

The George Washington University



**Distribution of Hotspot Initiative Monies
To
Reduce Crime in Prince George's Co.**

A Resource Allocation Decision Model

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Abstract

Over the last decade, crime in the Washington area (particularly Prince George's County, Maryland) has drastically increased necessitating drastic measures. Recognizing the need to prevent or reduce crime in Maryland, Governor Parris Glendening began the Maryland HotSpot Communities Initiative. The Initiative is an inter-jurisdictional, statewide coordinated effort to implement community based crime control and prevention strategies in partnership and local governments and citizens. The Initiative focuses on areas where crime is statistically heavily clustered; areas known as "HotSpots". In Prince George's County, \$450,000 has been made available each fiscal year to combat crime in 4 identified HotSpot communities. In this paper, we explore the best way to allocate the available monies to the 4 areas and strategy elements. 2 elements in particular have been chosen out of the possible 12 to be analyzed further with an optimization analysis. The 2 strategic elements were chosen based on the relationship to the Department of Environmental Resources. The 2 elements include Environmental Design and Nuisance Abatement. Utilizing Expert Choice, Inc. software, a ranking is performed to determine the optimum distribution of monies. Results from the ranking analysis are entered into MS Excel for evaluating the optimization with constraints and to determine where and to what degree monies should be spent within the 4 HotSpots and for which element.

Introduction

National studies have shown that more than 50% of violent crime occurs at about 3% of the addresses¹. In Maryland, the HotSpots Community Initiative seeks to reduce crime in those areas by focusing efforts on 12 strategic anticrime elements through community based actions. Prince George's County has 4 of the identified Hotspot Communities- Suitland, Mt. Rainier, Palmer Park, and Glassmanor. Begun in 1997, the Initiative has already returned dividends to the community. In Suitland for instance, serious crime dropped 7.05% at the end of fiscal year 1998 compared with fiscal year 1997. In Mt.

¹ Maryland HotSpot Community Initiative, Cabinet Council on Criminal and Juvenile Justice

Rainier, serious crime dropped 18.78% for the same period. And in Palmer Park and Glassmanor, serious crime dropped 13.80% and 12.93% respectively². The fiscal year 1999 statistics will be made available in July 1999 and they are currently projected to show a further decline in the crime rate for these areas. The strategy core elements have been shown to make a difference, and the above statistics reveal that they have had a positive influence in the target communities.

Converging technologies have made crime statistics easier to quantify and analyze. Nonetheless, serious crime occurrences are still difficult to predict or forecast to any degree of certainty. However; implementing crime prevention techniques such as the strategic core elements of the HotSpots Initiative, have been shown to achieve increased benefit as expenditures increase on those efforts. Monies for implementation are limited however, necessitating the need to perform a resource allocation analysis to distribute the available funds, both within the 4 HotSpot areas and the elements. To do this, an AHP resource allocation model is structured to determine the best distribution of monies. 2 of the core elements include involvement from the Department of Environmental Resources, Prince George's County. The chief concern here is how to allocate \$75,000 in grant monies in the 4 communities and between the two environmental strategic elements- Environmental Design and Nuisance Abatement. An AHP model structured utilizing Expert Choice software was developed for this purpose and is described in the following section.

² Data provided by the Governor's Office of Crime Control Prevention, Marce D. Scarbrough

Background

The Hotspots Initiative seeks to control or reduce crime through a cooperative police/community relationship. This relationship includes citizens within the community having a voice in how crime will be combated. This was done by public forum and public surveys that ascertain what exactly are the chief safety concerns facilitating crime. Each community identified safety concerns that were specific to their respective location.

Table 1.1 identifies these concerns.

Suitland	Glassmanor	Mt. Rainier	Palmer Park
Drugs	Drug Related Activities	Drug Trafficking	Drugs
Poor Lighting	Gangs	Transiency	Poor Lighting
Prostitution	Shootings	Prostitution	Shootings
Homeless People		Pan Handling	

Once the community identified their perceived and real safety concerns, the Governor's Office of Crime Control & Prevention determines a strategy by selecting those core elements that have been shown to have positive affect in reducing crime. Two of those elements (Environmental Design and Nuisance Abatement) are analyzed to determine which of the four Hotspots would receive funds, at what level funding, and one or both programs.

Environmental Strategy Elements Defined

The focus strategy elements related to the Department of Environmental Resources includes the *Environmental Design* element and the *Nuisance Abatement* element. These two elements are defined here for clarification:

1. ***Environmental Design***- Environmental Design includes projects and activities related to the physical appearance of a location to reduce crime activities. This includes increased lighting, physical obstructions, access control, pleasing streetscapes, and design of open space areas.
2. ***Nuisance Abatement***- Nuisance Abatement includes projects or activities related to the enforcement of codes and laws to maintain the physical appearance of a site to help reduce crime. This includes rapid response to reported nuisances, enforcement of housing, zoning and property codes, as well as a strong community involvement.

Model Discussion and Analysis

The Expert Choice, Inc. software has been chosen to evaluate the problem at hand and arrive at a goal going through the Analytic Hierarchy Process and rating analysis. The Analytic Hierarchy Process is used for this resource allocation problem to help determine a decision making approach to reach the final goal. This process includes the 6 steps identified in “Decision by Objectives” (Forman, 1997) and restated here for clarity:

1. Research and problem definition
2. Identification of alternatives
3. Model Structuring for hierarchy of objectives and sub-objectives

4. Prioritization of objectives and sub-objectives utilizing a pairwise comparison
5. Alternative's contribution to lowest level sub-objectives
6. Documentation of final decisions

After the model is developed, structured and evaluated following the steps above, the results from the model are exported to MS Excel Solver and an optimization analysis and synthesis is performed. Finally, an efficient frontier graph is plotted to examine the best plan to achieve an efficient distribution of monies for the hotspot areas and strategy elements. The following provides further detail of the model structure and the development thought processes used to create the model.

Goal

The model selected for this project is the Analytic Hierarchy Process model using the Expert Choice software. To develop and structure the model, the problem was identified as described above to arrive upon a goal. The Goal is "To distribute Grant Monies in Prince George's County to Hotspot Areas". In particular, determine the distribution of grant monies for two of the environmental strategy elements: Environmental Design & Nuisance Abatement.

Objectives Identification

The main objectives in the model look at the type of crime on a very broad level (Figure 1.1). The First level main objectives are defined into two categories; Violent Crime Incidences and Non-violent Crime Incidences. This breakdown was chosen due to the available data represented in the same fashion. Violent and Non-violent crime incidences are further subdivided and essentially defined in the sub-objectives of each node.

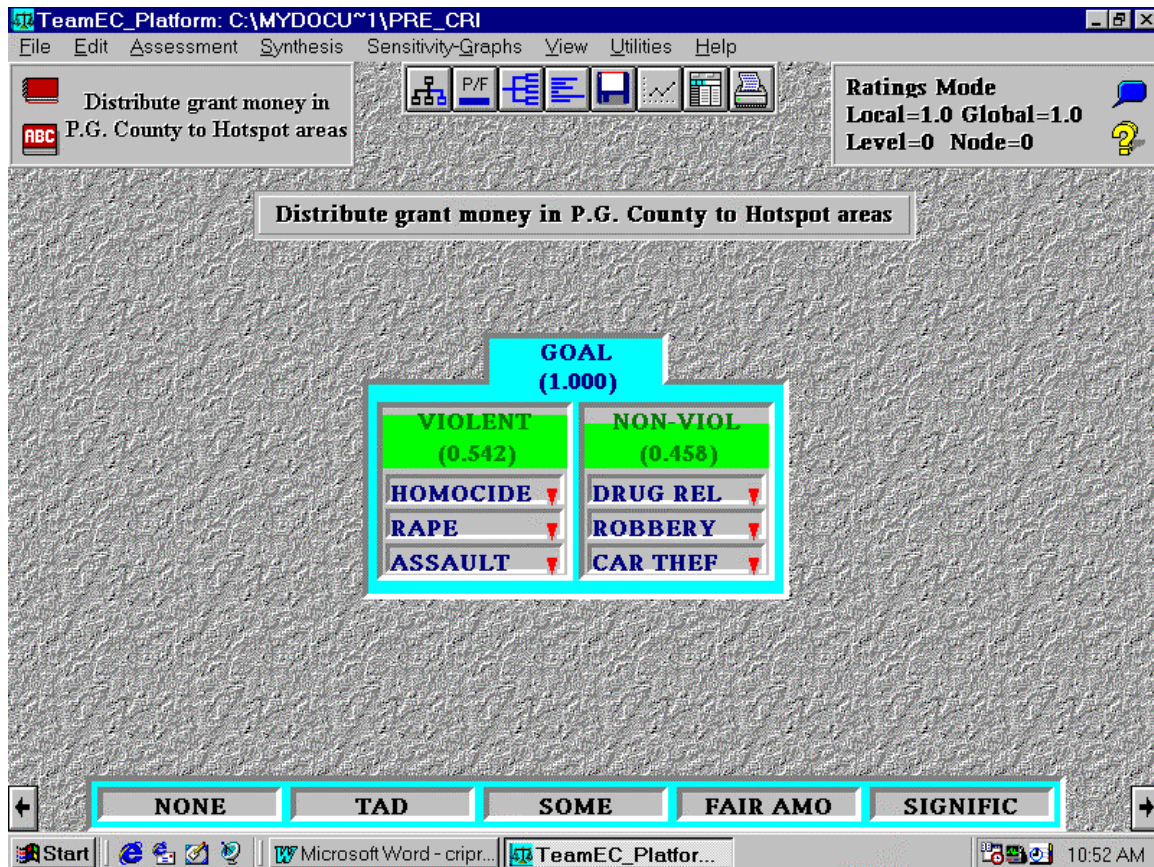


Figure 1.1 Goal w/ Objectives

Sub-Objective Identification

The Sub-Objectives are identified under each Objective node for Violent and Non-Violent crime incidence. Under the Violent Objective, Homicide, Rape and Assault sub-objectives have been assigned. Each of these sub-objectives was selected based upon the

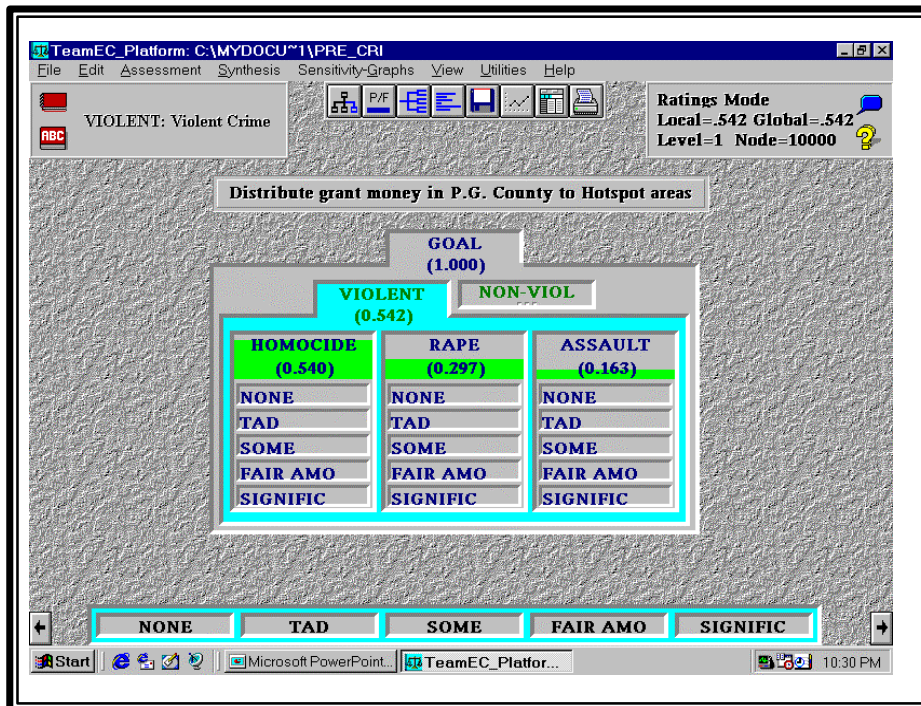


Figure 1.2 Violent Sub-Objectives

FBI’s Uniform Crime Report criteria. Figure 1.2 shows the model structure and the sub-objectives under the objective Violent.

Under the non-violent crime objective, Drug Related, Robbery and Auto Theft sub-objectives have been assigned. Again, these sub-objectives have been selected based upon the FBI Uniform Crime Report criteria. Figure 1.3 shows the model structure under the Non-Violent Objective node.

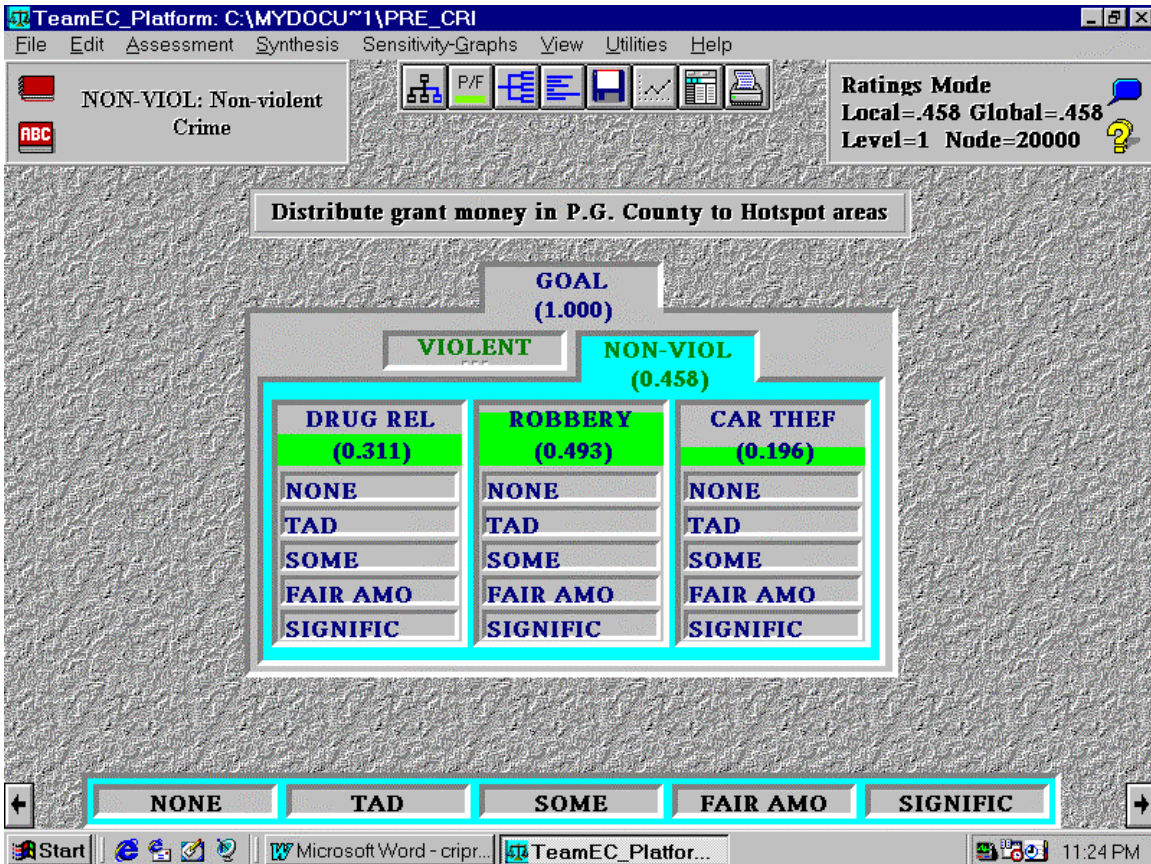


Figure 1.3 Non-Violent sub-objectives

Prioritize Objectives

To determine the rationality of funding under the different alternatives, focus groups were performed in the Hotspot communities. Based on responses from these focus groups a pairwise comparison was performed to prioritize the objectives (violent and non-violent crime) and the sub-objectives (homicide, rape, assault, drug related, and robbery and auto theft).

Explanation of Intensities

A scale of intensities for each of the lowest level sub-objectives has been defined so that the alternatives can be rated accordingly. 5 levels of scale have been defined in order to achieve sufficient differences between ratings of the alternatives with respect to the objectives and sub-objectives. The assignment of intensities to the sub-objectives has been based on the communities input into what they believe are the most problematic in their respective community hotspot area. The following lists the intensities used in this model with brief definitions for each one.

1. None – No impact at all
2. Tad – Very slight impact
3. Some – Some impact
4. Fair Amount - Fair amount of impact
5. Significant – Significant impact

Ratings of each of the Sub-objectives were evaluated against the 4 Hotspot areas with three possible funding limits set for each program within each area. The following table summarizes the ratings/alternatives evaluated. The scale for the ratings has been converted by the software for display purposes. In the table, none (any impact) is equal to 1 and significant (significant impact) is equal to 5.

Resource Allocation Analysis and Evaluation Methodology

As shown in the Ratings Table 1.2, each of the 4 Hotspots areas have been divided into six categories (three different funding levels for each of the two environmental core strategies). The funding limits are based on available funding of \$75,000. An optimization analysis was performed utilizing MS Excel Solver software. Constraints were applied that require the optimization to select at least one of the alternatives from each Hotspot area. Additionally, a constraint was also set so that the optimization would include no more than 2 alternatives from any one Hotspot area. These constraints were set to ensure equitable distribution of limited funds. Table 1.3 shows the summary optimization table.

Results from the optimization analysis were placed into an efficient frontier graph, which depicts the cost benefits relationship to amount of available funding (Chart 1.1).

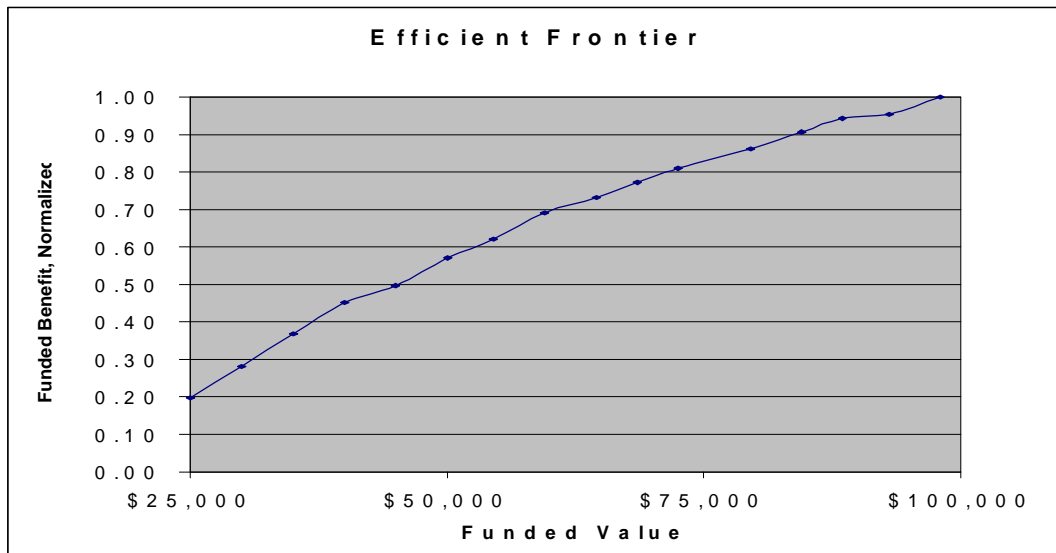


Chart 1.1 Efficient Frontier

As shown in the chart, the cost benefit relationship increases with increased funding limits. The projects that equate to the efficient frontier, based on the funding available to Prince George's County for the Hotspot program are shown in Table 1.4.

Current Methodologies for Resource Allocation

The current approach to making resource allocation decisions on which Hotspot area should be funded for the *Environmental Design* element and the *Nuisance Abatement* element includes several different levels. One of those levels begins in the community, providing them an opportunity to help determine how Hotspot monies are spent. The Community Hotspots Initiative is unique in that the program provides grant funding for community based anticrime strategies on a holistic level based on community input. Partnerships between not only the community and local police, but also all governmental agencies from city to state level become involved in ways that they can reduce crime in a “swat team” approach.

Currently, this is done by reviewing crime incidence maps and agencies being asked to assist in reducing crime through whatever mechanism their agency can bring to bear. For example, the Department of Environmental Resources within the Prince George’s County Government has been asked to evaluate environmental design, zoning violations, nuisance abatement, County construction, housing, and community standards codes violations in the target hotspots. Traditionally, code enforcement was only performed when someone complained directly. Additionally, code enforcement was a countywide program with no particular focus areas. With the Community Hotspot Initiative, agencies now get together using crime incidence maps to focus cleanup and enforcement efforts in the Hotspot areas. This method of BOGSAT (Bunch Of Guys/Gals Sitting Around Talking) is effective but lacks substantive comparison analysis, making critical

comparative rankings difficult. The typical result was to apply the same funding level to all 4 hotspot areas under the premise that the more money applied to specific strategy core elements, the greater the benefit. While the relationship is true, an optimization analysis could yield a better distribution of funds for the 4 hotspots and the two program elements selected.

AHP Model Application

The model results and recommendations were presented to The Department of Environmental Resources Hotspots Initiative Task Force for their consideration and application for determining appropriate distribution of funds to the four Hotspots. The model was well received by the Task Force and they were intrigued about the possible applications. The Task Force recommended that the model results be presented to the Management Team for further consideration and applications of the model beyond the environmental strategy elements.

On April 30, 1999, a presentation of the model recommendations was made to the Management Team. Again, the team was impressed with the model results. Essentially, the results were found to be a more exact way of distributing Hotspot monies than the manner that they are using. As a result of the presentation, a motion was made that the model should be utilized to help the Management Team make decisions affecting the distribution of Hotspot monies. Furthermore, the Team recommended that the model should be evaluated to determine the applicability to all the strategy elements. If this is done, the model should be fine-tuned to include additional ranking options and additional

iterations. Iterations are needed to make the model more applicable to the many facets of the Hotspot Program.

Summary and Conclusions

Utilizing the Analytic Hierarchy Process, the decision of selecting which project proposals to fund becomes simplified. While AHP does not make the final decision for the decision-maker, it is clear that AHP is a powerful tool that can be used to help make a very informed decision. Rather than relying on intuition and experience alone, a much more thorough analysis and evaluation may be accomplished. In this case, a priority is clearly established for the projects to be funded. The priorities are based upon the objectives, adding validity to a final decision.

In the final analysis, given a funding limit of \$75,000 to fund the two core strategy elements in the 4 Hotspot areas, the optimization of cost verses benefit suggests that the funding should be distributed in the following manner:

Suitland Hotspot	Palmer Park	Glassmanor	Mt. Rainier
Environmental Design \$12,000	Environmental Design \$12,500	Environmental Design \$10,000	Environmental Design \$17,000
Nuisance Abatement \$ 9,000	Nuisance Abatement \$12,000	Nuisance Abatement \$ 0	Nuisance Abatement \$ 0
Total Hotspot Funds \$21,000	\$24,500	\$10,000	\$17,000

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