Environmental Behavior Index Survey

Pamela M. M. Jull
Applied Research Northwest
Bellingham, WA

ABSTRACT

King County's Environmental Behavior Index (EBI) was designed to inform a wide range of programs and help consolidate survey research evaluation efforts that were being undertaken independently for each program at the Department of Natural Resources and Parks (the Department).

The EBI tracks residential behaviors across water quality, solid waste, and energy and climate change related behaviors. The EBI is intended for assessment of program effectiveness, to inform planning, and to develop information for education and outreach.

The 2008 EBI included 24 measures to assess the behavior of selected segments of the residential population including less educated residents, those in apartments and those in rural areas. It also contained piloted geospatial approach to allow program managers to target specific areas where behaviors are either far above or below the norm. This will inform program delivery as well as evaluation strategies.

Comparisons of 2005-06 data to 2008 showed trend information by behavior. The findings were promising, but should be considered with care since some adjustments were made to the telephone survey methodology in order to bolster the segmentation analysis.

The EBI has attracted the attention of the Environmental Protection Agency as a potential model for standardizing environmental behavior measurement across geographic areas. Standardized measurement could help inform best practices, consolidate and maximize resources used for such research and more effectively inform national and regional agendas on programmatic behavior change issues.

Introduction

In 2005, King County developed a comprehensive index of people's behaviors that programs run by the Department of Natural Resources and Parks seek to impact. Dubbed the "Environmental Behavior Index" (EBI), the measures were designed to inform programs by tracking program effectiveness, helping with planning and prioritizing and creating information that could be used for education and outreach in the programs themselves.

The 2008 Environmental Behavior Index is comprised of 24 behaviors (down from 30 in 2006). Of the 24, 14 were also in the 2006 survey, and several more were modified between 2006 and 2008. For each behavior, people were generally asked three questions:

1. What do you do? (Both improper and proper behaviors are provided as options)
2. How often do you do it that way? (Most of the time/some of the time)
3. Have you ever considered doing it differently? (Describe the proper behavior)

This line of questioning enabled analysts to place people in one of four behavioral stages strongly related to the transtheoretical model of behavior change (Prochaska & Velicer 1997): precontemplation, contemplation/preparation, action, or maintenance.

These questions about each behavior provide information that classified people into one of five categories:

- Bright Green – people who are consistently engaging in the desired behavior.
- Light Green – people who sometimes do the desired behavior, but sometimes do not.
- Yellow – people who do not do the desired behavior, but are considering doing it.
- Brown – people who do not do the desired behavior and who are not considering doing it.
- Grey – people who are unfamiliar enough with the behavior or their own household's practices that they couldn't respond to the questions.

The purpose of this classification is both to track change and to identify opportunities for creating change. The greatest opportunities are contained in the behaviors that have at least 15% of people who are either considering the behavior (Yellow) or doing the behavior inconsistently (Light Green). Generally, these are households that are aware of the issues that undesirable behaviors create, but something is keeping them from doing the more desirable behavior. Typical culprits are personal motivation, remembering to do it, added cost in terms of time, money or effort (in some cases simple inconvenience), missing knowledge or information, a lack of familiarity with the behavior (skills and experience), or having the right tools and materials and knowing where to get them.

The EBI is organized according to four broad areas of interest:

1. Waste avoidance, disposal and recycling behavior
2. Disposal down indoor drains – flushing and other behaviors that impact water quality and water treatment
3. Yard care, biodiversity and water quality
4. Environmentally conscientious lifestyle choices

The survey method used in 2008 adds a geospatial dimension that allows program managers to target specific areas where behaviors are either way above or way below the norm, enabling a more targeted response and facilitating a more detailed evaluation capacity.

Methods

The survey was administered by telephone during the period from May 14th, 2008 to August 11th, 2008 to residents of King County, Washington.

Phone numbers were supplied by a reputable survey sampling organization, Survey Sampling International. The bulk of the phone numbers (73%) were random digit dialing. Additional listed phone numbers were provided to target apartments (8%). A third sample was provided using reverse directory look-up to target rural residents (19%).

A total of 821 surveys were completed with qualified respondents. Six attempts were made to contact eligible respondents within each household, including at least one attempt on a weekend day and at least one attempt during business hours. The final response rate was 21%.

Because stratified sampling was used, weights were applied to the data to approximate the actual distribution of residents across rural, suburban, urban areas. Those weights were applied and reported in the findings of this report.

Comparison to 2005-06

In 2008, the Department created a survey methodology that would enable more strategic application of the findings. Primarily, there was interest in oversampling key subgroups in the population including those in rural areas, people living in apartments, and those without a college education. As a result, the survey methodology was quite different from that used in 2005-06. Random

residential telephone samples dominated the data collection, but targeted geographic samples were drawn and listed household telephone numbers used to reach a variety of subgroups in the population. Because of this, not every household in King County had an equal probability of being selected into the sample. The weighted data helps approximates the distribution of behaviors in the population, but it is likely that there is some bias in the estimates and some error that is unaccounted for in the data.

Nevertheless, the correspondence between the 2005 and 2006 measures suggests that the impact of these changes in survey methodology may be small. Readers should understand that while these data are very useful, care should be taken in describing their generalizability to King County population overall.

The 2008 Environmental Behavior Index Survey built on the prior years' research in several ways. Each of the following changes takes into consideration the usefulness of the index to program managers as well as the need to track change over time.

- The 2008 EBI was more audience-specific, focusing on people living in apartments, those in rural areas, and people who did not attend college. This enabled program managers to learn where the hot spots are for certain behaviors and augment their programs to better meet people's needs.
- The survey was modified to address emerging areas of concern including climate change-related behavior, purchase of local foods and picking up pet waste at home.
- Behaviors that had already been adopted by a substantial majority of households were dropped and items that were poor functioning, upon which programs could have little impact, or that didn't apply to many people were removed or improved.

Resident segmentation and key recommendations

The resident segmentation shows the distribution of the composite measure for particular subgroups based on age, education, income, ethnicity, type of residence (apartments, single family), sex, place of residence (rural or suburban/urban), marital status, and presence of children in the household.

Findings

Figure 1 shows all 24 behaviors from the 2008 EBI, sorted according to those that are being done consistently (Bright Green). There are many clear opportunities for addressing change in people's behaviors as nearly every item shows more than 15% of people are considering the appropriate behavior or engaging in the behavior inconsistently (Yellow and Light Green).

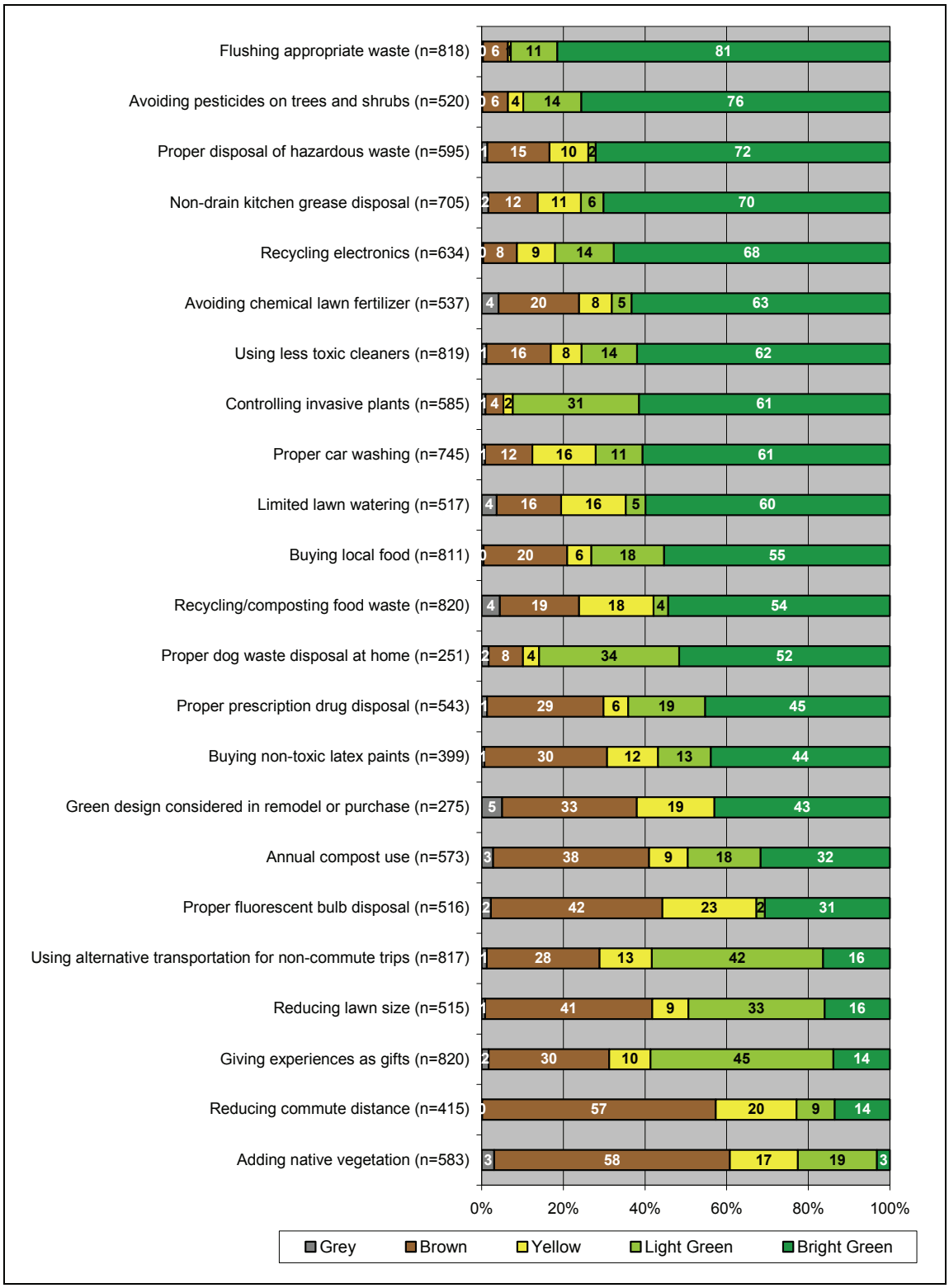

Figure 1. The Environmental Behavior Index 2008

Bright Green – consistently performs preferred behavior; Light Green – inconsistently performs preferred behavior; Yellow – Considering preferred behavior; Brown – not considering/discussing preferred behavior; Grey – don't know/unfamiliar with topic

The Environmental Behavior Index Scale

Creating a single summative scale can help King County better understand how it is doing over all of the behaviors over several years. In the interest of creating a single, summative measure of all these behaviors, managers at King County assigned a value to each improper behavior that would estimate the impact of each behavior on the local environment and community – impacts such as prevention of water and air pollution, impacts to human health as well as plants and other animals. Figure 2 illustrates the total EBI score for all respondents. The resulting scale ranges from 0 to 105 with a peak at about 45 points.

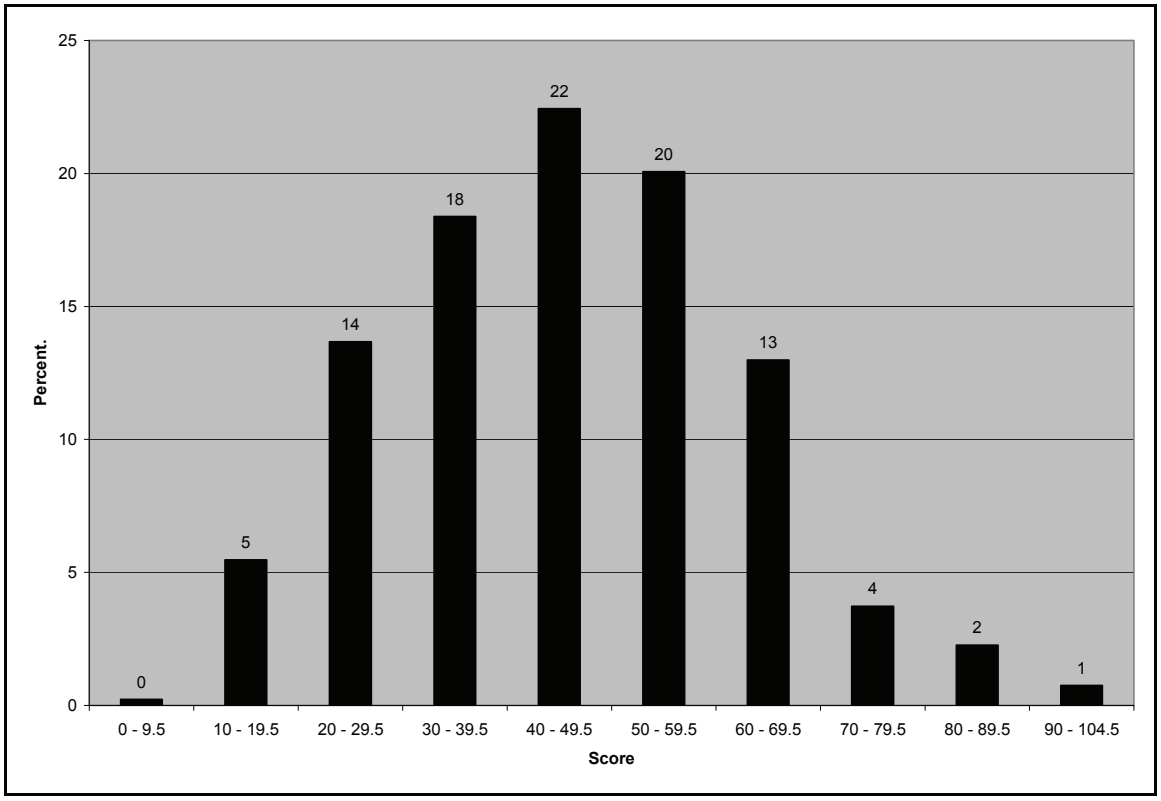

Figure 2. Environmental Behavior Index Scale (n=821)

The scores show that while most residents (60%) fall on the lower end of the scale (fewer negative impacts), there are some households that are contributing to a number of problems in the area (7% of those surveyed scored at 70 points or higher on the scale). This scale will allow for future research to conduct comparisons of overall impact across time or within particular segments.

How the EBI was used – Energy efficient bulb Disposal

In 2005-06, fluorescent lights were found to be in use in almost every home surveyed, though just 28% of them used them in most or all of their fixtures. Of particular concern was the disposal of the bulbs, which appeared to be properly done by only 24% of those who used them. A majority (56%) were not even considering proper disposal.

In 2008, respondents were asked "Do you currently use any energy-saving light bulbs in your home? These are also known as compact fluorescent light bulbs, and many of them are curly shaped." Most respondents said *yes* (86%). While use of these energy-saving bulbs is encouraged, improper disposal can be problematic. When thrown in the trash, the bulbs may break. When they break, they release mercury into the air, producing a health hazard in homes and for waste disposal workers.

Questions included:

- What will you eventually do, when you're ready to get rid of them?
    - Take to hazardous waste collection site (Wastemobile, haz-mat)
    - Take to special recycling services or events (EcoLights, city/county)
    - Take back to a store
    - Put in household garbage/trash
    - Take to trash transfer station/the dump
    - Someone else does it/don't know what they do
    - Other
- Do you do that most of the time or some of the time when you have these types of bulbs to dispose of?
- Have you or anyone in your household talked about taking these types of bulbs to a county hazardous waste collection site, returning them to a store, or trying to recycle them in some way?
    - Yes, thought/talked about/plan to
    - Yes, but don't know where to do that
    - No

When asked how they dispose of burned out fluorescent light tubes or compact fluorescent bulbs, the most common response was that they put them in the garbage or took them to the dump (29%). Another large portion said that it does not apply – that although they use the bulbs, they have never had to dispose of them (28%).

Figure 3 shows how residents were classified for these items in the EBI. Nearly one-third of respondents who dispose of fluorescent bulbs were classified as Bright Green because they indicated proper disposal methods. It was rare for people to inconsistently dispose of the properly (light green – 2%). Among those who did not dispose of the bulbs properly, most were <u>not</u> considering or talking about taking them to a disposal of toxics facility (42% of all respondents).

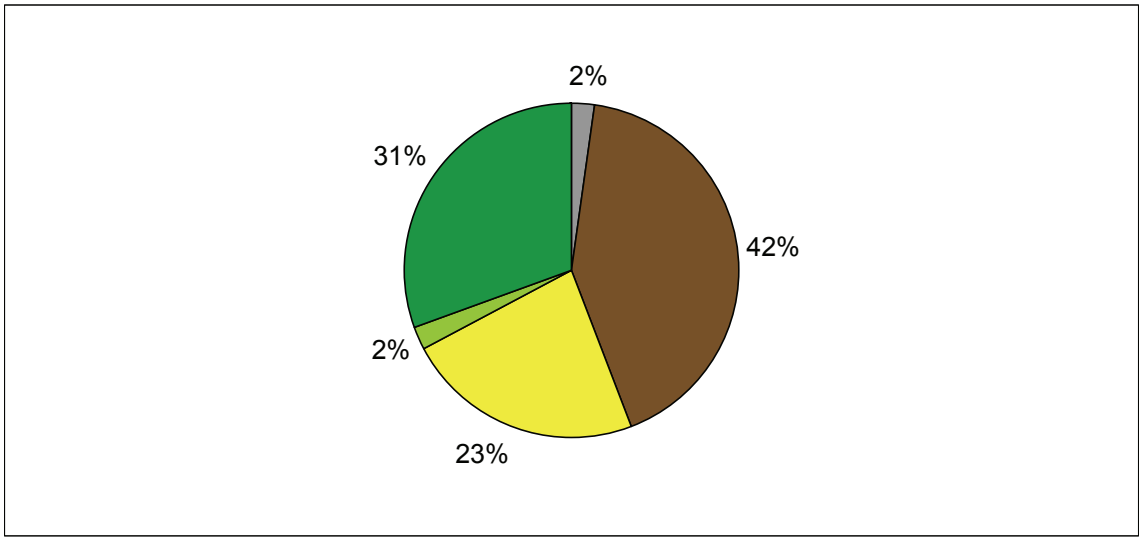

Figure 3. Proper fluorescent bulb disposal (n=516)

Bright Green – consistently performs preferred behavior; Light Green – inconsistently performs preferred behavior; Yellow – Considering preferred behavior; Brown – not considering/discussing preferred behavior; Grey – don't know/unfamiliar with topic.

Resident segmentation

Resident segmentation was presented for each behavior with a table illustrating the proportion of particular segments that fall into the categories of doing the behavior (Bright Green), willing to do the behavior (Light Green or Yellow), and unwilling to do the behavior (Brown or Grey).

Segments in which 15% or more are willing (light green and yellow) suggest areas where the program may be most productive. When that is coupled with a relatively large portion of people who are Bright Green, it suggests that there may be stronger norms among that population for the behavior than where there are few who are Bright Green. Considering the proportion that is categorized as Brown will give managers a sense of how often they will encounter disinterest or resistance within that population.

In addition, managers can consider how large the population is, and the size of the willing population (the final columns of the table). The larger the size of the willing population, the more opportunity there is for substantial net effects of behavior change.

Below is a table showing the willingness of each segment of the population to engage in proper bulb disposal**.** Segmentation showed that willingness was over 15% across all populations in large portions, recommendations are to focus on the largest. Shaded rows show the largest segments with 15% or more willing (considering) the behavior.

Table 1. Fluorescent bulb disposal within resident segments

	Doing (Bright Green)	Willing (Light Green or Yellow)	Unwilling (Brown or Grey)	Size of segment	Size of willing population
Apartment	12%	21%	67%	23%	5%
Non-apartment	35%	26%	38%	76%	20%
College	37%	27%	36%	74%	20%
No college	12%	18%	70%	26%	5%
Female	32%	24%	44%	60%	14%
Male	28%	27%	44%	40%	11%
Rural	33%	28%	39%	6%	2%
Non-rural	30%	25%	45%	94%	23%
Married	35%	31%	35%	63%	19%
Unmarried	22%	15%	63%	37%	5%
Parenting	26%	27%	47%	26%	7%
Non-parent	33%	25%	43%	74%	18%
White	33%	25%	42%	82%	21%
Non-white	23%	24%	53%	18%	4%

Key recommendations

The fact that so few residents are Light Green (Figure 3) suggests that people's understanding of the problem caused by improper disposal of fluorescent bulbs is quite compelling, causing them to almost always dispose of them properly. In addition, the high portion of respondents who are considering proper disposal (23% Yellow) suggests that this may be a high-barrier behavior. For those who overcome the barriers, they are able to do so consistently. For others, there may be significant barriers that prevent them from disposing of the bulbs properly, even a portion of the time.

Shaded areas in the table above show large segments of the population that could be targeted for disposal programming. Identifying the specific barriers that prevent each group from properly disposing of the bulbs and the proper incentives to motivate them would be useful.

A relatively large portion of people (28%) is inexperienced at disposing of fluorescent light bulbs. These people will need to be aware of the hazard prior to their bulbs burning out. Other targets for this indicator each make up 20% or more of King County's population and at least 1 in 4 of the households are willing to dispose of bulbs properly (Yellow or Light Green). They are non-rural, white, college educated, single family residences.

Although they make up a smaller portion of the population, younger respondents are least likely to be disposing of their bulbs properly (4% of those under 35), but 40% are willing – the largest age-group portion considering proper disposal.

Comparing year-to-year behavior: Waste avoidance, recycling and disposal behaviors, 2006-2008

Another aspect of the EBI is the ability to compare items from year to year to see if progress is being made. The figure below compares items relating to waste avoidance, recycling and disposal from the 2006 survey to 2008. This comparison should be considered with care since the research methods employed in each year were not identical. However, all of the measures showed change in the desired direction.

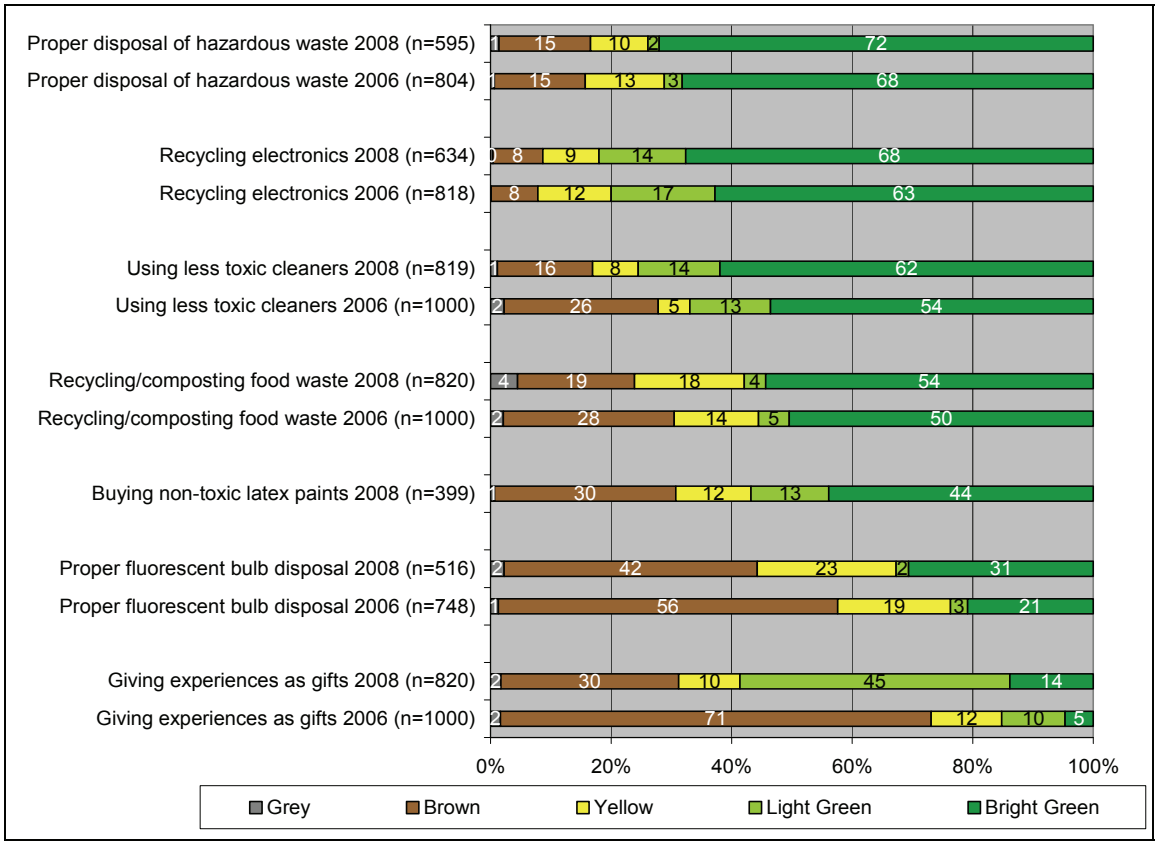

Figure 4. Waste avoidance, disposal and recycling behaviors, 2006-2008

Bright Green – consistently performs preferred behavior; Light Green – inconsistently performs preferred behavior; Yellow – Considering preferred behavior; Brown – not considering/discussing preferred behavior; Grey – don't know/unfamiliar with topic.

Buying non-toxic latex paints was a new item in 2008 and refined the item regarding the purchase of latex paints. In 2006, giving experiences as gifts was only considered if the intent of the purchase was to reduce waste. In 2008, that was changed to reflect only the behavior, not the intent, since the outcome is the same – reduced amounts of solid waste.

Mapping findings

The survey method used in 2008 added a geospatial dimension that allowed program managers to target specific areas where behaviors are either way above or way below the norm, enabling a more targeted response and facilitating a more detailed evaluation capacity.

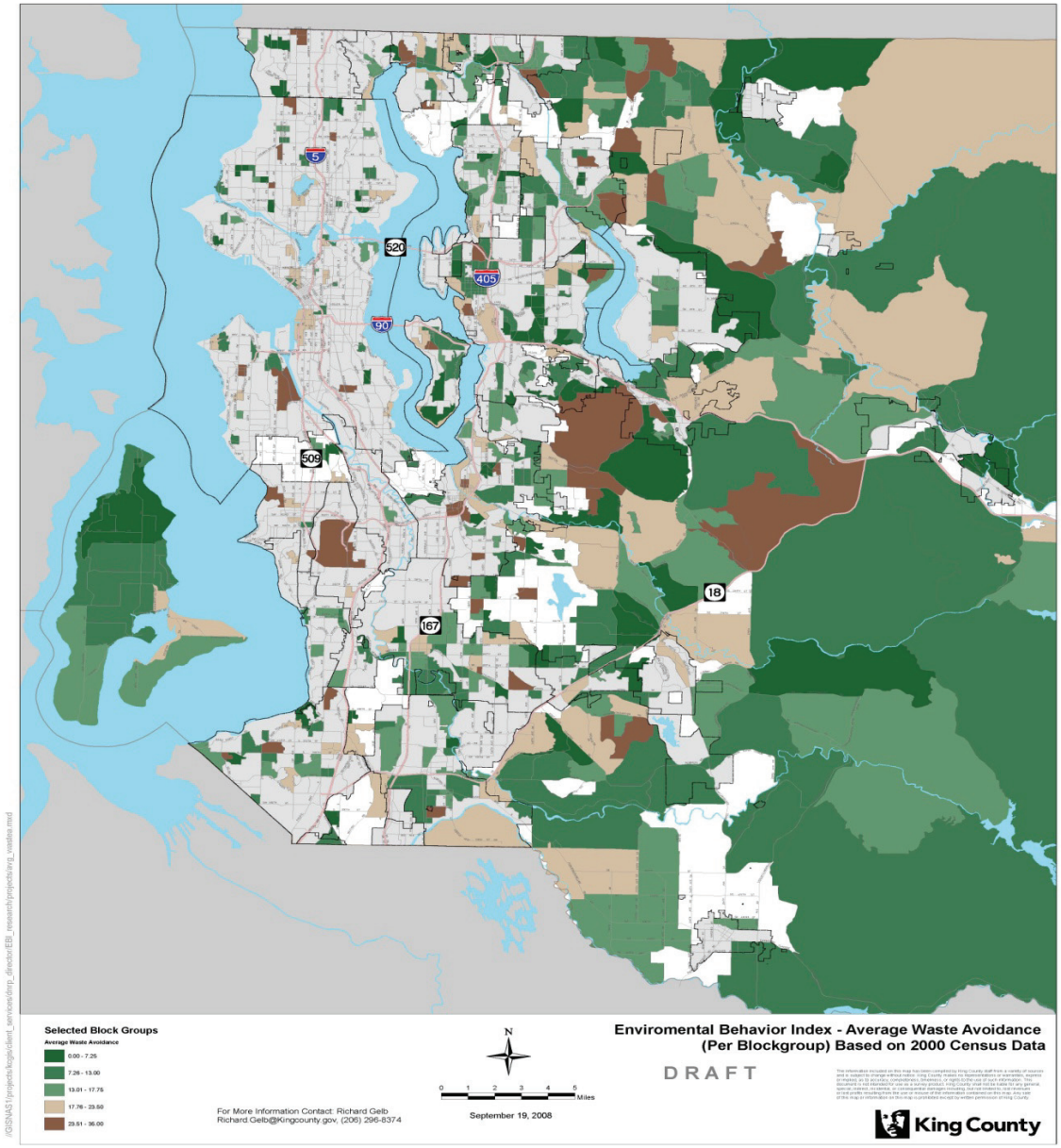

Figure 5. Geomapping of waste avoidance behaviors

The small sample size (n=800) left many census blocks blank, though King County is considering other approaches to creating geospatial data based on the EBI.

Conclusion

The 2008 EBI offers opportunities for King County to explore how ongoing use of a powerful survey tool can inform programs and track change.

Choosing target behaviors and audiences

A great deal of the report is dedicated to describing the willingness of sub groups of the population with regard to each behavior. There is no hard and fast rule to decide upon a target audience, but willingness to engage in the behavior is the most important of many dimensions to take into account. People who will not consider a behavior take far more resources to convince than people who are already open to learning more about an issue.

Table 2 includes the ten composite behaviors with the highest proportion of Light Green and Yellow categories. These are the behaviors that have the largest group of people who are already doing the behavior inconsistently or who are considering engaging in the behavior. Efforts may be most fruitful when the willingness to change is coupled with an established norm and low levels of resistance. The ten behaviors presented in Table 2 were evaluated for higher levels of Bright Green and corresponding lower levels of Brown. Behaviors where there is a favorable ratio of Light Green/Yellow to Brown are shaded. These are behaviors that may present the opportunities for change.

Table 2. Composite behaviors ranked by willingness to change

	% Light Green and Yellow
Giving experiences as gifts	55%
Using alternative transportation for non-commute trips	55%
Reducing lawn size	42%
Proper dog waste disposal at home	38%
Adding native vegetation	36%
Controlling invasive plants	33%
Reducing commute distance	29%
Annual compost use	27%
Proper car washing	27%
Buying non-toxic latex paints	25%

Table 2 suggests some areas to concentrate on programmatically. However the size of the target audience is another dimension to consider. If there are very few people who make up the sub group, focusing a program's resources on them could result in little measurable change. In addition, they may be hard to find or hard to reach. Resident segmentation should add to the insights program managers gain from the findings, and can begin to steer them toward the best opportunities to have an impact on large portions of the population.

In addition to willingness and size of the segments, three other variables should be considered when choosing target populations for Social Marketing approaches.

1. The prevalence of the behavior within a specific segment

2. Whether or not the segment is easy to identify
3. How reachable that segment is

The prevalence of the behavior may be higher in certain segments, suggesting programmatic focus. For example, if men are more likely than women to be a decision maker about yard care issues, then the impact of targeting men may be more substantial than targeting women.

The second two variables listed above are often related. For example, does the target population tend to live in distinct areas that could give a geographically-resourced program an edge? Do they tend to engage in similar activities? Do they trust information and seek it out from similar sources? Are there databases of contact information that are readily available? If so, that segment becomes one that programs could select for a focus.

Taking the EBI into the future

Behaviors that show high levels of adoption and low levels of willingness to change could be rotated out of the EBI. These items could be revisited with periodic inclusion in the full survey to make sure ground is not lost.

As described in the report, many measures suggest a need for additional research to clarify the barriers and motivators for engaging people in the desired behaviors. These investigations will be most productive if they are audience specific – identifying key characteristics of people in the population and customizing the investigations to address the subgroup's specific needs.

Expensive research is not necessarily required to develop a stronger understanding of the segmented audience. A great deal can be learned from informal discussions if they are entered into with a spirit of real inquiry and facilitator judgments and bias are kept carefully in check. Learning what people think about the topic -- whether they are well informed or not, and whether their view is considered appropriate or not -- is critical so that programs can appropriately speak to their target audiences. Programs that do not speak to the key concerns of the audience will see limited change compared to those that do.

Additional analysis could help reveal stronger profiles of residents that engage in sets of behaviors. If so, programs can strategize to leverage each others resources and together create more change.

The addition of the EBI scale to this year's work is valuable. Additional analysis could indicate key drivers to engaging in desirable behaviors or creating a willingness to do so, and thereby help bring into focus the most receptive target audience.

References

Prochaska, J. O., & Velicer, W.F. (1997). The Transtheoretical Model of health behavior change. American Journal of Health Promotion, 12, 38-48.