

Camargue is a major world heritage wetland and is host to many fragile ecosystems. The exceptional biological diversity is the result of water and salt in an "amphibious" land inhabited by numerous species.

Location: France, Region : Provence-Alpes-Cote d'Azur ; Department : Bouches du Rhône ; 2 municipalities.

Size: 86 300 ha.

## Nature & Landscape

### Woodlands

They are a minute part of Camargue but they play a major role in the overall balance of nature. Some are along the Rhone, others are on former sand dunes south of Vaccarès (like the Rièges woods in the national wildlife preserve). The forest hosts many mammals (rodents, foxes, and boars) and insects eaten by nesting birds (little egrets and night herons).

### The sansouires

The low-lying salt plains, which dry out and crack in summer, are carpeted with glasswort that the wild bulls and horses love to graze. Submerged in winter, by spring they provide wetlands for marsh birds (godwits, sandpipers, black-winged stilts, etc.). The glassworts and salt crystals used to be incinerated to yield soda for soap making and glassmaking, but by the end of the 19th century, the plant soda was replaced by industrial soda made from salt.

### Ponds and marshes

They cover a large proportion of the river delta. Partly dry in summer, the shallow (20 to 80 cm) marshes are subject to the unpredictable seasonal weather patterns of the Mediterranean climate. They are nevertheless, with the ponds, habitats of choice for both migratory and sedentary birds. Egrets, night herons, bitterns, mallards and wagtails are common guests in this fragile ecosystem. Since areas like this are rare in Europe, they are carefully protected by all the organizations responsible for protecting Camargue wildlife.

### The Vaccarès

Between reeds and sansouires, Vaccarès, a vast body of water extending 6 000 ha, is the keystone of the entire water control system of the delta. Its lack of depth (less than 2 meters), the winds that roil its surface and its good exposure to sunlight make it an effective water purification system. It collects over 50,000,000m<sup>3</sup> of agricultural runoff from the surrounding rice paddies. Some of it compensates for the water that used to come from flooding of the Rhone before it was embanked. This is the larder for coots, diving ducks and a multitude of fishing birds (grebes, storks, and seagulls) as well as for the Park's renowned pink flamingos.

### The sea dike

It is about 20 km long, and is off limits to all motor vehicles in the Nature Reserve. The entire area, which attracts many strikingly beautiful birds (storks, avocets, different varieties of seagulls, and Kentish plovers), should be seen in early morning. On the east, it borders a portion of the Salin-de-Giraud salt farms. Further west beyond the Gacholle lighthouse, take the sea path through the dunes down to the beach. The dunes, fragile structures if ever there were, are often stabilized by "ganivelles" (chestnut wood palisades to retain the sand). They also have their own special flora (marram grass, dog's tooth, spurge, sand lily, etc.).

### The lagoons

These bodies of salt water, surrounded by strings of dunes sculpted by the forces of weather, are now men made around Salin-de-Giraud to produce salt. Salt harvesting has become one of the most important activities in Camargue since the spectacular growth of the chemicals industry. The sodium and chlorine from the salt are used in many chemical and pharmaceutical products. The evaporation pans at Salin-de-Giraud extend over 11,000 ha and on average, produce 1,000,000 metric tons a year, making them Europe's largest. There are four steps in the salt

harvesting process (filling the basins, circulation of water to concentrate the brine, precipitation-drying and harvesting).

## History

Grande Camargue (750 km<sup>2</sup>), located at the mouth of the Rhone River, extends across the entire river delta area. Different from the Petite Camargue, or Camargue Gardoise, located West of the Little Rhone, it is often said to be an "island," because it is separated from the mainland by the Mediterranean and two arms of the Rhone River. The Rhone Delta drifted periodically until the end of the 19th century. These geological and geophysical characteristics have made this vast expanse what it is today, the result of successive sedimentation from the ebb and flow of the river and the sea.

While the construction of dikes and embankments salvaged more land for farming to meet economic imperatives, it cut off the Camargue region from its environment, depriving it of regular supplies of fresh water and silt previously provided by flooding. As a result of this the preservation of the exceptionally rich wildlife nowadays requires stringent management of the water resources. There are pumping, irrigation and draining stations and a dense network of channels throughout the river delta. The myth of a wild, untamed Camargue, often echoed by an abundant literature, is less true today than it used to be.

It was not until the 19th century that the sea and river were finally tamed and the inhabitants could start extending their farmland to feed the growing population. First, construction of a sea dike in 1859 limited the rise of tides in south Camargue. Ten years later, the Rhone was embanked to control flooding that periodically submerged the farmland. The Camarguais then could farm irrigated vineyards, and after W.W.II, rice was grown intensively. The desire to grow bigger amounts of these two crops was an incentive to extend the irrigation ditches, permitting desalination of more land, but required much more water control equipment. The artificial networks, which were improved in the 20th century, were also used to channel and manage water resources to cope with dry spells and to tailor water to growing seasons for the 20,500 tilled ha.

## Camargue (region)

Camargue (region), region of Bouches-du-Rhône department in south-eastern France. The Camargue is a large wetland expanse of marsh and lagoons comprising the delta of the River Rhône, flowing into the Mediterranean Sea. The delta covers 780 sq km (300 sq mi), lying between the Grand and Petit Rhône, and is sparsely populated. Much of the Camargue is wild, too marshy to be cultivated, and provides a natural haven for wildlife, particularly birds and horses. There are wild herds of white Arabian horses, as well as birds such as flamingos, egrets, and ibises, resident in the Grande Camargue and the smaller adjoining Petite Camargue. In total, the Camargue regional park covers some 82,000 hectares (20,265 acres). Many of its lagoons, such as the Étang de Vaccarès, are also nature reserves.

The Camargue's restored cathedral of Maguelone stands by the sea, and the Camargue is a centre of pilgrimage, reputedly the site (Saintes-Maries-de-la-Mer) where Mary Magdalene and others landed after escaping persecution in the Holy Land (see Palestine). Tourism is economically important to the Camargue, as is small-scale agriculture, grazing livestock (including black bulls for fighting) on the delta lands, fishing, and cultivating rice, grapes and wheat. Rice yields are not particularly high because of the high salinity of the land, despite great encouragement from the government towards local rice production after World War II. Salt is extracted from the marshy soils in the south-east of the region.

## Tourism

### What were the problems?

The culture and environment which makes the Camargue unique draws huge numbers of tourists

each year. However this influx threatens the area's fragile ecological balance.

The 140,000 ha of wetlands that comprise the Camargue provide a home for a unique collection of flora, including Tamarisk and Narcissi. The fauna includes egrets, pink flamingos and ibises. It's the most important wetlands site in the Mediterranean and attracts one million visitors a year.

150,000 people visit sites inside the Camargue Nature Reserve between April and November, to enjoy the beach, go bird watching or attend some of the cultural events specific to the area, such as the gypsy pilgrimage. Tourists can rent horses, go on 'safari' in a four-wheel drive vehicle or take a boat trip on one of the rivers or the sea. 30,000 to 40,000 visitors use the beaches at Arles, Beauduc and Les Saintes each summer.

Tourism is a major provider of employment for the people of the area, and it's widely encouraged. New hotels are built, camping grounds provided and golf courses created.

### **Consequences**

Towns can lose their unique character, and local traditions become reduced to performances for the tourists.

Land developed for tourist use can no longer provide habitat for wildlife. Walkers, riders and birdwatchers may stray from the paths and harm birds, animals or their habitat, even unintentionally.

The tourist industry and related services provide many jobs. Over time, the people of the region become reliant on tourist money.

Air and noise pollution are caused by too many people bringing their cars into the area.

These effects of tourism damage the wildlife and the atmosphere. Because of this, tourists may stop visiting the area and a major source of income will disappear.

### **Solutions**

In the EU, before any major project is undertaken, an environmental impact assessment must be completed. This identifies both the likely impact on the area and ways to reduce the impact.

Environmental groups campaign for sustainable tourism with detailed planning. This ensures the scenery and character of the area is not destroyed:

Tourist developments will be compatible with conservation plans.

Consumption, waste and pollution will be minimised.

Tourism will become more educational.

The whole park is under the management of the Director of the Société Nationale de Protection de la Nature, assisted by a management committee and a scientific committee. Local Visitor Centres educate visitors about the fragile ecology of the park and how it's preserved.

### **Industry**

#### **What were the problems**

The Camargue is surrounded by towns and industries which, as they expand, demand space

from the wetlands. Rising amounts of human waste, agricultural chemicals and industrial pollutants mean that it is difficult to maintain a supply of clean water to the wetlands. In the Vallée des Baux falling water quality poses a major problem and species are already being lost.

Extracting salt from sea water is an important activity and demand has increased as the chemical industry has grown. The area is responsible for 50% of France's annual salt production. The process is as follows; basins are filled with salt water which is circulated to increase the concentration, the water evaporates and the salt is revealed.

The area of Salin-de-Giraud is about 11,000ha that has become a series of artificial lakes linked together by the dunes created by the wind. About 1,000,000 metric tons of salt provides sodium and chlorine that is used in many chemical and pharmaceutical products.

Many industries and power stations are located on the edge of the Camargue. The salt works and industrial buildings disfigure this stretch of coastline from Port Saint Louis to Fos.

### **Cosequences**

Global temperatures have risen by 0.5 degrees Celsius in the past 100 years. An increase in the burning of fossil fuels also causes air pollution, and has added to global warming. A rise in sea level would flood and destroy the Carmargue:

freshwater would be replaced by saltwater.

many plant and animal habitats would be lost

the salt works would close, costing jobs

farmland would be lost

Excess water flowing off agricultural land partly washes out the salt contents from the ponds, and carries increasing amounts of toxic chemicals.

### **Solutions**

Management strategies could be proposed through which pollutants will either be reduced or have their harmful effects limited. Over 200 EU environmental laws are seeking to limit the air pollution, and the EU has the power to enforce these laws in court. The Camargue Regional Park Foundation is working to bring about less visual pollution and land pollution. They have succeeded to an extent, as industry is beginning to move away from sensitive areas and unsightly cabling is buried.

### **Agriculture**

#### **What were the problems?**

Much of the Camargue is farmland. Many of the inhabitants earn their living from farming rice which is the main cereal grain grown.

The Camargue wetlands are an ideal place for growing rice and the area's 15,000ha of rice paddies produce 75% of the rice grown in France. The crop needs a great deal of fresh water which comes from the Rhone River.

The wetlands water system is a vast network of irrigation canals that assists the rice growing. Farming is becoming more intensive and, as the area farmed increases, so does the amount of irrigation. This is causing problems.

So much fresh water is used in farming and industry that it's necessary to take steps to maintain the ecological balance between fresh and salt water. This balance is vital for preserving the plant and animal diversity that makes the Camargue so special.

This is a crucial time for the Camargue. 50% of its natural wetlands have disappeared in the past fifty years. If the area is to survive, steps will have to be taken to halt this loss.

### **Consequences**

Draining of the land means the loss of natural plant life, such as reeds, and this then affects wildlife which depends on the reeds for their habitat. Farmers use more and more fertilisers to compensate for the loss of fertility. These fertilisers are washed into the soil and find their way into the rivers or wetlands. Pesticides used on farmland can build up in the water and kill off aquatic life. Pollution from farming ruins the salt pans.

### **solutions**

The Camargue Regional Park was set up in 1972 to oversee and manage environmental pressures. There is funding from the EU to support developments to protect the environment. Within the Camargue there is zoning of various activities such as agriculture, industry, tourism and nature reserves. Housing and farming are forbidden in sensitive areas like the flamingo breeding grounds.

