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EU Parliament Member Shines A Light on Biodiversity Protection

Evangelia Tzambazi, Member of European Parliament and European Parliament Environmental Committee, was a keynote speaker at the October 25, 2007 European Union Natura Networking Program and Tilos LIFE-Nature Program Conference organized by the TPA on Rhodes. Ms. Tzambazi, who radiates a passion for the subject of environmental protection benefits for all Europeans, addressed the audience of scientists, students, theologians, NGO administrators, business persons, doctors, government officials, tour operators, Tilos stakeholders and representatives of Hellenic managing authorities of protected areas.

Ms. Tzambazi spoke about the importance of individual contribution to the European environmental protection efforts, the active leadership role that individual citizens can assume to improve the well-being of their communities and the unquantifiable benefits that will be conferred upon all of us as citizens, residents and travelers throughout Europe.

A letter that Ms. Tzambazi sent to the TPA Director following the conference was translated from Greek to English and is reprinted below with her written permission because it conveys in eloquent terms the substance of her message as a Member of the European Parliament.

To learn more about Ms. Tzambazi's work, visit her website at:
<http://www.tzampazi.gr/index.php?l=en>



Konstantinos Mentzelopoulos
Ambassador, Natura 2000
Thessaloniki November 2, 2007

Dear Mr. Mentzelopoulos:

"I would like to congratulate you for your hospitality and the successful organization of the educational Conference "Natura 2000: For the People, by the People".

The Conference provided us with a valuable forum to analyze the Natura 2000 framework, describe the current situation of the Network as well as the Protected Areas, identify the

problems and the weaknesses and evaluate the opportunities for properly protecting our natural environment.

I believe that an open channel of communication, exchange of opinion and information are extremely useful and mutually beneficial, considering the cooperation and foundation building for a strong partnership among the European Union (EU) institutions; national, regional and local governments; the society of citizens (NGOs); and the Church, which are important factors for the vital conservation and rehabilitation of biodiversity in the Protected Area Network, Natura 2000.

I believe that the results of the Conference will provide additional value to the implementation of the existing EU Legal framework and a benefit to be used in conjunction with all of the available tools for EU policy implementation for the protection of Greek biodiversity and the protection and sustainable development of all Natura 2000 areas.

Valuing your substantial contribution to the discussions that took place during the Conference, please send me in electronic form, if feasible, your speech and interventions.

My office and I remain at your disposal to assist in any effort for the successful implementation of the Tilos Park Association aims as well as in any other positive action.

Respectfully,

Evangelia Tzampazi
Member
European Parliament

EU Natura Networking Program and EU Tilos LIFE Nature Conferences



EU NNP office that the TPA-organized NNP conference in Rhodes received the highest attendance for a single NNP conference event in the organization's 2007 conference schedule which included at least one conference in each of the 27 EU Member States.

The joint conferences highlighted the remarkable regional gains made in the field of nature protection as well as the serious problems that continue to impede the progress envisioned by EU funded programs that are subsidized by European taxpayers who have a right to expect responsible activity from those to whom these programs are entrusted. The EU Tilos LIFE Nature program exposed examples of success and the integrity that are expected as well as the self-interested disregard of responsibilities all too often demonstrated by both the public and private sectors in the knowing absence of sufficient EU auditing and oversight that would reveal inefficiency, calculated mismanagement, conflict of interest and waste. As a result of the forthright discussions that were conducted at the conference, the audience, including new managers of protected areas, gained insight into the challenging European environmental conservation process and the gratifying rewards that are the inevitable outcome of actions well done.



(L-R) EU Parliament Member E. Tzampazi, K. Mentzelopoulos & Metropolitan Kyrillos of Rhodes

At the end of August, Claudia Klampff called the TPA Director on behalf of the EU Natura Networking Program [NNP] to advise him that the TPA had been selected to organize, host and be a keynote speaker at a 2008 conference sponsored by the EU Commission for the purpose of highlighting the nature protection progress that has been made and the lessons that can be learned from European environmental conservation practices.

Environmental Committee; His Eminence Metropolitan Kyrillos from Rhodes who was personally appointed by His All Holiness Ecumenical Patriarch Bartholomew, the Patriarch of all Orthodox Churches around the world; Haralambos Kokkinos, General Secretary of the Southern Aegean Prefecture; Yannis Maharides, Dodecanese Governor; Artemis Alexiadou, Forestry Department Director of the Southern Aegean Periphery; Anastasios Aliferis, Tilos Mayor; Konstantinos Mentzelopoulos, TPA Founder/ Director and Natura 2000 Ambassador; Andreas Sioulas, Director of the Rhodes National Marine Research Center; Georgia Valaoras, Greek Coordinator for LIFE Nature and LIFE Environment Programs; Eleni Makrygianni, Director of the Evros Delta Natura 2000 Managing Authority; Jacob Fric, Hellenic Ornithological Society biologist; Katerina Peraki, Hellenic Ornithological Society; Dr. Haralambos Alivizatos, EU Tilos LIFE Nature ornithologist and contributing author to several EU and International Avian Species Action Plans; Yannis Rigas and Evangelis Pappas, biologists from Oikos Ltd.; and Aristotelis Hadzifoudas, Tilos stakeholder, TPA employee and member of the TPA Board of Directors.

The TPA Director reflected upon the outstanding opportunity presented by the EU Commission-sponsored organization to invite speakers who would contribute perspectives from government, theology, science, academia, environmental conservation and stakeholder interests. The TPA was obligated to arrange for a conference venue on Rhodes rather than Tilos due to the unreliable boat transportation schedules to Tilos that are customarily never established sufficiently in advance to facilitate the necessary travel arrangements for speakers coming from other parts of Greece and Europe. The TPA organized the EU Tilos LIFE Nature Program conference in conjunction with the NNP conference which were held on October 25 and 26 at Aktaion in Rhodes by the port.

The speakers were Evangelia Tzambazi, Member of European Parliament and European Parliament

Following the event, the TPA Director received a report from the



(L-R) K. Mentzelopoulos & Secretary General of the Southern Aegean Prefecture H. Kokkinos



(L-R) K. Mentzelopoulos & Tilos Mayor Anastasios Aliferis

Bonelli's Eagle Rescue

On August 1st, Adriana Baiocchi and Silvio Adriana from Torino, Italy, were walking to Skafi beach and discovered a Bonelli's eagle (*Hieraetus fasciatus*) that had fallen into a water cistern from which it could not extricate itself. By mobile phone, they immediately engaged their Italian companions who were elsewhere at the time, all of whom alerted as many people as possible to the bird's distress in the hope that the eagle could be rescued before it befell the same fate as a drowned kestrel found next to it in the cistern.

Costas Moutzouris, a TPA employee, was dispatched to the scene and rescued the eagle using materials that he found close to the site. He attached a discarded section of fishing net to a long wooden pole and "fished" the eagle out of the cistern. The eagle tried to escape and in the process found that it could only manage to put its head through the holes in the fishing net that was used to prevent it from flying away. Costas called Mayor Aliferis who arrived with gloves and held the bird while Costas drove his passengers on his motorcycle to the Megalo Horio medical office.

No injuries were found on the eagle at the scene or at the medical office. The bird's feathers were dried with a hair dryer and the eagle was then placed inside a large cage on the Mayor's chicken farm. The eagle was given food and water and time to rest from the shock. According to Dr. Haralambos Alivizatos, the EU Tilos LIFE Nature ornithologist, this eagle was approximately 1 year old at the time of the accident judging by its colors and size.

The Italian visitors returned several times to the Tilos Park office to inquire about the bird's health and well-being. The TPA Director showed them the photos taken of the event and had an opportunity to discuss related island wildlife issues with them. The TPA Director explained that the EU Tilos LIFE Nature Project has targeted 3 vulnerable and/or endangered bird species on the island for population rehabilitation and that the Bonelli's eagle is one of those species. To date, the Project has documented 6 breeding pairs of Bonelli's eagles on Tilos. The eagle was released in excellent condition on August 6th amid hopes that this juvenile may one day become an important member of a 7th breeding pair on Tilos.



TPA Staff & Volunteers providing first aid to the injured Eagle at the Tilos Medical Office.



Recovering at the Tilos Medical Office.



Dr. Aliferis, Tilos Mayor, during the rescue mission.



Born to be Free.
The Eagle after its release.

Bonelli's Eagle

According to the EU Species Action Plan for *Hieraetus fasciatus* (Bonelli's Eagle), to which the Tilos LIFE Nature ornithologist Dr. Haralambos Alivizatos is a contributing author, this eagle is an endangered species at the European level. There are reported to be fewer than 1,000 breeding pairs throughout their European territory. The Hellenic Ornithological Society has estimated the Greek population of the Bonelli's eagle to be between 85 and 105 pairs, of which 50% live on Aegean islands and Crete with Tilos having 6 breeding pairs. [Stratis Bourdakis, Hellenic Ornithological Society magazine "Oeonus" – <http://www.ornithologiki.gr/en/oiwgnos/j6/enaege.htm>.] Spain has 75% of the European population with the remaining distribution in the Mediterranean areas of France, Portugal, Greece, Italy, Albania, Bulgaria Croatia, Cyprus and Turkey. The global range of this eagle extends from the Iberian Peninsula and northwest Africa across southern Europe, the Middle East and Arabian Peninsula through Afghanistan to India, southern China and Indonesia.



The Bonelli's eagle is a medium-sized eagle 55- 72 cm in length with a wingspan of 150-180 cm. This eagle's habitat consists of mountain areas up to 1,500 m, with the average height of 660 m. Only 11% of these eagles nest above 1,000 m. They inhabit rocky areas with extended scrub and short vegetation, such as phrygana and dry grassland. The average distance between pairs is 11.9 km, although neighboring pairs can breed as close as 2 km. (EU Species Action Plan, <http://ec.europa.eu/environment/nature/directive/birdactionplan/hieraetusfasciatus.htm>) These territorial statistics reveal how remarkable it is that Tilos has a population of 6 breeding pairs of Bonelli's Eagles and 8 breeding pairs of Long Legged Buzzards (*Buteo rufinus*) living on a small, 63

km2 island along with other resident and migratory raptor species including Peregrine Falcons, Eleonora Falcons, Marsh and Hen Harriers, Sparrow Hawks, Kestrels, Short-toed Eagles, Honey and Common Buzzards, and more.

Bonelli's Eagle pairs form at 3-4 years of age and last for life. Each pair builds several nests (1-6) close to each other which are used consecutively. The nests are made of sticks often located on a ledge or inside a cavity of a sheer cliff. The nests become larger each year with many reaching 1.8 m in height and 2 m in diameter. The eagles' pre-breeding displays begin before the end of the year and continue until the time that the eggs are laid. They demonstrate a typical eagle/buzzard pattern which includes soaring which then develops into steeply undulating displays and plunges.

Each female eagle that lays eggs usually lays 2 eggs during February and March, although the full breeding season extends from January to mid-April. In two thirds of the cases, only one of 2 chicks survives to fledge. The female incubates the eggs between 37-40 days. The fledgling period is 61-77 days and juveniles remain in the parents' territory for 12-16 weeks. While breeding success reaches 82% for those pairs that breed in a season, as many as 30% of the pairs do not lay eggs.

Bonelli's eagles often hunt in pairs and feed primarily on partridges and rabbits. As the population of the foregoing has declined, they also feed on hares, squirrels, rodents, pigeons, doves, gulls, corvids and lizards caught on the ground or in the air. Dr. Haralambos Alivizatos, the chief ornithologist of the EU Tilos LIFE Nature program, reported on October 26, 2007, that the Hooded Crow [*Corvus cornix*] which has a population of approximately 400 breeding pairs on Tilos is considered suitable prey by the Bonelli's eagle as well as the Peregrine falcon [*Falco peregrinus*].



Bonelli's Eagle (continued)



Hieraetus fasciatus
(Bonelli's Eagle)

"Shooting and trapping are the main causes of mortality and are responsible for a decline in the number of breeding [Bonelli's eagle] pairs." [EU Species Action Plan for Bonelli's Eagle] One biologist reported to the TPA in April 2005 that the black market prices for a Bonelli's eagle and an eagle egg were €12,000 and €5,000, respectively. Following the primary threat from human persecution, the additional threats to the eagles' survival include electrocution from collisions with electrical wires; habitat destruction from construction development, quarries, changes in land use and changes in traditional agricultural practices; food shortage; and nest disturbance from tourism and mountain sports.

newborn animals, such as lambs and goats, and are therefore hunted.

The EU Species Action Plan for the Bonelli's Eagle includes scientific recommendations for each European country with an eagle population including Greece. "The [Hellenic] Ministry of Agriculture should declare non-hunting zones over a large area surrounding vulnerable nesting sites... These areas should be managed appropriately for the conservation of the species." [EU Action Plan for Bonelli's Eagle in Greece, Section 2.5.4] In 2007 and for the fourth consecutive year, the TPA successfully lobbied the Hellenic governmental authorities having jurisdiction over Tilos hunting to achieve a renewal of the Tilos hunting ban by Administrative Decree issued by the Southern Aegean Periphery Office. The ban is for one year only and will expire August 22, 2008. According to a Hellenic Environment Ministry representative, the Hellenic government is legally precluded from introducing any actions that would violate or conflict with administrative provisions in a Presidential Decree that has been approved by the requisite

governmental authorities and is in the process of being established into Hellenic law.

The TPA successfully lobbied the Hellenic government (a) to approve the 1997 Tilos Environmental Study for the Creation of a Natural Park, which recommended a permanent hunting ban and (b) to approve the proposed Presidential Decree for the Tilos Natural Park establishment, which includes a permanent island hunting ban. This Presidential Decree has been approved by the Environment Ministry, the Agriculture Ministry that has jurisdiction over Hellenic hunting, the Development Ministry, the Dodecanese Governor's Council and the Tilos Municipality. The Decree must be approved by the Hellenic court before it is signed into law by the President of the Hellenic Republic, who has been a member of the TPA since June 18, 2006. In this regard, the TPA has to date been successful in its endeavors to implement the scientific recommendations of the EU Species Action Plan for Bonelli's Eagle as well as the EU LIFE Nature Project for the long term protection and population rehabilitation of this endangered eagle species.



The Italian Volunteer Eagle Rescue Team at the Tilos LIFE-Nature Office in Livadia, Tilos.

Electrocution is a critical cause of juvenile Bonelli's eagle mortality, especially in France and Spain. 77% die from electrocution in the first 15 months of their life. Food shortages result from (i) a decreased rabbit population from disease, (ii) increased pesticide use and (iii) a decreased partridge population from hunting. According to the Hellenic Ornithological Society and the TPA Director, many Greeks including Tilians maintain the mistaken belief that these eagles are a threat to

Archaeological Discovery on Tilos



Irene & Richard Hopkinson making their discovery.

On September 30th during their seventh visit to Tilos, Irene and Richard Hopkinson from the UK discovered what they believed to be ancient pottery embedded in the soil about 1 meter below and to the side of a road surface during one of their island walking excursions. They were accompanied by Janice and Rod Gorton and the group brought the pottery as well as photos to the TPA office. They then discussed the events which led to this discovery with the TPA Director. During this office visit, the TPA Director called the Hellenic Archaeological Service in Rhodes which arranged for Eriyfi Kaninia Zarifi, archaeologist, who was accompanied by Pantelis Giannourakis, Archaeological Service guard, to come to Tilos on October 8th. On this date, Ms. Zarifi and Mr. Giannourakis met with the TPA Director to examine and take possession as well as ownership of the two pieces of pottery on behalf of the Hellenic Archaeological Service.

Ms. Zarifi reported that the 10 cm diameter, round, shallow, earth-colored bowl which is smooth, intact and undecorated dates back to the 3rd century BC Hellenistic period. The terra cotta-colored pottery fragment approximately 12 cm long with geometric etching on it dates back to the first century AD Roman period. She said that although there is no monetary value associated with the pieces and unfortunately no reward for the finders, she expressed her appreciation for the contribution made by Mr. and Mrs. Hopkinson to the Hellenic cultural history. After Ms. Zarifi gave a receipt for the items to the TPA, she learned more about the Tilos Park from the Director. As a result, she requested TPA membership and attended the joint two day EU Natura Networking Program and EU Tilos LIFE Nature conferences in Rhodes organized by the TPA on October 25 and 26, 2007.



EU LIFE Nature Program Benefits Tilos

"Nature, in its infinite wisdom, has a reason for everything it creates." Aristotle

The European Union LIFE Nature program on Tilos illuminated the words of this ancient Greek philosopher uttered centuries ago that continue to resonate with increasing importance in the 21st century.

The EU LIFE Nature program has generously provided the indispensable means for the program participants, the Tilos island stakeholders and visitors to this Special Protection Area to discover the irreplaceable value of our natural environment in the Aegean and learn about the merits of preserving nature for the health and well-being of humanity.

The discoveries made during this LIFE program represent a significant contribution to our scientific knowledge, an opportunity for members of the public to enrich their lives, and an advancement in our ability to protect and nurture the irreplaceable wildlife that grace our natural world.

For this and more, we would like to extend our sincere appreciation to the European Commission and all who contributed to the continuing benefits provided by this exceptional program.

Konstantinos Mentzelopoulos
Ambassador, Natura 2000

EU Tilos LIFE Nature Project Coordinator

The EU Tilos LIFE Nature program is scheduled to end on February 29, 2008. The program aim has been to rehabilitate the population of the Bonelli's Eagle [*Hieraaetus fasciatus*], Eleonora Falcon [*Falco eleonorae*] and the Mediterranean Shag [*Phalacrocorax aristotelis desmarestii*] which are identified in Annex I of the EU Birds Directive [79/409/EEC] due to their threatened status. These species are legally protected throughout the EU. The final results of the program will be reported at the end of the program period by Dr. Haralambos Alivizatos; however, the preliminary indication is that the initial expected results have been achieved through the program actions.

The program actions include opening up water springs on the island to increase the availability of fresh water for the birds and other island wildlife; planting new oak [*Quercus ithaburensis macrolepis*] and wild pistachio trees [*Pistacia terebinthus palaestina*] which support as many as thirty different resident and migratory bird species, some of which serve as year round and seasonal prey for the Bonelli's Eagle and Eleonora Falcon, respectively; planting cereals exclusively for the birds to increase the population of the Chukhar Partridge and other species that serve as prey for the Bonelli's Eagle; monthly avian monitoring by Dr. Alivizatos; and the creation of a Nature Interpretation Trail with signs to raise visitor awareness of the island's natural environment and wildlife along the 2 hour walk to the peak of the northeastern Profitis Ilias (since the small 63 km² island has two mountains named Profitis Ilias due to long standing island rivalries).

The EU LIFE Nature program provided a car and a boat which were purchased unusually late in the program by the Hellenic Agriculture Ministry and were unable to be used during approximately the first 3 years of the 3 year 4 month program. This transportation equipment was supposed to provide the program period with the means to conduct island (i) avian monitoring for scientific research on the island and its 16 islets, including the valuable coastlines which feature the highest regional formation of limestone cliffs used by many of the island bird species such as the Eleonora falcons, Peregrine falcons, Bonelli's eagles and Mediterranean shags, (ii) surveillance to deter illegal wildlife activities and promote nature protection, and (iii) transportation to accommodate visiting environmental scientists, journalists and academicians. As a substitute for these delayed purchases and in order to prevent the possible termination of the LIFE Nature program on Tilos, the TPA rented car and boat transportation for three years at significant expense to the TPA. Although the European Commission sanctioned the reimbursement of this expense to the TPA through equitable adjustments in the program to be made by the Municipality, the Municipality has refused to acknowledge the obligation and has refused to implement the suggested program adjustments in spite of the significant financial benefits that the Municipality derived from the program.

There have been other problems experienced during the program, including one islander's destructive, albeit creative, use of some of the chain link fences on public property which were constructed to surround and protect newly planted LIFE Nature trees from the island wild goat population. The islander cut the fencing, opened up the fence sides, placed food in the fenced area, and thereby corralled his goats for capture, thus exposing the newly planted trees to destruction by the goats. This problem has been solved.

Despite the multitude of problems inherent in all worthwhile endeavors, the population of the 3 species targeted by the EU Tilos LIFE Nature program has increased to date according to the program records. The announcement of the LIFE Nature targeted avian population status will be made by Dr. Alivizatos following the end of the program.



Cereal Cultivation for the benefit of Tilos Avifauna (Tilos LIFE-Nature Project Action)

Unquantifiable Benefits for the Island

Equally as important as the precious increase in the targeted species population are the unquantifiable benefits that the European Commission has conferred on Tilos through its role as primary donor of the EU Tilos LIFE Nature program. The EU has provided (a) invaluable scientific data about this registered Special Protection Area and Natura 2000 site; (b) the requisite resources, knowledge and professional direction to enable the TPA and other stakeholders to develop the confidence and skills to utilize the multitude of derivative benefits of the LIFE program to further develop nature protection actions on the island; and (c) patient support throughout the program to assist the Tilos Municipality, as the LIFE Nature program Beneficiary, that demonstrated its inexperience in its conduct and, in many cases, flagrant and willful disregard of its financial management responsibilities.

Notwithstanding the obstacles, the EU LIFE Nature program provided the important means for the program participants and island population to discover the irreplaceable value of our natural environment and learn about the merits of preserving nature and preventing biodiversity loss. These discoveries contributed significantly to a development of confidence on the part of the foregoing individuals to freely engage with visiting scientists, teachers, government officials, tour operators, tourists, other NGOs and journalists in discussing Tilos nature protection and eco-tourism development on a scientific, socio-economic and political level. This social welfare benefit is a gift and must never be overlooked as it has affected how people on the island conduct their lives every day.

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Climate Change on Tilos

"Man must understand his universe in order to understand his destiny." Neil Armstrong, first man to walk on the moon, July 1969

Adi Maimon from Kibbutz Ein Harod in northern Israel is a graduate of Michmoret College of Marine Sciences and Environment and a graduate student at Ben Gurion University in Desert Studies and Water Management. She first visited the EU LIFE Nature Exhibition on July 2nd during a brief interlude from her summer employment with a charter sailing company that conducts tours in Turkey and Greece. She was impressed with the TPA environmental conservation actions on the island and inquired whether she could return to Tilos after her summer employment in order to volunteer her services for the island's nature conservation efforts before her return to graduate school. In August, she was welcomed enthusiastically upon her return to the island and met with the TPA Director to ascertain in what manner her past university studies could be applied to island needs during her one month hiatus. She joined the Elix international volunteers on Tilos who collectively came from 17 different countries to help the island this summer.

Ms. Maimon selected the proposal to interview island residents in key sectors to document climate changes on the island. She drafted a series of questions which she reviewed with the TPA and were designed for employed as well as retired islanders in the livestock, agricultural, fishing and tourism industries. The results of these interviews conducted by Ms. Maimon, with the translation assistance of Telis Hadzifoudas, and additional interviews conducted by the TPA staff are set forth below.

[Editor's Note: These interviews were conducted to elicit personal – as opposed to accredited scientific - observations which were based upon noticeable effects of climate change on the island during the last 40 years.]

Temperature: The average winter temperature on Tilos is noticeably higher than in previous years, although no specific temperature differentials were offered. The majority are under the impression that there is no longer a winter season so that autumn, winter and spring had become almost indistinguishable from one another with very few days of rain compared to years past. Formerly, winter on Tilos included morning ice and frost, however this condition no longer exists.

Summer temperatures are also significantly higher. The temperature on Tilos in the shade was recorded and lingered between 43C and 47C during the fourth week of June 2007. The remaining summer temperatures were unusually hot and uncomfortable for tourists who complained about the difficulty of sleeping as well as their necessity to curtail their anticipated holiday activities, such as taking nature walks and bird watching, due to the extreme heat. According to the interviewees, summer temperatures in the low 40 degrees Celsius were usually not experienced in previous years on Tilos, if at all, until perhaps August when temperatures customarily ranged in the mid to high thirties.

In agriculture, the absence of former cold winter temperatures has adversely affected Tilos olive production, which requires crisp, cold winters to produce a good quality harvest. In the last few years, almond and citrus tree blossoms have appeared between 4-6 weeks earlier than in years past due to warmer temperatures. The problem with the earlier appearance of blossoms is that the occasional winter storms have prevented the maturity and pollination of a large number of blossoms, thus significantly reducing the nut and fruit harvest. The warmer winter temperatures, especially in January, combined with high humidity have also contributed to plant leaf degradation and lower winter yields of certain crops. The unusually high summer temperatures have also contributed to agricultural problems concerning the lack of water retention in the soil, thus requiring more frequent watering and an overall greater volume of water required to obtain harvest yields reasonably comparable to years past.

In the livestock industry, the offspring of lambs are currently being born as late as January, which is warmer than in years past, rather than primarily in November/December which was the previous custom.



Rainfall: The retired interviewees reported that thirty to forty years ago rain would fall continuously for approximately 40 days without apparent cessation. [According to the Municipality, accurate rainfall measurements are not officially recorded on Tilos.] The noticeable reduction in rainfall volume and number of rainy days was first noticed by retirees about 20 years ago and the trend has steadily continued. Another noticeable change is that the months during which the rain appears are different from the past. Rain currently appears earlier in the autumn (September/October) and later in the spring (May) than in years past which is both disruptive and in some ways helpful to the agricultural industry but has had little or no effect on the tourism industry. Often, after seeds are planted, very heavy rains of short duration wash away the topsoil carrying the seeds and young plants with it. The current rain pattern, humidity and warmer winter temperatures cause leaf degradation and have contributed to lower quality crop yields as well as plant loss.

In the past, livestock owners used to plant grass for the goats in October and bring their herds to graze on the grass in February. This practice is no longer utilized as before due to the absence of sufficient rain. As a result, the livestock owners are buying corn to give to their goats to supplement a decreasing supply of vegetation upon which the animals graze. In addition, the owners have to supply more water for the goats than in years past due to the absence of sufficient natural supplies.

One retired Tilian who formerly raised sheep in Livadia thirty to forty years ago said "there used to be too much water" when asked from where his sheep derived fresh water. He mentioned the former Livadia wetland (which was lost to accommodate building construction) but added that there were other nearby fresh water sources which collectively satisfied the needs of his herds throughout his active employment years. The interviewees estimated that there are currently about 10 days of rain now with much less water deposited in each period than in the past.

Wind: Everyone agreed that the meltemi has changed. According to regional experts, the meltemi is the steady, seasonal northwest wind that traditionally blows in the southern Aegean at 5-6 Beauforts in July and August from sunrise to sunset. The meltemi is a wind that originates in the Himalayas as a result of the Indian monsoons which create pressure that results in a wind that is pushed down from the Black Sea into the Aegean. This year, according to the island residents as well as visiting commercial and recreational sailors, the meltemi did not arrive at all in any recognizable form. The wind pattern was irregular and unsteady ("more like storms"), ranged from weak to strong (7-8 Beauforts) and came from different directions during July and August. The fishermen reported that a southern wind was always followed by rain in years past; however, this has changed completely with a notable absence of rain following most southern winds.

Climate Change on Tilos (continued)

Bird Reproduction/Insect Activity/Plant Blossom Synchronization: The Tilians employed in agriculture have noted a current absence of synchronization that existed in former years among the emergence of blossoming plants and trees, insect activity, bird migration arrivals and bird species' reproduction. On March 13, 2007, Dr. Alivizatos noted for the EU Tilos LIFE Nature Program records that the size of the juvenile Mediterranean Shags [*Phalacrocorax aristotelis desmarestii*] on Tilos were of a size comparable to what he customarily observed one month later in April during years past. He noted that the warmer winter most likely advanced the winter breeding period of this species on Tilos.

Fishing: The fishermen reported the increased size and extent of algae in coastal waters, a significant decline in the local fish populations, the survival and continued presence of alien species of shellfish (such as *Strombus decorus*, a shell customarily found in the Red Sea, and *Bark tritonis* from the Atlantic), a dramatic decline in the Tilos shellfish population and the number of shellfish species from approximately 200 to 100 species during the last 30 years, the reduced size of harvested octopus from 5-10 kg per octopus to 1 kg each "if you're lucky", and increased humidity.

[Water vapor is a greenhouse gas produced as a response to higher temperatures. Humidity significantly amplifies the temperature rise – some experts estimate by a factor of as much as two- and impacts extreme weather events such as rainstorms and tropical cyclones as well as human health, insects and diseases and wildlife ecosystems.]

Except for the observations about the increased size and extent of algae, increased humidity and the continuing survival as well as adaptation in Tilos waters of alien shellfish that are normally accustomed to different water temperatures to which climate change may contribute, the remaining observations could be attributable to (i) overexploitation of fish, octopus and shellfish resources in coastal waters without allowance for adequate regeneration to sustain the local fishing industry, (ii) the increasing and well-documented presence of pollution in the Aegean, (iii) the increasing recreational and commercial boat traffic in and around Tilos, and/or (iv) a combination of the foregoing with other unspecified variables. As a result, in the absence of accredited scientific data to suggest the potential likelihood of a nexus between climate change and the observations by Tilos fishermen, certain of the fishermen's observations should be discounted from consideration as resulting from climate change.

An interesting footnote to this series of interviews with the fishermen is that, when overfishing and/or illegal fishing were suggested as potential causes of some of the observations, the interviewees preferred to rely upon climate change as the likely principle cause of the marine problems except for marine biodiversity damage that they believe may be inflicted upon the area by non-Tilian fishermen from neighboring islands.



Adi Maimon at the Tilos LIFE-Nature Exhibition & Information Center in Livadia, Tilos

After her research, Ms. Maimon discussed the interview results with the TPA Director and staff in a global context of the impact of climate change on world food production and availability, human migration of world refugees fleeing zones rendered environmentally uninhabitable, the increasing fresh water crisis around the world, the change in pests and disease patterns in terrestrial and marine areas, the expected change in tourism patterns and more.

Filippo Giorgi is the Department Chairman of the Earth System Physics Department at the International Centre for Theoretical Physics in Trieste, Italy, which participated in a study of 21 Mediterranean countries, the results of which were published June 15, 2007 in Geophysical Research Letters. He reported that "the hottest temperatures we are accustomed to experiencing will become the normal temperatures of the summer." He explained that the Mediterranean is a region that is extremely vulnerable to climate change which is expected to seriously impact the residents' personal and professional lives. He explained that rare events will become the norm and extreme events will be unprecedented in their severity.

With these Tilian reports that are consistent with the findings of respected international institutions concerning ongoing and expected changes in the Mediterranean climate, the TPA is appreciative of the volunteer efforts of Ms. Maimon and the interviewees who have contributed to the TPA library of island reference information.

Intergovernmental Panel on Climate Change [IPCC]

Climate change is “unequivocal” and is expected to bring “abrupt and irreversible impacts” including species extinctions. Approximately 20-30% of species assessed to date are likely to be at risk of extinction if global temperature increases exceed only 1.5-2.5C. This is the most recent assessment of the Intergovernmental Panel on Climate Change [IPCC] based upon more than 29,000 pieces of evidence.

The United Nations Environment Program [UNEP] and the World Meteorological Organization established the IPCC in 1988 (www.ipcc.ch). The Geneva-based IPCC is a co-winner of the distinguished 2007 Nobel Peace Prize shared with Albert Gore, Jr., which highlights the fact that climate change is now recognized as “a fundamental challenge to international peace and security” according to John Ashton, Britain’s Special Representative for Climate Change.

The genesis of human evaluation of climate change is now historically attributable to the American scientist named Charles David Keeling of the Scripps Institute of Oceanography in La Jolla, California, who began tracking carbon dioxide in the earth’s atmosphere in 1957. He recorded his findings on what is now termed an “iconic graph” called the Keeling Curve which documented the dramatic CO2 increase over the years in a steep upward and slightly jagged slope. According to Dr. Andrew Manning of the Tyndall Climate Change Research Centre at the University of East Anglia, UK [UEA], Professor Keeling conducted research to ascertain whether this increase was attributable to the burning of fossil fuels. Professor Andrew Watkinson at the UEA told the BBC that Professor Keeling discovered that the level of atmospheric CO2 was rising continuously and that the annual fluctuations in atmospheric carbon were caused by seasonal variations in plant growth and decay. In 1958, the CO2 levels were 315 ppmv (parts per million by volume), i.e. 315 molecules of CO2 for every 1 million molecules in the air. By 2005, the figure was 378 ppmv which represents a 20% increase. Today, fifty years after Professor Keeling inaugurated his research, CO2 levels are sampled weekly at 100 sites around the world

using aircraft, space-borne sensors and other state of the art equipment.

Today, the purpose of the IPCC is to assess the scientific, technical and socio-economic information that facilitates the understanding and public awareness of the scientific bases of human-induced climate change, its potential impacts, and potential mitigation as well as adaptation measures.

The following is a selection of projections and recommended adaptation measures taken from the IPCC reports which are relevant to Tilos based upon the island’s agricultural, animal farming, tourism, and fishing sectors.

Agriculture

Drier conditions, increasing temperatures and increased abundance of pests in the Mediterranean region are likely to result in lower agricultural yields, the need for new plant varieties and cultivation methods as well as moisture conservation methods. A temperature increase is expected to shorten the growing period.

Cool season vegetable crops, such as cauliflower, onions (which are particularly sensitive to abnormal temperature increases), and potatoes which are grown on Tilos, are expected to experience a decrease in quality and yield resulting from a shorter growing season and warmer conditions.

Olive cultivation is expected to be enlarged in certain parts of France, Italy, Croatia and northern parts of Greece. This change is likely to result in a change in olive supplies and location with a corresponding impact on prices, labor markets, human migration, transportation routes and more. The sale of Tilos olives currently used in the production of olive oil may be adversely affected by the increased olive production in other areas; however, this would have a negligible affect on the Tilos economy since this is not a significant island economic component.

Recommended adaptation

measures include increased moisture conservation. This can be accomplished by leaving some of the previous season’s crop residues on the soil surface to protect the soil from wind/water erosion and to retain moisture by reducing evaporation. Improved irrigation management is recommended around the world.

Additional recommendations include changing the plant species and dates of cultivation. Scientists are working on new breeds of plant species to develop plant varieties that will be resistant to heat, drought, floods, pests and diseases that are expected to occur. Plant species modifications are also recommended because salt is expected to seep into low lying aquifers as sea levels rise. The IPCC predicts a sea level rise of 81 cm (32 in.) this century due to melting ice and the expansion of sea water as the oceans warm. [According to Nature GeoScience, the sea level rise is expected to be 163 cm (64 in.) by 2100.] As a result, islands such as Tilos and low lying countries are expected to be the most affected by the sea level rise. One example of new plant breeds which have a remarkable tolerance for salt water is ancient Persian grass which is being cross-bred with commercial wheat. This is currently growing well in Australia’s increasingly salty soil.

Mitigation and adaptation in agriculture are very important because agriculture and related land uses account for one third of all greenhouse gas emissions from human activity.

Animal Farming

Livestock production in the Mediterranean is expected to be adversely affected by climate change. Pests and diseases are expected to increase in frequency and severity thereby causing losses. “Heat stress has several negative effects on animal production, including reduced reproduction ... and reduced fertility in pigs.” As Tilos has an animal farming industry that raises goats, sheep, pigs and chickens, adaptation measures appear likely to be required including the prospect of creating more shelter from the intense sun, providing more fresh water and checking regularly for pests and diseases to mitigate damage to the livestock. The illegal felling and



Potato Farming on Tilos



Goat Farmer on Tilos

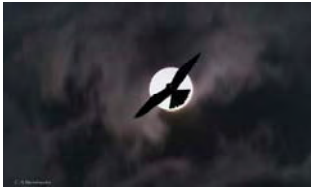


Fishermen on Tilos



Farming on Tilos

Intergovernmental Panel on Climate Change [IPCC] (continued)



Falco Eleonorae flying in front of the Moon over Livadia Bay on Tilos



Sunrise over Livadia Bay on Tilos

cutting of legally protected trees on Tilos by certain islanders, the collection and ferry transportation of these tree logs for sale, as evidenced by eyewitness testimony and photographs but which has not been prosecuted, will contribute to the island heat, shade loss for livestock and other wildlife, and moisture loss in the Tilian soil especially in the autumn when fallen leaves serve as a moisture retention facilitator for the soil. Unfortunately, those on Tilos who continue to profit from this annual practice are indifferent to the complaints and to the problems created by their illegal activities.

Tourism

The European tourism industry is expected to continue to grow. Today, tourists predominantly travel from north to south and this facilitates the transfer of capital to southern Europe of which Tilos is a part. However, the latest IPCC report states that temperatures are expected to rise between 1.1 to 6.4 degrees Celsius by 2100. In this event, "existing major tourist flows to the Mediterranean may be weakened if summer heat waves increase in frequency or if prolonged droughts result in water supply problems and forest fires." Traditional Mediterranean tourism may also be impacted by the development of new tourist areas in

previously undeveloped parts of the world.

Bird-watching tourism, which is popular on Tilos, may also be affected because, in general, species show earlier arrival and egg laying dates of 3-5 days for each 1 degree C of increased temperature.

Adaptation measures include winter or "off-season" travel to the Mediterranean which would necessitate a shift in tourism arrangements by the private and public sector, such as ferry boat transportation as well as seasonal hotel accommodations and restaurants.

Fishing

"Climatic factors affect the biotic and abiotic elements that influence the number and distribution of fish species." Abiotic factors include water temperature, salinity, nutrients, sea level, current conditions and amount of sea ice. Biotic factors include food availability and the presence of species composition of competitors and predators. These factors, in turn, impact protein synthesis in all life cycle stages, survival of alien species, fish and sea bird distribution, the existence or absence of predators, migratory patterns, nutritional status, diseases,

reproductive success and abundance. This, in turn, will affect human lifestyle, food, culture and health.

"Resource overexploitation appears to be the single most important factor directly threatening the sustainability of most commercial fisheries. This increases the vulnerability of fisheries to climate variability because so few fish are left in the stock to grow and multiply."

The IPCC report indicates that while water temperatures and other factors can be used to forecast the abundance and distribution of many fish species, "changes of local species presence will need to be assessed at a pan-European level."

Tilos fishermen have noted an increase in dolphin sightings, algae production, a reduction in fish population in the local waters, warmer air and sea temperatures and a shift in the season during which haze predominates the skyline from autumn to summer. Notwithstanding the foregoing and in light of the IPCC reports, it is premature to predict to what extent, if at all, Tilos will experience changes to its fishing industry as a result of climate change.

Great White Pelican Rescue

On October 4th, Telis Hadzifoudas, Dimitri Giannourakis and Andreas Hadzifoudas were travelling by boat across Livadia Bay when they saw a struggling juvenile Great White Pelican [*Pelecanus onocrotalus*] in the coastal water. They rescued the bird that was born this year and brought it into the boat while engaging in a futile attempt to avoid the inevitable consequences of making close physical contact with a very frightened bird possessed of a very large beak.

It had neck and right wing injuries from a collision with electrical wires in Livadia and was seriously weakened from its migration journey to Africa, according to Dr. Haralambos Alivizatos, the EU Tilos LIFE Nature Program ornithologist. Livadia residents offered assistance to the rescue team as well as a towel in which to wrap the bird before it was transferred to a large outdoor cage in

Eristos. The rescue team ensured that the bird was given daily care according to the advice given by Dr. Alivizatos. He recommended that the bird be given 1-2 kg of fish per day as well as sufficient water and rest from stressful exposure to human activity in order to regain the weight that the pelican had lost during its autumn migratory journey.

For two months, the pelican gained weight and strength by eating a variety of fish and appeared to continue its recovery; however, it was difficult during this time period when its movements were restricted in a cage 4 m² to ascertain to what degree the injuries were healing without the benefit of an examination by a specialist, x-ray equipment or other medical facilities to properly diagnose, treat and care for the bird. At the end of November, TPA employee and Board of Directors member Telis Hadzifoudas judged

the bird fit to be released into an area adjacent to the cage to ascertain the bird's ability to move in a free environment with the attenuating risk that recapture of the pelican could prove to be problematic if this release were premature. Telis, however, has prior experience with testing the recovery status of wild birds, including large birds such as the Long Legged Buzzard [*Buteo rufinus*] treated at the TPA Avian Recovery Center for four months in 2006. At the time of the buzzard's first attempted release in the presence of the TPA Director and LIFE Nature program Field Assistants, the bird did not fly more than 250 yards in several stages at a very low altitude of 2-4 meters off the ground and was returned to the cage by Telis until the second, successful release. When the juvenile Great White Pelican was released, the bird demonstrated its ability to fly around Eristos with no



Telis Hatzifoudas
TPA Field Assistant

Great White Pelican Rescue (continued)



Pelicans in flying formation

apparent difficulty. The pelican later returned for its fish which was given in the same location as during the previous two months.

Since the pelican's release, the bird lives in Eristos and can be seen flying around the coast and bay of Eristos. This pelican is a curious, intelligent and sociable bird that locates Telis and pecks at him if he is hungry. Sometimes Telis will call the bird, which he has named Tilo, when he has fish to offer and the pelican appears. The pelican uses its

beak to investigate any new, unfamiliar object in its surroundings and pecks at it to learn more about its structure. The pelican has been observed following coastal fishermen and has demonstrated a sufficient degree of recovery from its neck and wing injuries to scoop up fish of various lengths without any apparent difficulty.

The future of this pelican remains unknown; however, the bird currently has positive and negative influences that will affect its

destiny. The pelican receives beneficial care for its continuing recovery of strength and weight, but it also receives human companionship against which Mr. Hadzifoudas has been cautioned by ornithological experts because this will encourage an unhealthy dependency upon humans unless the bird chooses to rejoin a flock of Great White Pelicans during migration and resume a wild pelican life.

The Great White Pelican –A Conservationist's Dilemma in Africa



Pelecanus onocrotalus
Great White Pelican

A pelican is a large waterbird belonging to the family *Pelecanidae* which includes darters, cormorants, frigate birds, gannets, boobies and tropicbirds. The Great White Pelican [*Pelecanus onocrotalus*, Linnaeus 1758] is also known as the Eastern White Pelican, European White Pelican, White Pelican and Rosy Pelican.

The species' former scientific name was *Pelecanus roseus*. In the breeding season, the adult Great White Pelicans have a rose hue on their plumage which accounts for the name Rosy Pelican. This pelican has bare, pink skin surrounding its eye. Its bill and pouch are yellow. The legs and feet are flesh-colored or yellowish and its feet are fully webbed. The small hook on the end of the beak is used for preening feathers. The adults with their white plumage are distinguishable from the juveniles which are a dull gray-brown color with dark brown wings as the one rescued on Tilos. According to Bird Guides, the view of the bird in flight may resemble a White Stork with the primaries and most of the secondaries appearing to be jet black with contrasting white underwing coverts. One suggested way to distinguish between the White Pelican and White Stork in flight is that the stork flies with an outstretched neck and long trailing legs whereas the pelican flies with its head held close to and aligned with its body.



Pelecanus onocrotalus
Great White Pelican

In medieval Europe, the pelican was believed to be self-sacrificing and extremely caring of its young by actions such as providing its own blood when no food was available. As a result, the pelican became a symbol of the Eucharist and was used in heraldry ("a pelican in her piety"). The symbol of the Irish Blood Transfusion

Service is a pelican and, for a long period of time, its headquarters were based at Pelican House in Dublin, Ireland. The emblems of Corpus Christi Colleges in Cambridge and Oxford are pelicans displaying the medieval Christian symbolism.

An adult Great White Pelican weighs 9-10 kg and has a length of 140-180 cm with a wingspan of 280 cm. Its expected lifespan in the wild is between 15-25 years; however, one captive pelican is reported to have reached the age of 60 years. The Avian Demography Unit of the Department of Statistical Sciences at the University of Capetown, South Africa is conducting a study of this species. The Department reports a world population of 90,000 pairs of which 80% are estimated to be in Africa. Other sources estimate the European breeding population to be between 3,000 – 3,600 pairs, the Russian population to be 100-350 pairs and the Turkish population to be 250-400 pairs. The population of the Great White Pelican has significantly declined in recent years due to pollution, pesticides, habitat loss, food shortages and human persecution prompting this species to be listed in the Agreement on the Conservation of African-Eurasian Migratory Water Birds (AEWA).

The AEWA is an independent international treaty developed under the auspices of the United Nations Environment Program [UNEP] Convention on Migratory Species which became effective November 1, 1999. The AEWA covers 235 species of birds ecologically dependent upon wetlands. The agreement covers 119 countries from Europe, Asia, the Middle East and Africa and includes Canada. The treaty requires coordinated action throughout the

migratory system ("flyways") of the listed species. The coordinated action includes species and habitat conservation, human activity management, research, monitoring and education.

Pelicans are social and gregarious birds which breed and nest in colonies, usually in reed beds, swamps, lakes, islands and deltas. The male brings the stick material to the nest site where the female forms the nest structure on the ground. The female lays 2-4 eggs which are incubated for an average of 32 days. The chicks are able to fly at 10-12 weeks and breeding maturity is reached at age 3-4 years. Both parents give care to the young. Pairs are monogamous for a single season however the pair bond exists only within the nesting area.

The Great White Pelican (one of 7 species of pelicans) breeds in southeastern Europe, Asia and Africa and winters primarily on fishponds in Turkey, Israel, Africa, Iraq, Iran, Pakistan, China, India, Nepal and southeast Asia. This pelican generally feeds on fish and certain crustaceans. Large flocks frequently fish together by encircling and trapping shoals of fish in shallow water to facilitate the pelicans' use of their pouch to scoop up the fish in the pouch below the bill. This pelican is an excellent swimmer and a powerful flier, despite its rather awkward takeoff, usually flying in impressive V formations. Young Great White Pelicans are subject to predation by Egyptian vultures and eagles, jackals, hyenas, lions and crocodiles.

The Great White Pelican –A Conservationist’s Dilemma in Africa (continued)

A Universal Dilemma for Conservationists

According to the Capetown University Avian Demography Unit, the largest concentration of Great White Pelicans in southern Africa is primarily in Botswana where it breeds irregularly after heavy rains. Namibia, the Western Cape and Dassen Island are the next most populated areas for the species in southern Africa.

It is interesting to note that in the Western Cape, most of the Great White Pelican’s current food intake is chicken and not fish. Large flocks of these pelicans are also feeding on agricultural offal in chicken and pig farms. Pelicans on Dassen Island have been observed eating live chicks of seabirds such as Cape Cormorants, Kelp Gulls and Swift Terns as a result of fish shortages. In March 2002, conservationists were shocked when the Great White Pelicans on the island consumed Swift Tern chicks just one week before they were due to fledge and not one chick remained. Following this incident, the Swift Terns were removed from Dassen Island because they have been the subject of conservation programs which have yielded successful results, this incident notwithstanding.

This type of prey substitution in the absence of sufficient traditional food for a bird species is not uncommon. When fish are not available in sufficient quantities, the great skua has been observed feeding on other sea birds such as puffins, guillemots and black-legged kittiwakes [BBC, November 6, 2007].

According to Ogden Nash, “We face a difficult conservation dilemma: to continue the supply of extra feed to the pelicans in the farms and allow their population expansion in the Western Cape, or to somehow control their numbers, thereby reducing predation on other seabirds and the risk of spreading diseases from the domestic animals into the wild populations on the offshore islands. Discontinuing the supply of chicken offal will surely bring the pelican population increase to a halt, but the immediate response of a hungry population of pelicans could be the increased predation on the other seabird species’ chicks.” Save one ... sacrifice another? The decision to be made, not uncommon in the world of conservation, is surely daunting.

Additional Island Rescues

Additional wildlife rescues brought to the TPA include a female Peregrine Falcon [*Falco peregrinus*] rescued in Livadia by Telis Hadzifoudas; a female Moorhen [*Gallinula chloropus*] by Ilias Christofis, who rescued the bird from his Irini Hotel swimming pool; a male Little Bittern [*Ixobrychus minutus*] by Costas Siomos, the Tilos Municipal engineer; and a Sparrow [*Passer domesticus*] by Elena Pisa of the Tilos Cultural Association. This brings the total number of island wildlife rescues to the TPA in the last three years since September 6, 2004, to 71, of which 56 represent avian rescues. This year-round support reflects the extent of the increasing stakeholder participation in nature protection and conservation on Tilos, a Special Protection Area.

TPA Promoted in California



The Sierra Club in California founded in 1892 is America’s oldest and largest environmental NGO

with 1.3 million members and supporters. In September 2007, the Sierra Club website [<http://www.sierraclub.org>] published the story of the February 5, 2006 rescue of a Long Legged Buzzard on Tilos that received care at the TPA Avian Recovery Center before its bird ringing and release on April 27, 2006. After learning more about the TPA during this publication process, Tom Valtin, Senior Editor of the Sierra Club magazine Grassroots, reported to the TPA Director on September 14th that he is preparing a profile of the TPA for the Sierra Club magazine and a feature story for their website about the Tilos Natural Park establishment.

The Sierra Club’s aims are to raise public awareness and develop the active participation of individuals for the protection of our natural environment and to encourage the responsible consumption of our natural resources. The Sierra Club engages with international partners in its advancement of global environmental health and sustainable development issues, raising public awareness of wasteful resource consumption, promoting fair trade that impacts the natural environment, preventing illegal logging, promoting mitigation techniques by individuals in the face of climate change, lobbying for environmental conservation legislation and advocating the exploration and enjoyment of our natural world.

Seismological Monitoring on Tilos

Kyriakos Pefitselis, an electronics engineer, and Dominikos Vamvakaris, seismologist, from the Geophysical Research Laboratory at the Thessaloniki Aristotle University visited Tilos the week of October 8th to install monitors in certain locations such as Amali that will record earth movement activity in the area. Mr. Pefitselis reported that the Tilos island monitors are connected to a network of monitors in the region including Rhodes, Symi, Karpathos and Kos. This is a temporary network for a short term project to obtain specific area data. This network is connected to the permanent national earth movement monitoring network that includes Thessaloniki, Athens, and other significant locations. The monitored activity is published in daily bulletins that are transmitted internationally to locations such as Turkey; Colorado, USA; Edinburgh, Scotland, and more. According to Mr. Pefitselis, the permanent monitors in the Greek network record an average of approximately 20 events per day.

The following article (edited due to space considerations) was contributed by Mr. Vamvakaris and explains more about the seismological studies currently being conducted as well as the team of participating international scientists and universities.

Seismological Monitoring: The Egelados Project

Seismologist Domenicos Vamvakaris and electronics expert Kyriakos Pefitselis, both of the Geophysical Research Laboratory of the Thessaloniki Aristotle University, visited Tilos on October 8, 2007, to collect research data under the auspices of the international Egelados Project.

The EGELADOS Project: “Exploring the Geodynamics of Subducted Lithosphere Using an Amphibian Deployment of Seismographs”

The EGELADOS project is a seismic experiment to investigate earthquake activity and earth structure in the Hellenic Subduction Zone that is conducted within the framework of the Collaborative Research Centre 526 “Rheology of the Earth” at Ruhr-University Bochum. [Editor’s note: “Subduction” is a geological process in which one edge of one earth crustal plate is forced below the edge of another.] In addition to scientists from Ruhr-University Bochum, the following are participants in the project: University of Thessaloniki, represented by Associate Prof. C. Papazachos; Istanbul Technical University (ITU), represented by Prof. T. Taymaz; National Observatory of Athens (NOA), represented by Dr. G. Stavrakakis; Chania Branch of the Technological Educational Institute of Crete, represented by Dr. Vafidis; GeoForschungsZentrum (GFZ) Potsdam, represented by Prof. R. Kind, University of Hamburg, represented by Prof. T. Dahm.

Seismological Monitoring: The Egelados Project (continued)

The scientific targets are as follows:

Seismological Imaging: Using seismic waveforms from a dense, temporary network of broad-band ocean-bottom and land seismographs to be deployed on the Peloponnes peninsula, the South-Aegean Sea and adjacent Turkey, a detailed investigation will be performed into the elastic and inelastic properties of the Hellenic subduction zone. Particular targets will be (1) the contact zone between the subducted African lithosphere and the overlying Aegean mantle, (2) the mantle wedge above the slab extending from the Cretan Sea to beyond the volcanic arc of the Cyclades and (3) lateral variations in properties of the slab itself. [Editor's note: "Lithosphere" is the outer part of the earth's crust consisting of the crust and upper mantle which are approximately 100 km thick.]

One objective will be to map structural connections between the active volcanoes at the surface, fluids rising from the subducted slab and dehydration-related seismicity. The project also aims to create a high-resolution tomographic image of the entire region providing us with the necessary structural background information. Such a model is also essential for accurate earthquake location.

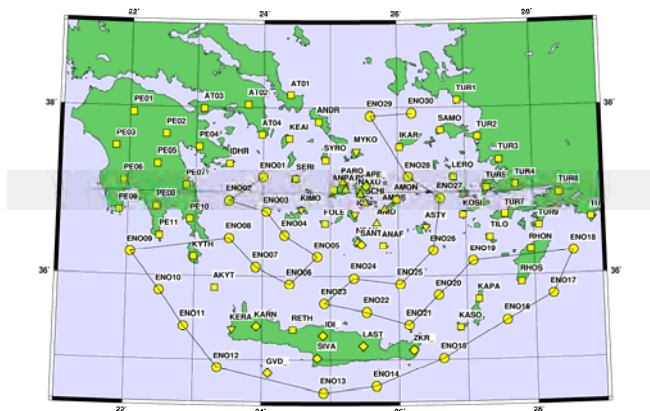
Seismicity: The EGELADOS network will allow the team to monitor shallow seismicity of the Hellenic Subduction Zone completely down to magnitudes of about 2. The seismicity of the plate contact can be studied from the Ionian Islands towards Crete, Rhodos and southwestern Turkey. A first glimpse on the data shows that hundreds of events have been recorded. Seismicity will be localized and studied with partners from National Observatory Athens, Thessaloniki University, Technical University Chania, Istanbul Technical University, and University of Hamburg.

Because of the high seismic activity, special emphasis will be put on automated data processing and localization. Fore- and aftershocks can be localized, source parameters (moment tensor, slip distribution) will be determined. The spatial-temporal history of these sequences will be revealed using EGELADOS data. Furthermore, the network is ideally suited for the study of intermediate depths events that occur in the Hellenic Subduction Zone. Intermediate depths events are supposed to be related to dehydration of the subducting lithosphere. Analyses of intermediate depths events will shed new light on these processes and on faults within the slab.

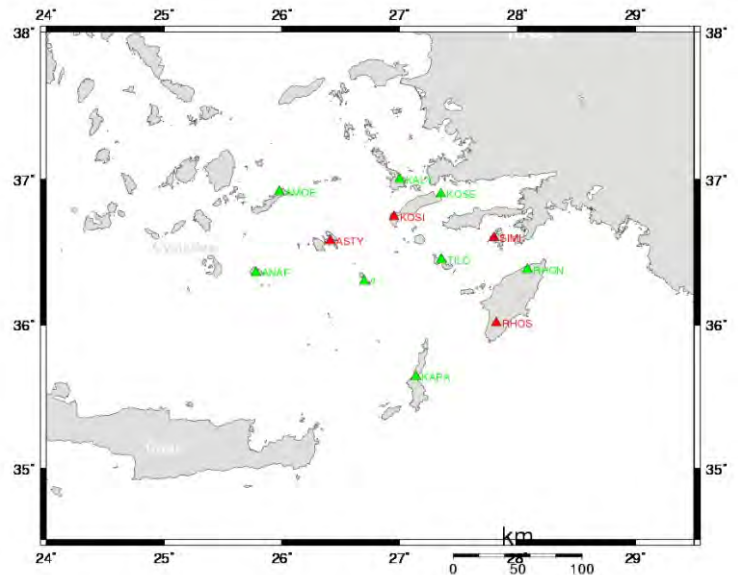
Numerical Modelling: Structural information can be used to set up a numerical model of the region to study the deformation and state of stress of the lithosphere. The results give new insights into the dynamic processes active in the subduction zone and controlling its seismicity.

Station Map:

The map shows the locations where seismographic equipment was installed under the Egelados Project. All terrestrial equipment was installed by October 2005 and all underwater equipment was installed by June 2006.



The Egelados Project was envisioned to last 18 months until April 2007. Because of its great scientific importance and due to the fact that a rich database was developed with scientific facts, it was decided to extend the life of the Project in the Southern Aegean region, which includes the Dodecanese. To further study the volcanic activity in the Dodecanese, the seismographic equipment that is shown on the map below will remain operational.



Livadia Bay, Tilos

Ministry of Agriculture Film Includes Tilos

Vangelis Rastias, television program producer and photography director, visited the TPA office during the summer to announce his film project for the Hellenic Ministry of Agriculture which will include a presentation of Tilos. Mr. Rastias met with the TPA Director to learn about the island wildlife and natural environment, the nature protection actions conducted year round by the TPA, and the island's status as a registered Special Protection Area, Natura 2000 site, IBA [Important Bird Area] and Corinne Biotopes Project region. Mr. Rastias will feature the island wildlife and natural environment that characterize Dodecanese values and activities that are promoted by the Hellenic Ministry of Agriculture.

Farewell

“If you want to go quickly, go alone. If you want to go far, go together.”

This African philosophy recently expressed by the 2007 Nobel Peace Prize co-winner, Albert Gore, Jr., was passed on to the Tilos Park Association before the TPA Founder and Director, Konstantinos Mentzelopoulos, said farewell to the island of Tilos in February.

As the TPA Director who successfully achieved the Hellenic government approval of the Tilos Natural Park establishment and was designated a Natura 2000 Ambassador by the European Commission Natura Networking Program [NNP] for exemplary nature protection actions, Mr. Mentzelopoulos will continue to develop environmental and wildlife conservation actions in Greece.

As a keynote speaker in November 2006 at a United Nations Environment Program sponsored conference in Athens, Mr. Mentzelopoulos had first announced that there is an appropriate time for the founder of an environmental NGO to ensure that the organization becomes managed and operated by stakeholders. This philosophy is shared by international institutions such as IUCN and UNEP for the purpose of enabling a local community to take responsibility for its own environmental and socio-economic future. The time to pass the management responsibility is when the environmental conservation infrastructure has been established, stakeholders are trained in the management and promotional operations of the NGO, local residents participate in nature protection and eco-development activities, and a Board of Directors understands its responsibilities as well as the problem solving process of an environmental NGO. This has been accomplished under the direction of Mr. Mentzelopoulos as evidenced by the NGO's achievements which were noted in the TPA Third Anniversary article published in the previous Tilos Park Journal.

During the last 4 years, the islanders have watched with an evolving cynicism, skepticism and eventual interest as the words of the African philosophy were brought to life on Tilos by the TPA, in spite of those who have always endeavored to thwart its progress, including those in local civic leadership positions. In spite of the obstacles and because of the obstacles, the TPA developed a close-working and committed team of spirited individuals who derived great satisfaction from an array of accomplishments which have inured to the benefit of people and wildlife. Together, the dedicated group assembled by Mr. Mentzelopoulos advanced the aims of the TPA during the last three and a half years and there is the hopeful prospect of continued successful advancement into the new frontiers of environmental conservation on Tilos waiting to be explored.



The issue now is whether or not the recently elected TPA Board of Directors will decide to continue utilizing the EU NNP award winning management, promotional and financially transparent infrastructure established by Mr. Mentzelopoulos, or whether the Board will change course and adopt different policies or priorities.

As with a mirror, the integrity of an organization is usually a reflection of the individuals who guide it. The future will soon reveal the degree of commitment of this new Board to the responsible management of the TPA ... and, thus, the islanders shall determine the destiny of their own Tilos Park Association.

[Editor's Note: The Tilos Park Journal writer/editor has also relocated to work in conjunction with Mr. Mentzelopoulos. As a result, the Tilos Park Journal publication is suspended until the TPA Board of Directors arranges for the renewed publication of Tilos environmental news.]



TILOS PARK