

**THE SALINS GROUP,
A SALT COMPANY COMMITTED TO EUROPEAN BIODIVERSITY
PROTECTION**

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ABSTRACT

Europe has a wide variety of climates, landscapes and cultures which leads to an immense biological variety. Natura 2000 is the centrepiece of the EU nature & biodiversity policy. It is an EU wide network of nature protection areas established under the 1992 Habitats and the 1979 Birds Directives. The aim of the network is to assure the long-term survival of Europe's most valuable and threatened species and habitats. In Europe, the Salins Group produces sea salt on several sites in France and Spain. These salt marshes, all integrated on Natura 2000 sites, represent an ecological interest of major importance.

The Salins Group implements biodiversity protection actions on its salt marshes. Salins Iberica, the Spanish constituent of the group, has led actions to improve the birds' reception on the Cabo de Gata and La Tapa y Marivelez salt marshes. In addition to this, the Life Nature Project "Improvement of the management of the SCI and SPA 'Cabo de Gata-Níjar'" was implemented on the Cabo de Gata salt marshes. This programme allowed the breeding conditions of the Avocet and the Little Tern on the site to be improved. Another Life Nature Project "Decantation circuit of residual salts and ecological recovery of the Natural Park of Las Lagunas de la Mata and Torrevieja" is currently being implemented on the Torrevieja saltworks. The objective of this program is to preserve the state of the Torrevieja lagoon and the Audouin's Gull population. The Compagnie des Salins du Midi, the French constituent of the group, is committed to undertaking ecological actions with the local authorities. To date, the Compagnie des Salins du Midi has written an ecological management plan and signed 3 Natura 2000 contracts on the Aigues-Mortes salt marshes. In this framework, some nesting sites have been created for Flamingos, Terns, Avocets and Gulls of patrimonial interest. Also, invasive plants have been eliminated. The company is committed to the Natura 2000 Charter which concerns the respect's good environmental practices for the next 5 years.

For these actions, the Company awarded the "Grand Prix Natura 2000". The Company is currently involved in a Life Nature project whose objectives are to protect or increase the biodiversity of active or abandoned salt marshes in Italy, France and Bulgaria. This project, filed in October 2010 with the European Commission, is currently under consideration.

Keywords: Natura 2000 network, Salins Group, salt marshes, biodiversity, ecological actions, Life Nature project, water birds, lagoon, invasive plants, contracts, charter

INTRODUCTION

With the double objective of preserving biological diversity and developing different regions, Europe launched, in 1992, an ambitious network of ecological sites called Natura

2000. The grid of these sites extends to the whole of Europe in order to make this initiative coherent by safeguarding the species and the natural habitats. The two most important texts establishing the lawful base of this network are the “Birds” Directive (1979) and “Habitats” Directive (1992). The sites designated under these two directives form the Natura 2000 network. The “Birds” Directive proposes the long-term conservation of different E.U. species of wild birds by targeting 181 threatened species which require special attention. More than 5000 sites were classified by the members of the European Union as Special Protected Areas (SPA). The “Habitats” Directive establishes a framework for the Community actions of the conservation of species and their habitats. This directive lists more than 200 types of natural habitats, 200 animal species and 500 plant species as being of Community interest and requiring protection. The Sites of Community Interest (SCI), currently more than 22,000 sites covering nearly 14% of the European territory, allow for the protection of these threatened habitats and species. In spite of their image as artificial mediums, the Mediterranean salt marshes prove to be of a great biological richness (Sadoul *et al.*, 1998). The water management implemented to the sea salt production induces specific conditions sometimes different from those of the natural areas. These conditions are favourable to many protected birds and essential for some species of European or international interest. Therefore the salt marshes managed by the SALINS Group in Europe have all been almost integrated into the Natura 2000 network and the Ramsar zones. The SALINS Group welcomed Natura 2000 and created a special biodiversity service in the society to actively implement biodiversity protection actions on its salt marshes.



Figure 1: mediterranean saltworks managed by SALINS Group (blue squares)

THE SALINS GROUP

The Salins Group is the only European salt producer to implement the three types of production technology (solar, thermal and mining) employing approximately 1,000 people. The group has an installed production capacity of 3.7 million tonnes. The sea salt production represents 2.3 million tonnes, more than 60% of the production. The SALINS Group manages 9 salt marshes (see Figure 1) with a total of about 22,000 ha mainly on the Mediterranean coastline in France, Spain and Tunisia.

This makes it the first European seasalt producer and private owner of remarkable wetlands. These salt marshes are generally integrated in protection zones: Ramsar and Natura 2000 network (Séjourné & Matrat, 2009).

THE LINK BETWEEN THE SEASALT PRODUCTION AND THE ECOLOGICAL IMPORTANCE OF THE SALT MARSHES

The principle of production consists of circulating sea water over ponds to increase its salt concentration by evaporation under the effect of the sun and the wind (see Figure 2). There are two main periods in the process. First, during spring and summer, the seawater is pumped or moved by gravity along different ponds. The seawater evaporates naturally with the wind and the sun. The salt concentration increases from 35g/litre in the sea to 320 g/litre in the salt tables where the salt crystallises. Salt is then harvested once or more per year depending on the location. In general, the salt is harvested in the salt tables by machines and rinsed with brine. When this has been done, the salt is stocked in piles. In some salt marshes, there is a second method of harvesting. It can be harvested by hand and this salt is called "Fleur de Sel". This salt is directly put into bags and then transported to the factory. During autumn and winter, maintenance work is necessary. In general, the salt marshes are dried out by removing excess water. The workers repair the dykes and the hydraulic system. If it is necessary, they renew the soil of the salt tables.

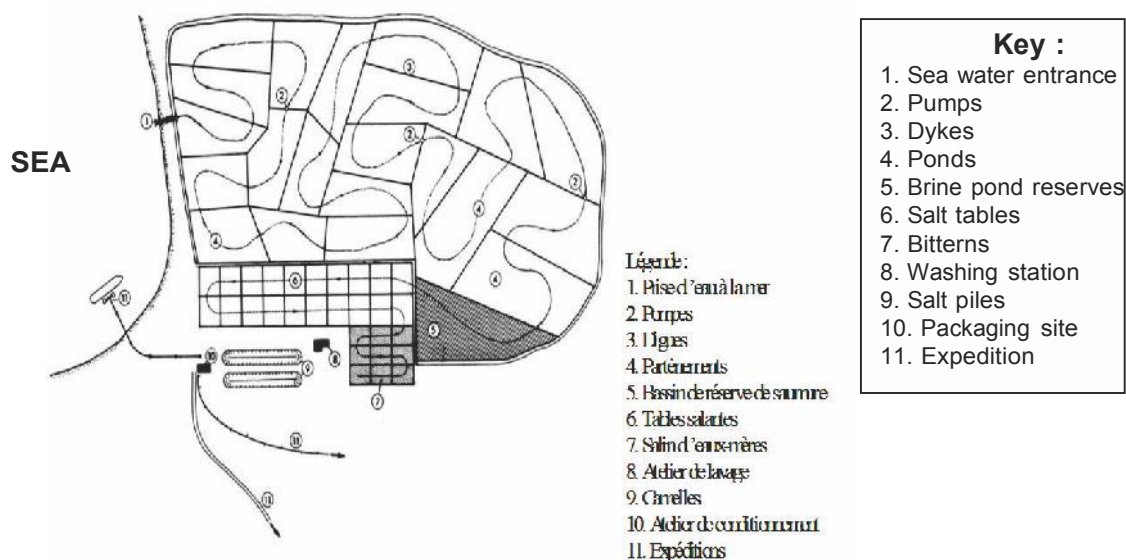


Figure 2. Sea Salt production process

This hydraulic management, which corresponds to the flooding of the salt marshes in the spring and the preservation of the water level during the summer, is favourable to the reproduction and to the food supply of the birds. These particular conditions, different from those of the natural areas which dry out in the summer, allow an isolation of the reproduction sites from predators for flamingos and colonial laro-limicolous (terns, gulls...) of patrimonial interest and provide aquatic food. In the autumn and winter, the hydraulic management, corresponding to the drying out of certain ponds, is favourable to the reception of wintering and migratory birds such as limicolous which feed on invertebrates in the mudflats formed by the dried up ponds. In the spring and summer, the salt marshes management induces a salinity gradient (see Figure 3) favourable to the growth of varied food resources. The low salinity ponds are characterised by the presence of aquatic vegetation, fish and a variety of aquatic invertebrates. The intermediate salinity ponds (> 70g / litre) welcome important quantities of shellfish *Artemia salina*, which are food resources for numerous water birds especially flamingos (Britton & Johnson, 1987).

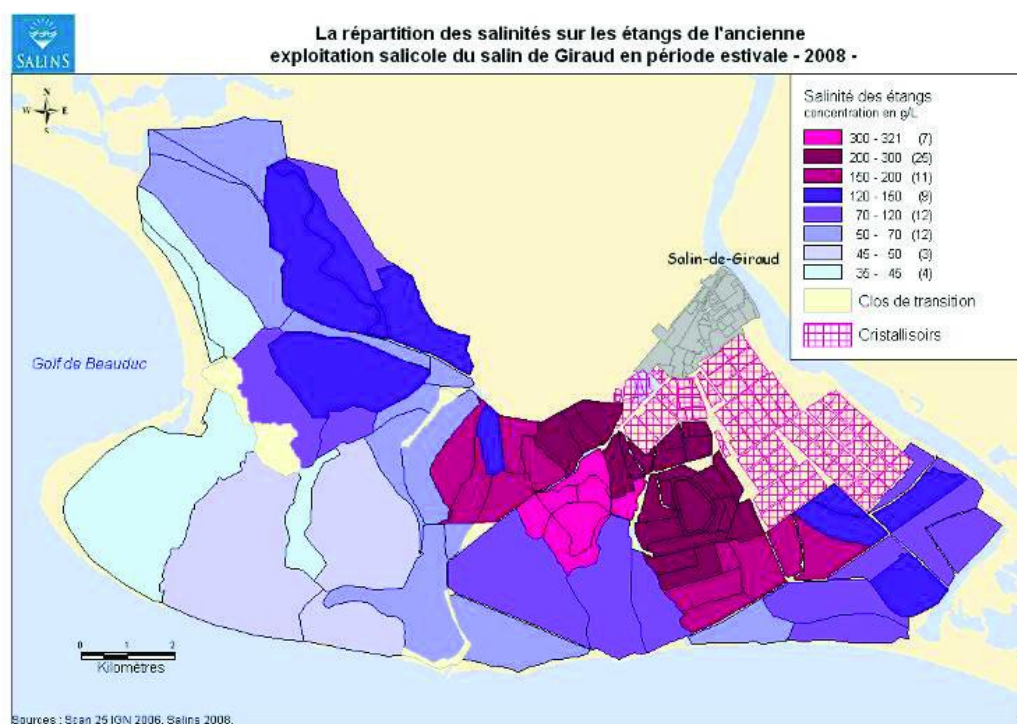


Figure 3: salinity gradient in the ponds of the former Salin de Giraud production site

The consequences of this process is that salt marshes shelter more than 230 species of birds representing more than half of the birds species targeted by the "Birds" Directive (Kayser, 2008; Séjourné & Constantin, 2008; Séjourné, 2008). The salt marshes have favourable conditions for feeding, reproduction and resting of many species of water birds (Britton & Johnson, 1987, Castro, 1993; Zeno, 2006; Koroivessis & Lekkas, 2006; Chokri, 2008) and represent fundamental wetlands for the conservation of protected or threatened waterbirds, especially the Great Flamingo, the laro-limicolous breeders and wintering, migrating limicolous. This role is even more

important in the middle of coastal zones threatened by urbanization and economic activities (Sadoul & Walmsley, 2000). The importance of saltmarshes for the feeding and reproduction of the Great Flamingo (European Interest Directive Habitat Appendix I) has long been recognised, especially on the saltworks of Salin de Giraud in France, by the presence of the most important and reliable nesting site in Europe (Johnson 1983; Johnson & Cezilly, 2007). The salt marshes are very important for the Great Flamingo population in terms of food. In France, the salt marshes of the Camargue (Aigues-Mortes and Salin de Giraud) welcomed certain years in summer about 50 % of the French Flamingo population (Béchet *et al*, 2007). Saltworks are also strategic hosting zones for certain species of laro-limicolous (Sadoul,

1997). They are of major importance for the conservation of these 8 species (European Interest Directive Habitat Appendix I): Slender-Billed Gull (*Larus genei*), Mediterranean Gull (*Larus melanocephalus*), Little Tern (*Sterna albifrons*), Common Tern (*Sterna hirundo*), Sandwich Tern (*Sterna sandvicensis*), Gull-Billed Tern (*Gelochelidon nilotica*), Audouin's Gull (*Larus audouinii*) and Avocet (*Recurvirostra avosetta*), hosting sometimes up to 100 % of breeders in France (Sadoul, 1996 and 1997). Thanks to the specific water management system, the salt marshes are very important stopovers on the migratory routes of the coastal migrating and wintering limicolous (Hortas, 1997; Masero, 2003).

4. THE ECOLOGICAL ACTIONS IMPLEMENTED ON THE SALT MARSHES

4.1. The ecological actions carried out in Spain

Salins Iberica, the Spanish constituent of the group, has led actions to improve the birds' reception on the Cabo de Gata and La Tapa y Marivelez salt marshes. These actions correspond to the clearing of salt deposits and the repair of a channel in Cabo de Gata. The electric cables were partly buried and fitted out with visual aids to decrease the collision risk with the birds in La Tapa y Marivelez. In addition to this, the Life Nature Project "Improvement of the management of the SCI and SPA 'Cabo de Gata-Níjar'" (LIFE00 NAT/E/007304) was implemented on the Cabo de Gata salt marshes from the 01/07/2001 to the 30/06/2005. Launched in 1992, LIFE (The Financial Instrument for Environment) co-finances nature and environment projects in the European Union. These programmes develop in the Natura 2000 network. The LIFE Nature projects contribute to the conservation of the flora, the fauna and the habitats in the countries of the European Union. On the Cabo de Gata salt marshes, over 2km of dykes were successfully repaired and three sluice-gates introduced to control the water circulation. This allowed for the recovery of 30 ha of wetland. Over 25 new islets were created to provide suitable nesting areas of particular importance for Avocets (*Recurvirostra avosetta*), Little Terns (*Sterna albifrons*) and Black-Winged Stilts (*Himantopus himantopus*). Rubbish was cleared and, to keep predators and humans away from crucial nesting areas for birds, 11km of 1.4m-high fencing (see Figure 4) were introduced around the saltpans together with five anti-predator systems along some of the dykes. The project constructed four wooden hides for bird observation (see Figure 5) and 18.7 km of pedestrian tracks in areas of low impact around the saltpans to promote didactic activities. Six

panels were installed to inform visitors about the project area and its main features. Complementary information leaflets were published together with the project website.



Figure 4: 11km of 1.4m-high fencing

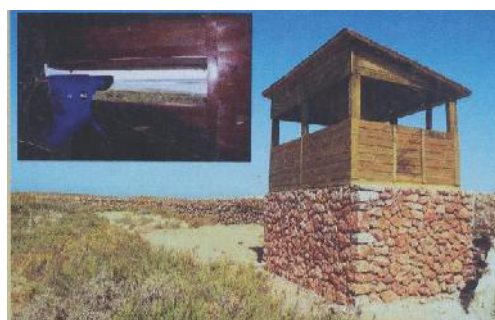


Figure 5: a wooden hide for bird observation

Another Life Nature Project "Decantation circuit of residual salts and ecological recovery of the Natural Park of Las Lagunas de la Mata and Torrevieja " (LIFE08 NAT/E/000077) is currently being implemented by the Torrevieja Salt Marsh Company (NCAST) (from the 01/01/2010 to 31/07/2011). The main objective is to avoid the filling of the Torrevieja lagoon due to the accumulation of mud and gypsum over the years. With the planned project, which is based on a new and improved design for a decantation circuit and brine recycling, the insoluble matter will be decanted and will remain in the circuit thereby avoiding the lagoon filling. In addition, this project also promotes the ecological recovery of a zone near to the Torrevieja lagoon. This second action will help the creation of a new potential nesting area for the birds in this park, particularly for the Audouin's Gull (*Larus audouinii*) (see Figure 6). In addition, there will be an experimental re-vegetation with the introduction of native species. The last main action consists of placing 3 information panels (see Figure 7) and various posters so as to inform the workers about the project and also all those who may be interested.



Figure 6 : Audouin's Gull (*Larus audouinii*)



Figure 7: panel presenting the decantation circuit of residual salts

The ecological actions carried out in France

The Compagnie des Salins du Midi, the French constituent of the group, is committed to undertaking ecological actions with the local authorities on its salt marshes. Within the European network of Natura 2000, France has made the choice of a contractual and voluntary management for the implementation of the sites: users may invest in their management by signing a “*Natura 2000 Contract*” or a “*Natura 2000 Charter*” for a 5-year period. The Natura 2000 Contract is comprised of many engagements of nature conservation actions and the Natura 2000 Charter is a tool for the adhesion to the respect of good environmental practices. To date, the company has subscribed to 3 Natura 2000 contracts on the Aigues-Mortes salt marshes to implement ecological actions. In this framework, since 2008, actions have been implemented to maintain favorable breeding conditions for colonial laro-limicolous of patrimonial interest (gulls, terns and avocets) with the implication of the scientific partner "Marais du Vigueirat". In total, 4 large islets, 32 small islets (see Figure 8), an anti-wave device (see Figure 9) with a protective ditch for predators have been created and 14 islets have been restored by light clearing of the undergrowth. In the long term, these breeding sites are managed to avoid their colonisation by the aggressive Herring Gulls by two methods (Sadoul *et al*, 2008 and 2009; Séjourné & Matrat, 2009). These actions already show satisfactory results with a growth in the population (Sadoul *et al.*, 2008).



Figure 8: small islets created



Figure 9: an islet with an anti-wave device

An islet (see Figure 10) and a protective ditch for predators have been created in March 2010 to improve the breeding conditions of the Great Flamingo on the Aigues-Mortes salt marshes. The technical recommendations of the Tour du Valat have been followed. With grape-picking buckets lent by the Listel Society, about 50 artificial nests (see Figure 11) have been created to attract the flamingos with the collaboration of Alan Johnson, ornithologist specialised in flamingos. This site with a surface area of 500m² could receive up to 1000 pairs per year. To date, the result of this action has not yet been confirmed.

To protect the biodiversity of the protected habitats identified on the Aigues-Mortes saltmarshes, a Natura 2000 Contract has been signed to eliminate the invasive plants like *Cortaderia selloana*. Since 2009, the company has been committed to the Natura 2000 Charter which concerns the respect of good environmental practice for the next 5 years over 4938 ha. For these actions, the Company was awarded the "Grand Prix Natura 2000" granted by the French Ministry of Ecology. Besides the contracts and charter, the Compagnie des Salins du Midi carries out many biodiversity favourable actions. Maps of the protected plant species and the habitats have been drawn up, so that during salt production works, they can be accommodated.



Figure 10: nesting islet for the Great Flamingo



Figure 11: artificial nests

The biological knowledge has been improved: more than 230 bird species, at least 300 plant species and 21 species of reptiles, amphibians and mammals have been identified by scientific partners on the French salt marshes. The company staff participate in the banding operations of the chicks and the monitoring of the medical and nesting birds status. Their naturalist skills are also improved by training on birds and plants. All this information has been recorded in a Geographical Information System and a Naturalist database. Access by the general public is managed in a controlled and limited way on the sites. In general, the nature conservation actions, the follow-ups and inventories on the flora, the fauna and the habitats are carried out with scientific partners and local authorities (Tour du Valat, Marais du Vigueirat, Office National de la Chasse et de la faune sauvage, Fédération Départementale de la Chasse du Gard, Centre Ornithologique du Gard, Ligue de Protection des Oiseaux, le Conservatoire-Etudes des Ecosystèmes de Provence / Alpes du Sud, Société de Protection de la Nature du Gard, Conservatoire Botanique National Méditerranéen de Porquerolles, Syndicat Mixte Camargue Gardoise, Parc Naturel Régional de Camargue, Syndicat Intercommunal de Sauvegarde de l'Etang de Berre). These actions are well specified in an ecological management plan (Séjourné & Constantin, 2009; Séjourné & Matrat, 2009) for the Aigues-Mortes salt marshes. This plan is currently being written for the Salin de Giraud production site.

5. CONCLUSION

The ecological actions implemented on the salt marshes illustrate the commitment and the professionalism of the SALINS Group to biodiversity conservation. For these actions, the group was awarded the Anders Wall prize in 2005, the Belleuropa prize in 2007 and the "Grand Prix Natura 2000" in 2010. This commitment to European biodiversity protection will continue with long term objectives for the SALINS Group to carry out actions of knowledge and nature protection on all their exploited sites. In this framework, the Compagnie des Salins du Midi is currently involved in the Life Nature Project "Environmental Management and Restoration of Mediterranean Salt Works and Coastal Lagoons" (LIFE10 NAT/IT/000256) whose objectives are to protect or increase the biodiversity of active or abandoned salt marshes in Italy, France and Bulgaria. Six partners have associated to submit this Project in October 2010 which is currently being examined by the European Commission.

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