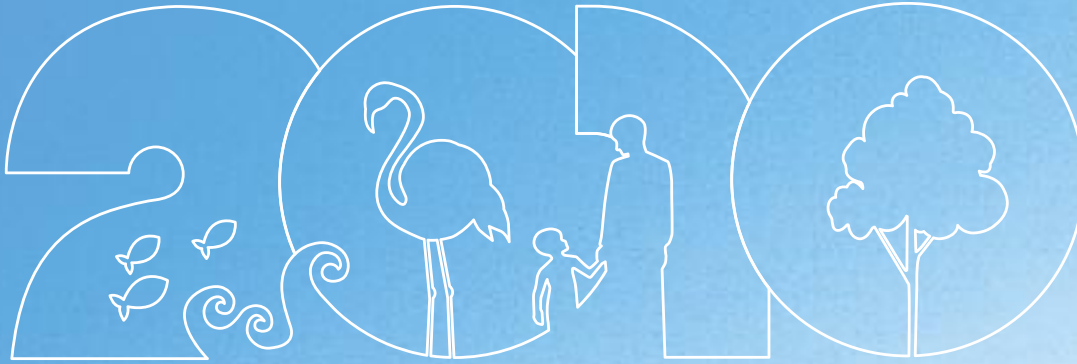


Reclamation of mining fills
Kleisoura - Fokis, Greece



2010 International Year of Biodiversity

"The United Nations declared 2010 to be the International Year of Biodiversity. It is a celebration of life on earth and of the value of biodiversity for our lives. The world is invited to take action in 2010 to safeguard the variety of life on earth: biodiversity"

United Nations Environment Programme – UNEP

Biodiversity: *The variability among living organisms from all sources including, i.a. terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.*

Definition from the Convention on Biological Diversity (signed at Rio de Janeiro in 1992)

Despite the widespread debate concerning biodiversity, especially because of the fact that 2010 was declared as International Year of Biodiversity by the United Nations (UN), most of us continue to have questions related to the issue at hand. The importance of conserving biodiversity may have been understood, since it is often promoted at public events celebrating the environment and through the mass media. Yet the link between the ecological approach to biodiversity, which is the one mostly highlighted to the public, and the importance of biodiversity for the activities of a mining group such as S&B Industrial Minerals S.A. remains obscure.

This special report begins exposing the development of the Convention on Biological Diversity from the very start, at the United Nations Conference on Environment and Development (the Rio "Earth Summit") in

1992, until the recent commitments by various nations in Nagoya (2010), as well as the aims finally agreed upon by the global community of nations. In addition, the link between the current legal framework of the European Union and biodiversity and mining activities in general is highlighted. And finally, the actions taken by S&B as a mining company in order to preserve biodiversity according to the principles of sustainable development are presented at length.

We hope that reading this "brief" special report on such a "big" issue will prove enlightening and entertaining as well!

This Focus was compiled with the cooperation of colleagues Michael Stefanakis, Myrto Kontaxi, Vini Filippi.

Biodiversity as part of the international agenda

Biodiversity does not constitute a new concept for the scientific community, especially for the disciplines that study the natural environment and ecology. It does, however, represent an issue that acquires increasingly more importance on an international, European and, ultimately, national level, from the point of view of both the adoption of policies and the enactment of legislation, rules and regulations.

The question, thus, arises: how and why has biodiversity developed from a mainly scientific discipline to an issue of major importance that climbs increasingly higher on the agenda of international organizations and in state policies and is by now directly involving business activities? The answer to the first part of the question follows below. As to the "why", the answer is the realization of the scale at which biodiversity is being lost, i.e. the number of species in relation to the past, in combination with the destruction of ecosystems in order to cover the growing needs of the growing population on earth.



The protection of biodiversity as an issue of international and national strategy

During the significant **United Nations Conference on Environment and Development** in 1992 in Rio, Brazil (also known as the "Rio Earth Summit"), the **United Nations Environment Programme** (UNEP) presented the global **Convention on the Conservation of Biological Diversity** (hence Convention on Biodiversity), as a result of in-depth study of the current situation by a Working Group of Experts since 1988. The Convention was ratified in 1993 and comprised targets for sustainable development, climate change and the management of natural resources without destruction of ecosystems. In April 2002, the Convention's signatory nations, having evaluated that the rate of implementation of its goals did not proceed satisfactorily and bearing in mind the other goals of the United Nations concerning the reduction of poverty and the improvement of living conditions in the whole planet, set a new aim, **to arrest the decline of biodiversity on an international, regional and national level until the year 2010**. Within this framework, 2010 was declared as **International Year of Biodiversity**.

At the Conference of the Parties to the Convention on Biological Diversity (COP-10), which took place in Nagoya, Japan, in 19-28 October 2010, progress regarding the implementation of the Convention was considered. Since the aim set for 2010 has not

been achieved, the new strategic plan for 2011-2020 was finalized and a new vision for 2050 was set forth. The new plan calls for attempts to reduce by 50% the rate of loss of biodiversity and, wherever possible, to eradicate the loss, restore 15% of the degraded areas to their natural condition and protect 17% of land and 10% of sea covering the planet. Fair and balanced distribution of benefits from the use of genetic resources is also taken into account. The Nagoya Protocol, as it has been called, is expected to enter into force in 2012, also defining Action Plans at the national level until then. Today, 193 countries are members of the Convention on Biodiversity, rendering it truly global.

The **European Union** (EU) and its member-states, that actively participated in this global action (from Rio to Nagoya), are at the forefront of laying down international policies, since they have been promoting, ever since 2006, a large number of legal initiatives to reduce the rate of loss of biodiversity. The EU framework for the protection of biodiversity today is being implemented through the Directives on the protection of habitats and of flora and fauna (also known as "Natura 2000 Network"), strategies of "green infrastructure" and "control of alien species", also aiming to incorporate the protection of biodiversity in other policies (for example, Common Agricultural Policy, Region-

al Development, protection of water and land, combating pollution etc.) The Natura 2000 network is the largest network of protected areas in the world, at 18% of the total landmass of the European Union, while the percentage for Greece is 28%. The Directive 409/EC for the protection of wild fauna is being implemented since 1979 while the Directive 43/EC has been in effect since 1992. It should be noted that the "Natura 2000 Network", as part of the initiative for the protection of biodiversity, does not cover every species of plant or animal in the EU but classifies as species "under protection" about 1,500 species of animals and plants that are under threat of extinction, rare, vulnerable or endemic, as well as about 230 habitats, in order to safeguard their long-term conservation in the EU.

In order to achieve the ambitious goals of the CBD, the European Union approved in 2006 a Biodiversity Action Plan while in March 2010 it adopted a new target with a year 2020 horizon. Greece ratified the CBD with Law 2004/1994, while the recent government bill "on the protection of biodiversity" that was tabled by the Ministry of the Environment, Energy and Climate Change, attempts to incorporate the concept of biodiversity in the protection objectives of Law 1650/1986, the basic law for the protection of the environment.

Biodiversity and the mining sector

The mining sector (and surface mining especially) by its very nature interferes with the natural environment, given that the process of extracting minerals moves and removes large quantities of soil, disturbing the local habitats even though temporarily. Yet the sector has acknowledged responsibility for carrying out its activities while respecting the natural environment that is, after all, the source of its business, and can present many examples of activities actually having a **positive** effect on biodiversity, which is also the goal of the largest mining companies in particular.

It is worth noting that the mining sector does not have the privilege of establishing or/and moving its activities at will, since nature has "located" mineral resources at specific areas, and also our civilization today needs minerals as raw materials for the manufacturing of products used everyday as well as for infrastructure. This need was eloquently expressed through the **Raw Materials Initiative** of November 2008 (also known as the **Verheugen Initiative**). Taking into account the diffi-

culties in accessing areas of the Natura 2000 network, not prohibited ex ante, in order to cover partly the needs for mineral raw materials, an EU Committee was created in order to develop an activities Guidance in protected areas. This consultation committee ensured the participation of all sides involved in the matter (the Directorate General-Environment, the Directorate General-Enterprise, representatives of the Public Administration, Non-Governmental Organizations and institutions representing the sector). S&B also participated as representative of EU mining associations.

After two years of work, in July 2010, the European Commission published a Guidance entitled **Non-energy mineral extraction and Natura 2000**. This booklet offers specific guidance on how the development of mining activities can be compatible with EU legislation on the protection of wild flora and fauna and their habitats. It is explicitly stated that the development of mining activities within a Natura-designated area is not prohibited ex ante. Even in the case where the network's pro-

TECTED elements may be affected, the mining activities are allowed as long as appropriate assessment as well as mitigation and compensation measures are carried out, under the condition that all provisions of EU legislation will be observed.



Non-energy mineral extraction and Natura 2000 Guidance:
"the development of mining activities in Natura-designated areas is not ex ante prohibited"

We plant the seeds ... for a sustainable future

A successful reclamation is measured not just by a satisfactory aesthetic result but –mainly– by the restoration of a self-sustained ecosystem with sufficient diversity of flora and fauna species. Reclamation is an on-going procedure implemented in stages, which needs to be supported by the necessary scientific methods. A critical success factor is the use of seeds and plants appropriate for the specific climate conditions and resistant to diseases. Care for sustaining and developing each ecosystem requires a broad, if not exclusive, use of local plant species.

Today, on Milos island and in the Fokis Prefecture, 95 different plant species, more than 90 percent of which are endemic and local, are used for land reclamation purposes; the majority of these plants are propagated at the company's plant nurseries.

Milos is a small island, with various climatic particularities. Its plants must be hardy due to poor soil, high salinity, strong winds (that are often comparable to a sandblast), soil erosion, lasting drought during the summer, long-term water scarcity,

unrestrained grazing and, occasionally, fires. The work carried out in the Milos nursery focused on the study and reproduction of plants that have developed mechanisms to withstand those conditions.

S&B's activity in **Fokis** is situated mainly on the mountain of Ghiona (2,150 m.). The Ghiona mountain's climate varies significantly depending on the altitude, from a mild Mediterranean climate in low altitudes to very low temperatures that are typical of the subalpine grasslands of 2,000 m. and

above. Accordingly, the plant nursery in Fokis reproduces plant species that can be used from sea level to the subalpine zone. Particular emphasis is given to the reproduction of native plants best suited for planting at the most challenging areas of the subalpine zone, as well as the reproduction of the black pine (*Pinus negra*), which is used in reclamation works in altitudes of 600-1,800 meters, as the precursor species of fir (*Abies cephalonica*) which is typical to the region's forests.



Aghia Eirini - Milos, Greece: reclamation of a mining fill



Trachilas - Milos, Greece: simultaneous mining & reclamation work



NE Nera 7 deposit - Fokis, Greece: reclamation of an open-pit mine



Continuous investments in infra-structure, research & development

Dedicated **Land Reclamation Departments**, managed by experienced foresters, already count more than 25 years of activity and cooperate with prominent research organizations and the academic community in order to acquire the necessary knowledge and optimize their methods and know-how.

The company also operates **plant nurseries** in the Fokis Prefecture and on Milos island, the two most important areas of its activity in Greece; the Fokis nursery has been active for 21 years while the Milos nursery has been in operation for 14 years.

The following are some of the most important scientific cooperations in recent years:

- A five-year research program (2005-2010) carried out by S&B in cooperation with the Institute of Mediterranean Forest Ecosystems of the **National Agricultural Research Foundation (NAGREF)** and the **University of Athens**. Dr. **Georgios Brofas**, a forester and landscape architect as well as resident researcher at NAGREF, describes some of the results of this multifaceted research: "Many very positive results arise from the programs we carried out:
 - The negative factors that restrict or inhibit the implantation and development of vegetation were identified;
 - The plants that flourish in developed areas were identified and their reproductive biology was studied, a fact that allowed the production of plants for most of them. We must especially note the production of seedlings of *Juniperus foetidissima*; all other methods having failed, it was made

*possible only with the grafting of cuttings into seedlings of *Cupressus sempervirens*;*

- New materials were used in seeding and new techniques, that improve the chances of survival of the plants and lead to the elimination of irrigation, were invented;

- The experimental trial of 18 local and foreign species gave us the possibility to choose new species resistant to the salty winds on Milos."

- A two-year research program aiming at recording and studying the fauna in the wider area of Ghiona Mountain in Fokis; the "Ghiona Surveillance Program – updating existing data" was concluded in 2008 by the **University of Thessalia**, under the guidance of **Thanassis Sfoungaris**, Assistant Professor and Director of the Ecosystem Management and Biodiversity Laboratory, Department of Agriculture, Crop Production and Rural Environment, who points out that "with this program, we carried out a detailed recording and surveillance of the fauna of Ghiona for a period of two years. I would like to call attention to the fact that very few research programs of similar extent have been carried out in Greece. Therefore, since there are very few areas with the width and depth of information comparable to our results, this program not only is the reference for Ghiona but will also act as the pilot for studies in other areas".
- A six-year cooperation between S&B, the research team on Energy Raw Materials at the Department of Geology of the

University of Patra and the German institute **Forschungsinstitut für Bergbaufolgelandschaften e.V.**, Finsterwalde (2002-2008) with an aim to research for Breton ameliorants in planted plots in the Ghiona-Parnassos area and on the island of Milos. **Kimón Christanis**, Professor at the Department of Geology of the University of Patra, commented that "unfortunately, in Greece, most companies do not apply practices that would contribute to linking industrial production to state-of-the-art research [...] S&B is one of very few exceptions [...] Our cooperation during the whole period was very constructive, since the researchers were able to [...] deduct scientific results with trials in real conditions, while the company was also able to acquire know-how in ameliorants that would help it improve its reclamation practices".

- A cooperation with the Laboratory of Forest Soil Science of the Department of Forest Production, Forest Protection and Natural Environment of the **Aristotle University of Thessaloniki (AUTH)** on trials for the application of a new method for the artificial ageing of surfaces of stony substances. Professor **Dimitris Alifrangis**, director of the Laboratory, mentions: "The aesthetic degradation of the landscape is one of the main characteristics [...] of all major excavations. S&B, in cooperation with the Laboratory of Forest Soil Science of AUTH, has developed and tried, during the past few years, a new method for the artificial ageing with very good results in Parnassos."