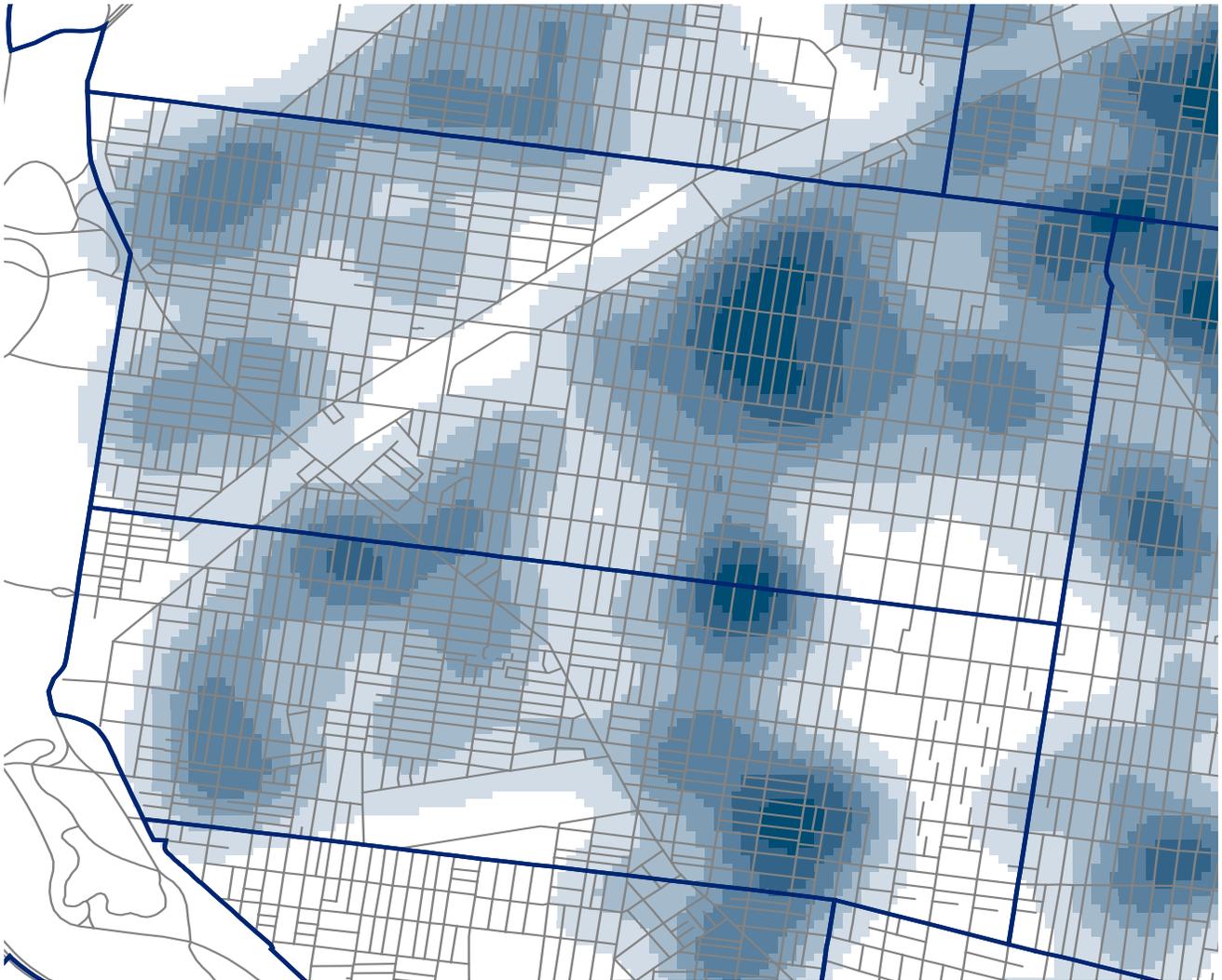# Jerry's top ten crime mapping tips

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# Crime Mapping: There are good maps, and there are bad maps…

At various conferences and visits to police stations I have seen quite a few maps, and some have been great - really well presented, laid out and prepared. Alas many have not been so great, and so I've put this page together as a brief guide to those perhaps less versed in the cartographic ways. You do not have to adhere to the guidelines here, but they might improve the readability and quality of your maps. If you do not follow these suggestions, MapInfo or ArcGIS will not self-destruct in a fit of cartographic rage, but this is part of the overall problem. The software does not understand your data and will let the user do just about anything the user wants - even if it is wrong. Hope you find this helpful.

By the way, if you are confused and perplexed by the concept of sarcasm, feel free to scroll down to the vanilla version for earnest types that follows the next section…

Ten tips to make your maps more 'interesting'

Tip 1: Do not include a scale bar
This will make it much more interesting as your map readers have to guess the distance between objects. One of the main purposes of mapping crime is to compare areas and examine the proximity of objects, so why make it easy for the uninitiated to understand you map? Without a scale bar nobody will have a clue how far things are apart and this gives you the opportunity to have impromptu quizzes or make things up as you are presenting. If you accidentally include a scale bar use a scale that goes; "0 ----- 6.75 ------13.25 kilometers" instead of the usual "0 ---5 ---10" or similar. Big complex numbers really impress audiences, and you want to look your most clever.
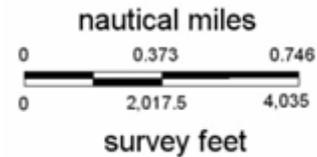
Tip 2: Do not include a North arrow
Hundreds of years of cartographic tradition have no place in the new millennium - we are in the digital age and therefore all maps automatically have North at the top: even if we have to rotate the map to get it to fit on the page. Anyway, if you have visitors from outside your suburb, city, or country, why the hell should they want to know which direction is North, so they can orientate themselves? They probably are not interested anyway.

Tip 3: Use jargon and special codes in the title of the map
Including special codes and police service jargon in the title of your map will make it, and you, look more professional. A title such as "B-type crimes for sectors GF and YTU for shifts R4 and R5" really impresses audiences. Make sure you also use dates in a mixture of European and American format at international conferences (without telling the audience which you are using). After all, 10/10/00 is the same either way, and what can the rest of the world teach us anyway? Better still, don't have a title at all (or have one that warbles on for three or more complete lines), and never put your name on it - that way there is nobody to blame (for examples of a good choice of title see legend in tip 7 below).

Tip 4: Find the color palette, and use every one
Color is what maps are all about. Use as many colors as you can find. There really are no rules about inappropriate choices of color, so bright cheerful pinks are fine for displaying child murder sites. If you have interesting symbols at particular places (such as body dump locations) try and de-emphasis them by making the background color glaring and bright. This will detract from your murder sites and make the viewer only see the underlying light industrial land use - much more important. Other features such as roads and railways and national parks are probably not very relevant, but they fill up the map nicely so give them a bold, bright color. This will further detract from your important points and distract the viewer - making them think there is less crime.

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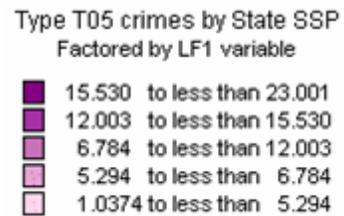**Tip 5: Don't worry too much about understanding your data**
The important thing is the presentation and the display. Don't worry about showing maps with dots all over the place, often obscuring other dots. The audience will get the general picture and do not need complicated things like graduated circles to show how many crimes have occurred at the same place. This is just pedantic mapping for airy-fairy academics. Especially do not worry about it when showing maps of repeat victimization - everybody knows that these crimes happen at the same place and there is no need to show it on a map. Also, if you can only geocode to the level of a thousand feet, show the viewers the very best detail you can, right down to the street corner. Let "spurious accuracy" be your guide.

Tip 6: Make the most of thematic mapping
Those automatic thematic map menu items are there to be used as much as possible, and negate the need to really understand what they do. After all, it always looks great so it must be right! If you have a numerical variable, use the graduated circle. I especially like those maps that show the time of day of an offence as a graduated circle. The bigger the circle - the later in the day. My favorite! Another one is to use the bar graph function when comparing big number and little numbers. You can never see the little bars unless your nose is against the screen - how that one makes us all laugh in my office!

Tip 7: Legends have had their day
There was a time for legends, but it has most definitely gone. In modern cartography - especially for presentations, you will be there to explain the symbols and the values associated with different colors. And if you forget, don't worry - the audience will understand. Hey, we've all done it. If you have to be passé and include a legend, then for color shaded areas use impressive looking numbers such as "3.01453 to less than 6.03215", instead of "3 to less than 6". This will impress the audience no end as you obviously have a grasp of quantum arithmetic.

Type T05 crimes by State SSP
Factored by LF1 variable

■	15.530 to less than 23.001
■	12.003 to less than 15.530
■	6.784 to less than 12.003
□	5.294 to less than 6.784
□	1.0374 to less than 5.294

Tip 8: Caveats look weak
You are out there to impress with your map. Having a caveat, especially for the geocoding rate, looks weak and as if you have not put enough effort in. To suggest that you have not been able to map every point will make you look bad next to all the other crime mappers who must obviously be better at it than you. After all, how can you make a good impression if you have data error. It is not like everyone else has the same problems.

Tip 9: Get as much information onto a map as possible
Maps take time to produce so it is important to squeeze as much information on them as is possible. This is especially true for maps with symbols. Try and use more than 5 different types of symbol on a map, and ideally make them roughly the same size and color. It would be unfair to give additional weight to one, so make them as indistinguishable as possible. If you can make them illegible from the back of a room on a PowerPoint presentation then that also helps. You could also try and disguise unhappy symbols like the locations of robberies and murders with unrelated symbols such as public lavatories and libraries. This can of course work both ways, it might suggest that there have been a lot of robberies, but most of your viewers will be fooled into thinking your area is well stocked for public utilities.

Tip 10: Never let anyone photocopy your map
A map is a work of art and should never be disseminated - ever. Stick it on the wall in the office, and use it in presentations but never let it out of your sight. Someone might take it down from the wall and photocopy it - ruining the whole point of the thing. The best way to teach them not to use your work is to make symbols and background colors roughly the same shade. A mid-blue and a mid-red blend nicely in color, producing a pleasing effect on the eye, but are indistinguishable when photocopied into grayscale. That will teach'em to steal your maps!

10 REAL Tips to improve your maps

OK, same tips – no sarcasm…

Tip 1: Include a scale bar
A map is all about geography, and what is the point if a map reader can not tell how far one place is from another? Use sensible numbers such as 0 - 5 - 10 kilometers, and adjust your scale bar accordingly. Be careful of this when using automatic scale bar creating programs. If you are presenting to an international audience, they might appreciate a map showing miles and kilometers. 5 miles is about 8 kilometers.
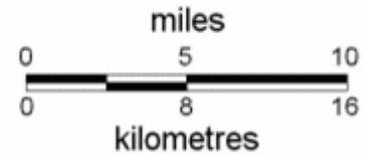
Tip 2: Include a North arrow
It may not seem much, but it takes up very little room, is easy to do and does help many viewers. If you are a MapInfo user, try the '%' equivalent in the font MapInfo Arrows that came with the software. It is accessed by pressing shift-5. It is a clear and easy to read North arrow. Some people say there is a limit to the value of North arrows - for example, it is probably not necessary to show a North arrow on a map of the whole of the US (most people know Canada is on top in so many ways!!). If in doubt, include a North arrow.

Tip 3: Simple and clear titles
Don't forget a title for your map, and use a simple one that means something to a wide range of people. You never know who will use your map later on and may misinterpret what they are seeing (alas, I speak from experience). When deciding on a title, use the KISS principle (Keep It Simple Stupid!). Often the type of crime, the place, and the date range - is enough. An explanatory sub-title can be helpful.

Tip 4: Use color carefully
Color is a marvel - that should be used sparingly. Think about how appropriate your color use is, and use color for those things that you want to emphasize. Strong colored backgrounds tend to destroy any hope of seeing symbols on top of them. Try and use paler (more insipid?) backgrounds to shade regions (if they have to be shaded at all) with dark or bold bright symbols over them. Don't be afraid to experiment (and make improvements), but remember the maxim "less is more". You might also want to view the companion web pages on color and presentations.

Tip 5: Really understand your data
Know what you are presenting, and understand the limitations of the data. This is especially true if you are presenting maps of data created by someone else. Having a map showing minute by minute burglary patterns is useless if your burglary data (like most) has start and end times hours or days apart. Repeat victimization is also a real consideration and most GIS will simply place one dot on top of another. Either do something about this, or at least be prepared to explain it to your audience, either in a caveat or in person.

Tip 6: Use thematic mapping cautiously
Thematic mapping really simplifies what used to be a complex procedure, but the automatic settings used by most GIS still leave a lot to be desired. The automatic settings when making maps using 'quantiling' or 'equal count' for example, tend to end up with categories that use fractions that, while technically accurate, mean little to most viewers. Be prepared to customize them to more sensible values. GIS are also stupid in that they will let you make choropleth maps of things that should just not be mapped in that way. The automatic features should not be invoked without understanding your data and the thematic map processes. Graduated symbols such as circles should only be used to denote increasing values of something (e.g. value of goods stolen, or number of burglaries at a location), while area mapping is better at showing proportional rates (assaults per 100,000 people) than raw rates, as the map can be skewed by different sized areas and therefore populations.

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Tip 7: Legends are generally essential

A legend is essential if you have any type of shading or symbology. It will also help you to remember what the map portrays months later. Stick it in an unused portion of the map, or on its own, but make sure it is somewhere. Use sensible numbers. 1 to less than 5 means something to most people. 1.000325 to 2.4352 is in the realm of nonsense, unless you have a very technical audience. In fact, I know a few technical people and they get offended by this. If you have complex numbers, you could always change the scale from 'low criminal activity' to 'high criminal activity' (or similar) and lose the numbers. The audience will appreciate it.

Burglaries by region

20 to less than 25
15 to less than 20
10 to less than 15
5 to less than 10
1 to less than 5
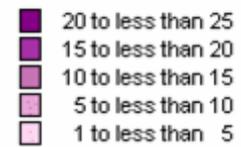
Tip 8: Caveats mean you are not lying

To make a map with a title saying; "Melbourne burglaries, 1998" implies that you are mapping all of the recorded burglaries. However it is still an unfortunate reality that geocoding rates are rarely 100% and you should inform the reader of the real rate, and any other caveats. This is especially the case if the geocoding hit rate is less than 95%. It saves embarrassing questions later, when someone points to an area of known burglaries that is featureless due to geocoding problems. You should append the caveat to the map itself, as maps and text can often be separated by others, either by accident or design.

Tip 9: Limit the information you show

As map complexity increases, a limit is reached beyond which map comprehension in the reader actually decreases. Sometimes it might be better to produce two or more maps instead of one monster that loses all meaning. The human being can differentiate about 5 different types of symbol at a glance, and any more needs to be constantly checked back to the legend. Why put them through that? Also consider the function of additional features such as national parks, public toilets & railway lines. Are railway lines relevant and therefore necessary to your map? If you suspect that burglars are using them to gain access to properties then perhaps yes, but they are hardly relevant for a map of drug sale locations.

Tip 10: Check the map appearance in grayscale

If you map is a real success then it will be copied and disseminated - this is the real mark of success. Unfortunately until color photocopiers become standard you should run your map under a photocopier to see what comes out of the other end. This will give you an idea of what becomes indistinguishable or illegible after reproduction. Small, italicized text is particularly vulnerable, as are similar shades of color.

I'm sure you could come up with another ten or even hundred useful map tips. These have been compiled after having looked at hundreds of maps, and trying to decide which were the most common and more serious errors. It is meant to be used as a helpful document, not a definitive statement of worldwide cartographic quality.