

# *The compliance of land-use planning with strategic spatial planning – insights from Zurich, Switzerland*

*Franziska B. Schmid<sup>1,2</sup>, Felix Kienast<sup>1,2</sup>, Anna M. Hersperger<sup>1</sup>*

*1) Land Change Science, Swiss Federal Research Institute WSL, 8903 Birmensdorf, Switzerland*

*2) Department of Environmental Systems Science D-USYS, ETH Zurich, 8092 Zurich, Switzerland*

*Corresponding author: Franziska B. Schmid (franziska.schmid@wsl.ch)*

## **ABSTRACT**

Although many planning systems are based on a combination of traditional land-use planning and strategic spatial planning, the interplay between the two approaches remains insufficiently investigated. Focusing on the Canton of Zurich, we applied a qualitative content analysis to extract strategic planning intentions from the Cantonal Structure Plan (1995). We quantitatively analysed the compliance of changes in municipal land-use plans between 1996 and 2016 concerning the extracted planning intentions. The overall low rate of changes was accompanied by few active contradictions of land-use planning. Minor deviations from the strategic plan were seen in the spatial allocation of new building zones. Considering the socio-economic dynamics of the region, surprisingly few changes were detected regarding the permitted building density for residential and mixed-use areas. This leads us to the conclusion that the Cantonal Structure Plan (1995) was very successful in quantitatively limiting the expansion of building zones. However, it showed a limited active steering capacity regarding their allocation and the regulation of building density. Our analysis showed that margins of discretion play a key role in multi-level planning systems, balancing flexibility for locally adapted solutions against statutory boundaries to prevent their misuse, as such they need to be considered in planning evaluation.

**Key words:** *strategic planning, zoning, planning evaluation, digital plan data, federalism, discretion*

# 1 INTRODUCTION

The creation of visions and plans is a way of dealing with complex (socio-)spatial issues and uncertainty in developing urban regions (Albrechts 2004; Healey 2006). Although the role of strategic spatial plans in guiding urban transformation is contested (Friedmann 2004), they are an important means to uncover and locate conflicts of interests and to transmit powerful images (Neuman 1998). By expressing intentions, plans enable coherent interdependent decisions (Boyer and Hopkins 2018) and thus influence the behaviour of different groups of actors (Kaza 2019). Networks of plans, the assessment of their horizontal and vertical consistency and the link between plans and large-scale urban projects have recently received growing attention (cf. Bacău et al. 2020; Berke et al. 2019; Pagliarin et al. 2019).

Surprisingly little is however known about how strategic spatial planning relates to traditional land-use planning (Mäntysalo et al. 2015; Van den Broeck 2013). Although the planning systems of many countries are based on a combination of both planning approaches (European Commission 1997), empirical assessments of how land-use planning translates strategic planning intentions into binding zoning regulations remain scarce. Quantitative studies addressing this topic are even rarer. The main reason for this may be that strategic spatial planning and traditional land-use planning are, from a theoretical point of view, fundamentally different (Albrechts and Balducci 2013): Strategic plans, being ideally flexible and dynamic, tend to remain vague when expressing quantitative and spatially explicit goals (Hersperger et al. 2018). They are not intended to function like blue-prints (Albrechts 2004) and therefore their intentions are difficult to compare with clear-cut, legally binding zoning regulations. However, at a certain point, strategic thinking enters a statutory stage (Mäntysalo et al. 2019; Persson 2019; Searle 2017). To improve future planning practice, it is important to understand if and how strategic planning intentions trickle down to land-use planning and how ultimately zoning transforms them into legally binding regulations.

The Canton of Zurich provides an interesting case to analyse the compliance of land-use planning with strategic spatial planning in a multi-level planning system. In Switzerland the

implementation of spatial development policy is delegated by federal law to the cantons, allowing spatial variation and locally adapted solutions (Kissling-Näf and Wälti 2007; Sager et al. 2017). Cantons are mandated to strategically envision their future spatial development in the form of a 'Cantonal Structure Plan' (*Kantonaler Richtplan*). Municipalities on the other hand are usually responsible for determining the permissible use of land, via regulations which are binding for land-owners. Although new forms of governance are emerging and gaining attention (Kübler 2007), cantons and municipalities play the central role in this multi-level planning system (cf. Gennaio et al. 2009; Mueller and Hersperger 2015). Despite the well-structured implementation process, Swiss land-use federalism has been suspected to reduce the efficacy of spatial development policy (Muggli 2014).

This case study thus addresses the question of whether land-use planning, specifically in form of zoning regulations reflects strategic planning intentions and how this takes place. Focusing on the Cantonal Structure Plan of Zurich from 1995 (Kanton Zürich 1995) we concentrate on the following research questions: (1) What were the planning intentions of the Cantonal Structure Plan (1995) regarding the future development of settlement areas? (2) How can these planning intentions be interpreted spatially? (3) How did land-use zones change between 1996 and 2016? (4) Were these zoning changes compliant with the planning intentions of the Cantonal Structure Plan (1995)? We will explain the rationale behind our analysis in section 2 and the methodological approach in section 3, before presenting and discussing the results in sections 4 and 5.

## **2 ANALYTICAL FRAMEWORK**

We aim to analyse the relationship between strategic spatial planning and land-use planning, focussing on margins of discretion. Swiss land-use planning is required by law to be compliant with the Cantonal Structure Plans. Compliance is enforced through cantonal authorities, which authorise municipal land-use plans. From a top-down perspective, the well-structured implementation process is expected to support policy success (Sabatier and Mazmanian 1980).

It corresponds with an observed tendency for formalisation and institutionalisation of strategic spatial planning in Europe (Oliveira and Hersperger 2019; Van den Broeck 2013). However, in accordance with the federalist principle of subsidiarity and in line with the theoretical ideal of flexible strategic planning, Cantonal Structure Plans leave margins of discretion for subsequent planning levels. These margins of discretion are important, as they enable municipalities to embrace local knowledge and needs during the implementation process and facilitate public participation in shaping the local built-up environment. This can though negatively affect policy implementation from a top-down perspective (Sabatier and Mazmanian 1980): As municipal interests may diverge from higher-level government intentions, the sum of local decisions (made using formal and informal margins of discretion) might undermine the overall strategy (Sager et al. 2017; Pollack 2017). To analyse the compliance of land-use planning with strategic planning it is therefore necessary to deconstruct the margins of discretion within strategic planning. This can be done by focusing on the *precision* and *weight* of each planning intention.

The *semantic and spatial precision* of a planning intention, as derived from textual statements and map entries (cf. Palka et al. 2018), influences the margin of discretion for municipal land-use planning. For example the map of the Cantonal Structure Plan (1995) has a spatial resolution of 1:50,000, this grants a considerable spatial leeway to local authorities for their land-use planning activities. General textual statements lacking spatial references leave more room for interpretation than a precisely formulated planning intention, which refers to a spatially explicit entry in the map. Moreover, fuzzy planning intentions might conceal unresolved conflicts of interest and the evaluation of their implementation is therefore very complex (Mueller and Hersperger 2015; Palka et al. 2018).

With *statutory weight* we refer to the binding character of a planning intention. In theory, strategic planning is flexible and not binding, but as practice shows, the border between strategic and statutory planning is not always very distinct (Mäntysalo et al. 2019; Persson 2019; Searle 2017). This is also the case in Switzerland. Although Cantonal Structure Plans are binding for authorities, they often contain a mixture of binding, explanatory or suggestive

elements. For example, the text of the Cantonal Structure Plan (1995) contained statements that were explicitly highlighted as legally binding, but also explanatory elements which eased the interpretation of the binding parts and indicated measures to achieve the outlined goals. The legal status of these explanatory parts remained unclear, which the federal council criticised upon approval of the plan (Bundesamt für Raumplanung 1996). Where a planning intention is presented in the form of a recommendation rather than a binding statement, it relies on voluntary compliance, which might be improved by indirect sanctions or incentives (Burby et al. 1998).

The purpose of land-use planning is to create legal certainty through the regulation of land-use and building rights (Van den Broeck 2013). Land-use planning thus controls the *horizontal extension*, the ‘*vertical extension*’ (or density) and the *functional arrangement* of built-up areas. Within defined margins of discretion, it regulates the type, location and intensity of permitted land uses on a plot-by-plot basis. We refer to this activity as zoning. Zoning is a key technique for land-use planning, but also a strongly politicised regulatory tool (Sclar et al. 2020). The way land uses are arranged and regulated affects the environment and the quality of urban life (Talen 2012; Tarlock 2014). This emphasizes the importance of a strategic framework, which can foster a coherent and coordinated long-term spatial logic for land-use regulation (Albrechts 2006).

### **3 MATERIALS AND METHODS**

We analysed the Cantonal Structure Plan (1995) and compared it with zoning changes at the municipal level from 1996 to 2016. This timespan covers roughly one generation of land-use planning, as the latter follows a planning horizon of 15 years and is usually fully revised within two decades. In comparison with ex ante evaluations (which address the possible future outcomes of planning activities), ex post evaluations in spatial planning are rarely conducted despite their contribution towards increasing the legitimacy of planning activities and improving future decision making (Guyadeen and Seasons 2018; Laurian et al. 2010). An ex post evaluation ideally covers the whole process of plan making and plan implementation (Oliveira

and Pinho 2010). In this study we specifically focused on mechanisms of plan implementation within a multi-level planning system.

### 3.1 Study area

The Canton of Zurich covers an area of approximately 1,730 km<sup>2</sup> and is the most socio-economically dynamic region of Switzerland. During the study period, from 1996 to 2016, its population grew from 1,175,000 to 1,466,000 inhabitants (Bundesamt für Statistik 2019a) and now amounts to almost one fifth of the total population of Switzerland. The working population increased from 721,000 to 994,000 during the study period (Bundesamt für Statistik 2019b). At the same time the amount of built-up area within the Canton increased by 17 percent from 19,742 ha to 23,067 ha (Bundesamt für Statistik GEOSTAT 2018).

### 3.2 Description of documents and data

In our analysis we used: the Cantonal Structure Plan (1995), data necessary to interpret its planning intentions spatially and zoning-data (Table 1).

*Table 1. An overview of the spatial data and selected classes used in the analysis.*

Topic	Dataset	Classes	Source
Strategic spatial planning	Cantonal Structure Plan (1995)	Settlement area	Cantonal Office for Spatial Development / GIS-ZH
		Valuable townscapes of cantonal importance	
		Centre areas	
Data for the spatial interpretation of planning intentions	Land use statistics 1992/97 NOAS04	(historically) built-up area	Federal Statistical Office GEOSTAT
	Classification of accessibility via public transport	Area with good to very good accessibility via public transport	Federal Office for Spatial Development
Land-use planning	Land-use zones 1996/2016	Residential	Cantonal Office for Spatial Development / GIS-ZH
		Commercial and industrial	
		Mixed uses	
		Townscape heritage	
		Town centre	
		Public facilities	
		Recreation	

The Cantonal Structure Plan (1995) was established through a complex participatory plan-making process in the 1990s, documented in detail by Ringli (1997). It has undergone several partial revisions during the implementation period, before being replaced by a fully revised and authorised plan in 2015. The Cantonal Structure Plan (1995) consists of a text document containing planning intentions regarding the spatial development of the Canton and three thematic maps (*Settlement and Landscape*; *Transport and Services* and *Public Facilities*). Our analysis focussed on the map *Settlement and Landscape*, as we were particularly interested in settlement development and urban land use. This map strategically defined three types of areas to manage urban growth (Figure 1): *Settlement areas*, *valuable townscapes of cantonal importance* and *centre areas*.

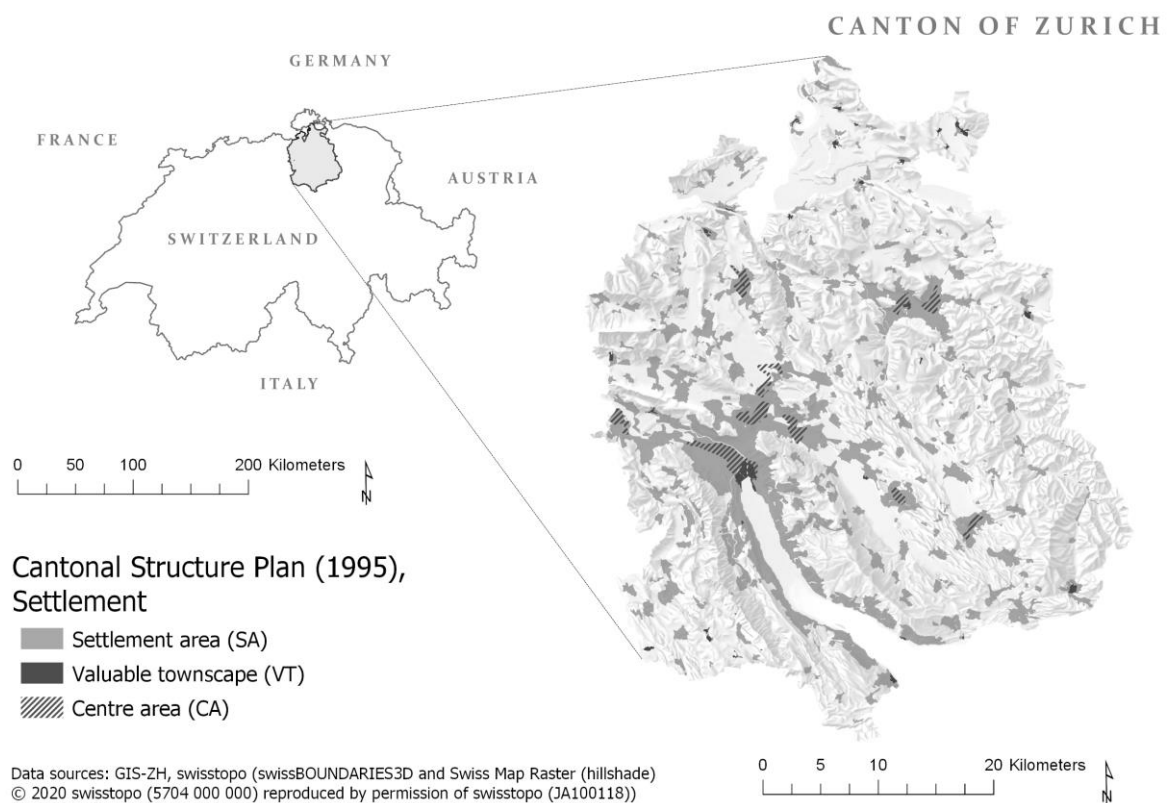


Figure 1. The study area within Switzerland and spatial information from the Cantonal Structure Plan (1995).

For planning intentions not explicitly stated in the map, proxies for their spatial extent were developed from additional geographical data. (1) *Historic hamlets*: The Cantonal Structure Plan (1995) defined historic hamlets and existing small groups of buildings as settlement areas,

without specifically delineating them on the map. The extent and location of these areas were therefore approximated using data on built-up areas from the Swiss *land use statistics 1992/97* (Bundesamt für Statistik GEOSTAT 2018). We refer to these areas as “*settlement area+*”. (2)

*Accessibility:* The Cantonal Structure Plan (1995) referred to areas which are easily accessible by public transport, without any further (spatial) definition. Therefore the current classification on the accessibility via public transport, from the Federal Office for Spatial Development, was used (Bundesamt für Raumentwicklung 2019). This classification is based on the distance to the nearest transport network stops, the means of transport and service intervals. A “*settlement area with high accessibility via public transport*” was defined by the overlap of the classes A (very high accessibility via public transport) or B (good accessibility via public transport) with *settlement area*.

To analyse changes in land-use zoning we used a dataset covering the period from 1996 to 2016 provided by the Cantonal Office for Spatial Development. The dataset includes information from early paper land-use plans, which had been digitised and current digital land-use plans.

Municipal nomenclatures had been transformed to a standardized typology of 20 principal land-use classes at the cantonal level. The dataset contains information on the permitted land use and density for built-up areas for each land-use zone.

### 3.3 Methodology

The analysis of the Cantonal Structure Plan (1995) was based on the procedure proposed by Palka et al. (2018), involving the extraction of planning intentions and their spatial interpretation. To extract planning intentions (question 1) we applied a qualitative content analysis, guided by the analytical framework presented in section 2. First, we identified relevant content concerning the development of settlements and collected 81 short statements in a table, which either contained a goal or a directive. Each of these statements was categorised regarding its margin of discretion. For semantic precision we used the categories: (1) fuzzy (e.g. *Ensure and improve the future viability of current settlement structures*), (2) generic (e.g. *Align settlement structures with public transportation network*) or (3) precise (e.g. *The defined settlement area*



*cannot be extended or reduced by lower level planning authorities*). Similarly, spatial precision was categorized as: (1) spatial reference lacking or fuzzy (e.g. *Foster inner development of built-up areas*), (2) generic spatial reference, not entered into the map (e.g. *Allocate new capacities for commercial centres near train stations*) and (3) precise, clearly delineated in the map (e.g. *Foster mixed uses within centre areas* – where centre areas were delineated within the map). To rate the statutory weight of a statement within the plan we distinguished between binding statements (which are highlighted grey within the text) and the remaining statements, whose legal status is not fully clarified by the text.

In a second step, all statements were coded and sorted based on the topic they addressed. Five major groups of statements emerged and the statements of each group were subsumed to a planning intention. The margin of discretion of each resulting planning intention was characterised depending on the precision and statutory weight of the related single statements. For example, the two statements *Allocate new capacities for commercial centres near train stations* and *Foster mixed uses within centre areas* entered the same group of statements, which formed the planning intention *Increasing mixed uses within centre areas and areas with high accessibility via public transport*. The planning intention was rated as semantically precise, but spatially generic due to the missing map entry delineating easily accessible areas. Subsequently, each planning intention was spatially interpreted, i.e. a map was created showing where certain zoning changes were favoured or disapproved (question 2). The lacking spatial information was approximated with the use of additional geographical data, as described in section 3.2.

To detect relevant zoning changes between 1996 and 2016 (question 3) a regular grid of sample points, with a grid square size of 100 x 100 m, was implemented. This method accounts for the spatial margin of discretion that the map of the Cantonal Structure Plan (1995) purposefully grants municipal planning authorities. The sample points were reclassified in three different ways: (1) to measure changes in the horizontal extension of building zones, all points were reclassified as either representing a building or non-building zone; (2) to analyse changes in the density regulations for built-up areas, points representing building zones were further

categorised regarding the permitted building density. (3) To detect functional changes the points were classified as representing one of the following types of zones: residential, commercial/industrial, mixed-uses, town centre, public facilities, townscape heritage or recreation.

As municipalities in the Canton of Zurich are free to choose one of three different ratios to regulate their density of built-up areas, further standardisation was necessary (Figure 2).

Derived from a method from the Cantonal Office for Spatial Development (Amt für Raumentwicklung 2014), the following formula was used to convert Building Mass Ratio (BMR) or Building Coverage Ratio (BCR) to Floor Area Ratio (FAR), where MBH is the Maximum Building Height and ANF is the Allowed Number of Floors. (1)

$$(1) \frac{BMR}{MBH} * ANF = BCR * ANF = FAR$$

As we used a regular grid of sample points, plot area was not needed as a reference for the ratios of permitted building density. The different ratios do not take into account any restrictions due to regulations on construction setbacks. We assumed, however, that construction setbacks do not generally prevent the maximum utilisation of building zones. In the analysis changes equal to or higher than 0.2 FAR (which equals approximately one storey) were considered zoning changes, whilst changes smaller than 0.2 FAR were considered conversion uncertainties. Only points which represented residential or mixed-use zones in both 1996 and 2016 were included in the density change analysis.

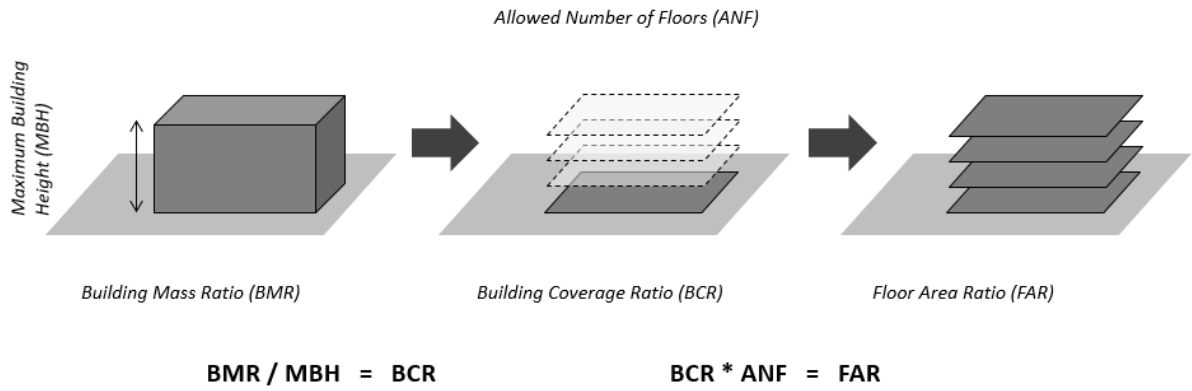


Figure 2. A graphical overview of the conversion of site ratios for the density of built-up areas.

Finally we compared the detected changes in zoning with the spatially interpreted planning intentions to evaluate the compliance of land-use planning with strategic spatial planning (question 4).

## 4 RESULTS

### 4.1 Planning intentions

Through our qualitative content analysis we found five principal planning intentions with a link to land-use planning (Table 2). The subsequent sections describe each planning intention in detail (question 1) and explain, how they have been spatially interpreted, i.e. which zoning changes were treated as compliant, neutral or non-compliant in the analysis (question 2).

Table 2. Planning intentions extracted from the Cantonal Structure Plan (1995) with their characteristics and the spatial interpretation of compliance.

	Planning intention	Target area	Characteristics			Spatial interpretation of compliance		
			semantic	spatial	statutory	Compliant	Non-compliant	Neutral
a	Allocation of built-up area	Within the <i>settlement area (SA)</i>	precise	precise	binding	New <i>building zones</i> within the SA  Rezoning to <i>non-building zones</i> outside the SA	Rezoning to <i>non-building zones</i> within the SA  New <i>building zones</i> outside the SA, not covering historic hamlets (SA+)	Designation of <i>building zones</i> within SA+ (covering historic hamlets)
b	Densification of built-up area	Within defined <i>centre areas (CA)</i> and <i>areas with high accessibility via public transport (PT)</i> .	generic	generic	binding	Increasing the permitted density of built-up areas within CA/PT  Decreasing the permitted density of built-up areas outside the SA	Decreasing the permitted density of built-up areas inside CA/PT  Increasing the permitted density of built-up areas outside the SA	Increasing the permitted density of built-up areas outside CA/PT, but inside the SA
c	Increasing mixed uses	Within <i>centre areas (CA)</i> and <i>areas with high accessibility via public transport (PT)</i>	precise	generic	binding	Rezoning from <i>single-function</i> to <i>mixed-use building zones</i> within CA/PT	Rezoning from <i>mixed-use</i> to <i>single-function building zones</i> within CA / PT	Rezoning of <i>single-function / mixed-use building zones</i> outside CA/PT
d	Preservation of heritage sites	Within the scope of <i>valuable townscapes of cantonal importance (VT)</i>	generic	precise	status unclear	Rezoning from <i>common building zones</i> to <i>zones for townscape heritage</i> within the scope of VT	Rezoning from <i>zones for townscape heritage</i> to <i>common building zones</i> within the scope of VT	Rezoning of <i>zones for townscape heritage / common building zones</i> outside the scope of VT
e	Ensuring settlement quality		fuzzy	missing	status unclear	Rezoning from <i>building zones</i> to <i>zones for nearby recreation</i>	Rezoning from <i>zones for nearby recreation</i> to <i>building zones</i>	

The allocation of built-up areas within the defined *settlement area* (planning intention a) was one of the main objectives of the Cantonal Structure Plan (1995). It involved defining sufficient suitable areas for the future development of residential, commercial, industrial and mixed-use structures, with a long-term perspective. According to the plan, municipalities should thus only allocate future building zones within the defined *settlement area*, covering but not exceeding their estimated need for development within 15 years. Additionally the Cantonal Structure Plan (1995) enabled municipalities to create *new* building zones in close proximity to existing

(historic) groups of buildings and hamlets (*settlement area+*). Land-use planning was therefore evaluated as compliant with planning intention *a* when new building zones were designated within the *settlement area*, or where existing building zones outside the *settlement area* were rezoned to non-building zones. New building zones in the *settlement area+* were considered as neutral changes as they were tolerated but not promoted by the Cantonal Structure Plan (1995). The intention to allocate building zones within the *settlement area* was semantically and spatially precise. Nevertheless, the text document explicitly mentioned a spatial margin of discretion expressed in the coarse spatial scale of the map (1:50,000). Highlighted text passages underlined the binding character of planning intention *a*.

Planning intention *b*, the densification of built-up areas within defined *centre areas* and *areas with high accessibility via public transport*, addressed inner development. This inner development can be understood as the increase in building density, along with an increasing population density in existing built-up areas. Following a polycentric approach, the Cantonal Structure Plan (1995) strategically defined eleven *centre areas*. These areas were envisaged for development and intended to contain a higher building and population density than the remaining settlement area. Furthermore, it was taken as a premise for the Cantonal Structure Plan (1995), that the regional railway network (*S-Bahn*, established at the beginning of the 1990s) should form the basis for future settlement development. Areas with (future) high accessibility via the public transport network should be developed as a priority, in order to limit the amount of individual motorised traffic. An increase in the allowed building density within these target areas was thus evaluated as compliant with planning intention *b*, whereas a decrease was rated as non-compliant. Changes within the remaining *settlement area* were considered neutral. An increase in the permitted density of built-up areas outside the *settlement area* was rated as non-compliant, whereas a decrease was considered compliant. Planning intention *b* was semantically and spatially more generic than planning intention *a*. For example, the Canton left it to the regional planning authorities to further define target values regarding

the density of specific built-up areas. Highlighted text passages emphasised the binding character of planning intention *b*.

Planning intention *c*, increasing mixed uses within *centre areas* and *areas with high accessibility via public transport*, aimed to improve the quality of settlement areas and reduce the amount of individual motorised traffic. The Cantonal Structure Plan (1995) promoted the allocation of mixed uses particularly in *centre areas*. It aimed to provide optimal locations for business activities in *areas with high accessibility via public transport*, whilst also providing sufficient amounts of housing in these areas. We summarised the objectives for an increase in mixed-use areas as planning intention *c*. Changes from *single-function* to *mixed-use zones* within *centre areas* and *areas with high accessibility via public transport* were evaluated as compliant, whereas changes from *mixed-use* to *single-function zones* in these areas were considered non-compliant. Planning intention *c* was semantically precise, however, apart from the spatially explicit *centre areas* its spatial reference was rather generic. Highlighted text passages, emphasised the binding character of planning intention *c*.

The preservation of heritage sites within *valuable townscapes* (planning intention *d*) aimed to preserve unique townscapes and valuable examples of typical regional townscapes, in order to make history visible and foster a link between contemporary built-up developments and historical structures. The Cantonal Structure Plan (1995) therefore defined *valuable townscapes* of cantonal importance within the map, but delegated the task of specifying locally adapted regulations for townscape heritage to the municipalities. The replacement of buildings was not generally prohibited by the Cantonal Structure Plan (1995), however it intended for historically sensitive areas to be taken into consideration, especially when located in *centre areas*. Within *valuable townscapes*, new zones for townscape heritage were considered compliant, whereas the re-designation of zones for townscape heritage to common building zones was considered non-compliant. Although this planning intention was precise in its spatial reference, the textual statements of the plan were rather generic considering the complex topic. Surprisingly, none of

the text passages concerning planning intention *d* were highlighted to indicate a binding character, leaving its statutory weight unclear.

Planning intention *e*, ensuring settlement quality, was very fuzzy and lacked spatial explicitness. Alongside good local leisure and shopping facilities (covered by planning intention *c*) the aim of the Cantonal Structure Plan (1995) was, for example, the development of suitably designed outdoor spaces for nearby recreation, in order to improve the attractiveness of municipalities and minimize traffic. Although planning intention *e* comprises settlement quality and quality of life in general, the focus of our analysis was thus exemplarily laid on the provision of spaces for nearby recreation. For this planning intention the entire study area was interpreted as target area. New zones for nearby recreation were evaluated as compliant, whereas the re-designation of zones for nearby recreation to building zones was considered non-compliant. This interpretation contradicts planning intention *a* and indicates an internal conflict within the plan. Considering its fuzzy description, missing spatial reference and unclear legal status, planning intention *e* contains a much larger margin of discretion than planning intention *a*.

#### *4.2 The compliance of land-use planning with strategic spatial planning*

Although we evaluated a time period of 20 years, overall surprisingly few changes occurred in land-use zoning. In 1996, 28,289 from a total of 172,886 sample points represented building zones. They almost completely filled the *settlement area*, which reveals that the Cantonal Structure Plan (1995) defined the *settlement area* based very closely on existing municipal building zones. This gave municipalities very little room for further horizontal extensions of building zones. Still overall, more horizontal than vertical changes of building zones occurred. However, the net increase in building zones was less than 1 percent (254 sample points). The majority of changes were functional ones, with a clear increase in the number of *zones for mixed-uses*. (Table 3).

Table 3. An overview of the compliance of land-use planning with strategic spatial planning (PI = planning intention, SP = number of sample points, SA = settlement area, CA = centre area, PT = area of high accessibility via public transport, VT = valuable townscape of cantonal importance, SA+ = historically built-up areas (hamlets) outside settlement area).

PI	Compliant	SP	Non-compliant	SP	Neutral	SP
a	New building zones within the SA	447	Rezoning to non-building zones within the SA	402	New building zones outside the SA but within SA+	134
	Rezoning to non-building zones outside the SA	278	New building zones outside the SA and SA+	353		
Subtotal a		725		755		134
b	Increasing the permitted density of built-up areas within CA/PT	448	Decreasing the permitted density of built-up areas within CA/PT	68	Increasing the permitted density of built-up areas within the SA, but outside CA and PT	316
	Decreasing the permitted density of built-up areas outside the SA	2	Increasing the permitted density of built-up areas outside the SA	8	Decreasing the permitted density of built-up areas within the SA, but outside CA and PT	117
Subtotal b		450		76		433
c	Rezoning from single-function to mixed-use building zones within CA/PT	1,454	Rezoning from mixed-use to single-function building zones within CA/PT	62	Rezoning from single-function to mixed-use building zones outside CA/PT	760
					Rezoning from mixed-use to single-function building zones outside CA/PT	208
d	Rezoning from common building zones to zones for townscape heritage within the scope of VT	2	Rezoning from zones for townscape heritage to common building zones within the scope of VT	15	Rezoning from common building zones to zones for townscape heritage beyond the scope of VT	482
					Rezoning from zones for townscape heritage to common building zones beyond the scope of VT	350
e	Rezoning from building zones to zones for nearby recreation	93	Rezoning from zones for nearby recreation to building zones	2		
Subtotal c/d/e		1,549		79		1,800
Total		2,724		910		2,367

The changes in land-use zones were predominately compliant with the planning intentions of the Cantonal Structure Plan, or neutral. The only exceptions were changes in the horizontal extent of building zones, concerning planning intention *a*. Here we identified the same number of non-compliant and compliant zoning changes. However, 56 percent of non-compliant changes occurred within a distance of less than 100 meter of the border of the *settlement area*, which might reflect the spatial discretionary leeway provided by the Cantonal Structure Plan (1995). In some cases, large deviations in horizontal building zones were found in the context of



development projects, such as the international airport in Kloten (Figure 3a). As the airport increased in size, more areas needed to be zoned for built-up areas. Figure 3b shows a more common pattern, namely scattered rezoning. New building zones that are remote from the *settlement area* are particularly problematic in terms of urban sprawl. Figure 3b also shows areas rezoned for non-built-up areas within the *settlement area*. This may be carried out, for example, to define the edges of settlements, to gain a strategic reserve of land for possible later development or to rezone areas for recreation. Although these changes figure as non-compliant regarding planning intention *a*, some of them are in fact in line with planning intention *e*.

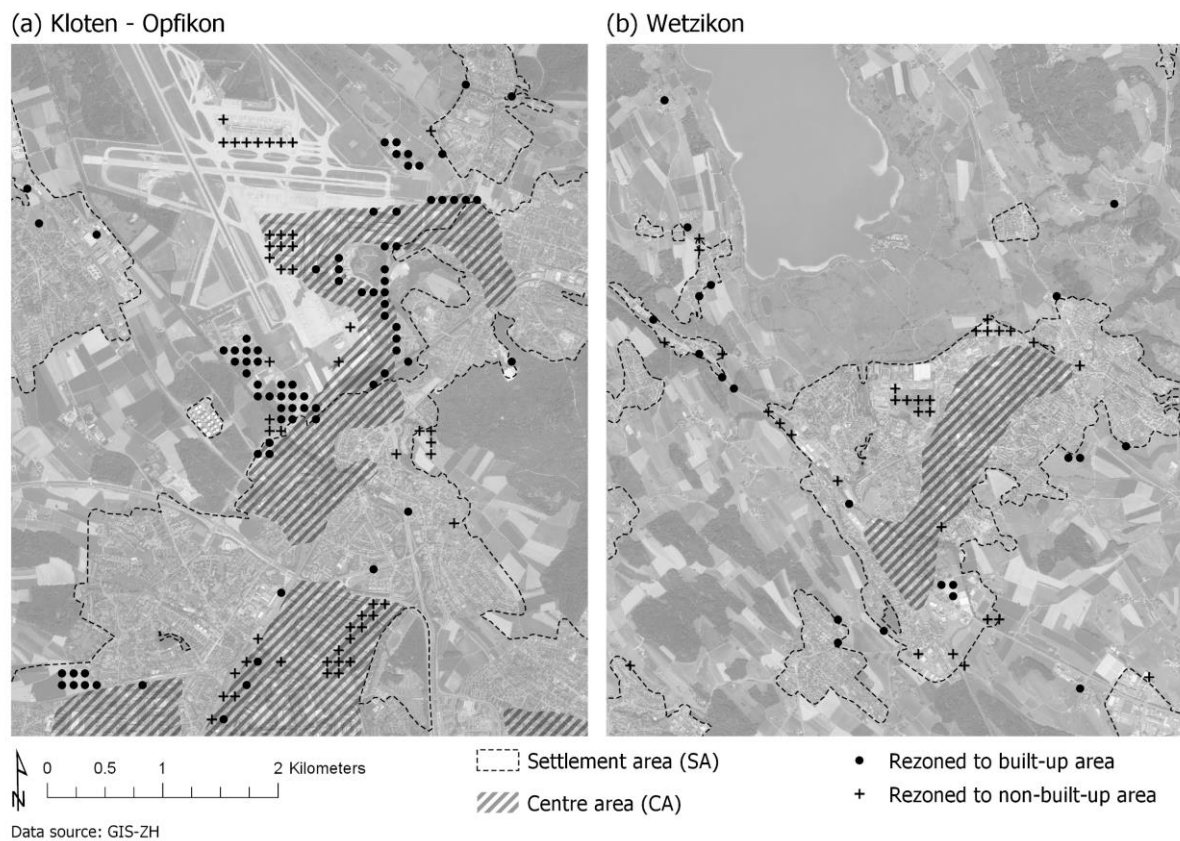


Figure 3. Almost half of the changes regarding the horizontal extent of building zones were spatially non-compliant with planning intention *a*. Adopting a local perspective, many of these changes can be legitimately explained: (a) Shows the international airport, as a special case, whilst (b) exemplarily shows a typical rezoning pattern found at the edges of municipalities.

Most of the changes regarding the permitted building density (in zones for residential uses and mixed-uses) were in compliance with planning intention *b*, or neutral (Table 3). A detailed view of these changes in permitted building density is shown in Figure 4. The distribution of Floor Area Ratios over time shows that of the sample points in residential zones, the majority had FAR

values between 0.3 and 0.6 in 1996 and 2016. Regarding the sample points in *zones for town centres* and *mixed-uses* (which clearly increased in general during the study period), a remarkable increase in sample points with high FAR values can be noticed.

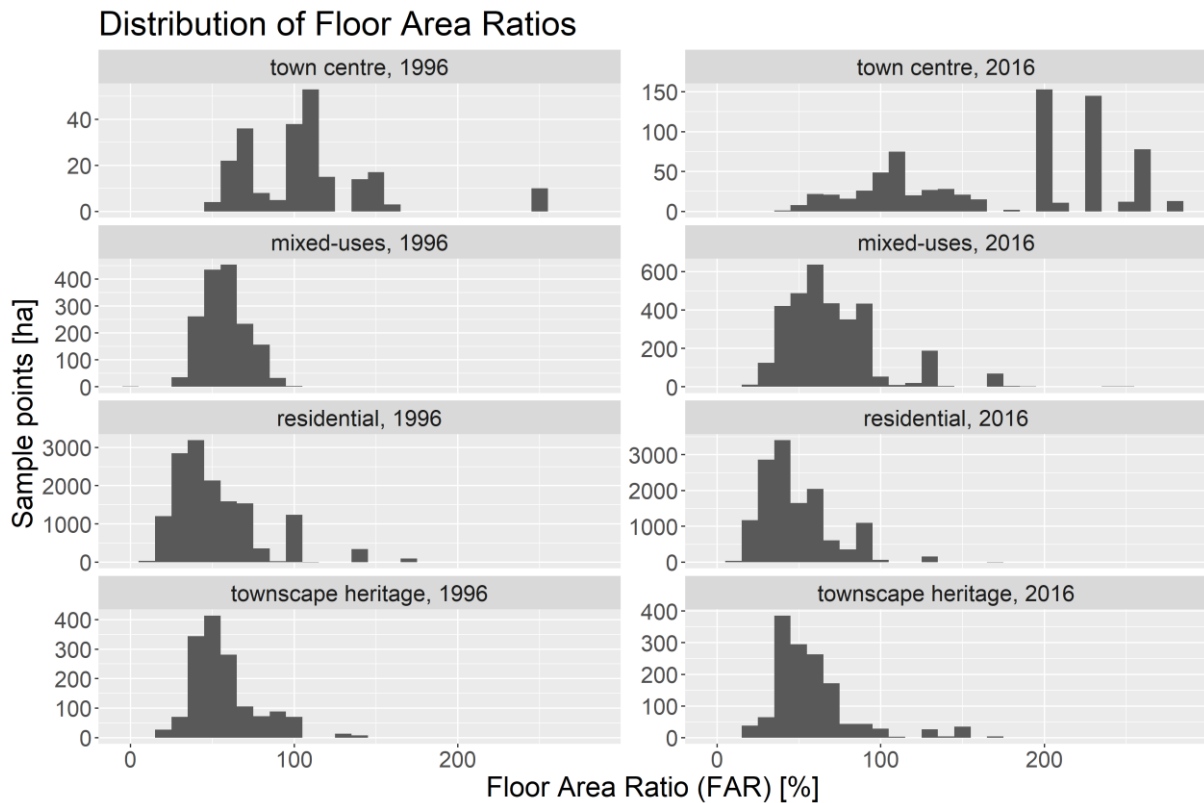


Figure 4. The distribution of permitted building density (Floor Area Ratio) shown for different functional types of land-use zones in 1996 and 2016.

Functional changes of inner-urban land-use zones were mostly compliant with the planning intentions of the Cantonal Structure Plan (1995). The majority of functional changes were changes from *single-function* to *mixed-use building zones*, which mostly occurred within *centre areas* and *areas of high accessibility via public transport* (compliant with planning intention c). However, a moderate proportion of these functional changes also occurred beyond *centre areas* and *areas of high accessibility*. In contrast, *zones for townscape heritage* decreased slightly within the areas of *valuable townscapes* of cantonal importance (non-compliant with planning intention d). Overall, however, an increase of 119 sample points of *zones for townscape heritage* could be observed. *New zones for nearby recreation*, replacing former building zones, increased the overall amount of sample points in *zones for nearby recreation* by almost five percent.

## 5 DISCUSSION

Planning evaluation can help to legitimize planning activities and improve future decision making (Guyadeen and Seasons 2018), however, like every form of policy evaluation it strongly depends on evaluation criteria (McConnell 2010; Sager et al. 2017). The extraction of planning intentions and their characterisation in terms of precision and statutory weight, proved to be a valuable procedure for analysing compliance. The framework allowed us to conduct a quantitative analysis of compliance between two fundamentally different planning instruments. Simultaneously it also gave us the opportunity to examine the results in the context of qualitatively assessed margins of discretion of planning intentions. The evaluation results will be discussed for each of the planning intentions in the following sections.

Planning intention *a* may be regarded as “responsive” rather than “transformative” (Healey 2009), since the definition of the *settlement area* mainly followed existing built-up areas and building zones. In this light, the focus of planning intention *a* lies more on the *containment* of future urban development than its *allocation*, and thus did not require an active adaptation of land-use zones. Given the socio-economic dynamics of the region a net increase of less than one percent of building zones can be viewed as an important achievement, as zoning is critical for successfully containing sprawl (Gennaio et al. 2009; Onsted and Chowdhury 2014). While the Swiss plateau in general has levels of urban sprawl notably above the average for Europe (Hennig et al. 2015), in a national comparison the Canton of Zurich demonstrated a low level of urban sprawl per capita (Schwick et al. 2018). This also concurs with results from Klaus (2019), who considered the Canton of Zurich to have a high level of cantonal land-use control. However, in 1995 very large reserves of building zones existed within the study area, which could readily take up urban growth (Amt für Raumordnung und Vermessung 2007). Despite this many of the changes appeared non-compliant with the target area of planning intention *a*, when referring to the (digitally) precise border of *settlement areas*. As we have shown, some of the deviations from the Cantonal Structure Plan (1995) can be considered as within the spatial margin of discretion expressed by the coarse spatial scale of the map. From a local perspective these deviations make

sense, particularly in the light of the limited room for manoeuvre. Nevertheless, it raises doubts regarding the ‘pro-active’ steering capacity of the plan in respect to the precise and binding planning intention *a*. This emphasizes the need for further research to complement current efforts of policy analysis, incorporating a local or even specifically urban perspective (cf. Kaufmann and Sidney 2020).

As the restriction of the designation of new building zones is expected to have an effect on building density in a growing region (Gennaio et al. 2009), it is surprising that few changes were observed regarding the vertical extension of zones for residential uses and mixed-uses (planning intention *b*). It is probable that the aforementioned reserves of building zones within the study area have taken up part of the observed growth (Schwick et al. 2018). Furthermore, the development of brownfield sites and special district plans play an important role in the urban densification processes (Cathomas and Hersperger 2018). Zoning did not actively contradict the binding, but rather generic, planning intention *b*. It could be argued, however, that municipalities might have missed the opportunity to *strategically use* their non-strategic land-use planning instruments (Mäntysalo et al. 2019) to create a more distinctive framework for the future development of urbanised areas in terms of density (cf. Wälty 2020). Taking into account the life-cycle of buildings, which usually outlive one generation of land-use planning, spatial reserves within existing building zones at strategically important locations may thus become ‘tied up’ for a longer period of time. For example when buildings are renovated or replaced without increasing the built-up density due to zoning restrictions. This highlights the importance of efforts to locate reserves within existing building zones, qualitatively assess their local specificities and statistically estimate their overall quantity, as an essential basis to strategically mobilise these reserves (Grams and Nebel 2013; Nebel et al. 2017; Nebel and Hollenstein 2018). With the method *Raum+* (ETH Zurich, Institute for Spatial and Landscape Development) a valuable tool has been developed to collect and constantly update data to support cantons and municipalities regarding future inward development.

A remarkable increase in the number of zones for mixed uses in *centre areas* and *areas with high accessibility via public transport*, which correspond with the binding and rather precise planning intention *c*, clearly stands out from the functional zoning changes analysed. Through promoting mixed uses within spatially distributed *centre areas*, the Cantonal Structure Plan (1995) complies with the polycentric development model (European Commission 1999). This is expected to have a positive effect on the economic performance of an urban area (Zhang et al. 2017). As Kaufmann and Meili (2019) point out, land-use planning can play an active role in economic development, particularly for small and medium-sized towns within metropolitan regions. In our study, zones for mixed uses not only increased within the spatially targeted areas, but also within the *settlement area* in general. The effects (and possible side effects) of such a highly dispersed use of zones for mixed uses could be investigated in further research.

The changes regarding zones for townscape heritage illustrate the conflict of interest that arises between the preservation of townscapes and urban densification. According to Skrede and Berg (2019) the topic of cultural heritage is frequently mentioned in planning documents, but often lacks sufficient discussion in the context of sustainable development. This is also true for the Cantonal Structure Plan (1995). Planning intention *d*, which is described rather generically and has an unclear legal status, aims for the preservation of built-up heritage partly in areas that are simultaneously envisaged for urban development. Despite recognising this spatial contradiction, the plan leaves a margin of discretion for municipal planning authorities and the cantonal reviewing authorities. This leeway can lead to locally adapted solutions, however, townscape heritage and quality should be well reflected in land-use planning to prevent conflicts at the level of building permission and to avoid missed opportunities for both preservation and densification (Trempe et al. 2018). As Avrami (2016) points out, there is a need to resolve the tensions between sustainability goals and the preservation of historic areas.

This is also the case for the preservation of recreational spaces and urban green infrastructures, which we chose as an indicator for settlement quality (planning intention *e*). The preservation of these areas, similar to built-up cultural heritage, is under eminent pressure due to current

densification processes (Haaland and Konijnendijk van den Bosch 2015; Pauleit et al. 2005). This phenomenon has been described as part of the “The Compact City Paradox” (Neuman 2005) and remains unresolved in the Cantonal Structure Plan (1995). The slight increase in the amount of zones for nearby recreation, compliant with planning intention *e*, is rather surprising considering the fuzzy description of this planning intention and its unclear legal status. As pressure on open spaces within urban areas is expected to increase, current research efforts regarding compact and green cities (Artmann et al. 2019; Richter and Behnisch 2019; Tappert et al. 2018) are essential.

From a methodological point of view, we strongly agree with Fertner et al. (2019) that increasing the availability of digital plan data holds an immense potential for future (comparative) planning evaluation. Based on our experience in the Swiss context we would like to reveal two possible problems, with the aim of advancing research efforts to address these problems. Making digital plan data more easily available entails the risk that planning intentions which were deliberately defined on a rough scale (as in the case of the Cantonal Structure Plan (1995)) can suddenly be viewed on a plot-by-plot basis. This problem was taken into account in our study through our sampling point approach and the use of a buffer to detect changes close to borders. Nevertheless, we suggest that future research should investigate handling digital accuracy in the case of fuzziness. In the case of zoning regulations, which are legally binding at the land parcel level, comparability is complex particularly in a federal planning system. Standardisation of zoning data to enable comparisons is thus another area for further research.

## **6 CONCLUSION**

To assess the relationship between strategic spatial planning and land-use planning, we compared zoning changes with planning intentions of the Cantonal Structure Plan (1995). Characterising the margin of discretion of strategic planning intentions, in terms of precision and statutory weight, was essential to accurately judge the quantitatively assessed compliance within the multi-level planning system. Overall we detected large amounts of passive

compliance, but few signs of an active, *strategic* use of land-use planning. Strategic margins of discretion are very important to structure transformation, while considering local knowledge and circumstances. However, margins of discretion nourish incremental responsiveness within multi-level planning systems, reducing their overall steering capacity and strategic effectiveness. Considering current land-use dynamics, a more pro-active and far-sighted form of land-use planning is required to legitimize strategic planning intentions with large margins of discretion.

## **ACKNOWLEDGEMENTS**

This research was funded by the Swiss National Science Foundation through the CONCUR project – From plans to land change: how strategic spatial planning contributes to the development of urban regions (ERC TBS Consolidator Grant number BSCGIO 157789). We are grateful to Urs Wachter from the Cantonal Office for Spatial Development and Magnus Gocke from the Cantonal Statistical Office in Zurich for providing data and insights on the cantonal classification methods and helpful comments on our analysis. Moreover, we would like to warmly thank Sarah Radford from the WSL language-editing centre for her careful editorial support, Dr Gaëtan Palka, Dr Robert Pazur and Dr Ana Beatriz Pierri Daunt for great tips and tricks in python and R and the two anonymous reviewers, who helped us to substantially improve our article.

## REFERENCES

- Albrechts, Louis (2004): Strategic (spatial) planning reexamined. In *Environment and Planning B: Planning and Design* 31 (5), pp. 743–758. DOI: 10.1068/b3065.
- Albrechts, Louis (2006): Shifts in strategic spatial planning? Some evidence from Europe and Australia. In *Environment and Planning A* 38 (6), pp. 1149–1170. DOI: 10.1068/a37304.
- Albrechts, Louis; Balducci, Alessandro (2013): Practicing Strategic Planning: In Search of Critical Features to Explain the Strategic Character of Plans. In *disP - The Planning Review* 49 (3), pp. 16–27. DOI: 10.1080/02513625.2013.859001.
- Amt für Raumentwicklung (Ed.) (2014): Berechnungsweise der Geschossflächenreserven im Kanton Zürich. Baudirektion Kanton Zürich.
- Amt für Raumordnung und Vermessung (Ed.) (2007): Raumentwicklung. Baudirektion Kanton Zürich (Raumbeobachtung Kanton Zürich, Heft 25).
- Artmann, Martina; Inostroza, Luis; Fan, Peilei (2019): From urban sprawl to compact green cities – advancing multi-scale and multi-dimensional analysis. In *Ecological Indicators* 96, pp. 1–2. DOI: 10.1016/j.ecolind.2018.10.058.
- Avrami, Erica (2016): Making Historic Preservation Sustainable. In *Journal of the American Planning Association* 82 (2), pp. 104–112. DOI: 10.1080/01944363.2015.1126196.
- Bacău, Simona; Grădinaru, Simona R.; Hersperger, Anna M. (2020): Spatial plans as relational data: Using social network analysis to assess consistency among Bucharest’s planning instruments. In *Land Use Policy* 92, pp. 1–14. DOI: 10.1016/j.landusepol.2020.104484.
- Berke, Philip R.; Malecha, Matthew L.; Yu, Siyu; Lee, Jaekyung; Masterson, Jaimie H. (2019): Plan integration for resilience scorecard: evaluating networks of plans in six US coastal cities. In *Journal of Environmental Planning and Management* 62 (5), pp. 901–920. DOI: 10.1080/09640568.2018.1453354.
- Boyer, Robert H. W.; Hopkins, Lewis D. (2018): Acting under the influence: Plans as improvisational gifts. In *Planning Theory* 17 (1), pp. 31–52. DOI: 10.1177/1473095216654729.
- Bundesamt für Raumentwicklung (2019): ÖV-Güteklassen ARE. Available online at <https://www.are.admin.ch/are/de/home/verkehr-und-infrastruktur/grundlagen-und-daten/verkehrserschliessung-in-der-schweiz.html>, checked on 11/6/2019.
- Bundesamt für Raumplanung (Ed.) (1996): Richtplan des Kantons Zürich. Prüfungsbericht zuhanden des Bundesrates. Eidgenössisches Justiz- und Polizeidepartement. Bern. Available online at [https://are.zh.ch/dam/audirektion/are/raumplanung/kantonalerichtplan/1995\\_karten/gehnemigung\\_bundesrat/3339-pruefungsbericht.pdf.spooler.download.1389798584109.pdf/3339-pruefungsbericht.pdf](https://are.zh.ch/dam/audirektion/are/raumplanung/kantonalerichtplan/1995_karten/gehnemigung_bundesrat/3339-pruefungsbericht.pdf.spooler.download.1389798584109.pdf/3339-pruefungsbericht.pdf), checked on 1/4/2020.
- Bundesamt für Statistik (2019a): Demografische Bilanz nach institutionellen Gliederungen. STAT-TAB – interaktive Tabellen (BFS). Available online at [https://www.pxweb.bfs.admin.ch/pxweb/de/px-x-0102020000\\_201/px-x-0102020000\\_201.px](https://www.pxweb.bfs.admin.ch/pxweb/de/px-x-0102020000_201/px-x-0102020000_201/px-x-0102020000_201.px), checked on 11/10/2019.
- Bundesamt für Statistik (2019b): Erwerbstätige (Inlandkonzept) nach Grossregionen und Geschlecht. Durchschnittliche Quartals- und Jahreswerte. Available online at <https://www.bfs.admin.ch/bfs/de/home/statistiken/arbeit-erwerb/erwerbstaetigkeit-arbeitszeit/erwerbstaetige/entwicklung-erwerbstaetigenzahlen.assetdetail.9366496.html>, checked on 11/10/2019.
- Bundesamt für Statistik GEOSTAT (2018): Arealstatistik 1992/97 NOAS04. Available online at <https://map.geo.admin.ch>, checked on 11/8/2019.
- Burby, Raymond J.; May, Peter J.; Paterson, Robert C. (1998): Improving Compliance with Regulations: Choices and Outcomes for Local Government. In *Journal of the American Planning Association* 64 (3), pp. 324–334. DOI: 10.1080/01944369808975989.
- Cathomas, Gierina; Hersperger, Anna M. (2018): Implementierung von Massnahmen gegen Zersiedelung: Lernen von guten Beispielen. In Christian Schwick, Jochen Jaeger, Anna M. Hersperger, Gierina Cathomas, Rudolf Muggli (Eds.): *Zersiedelung messen und begrenzen. Massnahmen und Zielvorgaben für die Schweiz, ihre Kantone und Gemeinden*. 1. Auflage 2018. Bern: Haupt Verlag (Bristol-Schriftenreihe, 57), pp. 135–188.
- ETH Zurich, Institute for Spatial and Landscape Development: Raum+. Available online at <https://www.raumplus.ethz.ch>, checked on 7/1/2020.
- European Commission (Ed.) (1997): The EU compendium of spatial planning systems and policies. Office for Official Publications of the European Communities. Luxembourg (Regional development studies).



- European Commission (Ed.) (1999): ESDP European Spatial Development Perspective. Towards Balanced and Sustainable Development of the Territory of the European Union. Office for Official Publications of the European Communities. Luxembourg.
- Fertner, Christian; Aagaard Christensen, Andreas; Stubkjær Andersen, Peter; Stahl Olafsson, Anton; Præstholt, Søren; Hjorth Caspersen, Ole; Grunfelder, Julien (2019): Emerging digital plan data – new research perspectives on planning practice and evaluation. In *Geografisk Tidsskrift-Danish Journal of Geography* 119 (1), pp. 6–16. DOI: 10.1080/00167223.2018.1528555.
- Friedmann, John (2004): Strategic spatial planning and the longer range. In *Planning Theory & Practice* 5 (1), pp. 49–67. DOI: 10.1080/1464935042000185062.
- Gennaio, Maria-Pia; Hersperger, Anna M.; Bürgi, Matthias (2009): Containing urban sprawl—Evaluating effectiveness of urban growth boundaries set by the Swiss Land Use Plan. In *Land Use Policy* 26 (2), pp. 224–232. DOI: 10.1016/j.landusepol.2008.02.010.
- Grams, Anita; Nebel, Reto (2013): Nutzungsreserven und -potenziale für die Siedlungsentwicklung nach innen. In *disP - The Planning Review* 49 (2), pp. 28–38. DOI: 10.1080/02513625.2013.826535.
- Guyadeen, Dave; Seasons, Mark (2018): Evaluation Theory and Practice: Comparing Program Evaluation and Evaluation in Planning. In *Journal of Planning Education and Research* 38 (1), pp. 98–110. DOI: 10.1177/0739456X16675930.
- Haaland, Christine; Konijnendijk van den Bosch, Cecil (2015): Challenges and strategies for urban green-space planning in cities undergoing densification: A review. In *Urban Forestry & Urban Greening* 14 (4), pp. 760–771. DOI: 10.1016/j.ufug.2015.07.009.
- Healey, Patsy (2006): Relational complexity and the imaginative power of strategic spatial planning. In *European Planning Studies* 14 (4), pp. 525–546. DOI: 10.1080/09654310500421196.
- Healey, Patsy (2009): In Search of the “Strategic” in Spatial Strategy Making. In *Planning Theory & Practice* 10 (4), pp. 439–457. DOI: 10.1080/14649350903417191.
- Hennig, Ernest I.; Schwick, Christian; Soukup, Tomáš; Orlitová, Erika; Kienast, Felix; Jaeger, Jochen A.G. (2015): Multi-scale analysis of urban sprawl in Europe: Towards a European de-sprawling strategy. In *Land Use Policy* 49, pp. 483–498. DOI: 10.1016/j.landusepol.2015.08.001.
- Hersperger, Anna M.; Oliveira, Eduardo; Pagliarin, Sofia; Palka, Gaëtan; Verburg, Peter; Bolliger, Janine; Grădinaru, Simona (2018): Urban land-use change: The role of strategic spatial planning. In *Global Environmental Change* 51, pp. 32–42.
- Kanton Zürich (1995): Kantonaler Richtplan. Beschluss des Kantonsrates vom 31. Januar 1995. Available online at [https://are.zh.ch/internet/baudirektion/are/de/raumplanung/richtplaene/kantonaler\\_richtplan/kt\\_richtplan\\_abgeschlossen\\_verfahren/31\\_03\\_1995.html](https://are.zh.ch/internet/baudirektion/are/de/raumplanung/richtplaene/kantonaler_richtplan/kt_richtplan_abgeschlossen_verfahren/31_03_1995.html), checked on 1/4/2020.
- Kaufmann, David; Meili, Rahel (2019): Leaves in the wind? Local policies of small and medium-sized towns in metropolitan regions. In *European Planning Studies* 27 (1), pp. 21–41. DOI: 10.1080/09654313.2018.1535576.
- Kaufmann, David; Sidney, Mara (2020): Toward an Urban Policy Analysis: Incorporating Participation, Multilevel Governance, and “Seeing Like a City”. In *PS: Political Science & Politics* 53 (1), pp. 1–5. DOI: 10.1017/S1049096519001380.
- Kaza, Nikhil (2019): Vain foresight: Against the idea of implementation in planning. In *Planning Theory* 18 (4), pp. 410–428. DOI: 10.1177/1473095218815201.
- Kissling-Näf, Ingrid; Wälti, Sonja (2007): The Implementation of Public Policies. In Ulrich Klöti, Peter Knoepfel, Hanspeter Kriesi, Wolf Linder, Yannis Papadopoulos, Pascal Sciarini (Eds.): *Handbook of Swiss Politics*. 2<sup>nd</sup>, rev. ed. Zürich: Neue Zürcher Zeitung Publishing, pp. 501–524.
- Klaus, Jacopo (2019): Do municipal autonomy and institutional fragmentation stand in the way of antisprawl policies? A qualitative comparative analysis of Swiss cantons. In *Environment and Planning B: Urban Analytics and City Science*, 1–17. DOI: 10.1177/2399808319833377.
- Kübler, Daniel (2007): Agglomerations. In Ulrich Klöti, Peter Knoepfel, Hanspeter Kriesi, Wolf Linder, Yannis Papadopoulos, Pascal Sciarini (Eds.): *Handbook of Swiss Politics*. 2<sup>nd</sup>, rev. ed. Zürich: Neue Zürcher Zeitung Publishing, pp. 253–278.
- Laurian, Lucie; Crawford, Jan; Day, Maxine; Kouwenhoven, Peter; Mason, Greg; Ericksen, Neil; Beattie, Lee (2010): Evaluating the outcomes of plans: theory, practice, and methodology. In *Environment and Planning B: Planning and Design* 37 (4), pp. 740–757. DOI: 10.1068/b35051.
- Mäntysalo, Raine; Kangasojä, Jonna K.; Kanninen, Vesa (2015): The paradox of strategic spatial planning. A theoretical outline with a view on Finland. In *Planning Theory & Practice* 16 (2), pp. 169–183. DOI: 10.1080/14649357.2015.1016548.

- Mäntysalo, Raine; Tuomisaari, Johanna; Granqvist, Kaisa; Kanninen, Vesa (2019): The Strategic Incrementalism of Lahti Master Planning: Three Lessons. In *Planning Theory & Practice* 20 (4), pp. 555–572. DOI: 10.1080/14649357.2019.1652336.
- McConnell, Allan (2010): Policy Success, Policy Failure and Grey Areas In-Between. In *Journal of Public Policy* 30 (3), pp. 345–362. DOI: 10.1017/S0143814X10000152.
- Mueller, Georg Philipp; Hersperger, Anna M. (2015): Implementing comprehensive plans: indicators for a task-sheet based performance evaluation process. In *Journal of Environmental Planning and Management* 58 (11), pp. 2056–2081. DOI: 10.1080/09640568.2014.973482.
- Muggli, Rudolf (2014): Ist der Föderalismus an der Zersiedelung schuld? Raumplanerische Entscheidungsprozesse im Spannungsfeld von Demokratie, Föderalismus und Rechtsstaat. Pilotstudie. Zürich: Verlag Neue Zürcher Zeitung (NZZ libro).
- Nebel, Reto; Hollenstein, Karin (2018): Siedlungsgebiete und Bauzonen effizienter nutzen. In *DENARIS* 02/2018, pp. 6–9. DOI: 10.3929/ETHZ-B-000247583.
- Nebel, Reto; Hollenstein, Karin; Di Carlo, Giovanni; Niedermaier, Mathias; Scholl, Bernd (2017): Schweizweite Abschätzung der Nutzungsreserven 2017. Edited by ETH Zurich, Institute for Spatial and Landscape Development.
- Neuman, Michael (1998): Does Planning Need the Plan? In *Journal of the American Planning Association* 64 (2), pp. 208–220. DOI: 10.1080/01944369808975976.
- Neuman, Michael (2005): The Compact City Fallacy. In *Journal of Planning Education and Research* 25 (1), pp. 11–26. DOI: 10.1177/0739456X04270466.
- Oliveira, Eduardo; Hersperger, Anna M. (2019): Disentangling the Governance Configurations of Strategic Spatial Plan-Making in European Urban Regions. In *Planning Practice & Research* 34 (1), pp. 47–61. DOI: 10.1080/02697459.2018.1548218.
- Oliveira, Vitor; Pinho, Paulo (2010): Evaluation in Urban Planning: Advances and Prospects. In *Journal of Planning Literature* 24 (4), pp. 343–361. DOI: 10.1177/0885412210364589.
- Onsted, Jeffrey A.; Chowdhury, Rinku Roy (2014): Does zoning matter? A comparative analysis of landscape change in Redland, Florida using cellular automata. In *Landscape and Urban Planning* 121, pp. 1–18. DOI: 10.1016/j.landurbplan.2013.09.007.
- Pagliarin, Sofia; Hersperger, Anna M.; Rihoux, Benoît (2019): Implementation pathways of large-scale urban development projects (IsUDPs) in Western Europe: a qualitative comparative analysis (QCA). In *European Planning Studies*, pp. 1–22. DOI: 10.1080/09654313.2019.1681942.
- Palka, Gaëtan; Grădinaru, Simona R.; Jørgensen, Gertrud; Hersperger, Anna M. (2018): Visualizing Planning Intentions: From Heterogeneous Information to Maps. In *Journal of Geovisualization and Spatial Analysis* 2 (16), pp. 1–14. DOI: 10.1007/s41651-018-0023-9.
- Pauleit, Stephan; Ennos, Roland; Golding, Yvonne (2005): Modeling the environmental impacts of urban land use and land cover change—a study in Merseyside, UK. In *Landscape and Urban Planning* 71 (2-4), pp. 295–310. DOI: 10.1016/j.landurbplan.2004.03.009.
- Persson, Christer (2019): Perform or conform? Looking for the strategic in municipal spatial planning in Sweden. In *European Planning Studies*, pp. 1–17. DOI: 10.1080/09654313.2019.1614150.
- Pollack, Michael (2017): Land Use Federalism's False Choice. Cardozo Legal Studies Research Paper No. 522. In *Alabama Law Review* 68 (3). Available online at <https://ssrn.com/abstract=3012284>, checked on 5/5/2020.
- Richter, Benjamin; Behnisch, Martin (2019): Integrated evaluation framework for environmental planning in the context of compact green cities. In *Ecological Indicators* 96, pp. 38–53. DOI: 10.1016/j.ecolind.2018.05.025.
- Ringli, Hellmut (1997): Plan-Making in the Zürich Region. In Patsy Healey, Abdul Khakee, Alain Motte, Barrie Needham (Eds.): *Making Strategic Spatial Plans. Innovation in Europe*. eBook, published 7 April 2006. London: Routledge, pp. 92–104.
- Sabatier, Paul; Mazmanian, Daniel (1980): The Implementation of Public Policy: A Framework of Analysis. In *Policy Studies Journal* 8 (4), pp. 538–560.
- Sager, Fritz; Ingold, Karin; Balthasar, Andreas (2017): Policy-Analyse in der Schweiz. Besonderheiten, Theorien, Beispiele. Zürich: NZZ Libro, Neue Zürcher Zeitung AG (Politik und Gesellschaft in der Schweiz, Band 4).
- Schwick, Christian; Jaeger, Jochen; Hersperger, Anna M.; Cathomas, Gierina; Muggli, Rudolf (Eds.) (2018): *Zersiedelung messen und begrenzen. Massnahmen und Zielvorgaben für die Schweiz, ihre Kantone und Gemeinden*. 1. Auflage 2018. Bern: Haupt Verlag (Bristol-Schriftenreihe, 57).
- Sclar, Elliott; Baird-Zars, Bernadette; Fischer, Lauren Ames; Stahl, Valerie E. (Eds.) (2020): *Zoning. A Guide for 21<sup>st</sup>-Century Planning*. New York: Routledge.

- Searle, Glen (2017): Strategic planning and land use planning conflicts. The role of statutory authority. In Louis Albrechts, Alessandro Balducci, Jean Hillier (Eds.): *Situated Practices of Strategic Planning. An international perspective*. Abingdon, Oxon: Routledge (Routledge Advances in Regional Economics, Science and Policy, 18), pp. 317–330.
- Skrede, Joar; Berg, Sveinung Krokann (2019): Cultural Heritage and Sustainable Development: The Case of Urban Densification. In *The Historic Environment: Policy & Practice* 10 (1), pp. 83–102. DOI: 10.1080/17567505.2019.1558027.
- Talen, Emily (2012): *City Rules: How Regulations Affect Urban Form*. Washington, DC: Island Press.
- Tappert, Simone; Klöti, Tanja; Drilling, Matthias (2018): Contested urban green spaces in the compact city: The (re-)negotiation of urban gardening in Swiss cities. In *Landscape and Urban Planning* 170, pp. 69–78. DOI: 10.1016/j.landurbplan.2017.08.016.
- Tarlock, A. Dan (2014): Zoned not planned. In *Planning Theory* 13 (1), pp. 99–112. DOI: 10.1177/1473095212469942.
- Trempp, Roland; Maurer, Philipp; Bühlmann, Lukas; Jud, Barbara (2018): Ortsbildschutz und Verdichtung. Raumplanerische Interessenabwägung in Gemeinden mit einem Ortsbild von nationaler Bedeutung (ISOS). Arbeitshilfe. Edited by VLP-ASPAN. Bern.
- Van den Broeck, Jef (2013): Balancing Strategic and Institutional Planning: The Search for a Pro-Active Planning Instrument. In *disP - The Planning Review* 49 (3), pp. 43–47. DOI: 10.1080/02513625.2013.859007.
- Wälty, Sibylle (2020): Greater Zurich does not use land parsimoniously: despite the spatial planning act, which has been in force since 1980. In *Journal of Urbanism: International Research on Placemaking and Urban Sustainability*, pp. 1–17. DOI: 10.1080/17549175.2020.1762707.
- Zhang, Tinglin; Sun, Bindong; Li, Wan (2017): The economic performance of urban structure: From the perspective of Polycentricity and Monocentricity. In *Cities* 68, pp. 18–24. DOI: 10.1016/j.cities.2017.05.002.