

# What does **QUALITY** mean?

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Corcoran

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**Our work is concentrating on**  
**POINTS/POLYGONS – not polylines or roads**

**Muki Haklay @ UCL**

**Oliver O'Brien @**  
**<http://oliverobrien.co.uk>**

**Dmitri Toropov. @ SOTM 2010**

**Alex Zipt @ Heidelberg**

An OSM-er claims OSM is good quality to his GIS friends....



**SUDDENLY**

Evil Monkeys

quality, *n.* and *adj.*

**8. a.** Originally: the nature, kind, or character (*of* something). Later: the standard or nature of something as measured against other things of a similar kind; the degree of excellence possessed by a thing.

**quality of life:** the standard of living, or degree of happiness, comfort, etc., enjoyed by an individual or group in any period or place; an instance of this. †**in the quality of** (quot. 1794): in the manner of (*obs.*).

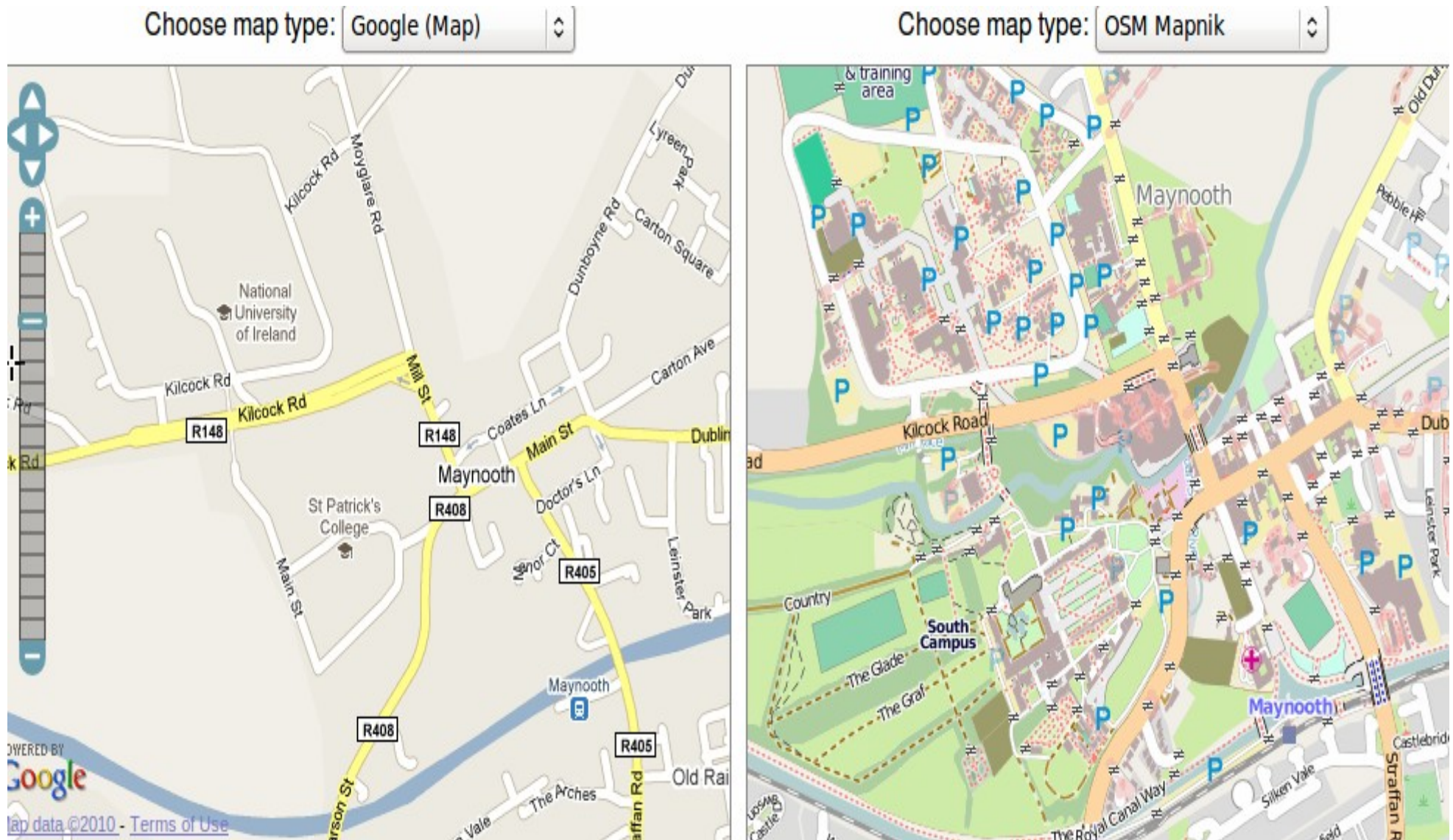
**1398** J. TREVISA tr. Bartholomaeus Anglicus *De Proprietatibus Rerum* (BL Add.) f. 304, Colour nedeþ light þat schyneþ in dede to prente þerby þe qualite of þe colour. **1425** *Mandeville's Trav.* (Egerton) (1889) 59 A man may gyffe no couenable penaunce bot if he knawe þe qualitee and þe quantitee of þe synne. **1475** tr. C. de Pisan *Livre du Corps de Policie* (Cambr.) (1977) 111 To geue you a clere vndirstonding of the qualitees of theis twoo passions. **1570** J. DEE in H. Billingsley tr. Euclid *Elements Geom.* Pref. sig. \*ijj<sup>v</sup>, An other liquid Medicine I haue: whose Qualitie, is heate, in the first degree. **1630** tr. G. Botero *Relations Famous Kingdoms World* 190 The English Gentleman..judiciously determineth his manner of satisfaction, according to the quality of the offence. **1650** R. BAXTER *Saints Everlasting Rest* (1662) I. iv. 22 It is so little I know of mine own soul, either its quiddity or quality. **1734** *Treaty Eng. & Russ.* in N. Magens *Ess. Insurances* (1755) II. 592 The Brackers shall be answerable for the Quality of the Goods. **1751** *Let.* 4 Dec. in *Beekman Mercantile Papers* (1956) II. 553 Our Flower was all heavy and of an extraordinary good quality. **1794** J. HUTTON *Diss. Philos. Light* 272 This principle of fire moves, in the quality of light, with the most amazing velocity. **1841** R. W. EMERSON *Ess.* 1st Ser. vii. 188 There is more difference in the quality of our pleasures than in the amount. **1879** G. C. HARRIS *Eyesight* viii. 114 It is on account of the quality, rather than the size, of English print, that it is usually so

Results

Entry

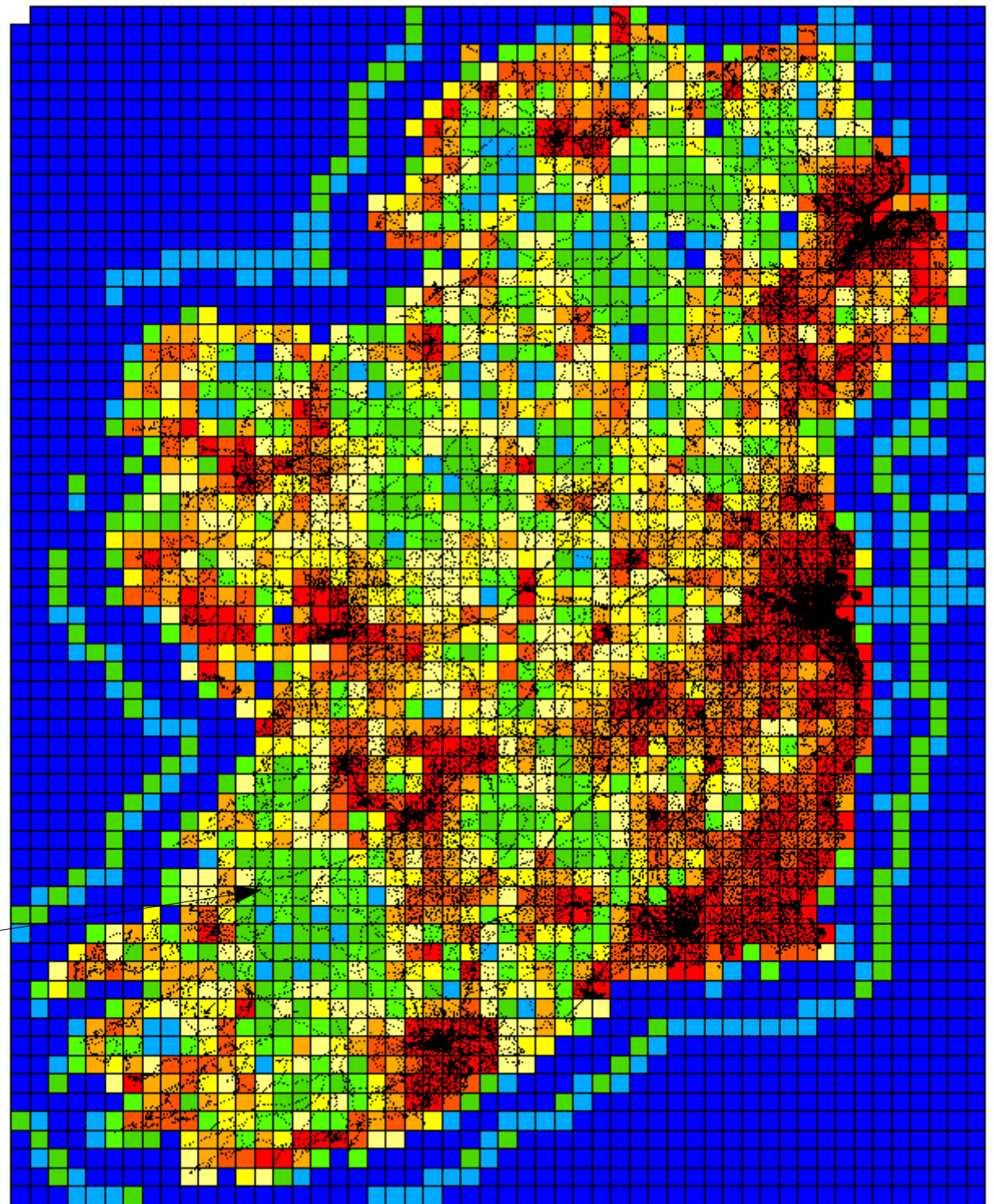
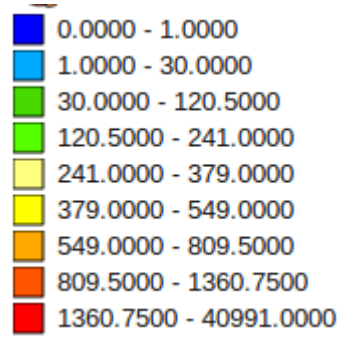
qualifying, *n.*qualifying, *adj.*qualimeter, *n.*qualisign, *n.*qualified, *adj.*qualitative, *adj.*Qualitätswein, *n.*qualified, *adj.*qualitive, *adj.*quality, *n.* and *adj.*quality, *v.*quallmire, *n.*qually, *adj.*qualm, *n.*<sup>1</sup>qualm, *n.*<sup>2</sup>qualm, *n.*<sup>3</sup>qualm, *n.*<sup>4</sup>qualm, *v.*<sup>1</sup>

# OSM often benefits from dedicated local interests...



<http://tools.geofabrik.de/mcl/>

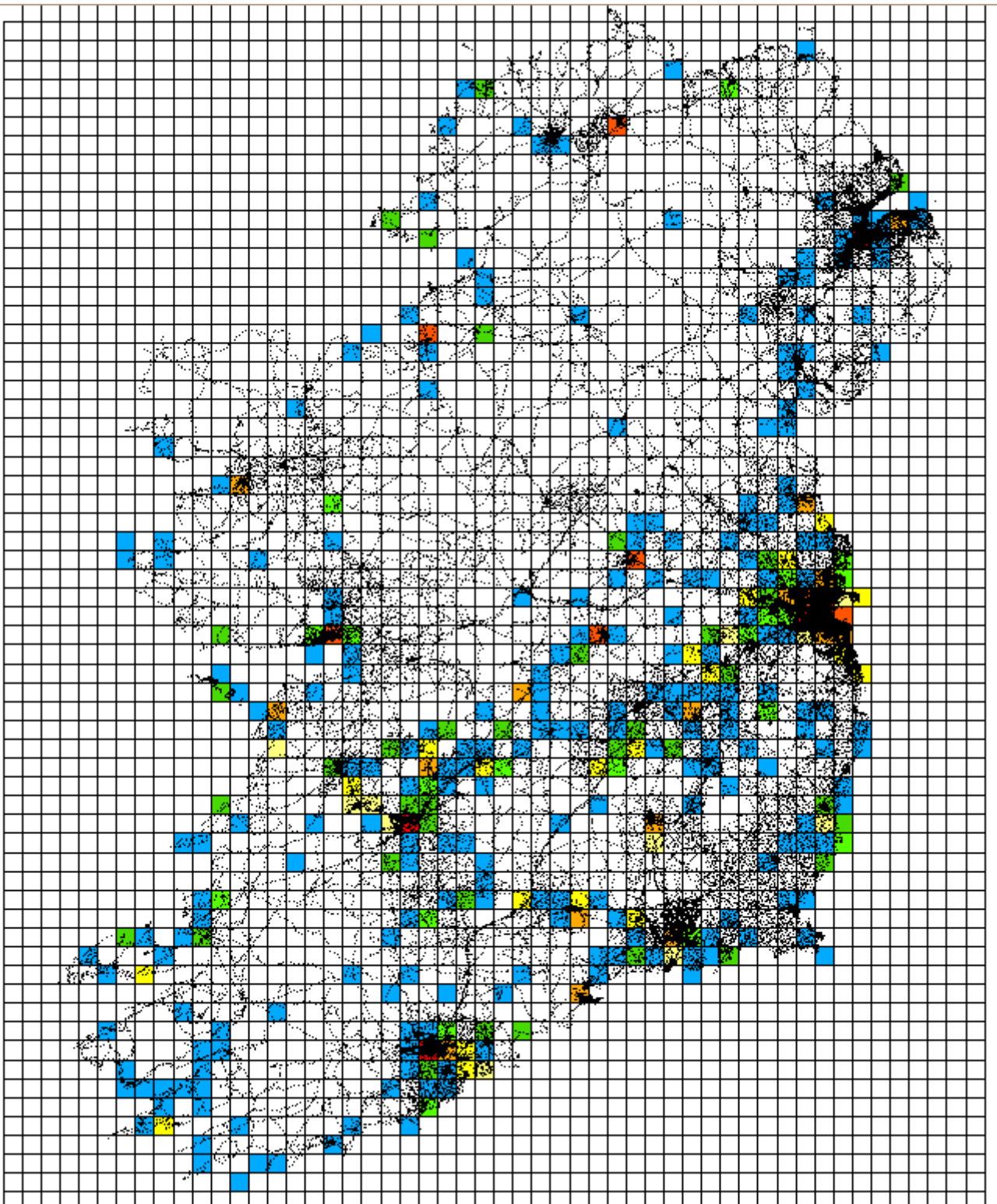
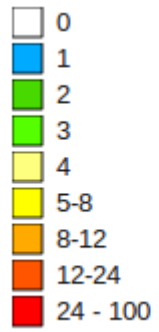
# Number of Points



How many Points we have in Ireland in OSM Database?

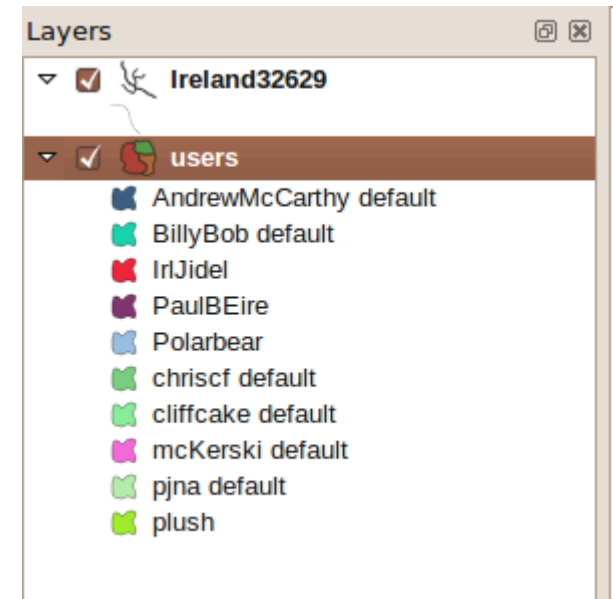
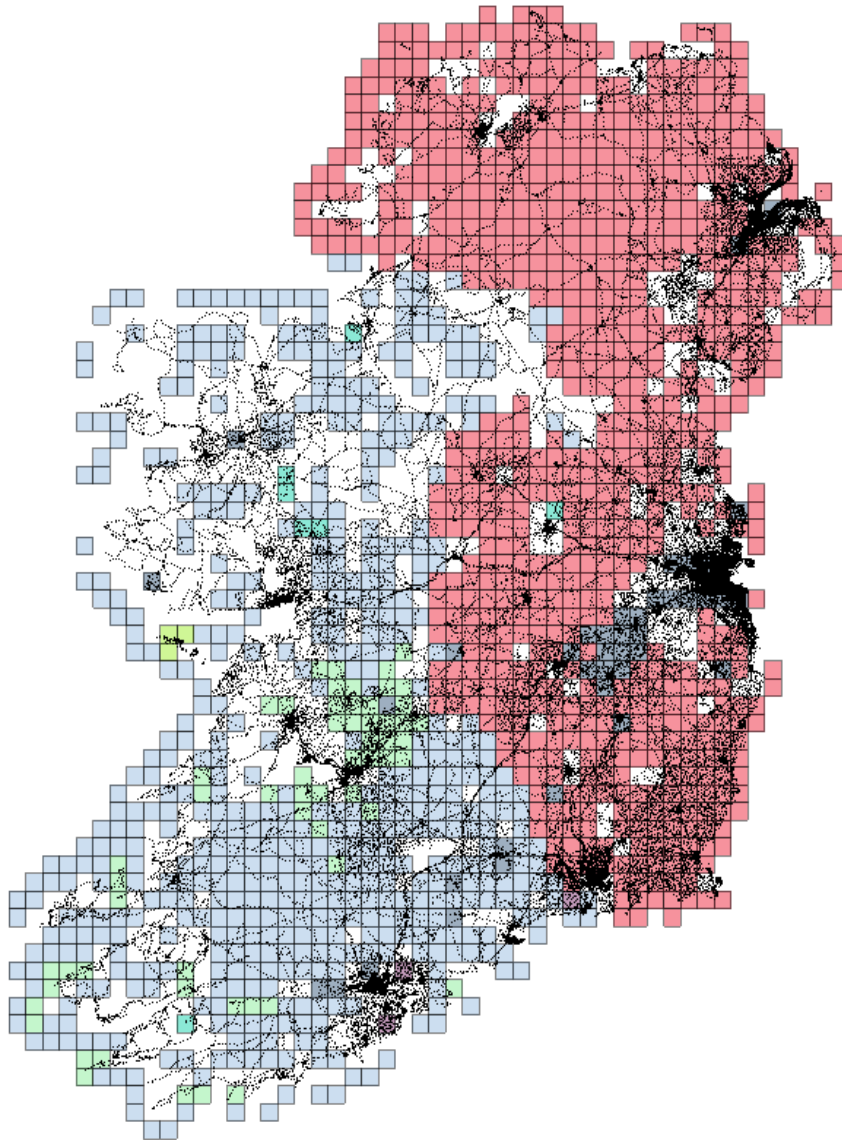
5x5km boxes

# Number of Pubs

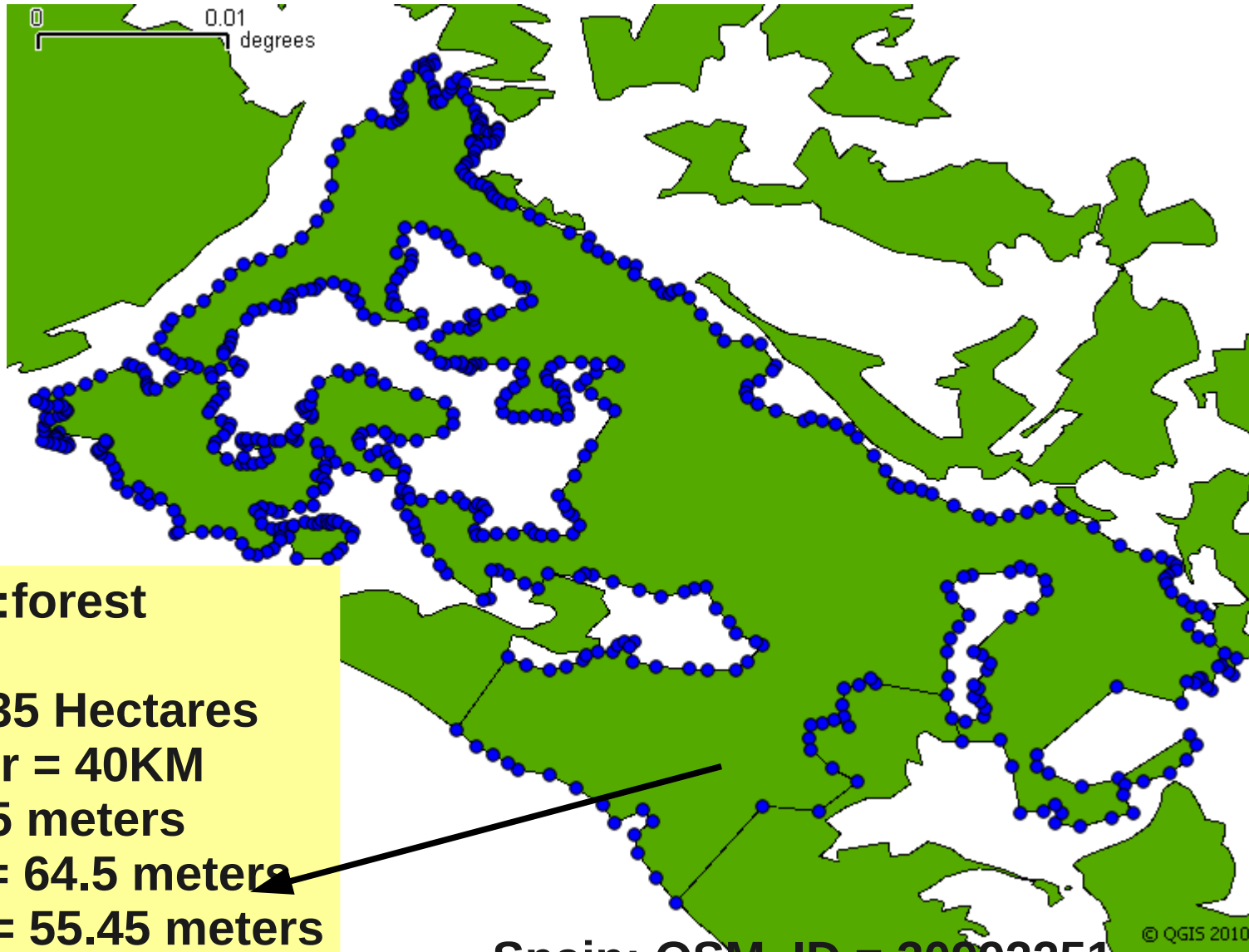


# Number of Pubs in Ireland

# Ireland OSM - Polygon Editors – Several Users are dominant contributors



# Representation of a polygon concerns how it was sampled for OSM upload



**Landuse:forest**

**N = 629**

**Area = 735 Hectares**

**Perimeter = 40KM**

**P/N= 63.5 meters**

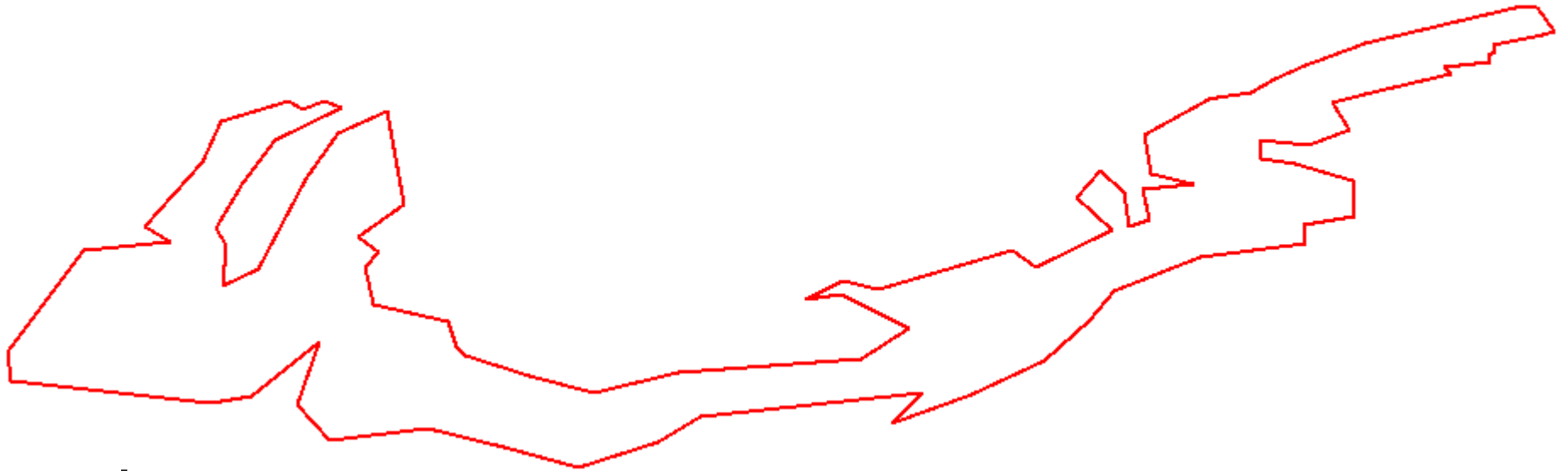
**Mean D = 64.5 meters**

**Std-dev = 55.45 meters**

**Max D = 672 meters**

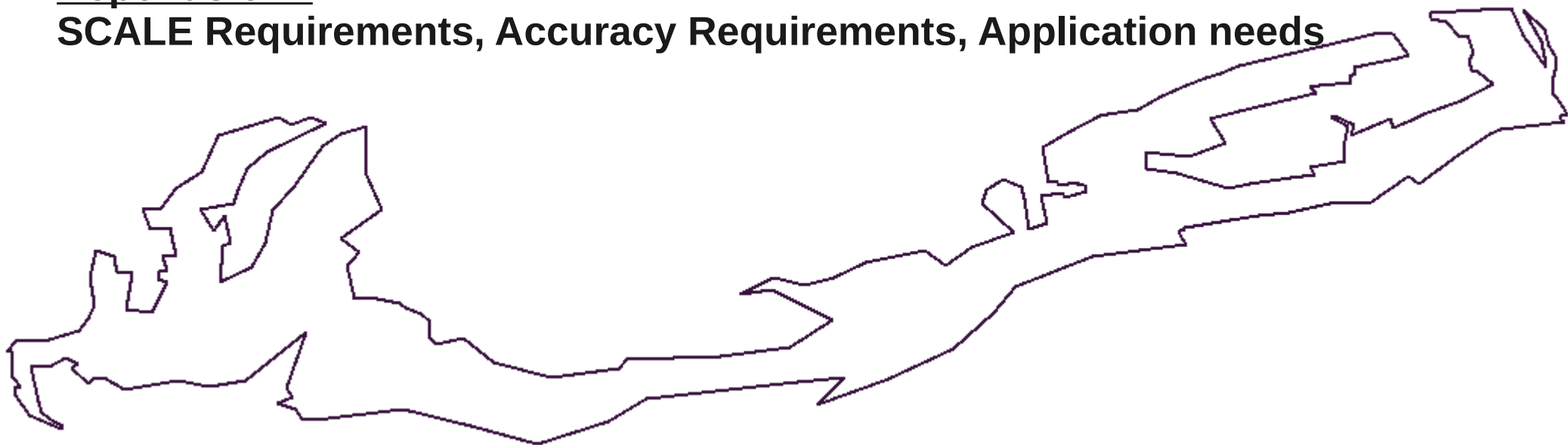
**Spain: OSM\_ID = 30992251**

# Which is better for LBS? Two versions of the same polygon



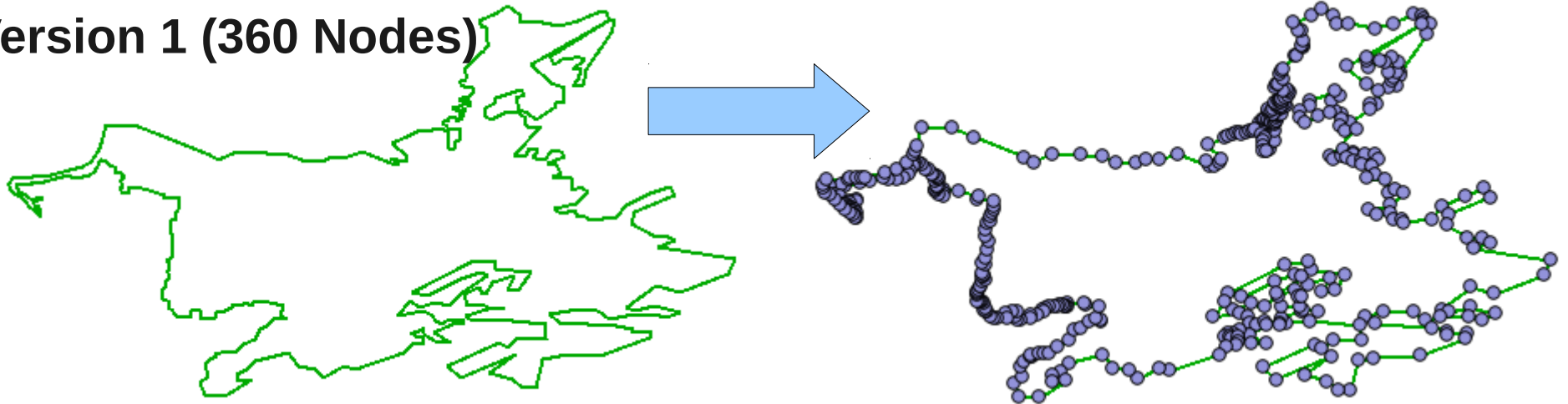
Depends on:

**SCALE Requirements, Accuracy Requirements, Application needs**



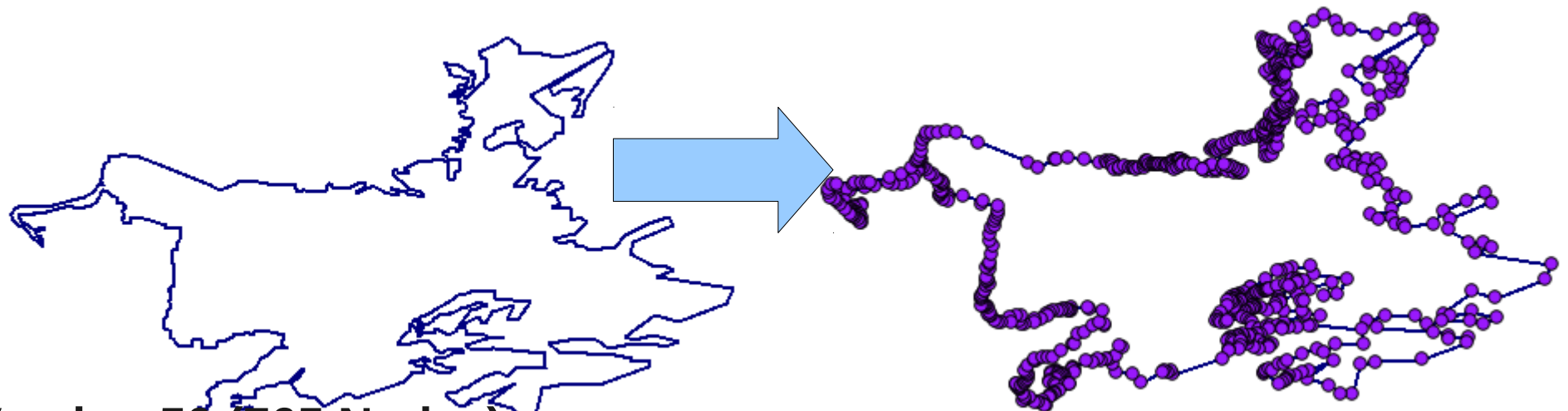
# Different editors of data – different ideas (representations)

Version 1 (360 Nodes)



Area difference < 1%

Version 50 (765 Nodes)



# Experiments

- **646 polygons** (water, forest, wood, farms, etc)

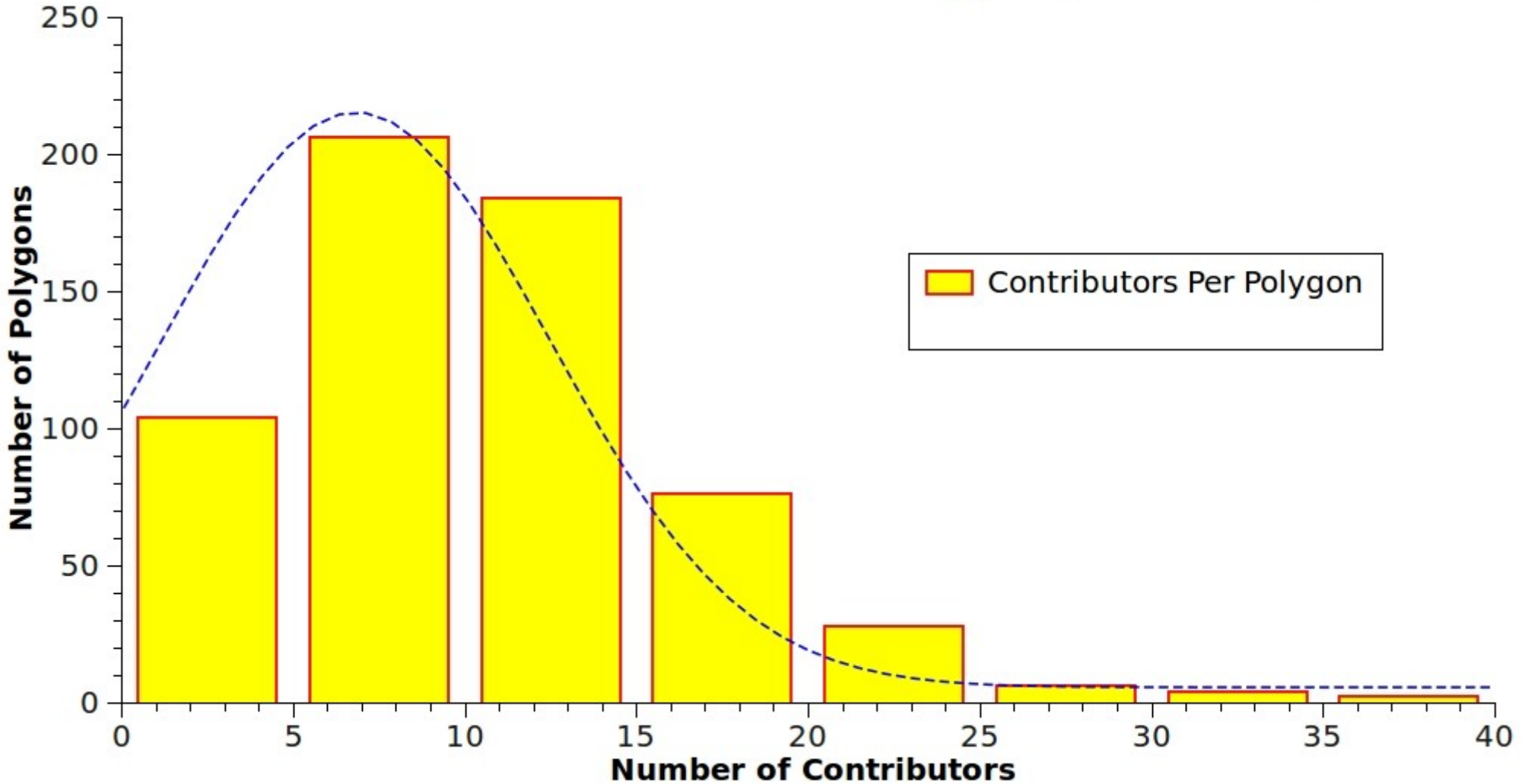
Polygon Status	Number of Polygons
V1 (Closed) Vfinal (Closed)	68%
V1(Open) Vfinal (Closed)	31%
V1(Open) Vfinal (Open)	< 1%

Number of Polygons	Editing Lifespan
68 (11%)	> 3 Years
368 (57%)	> 2 years < 3 years
170 (26%)	> 1 years < 2 years
40 (6%)	< 1 year

- Polygons from France, Ireland, England, Germany, Czech Republic, Switzerland, Finland, Austria, Lithuania

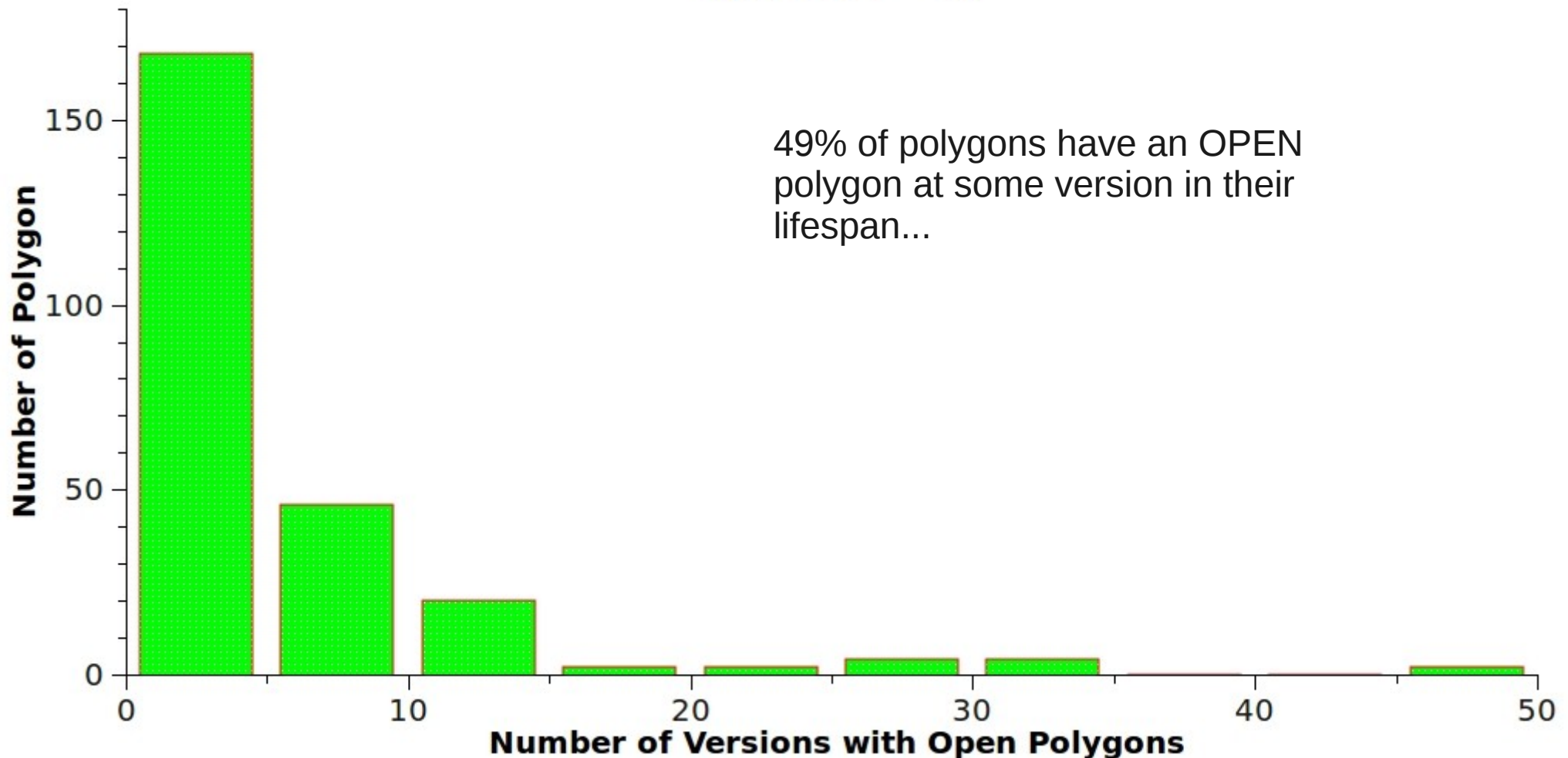
# 85% of polygons have $> 5$ contributors

Number of Contributors Per Polygon (Bin size = 5)

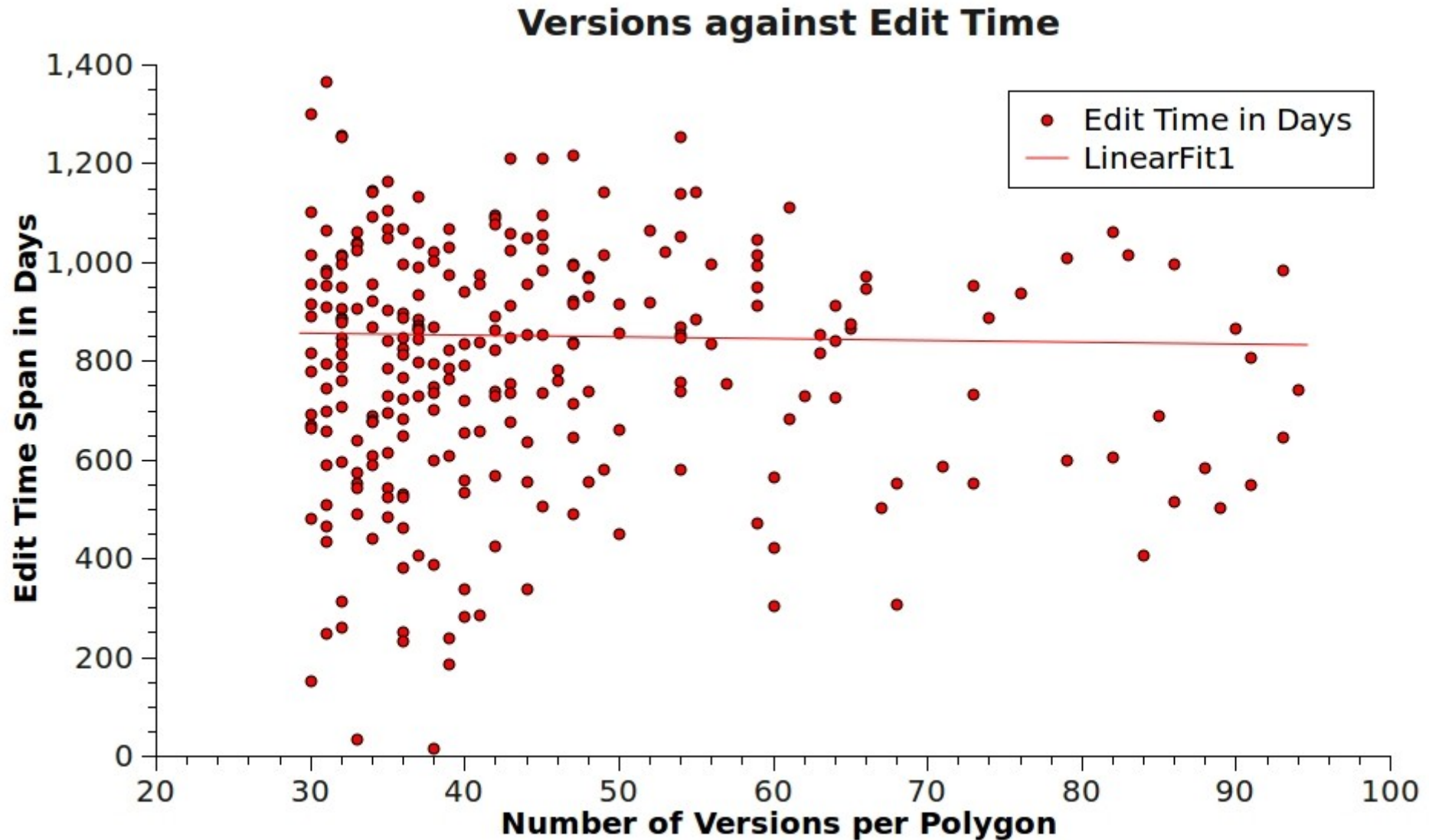


# “Open” polygons are contributed but are usually corrected quickly

**Presence of non-closed (Open) Polygons  
(Bin size = 5)**

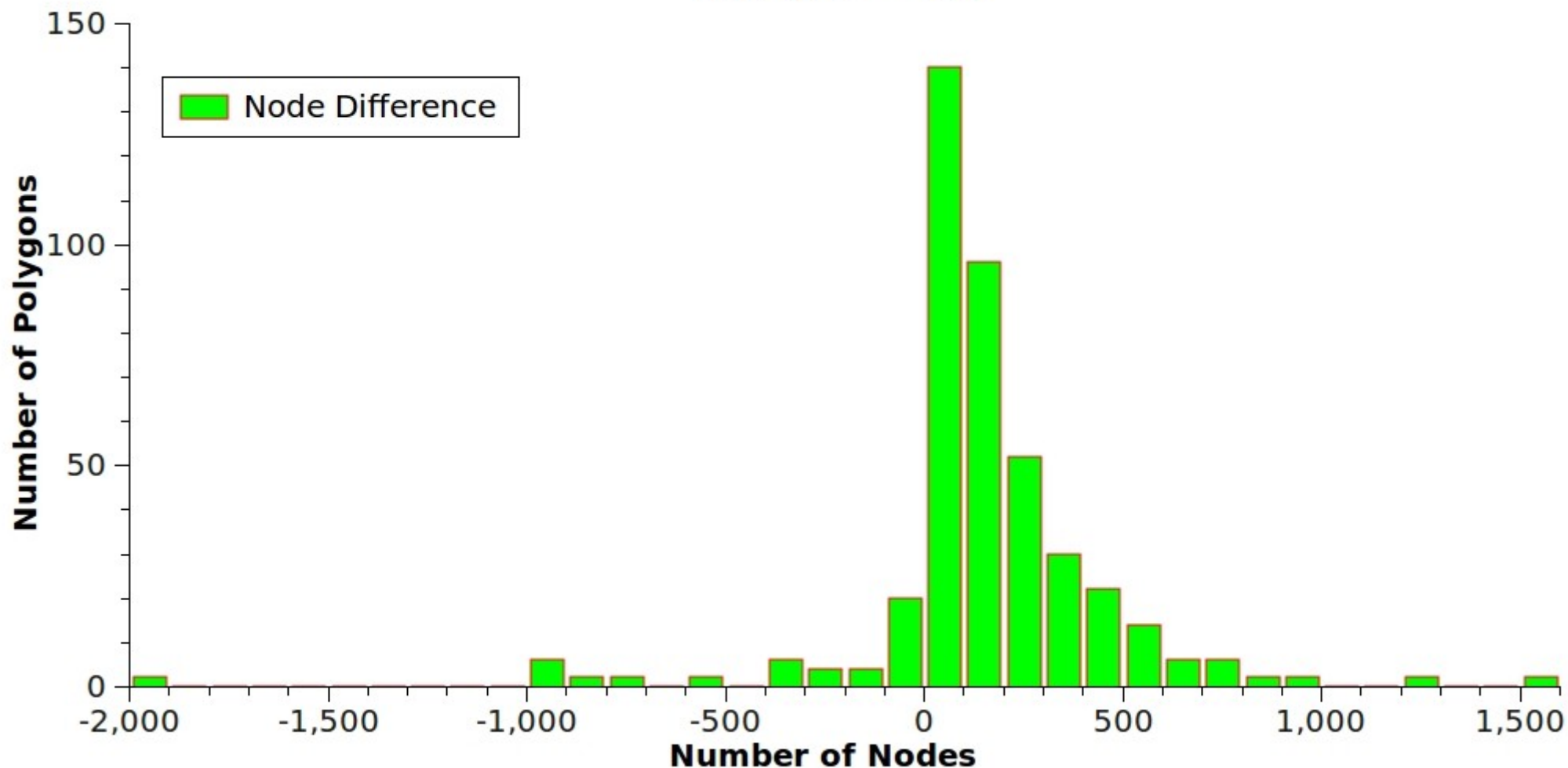


# Versions are not necessarily distributed evenly over total edit lifespan



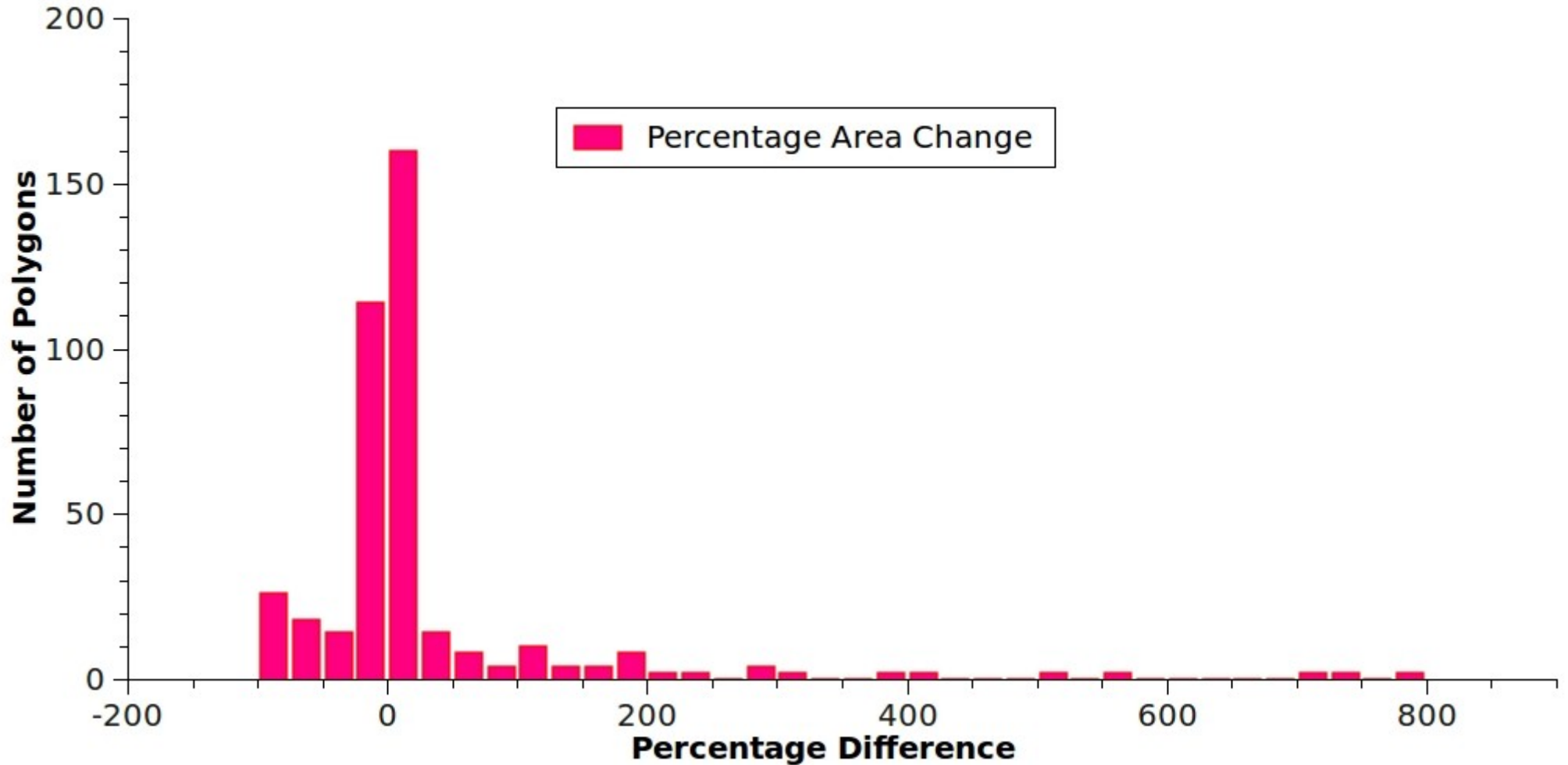
# In most cases polygons have nodes added over editing lifespan

**Change in Number of Nodes (first to last version)**  
**bin size = 100**



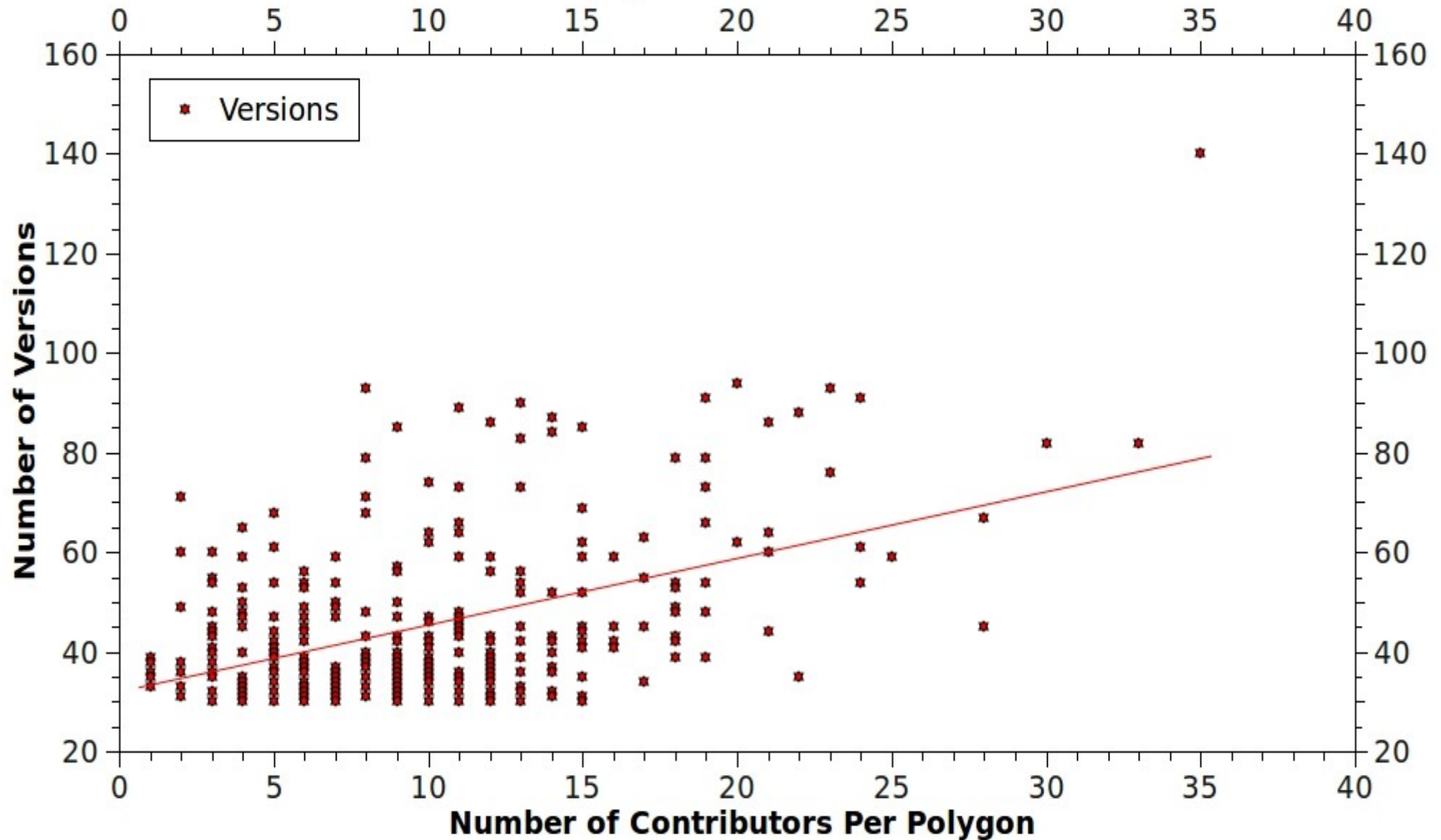
# Some polygons under-go radical changes in overall spatial area

**Percentage Difference Area (First, Last Version)**  
**Bin size = 25%**

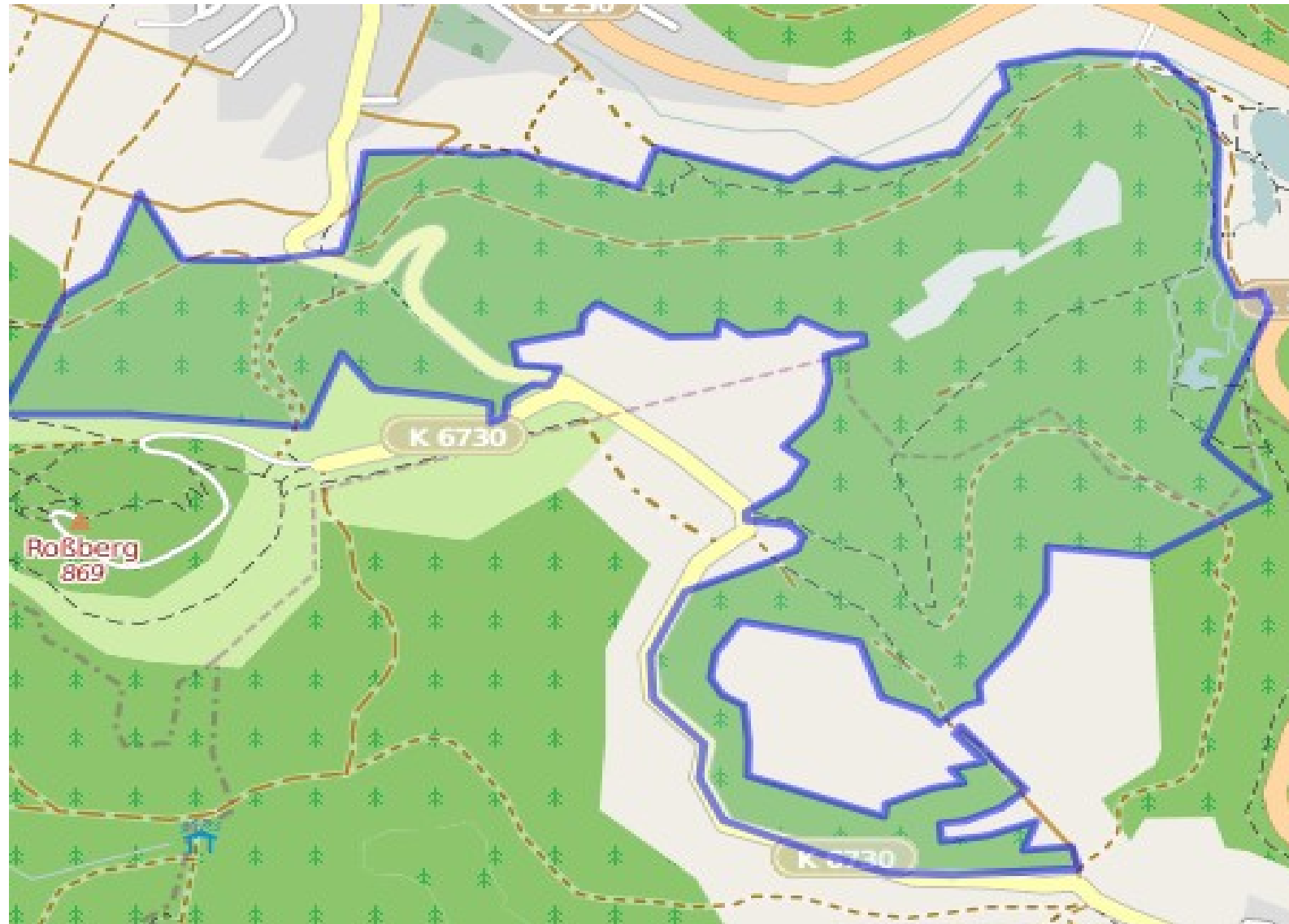


# As more contributors get involved more versions of the polygons are created

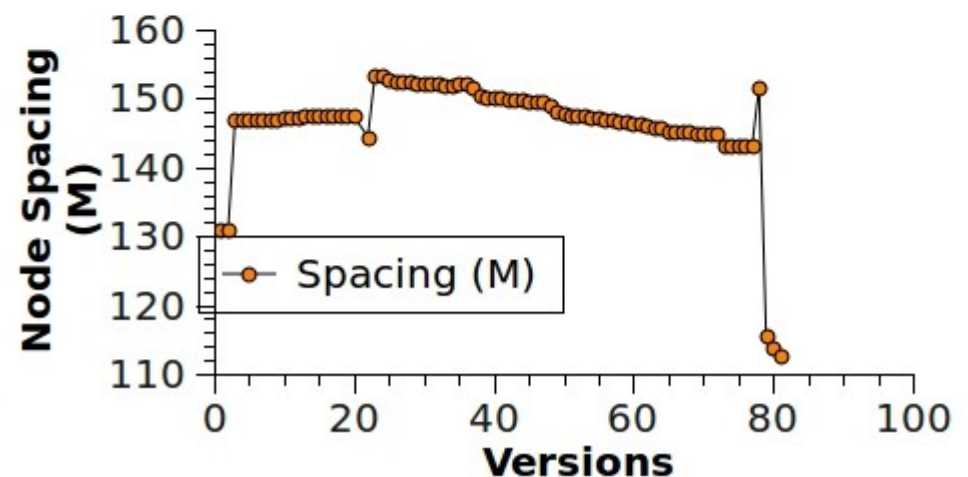
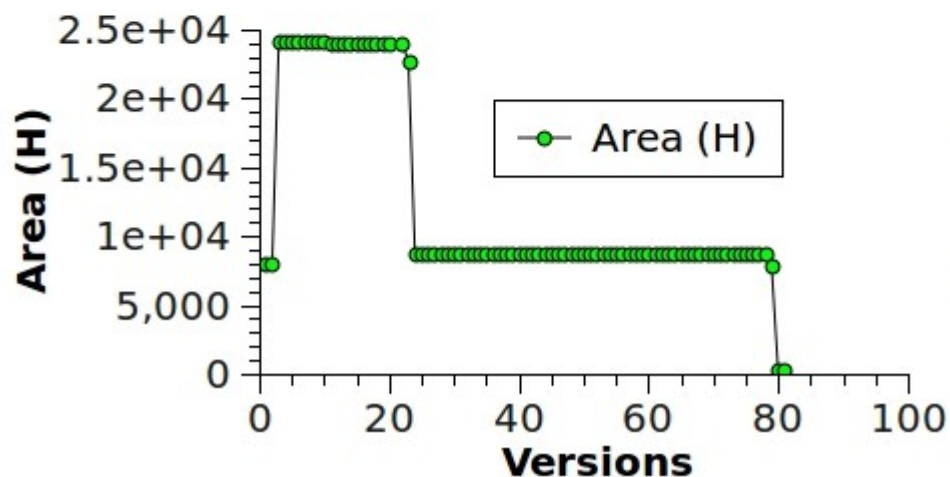
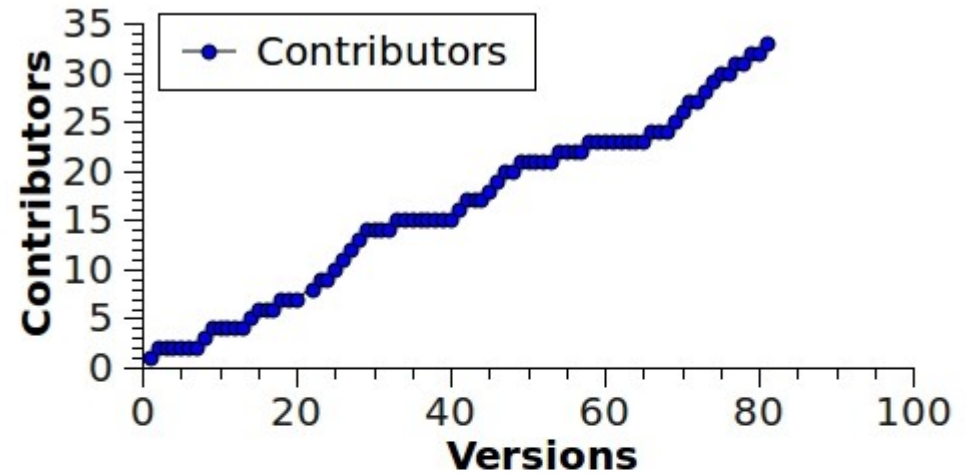
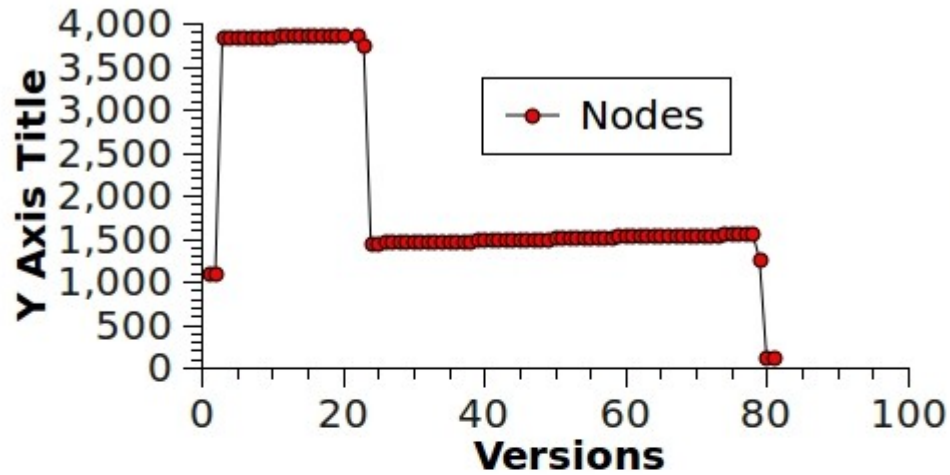
Relationship (contributors,versions)



Here is a polygon....



# How has this polygon evolved?







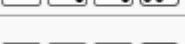









# Time between edits is actually surprisingly slow for crowdsourcing

Time between Consecutive Versions	No. Occurances
< 15 minutes	422
15 mins – 30 mins	135
30 mins and 1 hour	2254
1 hour and 2 hours	95
2 hours and 3 hours	331
3 hours and 4 hours	70
4 hours and 5 hours	2129
5 hours and 12 hours	2183
12 hours and 1 day	585
1 day and 1 week	303
1 week and 1 month	240
> 1 month	5669

- 19% of consecutive edits happen within 1 hour
- 37% happen between 1 hour and 1 day
- 44% more than 1 day between edits

# Annotating data ... is not so bad.. honestly!

Key	Value	Element	Comment
<a href="#">note</a>	<i>User defined</i>		A note to yourself or to other mappers.
<a href="#">fixme</a>	<i>User defined</i>		A description to yourself or to other mappers of a (possible) error in the map
<a href="#">description</a>	<i>User defined</i>		Text that might be viewable to the end user (perhaps using a search system or a map with pop-ups)
<a href="#">image</a>	<i>URL</i>		Reference to an image (use the "source_ref" key below when the image is referencing the source of the element)
<a href="#">source</a>	extrapolation		Extension of information from a known source
<a href="#">source</a>	knowledge		Local or common knowledge
<a href="#">source</a>	historical		from out-of-copyright mapping or other historical document
<a href="#">source</a>	image		photograph or video
<a href="#">source</a>	survey		gpx track or other physical survey
<a href="#">source</a>	voice		Voice recordings, eg dictaphone
<a href="#">source</a>	<i>User defined</i>		
<a href="#">source_ref</a>	<i>User defined</i>		To record the URI, source reference (eg Landsat) or other link to physical sources
<a href="#">source:name</a>	<i>User defined</i>		Source used to gather name information eg. for street names
<a href="#">source:ref</a>	<i>User defined</i>		Reference data source eg. for road numbers

Not scary

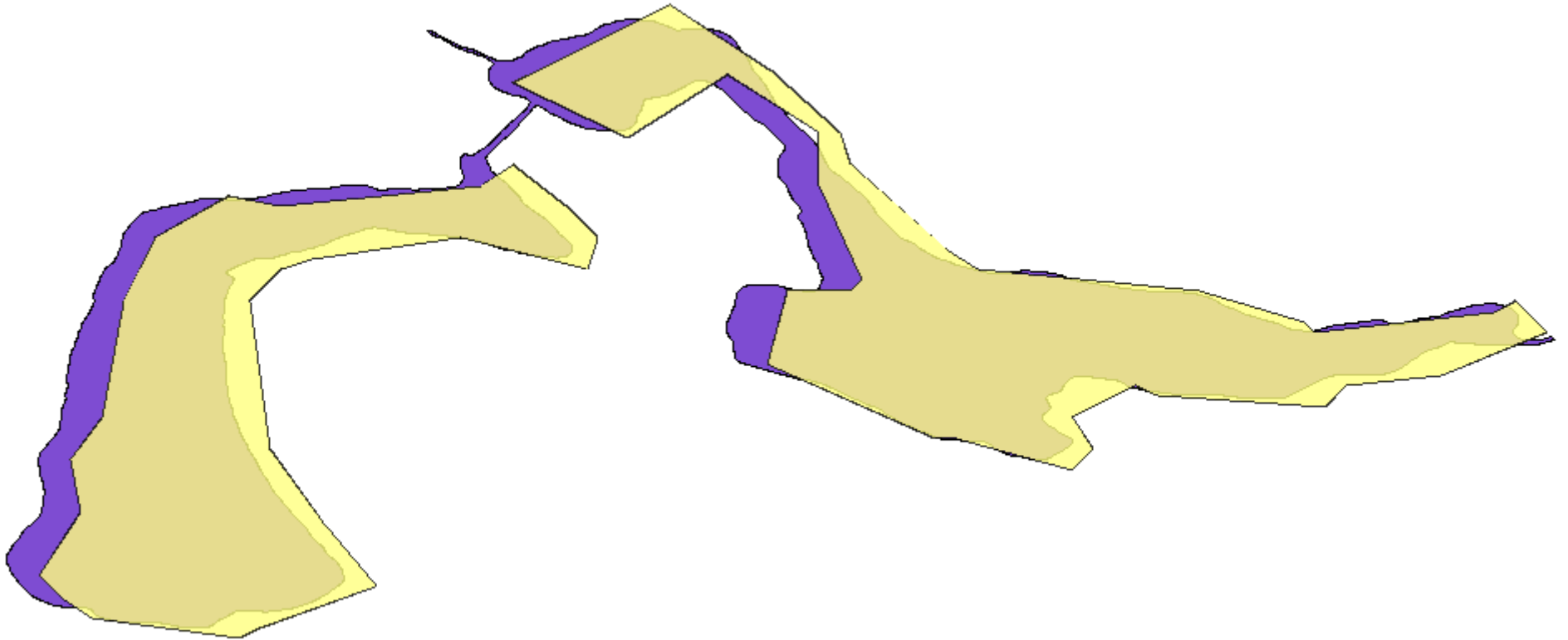


# High Shape Similarity (0.93)

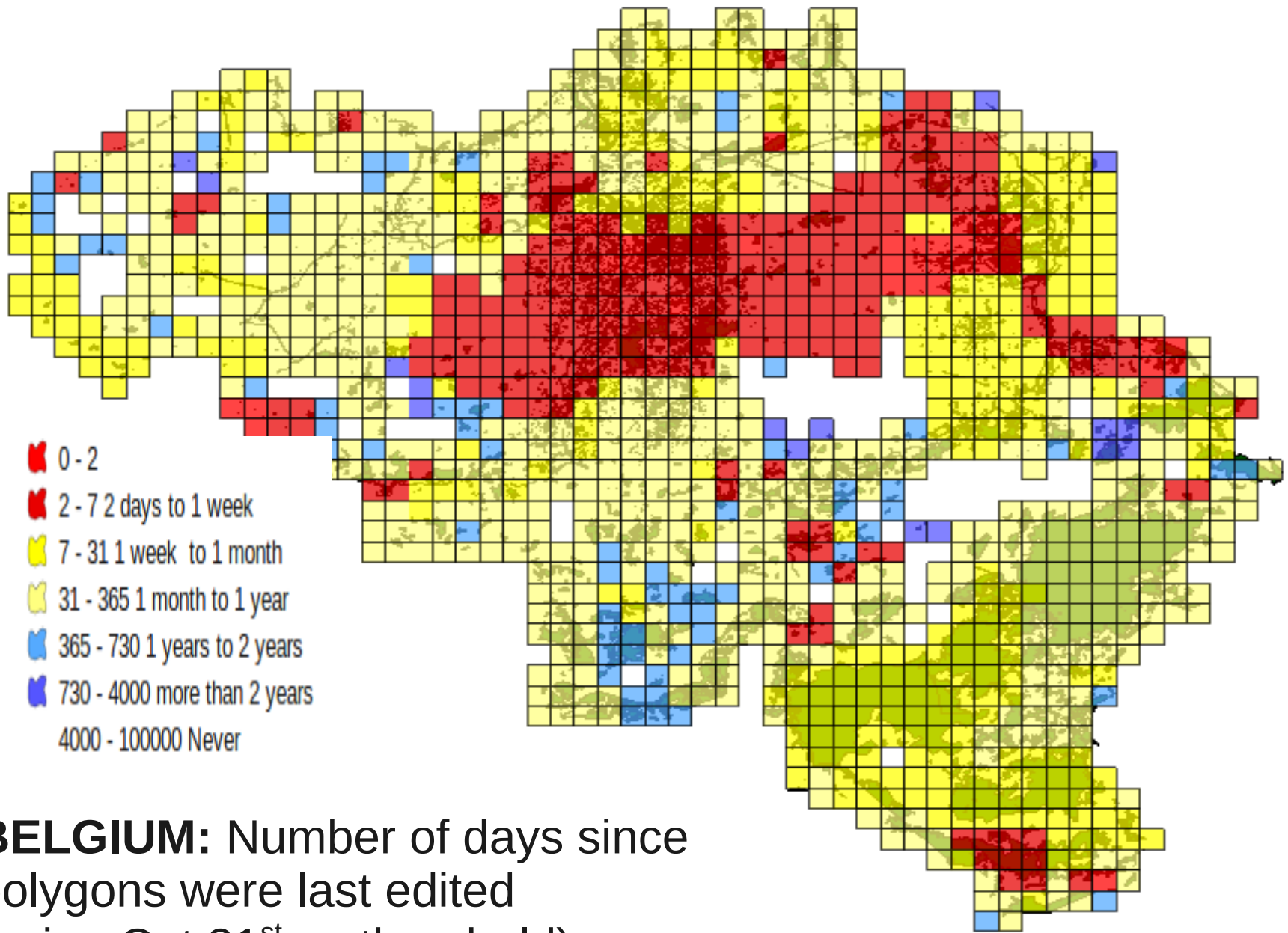


OSM\_ID = 5030097  
Lough Ramor, Co. Cavan, Ireland

# Very low shape similarity

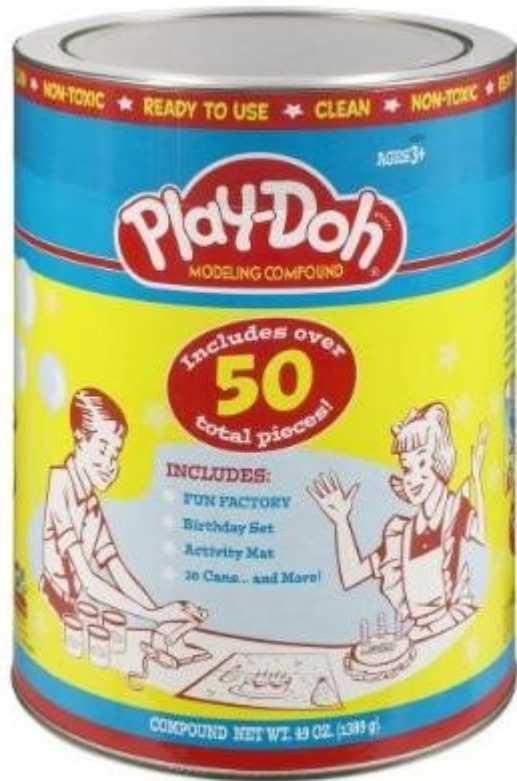


OSM ID = 23638219 and 23638219

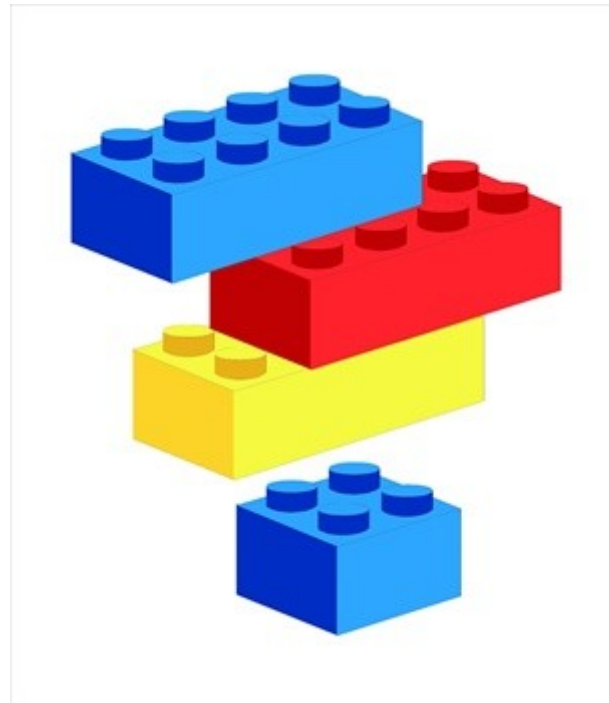


**BELGIUM:** Number of days since polygons were last edited (using Oct 31<sup>st</sup> as threshold)

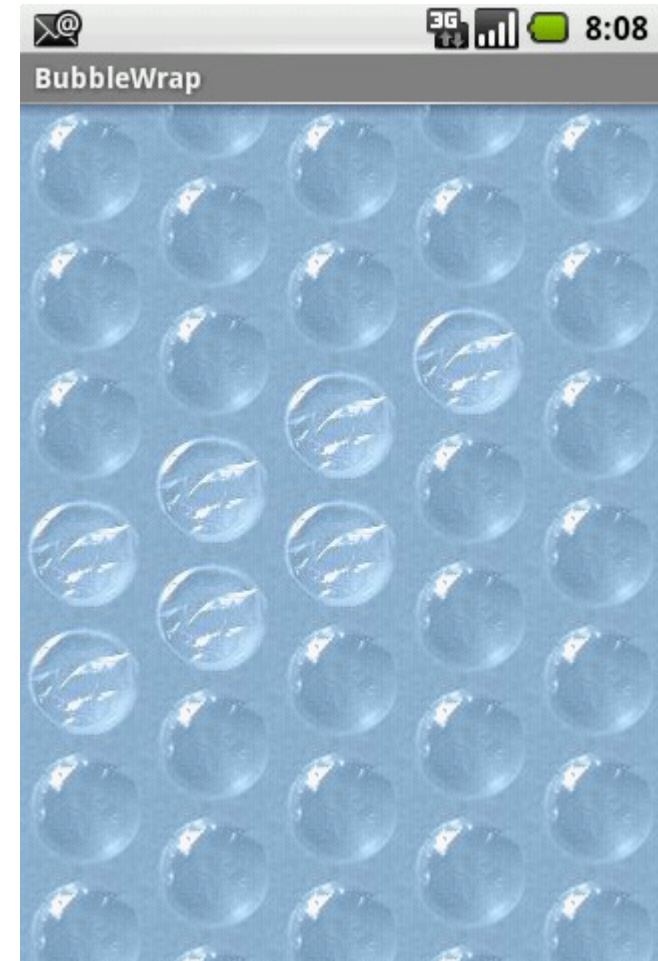
# Overall OpenStreetMap is a good product for use in GIS research



Squeezable,  
Changeable



Extendible



Mildly addictive

<http://waterflea.com/android.php#BubbleWrap>

BUT.....

GIS people need to be assured  
about QUALITY

# Quality Metrics/Indicators

- Against a “trusted” ground truth
- 
- Or how about “intrinsic” OSM quality indicators without ground truth
- 
- Maybe you cannot get your hands on a ground truth

# YOUR OPINION

- What is the “deal sealer” for quality.....
- 
- Why would you NOT use VGI?
- 
- What would you need ... a number... a quantitative statement etc....
- 
- What does quality mean to you....