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Finnish revaluation of land for taxation 2019

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Part I: Current property taxation in Finland

- As to land for housing, Finland is one of those few countries, where separate rates are applied to land and structures.
- Housing land is taxed more heavily than housing structures.
- The nominal rate for housing land varies between 0,6 - 1,35 % and the nominal rate for housing structures varies between 0,39 - 0,9 %.
- As for all other land and structures, the nominal rate variation is 0,6 - 1,35 %, the same as for housing land.

Current property taxation in Finland

- The law on property taxation was introduced in 1993. In all property classes land and buildings must be valued separately, land based on market value and structures based on reproduction costs.
- Property tax income is 1,7 billion euros, or 1 % GDP.
- Property tax is a local tax, towns and cities are receivers of the tax.
- Income of property tax on buildings is ca 1.2 billion euros, and income on property tax on land is 473 million euros.
- The importance of property tax revenue in local finance is expected to rise in the near future.

The amount and structure of property tax on land, 2014

	number	assessment value (mill.€)	property tax on land (mill.€)
all properties	2175817	57475	473
	shares (%) 2013		
type of property	number	assessment value (mill.€)	property tax on land (mill.€)
residential	69 %	62 %	64 %
office/retail	1 %	14 %	13 %
logistics	1 %	1 %	1 %
recreation	26 %	11 %	13 %
industrial	2 %	4 %	4 %
public	1 %	6 %	4 %

Analysis of effective property tax rate

- Effective property tax rates were analyzed in all property classes where sufficient market data is available, namely housing properties and property for commercial and industrial purposes.
- Sales of built and unbuilt properties were analyzed.
- The relevant assessment value for built properties was the sum of assessment value of land and structures.
- As for unbuilt properties, the relevant assessment value was the assessment value of land only, of course.

System of comparing assessment value and market value

	assesment value	unit	market value	remarks
land				
housing lot				
vacation housing lot				
commercial/industrial lot	of land	€/land-m2	real estate sale	most recent sale after 1985
built property				
multifamily building		€/floor area-m2	comdominium sale	all sales in 1987-2011
single family building	of land and building together	€	real estate sale	most recent sale after 1985

Ratio and equity statistics in Finnish property taxation, 2011

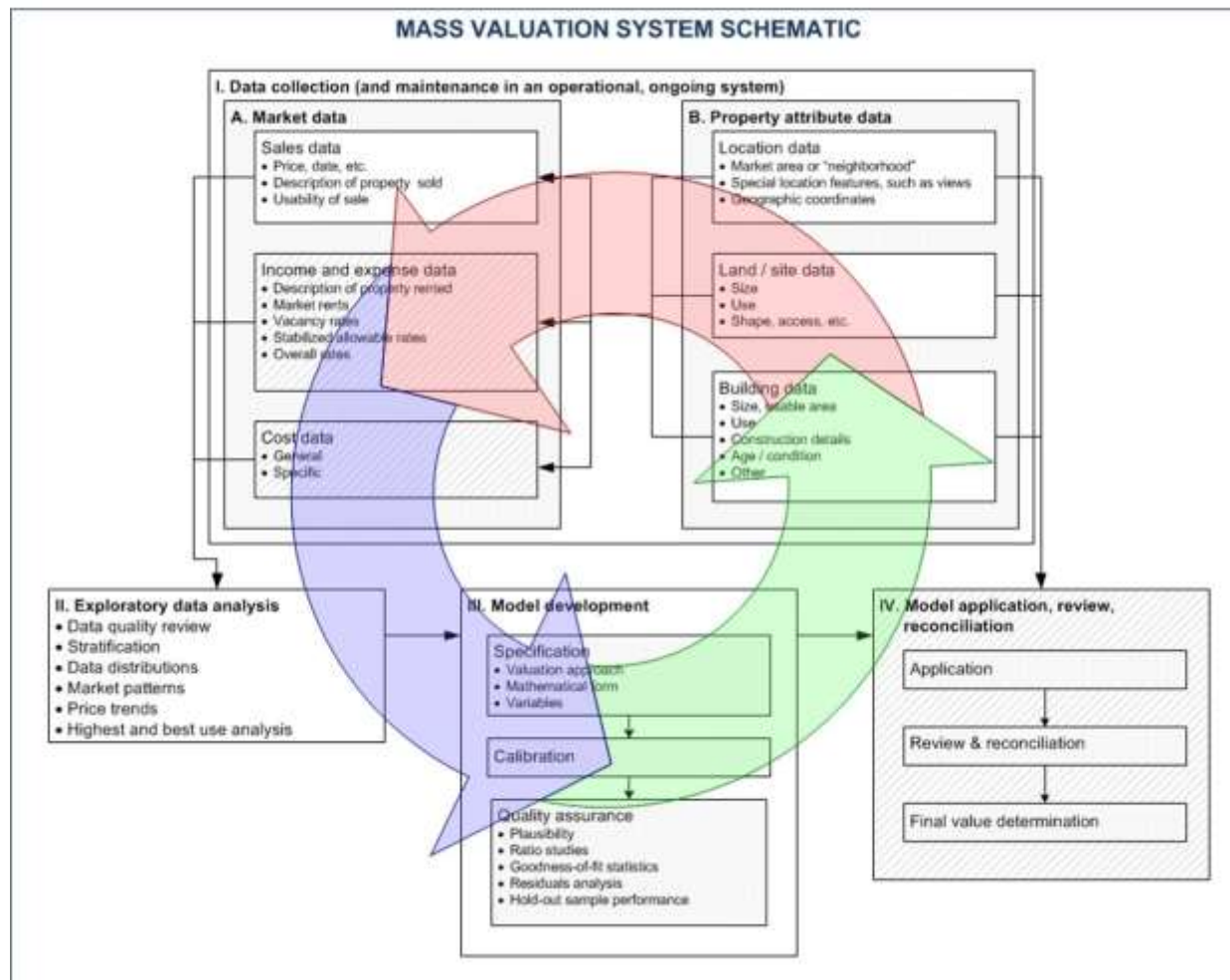
	the ratio of assessment value to market value (%)			effective property tax rate (0,01 %)
	Median	standard deviation (log)		
		all country	within a jurisdiction	Median
housing, several apartments	25	0,49	0,32	12
single family house	32	0,70	0,67	15
lot for housing	34	0,94	1,00	25
second home, recreation	29	0,72	0,69	27
lot for second home, recreation	32	0,97	0,97	22
commercial-industrial, built	42	1,14	1,07	34
commercial-industrial lot	47	1,17	1,12	32

Part II: Introducing a new set of methods for valuation

- Skills in valuation, statistics, econometrics, geomatics, and computing are needed and have been used to develop state-of-the-art mass valuation models.
- The databases on which they depend were taken mostly from public databases, and in some cases non-public databases kept by taxation authorities.
- The key methods are intensive use of market information, simple hedonic models and spatial analysis.
- The main innovation is a mix of standard hedonic regression and spatial analysis, mainly identifying nearest property sales and calculating spatial moving average.

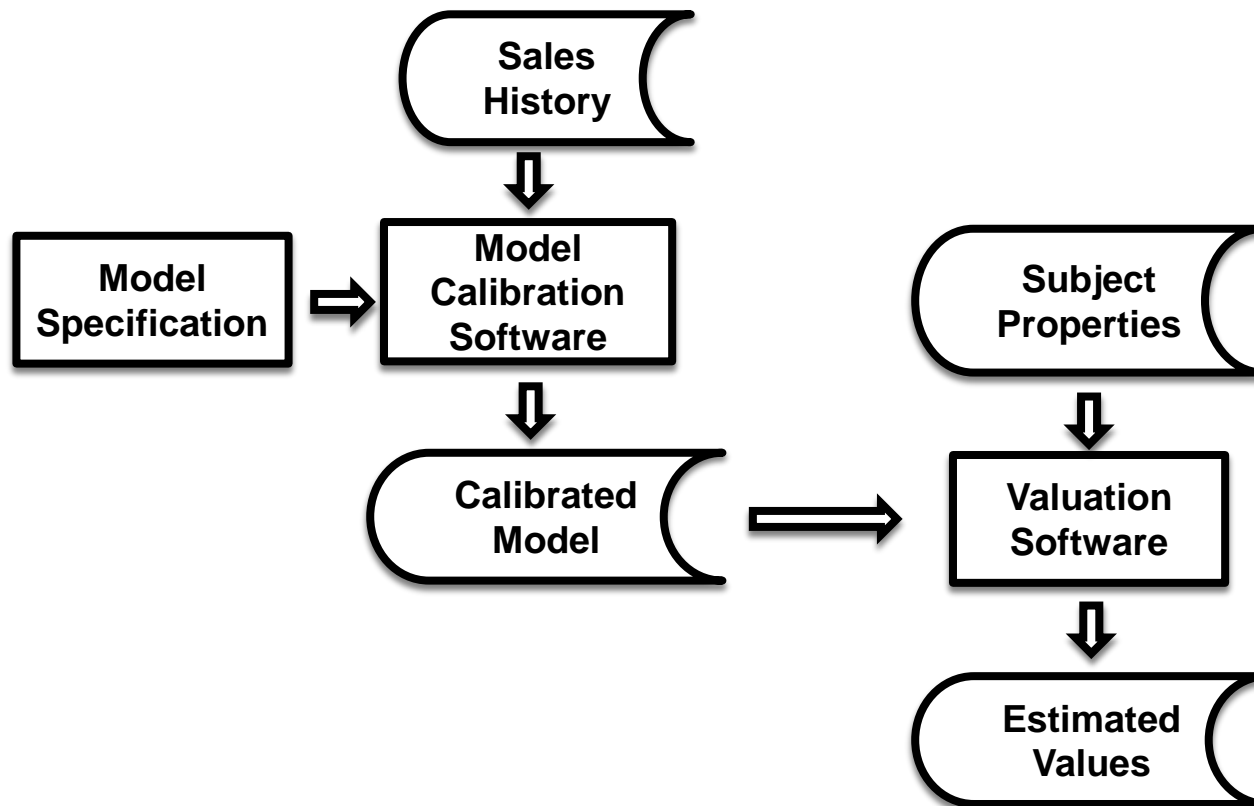
Mass valuation process

(Robert Gloude-mans, Richard Almy Fundamentals of Mass Appraisal, p. 6)



The role of CAMA in mass appraisal

(Richard Borst)



Data sources:

- property tax records of 2011, 2014 and 2015 taxation (source: Taxation authorities).
- condominium sales 1987 - 2016, which are collected for transfer and sales profit taxation purposes (source: Taxation authorities).
- land and other real property sales 1986 - 2016 (Official real property sales price register, kept by National Land Survey)
- cadastre
- zip code area subdivision
- grid data 250x250 m² (major cities only)

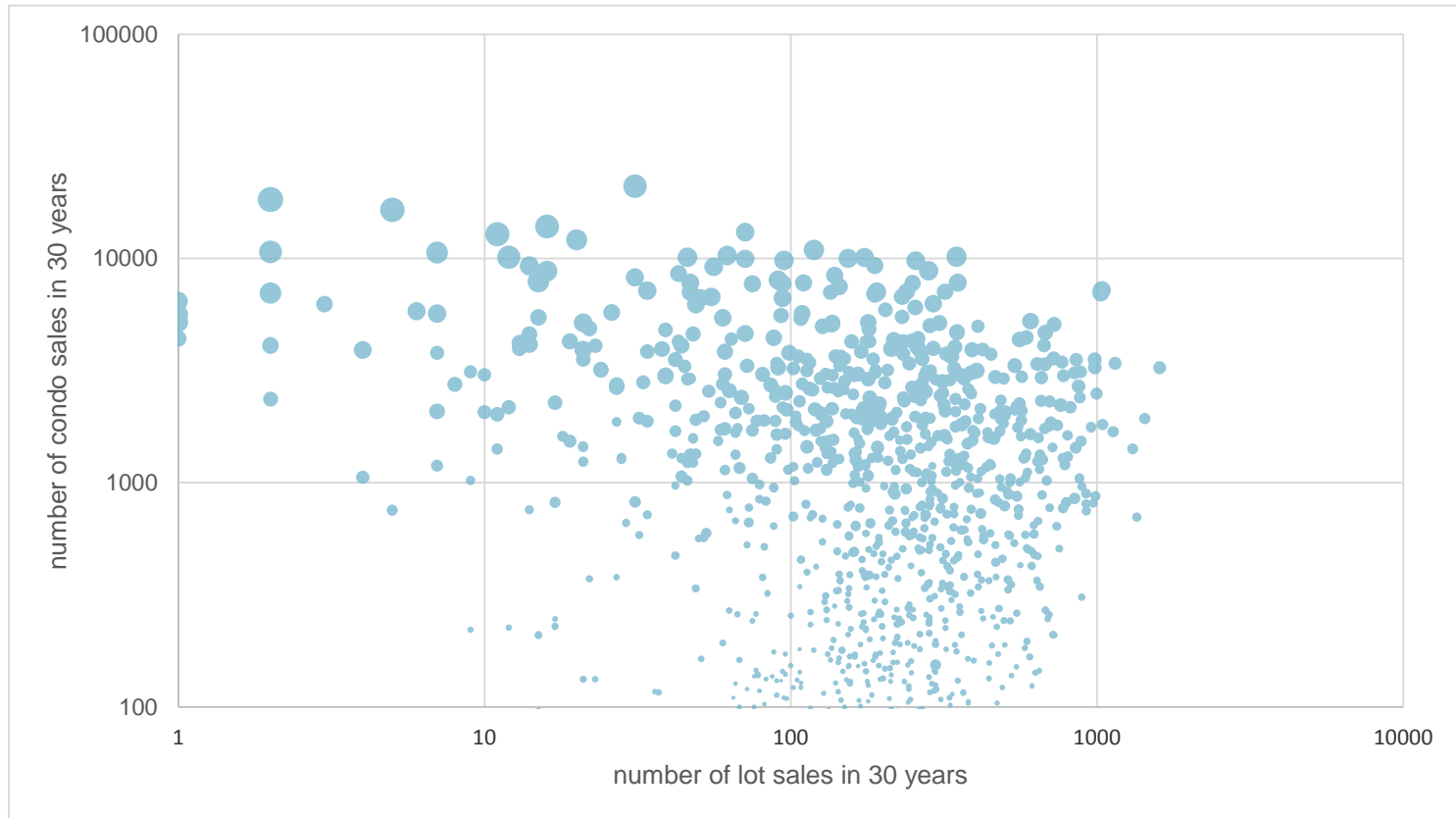
Critical conditions and tasks

- **The adequacy of market information**
- **Subdivisions of land**
- **Overview of the price landscape**
- **Modelling land prices**
- **The toolbox for practical use: a set of 3 valuation methods to choose from**

The adequacy of market information

- The next slide illustrates, that in most zip code areas there is enough land sales to determine the average residential land value.
- In some areas there are enough land sales to determine the residential land value variation within the area.
- In some areas the land sales are scarce, and those are the areas where land is most expensive. However, there is plenty of home sales in those expensive areas.

Number of lot sales and condominium sales in 30 years by zip code area



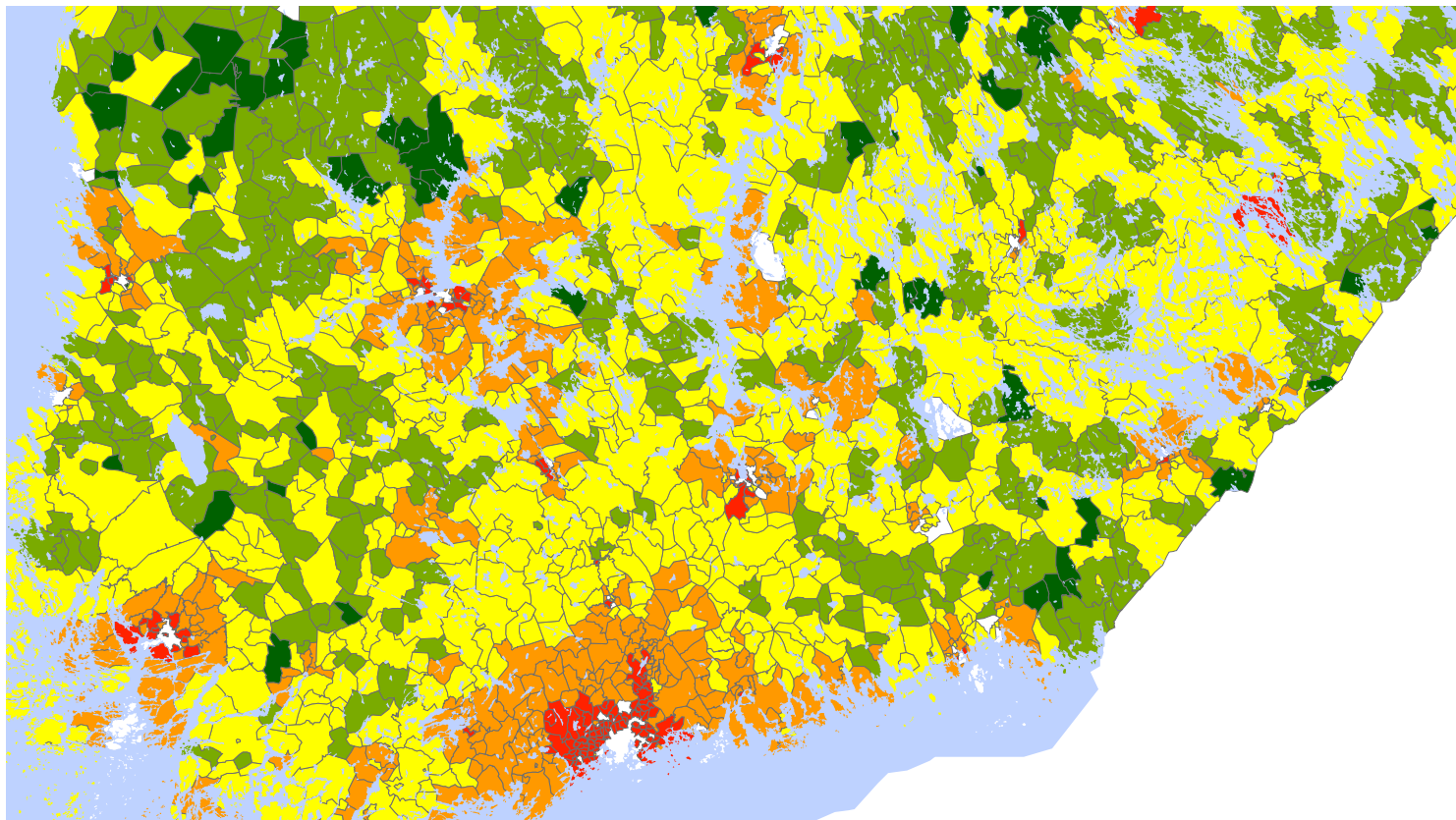
Price of housing lot and condominium in 2014 by zip code area



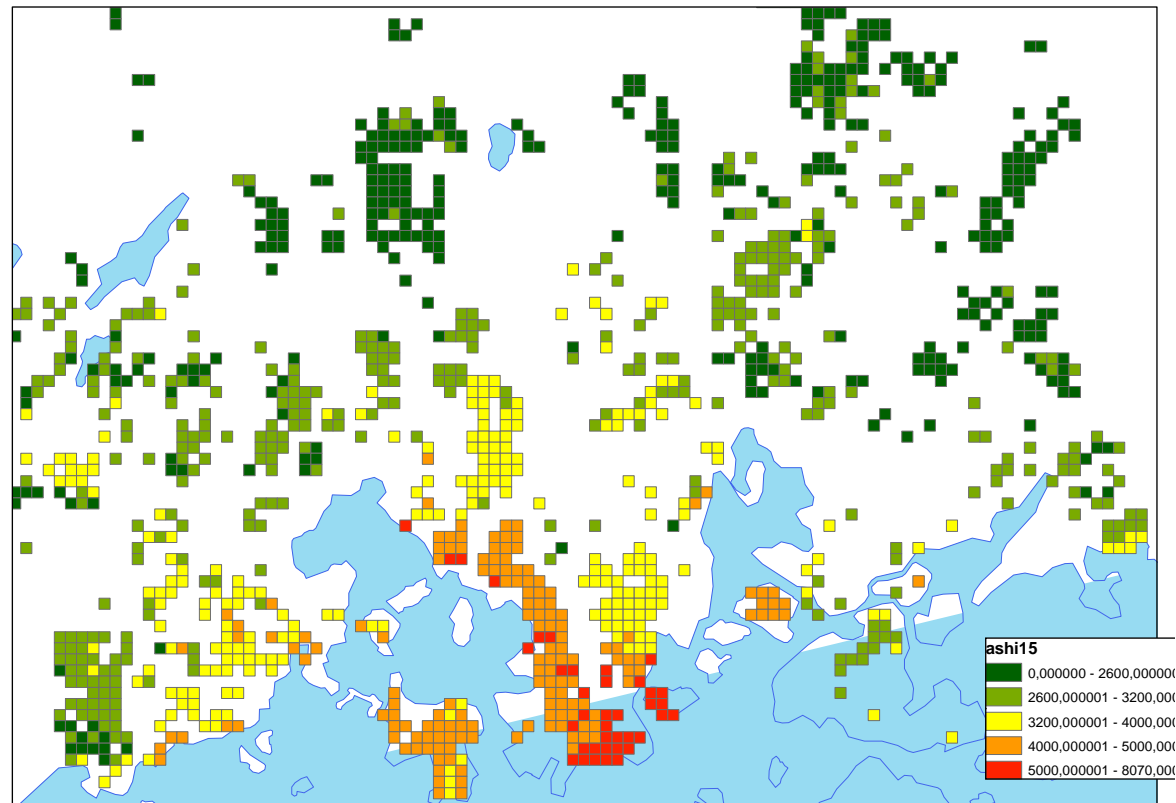
Overview of the price landscape

- Slides 17-19 illustrate three levels of accuracy in presenting the price landscape
 - 17) zip code area (3000 in the country)
 - 18) grid area (2000000 grids if 6,25 ha in the country)
 - 19) Property level (again, 2000000 properties in the country)
- Slides 20-22 illustrate the price landscape in Helsinki Metropolitan area.

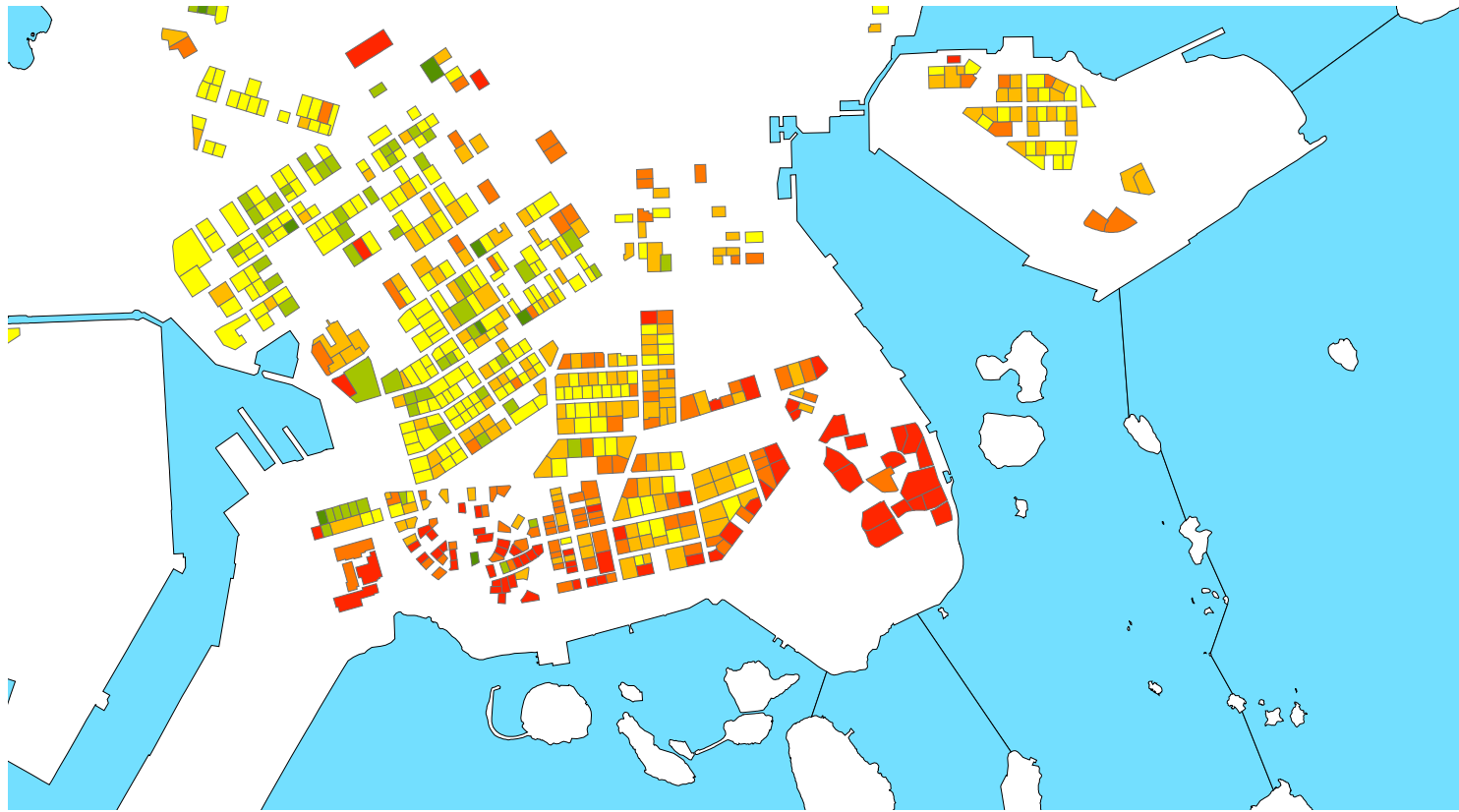
Price of single family home by zip code area, Southern Finland



Constant quality price of condominium by grid, Helsinki MPA

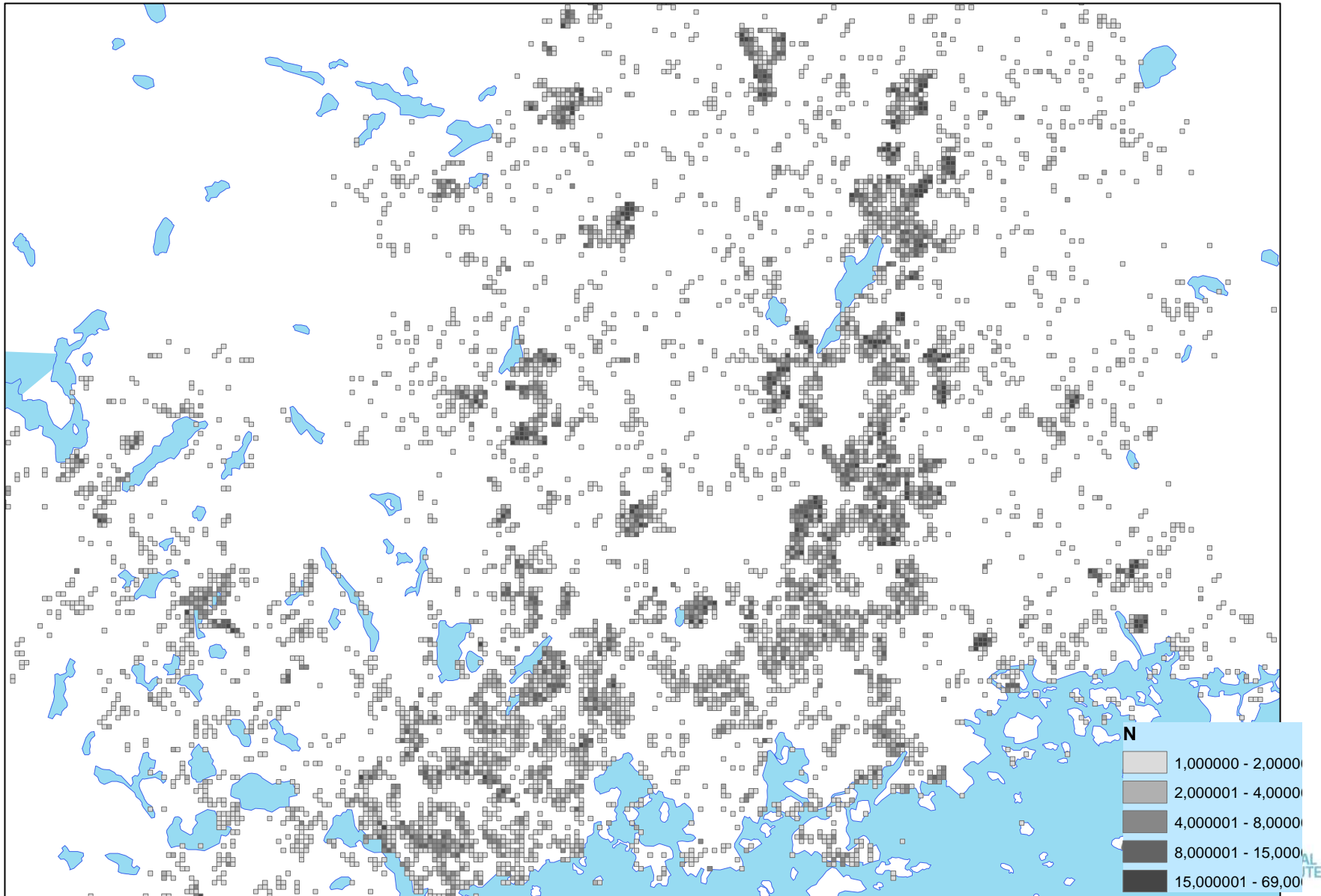


Constant quality price of condominium by property, Southern inner Helsinki

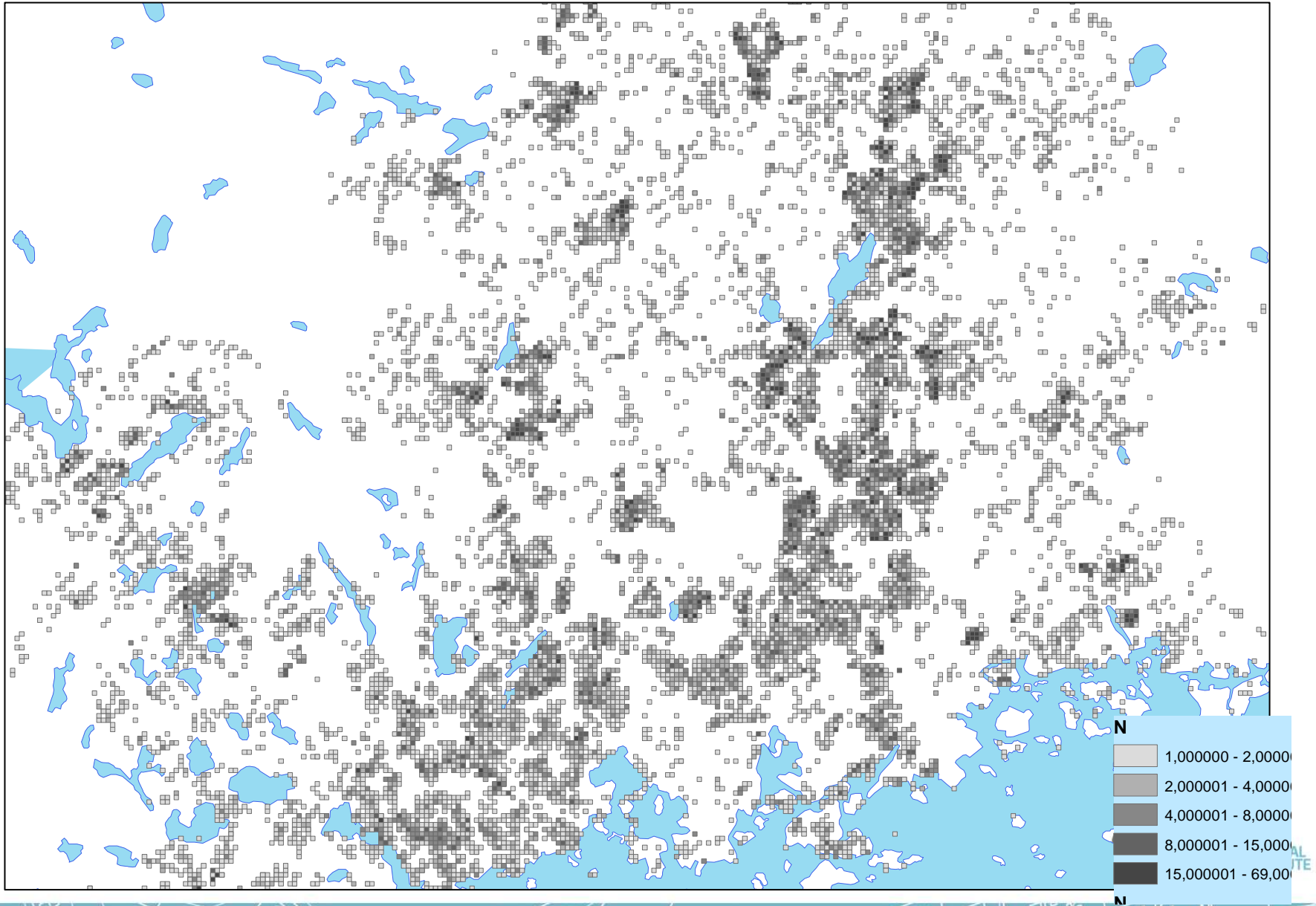


Helsinki MPA

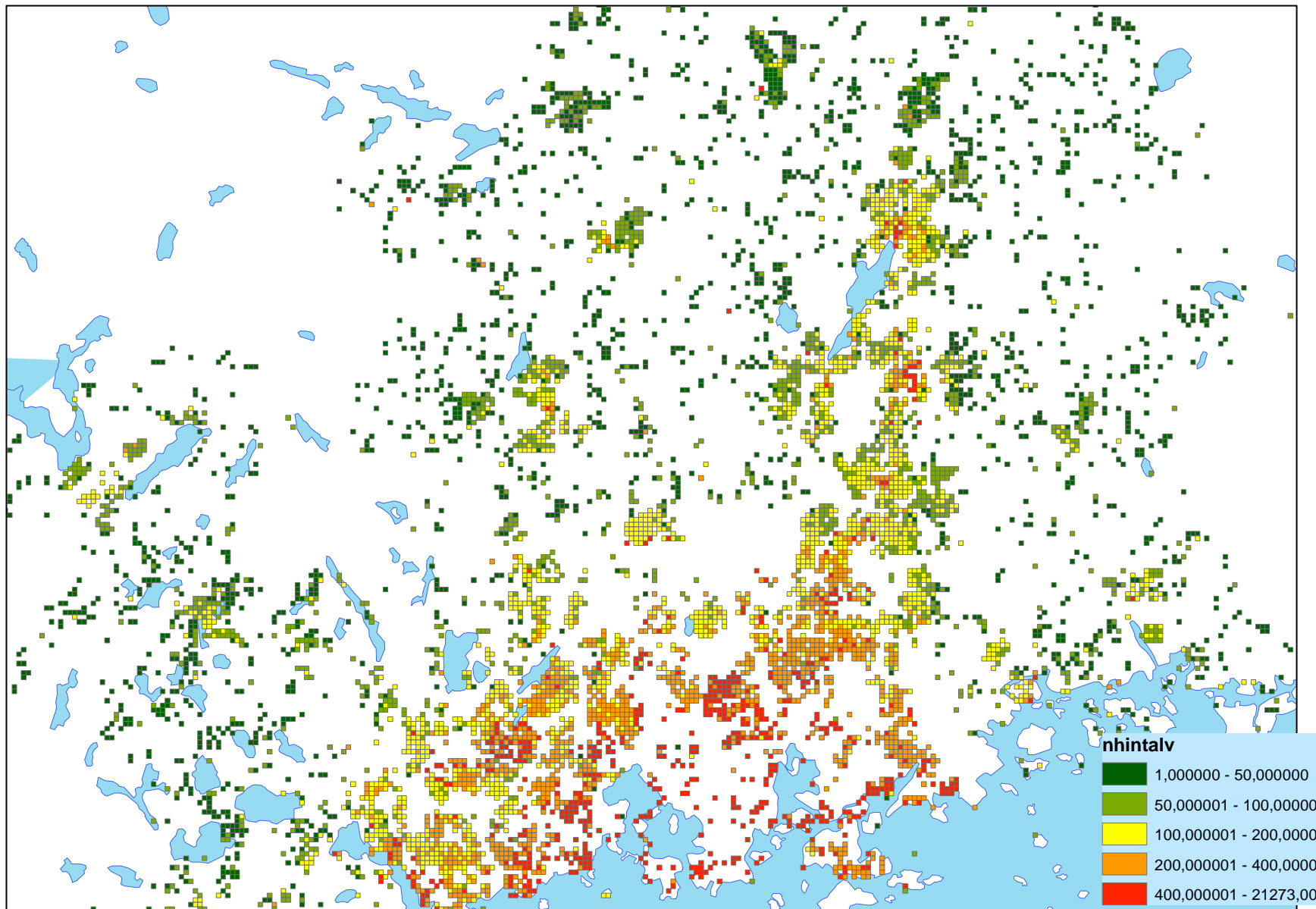
The amount of housing lot sales



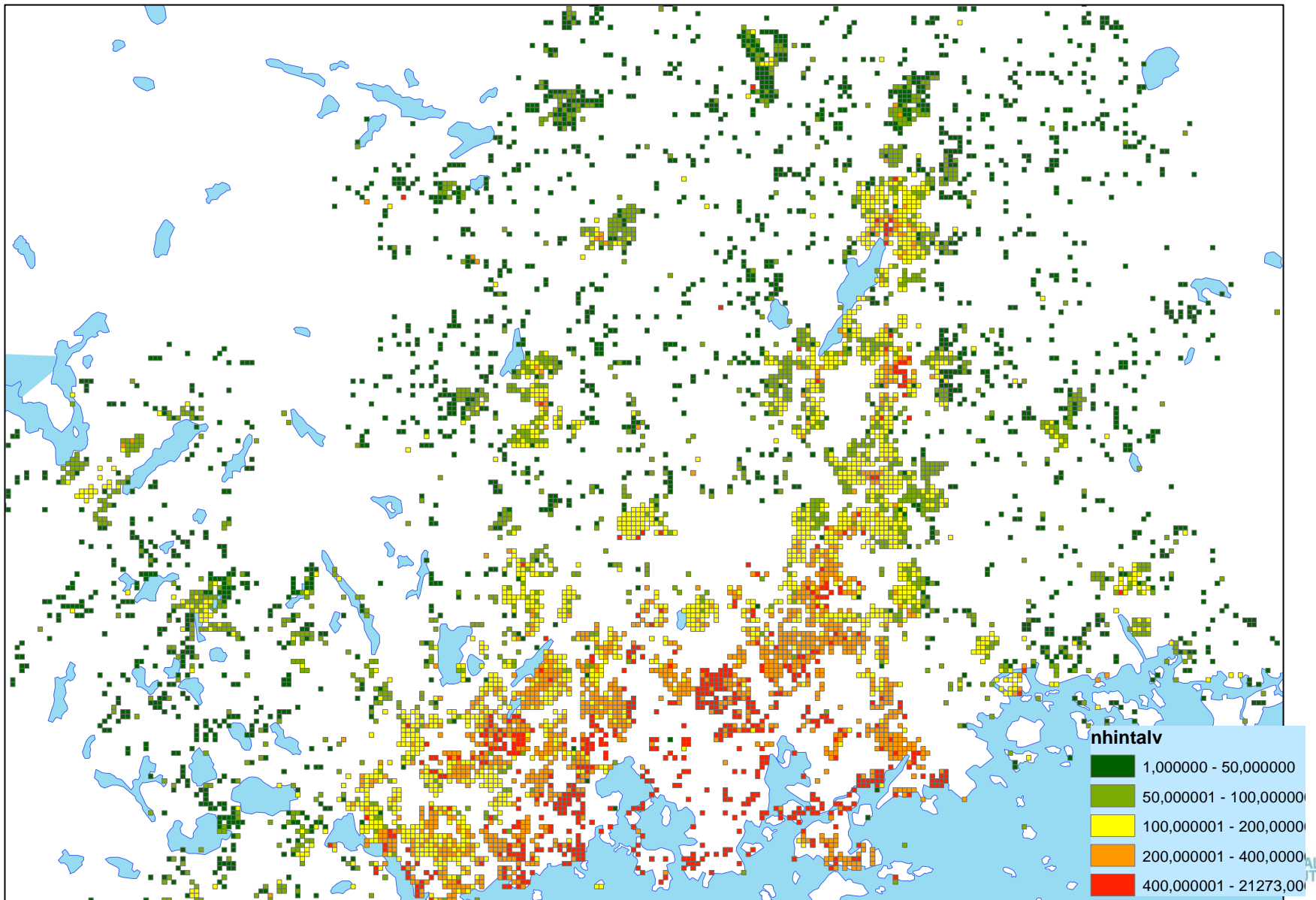
The amount of single family house and housing lot sales



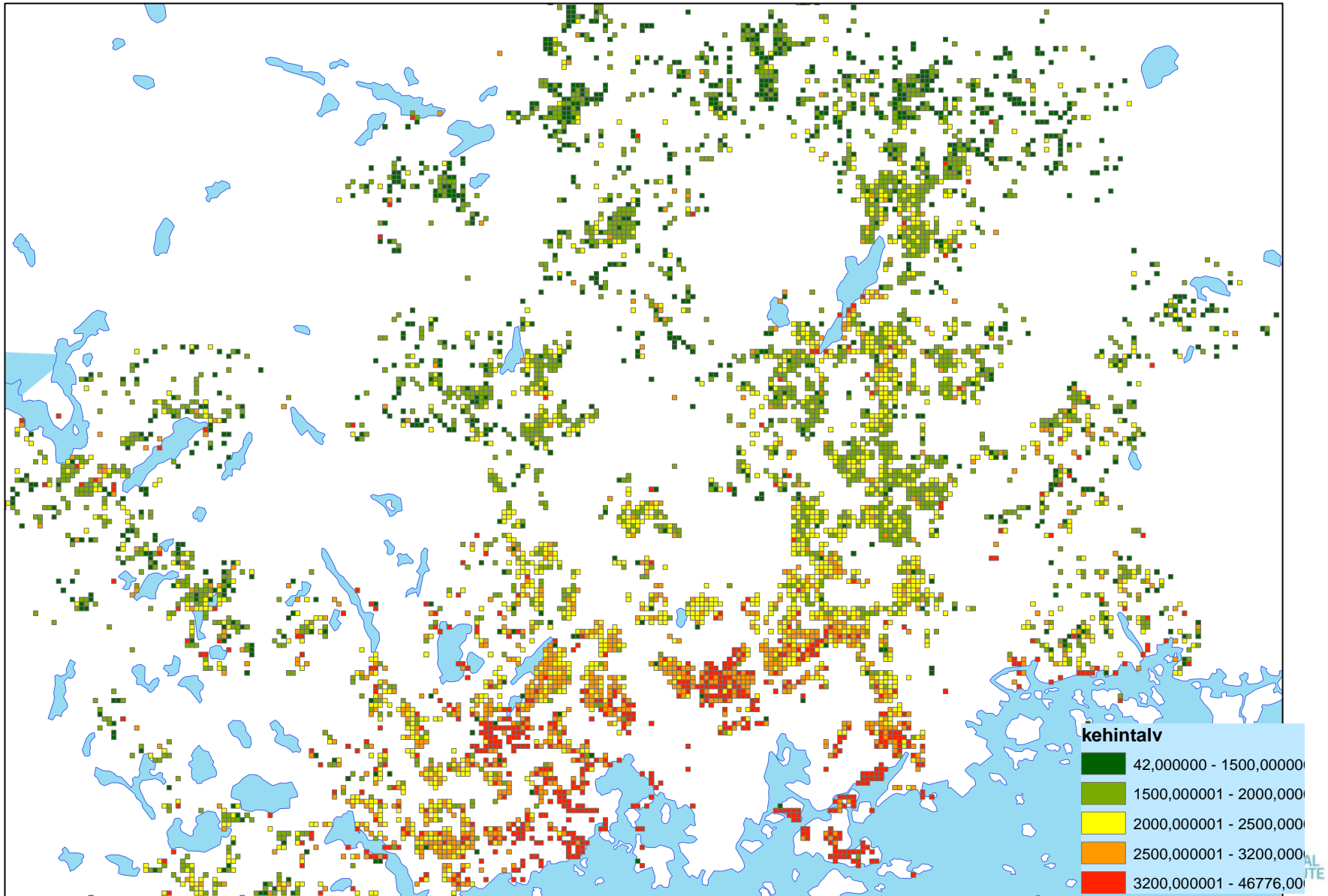
Constant quality housing lot sales price (€/m²)



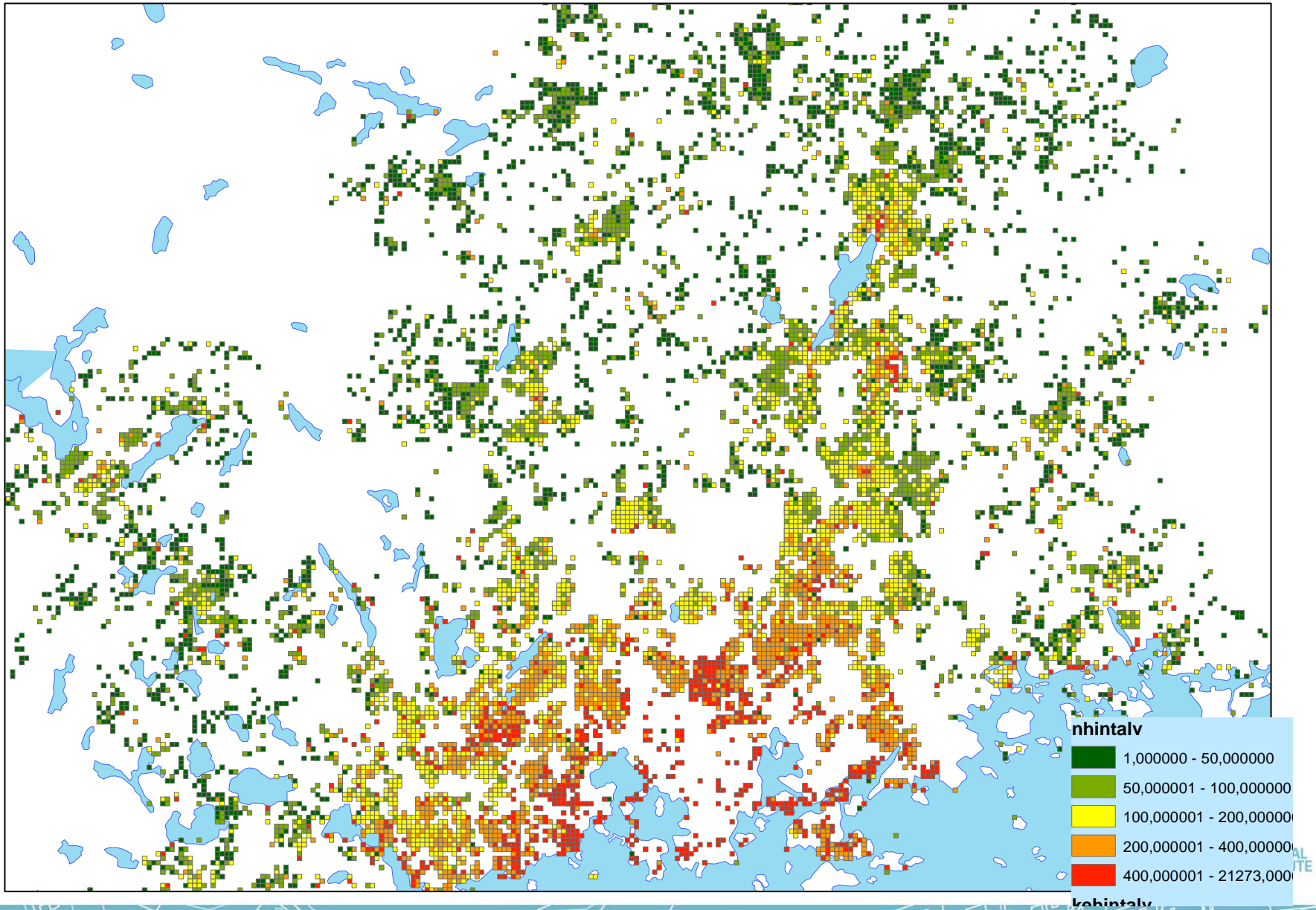
Constant quality housing lot sales price (€/m²)



Constant quality single family house sales price (€/floor-m2)

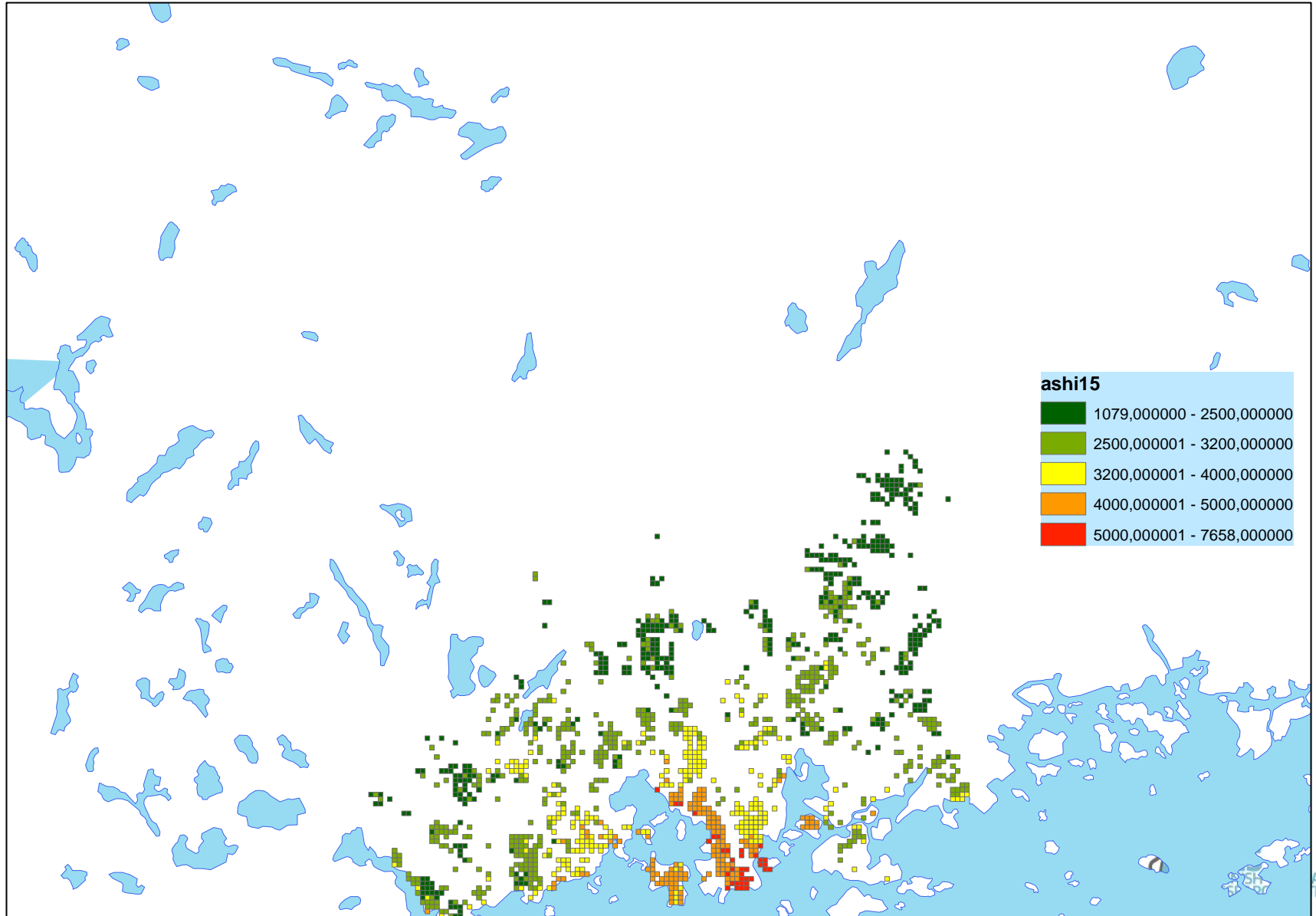


Constant quality sales price: house and housing lot



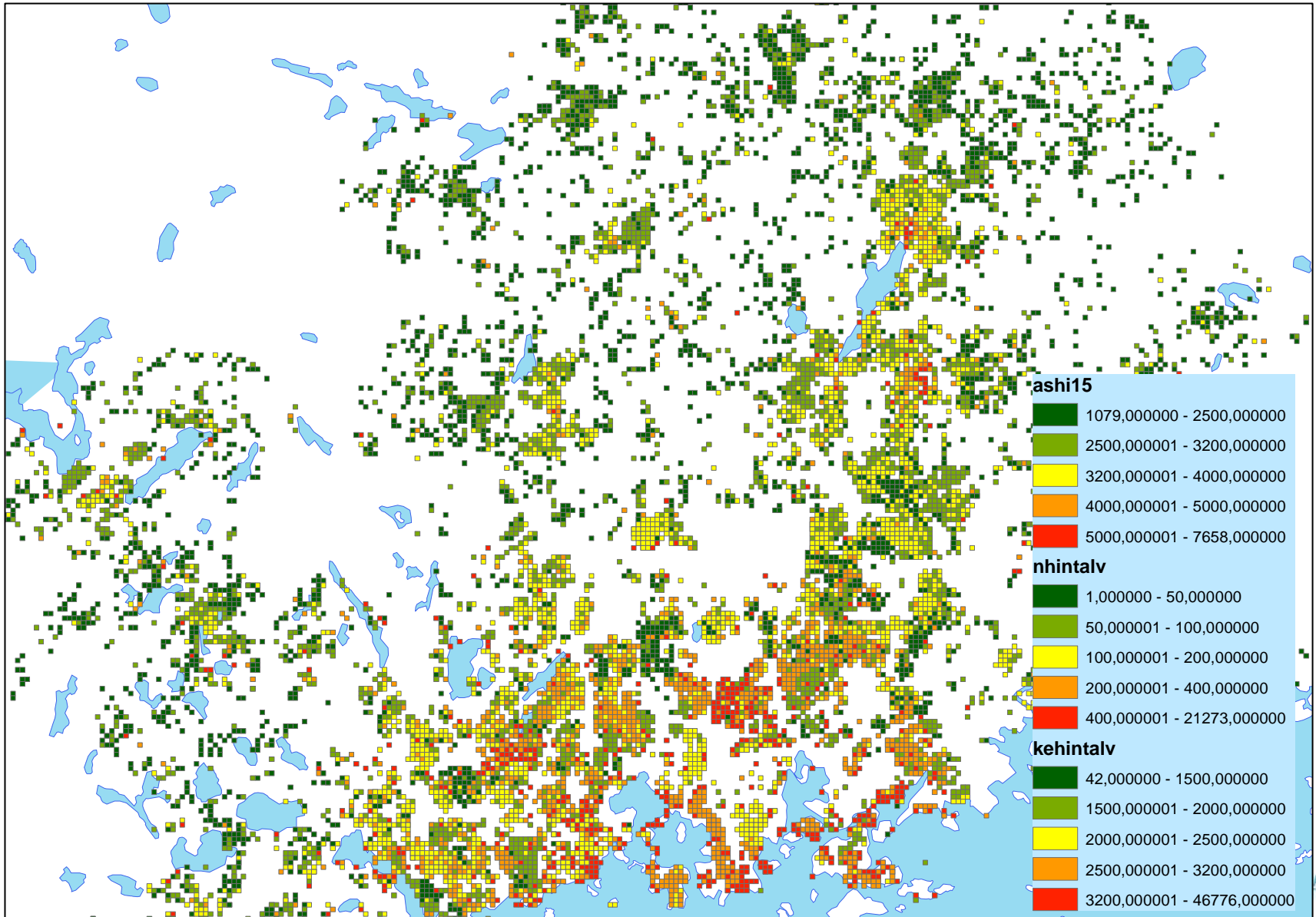
Constant quality housing condominium sales price

(€/floor-m2)



Constant quality sales price:

condominium, house and housing lot



The toolbox for practical use: a set of 3 valuation methods to choose from

- In search of a scalable, cost-effective way to calculate more than 2 million land values, a multiple method approach is proposed.
- There are three methods that are very different from each other in terms of accuracy, effort, costs and ease of use. The methods are, from less accurate to most accurate:
 1. Zip code area median price. This method is less accurate, very easy to use, very cheap.
 2. Nearest lot sales. This is the main method, quite accurate, quite costly.
 3. Nearest condo sales. This is most difficult to use, quite accurate even when land price data is scarce.

The toolbox for practical use: a set of 3 valuation methods to choose from

	expensive location	average location	inexpensive location
high rise housing lots	nearest condo sales	nearest lot sales	nearest lot sales
single family housing lots	nearest lot sales	nearest lot sales	zip code area median price
recreational housing lots	nearest lot sales	nearest lot sales	zip code area median price
office and commercial lot	nearest lot sales	zip code area median price	zip code area median price
industrial lots	zip code area median price	zip code area median price	zip code area median price
tax base share (%)	40	40	20
land area share (%)	3	27	70

Zone price based on a spatial moving average of nearest comparable land sales.

- Identifying an area of homogenic land values involves five steps:
 1. Based on high price level, high variation on prices, or a vision of price landscape produced by grid data, a method of nearest land sales is chosen
 2. Constant quality, deflated unit land prices are calculated by hedonic regression. Only spatial factors are left out of regression.
 3. Nearest land sales are automatically identified and a suitable number, between three and nine of them, is chosen
 4. Spatial moving average of land prices is calculated automatically
 5. Price zones are finished by manual interpretation

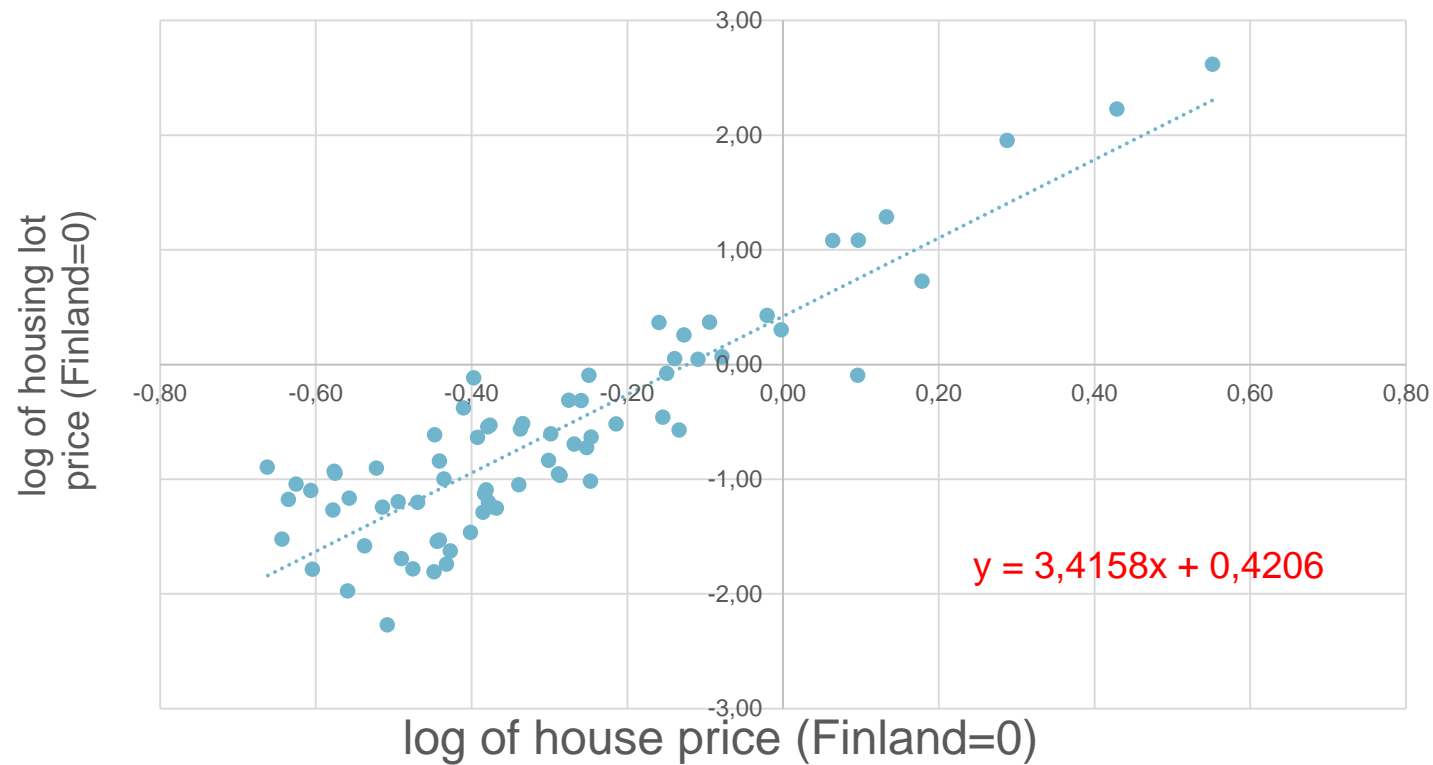
Price of housing lot and condominium in 2014 by zip code area



Housing lot price model specification

- LBRPRICE $= \alpha + \beta_t * \text{TIME} + \beta_a * \text{LLOTAREA} + \beta_r * \text{ADJACENTTOSEE} + \varepsilon$, where
- LBRPRICE = ln (price of building right €/floor-m2)
- TIME = time of sale = year - 2000 + month /12
- LLOTAREA = ln (LOTAREA)
- LOTAREA = lot area m2, max 1000 m2 in cities and towns
, max 3000 m2 elsewhere
- ADJACENTTOSEE = 1, when the sale is adjacent to see, otherwise
= 0
- A = constant
- $\beta_t, \beta_a, \beta_r$ = parameter values
- ε = error term
- ln = natural log

Housing land price (€/m²) as function of house price. 77 commuting areas in the country



Property tax base in a medium sized city (Kouvola). Lilac indicates housing lot sales.



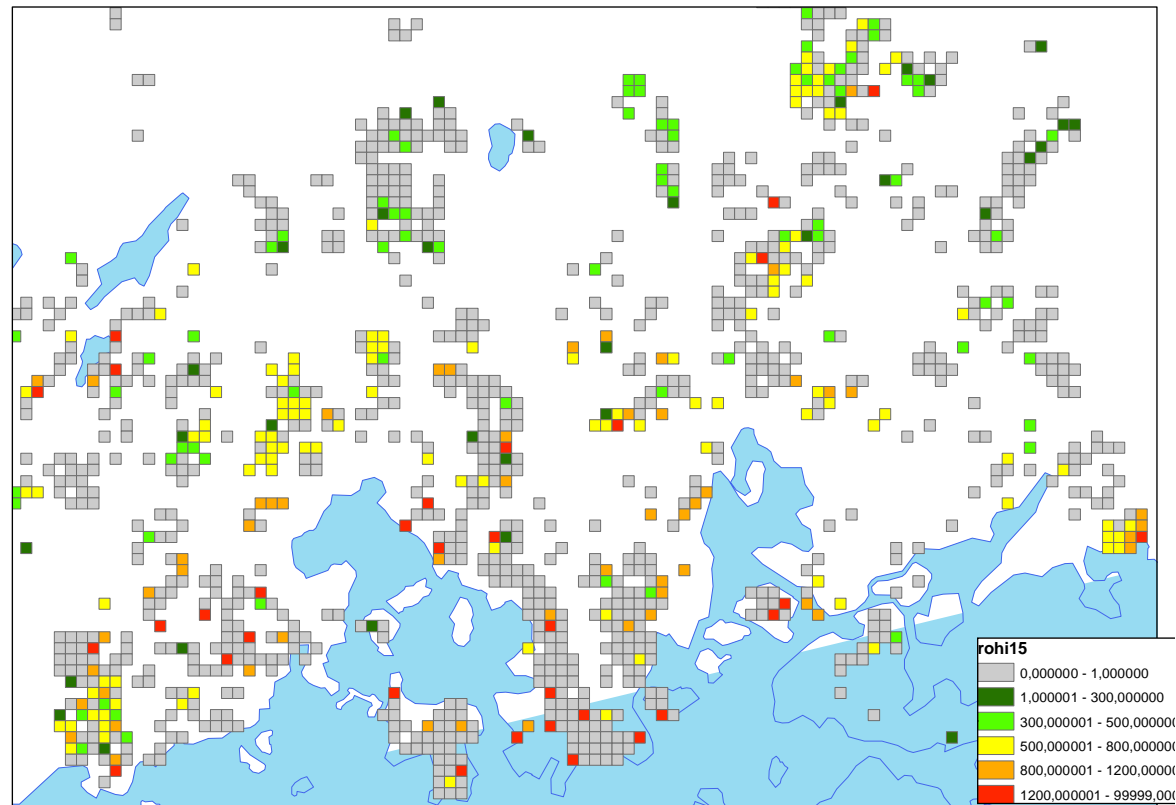
Based on three nearest neighbors a spatial moving average of land values is generated automatically.



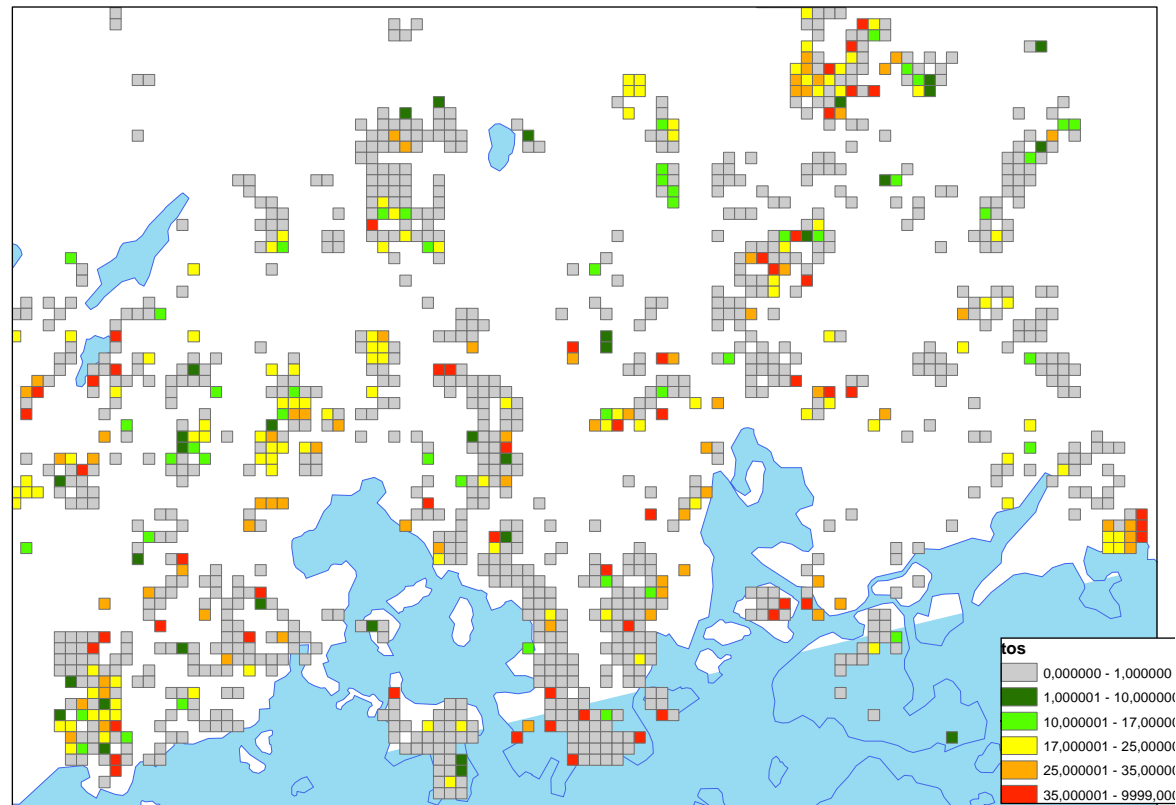
House prices as indicators of land prices

- Slides 29-40 illustrate, how land price can be derived from home prices: condominium prices in high rise buildings in urban areas, and single family house prices in suburban areas.

Multi-family housing lot price by grid, constant quality, Helsinki MPA



Land share of housing price by grid, Helsinki MPA



Conclusions (1)

- The aim was to derive the land part of the property value for all the property tax base.
- In most cases comparable prices of land sales are enough
- In most valuable locations land sales are scarce, but home sales are abundant. It's possible to derive the land share of house prices.
- The relevant technique
 1. Extensive use of standard regression analysis
 2. Calculating constant quality home prices
 3. Identifying nearest comparable sales and calculating spatial moving average

Conclusions (2)

- Based on the availability of data and how valuable the location is, a toolbox of three valuation methods is introduced:
 - 1) for most invaluable land zip-code medians are recommended,
 - 2) for more expensive land a spatial moving average of nearest comparable land sales is recommended, and
 - 3) for most expensive land a spatial moving average of nearest comparable apartment sales is recommended as a second method.

More information

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