

PILOT ACTION 7 - WAIDHOFEN/YBBS DRINKING WATER SOURCES

OUTPUT O.T3.9

WORK PACKAGE T3 - IMPLEMENTATION AND FEEDBACK -
TOOLBOX VERIFICATION

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1. Introduction

Testing of the Toolbox beta version by project partners (PPs) in pilot actions (PAs) will provide:

- documented learning experience, where PPs from different countries and disciplines will verify the Toolbox applicability and
- an important communication tool where project results will enable important outreach and key post-project capitalization leverage supporting bottom-up participatory principles in water management planning processes, generally drafted by the Common Implementation Strategy for the Water Framework Directive (WFD CIS No.11).

The Toolbox will also be tested by stakeholders during training workshops and in the post-training implementation phase, when strategies will be discussed. These stakeholder interactions will enable clarification of needs and provide recommendations for Toolbox improvements (bottom-up approach) and for direct local and regional implementation of the Toolbox.

The Output OT.3.7 puts a specific focus on the land-use types forestry, grassland management, mining (Dolomite stone quarries) and urbanism - all of them within the context of water-resources protection. The stakeholder engagement will cover all issues about toolbox-testing with specific regard to water-resources protection in PA7.

2. Basic data about Pilot Action 7

The catchment area of the Waidhofen/Ybbs Water Supply, (Pilot Action 7 = PA 7) is characterized by steep karstic mountain ranges with forest ecosystems, grasslands, Dolomite stone quarries and urban areas (Fig. 1). The PA7 is situated in the North-Eastern Limestone Alps of Austria, in the Austrian province Lower Austria.

As most important economic factors of the region industry, forestry, drinking water supply, agriculture with alpine pastures and tourism have to be mentioned. The karstic alpine terrain of PA7 is situated in a rather dense populated region, industry is hence an important aspect of this area.

The water intake zone of Waidhofen/Ybbs was declared and decreed as water protection zone in 2018. The related aspects of all mentioned land-use types with regard to drinking water supply will be thematized.

All PA-specific information is provided in the subsequent chapters.

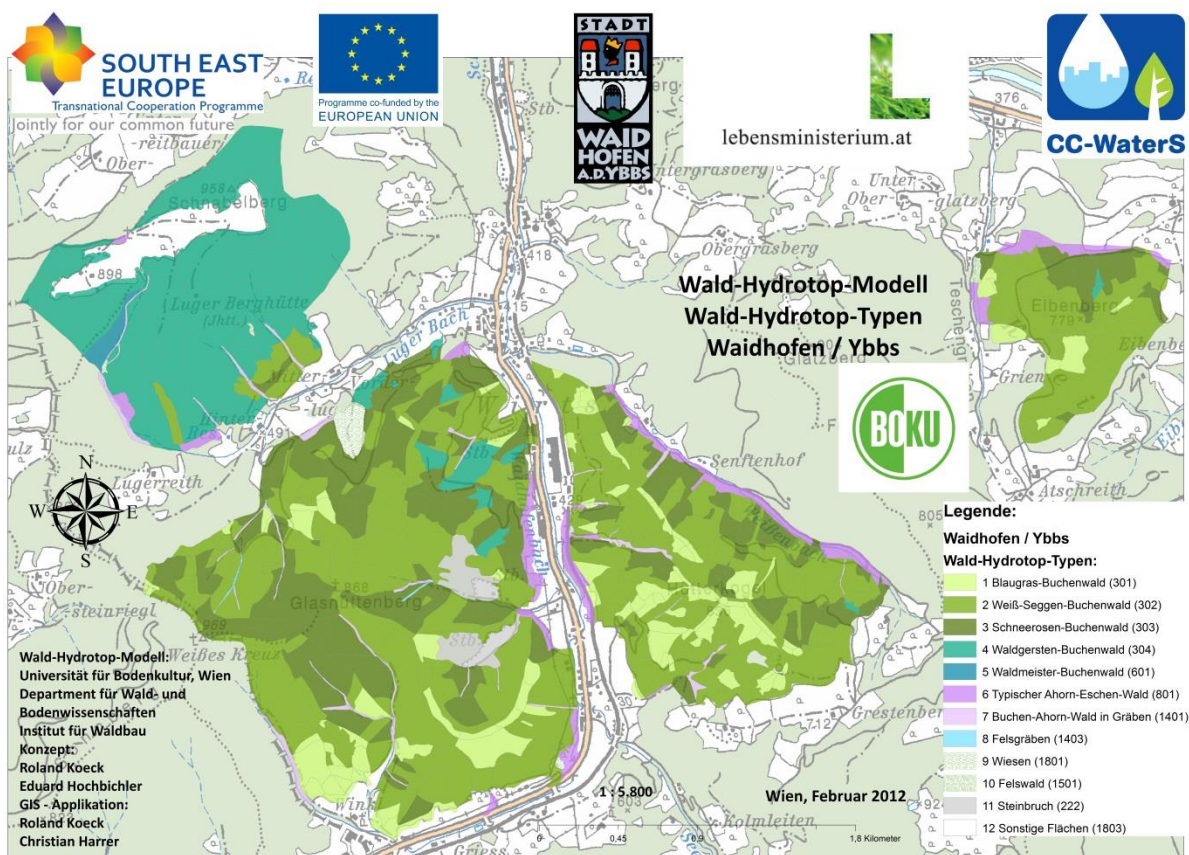


Figure 1: Water Protection Zone of Waidhofen an der Ybbs, with the forest hydrotope types in PA 7 (Source: Project CC-WaterS, Koeck & Hochbichler 2012).

2.1. Geographical description

PA 7 is situated in the Lower Austrian Limestone Alps region at the Northern edge close to the Danube valley, which is part of the forest growth district 4.2 (Eastern part of the Northern Alps of Austria - Fig. 1).

The Pilot Action is ranging from 385 m ASL (urban area in the valley) up to the summits “Schnabelberg” (958 m ASL), “Weißes Kreuz” (969 m ASL), Eibenberg (779 m ASL) and “Hüttenkogel” (838 m ASL). The main part of PA 7 is forested, the second most important area is covered with grasslands, urban areas and dolomite stone quarries. There do not occur significant rock areas in the steep karstic alpine terrain. The Lower Austrian city Waidhofen / Ybbs is situated already outside the PA. The total area of PA7 is 10.3 km² (Fig. 1).

The karstic alpine terrain includes types of the bedrocks Dolomite and Werfener Sandstone.

Three karstic alpine springs and one groundwater well are located within PA7, all of them contribute as raw water sources to the drinking water supply of the City of Waidhofen/Ybbs.

2.2. Climate characteristics

The alpine climate in PA7 is characterized by its location at the northern edge of the Alps. The yearly mean-temperature in the City of Waidhofen an der Ybbs (385 m ASL) was during the period 1965 to 1988 about 8.9 °C, the yearly mean sum of precipitation 1164 mm (ZAMG 2016).

The pattern of precipitation shows a characteristic summer maximum, which has in July the greatest amplitude (Fig. 2). A second, less pronounced maximum can be seen in the months November, December and January (winter maximum of precipitation (Fig. 1)). Especially the yearly sum of precipitation can be described as rather high, what is due to the Northern congestion of precipitation (=Nordstau) in the North-Eastern Limestone Alps of Austria.

Also in PA 7 (like in PA6) the climatic conditions characterize an alpine region which is well suited for providing water resources for the City of Waidhofen/Ybbs and its surroundings, as annual precipitation and mean annual temperature point out the presence of valuable water storage within the karstic alpine groundwater bodies.

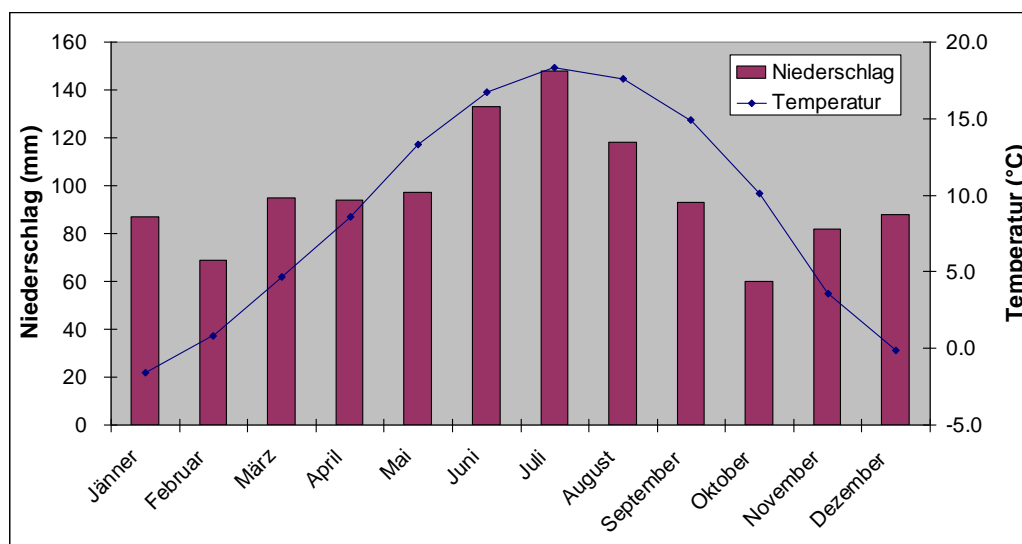


Figure 1 Monthly means of temperature and precipitation in Waidhofen/Ybbs (1965-1988).

2.3. Hydrology

2.3.1. Surface waters

The most important surface water around PA 7 is the river Ybbs, which flows close to the Eibenberg sector of the PA. Together with the Luger-Brook, which is flowing from the Luger-valley to Waidhofen/Ybbs and the Waidhofen-Brook, the westerly sector in PA7 is drained. There does not exist any lake in PA 7. For this respective sector of rivers and brooks do not exist any data about discharge. Due to the karstic alpine character of river Ybbs the highest flow rates can be expected in the spring season in April and May, when the snow is melting in the alpine summit areas and provides high groundwater recharge.

2.3.2. Flooding

Flooding occurs frequently in PA 7. The flood risk for any human settlement areas is displayed in the flood risk map (Fig. 2). Most of the water intake zones (the karstic spring buildings) are not endangered by floods, only Kerschbaumer-Spring is situated in the area, where flooding potentially can occur. But the building of this spring is constructed in a way that potential flood waters cannot enter.

Due to this fact floods do not affect drinking water supply directly. The potentially affected urban areas are displayed in the map (Fig. 2

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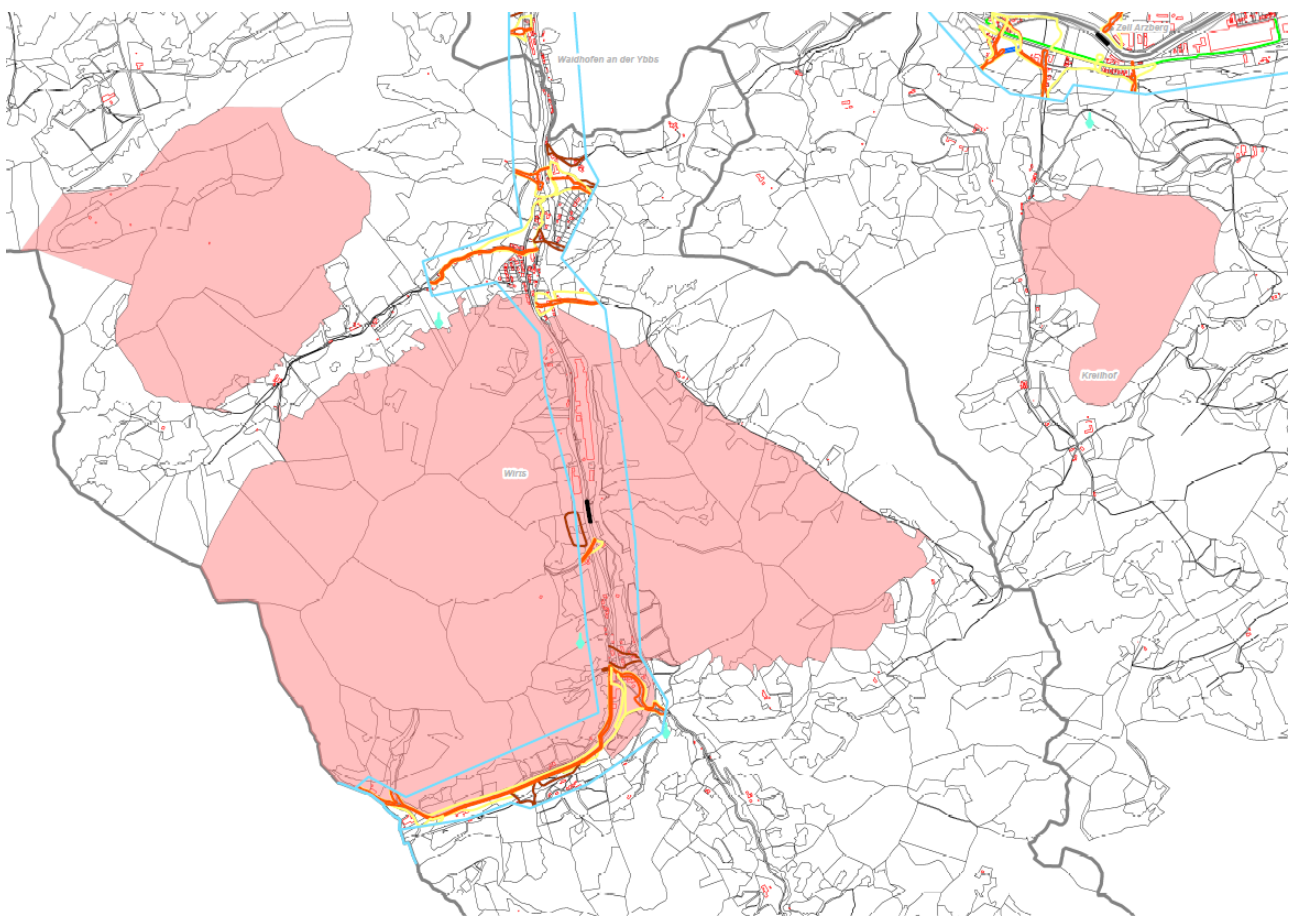


Figure 2: Flood-map of the city of Waidhofen/Ybbs, with the extension of the water protection zone (in red). The blue line marks the area, for which flood risk was calculated, the red and yellow lines mark the areas of flood-danger (Municipality of Waidhofen/Ybbs 2021).



2.3.3. Heavy rain

Heavy rain events are characteristic for PA7 and occur each year. Some of them are outstanding and show very high intensities of rainfall during short time periods.

The relevant dimension of heavy rain events within PA7 is the creation of turbidity within the karstic spring waters, caused by erosion of soil- and karst-body materials. These erosion processes are intended to be mitigated or prevented by the water works of Waidhofen/Ybbs, something what can be reached through application of specific Best Practices. Those were elaborated through PP6 in the course of the CC-WARE project.

The most important response to the potentially threat through heavy rain events is a closed and stable forest cover on the whole PA area. Especially ditch-sites should also be covered by forest vegetation. Related Best Practices were defined for the PA and also were integrated into the GWP (Chapter 2.7).

2.4. Hydrogeology

The Pilot Action 7 was decreed as water protection zone of the City of Waidhofen/Ybbs back in 2018. The karstic alpine springs Kerschbaumer-Spring, Hinterlug-Spring, Mitterlug-Spring, Glashütten-Spring, Hiaslwirt-Spring, Greilhof-Spring and the Forsterbrunnen-Well contribute to the Drinking Water Supply of the City of Waidhofen/Ybbs and are situated in PA7. Spring discharges statistics will not be provided.

The aquifers are in all spring-cases karstic fissured groundwater aquifers (karstic springs) and one (Forsterbrunnen) is a porous karstic groundwater aquifer (groundwater well) (Tab.1). The existence of the groundwater well provides resiliency of the drinking water supply system during longer lasting drought periods.

Table 1: Water sources of the drinking water supply system of Waidhofen/Ybbs.

NAME	Character	Aquifer
Kerschbaumer-Spring	Spring	Karstic fissured GW aquifer
Hinterlug-Spring	Spring	Karstic fissured GW aquifer
Mitterlug-Spring	Spring	Karstic fissured GW aquifer
Glashütten-Spring	Spring	Karstic fissured GW aquifer
Hiaslwirt-Spring	Spring	Karstic fissured GW aquifer
Greilhof-Spring	Spring	Karstic fissured GW aquifer
Forsterbrunnen	Well	Karstic porous GW aquifer

Results from hydrological modelling could potentially become available in the course of the TEACHER-CE project and would then be provided.

2.5. Land use

The PA 7 region is characterised through the dominance of forest cover. About 7 % of the area (10.3 km²) is covered by grassland and alpine pastures, 4 % by urban areas, 4 % by dolomite stone quarries and 85 % by forests. Within PA 7 the following forest hydrotope types are present:

- + Montane Beech forest hydrotopes on carbonate substrates
- + Montane Maple-Ash forest hydrotopes on carbonate substrates
- + Montane Beech forest hydrotopes on siliceous substrates

The forest hydrotope map shows the spatial explicit distribution of each hydrotope type (Fig. 3). It has to be mentioned that about 40 % of the forest area within PA 7 shows natural tree species distribution. In contrast some forest areas are of course characterised by homogeneous spruce-plantations. Best Practices were specifically defined for each forest hydrotope, including tree species sets for current climates and climate change scenarios (Source: CC-WaterS Project, Koeck and Hochbichler, 2012).

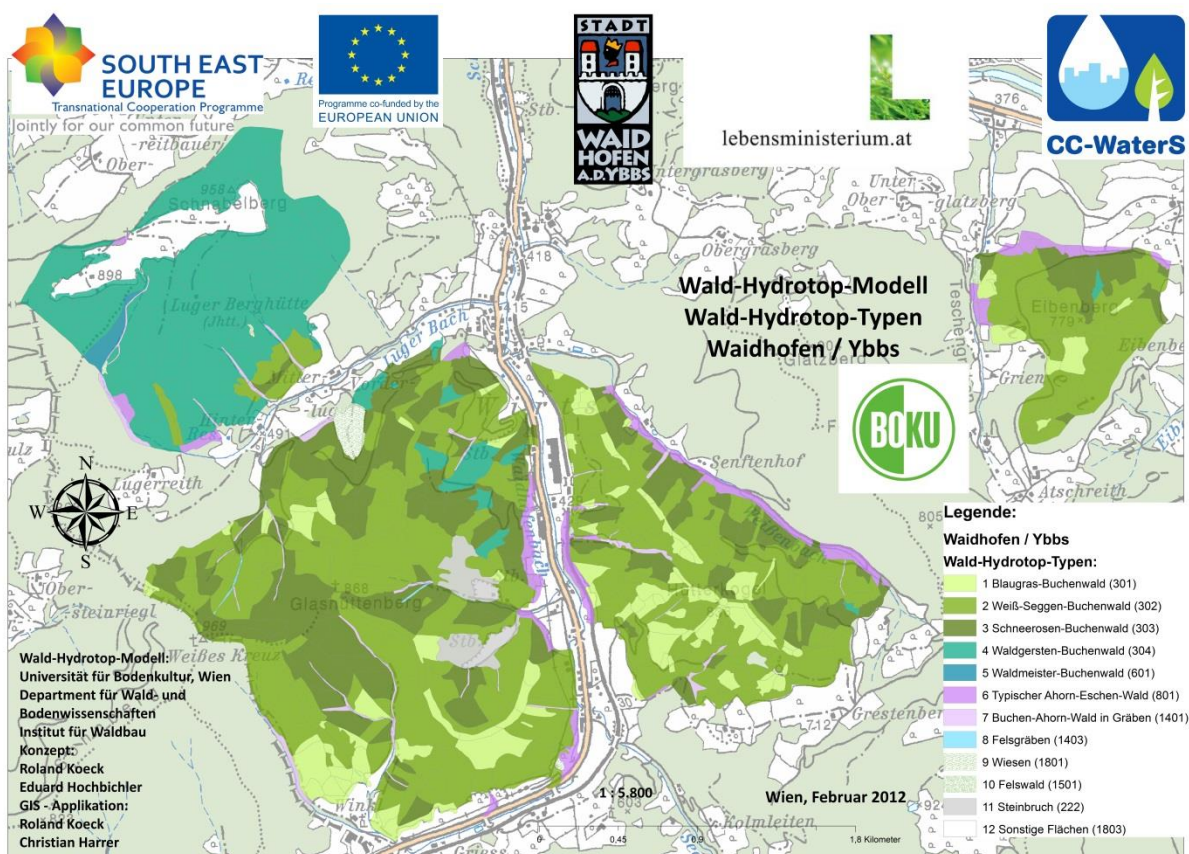


Figure 3: Forest Hydrotope Map of the City of Waidhofen an der Ybbs, covering the whole area of PA 7 (Source: Interreg SEE Project CC-WaterS, Koeck & Hochbichler 2012).



2.5.1. Forestry

Forestry and Best Practices implementation in this sector of land-use are major focus of PA 7 in the TEACHER-CE project. The related data are described in chapter 2.5 land-use.

2.6. Protected areas

There are no protected areas within PA 7.

2.7. Drinking water sources and protection

PA7 is the water protection zone of the City of Waidhofen/Ybbs. The springs and wells which contribute to the water supply are detailed in chapter 2.4 (Tab. 1).

The legal frame of the decreed water protection zone defines some restrictions within the normal frame of land-use practices for forestry and agriculture. But those decreed restrictions do not go far enough for drinking water protection strategies. Hence the City of Waidhofen/Ybbs elaborated together with PP 6 an own Best Practice Catalogue for forestry and cooperated within this context during all related Interreg projects. The most important Best Practices for forest management were condensed into the “Guideline for securing the Water Protection functionality of the forest ecosystems within the DWPZ” of Waidhofen/Ybbs (GWP). The GWP is written in German and was based on the BMP catalogue of the PROLINE-CE project.

Also of relevance for drinking water protection are following land use types and related Best Practices:

- + Dolomite stone quarries
- + Grassland areas and alpine pastures
- + Urban areas
- + Industrial facilities

Despite this situation the main focus during the stakeholder process will be forestry and the implementation of GWP.



3. PA issues concerning TEACHER-CE topics

3.1. Heavy rain

Heavy rain events are of course an issue for drinking water supply, as turbidity caused by related erosion processes forms a major issue in karstic water bodies. Best Practices dealing with this threat were elaborated and defined for the water protection zone of Waidhofen/Ybbs. This was done in the course of the PROLINE-CE project. This issue will be detailed in the course of the TEACHER-CE project.

3.2. Floods

Floods are no relevant issue in PA 7, as all water intake facilities are situated protected from any flood event. Floods as issue for other urban installations will not be considered in the project, as drinking water protection themes are prioritized.

3.3. Drought

Drought could impose a threat for water supply, if the period would last too long. This has not been the case until now. The integration of the Forsterbrunnen well as porous aquifer water source provides more resiliency of raw water supply during drought periods. This issue will be detailed in the course of the TEACHER-CE project.

3.4. Forest management

Forest Management is a major issue in PA 7 and is tackled through the Best Practice Catalogue of the City of Waidhofen/Ybbs. The most important Best Practices for forest management were condensed into the “Guideline for securing the Water Protection functionality of the forest ecosystems within the DWPZ” of Waidhofen/Ybbs (GWP). The GWP is written in German and was based on the BMP catalogue of the PROLINE-CE project. The resolution of GWP through the municipal council can be regarded as milestone towards the implementation of integral drinking source water protection and was accomplished in May 2018. Now the implementation phase of the GWP is carried out, accompanied by the TEACHER-CE stakeholder process. This issue hence will be detailed in the course of the TEACHER-CE project.

3.5. Drinking water sources protection

Drinking water protection is a major issue in PA 7 (Fig. 5) and is tackled through the Water Works of Waidhofen/Ybbs. Through the synopsis of scientific research in the water protection zone the related Best Practices were elaborated. All basic research activities like the forest hydrotope mapping survey (Koeck and Hochbichler 2012) formed the fundamentals for the definition of Best Practices Catalogues for (A) Water Management and (B) Forest Management. These issues will be detailed in the course of the TEACHER-CE project.

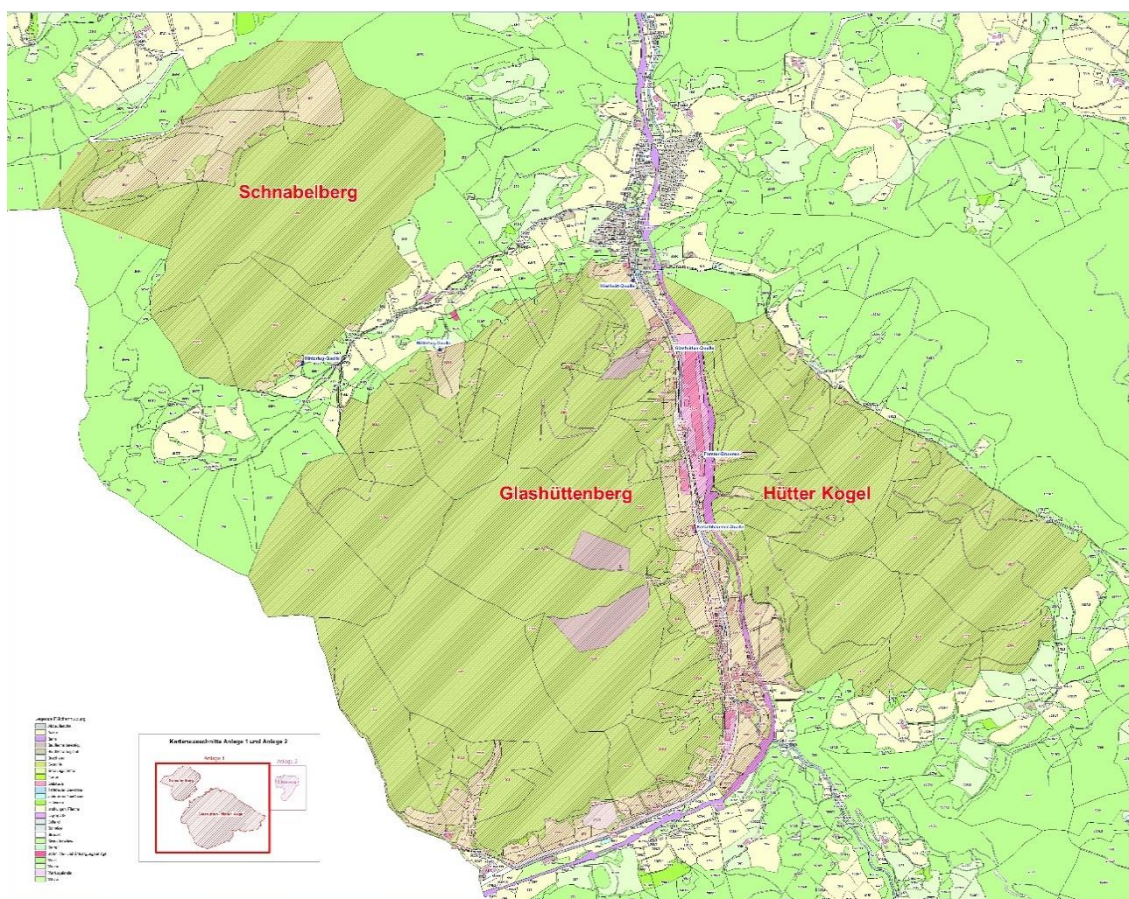


Figure 5: Water protection zone Waidhofen/Ybbs: Schnabelberg, Glashüttenberg and Hütter Kogel; Eibenberg is not displayed in this map (see Fig. 4).



3.6. PA7 Waidhofen/Ybbs drinking water sources

Related problems are alpine pasture practices and touristic activities which could create adverse effects on the karstic drinking water resources. Moreover forest ecosystem stability has to be secured, also with respect to climate change. BMP implementation represents a challenge. A huge catalogue of Best Practices exists already and is also implemented in the presence.

4. Testing of the TEACHER-CE toolbox CC-ARP-CE

The two Austrian project partners PP6 (BOKU) and PP7 (BFW) conducted an online workshop on 19.10.2021 with a broad range of participants. Although only 9 people participated at the end, it has to be mentioned, that all of them were coming from different institutions on different levels and different field of actions, so that a wide spectrum of stakeholders was covered. The discussion after the presentations was very fruitful and efficient.

Generally, the Toolbox was seen as an interesting instrument for the present and the future, especially due to integrated climate scenarios and indicators, showing a huge amount of recommended measures in various land uses based on well-founded previous studies and projects. Thus, this Toolbox could play an important role for decision-making processes in the future to enhance transparency and acceptance within involved stakeholders. This means, that it should be spread also to other stakeholder groups and the access should be made very user-friendly and easy, so that it can be really used and improved through additional inserted issues or comments.

Water scarcity and drought risk management were seen as the most challenging issue for the future, followed by other fields of action (drinking water supply, fluvial and pluvial flood risk, increase of irrigation) correlated with climate change.

One crucial issue will be the administration and applicability of the Toolbox for interested stakeholders also after project end.

Beforehand the beta version of the CC-ARP-CE Toolbox was intensively tested by the Focus group, which is in principle composed by representatives of the Austrian Strategic partners (Vienna Water, Municipality of Waidhofen/Ybbs and the Federal Ministry of Agriculture, Regions and Tourism). This kind of meetings were conducted on 27.10.2020 in Neuberg/Mürz (within the Vienna drinking water catchment area) and on 25.05.2021 due to the actual COVID-situation only online. These meetings turned out to be very fruitful as the involved participants will be the key stakeholders for using this Toolbox in the future. All partners asked questions regarding the functionality of the Toolbox and communicated their point of view within the context of all Toolbox specialities. The climate change indicators were a true focus of interest as people want to know more about the climate change signal within their watersheds. The testing was carried out in an interactive way, the partners were asked and also asked questions, the presentations of the Toolbox were received in a positive way. This resulted in increased interest in the Toolbox, which is the basis for its utilisation.



5. Synthesis of the National Stakeholder Workshop

In general, the Toolbox is seen as an interesting instrument, which could be applied related to various aspects and fields of action (e.g. water supplier, preparation of concepts in “KLAR!-regions” - climate change adaptation model regions). It provides a good overview of recommended measures based both on new scientific findings and on already realised best practices in different land uses. Therefore, this tool can be used as a well-founded argument and decision support tool for the implementation of certain measures. Also, the awareness raising and willingness to implement recommended measures by land users could increase. The pilot actions of TEACHER-CE are suitable as perfect showcases.

The climate indicators and the various links to the national data base were seen as very important and helpful for users.

Besides some stakeholders stated, that they will present the Toolbox in their institution and will review the related measures and evaluate them related to practicability.

Furthermore, the administration and applicability of the Toolbox, also after project end, are very central. In this context the information of other stakeholder groups and experts (like official experts - “Amtssachverständige”) would be important.

- a) *Does the **functionality and usability** of all parts of the toolbox convince the stakeholders? Do stakeholders know, how to use the toolbox and does it meet user expectations?*

As far as the participants could already assess the Toolbox in this phase it seems user-friendly, simple and clear. Of course, it has to be tested further on.

- b) *What are **the decision-making processes** in the user’s fields of responsibility - do stakeholders think decision support systems enhance public acceptance of the results?*

For all participants the Toolbox provides an important tool for an enhanced acceptance of the results, not only within the general public, but also within a wide spectrum of stakeholders. Perhaps new measures could be integrated within existing strategies or guidelines (like the new guideline for water protection forests in Waidhofen/Ybbs). Furthermore, it increases the transparency as a basis for future proceedings. It could also provide a kind of orientation guideline for certain land uses (e.g. in forestry) as it already exists for example in the field of water supply (ÖWAV-guidelines).

- c) *Regarding the representation of all relevant issues? - Do the stakeholders find a measure quotation for their relevant **fields of action**?*

As far as most of the recommended measures, especially related to forestry and water protection, are based on previous numerous studies and partially already implemented in some pilot areas (Vienna Water, Waidhofen/Ybbs) they are really well-proved and should be further applied also in other regions. Additional suggested measures will be checked, especially related to the level of detail.

- d) *As regards the suitability of the suggested measures - do the stakeholders identify with the Toolbox’s approach to adapting landscape management in line with different **measures**?*

Yes



- e) *With regard to the problems and remarks concerning the procedure or selection of MEASURES - AHP Criteria ranking - with regard to the usability of the AHP Criteria ranking tool - is it clear for users how to select the priorities/rank the criteria? Is it clear how to interpret the output?*

Yes, this possibility is good and important as an additional information and for implementation and interpretation of related measures.

- f) *Usability of climate indicators and scenarios?*

They are seen as very important

- g) *What are the expectations - What are the stakeholders hoping to gain?*

What are the limitations - what stops stakeholders from providing information?

In general, the usability seems very good (precondition is the usability also after project end), the implementation of climate scenarios and indicators is very interesting and important. The testing of the range of possibilities is seen as very central. Additional measures should be inserted by planners, authorities, land users, water suppliers and the adequate umbrella associations respectively. All participants think that the provision of information and data to the Toolbox will not really be a problem, especially related to authorities, provided that the backflow of information is guaranteed. But in this context, it is important, that stakeholders (e.g. smaller water suppliers) are not forced to save their information about existing problems and to make it public within the Toolbox by that way.

The limitations are seen in the level of detail and perhaps some stakeholders are afraid of handling IT-issues.

- h) *What about the usability of the Toolbox within Your institution/authority/service? Do you know of institutions/persons that may have been interested in using the toolbox?*

Some ideas on how to spread the information about the Toolbox are: presentation within existing KLAR!-regions, ÖVGW (Austrian Association for gas and water) as well as ÖWAV (Austrian Water and Waste Management Association), municipality forest inspections, surveyors (within proceedings of authorities, e.g. approval for clearcutting) and forest companies, integration within research projects and student works

The most important issues are climate change scenarios and the respective measures in different land uses.

An easy access to the Toolbox for users would be important (e.g. common access-code for a group of stakeholders).

- i) *What strategies/policy documents related to water management in the Pilot Area are known to you?*

Water Framework Directive, National water management plan, flood risk management plans, protective water management concepts, decree for water conservation area, internal guideline for forest/agricultural management of Vienna Water, management plan for mountain pastures (Vienna Water), guideline for forest management within the water protection area (Waidhofen/Ybbs), decisions of the water authority

- j) *In which FofA is the greatest need to update / develop a strategy in aspect of Climate Change?*



- a. water scarcity and drought risk (management) - 3x (less amount of snow-melt causes less spring discharge and trees suffer from drought damages and pests; the period of low water levels and the related problems like rise of water temperature of springs and surface water increase, thus influencing water quality)
- b. drinking water supply (management) - 2x (actualization, change of behavior of customer, future influences on spring discharge due to changes in snow cover)
- c. fluvial flood risk (management) - 1x (several studies)
- d. pluvial flood risk (management) - 1x (sensibilization of municipalities, subsidies)
- e. irrigation water (management) - 1x (regional differences, financial burdens despite subsidies, in Styria: development of pilot projects - intermediate storage capacities for frost irrigation in fruit production, protection-nets against hail)
- f. management of water-dependent ecosystems - 1x (utilization and quality - nutrient loads)

k) *Do you know institutions or people that may have been interested in updating existing strategies related to water management using the toolbox? - What about your institution?*

All participants or their institutions respectively would be interested in using the Toolbox for updating existing strategies related to water management. Following additional stakeholders should be involved in the future: water cooperatives, KLAR!-regions, other departments within the Ministry of Agriculture, Regions and Tourism (e.g. forest department - has been invited to this workshop, but unfortunately didn't participate)

6. Conclusions

The conclusions of the National Stakeholder Workshop in Austria are as follows:

- + It was necessary to hold the workshop via Videoconference in order to get all interested participants integrated.
- + The Videoconference was an adequate tool within this context, it was possible to hold the workshop through it.
- + The number of participants was rather small, with 9 stakeholders and 3 project partners, but: This small number allowed a very intensive and interactive workshop, where discussions and questions were actively carried out by all participants.
- + It was possible to motivate rather different types of stakeholders, like (I) staff from ministries, (II) water suppliers, (III) foresters, (IV) governmental research centres, (V) regional governments, (VI) ÖVGW - Austrian Association for Gas and Water and (VII) universities. This provided a very wide spectrum of decision makers and researchers, what is a very good basis for the implementation of the TEACHER-CE Toolbox CC-ARP-CE.
- + The outcome of the Stakeholder Training Workshop in a conclusive way can be described as very fruitful, it was possible to gain the interest of the stakeholders for the Toolbox and also to integrate them in the process of the Toolbox refinement.