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STEERING COMMITTEE FOR THE CONSERVATION AND MANAGEMENT
OF THE ENVIRONMENT AND NATURAL HABITATS (CDPE)

Committee of Experts on Protected Areas

WURZACHER RIED NATURE RESERVE

Application for the European Diploma
submitted by the Federal Republic of Germany

12.486
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Application

for the Conferment of the

Diploma of Europa

on the

Wurzacher Ried Nature Reserve

Contents:

Application for the Award of the Diploma of Europe
Category A

Shortened form as required by the application form

Tittle	Wurzacher Ried
Administrative Body	Regierungspräsidium Tübingen - höhere Naturschutzbehörde - Nauklerstr. 47, 7400 Tübingen
Country	Bundesrepublik Deutschland (FRG) Province of Baden-Württemberg

(1) Type of natural region, landscape or places of special interest: Wurzacher Ried is a piece of extensive moorland where the zones of each type of mire are perfectly preserved. The largest area of intact raised bog in Central Europe is surrounded by extensive areas of fen, transition mire, heather dominated mire, secondary forested swamps dominated by birch, calcareous spring pools as well as the streams which drain the area. With this composition, Wurzacher Ried constitutes an exemplary relic of former Central European primeval landscape as developed after the last ice-age.

(2) Distinctive features and scientific, aesthetic, cultural and recreational value which warrant conservation:

It is particularly the extent of the area of the bogland and their unspoilt condition which are decisive factors in warranting the conservation order. These features have enabled the mire to evolue into a haven for rare and endangered species of flora and fauna. Various species of glacial heritage (ca. 230) and wild animals unable to thrive away from their natural habitat and requiring extensive territory find here an environment which makes it possible for them to survive. The programme for the breeding of the black grouse and its subsequent integration into their natural habitat, which has been carried out in the Wurzacher Ried Nature Reserve since 1978, is to be viewed in connection with this.

This - as well as the extraordinary high species diversity to be found in the areas of transition mire and fen (ca. 650 species of plant)- designate the mire of both high ecological and scientific value.

Consequently numerous scientific studies have been written on Wurzacher Ried in the fields of botany, plant sociology, zoology, limnology and peatland research.

(3) European significance warranting application

The nucleus of Wurzacher Ried consists of the largest intact area of perfectly preserved raised bogland in Central Europe.

Wurzacher Ried is a haven for species of animals and plants whose continued existence is endangered in all parts of Europe, and which consequently have been entered on the "Red List" of endangered species.

In view of the extremely advanced state of destruction of wetlands and the rapid decrease particularly of larger of areas of moorland in Europe, Wurzacher Ried is becoming increasingly significant as one of the last intact examples of a post-glacial primeval landscape in Central Europe, as well as being an international important habitat for endangered species of animals and plants.

(4) Geographical description of the site

Wurzacher Ried lies in Oberschwaben, Federal Province of Baden-Württemberg, Federal Republic of Germany. The location of the area can be found on the attached map (scale 1 : 50.000). The coloured region represents the area under conservation.

(5) Photographs illustrating typical features of natural territory, landscape or places of special interest.

Photographs illustrating typical features of Wurzacher Ried are available at the Secretariat.

(6) Conservation measures taken up to now and those planned for the future

With the decree of 3.2.1959 the most valuable areas of mire (426 ha) were initially placed under conservation, and a further 400 ha were made into a landscape protection area.

Since public ownership ensures the highest level of protection for ecologically valuable areas of land, the province of Baden-Württemberg went to great lengths in the subsequent years to buy areas of moorland. Thus it has been possible to bring over 950 ha under the ownership of the Province.
An important consequence of this was that with the decree of 23.3.81, it was possible to enlarge the Wurzacher Ried Nature Reserve to an area of 1,387 ha.

As the moment negotations are being held to arrange for the last significantly large areas of the Nature Reserve still under private ownership to be likewise taken over by the Province. When the agreement has been successfully concluded there will then be only small areas still existing as private smallholdings.

The decree of 1981 ensures the protection of the intact central areas of marshland and permits only the peripheral zones of the conservation area changed by earlier encroachments to be made accessible to the public. The extensiv preservation of the ecology of these peripheral zones will, however, also be achieved by an appropriate network of paths together with the restrictions on the use of these zones laid down in the decree.

From 1982 - 83 a management plan for Wurzacher Ried was developed using a vegetational study as a basis. By means of numerous detailed measures an attempt is to be made over the coming years to bring the consequences of previous anthropogenic influence and exploitation under control, to reverse the process and prevent any uncontrollable process of succession.

The beginning of 1985 the first Nature Conservation Information Centre run by the province of Baden-Württemberg was opening in Bad Wurzach. Measures for protection and management, scientific investigations as well as functions to spread information about the mire have been organized and carried out by a biologist employed by the Centre. As well as providing information about the mire and nature conservation, the Centre serves to relieve the concentration of visitors to the heart of the pro-

tected area by diverting people to the cultivated and ecologically less vulnerable peripheral zones which have been opened up. The opening of an extensive nature trail on the edge of the protected area adjacent to the town of Bad Wurzach is planned in conjunction with this.

(7) References for published reports:

In addition to approx 100 bibliographical references to Wurzacher Ried (of additional material) the following works are of fundamental importance:

BERTSCH, K. & F. (1938): Das Wurzacher Ried. - Veröff. Landesstelle Naturschutz und Landschaftspflege Ba-Wü 14: 59 - 146.

ILSCHNER, G. (1959): Die Pflanzengesellschaften des Wurzacher Riedes. Zur Systematik, Ökologie und Kenntnis des Vegetationsgefüges von Moorgesellschaften. Diss. Tübingen.

GERMAN: R. (Hrsg.) (1968): Bad Wurzach. Ein naturkundlicher und geschichtlicher Führer durch die Umgebung. - Stuttgart, 75 S.

GÖTTLICH, K.-H. (1969): In: Moorkarte von Baden-Württemberg 1 : 50.000. Erläuterungen zu Bl. Bad Waldsee L 8124. - Landesvermessungsamt Ba-Wü: 7, 31 - 33, 67 - 70.

KRAMER, W. (1983): Landschaftspflegeplan für das Naturschutzgebiet "Wurzacher Ried". - Information der Bezirksstelle für Naturschutz und Landschaftspflege, 31 S. (plus Karten).

SCHNEIDER, Pater A. (1986): Die Tier- und Pflanzenwelt des Wurzacher Riedes. - Führer Natur- und Landschaftsschutzgebiete Ba-Wü. (in Vorbereitung).

Application for the Conferment of the Diploma of Europe on the Wurzacher Ried Nature Reserve

Reasons for Applying

2.1 Introduction

By applying for the conferment of the Diploma of Europe on the Wurzacher Ried Nature Reserve, it is hoped to distinguish a natural landscape with the patronage of the Council of Europe, a landscape which is of international significance, not only as an intact mire ecosystem, but also as a relic of Central European primeval landscape (KAULE 1974).

Even the first protection decree of 03.02.1959 placed the most valuable section of Wurzacher Ried under a protection order. With the enlargement of the protected area on 23.03.81 was it then made possible to place the entire Wurzacher Ried under the strictest protection order possible under German law. Thus the hope exists that this, the largest area of raised bogland in Central Europe, may also be preserved for the future.

The following report gives an impression of the features of Wurzacher Ried which form the basis upon which this application is made. In addition to this an account of the protective measures already taken and those planned for the future is also given.

2.2. Landscape and History of the Landscape

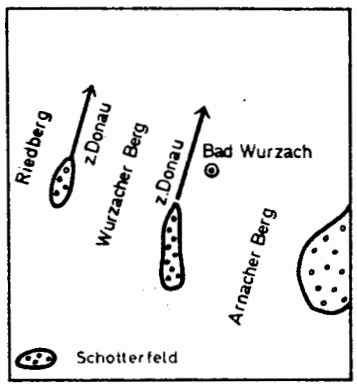
The Wurzach Basin, where the raised bogs of Wurzacher Ried rise up, came into being in the aftermath of the quaternay cold times as a tongue-shaped depression caused by the tail-end of Alpine glaciers (Fig. 1). Here the meltwaters of the last ice-age gathered to create the former Wurzach lake. Deposits rapidly filled the lake-basin, so that with the beginning of the post ice-age period, a sucessional process called "Verlandung" could take place. It is only thus that, according to current research, the exceptional features found in marshland stratigraphy at Wurzach, which distinguish the mire from others in the foothills of the Alps, can be explained. Fen peat immediately developed out of the de-

posits of the Würm Ice Age. Lake chalk, a common feature of post-glacial lakes, is not completely absent, but does not exist in the form of an intact layer. It is deposited erratically in linseed-like shapes in the fen-peat. Organic deposits in the form of liver-mud, likewise typical of a lake, changed by succession, are not present at Wurzach. The layers of fen peat, which in Wurzacher Ried reach a maximum thickness of 5.5 m, are bog-peats deposited with an average thickness of 4 - 5 m.

Moraines deposited at the tip of the Würm glacier project into the south-west side of the Wurzach basin. They lie 700 m above sea-level and 100 m above the marsh. The mire is bordered on the remaining sides by moraines deposited at the end of the Riss Ice Age.

Fig. 1: Process of Geological History in Wurzach Basin

		Present time	
Quaternary		Holocene = postglacial period	Wurzach lake silts up to Wurzacher Ried (peat formation)
		100.000 j.	
	Pleistocene	Würm glacial period (d, e, f)	Melting of the dead ice, formation of the Rohrsee
		18.000 j.	
			Ice cover near western and southern edge of Fig. 1 d. Moraines near Binzen-Mopertshaus-Eintürnen-Arnach. By aqueoglacial deposits on Haidgau heathland and in Arnach basin both basins are highly filled up. Formation of late Wurm glacial Wurzach lake in the area of the present mire. Overflowing of the damed up melt waters to Arnach basin and to river Iller.
		70.000 j.	
		Last interglacial period (Riß-Würm) (c)	Former lake in Wurzach basin ca. 85 - 95 meters below the present Haidgau mire near Rohrsee. Relics of plants and Kieselgur. Wurzach basin is much deeper than today. Outflow of the waters to river Argen and to lake Constance.
		100.000 j.	
		Riss glacial period (b)	Cover of ice up to the morainic arcs near the northern and eastern edge of Fig. 1, the melt waters mostly pass the Rot valley and flow to river Riss and river Donau.
		Mindel-Riss interglacial period	The terrestrial surface of Wurzach basin lies deeper than in the last interglacial period, about 160 meters below the present Haidgau mire. It is drained by river Argen to lake Constance.
		Mindel glacial period	The entire Wurzach basin is covered by ice. The morainic arcs are situated in the east near Bellamont (outside of Fig. 1)
		Günz-Mindel interglacial period	Growth of forest in Oberschwaben
		Günz glacial period	The entire Wurzach basin is covered by ice. The farthest morainic arcs are situated in the east near Spindelwaag outside of Fig. 1.
		Donau glacial periods (a)	Relics of gravel on the mountain Ziegelberg, on the crest of Stadtwald and on the mountain Haisterkircher Höhe. The waters flow in northern direction to the river Donau.
		1 - 2 mill. j.	
Tertiary			Formation of the Alps, rivers deposit sand and clay in the Alpine foothills.
		70 mill. j.	
Cretaceous			Removing of Jurassic layers.
		150 mill. j.	
Jurassic			Depositing of the rocks of the Schwäbische Alb.
		180 mill. j.	



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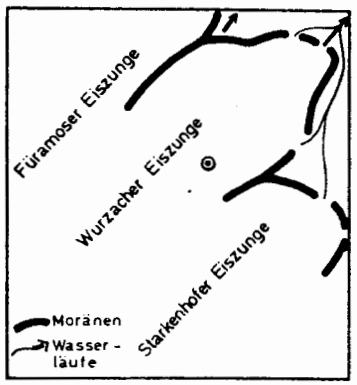

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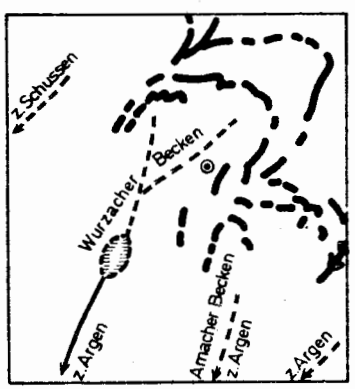

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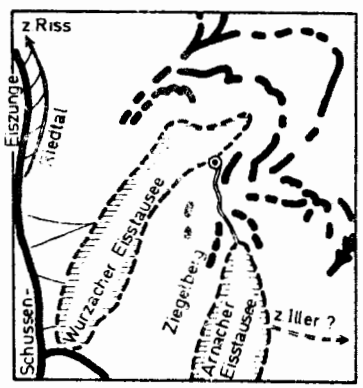

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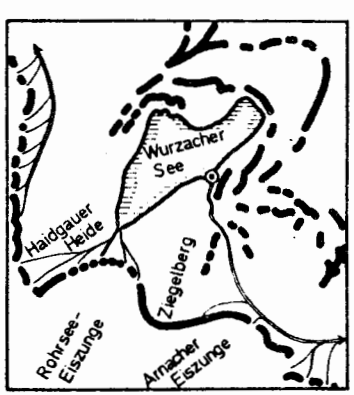

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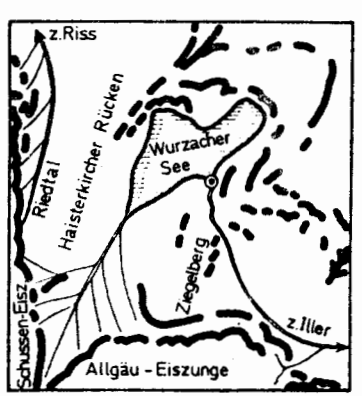

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Wurzacher Ried (649 - 655 m above sea-level) stretches from south-west to north-east with a length of 9 km and has a maximum width of 3,5 km. The total area of the original mire was about 16 km^2, of which today 14 km^2 have been preserved under a protection order.

2.3 Climate

As a result of its basin shape, climatic conditions have develeoped in the Wurzach basin which have made the mire into an exceptionally interesting location for surviving Arctic and Nordic plant species. The average annual temperature of the Federal Republic of Germany of 8-9° C is appreciably higher than in Wurzacher Ried, which has an average temperature of 6-9° C. Cold fronts building up inside the basin and the special microclimatic conditions of the bog, mean that one has to rectan with frost during 115-120 days between October and May. Occasional night frosts are recorded in each of the summer months. In accordance with this plants bloom about one month later in the Wurzach basin than in the neighbouring region bordering Lake Constance. Above all, however, due to conditions at this location, about 230 Arctic and Nordic plant-species have been able to endure, all of which belong to the scientifically noteworthy features of this nature-reserve. With approx. 1090 mm the average annual precipitation lies distinctly above the norm the Federal Republic of Germany, an important requirement for the formation of the Wurzach bogland.

Fig. 2 shows a diagram of the original distribution of the various mire-types in the Nature Reserve. Joined to the central bog-area are several small areas of bogland, transitional mire, extensive areas of fen, secondarily formed forest swamps dominated by birch on bogland which have been cutted and meadows bordering the bogland.

The two marsh streams, which trickle through the marsh and drain the area, rise in several calcareous spring pools which are rendered floristically particularly interesting by the high lime content of the water.

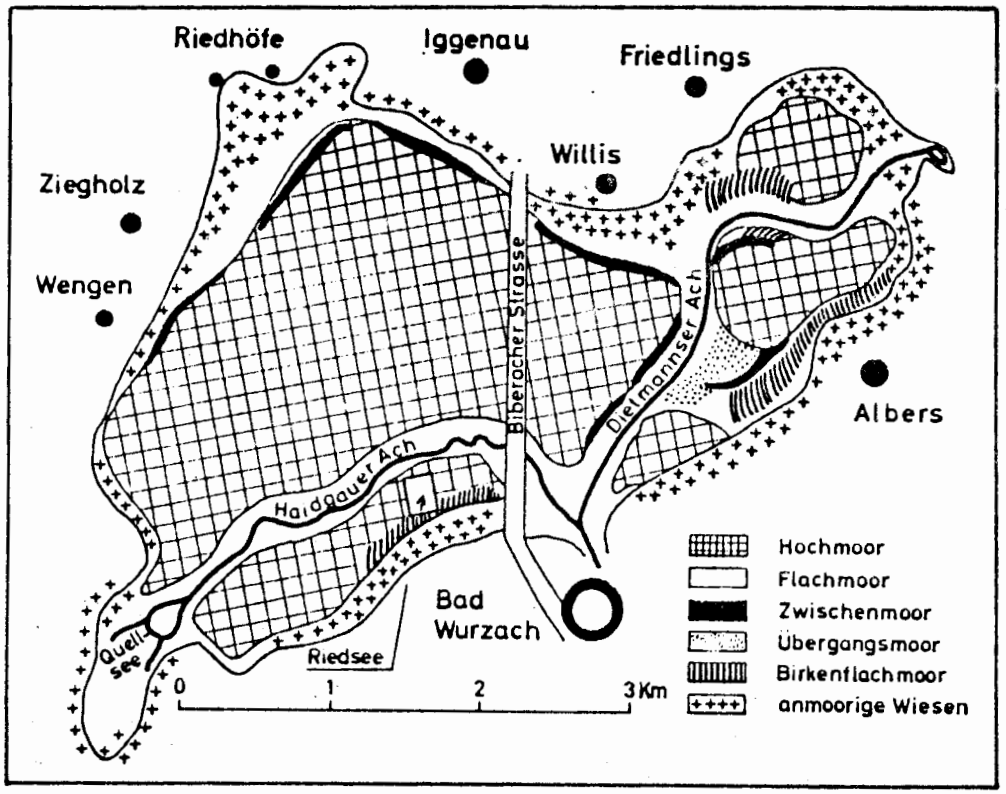

Fig. 2: Distribution of mire-types in Wurzacher Ried (from GERMAN, 1968).
Explanations:
Hochmoor = raised bog
Flachmoor = fen
Zwischenmoor, Übergangsmoor = transition mire
anmoorige Wiesen = boggy meadows

2.4 Plant-life

There are three original vegetation complexes which are characteristic of the moorland of Wurzacher Ried:

- the vegetation of the raised bogs
- the vegetation of the transition mires at the edge of the boglands together with
- the vegetation of the fens and the calcareous spring pools.

In addition to this heather dominated mires and secon-

darily formed birch swamps have formed on cutted or drained areas of raised bogland. On sectors of previously diverted waterways transitional mires have developed, and finally the meadows bordering on the peatland are locations for typical moist meadow communities.

2.4.1 Raised bog

The central area of the largest bog area (Haidgau bog area) has entirely escaped human influence. Here, the zoning of the raised bog vegetation complex has developed typically.

In the central, wettest part is a stretch of cotton gras bog with characteristic hummocks. In Wurzacher Ried alone sixteen different peatmosses of the sphagnum genus occur. In the oligotrophic environment of the central area of bogland only a few specialised vascular plants exist. Besides marsh worts (Vaccinum oxycoccus), rosemary moorwort (Andromeda polifolia), both the roundleaved and the long-leaved sun-dew (Drosera rotundifolia, D. anglica) settle on the drier tops of hummocks bleaberries

(Vaccinium uliginosum), cranberries (Vaccinium vitis-idaea) and heather (Caluna vulgaris). There is an almost total absence of trees in the wet central area of the bog area, only a few mountain pines (Pinus mugo), maximum height 20 cm, are able to exist here. Towards the drier edge of the bog area the density of shrubs increases, an increased number of bilberries (Vaccinum myrtillus) make an appearance, and the stunted, shrublike ("Kuschel"shape) mountain pine gives way to the straight, treelike form called "Spirke" (several meters high).Most of the raised bogland is typically dominated by mountain pine bog forest (vaccinio uliginost-mugetum).

An exceptional feature is found to the west of the centre of the Haidgau bog area, where quite a number of approx. 20 m long and 1 m wide so-called Rißschlenken have formed. They are filled with sphagnum cuspidatum and are without stable foundation. Various theories concerning the origin of their formation can be found in literature on the subject. Hence it could concern artesian pressurized water ditches (Druckwassergräben) and hollows of inflowing water from the hillsides.

As a particular feature of another raised bog area, the Albers bog area, an intermediate stage in the formation of bogland has developed on an area (approx. 500 m^2) from which decades ago the peat was slightly removed, in which hummocks are formed by haircap moss (Polytrichum strictum).

Table one shows the most important types of vegetation found in the Wurzach bogland.

Tab. 1: Natural and Anthropogenic Plant Communities of the Wurzach Boglands

Natural Plant Communities	Anthropogenic Plant Communities
Scheuchzerio-Caricetum limosae (PAUL 1900, BR.-BL. 1921) LIBB. 1933 **Distribution area:** Northern part of Haidgau bog area (not influenced by mineral soil water)	Eriophoro-Sphagnetum recurvum HUECK 1925 **Distribution area:** South-west part (peat removed) of Haidgau bog area
Sphagnetum medii KÄSTN. et FLÖßN. 1933 **Distribution area:** Haidgau and Albers bog area	Sphagnetum medii KÄSTN. et FLÖßN. 1933 **Distribution area:** Above all in the peat removed south-west part of Haidgau bog area
Sphagnetum fusci LUQ. 1926 **Distribution area:** Haidgau and Albers bog area	Polytrichum strictum-hummocks **Distribution area:** Northern border of Albers bog area
Vaccinio uliginosi-Mugetum KÄSTN., FLÖßN. et UHL 1933 **Distribution area:** Haidgau and Albers bog area	

2.4.2 Transition mire

At different points at the rand (Randgehänge) acidic, oligotrophic bog-water trickles out gradually moving across to the zones of fenland which are rich in minerals. Here species of bog and fenland plant-communities grow side by side. At the same time the transition mires also house their own plant-species, which are of high floristic significance as indicators of this rare biotope. A characteristic zoning of plant associations has also developed within the transition mire. The highest level of humectation occurs directly at the edge of the bog. The bog is unstable and one cannot walk on it. Here a specifically sub-arctic plant community typical for hollows (Schlenkengesellschaft, Scheuchzerio-Caricetum-limosae), is to be found, in which Scheuchzeria palustris (2) and mud sedge (Carex limosa) dominate amongst the sphagnum cuspidatum. Gradually, the Schnabelbinsenmoor (Rhynchosporetum albae) more characteristic of the northern subatlantic zone, is then to be found. Here the dominating peat moss is sphagnum recurvum, the white beak sedge (Rhynchospora alba), the cord-rooted and the dioecious sedge (Carex chordorrhiza, C. dioica), and the marsh club moss

into the fen Alpine deer sedge becomes the visually most striking plant. Out an uncreasingly rich variety of species attention must drawn in particular to one species of especial value, Hammarbya paludosa, which belongs to the orchid family, threatened with extinction not only in Germany but in the whole of Europe.

Table 2 shows the most important types of vegetation found in the Wurzach transition mire.

Tab. 2: Natural and Anthropogenic Plant Communities of the Wurzach Transition Mire

Natural Plant Communities	Anthropogenic Plant Communities
Scheuchzerio-Caricetum limosae (PAUL 1910, BR.-BL. 1921) LIBB. 1933 **Distribution area:** North of Haidgau bog area as well as south of Albers bog area (influenced by mineral soil water)	Rhynchosporetum albae PAUL 1910 **Distribution area:** South-west of Albers bog area with marsh club moss (Lycopodium unundatum)
Scorpidio-Utricularetum minoris MÜLL. et GÖRS 1960 **Distribution area:** Above all north of Albers bog area	Gentiano-Molinietum OBERD. 1957 **Distribution area:** Former bog area of Dietmanns and south of Haidgau Ach
Rhynchosporetum albae PAUL 1910 **Distribution area:** Above all south of Albers bog area	Salicetum auritae OBERD. 1964 **Distribution area:** Wurzacher Ried in transition mire areas
Trichophorum alpinum-community **Distribution area:** Above all on both side of Dietmanns bog area between the former Dietmanns bog area and the existent Albers bog area	Frangulo-Salicetum cineriae MALC. 1929 **Distribution area:** Wurzacher Ried in transition mire areas
	Betulo-Salicetum repentis OBERD. 1964 **Distribution area:** Surrounding Vaccinio-Pinetum and Salici-Betuletum pubescentis mainly in district Öl
	Salici-Betuletum pubescentis GÖRS 1961 **Distribution area:** Above all south of Albers bog area in Öl
	Veccinio uliginosi-Penetum sylvestris DE KLEIST 1929 **Distribution area:** Above all south of Albers bog area and in the northern peripheral area of the former Dietmanns bog area as well as in the peripheral area of the former bog area south of Haidgau Ach.

2.4.3 Fen

The fenlands provide the richest variety of flora in Wurzacher Ried, although they are limited to relatively small areas. Strips of fenland have formed along the Haidgau and Dietmann Ach, dependant on the rich mineral content of the streams. Further strips of fenland are found on the outer edge of Wurzacher Ried. The area around the Haidgau spring lakes is particularly interesting for its flora. Here in this area with its landscape of great beauty a richly varied collection of different plant communities has established itself. The small area of lakes with its circular pools of spring water (10 - 100 m in diameter) is surrounded on the outside by a forest dominated by pubescent birch (Betula pubescens) and patches of reeds. Numerous islets crop up in between the pools of spring water.

Only a small number of plants (Characeae Veronica beccabunga) live in the clear water of these spring lakes because of the high lime content of the water, and they become heavily encrusted with lime. In the shallow water, tussocks of juncus subnodulus alternate with those of sedge grass (Cladium mariscus). Here the rare pale yellow orchid (Dactylorhiza incarnate var. ochroleuca) is also to be found. The black and russet bog rush (Schoenus nigricans, Sch. ferruginaeus) leads over to drier tracts, where members of the Scotch primrose-bog-rush community (Primulo-Schoenetum) e.g. Alpen beanweed (Pinguicula alpina), common beanweed (Pinguicula vulgaris) and a series of species from the extreme North thrive. Especially worth mentioning are surviving subarctic glacial species such as the mooses Caliergon trifarium, Cinclidium stygium, Cathoscopium migritum or amongst the flowering plants the Scotch primrose (Primula farinosa) and Tofildia calyculata. In the limey mud of small water-holes a special community is to be found, the scorpidio-utricularietum, in which along with scorpion-moss (Scorpidium scorpioides) and other brown mosses, both the little and medium bladdersnout (Utricularia minor, U. intermedia) are found.

The strips of fenland bordering on the streams and the edge of the mire shelter above all a wealth of rare orchids. Here various orchids grow for example Dactylorhiza maculata, Orchis morio, Dactylorhiza incarnata, the two-leaved wood hyacinth (Platanthera bifolia), the swamp helleborine (Epipactis palustris) and, a great rarity, the Traunstein orchid (Dactylorhiza traunsteinerii) as well as canary-weed (Lipars loeselii), an endangered species all over Europe. On the edge of Wurzacher Ried, secondary plant associations have established themselves on areas from which the peat has been removed. Whilst open areas have mostly evolved as meadows of purple moor grass Gentiano-Molinetum) with Gentiana asclepiadaea, rapunzel (Phytheuma orbiculare) and even Swertia perennis, large areas are covered with Moorbirkenwald and heath (Calluna vulgaris). Amongst the trees which grow here, attention is particularly drawn to the Strauchbirke (Betula humilis), also a surviving glacial species endangered all over Europe.

The wet soil of abandonned peat cutting areas on the edge of the marsh is covered for the most part with shrubs of willow and buchthorn (Frangulo-Salicetum-cinereae).

Table 3 shows the most important taxonomic plant groups of the fenlands of Wurzacher Ried.

All in all, BERTSCH (1938) has identified 425 vascular plants and KRAMER (1982) 477 flowering plants in Wurzacher Ried. Furthermore BERTSCH was able to determine 133 different species of moss.

Tab. 3: Natural and Anthropogenic Plant Communities of Wurach Fenlands

Natural Plant Communities	Anthropogenic Plant Communities
Scheuchzerio-Caricetum limosae (PAUL 1910, Br.-BL. 1921) LIBB. 1933 **Distribution area:** Spring area of Haidgauer Ach	Gentiano-Molinietum OBERD. 1957 **Distribution area:** Spring area of Haidgauer Ach and peripheral area of the entire Wurzacher Ried
Scorpidio-Utricularietum minoris MÜSS. et GÖRS 1960 **Distribution area:** Above all in the spring area of Haidgauer Ach	Trollio-Cirsietum rivularis OBERD. 1957 **Distribution area:** Spring area of Haidgauer Ach and peripheral areas of Wurzacher Ried
Cladietum marisci ALL. 1922 **Distribution area:** Spring area of Haidgauer Ach	Alchemillo-Arrhenatheretum SOUGNEZ 1963 **Distribution area:** Entire peripheral area of Wurzacher Ried
Salici-Viburnetum opuli MOOR 1958 **Distribution area:** Spring area of Haidgauer Ach	Salici-Betuletum pubescentis GÖRS 1961 **Distribution area:** Spring area of Haidgauer Ach

Some 120 species of flowering plants found in the protected area are entered in the "Red List" as being threatened in Germany. At least three species are listed there as having been identified as endangered in the whole of Europe.

2.5 Animal-life

As is the case with the plant-life of Wurzacher Ried, the results of systematic scientific research into its animal-life are not as yet available. However, details of the occurence of certain species have existed for about a century, continuous observation of the list of species for many decades. In particular, Pater Agnellus Schneider, the special representative for Nature Conservation in Wurzacher Ried, has been intensively observing and documenting the avifauna and insect-life of the region for forty years.

Strict classification according to biotope is not appropriate for an account of animal-life. Indeed, particularly amongst the invertebrates, many species can be assigned to definite biotopes, however there are at the same time numerous species which are found in more than one biotope. Finally, Wurzacher Ried especially provides a habitat for those animals which are dependant on the characteristic mosaic of bogland, fenland, wet meadows and woodland.

Here the black grouse (Lyrurus tetrix) must take priority. Fifteen years ago it had become almost extinct in Baden-Württemberg. Since 1978 a scientifically monitored recolonization programme for the black grouse has been ran with the joint participation of the Regional Authority for Nature Conservation and the Regional Association of Gamekeepers of Baden-Württemberg. Approx. 250 animals have been released in the meantime and it has been possible for a population with a natural structure in age classes to become acclimatized. Obviously successful breeding also takes place in the meantime throughout the mire, some individuals are already migrating to neighbouring areas of mire. Details can be taken from the interim report of 1985, extracts of which are cited in the additional material. The objective of this project, which has been extensively screeneed from the public, is to build up a stable black grouse population, which will further enable a recolonisation of other areas of mire in Oberschwaben.

Another endangered species which can only survive away from human civilisation and which is there for dependant on the open spaces of Wurzacher Ried ist the Great curlew. It breeds every year in the Nature Reserve.

Wurzacher Ried is also an important location for the survival of the snipe (Gallinago gallinago), which regularly comes to a successfull breeding. For the civilisation-shy black grouse, curlew and snipe, but also for the meadow-pipit (Anthus pratensis) and the blue-headed wagtail (Motacilla flava), the open spaces of Wurzacher Ried provides a haven which is of great significance for the survival of the species in SW Germany.

The bird-life in the mire is especially rich on the raised bogland live, for example, the blue headed wagtail and meadow-pipit, which have already been mentioned, and the Wesser whitethroat (Sylvia curruca), the linnet (Carduelis cannabina) and the redpoll (Carduelis flammea) live in the bordering mountain pine forest.

Bush-covered fenland and birchwood provide a habitat especially for small birds. Warblers (Sylvia communis, S. borin, S.atricapilla, Phylloscopus trochilus, P. collybita, Regulus ignicapillus, R. regulus), titmice (Parus montanus, P. palustris, P. cristatus, P. caeruleus, P. ater), tree creepers (Certhia familiaris, C. brachydactyla) and of the finches Fringilla coeleps, Pyrrhula pyrrhula, Serinus serinus, Carduelis carduelis, Loxia curvirostra, Prunella modularis and Jynx torquilla are merely a selection of the bird species indigenous to this mire biotope. Worthy of a special mention is also the occurence of the tree falcon (Falco subbuteo).

A number of species which are either endangered or threatened with extinction live and nest in the fenlands and the expanses of water.

Teal (Anas crecca), garganey (Anas querquedula), shoveler (Anas clypeata), Spotted crake (Porzana porzana), little bittern (Ixobrychus minutus), water rail (Rallus aquaticus), corncrake (Crex crex) and lanceolated warbler (Locustella luscinioides) may be named as examples.

The large areas of moorland in Wurzacher Ried are also a resting-place for endangered species of migratory bird. Belonging to these are the waders (Philomachus pugnax, Calidris alpina, C. minuta, C. temmenckii, Tringa ochropus, T. glareola, Limosa limosa, Pluvialis agricaria, P. squatarola), ducks and small birds (Luscinia svecica, Saxiocola rubetra) as well as a number of endangered birds of prey (Circaetus gallicus, Pandion haliaetus, Falco columbarius, Circus aeruginosus, C. gyaneus, C. pygargus, Buteo lagopus, Pernis apivorus).

Of reptiles, the viper (Vipera berus) and the grass-snake (Natrix natrix) which are both highly endangered species in Germany are ensured a continued existence in Wurzacher Ried, of amphibians, the field frog and the alpine newt.

Fishing and technical manipulation of streams have severely reduced the original population of fish in the running waters of the protected area. Preparations are currently being made to reintroduce to the mire species of small fish threatened with extinction within a scientifically supported recolonisation programme. Measures are also being planned to foster the stock of the crab Astacus astacus.

The flora of the areas heath and fenland shelter a rich insect fauna. One is in particulary able to observe rare beetles, butterflies, grasshoppers as well as an evidently rich variety of species of spider fauna.

Of the 37 (!) identified species of dragonfly in the mire many are high endangered or threatened with extinction.

Just as is the flora (228 arctic flowering-plants), the fauna of Wurzacher Ried ist marked by a high share of surviving glacial species. Especially amongst the insects and the invertebrates, one finds many species which are typical members of the humid regions of Scandinavia.

Thus also in this respect Wurzacher Ried is a Nature Conservation area of European class as a area of bogland "almost north European character" or as a "Swabian lapland" (BERTSCH).

2.6 Conservation Measures

2.6.1 Conservation Decree of 03.02.1959

With the decree of 03.02.1959 parts of Wurzacher Ried were placed under a conservation order for the first time. The corresponding texts are cited in the additional material. The four most valuable regions with a total area of 466 hectares were identified as a nature reserve, a further 400 hectares as a landscape protection area.

In order to ensure a more far-reaching protection of the mire, the Province of Baden-Württemberg began in subsequent years to buy up areas in the nature reserve. In this way over 950 hectares were purchased by the end of 1984. Negotations are currently being hold likewise to purchase the last large area of Wurzach bogland still under private ownership at a cost of approx. 2,5 million DM. If these negotations can be successfully concluded, only small areas of the nature reserve still remain under privat ownership as smallholdings.

2.6.2 Conservation decree of 23.03.1981

Approx. 800 hectares were already under ownership of the Province, and with the decree of 23.03.1981 the entire Wurzacher Ried was able to be placed henceforth under the highest level of protection possible under German law. With the nature conservation decree, which is cited in the additional material, Wurzacher Ried was withdrawn as far as possible from the sphere of economic and tourist exploitation. It is in particular guaranteed that the natural and biological integrity of the central area of bogland with its characteristic zoning will not be interfered with.

The exploitation for forestry or agricultural purposes was restricted and limited in the peripheral zones which had already been developed before they were placed under a conservation order. The central areas of bogland are not able to be used for any development of this kind at all. Removal of peat for private use is prohibited. Merely the removal of peat to cover the medical requirements for peat baths in the town of Bad Wurzach is allo-

wed. This is however only allowed on a mire area, which had been denaturated before by draining. It is guaranteed by strict removal regulations that after removal has been effected a regeneration of bog in the area is made possible.

Since hunting, gaming and fishing are necessary to maintainthe biocenotic harmony of Wurzacher Ried they are authorized on an appropriate scale. By regular close contact and consultation by the Nature Conservation Authority it is guaranteed that hunting, gaming and fishing serve the interests of the Nature Reserve. For the town of Bad Wurzach, as one of the most important spas of Oberschwaben, Wurzacher Ried has traditionally been of spezial significance for visitors to the spa and walkers. By arrangement with the Nature Conservation Authority a network of paths was recently laid down for holiday-makers which indeed show off the landscape of the mire, but which, however, at the same time prevent accent to the sensitive central parts of the mire. This is limited in the peripheral zones of the Nature Reserve, which have already been developed.

Regulations laid down in the nature conservation decree together with a corresponding system of signs ensure that the remaining unspoilt inner zones of the protected area escape any kind of tourist interference. Furthermore (due to the ground conditions and vegetation) trespassing into the central areas of the mire is practically impossible.

2.6.3 Surveillance and Management - Nature Conservation Centre

With the appointment of Pater Agnellus Schneider as special representative for Wurzacher Ried, the Nature Conservation Authority guaranteed continuous management and surveillance of the region through an local expert.

At the beginning of 1985 a publically backed Nature Conservation Centre was established in Bad Wurzach inspired by the national and international importance of the Wurzach mire. Leader of the centre is a biologist who, under the expert supervision of the District Authority for Nature Conservation and Landscape Management, is entrusted with the surveillance, management and scientific maintenance of Wurzacher Ried. Furthermore, it is also an essential duty to spread information natio-

nally and internationally about the special significance of this protected area. Through work in the public sphere with exhibitions, slide-shows and tours, guided by an expert, the need for conservation is illustrated to and impressed upon visitors. Moreover, with the opening of the Nature Conservation Centre it is guaranteed that any increase in the number of visitors - for instance as a result of possibly being awarded the Diploma of Europe - will be concentrated upon less sensitive areas and will not have a negative effect on the mire.

2.6.4 Management

A comprehensive management plan of Wurzacher Ried was completed in 1983, based upon vegetational studies (1981 - 1983) commissioned by the District Authority for Nature Conservation and Landscape Management as well as upon a comparison of earlier surveys. This is also cited in the additional material. This management programme on a long term base has been in action since 1983. The annual management is determined in co-operation with all the authorities and associations involved. The financial means for this have been made available by the District of Ravensburg, which has taken over the sponsorship of the Nature Reserve, by the Province of Baden-Württemberg and up to now also by the Regional Association of Hunters and Gamekeeper. Maintenance is carried out by experts from the Forestry Commission, private concerns and numerous helpers from nature conservation associations, schools etc. The Nature Conservation Commission is endeavouring to obtain additional financial aid in order to be able to intensify the degree of management in future years. In this context it is planned in particular to foster fresh water communities of the region and to include the aquatic biotopes in the management plan.