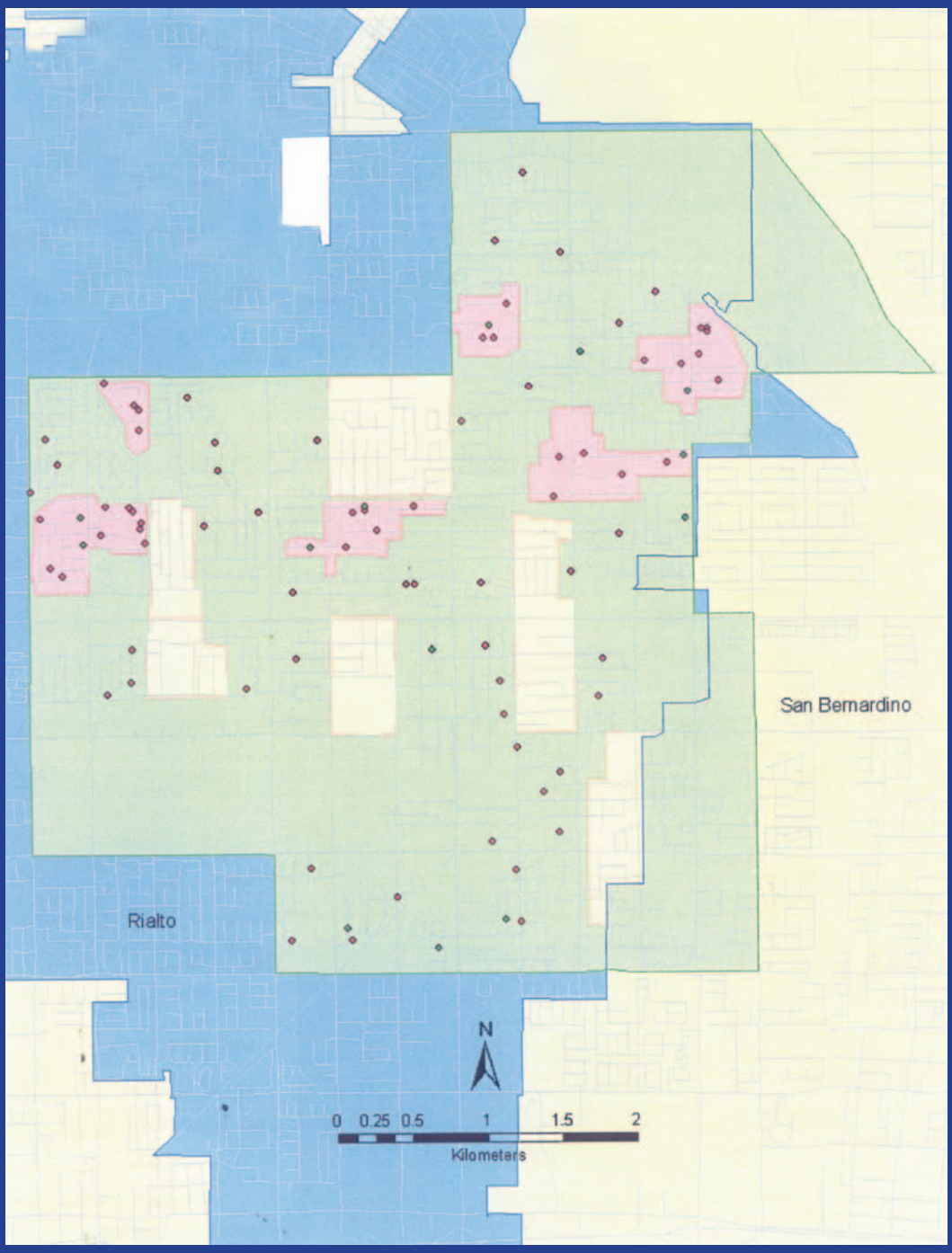
Officer Next Door / Teacher Next Door (OND/TND)

PROGRAM EVALUATION



U.S. Department of Housing and Urban Development
Office of Policy Development and Research

Final Report

Evaluation of the Officer Next Door (OND) And Teacher Next Door (TND) Programs

Prepared for the U.S. Department of Housing and Urban Development
By
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FOREWORD

The results of an evaluation of the Officer Next Door (OND) and the Teacher Next Door (TND) Programs are presented here. The OND/TND Program was created in the late 1990's to strengthen America's communities by encouraging law enforcement officers and school teachers to live in low- and moderate-income neighborhoods designated as Revitalization Areas by HUD. Among the program's most important objectives was an improvement of quality of life in distressed communities. Specifically, with respect to police officers, it was reasoned that their increased presence would help reduce crime. In the eyes of the program, teachers are role models for a productive, responsible lifestyle, leading by example.

In 2002, HUD's Office of Housing, which administers the OND/TND Program, requested the Office of Policy Development and Research (PD&R) to conduct an evaluation of the program. In the fall of 2002, PD&R launched the evaluation through a contract with Pacific Western Technologies Limited. The evaluation focused on OND/TND neighborhoods with the heaviest concentrations of participating police officers and sought to test the hypothesis that their presence would lower the incidence of serious crime. Using crime mapping to study parcels with such concentrations, the evaluators compared reported offenses for calendar years 1999 and 2002.

The reader of this report will note that the evaluation's findings do provide evidence to support the assumption that an influx of police officers as homeowners does result in a substantial decrease in serious crime in the target neighborhood. The evaluators of the OND/TND Program selected two (2) cities with Revitalization Areas having concentrations of police officers. Teachers were also a presence in the program participant pool but at a much lower number than officers due to the fact that the teacher component of the program began several years later in 1999.

The limited availability of research sites was the result of an important change that was made in the program. In 2002, HUD recognized that the program was not sufficiently targeted and dramatically narrowed the geography of the Revitalization Areas from some 27,000 Census block groups to slightly less than 10,000. This revision placed most of the participating officers and teachers outside the target neighborhoods' boundaries. The new configuration of the Revitalization Areas should result in more dense concentrations of police officers and teachers than were present when the PD&R evaluation was conducted.

While one may view the evaluation's findings as encouraging, the results also strongly indicate the need for broader, future research efforts. Still, the results are cause for hope about our ability to reclaim distressed urban communities, and the research methodology itself showcases an innovative application of geographic information systems technology for program evaluation.

Darlene F. Williams
General Deputy Assistant Secretary for
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Executive Summary

Background

The Officer Next Door (OND) and Teacher Next Door (TND) Programs were created to strengthen America's communities by encouraging law enforcement officers and school teachers to live in low and moderate-income neighborhoods which have been designated as Revitalization Zones by the U.S. Department of Housing and Urban Development (HUD). At its inception in the late 1990s, it was hoped that the OND/TND programs would improve the quality of life in distressed urban communities. With respect to police officers, it was hoped that their presence as residents in distressed communities would reduce crime levels and thus "promote safe neighborhoods." With respect to teachers, it was reasoned that distressed communities would be strengthened by the example of how these caring persons live their lives.

Evaluating the OND/TND programs

In FY 2003, an evaluation of the OND/TND Program was conducted by Pacific Western Technologies, Ltd. (PWT) through a contract administered by the Department's Office of Policy Development and Research (PD&R). It was reasoned that one measure of the impact of these programs would be the level of crime reported in the neighborhoods where the OND/TND Programs were active, i.e., where police officers and teachers had purchased homes through the program. Specifically, it was hypothesized that levels of reported crime would be measurably lower in neighborhoods where police officers and teachers have purchased homes than in nearby neighborhoods where the programs had not been involved in home sales.

In designing the evaluation, it was decided to focus on OND/TND neighborhoods where the heaviest concentrations of officers and teachers could be found. Hence, the evaluation design called for a focus on neighborhoods where clusters of OND/TND homes could be identified. To actually assess whether levels of crime have been favorably influenced, the researchers identified parcels of land that contained clusters of program homes and compared annual crime counts for Part I crimes (homicide, forcible rape, robbery, aggravated assault, burglary, larceny/theft, motor vehicle theft, and arson) and drug crimes before and after officers and teachers purchased homes.

Neighborhoods in two cities: Rialto, California, and Spokane, Washington were selected for study. Crime levels before the initiation of home sales (calendar year 1999) and after the included homes were purchased (calendar year 2002) were examined. Crime counts in the cluster parcels were compared to neighborhoods near clusters and were also compared to crime counts in other geographic areas within the cities and in the cities as whole.

Geographic Information Systems (GIS) Methodology

PWT used GIS as the primary data organization and analytical tool. GIS allowed us to determine the map locations of individual crimes and OND/TND properties given their street addresses, and then to map these in relation to each other and in relation the city and revitalization zone boundaries. GIS was also used to define clusters of OND/TND properties and similar-sized control areas within the revitalization.

PWT obtained the addresses of OND/TND properties and the geographic boundaries of revitalization zones from HUD; and street centerline files, crime locations and city boundaries from the police departments of the cities that participated in the research.

GIS was also used to automate the process of counting crimes in specific areas, i.e. citywide, within the revitalization zone, within clusters of OND/TND properties, and within control areas, and to calculate and compare the density of OND/TND properties within the revitalization zones.

Findings

The density of OND/TND homes was found to be crucial factor with respect to the impact pf the program on crime levels. The Rialto Revitalization Zone has some 90 program homes compared to Spokane's 28 program homes in a revitalization zone of nearly identical size; hence the density of program homes was much higher in Rialto than in Spokane. Overall, the levels of crime in Rialto's clusters either showed greater decreases or much smaller increases than comparison parcels in that same city. No such clear-cut findings emerged for Spokane. In other words, a significant positive impact was noted in Rialto where the density of program homes was relatively large, but no similar benefit in Spokane where the program homes are much more widely dispersed.

Neither city experienced consistent trends in crime counts for drug crimes when comparing counts within clusters of officer's and teacher's homes to counts in other areas of the respective cities. This may be due to the fact that drug crime arrests are often a function of discretionary police enforcement activity. In contrast, most reports of Part I crimes are initiated by crime victims or their families and therefore better reflect actual concentrations of predatory activity.

Conclusions

Although only two OND/TND sites were involved in the evaluation, the findings suggest that, when sufficient numbers of home sales take place in a particular neighborhood, crime levels will be suppressed significantly. Clearly, however, firm validation of a "program effect" awaits further research in areas where similarly dense concentrations of OND/TND homes can be identified.

Introduction

The Officer Next Door and Teacher Next Door Programs

Pacific Western Technologies, Ltd. (PWT) evaluated the Officer Next Door (OND) and Teacher Next Door (TND) Programs for the U.S. Department of Housing and Urban Development (HUD) in a cooperative effort with HUD's Government Technical Representative (GTR), Dr. Harold Holzman. This document, the *Final Report*, is a deliverable under Task 6 of that contract (No. 2CC00670001).

These programs allow law enforcement officers and teachers to purchase HUD properties in revitalization zones for a 50% discount by forgiving a second mortgage on the property after the officer or teacher has resided on the premises for three years. The intents of the programs are similar: to improve public safety in low and moderate income revitalization zones and strengthen the communities.

Research Design and Methodology

Research Questions

The evaluation was intended to determine whether the insertion of police officers and school teachers as homeowners into neighborhoods within HUD revitalization zones has reduced rates of serious crimes in select neighborhoods where concentrations of Officer Next Door and Teacher Next (OND/TND) sales are found. The goal was to test the null hypothesis that there is no statistically significant decrease in these crime rates after the insertion of officers and teachers in the selected neighborhoods. Rejection of the null hypothesis would suggest that these programs have had positive impacts on crime rates in OND/TND neighborhoods.

Research Design

It was decided *a priori* to select two revitalization zones in two cities where significant clusters of OND/TND properties existed, and to compare crime trends between 1999 and 2002 within the cluster neighborhoods to crime trends in the two cities, their revitalization zones, and control areas within the revitalization zones (i.e. areas within the revitalization zones that lack any OND/TND properties). Greater reductions in crime rates in the cluster neighborhoods, or lower increases, would suggest that the programs are having the desired impact.

The decision to limit the research to two sites was dictated by the availability of funds to support the research. However, this number of sites was considered sufficient to answer the research questions.

The decision to evaluate possible effects within clusters of OND/TND properties rather than around individual properties was based on the assumption that the synergy generated by multiple police officers and/or teachers living in close proximity would produce greater effects than the sum of the effects around individual properties. This assumption appears to be supported by the results of the research reported below.

Briefly, the research collection and data analysis procedures can be summarized as follows:

- Obtain geographic data from various sources including HUD, the US Census Bureau, and the participating police departments.
- Where necessary, convert address-based data into spatially-referenced data, i.e. create **geographic information system**[1] (GIS) **layers** for OND/TND property locations and crime locations from the addresses contained in tabular databases. This process is described in more detail below.
- Identify revitalization zones where clusters of OND/TND properties existed in 2002, but not in 1999. These years were chosen to represent the "before" and "after" datums.
- Conduct site visits to two jurisdictions to become familiar with the jurisdictions, the police personnel, local procedures, and the nature of the crime data in each jurisdiction.
- Negotiate contracts with the police departments in two of the jurisdictions containing clusters of OND/TND properties to obtain crime location data for 1999 and 2002.
- Obtain crime data including location, date, and descriptions from the police departments.
- Define clusters of OND/TND properties.
- Define control area boundaries within revitalization zones.
- Overlay the crime data with the geographic boundaries of the various spatial units (city boundaries, revitalization zones, clusters, and control areas) to obtain crime counts within each area.
- Compare before and after crime counts in the various areas to identify differences that might be attributable to the presence of clusters of OND/TND properties.

Kickoff Meeting

PWT's Dr. Robert Hyatt, the Principal Investigator (PI), and Mr. Robert Bell, PWT's GIS Analyst, met with the GTR and Mr. John Sperling, a HUD GIS Analyst, on October 4, 2002, to discuss the research plans and the available data. During that meeting, Mr. Sperling reviewed preliminary analyses he had conducted. The GTR provided the PI with spreadsheets identifying the 55 zip codes with the largest numbers of OND program homes and the 55 zip codes with the largest numbers of TND program homes. Both lists were sorted in descending order by the number of OND or TND properties they contain.

Although the numbers of OND properties in any particular zip code range from 126 to 13, only four zip codes contain more than 50 OND properties and the median number of OND properties is only 21. The numbers of TND properties per zip code ranges from 51 to 9, only four zip codes contain more than 25 properties, and the median number of OND properties is only 13.

During a later meeting with OND/TND Program staff members, both the GTR and the PI learned for the first time that the criteria used to define revitalization zones, originally zip code areas, were modified in 2000, and that the boundaries of existing revitalization zones had been modified to match the new criteria.

The new criteria are based on median family income, home ownership rates, and the availability of eligible HUD-owned properties. As later discovered, the practical effect of the application of these new criteria was to exclude large areas that were formally within the revitalization zones. As a result, the majority of OND/TND properties purchased prior to this change are located outside of the revised boundaries. This result should not be unexpected because a potential buyer would naturally prefer the nicest home in the most desirable neighborhood that meets his or her needs in terms of size and purchase price.

When it was determined that numerous OND/TND properties were excluded from the revitalization zones when the boundaries of the zones were redrawn, we decided to limit the

[1] Bold face text is used to introduce terms that are defined in the glossary, Appendix 1.

analysis to clusters of OND/TND properties within the current boundaries of the revitalization zones and exclude from consideration any properties or clusters of properties outside of the current limits of the revitalization zones.

The number of OND/TND properties within the current revitalization zones is usually significantly lower than the numbers associated with the corresponding zip codes; therefore, the practical effect of the decision to greatly limit the research to clusters within the current boundaries of revitalization zones was to limit the number of sites eligible for participation in the research.

Initial Data Collection and Analysis

In addition to the lists of OND and TND properties sorted by the number of homes per zip code, the GTR provided PWT with two Excel spreadsheets containing data for OND and TND properties, including the street address of each property, and a GIS layer containing the current boundaries of revitalization zones throughout the United States.

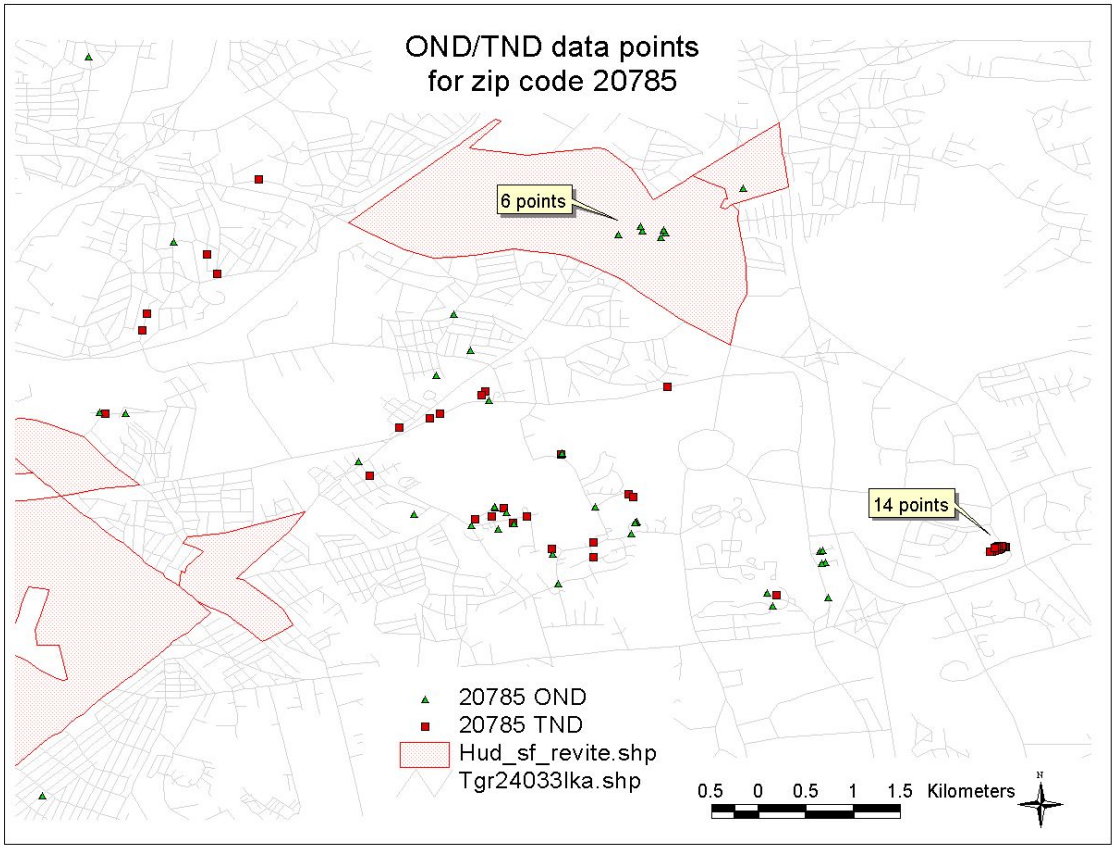
The OND/TND Program staff provided documentation and guidance related to the establishment of the OND and TND programs, the criteria used to define revitalization zones, and the timing of the revisions.

Site Selection

The primary goal of the site selection process was to identify two revitalization zones with multiple clusters of OND/TND properties. Because there are far more OND properties than TND properties in any particular zip code, the search for suitable sites began at the top of the list of zip codes with the maximum numbers of OND properties.

To visualize the distributions OND and TND properties in a particular revitalization zone, it was necessary to produce maps showing the boundaries of the revitalization zone and the point locations of properties within the zone. The street pattern was also included on these maps to provide a sense of scale and an immediate indication of the distances separating individual properties.

The map produced for the revitalization zone properties associated with the 20785 zip code (Map 1) is typical of these maps and clearly illustrates how the redefinition of the revitalization zones impacted our ability to select two suitable sites. Only seven OND Program properties (green triangles) are located within the current boundaries of this revitalization zone, six of which might constitute one suitable cluster of homes. None of the TND properties associated with this zip code (red squares) are within the current boundaries of the revitalization zone. All of the TND properties and the vast majority of the OND properties were purchased when homes anywhere in the 20785 zip code area were eligible for purchase through the OND/TND programs.



Map 1. OND and TND properties associated with the revitalization zone that was formerly defined by the 20785 postal zip code in Hyattsville, Maryland. The current boundaries of the revitalization zone are shown in red. Note that only seven OND properties and no TND properties were included in the revised boundaries of the revitalization zone.

The revitalization zone boundaries for these maps (Hud_sf_revite.shp in the legend) were provided by HUD. The **street centerlines** (Tgr24033lka.shp) are derived from GIS layers created and maintained by the US Census Bureau and were downloaded from a web site maintained by Environmental Systems Research Institute (ESRI), the manufacturer of the GIS software programs used by PWT for all of the GIS analyses required by this study. However, the locations of the OND/TND were only available as street addresses in the spreadsheets provided by HUD.

In order to map the OND/TND property locations (and later crime locations), it was necessary to **geocode** the street addresses in the tabular databases to create GIS layers containing points in the same **coordinate system** used by other GIS layers, e.g. streets and revitalization zone boundaries. Geocoding relies on precisely matching each of the address components (number, prefix direction, street name, street type, and postfix direction) contained in a record in a tabular database to a geographic location along a street segment in the GIS street layer.

A revitalization zone with a large number of OND properties can be reasonably expected to contain at least a few TND properties and is more likely to contain clusters of OND/TND properties than is a zone with fewer properties. Therefore, map production and the search for suitable sites began with the zip code with the largest number of OND properties and proceeded down the sorted list of OND properties.

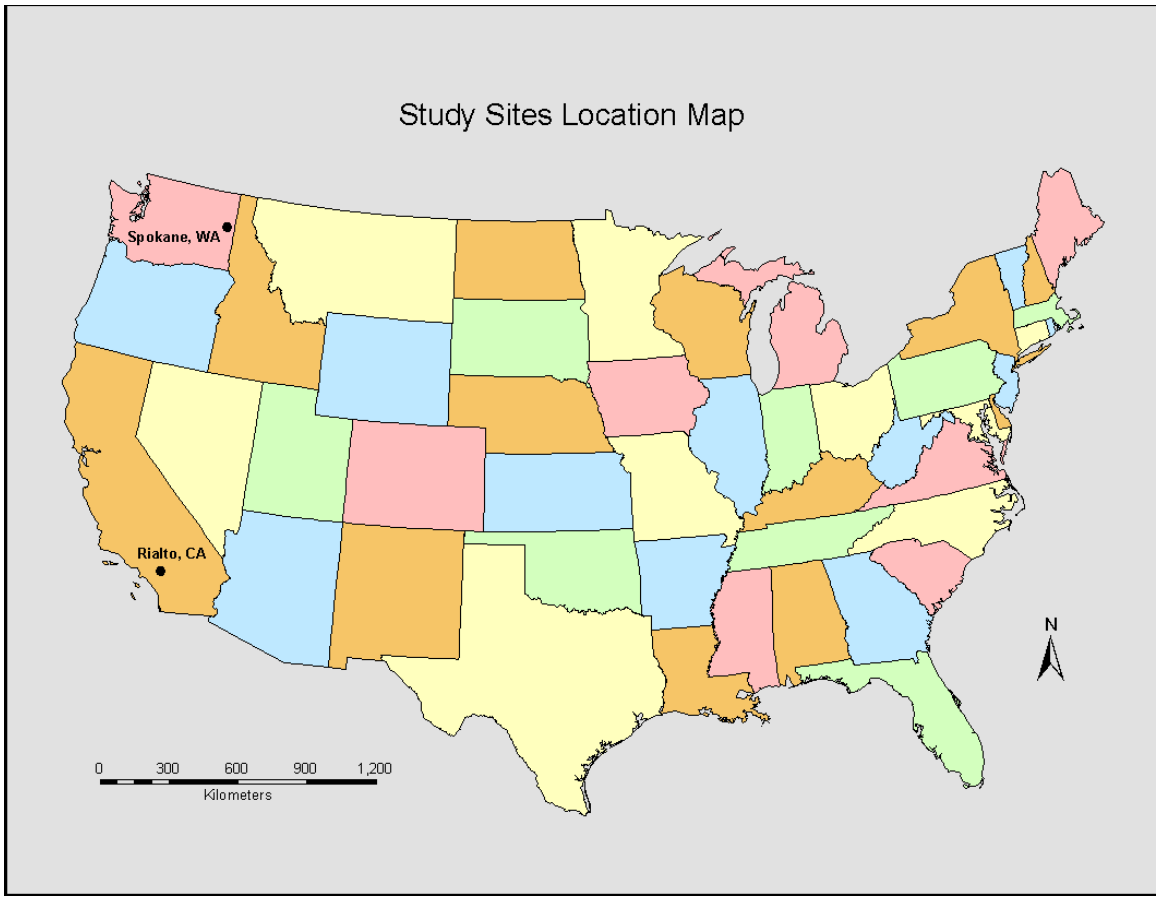
The first site on that list was the 92376 zip code area in Rialto, California. Of the 126 OND properties in this zip code, 77 are within the revised boundaries of the revitalization zone and

many of these are found in close proximity to each other forming several distinct clusters. This zip code also has 21 TND properties, 13 of which are within the revitalization zone. With a large total number of properties and several clusters of combined OND/TND properties, Rialto was a strong candidate for inclusion in this research from the beginning.

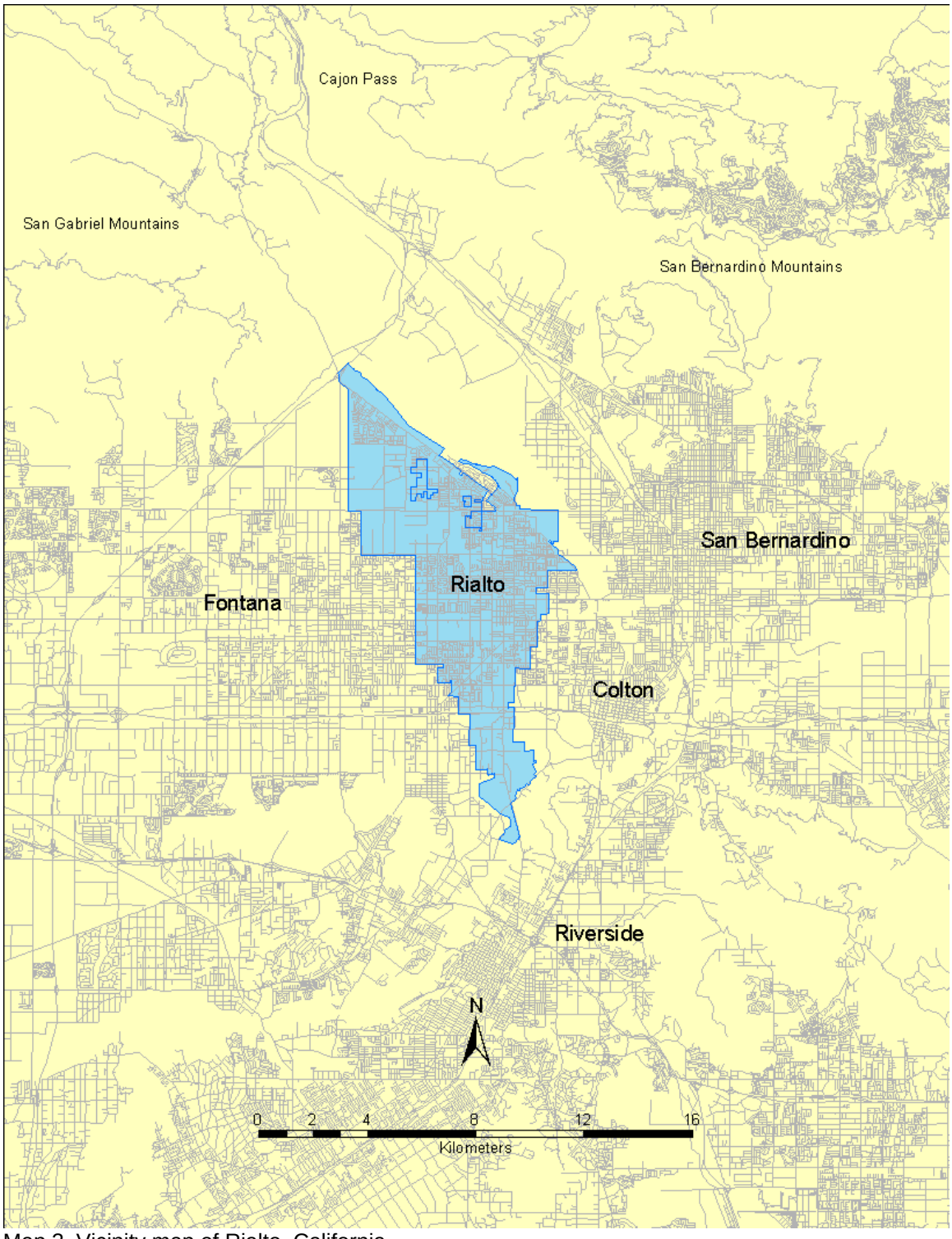
The next six entries on the list of OND properties were located in the Baltimore, Maryland, area, including two in Prince George's County. At all of these sites, however, more than half of the OND/TND properties associated with each zip code are outside the current boundaries of the revitalization zones. The extreme case is the 20206 zip code area: all 47 OND/TND properties associated with this zip code are outside of the revised boundaries of the revitalization zone. None of the current revitalization zones in these six areas contains more than one cluster of properties, and the few clusters of OND/TND properties that are found in this area have even fewer homes.

In the end, the OND/TND properties and current revitalization zone boundaries in all 55 zip codes on the OND list were mapped. Although there were other potentially suitable sites identified in California, only one other site outside of California remained a viable candidate: Spokane, Washington. The revised revitalization zone associated with the 99207 zip code in Spokane has 13 OND properties and 15 TND properties within its boundaries. Unfortunately, these properties are much more dispersed than the properties in Rialto, leading to clusters with fewer and more widely separated OND/TND properties. Nevertheless, defining clusters in any other city outside of California would have been even more difficult.

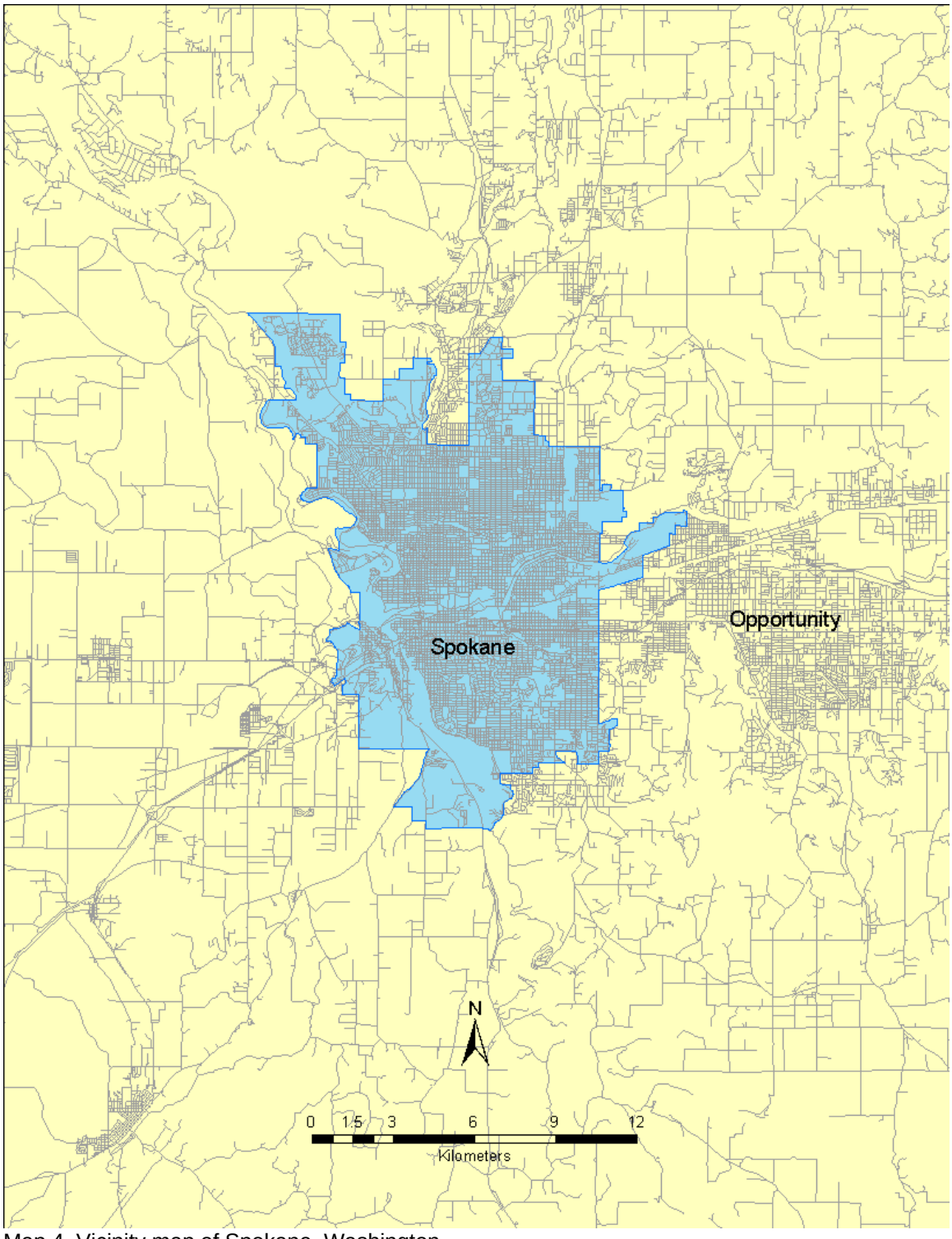
Map 2 shows the locations of these two sites within the United States, and Maps 3 and 4 show their local contexts.



Map 2. Locations of the selected study sites within the contiguous United States.



Map 3. Vicinity map of Rialto, California.



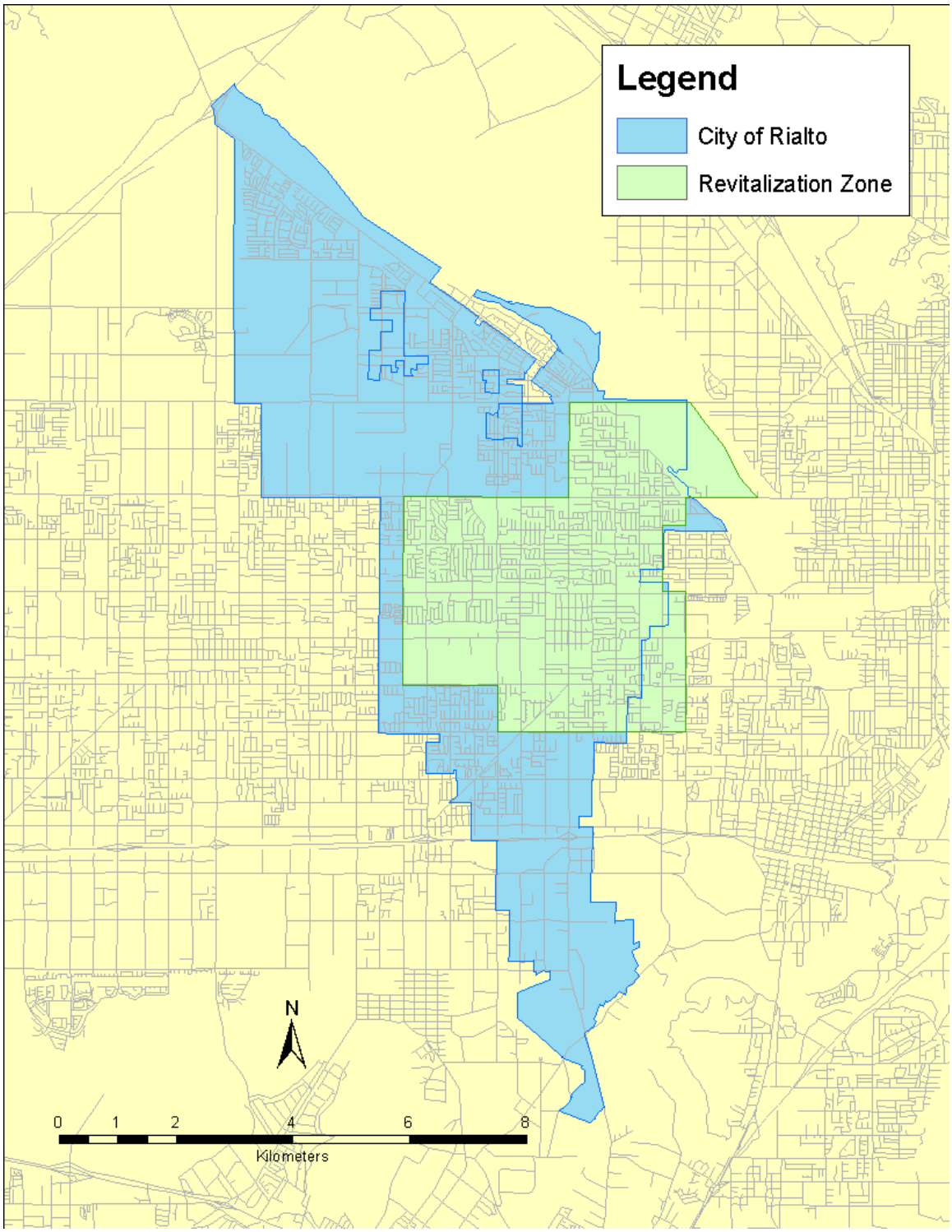
Map 4. Vicinity map of Spokane, Washington.

Having identified two potential sites, Rialto and Spokane, we proceeded to further evaluate the sites and eventually contacted the Chief of Police in each of these jurisdictions to solicit the cooperation necessary to obtain crime data and ancillary information. Both agreed to participate after their questions and concerns had been adequately addressed, and PWT negotiated a Memorandum of Understanding (MOU) with each of the jurisdictions.

General Characteristics of the Sites

Rialto, with a population of about 92,000, is located in the highly urbanized southwest portion of San Bernardino County (Map 3), approximately 90 kilometers east of Los Angeles in Southern California. It lies along the southern edge of the San Bernardino Mountains and is surrounded on the other three sides by the communities of San Bernardino, Fontana and Colton. It is largely a residential community, but it supports some industry and commerce and is a transportation center.

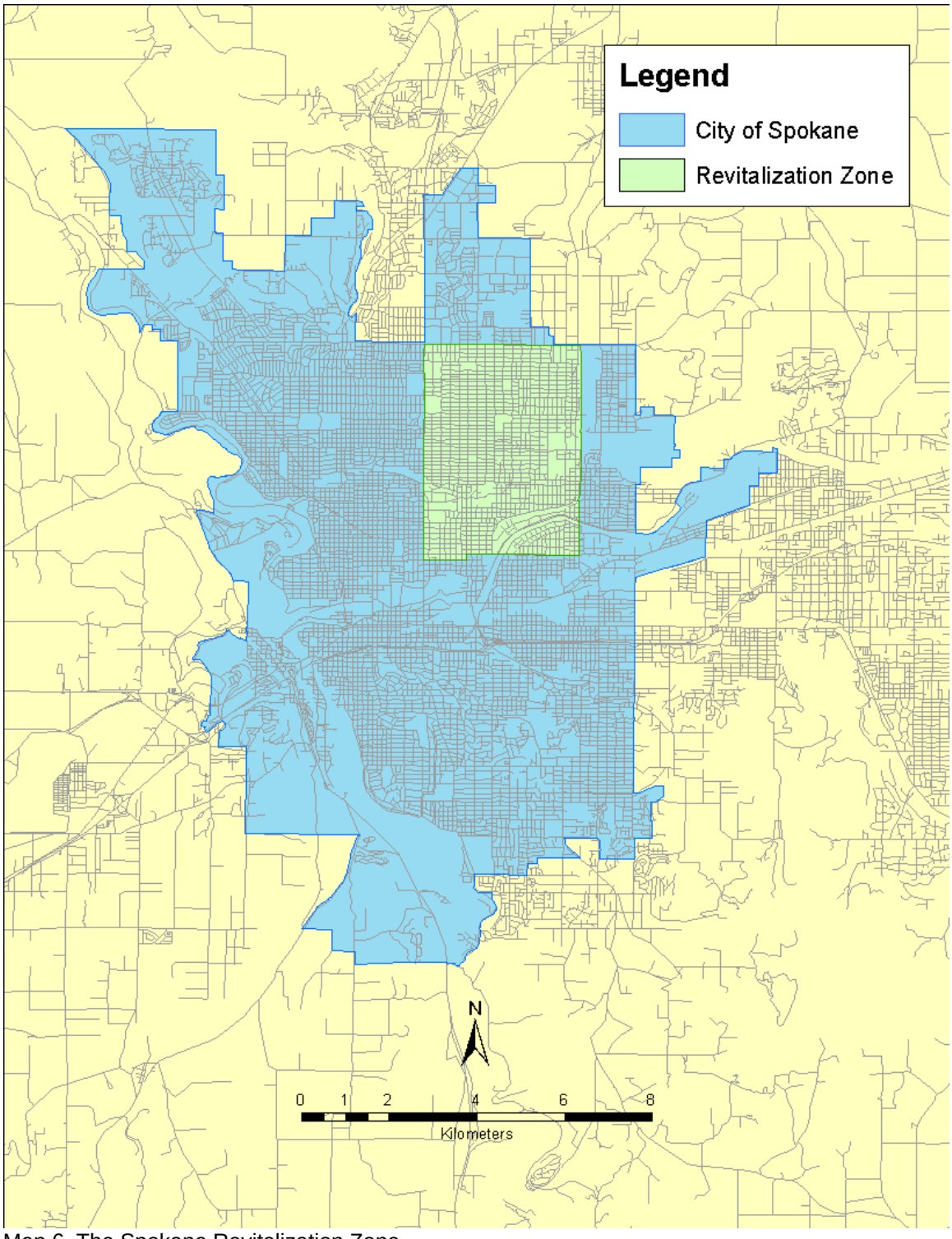
The revitalization zone associated with the 92376 zip code (Map 5) covers 22.0 square kilometers, but only 19.2 square kilometers lie within the city limit of Rialto. This study area is henceforth referred to as the Rialto Revitalization Zone. This revitalization zone is dominated by residential housing, most of which appears to have been constructed between 1970 and 1990. All of the OND/TND properties in the revitalization zone are with the Rialto city limit.



Map 5. The Rialto Revitalization Zone. Note that the revitalization zone extends beyond the Rialto City limits into portions of the City of San Bernardino.

Spokane (Map 4) is more than twice as populous as Rialto with a population of nearly 200,000. Located astride the Spokane River in eastern Washington, about 450 kilometers from Seattle, it is by far the largest urban center in this area. The regional economy is based on forestry, farming and mining, and Spokane serves as a service center to these industries.

The revitalization zone associated with the 99207 zip code (the “Spokane Revitalization Zone,” Map 6) is only slightly smaller than the Rialto Revitalization Zone at 17.3 square kilometers and lies entirely within the Spokane city limit. It is also primarily residential, but the majority of the homes appear to date from an earlier period than those in the Rialto Revitalization Zone, about 1950 to 1970.



Map 6. The Spokane Revitalization Zone.

Subjectively, the typical house and yard in the Spokane Revitalization Zone is less well maintained than those in the Rialto Revitalization Zone. However, exceptions abound and the differences are relatively minor.

Data Collection

PWT used **ArcInfo** GIS technology to visualize and overlay geographic data layers including streets, revitalization zone boundaries, OND/TND property locations, city boundaries, crime locations, and additional derived layers including areas containing clusters of OND/TND properties and control areas.

PWT obtained the geographic boundaries of revitalization zones from HUD; population data from Environmental Systems Research Institute[2]; economic data from the US Census Bureau; and street centerline files, crime locations and city boundaries from the police departments of the cities that participated in the research.

OND/TND Properties and Clusters of OND/TND Properties

OND/TND property addresses were provided by HUD. All addresses for both revitalization zones were successfully geocoded with **ArcView** GIS using street centerline files provided by the two jurisdictions.

Maps 5 and 6 show the locations of the revitalization zones within the jurisdictions. Maps 7 and 8, discussed below, are larger scale views of the revitalization zones and show the locations of OND and TND properties, the boundaries of clusters of OND/TND properties, and the boundaries of control areas within the revitalization zones.

The GIS software represents geocoded addresses as points in a GIS layer. Collections of points representing OND/TND properties in close proximity to each other can be used to define "clusters" of OND/TND properties, but the areal extent of these clusters must be precisely fixed because the purpose of defining the clusters is to later determine how many crimes (also represented by points at geocoded addresses derived from a tabular database) fall within each cluster.

An initial attempt to define cluster boundaries by letting the GIS software create lines at a fixed distance from any OND/TND property was abandoned because the areas enclosed by these lines extended the same distance along streets as they did perpendicular to streets. Obviously, though, the visibility of a property is greater along a street than it is perpendicular to the street where the view is more likely to be blocked by fence lines, vegetation, and other structures including other houses. An underlying assumption of the research is that the crime-deterrent effect of having officers and teachers living in a neighborhood is dependent of potential criminals knowing that the officers and teachers are there. The influence of these residents, therefore, is likely to be more effective when they are most easily seen coming and going, i.e. at a greater distance along the street than perpendicular to it.

Therefore, clusters were defined by subjectively outlining areas where two or more OND/TND properties are in relatively close proximity and included areas were they were most likely easily visible. Because both proximity and visibility were considered important when delimiting the cluster boundaries, the boundaries are irregular and extend further from the OND/TND properties along the streets where they are located than they do at right angles to these streets.

It was assumed residents of homes near OND properties would be aware that they had police officers as neighbors because it was assumed that the police officer and their patrol cars would be highly visible. However, it was subsequently learned that uniformed officers in neither jurisdiction, with the exception of officers assigned to K-9 units, are allowed to drive their patrol cars to and from work or keep them at home when off duty. There may be officers from surrounding jurisdictions who have purchased homes in these revitalization zones, but the

[2] Environmental Systems Research Institute (ESRI) is the manufacturer of ArcInfo, ArcView, and other GIS software tools.

immediately adjacent jurisdictions similarly prohibit personal use of police vehicles by uniformed officers.

However, it is likely that officers are seen coming and going in uniform, and it is equally likely that the neighbors of both police officers and teachers are generally aware that members of these professions are their neighbors.

Therefore, the absence of patrol cars due to prohibitions on personal use of such vehicles does not preclude the potential beneficial impacts of having exemplary citizens living in the community. Officers and teachers alike can also have positive impacts in the community without their professions being known to their neighbors.

There are 90 OND/TND properties in the Rialto Revitalization Zone and 28 in the Spokane Revitalization Zone (Table 1). There are also OND/TND properties outside the revitalization zone boundaries in both cities. These are properties that were purchased before the revitalization zone boundaries were adjusted in 2000. However, this study was limited to OND/TND properties within the current boundaries of the revitalization zones in each city.

None of the OND/TND properties that are outside of the current boundaries of the revitalization zones in either Rialto or Spokane are near enough to the boundaries that they might influence crime counts within nearby parts of the revitalization zones and thus skew the results and conclusions of this study.

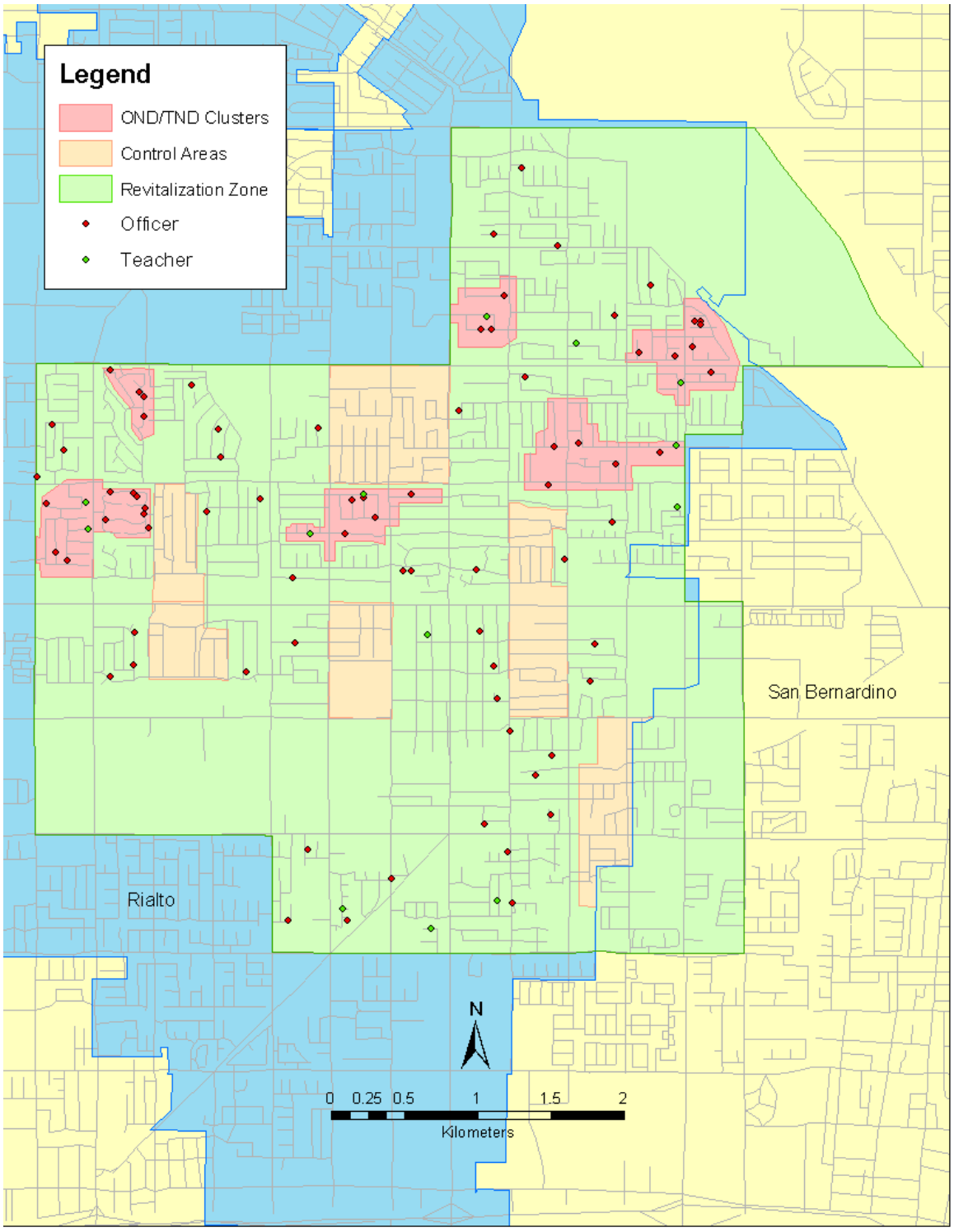
The density of OND/TND mortgages in the Rialto Revitalization Zone (4.7 homes per square kilometer) is much higher than their density in the Spokane Revitalization Zone (1.6 homes per square kilometer) (Maps 5 and 6 and Table 1); therefore, any affect the presence of law enforcement officers and teachers might have on crime would likely be more pronounced in Rialto. Eighty-six percent of these homes are owned by law enforcement officers in Rialto, while only forty-six percent of the program homes in Spokane are owned by law enforcement officers. Intuitively, law enforcement officers might be more highly visible and more authoritative than teachers, and therefore more likely to have a higher impact on crime in their neighborhoods. The density of law enforcement officers' homes contrasts even more sharply in the two revitalization zones, 4.0 per square kilometer in Rialto *vs*. 0.5 per square kilometer in Spokane.

Table 1. Statistical parameters of the revitalization zones and their OND/TND properties.

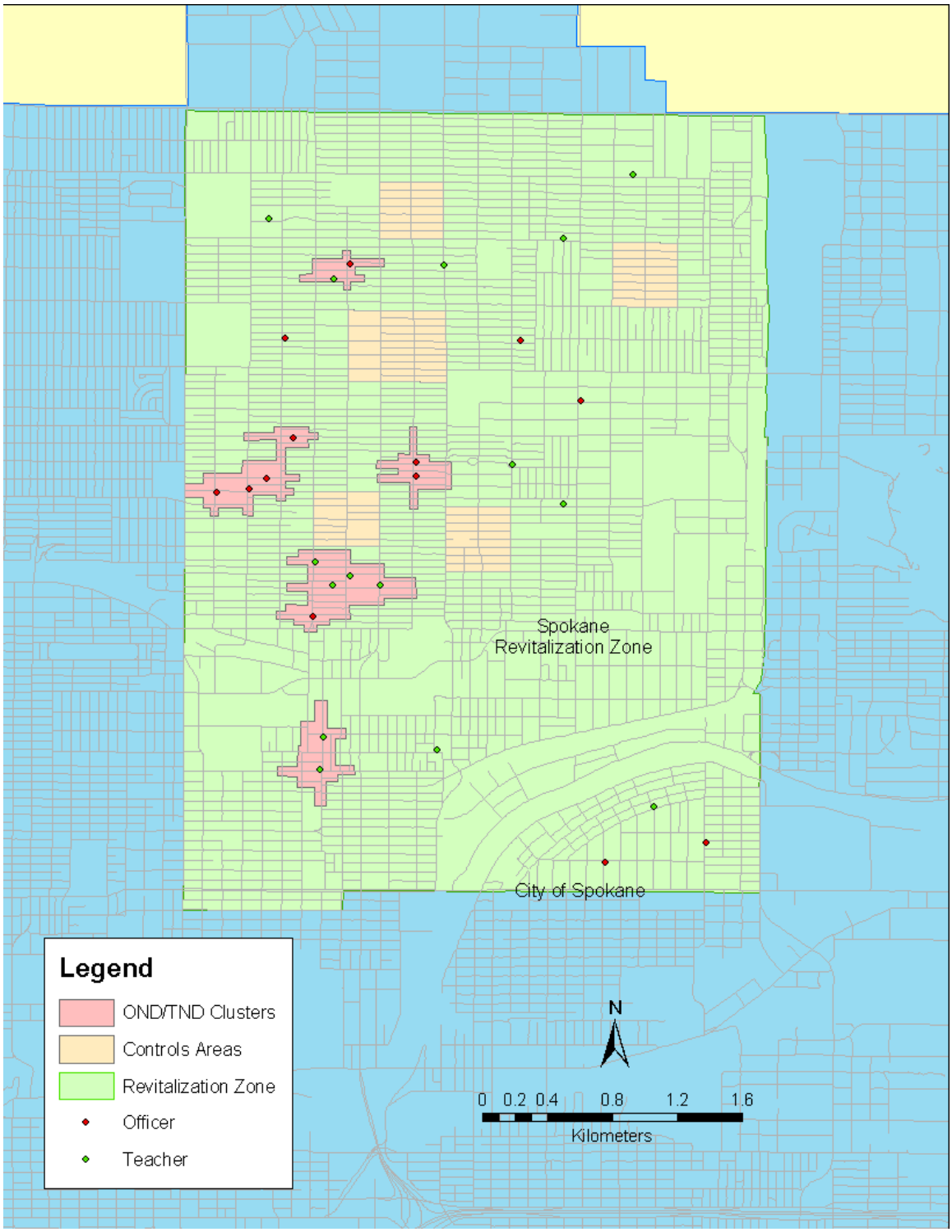
Revitalization Zone	OND Properties	TND Properties	Area (square kilometers)	OND/TND Density (Properties per square kilometer)
Rialto	77	13	19.2	4.7
Spokane	13	15	17.3	1.6

Because it has always been assumed that the impact of *clusters* of homes would be greater than that of any isolated homes, statistics around individual properties outside of clusters were not generated.

The six clusters in Rialto contain 34 officer's homes and seven teacher's homes (Map 7). No cluster contains more than two teachers' homes and only one cluster contains no teacher's home. In contrast, seven of the fifteen homes used to define the five clusters in Spokane belong to teachers.



Map 7. OND properties, TND properties, clusters of OND/TND properties, and control areas in the Rialto Revitalization Zone



Map 8. OND properties, TND properties, clusters of OND/TND properties, and control areas in the Spokane Revitalization Zone.

The low density of program homes in Spokane dictated fewer clusters and fewer homes per cluster (Map 8). Three of the five clusters in Spokane consist of only two homes. One the two remaining clusters in Spokane contains four officer's homes while the other contains four teacher's homes and one officer's home. The number of homes used to define a cluster in Rialto

ranged from a minimum of four (for two different clusters) to a maximum of twelve. The other three Rialto clusters include six to eight OND/TND properties.

The low density of program homes in Spokane also dictated that the density of program homes *within* clusters is lower in Spokane than it is within clusters in Rialto. In other words, homes within clusters are much further apart in Spokane than they are in Rialto. Therefore, it should not be surprising that we found that the apparent impact of these programs on crime in Spokane is minimal while the apparent impact in Rialto is impressive across all crime types where the number of crimes makes a comparison reasonable.

Control Areas

In order to insure that any decrease or increase in crime in the clusters could be reasonably attributed to the presence of law enforcement officers and teachers rather than other factors, control areas lacking either OND or TND properties were defined within each revitalization zone. It was assumed that the trends in the control areas would be representative of what might have been expected throughout the revitalization zones if the OND and TND programs had not encouraged officers and teachers to move into these areas.

For further comparisons, citywide crime counts and crime counts for the entire revitalization zones for both years were also generated.

Crime Types

Crime data for both cities were provided by the respective police departments. These data included:

- Part I Crimes for the purpose of the FBI's Uniform Crime Reporting (UCR) Summary System (Table 2) (with the exception that Spokane did not provide data on Arsons), and
- Drug crimes (Table 3 for Rialto and Table 4 for Spokane).

Table 2. Uniform Crime Reporting (UCR) Summary System Part I crime types.

UCR Code	Description
1	Murder and Non-negligent Manslaughter
2	Forcible Rape
3	Robbery
4	Aggravated Assault
5	Burglary
6	Larceny-Theft
7	Motor Vehicle Theft
8	Arson

Part I crimes are serious crimes by nature and/or volume. According to the FBI's Frequently Asked Questions related to the UCR Summary System: "they are the crimes most likely to be reported and most likely to occur with sufficient frequency to provide an adequate basis for comparison" (http://www.fbi.gov/ucr/ucrquest.htm).

"Besides being generally recognized as including the most serious types of violent and property crime, the FBI's Part I Crimes were chosen for the following reason: The overwhelming majority of U.S. police agencies participate in the UCR crime data collection program and, therefore, use the same definitions for each of the Part I Crimes. This uniformity of definition also extends to the crime reports that participating [police departments] use in generating their own crime statistics. Therefore, Part I Crime data represent the standardized depiction of crime, and their use allows

for valid crime comparisons across the highly diverse universe of law enforcement agencies in the United States" (Hyatt and Holzman, 1999).

Table 3 lists the penal code numbers and descriptions of drug crimes reported by the Rialto Police Department and Table 4 lists the descriptions of drug crimes reported by the Spokane Police Department. No attempt was made to relate drug-crime types between the two jurisdictions because, unlike Part I crimes, there is no standardization of drug crime descriptions between jurisdictions in the United States. Comparisons of the descriptions of drug crimes in Tables 3 and 4 will clearly reveal the problem of attempting to make such comparisons.

Table 3. Drug crime categories used by the City of Rialto.

Penal Code	Description
HS11350	POSSESS NARCOTIC CONTROLLED SUBSTANCE
HS11351	POSSESS/PURCHASE FOR SALE NARCOTIC/CONTROLLED SUBSTANCE
HS11351.5	POSSESS/PURCHASE COCAINE BASE FOR SALE
HS11352	TRANSPORT/SELL NARCOTIC/CONTROLLED SUBSTANCE
HS11353	ADULT SELL/ETC CONTROLLED SUBSTANCE TO MINOR
HS11357	POSSESS MARIJUANA/28.5 GRAMS OR LESS OR W/PRIOR
HS11358	PLANT/CULTIVATE/ETC MARIJUANA/HASHISH
HS11359	POSSESS MARIJUANA/HASHISH FOR SALE
HS11360	GIVE/TRANSPORT/ETC MARIJUANA OVER 28.5 GRAMS
HS11364	POSSESS CONTROLLED SUBSTANCE PARAPHERNALIA
HS11369	UNKNOWN
HS11370.1	POSS CONTROLLED SUBSTANCE WHILE ARMED W/LOADED FIREARM
HS11377	POSSESS CONTROLLED SUBSTANCE
HS11378	POSSESS CONTROLLED SUBSTANCE FOR SALE
HS11379	TRANSPORT/SELL CONTROLLED SUBSTANCE
HS11379.6	MANUFACTURE/ETC CONTROLLED SUBSTANCE
HS11383	POSSESS SUBSTANCES W/INTENT TO MFG METHAMPHETAMINE/ETC
HS11550	USE/UNDER INFLUENCE OF CONTROLLED SUBSTANCE
381 PC	POSSESSION OF TOLUENE

Table 4. Drug crime categories used by the City of Spokane.

Description
DRUG EQUIPMENT
DRUG-DSTRB-HALLCGN
DRUG-MANUF-AMPHTMN
DRUG-MANUF-HALLCGN
DRUG-MANUF-METHAMPTMN
DRUG-NARC-OTHER
DRUG-OTHER-AMPHTMN
DRUG-OTHER-COCAINE
DRUG-OTHER-HEROIN
DRUG-OTHER-METHAMPTMN
DRUG-OTHER-MRJNA
DRUG-OTHER-SYNTH
DRUG-POSS-AMPHTMN
DRUG-POSS-BARB
DRUG-POSS-COCAINE
DRUG-POSSESS-HALLCNG
DRUG-POSS-HEROIN
DRUG-POSS-METHAMPTMN
DRUG-POSS-MRJNA
DRUG-POSS-OPIUM
DRUG-POSS-SYNTH
DRUG-PROD-MRJNA
DRUGS-DELIVER
DRUG-SELL-AMPHTMN
DRUG-SELL-COCAINE
DRUG-SELL-HEROIN
DRUG-SELL-METHAMPTMN
DRUG-SELL-MRJNA
DRUG-SELL-OPIUM
DRUG-SELL-SYNTH
DRUGS-MANUF
DRUGS-OTHER
DRUGS-PARA
DRUGS-POSSESS
DRUGS-SELL

The Rialto Police Department provided the crime data in the form of **shapefiles** containing crime location points they had geocoded using a **street centerline file** that was geometrically corrected from the original **TIGER** line files.

They also provided the corrected street centerlines file, and shapefiles for the city boundary and police patrol sectors. This street centerline was used to geocode OND/TND property addresses to insure that the spatial relationships between property locations and crimes were correct.

The Spokane Police Department provided shapefiles for the Spokane city boundary and a street centerline file that was used to geocode the crime data.

They also provided crime data in comma-delimited text files containing fields describing crime types and locations. Most of the location data were in the form of street addresses, but a significant number of locations were provided as street intersections. After eliminating records with no location information and reformatting some of the location data to conform to geocoding standards imposed by ArcView, the four data files were geocoded against the street centerline file to generate crime layers.

Not all of the tabular records were successfully geocoded. The success rates ranged from 91.6% for the 1999 drug crimes to 97.4% for Part I crimes in 2002. These "match rates" are very good considering that the source of the address data in the tabular databases was derived from police reports and had to be manually computerized by data entry staff. These high rates were achieved only by interactively allowing the inclusion of addresses with imperfect matches during the geocoding process. However, this was only done when it was very likely that the correspondence was correct, e.g. when the input address lacked the street type (street, avenue, lane, etc.) but there was only one suitable alternative available in the street centerline file, that is only one such road in the jurisdiction.

Other GIS Data Layers

HUD provided Microsoft Excel spreadsheets containing OND/TND property data, including the program type (OND or TND) and the addresses. GIS layers for property locations were generated by geocoding the addresses in ArcView using the street centerline layers provided by each of the two jurisdictions. All addresses in both jurisdictions were successfully geocoded after obtaining a number of address corrections from HUD.

HUD also provided a GIS layer containing the revised boundaries of revitalization zones. The boundaries for the Rialto and Spokane revitalization zones were extracted from this layer to create separate layers for each jurisdiction.

All data layers were ultimately projected from the source coordinate systems to a common working coordinate system and measuring units: **UTM NAD 83 Zone 11 Meters**. This insures that all data derived from disparate sources properly overlay each other for mapping and measurement purposes.

Study Period

The research was intended to compare crime levels citywide, within the revitalization zones and in the clusters and control areas before and after officers and teachers purchased homes in the revitalization zone clusters. Therefore, crime data were collected for two calendar years: 1999, before any OND/TND mortgages were obtained, and 2002, after the existing mortgages were in place. Crime data for the intervening years were not collected.

We assumed that the number and distribution of officers and teachers living within these areas and not participating in the OND/TND Programs was relatively small, constant over the time period, and randomly distributed, i.e., their presence would have very little, if any, impact on the results of this evaluation. No data were available to test these assumptions, but there is no reason to believe that there were significantly different numbers of officers or teachers living in these areas and not participating in the programs during the two years under consideration.

Results

Part I Crime Results

The limited total numbers of murders, rapes, robberies and aggravated assaults tabulated in the study years result in changes in those numbers from 1999 to 2002 producing large changes when they are expressed as percentages. Some Part I crimes are statistically rare; this can easily lead to a misunderstanding of the actual changes in the risk levels associated with these crimes. Therefore, it is useful to aggregate crime counts in order to smooth out random variations. In the following sections on the results associated with Part I crimes, a discussion of the aggregate counts for all crimes is followed by discussions of Part I crimes subdivided into two categories, "violent" Part I crimes and Part I "property" crimes. Finally, the results for individual Part I crimes are discussed.

Later, when drug crimes results are discussed, the very small numbers of these crimes in the OND/TND clusters and control areas precludes conclusions for individual crimes and only aggregate counts are considered. Counts for individual drug crimes are included in appendices.

Total Part I Crime Results – Rialto

Tables 5 shows Part I crime count totals for 1999 and 2002 and the percent change from1999 to 2002, for the City of Rialto, the Rialto Revitalization Zone, the clusters of OND/TND properties within the revitalization zone, and the control areas in the revitalization zone. Note that these areas are not additive because the crime counts in the clusters and control areas are included in the crime counts for the revitalization zone and the later are included in the citywide counts.

Table 5. Part I crime totals for the City of Rialto.

Geographic Area	1999	2002	Percent Change
City of Rialto	2668	3626	+35.9%
Rialto Revitalization Zone	1690	2265	+34.0%
Rialto OND/TND Clusters	114	114	0.0%
Rialto Control Areas	291	489	+68.0%

There was no change in the total number of Part I crimes between 1999 and 2002 in the OND/TND clusters. During the same time period, however, there were large increases in the numbers of Part I crimes citywide, within the revitalization zone as a whole, and within the control areas. These numbers would suggest that the insertion of clusters of police officers and teachers in the revitalization zone prevented what would otherwise have been a large increase in the number of Part I crimes in those neighborhoods.

Part I Crime Results by Category – Rialto

Tables 6 and 7 show the results of splitting the Part I crimes into violent crimes (murder, rape, robbery and aggravated assault) and property crimes (burglary, larceny/theft, motor vehicle theft and arson). This breakdown is useful because some violent crimes (e.g., aggravated assault and homicide) tend to be crimes between intimates and acquaintances; therefore their numbers may be less likely to be influenced by the number of police officers or teachers living in the area.

Comparing these two tables supports this conclusion, i.e. property crimes decreased during the study period in the OND/TND clusters while violent crimes increased in the clusters albeit still at a lower rate than in other geographic areas.

Table 6. Violent Part I crime totals for the City of Rialto.

Geographic Area	1999	2002	Change
City of Rialto	573	830	+44.9%
Rialto Revitalization Zone	409	568	+38.9%
Rialto OND/TND Clusters	16	19	+18.8%
Rialto Control Areas	95	125	+31.6%

Table 7. Part I property crime totals for the City of Rialto.

Geographic Area	1999	2002	Change
City of Rialto	2095	2796	+33.5%
Rialto Revitalization Zone	1281	1697	+32.5%
Rialto OND/TND Clusters	98	95	-3.1%
Rialto Control Areas	196	364	+85.7%

The conclusions to be drawn from the data are less clear cut when individual Part I crime counts are considered (Table 8).

Table 8 – Detailed Part I crime counts for Rialto

Rialto Part I Crimes	Citywide				Revitalization Zone				OND/TND Clusters				Control Areas			
	1999	2002	Total	Change	1999	2002	Total	Change	1999	2002	Total	Change	1999	2002	Total	Change
1 Murder	9	16	25	+77.8%	7	8	15	+14.3%	0	1	1		0	2	2	
2 Rape	22	16	38	-27.3%	17	11	28	-35.3%	0	1	1		1	1	2	0.0%
3 Robbery	179	225	404	+25.7%	139	154	293	+10.8%	2	1	3	-50.0%	22	31	53	+40.9%
4 Aggravated Assault	363	573	936	+57.9%	246	395	641	+60.6%	14	16	30	+14.3%	72	91	163	+26.4%
5 Burglary	653	529	1182	-19.0%	426	323	749	-24.2%	40	21	61	-47.5%	64	66	130	+3.1%
6 Larceny/Theft	983	1232	2215	+25.3%	595	727	1322	+22.2%	33	31	64	-6.1%	75	161	236	+114.7%
7 Motor Vehicle Theft	446	1016	1462	+127.8%	252	632	884	+150.8%	25	42	67	+68.0%	56	135	191	+141.1%
8 Arson	13	19	32	+46.2%	8	15	23	+87.5%	0	1	1		1	2	3	+100.0%
Totals	2668	3626	6294	+35.9%	1690	2265	3955	+34.0%	114	114	228	0.0%	291	489	780	+68.0%

Part I Crime Results by Type – Rialto

There were no homicides, rapes or arsons within the Rialto OND/TND clusters in 1999, and there was one of each of these crimes in the same area in 2002. Between the two years, the number of robberies declined from two to one. This 50% decrease in robberies sounds impressive when compared to a citywide increase of 26%, an increase within the revitalization zone of 11%, and a 41% increase in the control areas. However, the small number of homicides, rapes, arsons, and robberies in the Rialto control areas makes these statistics unreliable indicators of the relative risk of being a victim of one of these crimes in the various geographic areas.

On the other hand, during the same time period:

- Burglaries declined by 48% in the OND/TND clusters while declining only 19% citywide and 24% in the revitalization zone and actually increasing slightly in the control areas.
- Larcenies declined 6% in the OND/TND clusters while increasing 25% citywide, 22% in the revitalization zone, and 115% in the control areas.
- Aggravated assaults increased 14% in the OND/TND clusters, but the increases were much greater citywide (60%), in the revitalization zone (61%), and the control areas (26%).
- Motor vehicle thefts increased by 68% in the OND/TND clusters, but again the increases were much greater in the other areas: 128% citywide, 151% in the revitalization zone, and 141% in the control areas.

For these four crimes in Rialto – burglary, larceny, aggravated assault, and motor vehicle theft – the apparent changes over time strongly argue against the hypothesis that there was no significant impact on crime in the OND/TND clusters.

Total Part I Crime Results – Spokane

Tables 9 shows Part I crime count totals for 1999 and 2002 and the percent change from1999 to 2002, for the City of Spokane, the Spokane Revitalization Zone, the clusters of OND/TND properties within the revitalization zone, and the control areas in the revitalization zone.

Table 9. Part I crime totals for the City of Spokane.

Geographic Area	1999	2002	Percent Change
City of Spokane	14172	15005	+5.9%
Spokane Revitalization Zone	3511	3874	+10.3%
Spokane OND/TND Clusters	139	155	+11.5%
Spokane Control Areas	196	193	-1.5%

These results from Spokane do not support the notion of a proportionate effect. The total number of crimes decreased only in the control areas and the largest increase was found in the clusters although there was a similar increase in the revitalization zone as a whole, and a smaller but significant citywide increase.

Part I Crime Results by Category – Spokane

Splitting the Part I crimes into violent and property crimes (Tables 10 and 11) does not help to explain the results. The OND/TND clusters experienced a large percentage decrease in violent crime during the period while the counts in the revitalization zone held steady and the city experienced a relatively small decline. However, the largest percentage decrease was in the control areas. But, the much smaller numbers of crimes in the clusters and control areas than in the revitalization zone or the city as a whole suggest that random incidents may be strongly influencing the results.

Table 10. Violent Part I crime totals for the City of Spokane.

Geographic Area	1999	2002	Change
City of Spokane	1289	1206	-6.4%
Spokane Revitalization Zone	351	350	-0.3%
Spokane OND/TND Clusters	14	9	-35.7%
Spokane Control Areas	23	13	-43.5%

The trends in crime counts for property crimes were upward for all areas in Spokane. Interestingly, the largest percentage increases in property crimes were in the OND/TND clusters. In all areas considered, the number of property crimes is vastly larger than the number of violent crimes making these numbers more reliable indicators of overall risk. However, these numbers define trends that roughly mirror the trends for all Part I crimes.

Table 11. Part I property crime totals for the City of Spokane.

Geographic Area	1999	2002	Change
City of Spokane	12883	13799	+7.1%
Spokane Revitalization Zone	3160	3524	+11.5%
Spokane OND/TND Clusters	125	146	+16.8%
Spokane Control Areas	173	180	+4.0%

Part I Crime Results by Type – Spokane

Looking at the counts for individual Part I crimes (Table 12), as in Rialto there were too few murders, rapes, and robberies in the OND/TND clusters and control areas to make meaningful comparisons to changes in the city as a whole or the revitalization zone as a whole. Robberies, the most common of these three crimes, increased by 33% in the OND/TND clusters, but this is simply a result of one more robbery being reported in 2002 than in 1999. Differences in the number of robberies in other areas were also small. Arson crimes were not included in the Part I crime data provided by the Spokane Police Department.

Table 12 – Detailed Part I crime counts for Spokane

Rialto Part I Crimes	Citywide				Revitalization Zone				OND/TND Clusters				Control Areas			
	1999	2002	Total	Change	1999	2002	Total	Change	1999	2002	Total	Change	1999	2002	Total	Change
1 Murder	5	20	25	+300.0%	2	4	6	+100.0%	0	2	2		0	0	0	
2 Rape	82	74	156	-9.8%	15	19	34	+26.7%	0	1	1		0	0	0	
3 Robbery	339	351	690	+3.5%	87	82	169	-5.7%	3	4	7	+33.3%	5	4	9	-20.0%
4 Aggravated Assault	863	761	1624	-11.8%	247	245	492	-0.8%	11	2	13	-81.8%	18	9	27	-50.0%
5 Burglary	3082	2563	5645	-16.8%	735	609	1344	-17.1%	37	32	69	-13.5%	38	42	80	+10.5%
6 Larceny/Theft	8930	9657	18587	+8.1%	2160	2459	4619	+13.8%	75	93	168	+24.0%	120	117	237	-2.5%
7 Motor Vehicle Theft	871	1579	2450	+81.3%	265	456	721	+72.1%	13	21	34	+61.5%	15	21	36	+40.0%
Totals	14172	15005	29177	+5.9%	3511	3874	7385	+10.3%	139	155	294	+11.5%	196	193	389	-1.5%

The crime patterns emerging from our trend analyses of the remaining Part I crimes in Spokane are not nearly as clear or as consistent as in Rialto. Aggravated assaults plummeted from eleven in 1999 to two in 2002 in the OND/TND clusters, an 81.8% decrease while they declined only 11.8% in the city and were essentially unchanged in the revitalization zone, but they also declined substantially in the control areas within the revitalization zone.

Burglaries decreased significantly across the city between 1999 and 2002, including within the revitalization zone. The decline was also experienced in the OND/TND clusters, but it was slightly less pronounced. Although there was an increase in burglaries in the control areas during the same time period, it is again hard to ascribe the difference between the clusters and the control areas to the OND/TND programs when a similar decline was experienced in the remainder of the revitalization zone and the city as a whole.

Larceny/theft increased citywide between 1999 and 2002, and an even larger increase occurred in the revitalization zone. The largest increase was experienced in the OND/TND clusters, but the control areas actually experienced a slight decline.

Motor vehicle theft trends were more in line with expectations when the changes in the clusters are compared to the city or to the entire revitalization zone, with a somewhat smaller increase occurring in the clusters than in the other areas. However, the rate of increase in motor vehicle thefts was actually smallest in the control areas.

Drug Crime Results

The results for drug crimes were disappointing. The aggregate drug crime counts for the various geographic areas in both cities are considered in this section. Appendix 4 includes counts for individual drug crimes in Rialto, but no attempt is made to draw conclusions from individual drug crime counts because there were so few of any particular drug crime in the OND/TND clusters or control areas.

Drug crime Results – Rialto

Table 13 shows the total counts for drug crimes for 1999 and 2002 in Rialto, the revitalization zone, the clusters of OND/TND properties, and the control areas.

Table 13. Part I drug crime totals for the City of Rialto.

Geographic Area	1999	2002	Percent Change
City of Rialto	208	358	+72.1%
Rialto Revitalization Zone	144	251	+74.3%
Rialto OND/TND Clusters	2	6	+200.0%
Rialto Control Areas	29	85	+193.1%

These data suggest a 200% increase in drug crimes in the OND/TND clusters between 1999 and 2002, but the numbers of crimes, two in 1999 and six in 2002, argues against drawing any conclusions from this difference.

Unlike Part I crimes which are almost always reported to the police by the public, drug crimes are more often a result of discretionary police enforcement activity. Therefore, it is quite possible that the increases in drug crime counts between 1999 and 2002 are simply the result of more aggressive enforcement activity. It is also possible that enforcement activities, by chance, were concentrated in the areas that include the OND/TND clusters and control areas. However, we have no evidence other than the numbers to suggest that this was the case.

In short, it appears that few conclusions can be drawn from the drug crime data for Rialto.

Drug crime Results – Spokane

Table 14 shows the results for drug crime count totals for 1999 and 2002 in the City of Spokane, the Spokane Revitalization Zone, the clusters of OND/TND properties, and the control areas. At first glance, the results would suggest that the presence of officers and teachers in the OND/TND clusters has had a positive impact, i.e. reducing drug crimes in the clusters while counts increased significantly in the city as a whole and in the revitalization zone. However, given the caveats related to the small number of crimes in the OND/TND clusters and the discretionary nature of drug crime enforcement, and given the fact that drug crimes dropped by a similar amount in the control areas, it would be difficult to argue that the OND/TND programs are solely or even primarily responsible for the observed results.

Table 14. Part I drug totals for the City of Spokane.

Geographic Area	1999	2002	Percent Change
City of Spokane	1323	1505	+13.8%
Spokane Revitalization Zone	299	382	+27.8%
Spokane OND/TND Clusters	24	20	-16.7%
Spokane Control Areas	32	28	-12.5%

Crime counts for individual drug crimes in Spokane are tabulated in Appendix 5. As previously noted, no attempt is made to draw conclusions from these data due to the very small number of individual drug crimes.

Discussion of Findings

The results associated with Part I crimes in Rialto support the position that inserting law enforcement officers and teachers as homeowners in revitalization zone can have the positive effect of reducing crime counts in these neighborhoods. The percent change from 1999 to 2002 suggests that the presence of officers and teachers resulted in larger reductions, or smaller increases, in crime counts whether one looks at aggregate crime counts, counts classified as violent crimes and property crimes, or at individual offenses.

A much weaker argument can be made for a programmatic effect on aggregated drug crimes in Spokane during the study period; they declined in the clusters (and in the controls) while increasing significantly in the city as a whole and in the revitalization zone as a whole. However, this argument weakens when we take into consideration the small numbers of drug crimes and the discretionary nature of drug crime enforcement.

Why are the results so much more apparent for certain Part I crimes in Rialto? Several factors are suggested:

- The densities of officer's and teacher's homes in the OND/TND clusters are much higher in Rialto than in Spokane.
- For drug crimes in both cities, the number of crimes in the OND/TND neighborhoods, both in 1999 and 2002 is so low that chance plays a larger role in determining the differences between the two years than does the actual level of criminal activity. Not all crimes are detected and reported. Similarly, low crime counts with respect to murder and rape in both cities and to arson in Rialto (arson crime counts were not provided for Spokane) militates against drawing firm conclusions about programmatic impacts.
- Because drug crime enforcement activity is discretionary, the police department's tactical operations are much more likely to influence the arrest rates for drug crimes than for Part I crimes.

Conclusions

Introduction

The trends in Part I crime counts in Rialto support the expectations of the program planners. That is, the establishment of clusters of police officer's and teacher's homes in the Rialto Revitalization Zone is associated with declines in Part I crimes relative to other areas of Rialto in 2002 as compared to 1999. No similar effects were seen for Part I crimes in Spokane or for drug crimes in either city.

Discussion

A reasonable explanation for the lack of a similar effect in Spokane is that the density of OND/TND properties in Spokane is much lower than in Rialto. Although an individual officer or teacher living in a neighborhood might have a positive impact on the level of crime in the neighborhood, there is probably a synergistic effect when several officers and/or teachers live in close proximity to each other, i.e. the total impact is probably greater than the sum of the individual officers and teachers.

If these programs deter Part I crimes in OND/TND clusters or around individual OND/TND properties, it is likely that they also deter drug crimes in spite of the fact that no such effect was seen in the data generated for this study. It is possible that drug crimes were prevented by placing officers and teachers in the neighborhoods we studied, but that the effects were masked by discretionary law enforcement activities or simple chance. The low numbers of drug crimes in OND/TND clusters and control areas make the latter quite possible.

Suggestions for Further Research

Discussion

Perhaps the most significant finding of this research is that a high density of program clients is necessary to produce measurable results. The 2001 revision of the criteria applied to define revitalization zones had the practical effect of reducing the sizes of revitalization zones, especially in the central and eastern states. Assuming that this does not deter a significant number of potential clients from participating in the program, it will have the effect of increasing their density within the now more compact zones. This effect is perhaps the most important topic for further research.

References

Hyatt, R.A., and H.R. Holzman, 1999, *Guidebook for Measuring Crime in Public Housing with Geographic Information Systems*: U.S. Department of Housing and Urban Development, Washington, DC

Appendix 1: Glossary

ArcInfo: A GIS manufactured by Environmental Systems Research Institute (ESRI), Redlands, California. This software was used for most of the GIS analysis and map production associated with this research.

ArcView: A GIS manufactured by Environmental Systems Research Institute (ESRI), Redlands, California. This software was used for geocoding crime locations in Spokane and OND/TND property locations in both Rialto and Spokane.

Coordinate System: An orderly method of specifying the locations of points and, by extension, the shapes and locations of lines and polygonal areas. A specific coordinate system is defined by certain parameters including its origin, measurement units, and other parameters specific to that system.

Geocode: Use GIS software to create coordinate-based spatial data from street addresses. Geocoding uses the spatial and tabular data contained in a GIS layer representing streets to find the approximate coordinate location of an address contained in a tabular database.

Geographic Information System (GIS): An automated, computerized system used to analyze and display spatial features and related tabular data.

Layer: Spatial features of a particular type contained within a GIS. For example, streets, OND/TND properties, and clusters are contained in separate layers in a GIS.

Shapefile: A GIS layer format created by ESRI as an open (non-proprietary) standard. Shapefiles are commonly used to share GIS data layers between users of different geographic information systems.

Street Centerline File: A GIS layer containing streets and database records describing the attributes of each street segment in the file. Street centerline files are typically used to geocode street addresses from a tabular database and as background layers in maps.

TIGER: A GIS system developed by the US Census Bureau. TIGER line files are GIS layers containing approximate street locations and linked databases with attribute information including the start and end street address numbers, street names, street types, and other data. The geometric and attribute accuracy of TIGER files is relatively poor – cities often use street centerline files that have had both the geometry and attribute information commercially enhanced.

UTM NAD 83 Zone 11 Meters: The parameters of the coordinate system used for the GIS analyses and mapping performed during this project, i.e. Zone 11 of the Universal Transverse Mercator (UTM) coordinate system based on the North American Datum of 1983 (NAD 83) with distances measure in meters. Zone 11 is appropriate for locations with a longitude in the range of 114W to 120W. Rialto and Spokane are both within one-half degree of the central meridian of this zone (117W), where shape and size distortions are minimized. Direction is everywhere accurate in this coordinate system.

Appendix 2: Detailed Part I Crime Counts for Rialto

City of Rialto

Part I Crime	1999	2002	Total	Change
Murder	9	16	25	+77.8%
Rape	22	16	38	-27.3%
Robbery	179	225	404	+25.7%
Aggravated Assault	363	573	936	+57.9%
Burglary	653	529	1182	-19.0%
Larceny/Theft	983	1232	2215	+25.3%
Motor Vehicle Theft	446	1016	1462	+127.8%
Arson	13	19	32	+46.2%
Totals	2668	3626	6294	+35.9%

Rialto Revitalization Zone

Part I Crime	1999	2002	Total	Change
Murder	7	8	15	+14.3%
Rape	17	11	28	-35.3%
Robbery	139	154	293	+10.8%
Aggravated Assault	246	395	641	+60.6%
Burglary	426	323	749	-24.2%
Larceny/Theft	595	727	1322	+22.2%
Motor Vehicle Theft	252	632	884	+150.8%
Arson	8	15	23	+87.5%
Totals	1690	2265	3955	+34.0%

Rialto Revitalization Zone OND/TND Clusters

Part I Crime	1999	2002	Total	Change
Murder	0	1	1	
Rape	0	1	1	
Robbery	2	1	3	-50.0%
Aggravated Assault	14	16	30	+14.3%
Burglary	40	21	61	-47.5%
Larceny/Theft	33	31	64	-6.1%
Motor Vehicle Theft	25	42	67	+68.0%
Arson	0	1	1	
Totals	114	114	228	0.0%

Rialto Revitalization Zone Control Areas

Part I Crime	1999	2002	Total	Change
Murder	0	2	2	
Rape	1	1	2	0.0%
Robbery	22	31	53	+40.9%
Aggravated Assault	72	91	163	+26.4%
Burglary	64	66	130	+3.1%
Larceny/Theft	75	161	236	+114.7%
Motor Vehicle Theft	56	135	191	+141.1%
Arson	1	2	3	+100.0%
Totals	291	489	780	+68.0%

Appendix 3: Detailed Part I Crime Counts for Spokane

City of Spokane

Part I Crime	1999	2002	Total	Change
Murder	5	20	25	+300.0%
Rape	82	74	156	-9.8%
Robbery	339	351	690	+3.5%
Aggravated Assault	863	761	1624	-11.8%
Burglary	3082	2563	5645	-16.8%
Larceny/Theft	8930	9657	18587	+8.1%
Motor Vehicle Theft	871	1579	2450	+81.3%
Totals	14172	15005	29177	+5.9%

Spokane Revitalization Zone

Part I Crime	1999	2002	Total	Change
Murder	2	4	6	+100.0%
Rape	15	19	34	+26.7%
Robbery	87	82	169	-5.7%
Aggravated Assault	247	245	492	-0.8%
Burglary	735	609	1344	-17.1%
Larceny/Theft	2160	2459	4619	+13.8%
Motor Vehicle Theft	265	456	721	+72.1%
Totals	3511	3874	7385	+10.3%

Spokane Revitalization Zone OND/TND Clusters

Part I Crime	1999	2002	Total	Change
Murder	0	2	2	
Rape	0	1	1	
Robbery	3	4	7	+33.3%
Aggravated Assault	11	2	13	-81.8%
Burglary	37	32	69	-13.5%
Larceny/Theft	75	93	168	+24.0%
Motor Vehicle Theft	13	21	34	+61.5%
Totals	139	155	294	+11.5%

Spokane Revitalization Zone Control Areas

Part I Crime	1999	2002	Total	Change
Murder	0	0	0	
Rape	0	0	0	
Robbery	5	4	9	-20.0%
Aggravated Assault	18	9	27	-50.0%
Burglary	38	42	80	+10.5%
Larceny/Theft	120	117	237	-2.5%
Motor Vehicle Theft	15	21	36	+40.0%
Totals	196	193	389	-1.5%

Appendix 4: Detailed Drug Crime Statistics for Rialto

City of Rialto

Drug Penal Code	Description	1999	2002	Change	Percent
HS11350	POSSESS NARCOTIC CONTROLLED SUBSTANCE	15	26	41	+73.3%
HS11351	POSSESS/PURCHASE FOR SALE NARCOTIC/CONTROLLED SUBSTANCE	4	6	10	+50.0%
HS11351.5	POSSESS/PURCHASE COCAINE BASE FOR SALE	0	8	8	
HS11352	TRANSPORT/SELL NARCOTIC/CONTROLLED SUBSTANCE	2	0	2	-100.0%
HS11353	ADULT SELL/ETC CONTROLLED SUBSTANCE TO MINOR	0	2	2	
HS11357	POSSESS MARIJUANA/28.5 GRAMS OR LESS OR W/PRIOR	30	16	46	-46.7%
HS11358	PLANT/CULTIVATE/ETC MARIJUANA/HASHISH	1	4	5	+300.0%
HS11359	POSSESS MARIJUANA/HASHISH FOR SALE	9	33	42	+266.7%
HS11360	GIVE/TRANSPORT/ETC MARIJUANA OVER 28.5 GRAMS	2	8	10	+300.0%
HS11364	POSSESS CONTROLLED SUBSTANCE PARAPHERNALIA	16	3	19	-81.3%
HS11369	UNKNOWN	2	0	2	-100.0%
HS11370.1	POSS CONTROLLED SUBSTANCE WHILE ARMED W/LOADED FIREARM	0	7	7	
HS11377	POSSESS CONTROLLED SUBSTANCE	40	116	156	+190.0%
HS11378	POSSESS CONTROLLED SUBSTANCE FOR SALE	2	19	21	+850.0%
HS11379	TRANSPORT/SELL CONTROLLED SUBSTANCE	3	6	9	+100.0%
HS11379.6	MANUFACTURE/ETC CONTROLLED SUBSTANCE	1	1	2	0.0%
HS11383	POSSESS SUBSTANCES W/INTENT TO MFG METHAMPHETAMINE/ETC	0	1	1	
HS11550	USE/UNDER INFLUENCE OF CONTROLLED SUBSTANCE	77	101	178	+31.2%
PC381	POSSESSION OF TOLUENE	3	0	3	-100.0%
Totals		208	358	566	+72.1%

Appendix 4 (cont)
Detailed Drug Crime Statistics for Rialto

Rialto Revitalization Zone

Drug Penal Code	Description	1999	2002	Change	Percent
HS11350	POSSESS NARCOTIC CONTROLLED SUBSTANCE	13	20	33	+53.8%
HS11351	POSSESS/PURCHASE FOR SALE NARCOTIC/CONTROLLED SUBSTANCE	3	6	9	+100.0%
HS11351.5	POSSESS/PURCHASE COCAINE BASE FOR SALE	0	5	5	
HS11352	TRANSPORT/SELL NARCOTIC/CONTROLLED SUBSTANCE	2	0	2	-100.0%
HS11353	ADULT SELL/ETC CONTROLLED SUBSTANCE TO MINOR	0	1	1	
HS11357	POSSESS MARIJUANA/28.5 GRAMS OR LESS OR W/PRIOR	16	12	28	-25.0%
HS11358	PLANT/CULTIVATE/ETC MARIJUANA/HASHISH	1	3	4	+200.0%
HS11359	POSSESS MARIJUANA/HASHISH FOR SALE	5	20	25	+300.0%
HS11360	GIVE/TRANSPORT/ETC MARIJUANA OVER 28.5 GRAMS	1	7	8	+600.0%
HS11364	POSSESS CONTROLLED SUBSTANCE PARAPHERNALIA	13	1	14	-92.3%
HS11369	UNKNOWN	2	0	2	-100.0%
HS11370.1	POSS CONTROLLED SUBSTANCE WHILE ARMED W/LOADED FIREARM	0	4	4	
HS11377	POSSESS CONTROLLED SUBSTANCE	27	84	111	+211.1%
HS11378	POSSESS CONTROLLED SUBSTANCE FOR SALE	1	12	13	+1100.0%
HS11379	TRANSPORT/SELL CONTROLLED SUBSTANCE	1	4	5	+300.0%
HS11379.6	MANUFACTURE/ETC CONTROLLED SUBSTANCE	0	0	0	
HS11383	POSSESS SUBSTANCES W/INTENT TO MFG METHAMPHETAMINE/ETC	0	1	1	
HS11550	USE/UNDER INFLUENCE OF CONTROLLED SUBSTANCE	55	70	125	+27.3%
PC381	POSSESSION OF TOLUENE	3	0	3	-100.0%
Totals		144	251	395	+74.3%

Appendix 4 (cont)
Detailed Drug Crime Statistics for Rialto

OND/TND Clusters in the Rialto Revitalization Zone

Drug Penal Code	Description	1999	2002	Change	Percent
HS11350	POSSESS NARCOTIC CONTROLLED SUBSTANCE	0	1	1	
HS11351	POSSESS/PURCHASE FOR SALE NARCOTIC/CONTROLLED SUBSTANCE	0	0	0	
HS11351.5	POSSESS/PURCHASE COCAINE BASE FOR SALE	0	0	0	
HS11352	TRANSPORT/SELL NARCOTIC/CONTROLLED SUBSTANCE	0	0	0	
HS11353	ADULT SELL/ETC CONTROLLED SUBSTANCE TO MINOR	0	0	0	
HS11357	POSSESS MARIJUANA/28.5 GRAMS OR LESS OR W/PRIOR	0	0	0	
HS11358	PLANT/CULTIVATE/ETC MARIJUANA/HASHISH	0	1	1	
HS11359	POSSESS MARIJUANA/HASHISH FOR SALE	0	0	0	
HS11360	GIVE/TRANSPORT/ETC MARIJUANA OVER 28.5 GRAMS	0	1	1	
HS11364	POSSESS CONTROLLED SUBSTANCE PARAPHERNALIA	0	0	0	
HS11369	UNKNOWN	0	0	0	
HS11370.1	POSS CONTROLLED SUBSTANCE WHILE ARMED W/LOADED FIREARM	0	0	0	
HS11377	POSSESS CONTROLLED SUBSTANCE	0	2	2	
HS11378	POSSESS CONTROLLED SUBSTANCE FOR SALE	0	0	0	
HS11379	TRANSPORT/SELL CONTROLLED SUBSTANCE	0	0	0	
HS11379.6	MANUFACTURE/ETC CONTROLLED SUBSTANCE	0	0	0	
HS11383	POSSESS SUBSTANCES W/INTENT TO MFG METHAMPHETAMINE/ETC	0	0	0	
HS11550	USE/UNDER INFLUENCE OF CONTROLLED SUBSTANCE	2	1	3	-50.0%
PC381	POSSESSION OF TOLUENE	0	0	0	
Totals		2	6	8	+200.0%

Appendix 4 (cont)
Detailed Drug Crime Statistics for Rialto

Control Areas in the Rialto Revitalization Zone

Drug Penal Code	Description	1999	2002	Change	Percent
HS11350	POSSESS NARCOTIC CONTROLLED SUBSTANCE	5	6	11	+20.0%
HS11351	POSSESS/PURCHASE FOR SALE NARCOTIC/CONTROLLED SUBSTANCE	0	3	3	
HS11351.5	POSSESS/PURCHASE COCAINE BASE FOR SALE	0	2	2	
HS11352	TRANSPORT/SELL NARCOTIC/CONTROLLED SUBSTANCE	0	0	0	
HS11353	ADULT SELL/ETC CONTROLLED SUBSTANCE TO MINOR	0	0	0	
HS11357	POSSESS MARIJUANA/28.5 GRAMS OR LESS OR W/PRIOR	3	3	6	0.0%
HS11358	PLANT/CULTIVATE/ETC MARIJUANA/HASHISH	0	0	0	
HS11359	POSSESS MARIJUANA/HASHISH FOR SALE	1	10	11	+900.0%
HS11360	GIVE/TRANSPORT/ETC MARIJUANA OVER 28.5 GRAMS	0	2	2	
HS11364	POSSESS CONTROLLED SUBSTANCE PARAPHERNALIA	3	0	3	-100.0%
HS11369	UNKNOWN	0	0	0	
HS11370.1	POSS CONTROLLED SUBSTANCE WHILE ARMED W/LOADED FIREARM	0	1	1	
HS11377	POSSESS CONTROLLED SUBSTANCE	4	31	35	+675.0%
HS11378	POSSESS CONTROLLED SUBSTANCE FOR SALE	0	4	4	
HS11379	TRANSPORT/SELL CONTROLLED SUBSTANCE	0	1	1	
HS11379.6	MANUFACTURE/ETC CONTROLLED SUBSTANCE	0	0	0	
HS11383	POSSESS SUBSTANCES W/INTENT TO MFG METHAMPHETAMINE/ETC	0	0	0	
HS11550	USE/UNDER INFLUENCE OF CONTROLLED SUBSTANCE	13	21	34	+61.5%
PC381	POSSESSION OF TOLUENE	0	0	0	
Totals		29	85	114	+193.1%

Appendix 5: Detailed Drug Crime Statistics for Spokane

City of Spokane

Description	1999	2002	Total	Change
DRUG EQUIPMENT	392	368	760	-6.1%
DRUG-DSTRB-HALLCGN	1	0	1	-100.0%
DRUG-MANUF-AMPHTMN	5	2	7	-60.0%
DRUG-MANUF-HALLCGN	2	0	2	-100.0%
DRUG-MANUF-METHAMPTMN	0	15	15	
DRUG-NARC-OTHER	104	63	167	-39.4%
DRUG-OTHER-AMPHTMN	10	1	11	-90.0%
DRUG-OTHER-COCAINE	11	1	12	-90.9%
DRUG-OTHER-HEROIN	1	1	2	0.0%
DRUG-OTHER-METHAMPTMN	0	6	6	
DRUG-OTHER-MRJNA	19	8	27	-57.9%
DRUG-OTHER-SYNTH	3	6	9	+100.0%
DRUG-POSS-AMPHTMN	173	3	176	-98.3%
DRUG-POSS-BARB	2	1	3	-50.0%
DRUG-POSS-COCAINE	137	81	218	-40.9%
DRUG-POSSESS-HALLCNG	5	6	11	+20.0%
DRUG-POSS-HEROIN	33	39	72	+18.2%
DRUG-POSS-METHAMPTMN	0	138	138	
DRUG-POSS-MRJNA	319	212	531	-33.5%
DRUG-POSS-OPIUM	1	0	1	-100.0%
DRUG-POSS-SYNTH	29	20	49	-31.0%
DRUG-PROD-MRJNA	10	1	11	-90.0%
DRUGS-DELIVER	0	7	7	
DRUG-SELL-AMPHTMN	10	0	10	-100.0%
DRUG-SELL-COCAINE	12	7	19	-41.7%
DRUG-SELL-HEROIN	4	1	5	-75.0%
DRUG-SELL-METHAMPTMN	0	7	7	
DRUG-SELL-MRJNA	8	6	14	-25.0%
DRUG-SELL-OPIUM	0	1	1	
DRUG-SELL-SYNTH	2	1	3	-50.0%
DRUGS-MANUF	1	20	21	+1900.0%
DRUGS-OTHER	2	13	15	+550.0%
DRUGS-PARA	0	165	165	
DRUGS-POSSESS	24	302	326	+1158.3%
DRUGS-SELL	3	3	6	0.0%
Totals	1323	1505	2828	+13.8%

Appendix 5 (cont)
Detailed Drug Crime Statistics for Spokane

Spokane Revitalization Zone

Description	1999	2002	Total	Change
DRUG EQUIPMENT	73	85	158	+16.4%
DRUG-DSTRB-HALLCGN	2	0	2	-100.0%
DRUG-MANUF-AMPHTMN	1	2	3	+100.0%
DRUG-MANUF-HALLCGN	0	0	0	
DRUG-MANUF-METHAMPTMN	0	6	6	
DRUG-NARC-OTHER	29	12	41	-58.6%
DRUG-OTHER-AMPHTMN	1	0	1	-100.0%
DRUG-OTHER-COCAINE	1	0	1	-100.0%
DRUG-OTHER-HEROIN	1	1	2	0.0%
DRUG-OTHER-METHAMPTMN	0	2	2	
DRUG-OTHER-MRJNA	11	3	14	-72.7%
DRUG-OTHER-SYNTH	0	0	0	
DRUG-POSS-AMPHTMN	47	0	47	-100.0%
DRUG-POSS-BARB	0	0	0	
DRUG-POSS-COCAINE	20	23	43	+15.0%
DRUG-POSSESS-HALLCNG	1	2	3	+100.0%
DRUG-POSS-HEROIN	8	7	15	-12.5%
DRUG-POSS-METHAMPTMN	0	46	46	
DRUG-POSS-MRJNA	70	50	120	-28.6%
DRUG-POSS-OPIUM	0	0	0	
DRUG-POSS-SYNTH	8	6	14	-25.0%
DRUG-PROD-MRJNA	5	0	5	-100.0%
DRUGS-DELIVER	0	2	2	
DRUG-SELL-AMPHTMN	5	0	5	-100.0%
DRUG-SELL-COCAINE	1	3	4	+200.0%
DRUG-SELL-HEROIN	1	0	1	-100.0%
DRUG-SELL-METHAMPTMN	0	3	3	
DRUG-SELL-MRJNA	4	2	6	-50.0%
DRUG-SELL-OPIUM	0	1	1	
DRUG-SELL-SYNTH	1	1	2	0.0%
DRUGS-MANUF	0	8	8	
DRUGS-OTHER	0	5	5	
DRUGS-PARA	0	37	37	
DRUGS-POSSESS	8	75	83	+837.5%
DRUGS-SELL	1	0	1	-100.0%
Totals	299	382	681	+27.8%

Appendix 5 (cont)
Detailed Drug Crime Statistics for Spokane

OND/TND Clusters in the Spokane Revitalization Zone

Description	1999	2002	Total	Change
DRUG EQUIPMENT	4	3	7	-25.0%
DRUG-DSTRB-HALLCGN	0	0	0	
DRUG-MANUF-AMPHTMN	0	0	0	
DRUG-MANUF-HALLCGN	0	0	0	
DRUG-MANUF-METHAMPTMN	0	0	0	
DRUG-NARC-OTHER	2	0	2	-100.0%
DRUG-OTHER-AMPHTMN	0	0	0	
DRUG-OTHER-COCAINE	0	0	0	
DRUG-OTHER-HEROIN	0	0	0	
DRUG-OTHER-METHAMPTMN	0	0	0	
DRUG-OTHER-MRJNA	1	0	1	-100.0%
DRUG-OTHER-SYNTH	0	0	0	
DRUG-POSS-AMPHTMN	6	0	6	-100.0%
DRUG-POSS-BARB	0	0	0	
DRUG-POSS-COCAINE	2	3	5	+50.0%
DRUG-POSSESS-HALLCNG	0	0	0	
DRUG-POSS-HEROIN	1	2	3	+100.0%
DRUG-POSS-METHAMPTMN	0	1	1	
DRUG-POSS-MRJNA	5	3	8	-40.0%
DRUG-POSS-OPIUM	0	0	0	
DRUG-POSS-SYNTH	1	0	1	-100.0%
DRUG-PROD-MRJNA	0	0	0	
DRUGS-DELIVER	0	0	0	
DRUG-SELL-AMPHTMN	0	0	0	
DRUG-SELL-COCAINE	0	1	1	
DRUG-SELL-HEROIN	0	0	0	
DRUG-SELL-METHAMPTMN	0	0	0	
DRUG-SELL-MRJNA	0	0	0	
DRUG-SELL-OPIUM	0	0	0	
DRUG-SELL-SYNTH	0	0	0	
DRUGS-MANUF	0	0	0	
DRUGS-OTHER	0	0	0	
DRUGS-PARA	0	0	0	
DRUGS-POSSESS	2	7	9	+250.0%
DRUGS-SELL	0	0	0	
Totals	24	20	44	-16.7%

Appendix 5 (cont)
Detailed Drug Crime Statistics for Spokane

Control Areas in the Spokane Revitalization Zone

Description	1999	2002	Total	Change
DRUG EQUIPMENT	8	9	17	+12.5%
DRUG-DSTRB-HALLCGN	0	0	0	
DRUG-MANUF-AMPHTMN	0	0	0	
DRUG-MANUF-HALLCGN	0	0	0	
DRUG-MANUF-METHAMPTMN	0	0	0	
DRUG-NARC-OTHER	4	1	5	-75.0%
DRUG-OTHER-AMPHTMN	1	0	1	-100.0%
DRUG-OTHER-COCAINE	0	0	0	
DRUG-OTHER-HEROIN	0	0	0	
DRUG-OTHER-METHAMPTMN	0	0	0	
DRUG-OTHER-MRJNA	1	1	2	0.0%
DRUG-OTHER-SYNTH	0	0	0	
DRUG-POSS-AMPHTMN	5	0	5	-100.0%
DRUG-POSS-BARB	0	0	0	
DRUG-POSS-COCAINE	3	1	4	-66.7%
DRUG-POSSESS-HALLCNG	0	1	1	
DRUG-POSS-HEROIN	0	0	0	
DRUG-POSS-METHAMPTMN	0	3	3	
DRUG-POSS-MRJNA	7	4	11	-42.9%
DRUG-POSS-OPIUM	0	0	0	
DRUG-POSS-SYNTH	1	0	1	-100.0%
DRUG-PROD-MRJNA	0	0	0	
DRUGS-DELIVER	0	0	0	
DRUG-SELL-AMPHTMN	1	0	1	-100.0%
DRUG-SELL-COCAINE	0	0	0	
DRUG-SELL-HEROIN	0	0	0	
DRUG-SELL-METHAMPTMN	0	0	0	
DRUG-SELL-MRJNA	0	0	0	
DRUG-SELL-OPIUM	0	0	0	
DRUG-SELL-SYNTH	0	0	0	
DRUGS-MANUF	0	1	1	
DRUGS-OTHER	0	0	0	
DRUGS-PARA	0	5	5	
DRUGS-POSSESS	1	2	3	+100.0%
DRUGS-SELL	0	0	0	
Totals	32	28	60	-12.5%

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