

<b>Title</b>	Trial of Multicriteria Mapping process and software in SEPA – Full report		
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# Trial of Multicriteria Mapping process and software in SEPA

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*Using MCM to assess the most effective interventions for combatting or reducing waste related crime*

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## Executive Summary

Multicriteria mapping (MCM) is a decision aiding tool that has been selected to meet part of Action 10 of the SEWeb LIFE project. This concerns developing a method to assess the effectiveness of environmental measures.

MCM was chosen from a range of decision aiding tools, and the justification for this is described in a separate document<sup>1</sup>.

MCM was trialled in SEPA to establish the scope of its utility to the organisation and SEWeb partnership. This was achieved through collaboration with SEPA's LIFE SMART waste project, with a focal goal to determine "what interventions are most effective in combatting or reducing waste related crime?"

This document reports on that trial and fulfils two functions:

- 1) to work through the MCM process and software tool to assess its potential usefulness to SEPA; and
- 2) to report the findings of the trial to assess the effectiveness of measures to combat waste related crime.

Seven participants were interviewed and asked to assess six waste crime interventions against their chosen criteria. Overall, participants scored traditional, "hard" options of enforcement more highly than "soft" options of voluntary measures and education. Participant comments demonstrated concerns over the likely effect of measures at the top of the waste hierarchy suggesting a more nuanced approach to waste prevention and recycling and recovery may be needed.

The MCM software tool was well received and the MCM approach has many applications for decision aiding. Within the LIFE SMART waste project MCM could help deliver on identifying barriers to collaborative working and creating an interventions menu. It is also possible that MCM could be part of the next round of the State of Environment reporting process.

## 1. Introduction

Scotland's Environment Web (SEWeb) is an ambitious project that aims to be a one stop shop for all environmental matters in Scotland. It is also the means by which Scotland reports on the state of the environment. As part of this project there is a commitment (Action 10) to develop a method to assess the effectiveness of environmental measures. A measure is defined as any action put in place to achieve an environmental objective. SEPA commissioned the Centre of Expertise for Waters (CREW) to research the range of existing decision aiding methodologies and tools and put forward a recommendation for a product that would meet the SEWeb brief. This work is set out in a separate report<sup>1</sup> that includes a literature review of decision aiding tools, a description of the four shortlisted tools, a justification for the selection of multicriteria mapping (MCM) and a description of MCM.

Multicriteria mapping (MCM)<sup>2</sup> was selected from recommendations made in that report and has been used for a trial in SEPA. The subject area selected for the trial was waste crime as it offered the

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<sup>1</sup> Assessing the effectiveness of environmental improvement measures. Developing a toolkit to rank success and inform policy (CREW 2015)

opportunity to link with another major project running in SEPA. This is LIFE SMART Waste, which sets out to find innovative methods to tackle waste related crime, and MCM could be used to assess the effectiveness of some of the measures. A team including representatives from both projects was established (Table 1) and the aims of the trial were agreed:

- I. To use MCM for assessing the effectiveness of measures used to combat waste related crime; and
- II. To work through an MCM process using the manual and software to determine whether it has potential for wider use.

<b>Table 1. Project team</b>	
<b>Melanie van Niekerk</b>	State of Environment (SoE) Unit (SEWeb)
<b>Nathan Critchlow-Watton</b>	Manager SoE Unit (SEWeb)
<b>George Hope</b>	Intelligence analyst (LIFE SMART waste)
<b>Cath Preston</b>	Principal policy officer (LIFE SMART waste)

## 2. Methods

### a. Planning the engagements

Project team members from LIFE SMART Waste set the question to be tested, drew up a list of core options and selected a group of participants to invite. Representatives from SEWeb managed the project, carried out the interviews, analysed the data and wrote the final report, which forms a key deliverable for SEWeb.

The focal goal selected for the trial was:

**“What interventions are most effective in combatting or reducing waste related crime?”**

The core options chosen were:

- **Waste prevention:** avoided waste flows, waste minimisation, sustainable consumption  
Description: targets at-source waste production to reduce the amount and toxicity of waste before recycling, recovery and disposal become options.
- **Improved recycling and recovery options:**  
Landfill, incineration, recovery of energy, waste hierarchy, producer responsibility, and polluter pays  
Description: these are stages of waste management rather than waste prevention. It includes collection, transportation, disposal, and recycling of waste
- **Better Regulation and legislation:**  
Compliance costs; quality of regulations; national targets; loopholes; unseen impacts of legislation/regulations  
Description: this means the impact of strong/weak legislation in either combatting or stimulating waste crime
- **Enhanced enforcement:** new enforcement powers; financial penalties; new judicial powers, industry pre-screening mechanisms

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<sup>2</sup> <http://www.multicriteriamapping.com/>

Description: to what extent criminal sanctions are the best response to the issue of waste crime; and to what extent is increased attention from all components of the enforcement chain needed.

- **Communication and Education:**

Improved regulatory guidance; industry awareness training; name-and-shame strategies

Description: use of communication and education strategies to guide and report on performance and criminal behaviours, as a means of changing those behaviours

- **Voluntary approaches:**

Establish charter mark endorsed by SEPA and others indicating performance; industry auditing regime

Description: voluntary and complementary approaches to inspection and audit which are not controlled by regulatory or enforcement agencies

### b. Selecting participants

Eleven people were invited to participate and seven agreed to be interviewed (Table 1). This provided enough data and breadth of perspectives while remaining manageable for the purposes of a trial.

The shortlist of participants should be drawn up to include a broad range of perspectives. This important element was subject to some compromise for the trial because it was easier to contact SEPA colleagues in the short time scale offered by the project. However, we did extend the scope to include Prof Jim Baird from Glasgow Caledonian University, Gordon Innes, an Environmental Health Officer (EHO) from Glasgow City Council and Linda Ovens who was, until recently, chair of the Chartered Institution of Wastes Management (CIWM). It is recognised that the absence of participants from the waste industry represents a gap in the breadth of the engagement but this also provides an opportunity to extend the study in future.

**Table 1** Participants who were interviewed for the MCM trial

Name	Area of expertise
<b>Hilary Holding (SEPA)</b>	Operations – waste regulation
<b>Linda Ovens (Ex chair CIWM, Consultant)</b>	Professional
<b>Jim Baird (Glasgow Caledonian University)</b>	Academic – waste management research
<b>Jim Pritchard (SEPA)</b>	Waste data
<b>Andrew Sullivan (SEPA)</b>	Waste policy
<b>Colin Hershaw (SEPA)</b>	Enforcement, waste crime investigation
<b>Gordon Innes (Glasgow City Council)</b>	Environmental Health

### c. Arranging interviews

Interviews were arranged at a time and location to suit each participant. At least one week before the interview the participant was sent a briefing pack. This contained a short description of MCM and a summary of the project. It asked the participant to review the core options and select their criteria before the day of the interview. Examples of options and criteria were provided from the MCM demonstration project on the MCM website.

During the week of the interview most of participants were contacted by telephone to discuss the information in the briefing pack and address any queries regarding the interview process. It was also

an opportunity to ensure that each participant had selected a set of criteria in advance of the interview. Three participants did not receive this contact because they were not available before the interview date.

#### d. Carrying out interviews

Interviews can be carried out either using the MCM software online or by downloading a template and running it offline. For the trial all interviews were carried out offline and then uploaded to the online project later. For two of the interviews the interviewer typed in the information dictated by the participant whereas the other five participants operated the software themselves. The MCM manual recommends recording the interviews and producing a transcript of each to be added to the analysis. This element of MCM was not used for the trial because resources were not available for transcribing the recordings. Wherever possible the interviewer made notes during the interviews to capture some qualitative information.

### 3. Results

#### a. Results of LIFE SMART waste project question

The focal goal for this trial was **“What interventions are most effective in combatting or reducing waste related crime?”**

All participants assessed the six core options but provided their own criteria by which to do this. In all 32 criteria were generated by the seven participants and these are listed in Appendix 1.

Six participants accepted the core options with minor reservations (see Differences between SEPA and non SEPA perspectives on the effect of voluntary measures are also interesting. Comments from the SEPA group such as *“illegal sites are operating outwith formal regulation - they are not going to buy into ‘champion’ style voluntary approaches”* help to explain the lower scores and indicate a level of scepticism about these measures. Participants outside SEPA gave higher scores accompanied by comments such as *“cheap option and have wider benefits beyond waste crime”*. Indeed the voluntary measures often scored highly when assessed against cost criteria by the non SEPA group whereas SEPA participants were not considering matters of cost. This was confirmed by creating a new issue (Costs) comprising the following criteria: cost of resources, costs, efficacy, implementation cost, and ongoing cost. All of these criteria were selected by the non SEPA group.

Additional options). One participant (academic) provided five additional options that were only assessed by him.

Once the interviews had been carried out, the data were analysed using the MCM software. The analysis was carried out by starting with a general exploration of the data and then moving towards a more detailed investigation of specific areas of interest. For the purpose of this report the analysis is limited to a selection that illustrates the capabilities of MCM and provides useful feedback to the LIFE SMART waste project.

Groupings of options, participants and criteria were created as shown below. The MCM manual explains that groupings are powerful *“in the way they cast light on either the performance of the options themselves or the reasons for this picture of the performance”*. Creating perspectives is

necessary for the analysis but due to the small number of participants in this trial some of the perspectives (eg academic) had only one participant.

### **Groups of participants (Perspectives)**

- SEPA (Participants who work at SEPA)
- Non SEPA (Participants who do not work for SEPA)
- Enforcement (Waste crime investigation, Environmental Health, Operations – waste regulation)
- Policy (Academic/research, waste data, professional, waste policy)
- Academic (Academic/research)

### **Groups of Options (Clusters)**

- Hard approaches (Enforcement, more regional presence, quicker action)
- Soft approaches (Education, voluntary approaches)
- Policy changes (Recycle & recovery, regulation & legislation, waste prevention)

### **Groups of criteria (Issues)**

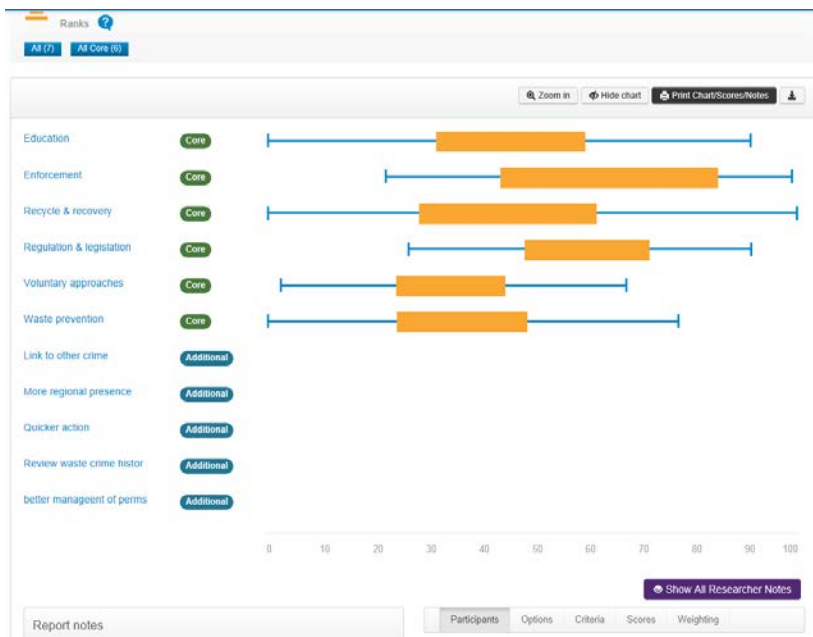
The criteria selected for each issue are listed in Appendix 1.

- Designing effective interventions
- Detecting waste crime
- Effectiveness of interventions
- Impact of waste crime
- Scale of the problem

The data were analysed by generating reports that display the results of a selection of perspectives, clusters and issues.

### ***Ranking the six core options***

The rank extrema data in Figure 1 give a full picture of the variability in the ranks assigned by different participants. Across all participants enforcement measures received the highest scores as being the most likely to reduce or combat waste related crime although there was considerable overlap between the rankings. There was also a lot of variability and uncertainty within these results as illustrated by the extremes bars either side of the means block.



The left terminus of the blue lines indicates the lowest rank assigned to each option by any participant included in that perspective.

The right terminus of the blue lines indicates the highest rank assigned to each option by any participant included in that perspective.

Rank extrema give no indication of the distribution of participants' ranks within the ranges defined by the extrema.

The rank means data gives an indication of the distribution of participants' ranks within the ranges defined by the extrema.

The left ends of the orange bars indicate the means of the pessimistic (low) ranks assigned by each participant included in that perspective.

The right ends of the range indicate the means of the optimistic (high) ranks assigned by each participant included in that perspective.

Figure 1 Ranks chart showing weighted scores for all participants and all core options. Key: rank extrema (blue lines) and rank means (orange bar)

When a filter was applied to this analysis, to distinguish between participants who work for SEPA (Figure 2) and those who do not (Figure 3), it showed a difference in the range of uncertainty and variability. Participants who work for SEPA were less certain and less in agreement about the likelihood of success for all options.

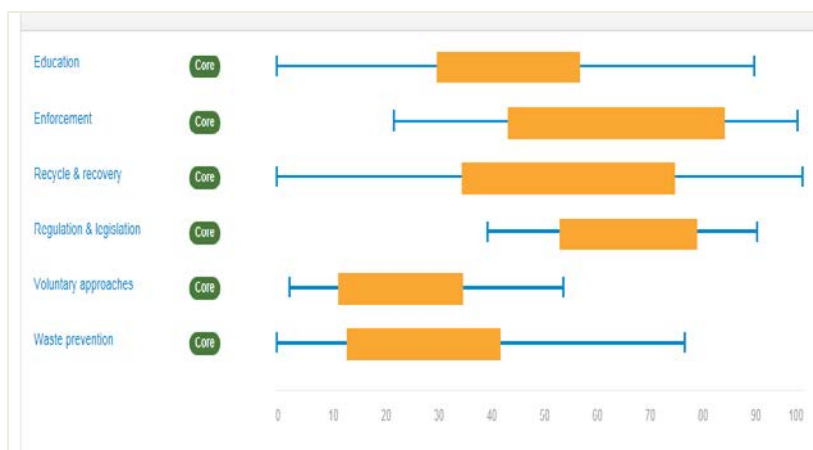


Figure 2 SEPA core options. Key: rank extrema (blue lines) and rank means (orange bar)

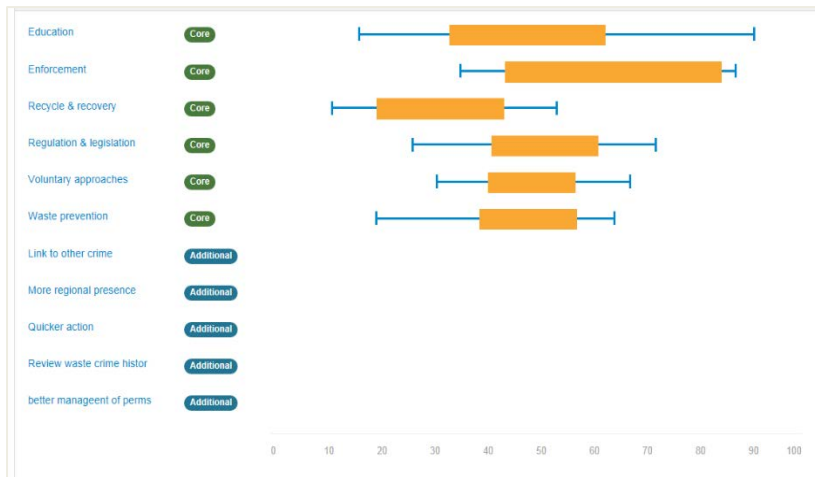


Figure 3 Non SEPA core options. Key: rank extrema (blue lines) and rank means (orange bar)

The option of recycling and recovery was viewed more favourably by participants inside SEPA than those outside the organisation. Comments from individual perspectives can help to explain these differences. The participants outside SEPA assessed recycling and recovery positively in it being a legitimate approach for SEPA to take but difficult to implement because it is not an area in which it is perceived to be influential. It was also thought that “...by providing more ways to recycle and recover waste it would increase the opportunities for waste crime activities”. This option also scored poorly against criteria of time and cost to set up although it was also recognised that many measures are already in place and once established they can be effective.

Participants inside SEPA were more optimistic about recycling and recovery and it was suggested that “recycling and recovery measures would remove the opportunity for criminal benefit from waste related activities and could motivate good behaviour if there were financial incentives attached”. Also “Segregation and achieving high value for recovered products will reduce waste related crime”.

A more nuanced approach to recycling and recovery would be more likely to succeed. “Materials with high value tend to be well looked after already while problem and low value waste streams have few markets”. “High value materials are not routinely fly-tipped or burned in the open so creating strong end-markets for other waste streams would reduce fly-tipping. In addition high value wastes will not be landfilled so no tax evasion could result. Ultimately good quality recycling and recovery markets could remove the need for landfill tax. Conversely recycling also drives community impacts such as odour from new bio-waste facilities”. Other comments were that “Waste streams such as tyres could benefit from a producer responsibility scheme which would force tyres through a recovery market and cut out illegal operators”. “Recycling has been one of the main causes of illegal exports - an understanding by producers of the importance of 'right waste, right bin' would certainly help. Every actor in the chain has an effect on overall quality and this will get better over time as recycling behaviours become more normalised”.

In particular the comments relating to waste prevention demonstrate the disconnect between environmental priorities, which place these measures at the top of the waste hierarchy, and the practical experience of people working in the sector. Although it was accepted that if there was less



waste there would be fewer opportunities for waste related crime, participants were not convinced that it would remove the problem waste streams most associated with waste crime. Some participants thought that waste prevention measures had gone as far as was possible.

Differences between SEPA and non SEPA perspectives on the effect of voluntary measures are also interesting. Comments from the SEPA group such as *“illegal sites are operating outwith formal regulation - they are not going to buy into 'champion' style voluntary approaches”* help to explain the lower scores and indicate a level of scepticism about these measures. Participants outside SEPA gave higher scores accompanied by comments such as *“cheap option and have wider benefits beyond waste crime”*. Indeed the voluntary measures often scored highly when assessed against cost criteria by the non SEPA group whereas SEPA participants were not considering matters of cost. This was confirmed by creating a new issue (Costs) comprising the following criteria: cost of resources, costs, efficacy, implementation cost, and ongoing cost. All of these criteria were selected by the non SEPA group.

### ***Additional options***

One participant felt that the core options of waste prevention and recycling and recovery are not interventions and as such cannot be scored properly. Consequently, the participant provided additional options:

- Link to other crime
- More regional presence
- Quicker action
- Review waste crime history
- Better management of permits

These were put into two groups; permitting and disrupt waste crime. The former has been touched upon in the criteria of other participants. The latter introduces a new area of intelligence based interventions comprising the options *“review waste history”*, *“link to other crime”* and *“more regional presence”*. The ranks chart from this participant including the core options and additional five options are shown in Figure 4.

Participant notes explain the value of looking at key features of past crimes and shifting effort to targeting these. This type of intervention together with establishing links with the police and organisations investigating other fraud and taxation crime can disrupt crucial points in the waste crime narrative.

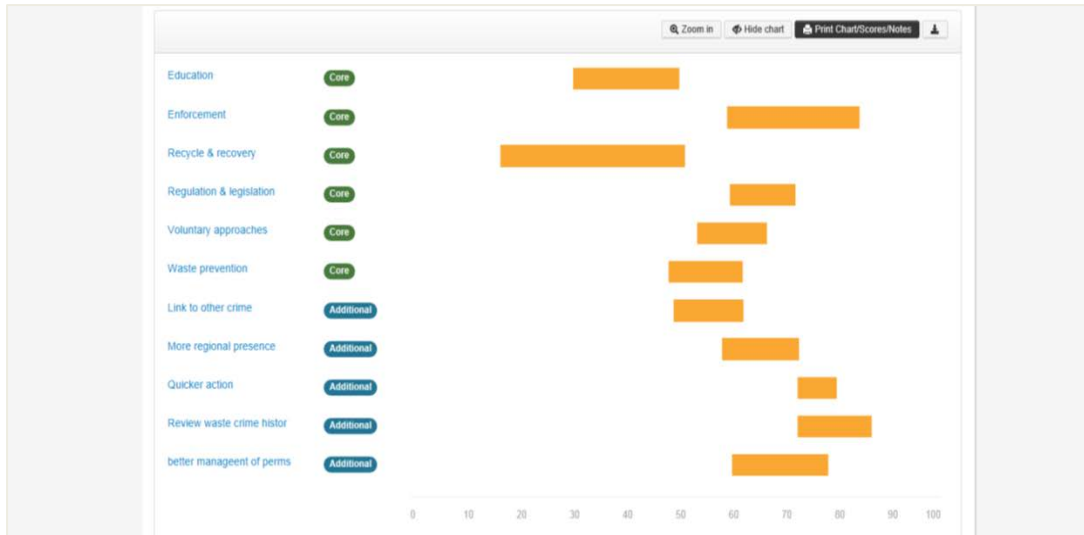


Figure 4. Scores from the academic perspective including five additional options

The MCM software can also produce charts that illustrate the relative weightings assigned by participants to criteria in the different issues (Figure 5).

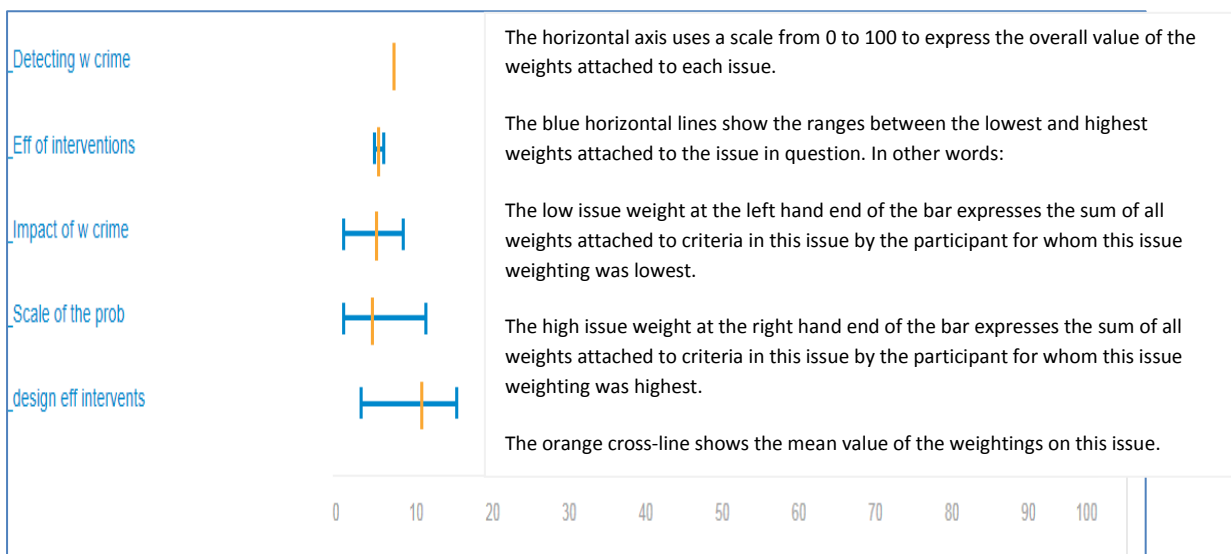


Figure 5 Relative weightings of criteria in the five issue groupings

Figure 5 shows that the criteria relevant to the design of effective interventions are seen as relatively more important. This type of information can be useful to help understand how proposed measures are likely to be valued by different perspectives.

### b. Using the MCM process and software tool

After the interview each participant was sent a questionnaire to rate their experience of the MCM process. Five of the seven participants returned the questionnaire. When asked about the pre-interview information four of the five were happy or neutral. One participant felt that the preparation was not adequate and crucially this person did not receive a phone call before the interview but relied only on the briefing pack. Whilst this briefing information was give positive

reviews by other participants, it is clear that its value lies in combination with a discussion where the process can be clarified and specific uncertainties addressed.

Once the software had been downloaded it was simple to carry out the interview offline and then upload it to the online project later. The software is robust, intuitive and straightforward to use. All participants commented positively about the software tool. All were also happy that their perspectives had been captured by the process. Four of the five participants would be happy to take part in another MCM interview and the fifth was neutral on this question.

At the end of the interview participants were asked how they would have felt about the interview being recorded. The general feeling was neutral though there were some comments suggesting they would have felt less able to voice thought processes and less free to share some thoughts. The interview might therefore have taken longer and the data may have been less insightful as a result of self-censorship. Conversely it would have captured an extra narrative that may have been useful in itself. The MCM manual recommends that the interviewer makes notes during the interview. In practice this was difficult as it disrupted the flow where the participant was operating the software and it is recognised that recording interviews could be useful to capture this level of detail.

The MCM manual was more useful for the preparation and interview stages than for the analysis and more guidance by example could have been provided for the analysis work.

The results demonstrated a very wide range of uncertainty and variability between participants limiting the strength of any conclusions that could be drawn. With the benefit of hindsight it may have been useful to have framed the question more narrowly to allow participants to express a greater degree of certainty in their scores.

Minor issues with the software and general feedback on using MCM are summarised in Appendix 2 and this has been sent to Sussex University (the developers of the system).

### **Benefits of MCM**

The flexibility offered by MCM and the value it places on qualitative information are major advantages of this methodology over other decision aiding tools considered for the trial. MCM encourages project teams to explore conditions under which people agree or disagree about what is important and it opens up the decision making process rather than closing it down. Other factors in its favour are the low cost of a licence and the lack of any contract tie in. This means that SEPA could hold a licence only when running a project. The MCM team at Sussex University also undertake to archive projects so that they can be revisited. The MCM website gives an aim of offering this service permanently but they reserve the right to delete accounts that have been inactive for a year. All project data can also be exported.

One alternative approach to this work would have been to hold a workshop to which all participants were invited. Participants were asked at the end of the MCM interview if they would have preferred a workshop and all commented that the structured interview approach of MCM was preferable. They felt that their perspective was captured more fully than would have been the case in a workshop. Also some of the participants remarked that it is usual for managers rather than operational staff to attend workshops and this would not have elicited the range of opinion gathered using MCM.

## Limitations

MCM interviews for this trial took between one and half hours and two and a half hours with the six core options. The time commitment on the interviewer necessary to assess a longer set of options with a larger group of participants might prove to be excessive and this must be taken into account when deciding whether to use MCM. The nature of the focal goal must be carefully considered to determine whether MCM is the best means of addressing the issue. For the purposes of the SEPA trial all engagements were carried out as one to one interviews and it has not been tested in a group or workshop format.

The range of analysis offered by the MCM software is limited, for example it does not generate rankings of combinations of options or criteria. However the overall effect is to encourage the researcher to adopt a conservative approach so that conclusions drawn from the data do not exceed their statistical confidence limits. Conclusions from this analysis are good for shedding light on alternative ways forward and developing understanding rather than generating “an answer”.

Although the individual nature of the process eliminates the need to organise workshop dates to suit a large number of people, it can be more time consuming for the interviewer to meet with each participant individually and this must be factored in at the project planning stage. Multiple times and venues also place an extra pressure on the project team.

## 4. Conclusions and next steps

### a. The MCM tool and process

Multicriteria mapping offers a transparent and cost effective way of gathering and analysing combinations of qualitative and quantitative data. It was selected for trial in SEPA as it met the criteria of Action 10 of the SEWeb project - to find a means of assessing the effectiveness of environmental measures. Although certain caveats have to be recognised (see above) the outcomes of the MCM trial in SEPA have proved very positive and the recommendation is that it could be used more widely. In relation to the LIFE SMART waste project MCM could be considered for use in work streams for “Scoping out the barriers to joint working between agencies nationally” and “ACTION B.14: Create an innovative interventions menu and design manual that allows interventions to be selected according to the specifics of the situation”. MCM may also be a useful tool in the next round of “State of the Environment” reporting.

MCM fills a gap in providing a systematic means of collecting and analysing qualitative data that is transparent and robust yet simple to use and inexpensive. MCM is flexible enough to be used to rank and prioritise existing measures and also to consider which measures might be most likely to succeed in future. In this respect it offers a very attractive way of approaching both types of decision in a consistent and transparent fashion. It encourages a deliberative approach to decision making and problem solving and recognises that there may not be a single “answer”. For some decision makers this may require a departure from their usual decision making methods and time to work with them on this transition should be built into a project if necessary.

### b. The SEPA waste crime trial

MCM was used to assess which interventions are most effective in combatting waste crime. The focal goal was worded so as to include present and future interventions and no distinction was made between the two sets of circumstances.

Seven participants from within and outside SEPA were interviewed for the trial and there was broad agreement that the options under consideration were ranked as follows:

- 1 Enforcement
- 2 Legislation and regulation
- = 3 Recycling & recovery
- = 3 Education
- = 5 Voluntary approaches
- = 5 Waste prevention

The software allows for more detailed analysis of the data to examine the reasoning behind these preferences and a selection of participant comments has been analysed in relation to two groups of criteria. These suggest that within the traditional options of enforcement, legislation and regulation there could be value in exploring intelligence based approaches and in particular in looking into crime scripts to pinpoint opportunities to disrupt the waste crime narrative.

The main messages from the analysis are:

- A) Enforcement is still seen as the most effective type of intervention.
- B) Novel, intelligence based approaches should be considered.
- C) There are divergent views on the value of waste prevention, recycling and recovery measures. Participant comments shed light on the reasoning behind this dissimilarity and suggest that there is scepticism about the likelihood of reducing waste crime practices currently in operation.
- D) People in SEPA may not be focussing on costs when considering how to assess effectiveness of measures. This will have implications for the type of data collected and an understanding of this could help to overcome some of the barriers to better data collection in the organisation.

It is recommended that the LIFE SMART waste team explores this data further to build on the important foundation that this trial has provided. The format of MCM allows a project to be re-opened and built upon. New participants could be added to close some of the gaps in perspective that occurred in this limited trial.

The trial should be seen as an important first step in developing a fuller understanding of the most effective interventions for combatting waste related crime. It is recommended that the range of participants be extended to include representatives from the waste industry as this perspective would enhance understanding of the relative merits of options being considered.

## Appendix 1

Table of Criteria and issues where an issue is a group of criteria chosen to reflect a common theme.

Criterion	Perspective	Issue
<b>Implementation costs</b>	PR, OU	Designing Effective Interventions
<b>Ongoing costs</b>	PR, OU	Designing Effective Interventions
<b>Ease of implementation</b>	PR, OU	Designing Effective Interventions
<b>Quick win</b>	PR, OU	Designing Effective Interventions
<b>Polluter pays</b>	EN, IN	Designing Effective Interventions
<b>Motivate good behaviour</b>	EN, IN	Designing Effective Interventions
<b>Achievable</b>	EN, IN	Designing Effective Interventions
<b>Effectiveness</b>	EN, IN	Designing Effective Interventions
<b>Efficacy</b>	AC, OU	Designing Effective Interventions
<b>Acceptability</b>	AC, OU	Designing Effective Interventions
<b>Practicability</b>	AC, OU	Designing Effective Interventions
<b>Site compliance</b>	RE, IN	Detecting Waste Crime
<b>Background (of operator)</b>	RE, IN	Detecting Waste Crime
<b>Operator understanding</b>	RE, IN	Detecting Waste Crime
<b>Access to transport infrastructure</b>	RE, IN	Detecting Waste Crime
<b>No active illegal sites</b>	PO, IN	Effectiveness of interventions
<b>Reduction in fly tipping</b>	PO, IN	Effectiveness of interventions
<b>Reduction in illegal burning</b>	PO, IN	Effectiveness of interventions
<b>Compliance</b>	PO, IN	Effectiveness of interventions
<b>Compliance</b>	RE, IN	Effectiveness of interventions
<b>Tax evasion</b>	PO, IN	Impact of waste crime
<b>Costs</b>	EN, OU	Impact of waste crime
<b>Acceptability</b>	EN, OU	Impact of waste crime
<b>Longevity of effect</b>	PR, OU	Impact of waste crime
<b>Localised impact</b>	PR, OU	Impact of waste crime
<b>National impact</b>	PR, OU	Impact of waste crime
<b>Cost of resources</b>	AC,OU	Impact of waste crime
<b>Illegal exports</b>	PO, IN	Scale of the problem
<b>Complaints</b>	RE, IN	Scale of the problem
<b>Fly tipping</b>	EN, OU	Scale of the problem
<b>Waste notices</b>	EN, OU	Scale of the problem
<b>Problem waste streams</b>	EN, IN	Scale of the Problem

Perspectives key: AC = academic, EN = enforcement, PO = policy, PR = professional, RE = regulatory, IN = inside SEPA, OU = outside SEPA

## Appendix 2 Feedback on the MCM manual and the software tool

### *Manual*

- The manual was very useful for preparing an engagement and planning the interviews. It was less helpful for carrying out the analysis.
- **Manual s20.6 - saving a report.** The instruction: “To save a report outside the MCM software, click on ‘Print Chart/Scores/Notes’ at the top of the report and choose ‘Save page as...’ to save the page that is generated.” No “save page as” option is seen.
- It was difficult to know how to represent a neutral score where the participant thinks the option would have neither positive nor negative effect on a criterion. Does a zero score mean a negative impact or no change? You use “perform better” to explain high scores. This is not always easy to interpret. Should participants be thinking of relative performance for all options under that criterion rather than absolutes? Do scores below the neutral value have to represent a deterioration or reduction in the criterion?

### *Software tool*

- Overall the software tool was rated highly by the researchers and participants as being well thought out and intuitive to use.
- One file became corrupted before it could be uploaded. The DabApps people resolved this immediately and repaired the file. This was much appreciated.
- The offline version could be improved by having a prompt to save comments so that they are not lost.
- Change the wording from “exit engagement” to “save and exit engagement” would give more confidence that data was being saved.
- Create a way of selecting multiple participants, options, or criteria to add to perspectives, clusters and issues respectively.
- One engagement displayed a 99% complete status on the software. However there was no guidance towards where the unfinished 1% was to be found.
- It would be useful to have example statements to use for scoring. For example “a score of 100 means that this option would achieve criterion x in a major way” and “a score of 0 indicates that this option would not achieve criterion x at all”
- I did not realise until too late that it is not possible to edit the names of participants once an engagement has been started. I would like to have made the naming more consistent and imagined that I could do this during the analysis – as well as correcting any spelling or grammatical errors. It would be useful if either a) an editing option is supplied or b) the permanence could be made clear in the manual.

### *Feedback from participants*

Participants were asked whether they would prefer the MCM approach or to attend a work shop. All felt that their views were captured better using MCM. One participant commented that had it been a workshop, then his manager would have attended in his place thus we would not have had this operational perspective.