Interreg
Danube Transnational Programme
EcoVeloTour

WP3 Ecotourism planning

Guidelines for sustainable bicycle tourism

Deliverable 3.3.1

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Notice:

Please, be aware that Deliverable 3.3.1 "Guidelines for sustainable cycle tourism" is a preliminary version of Output 3.3 "Guidelines for sustainable mobility planning". Deliverable 3.3.1 will be revised after field tests in the pilot regions of Workpackage 4 "Ecotourism development" have been carried out and feedback from project partners and external experts has been collected. An updated and proofread final version of the guidelines will be published at the end of period 3 of the project EcoVeloTour.

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Content

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0 Executive Summary

The **guidelines for sustainable bicycle tourism** provide a comprehensive basis for planning and improving all mobility-related infrastructure and services in connection with bicycle-tourism as the main representative of eco-tourism. A short introduction is followed by a systematic overview of bicycle tourism, covering history and trends, highlighting the benefits for local economy, nature conservation and fostering of local culture and heritage – a typical win-win situation. This chapter also describes different types of bicycle tourists and gives clues, which challenges you have to face in order to start a successful regional bicycle tourism initiative.

The section "Planning for different types of cyclists" introduces basic design principles, pointing out common and distinct elements for different cyclists' needs. Vehicular speed (differences) and traffic volumes in both motorized and bicycle traffic either allow mixed traffic on a shared road space or require segregated facilities for motorized and bicycle traffic. For touristic cycling recommendations generally are in favour of segregated bicycle tracks or low-volume roads. This guarantees comfortable and safe rides away from the noise and pollution of car traffic and takes the needs of more inexperienced leisure time cyclists into account.

The development of touristic bicycle routes should aim at advertising and monetizing all natural beauty and regional cultural characteristics. Thematically branded touristic routes like the EuroVelo network assist in conserving regional ecosystems and heritage. At the same time, they open economic opportunities for local businesses and generate jobs. The guidelines show initial steps and recommendations to cope with the constant necessity for improvements to safeguard a leading position as a successful tourism destination.

The section "Infrastructure for high-level bicycle tourism" constitutes the comprehensive middle part of the guidelines. Although it is impossible to describe all details of bicycle planning, this chapter deals with most infrastructure elements worth knowing in bicycle traffic. Starting with basic components of the infrastructure, different types of tracks are listed with their applications, organisational aspects of intersections and roundabouts are covered and route signposting and information necessities are approached. Furthermore, aspects of bicycle parking, shelters for cyclists, lighting and maintenance are also part of this chapter. The recommendations given should enable (local) stakeholders to tackle all relevant aspects. We defined "must have" criteria to be met for good basic conditions and pointed out "nice to have" criteria for further improvements. Nevertheless, we strongly recommend seeking the advice of skilled planners, when planning, organising and implementing infrastructure. The implementation of infrastructure projects is a complex task and includes the participation of numerous stakeholders.

The section "Transport services and intermodality" approaches the questions how cyclists can reach the starting point of their bicycle tour and how they can return back home after it. The principles of eco-tourism require the use of environmentally friendly modes. Hence, public transport (train and bus) has to be used for the transfers to the origin and from the final destination of the bicycle tour. Changes between the different modes of transport (= intermodality) and the transport on the public vehicles have to be very well organized beforehand to make cyclists feel safe and comfortable. This includes appropriate information and booking possibilities.

Bike rental schemes are a possibility to leave your own bicycle at home and get one for the time of your vacation. In addition, cyclists might rent an electric assisted bicycle (pedelec) and realize how much fun riding it is. We can distinguish between two rental options: Bicycles rented for longer periods from an organisation, such as a tour provider, a bike shop or the hotel you are staying at and shared bicycles. The first option is the usual way for bicycle tourists for getting along, the shared bikes are mostly located in city centres and not so much an option along touristic routes, especially because these bicycles are rather robustly built and therefore rather heavy and not very comfortable.

Accommodation and gastronomy should complement each other and inform customers about the services of the other business. Everybody has to eat and drink during longer bicycle tours. Cyclists on longer tours also have to stay overnight – which is also a big chance for the local economy. It is highly recommended that enterprises in both categories aspire excellent quality and demonstrate this with approved certifications. Cyclists love it when accommodations and gastronomy spoil them with best value for money. Examples for cyclists' needs are given, such as one-night stays, warm meals all day long etc.

The section "Information, communication and marketing" answers questions about which information is necessary to inspire bicycle tourists to come, how the product of "cycling tourism" is properly placed on the market of tourism and which success factors should be taken into account.

The success of bicycle tourism over longer periods can be measured with permanent counts of cyclists. Surveys – such as interviews – where cyclists reveal their characteristics are helpful for the optimization of planning. Cyclists should also be enabled to give feedback and suggest improvements. The most important success factor of cycling tourism is permanent improvement.

Selected success stories and best practice examples are presented in their own chapter.

While short checklists for successful implementation are provided at the end of each chapter or larger subsection, a summary checklist is given at the end of the guideline for those who want to develop bicycle tourism in their region from scratch.

1 About these guidelines

These guidelines provide structured general information on how to develop and improve cycle based eco-tourism. They address topics like:

- Specific needs of cyclists
- Infrastructure for cycling and resting
- Mobility services to and from your region
- Cycling specific aspects in terms of accommodations and touristic attractions
- Services pre-, on-, and post trip

The guideline goes in line with the standards provided by the European Cyclist Federation (ECF) that need to be fulfilled by EuroVelo routes to receive an official certification by ECF.

To support starting bicycle tourism along the Danube requires new as well as established starting points, we structured our guideline in "must haves" and "nice to haves". This distinction also helps to address the heterogeneity of the project countries. "Must haves" are parameters or services that are necessary for high-quality infrastructure, while "nice to have" are optional to improve further. If you guarantee your guests all the "must have", they are able to experience high quality infrastructure and services in a more sustainable way than in conventional tourism.

You will find in the following chapters of these guidelines all necessary tools and recommendations to design and improve facilities and services for bicycle tourism. At the end of each chapter, a checklist will help you not to forget relevant elements.

To keep the guidelines concise, it is not possible to discuss all planning and design principles related with all modes of transport in all details. The guidelines cannot substitute profound knowledge of transport planning and tourism. As local situations may also be quite complex, we recommend seeking the help of experienced transport planners and bicycle tourism experts for the detailed planning of a high-level touristic bicycle route and the touristic offers. You can also find further technical and detailed information in the compiled international standards and the literature quoted in these guidelines.

The main target groups of these guidelines are tourism coordinators and boards, development agencies, public authorities on different administrative levels, business associations and local economic entities and all EuroVelo coordinating entities in the Danube region.

1.1 Scope of these guidelines

Existing standards in the countries along the EuroVelo network

Unifying national standards and regulations throughout the European Union is one of the fundamental ideas of the EU. These guidelines provide technical recommendations for bicycle infrastructure elements that fulfil the cyclists' demand for high quality infrastructure. By applying these guidelines, transnational routes will show comparable technical standard throughout. This guarantees easy recognition and use for cyclists, independent of the country of origin and destination.

These are not guidelines to overrule national standards; they merely improve and harmonise them, if they are not specific enough. Should your country have stricter values and standards than formulated in these guidelines, your national standards should be applied.

Some elements cannot be covered in full detail; for more detailed information, we refer to additional literature. Keep in mind that these guidelines are designed to provide you with standards for a high quality bicycle infrastructure. The detailed route design, planning and implementation must be done in consultation with local experts and stakeholders (e.g. traffic planners or civil engineers), preferably also including community based planning (CBP).

Synthesis of international standards for EcoVeloTour

These guidelines sum up the norms and standards of some leading bicycling countries in Europe (e.g. Netherlands, Denmark, Belgium, Germany, Switzerland and Austria). Most key parameters are very similar (e.g. minimal track widths, standard widths, radii, slopes, clearances etc.). National guidelines differentiate mainly in their levels of detail.

When creating these technical guidelines, the Austrian bicycle planning guideline RVS 03.02.13 was one of the main resources among many others. National standards and literature are referenced, where appropriate. For a detailed overview, it is advised to deepen research also with the listed literature and standards.

Certification standards

These mobility guidelines define key parameters for bicycle infrastructure and eco-tourism more precisely and detailed than the European certification standard (ECS), while all essential criteria set by the ECS are met. For information of the complete certification process, please have a look at the ECS (Trendscope, (ECF) et al. 2018) on the website of the European Cyclists Federation (ECF).

2 Bicycle based eco-tourism

2.1 History of bicycle based eco-tourism

Cycling tourism and recreational cycling in general is well established in many European countries. Its renaissance dates back to the 1980s, before the fall of the Iron Curtain. In countries like the Netherlands, Denmark, Germany and Austria spending some days on a bicycle with saddlebags was a new phenomenon. Cycling holidays along rivers on former towpaths as on the Danube, on former railway tracks as on the Bristol and Bath Railway Path, around lakes like the Neusiedler See on the Hungarian-Austrian border or along coasts as in Denmark and the Netherlands are examples for early starters. Gradually, it was recognized to be an emerging kind of tourism. Against all scepticism of whether this would only be a passing phenomenon, it lasted for more than 40 years since. In the early 2000s cycling tourism was established as a lucrative sector of tourism business.

Development of the EuroVelo network

In 1995 the European Cycle Federation, the Danish organisation De Frie Fugle and the British charity Sustrans came up with the idea of creating a European cycle network. Its main target was and still is to improve the falong these routes for the local population and cycling tourists. At first 12 cycle routes were prepared, connecting the northern regions with the southern and the western countries with the east.

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Figure 1: EuroVelo network across Europe

In 2001, the first EuroVelo route starting at the Atlantic Ocean and ending at the Black sea was 'opened'. Today it is the EuroVelo 6 traveling mostly along the river Danube. Since 2011, four additional routes joined the network, and in 2012, the network grew to a length of 45.000 km. The goal for 2020 was a network of 70.000 km, which is already fulfilled to day. In the year 2015, the EuroVelo 15 (Rhine Cycle Route) was the first route to be completely certified by the ECF's certification standards.

Recent years in cycle tourism

In 2018, cycling tourism is not only still attractive, but also growing. The number of cycle-tourists in Germany, the world's strongest market, grew in the years 2014 to 2016 by 30 % from 4.0 Mio to 5.2 Mio (ADFC and Travelbike 2017). However, it is essential to look at the different guest-segments. While the percentage of long-distance cycle journeys remain relatively stable, the increase was mainly observed in the segments cyclists with fixed accommodation and daytrips.

In 2016, 682.000 cyclists travelled along the Austrian section of the Danube Cycle Path, a section of the EuroVelo 6 (ARGE Donau Österreich 2017). Interviews revealed the different types of cyclists:

- 26 % cycle tourists with changing accommodation,
- 33 % day-trippers and
- 41 % everyday cyclists.

Important driving forces of recent developments are e-bikes, which in turn appeal to new cycle guests as well as trends towards internationalization among cyclists and the demand for border-crossing routes.

Other indicators for the increasing importance of cycle tourism in countries like Austria are the growing demand for the certification of cycling friendly hotels and B&Bs, or the foreground position of cycle tourism in marketing (Hinnenthal and Miglbauer 2017).

EuroVelo specific requirements

In their European Certification Standard (ECS) guideline (Trendscope, (ECF) et al. 2018), the European Cyclists Federation (ECF) defines numerous criteria to be fulfilled along suitable EuroVelo or other high quality cycling routes. The ECS covers the main categories of infrastructure, services and promotion. At the infrastructure level, criteria are defined for the sub-categories of continuity, route components, surface and width, gradients, attractiveness, signposting and public transport.

Lengthwise the EuroVelo infrastructure is divided into daily sections (30-90km) and minor sections (1km) which are the basic units of data collection and evaluation. Defined below are the following criteria for a certification:

Table 1: Criteria classes for EuroVelo certification (Trendscope, (ECF) et al. 2018)

Criteria level	Need to be fulfilled on …	Cover the needs of …
Essential	100% of the route	Regular cycle tourists, who use the bicycle as a main mode of daily transportation and/or frequently for leisure and tourism purposes.
Important	70% of the route length	Occasional cycle tourists with little experience and average skill and fitness levels, who use the bicycle for daily transportation and/or have already made several leisure trips.
Additional	Optional – depends on the aspiration level	More 'demanding' and 'inexperienced' cycle tourists, including cyclists with children in trailers, tandem riders, hand bikers etc.

2.2 Cycling as eco-tourism

In conventional tourism, traveling causes CO_2 stemming from emissions, either from cars or from airplanes. This also includes motor traffic caused at the tourist's destination. Arrival and departure by train or public transport helps to reduce CO_2 and other emissions drastically.

Furthermore, using your bicycle instead of a car helps to preserve the natural environment (e.g. soil, water) and reduce the use of resources.

Bicycles hardly produce any pollution (e.g. noise or air pollution) and help to improve mental as well as physical health. Cycling contributes to 12 of the 17 UN Sustainable Development Goals, as presented to the UN Climate Summit COP 21 in Paris (Confederation of European Bicycle Industries, CROW et al. 2017).

Cycling is the ideal mode of transportation to experience nature and preserve it at the same time. You can cover daily distances of 40-90 km, which is a lot more than on foot, and still have time to enjoy points of interest (e.g. historical or cultural attractions). If you combine it with ecosystem services[1], you even actively help to conserve the local flora and fauna.

The experience of nature and landscape is the dominating motivation for cycling during holidays and leisure time. Feeling freedom is another important aspect (Holzhauer 2015). Experiencing beautiful landscapes, an intact environment, clear rivers, creeks and lakes from the saddle or rest areas brings pure joy.

[1] *Ecosystem services can be defined as conditions and processes through which ecosystems sustain and enrich human life*. Hegedűs, S., K. Kasza-Kelemen, I. R. Nagy, G. Pataki, I. Pinke-Sziva and Á. Varga (2019). EcoVeloTour Deliverable 3.1.1 Guidelines for ESS-based ecotourism strategy. G. P. Editor: Ivett Pinke-Sziva. Budapest, Corvinus University of Budapest.

Tourism is an economic sector with the goal of further developing destinations and regions. The creation of added value is a predominant goal for establishing sustainable cycling tourism. Preserving nature and environment is not a conflicting goal in cycling tourism. Cycle tourism is widely perceived as the most enjoyable type of soft tourism, because of its non-motorized mobility, ideally including arrival to the start of the cycle tour and returning home at the end of the tour per train or other public transport.

The generation of added value demands a certain duration of stay. A one-day visit without the necessity of an overnight stay could be seen as the minimum. This states the distinction from leisure cycling. Obviously, the longer the stay, the more relevant the added value becomes for tourism business.

Goals in cycling tourism

Main goal in cycling tourism is to generate value added and sustainable business models driven by core stakeholders (tourism destination, incoming agencies, hotels, guesthouses and restaurants, transport service operators etc.).

Further subordinate goals of cycling tourism can be:

- improving the competitive position,
- become a leading region in cycling tourism,
- fostering cycling as a soft kind of tourism and
- targeting special interest groups for cycling holidays.

2.3 Positive impacts of cycle based eco-tourism

According to a study commissioned by the European Parliament in 2012, cycling tourism contributes more than € 44 billion to the EU (+ Switzerland and Norway) economy per year (Weston, Davies et al. 2012). Approximately a share of 8 % to 10 % of the added value of the whole summer tourism is triggered by the key motivation cycling in holidays.

In 2009 a study by the European Parliament found that an average of about 16 € was spent on daytrips. For multi-day trips expenses were estimated with 353 € per trip (ECF n.a.). While a study made in France found, that cycle tourists spent on average 68 € per person per day (ECF n.a.).

The Health Economic Assessment Tool (HEAT) of the WHO (www.heatwalkingcycling.org) calculates a health benefit (including pollutant exposure, accident costs and greenhouse gas emission costs) of approx. 0.70 €/km by switching from private car to bicycle.

The environmental benefit of cycling clearly is to reduce emissions in the transport sector by switching from other modes of transport.

2.4 Diversifying trends in supply, demand and motivation

In the early phase of cycle tourism, the cycle tourists were content with a moderate offer of waymarked routes, mostly along rivers and around lakes, printed maps and guides, overview folders for hotels and B&Bs and printed train schedules. 40 years later, the general conditions in the tourism business have changed. Relevant keywords are more competition among cycle tourism providers, digitalisation and higher standards concerning offers and products.

- **Cycling on a conventional journey with sightseeing in attractive regions**

  Every cycle tourist has to start somewhere, some start cycling as a tourist on a typical city trip. Thereby experiencing the advantages of bicycle tourism. These tours are often coached or led by a tour operator. Many operators provide guided tours through larger cities (e.g. Vienna, Munich, Salzburg, Bratislava, etc.). This combines traditional cultural heritage tourist programmes with the cycling experience.

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Figure 2: Examples of the cycle tourism, shorter day trips

- **Long distance cycling tour as the leading pattern in cycling tourism**

  In comparison to shorter forms of cycling (day-trips, loops) the main motivation for cyclists to go on a long distance trip is the desire of riding several days on a prominent route between a defined starting point and a destination, all while discovering regional specialities and differences throughout the trip.

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Figure 3: Trips over several days with luggage

- **Discovery of routes beside the big cycling routes**

  After their first experience of long cycle routes, many guests want to complete deviating regional routes as well as to discover further attractive landscapes.

- **Pilgrimage by bike**

  Corresponding to hiking the famous pilgrimage route towards Santiago de Compostela on the Jacobs Trail, Operators offer to travel similar paths per bike; rental bikes can be included in the package.

- **Pedelecs**

  Pedal electric bicycles (pedelecs, also known as e-bikes) are bicycles where a motor amplifies one's pedalling power. Pedelecs are established in everyday mobility at home or for commuting to the workplace. Meanwhile e-bikes are widely used in cycling tourism as well. They are a main driver in cycling tourism because of reducing uncertainty about one's own physical capabilites. E-bikes contribute to the homogeneity of performance in groups of cyclists.

To be added

Figure 4: Examples of cycling tourism with e-bikes

- **Use of former railway tracks for cycling**

  Cycling on abandoned railway tracks is very attractive among all types of cycling guests because of its qualities (cycling away from motorised traffic, low gradients, big curve radii etc.). Using the paved tracks and when possible the related infrastructure (e.g. bridges, tunnels, train stations) creates a wonderful experience. Old train stations are in use as cafes or remodelled into accommodations.

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Figure 5: Cycling along a former railway track

- **Certified quality of accommodation and routes**

  More and more companies are interested in the certification of their accommodations or routes. The growing segment of bicycle tourism drives the demand for certified quality in the last years. Meanwhile quality labels for bicycle friendly hotels, guesthouses or camping areas (e.g. "Bett+Bike": http://www.bettundbike.de/en/) are spreading in about 15 countries throughout Europe (Hinnenthal and Miglbauer 2017).

- **Digital information**

  The demand for GPS-tracks is increasing, but these do not substitute signage. In the planning phase of a bicycle tour, potential tourists often want to download routing material or maps, to use it later for off-line navigation. If you provide an app for your region or route, consider an off-line mode, so the app is usable without permanent internet connection.

  Availability of digital information has become a "must-have" in cycling tourism, including web portals and apps of cycling related tourism destinations and businesses, GPS-tracks for navigation on routes, social media and blogs for reports and information. Wireless internet access (Wi-Fi) has become a "must-have" at accommodations.

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Figure 6: Cycling tourism supported by digital information via smart phone app.

2.5 Customer segmentation

In cycling tourism, customer segments can be identified using the following criteria:

- Motives and accommodation choices during the tour,
- Bicycle type used,
- Specific interests besides cycling.

All types of tours need to offer their potential tourists a perfect mobility chain including intermodal transport (arrival > tour > return home), regardless how many stages the tour has or how long it is. Furthermore, the infrastructure of local or regional routes must be of good quality to satisfy tourists and create a long lasting experience.

2.5.1 Segmentation by different motives and accommodation during the tour

A tour of several days can start from a fixed accommodation (e.g. coming back at the end of the bike tour or day) as well as stage tours with changing accommodation every day like on most long-distance cycling routes.

This segmentation brings some requirements to tackle different users' needs:

- **Cyclist day-trippers**

  Day-trippers, as the name suggests, do not stay overnight. Therefore, they start and end their trip at home on the same day. They either travel to the starting point of the tour by train or public transport, or start right at their homes.

  

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  Figure 7: Day-tripper

  Their preferred routes can either be circular, to one point of interest and back, or connect multiple spots. Day-trippers are quite weather sensitive, since planning is not that time-consuming. When the weather is bad, they simply postpone the trip to another date.

  Their motives are experiencing nature and physical activity for a healthy lifestyle. Their main demand is a route in a safe natural environment, with possibilities for resting at beautiful places, rest stops in cafés etc.

- **Cyclists with fixed accommodation**

  In this segment tourists travel to another location, and book a central accommodation there to reside and explore the region from this place. Possible route characteristics are the same as in the segment of day-trippers.

  Compared to day-trippers the main motives differ slightly and are experiencing nature and getting in touch with locals. Experiencing local traditions is important in this segment. For the majority doing something healthy is a positive side effect rather than a key motivation. Anyhow there might be a significant sub-segment for which doing sport and cycle training is the key motive.

  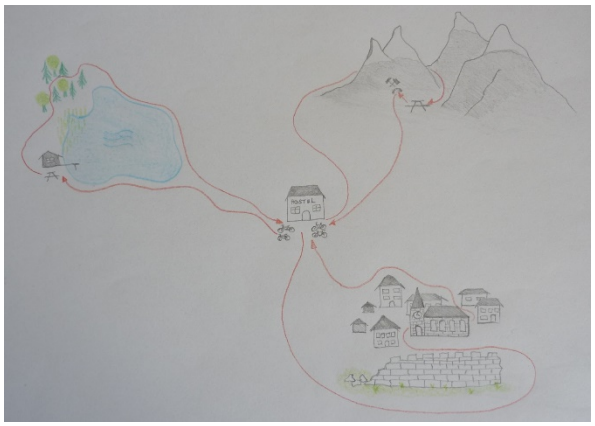

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  Figure 8: Fixed accommodation

Hotels, guesthouses or camping sites are key players in this segment by being of cyclist friendly quality. Stops at sites for environmental and ecological experience (viewpoints, short visitor education, visitor centres in nature parks etc.) are perfect for this type of cycling guests.

- **Cyclists with changing accommodation**

In this segment cyclists change accommodations after every stage of their tour. Tourists often book them in advance, to have certainty about their overnight stays. When booked through a tour operator or booked in advance, spontaneous changes in the schedule are difficult to fulfil in order to keep to the tour plan without extra organisational effort and expenses.

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Figure 9: Changing accommodation

As in the other segments, experience of nature and sociability are of importance. Pedalling a certain number of kilometres per day is not a negligible aspect.

Hotels, guesthouses or camping sites must commit to cyclists, allowing one-night stays and provide safe facilities for bicycle storage. As above, experiencing environmental and ecological sites are in demand among these guests.

2.5.2 Segmentation by bicycle type used

In addition, a segmentation by bicycle type is of touristic relevance and includes four main categories:

- **Touring bicycles and trekking bikes:**

  These bicycles are ideal to transport your luggage for longer distances, because they are designed for high endurance and mechanical resilience. However, many tourists use them for every tour type, not only for long multi stage trips.

- **Mountain bikes (mountain bike tours):**

  Mountain bikes are designed with wide-range gearing and studded tyres for off-road cycling in rough terrain and on mountain slopes. Typically used by day-trippers or tourists that stay at a fixed accommodation.

- **Racing bicycles:**

  They are designed for traveling on roads at higher speeds, with a minimum of luggage to carry. Mainly used by day-trippers or when staying at a fixed accommodation.

- **E-bikes:**

  Bicycles with an integrated electric motor, supporting propulsion, available for all bicycle types mentioned above.

Services such as luggage transport to the next accommodation offered by tourism providers, support the use of road- or mountain bikes for tours with changing accommodations.

The crucial point for developing bicycle touristic offers and products is the motivation of cyclists. A German study "Was bewegt Deutschland?" (Holzhauer 2015) distinguished the motivation by the used bicycle type show the following ranges of motivations between the different bicycle type users:

Table 2: Ranked motivation for users of different bicycle types, (Holzhauer 2015)

	Road bikes	Touring bikes	Mountain bikes
1.	freedom	nature	nature
2.	nature	to relax	freedom
3.	balance	landscapes	fun
4.	to get away	freedom	balance
5.	to relax	health	to get away

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Figure 10: Touring bicycles

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Figure 11: Mountain bikes

2.5.3 Segmentation by core activities and interests besides cycling

During their holidays bicycle tourists often combine cycling with other activities. These other activities can be categorized in:

- **Nature-bound activities**

  This segment does not only travel to regions abroad to experience nature, they want to explore the local fauna and flora in detail. For example, certain species or plants which can only be found in your region. If your region can provide a certain niche or uniqueness, use it actively to address a specific target group (e.g. ornithologists, geologically interested tourists, etc.).

- **Cultural activities**

  Especially tourists of advanced age want to combine their holidays with more cultural aspects, than younger ones. Museums and historical heritage are a lovely change and opportunities for a break.

- **Regional cuisine**

  Often tourists are interested in the local specialities, food, wine or local products. Amongst other reasons, the regional cuisine is a convincing argument to visit a region.

- **Other sports**

  Cycling tourist often integrate other sports (e.g. canoeing, rock climbing, sailing, etc.) along the tour as a diversion to cycling. This way they can experience nature in different ways or spots otherwise not accessible to them.

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Figure 12: Combining cycling with other sports

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Figure 13: Cycling tourism including cultural interests e.g. outdoor museums

2.6 Steps to establish bicycle based eco-tourism in your region

Considering the above-mentioned goals in cycling tourism – namely to generate added value and sustainable business driven by key stakeholders – the following requirements and challenges have to be addressed:

- Conduct a market research: market analysis (touristic potential, status quo analysis, concrete target groups etc.), stakeholder analysis, exchanges with partners and using synergies, fairs etc. (See chapters 9 and 9)
- Identify attractive routes with interesting sights along them. Collect and locate potential attractions and activities as described in chapter 2.5.3.
- Construct and improve the infrastructure according to qualities/standards to meet essential needs and constantly improve the quality of:
    - Cycling routes and resting places (infrastructure for cycling),
    - Transport services and intermodality (arrival, departure),
    - Accommodation (hotels, camping areas, guest houses) and restaurants,
    - Offer cycling tours and products with the necessary information, marketing and communication.
- Find and include necessary partners in transport and tourism planning,
- Build relationships with external partners for marketing and communication, sales and distribution, such as:
    - Transport operators (bus, rail, micro bus, shuttle bus, on-demand service, taxi, ship, tour buses),
    - Bike rentals and shops,
    - Partners in the origin markets of tourists,
    - Attractions in the region (e.g. museums, heritage buildings, natural heritage, mines, caves, leisure activities, local products such as food, wine, pottery, wool or perfumes, etc.),
    - Special interest associations (nature, cycling etc.) in the guest markets,
    - Tourist information centres,
    - Regional / local incoming tourism operators,
    - Regional / local hotels, guesthouses, etc.

This guideline will discuss these challenges further in the upcoming chapters and present solutions and help you overcome potential obstacles during the implementation.

Summary checklist

Chapter: 2 *Pages: 5-18*

- Define the overall goals you intend to reach with bicycle tourism, especially the positive impacts on your region.
- Which target groups (tourists) do you want to address?
- How do the routes you provide accommodate your target groups? (different types of customers on different bikes, different activities and so on)
- Are all important stakeholders included in your planning processes as partners?
- Make a list of all amenities/interesting sights/possible activities your region offers.
- Did you conduct a "market research" to check your prospects of success?

3 Planning for different types of cyclists

In general, in bicycle traffic there are two different groups of cyclists: Everyday (commuter) cyclists and touristic or leisure cyclists. Everyday cyclists seek a destination and have similar trip purposes, as users of other modes of transport, like for example car or public transport users or pedestrians. They use the bike to get from point A to B. With touristic or leisure-time cyclists, the trip itself is the purpose in connection with other recreational activities. The latter group also includes athletes and can be subdivided into – mostly local – cyclists on one-day or shorter trips/excursions and bicycle tourists on tours longer than one day including overnight stays. For a further differentiation of cycling tourists, refer to chapter 2.5.

All groups have the same basic needs for infrastructure ("must haves", like minimum track widths and good surfaces). In addition, more cyclist from both groups can be attracted and offered extra convenience when they are provided with features exceeding these basic needs, in these guidelines referred to as "nice to haves".

All types of cyclists need basic qualities in cycling infrastructure, like wide enough tracks or smooth surfaces – and they all like to avoid roads with heavy and/or high-speed vehicle traffic. Yet, when you keep in mind that everyday cyclists have a destination in mind, they can and will cope with harsher conditions, are usually in a hurry and choose the most direct route, with less regard to the aesthetic qualities of the ambiance. Bicycle tourists avoid motorized traffic whenever possible and seek for routes with outstanding attractive surroundings. In addition to that, bicycle tourists are not so much dependent on strictly direct routes from A to B – they tolerate longer detours than everyday-cyclists, if they can ride in a more pleasant environment.

In comparison to everyday-cyclists, the share of less experienced riders is higher among bicycle tourists. Accordingly, the infrastructure must be well organized and in good shape, route finding easily understandable, safety and security on a high standard.

Everyday cyclists and cycle tourists need information about routes and their usability, to navigate from point A to point B. In addition to navigation, cycle tourists need much more information, including:

- Detailed information on route characteristics,
- Sights and attractions along the route,
- Services, resting places, accommodations and gastronomy.

3.1 Cyclist's needs

Successful strategies of established bicycling regions show one common characteristic: A continuous endeavour to improve infrastructure and touristic offers, trying to make bicyclists feel safe and well looked after. The more a region tries to fulfil the needs of bicyclists and establishes its status as a cycling destination, the more successful it will be.

Basic qualities for all-cyclists are:

- Cycling separated from motor traffic, wherever possible
- Cycling in a bicycle friendly environment
- Calming of / separating from motorized traffic
- Intermodal nodes
- Signposting

Additional qualities, especially for touristic cyclists are:

- Cycling in a natural environment, to experience nature and special ecosystems in a distance to motorized traffic
- Cycling on well signposted routes with links to attractions in the region
- Certainty regarding accommodation and gastronomy
- Certainty regarding additional infrastructure and services (e.g. safe parking, e-bike charging possibilities, mechanical assistance)

3.2 Design principles

Organisational concepts

Mixed or segregated traffic

In general, cycle traffic can be managed following two major concepts: segregated from other modes of transport like motorised traffic/pedestrians or integrated. This implies that either cyclists have their own infrastructure, which intersects at certain points with other traffic modes, or they share the same infrastructure with other road users. The basis for the decision whether cyclists are being led on tracks exclusively for their own, or mixed with motorised modes or pedestrians, are traffic volumes and speed levels. The higher traffic volumes and speed levels are, the more important is the segregation of bicycle traffic from motorised modes. With lower volumes and speeds (30 km/h or lower) a coexistence on shared surfaces is possible. For more detailed information on types of bicycle infrastructure see chapter 5, especially subchapter 5.3 for when to mix and when to separate motorized and non-motorized traffic.

***Note**: When speed and traffic volumes are high, build segregated bicycle infrastructure.*

All: © Michael Meschik

Figure 14: Examples of mixed bicycle infrastructure.

Figure 15: Examples of segregated bicycle infrastructure.

Traffic calming

Key factors, for whether people choose to ride a bicycle or not, are the volumes and the velocity of motorized vehicles. Cyclists dislike and tend to avoid sections where motor traffic is driving at 50 km/h or faster. Separate infrastructure (e.g. such as adjacent cycle paths or lanes) is needed, when slowing down motorists is not an option. Where cyclists and motorists share the same road surface, the speed difference between cyclists and motorists should be as small as possible. In traffic calmed areas (speed limit 30 km/h or lower) mixed traffic of bicyclists and motorists without special infrastructure for cyclists is a cheap and safe solution.

Various design principles apply for traffic calmed areas. The similarities lie in the principle that the (built) design should generate the desired speed of motorised traffic automatically without additional enforcement.

One can achieve the greatest impacts, when using combinations of psychological and physical measures (Transport For London 2014), such as:

***Note**: When no segregated cycle tracks are possible, use traffic calming in urban areas and along relevant inner-city sections of main bicycle routes.*

- Removal of road markings, such as centre lines, which give motorists more security than is appropriate, resulting in excessive speed
- Use of different materials, colours, street furniture and plants to achieve an amiable street environment

All: © Michael Meschik

Figure 16: Examples of traffic calming measurs

Safety and security

Cyclists should feel safe when using cycling facilities. Leisure cyclists prefer quiet routes with enough space for two cyclists to ride side by side, away from motorised traffic. Since the ride itself is part of the experience, directness does not have the highest priority. Most of the leisure cycling and ecotourism takes place outside cities; accordingly, these guidelines focus more on cycle routes and infrastructure in rural contexts. In general, most guidelines or national standards are designed to handle everyday inner-city traffic in the most effective way. They allow higher capacities on certain facilities than recreational cyclists would find comfortable.

***Note**: Not only infra-structure, also the nearby environment has to be safe and attractive to use.*

Visibility is crucial for safe traffic interactions (e.g. at crossroads) and must be given for all users along their route. Signage and adjacent vegetation should never obstruct necessary visibility conditions.

Besides traffic safety, also security is worth considering. The appearance of bicycle routes should also be considered at night times or during off-peak hours. Very remote, dark or deserted stretches of bicycle routes can cause discomfort. We recommend avoiding dense shrubbery next to bicycle paths and tracks.

Bicycle-friendly design

Bicycle-friendly design of roads and their environments

The ideal design of streets and their environment should be intuitive and self-evident. Road users should easily find their way through an intersection or road section. Planners must consider the needs of everyone and the specific behaviour patterns of each user group. Safety of vulnerable road users must have high priority.

> ***Note**: When designing cycle infrastructure keep also the direct surrounding in mind and design it in an attractive way.*

Part of a well-designed infrastructure is the surface. A good quality surface ensures a smooth ride and coloured asphalt additionally enhances the visibility of a facility, make other road users more aware of the presence of cyclists.

All: © Michael Meschik

Figure 17: Examples of bicycle friendly design

Intermodal connections to public transport

Cyclists need easy access to public transport (e.g. train stations or bus stations) at the beginning and the end of the bicycle tour as well as in between, if there are less pleasant or high traffic affected route sections, or as a shortcut if weather conditions are bad. Route signs and information boards should show the best route to intermodal nodes like railway stations, bus stops or bike rental services. Finding an easy link between a cycling route and railway stations or bus stops is often a challenge. Therefore, full integration of railway stations as well as bus stops and shuttles is necessary in route signage.

> ***Note**: This topic is discussed in more detail in chapter* 6 Transport services and intermodality.

The signage should include distance to the transport hub, type of mode and service. It is helpful if information about the conditions of bicycle transport in different languages and proper bicycle parking stands are provided at these hubs.

All: © Ernst Miglbauer

Figure 18: Examples for signposting at intermodal nodes

Cycling in a natural environment

Riding along rivers or through scenic landscapes is a key motivation for going on a cycle tour. Therefore, the assets of environments and landscapes must be included when creating bicycle infrastructure for touristic purposes. In addition, when tourists cycle in nature, also consider the consequences on the natural resources. How is it possible to keep the impact as low as possible? Resting places in beautiful natural places along cycling routes offer the opportunity to experience the beauty of the landscape, but are also a challenge for the preservation of the ecosystems. We recommend the planning of cycle routes in sensitive ecosystems in close collaboration with the stakeholders responsible for nature and ecosystems conservation.

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Figure 19: Cycling routes in unspoilt areas

© Tourismusverband Ostbayern e.V.

Figure 20: Experiencing nature during trips

Cycling on well signposted routes

Tourists usually visit areas previously unknown to them. Therefore, signposting is the main source of information during cycling on routes, even more important than digital routing. Signage includes links to relevant destinations like city centres, villages, railway stations, etc. by specification of metres/kilometres and information on places of interest,

tourists could visit. Ensure continuous signposting above all by continuous maintenance. More details about placement and content see chapter 5.1.

All: © Joachim Gauster

Figure 21: Examples for signage on EuroVelo tracks in Austria

Certainty about accommodation and gastronomy

Since sleeping and eating are necessities for tourists on longer journeys, easy access from the route to the accommodation and gastronomy is very important. Regard certified hotels, camping sites and restaurants as full partners and supply cyclists with signage to such services. Typically, tourists accept detours of no longer than 5 km.

Certainty about additional infrastructure

When visiting any touristic attractions, cyclists need safe parking facilities to enjoy these attractions, especially when the bicycles are parked longer/overnight. Bicycle racks of good (theft proof) quality, bicycle pumps for inflating the tires, a set of tools for simple repairs help all cyclists. As the segment of e-bikes is growing constantly especially with well-off people, electric sockets or even charging stations at key points (accommodations, gastronomy, resting places and intermodal nodes) are becoming increasingly important. Provide information boards with an overview of all these facilities along the routes on site.

> ***Note**: This topic is discussed further in detail in chapter* 5.6 Bicycle parking.

Summary checklist

Chapter: 3 *Pages: 19-25*

- Does your existing/planned infrastructure fulfil the needs of all cyclists, especially of bicycle tourists?
- To which extent do your existing routes fulfil the design principles, especially separation from motorists/traffic calming, bicycle friendly environment?
- Can you appraise where and how much improvements will be necessary?

a

4 How to start bicycle tourism in your region

There exists no standard recipe for how to develop bicycle-based eco-tourism successfully. Even in successful bicycle tourism regions, it has been discussed in the initial phase whether investments in bicycle tourism would pay off. Each region is unique and the development has to be planned and implemented individually. However, one good concept is to continue the strategies of nature conservation and reinforcement of regional characteristics with business opportunities. Community based planning is a good approach to include the local community in the planning process. It is a very motivating policy to develop the local economy based on the strategies named above: When bicycle tourists visit a region, explicitly intending to see natural and cultural sights and experience local amenities, this is a chance to preserves fragile natural areas through payments for ecosystems services (ESS) and to retain regional characteristics as a basis for further economic use – a win-win situation.

> ***Note**: For more information on payment for ecosystem services, see the* Guidelines for ESS-based ecotourism strategy.

4.1 Developing touristic bicycle routes

Developing a touristic bicycle route is a time-consuming process, but worth the effort. Often multiple stakeholders (e.g. municipalities, tourism boards, interest groups, financiers, etc.) must reach an agreement on the branding, the corridor and the responsibilities (e.g. for maintenance, resources, marketing, etc.). The effort pays off in the end as bicycle tourism can create benefits and opportunities for many local businesses.

Bicycle tourists expect a few things of a bicycle route:

- Crystallization points, a brand or theme to spark their interest,
- Access to the route (public transport at the start and end of the route),
- Signage along the route and
- Certain infrastructure (e.g. resting places, accommodation, gastronomy, bicycle parking, etc.)

The development of a bicycle route usually starts with some crystallization points, developed locally e.g. with small-scale investments to spark the interest of tourists. The main requirement for such points of interest is that they are accessible per bicycle.

Possible crystallization points for a route development can be:

- Cultural, historical, industrial or natural heritage sites
- Culinary culture, regional cuisine or agricultural products special to a specific area
- Workshops with traditional arts-and-crafts
- Lookout points over scenic landscapes or for observing wildlife
- Sports or activities typical for your region

The next step after identifying such points would be to connect the crystallization points, in order to form a bicycle route. This can happen in numerous steps. At first, take a look at the already existing infrastructure (e.g. cycle paths, underused roads, abandoned railway-tracks, dirt roads, etc.). These can, when connected and adapted for bicycle traffic, form a draft version of a route. Infrastructure also includes accommodation and gastronomy, as well as resting places. These are crucial elements for every route (for details see chapter 5 and chapter 8, respectively). In the further development, continuous improvements should be achieved. Develop the routes from basic characteristics ("must haves") towards first class quality ("nice to haves").

For example, starting with the draft version of the route on existing infrastructure, missing track sections need to be filled and essential connections have to be made. Smaller existing routes can be continued to form a larger corridor and a homogenous branding can be implemented.

Typically, linear routes run along a river or valley and are connected with circular routes with the same starting and finishing point. Linear routes are a good instrument to connect different regions. Circular routes invite tourists to discover a smaller region in depth, keeping them longer in the region or inviting them to come back next year.

Keep in mind, your route must be accessible per bicycle and be pleasant to ride. Therefore, try to have gentle slopes and segregate the tracks as much as possible from vehicle traffic. For more details on design of bicycle infrastructure, have a look at chapter 5.

Story telling is an important aspect. Coherent narratives spark the interest of potential tourists and can be used to implement a successful marketing campaign. Thematic routes are a common tool to brand cycle routes. Through branding, you can connect the local economy (e.g. small businesses, local producers of food specialities) to cyclists as customers and distinguish your region from other cycling destinations.

The branding can be:

- **Historical**: e.g. the Iron Curtain Trail EuroVelo 13, Styrian Castle route, Via Claudia Augusta, Via Romea EuroVelo 5, Amber Route EuroVelo 9, railway-themed routes on disused tracks
- **Culinary**: e.g. wine routes (e.g. several circular routes branded with names of grape varieties in the Austrian region Weinviertel), cheese, you can use any culinary aspect a region is famous for to create a theme
- **Nature based**: tours with information along the track regarding spectacular sights and local fauna and flora e.g. birds, famous animals, or special flowers or trees (e.g. a circular route passing a unique salt steppe with rare plants and animals in in the Austrian region Weinviertel, Cherry Blossom Cycle Path in Burgenland), river and water-themed routes
- **Cultural**: here you can use famous people (e.g. Mozart cycling route in Salzburg), museums or arts from your region, even local fairy tales or myths to create a theme for families as well.
- **Sportive**: Wherever a famous bicycle race took place, tourists seek the thrill to cycle on the same courses. Special challenges like mountain passes or mountain range crossings (e.g. Trans Alp) provide challenges.
- **Wellness:** Routes connecting thermal baths, spas, hot springs (e.g. Thermal Springs Cycle Path in Styria, Idaho Hot Springs MTB Route)

If your region has already developed a branding, you can also try to implement the existing branding for cycle routes. As done in the Wachau region in Lower Austria, connecting the apricot production and products made out of apricots (e.g. jam, dumplings, liquor, etc.) with historic sites.

To be added

Figure 22: Examples for culinary branding e.g. produce from the Wachauer Marille g.U.

When finished developing a route brand or integrating the route into an existing brand, also include proper signage. During a trip, cyclists need help to follow the route. Start by assessing the currently existing signage, to get an overview. Then estimate the number of required signs needed. You can choose to either add small secondary signage to the already existing one or replace existing signage with new ones including your brand/route sign. More information could be found in chapter 5.5 and in Capirone and Stadtherr (2016).

© European Cyclists' Federation (EuroVelo Signing) November 2016

Figure 23: Signposting of EuroVelo routes (DE, HU, RS) with logo added or integrated

Developing scenic routes, however, is not everything. Routes need to be accessible for tourists, preferably either directly per bicycle or with public transport. A step further will be to offer rental bikes for tourists who do not travel with their own bicycles (see also chapter 6, and chapter 7).

If you develop a bicycle route longer than 80 km, you need to think about how to divide your route into day stages.

Recommended characteristics of a day's stage:

- Ideally be about 40-60 km long
- Start and end at a town or village with cycle friendly accommodations and access to public transport
- Have multiple opportunities for resting en route
- Include points of interest representing the theme or story used for this route

4.2 Initial steps to climate-friendly mobility offers in tourism

The implementation of new mobility concepts is a process that requires careful planning and the involvement of numerous stakeholders. On the next two pages, we provide insight into the necessary processes for planning, implementation and monitoring. You will also find listed suggestions of possible methods for each process step, which include the integration of stakeholders in such a process.

The following section was part of the REFRESH project and worked out by Juschten and Unbehaun (2018).

Impulses and how to start

Aim

Informing and awareness raising among decision-makers in the region for the benefit of sustainable mobility offers through tourism players, cost-benefit calculations, integration of all stakeholders, formulation of rough targets, resource creation.

Important questions

- Who is affected and / or involved and should be included in the process?
- What are the main benefits of improved mobility?
- Clarification of financing options, if necessary, application for funding

Methods

- Stakeholder analysis (identification of relevant actors)
- Visioning workshop (developing a shared vision among the stakeholders)

Survey of present state and analysis, definition of targets

Aim

Knowledge about existing resources, as well as tourism and supply structures along the travel chain (planning phase, arrival & departure, local mobility, mobility during the tour)

Important questions

- What is the current travel behavior of guests and what are the requirements resulting from this (origin, travel destinations in the region, choice of transportation, booking behavior, etc.)?
- How is the quality?
- Is there, and if yes, how is the quality of the infrastructure for pedestrians and cyclists?
- How is the supply of public transport or micro-public transport (also on weekend)?
- Is there information on the public transport offers and the accessibility of attractions?
- Which shortcomings result from this and which goals are to be achieved?
- What do other destinations do and how can the region position itself in comparison?
- Which current trends and developments play a role for the needs of mobility?

Methods

- Surveys and observations[2] of the mobility behaviour of tourists as preliminary data in close coordination with indicators of the monitoring concept
- Market analysis (existing offers and competitors)
- SWOT analysis (strengths, weaknesses, opportunities, threats/risks)

Creative brainstorming and development of offers

Aim

Collective definition of concrete objectives and matching target groups, development of a catalog of ideas and initial relevant data for the offers being developed

Important questions

- How can offers be combined with climate-friendly mobility? What are core topics and unique selling points (USPs)?
- Whom do I want to address and how can I describe my target group?

Methods

- Idea brainstorming (for now, quantity before quality)
- Collective notebook (written brainstorming)
- Stakeholder role play (put into other roles)

[2] For more information traffic counts and surveys see chapter 10, p. 115 ff.

Networking, action planning & implementation

Aim

Clear definition of action steps for the development of climate preserving mobility offers, responsibilities, networking with involved stakeholders, time and cost plans to create transparency and better target control

Important questions

- Who is responsible for which specific tasks and takes over this until when?
- How is the financing specifically guaranteed of the individual measures?
- Which stakeholders should be involved in the process and when?
- How can you communicate the offers successfully to the target group?

Methods

- Contact data base (includes all major stakeholders)
- Touristic product outline (features of the proposed offer)
- Empathy card (analysis of guest needs)
- Business Model Canvas (steps of implementation)

Monitoring

Aim

Control of the achievement of targets as defined in the points "Survey of present state and analysis, definition of targets" and "Networking, action planning & implementation", monitoring of the needed resources and possible leverage points for timely adjusted solutions or process optimization, e.g. through cooperation (see also chapter 9).

Important questions

- Have the set goals been achieved? If so, to what extent (Use of indicators of the monitoring concept from the target in step 2 Survey of present state and analysis, definition of targets)?
- Which setscrews can still be turned in the long run to improve an effect? Who will do this?

Methods

- Guest surveys on the satisfaction for used offers (Comparison before and after with data from the present state survey in point 2 Survey of present state and analysis, definition of targets)
- Higher-level statistics on usage numbers
- Monitoring tools (indicator-based target control)

Summary checklist

Chapter: 4 *Pages: 26-32*

- Formulate targets (different levels: chief/medium/detailed) and indicators for monitoring.
- List and contact relevant stakeholders (e.g. from tourism, environmental protection, public sector etc.).
- Collect information about existing resources (e.g. on tourism and supply structures, mobility chains), surveys of present state.
- Identify a successful comparable model region, invite representatives or visit the region to learn from their experience.
- Compare the present state with your targets, identify weak points where intervention is needed.
- Develop alternative variants and rate them according to how they help reaching your targets; develop individual branding of routes and offers.
- Select the best option in teamwork with relevant stakeholders.
- Implement the selected variant with experts (e.g. transport planners, environmental engineers, tourism boards etc.) according to a time schedule.
- Keep time and cost plans transparent for a better target control.
- Monitor the resources, to optimize/adapt in time.
- Monitor the achievement of your targets and collect data for further improvement.

5 Infrastructure for high-level bicycle tourism

A cycling network should offer an attractive and safe environment, which allows cyclists to drive comfortable from their point of origin to their desired destinations.

How can this be reached

Cohesion

Cohesion in this context means, that numerous parts of cycle infrastructure are connected, to form one network. Furthermore, the network has to provide connections to link up cyclists' point of departure and destinations (de Groot 2007). EuroVelo routes are linear routes, but they should connect with local route networks for different needs, offering outstanding touristic opportunities.

According to Sustrans (2014), cohesive bicycle networks should:

- *be continuous and recognisable*
- *offer consistent standards of protection throughout*
- *be properly signed*
- *include well located bicycle parking*

Attractiveness

Attractiveness is important for recreational cycling. In this context, attractiveness refers to the infrastructure and the surroundings of the route, not only the landscape. The task is to create an overall experience of nature and cycling. An attractive landscape is beneficial and must be considered in the planning process.

An ideally designed infrastructure fits into the surrounding environment and cyclists should find its use attractive. This includes also a summary of psychological factors, not just appearance. Recreational cyclists attach a great deal of importance to peacefulness and quietness.

Recreational bicycle networks try to use roads with low volumes of vehicular traffic, to create a pleasant experience. The European Cycle Federation (ECF) categorizes traffic volumes of up to 1500 passenger car units (PCU) per day at speeds of up to 50 kph as very low. In comparison, a maximum of around 1.000 PCU per day is appropriate according to de Groot (2007).

The routes must be regularly maintained (e.g. vegetation trimmed, complete and up to date signage, good surface quality) to guarantee an appealing infrastructure.

For a deeper insight, please research the mentioned literature.

Traffic safety

Traffic safety implies the prevention of injuries from accidents. Cyclists as vulnerable road users (VRUs) do not have injury preventing features, like a car body or an airbag. Hence, they are at a higher risk when using the same space as motorised vehicles at the same speed. The most important factors contributing to safety are:

- Keep lines of sight open at intersections,
- Regulate intersections clearly, either by traffic lights or clear signage,
- Separate motor and cycle traffic when possible,
- Adapt vehicular speed to fit to cyclists.

Security

Personal security can be defined as how safe a person feels in a given environment in terms of encroachments from others or even sexual assaults.

Many factors contribute to personal security:

- Personal experience or predisposition,
- Lines of sight at underpasses, bridges, etc.
- Route through safe or unsafe neighbourhood,
- Lighting at night.

Comfort

Uneven or bumpy roads cause discomfort and cyclists will hesitate before using such routes. The quality of the track, respectively the route is essential for the user experience

and for creating comfort. Keep the following points in mind to maintain a high level of comfort for your route:

- Try to keep infrastructure standards (e.g. for width, clearance, gradients, radii and surface),
- Maintain the infrastructure regularly (e.g. repairing surface damage, clearing shards of glass, waste removal, etc.),
- Let them cross intersections in one go, without having to stop repeatedly. Avoid repeatedly starting and stopping (e.g. at intersections or other interruptions),
- Try to give cyclists right of way on high level bicycle routes,
- Think of winter maintenance (snow removal or de-icing) in urban and suburban areas, when also used by every-day cyclists in commuter traffic.

5.1 Basic parameters of bicycle infrastructure

Design speed for cycling infrastructure:

The cycling infrastructure should enable certain driving speeds for cyclists, called design speed. The Austrian, Swiss, Belgian, and British guidelines recommend 30 kph as design speed for new main cycle routes, which EuroVelo routes should aim to be.

Often due to the local characteristics of your region, a design speed of 30 kph throughout the whole route is not possible. Therefore, try to fulfil the following conditions.

Table 3: Design speed conditions for your route

Must haves	Nice to haves
50 % with design speed of 30 kph	80 % with design speed of 30 kph
Only 10 % of the route with design speed below 20 kph	

Attractive routing (detour-factor and directness)

When planning a cycle infrastructure for everyday use, direct routes are very important to guarantee short trips. The detour-factor is a measurement of how direct a route is. It can be calculated trough the ratio of the length of the route to the linear distance between point of origin and the destination. Mekuria, Furth et al. (2012) and de Groot (2007) define the desired detour-factor (for inner city traffic) as less than around 1.2 and 1.3.

However, recreational cyclists prefer safe routes with iconic landscapes and scenery. Therefore, cycling a quieter route that is more enjoyable but longer will be preferred over detours will still be felt as a nuisance. Our rule of a thumb advice is that detour-factors of touristic routes should not exceed a value of 1.5. Of course, detours to points of interest, which are sub-destinations aside the main route, are exempt from this rule.

In all cases, signposting and other means of information should inform the bicycle tourists about available routes, including distances and their pros and cons. For example, when

long detours offer views that are more scenic, the cyclists should be enabled to decide on objective criteria, whether they take a longer, scenic or shorter, direct route.

Creating infrastructure with sufficient capacities

Capacity of an inner city cycle track

The capacity of a cycle track or lane is dependent on factors like:

- Width,
- Uni- or bidirectional traffic,
- Mean velocity respectively traffic volumes cyclists and
- Obstructions per kilometre.

Table 4: Capacities for cycling tracks

Direction of traffic	Width [m]	Capacity [bicycles/h] (Jensen, Andersen et al. 2012)
One-way (not recommended)	1.0	-
Two-way	2.0	2000
	per additional metre	+1500

Table 4 contains the capacity used for designing and dimensioning cycle infrastructure in the Netherlands. These capacities are for inner city (rush hour commuter) traffic. Driving on facilities at full capacity is not the aim for EuroVelo tracks. Rarely is the capacity the limiting factor, when planning leisure cycling infrastructure, more often processes like overtaking or the accessibility for maintenance vehicles are crucial factors regarding the track width. We recommend track/road widths of 3 m for easy access with maintenance lorries etc.

When reaching high volumes of cyclists, widen the widths generously for EuroVelo routes, therefore increasing the available space for the individual cyclist, making it enjoyable, as leisure cycling should be.

***Note**: Consider this chapter also, when planning routes with transit purposes in urban areas.*

Level of Service (LOS)

The level of service describes the quality of the traffic flow. Six classes have been defined in the highway capacity manual (HCM), LOS A – low traffic volumes, free flowing; down to LOS F – high traffic volumes and sluggish traffic flow. LOS A is the traffic flow with the best operating conditions and LOS F with the worst (Transportation Research Board of the national Academies 2010).

The German guideline (FGSV 2015) uses interruptions in bicycle-traffic flow to calculate the level of service for a track section. The geometry (width) of the track and traffic volume

of cyclists are the significant criteria. Interruptions can be oncoming cycle traffic, passing manoeuvres or punctual interruptions (e.g. bus stops, pedestrian crossings, traffic lights, etc.).

The rate of interruptions will be calculated for all sections of the track, combined in a length-weighted average Level of Service for the whole track (FGSV 2015).

The LOS for a two-way cycle infrastructure is defined in the following table.

Table 5: Level of Service classification according to FGSV (2015)

LOS	Interruption rate SR [interruptions/(bike*km)]	
	One-way traffic	Two-way traffic
A	< 1	< 10
B	< 3	< 30
C	< 5	< 50
D	<10	<100
E	>10	>100

The Level of service F cannot be sufficiently defined with this criterion.

We recommend using the German rating method since it is up to date and its calculations are rather simple compared to others.

As leisure cycling infrastructure, the EuroVelo tracks should set high quality standards. The target should be less than 50 interruptions per cyclist and per kilometre, which would be LOS C, as listed in the tables below.

Table 6: Recommended level of service (LOS)

Level of Service LOS	
Must have	Nice to have
LOS C	LOS B (A)

However, the verification of a LOS for a certain track will be necessary when reaching the tracks capacity. For detailed information of calculating the LOS please have a look at the German guideline "Handbuch für die Bemessung von Straßenverkehrsanlagen" (FGSV 2015).

> ***Note**: The topic "Information, communication and marketing" is covered in chapter 9.*

Summary checklist

Chapter: 5.1 *Pages: 34-37*

- Choose an appropriate design speed for your route and illustrate where it can (not) be achieved along your route.
- Provide infrastructure with sufficient capacity at a recommended Level of Service; check especially for sections carrying high volumes of cyclists.
- Establish a continuous route, check for cohesion, attractiveness, safety, security and comfort.
- Consult or commission an experienced transport planner for adequate design of bicycle infrastructure.
- Check for accidents along your route; this gives valuable information on problematic spots/sections and where improvement is needed. Keep time and cost plans transparent for a better target control.

5.2 Design elements of cycling facilities

Elements of a cross section

- The recommended width for the movement per cyclist is 1 m. This results in minimum widths of 2 m for most bicycle facilities, so that cyclists can pass or overtake each other. With higher volumes of cycle traffic, facilities should be three, four metres wide or even wider.
- In addition, protection strips should be arranged between bicycle facilities and potentially dangerous areas to protect cyclists, for example against opening car doors, cars backing out of parking spaces, fast traffic, dangerous falling edges and so on. Accordingly, protection strips should be 0.5 m (low risk) up to 1.0 m (high risk) wide.
- Cross-slopes of at least 1.5 % for drainage purposes are advised. The Slovakian standard demands 2.0 % and the Serbian standard 2.5 %.

Clearance

For comfortable driving and to avoid an obstructed view, a cyclist needs a clearance which is on both sides 25 cm wider than the physically required/recommended width – for example 2.5 m for two cyclists next to each other (two times 1.0 m plus 25 cm on both sides). The recommended height free of any solid objects like signs or shrubbery over the widths defined above should be 2.5 metres.

Curve radii

To meet with the design speed of 30 kph the minimum (inside) radius is 22 m, for radii < 50 m a cross-slope toward the inside of the curve could be necessary. With small radii (<10 m) also a widening of the cross section of 0.5 m per 1 m width is needed

Gradients and ramps

Generally, gradients should be small with bicycle traffic. Gradients influence the speeds of cyclists significantly. Uphill the basic principle is; steep grades are only suitable for small height differences. The longer an ascent is, the smaller the incline should be. When cyclists travel uphill, they begin to swerve and drive in a wiggly line, especially at low speeds, on that account they need an extra amount of width. Build ramps with smooth beginnings, uneven surfaces will cause discomfort.

A maximum slope of 3 % guarantees a comfortable ride, even during windy conditions. 6 % is the maximum recommended longitudinal gradient for handicapped people with wheelchairs, handbikes etc. Also downhill slopes should be moderately inclined, as from 3 % incline on speeds of cyclists rise well above 30 kph. (See Table 7)

Table 7: Recommended uphill gradients and the corresponding length of the slope (FSV 2014)

Grade [%]	Maximal length of the slope [m]
10	20
6	65
5	120
4	250
3	> 250

The Slovakian Standard for bicycle infrastructure "Technické Podmienky Navrhovanie cyklistickej infraštruktúry 2014" (SR 2014) defines a combination of design speed, slope length and grade: The design speed generally is 25 kph, if the slope is steeper than -3 % (downhill), the design speed is increased to 40 kph. For flatlands, a slope of 3 % to 6 % is advised, for hilly country, slopes of up to 8 % are allowed.

To connect sections of different elevation, ramps are necessary. Build them with smooth beginnings, uneven surfaces or kinks will cause discomfort.

Note: Setting the right slope for ramps is depended on factors like (Van den Berg 2015):

- The space at hand: can limit the minimum incline, especially with underpasses.
- User types: e.g. elderly people need longer ramps, with flat landings for resting
- The height to overcome: small height differences are easier to overcome with small steep ramps, rather than with longer ramps.
- The line of sight: if cyclists can see inclines from distance, they can prepare, gain speed or momentum.
- The detour due to the ramp: if cyclists find an unintended shortcut, they will rather use it, than long ramps.
- Road safety: inclines or declines should not directly end into an intersection with other paths.

Sight relations

One must differentiate between required sight distances in motion and stopping sight distances. Cyclists need sufficient visibilities of the infrastructure in front (e.g. junctions, road sections, roundabouts, etc.) to ride at design speed (30 kph) and still be comfortable and safe, de Groot (2016) for example defines the sight distance in motion as followed:

Table 8: Sight distance in motion for design a speed of 30 kph

Sight distance in motion	Minimum (must-have)	Comfortable (nice-to have)
Distance covered in [s]	4-5	8-10
Distance in [m]	35-42	67-83

An adequate stopping distance is vital for road safety. At any point of the cycle infrastructure:

- Keep adequate visibility, so that cyclists are able to identify threats and stop in time (stopping sight distances).
- At a design speed of 30 kph (de Groot 2016) assumes a stopping distance of 40 m.

The stopping distances vary with the:

- Reaction time of cyclists,
- Environmental condition (e.g. wet surface, fallen leaves),
- Condition of the bicycle (e.g. breaking performance, service status),
- Load capacity of the bike (e.g. fully packed tourist, racing gear).

Speed bumps or elevated roadways

Speed bumps or elevated roadways are included in the toolbox of traffic calming. They are an efficient way to reduce traffic speeds at critical junctions and remind motorists to give-way, where necessary. Those who have priority should not be affected by such measures. Elevated parts of the roadway are normally applicable for complete intersections and all traffic participants.

Key facts:

- Speed bumps for motorists should normally not affect cyclists, who should be able to bypass them
- Ramps should have an incline according to the intended speed reduction
- A ratio around 1:12.5 or 1:15 and an elevation of 10 cm above standard surface level are normal

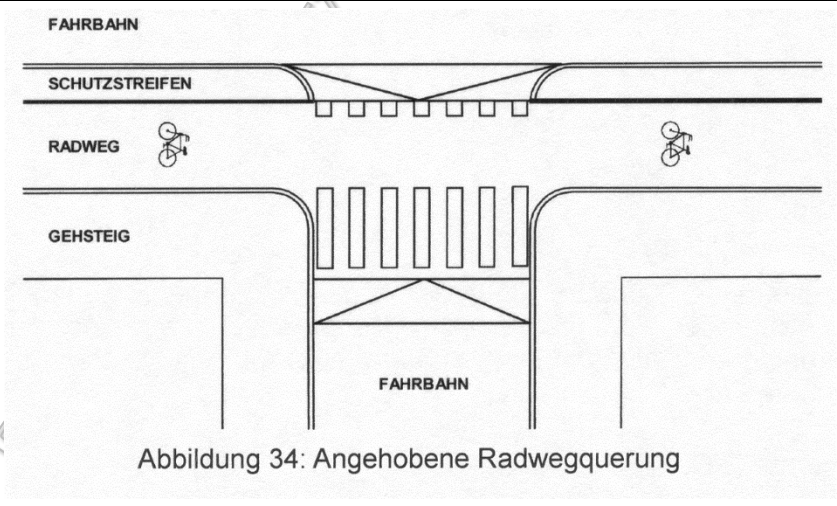


Figure 24: Example for a speedbump, which does not affect cyclists. (FSV 2014)

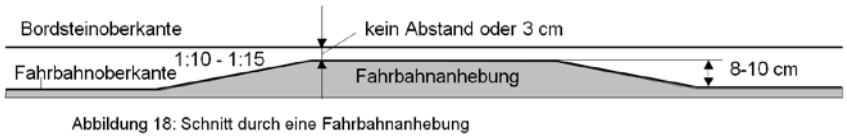


Figure 25: Cross section of an elevated roadway or speedbump. (FSV 2014)

Surfaces (materials, evenness, bumps, skid resistance, drainage)

The surface should offer a smooth and even ride and enough skid resistance during wet conditions. Asphalt or concrete should be used for sufficient durability and easy maintenance.

In sensitive areas like nature conservation areas compact gravel also is an option, minimising the environmental impact at these sections. Compacted gravel surfaces need regular maintenance (e.g. after heavy rain storms) to ensure an even surface without potholes or grooves.

Coloured asphalt/concrete should be used where conflicts occur frequently to sensitise traffic participants – especially at intersections – or as guidance through complex situations.

Keep in mind:

- The main loads for cycling facilities are not cyclists, but service vehicles (e.g. maintenance lorries or emergency units etc.)
- An even surface implies that cyclists can ride at high speeds
- Bumps caused by root growth or frost should be removed rather quickly.
- The natural skid resistance of asphalt surfaces is usually enough. Material of road markings, tramway or railway tracks reduce grip during wet conditions.
- Basic drainage is provided by the cross slope. Drainage for bridges or tunnels needs special considerations, to be effective and to require low maintenance.

Road markings

For road markings, there are two commonly used materials: Thermoplastics and two or three component cold plastics. Their visibility is sufficient even in rainy conditions. If applied correctly, they are well resistant to abrasion. (de Groot 2007, FSV 2014)

Consider:

- During wet or icy conditions, in autumn and winter the combination of fallen leaves, rain and improperly placed road markings can cause notably unsafe situations.
- Skid resistance can be critical e.g. in sharp corners, steep and shady track sections, here the application of certain markings must be carefully considered and situated.

Summary checklist

Chapter: 5.2 *Pages: 37-41*

- Determine adequate width and transverse gradient (cross section) along your route.
- Check for sufficient clearance throughout your route.
- Avoid sections with steep longitudinal gradient.
- Provide adequate (minimum) sight relations.
- Use smooth and skid-resistant surface materials and take (future) maintenance into account.

5.3 Types of track sections

Depending on the hierarchy of the road and traffic volumes, the Austrian guidelines on bicycle traffic (RVS 03.02.13, (FSV 2014)) recommend shared infrastructure with motor traffic below 30 kph speed limits and low hierarchies, and separation on main traffic routes with a speed limit of 50 kph or higher. The German guideline ERA (FGSV 2010), Cycling Embassy of Denmark (Jensen, Andersen et al. 2012), Sustrans (Sustrans 2014), and CROW (de Groot 2016) have published similar requirements for this decision.

Literature mentions other factors that influence the decision to separate or integrate cycle traffic with motorised modes, but do not specify any numbers to help with the decision. In addition to vehicular speeds and motorised traffic volumes, condider the following factors as best as possible:

- the number of cyclists,
- crossing traffic volumes,
- distances between intersection and
- available space for infrastructure.

Especially when space is scarce, separated traffic infrastructures do not fit in. Here – as a compromise – we recommend mixed traffic under suitable conditions, commonly reduced maximum speed to 30 kph and traffic volumes below 7000 vehicles/day, according to Figure 26. In all other cases, the recommendation for bicycle facilities in bicycle tourism are definitely bicycle tracks separated from motorised traffic or low-volume roads.

Different bicycle facilities are described in the following paragraphs. As an overview Table 9 provides you with the widths for those facilities.

Table 9: Recommended widths for bicycle facilities

Facility		Widths [m]		
		Exceptions*	Must have	Nice to have
Cycle track	One-way	1.00	1.60	2.00
	Two-way	1.60	2.00	3.00
Bicycle lanes (advisory lanes)	No adjacent parking	-	1.50	1.75
	On main cycle routes	-	2.00	> 2.00
	Kerb-side parking	-	add protection strip of 0.50 m to widths given above	
	Diagonal parking	-	add protection strip of 1.00 m to widths given above	
Bicycle highways		-	3.00	4.00
Bicycle streets			4.00	> 4.00

* Exceptions are not recommended and only applicable on short sections (a few metres) where the regular widths cannot be implemented. Otherwise, the travel quality decreases drastically. A complete route can be discredited when more than a few very short stretches show less than the recommended widths.

One-way bicycle track

Bicycle tracks are used along roads with high motorised traffic volumes and/or high speeds. Cycle tracks are separated from automobile infrastructure, typically through a verge or kerb. As the name says, they are only open for cycle traffic, to be used in one direction. Usually one-way cycle tracks are located at each side of the road, going with the direction of traffic. This network element is typical for urban areas on main traffic routes but can also be used in suburbs.

Key facts:

- Usually used for inner city traffic
- Recommended for high volumes of bicycle traffic
- At low cyclist volumes counter flow occurs, which increases risks of accidents

Two-way bicycle track

Two-way cycle tracks allow bicycle traffic in both directions. These are also recommended along roads with high traffic volumes, preferably outside settlements. This element is frequently used for recreational bicycle infrastructure; according to Jensen, Andersen et al. (2012), as a connecting route between cities, as a cycle path in residential areas, or along major roads with few intersections.

Key facts:

- Can be arranged directly along the road or better apart and independently from motor roads
- Marked with edge and centre lines to indicate lanes

Bicycle lanes

Bicycle lanes are part of the carriageway, separated from motorist's lanes with a marked line or protective objects. Compared with bicycle tracks they are used along roads with lower traffic volumes. Exclusively cyclists are permitted to use bike lanes.

Key facts:

- Typically for inner city roads
- If used outside, then in combination with speed limit of 70 kph
- For EuroVelo route only as temporary solution, until a track is built
- Width is dependent on the surrounding parking conditions

Advisory lanes

Advisory lanes are a subcategory of bicycle lanes and part of the carriageway, but not exclusively for cyclists. They should not be used on roads with high volumes of traffic, especially with high amounts of heavy traffic.

Key facts:

- Are not suitable elements for EuroVelo routes
- Can only be used as temporary solution, until construction works for other suitable facilities are finished

Bicycle highways

Bicycle highways are very high quality connections of cycle infrastructure between regions or agglomerations. They aim to connect municipalities, city outskirts and important points of interest with high potential and link them over larger distances, especially for rush-hour traffic and targeted of commuter cyclists. The infrastructure must be safe and attractive, high travel speeds (30 kph) must be possible.

Cycle highways should also have a high quality standard regarding alignment, equipment, links to the other cycle networks and accompanying facilities.

Key facts:

- For urban areas, only suitable when combined with local commuting traffic
- In rural areas with no or little commuter traffic, cycle highways demand too high standards for EuroVelo tourists needs

Further information on this topic can be found in the German working paper "Arbeitspapier Einsatz und Gestaltungen von Radschnellverbindungen" by Gwiasda and Forschungsgesellschaft für Straßen- und Verkehrswesen Arbeitsgruppe (2014) and in (de Groot 2016)

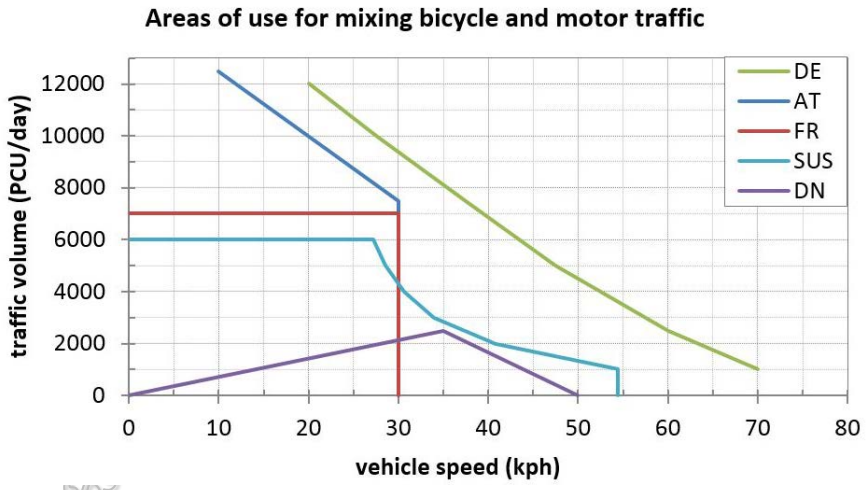
Bicycle streets

"Bicycle street" is a legal term implemented in the road regulations of the Netherlands, Germany and Austria. These are designated cycle routes, which use quiet, low speed streets (e.g. residential roads, town centre back streets or roads through a park). Limiting traffic speed to 30 kph and prioritising cyclists will attract cycle traffic, especially when they provide a convenient and direct route between key destinations.

Key facts:

- In urban areas, where well developed bicycle infrastructure already exists; and when a separated track from motor traffic is not possible
- Carry not more than 3,000 motor vehicles per day
- Speed limit is 30 kph for all road users
- Cyclists should constitute the most frequent road users
- Give cyclists priority on the road itself and also right of way at junctions
- Keep a 0.75 m safety strip to adjacent parking lanes!

More details can be found in the Austrian RVS 03.02.13 (FSV 2014), the German ERA (FGSV 2010), Arbeitspapier Einsatz und Gestaltung von Radschnellverbindungen (Gwiasda and Forschungsgesellschaft für Straßen- und Verkehrswesen Arbeitsgruppe 2014), in the Handbook for cycle-friendly design (Sustrans 2014) an in the Copenhagen Guidelines for the design of road projects (Hausschildt 2013).



Note: PCU – all motorized vehicles are standardized to equivalent passenger car numbers; V85 – speed from measurements, which 85% of the motorized vehicles fall short of (and 15% exceed).

Figure 26: Rough estimation when to mix (below lines) or separate bicycle traffic (above lines) from motorized traffic, depending on traffic volumes (PCU = passenger car units) and design speed (V85).

This figure was extracted from „Grundlagen für die Dimensionierung von sicheren Veloverkehrsanlagen“ (Dörnenburg, Steiner et al. 2016) and modified by with data from Sustrans (2014).

Summary checklist

Chapter: 5.3 *Pages: 41-45*

- Which types of track sections exist/are selected along your route? Depict in a plan and identify the quality per section.
- Aim at tracks separated from motorised traffic, appropriate width, high level of comfort and environmental beauty.

5.4 Intersections, roundabouts

General concept for safe design of intersections/roundabouts

Intersections should be self-explanatory and allow as direct lines of movement as possible. All different road users should easily understand the organisational principles of the intersection, who has priority, where and how they have to manoeuvre through the intersection to reach their point of desire. It is important that road users recognise other users and realise how to interact with them. The lines of movement of other traffic participants should be foreseeable. Therefore, visibility conditions should be good and free lines of sight are crucial elements, allowing interaction between traffic participants.

Remember:

- If the line of sight is not given for both directions, misjudgements of traffic situations arise.
- Proper road markings, signage and illumination are essential for good comprehensibility at night.

Cycle traffic at intersections

When the cycle track is kept alongside the road, right turning traffic often causes conflicts, even accidents with ongoing cyclists. Therefore, it is wise to situate the lane for cyclists directly next to the lane for the motorists for at least 20 to 30 metres upstream of the point of conflict, e.g. the intersection (Figure 27). So bicycles are seen in time.

Using traffic lights to ensure safe passing is a valid option at large or complex intersections, or when over and underpasses are too expensive (Figure 28).

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Figure 27: Cycle lane next to the lane for the motorists at an intersection

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Figure 28: Traffic lights at complex intersections

Cycle traffic at roundabouts

Roundabouts do not improve safety for pedestrians and cyclists, as they do with motorists; on the contrary, at roundabouts cyclists have to put up with detours and demanding interactions. Bicycle traffic can share the ring road with others at small roundabouts (up to 30 m diameter) in built up areas, whereas in the open land – larger roundabouts allow higher speeds – it is recommended to organise bicycle traffic on a concentric circle around the ring road, so that bicycles cross the arms leading to and from the roundabout. The following table shows the recommended application of either design principle.

Two types how to lead bicycle traffic across a roundabout:

Carriageway shared with motor vehicles:

- Only possible at smaller inner city roundabouts (diameter max. 30 m)
- Maximum of 15.000 vehicles/day (Reuter and Köhler 2013)
- The roundabouts are smaller and speeds are also lower
- The traffic flow is easy to understand
- Untrained cyclists feel unsafe driving through the roundabout
- Risk of accidents caused by driver overtaking inside the roundabout
- An elevated inner third of the ring road improves safety for cyclists
- less effort for planning and design

Segregated track around the roundabout:

- Even larger detours for cyclists and pedestrians
- Higher traffic speeds caused by larger roundabouts
- Roundabouts plus cycle track require more space
- A cyclist's line of traffic should be foreseeable for vehicle drivers at the crossings, therefore the cycle track shown, from a concentric circle around the roundabout
- Junctions with cycle track must be carefully designed
- Surface of cycle crossings can be coloured for awareness

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Figure 29: Carriageway shared with motor vehicles

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Figure 30: Segregated track around the roundabout

Again visibility is very important. Neither bike nor motor traffic shall be obscured by directional or information signage. Further detailed information and design can be found in (de Groot 2016) or the RVS 03.05.14 (FSV 2010).

Bridges, tunnels, over-/underpasses

In general, cyclists are sensitive to steep slopes. Therefore, unnecessary differences in height along cycle routes should be avoided. Steep slopes or even steps should be avoided over the course of important cycle routes; Cyclists should be able to cycle along and not be forced to dismount.

Bridges, tunnels, under- and overpasses can be essential links in the infrastructure to avoid heavily travelled roads or passages which are otherwise not passable (e.g. highways, waterways, rock formations). Pedestrians will also use such infrastructure.

In height, bicyclists require a smaller clearance than motor vehicles (lorries), therefore underpasses or tunnels for cyclists need lower construction heights than overpasses (about two metres less) and can be built with smaller ramp gradients. Security issues should be considered with underpasses.

Widths and heights, slopes, grades

For grades and ramps see chapter "gradients and ramps" above. For a two-way cycle path, the overpass or bridge should at least be 2.5 m wide, with pedestrians twice as wide. If the bridge is built with bends or curves, 0.5 m extra width is needed, because cyclists will lean into the curve at higher cornering speeds.

The height of tunnels or underpasses is at least 2.5 m (minimum clearance). The width should be at least 1.5 times the height and the cross section should be wider at shoulder height than at the bottom. This creates positive feelings, where the tunnel is not perceived to narrow or low-ceilinged.

For tunnels, a minimum cross and longitudinal slope of 1.5 % is advised to drain incoming rainwater. The drainage must be designed carefully, leaves or waste can easily clog a drain at the entrance.

For safety reasons, overpasses, bridges and falling edges must have railings, normally 1.2 m or higher, as cyclists´ centre of gravity is higher than pedestrians´ (Van den Berg 2015). For children the vertical or horizontal spacing must be small enough, so they cannot slip through.

Table 10: Recommended features of over- and underpasses

Must haves	Nice to haves
Maximal ramp slope 6 %	Ramp slope <3 %
Minimum height clearance 2.5 m for tunnels and underpasses	Width of tunnels and underpasses 1.5 times their height.
Width of bridges and overpasses min 2.5 m. If curved + 0.5 m extra width	For additional pedestrians double the width
Lighting in tunnels and underpasses	Smooth transition of lighting for longer stretches
Railings 1.2 m at bridges and overpasses	Railings of 1.3 m at bridges and overpasses
Min 1.5 % cross slope for drainage	
Continuously passable, sitting on the bike	

Lighting, sight relations

Open lines of sight and streetlights are very important for underpasses and tunnels. When not well lit and sight is obstructed due to bends or corners, anxious persons will feel insecure and tend to use alternative routes. Avoid blind corners, by designing straight approaches and a good through visibility created.

A sound approach is that tunnels and underpasses should not be darker than the surroundings, and lighting should start outside to create a soft transition between the lighting level outside and inside. Providing underpasses with a maximum of natural light is well advised. This can be achieved by splitting the carriageway, thus creating two shorter tunnels and an inlet in between for natural light.

Colouring the tunnel walls with rather warm than cold colours can increase the feeling of personal security. Recess the lighting into the walls to prevent acts of vandalism.

Summary checklist

Chapter: 5.4 *Pages: 45-50*

- Which types of track sections exist/are selected along your route? Depict in a plan and identify the quality per section.
- Aim at tracks separated from motorised traffic, appropriate width, high level of comfort and environmental beauty.

5.5 Route signposting and information

Principles: clear, complete and uniform

Signposting systems for transnational routes should ideally be standardised. They must also comply with national regulations. If a uniform signage over all participating countries is not possible, use an additional recognizable brand logo for EuroVelo routes and combine it with the existing national signage system. More details can be found in the EuroVelo press kit (Bodor, Lancaster et al. 2016) or in Signing of EuroVelo cycle routes (Capirone and Stadtherr 2016).

Replace missing signs along the route as soon as possible to maintain the high level of navigational service.

Sign content and intervals

Signage regarding EuroVelo routes must be easy to understand, with all the necessary information cycle tourists need to navigate to their points of interest. Recommended are names of next destinations plus distances plus the route number/identification.

Place routing signs at every intersection or major junction where a route changes direction. They are necessary indicating nearby touristic attractions. On longer sections without intersections, additional confirmatory logo signs should be placed to reassure bicycle tourists. Areal maps provide an overview and give important contact information for places of interest or in case of emergency. A QR-Code an also be of service, linking websites for information for the surrounding area.

Emergency and support telephone numbers

Providing an emergency number (in English) on information boards is very helpful for bicycle tourists in case of an emergency. The emergency does not have to be life threatening, mechanical problems are frustrating and often need outside support. A helpline for complaints or hints from cyclists to the authority in charge of maintenance can be effective tool to keep track of the infrastructure conditions.

Possible emergency or support numbers:

- Ambulance, police, fire brigade, nearest hospital
- Mechanics, repair services
- Local tourist information, helpline of the municipality
- Authority in charge of maintenance

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Figure 31: Examples of information boards including support telephone numbers.

Communicate information about resting places, sights, accommodations and gastronomy etc. in the surrounding area on such signs to ease navigation.

Table 11: Positioning and contents of route sign

Must haves	Nice to haves
At junctions sign with route number/name	At main intersections information of shelters, repair services, shops or accommodations
At main intersections nearest settlements with distances and directions	Nearby tourist attractions (e.g. landmarks, nature reserves, cultural sites)
Areal maps at shelters and resting places with information about local tourism information etc.	QR Codes for additional information at resting places or links to regional information in English or online route planning

Placement, clearance, size

The placement of signposts should be at least 1.0 m apart to the right side of the track. That way the signs are still in the cyclist's view and far enough apart from the track not to form an obstacle. Place the signs in a height between 1.0 and 2.0 m, right in the view of cyclists. The size of the signs can be depended on their hierarchy, but always large enough to be read while riding the bicycle.

For a sign to be recognized on approach its surface should be retroreflective and the colour set in contrast to the surroundings. Keep a clearance of 1.0 m beside and above the sign, to ensure visibility and trim the vegetation on a regular schedule.

Another option is to place information on the surface with road-marking-materials to give a quick overview (similar to Figure 32).

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Figure 32: Examples of signage on the surface.

Summary checklist

Chapter: 5.5 *Pages: 50-52*

- Implement standardised signposting along the route
- Does it comply with the regulations for EuroVelo routes?
- Do you communicate locations and distances?
- Is there additional information about possible sights or points of interest?
- Do you provide an emergency number?

5.6 Bicycle parking

Possible locations of interest, amount of parking lots

A wide range of places can be a location of interest for cyclists:

- Resting places
- Vantage points with a special view
- Landmarks, ruins, castles etc.
- Cultural sites like museums, theatres, religious buildings, historic town centres etc.
- Shops, repair services, stations of public transport, public places, accommodations, restaurants, other services

The amount of parking lots provided depends on the size or importance of the site, the current supply of lots and local characteristics. The parking facilities should be built in accordance with local authorities. As bicycle tourism usually is depending on the season, also temporary racks are possible. We recommend installing some racks and adding more, when these are fully occupied. Check several times per season or ask the cyclists, how fond they are of your parking supply (see chapter 10). Bicycle racks should be reasonably theft-proof. Several studies and surveys recommend racks, where one can lean the bicycle against a solid object and lock the frame plus wheels securely. For more technical details have a look at the Interreg project 'Transdanube.Pearls – Network for sustainable Mobility along the Danube' or the Swiss guideline for bicycle parking from Sigrist, Zahnd et al. (2008).

Requirements (roofing, safety/security, accessibility)

At locations where stays over two hours are expected, parking lots should have a roof to protect the gear and personal belongings, keep the saddle dry and offer shelter during bad weather conditions. Safe deposit boxes or lockers for panniers enable tourists to explore sites, or city centres without having to carry all their belongings.

Parking areas should meet at least the following requirements:

- Offer sufficient parking lots
- Personal security (e.g. lighting, good visibility, at highly frequented places)
- Close to the destination or point of interest, easy to find (information boards)
- Suitable for all different types of bikes, also hand-bikes, bikes with trailers etc.
- Comfortable stands, which do not cause any personal injury or bike damage (e.g. bike lights, saddle, tires or rims)
- Easy handling / barrier-free, accessible per bike
- Avoid conflicts with motor vehicles at entrances and exits

For short-term parking, the listed requirements above apply as well, roofing and lockers are not mandatory.

Bicycle tourists have high expectations for overnight parking at accommodations. Since touring- or e-bikes are often expensive, cyclists do not want to lock their bikes somewhere outside overnight, a lockable room with bike stands must be provided.

Table 12: Recommended features of bicycle parking

Must haves	Nice to haves
Theft-proof bicycle racks	Lockable boxes
Accessible per bike	Barrier-free
Easy handling / locking	Roofing (despite stays shorter than 2h)
Close to points of interest	E-bike charging station
Sufficient parking lots	Lots for oversized bikes or special bikes
Comfortable bicycle racks	Tools, air pump

Summary checklist

Chapter: 5.6 *Pages: 52-54*

- Are all your points of interest equipped with bicycle parking?
- What duration of parking is expected?
- Are the existing parking lots sufficient in quality (theft protection)/quantity or do they need improvement?
- Are they accessible per bike?
- Are the parking lots checked in regards to personal security?

5.7 Shelters, resting places, service points

Shelters (basic features) and resting places (highest functionality) offer shelter, emergency aids, information and comfort. Resting places should offer all amenities of shelters and additional features, service points that allow bicycle repairs can be included in those two, or can also stand on their own. A corporate design along longer stages of the route provides good recognisability. Maintain waste bins and tools on a regular basis. As bicycle tourists pedal on average 40 to 50 km per day between their overnight stays, the locations of resting places should be chosen 10 to 20 km apart from main settlements where a substantial number of beds are available.

Shelters

Simple shads or utilisable sunroofs, porches shelter cyclists during bad weather or emergencies. Shelters must be located frequently along the route to be reached on foot even when bicycles are faulty.

Table 13: Features of shelters along main bicycle routes

Must haves	Nice to haves
Located every 10 km	Located at shorter intervals
Information about emergency or pick-up services	Benches and table
Waste bin	Repair tools
	First aid kit

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Figure 33: Example for a basic shelter with information, bench, waste bin and drinking water

Resting places

They should accommodate cyclists during resting breaks. Locations with views or quiet places off the roads are ideal. In addition to features of shelters, resting places offer:

Table 14: Features of resting places along main bicycle routes

Must haves	Nice to haves
Located every 20 km along the route	Located every 10 km along the route
Roofing	Bike stands
Picnic table / benches	Shading and/or wind shelter
Waste bins	Toilets
General map and local information for further navigation	Free WiFi and charging stations for mobile devices
	Electric charging stations for E-bikes
	Drinking water
	Lighting
	Clothes changing area

According to possibilities, resting places can also be equipped with technical gadgets, like info-screens etc.

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Figure 34: Well accepted resting place

Service points

Service points should enable cyclists to do minor repair works or at least to fix their bike to reach the next bicycle repair shop. They should be included in resting places, located in small villages or be part be of a bike friendly accommodation. Information on local workshops of bicycle mechanics or other repairmen should be provided, in case the bike cannot be fixed easily.

In order to repair minor damages, a service point is equipped with:

Table 15: Recommended tools offered at service points

Must haves	Nice to haves
Located every 20 km along the route	Located every 10 km along the route
Accessible via contact information	Accessible at all times
Tyre inflator / air pump	Work bench
Bike mount	Lighting for repairs at night
Bike repair tools (Allen keys, fork wrench set, screwdrivers, spoke spanner, chain tool, patch kit for tube and outer tire, cleaning cloth and hand wash paste)	Basic spare parts (e.g. patch or glue sets for tubes)

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Figure 35: Self-service point

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Figure 36: Possible equipment of tools

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Figure 37: Possible signage towards service points

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Figure 38: Automat for spare tire tubes

Electric charging stations for E-bikes should be provided in 30 km to 40 km intervals. Medium-sized towns serve as good locations for charging infrastructure. Since during a charging event, cyclists can explore nearby town centres or other points of interest or simply enjoy a coffee or meals at local restaurants.

Summary checklist

Chapter: 5.7 *Pages: 54-57*

- Does your route have shelters and resting places at regular intervals? If yes, how long are the distances between them on average?
- Do they provide the recommended features, like roofing, benches, water etc.?
- Are there any service points existing/planned along the route?

5.8 Lighting

In urban areas or at points of interest

Touristic cycling is usually an activity during daylight. Therefore, it is not necessary to implement special street lighting on recreational routes for tourists. However, lighting is recommended for all locations which are also visited during the evening or at night, for example (sub-)urban areas, potentially dangerous places or points of interest, to increase visibility and reduce conflicts with motor traffic. Lighting fulfils numerous tasks:

- Increases comfort of cyclists
- Improve traffic flow and safety
- Increases personal security in uncomfortable areas
- Increases the visibility of the bike path and close surroundings.

Motion sensitive lighting

Nature is very sensitive to artificial lighting. Many species use the moon for orientation, as it is the brightest natural object in the night sky. Therefore, lighting along routes in the open country should only be operating when necessary (e.g. at intersections, points of interest, etc.) and with good judgement, so the impact of artificial lighting is kept to a minimum.

For sections that have to be lit, motion sensitive lighting or "eco-dynamic lighting" is an option. LED lights minimize energy consumption, the colour can be adapted to the surrounding and the intensity can be dimmed down. A shutdown during the night hours is also an option. That way fauna is impacted least possible, energy costs are reduced and cyclists safely guarded.

Summary checklist

Chapter: 5.8 *Pages: 58-58*

- Are there any critical intersections in need of lighting?
- Complies lighting with necessities of nature protection?

5.9 Maintenance

Road repair (surfaces, road markings)

Inspect the cycle infrastructure twice a year during the touristic season or in the same intervals as the surrounding network of main roads. The monitoring should include evenness, grip, potholes, cracks etc. Carry out the inspection from the view of a cyclist, so at least one person of the inspection team should ride a bicycle without suspension, thus noticing deficits better.

A hotline (phone or mail) can be established for cyclists to report critical road or surface damages or other faults.

Maintaining the good quality of surface and road markings ensures the acceptance of the facility and thereby its usage (Gwiasda and Forschungsgesellschaft für Straßen- und Verkehrswesen Arbeitsgruppe 2014).

If redirections are necessary for road repairs, it is important to use temporary signage to guide cyclists through or around larger construction sites (see Figure 39). An overview sign is also very helpful to show the scale of the repairs and possible detours.

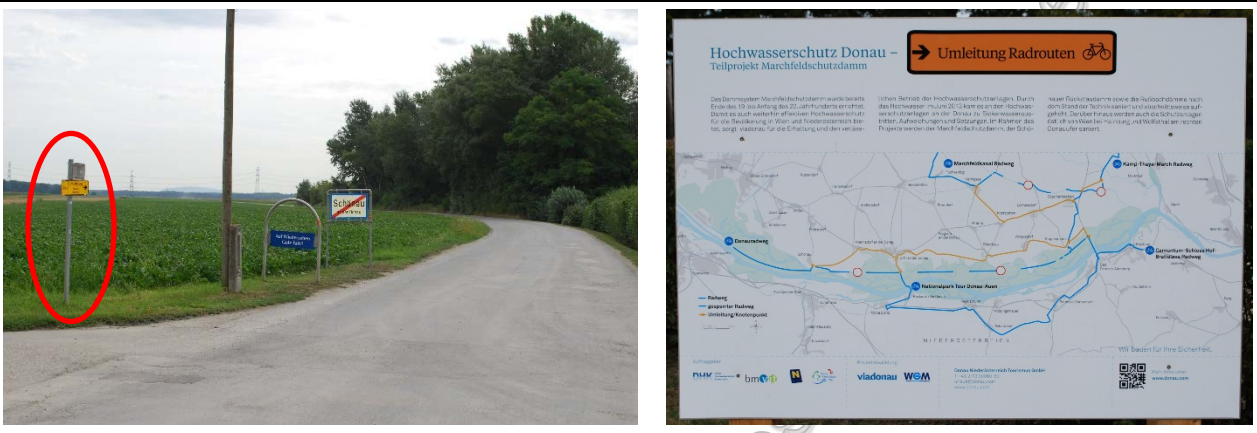

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Figure 39: Examples for redirecting signage during long lasting road repairs.

Cleaning, winter maintenance

Broken glass is the most common reason for a flat tire. Therefore, regular cleaning of cycle infrastructure, especially around shelters and resting places or urban areas with nightlife keeps the environment clean, and cycle tourists safe.

During fall, additional sweeps for fallen leafs and branches should be considered. Winter maintenance can be necessary in urban areas, where local cyclists use the infrastructure for commuting traffic. However, since there is almost no bicycle tourism during winter, snow removal seldom is an issue in bicycle tourism.

Signposting, lighting

For tourists being able to navigate freely, exclusively with the provided signage, is very important. Therefore, keeping route signs up to date and complete is a key criterion for a comfortable ride. In areas known vandalism (e.g. graffiti, tags), regularly check and replace sprayed signs (see Figure 40). Lighting is usually situated at places, where safety is important, like critical intersections or crossing points; also in remote areas to improve security issues. Replacing faulty lightbulbs in time should have a high priority.

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Figure 40: Examples for vandalized signage and lighting.

Sight obstructions, vegetation pruning, shelters and resting places

During the summer months, an additional inspection with the focus on pruning vegetation could be required to keep all signs clear and eliminate sight obstructions.

Shelters or resting places are important pieces of infrastructure for leisure cyclists. During the inspections, basic integrity must be checked (e.g. faulty roofing, structure, completeness of tools etc.). Waste bins have to be emptied at short intervals

Table 16: Maintenance elements, organisation and timing

Must haves	Nice to haves
Two inspections per year during the cycling season	Inspection per bike (cyclists´ point of view)
Surface cleaning (e.g. waste, shards of glass, leaf)	Maintenance hotline to report required action.
Check for and replace missing or unreadable signs	Third inspection during the autumn months
Check for faulty light bulbs	Winter maintenance in urban areas
Inspection of shelters, resting places	
Avoid overflowing waste bins	

Summary checklist

Chapter: 5.9 *Pages: 58-60*

- Are road inspections and maintenance works scheduled per year?
- Who is responsible for pruning shrubs and trees?
- How (often) do you collect the waste along the route?

6 Transport services and intermodality

Transport services include the arrival to and departure from the bicycle trip (both back to the starting point and back home in direct way) with other means of transport than the bicycle, in ecotourism preferably with public transport. During the trip, visitors need additional transport services, e.g. when technical or physical problems occur, to bypass difficult or steep sections of the track or for further pick-up or drop-off services. Check intermodal hubs with regard to suitability for cyclists in order to guarantee the arrival via public transport. A combined range of transport services from various mobility providers leads to increased satisfaction and flexibility for cycling tourists.

***Note**: Cycling tourists, especially those of one-day excursions, mainly use the bike for their arrival (Brimmers 2011). Contrary to this, cyclists who spend several days cycling are more dependent on transport services. However, cyclists have a high sensitivity for sustainable mobility - offers in combination with rail transport, bus shuttle services are becoming increasingly important.*

For this purpose, regional mobility providers must form a network and coordinate among themselves. In co-operation with each other, adequate mobility supply for cycling tourists can be provided. Due to the characteristic one-way trips of bicycle tourists, a secure return from their final point of destination has absolute priority, even more from areas and cities unknown to them. Taking bicycles with you on long-distance trains is becoming increasingly important, especially on the night-trains. Cycle tourists often choose them for a return journey back home. Luggage and bicycle forwarding as well as pick-up services for bicycle tourists ease their arrival and departure. These services are an indispensable component of large intermodal hubs.

***Note**: Where several-day bicycle tours are of significant importance, luggage transport service is particularly relevant. From the perspective of demand, it is important that the service is known, reputable and reliable, easily accessible and ideally combinable with other offer modules.*

The provision of signage services and the provision of safety and emergency services are the most important destination-specific factors, accountable for the satisfaction of a cycling tourist (Lee 2014). Tour operators need to collaborate with local companies to ensure emergency services, if tourists call in case of an emergency. Make emergency hotlines clearly identifiable on the route section for individual bicycle tourists as well, who have not booked with a tour operator. Maybe install communication interfaces (touchable displays) to call for assistance at important points in order to increase the service quality for the cyclist.

Cyclist's needs

The cyclists need other means of transport (such as public transport) for arriving at the starting point, departing from the ending point (or returning to the starting point) or in case the cycle tour has to be stopped, in between. This could be because of the physical overload of cyclists, technical problems with the bicycle or bad weather. We recommend as part of an eco-tourism strategy:

- Clear proposals: How to arrive conveniently at the start of the tour and how to return home or to the starting point?
- Flexibility on the route, availability and confidence in public transport services, demand responsive services, taxi services, etc. (in case the bicycle breaks down, cycling tourist is too exhausted to reach the destination, avoiding hard sections with steep ascents, sections with heavy traffic and missing cycling paths);
- Occasional luggage transport (unattended by the cyclist).

6.1 Modes of public transport

Defined transport modes and services

We categorize travelling with bicycles in long distance and local or regional travels. With consequences for the extent of service expected by tourists. Usually such journeys in coherence with eco-tourism are done by train or if not otherwise possible per bus.

Long distance travel with bicycles

Here, tourists need all the necessary information available before starting the journey. Therefore, make sure the information (e.g. travel conditions, max capacities, pricing, necessary reservations, booking information, etc.) is online accessible. Services like luggage transport from their home to the destination and back home or special offers for travel groups will help to make your region even more attractive.

- **Railway**

Rail service providers (e.g. German DB, Austrian OeBB and Czech CD) handle long distance services and local services differently. Whereas in local services flexibility and spontaneous usage in self-service is the dominant factor, long distance services consider advanced booking and optional transport of bikes as well. In long distance services, such as the Intercity network a reservation for the bicycle is mandatory and can be booked online. The capacity for bicycles is often limited on long distance trains.

A ticking box in the ticketing and information system exists ("Carriage of bicycle - only show connections that allow also transport of bicycles"), which ensures a connection including bike transport.

The Austrian railway OeBB offers luggage transport from home to the desired destination in Germany or Switzerland. This service includes not only suitcases or bags, also the transport bicycles as special luggage.

- **Buses**

For long distance buses, several operators offer bicycle transport, e.g. **Flixbus** (https://www.flixbus.co.uk/discover/cycling). Buses are equipped with bicycle racks, which can carry up to five bikes. In other cases, transporting the bicycles as special baggage is a possibility.

Local/regional travel with bicycles

Transporting a bicycle on local or regional services is more common. Therefore, those service providers provide more space. Local services are used rather spontaneously, compared to long distance services.

- **Railway**

In the local railway transport network, purchasing a day ticket for the bicycle is mandatory, but no pre booking. In some of the regions, a time restriction during peak times on working days exists, where no bicycle transport is possible.

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Figure 41: Examples for bicycle transport on buses and trains.

- **Buses**

Buses operating in local services can be equipped with bicycle racks or trailers for bicycles, if justified by the demand. Examples are the Radtramper lines in the province of Lower Austria, servicing the most popular cycling routes with trailer-equipped buses for bicycles (see https://www.vor.at/mobil/fahrrad-im-vor/, German only). Their webpage shows the most popular routes in the area including an abstract map with the cycling route and the public transport lines (see Figure 42). The capacity of the trailers varies from eight bicycles with an 8-seater minibus, up to 32 bicycles with a standard bus (see Figure 43). They transport E-bikes as well.

© www.vor.at/mobil/fahrrad-im-vor/

Figure 42: Regional bus lines capable of transporting bicycles in lower Austria.

At the Via Claudia Augusta cycling path, you can bypass all six difficult steep road sections by a bus. The "Ötztaler" bus company has a similar service, during the summer months a bicycle transport service is established (see Figure 43). With this service one can transport their bicycles with a valid bus ticket free of charge. For the transport of 5 bicycles at the same time on a marked bicycle bus or for large groups of 15+ persons an advance reservation is absolutely required.

© Joachim Gauster

Figure 43: Examples of a bus shuttle service, bypassing difficult sections of a cycling path.

- **Demand responsive transport**

Demand responsive transport can be shuttle services, bicycle taxies, luggage services, etc. Private local tourism partners, tourism boards or even municipalities can organize these services. Usually they fill in the gaps where public transport is not available.

In the region **Neusiedlersee**, a popular region for cycling tourism, a web page offers links to taxi operators and ferry services crossing the lake Neusiedl. They are carrying bikes and offering luggage transport, including information on location and a link for the contact details. Figure 44 and Figure 45 are examples on how you can present such information.

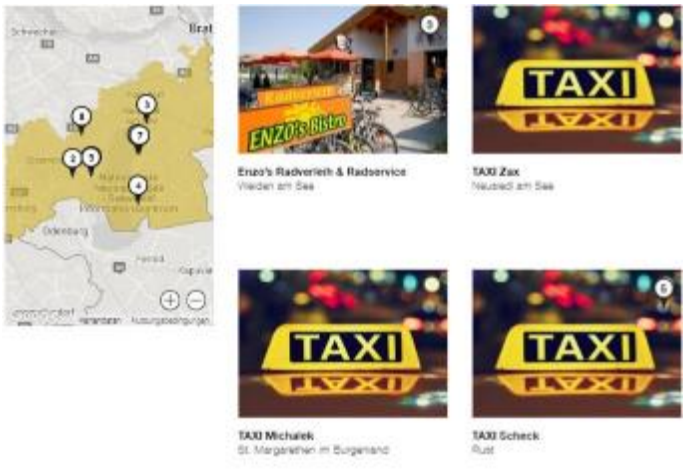

Figure 44: An overview of taxi operators, listed on the tourist information web page. https://www.neusiedlersee.com/de/aktivitaeten/sport-bewegung/radfahren/radverleih-service.html

Figure 45: A ferry service crossing the Danube at the Schlögener Schlinge in Upper Austria.

© OÖ Tourismus/Erber

6.2 Intermodality

Intermodal means to use a combination of transportation modes for a single journey. Therefore, intermodality is an important aspect for a region to offer a sustainable transport chain. Since every mode of transport has its advantages and limits, the combination provides a good solution to avoid unnecessary pollution due to motorized traffic.

Keep in mind, taking your bicycle on holiday per plane or car is per definition intermodal, but it is not a sustainable way of transportation.

Route signage for intermodal nodes

This kind of signage is necessary to guide cyclists to the nearest intermodal hub. Existing signage can also be fitted with an additional sign (e.g. for a train station or bus terminal, etc.).

The **province of Tyrol** published a guideline for bicycle signage (Amt der Tiroler Landesregierung 2017, Amt der Tiroler Landesregierung 2017), the official Austrian guideline RVS 03.02.13 (FSV 2014) also covers this topic. Information on public transport hubs along the route are included (see Figure 46 below).

Provide signage content (depending on the hierarchy):

- Directions and locations with distances
- Information on mode of transport (e.g. train or bus)
- Other route logos for fast navigation
- Additional information (e.g. info points, city centres, border crossings, etc.)

© Amt der Tiroler Landesregierung

© Michael Meschik

Figure 46: Examples of signposts including information on public transport links on cycling route.

6.3 Information and promotion

Information on public transport

All modes of transport (trains, buses, ferryboats) and all companies operating public transport in the area need to be included in the provided information. A search engine for timetables of public transport is very helpful, where on request only public transport connections can be displayed, and also bicycles can be transported as well (optional filter at search engines).

Besides the time tables, complete information, including terms of conditions to carry the bicycle must be available in English and local language for tourists.

Emergency and support telephone numbers

Providing an emergency number (in English) on information boards is very helpful for bicycle tourists in case of an emergency. The emergency does not have to be life threatening; mechanical problems while riding a bike are frustrating and often need on-track support. A helpline for complaints or hints from cyclists to the authority in charge of maintenance can be an effective tool to keep track of the infrastructure conditions.

Possible emergency or support numbers:

- Ambulance, police, fire brigade, nearest hospital
- Mechanics, repair services
- Local tourist information, helpline of the municipality
- Authority in charge of maintenance

© Michael Meschik

Figure 47: Examples of information boards including support telephone number.

Communication interfaces for detailed information and to call for assistance

Offer electronic (touchable) displays for accessing further information and the possibility to get in contact with a service line for further assistance and trouble shooting. These interfaces should be located at strategic points of navigation e.g. in city centres or at intersections of cycling routes. Such interfaces are very useful to help tourists in need, to gather feedback or collect complaints about the infrastructure to improve the provided services of your region.

Promote sustainable transport

Inspire local partners and businesses to address the needs of bicycle tourists and sustainable transport, thereby widening their product offering for new potential customers. This can also lead to increased mobility options within the local community.

Promotion includes providing leaflets and information material with regard to bicycle transport at public transport, and on demand services. Send out this information to potential visitors, distributing it at destinations, accommodations, restaurants, attractions etc. (for the next visit or spontaneous usage).

Information on parking areas for shuttle services and buses

Especially for groups arriving with coaches, providing a parking guidance system (both in the web and on the road) is recommendable.

This simple information helps to avoid unnecessary traffic in city centres and ease the planning upfront. Travel groups will hop on and off the shuttle service at these designated locations, thereby bundling touristic traffic. At these parking areas, tourists can switch to their bicycles and explore the city or region.

One-stop shop experience

The idea of a one-stop-shop is that a potential tourist can purchase a complete tour in a single shop (online or at a service desk). Such a booking includes the whole arrival and departure trip (train, sleeping car, bicycle place reservation, local transport, on demand transport, etc.). A search engine can help to gather alternative offers if available.

Summary checklist

Chapter: 6 *Pages: 61-68*

- What modes of (public or privately organized) transport can a potential tourist use when visiting your region?
- Is the transport of bicycles easily accessible?
- Are there any transport offers you can improve with the help of stakeholders in the transport sector?
- Do you offer special tickets for cycle tourists on public transport?
- How do you promote the use of sustainable transport to cycle tourists?
- Does your signage contain information on intermodal nodes?
- Is a website communicating all the vital information regarding public transport in your region?

7 Bicycle rental schemes

For all visitors not owning a bicycle, or who are not willing to transport their own bicycles to the cycle tour, a renting scheme is necessary, providing them an opportunity to enjoy a bicycle tour. Staffed conventional bicycle rental shops are usually set up at large intermodal hubs or in larger cities to meet the needs of tourists. In order to deal with the possible high demand of rental bikes on the typical one-way trips, a close cooperation between the bike rental providers, the local/regional public transport system and taxi operators, and regional/national destination management organisations is necessary. This could ideally allow picking up and returning the bike at different places, which is of interest especially for tour-cyclists. As an alternative self-service rental-stations without staff can be provided at several points in an area, which also offers the opportunity to pick and return the bicycle at different points.

Cyclists must be confident to get a bike for the planned tour, which means a reservation system is necessary. The cyclists needs to know, where they can pick up and return the bicycles, which equipment and documents are necessary to bring along, etc. (see also Table 17).

Table 17: Bike rental schemes

Must haves	Nice to haves
A reservation system with an option for advanced booking	Online booking scheme
"Emergency telephone line" for trouble shooting or any other support in English language during the tour	Different types of bicycles ,and additional equipment
Defined places, where to pick up and return the bicycle, including operating times	An information platform on the internet with all available renting stations in the region including utilization
Information on options, how to transport the bicycle within the region (e.g. train, bus, taxi)	Options to get the rented bicycles delivered to important starting points
Checklist, what you need to bring with you for renting and the tour itself and what is provided by the operator (e.g. ID-card, saddlebags, drinking bottles)	Short introduction of the bikes (especially for pedelecs)
	Several points along the route, where bicycles can be returned
	Luggage transport/storage by the operator

General requirements for rental bikes:

- Easy handling to rent the bicycle (the handing over process lasts just a couple of minutes)
- Availability and confidence in the rental services. Ideally rental services with electronic registration provide smooth operation and 24/7 return options
- Technical support on the route in case of technical or any other problems
- Different types of bicycles and accessoirs, in over-all good conditions

A common platform summarising different rental operators within a region, is helpful for tourists. Visitor centres or tourism agencies can provide basic information or a list of web links for this platform. Basic information such as the business name, address, the operating time, a telephone number, an email address and a web page of the operator should be provided.

An example of such kind of a platform is **E-biking Styria.** It lists the rental companies for the province of Styria, which are providing e-bikes (see Figure 48 and www.steiermark.com/de/urlaub/natur-und-bewegung/rad-bike/e-bike).

© www.steiermark.com

Figure 48: An overview of e-bike rental operators within the province of Styria.

7.1 Conventional rental bikes

Customers visit a store or rental business and rent a bicycle for a certain duration (e.g. for a day, a few days/weeks). Typically, the rented bike is returned to the same store or company. Cooperating partner can form a network to increase the locations for retouring a rented bike. The rental company can offer additional services like an insurance against theft, technical support during the tour, etc.

Balticbike is an Example for a bicycle rental company, which provides bicycles on the Baltic coast in Germany and Poland (see http://balticbike.pl and https://balticbike.info). This operator provides a web page for booking, including suggestions for bicycle trips in the region. Balticbike delivers bicycles to hotels or one can pick them up at their renting offices. The company offers both e-bikes and conventional bikes. The company operates cross border, meaning, that you can rent bicycles in Poland and return them in Germany or the other way round.

© Roman Klementschitz

Figure 49: Examples of large conventional and e-bike renting depots in Ameland (NL).

7.2 Shared bikes

Shared bicycles (station based or free floating) are usually rented at a terminal, after an online registration with an ID-card and payment via credit card or electronic banking. The pricing is dependent on the duration of use. The chance of getting a faulty bicycle is higher with shared bikes as with rental bikes, since you can test the bicycle at the shop and complain immediately, if necessary.

Station based services

Provide multiple storage stations in a certain area, at which bicycles can be picked up or returned 24/7. Providers need to redistribute bicycles if preferred route patterns appear (e.g. typically downhill or downstream). It is important to avoid empty stations or full stations, where visitors are not able to return the bicycle.

Often the first 30 minutes are for free to encourage locals to use a bicycle for short trips, journeys longer than 30 minutes are charged. Day passes allow unlimited trips (each up to 30 minutes) per day, longer trips are charged. A day pass costs for example 4 € in Antwerp, Belgium; 500 huf (~1.60€) for MOL Bubi bikes in Budapest. In Lower Austria nextbikes offers to rent a bike for a hole day at a cost of 10 €, without additional charges depending the length of a trip.

Example for station based rental bike operators

Usedom Rad is one such operator (http://usedomrad.de), hosting 125 docking stations within the area of the island Usedom (DE) and the mainland. The web page includes an online booking system.

Nextbike is another operator, operating in many European regions, of which one of them is the area surrounding the Neusiedler See (https://www.nextbike.at/de/burgenland/) in the Austrian province of Burgenland as well as the whole province of Lower Austria (including the section of the Danube cycling path). The system operates in the same way as Usedom Rad, a web page and an App for the mobile phone offers online reservation and an overview of docking stations and the availability of bicycles.

© Roman Klementschitz

© www.nextbike.at

Figure 50: Examples of docking stations for bike renting in Germany (left) and some Nextbike stations in Lower Austria (right).

Free-floating services

Provided bicycles are not located at stations, instead they can be parked within a certain area. Via a smartphone application a potential customer, has to register and scan a QR-code on such a bike to unlock it. GPS-tracking is used to gather data (e.g. duration of use, movement profile) and calculate the fees charged on your account.

Providers of free-floating bicycles had many problems with misused and falsely parked bicycles. Free-floating bicycles are for spontaneous use, we do not recommend them for tourism purposes.

OBike and **Ofo-Bike** were some operator of free-floating bicycles in Vienna. After about one year, these providers cancelled their service. Due to vandalism and misuse, the city of Vienna enforced stricter regulations for such companies.

Summary checklist

Chapter: 7 *Pages: 69-72*

- Are there any bicycle rental schemes currently available in your region?
- Do you intent to set up such rental scheme with the help of local stakeholders?
- If yes, which scheme and what kind of bicycles will this include?
- How can a potential tourist get information on how to rent a bicycle?
- Will additional equipment be for rent, too?

8 Accommodation and Gastronomy

Accommodations and gastronomy should assist and complement each other as partners in the bicycle tourism trade. They should recommend the other service respectively and provide appropriate information materials.

For a long time cycling tourism focused only on the availability of good cycling routes and their infrastructure (signposting, resting places etc.), maps and guidebooks. The availability of accommodation and restaurants was not considered of high importance for planning and communication. Poor information in travel guides and maps like, "… here you can stay overnight" was common. Eco-tourism was not addressed with further more detailed information. Meanwhile the importance of accommodation and gastronomy has increased, driven by higher expectations of tourists in general as well as in the segment of cycling tourism. Pre-booking and web-based accommodation platforms are a good basis for booking in advance or to gather information during the trip.

© Ernst Miglbauer

Figure 51: Device for booking a bicycle friendly accommodation at restaurants.

Cyclist's needs

Accommodation and gastronomy are essential for cycling tourism, fulfilling the generic requirements for resting and the demand for eating and drinking. Various types of tourists have different types of accommodations in mind to spend their nights at (e.g. hotels, hostels, guesthouses, inns, camping sites etc.).

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Figure 52: Gastronomy and accommodation should meet the specific requirements of cycling tourists.

Accommodation

From the viewpoint of the customer the following needs are distinctively meaningful for providing of the right offer. Table 18 displays the needs of cycle tourists for the different stages of a bicycle tour. According to ADFC and Travelbike (2018), digital devices are of the highest importance for receiving information during the trip (matching the phases "inspiration, desire" and "on tour", see also chapter 9). Local day-trippers are not of relevance regarding the accommodations along a cycle route, when they start and end their trip at home.

Table 18: Tourist´s needs regarding accommodations

	Tourist with fixed accommodation	Tourist with changing accommodation
Inspiration or desire:	Favour accommodation of higher quality, since staying for more than a night.	Confidence in providers of sufficient accommodation, especially in remote areas new to tourism.
Planning:	Perfect information (print and digital information.); Access to information about cycle-friendly, safe and environmentally friendly facilities; Possibility of rental bikes as an element of high quality accommodations	Complete information (print and digital information); Devices at accommodation for tourists to gather additional online information, to adapt the route during the trip
Starting the tour:	Recommendations and tips for the trip by bike	Recommendations and tips for the next sections of the route resp. the next stage.
During the tour:	Information (print - maps, guides; digital - GPS-tracks, routing apps). Communication concerning the expectations of cyclist friendly and safe facilities.	
Ending the tour:	Possibility for feedback from guests to create a general welcome atmosphere and trigger the desire for future visits and to collect data to further improving your services (recommendation: ask tourists actively).	

In the early period, cycling tourism was widely associated with moderate claims on accommodation with focus on hostels, camping areas and traditional inns. Meanwhile, all types of accommodation businesses are an option for overnight stays for cyclists on tour. Important is, that the accommodations are providing a cycling friendly atmosphere, on their website as well as on site. Alternative accommodations can be sleeping barrels as well as "wagon hotels" on routes along former railway-tracks (Figure 53 shows examples).

© Roman Klementschitz (left), © Camping&Pension Au an der Donau (right)

Figure 53: Examples of extraordinary places to stay overnight along a cycling route (wagon hotel in Waldkirchen an der Thaya, Lower Austria and "sleeping barrels" in Upper Austria).

Providing sufficient accommodation, especially in areas where tourism is evolving, is essential for building up sustainable cycling tourism. The lengths of daily stages ranges on average around 40 to 60 kilometres. It also depends on offers along the route, like for example breaks at special natural sites (nature observations, short meetings with rangers in the national parks, lookout towers etc.) or any other points of interest.

Communicate a lack of accommodation to your guests. So they can consider this information into their trip planning. Specifying the location of accommodations by distance on signposting is important. Cyclists as well as many other guests enjoy quiet nights away from busy roads. Overnight stays in quiet areas amidst nature are an advantage of locations in remote areas.

Gastronomy

This part of service does not differentiate between the three listed types of cycling guests. Important needs to be fulfilled by gastronomy are:

- Inspiration and desire: confidence in sufficient providers of gastronomy along the route, especially in remote areas new to tourism,
- Planning: information (printed information - maps, guides etc.; digital information - fixed devices at restaurants/bars/buffets and for mobile devices); information concerning kitchens - serving warm meals all-day, regional cuisine and specialities,
- Cycling on tour / tour breaks: serving-all-day kitchen, regional cuisine and specialities; safe parking of the bicycles (ideally seen from the table); charging facilities for e-bikes; recommendations and tips for the next sections,
- While local day-trippers rather call for quick lunches, cyclists staying overnight enjoy abundant breakfasts; also dinners accompanied by wine tasting etc. are a chance to present local cuisine.

8.1 Accommodation

Apart from the accommodation itself, lodging providers can offer a wide range of cyclist-friendly equipment and specific services, in order to increase the attractiveness of their "product" for cycling tourists. Many of these services are indispensable for cyclists to ensure satisfactory and speedy progress on their journey. The listed criteria below are particularly important for certified cycling-friendly accommodations (Bundesministerium für Wirtschaft und Technologie 2009). Similar criteria are applicable for "Bett+Bike" certification (www.bettundbike.de/en). The catchphrases listed in **Table 19** are described in detail below the table.

Table 19: Must and nice to haves for accommodations

Must haves	Nice to haves
Acceptance of single overnight stays	Information and proposals for bike tours
Safe storage of bikes over night	(E-)bike rental
Drying facilities for wet clothes (drying room, drying service)	Cooperation with bicycle shops
Healthy breakfast	Regional cuisine
Provision of a basic repair kit	Luggage transfer
Battery charging facilities	Cooperation among accommodations
Competent information on routes	Weather information
Free Wi-Fi	Lunch packs for guests
Environmental friendly arrival and departure	Pick-up and delivery service
	Provision of spare parts
	Provision/sale of information materials
	Facilities for bike cleaning

Acceptance of single overnight stays

For guests who spend every night in a different accommodation, this criterion is very important to build up trust. These touring cyclists are predominant riding on (long distance) routes, for example along the Danube cycling path. In general, the flexibility of accommodation business concerning the acceptance of "only-one-night-guests" has increased in the last 20 years, also driven by generally declining durations of stays. Still, some accommodations will not accept guests spending only one night. The local tourism agency can provide a list of accommodations, which accept overnight stays (this will also raise awareness on this issue to other owners of accommodations). Of course, this criterion is of no importance to guests with a fixed accommodation for several days or nights.

Safe storage of bicycles over night

This criterion is very important for all cycling guests. Tourists want their expensive bikes safely stored. Allow storing bicycles on site without an extra fee. Attempts to ignore the fact of lacking quality by the argument "this is a very unspoilt region, nothing will be stolen" will not convince cycling guests to spend the night there.

Quality of safe storage facilities means:

- Roofed room with easy but restricted access,
- Equipped with simple facilities for indoor-parking of the bicycles,
- Lockable in the best case only with one key kept at the reception,
- Signposting the access to the storage room similar as for other service rooms like sauna, pool etc.

The visibility of storage rooms will strengthen the perception as a cycling friendly accommodation. Camping areas should offer safe and lockable parking facilities as well.

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Figure 54: Examples of bike storages at accommodations.

Drying facilities for wet clothes (drying room, drying service)

Providing a boiler room with a clotheshorse or some clotheslines for wet clothes and equipment is also essential for a cyclist friendly accommodation. Further services can be clothes dryer or drying services, maybe in connection with laundry facilities and cleaning services.

Healthy breakfast

The breakfast is very important before starting a bicycle tour. Serve it in the form of a buffet or traditional, by service. Breakfast is an opportunity to provide regional products and ingredients from local production (cheese, eggs, home baked bread, meat, homemade jams, honey, fruit and juices etc.).

Cooking facilities in apartments with no offered breakfast service will fulfil the criterion as well when it is possible to buy groceries around the corner.

Provision of a basic repair kit

To fix small technical problems (e.g. tighten screws, changing tubes or chains), essential repair-tools should be present at accommodations. This minimal equipment cannot substitute professional repair services of bicycle workshops. The best solution is a tool kit in form of a box, which allows the check of the completeness at a glance. Furthermore, a functioning bicycle pump is also a big help.

© Ernst Miglbauer

Figure 55: Example of a repair tool kit.

Provision of spare parts

The availability of certain spare parts / wearing parts makes sense for hotels, camping areas or guesthouses in rural areas with no repair shop nearby. Cooperate with bike shops to choose the selection of spare parts for guests (e.g. like bicycle tubes, brake cables etc.).

© Ernst Miglbauer

Figure 56: Spare parts depot for cyclists.

Cooperation with bicycle shops

The repair of serious problems (broken spokes, problems with bottom bracket or gearshift etc.) demands professional help. Therefore, a cooperation with a reliable bike shop or repair service nearby, maybe with an emergency service on call will contribute to build the trust of cycling guests ("anything can happen, we offer a solution 24/7"). Some cycling routes offer mobile repair services at certain sections. In that case direct guests to such places or display a telephone number for emergencies at information boards along the route. 24/7 emergency services are utilised by cyclists in distress only a handful of times per year but they are an important top seller in bicycle tourism.

Battery charging facilities

Meanwhile, pedelecs are widely spread in all different segments of cycling tourism. Therefore, offering charging facilities is essential for a cyclist friendly accommodation. It will be sufficient to provide a power strip. Framing with certain matching design elements will contribute to the perception of a bike friendly accommodation. Power supply by means of solar cells underlines an ecologically friendly approach of the host.

Free Wi-Fi

Free access to internet in hotels, guesthouses and on camping sites has become a must-have in the last five years as it provides important information sources and contact to beloved-ones at home. Communicate possible deficits of net coverage in remote areas on the website, for potential tourists to keep it in mind during the tour. Thus, preventing frustration with guests. Internet access also allows the upload of positive travelogues and pictures as appetizers for future guests.

Provision/sale of information materials

Offering brochures, folders and maps, free or for sale, is a standard with accommodations. Information on local/regional amenities, excursions, destinations and on public transport should appetize for must-see- or must-go-to sites (viewpoints, offer of guided tours etc.). However, it does not substitute personal tips and advice from hosts to guests.

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Figure 57: Information and free maps at accommodations.

Competent information on routes

Beyond the huge availability of digital information (for mobile devices and fixed devices at accommodations), personal communication from host to the guests is still very important and will not lose its importance in the future. Cycling guests appreciate tour proposals or being given advice and tips for the next sections (e.g. quality of the route, viewpoints, must-see attractions, picnic areas, natural bathing places etc.). The demand for GPS-tour-data is also increasing.

Environmental friendly arrival and departure

Arrival and departure by train or by bus is a key element of eco-tourism, especially on long-distance cycling tours. Information how to close the mobility chain is necessary. It is easy to query schedules for train and bus lines as well as transport conditions for bikes on public transport in internet portals and apps. However, it demonstrates a welcome atmosphere, when the accommodation offers information to essential questions:

- Number of train / bus connections per day,
- Transport facilities,
- Fares,
- Booking options etc.

It is not necessary to know exactly the schedules of train and bus lines, but to know, where to get this information. The regional tourism management can prepare the basic information.

Information and proposals on bike tours

Owners of accommodations could offer (guided) bicycle tours for their guests or cooperate with local bicycle tour operators. In the first case a training course should be attended, informing on how to guide a tourist group (responsibilities, risk avoiding, first aid, languages, etc.) and how to plan such excursions (length of tour, what to see, what to visit, what to avoid). Chambers of commerce or outdoor tour operators themselves may offer such courses in cooperation with bicycle tourism experts.

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Figure 58: Example for access to personal information at the reception.

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Figure 59: Offer on a guided bicycle tour for guests.

Bike rental

High quality hotels and guesthouses often offer bikes and e-bikes for rent to address longer staying guests. Sited in natural areas they can contribute to the regional eco-tourism profile. Bike rental is possible in cooperation with a professional rental service nearby as well. The hotel or guesthouse should handle the reservation, operation and payment of the rental bikes, in order to create the sense of a one-stop-shop.

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Figure 60: Information on e-bike renting at the accommodation

Offer cyclists new to e-bikes an introduction into riding and proper handling of this new kind of bike. See also chapter 7.

Luggage transfer

Meanwhile cyclists often enjoy the quality of luggage transport by tour operators between accommodations. Most groups use this offer on long distance tours, depending on the guest segment. By booking and payment at the reception, the hotel or guesthouse as well can provide such a service in cooperation with a transport or shuttle service.

© Ernst Miglbauer

Figure 61: Luggage transfer offered by hosts

Cooperation among accommodations

See a cycle friendly accommodation as one provider among others in a network with the common goal to attract cyclists. Good cooperation among the providers (including reservations) pays off itself in mutual recommendation to cycling guests.

Weather information

Cyclists expose themselves to the weather conditions on longer routes to a certain extent. Rural or mountainous areas reduce the flexibility to evade bad weather conditions. Therefore, cycling guests appreciate reliable weather information at the reception as taking good care before starting the tour.

Lunch packs for guests

Cyclists like to take a lunch package for the day tour. Often hotels and guesthouses offer putting it together from the breakfast buffet, chosen by the guests. Especially on long distance trips, cyclists leave sometimes early in the morning before breakfast. Offer lunch packages, by preparing them in the evening before, like for the pilgrims on their routes. These services are especially important, when gastronomic offers along the route are scarce.

Pick-up and delivery service

Bigger hotels sometimes offer own services for the transportation of cycling guests with minibuses. Most of them are suitable for transporting a few guests with their bikes plus luggage and allow to pick up cyclists in emergency or in case of a breakdown. Concession for the transport of persons is mandatory in many countries; sometimes the rules for transporting own guest are more flexible. Providing this service in cooperation with a professional transport or shuttle service is an option.

Facilities for bike cleaning

Returning back from tours through natural landscapes, nature parks and vineyards on rainy days means dirty bicycles and equipment with all inconveniences. Therefore, cycling guests appreciate facilities to wash and clean their bicycles at the accommodation.

A simple garden hose, a brush and cleaning cloths will suffice.

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Figure 62: A bicycle cleaning facility.

8.2 Gastronomy

The gastronomy is an important factor for all cyclists, especially for tourists, as most take lunch breaks to enjoy regional cuisine and rest some time before the afternoon tour section. Since tourists stay at such locations for only a few hours at most, the service requirements are not as ambitious as for accommodations.

Nonetheless, they are important for the decision making process of bicycle tourists. Table 20 offers an overview of the most relevant qualities.

Table 20: Must and nice to haves for the gastronomy

Must haves	Nice to haves
Safe parking	Charging facilities for e-bikes
Regional cuisine	Beverages for cyclists
Offering at least one warm meal during the opening hours	Repair tools, free to use

Safe parking

In comparison with hotels and guest houses safe parking at restaurants, inns and snack bars is a bigger challenge, because parking usually takes place outside and not inside the house. The best location of the parking facilities is in direct view from the restaurant tables inside or outside. If not possible, provide parking inside the courtyard of the inn together with a signpost. Quality bicycle stands are necessary to fulfil the expectations of safe parking. Secure bicycles against theft with quality locks, which include the bicycle frame and the bracket of the bicycle stand. Some restaurants may offer quality locks for their guests.

Regional cuisine

Cycling tourists very much appreciate regional dishes. These offers using regional products are able to sharpen the eco-tourism profile of the region at the same time. Organic meats, cheese, bread, flour, honey, wines, beer or special juices are classic ingredients of regional cuisine. Trips to short visits of some of the regional producers (farms, grain mills, wine growers, breweries etc.) can enrich the ecological aspects of the bike tour resp. daily tour.

© WGD Donau Oberösterreich Tourismus GmbH-Peter Podpera

Figure 63: Example for regional food and drinks.

Offering at least one warm meal during the opening hours

Cyclists appreciate a hot meal all day long, especially in remote areas with few gastronomic businesses. Two or three small local dishes, with a vegetarian option will be sufficient.

Charging facilities for e-bikes

Parking facilities for bikes can be easily equipped with sockets or a power strip for charging the e-bikes. As some examples show, this offer will attract guests, because they use the time for charging the battery for taking lunch or a drink. Framing it with matching design elements, it will contribute to the bike friendly perception of the location.

Beverages for cyclists

Drinks should be tailored to the needs of bicycle tourists (e.g. fruit juice, mineral water, fruit or herbal teas, etc.). The price should be below those of alcoholic beverages. Cyclists often order non-alcoholic beer or "Radler" (a mixture of beer and lemonade).

Repair tools, free to use

Free-to use bicycle repair sets with tools should be provides for simple repair and maintenance work. This will only allow the repair of small problems like tighten screws, fixing flat tires and inflating tires, oiling the chain.

Summary checklist

Chapter: 8 *Pages: 73-84*

- Do your accommodations and gastronomy have safe bicycle parking lots?
- Do they allow single overnight stays?
- Do they have sufficient options for an athlete's breakfast?
- Do they offer a drying room?
- Do they offer a basic repair set?
- Is there information regarding bicycle tours form the surrounding area available?
- Are any activities aside from cycling available?
- Do they offer warm meals during their opening hours?
- Are they presenting regional cuisine?

9 Information, communication and marketing

The goal of tourism marketing is to present touristic services and products on the market, and make them visible. Their providers can be hotels and restaurants, tourism destinations, tour operators or museums, individually or together. The term "marketing" is a widely used term in tourism, but very often based on different understandings. Usually marketing in tourism includes the following instruments:

- Offers and product descriptions
- Pricing
- Sales and distribution: individually self-directed or in cooperation with regional incoming agencies or external tour operators;
- Communication: information via manifold media channels, print or digital (websites, apps, social media), presentations (tourism fairs, special interest events etc.) testimonials;
- Market research and quality management (guest surveys, guest feedback).

Cooperative marketing among the actors along cycling routes is very specific for cycling tourism. This brings synergy effects for small enterprises, where – for example – a coordinated website offers good quality and reduces effort. Long distance routes often cross borders of tourism region or countries. Therefore, it is required to build a cooperation for transnational development to communicate and distribute products and offers throughout the catchment area of the route.

Local/regional tourism offices can distribute their offers and products self-organised, or in cooperation with external partners (e.g. tour operators, tourism boards). This requires qualitative printing material and digital communication (cycling appealing website etc.).

Cyclist's needs

Information and marketing should give answers to the needs of the cyclists, before and during the whole journey:

- **Inspiration and desire**

  Somehow, you have to create the desire of potential guests. Relevant channels for advertising are:

  - Travel pages in newspapers,
  - Television and social media (Instagram, blogs, website etc.),
  - Word-of-mouth advertising of friends from their bike tour after returning home.

  That means above all, holidays in your region ideally leave inspiring stories and emotional images in your customer's mind.

- **Information, planning and booking**

  After the emotional phase of inspiration, the rational phase of planning follows. Questions are of high relevance concerning:

  - The length of the cycling tour,
  - Modes of arrival and departure,
  - Availability of hotels, guesthouses or camping sites,
  - Access to natural sites and cultural attractions etc.

  Following inspiration, digital information is of the utmost importance when planning a bicycle tour. According to ADFC and Travelbike (2018) increasing proportions of currently 86 % use the internet to search for information, about 50% use print media like folders, brochures and maps (additionally). This requires that the available information is well prepared. Online booking platforms should provide a list with cyclist friendly accommodations. Alternatively, cooperate with existing platforms by integrating the filter criteria "bicycle tourist friendly" in the search routines.

- **Arriving**

  Easy access to the cycling route resp. to the accommodation by train, bus or bike requires both signposting (parking, railway and bus stations) and its digital presence (apps, websites of transport services etc.).

- **Starting the cycling tour**

  Guests appreciate recommendations and tips for the next sections of the route. Make information available (e.g. touristic information, digital maps, route books, stories concerning attractive points of interest along the route etc.)

- **Experiencing the cycling tour**

  According to ADFC and Travelbike (2018) accurate signposting is of highest importance for safe cycling along the route (74 %), followed by maps (60 %) and digital information (50 %).

- **Ending the cycling tour**

  This is the window of opportunity for active communication between hosts and guests to fetch feedback regarding the quality of the route and services. This creates a welcoming atmosphere and triggers the desire for coming back another time. Word of mouth is a key element especially within social media and digital recommendations (e.g. on trip advisor).

Certified bicycle-friendly quality

Assess the required qualities of your offers and products (of the route resp. sub sections and the touristic services) to get a certification:

- the route, its sections with infrastructure (incl. intermodality),
- accommodations,
- restaurants,
- attractions (e.g. museums or natural sites (individually or with guides),
- etc.

The key question is if you can fulfil what was promised by the offer respectively the product? How can you achieve to experience nature and ecology on the bike tour?

9.1 Offers and products

Tourism uses the terms **"offers"** and **"products"** commonly. Often used with unclear and different implications. The **understanding** of these terms in these guidelines will be starting with the term "cycling route" as a collective term for connections with different qualities like bicycle path (defined quality according building regulations), signposted connections on public or rural roads.

- **Cycling tourism offers:**

  Cycling routes provide lots of different "offers" for the tourists. Responsible are the tourism stakeholders (hotels, camping sites, restaurants etc.), mobility services (train, bus, shuttle), guides (natural and cultural sites) etc. often without defined agreements with each other. Information for organising a tour (in print and digital media) is normally provided by the local/regional tourism destination. The usage/purchase of an offer is basically done on own initiative by the cycling tourist resp. group leader.

- **Cycling tourism product:**

  In contrast to cycling tourism offers, a product is organised resp. packaged by incoming operators, hotels or guesthouses, tour operators. The essential difference to offers is the contracted agreement among the stakeholders for providing a clearly defined package of services (number of overnight stays, guidance services, transport services etc.) at a defined price. Products can be flexible in modules, clients can combine several offers to their own specific products.

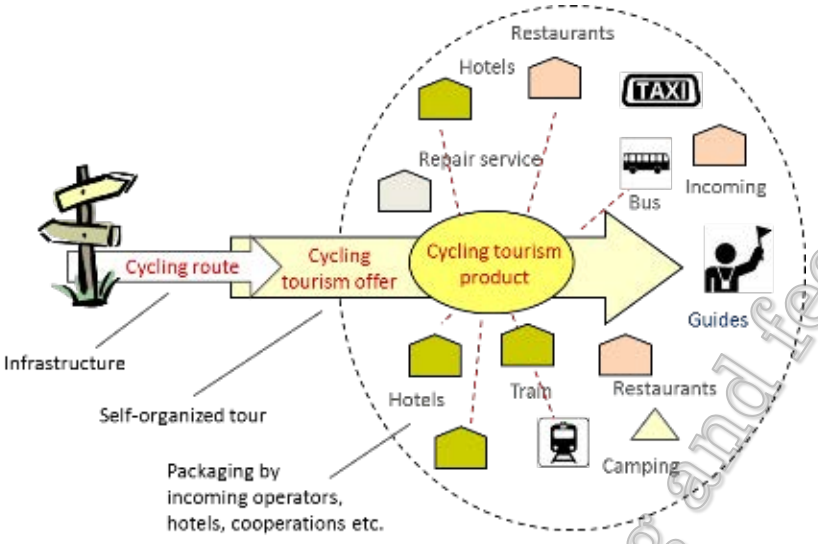

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Figure 64: Stakeholders of cycling tourism.

For the three defined segments of cycling guests different offers/products are of relevance:

- Cyclist day trippers: only one day, without overnight stay;
- Cyclists with fixed accommodation
- Cyclists with changing accommodation

Developing offers and products as basis for communication, distribution and sales has to start with the assessment of the potential offer-product-market-combinations (see Table 21 below). It can be done by reflecting existing demand for cycling in the region, by contact with competent partners as regional incoming agencies or by contacts with external partners like tour operators or special interest operators.

Table 21: Offer-/Product-Market-Combinations

Strengths of cycling routes for offers and products	Day trip	Fixed Accom.	Changing Accom.
Cycling routes/regions addressing the key needs of the cycling guests– nature and landscape etc.	++	++	++
Cycling routes/regions are established in the market and widely perceived as a must-go-there-route	-	+	++
Cycling routes/networks with easy access including the availability of intermodal transport services	++	+	++
Relevant catchment area including good accessibility	++	+	-
Prosperity and purchase power of nearby markets for cycling tourism	++	+	-
Cycling routes - safe and aside from motorised traffic	++	++	+
Experience of natural attractions	++	++	+

- not relevant / + relevant / ++ highly relevant

Marketing has to start with reflections on the question:

- Who are the potential guest groups?
- Which offers and products address potential guest groups on the cycle route?
- What are the unique selling points/highlights?

Not every cycling guest can be attracted. It is required to have a look at the **potential number of guests** by **regarding certain conditions**:

- Cycling routes/regions best possibly address the key needs of the guests: experience of nature and landscape, rivers and lakes, must-see attractions (e.g. castles, cities or points of view).
- Introduce cycling routes/regions with good sounding names on the market to be widely perceived as a must-go-route, possibly also in sections. Keep routes on the "mental map" of the potential guests.
- Cycling routes/networks with easy access in combination with (public) transport services (one direction by bicycle, back to the starting point with scheduled transport by train or buses).
- Relevant Catchment Area: Distance between cycling route resp. region and residential area of the guests.
- Prosperity and purchase power of residential areas (urban areas host bigger guest potentials for cycling tourism).

A distinction according prevailing interests is of relevance:

- Cycling routes - safe and free of motorised traffic: Families as well as seniors prefer safe cycling routes for spending time for sharing common experiences, experience conviviality, without having to pay attention to the traffic; cycling routes in nature areas or on former railway tracks are therefore very attractive;
- Experience of natural attractions: cycling routes in nature areas are often away from noisy traffic; national parks, nature parks or biosphere reserves often offer networks of "nature routes" with special offers for nature-oriented cyclists (viewing and watching platforms, picnic and natural bathing areas etc.); relevant for potentials of guests are special interest associations (e.g. nature associations) as well.

9.2 Proposed marketing strategies

After you have already worked out your offers and products, know you need to communicate them to your target groups. As the "Radreiseanalyse" (ADFC and Travelbike 2018) clearly states, most information for bicycle tours is gathered online. Therefore, a strong online presence is necessary with information posted from simple websites to social media (e.g. Instagram and Facebook). Stories told by tourists who visited a cycle path in your region are worth sharing and implementing in your marketing, as they provide first hand experiences.

Do not neglect print and offline media, they are an important aspect to complete the information found online. Table 22 contains the most vital aspects for marketing strategies.

Table 22: Must and nice to haves to reach your target group successfully

Must haves	Nice to haves
Cooperation with cycling tour operators	Online booking platform
Use various communication channels	Press contacts and travel blogs
Use inspiring images	Attend fairs (e.g. holiday, cycling, etc.)
Amplify word of mouth	

Cooperation with cycling tour operators

In general, there are three types of cycling tour operators providing their core business:

- Cycling tour operators with focus on long distance routes: at least 200 kilometres, 5-8 days including provision of bicycles, well introduced in the market;
- Special interest tour operators with focus on: culture, natural and ecological trips etc.; duration of journeys between some days up to one week, often in cooperation with special interest associations;
- Traditional tour operators with cycling tours as a special segment: transport by coach and bike trailer; programmes including day-trips as well as tours of a full week with cycling on beautiful routes of the visited region;

Provision of good attuned accommodation and transport of luggage on long distance cycling trips are one of their basic services. To become a partner of cycling tour operators the cycling route resp. cycling region has to match their offer-demand-combinations.

© Rad+Reisen, www.radreisen.at

Figure 65: Example of a tour operator providing cycling tours in the region of the Danube delta.

Use various communication channels

Try to use whatever is available, print, television, digital, social media, blogs, etc.

- **Inspiring articles and presentations in print media**

  Articles in print media as travel pages in newspapers, journey reports in magazines etc. can strengthen the desire to realise a certain cycling tour. This is even more relevant for certain special interest groups, for example associations committed to natural protected areas, eco-tourism or educational trips. For members of these special interest groups reports in social media like in blogs are also of high relevance. That means it is important to win media partners for reports by actively

offering them novelties, new products of the cycling path area. Providing images of good quality is very essential for communicating a convincing story.

- **Digital Information – Website, Apps**

  Digital information is of highest importance for planning a cycling tour or a cycling holiday as mentioned above. It has to be presented at the right time in late winter or early spring, when planning becomes virulent. Digital information includes description of routes (length, short briefing on potential problematic sections such as slopes, motorized traffic etc.). Suggestions for stages, stops, attractions or information about cycling friendly accommodation and restaurants, arrival and departure by train and bus, links to their timetables, shuttle services are very helpful for cyclists. Tourist destinations should operate the corresponding websites. To provide digital information by apps, it is useful to look for well-established partners, whose apps are already well present on the market.

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Figure 66: Examples of print and digital communication.

- **Blogs and social media**

  In order to access members of special interest groups, social media like blogs are of high relevance as well. That means winning media partners, bloggers and influencers for reporting in their channels by introducing novelties, new products of the cycling route region and their offers and products. As a first step, it has to start with getting an overview of relevant blogs well introduced in the right social networks or markets. To create an own blog or channel does not always make sense (do not underestimate the resources needed to maintain the channel and to access the followers in real time).

Use inspiring images

Pictures meet the needs and desires of potential guests more quickly than text messages. They raise their awareness of a destination and trigger the motivation for a visit. Therefore, emotional and inspiring images to the variety of nature and landscape along

the routes, its accommodations with regional ambience, are very essential for the quality in marketing. Cycling tour operators as well as media invest a lot in high quality images for marketing.

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Figure 67: Examples of emotional images used in blogs and print media.

Amplifying word of mouth

Despite all the changes in communication in tourism, word of mouth has never lost its importance, even in times of the internet. Tourism products are very sensitive, as nobody wants to return from the holidays with disappointed illusions. Therefore, trust in information is important and personal communication among friends and relatives is of high importance to spark desire. To influence this instrument, experience of high quality, a welcoming atmosphere and cycling friendly ambience is the best source for initiating and amplifying the word of mouth. According to ADFC and Travelbike (2018), reports and recommendations of friends trigger 66 % of all daytrips, 87 % of the cycling tourists tell their friends about their experiences. You cannot influence word-of-mouth directly by the supply side, but trigger it indirectly by good quality.

Important strategies are:

- Fulfil the promises that were drawn by destination,
- Get feedback before guests are leaving the region or accommodation,
- Follow-up e-mail contacts with suggestions for reasons to come back a second time, or offer to forward materials for friends and relatives.
- Motivate digital recommendations (trip advisor, social media channels etc.)

Online booking platform

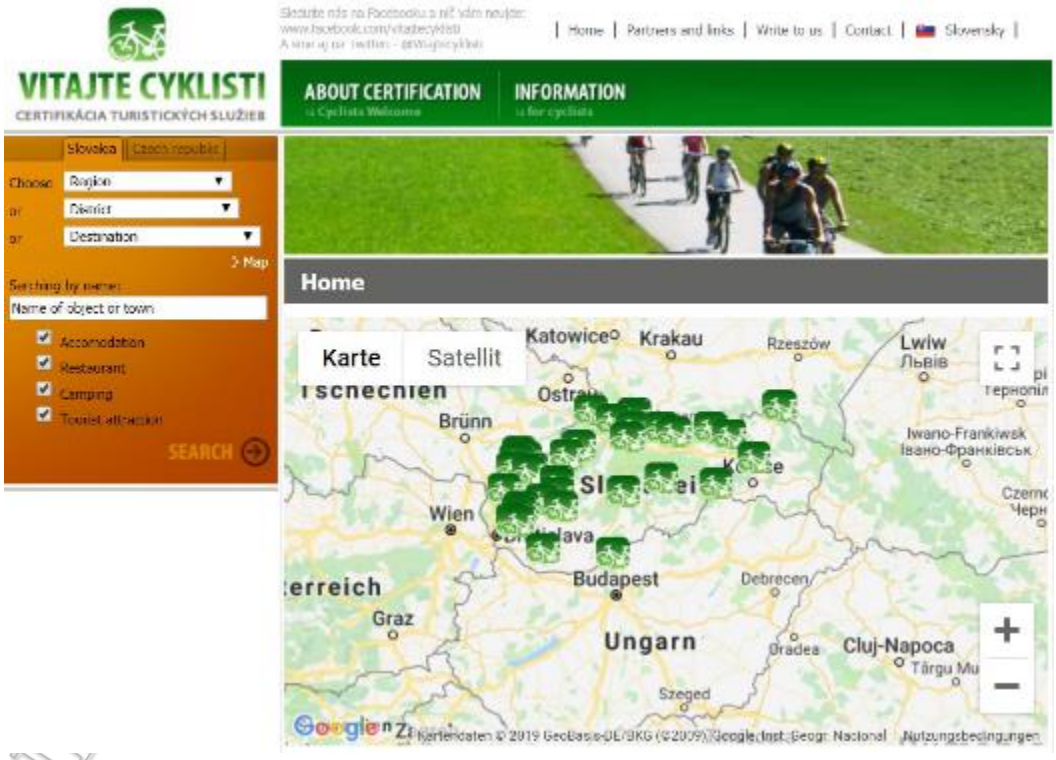
The online booking platform for bicycle tourists should list cyclist-friendly accommodations and other facilities like gastronomy. For bicycle tourists, who travel for more than one day as either touring or staying at a fixed location, an online booking platform can assist their travel planning. Accommodations highlighted on such online platforms need to fulfil specific bicycle-friendly criteria. The verification of the fulfilment requires a certification process, carried out by a certifying organisation.

One example of such a booking platform is www.vitajtecyklisti.sk.

Accommodations listed in this platform need to fulfil all the mandatory criteria plus at least three of the additional criteria (listed in Table 23 below).

Table 23: Example: Criteria for bicycle-friendly accommodations on Vitajte Cyklisti

Mandatory criteria	Additional criteria
Lodging possibility for one night	Securing luggage transportation for cyclists
Low fat and re-energizing breakfast menu (yogurt, cereals, fruit, etc.)	Possibility to rent quality bicycles or its mediation
First-aid kit	Possibility to buy lunch boxes
Basic tools for bicycle repairs	Rental or sale of basic bicycle spare parts
Possibility to wash your bicycle with the offer of corresponding equipment	Sale of cycling and tourist maps of the area
Possibility to wash and dry your clothes and equipment	A list and descriptions of recommended one day bicycle trips in the area
Displayed certificate	Information material in foreign languages
Information panel Cyclist Welcome! with updates and information about services for cyclists	Reservation service of accommodation in other establishments offering services for cyclists
	Internet access (own computer is not necessary)
	A list of accommodation possibilities for cyclists in the area



© www.vitajtecyklisti.sk

Figure 68: Example of a booking platform for bicycle friendly accommodations in Slovakia.

Press contacts and travel blogs

Attracting media-partners like journalists and professional bloggers for presenting cycling routes and cycling touristic offers is helpful in accompanying the marketing measures. Coverage has to offer interesting aspects of novelty for the travel pages of journals, special interest magazines and blogs according their profile. Try to prepare tailor made information and try to get direct contact with the responsible authors instead of sending out an unspecified press release.

Attending fairs

Tourism fairs or special cycling tourism fairs (e.g. ADFC cycling fairs - Germany, fiets en wandelbeurs - Netherlands and Belgium etc.) offer a good opportunity to convey inspiration to potential cycling guests, to provide information on details through face to face contacts with representatives from the tourism destinations. Accompany presentations at fairs with press articles and information on other communication channels.

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Figure 69: Cycle fair in the Netherlands.

Summary checklist

Chapter: 9 *Pages: 85-94*

- Is your region present with a website in several languages?
- Do you cooperate with tour operators?
- Does your region have any bicycle-friendly certifications in use?
- Do you provide regional touristic information tailored for your target groups?

10 Measuring bicycle based eco-tourism

As already mentioned in chapter 4, the conservation of nature is much easier and successful, when connected with eco-business opportunities. The development of the eco-tourism along the Danube EuroVelo 6, for example in the Austrian region "Wachau", has shown that bicycle tourists actually choose this route for the natural beauty and cultural heritage. Here local businesses and the chamber of commerce have learned over 20 years, that the most important assets for tourism – which is one of the most profitable economic branches – are well maintained nature and retained cultural heritage. Local businesses in the Wachau region exploit the regional apricot in all possible forms, organize tours to watch the trees blossoming etc., connecting and presenting skilfully apricot products with other local produce in the historical background of the region. All economic stakeholders carefully develop this economical sound eco-tourism concept to optimize the positive effects both on nature and local incomes and business opportunities.

Counting cyclists is indispensable, to monitor over time the successful implementation of cycling-friendly infrastructure, facilities and measures. In the case of measures from ecosystem service (ESS) based eco-tourism, this can range from the development of a new ESS in the cycling infrastructure or greenways (or vice versa) to the collective implementation of a strategy based on measure bundles and ESS-based tourism concepts. The number of cyclists counted on a track section or in an accommodation can serve as an indicator of the popularity of implemented measures. For the local economy, implementation planners, local and regional authorities, providers of tourism services within the framework of eco-based cycle tourism, information on cycling traffic volume is therefore an essential source of information. For additional information, e.g. on the mobility and spending behaviour of tourists, surveys of cyclists and cycle tourists can also be conducted. Further information on cyclist monitoring can be found on the EuroVelo Guidance on usage monitoring (Bodor, Lancaster et al. 2014) published by the ECF.

The successful implementation of eco-tourism is therefore based on two monitoring tools:

- Permanent counts of cyclists and
- Surveys of eco-tourism (cyclists).

10.1 Counting bicycle traffic

Introduction

Measurements of the traffic volumes of cyclists per time unit (hour, day, month or year) are an important basis for the evaluation of measures. The data, which should be collected as regularly as possible – ideally permanently –, serve to monitor success and are also an indicator of the economic benefit to be expected from planned and implied measures in cycle-based tourism.

Quantitative measurements are carried out in the form of continuous counts of cycle traffic at specific cross-sectional points. Continuous measurements over a longer period describe the quantitative development of cycle traffic on the cycle path. The process of data collection and analysis is carried out according to the following scheme (https://www.eco-compteur.com/en/applications/bicycle-tourism):

Collect and understand your data

Conduct your measurements in a defined cross-section of a route, coordinated with other counting points. The aim should be to carry out measurements in the entire strategic network. Subsequently, identifying peaks (by hour, day, week or season) helps to roughly map the behaviour of cyclists around a certain cross-section and the demand (the popularity at peak times). In addition to the cyclist counting data, data about the weather should be included in the time course, as temperature, wind and precipitation have a significant impact on cycling behaviour. Rain, especially in the morning can shoo away day-trippers completely, whereas cyclists on a longer tour have to ride on, to reach the next booked accommodation. With continuing counting time, the recorded stream of data allows the assessment of trends. The measuring equipment must be regularly calibrated in order to avoid typical measuring errors and to be able to record the traffic volume as accurately as possible.

Observe and interpret your data

The evaluation of cycle tourism-based measures based on the collected data must be carried out as an in-depth data analysis: the volume of bicycle traffic and its patterns must be understood as a function of season, time and weather. This way you can derive trends in cyclist's volume from the data.

Assess and Communicate

The data collected should be subject to contextual analysis and compared with other important regional indicators (hotel beds and overnight stays, ESS-based admissions and other tourism-relevant counts). Finally, publish the results in order to give stakeholders the opportunity to interpret the trends, derive necessary steps on new measures and to quantify economic impact. Key attendance figures should be published on a public website.

Arrangement of counting points

Chose the arrangement of the counting points from a strategic point of view. On the one hand, a location that describes bicycle traffic in the planning area as completely as possible, and on the other hand, counting points should provide counting value as accurate and unbiased as possible. This is especially important if you measure other parameters such as speed in addition to the number of cyclists. Consider the following conditions when arranging counting points:

- They should be able to count and distinguish traffic in both directions,
- They should be placed preferably in sections with no longitudinal incline (if you want to measure unaffected cyclists speed)
- They should be placed in uninterrupted sections where "all cyclists" have to pass (there are no alternative routes available).
- Do not change the location of counting points, to keep results comparable to previous years.

Counting methods and technologies

In principle, conditions should be created to enable the most accurate counting possible. This includes the distinction of bicycle traffic from other traffic in order to make a clean and undisturbed detection of cyclists possible. The selection of a suitable method and the corresponding tool for counting can depend on various factors.

- Local conditions at count locations
- Costs
- Ease of installation and portability and maintenance
- Quality of technical support from manufacturer
- on-site data retrieval or automatic data transmission

For more information on counting with focus on metropolitan areas, see the *FHWA Bicycle-Pedestrian Count - Technology Pilot Project: Summary Report* (Baas, Galton et al. 2016).

Measuring systems such as pneumatic hoses and induction loops, which can be laid in asphalt and are low-maintenance, are best suited for long term use to enable years of continuous counting. These allow on-site data readout or even electronic data transmission if they can be connected to the appropriate electronic network. The following standard products are available on the market for counting cyclists:

Types of detectors	Examples
For the registration of bicycle axes:	
• Mechanical	contact bumps
• Pneumatic	air hoses
• Hydraulic	hydraulic bumps
For the registration of bicycles:	
• Electrical	induction loops, radar probes
• Optical	infrared probes, photoelectric barriers, video
• Acoustic	sound waves, ultrasonic probes

Most permanent counters combine inductive loops with automated data transfer via mobile telephone networks.

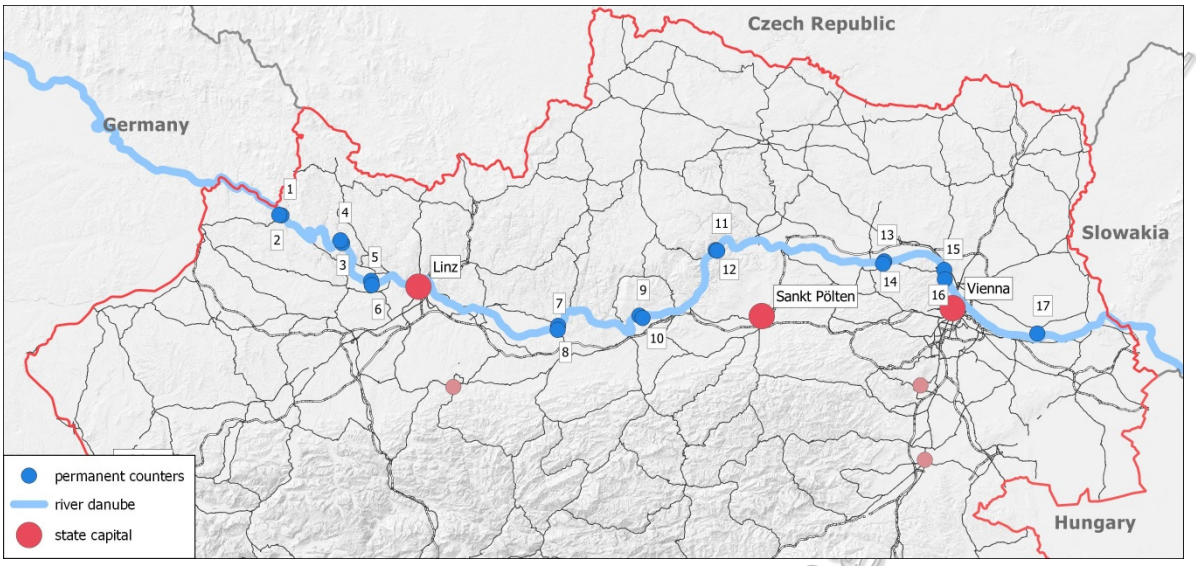

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Figure 70: Permanent counters along EuroVelo 6 in Austria

Key facts:

- Plan the installation of counting points as a permanent counting facility within a defined cycle network. Add additional weather data to the time count data and interpret and publish the results in a meaningful and coherent way.
- Careful planning is necessary for counting site selection. Consult an expert to determine feasible counting points.
- For continuous measurements of bicycle traffic, the use of induction loops is recommended, which can be integrated into the bicycle infrastructure.

10.2 Surveying behaviour of bicycle-based tourism

Introduction

The data required for the comprehensive development of bicycle based eco-tourism also includes relevant information on the characteristics and behaviour of cycle tourists. Several survey methods are suitable for this purpose. The aim of surveys in bicycle tourism relevant areas is the collection of information that cannot be collected by means of cycle counts. The information allows conclusions to be drawn about the on the composition and origin/destination of cyclists (the user characteristics) and the individual mobility behaviour of cyclists. In order to evaluate measures and projects, cyclists can be interviewed for their opinions and assessment of eco-tourism offers. In addition, statements about the economic potential of a region can be made by recording the cyclist's expenditure behaviour. This helps to evaluate investments, learn for future projects and also to inform the stakeholders of a region on the return of an (their) investment.

From counts you can only assess the numbers of cyclists per direction and time interval. At the EuroVelo in Austria for example, every two years interviews with samples of cyclists revel the proportion of different types of cyclist customers shown in chapter 2.5. This distinction is vital to calculate the proportions of different cyclist quantitatively and to assess the economic impact when correlated with the individual spending characteristics.

Survey contents

The contents of the survey should be adapted on the basis of concrete questions: which information is relevant to the survey must be defined beforehand and the content limited to it to minimize respondent burden. Suggestions for survey contents are summarized in the following table. In principle, however, all areas of these guidelines can be the subject to a bicycle tourist survey when it comes to evaluating the actual state or a newly introduced measure in one of these areas on the basis of the statements made by cyclists.

User characteristics	
• Origin • Sociodemographics, • Number of people in a group,	• Type of cyclist (touring cyclist, mountain biker)
Mobility behaviour	
• Length / duration of daily/overall cycling trip and trip stages, • Trip purpose, • Starting point and destinations of trips, • Modes used when arriving and departing from the cycling track,	• Length of the stay, • Types of bicycles, owned or rented bicycle • Trip organisation
Spending behaviour	
• Expenses on accommodation, restaurant, touristic offers and services, ESS,	
Attitudes	
• Motivation for cycle tourism, • Rating of cycle infrastructure, routes and tourist offers (Transport services, Rental services, accommodation, gastronomy, information and marketing, etc.	

The survey of cyclists on a cycle path has another advantage: most cyclists and cycle tourists pass several counting points on a cycle path and are thus counted several times. On the basis of surveys, a model can be developed that converts the numbers counted bicyclists as "cyclists" into the actual number of people. This then represents the user frequency on the cycle path.

Survey methods

Surveys can be conducted on the cycle route, ideally at a resting place or any other location, where cyclists usually pass or even stop. Also at accommodations surveys can be very profitable. The survey itself should not take more than 2-3 minutes, as otherwise the willingness to take part in the survey will be too low or the survey will be interrupted due to time pressure. An example for a basic questionnaire focusing on the mobility behaviour of cyclists is the *Common Core Questions for EuroVelo User Surveys* by the ECF (download under http://www.eurovelo.org/wp-content/uploads/2011/08/Common-Core-Questions-for-EuroVelo-User-Surveys.pdf).

Key facts:

- Surveys of cyclists in regions relevant to ecotourism can provide valuable information on the composition and mobility behaviour of cyclists and provide an overview of their spending behaviour and attitudes.
- Surveys should be carried out on site with a short and formative questionnaire.
- Get support from an expert in the creation of the questionnaire, the implementation and the analysis of the survey.
- Allow your interviewees to give feedback on the quality of the offers and to suggest improvements.

Summary checklist

Chapter: 10 ***Pages: 95-100***

- Do you have reliable numbers of cyclists?
- Do you have reliable surveys on cyclist´s opinions and needs?
- Implement the possibility for cyclists to provide feedback for further improvement.

11 Success stories and good practices

- **Note:** Examples of successful planning of strategies and implementation of measures will be completed based on the field test and feedback from project partners and external experts. If you are aware of interesting stories and examples, please contact the WP3 team: paul.pfaffenbichler@boku.ac.at

12 Checklists for implementation

Chapter: 2 Bicycle based eco-tourism	*Pages: 5ff*
• Define the overall goals you intend to reach with bicycle tourism, especially the positive impacts on your region. • Which target groups (tourists) can you define? • How do the routes you provide accommodate your target groups? (different types of customers on different bikes, different activities and so on) • Are all important stakeholders included in your planning processes as partners? • Make a list of all amenities/interesting sights/possible activities your region offers. • Did you conduct a "market research" to check your prospects of success?	
Chapter: 3 Planning for different types of cyclists	*Pages: 19ff*
• Does your existing/planned infrastructure fulfil the needs of all cyclists, especially of bicycle tourists? • To which extent do your existing routes fulfil the design principles, especially separation from motorists/traffic calming, bicycle friendly environment? • Can you appraise where and how much improvements will be necessary?	

Chapter: 4 How to start bicycle tourism in your region	*Pages: 26ff*

- Formulate targets (different levels: chief/medium/detailed) and indicators for monitoring.
- List and contact relevant stakeholders (e.g. from tourism, environmental, municipalities, etc.).
- Collect information about existing resources (e.g. on tourism and supply structures, mobility chains), surveys of present state.
- Identify a successful model region, invite representatives or visit the region to learn from their experience.
- Compare the present state with your targets, identify weak points where intervention is needed.
- Develop alternative variants and rate them how they fulfil your targets; develop individual branding of routes and offers.
- Select the best option in teamwork with relevant stakeholders.
- Implement the selected variant with experts (e.g. transport planners, environmental engineers, tourism boards etc.) according to a time schedule.
- Keep time and cost plans transparent for a better target control.
- Monitor the resources, to optimize/adapt in time.
- Monitor the achievement of your targets and collect data for further improvement.

Chapter: 5.1 Basic parameters of bicycle infrastructure	*Pages: 34ff*

- Choose an appropriate design speed for your route and illustrate where it can (not) be achieved along your route.
- Provide infrastructure with sufficient capacity at a recommended Level of Service; check especially for sections carrying high volumes of cyclists.
- Establish a continuous route, check for cohesion, attractiveness, safety, security and comfort.
- Consult or commission an experienced transport planner for adequate design of bicycle infrastructure.
- Check for accidents along your route; this gives valuable information on problematic spots/sections and where improvement is needed. Keep time and cost plans transparent for a better target control.

Chapter: 5.2 Design elements of cycling facilities	*Pages: 37ff*

- Determine adequate width and transverse gradient (cross section) along your route.
- Check for sufficient clearance throughout your route.
- Avoid sections with steep longitudinal gradient.
- Provide adequate (minimum) sight relations.
- Use smooth and skid-resistant surface materials and take (future) maintenance into account.

Chapter: 5.3 Types of track sections	*Pages: 41ff*
• Which types of track sections exist/are selected along your route? Depict in a plan and identify the quality per section. • Aim at tracks separated from motorised traffic, appropriate width, high level of comfort and environmental beauty.	
Chapter: 5.4 Intersections, roundabouts	*Pages: 45ff*
• Which types of track sections exist/are selected along your route? Depict in a plan and identify the quality per section. • Aim at tracks separated from motorised traffic, appropriate width, high level of comfort and environmental beauty.	
Chapter: 5.5 Route signposting and information	*Pages: 50ff*
• Implement standardised signposting along the route • Does it comply with the regulations for EuroVelo routes? • Do you communicate locations and distances? • Is there additional information about possible sights or points of interest? • Do you provide an emergency number?	
Chapter: 5.6 Bicycle parking	*Pages: 52ff*
• Are all your points of interest equipped with bicycle parking? • What duration of parking is expected? • Are the existing parking lots sufficient in quality (theft protection)/quantity or do they need improvement? • Are they accessible per bike? • Are the parking lots checked in regards to personal security?	
Chapter: 5.7 Shelters, resting places, service points	*Pages: 54ff*
• Does your route have shelters and resting places at regular intervals? If yes, how long are the distances between them on average? • Do they provide the recommended features, like roofing, benches, water etc.? • Are there any service points existing/planned along the route?	
Chapter: 5.8 Lighting	*Pages: 58*
• Are there any critical intersections in need of lighting? • Complies lighting with necessities of nature protection?	
Chapter: 5.9 Maintenance	*Pages: 58ff*
• Are road inspections and maintenance works scheduled per year? • Who is responsible for pruning shrubs and trees? • How (often) do you collect the waste along the route?	

Chapter: 6 Transport services and intermodality	*Pages: 61ff*
• What modes of (public or privately organized) transport can a potential tourist use when visiting your region? • Is the transport of bicycles easily accessible? • Are there any transport offers you can improve with the help of stakeholders in the transport sector? • Do you offer special tickets for cycle tourists on public transport? • How do you promote the use of sustainable transport to cycle tourists? • Does your signage contain information on intermodal nodes? • Is a website communicating all the vital information regarding public transport in your region?	
Chapter: 7 Bicycle rental schemes	*Pages: 69ff*
• Are there any bicycle rental schemes currently available in your region? • Do you intent to set up such rental scheme with the help of local stakeholders? • If yes, which scheme and what kind of bicycles will this include? • How can a potential tourist get information on how to rent a bicycle? • Will additional equipment be for rent, too?	
Chapter: 8 Accommodation and gastronomy	*Pages: 73ff*
• Do your accommodations and gastronomy have safe bicycle parking lots? • Do they allow single overnight stays? • Do they have sufficient options for an athlete's breakfast? • Do they offer a drying room? • Do they offer a basic repair set? • Is there information regarding bicycle tours form the surrounding area available? • Are any activities aside from cycling available? • Do they offer warm meals during their opening hours? • Are they presenting regional cuisine?	
Chapter: 9 Information, communication and marketing	*Pages: 85ff*
• Is your region present with a website in several languages? • Do you cooperate with tour operators? • Does your region have any bicycle-friendly certifications in use? • Do you provide regional touristic information tailored for your target groups?	
Chapter: 10 Measuring bicycle based eco-tourism	*Pages: 95ff*
• Do you have reliable numbers of cyclists? • Do you have reliable surveys on cyclist´s opinions and needs? • Implement the possibility for cyclists to provide feedback for further improvement.	

13 Glossary and abbreviations

AT	Austria
BG	Bulgaria
CBP	Community based planning
CD	České dráhy, Czech national railway
CED	Cycling Embassy of Denmark
CH	Switzerland
DB	Deutsche Bahn, German national railway
ECF	European Cyclists' Federation
ERA	Empfehlungen für Radverkehrsanlagen, German standard for cycling infrastructure
ESS	Ecosystem services
EU	European Union
DE	Germany
GPS	Global positioning system
HBS	Handbuch für die Bemessung von Straßenverkehrsanlagen, German standard for road infrastructure
HCM	Highway Capacity Manual, infrastructure standard of the USA
HU	Hungary
LOS	Level of service
NL	Netherlands
NO	Norway
OeBB	Oesterreichische Bundesbahn, Austrian national railway
PCU	Passenger car unit
RO	Romania
RVS	Richtlinien und Vorschriften für das Straßenwesen, Austrian standards for road traffic infrastructure
SK	Slovakia
RS	Serbia
SR	Stoerungsrate, interruption rate
US	United States of America
VRU	Vulnerable road users (cyclists, pedestrians, motorcyclists, etc.)
WIFI/WLAN	Wireless lan

14 Literature

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