimise the risk of theft or vandalism.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