

# As Many Die At Everest, An Old Problem: Too Many Climbers, Deadly Congestion

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Adam Minter,  
Bloomberg



This year more than 400 climbers and sherpas decided to try their luck at summiting Mount Everest during the spring climbing season. Tragically, at least four have died so far and more than 30 others are reported to be suffering from severe frostbite and other ailments caused by prolonged exposure to Everest's brutal conditions. With several days remaining in the climbing season, and many climbers still preparing to make ascents, the potential for further tragedy is high.

Source: [www.ndtv.com](http://www.ndtv.com)

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Ein Interview von *Matthias Gebauer*



Toni Stocker

**Der Südtiroler Bergführer Toni Stocker hat den Mount Everest vor wenigen Tagen erklommen. Er berichtet von Höllenstrapazen, den Gefahren am Berg - und von unfassbar naiven Kletterern.**

Source: [www.spiegel.de](http://www.spiegel.de)

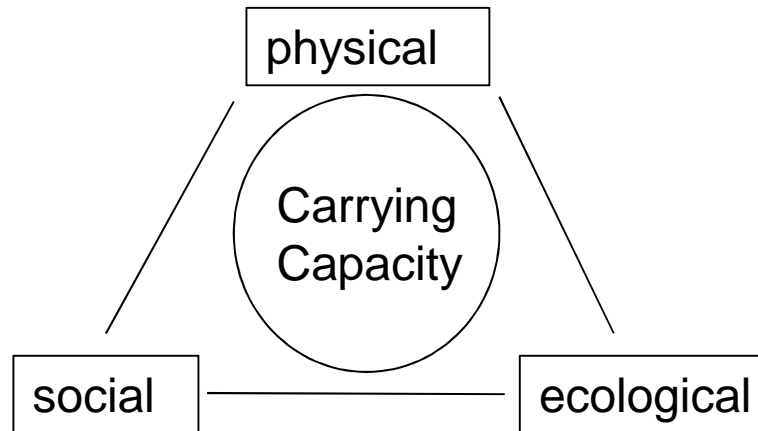
# **Social Carrying Capacity of Protected Areas**

Bad Schandau

08.06.2016

- 1. Social Carrying Capacity and Crowding**
2. Visitor Numbers in German national parks
3. Crowding Perception in Saxon Switzerland National Park
4. Demographic Change, Spatial Behavior and Carrying Capacity in Berchtesgaden National Park

## Carrying Capacity and outdoor recreation

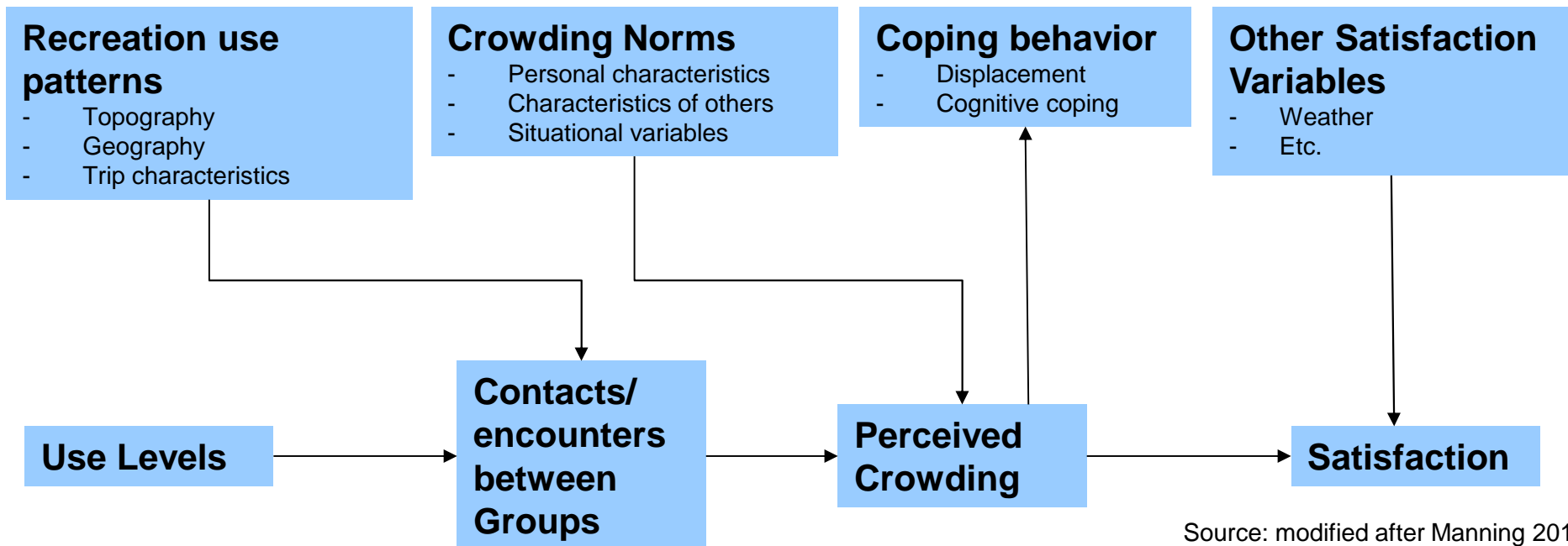


- ✓ The concept of Carrying Capacity was introduced to tourism literature by Wagar (1964) and can be defined as „*the level of use beyond which impacts exceed acceptable levels specified by evaluative standards*” (SHELBY/HEBERLEING 1984, p. 441)
- ✓ Carrying Capacity is a multidimensional concept including physical, social and ecological aspects
- ✓ Focus in Germany and Europe is lying primarily on ecological aspects of carrying capacity

- ✓ Social Carrying Capacity can be defined as *“the level or type of use beyond which impacts to the visitor experience exceed acceptable levels”* (VASKE & SHELBY 2008, p.155)
- ✓ Researches can define and measure indicators for Social Carrying Capacity, however the management of the national park and local stakeholders have to define limits of Social Carrying Capacity
- ✓ In North America the concept of Social Carrying Capacity is incorporated in visitor management frameworks (LAC, VERP etc.)
- ✓ Zoning concepts define sub areas with low capacity to provide opportunities for solitude and high capacity to provide opportunities for the general public



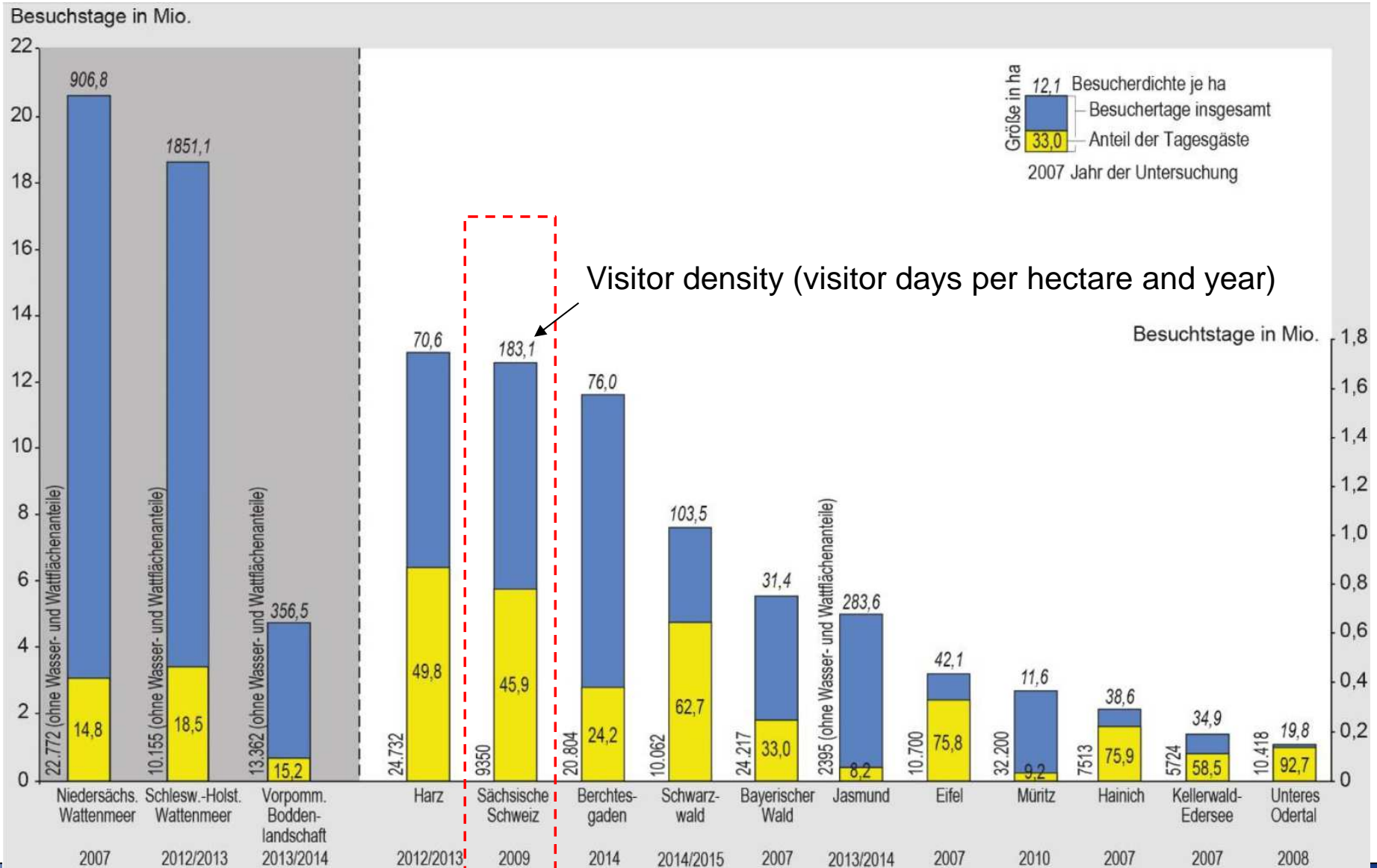
- ✓ Crowding can be defined as „a negative assessment of a certain density level in a given area” (Lee/Graefe 2003)



1. Social Carrying Capacity and Crowding
- 2. Visitor Numbers in German national parks**
3. Crowding Perception in Saxon Switzerland National Park
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# Visitor numbers in German national parks



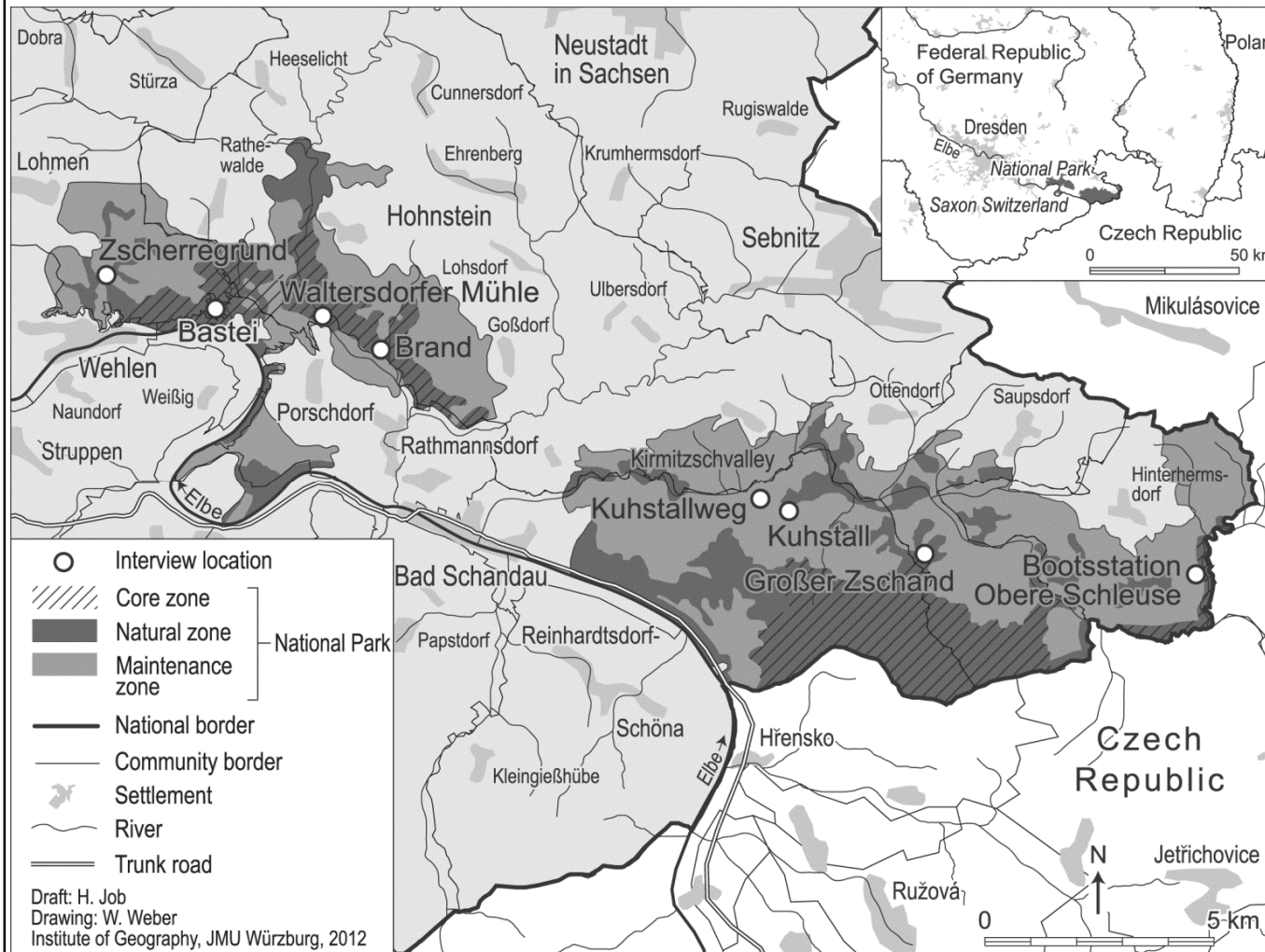
## Most visited areas in German national parks

National park	Year of data collection	Interview location	Number of visitors	Share of total visitor number
Saxon Switzerland	2009	Bastei	919.000	53.7%
Berchtesgaden	2014	Königssee	874.000	55.3%
Harz	2012/13	Torfhaus	631.000	36.1%
Harz	2012/13	Brocken	583.000	33.4%
Jasmund	2013/14	Königsstuhl	515.000	75.8%

- ✓ Bastei most visited area in all German national parks
- ✓ Concentration of visitors is highest in Jasmund national park

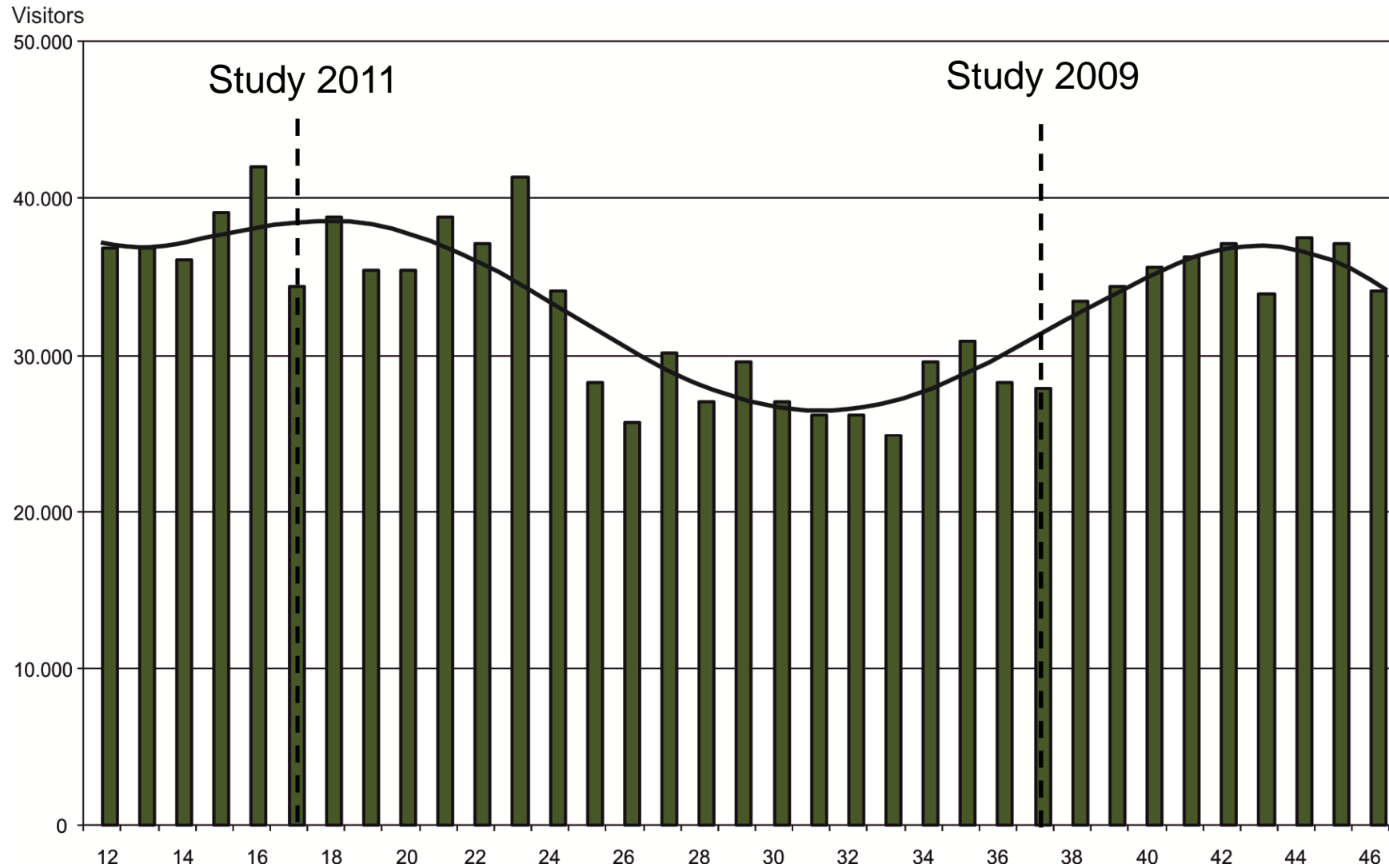
1. Social Carrying Capacity and Crowding
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## Study Area & Methods



Two visitor surveys on crowding:

- Schreiner (2009) in the Kirnitzschvalley in eastern part (n=280)
- Schamel (2011) on four interview locations in the western part (n=312)
- Both studies used 9 point Likert Scale to measure Crowding



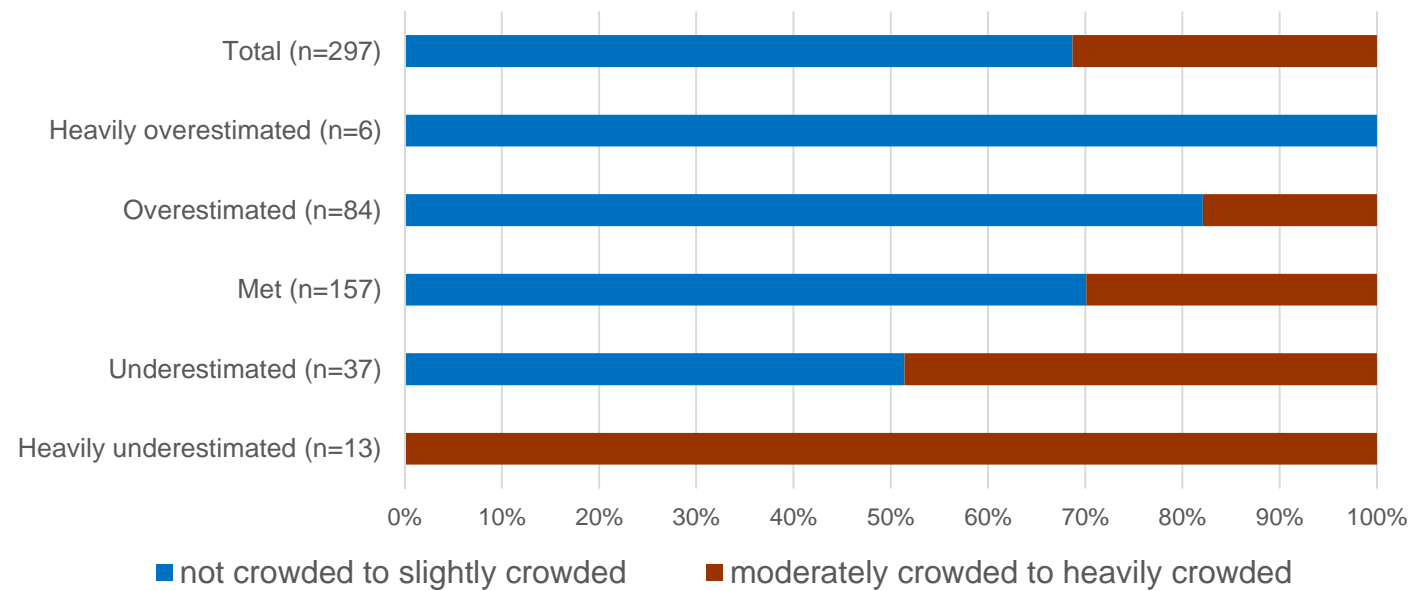
Source: Job et al. (2010), p. 18

## Results - Crowding Perception

	N	Mean	SD	Crowding –Perception ≥5
<b>2011</b>				
Bastei	86	5.76	1.68	74.4%
Brand	76	3.51	1.52	25.3%
Zescherregrund	75	3.03	1.49	8.0%
Waltersdorfer Mühle	75	2.73	1.07	12.0%
<b>2009</b>				
Kuhstall	70	4.43	2.37	44.3%
Kuhstall-trail	70	3.84	1.97	40.0%
Großer Zschand	70	2.16	1.60	10.0%
Bootstation Oberer Schleuße	70	2.37	1.50	11.4%
<b>Total (2009 + 2011)</b>	<b>592</b>	<b>3.52</b>	<b>2.03</b>	<b>29.0%</b>

## Results - Crowding and Expectation

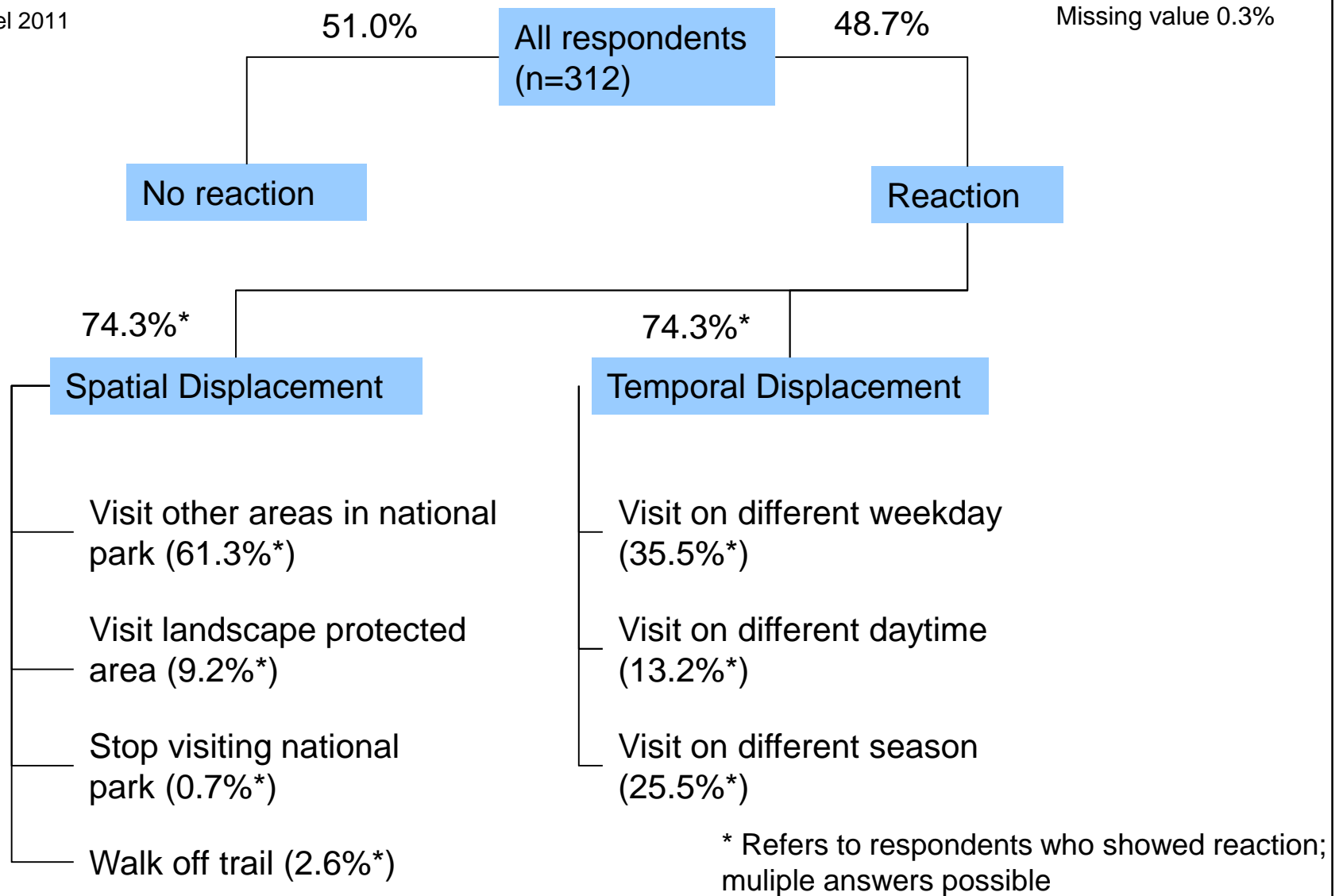
### Crowding and expected visitor numbers



Source: Schamel 2011

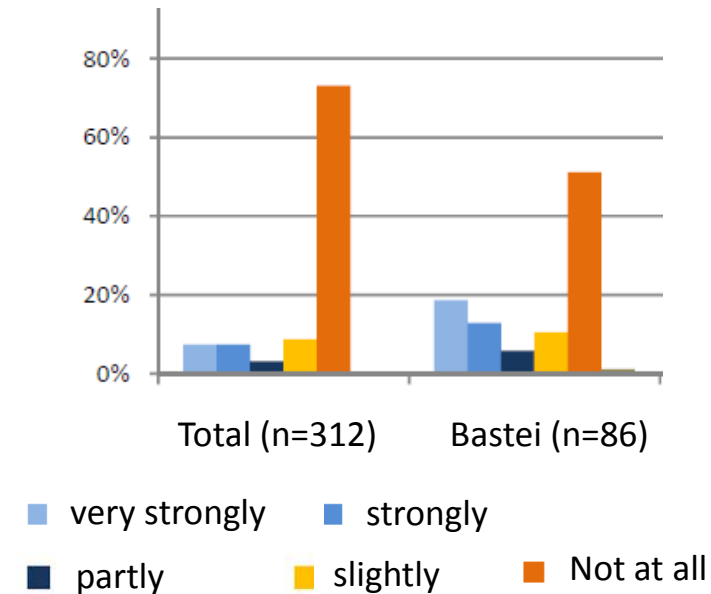
## Results - Reaction to Crowding

Source: Schamel 2011

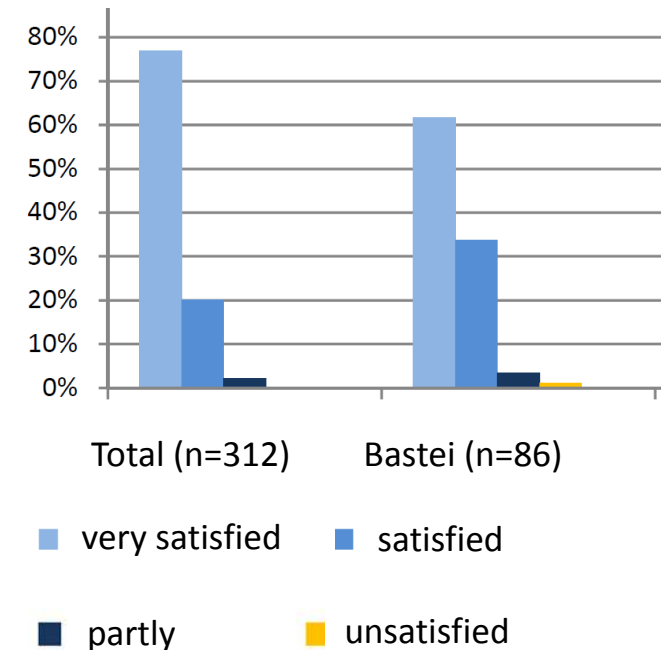




### Disturbance of nature experience



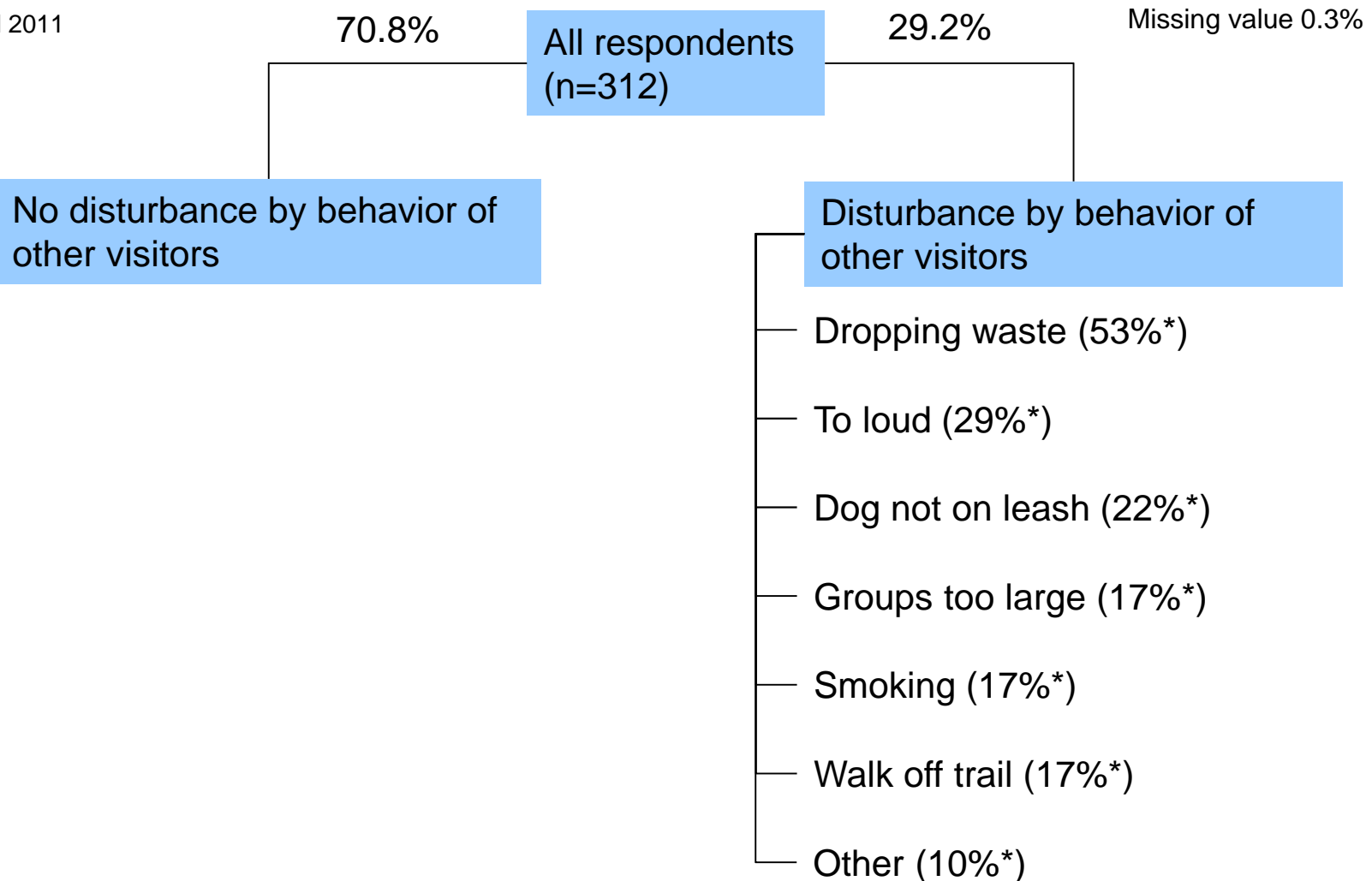
### Satisfaction



- ✓ More than 80% of visitors are not or only slightly disturbed in their nature experience, however at the Bastei one of three visitors is disturbed
- ✓ More than 95% of visitors are satisfied or very satisfied; Significant, but low correlation between crowding perception and satisfaction ( $r=-0.24$ )
- ✓ Low correlation may be rooted back to cognitive coping strategies or displacement of sensitive visitors

## Results - Conflicts besides Crowding

Source: Schamel 2011



\* Refers to respondents who showed disturbance; multiple answers possible

- ✓ No management action needed where crowding perception is low
- ✓ At the Bastei, Brand and in Lower Kirnitzschvalley providing information about temporal and spatial distribution of visitors numbers is essential
- ✓ Providing information in situ about possible alternatives to crowded areas and trails
- ✓ Promotion of off-season use, marketing with low visitor numbers
- ✓ However, changing temporal and spatial patterns of visitors use could increase crowding perception in other parts of the area

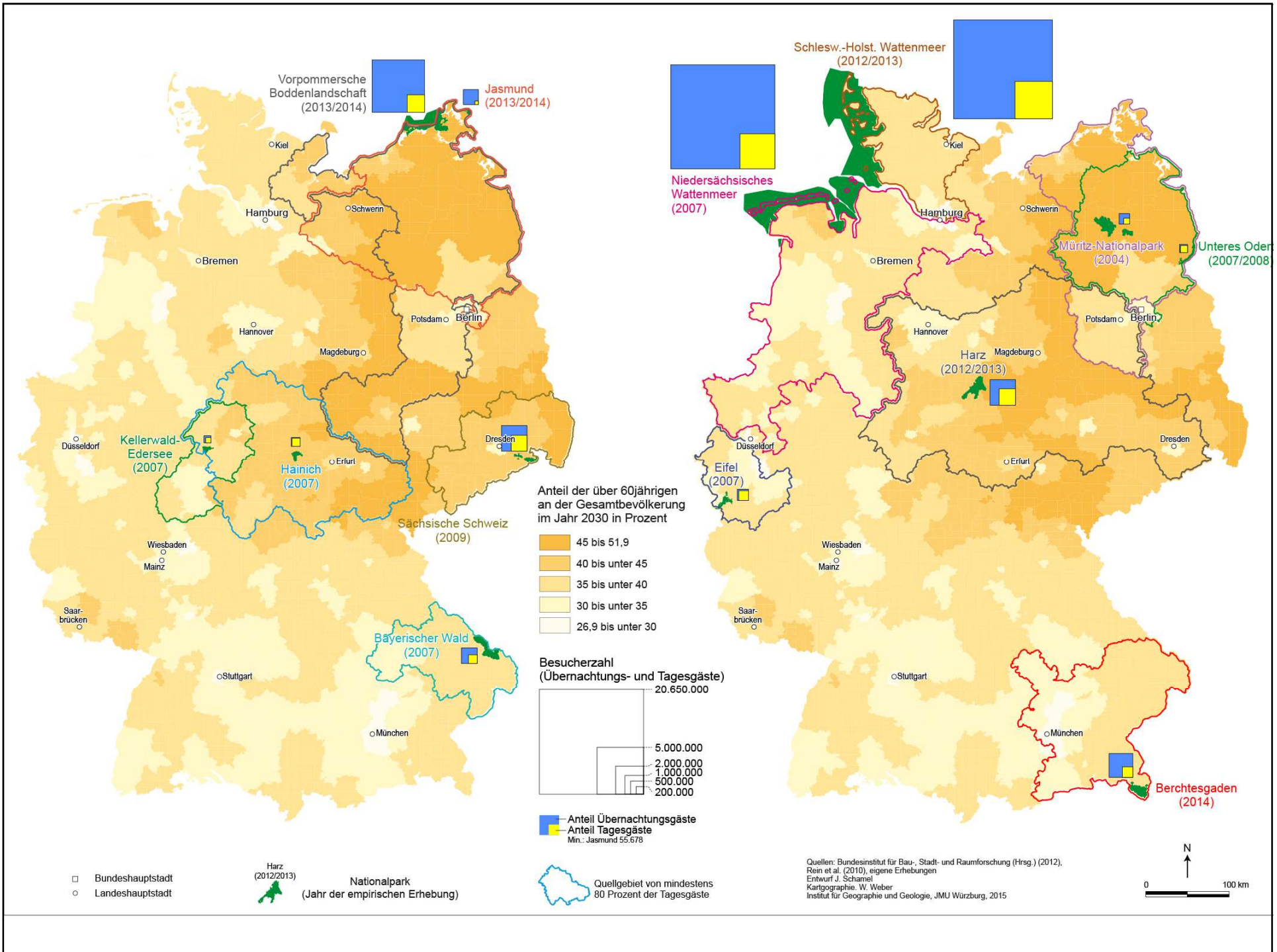
Trail	Distance miles (km)	Elevation Gain feet (meters)	Crowd Factor
<a href="#">4-Mile Trail</a>	4.7 (7.5)*	3,200 (975)	👤👤👤👤
<a href="#">Artist Point</a>	2.0 (3.2)	500 (150)	👤👤
<a href="#">Bridalveil Fall</a>	1.2 (1.9)	200 (60)	👤👤👤👤
<a href="#">Columbia Rock</a>	3 (4.8)	1,000 (300)	👤👤👤👤
<a href="#">Half Dome</a>	14.2 (22.7)*	4,800 (1,600)	👤👤👤👤
<a href="#">Happy Isles</a>	0.5 (0.8)*	< 10	👤👤👤

Source: Yosemitehikes.com

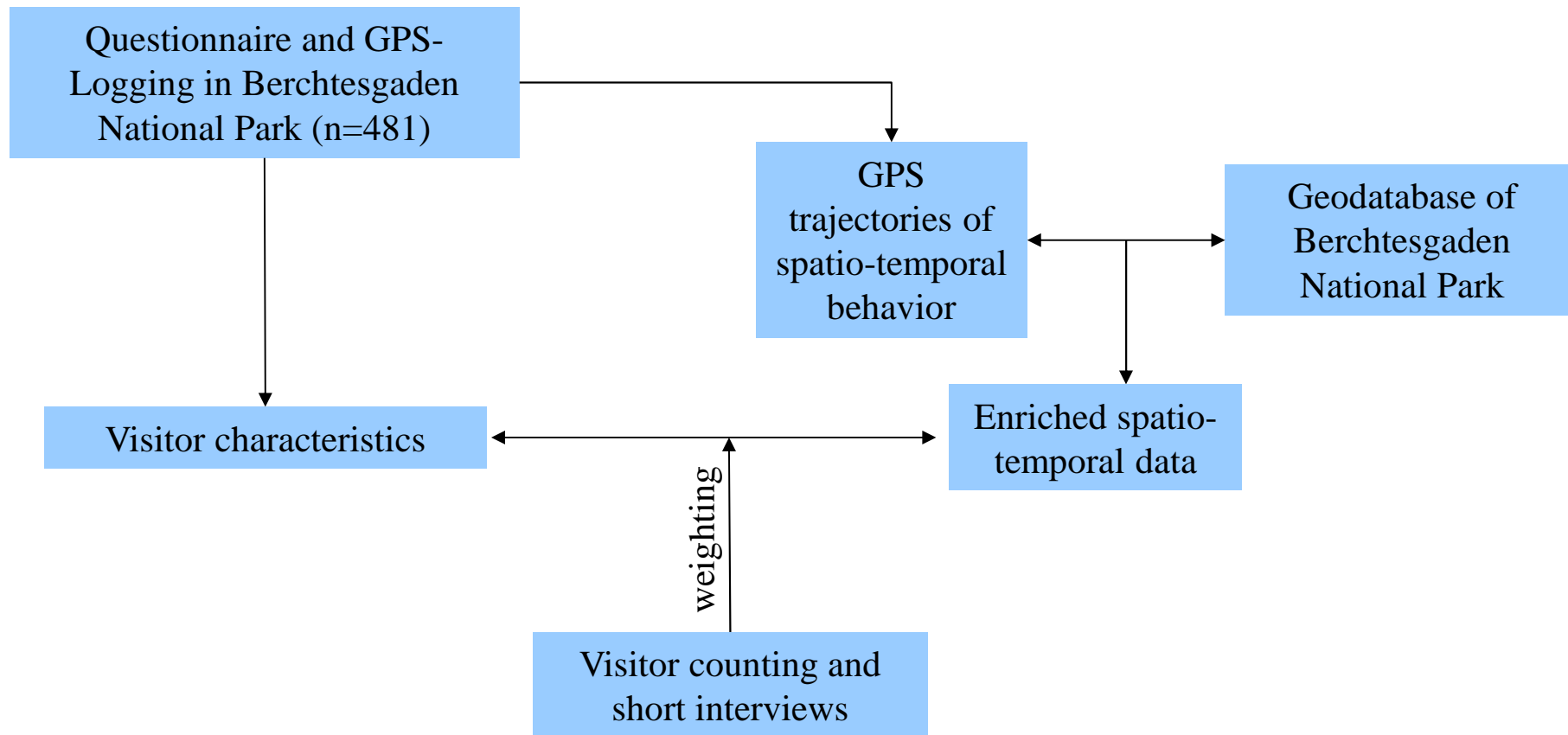


Source: Google.de

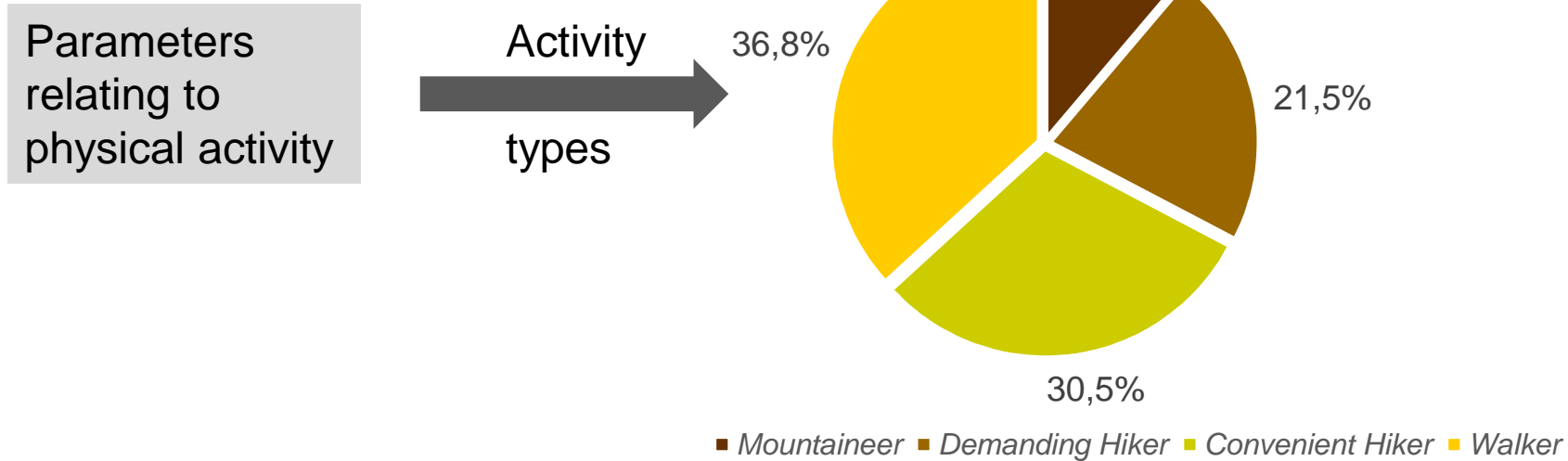
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4. **Demographic Change, Spatial Behavior and Carrying Capacity in Berchtesgaden National Park**



- ✓ Berchtesgaden NP is the only alpine NP in Germany
- ✓ Most visitors concentrate at Lake Königsee, where easy walks can be found, but also demanding mountaineering possible (e.g. Mount Watzmann, 2713m)

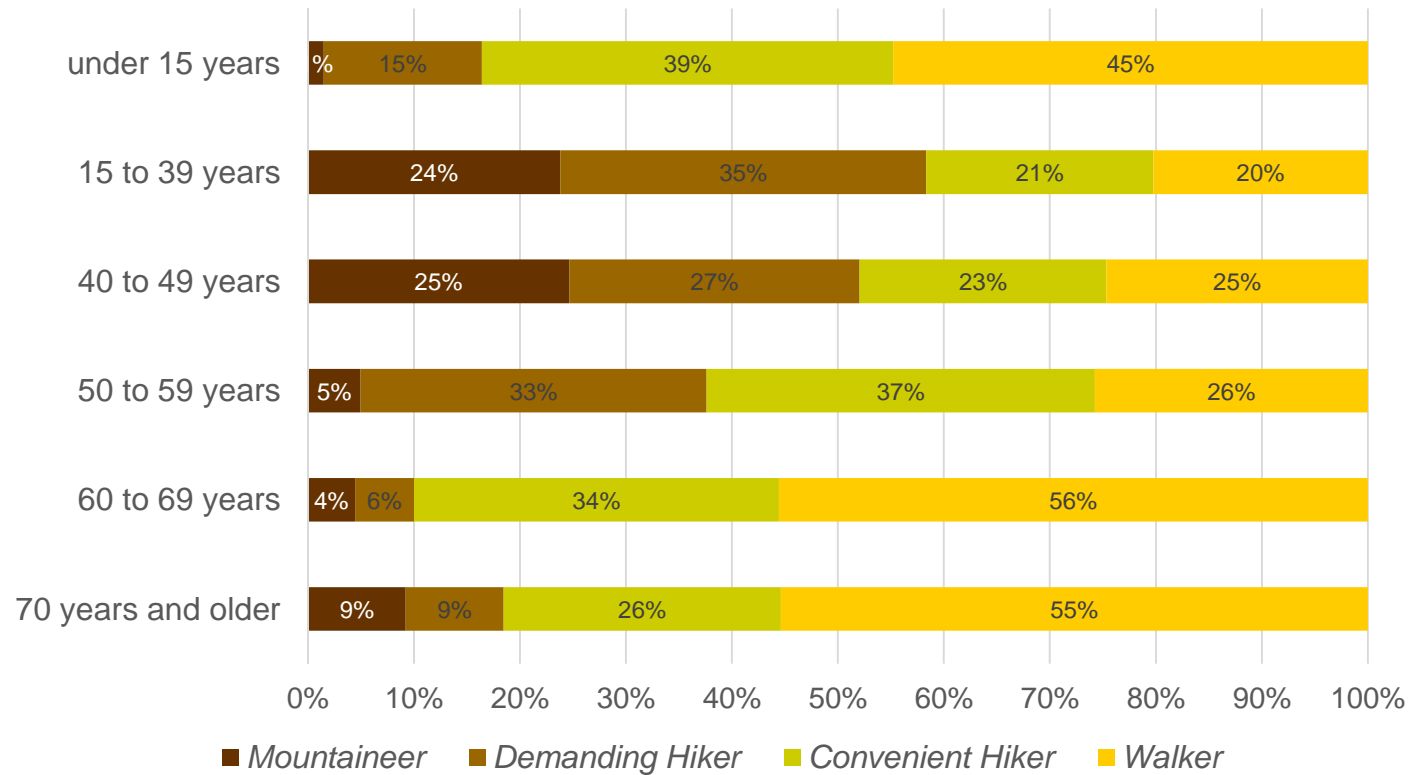


## Activity types



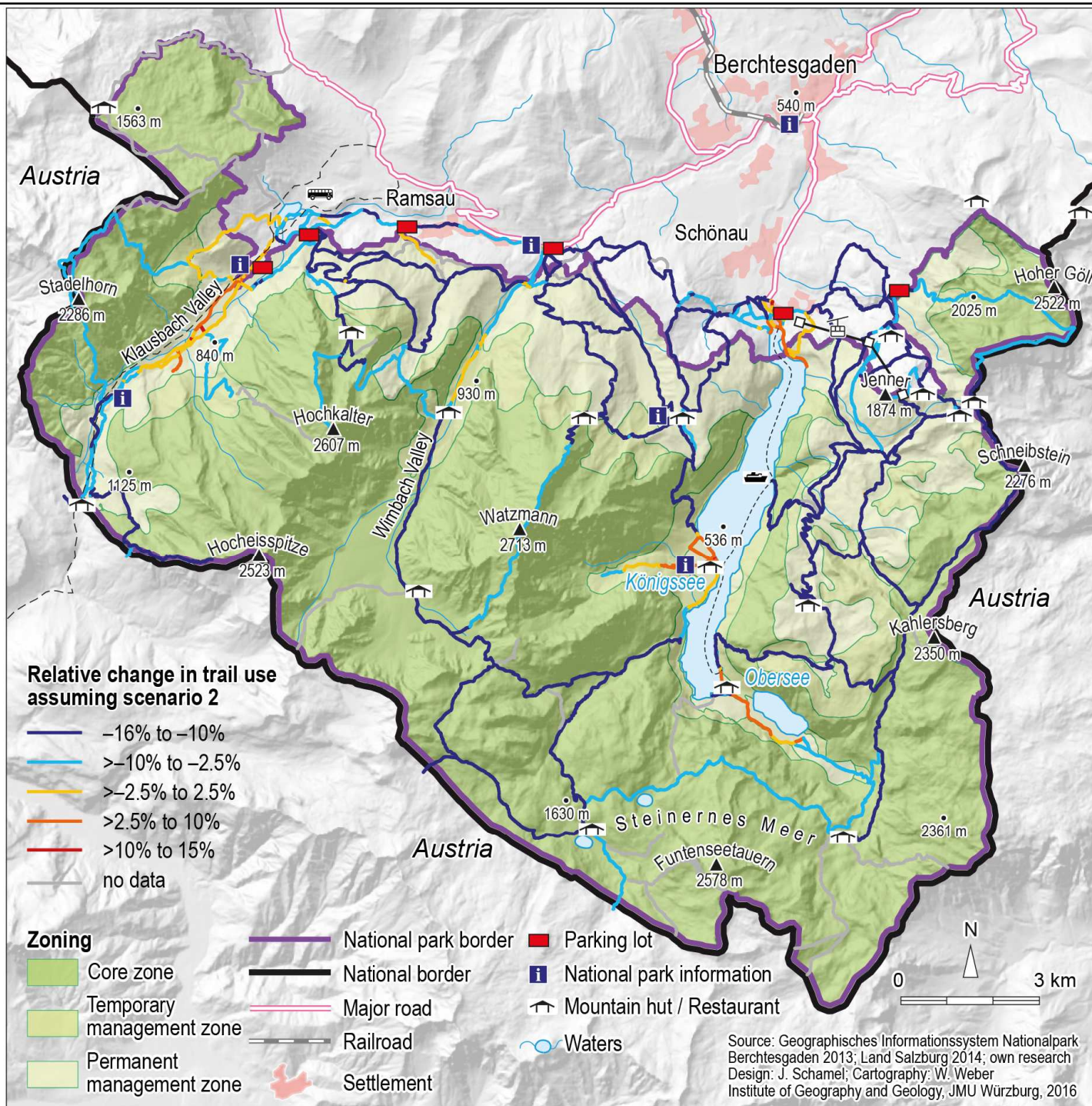
- ✓ *Mountaineer*: 9.4 km distance; 751 m elevation gain; steep trails with danger of falling
- ✓ *Demanding Hiker*: 14.0 km; 732 m elevation gain; avoid trails with danger of falling; hike in grassland or forest areas
- ✓ *Convenient Hiker*: 5.7 km; 208 m elevation gain; almost exclusively on trails with even surface
- ✓ *Walker*: 3.4 km; 64 m elevation gain; highest share of stoping time of total trip time

## Activity Types and Age



- ✓ Share of Mountaineers drops after the age of 49
- ✓ Share of Walkers is strongly increasing after the age of 59





## Conclusions

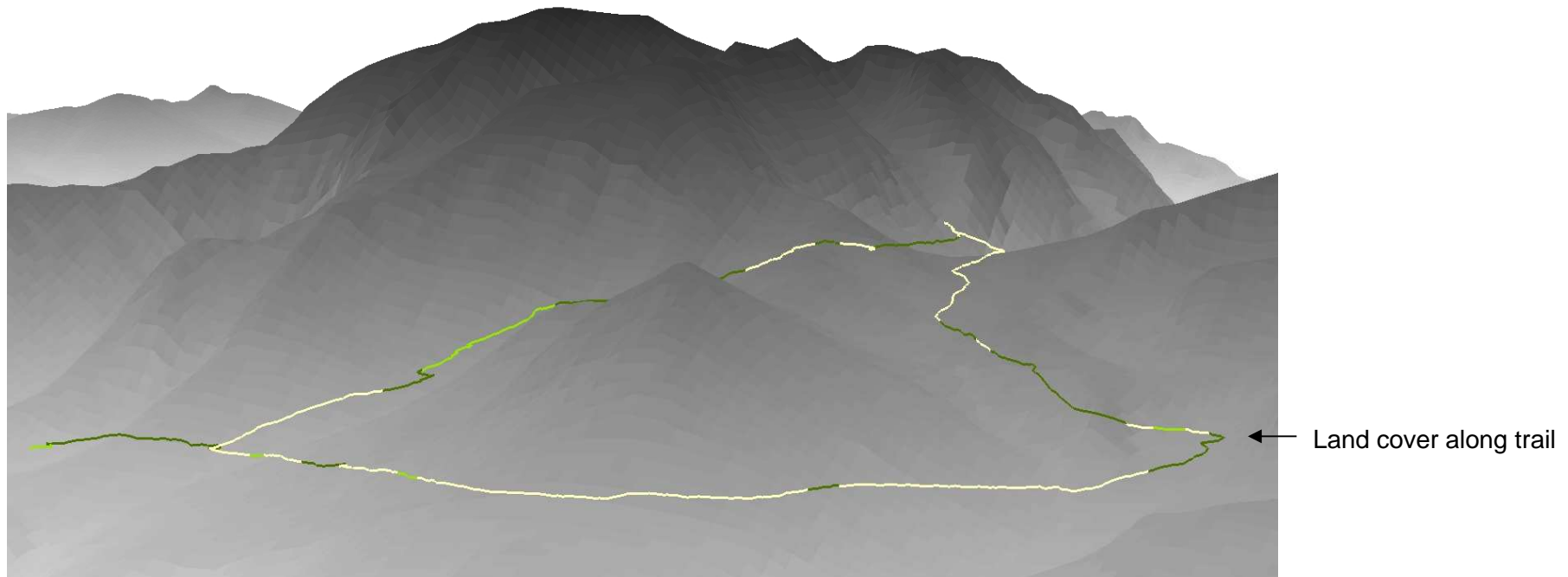
- ✓ Demographic change is only one factor, besides others like changing preferences for outdoor recreation activities, technological change, etc. that will affect future spatial behavior
- ✓ Results suggest that, demographic change may lead to a concentration of visitors of easy trails, due to increase of *Walkers*
- ✓ Frequentation of trails in remote areas is likely to decline with demographic change
- ✓ The demographic change may lead to a concentration of visitors in easily accessible areas, which may increase social conflicts, especially as older visitors were found to be more sensitive to these conflicts (ARNBERGER & EDER 2011, TRACHSEL & BACKHAUS 2011)



Thank you for your attention

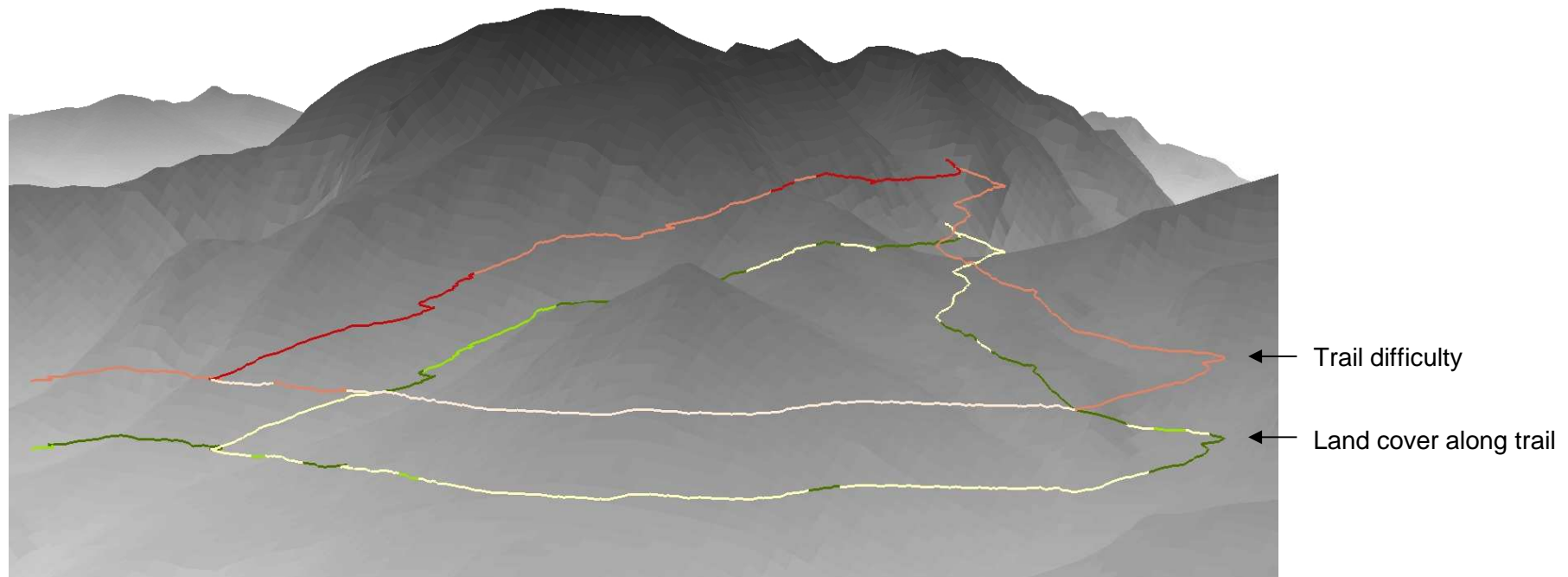
## Enriching GPS-trajectories

- 2 Persons
- 55 years male and 56 female
- Member of Alpine hiking club
- Medium self-rated endurance
- No health restrictions
- Etc.



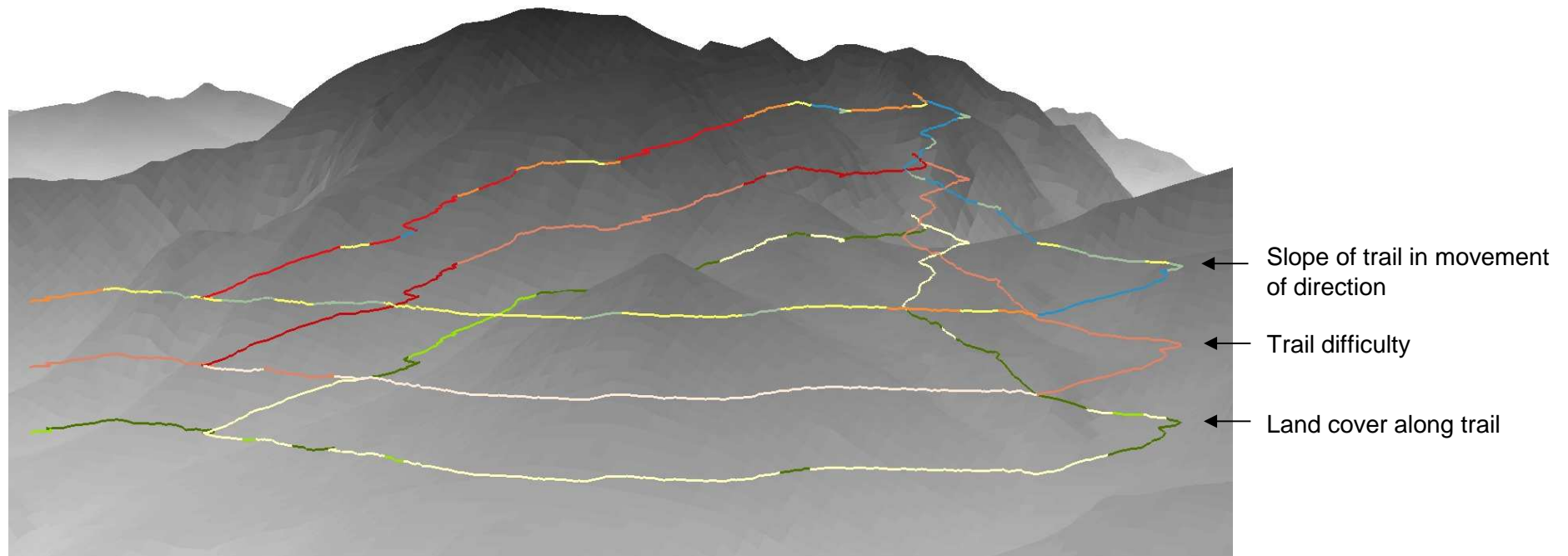
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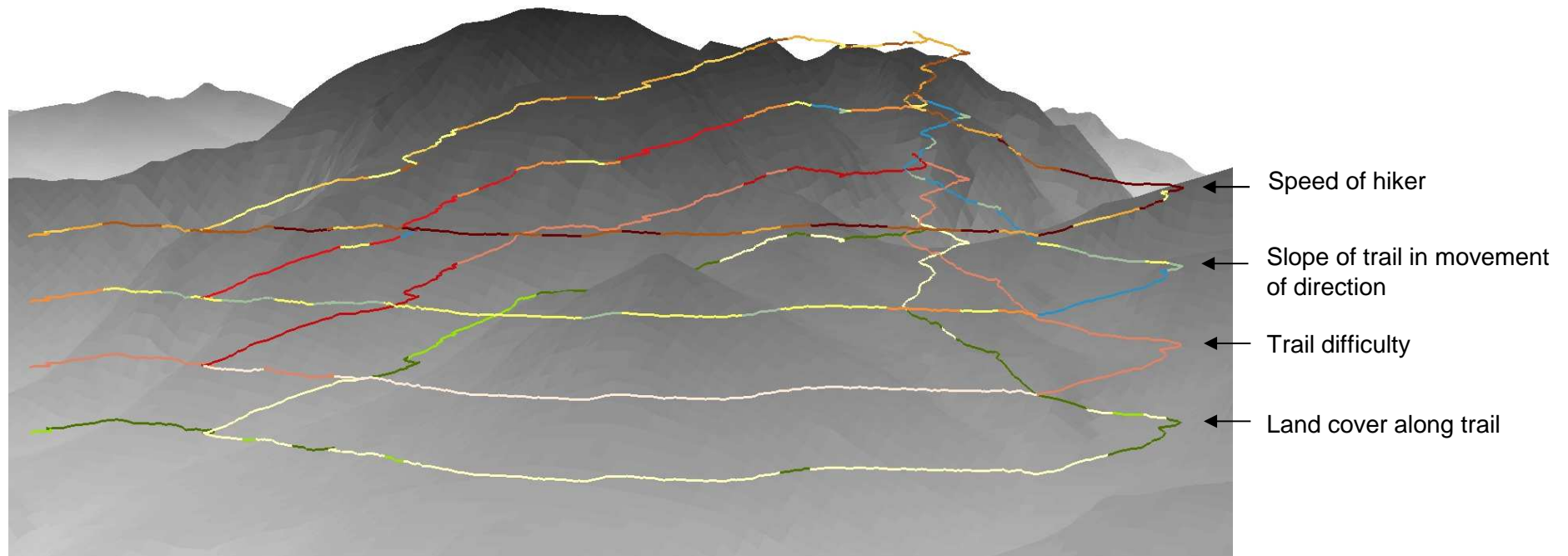
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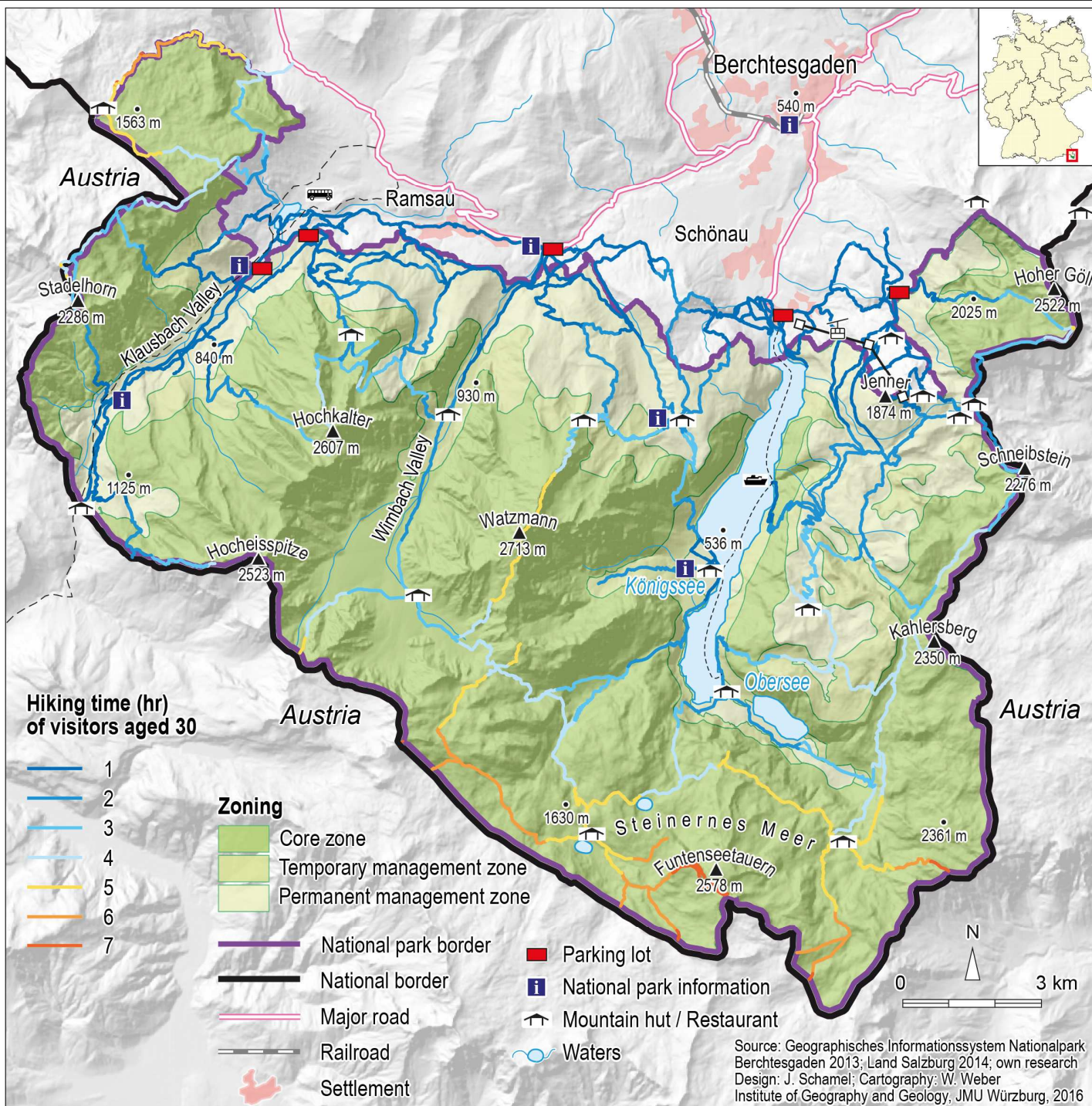
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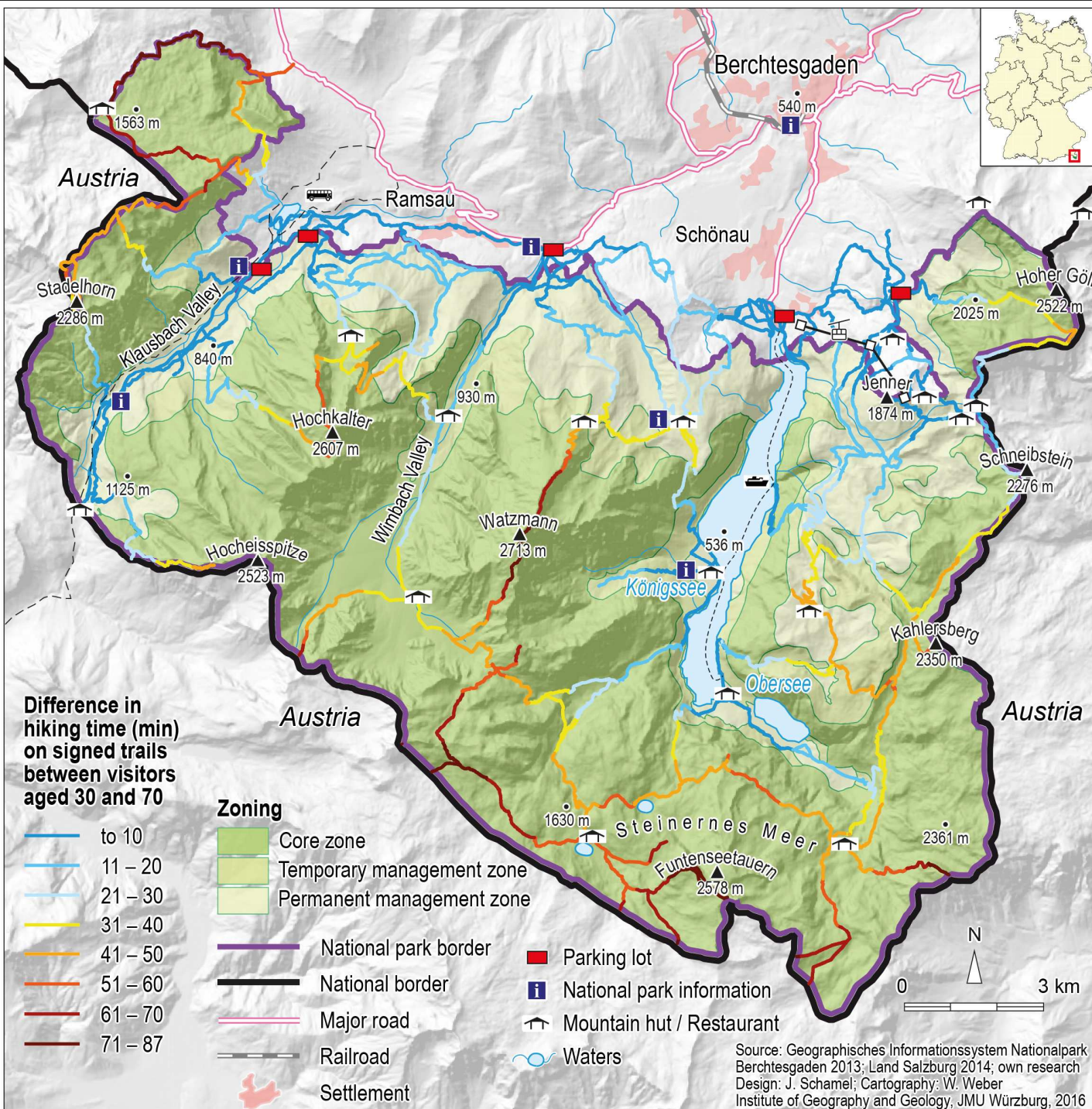
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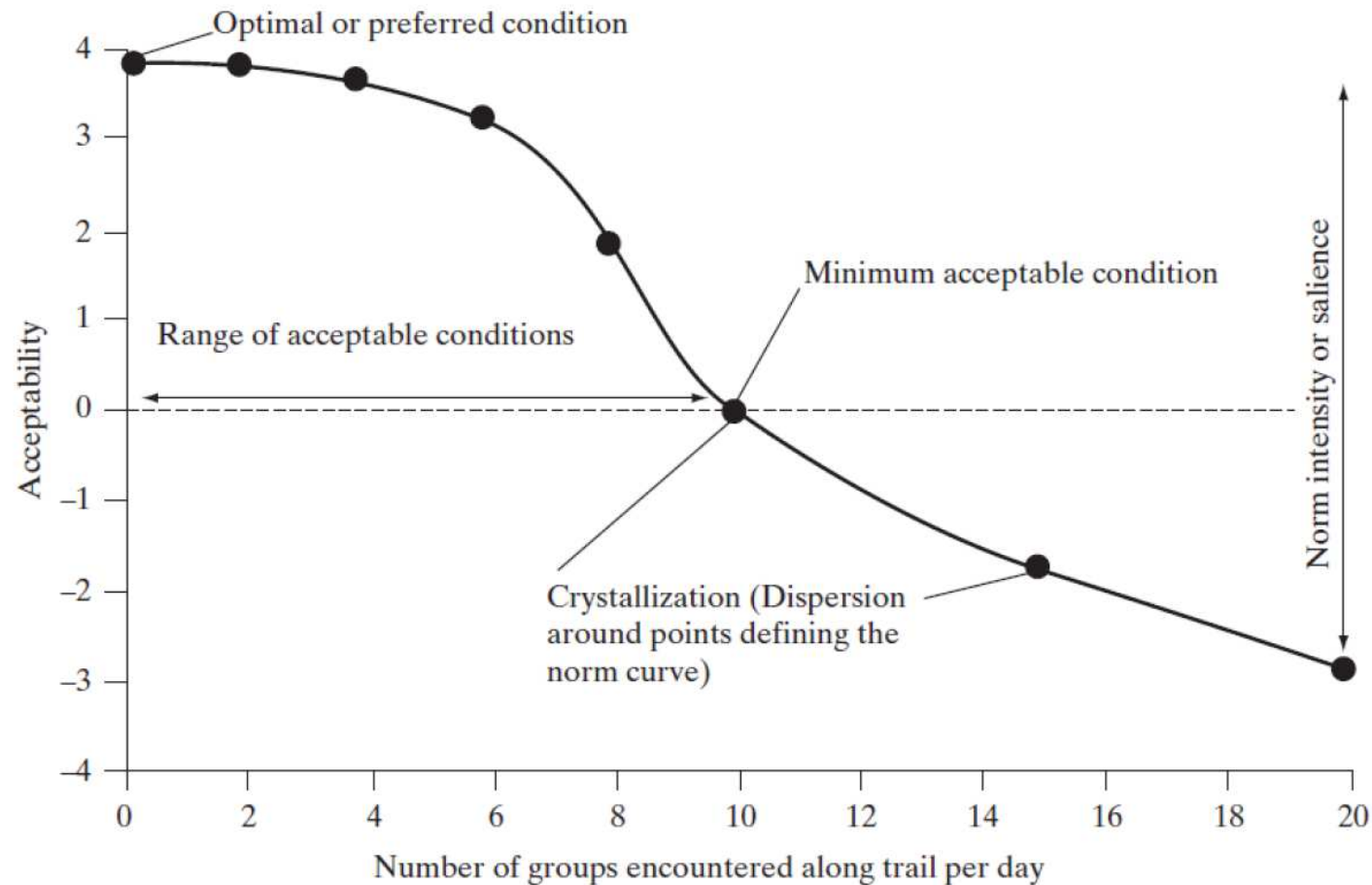






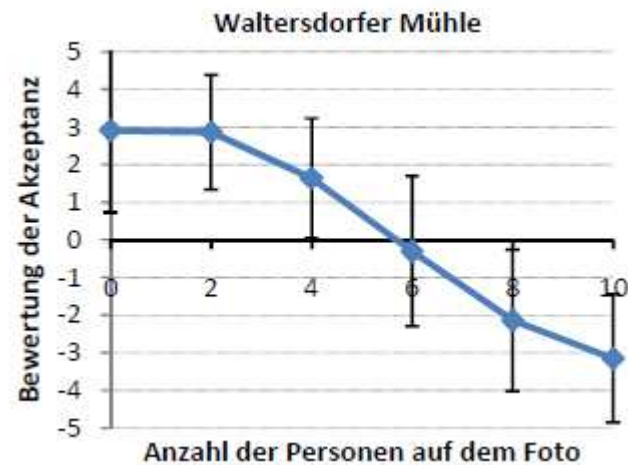
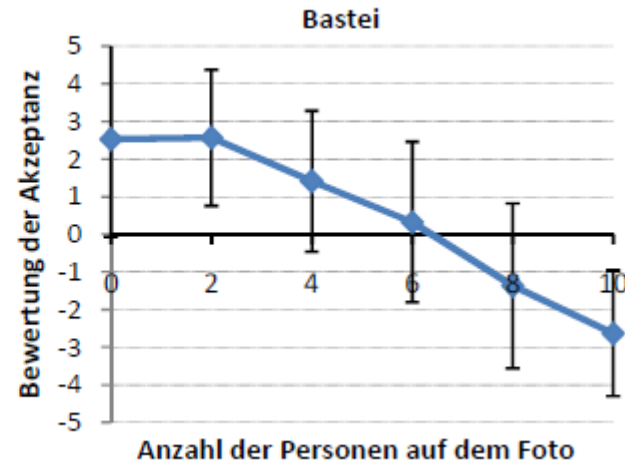
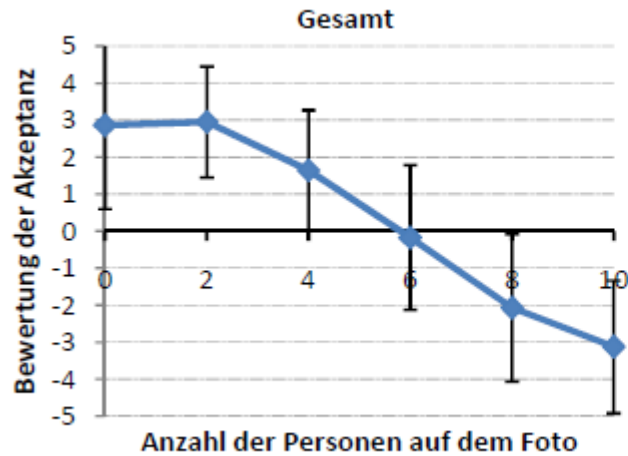


# Social Norm Curve



Source: Manning et al. 1999, p. 99

# Crowding Norms



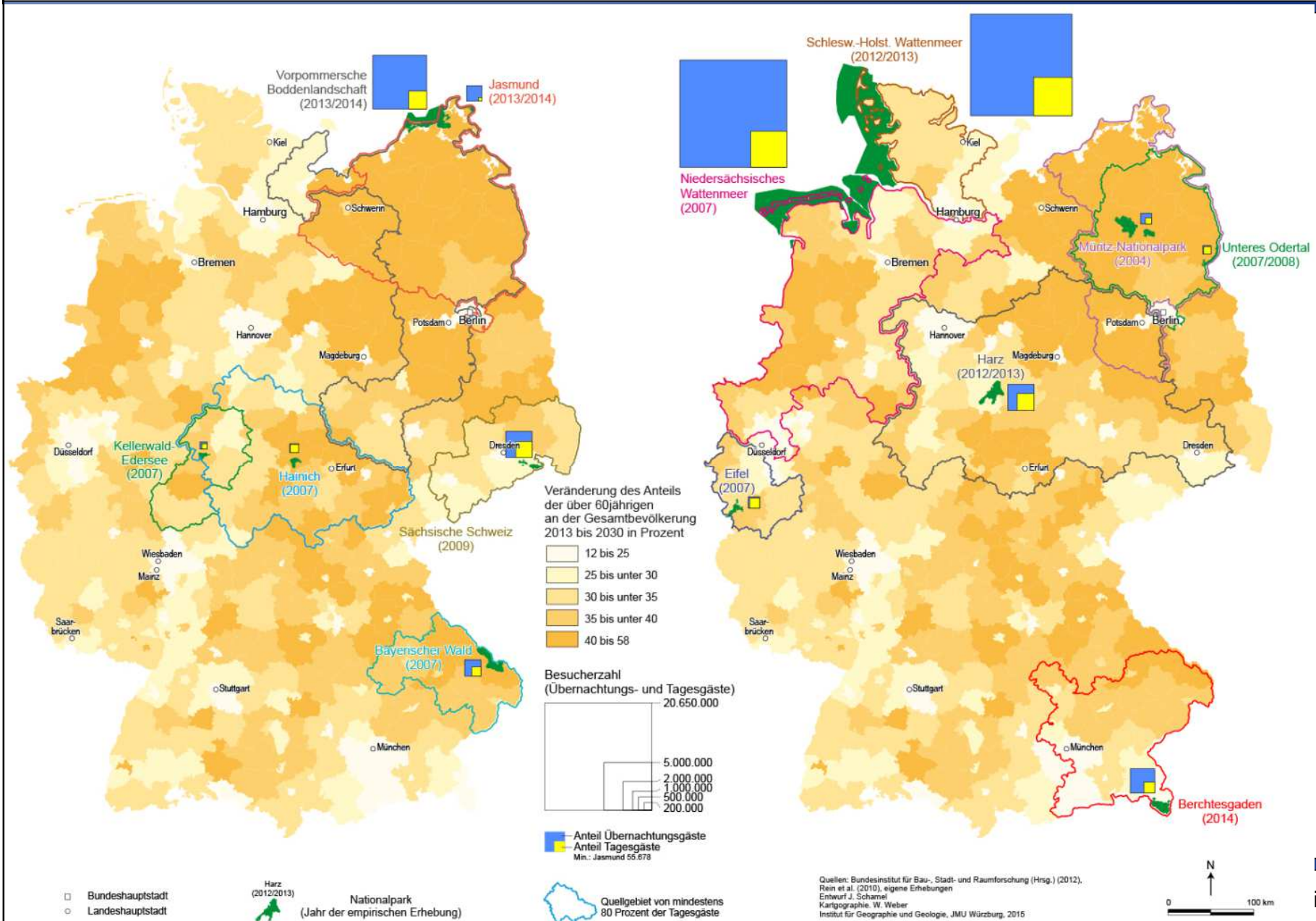
- ✓ KALISCH (2012): only slight forms of crowding on Hamburger Hallig in Schleswig-Holstein Wadden Sea National Park
- ✓ AHREND (2013): about one fourth of the visitor perceives moderate to heavy forms of crowding on trails to Brocken in Harz National Park, however high satisfaction levels
- ✓ WÖLFLE ET AL. (2016): no forms of crowding on weekdays, but about one fourth of visitors perceives some form of crowding on sundays in Eifel National Park

## Demographic Scenarios

Activity Types	Share of groups with a member over 60 years			
	32% (Today)	40% (Scenario 1)	48 % (Scenario 2)	56% (Scenario 3)
<i>Mountaineer</i>	11.2%	10.7%	10.1%	9.5%
<i>Demanding Hiker</i>	21.5%	19.7%	18.0%	16.3%
<i>Convenient Hiker</i>	30.5%	30.5%	30.5%	30.6%
<i>Walker</i>	36.8%	39.1%	41.3%	43.5%

- ✓ Assuming an age effect, the share of Walkers will incline at the expense of Moutaineers and Demanding Hikers

# Demographic Change and Spatio-Temporal Behavior



## Conclusions

- ✓ Demographic change likely leads to a concentration of visitors and may thus lead to a exceeding of Social Carrying Capacity
- ✓ Crowding is primarily occurring at gathering points
- ✓ At the Bastei, the most visited spot in all German national parks, Crowding is a widespread phenomenon and it must be discussed if social carrying capacity is exceeded
- ✓ Displacement in reaction to crowding is observable, however the relationship between crowding perception and satisfaction is weak