

# Mental Mapping of Pleasantness and Planning Objectives in the Town of Brillion Landscape

by  
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## The Project

This project examined mental maps of citizens from the town of Brillion, Wisconsin to determine perceived landscape qualities and planning goals of local residents. This project was sponsored by the USDA Natural Resource Conservation Service in cooperation with Omni Associates, a Wisconsin consulting firm.

Members of the St. Lawrence University Environmental Psychology Lab met with members of the Brillion Visioning committee in June of 2001 and collected the mapping data presented in this report. The accompanying maps depict these subjective perceptions of landscape pleasantness and areas that should or should not be developed for commercial or residential land uses.

## Participants

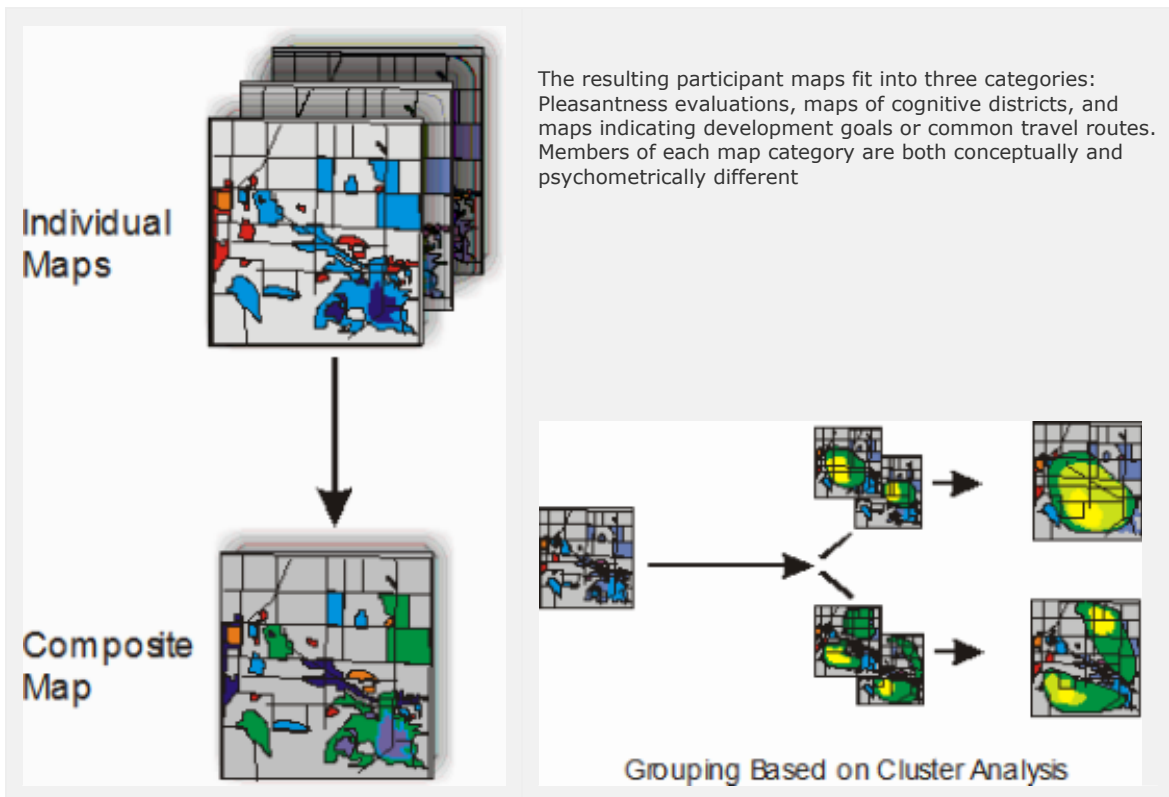


Our task was to investigate the utility of mental mapping as a complement to the ongoing Brillion visioning project. The target participant group was an already established citizen visioning team made up of residents of the town and city of Brillion, Wisconsin. Thus, the intent of our efforts was to develop exercises to inform the discussions of these leaders and volunteers, not to gather a representative sample of Brillion residents.

We anticipated the participation of about 50 individuals, but only 32 people attended the data collection session. Although we prepared an additional 50 maps with instructions so that they could be given to other members of the committee, only three were returned in postage-paid envelopes. A small number of the 35 participant maps were too difficult to reliably read, resulting in a final sample size of either 32 or 33 maps.







The resulting participant maps fit into three categories: Pleasantness evaluations, maps of cognitive districts, and maps indicating development goals or common travel routes. Members of each map category are both conceptually and psychometrically different

The greatest psychometric precision was obtained on the maps of pleasantness. Because participants indicated areas that were very pleasant, somewhat pleasant, neutral, somewhat unpleasant, or very unpleasant, each participant was responding to a five-point interval scale. The resulting composite maps can appropriately be interpreted as mean responses.

**Table 1, Demographics of the Brillion Sample**

<b>Location</b>	<b>Code</b>
City	1
Town	2
<b>Occupation</b>	<b>Code</b>
Retired	1
Farmer	2
Publisher	3
Computer Consultant	4
Portrait Photographer	5
Registered Nurse	6
Accounting	7
Community Development Director	8
Sales Person	9
Postal Worker	10
Government	11
Inn Keeper	12
Real Estate Broker	13
Electrical Engineer	14
Shop	15
Quality Technician	16
Manager	17
Calumet County Planning Department	18
Housewife	19
Home Address	97
No Answer	98
Can't Read Answer	99

**Table 1, Demographics of the Brillion Sample  
(Cont'd.)**

<b>Represent Specific Group</b>	<b>Code</b>
No/No Answer	1
Yes	2
Brillion Planning Commission	3
Brillion Township	4
Local Business	5
City of Brillion	6
Water/Sewer Utility	7
Volunteer	8
Town of Brillion	9
City of Brillion Planning Board	10

The map of cognitive districts resulted in the most idiosyncratic responses and the interpretation of the resulting maps requires the most caution. Participants were instructed to think about districts, defined as “areas with a common character or feel.” They were then asked to indicate as many or as few districts as they liked on their maps, and to provide a descriptive label for each district. For instance, many individuals identified Forest Junction or downtown Brillion as districts, whereas a small number of individuals singled out farms or schools.

The data for each identified category were coded separately for these maps, so the final composite maps represent the proportion or percentage of individuals who included a given area in a particular common category rather than a mean scale response. Although the resulting overlaps for any one category are frequently small in number, these cognitive districts may offer unusual insights. Instead of limiting participants to pre-established planning categories, the maps provide insight into the way this group of individuals mentally categorizes or organizes the town landscape.

Finally, participants were asked to indicate: 1) their most frequent travel paths, 2) areas in which they would like to see development for commercial, residential, or recreational use, and 3) areas in which they would like to minimize development. As in the case of the cognitive districts, participant responses for each category were digitized as binary maps rather than as scale responses. (For example, a given individual indicated only whether an area was or was not a desirable area for residential development). Again, the composite maps can be interpreted as illustrating the percentage of individuals who indicated that a location was suitable for a particular type of development.

## **Analysis**

As depicted in the figure, our primary approach was to aggregate the individual participant maps into composite summary maps for each response dimension. For example, each of the 33 usable maps of pleasantness were digitized and then combined to yield a composite or summary map representing the average evaluation for the study area. We used a similar approach to discover the most common travel routes, the areas collectively judged as most desirable for commercial, industrial, residential, and recreational development, and the areas most commonly identified as areas that should be restricted from development.

Again, these data represent the combined view of those present at the June meeting. We believe these collective images are valuable resources in understanding the perceptions and goals of the leaders and stakeholders who make up the committee. Our view is supported by the intuitively meaningful maps that resulted from the analysis. On the other hand, we must again emphasize that it is unlikely that our sample of just more than 30 leaders and volunteers represents a statistically valid sample of the Town of Brillion residents. Again, the results probably accurately reflect the views of the committee but not the population from which its members were drawn.

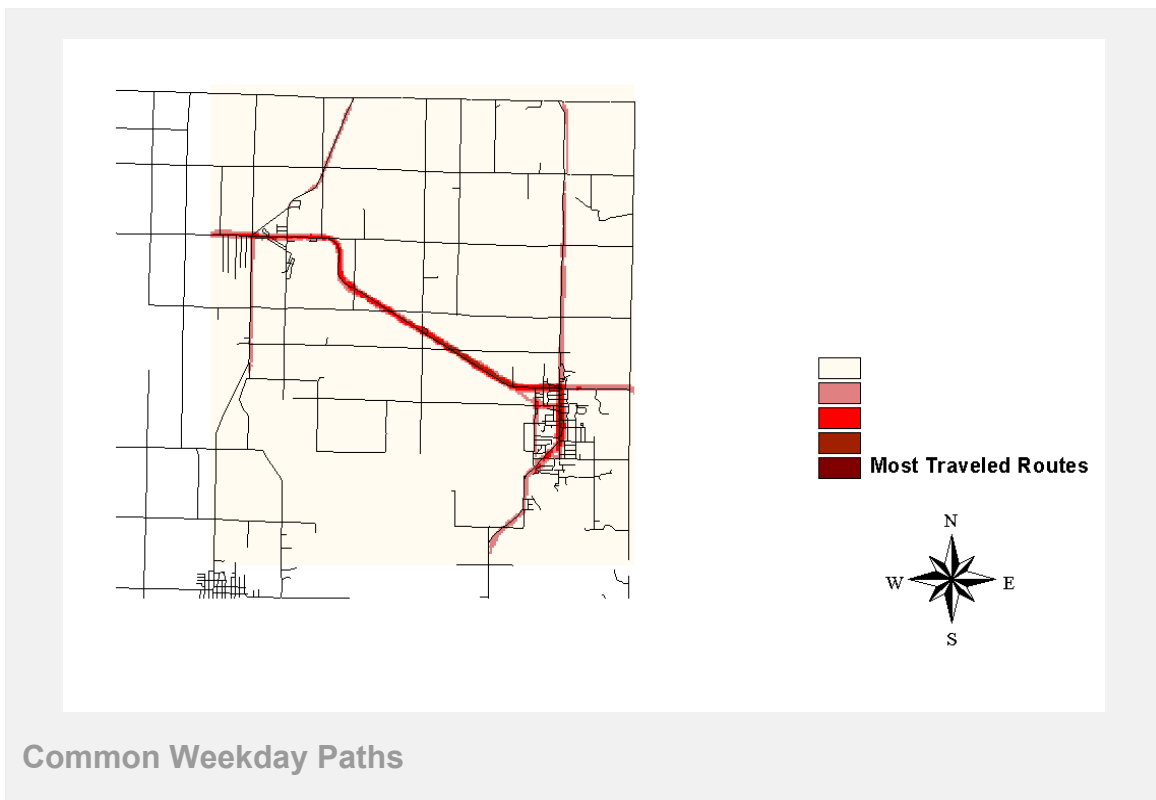
## **Subpopulation and Cluster Analysis**

In addition to the primary analysis that combined data across all of the study's participants, two additional techniques were used to create separate maps of sub-samples of respondents. The most straightforward approach was to use the demographic information in Table 1 to separate participants into subgroups for additional analysis. Our primary distinction was between those living in the City of Brillion and those living elsewhere, but we also investigated the possibility that government employees or those formally appointed to planning positions might differ from other volunteers.

The second approach was limited to the pleasantness maps. In this analysis we attempted to statistically identify groups of people based on the similarity of their maps. We calculated the pleasantness score for each of 112 regularly spaced map locations for each of the 33 usable participants. These data were submitted to hierarchical cluster analysis, which identified those participants with the most similar maps. Based on our interpretation of the cluster analysis, we split the participants into five groups made up of individuals whose maps were statistically determined to be similar to each other and dissimilar to the rest of the population.

## Results

### Travel Paths

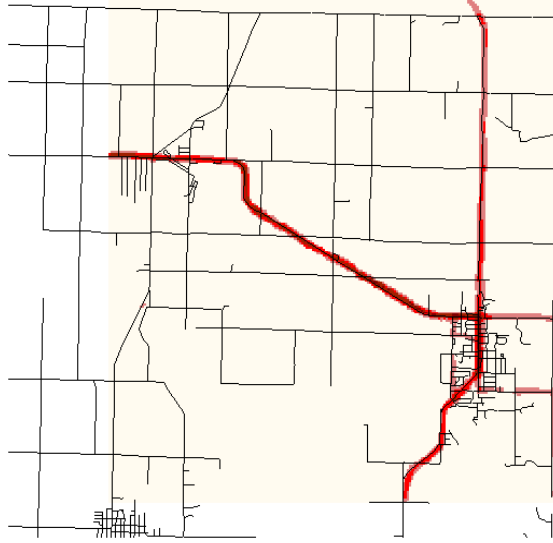


### Common Weekday Paths

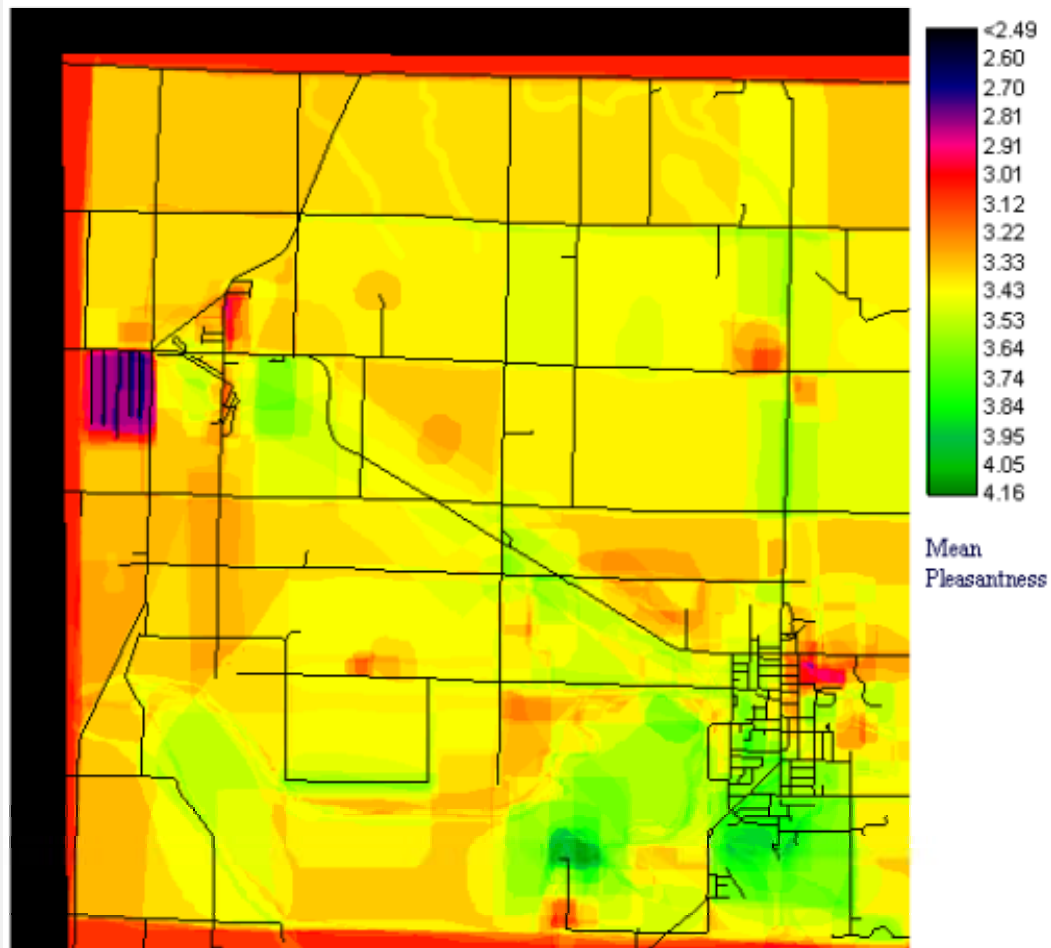
Highway use is perhaps better measured by objective counters rather than survey techniques. Nevertheless we felt that differences in travel patterns would be useful in subsequent analysis. Here are the paths the participants reported traveling most frequently on 1) weekdays and 2) weekends/evenings. In hindsight, this analysis seems remarkable only in indicating the similarity between individuals, and between weekend and weekday travel paths.



## Common Weekend/Evening Paths

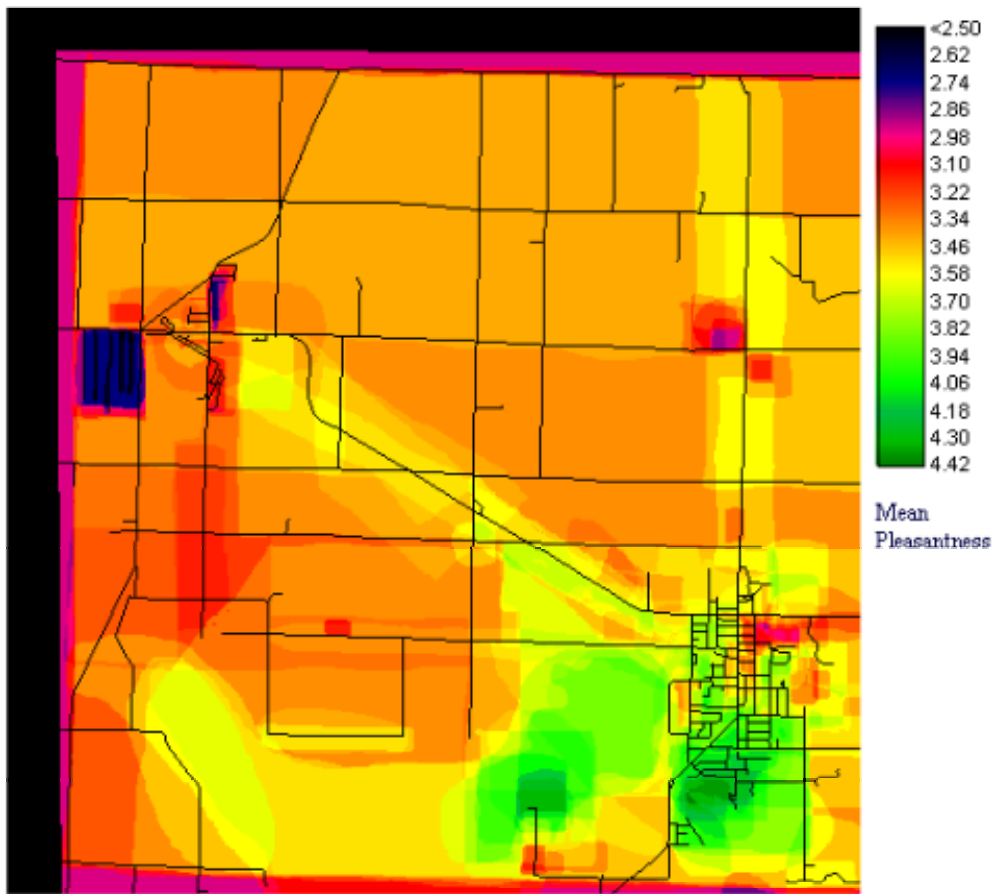


## Pleasantness



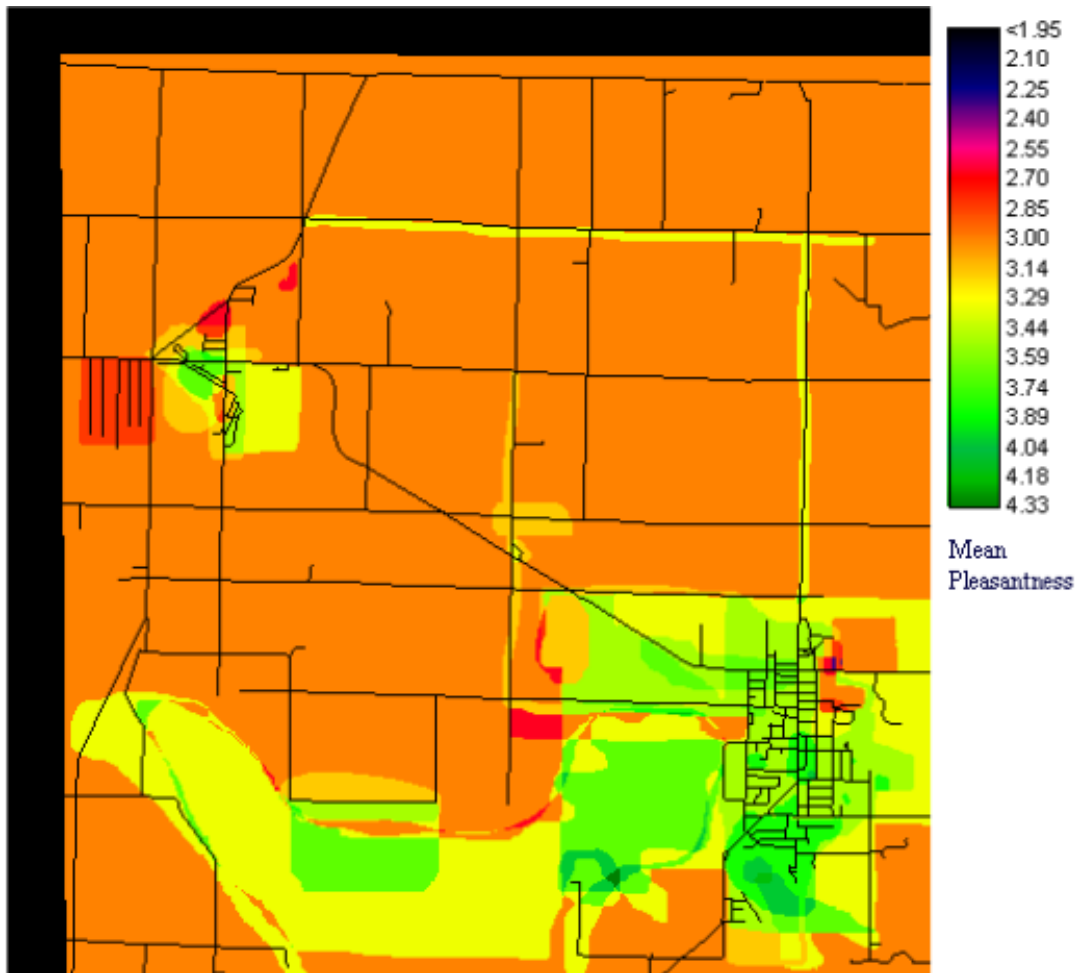
The figure illustrates the combined participant judgments of pleasant, somewhat pleasant, neutral, somewhat unpleasant, or unpleasant landscapes. The most positive evaluations included both urban and rural areas. Pleasant rural areas were especially concentrated in the southern part of the town, particularly in the vicinity of the nature center. The newer residential neighborhoods in Brillion and Forest Junction also received very positive evaluations, whereas the old industrial zone of Brillion and a mobile home park near Forest Junction were evaluated less positively.

### Pleasantness (City Residents)



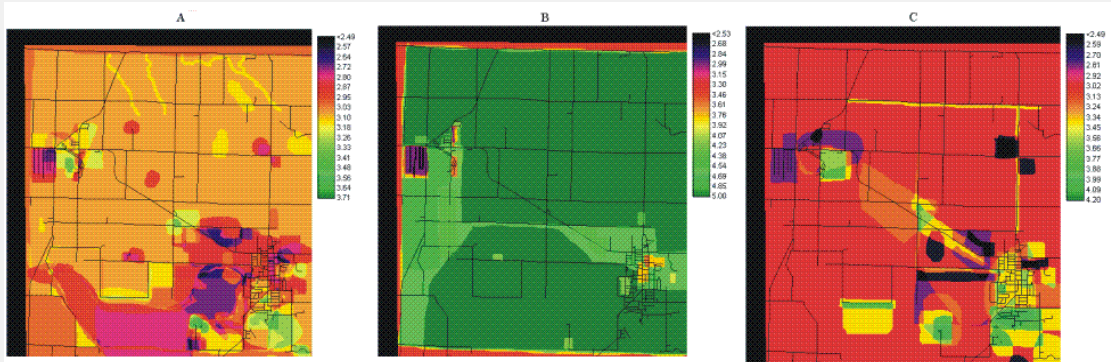
Comparing the pleasantness maps compiled from 19 participants living in the City of Brillion to the 11 who reported living in the town reveals some interesting differences. Most remarkably, only town residents included farmlands in their pleasantness zones and rated areas around Forest Junction positively. On the other hand, they did not share city resident's high pleasantness ratings for the City of Brillion. These results may reflect a difference in perception between rural and urban respondents. In addition, the results probably represent self-selection, that is, rural folks are likely to live there because of attributes or opportunities they value, whereas others live in the city because they prefer opportunities or residential environments. Not surprisingly then, people may report preference for their chosen areas. The area of greatest agreement centered on the nature center area, which is, apparently, appreciated by both groups. We present without comment an additional map that represents the pleasantness zones for six individuals who we identified from their data as members of formal planning boards or local government.

### Pleasantness (Officials)



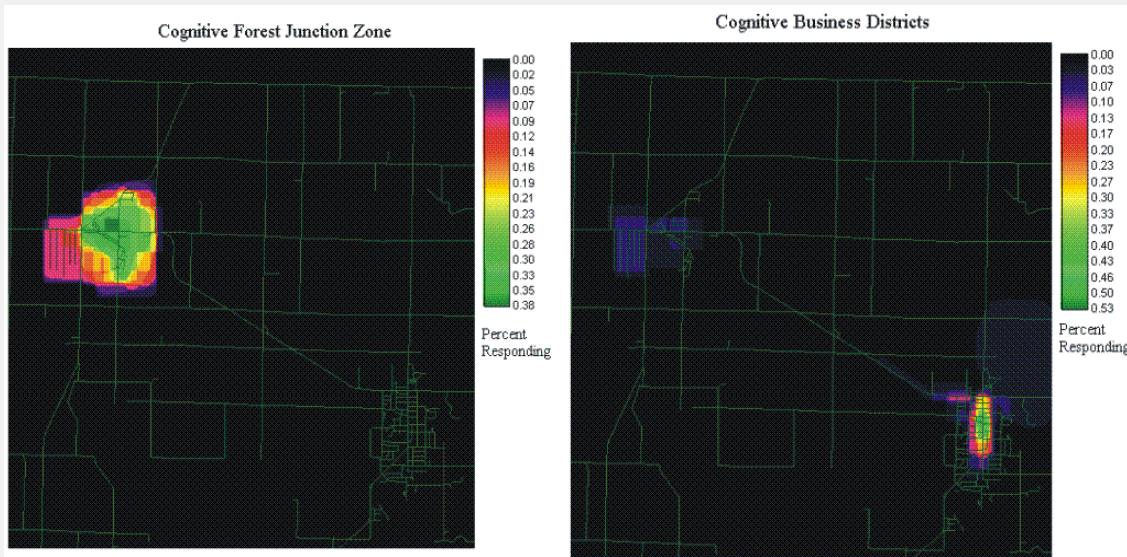
The final pleasantness map shows the results of a cluster analysis of pleasantness maps which separated individuals into 5 stylistic clusters, three of which are noticeably different. Clusters varied in the size of their membership, with the first group representing 14 responses. This group resembles the total sample in its responses. The second map (based on 5 individual responses) might be termed the "optimists" because its members reported liking almost all of the Town of Brillion, with only small isolated areas of less positive opinion. Conversely, individuals in the third map seemed to be less positive overall with preferences tending to group around travel corridors. Perhaps the differences between the first and second maps illustrate so-called leniency and stringency scaling biases in measurement as much as genuine differences in perception. The final two maps were identified by the statistical analysis, but in each case, are based on only three individuals so overinterpretation of these data is questionable.

## District Analysis

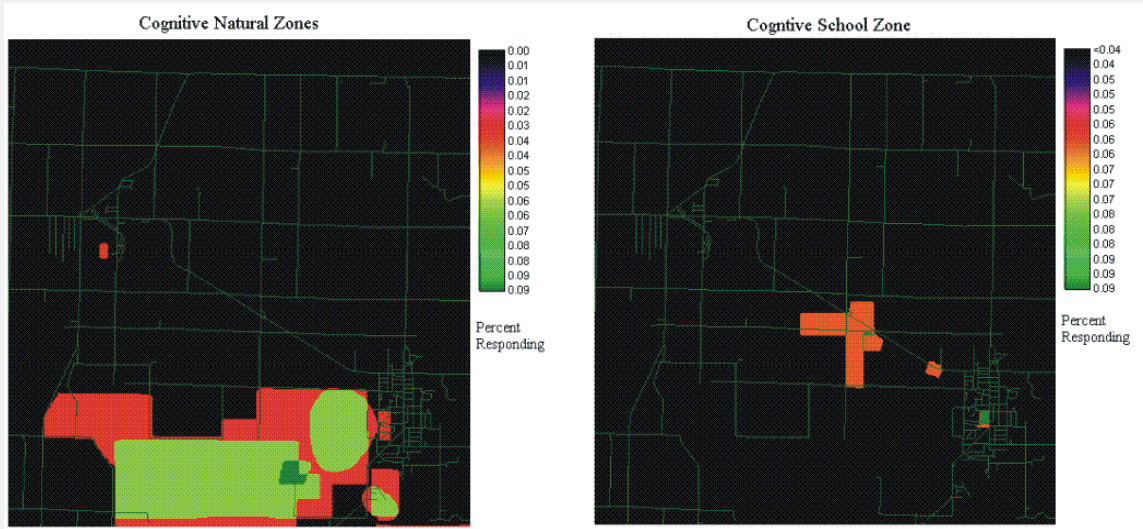


These maps depict areas that the participants considered to have distinctive character. Recall that participants were instructed to think about districts, defined as “areas with a common character or feel,” to indicate as many or as few districts as they liked on their maps, and to provide a descriptive label for each district. In order to interpret these results it is important to keep in mind that the maps reflect the proportion of individuals who volunteered a particular category as a description for a cognitive district. About a third of the participants labeled the Forest Junction and the Brillion business districts, for example, but only five people identified farms as districts. The districts volunteered and labeled by the participants include the school district, business districts, residential districts, an industrial district, farm districts, Forest Junction, and recreational districts. Because this procedure resulted in an already small sample size, we attempted no further breakdown of subgroups (for example, city versus town residents).

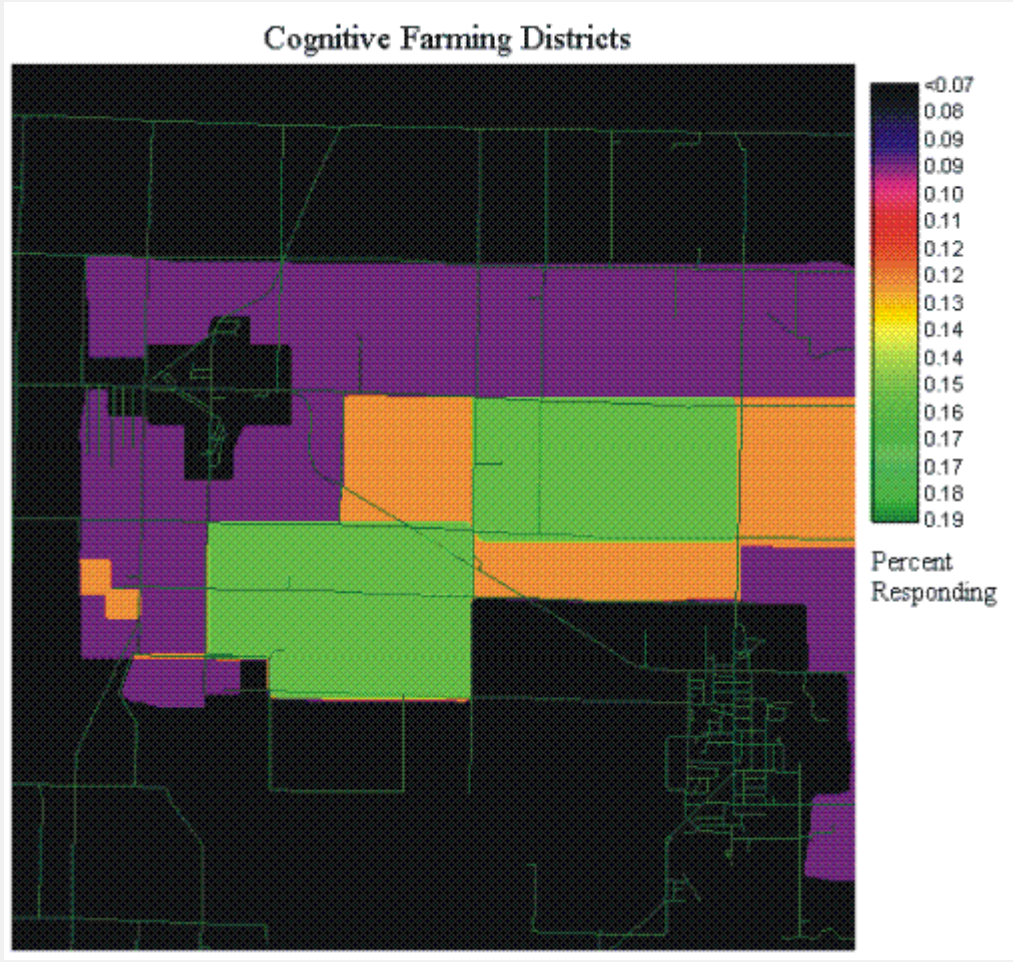
## Maps of Planning Objectives



These maps illustrate desirable areas for commercial, residential, or recreational growth and areas in which the participants do not want to see change. Collectively, they represent one assessment of planning objectives. Each analysis begins with the overall response, followed by the data broken down by the 19 city and 11 town residents.



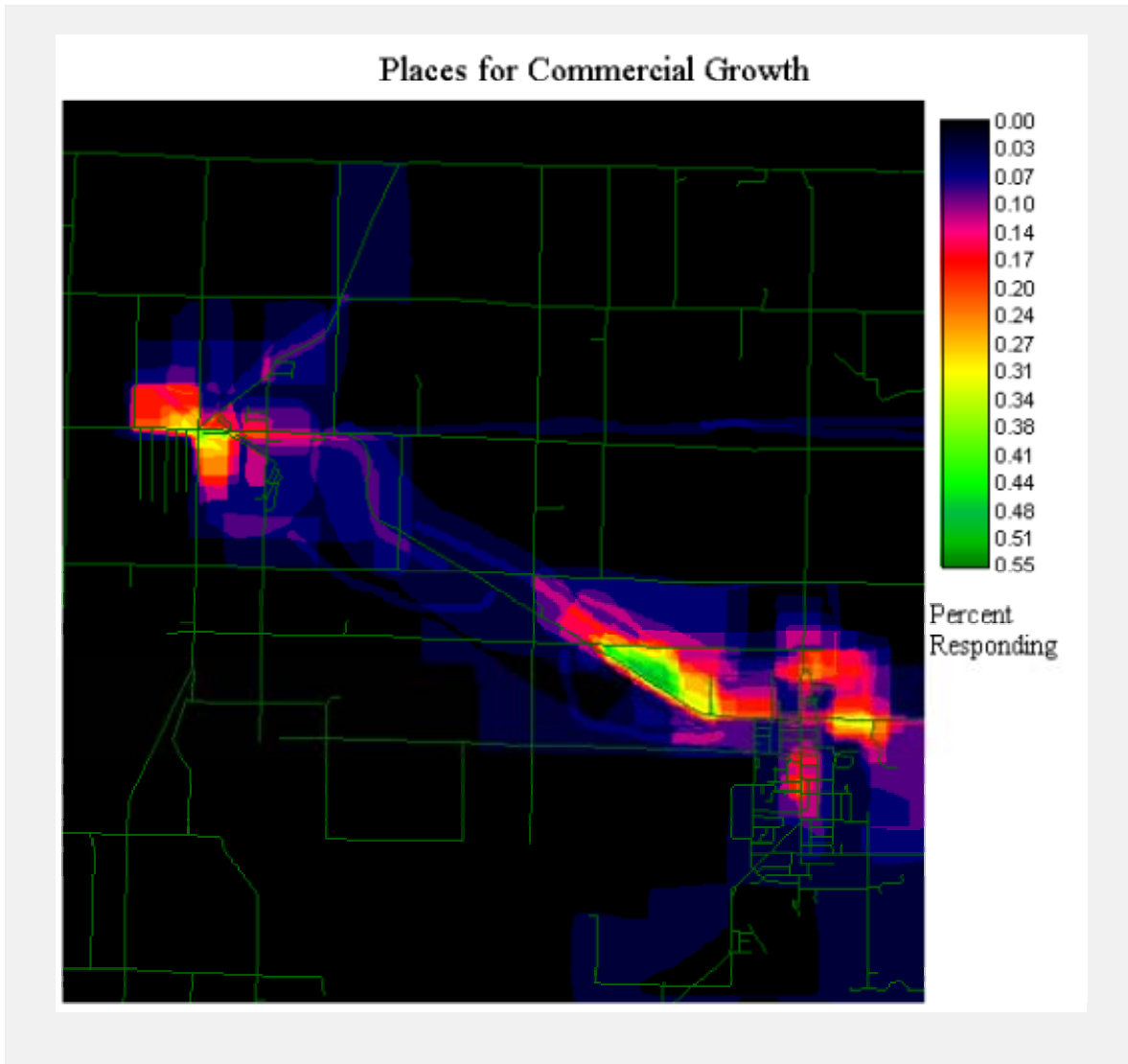
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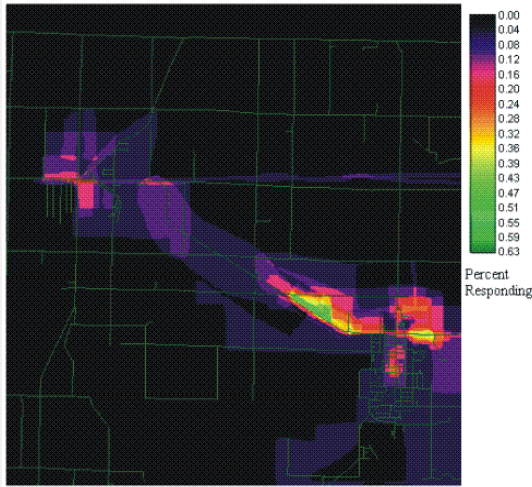


## Commercial Development

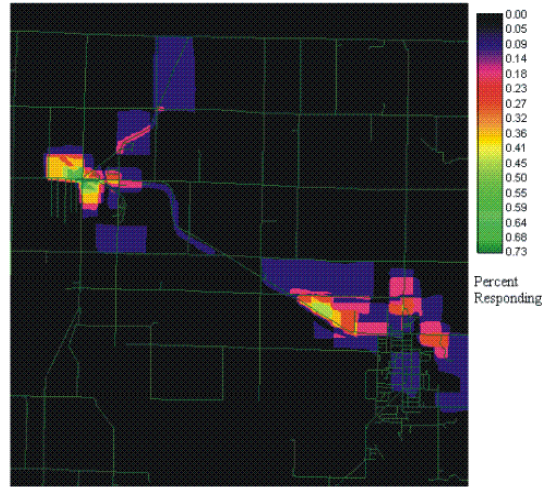
Three zones were identified for commercial development. They include parts of the City of Brillion (particularly on the north), a corridor along US 10 in the vicinity of the new high school, and Forest Junction. Although there was general agreement, it is interesting that non-city residents were more likely to desire additional commercial development in Forest Junction.



# Places for Commercial Development



City

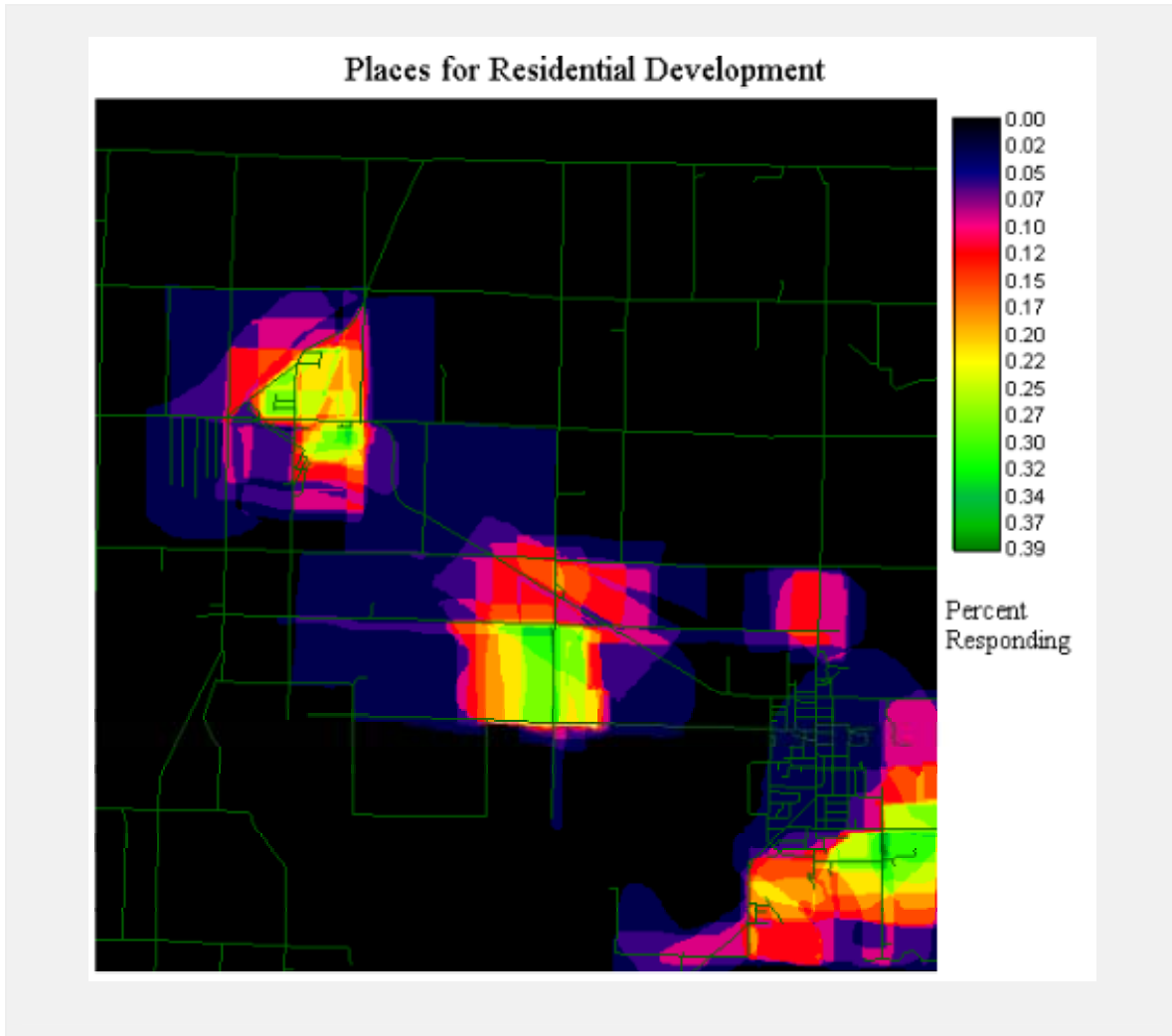


Town

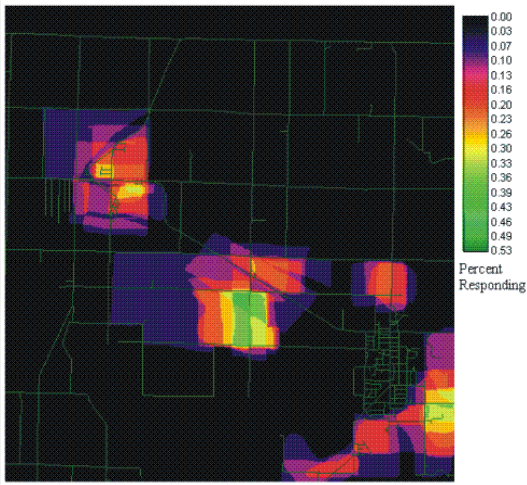


## Areas for Residential Development

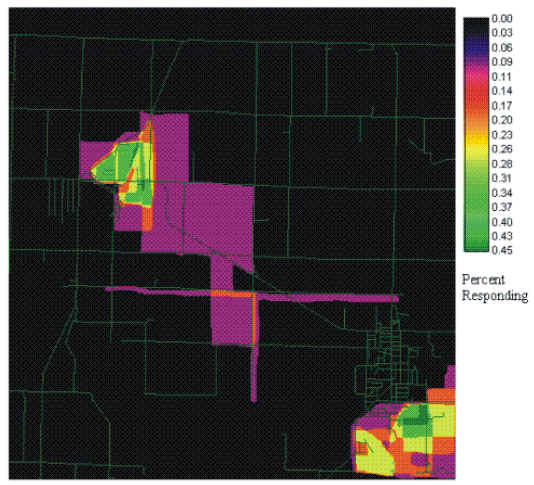
Data are presented for the total sample and for the city and town subgroups. Although there is general agreement, city residents were more likely to identify the residential district south of US 10 midway between Brillion and Forest Junction. This disagreement reappears on the map of areas to restrict from development and may represent an area where land use objectives conflict.



# Places For Residential Development



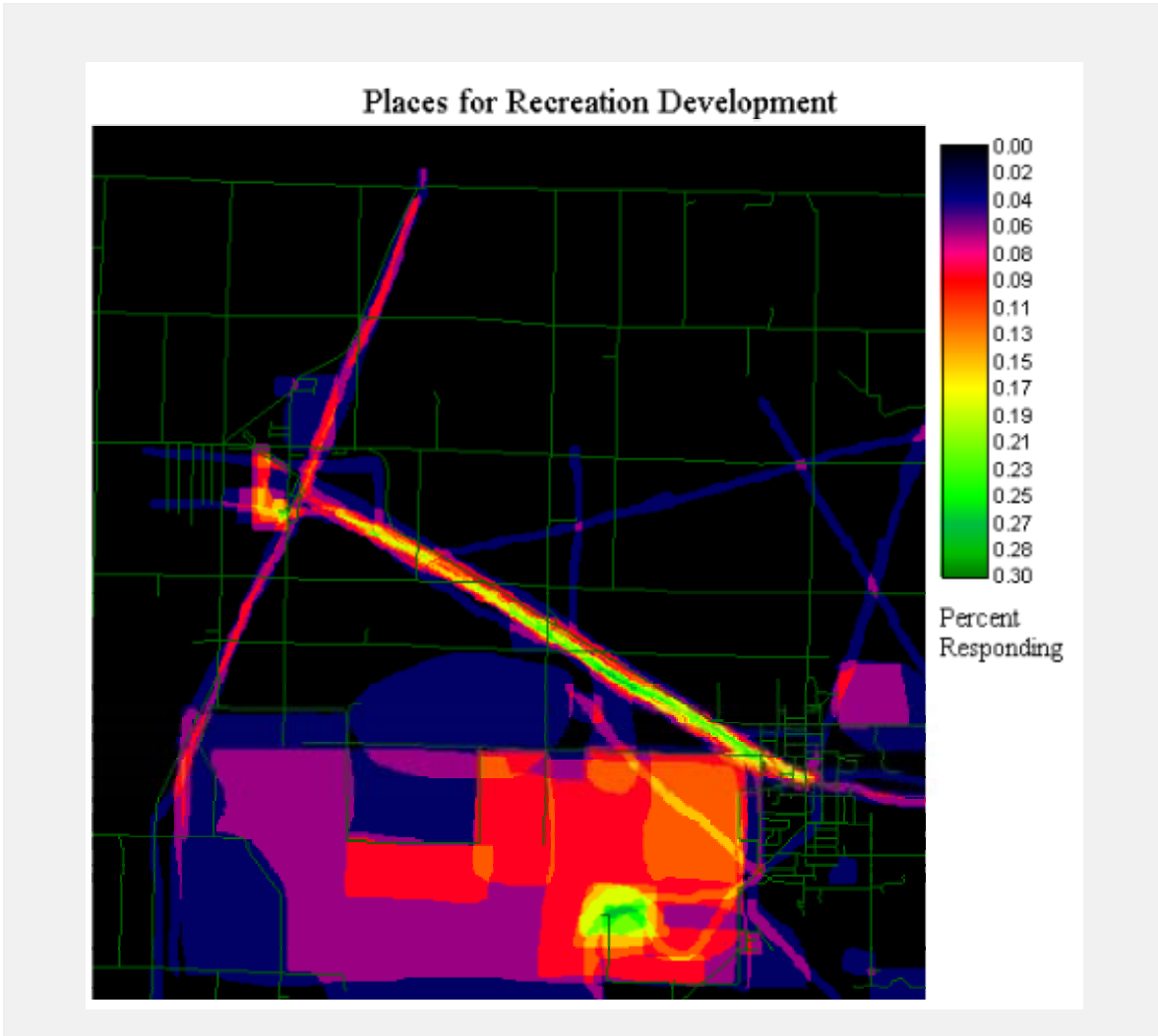
City



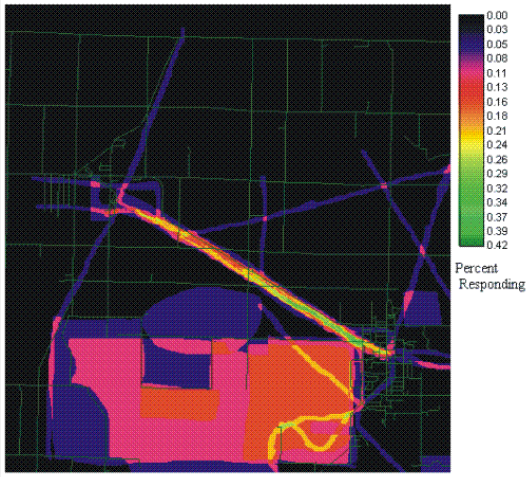
Town

## Areas for Recreational Development

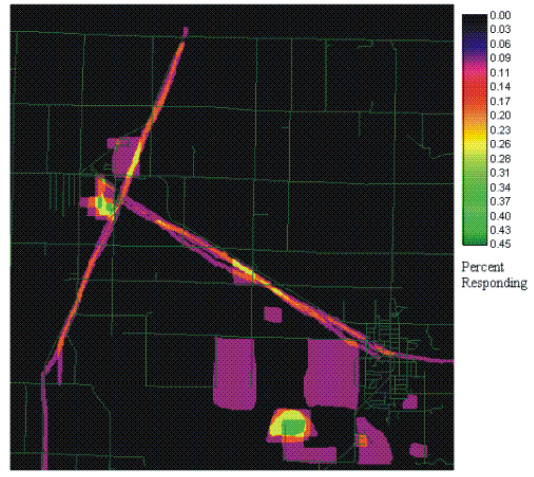
There seemed to be fairly good agreement regarding the areas most desirable for additional recreational development. The nature center/wetland area in the south and the potential recreational trail corridors were commonly identified by both rural and urban participants



# Places for Recreation Development



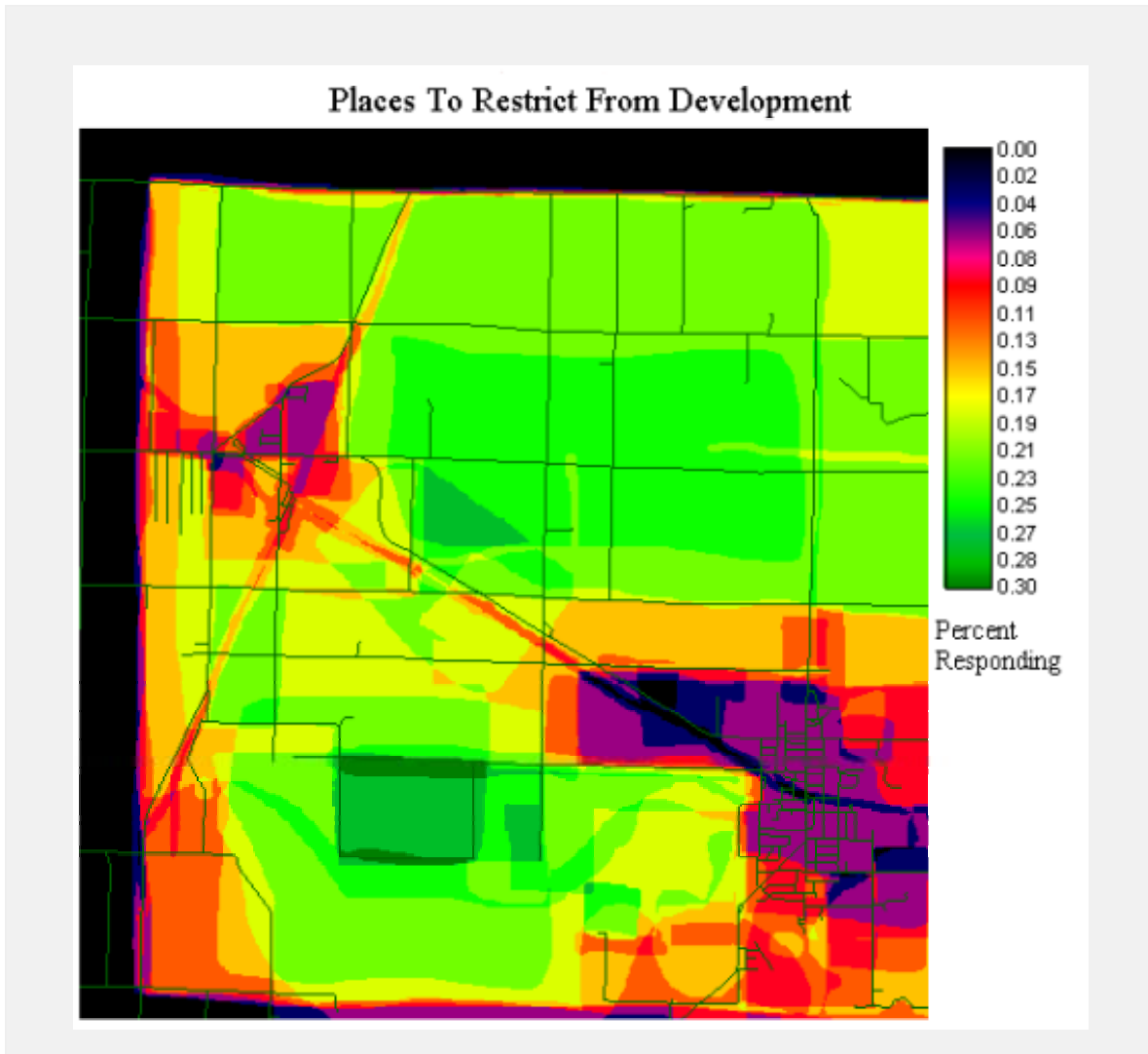
City



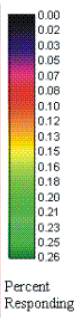
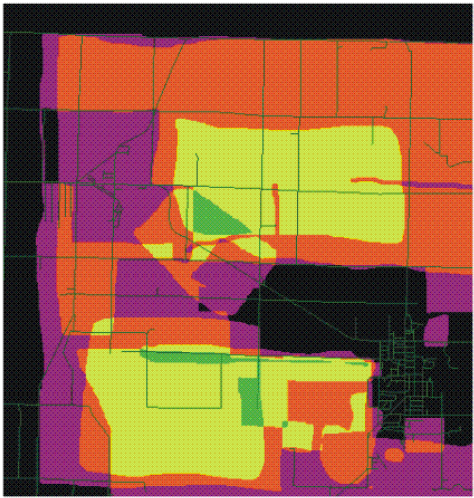
Town

## Areas to Restrict from Development

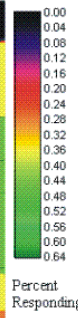
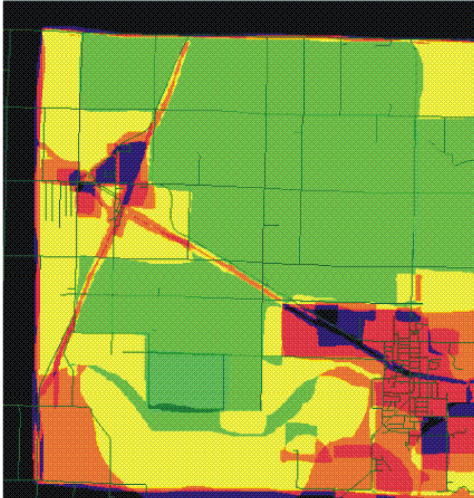
A greater percentage of town residents seemed to advocate restricting areas for development, but city and town residents were in general agreement about the location of lands that should be reserved.



# Restrict From Development

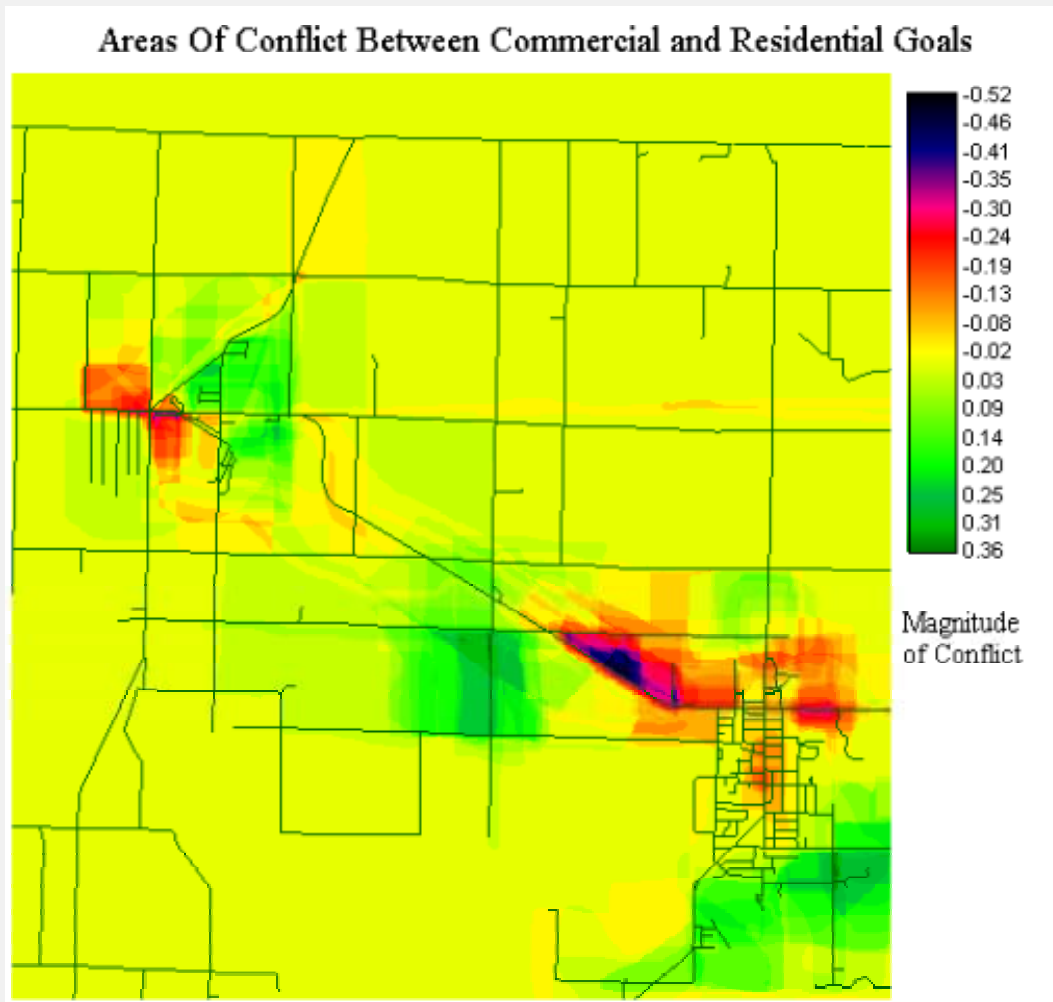


City



Town

Of course, potential conflicts are represented by zones that are considered desirable for incompatible land uses. The figure below results from the numerical subtraction of the residence and commercial zones, a quick way of illustrating potential conflicts. Reds and purples indicate an area considered desirable for both residential and industrial and commercial development.



## Limitations

Our approach was cognitive, and thus heavily dependent upon the ability of the participants (almost all of whom were sitting together in a meeting room) to remember the Billion geography. Depending on the specific goal, the mental mapping approach can be either an asset or a limitation.

Clearly the vagaries of human memory can result in distortions. On the other hand, these maps may represent the geography-as-perceived more realistically than an otherwise accurate planning map based upon either expert judgment or political compromise. In this instance, the purpose of the study was to supplement other methods by including the landscape as *perceived*. Nevertheless, some people are more or less familiar with specific town locations, and some are more familiar with maps and therefore better able to transfer their memories to the physical base maps. Predictably, this cognitive approach inevitably resulted in some errors. For example, some individuals identified the wetlands south and west of the City of Brillion as desirable locations for residential development, an outcome that is both practically and politically unattractive. The magnitude of individual or random errors is more serious with this small sample drawn from a self-selected committee than it might be with a larger study of the general population. The potential errors will be exaggerated by any analysis that breaks the total sample down into smaller group units, as was the case with the analysis of demographic subgroups and cluster analytically defined samples.

A second limitation is, perhaps, even more serious. We built our base maps from the most current information provided to us by planning agencies. However, participants noticed mapping errors when we presented our results in November at a meeting in Brillion. In particular, a roadway interchange north of Forest Junction has been re-engineered since the maps we were provided were compiled. In addition a knowledgeable participant noted that the streets indicated in the (highly disliked) Forest Junction mobile home park in our base map were actually the streets as planned, not those that were eventually built. Again, new orthographic photos reveal that the mobile home park is, in fact, much smaller than indicated on the map used during data collection. Thus, although the (often extreme) evaluations assigned to Forest Junction are probably accurate, their surface area should be much smaller.

Finally, our second meeting made clear the inevitable disadvantages faced by consultants who are only visitors to the area. For example, the desirability of a corridor neighboring US 10 for recreational development is not obvious unless one is aware that there is a proposal to turn an abandoned railway right of way into a recreational trail. Similarly, localized areas of pleasantness or unpleasantness included individual properties thought to be attractive or unattractive insights only available to locals.