Ecological management of salinas

Salinas are especially known for their rich bird life. Flamingos, avocets and many other waders (like the "ALAS bird", the black-winged stilt) here find both shelter from predators and a good place for feeding and breeding. In winter, migratory birds - ducks, geese, waders, birds of prey - from northern Europe stop by or spend several months in the Mediterranean and Atlantic salinas.

In order to be attractive for the birds, salinas require an active ecological management. This is often fully compatible with the production of salt and most landowners understand the interest of this nature conservation aspect of the salinas.

The general aim of ecological management is to provide the birds with food, protection and suitable nesting sites. It is partly a question of managing the water levels to prevent the nests from being flooded and the pools from drying out.

Providing with breeding sites

Constructing or reinforcing nesting sites in the preparatory surfaces of the salinas and controlling the vegetation are examples of practical works. One of the most well known artificial nesting sites was made in Salins de Giraud in Camargue. In one of the huge evaporation pools, a whole island was built specifically for the flamingos (see drawing). It was rapidly accepted by the birds and hosts several thousand breeding pairs.

Specifically built islands – big or small - are no more than flat mounds inside the salina. The summit should be just above the highest water mark. The edges must have gentle slopes in order to facilitate the access to flightless young birds (waders, terns). The shape must consider the risk of erosion resulting from dominant spring and summer winds.

Vegetation cover can vary according to which species you wish to attract. Black-winged stilts will use mud islands with low salt marsh vegetation, while little terns will prefer islands with gravel or broken shells.

Floating islands can be placed inside deeper parts of the salina. They will provide with safe breeding conditions for bird species such as ducks, but also for terns. They can be made from very simple materials, for instance wooden boxes and empty barrels to keep them afloat.

Big restoration works require machines, but small interventions can very well be carried out by hand. Before proceeding to any major works or modifications, a general management plan of the area is needed. Andrej Sovinc describes a basic methodology to follow, *see page 7*.

The ALAS project is currently working on the subject. Several printed publications are on their way and we hope they will be useful for managers of salinas.

Protection of salinas

The best protection for the salinas is that they remain economically viable and that they continue to produce salt. Other legal types of nature conservation measures give additional guarantee for the preservation of these manmade wetlands and their biodiversity:

- the international convention on wetlands: the Ramsar convention,
- the European network: Natura 2000,
- national legislation (Nature reserve, National park…).

Rui Rufino and Hjalmar Dahm

Further reading:

N. Sadoul, J. Walmsley and B. Charpentier. 1998. *Salinas and nature conservation*. (A MedWet's publication to order through secretariat@tour-du-valat.com)

Castro Nogueira, E. 1993. *Ecologia y dinamica annual de las poblaciones de aves en las salinas de Gata (Almeria)*. Instituto de Estudos Almeriensis, Coleccion Investigacion, Almeria.

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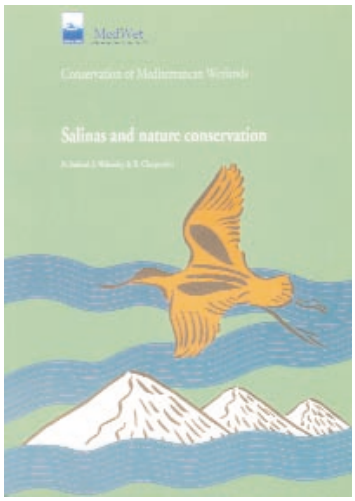

Building floating islets for ducks and terns. (Guérande salinas, 1986)

Relevant web sites about conservation of salinas and nature protection:

Ramsar: www.ramsar.org

Natura 2000: http://www.europa.eu.int/comm/environment/nature/home.htm

Wetlands International: www.wetlands.agro.nl

World Wetlands Day, 2 February 2002

The International Convention on Wetlands, the Ramsar Convention, will focus the annual "World Wetland Day" on the many cultural expressions that link people to wetlands. Salinas are cultural wetlands and also ALAS should do its best to join the activities on this day. It takes place on a Saturday, so why not use this day to organise an excursion combined with a local workshop!

More information from alas@otenet.gr or www.ramsar.org

Preparations for the Management Plan for the Secovlje salinas

The Secovlje salinas are a Landscape Park and also the first Ramsar Site in Slovenia. According to the new national law on nature conservation, it is recommended that all protected areas should have a management plan. In order to prepare a draft of the management plan of the salinas, a training module was organised. Although this seminar took place two years ago, I believe that the basic methodology we followed then is of interest to all managers of coastal salinas.

The 30 participants were provided with general information about the management planning process. The importance of a management plan as a printed document was clearly demonstrated.

The "Protected Area Management Planning Process" can be described a series of steps:

Step 1: Form the Planning Team
Step 2: Gather Basic Background Information
Step 3: Field Inventory
Step 4: Assess Limitations and Assets
Step 5: Review Regional Interrelationships
Step 6: State the Objectives of the Area
Step 7: Divide the Area into Management Zones
Step 8: Review Boundaries of the Area
Step 9: Design the Management Programmes
Step 10: Implement the Plan and Monitor the Effectiveness

The work of the group was based on the following definition of the management plan:

"A management plan is a written, circulated and approved document which describes a site or area and the problems and opportunities for management of its nature conservation, land form or landscape features, enabling objectives based on this information to be met through relevant work over a stated period of time." (EUROSITE,1999)

The group was informed about the necessary steps in the preparation of the management plan:

1. Description of the site
2. Evaluation
3. Orientations
4. Objectives
5. Operation/Tasks
6. Implementation
7. Monitoring

The scope of the group's work was to identify the different factors that affect the management. They are an essential background for the evaluation and definition of future orientations. The participants identified the following main constraints and assets for Secovlje salinas:

1. Natural (overgrowing, hydrological regime, erosion and sedimentation, spawning grounds, breeding areas, presence of species, invasive species, climatic factors, halophytes).
2. Human (maintenance of water levels, introduced species, access to the site and visitor management, maintenance of infrastructure, pollution, aqua-culture, salt-production, angling, marina, museum, local architecture, disturbance, research).
3. External (climate, airport, pollution, aqua-culture, tourism, fishing reserve).
4. Legal and others (transboundary area, internationally designated Ramsar site, state property, development plan, concessions, inventories, finances, EU Directives, mining, lack of control, weak legislation and management, salt-production and market etc.).

The results above are an important contribution to the management plan for the Secovlje salinas.

Andrej Sovinc
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Management plan for Pomorie Lake

Pomorie Lake in June 2001.

The lake of Pomorie lies just North of the town. It is separated from the sea only by a narrow dike. The lake is not only an important site for birds (breeding avocets, stilts, terns), but it also serves as saltwater reservoir for the salinas.

The Ministry of Environment and Waters has now asked the Municipality of Pomorie – the ALAS project leader – to conceive a management plan for the "Pomorie Lake Complex". The Municipality will work together with an NGO, Green Balkans in Plovdiv. Further, the Municipality discusses a future collaboration with the Bulgarian-Swiss Biodiversity Program, both for financial reasons and environment related activities.

Milcho Skumov, ALAS project manager in Pomorie

harvest rate varying from few (*continuous crystallization*) to many harvests per period (*periodical crystallization*).

According to the size, the variety of methodology for salt-making employed, as well as other characteristics, the following types of Mediterranean salinas are distinguished:

1. *primitive or artisanal salinas*, in which salt is gained with little or no human intervention, mainly collected from nature (e.g. rocky coasts, closed lagoons etc);
2. *traditional salinas*, comprising small compartments and crystallizers that can be efficiently operated by one or two persons. They are characterized by intense human presence in all stages of salt-making;
3. *semi-industrial salinas* (rather *saltworks*), with relatively large compartments and crystallizers. They are still characterized by involvement of man and are manually operated at least for salt harvest;
4. *fully mechanized* huge *industrial saltworks*, with almost no manual operation, that are extremely large and economically profitable.

Since the ancient times, hundreds of salinas have operated in the Mediterranean. Considering only the non-primitive coastal ones, ca. 170 of them are recognizable today. 90 are still working, whereas the rest are inactive or transformed. Of the 90 active salinas, 77% are located on the European coast, the rest in Turkey, Tunisia, Algeria, Lebanon, Israel, Egypt and Morocco. Their surface may vary from 1 ha to 12,000 ha. Largely created from areas of natural saltmarsh, they have developed into areas of major importance not only for the ca. 7 million tons of salt produced per year, but also for historical, cultural and ecological reasons.

The values of the Mediterranean salinas

Economical and historical value

Mediterranean salinas are recognized among the most important non-polluting industrial activities of the area. Their importance has been more pronounced in the past, when salt was a vital commodity, at least for food preservation, and played a key role throughout history, providing political power to those who controlled its production and trade. The first *Salt Routes*, through which salt was traded, were probably those of the Protocycladic II period, in early Bronze Age, later the Phoenician ones. Amongst the most known, the terrestrial *viae salariae* of the Romans, and the marine ones by Venetians and Genoese, justify the metaphor *white gold* referring to the economic importance of this commodity, the renowned "*edible money*" of Cassiodorus. Indeed, for many centuries, states, churches, cities, as well as families acquired power and wealth from producing, trading or simply taxing monopolized salt (the roman *annona*, the byzantine *kommerkion*, the arab *al-quabala*, the french *gabelle*). It is because of its economic importance that salt still makes part of today's monthly payments, at least as a relict in some European languages (*salarium, salary*).

Cultural value

Based on the same fundamental technique, many varieties of salt-making adapted to the particularities of geology, the vicissitudes of climate and anthropological temptations, challenged the Mediterraneans to develop a diversity of devices and tame wind and waves for letting salinas be white. The immense quantity of human energy invested resulted not only to a simple commodity, but also to everlasting cultural features: the saline landscape of the Mediterranean, comprising architectural and technical achievements (devices, equipment, tools, techniques), as well as social aspects such as the salter's life style and manners (materials, housing etc.). Yet, salt, basic seasoning and food preservative, served as vehicle for the tastes of the European history of gastronomy since the ancient times: from *γάρος* (gr.) to *garum* (lt), *salcicia* (lt) to sausages, *salsa* (it.) to sauce, *insalata* (it.) to salad, *salsamenta* (lt) and *salgama* (lt), salted herring. Inside the ancient Greek *salt cellars*, the Roman *salina* (sing. *salinum*), the byzantine *alatika*, and the Italian *saliere*, salt

has always had a special place on the table, and a prominent position in famous museums. As a profession, it accompanied many people through life: salters, *salgamari*i, salt transporters and traders, salt guides, tax officers and smugglers. Although notorious, its symbolic significance for human behaviour, customs, religion, mythology, legends and superstitions is, therefore, quite understandable.

Ecological value

There are several reasons for qualifying salinas as important wetlands, and interesting from the viewpoint of nature conservation:

First, because of the special biodiversity they host. This is due to the hypersaline character of the saline basins, one of the harshest wetland habitats. Very few organisms can stand the inhospitable environments of these saline deserts, where, however, they can grow into extremely large populations due to lack of competitors. This is why *Artemia,* the brine shrimp, attain high numbers in the saltpans, providing other consumers, such as flamingos *Phoenicopterus ruber* and avocets *Recurvirostra avosetta,* with ideal conditions for feeding by filtration.

Second, because salinas are biologically rich despite being artificial habitats. This is due partly to the fact that as man-managed they are kept constantly under water, which makes them ecologically invaluable during the dry summer. In winter, however, their ecological value may decline if the pools are left without water. Their biological richness is also due to a mosaic consisting of a combination of basins with a wide salinity gradient, providing diverse niche possibilities to species of different tolerance. In addition, salinas contain a number of relatively undisturbed aquatic and terrestrial habitats that make them vital for the conservation of waterbirds.

Third, because many salinas constitute the only functioning wetlands among extremely dry areas such as islands and extended Mediterranean archipelagoes.

The Mediterranean salinas are artificial idiosyncratic wetland systems, characterized by:

- the presence of equally uncommon species: salinity tolerant unicellular organisms, some of them interfering with the quality of salt produced (*Aphanotheca, Dunaliella salina, Halobacterium*);
- an interesting halophilous flora, aquatic and terrestrial, the latter pollinated by a specialized wasp fauna;
- a quite diverse fauna of salinity tolerant aquatic invertebrates, but few fish genera;
- a considerably high diversity of waterbirds using the salinas for breeding (often in large colonies) or as wintering and refueling sites during their transcontinental stopovers.

Is the ecological value of a salina size-related? To put it in another way, are small salinas inferior than large ones? The answer cannot be simply yes or no. This is because on the one hand, large salinas are endowed with unique ecological characteristics, whereas small ones are sometimes unique within extended, dry areas. This makes the latter invaluable from the viewpoint of nature conservation. In addition, ensuring water circulation in them throughout the year is less complicated compared to managing the large ones.

Pressures and threats to the Mediterranean salinas

Mediterranean salinas are today facing many pressures and threats due to change of social values and economic stresses, notably:

1. conversion from low intensity to mechanized production. Worst is the transformation to high salinity brining salinas of almost no biological value;
2. abandonment or conversion to other uses such as ports and airports, aquaculture and rice paddies, industrial, urban or tourist zones.

These impacts affect the salinas' role as cultural landscapes and the coexistence of sustainable salt production and biodiversity. Landscape quality may be additionally affected by occasional pollution events, marine (e.g. oil accidents) or terrestrial (wastes, sewage).

The fragile socioeconomic balance is linked to a market that is subject to competition from cheaper land-produced salt and the world trade. Faced with the need to be economically viable, Mediterranean salinas are confronted with the choice of closing, industrializing the production, or finding a niche market for quality salt that gives higher market returns. Where salinas close, this leads to a significant loss of their biodiversity. In the cases of transformation into other farming use, they definitely loose their ecological values. The current trend to cease, or consolidate, salt production in many parts of the Mediterranean has created many inactive and intermittently exploited salinas with buildings and hydrological infrastructures falling into ruin. This is exacerbated by competition for space along the Mediterranean coastline for urbanization, industry, and tourism, especially on the northern edge where the largest number of dormant salinas is found.

Experiencing on conservation and public awareness of Mediterranean salinas

The friends of Mediterranean salinas can share common interests with two important current initiatives:

1. The *ALAS project*, with ambitious objectives to be achieved through active networking:

- development of specific local concepts on the production and use of traditional salt to maintain/create jobs, and conservation of the salinas' cultural and natural heritage as an important factor of regional development;
- enhance the wetland values of the salinas through drafting and implementing ecological management plans;
- conserve small salinas through promoting and marketing traditionally produced salt as a high-quality product (economic study, labeling, setting-up co-operative structures);
- conservation of the salinas' heritage through compilation of knowledge on traditional salt production and related cultural heritage, together with preparation of guidelines and execution of pilot projects on re-establishing/upgrading/operating traditional salinas including training of qualified salters;
- establishing or improving salt-museums for raising awareness on cultural and natural heritage of salinas;
- experimenting to use the cultural and natural heritage of salinas and traditional salt for additional quality tourism.

2. The initiative of the recent *MedWet/Com4 Technical Session*. Among the substantial conclusions on the future action for the "wise use of salinas", it encourages MedWet/Com members to support existing networks and programs on the conservation of salinas, and it recommends:

- the establishment of a multi-sectoral *MedWet Salinas Working Group*, with responsibility to report to *Ramsar COP8* on the status and trends of Mediterranean salinas;
- include salinas and salt into the *Millennium Ecosystem Assessment*;
- promote awareness and a multi-sectoral "wise use of salinas" network in collaboration with relevant existing sites and project networks such as *ALAS.*

The Ruddy shelduck, can be observed in salinas in the eastern Mediterranean and around the Black Sea.

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Mediterranean salinas: tradition and sustainable use

Theodora Petanidou, University of the Aegean, Lesvos

Since some years Mediterranean salinas have been defended by nature and cultural conservationists, for the simple reason that they are unique for their landscape and wetland values, as well as for making part of the cultural heritage of the Basin. In this respect, some salinas, once degraded or fallen into ruin, have recently been upgraded, restored and rehabilitated. The raising interest about them was expressed through symposia and workshops by scientists (historians, ethnologists, ecologists), managers and owners, local developers. All agree with sustainable development and wise use of salinas, where salt-making is combined with soft tourism. In addition, there have been some Mediterranean initiatives aiming mainly at raising awareness and networking on the study and conservation of the salinas. Such initiatives are the *Salt Routes* of UNESCO, the current *ALAS project* and the recent *MedWet/Com4 Technical Session*.

The *Salt Routes* was a splendid idea from the Paris workshop in April 1997 (DG XI-INSULA, UNESCO). It was followed by the currently running *ALAS* (**Al**l **A**bout **S**alt) ECOS-Ouverture project (1999-2002), the first Mediterranean collaboration initiative between salinas: Lesvos (Greece), Figueira da Foz (Portugal), Piran (Slovenia), and Pomorie (Bulgaria). The recent MedWet/Com4 Technical Session (Sesimbra, May 2001) recognized the importance of ecological, cultural, historic, landscape, educational and touristic values of the Mediterranean salinas. It also identified the pressures and threats they are currently facing, and proposed a set of recommendations for their conservation.

Salinas of the Mediterranean and their History

The Mediterranean salinas are usually coastal and man-made. Seawater evaporates in a succession of shallow ponds, the salt is finally collected or harvested for domestic and industrial use. Since the eve of civilization, and due to the diversity of technical solutions, a rich terminology has developed: saltpans, salterns, salt-gardens, salinas, salines, saltworks.

The Mediterranean climate is ideal for salt making. Although a generous gift of nature, salt has been artificially produced as early as 641 BC in the first salt-gardens of Ostia (Rome). Already then, later even more, salt has been an expensive commodity for the Mediterranean, as well as the world beyond this region. The evolution of salt-making techniques came to a standstill with the method of *successive evaporation basins*, introduced into the Mediterranean by the Arabs in the early Middle Ages. The basics of this technique remain unchanged until today. First, the compartments (pre-basin, evaporation ponds of low, medium, and high salinity, crystallizers), all connected and separated by canals, gates, sluices, dikes, bridges, aqueducts. Second, the process that differs only as to the

Report from ALAS annual conference

The annual conference took place in Figueira da Foz, 29/9-2/10. Delegates came from all four ALAS sites to discuss the work inside the project, especially the interregional tasks (video, publications…). The principal workshop debates dealt with salt museums, ecological management plans and the future of traditional salinas and salt.

A main event was the contribution from the two invited guests from the Guérande salinas. Charles Perraud, director of the salt co-operative, clarified how the *paludiers* have managed not only to survive, but also to develop their activity. Laurent Boulo from *la Maison du Sel* presented how an information centre about salinas and birds can co-operate with two complementary structures and museums in the same site. Anabela Resende from Castro Marim, Algarve, explained how a nature reserve co-operates with the salt producers and how they obtained a quality labelling of the salt. Luis Costa from Birdlife-Portugal explained the MedWet Inventory methodology for wetlands.

The conference excursion took us to the salina that the municipality has bought and the participants could taste the salt, the first produced since many years. The future eco-museum will be placed here and the local team wished to hear the views from the other sites. We were joined by José Figueiras (chairman of the Lavos parish), António Duarte Silva (President of the Municipal Council and candidate for the next mayor-ship in Figueira) and several of the Figueira salters.

The participants at the municipal salina, Corredor da Cobra (the Cobra's corridor!).

www.alas.gr

At last the ALAS web site is ready! It has been elaborated after an intense collaboration between Mãe d'agua and the Lesvos team. The design and technical set-up were finally made by Thomas Mavrofidis and Mitsos Papageorgiou from the University of the Aegean (Cultural Technology and Communication).

The site should be regularly updated and we expect that you will contribute with your remarks. Articles and all types of information are most welcome.

More web-sites

In the Newsletter 2 we published a short list of interesting web-sites. The Guérande salt co-operative now has a new site www.seldeguerande.com and one site got a slightly wrong address: www.saltinfo.com

Some other ECOS-Ouverture projects have their own web-sites. Check www.oleumnostrum1.com for an interesting site about olive oil and quality. One partner is from Istria!

Many more sites – especially to salt museums - can now be found on www.alas.gr

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ALAS calendar for coming events

March 2002
Project Management Committee in Lesvos

17-20 May 2002
Annual Conference in Piran

And don't forget:
World Wetland Day, 2 February 2002

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All photos in this issue: Hjalmar Dahm.
Paintings by Iliana Apostolopoulou (salina landscapes) and Marios Apostolopoulos (birds).

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For local language Newsletters, contact the local project manager.

Next ALAS Newsletter:
March 2002. This will be a special issue on European salt museums. Please send manuscripts before 15th of February.

ALAS
All About Salt

Newsletter

Issue 3, December 2001

Notes from the editor

Salinas and wildlife

Coastal salinas are manmade wetlands. As such they are very important for nature conservation and biodiversity – as long as they are well managed. This third ALAS Newsletter therefore focuses on ecological management, both with some articles and other information. Next year, a specific "technical letter" will be published on the subject.

The article by Theodora Petanidou gives a fascinating introduction to the global values of the different types of salinas. It is a solid summary that provides with all the necessary arguments for the preservation of this cultural and semi-natural heritage. Read it carefully!

As usual, the Newsletter gives you some brief information from the latest events. The biggest event is the ALAS web site. We hope that it will be a useful tool and that it will continue to evolve the coming months. So check www.alas.gr regularly!

During winter, thousands and thousands of birds are present in the Atlantic, Mediterranean and Black Sea salinas. Here is my advice for your Christmas vacations: hang a pair of binoculars around your neck, go out and check the shelducks (drawing), brent geese, avocets, wood sandpipers and other flamingos. I promise that it will not only be a rich day, but also a good possibility to lose some calories!

In sale salus,

Editor

In this issue:

The ALAS Newsletter is published with the financial support of the European Commission.

ECOS-Ouverture is the European Commission's Programme for Co-operation between the regions and cities of the European Union and their counterparts in Central and Eastern Europe.

Croatian salinas

There are three coastal salinas working in Croatia. The biggest – and through history most known - is found on the island of Pag. Today the final cristallization takes place in huge vacuum boilers. Further to the south lies the old town of Nin. The small salina is like a glimmering jewel in the flat landscape. The salt is harvested on a weekly basis. In the surrounding pools, avocets, redshanks and black-winged stilts give a vivid atmosphere to the scenery.

The southernmost salina is situated on the island of Peljesac in Ston. The landscape is magnificent, between the pines on the Adriatic coast and the green hills. Here, Svetto Pejic and his son Marijo invest their energy to make the salina live again.

A technical invention in Nin makes the salt harvest easier: the scrape is pulled by an electric winch. (August 2001)