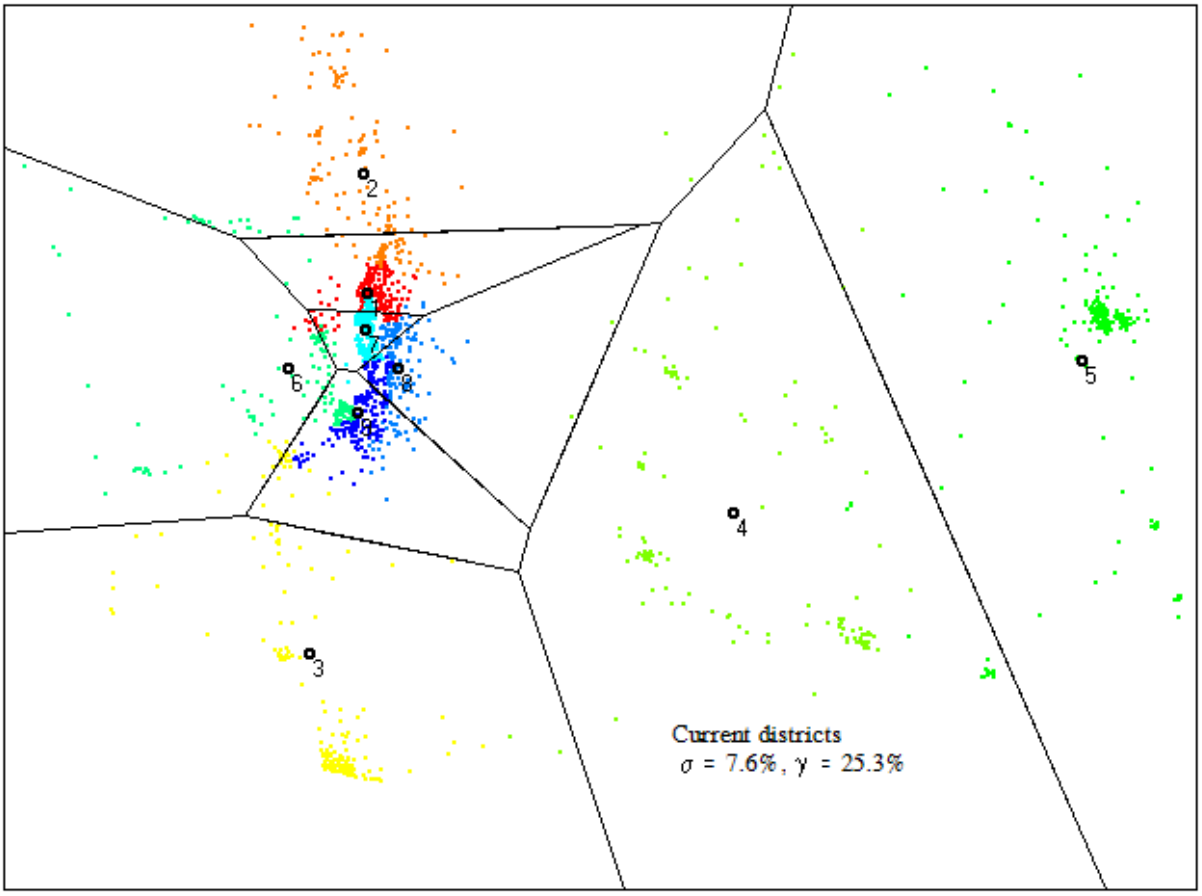
From:	Jim Burrows
To:	zzRedistricting Commission Voicemail
Subject:	10th Congressional district
Date:	Thursday, June 16, 2011 8:53:38 PM
Attachments:	nine.png ten.png nine.png ten.png

I'm Jim Burrows, phD math, and Boeing retiree. I gave a short talk at the Seattle forum on
June 13. I described mathematical redistricting and showed the commissioners two pictures about the
application of this to Washington's 2010 congressional redistricting with the placement problem of the
new 10th district.

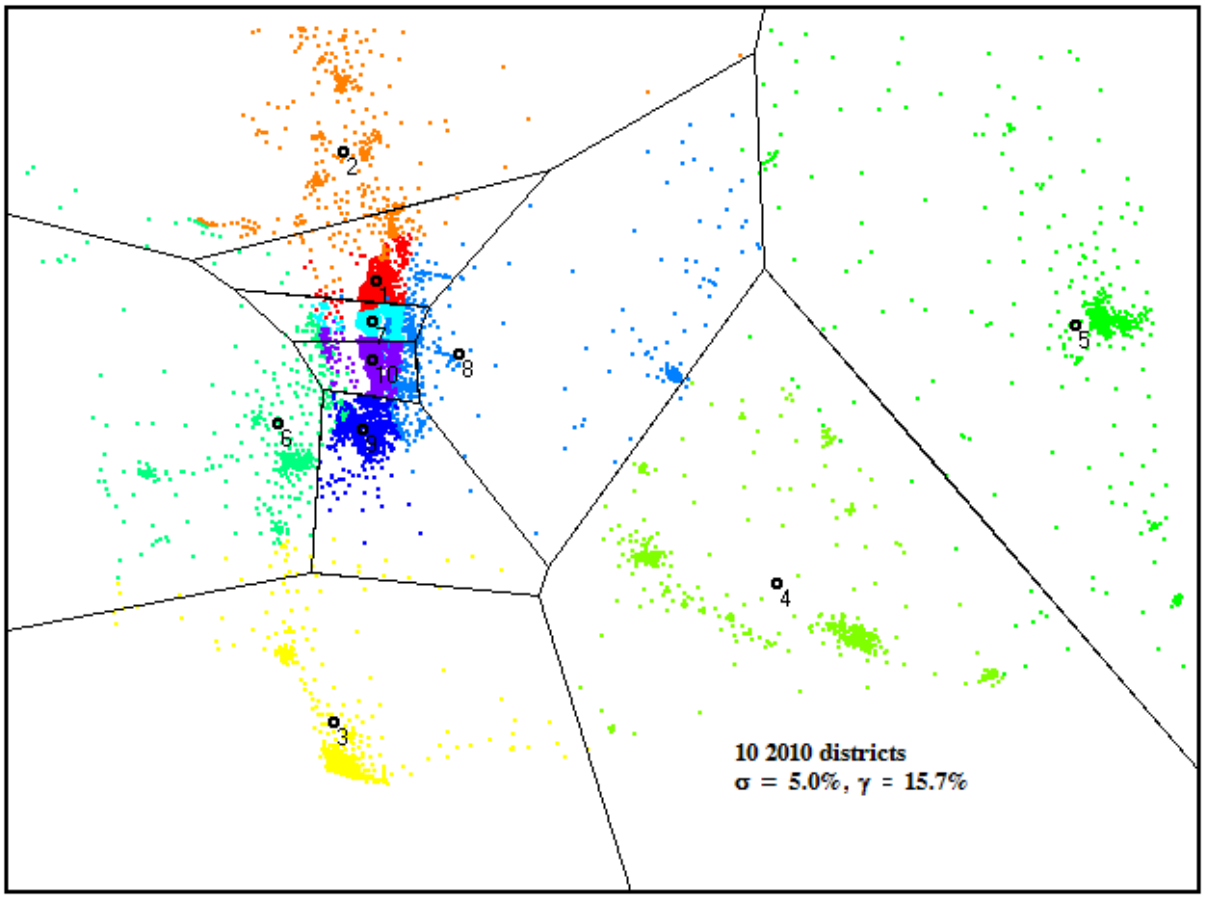
The first picture shows the 2000 congressional districts.



The dots are the 2000 census tracts colored according to their assignments to the 9 districts. s
is the standard deviation of the districts' populations. That number can be regarded as the magnitude of
the violation of "one person-one vote". According to the US and WA constitutions, s should be "as
small as possible".

The small labelled black circles are the districts' population centers. The black straight lines are
not district boundaries, they are simply lines halfway between adjacent district population centers. Some
tracts are on the "wrong" side of a line, for example, the blue dots of district 7 above the line halfway
between districts 1 and 7 "should" be in district 1, and red district 1 dots below the line should be in
district 7. g = 25.3% is the percent of population on the wrong sides and this number can be regarded
as the violation of district compactness, thus the violation of the WA constitutional requirement that
districts be "compact as possible". Tom Delay's famous 2004 gerrymandered Texas districting plan had
g = 47%!

This picture shows the result of processing the 4766 2010 census block groups to obtain 10
congressional districts.



The first step was to draw 9 lines perpendicular to the principal axis of the set of block group points so that the total population between each line was as equal as possible (s was 0.4%).
The g for this set of "districts" was huge, 54%. g can be reduced by doing a series of

block exchanges,
for example, if block a is closer to district B's population center and block b is closer to A's, the blocks
can be exchanged to reduce g. Carrying this out resulted in s = 6.1% and g = 17.6%. A last
adjustment was to reduce s slightly by moving blocks from a district to an adjacent district with smaller
population, resulting in the s and g shown in the picture.

The final step was to rename the new districts so that their centers of population were as close as
possible to the current centers. It turned out that only two new districts, 7 and 10, were closest to one
old district, 7. Of the two, 7 was closest, so its name was unchanged and the new district 10 turns up to
be in the Seattle area.

Regards,

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