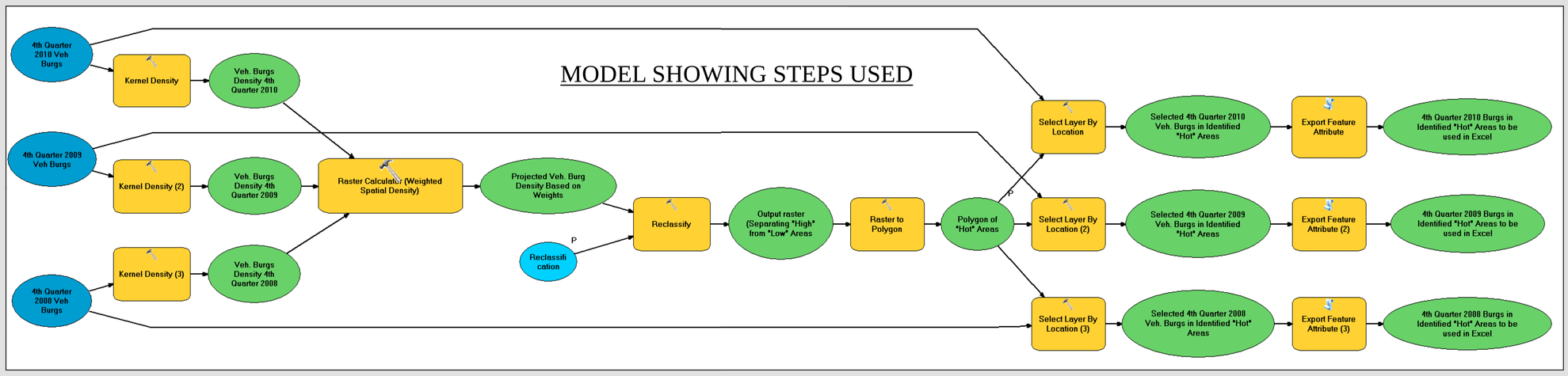
VEHICLE BURGLARIES - TARGETED ENFORCEMENT USING WEIGHTED HOTSPOTS
(Identification of Targets for 4th Quarter 2011)

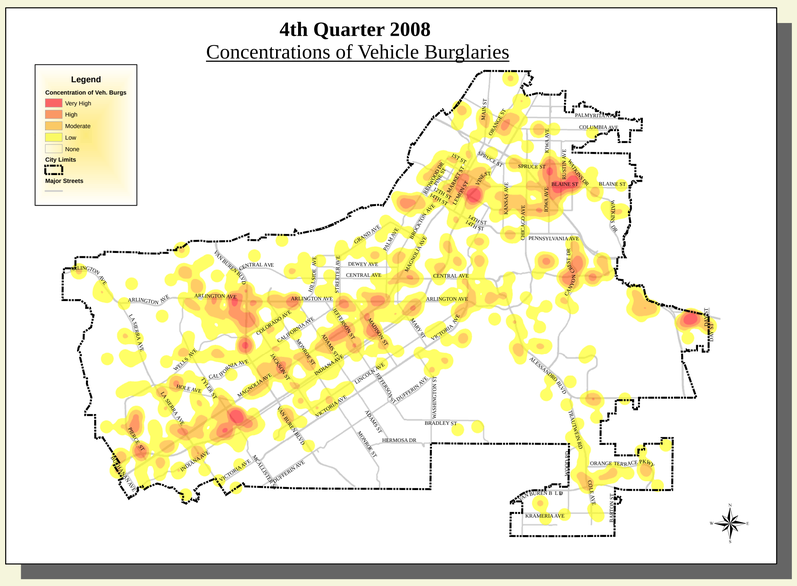
BACKGROUND

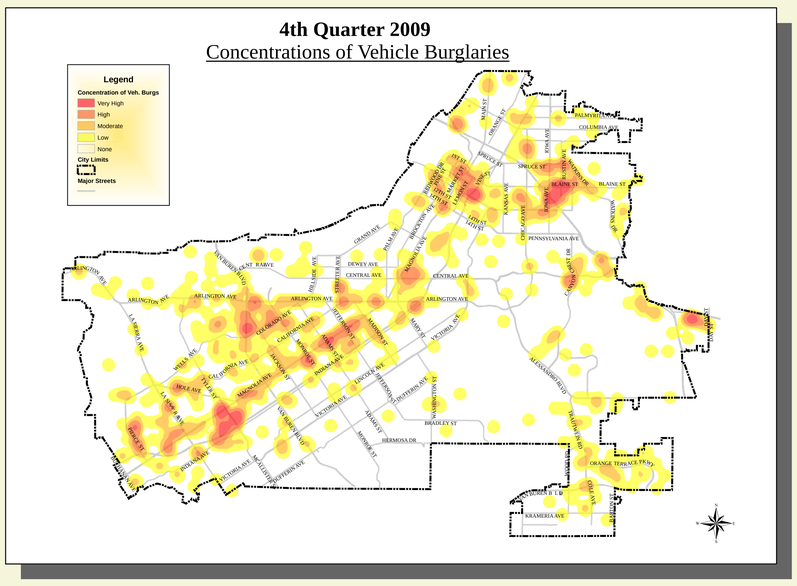
Given scarce policing resources and a move towards working smarter with innovative tools and analytics, the Crime Analysis Unit at City of Riverside is providing information to support targeted policing strategies. One of the methods developed is the use of weighted hotspots derived from previous year crime data to identify “Hot” specific locations and “Hot” address blocks. This map presentation illustrates the weighted hotspots approach as applied to vehicle burglaries.

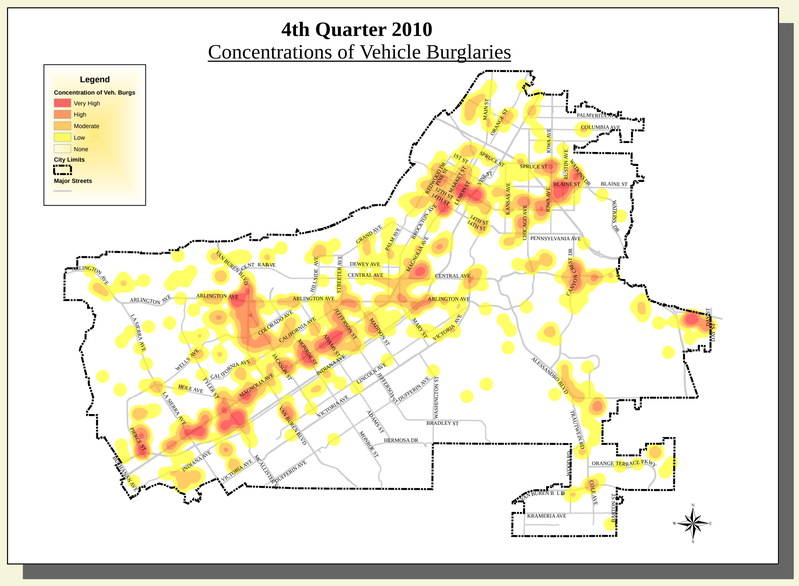


1.

The three maps below represent concentrations of vehicle burglaries for the 4th Quarter in the years 2008; 2009; and 2010. The Kernel Density method with a search radius of a quarter (1/4) mile was used. The Natural Jenks classification method is used to highlight the "areas of highest density as well as revealing subtle patterns" (Mitchell - ESRI Press) for each year. The objective is to highlight the concentration based on the data per year as opposed to using the same classification method for each year.

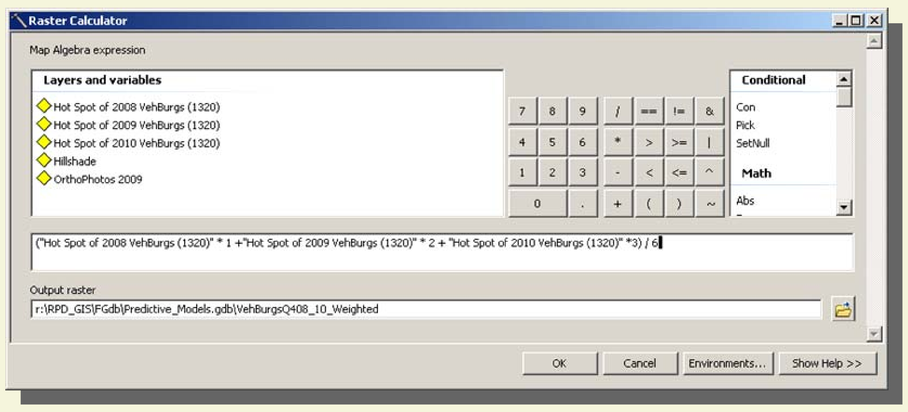






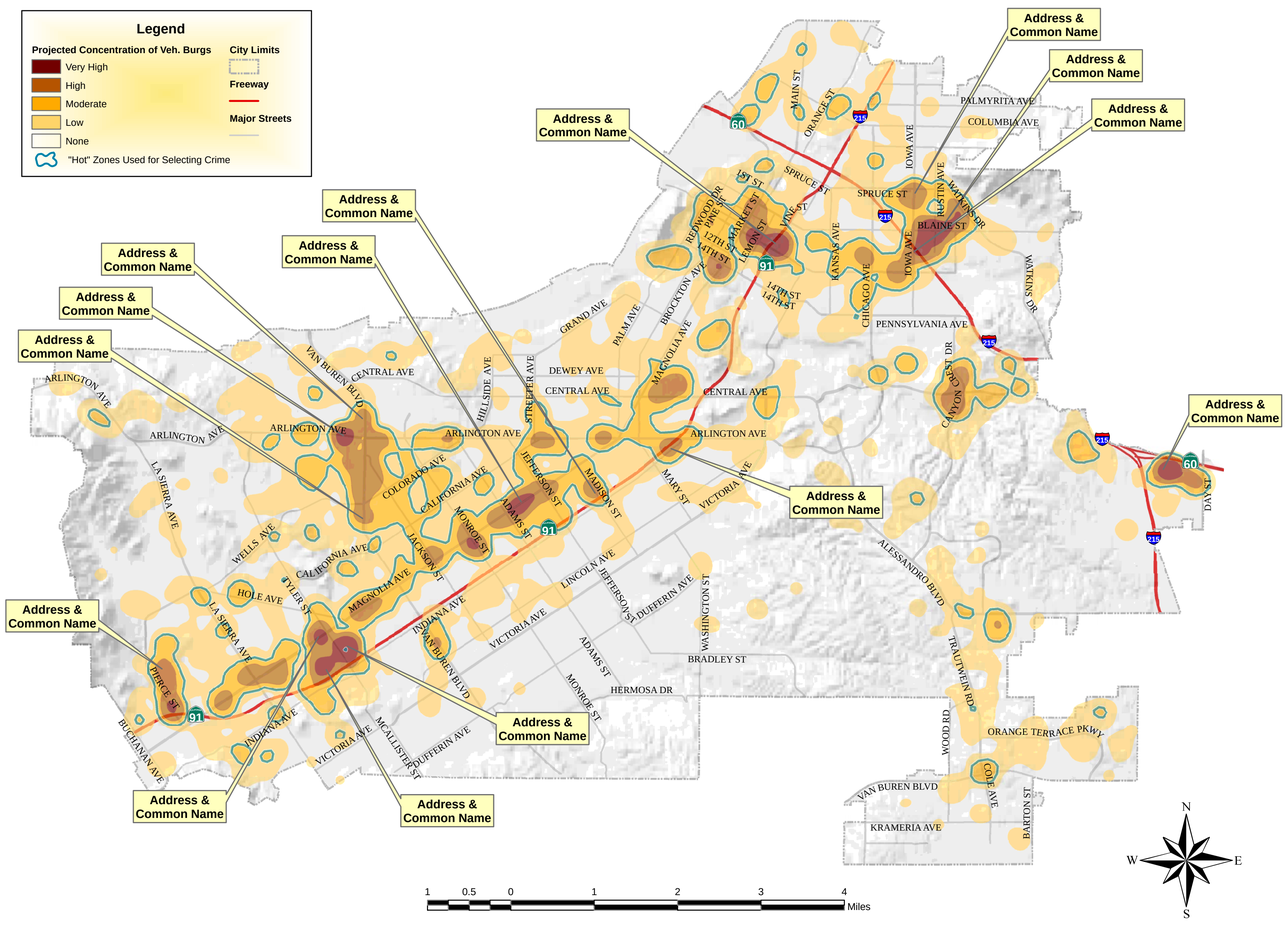
2.

Using the raster calculator in ArcMap, the hotspot data for the three quarters were assigned weights to derive a **Weighted Average Density**. The density for the 4th Quarter 2010 is assigned the highest weight. This is based on the assumption that locations of crime incidence in the most recent quarter play a more significant role in predicting crime in the current year’s quarter:2011.



3.

4th Quarter 2011 - Projected Concentrations of Vehicle Burglaries.
Locations with Ten or More Incidents are Labeled
((Note: For This Presentation the Addresses Have Been taken out))



The weighted average density map serves as a good visual for highlighting potential concentrations of vehicle burglaries for 2011. To add a quantitative dimension to the map, the medium to high concentration areas are converted from raster grids to polygons using the reclassify and raster to polygon tools.

Vehicle burglaries within the "hot" areas are then selected using the "hot" polygons and exported to Microsoft Excel for data mining. Summary heat charts are generated in excel showing hours of occurrence in places with high vehicle burglaries . These identified target locations are then overlaid on the hotspot map to make it more meaningful for policing. In addition, the data is summarized by address blocks to widen the scope of the target areas for vehicle burglaries.

Table 1. IDENTIFIED TOP ADDRESSES AND NUMBER OF VEH. BURGS BY TIME OF DAY

Location Name	Address	0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	Grand Total
1.	List of Top Addresses (Not Shown for this Presentation)	0	0	0	0	0	0	1	0	1	2	3	3	0	2	1	1	1	3	3	1	1	3	0	0	26
2.		1	1	0	0	0	0	2	0	1	4	1	1	0	0	1	1	2	1	0	1	1	0	1	2	21
3.		0	0	0	0	0	0	0	0	1	3	0	2	0	1	2	1	0	3	2	1	0	1	2	0	19
4.		0	0	0	1	0	0	1	0	1	1	0	1	0	2	0	1	1	1	4	0	0	0	0	0	14
5.		0	1	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	4	2	2	1	14
6.		1	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	1	1	0	2	2	0	0	2	14
7.		1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	8	14
8.		0	0	0	1	0	0	0	0	2	0	0	0	1	0	0	0	2	1	0	1	0	3	1	1	13
9.		3	1	1	0	0	0	0	0	1	0	0	0	0	0	1	1	0	1	0	0	0	0	4	0	13
10.		2	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1	0	0	1	1	0	1	0	12
11.		0	0	0	0	0	0	0	0	1	1	0	1	2	0	1	1	0	0	0	3	0	0	0	0	11
12.		0	0	0	0	0	0	0	0	1	0	0	1	0	1	1	0	0	5	2	0	0	0	0	0	11
13.		0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	0	0	0	1	1	1	1	2	10
14.		0	0	0	0	0	0	0	2	1	0	0	1	0	0	0	0	0	1	1	1	1	1	0	1	10
15.		0	0	0	0	0	0	0	1	0	0	0	1	2	1	0	1	1	2	0	1	0	0	0	0	10
	Grand Total	8	5	1	2	1	1	6	2	11	13	10	11	4	9	9	10	11	16	16	9	12	12	22	11	212

Table 2. IDENTIFIED TOP ADDRESS BLOCKS AND NUMBER OF VEH. BURGS BY TIME OF DAY

Block	0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	Grand Total
A.	0	0	0	0	0	0	0	0	1	4	0	3	0	3	2	1	0	5	3	3	1	1	2	1	30
B.	0	0	0	0	0	0	1	0	1	2	3	3	0	2	1	1	1	3	3	1	1	3	0	0	26
C.	1	1	0	0	0	0	2	0	1	4	1	1	0	0	1	1	2	1	0	1	1	0	1	2	21
D.	0	0	0	1	0	0	1	0	2	1	0	1	0	2	0	1	1	1	5	0	0	1	1	0	18
E.	0	1	0	1	0	0	1	0	1	0	3	1	1	0	0	0	1	0	2	1	1	2	1	0	17
F.	1	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	9	2	17
G.	1	0	0	1	0	0	0	0	2	0	0	1	1	1	0	0	1	2	1	3	0	0	2	0	16
H.	0	1	0	0	0	0	0	0	1	0	2	0	0	0	0	2	2	0	0	1	1	1	2	2	15
I.	0	1	0	0	1	1	0	0	0	1	0	0	0	0	1	0	0	0	0	4	2	2	2	1	14
J.	0	0	0	1	0	0	0	0	2	1	0	0	1	0	0	0	2	1	0	1	0	3	1	1	14
K.	1	0	0	0	0	0	0	0	2	1	0	0	0	0	0	1	1	0	2	2	0	0	2	2	14
K.	0	0	0	0	0	0	0	0	1	1	1	0	1	2	0	2	1	0	0	0	4	0	0	0	13
L.	3	1	1	0	0	0	0	0	1	0	0	0	0	0	1	1	0	1	0	0	0	0	4	0	13
M	2	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1	0	1	1	1	0	1	1	0	12
N.	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	3	1	1	4	0	0	1	0	12
O.	0	0	0	0	0	0	2	1	0	0	1	0	0	0	0	0	0	1	1	2	1	0	0	1	11
P.	0	0	0	0	0	0	0	0	1	0	0	1	0	1	1	0	0	5	2	0	0	0	0	0	11
Q.	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0	2	0	2	1	0	2	1	0	0	11
R.	1	0	0	0	0	0	0	0	0	3	1	2	0	0	0	0	1	0	0	0	1	1	1	1	11
S.	0	0	0	0	0	0	0	0	1	0	2	1	0	0	1	0	0	0	0	3	0	2	0	0	10
T.	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	1	2	3	0	0	10
U.	1	0	0	0	0	0	0	1	1	0	0	0	0	1	1	0	0	0	1	0	0	0	4	0	10
V.	0	0	0	0	0	0	1	0	0	1	0	1	0	0	1	0	0	1	1	1	3	0	0	0	10
W	0	0	0	0	0	0	0	0	1	0	1	0	1	1	1	0	1	3	0	0	0	0	0	0	10
Grand Total	11	8	1	4	1	2	9	2	20	19	16	17	7	15	13	13	17	25	27	25	23	21	37	13	346

List of Top ADDRESS BLOCKS (Not Shown for this Presentation)

List of Top ADDRESS BLOCKS

Crime Analysis Unit
City of Riverside Police Department, California.

Deliverables to Patrol and specialized units are the (i) Projected map overlaid with the target locations (ii) The heat charts for specific places and address blocks. Patrol officers and specialized units are now armed with information to support the targeted policing strategies. Crime Analysts have access to the data in excel to further analyze and routinely compare it to the current year's crime and advise if patterns remain consistent, if they change, and new patterns.