Information Sheet on Ramsar Wetlands (RIS) – 2009-2014 version

Available for download from http://www.ramsar.org/doc/ris/key_ris_e.doc and http://www.ramsar.org/pdf/ris/key_ris_e.pdf

Categories approved by Recommendation 4.7 (1990), as amended by Resolution VIII.13 of the 8th Conference of the Contracting Parties (2002) and Resolutions IX.1 Annex B, IX.6, IX.21 and IX. 22 of the 9th Conference of the Contracting Parties (2005).

Notes for compilers:

1. The RIS should be completed in accordance with the attached *Explanatory Notes and Guidelines for completing the Information Sheet on Ramsar Wetlands*. Compilers are strongly advised to read this guidance before filling in the RIS.

2. Further information and guidance in support of Ramsar site designations are provided in the *Strategic Framework and guidelines for the future development of the List of Wetlands of International Importance* (Ramsar Wise Use Handbook 17, 4th edition).

3. Once completed, the RIS (and accompanying map(s)) should be submitted to the Ramsar Secretariat. Compilers should provide an electronic (MS Word) copy of the RIS and, where possible, digital copies of all maps.

1. Name and address of the compiler of this form:

State of Carinthia
Mag. Klaus Krainer
Mag. Margret Dabernig
Arge NATURSCHUTZ
Gasometergasse 10
A-9020 Klagenfurt
Tel.: 0043 463 329666
Fax: 0043 463 329666-4
E-Mail: office@arge-naturschutz.at
Website: www.arge-naturschutz.at

FOR OFFICE USE ONLY.

DD MM YY

Designation date			Site Reference Number					
0 6	0 5	2 0 1 4	2	2	0	8		

2. Date this sheet was completed/updated:

March 24th 2014

3. Country:

Republic of Austria

4. Name of the Ramsar site:

The precise name of the designated site in one of the three official languages (English, French or Spanish) of the Convention. Alternative names, including in local language(s), should be given in parentheses after the precise name.

Upper Drava River (Obere Drau)

5. Designation of new Ramsar site or update of existing site:

This RIS is for (tick one box only)**:**
a) Designation of a new Ramsar site ☒; or
b) Updated information on an existing Ramsar site ❑

6. For RIS updates only, changes to the site since its designation or earlier update:

a) Site boundary and area

The Ramsar site boundary and site area are unchanged: ❑

or
If the site boundary has changed:
i) the boundary has been delineated more accurately ❑; or
ii) the boundary has been extended ❑; or
iii) the boundary has been restricted** ❑

and/or

If the site area has changed:
i) the area has been measured more accurately ❑; or
ii) the area has been extended ❑; or
iii) the area has been reduced** ❑

** **Important note**: If the boundary and/or area of the designated site is being restricted/reduced, the Contracting Party should have followed the procedures established by the Conference of the Parties in the Annex to COP9 Resolution IX.6 and provided a report in line with paragraph 28 of that Annex, prior to the submission of an updated RIS.

b) Describe briefly any major changes to the ecological character of the Ramsar site, including in the application of the Criteria, since the previous RIS for the site:

7. Map of site:
Refer to Annex III of the *Explanatory Note and Guidelines*, for detailed guidance on provision of suitable maps, including digital maps.

a) A map of the site, with clearly delineated boundaries, is included as:
i**) a hard copy** (required for inclusion of site in the Ramsar List): ☐;

ii**) an electronic format** (e.g. a JPEG or ArcView image) ☒;

iii) **a GIS file providing geo-referenced site boundary vectors and attribute tables** ☒.

b) Describe briefly the type of boundary delineation applied:
e.g. the boundary is the same as an existing protected area (nature reserve, national park, etc.), or follows a catchment boundary, or follows a geopolitical boundary such as a local government jurisdiction, follows physical boundaries such as roads, follows the shoreline of a waterbody, etc.

The boundary of the Ramsar site has been adjusted to the boundary of the "Europaschutzgebiet Obere Drau" (Natura 2000 site, AT2114000).

8. Geographical coordinates (latitude/longitude, in degrees and minutes):
Provide the coordinates of the approximate centre of the site and/or the limits of the site. If the site is composed of more than one separate area, provide coordinates for each of these areas.

Eastern and western limits of the site:
West: WGS84 (GM): 12° 53.95‘ E / 46° 46.60‘ N
East: WGS84 (GM): 13° 34.57‘ E / 46° 44.91‘ N

Approximate centre oft the site:
WGS84 (GM): 13° 17.37‘ E / 46° 45.22‘ N

9. General location:
Include in which part of the country and which large administrative region(s) the site lies and the location of the nearest large town.

Carinthia, Spittal an der Drau and Villach-Land (districts);
The site extends from the federal state boundary at Oberdrauburg (approx. 10 km SE of Lienz in Osttirol) to the backwater of the power station Paternion to the east of Spittal an der Drau (approx. 7 km SE of Spittal an der Drau). It contains parts of the municipalities Baldramsdorf (1827 inh.), Berg im Drautal (1378 inh.), Dellach im Drautal (1778 inh.), Greifenburg (1923 inh.), Irschen (2089 inh.), Kleblach-Lind (1302 inh.), Lendorf (1776 inh.), Lurnfeld (2718 inh.), Oberdrauburg (1340 inh.), Sachsenburg (1440 inh.), Spittal an der Drau (16084 inh.), Steinfeld (2291 inh.) and Stockenboi (1749 inh.).

10. Elevation: (in metres: average and/or maximum & minimum)

525 m – 640 m NN (minimum & maximum)

11. Area: (in hectares)

1029 hectares

12. General overview of the site:
Provide a short paragraph giving a summary description of the principal ecological characteristics and importance of the wetland.

The site involves an approx. 68 km long part of the inner alpine mountain river Drau and its neighbouring alluvial areas, extending from the Carinthian border at Oberdrauburg to the beginning of the power station backwater of Paternion a few kilometres east of Spittal an der Drau. This section is the last free-flowing, meaning not dammed stretch of the Drau in Carinthia, not used to generate energy. Various ecological valuable habitats were lost because of river controls accompanied by drainage and agricultural increase in the past. Despite all that, a various flora and fauna rich in species and remarkable alluvial water bodies and forests survived. The site supports the largest Grey alder alluvial forest of Austria. The Drau River and Drau floodplain contain endangered habitat types and together form a river-floodplain-complex that is environmentally valuable. This complex is unique in Carinthia as well as in Austria due to its characteristics, the speciality and diversity of vegetation types and fauna together with various rare and endangered animal and plant species and from the viewpoint of nature conservation it is of national importance.

The Drau floodplain ranks among the most beautiful and best structured alluvial zone in Austria and for the most part is an intact alluvial-ecosystem (Österreichisches Institut für Raumplanung 1991). In the course of two LIFE projects, “Restoration of the wetland and riparian area on the Upper Drau River” (1999 – 2003) and “Life vein – Upper Drau River” (2006 – 2011), several habitat improving measures were implemented. Now the site once more supports regionally extinct species like German tamarisk, Dwarf bulrush, Ukrainian brook lamprey, Spined loach and the wolf spider *Arctosa cinerea*. Because of the high ecological value of this riverscape the upper part of the river Drau is listed as Natura 2000 site according to the EU Habitats Directive in 1998. Since May 24th 2011 the Natura 2000 site is ruled by Carinthian law as “Europaschutzgebiet Obere Drau” (49th federal ordinance of the Carinthian Government, Federal State Law Gazette 2011, 15-NAT-2013/62/2011).

13. Ramsar Criteria:

Tick the box under each Criterion applied to the designation of the Ramsar site. See Annex II of the *Explanatory Notes and Guidelines* for the Criteria and guidelines for their application (adopted by Resolution VII.11). All Criteria which apply should be ticked.

1	2	3	4	5	6	7	8	9
☒	☒	☒	☒	❑	❑	☒	☒	❑

14. Justification for the application of each Criterion listed in 13 above:

Provide justification for each Criterion in turn, clearly identifying to which Criterion the justification applies (see Annex II for guidance on acceptable forms of justification).

Criterion 1: The site contains various representative, rare, natural and near-natural wetland types. Particularly noteworthy is the Grey alder alluvial forest of the site, which is the largest in Austria. Due to its extent, its phytosociological characteristic and its structural diversity it has supraregional and international importance too.

According to the EU Habitats Directive we find in the study area several internationally important habitats as listed below: Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp. (3140), Natural eutrophic lakes with Magnopotamion or Hydrocharition type vegetation (3150), Alpine rivers and the herbaceous vegetation along their banks (3220), Alpine rivers and their ligneous vegetation with *Myricaria germanica* (3230), Alpine rivers and their ligneous vegetation with *Salix elaeagnos* (3240), Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation (3260), Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels (6430), *Alpine pioneer formations of the Caricion bicoloris-atrofuscae (7240) and *Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) (91E0). ('*' indicates priority habitat types according to EU Habitats Directive.)

On the Red List of threatened biotope types of Carinthia (Petutsching 1998) we find various wetland-habitats which occur in the study area: brooks (2) and rivers (2) of the mountainous and hill country, groundwater-affected tepid brooks (2), alluvial ponds (2) and wetland waterbodies (2); *Phragmites*-reeds (3) and other reeds (3), wet tall herbaceous vegetation (3), several types of pioneer sites of rivers (alluvion) like vegetation-free sands and gravel surfaces (lowlands) (1), alluvial mud areas with Dwarf bulrush (0), herbaceous riverbank edges (3), shrubbery with German tamarisk (1); sustainably managed pastures and meadows (moist and wet meadows rich in species (3), rich meadows rich in species (V)); intensively managed grassland (wet meadow poor in species (V)); various types of alluvial forests (willow shrub (2), willow alluvial forest (2), White willow alluvial forest (2), Grey alder alluvial forest (3)). (The term in parentheses shows the degree of threat: (0) completely destroyed or disappeared, (1) threatened of complete habitat destruction, (2) endangered, (3) vulnerable, (V) declining.)

Criterion 2: Numerous threatened species of the Annex II (16 species) and Annex IV (24 species) of the EU Habitats Directive have their natural habitat in the site. These are the Otter (*Lutra lutra*; II, IV), the mouse-eared bat-species *Myotis emarginatus* (II, IV), *Myotis myotis* (II, IV), *Myotis daubentonii* (IV) and *Myotis mystacinus* (IV), the Lesser horseshoe bat (*Rhinolophus hipposideros* (II, IV), the pipistrelle bat-species *Pipistrellus kuhlii* (IV), *Pipistrellus nathusii* (IV) and *Pipistrellus pipistrellus* (IV), the Common long-eared bat (*Plecotus auritus*; IV), the Serotine bat (*Eptesicus serotinus*; IV) and the Parti-coloured bat (*Vespertilio murinus*; IV), the Amphibians Yellow-bellied toad (*Bombina variegata*; II, IV), Agile frog (*Rana dalmatina*; IV), Pool frog (*Rana lessonae*; IV), Tree frog (*Hyla arborea*; IV) and Italian crested newt (*Triturus carnifex*; II, IV), the reptiles Wall lizard (*Podarcis muralis*; IV), Sand lizard (*Lacerta agilis*; IV), Smooth snake (*Coronella austriaca*; IV) and Aesculapian snake (*Zamenis longissimus*, IV), the fish-species Spined loach (*Cobitis taenia*; II), Bullhead

(*Cottus gobio*; II), Ukrainian brook lamprey (*Eudontomyzon mariae*; II), Danube salmon (*Hucho hucho*; II), Vairone (*Leuciscus souffia agassizi*; II) and Bitterling (*Rhodeus sericeus amarus*; II), the White-clawed crayfish (*Austropotamobius pallipes*; II), the Thick-shelled river mussel (*Unio crassus*; II, IV), the butterflies Jersey tiger (*Callimorpha quadripunctaria*; II) and Clouded Apollo (*Parnassius mnemosyne*; IV) and the orchid Yellow lady's slipper (*Cypripedium calceolus*; II, IV).
Additionally all of the mentioned bat-, reptile- and amphibian-species, the White-clawed crayfish, the Clouded Apollo and the Yellow lady's slipper are completely protected too (according to the protection status in Carinthia) and are listed in the respective Red Lists.

The site supports 32 bird-species of the Annex I of the Birds Directive – to name but a few: Little bittern (*Ixobrychis minutus*), Night heron (*Nycticoras nycticorax*) and Purple heron (*Ardea purpurea*), White and Black stork (*Ciconia cinonia*, *C. nigra*), Ruff (*Philomachus pugnax*), Red-backed shrike (*Lanius collurio*), Wood sandpiper (*Tringa glareola*) and Kingfisher (*Alcedo atthis*). Furthermore 51 species of about 140 existing bird-species of the site are noted on the Red List of birds of Carinthia.

13 of the 22 fish-species of the Upper Drau are listed on the Red List of threatened animals of Carinthia. The wolfspider *Arctosa cinerea* is classified as a critically endangered species as well.

The critically endangered German tamarisk (*Myricaria germanica*) and the Dwarf bulrush (*Typha minima*; repopulated), which was thought to be extinct (Red List of threatened species of ferns and flowering plants of Carinthia), are completely protected in Carinthia. Further vulnerable (3), regionally vulnerable and endangered (2) species within the site are Costal small-reed (*Calamagrostis pseudophragmites*, 3), Giant bellflower (*Campanula latifolia*, 3), *Chondrilla chondrilloides* (2), Yellow cyperus (*Cyperus flavescens*, 2), Black cyperus (*Cyperus fuscus*, 3), Marsh helleborine (*Epipactis palustris*, 3), Mare's tail (*Hippuris vulgaris*, 3), Spiked water milfoil (*Myriophyllum spicatum*, r), Whorled water milfoil (*Myriophyllum verticillatum*, 3), Lesser butterfly-orchid (*Platanthera bifolia*, r), Alpine pondweed (*Potamogeton alpinus*, 3), Longleaf pondweed (*Potamogeton nodosus*, 2), *Potamogeton berchtoldii* (r), *Potamogeton pusillus* (3), *Potamogeton trichoides* (3), Simple bur-reed (*Sparganium emersum*, 3), Branched bur-reed (*Sparganium erectum* ssp. *erectum*, 2) and Southern bladderwort (*Utricularia australis*, 3).

As to habitat please see Criterion 1.

Criterion 3: The Drau and the tributary streams support 19 native fish-species, such as Danube salmon (*Hucho hucho*), Vairone (*Leuciscus souffia agassizi*), Bullhead (*Cottus gobio*) and Bitterling (*Rhodeus sericeus amarus*), which find an adequate habitat for reproduction. Spined loach (*Cobitis taenia*) and Ukrainian brook lamprey (*Eudontomyzon mariae*) were thought to be extinct, until repopulation attempts were implemented.

In the Upper Drau Valley and the Upper Gail Valley the White-clawed crayfish (*Austropotamobius pallipes*) has its only natural distribution within Austria. The rare German tamarisk (*Myricaria germanica*) and Dwarf bulrush (*Typha minima*) have been successfully repopulated under a LIFE-project (1999 – 2003). The current populations are the only known distributions in Carinthia.

The Otter (*Lutra lutra*) which had temporarily disappeared has redeveloped a small population thanks to river revitalisation. The Italian crested newt (*Triturus carnifex*) has been recorded in at least five sites. Within the whole site Yellow-bellied toad (*Bombina variegata*) has secured populations. Near Baldramsdorf the White stork (*Ciconia ciconia*) has been

successfully breeding for years. Additionally the spider *Arctosa cinerea* shows self-preserving populations.

All these species are of international importance for maintaining the biological diversity in the Alpine biogeographic region.

Criterion 4: The Site supports animal species at a critical stage of their life cycle. Many specialist animals need the various wetland types, river, brooks and open water areas for reproduction. For instance the Kingfisher has been regularly breeding again in the steep faces of the banks of the Upper Drau. River widening measures like the construction of distributaries have created a valuable sanctuary for many species of fish. The alluvial ponds serve as “nurseries” for young fish and amphibians. Others, like bats, profit from the area as hunting grounds.

The importance of the Upper Drau Valley for birds (over 140 species of birds) is of major importance for many reasons including as a resting place during their migration over the Alps.

Criterion 7: Within the site the Drau River is associated with the grayling region. Characteristic fishes are Grayling (*Thymallus thymallus*), Brown trout (*Salmo trutta* f. *fario*), Sneep (*Chondrostoma nasus*), Burbot (*Lota lota*), Chub (*Leuciscus cephalus*) and Minnow (*Phoxinus phoxinus*). The Upper Drau supports 22 fish-species, including 19 native species. 13 species of them are listed on the Red List of threatened animals of Carinthia. Furthermore the site supports 6 fish-species of the Annex II of the EU Habitats Directive: Spined loach (*Cobitis taenia*), Bullhead (*Cottus gobio*), Ukrainian brook lamprey (*Eudontomyzon mariae*), Danube salmon (*Hucho hucho*), Vairone (*Leuciscus souffia agassizi*) and Bitterling (*Rhodeus sericeus amarus*).

Criterion 8: The Drau and the tributary streams function as an adequate habitat for reproduction for native fish-species, for example Vairone (*Leuciscus souffia agassizi*), Bullhead (*Cottus gobio*) and Bitterling (*Rhodeus sericeus amarus*). The Danube salmon (*Hucho hucho*) regularly spawns at the Upper Drau and shows natural populations, which are survivable without stocking. Spined loach (*Cobitis taenia*) and Ukrainian brook lamprey (*Eudontomyzon mariae*) were thought to be extinct, until repopulation attempts were implemented. The alluvial ponds as well serve as “nurseries” for young fish.

---

15. Biogeography (required when Criteria 1 and/or 3 and /or certain applications of Criterion 2 are applied to the designation):

Name the relevant biogeographic region that includes the Ramsar site, and identify the biogeographic regionalisation system that has been applied.

a) biogeographic region:

Alpine biogeographic region

b) biogeographic regionalisation scheme (include reference citation):

Biogeographical Regions Europe, 2005, European Environment Agency

---

16. Physical features of the site:

Describe, as appropriate, the geology, geomorphology; origins - natural or artificial; hydrology; soil type; water quality; water depth, water permanence; fluctuations in water level; tidal variations; downstream area; general climate, etc.

The site is characterised by its ribbonlike shape. After the border crossing at Oberdrauburg the Drau runs through the Upper Drau Valley, flanked by the Kreuzeck range in the north

and Gailtal Alps in the south, and exists the area at the narrow section of the valley at Möllbrücke und Sachsenburg. At this point the river Möll, which carries the glacial run-off of the Pasterze (glacier of Großglockner, the highest mountain of Austria, 3798 m), joins the Drau. Passing the Lurnfeld, the Drau comes into the Lower Drau Valley at Spittal an der Drau, where the Lieser River flows in. The described area is the last free-flowing, meaning not dammed stretch of the Drau River.

Originally the Drau was a wide branching river and wetland water body system (furcation type). Large gravel surfaces, willow brushwood, Grey alder wetland, widespread pastures and damp meadows characterised the valley floor. Since the middle of the 19th century regulation of the river has been in force and since this time bed load barriers were implemented at the torrents of the catchment area. The regulatory procedures led to losses of valuable habitats as well as river bed deepening. Revitalisation projects of recent times play an important role for the animal and plant world as well as achieving good ecological conditions as defined by the EU Water Framework Directive. Additionally, they also improve flood protection in the Drau Valley, by expanding the run-off area and stabilising the Drau river bed.

In accordance with EU Water Framework Directive the Upper Drau is assigned to the type “alpine rivers” at the border of the bioregion “Southern Alps” and the bioregion “unglaciated Central Alps” within the ecoregion “Alps”.

Below are some important parameters of the Upper Drau:
River bed width: 20 – 60 m
Gradient: 1.5 – 2.9 ‰
Water temperature: -0.1 – 15.7 °C; mean 8 °C (Sachsenburg)
Run-off (water level Sachsenburg):
- Mean-flow conditions: 73.8 m³/s
- Low-flow conditions: 13.2 m³/s
- Mean annual high waters: 391.2 m³/s
- 30-year flood waters: 841 m³/s
- 100-year flood waters: 1029 m³/s
- Maximum experienced flood: 1030 m³/s (4th september 1965)

Regime type: nivo-glacial i. e. fed from snow and glaciers, maximum run-off in June
River course (until 1870): branched, oscillating, naturally stretched
River course to-date: stretched to arched
Biological water quality: I-II
Fish region: grayling region

The control structure on the Upper Drau shows a mean-flow conditions flood control. The river still has extended retention areas, which overflow in the case of 10-annual events. Studies show, that the retention behaviour of the Upper Drau is balanced. Because of the extended linear shape of the site it is difficult to separate both points 16 and 17 from each other concerning geology, geomorphology, soiltypes and climate. Please see point 17.

---

17. Physical features of the catchment area:
Describe the surface area, general geology and geomorphological features, general soil types, and climate (including climate type).

The valley system was formed during the Upper Tertiary. Several glacial transformations and repeated interglacial depositions were responsible for the current physiognomy. During the last ice age the Drau Valley was filled with a huge glacier up to 2000 m above sea level which formed the tertiary landscape to a wide trough valley with precipitous slopes. The alluvial fans of the tributary streams mostly extend to the low areas of the valley floor and

cause the oscillating river course of the Drau. The bedrock only crops out in a few places. Almost the whole valley shows detritic cones, alluvial fans and avalanche (mudflow) cones.

The northern valley side and the alluvial fans are the main settlement areas, the steep slopes on the southern valley side are only sparsely populated. In some places ground moraines and depositions of the glacier edge with a depth of about 40 m exist. The retreating ice caused the Drau terraces to be built in phases. There are three alluvial terraces, the youngest lies up to 5 m above the valley bottom. Tidal pools, backwaters and abandoned channels within the alluvial terraces can be flooded. The terraces are composed of gravels. A loamy to sandy-silty sediment layer of varying thickness lies on it, which is completely involved in soil formation.

In this area the Upper Drau Valley separates the Southern Limestone Alps from the crystalline Central Alps. The crystalline rocks of the Kreuzeck Range (northern face of the valley) show mica shists and paragneisses. In some places residues of permomesozoic sediments lie on this crystalline (variscan) basement. The rock structur of the Kreuzeck Range extends at the Goldeck. The grade of metamorphosis of the crystalline schist is less than in the Kreuzeck Range, the early Palaeozoic sediments are clay schists and phyllites. There are basically different petrographic conditions in the South of the Drau Valley. The Gailtal Alps, part of the Southern Limestone Alps, are made of mesozoic limestone and dolomite rocks. The relief structure shows foldings and geological faults in west-east direction.

The conditions of temperature and precipitation are related to the southern location within the Alps, the west-to-east extension of the valley and to the remarkably great difference in altitude. The mean annual rainfall is 1121 mm (climate measuring station Oberdrauburg) with maxima of precipitation in spring during March and April as well as September. Minimum precipitation is during February and March. The mean annual air temperature is 8.1 °C (Sachsenburg). Cold temperatures in winter, caused by cold air lake on valley bottom (monthly mean in January at Oberdrauburg under – 5°C) and high temperatures during summer months (monthly mean in July above 18 °C) are characteristic. Another climatic factor is the frequency of fog, caused by the previously mentioned cold air lake and the associated temperature inversion. The macroclimate is attributed to climate type VI 4, of the submontane/montane mid-European temperate zone with well-marked cold season and warm, partly hot summer months.

---

18. Hydrological values:

Describe the functions and values of the wetland in groundwater recharge, flood control, sediment trapping, shoreline stabilization, etc.

The Drau River, the main river of Carinthia, drains almost the whole state area. Major tributaries like Möll, Lieser, Gail or Gurk influence the character. Mountains occupy a significant part of the catchment area (2600 km², Sachsenburg measuring station). That is why the run-off depends less on rainfall than in contrast to delayed snowmelt and therefore mainly on temperature conditions. The snow- and glacier melt last till late summer, so during summer months the Drau is characterised by higher run-off (run-off maximum in June) and cloudy water because of glacial meal. Run-off minima are in January and February (regime type: nivo-glacial). In autumn the Drau has a higher run-off compared to other rivers in Austria.

The flood protection plan on the Upper Drau provides for the fact that (in the case of 10-year floods) floodwaters easily overflow the banks and collect in the wide valley area. In this way, so much water is retained here that downriver locations remain free of flooding. Endangered localities are protected locally. A narrow river course and failure to replenish gravel had

accelerated the deepening of the river bed. This resulted in bank control structures becoming unstable and flood plains lost their function. River bed widening measures have proved to be a successful model on the Upper Drau. They stabilise the Drau bed, retain water and possess additional value for flood protection. Because of different weather conditions the rivers of the Southern Limestone Alps are permanent bed load suppliers whereas northern tributaries occasionally provide bed load.

---

19. Wetland Types

a) presence:
Circle or underline the applicable codes for the wetland types of the Ramsar "Classification System for Wetland Type" present in the Ramsar site. Descriptions of each wetland type code are provided in Annex I of the *Explanatory Notes & Guidelines*.

Marine/coastal: A • B • C • D • E • F • G • H • I • J • K • Zk(a)

Inland: L • M • N • O • P • Q • R • Sp • Ss • Tp Ts • U • Va •
Vt • W • Xf • Xp • Y • Zg • Zk(b)

Human-made: 1 • 2 • 3 • 4 • 5 • 6 • 7 • 8 • 9 • Zk(c)

b) dominance:
List the wetland types identified in a) above in order of their dominance (by area) in the Ramsar site, starting with the wetland type with the largest area.

Xf – Freshwater, tree-dominated wetlands: 434.7265 ha
M – Permanent rivers/streams/creeks: 356.386 ha
4 – Seasonally flooded agricultural land: 75.4131 ha
Ts – Seasonal/intermittent freshwater mareshes/pools on inorganic soil: 35.2179 ha
W – Shrub-dominated wetlands: 33.7049 ha
Tp – Permanent freshwater marshes/pools (below 8 ha): 7.8225 ha
9 – Canals and drainage channels, ditches: 0.4268 ha
N – Seasonal/intermittent/irregular rivers/streams/creeks: 0.2712 ha

---

20. General ecological features:
Provide further description, as appropriate, of the main habitats, vegetation types, plant and animal communities present in the Ramsar site, and the ecosystem services of the site and the benefits derived from them.

In Carinthia the Drau is a typical inner alpine mountain river with Grey alder alluvial forests at the submontane valley floor. Nowadays the agricultural land borders the river in large areas, even so the alluvial forests at the Upper Drau belong to the greatest inner alpine closed alluvial forests at not dammed river stretches. Grey alder (*Alnus incana*) dominates the forest stands, in smaller areas White willow alluvial forests are characteristic. The greatest and most environmentally valuable alluvial forests are to the west of Spittal an der Drau, on the right bank between Unterhaus and Rosenheim and on the left bank in the municipality of Lendorf.

Depending on altitude above water level and frequency of floods, pioneer plant communities, willow shrubs or willow alluvial forests grow at the sand and gravel areas. Typical herbaceous pioneer plants on gravel are Fiorin (*Agrostis stolonifera*), Costal small-reed (*Calamagrostis pseudophragmites*), Tussock grass (*Deschampsia cespitosa*), Reed canary grass (*Phalaris arundinacea*), Large bitter-cress (*Cardamine amara*), Bird's foot trefoil (*Lotus corniculatus*) and Bittersweet (*Solanum dulcamara*).

The whole range of species of the neighbouring alluvial forests is characteristic too. Plants like Yellow saxifrage (*Saxifraga aizoides*), Alpine milkvetch (*Astragalus alpinus*) or Scheuchzer bellflower (*Campanula scheuchzeri*), which were swept away from higher

elevations (subalpine and alpine level) by streams to the Drau ("Alpenschwemmlinge"), exist at the riparian pioneer sites, e. g. gravel banks. On sand Dwarf bulrush (*Tyhpha minima*), Cow bitter (*Tanacetum vulgare*) and Annual fleabane (*Erigeron annuus*) join in.

On gravel bars, which are above river level and lie dry during vegetation period, there are willow shrubs with gapped herb layer. Beside Purple willow (*Salix purpurea*), White willow (*Salix alba*) and Daphne willow (*Salix daphnoides*), which are accompanied by Grey alder (*Alnus incana*), you can find on such sites Bitter willow-shrub (*Salix eleagnos*) and Tamarisk-shrub (*Myricaria germanica*). Bitter willow-Daphne willow alluvial forest grows as seral stage.

Sand bars with decreasing river morphological dynamic support the characteristic French willow shrub (*Salix triandra*), which is replaced by White willow alluvial forest. Grey alder alluvial forest is the alluvial forest type largest in area. Characteristic for intact Grey alder alluvial forests are periodic floods and siltation in case of extraordinary flood events.

The Grey Alluvial Soil, a Humus horizon, develops from the fine silty sands. The soils are dewy to humid. The forest stands are mostly homogen, dominated by Grey alder that are sometimes towered over by areas of White willow.

The specific alluvial climate with evenly high soil and air moisture promotes a good growing herbaceous layer rich in species. The Grey alder-Ash alluvial forest connects landward on the Grey alder alluvial forest. Relating to river level this alluvial forest type is higher than the Grey alder alluvial forest, the dynamic processes are weaker and have less effect. Reed beds with Reed (*Phragmites australis*), bulrush (*Typha* sp.), Reed canary grass (*Phalaris arundinacea*) or sedges (*Carex* sp.) grow at the terrestrialization areas of the waterbodies in the wetlands.

Distribution of the habitats in the site (referred to total area):
Agricultural areas: 8.4 %
Forests and brushes of the alluvial zones: 47 % (Grey alder alluvial forest: 32 %; White willow alluvial forest: 7 %)
Nitrophilous, humid to wet tall herbaceous vegetation: 2 %
Drau River: 31 %
Brooks distributary and oxbow lakes: 1.4 %
Riparian zone: 3.4 % (gravel bar, more or less vegetation free: 1.4%; riparian pioneer shrub: 0.35 %)

---

21. Noteworthy flora:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 14, Justification for the application of the Criteria) indicating, e.g., which species/communities are unique, rare, endangered or biogeographically important, etc. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

The repopulated German tamarisk (*Myricaria germanica*) and Dwarf bulrush (*Typha minima*) are indicator species within the Natura 2000 management plan. Both species serve to refine the qualitative evaluation of the protected habitats according to Habitats Directive. Furthermore the state of the populations gives information about the success of the renaturation measures. The Tamarisk populates gravel banks of running waters and sandpits. The species is extremely endangered – in Carinthia it is threatened with extinction. The existence of German tamarisk is due to natural populations (Kleblach) and largely to repopulation projects. The Dwarf bulrush, the smallest indigenous bulrush species, has only a few habitats within Austria. As a consequence of river regulations and the construction of power plants appropriate habitats disappeared at Drau and Gail and so the species is

thought to be extinct in Carinthia. In the areas of the river widening at Dellach, Greifenburg and Kleblach the Dwarf bulrush was repopulated successfully. The continued existence of both species depends on fluvial dynamics.

Furthermore from a floristic point of view the populations of Yellow lady's slipper (*Cypripedium calceolus*) at the carbonate talus fan of the confluent southern tributaries are remarkable. Additionally the site supports several endangered flowering plants according to the Red List of threatened species of ferns and flowering plants of Carinthia (please see point 14).

Another interesting plant group of inner alpine rivers are the so called "Alpenschwemmlinge". These plants are washed ashore in the form of parts of sprouts or seeds from higher mountain regions and grow along the river banks especially at gravel bars. So beside the alpine scree vegetation they have another main habitat at the open riparian pioneer sites. Beside the above mentioned plants (please see point 20), *Campanula cochlearifolia*, *Oxytropis campestris* (Yellow oxytropis) and *Gypsophila repens* have been recorded.

---

22. Noteworthy fauna:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 14. Justification for the application of the Criteria) indicating, e.g., which species/communities are unique, rare, endangered or biogeographically important, etc., including count data. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Characteristic for the site are typical bird communities of inner alpine branching rivers with the Kingfisher (*Alcedo atthis*), Sandpiper (*Actitis hypoleucos*), Grey wagtail (*Motacilla cinearea*) and White throated dipper (*Cinclus cinclus*). In the alluvial forests we can find species such as the Golden oriole (*Oriolus oriolus*) and Lesser spotted woodpecker (*Dendrocopos minor*), which are numerous in the alderwoods. Other important breeding birds are Grey heron (*Ardea cinerea*), Honey buzzard (*Pernis apivorus*), Sand piper (*Actitis hypleucos*), Eagle owl (*Bubo bubo*), Hazel grouse (*Bonasa bonasia*), Nightjar (*Caprimulgus europaeus*), Peregrine falcon (*Falco pergrinus*) and, for a couple of years, White stork (Ciconia ciconia). European wide protected birds were already previously mentioned as well as the importance of the site as a resting place for migrating birds (please see point 14).

The Danube salmon (*Hucho hucho*) regularly spawns at the Upper Drau and shows natural populations, which are survivable without stocking. The Upper Drau supports 22 fish-species, the most important were already mentioned in point 14.

Among the Amphibians, beside the already mentioned Annex II species Yellow-bellied toad and Italian crested newt, Agile frog (*Rana dalmatina*), *Phelophylax* sp., Tree frog (*Hyla arborea*), Common toad (*Bufo bufo*), Grass frog (*Rana temporaria*) and Common newt (*Triturus vulgaris*) have been recorded at the Upper Drau.

Among the reptiles there is a decline. There are actual findings of 4 lizard species, (Blind worm (*Angius fragilis)*, Green lizard (*Lacerta viridis*), Sand lizard (*Lacerta agilis*), Wall lizard (*Podarcis muralis*)) and 3 snake species (Grass snake (*Natix natrix*), Smooth snake (*Coronella austriaca*), Aesculapian snake (*Zamenis longissimus*)). With exception of Blind worm and Grass snake, the remaining reptiles have been recorded less often.

Among the crayfishes European crayfish (*Astacus astacus*), Stone crayfish (*Austropotamobius torrentium*) and White-clawed crayfish (*Austropotamobius pallipes*) has been recorded. There were several sightings of populations of the White-clawed crayfish, a faunistic rarity, in tributary waters near Greifenburg.

The last record of Thick-shelled river mussel dates back about 20 years. It is to be feared that this species has become extinct within the site.

The site supports 60 of the 80 Carinthian recorded mammal species. Noteworthy are the existing bat-species and the Otter, which are already mentioned in point 14.

---

23. Social and cultural values:

a) Describe if the site has any general social and/or cultural values e.g., fisheries production, forestry, religious importance, archaeological sites, social relations with the wetland, etc. Distinguish between historical/archaeological/religious significance and current socio-economic values:

Log driving has long tradition at the Drau. The roundwood, especially spruce and fir, was transported to the sawmill in the form of rafts during summer months. Nowadays there is an annual log driving meeting on the Drau.

The alluvial forest was used as woodland pasture and for firewood. Both traditional uses were regulated in the management plan.

b) Is the site considered of international importance for holding, in addition to relevant ecological values, examples of significant cultural values, whether material or non-material, linked to its origin, conservation and/or ecological functioning?

If Yes, tick the box ☒ and describe this importance under one or more of the following categories:

i) sites which provide a model of wetland wise use, demonstrating the application of traditional knowledge and methods of management and use that maintain the ecological character of the wetland:

Until now the two LIFE Projects were the largest “Nature Restoration Campaign” as measured by revitalised river length in the history of river engineering in Carinthia. Important measures were mentioned in point 27d. For further information please see www.life-drau.at.

ii) sites which have exceptional cultural traditions or records of former civilizations that have influenced the ecological character of the wetland:

iii) sites where the ecological character of the wetland depends on the interaction with local communities or indigenous peoples:

iv) sites where relevant non-material values such as sacred sites are present and their existence is strongly linked with the maintenance of the ecological character of the wetland:

---

24. Land tenure/ownership:

a) within the Ramsar site:

Republic of Austria (public water resource)
Government of Carinthia
Municipalities
VERBUND Hydro Power AG
Österreichische Bundesforste AG (Austrian Federal Forests)
Private owners

b) in the surrounding area:

Government of Carinthia
Municipalities
Österreichische Bundesforste AG (Austrian Federal Forests)
Private owners

25. Current land (including water) use:

a) within the Ramsar site:

Hunting; fishing; agriculture/farming; sustainable forestry; recreational use (especially biking, hiking, barbecues, canoeing and a small amount of camping);

b) in the surroundings/catchment:

Hunting; agriculture/farming; forestry; generation of electricity; bed-load use (gravel removal); tourism; sports; settlement.

26. Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land (including water) use and development projects:

a) within the Ramsar site:

Because of flood disasters in the middle of the 19th century and with the building of the railroad line through the Upper Drau Valley (in about 1870) regulatory procedures set the river course, in order to reduce flood danger and for intensive agricultural use and to make it possible to expand settlement areas. The original valley floor shrank. After the 100-year floods in 1965 and 1966 a new problem arose. Severe river bed erosion occurred in the Drau, due to decreased bed load influx from the obstructed torrents, gravel removal from the river and narrowing the river bed. The riverbed deepened even further, many water bodies went dry with the decreasing groundwater level. Agriculture and the stability of the bank protection structures also suffered.

b) in the surrounding area:

In the Upper Drau Valley the diversion and storage power plants of the catchment area affect the ecological system of the Drau. Two storage power plants cause considerable fluctuations in daytime run-off as well as changes in natural seasonal water run-off. In particular the return water from the Malta-Unterstufe power plant leads to hydropeaking in the Drau River.

Local water treatment facilities could pose a problem due to technical defects, by dumping sewage into the river. In some cases the routing of roads in the close proximity to the river could pose a problem when used by heavy traffic (e.g. in case of accident).

27. Conservation measures taken:

a) List national and/or international category and legal status of protected areas, including boundary relationships with the Ramsar site:

In particular, if the site is partly or wholly a World Heritage Site and/or a UNESCO Biosphere Reserve, please give the names of the site under these designations.

In the year 1998 the upper part of the river Drau was proposed as Natura 2000 site according to the EU Habitats Directive (proposed Sites of Community Importance [pSCI]; Obere Drau, AT2114000) and in 2011 it was classified as Special Protection Area (SPA).

Since May 24th 2011 the Natura 2000 site has been ruled by law as "Europaschutzgebiet Obere Drau" (Special Area of Conservation [SAC]; 49th federal ordinance of the Carinthian Government, Federal State Law Gazette 2011, 15-NAT-2013/62/2011).

b) If appropriate, list the IUCN (1994) protected areas category/ies which apply to the site (tick the box or boxes as appropriate):

Ia ❑;Ib ❑; II ❑; III ❑; IV ☒; V ❑; VI ❑

c) Does an officially approved management plan exist; and is it being implemented?:

A Natura 2000-management plan exists (THEISS et al. 2004). Based on this, analysis and balance of habitats and vegetation as well as associated studies to the LIFE II-Project (2006 – 2011) were made (EGGER et al. 2012). Under the first LIFE-Project (1999 – 2003) partially management plans "Fish ecological management plan" and "Alluvial forest utilization concept" were put into effect and corresponding measures implemented. The two partial management plans were the basis of the Natura 2000-management plan.

d) Describe any other current management practices:

At the beginning of the 1990's hydraulic engineers and environmentalists acknowledged their common interests in the Upper Drau, following the cancellation of the construction of a power plant, due to strong public opposition in the 1980's. This resulted in intensive collaboration where both the view of water management and nature conservation were taken into consideration. As early as 1993, on the basis of a water management concept, the first renaturation measures began in the form of river widening. Based on this in the course of the first LIFE-Project "Restoration of the wetland and riparian area on the Upper Drau River", between 1999 and 2003, a range of measures were implemented: 10 kilometres of river have already been revitalised, 22 wetland waterbodies have been constructed and about 100 hectares of alluvial forest have been safeguarded. The main aims of the project were on river widening and natural configuration of the riverbanks. Furthermore new alluvial forest stands developed because of wood planting on purchased agricultural areas and because of natural succession along new constructed wetland waterbodies. Management agreements with private owners saved the preservation of alluvial forests and put into effect actions for the conservation of particular endangered animal and plant species. These measures were implemented: purchase of land (55 hectares); river widening and renaturation of river banks (about 10 km; major river widening near Spittal, Kleblach and Dellach); restructuring of tributaries; removal of migration barriers (12 river segments); construction of wetland waterbodies (about 4 to 5 hectares) and alluvial forest stands (3000 plants on 4,5 hectares); one-off payment for grazing rights in the alluvial forest (65 hectares); management agreements in the alluvial forest (40 hectares); return of Tamarisk, Dwarf bulrush, Ukrainian brook lamprey, Spined loach, Black poplar; population strengthening of Bitterling, mussels (*Anodonta* sp.), White-clawed crayfish, Common tree frog, Minnow, Sneep, Danube salmon, Grayling; bat nesting aids (63), Kingfisher breeding aids (construction of breeding sites on steep faces).

During the 2nd LIFE-Project "Life vein – Upper Drau River" (2006 – 2011) several goals, like further stabilisation of the Drau river bed through widening and strengthening of bed load influx from tributary brooks, more pristine, dynamic shaped river habitats, improved information and visitor management on site as well as international cooperation with the respective authorities of the Drau neighbouring states were pursued. Three river widening measures at Rosenheim, Amlach/St. Peter and Obergottesfeld as well as an open check dam at Feistritzbach were constructed.

River widening measure at Obergottesfeld: Three kilometres of the narrow embankment was removed and hidden built-in breakwaters were installed to protect the banks during floods. Several river bed widening measures, distributaries, oxbow lakes and standing bodies of water were constructed.

River widening measure at Rosenheim above Spittal: For a one-kilometre stretch a new side channel of the river, several wetland water bodies and a system of bayous came into being. Steep river banks were created in the side channel as Kingfisher's breading sites.

River widening measures at Amlach/St. Peter: The river bed was widened to 20 metres. A new distributary and wetland water bodies were created. 2 hectares of alluvial forest will be developed.

Open check dam at Feistritzbach: A partially open bed load dosing dam was constructed. A large driftwood drake holds back alluvial driftwood and debris but lets the crushed rock and gravel pass through during times of flooding.

Furthermore monitoring of fish, ground beetles and other invertebrates, amphibians, river morphology and bed load influx at Feistritzbach were executed in the frame of the 2nd LIFE-Project.

28. Conservation measures proposed but not yet implemented:
e.g. management plan in preparation; official proposal as a legally protected area, etc.

As already mentioned a water management plan and a Natura 2000-management plan exist. Based on these several measures (river widening) are proposed, but not yet implemented.

In the course of a nature conservation project, financed by an Austrian banking institution, amphibian breeding sites will be created near to Windschnurn in winter 2012/2013.

Close to Windschnurn a substitute area for the B 100-bypass at Greifenburg is projected. Measures like river widening and sustainable use of the neighbouring areas shall be implemented.

29. Current scientific research and facilities:
e.g., details of current research projects, including biodiversity monitoring; existence of a field research station, etc.

At present an Interreg IV A project "Grenzüberschreitende wasserwirtschaftliche Initiative für die Flüsse Drau und Mur" (Transborder water management initiative for Drau River and Mur River) between Austria and Slovenia is in process. The aim of the project is the coordination and joint realisation of water management work on the main rivers. Common standards for the flood and bed-load management shall be created, which currently do not exist. The project shall play a part in contributing to protect human and its environment against natural danger and to improve the habitat for flora and fauna.

The Carinthian Government carries out monitoring (e.g. of breeding birds) required by law according to the Habitats Directive.

30. Current communications, education and public awareness (CEPA) activities related to or benefiting the site:
e.g. visitors' centre, observation hides and nature trails, information booklets, facilities for school visits, etc.

Within the framework of the two LIFE-Projects a lot of public relation exercises were conducted, e.g. excursions, presentations, volunteer work projects, information leaflets, postcards, media relations, films, information boards, homepage (www.life-drau.at) etc. Some of them are specified below.

Two leaflets on the subjects of species conservation and water engineering as well as a bike map were made among others within the first LIFE-Project. Near Spittal a viewing platform was opened in summer 2003. Within the site there are 12 Info Points with a quick glance at nature and flood on the Upper Drau.

A Carinthian film producer made the poetic film "Rittlingers Dream – A New Life on the Upper Drau", which is a philosophical and at the same time scientific reflection about the current revitalisation of the Upper Drau.

A Folding map "People and Nature" gives valuable tips for nature compatible free time use and local recreation. A LIFE-touring exhibition will be shown in schools and public buildings until the end of 2012.

On the occasion of the Drau revitalisation near Amlach/St. Peter a postcard with a hologram effect (original state 2006/state after building completion 2010) was published. An information brochure about the 2nd LIFE Project "Life vein – Upper Drau" was published in German, English and Italian. At Berg im Drautal a birdwatching tower was built for the observation of Kingfishers.

---

31. Current recreation and tourism:
State if the wetland is used for recreation/tourism; indicate type(s) and their frequency/intensity.

Along the river outdoor activities such as barbecuing, biking, hiking/walking and canoeing are very popular. A continuously signposted bike path, the Drau cycle route from Toblach (South Tyrol, Italy) to Maribor (Slovenia), which runs mostly along the river bank, passes the site.

The Outdoor Park Upper Drau Valley offers guided canoe and riverboarding rides along the Upper Drau from Oberdrauburg to Sachsenburg. The 38.6 kilometres long route is divided into 8 stages, each with a distinctly marked entry and exit point. Also you can take a river trip by a historically recreated not motorised flat-bottomed boat.

In 2007 a water adventure area was opened at Dellach (play and bathing area on the river, sunbathing lawn, barbeque area, tree house with lookout and information point). Additionally the Drau River is used for fly fishing.

---

32. Jurisdiction:
Include territorial, e.g. state/region, and functional/sectoral, e.g. Dept of Agriculture/Dept. of Environment, etc.

Amt der Kärtner Landesregierung
Abteilung 8 (Kompetenzzentrum Umwelt, Wasser und Naturschutz,
Uabt. Naturschutz und Nationalparkrecht)
Mag. Christian Kau
Flatschacher Straße 70
9021 Klagenfurt am Wörthersee

---

33. Management authority:
Provide the name and address of the local office(s) of the agency(ies) or organisation(s) directly responsible for managing the wetland. Wherever possible provide also the title and/or name of the person or persons in this office with responsibility for the wetland.

Amt der Kärntner Landesregierung
Abteilung 8, Kompetenzzentrum Umwelt, Wasser und Naturschutz
Uabt. Naturschutz und Nationalparkrecht
Sachgebiet Schutzgebietsmanagement
Ing. Klaus Kleinegger
DI (FH) Mag. Johann Wagner
Flatschacher Straße 70
9021 Klagenfurt am Wörthersee

Amt der Kärntner Landesregierung
Abteilung 8, Kompetenzzentrum Umwelt, Wasser und Naturschutz
Uabt. Naturschutz und Nationalparkrecht
Sachgebiet „Sachverständigendienst Naturschutz"
Dr. Werner Petutschnig
Flatschacher Straße 70
9021 Klagenfurt am Wörthersee

Amt der Kärntner Landesregierung
Abteilung 8, Kompetenzzentrum Umwelt, Wasser und Naturschutz
Uabt. Schutzwasserwirtschaft
Dipl.-Ing. Norbert Sereinig
Flatschacher Straße 70
9020 Klagenfurt a. W.

Arge NATURSCHUTZ
Mag. Klaus Krainer
Nationales Ramsar Komitee Österreich
Ländervertreter Kärnten

---

34. Bibliographical references:
Scientific/technical references only. If biogeographic regionalisation scheme applied (see 15 above), list full reference citation for the scheme.

AMT DER KÄRNTNER LANDESREGIERUNG (1989): Verordnung der Landesregierung vom 21. Februar 1989, Zl. Ro-147/3/1989, über den Schutz wildwachsender Pflanzen (Pflanzenartenschutzverordnung), LGBl. Nr. 27/1989. Klagenfurt.

AMT DER KÄRNTNER LANDESREGIERUNG (ed.) (1999): Rote Listen gefährdeter Tiere Kärntens. Naturschutz in Kärnten 15.

AMT DER KÄRNTNER LANDESREGIERUNG (ed.) (2004): LIFE Projekt Auenverbund Obere Drau. Endbericht. Amt der Kärntner Landesregierung, Abt. 18 Wasserwirtschaft. Klagenfurt.

AMT DER KÄRNTNER LANDESREGIERUNG (ed.) (2008a): Drau Sohlstabilisierung, Liesermündung bis Möllmündung im Zuge des LIFE-Projektes „Auenverbund Obere Drau", Ausführung, Bilddokumentation, Einlage 5.1. Amt der Kärntner Landesregierung, Abt. 18 – Wasserwirtschaft, Unterabteilung Spittal/Drau.

AMT DER KÄRNTNER LANDESREGIERUNG (ed.) (2008b): Drau Wasserbaumaßnahme LIFE im Zuge des LIFE-Projektes „Auenverbund Obere Drau" Ausführung, Bilddokumentation, Einlage 5.3. Amt der Kärntner Landesregierung, Abt. 18 – Abt. 18 Wasserwirtschaft, Unterabteilung Spittal/Drau.

AMT DER KÄRNTNER LANDESREGIERUNG (2011): 49. Verordnung der Kärntner Landesregierung vom 24. Mai 2011, Zahl. 15-NAT-2013/62/2011, mit der das Gebiet zwischen der Landesgrenze bei Oberdrauburg bis zum Beginn des Draustaus Paternion östlich von Spittal a. d. Drau zum Europaschutzgebiet „Obere Drau" erklärt wird. Klagenfurt.

AMT DER KÄRNTNER LANDESREGIERUNG (ed.) (2011): LIFE-Projekt Lebensader Obere Drau. Kärntens größte Naturrückholaktion (2006 – 2011). Broschüre. Amt der Kärntner Landesregierung, Abt. 8, Uabt. Schutzwasserwirtschaft. Klagenfurt.

AMT DER KÄRNTNER LANDESREGIERUNG (ed.) (2011): Lebensader Obere Drau. LIFE Final report. Amt der Kärntner Landesregierung, Abt. 8, Uabt. Schutzwasserwirtschaft. Klagenfurt.

AUSTRIAN FEDERAL MINISTRY FOR AGRICULTURE, FORESTRY, ENVIRONMENT AND WATER MANAGEMENT & GOVERNMENT OF CARINTHIA (ed.) (2008): „Is the Drava River Basin management sustainable and well on the way?". Report of the International Symposium "Drava River Vision", Maribor, Slovenia. Austrian Federal Ministry for Agriculture, Forestry, Environment and Water Management, Abt. II/4 and Government of Carinthia, Department of Water Management. Vienna, Klagenfurt.

BERNT, D. (Red.) (1990): Raum- und Umweltverträglichkeitsprüfung der Kraftwerksprojekte Obere Drau I. Sachsenburg – Spittal – Mauthbrücken. Im Auftrag des Amtes der Kärntner Landesregierung, Abt. Landesplanung und der Österreichischen Draukraftwerke. Wien.

EGGER, G. (1993): Gewässerbetreuungskonzept "Obere Drau". Lienz – Sachsenburg. Arbeitspaket 10 – Vegetation. Unveröff. Bericht im Auftrag des Amtes der Kärntner Landesregierung, Abt. Wasserwirtschaft. Klagenfurt.

EGGER, G., KUCHER, T., AIGNER, S. & KUGI, K. (2006): Vegetationsmonitoring Maßnahmenbereich Kleblach-Ost. Unveröff. Projektbericht im Auftrag des Amtes der Kärntner Landesregierung. Klagenfurt.

EGGER, G., EXNER, A., HASSLER, J., SACHER, B. & ANGERMANN, K. (2008): Vegetationsmonitoring Maßnahmenbereich Kleblach-Ost. Unveröff. Projektbericht im Auftrag des Amtes der Kärntner Landesregierung. Klagenfurt.

EGGER, G., ANGERMANN, K. & GRUBER, A. (2010): Wiederansiedelung der Deutschen Tamariske (Myricaria germanica (L.) DESV.) in Kärnten. Carinthia II, 200/120: 393 – 418.

EGGER, G., GRUBER, A., AIGNER, S., LENER, F., MELCHER, D., BRUNNER, D. & MERKAC, N. (2012): Monitoring Natura 2000-Gebiet „Obere Drau". Begleitende Untersuchungen zum LIFE II-Projekt. Analyse und Bilanz der Schutzobjekte Lebensraumtypen und Vegetation. Ergänzter Bericht. Klagenfurt.

EXNER, A., EGGER, G., KUGI, K. & KUCHER, T. (2008): Vegetationsmonitoring Maßnahmenbereich Kleblach-Ost (Obere Drau). Unveröff. Projektbericht im Auftrag des Amtes der Kärntner Landesregierung. Klagenfurt.

EXNER, A. & MICHOR, K. (2009): Auenverbund Obere Drau – Geschichte einer erfolgreichen Revitalisierung. In: Egger, G., Michor, K., Muhar, S. & Bednar B. (ed.): Flüsse in Österreich – Lebensadern für Mensch, Natur und Wirtschaft, 278 – 282. Innsbruck: Studienverlag.

DRESCHER, A., EGGER, G., FUCHSIG, I., PETUTSCHNIG, J. & PETUTSCHNIG, W. (1990): Raum- und Umweltverträglichkeitsprüfung der Kraftwerksprojekte Obere Drau I. Teilgutachten 2 Vegetation. Im Auftrag der Kärntner Landesregierung, Abt. Landesplanung und der Österreichischen Draukraftwerke. Graz.

DRESCHER, A., EGGER, G., PETUTSCHNIG, W., PETUTSCHNIG, J. & WRBKA-FUCHSIG, I. (1995): Landschaftspflegeplan Baldramsdorfer Feld und Schutzgebietskonzept Obere Drau. Vegetationsökologische Bestandsaufnahme und Schutzkonzept der Drauauen zwischen Lendorf und Spittal (Kärnten). Naturschutz in Kärnten, Band 14: 1 - 96.

KNIELY, G., NIKLFELD, H. & SCHRATT-EHRENDORFER, L. (1995): Rote Liste der gefährdeten Farn- und Blütenpflanzen Kärntens. Carinthia II, 185/105: 353 – 392.

KOMPOSCH, C., KOMPOSCH, B. PAIL, W. PETUTSCHNIG, W. (2003): LIFE-Projekt Obere Drau – Zoologisches Monitoring. Unveröff. Bericht im Auftrag des Amtes der Kärntner Landesregierung, Abt. Wasserwirtschaft, Klagenfurt.

KORBER, S., NIEDERMBICHLER, I., MAYR, P. & MICHOR, K. (2008): LIFE-Projekt „Lebensader Obere Drau" Flussaufweitung St. Peter/Amlach, Flkm 65,700 bis Flkm 66,835. Lageplan. Unveröff. Bericht.

KUCHER, T., EGGER, G., EGGER, B., MOSER, M., RASSI, Y. & RIPPEL-KATZMAIR, I. (2000): LIFE-Projekt Auenverbund Obere Drau Basiskarte. Unveröff. Bericht im Auftrag des Amtes der Kärntner Landesregierung, Abt. Wasserwirtschaft. Klagenfurt.

KUCHER, T., AIGNER, S. & EGGER, G. (2003): LIFE-Projekt „Auenverbund Oberes Drautal" – Monitoring Vegetation. Unveröff. Projektbericht im Auftrag des Amtes der Kärntner Landesregierung. Klagenfurt.

LENER, F. (2011): Entwicklung und Etablierung der Deutschen Tamariske (*Myricaria germanica*). Diplomarbeit. Universität für Bodenkultur. Wien.

MICHOR, K. (Red.) (1995): Gewässerbetreuungskonzept Obere Drau (Lienz – Sachsenburg). Gewässerspezifisches Leitbild, sektoraler Teil, operationaler Teil. 4. Arbeitsschritt. Unveröff. Bericht im Auftrag des Amtes der Kärntner Landesregierung, Abt. Wasserwirtschaft. 3. zusammengefasster Bericht, Lienz.

MICHOR, K., UNTERLERCHNER, M, ANGERER, H., ERBSTALLER, J., EGGER, G., GRAF, M., HABERSACH, H., HAJNY, C., JUNGWIRTH, M., MORITZ, C., NACHTNEBEL, H. P., NAMESTEK, G., PETUTSCHNIG, J., RITZENFELD, T., SAXL, R., SEHER, G., STEINDL, W., WICK, H. & ZEDROSSER A. (1994): Gewässerbetreuungskonzept Ober Drau, Zusammenfassung „Ausgewählter Wirbeltiergruppen". Unveröff. Bericht im Auftrag des Amtes der Kärntner Landesregierung, Abt. Wasserwirtschaft, 3. zusammengefasster Bericht, Lienz.

MUHAR, S., EGGER, G., ANGERMANN, K., AIGNER, S., KUCHER, T., ZAUNER, G., PINKA, P., UNFER, G., SCHMUTZ, S., JUNGWIRTH, M., MICHOR, K. & UNTERLERCHER, M. (2000): Beurteilung flussbaulicher Maßnahmen an der Oberen Drau in Hinblick auf die Verbesserung der ökologischen Funktionsfähigkeit. Wien.

PETUTSCHNIG, J. (2001a): Flusskrebsvorkommen in Kärnten. Rudolfinum, Jahrbuch des Landesmuseums für Kärnten 2000: 291 – 304. Klagenfurt.

PETUTSCHNIG, J. (2001b): Artenschutzprojekt Dohlenkrebs. Kärntner Naturschutzberichte 6: 25 – 34.

PETUTSCHNIG, W., PETUTSCHNIG, J. & EGGER, G. (1991): Gefährdete Augewässer im Oberen Drautal. Carinthia II, 181/101: 79 – 87.

PETUTSCHNIG, W. (1994): Die Deutsche Tamariske (*Myricaria germanica* (L.) DESV.) in Kärnten. Carinthia II, 184/104: 19 – 30.

PETUTSCHNIG, W. (1998): Rote Liste der gefährdeten Biotoptypen Kärntens. Carinthia II 188./108.: 201 – 218.

PETUTSCHNIG, W. (2003): Das LIFE-Projekt „Auenverbund Obere Drau". Kärntner Naturschutzberichte 8: 15 – 24.

PETUTSCHNIG, W. (2009): Die Deutsche Tamariske – Eine gelungene Wiederansiedelung an der Oberen Drau in Kärnten. In: Egger, G., Michor, K., Muhar, S. & Bednar, B. (ed.): Flüsse in Österreich – Lebensadern für Mensch, Natur und Wirtschaft, 284 – 286. Innsbruck: Studienverlag.

PETUTSCHNIG, W. & STREITMAIER, D. (2001): Der Eisvogel (*Alcedo atthis ispida* L.) in Kärnten. Carinthia II, 191/111: 57 – 72.

PETUTSCHNIG, W. & HONSIG-ERLENBURG, W. (red.) (2004): Das Obere Drautal. Tiere, Pflanzen und Lebensräume einer inneralpinen Flusslandschaft. Carinthia II/61. Sonderheft

ÖSTERREICHISCHES INSTITUT FÜR RAUMPLANUNG (ed.) (1991): Raum- und Umweltverträglichkeitsprüfung Obere Drau I. Schlussbericht. Wien.

REITER, G., HÜTTMEIR, U. & JERABEK, M. (2002): Erhebung der Fledermausarten im Natura 2000-Gebiet „Obere Drau". Unveröff. Bericht im Auftrag des Amtes der Kärntner Landesregierung, Abt. Wasserwirtschaft. Klagenfurt.

THEISS, M., MICHOR, K., EGGER, G., HOFFERT, H., PETUTSCHNIG, W., KRAINER, K., KOMPOSCH, C. & PETUTSCHNIG, J. (2004): Gebietsmanagementplan Natura 2000-Gebiet Obere Drau. Unveröff. Projektbericht im Auftrag des Amtes der Kärntner Landesregierung, Abt. Wasserwirtschaft. Klagenfurt.

UIBLEIN, F., FRIEDL, T., PROCHINIG, U. & HONSIG-ERLENBURG, W. (2002): Fischereiökologischer Managementplan Obere Drau. Unveröff. Bericht im Auftrag des Amtes der Kärntner Landesregierung, Abt. Wasserwirtschaft. Klagenfurt.

UNTERLERCHER, M. & PETUTSCHNIG, W. (2011): Lebensader Obere Drau. F.2 Monitoring. Synthesebericht. Amt der Kärntner Landesregierung, Abt. 18 Wasserwirtschaft, Uabt. Spittal/Drau. Spittal/Drau.

ZULKA, K. P. (2005): Rote Listen gefährdeter Tiere Österreichs. Checklisten, Gefährdungsanalysen, Handlungsbedarf. Teil 1: Säugetiere, Vögel, Heuschrecken, Wasserkäfer, Netz-flügler, Schnabelfliegen, Tagfalter. Böhlau: Wien, Köln, Weimar.

ZULKA, K. P. (2007): Rote Listen gefährdeter Tiere Österreichs. Cheklisten, Gefährdungsanalysen, Handlungsbedarf. Teil 2: Kriechtiere, Lurche, Fische, Nachtfalter, Weichtiere. Böhlau: Wien, Köln, Weimar.
