Thinking Green Digest 2013

Department of the Environment and Climate Change

HM Government of Gibraltar

GIBRALTAR NATURE RESERVE

Gibraltar Marine Reserve

Introduction

Thinking Green Digest 2013

Produced by the Department of the Environment and Climate Change.

This document aims to present an overview of the work carried out during 2013 by the Department of the Environment and Climate Change, as well as significant information relating to our local environment.

CONTENTS

Table of Contents

Minister's Foreword

This new, more user friendly format of the Department's Annual Report in turn reflects a new, more user friendly, and dynamic department, working consistently hard to both protect our environment and enhance its quality, and therefore our quality of life.

What the report does not detail, is all that goes on behind the scenes in order to achieve this increased environmental activity, with new initiatives, new sections and new team members.

Things are progressing quickly; so much so that already since the year that this publication covers, there have been many more developments, including, significantly, the renaming of the Department to the Department of the Environment and Climate Change. This reflects the Government's commitment to a low carbon community. A great deal of background work continues to be going into this, much of which was carried out during 2013.

The challenges remain. Driving economic activity in such a small jurisdiction while at the same time aiming to reduce carbon emissions and prevent negative impact to natural communities is a great deal to ask of any

administration. But it is being achieved. The groundwork, which continued to be done beyond 2013, forms the essential building block to translate a green philosophy into real improvements.

In order to best achieve this, engagement from both public and private sectors has to be greater. The Department will continue to work in trying to achieve this, which will be the most significant step still needed to pushing this agenda forward. Much of this is seen in the work of the Climate Change Task Force.

In the meantime the routine work to keep up with implementation of European Directive requirements and to manage the different elements of Gibraltar's environment continues, and I am grateful to the staff of the Ministry, the Department, the Environment Agency and other contractors, for all that they have done and continue to do.

With my best wishes,

Dr John Cortes MBE, D.Phi, C.Env.

Our Natural Environment

Gibraltar is an Overseas Territory of the United Kingdom, situated at the entrance to the Mediterranean, overlooking the Straits of Gibraltar. Its strategic location and prominence have attracted the attention of many civilisations, past and present, giving rise to the rich history and popularity of 'The Rock'. In addition to its geographical importance, Gibraltar boasts a myriad of terrestrial and marine habitats, all of which are protected under the Nature Protection Act 1991; Gibraltar's pioneering nature conservation legislation.

With a terrestrial area of 5.8 km^2 and territorial waters extending up to three nautical miles to the east and south, and up to the median line in the Bay of Gibraltar, Gibraltar's biological resources are inevitably limited. Nevertheless, even taking into account its small size and extent, Gibraltar's biological diversity is indeed rich. It includes some endemic species and near-endemic flora and fauna that are found nowhere else in mainland Europe.

Notable species include the Gibraltar Campion *Silene tormentosa*, the Barbary Macaque *Macaca sylvanus* and the Barbary Partridge *Alectoris barbara*. Moreover, Gibraltar's importance as a migratory bottleneck for birds, insects and marine species such as cetaceans and marine reptiles make Gibraltar, and the wider area of the Straits of Gibraltar, an extremely important conservation area as recognised by leading scientific institutions and non-governmental organisations.

Both the terrestrial and marine ecosystems found in Gibraltar are sub-divided into some of the representative habitat types found in the Mediterranean region e.g. maquis, garrigue, shallow and deep-sea reef ecosystems. Some of these areas are delineated by topographical characteristics. Others are formed by natural and/or artificial boundaries, as is the case with the Upper Rock component of the Gibraltar Nature Reserve, whereas some are bordered by the nature of their underlying geology or depth of the seabed.

Gibraltar's climate is typically Mediterranean, with mild winters and warm summers. Its terrain is largely narrow coastal lowland bordering the 426-metre (1.397-foot) high Rock of Gibraltar.

Special Areas of Conservation (SAC) / Special Protected Areas (SPA)

The Rock of Gibraltar SAC/SPA boasts a rich flora, with around 360 species having been recorded within the boundary of the terrestrial Nature Reserve. The vegetation of the Upper Rock Nature Reserve is dominated by closed Mediterranean shrubland known as maquis (a tall, thick type of Mediterranean matorral), which consists of a dense community of evergreen, sclerophyllous shrubs that typically replaces evergreen woodland after fire or deforestation, as was the case with the Upper Rock following the initial removal of its Mediterranean woodland.

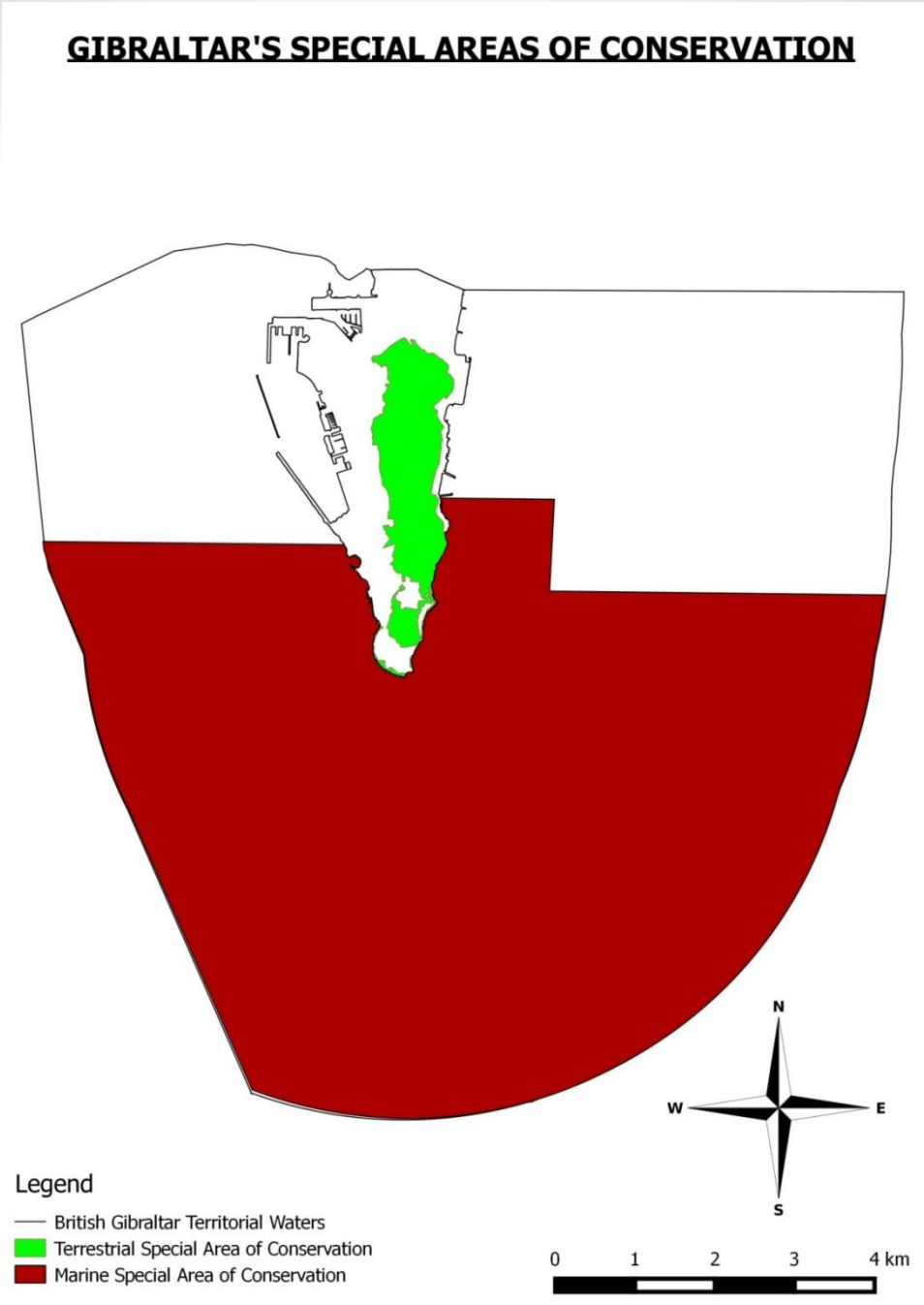


Figure 1: Gibraltar's Special Areas of Conservation

The Rock of Gibraltar, and in particular the Upper Rock component of the Gibraltar Nature Reserve is dominated by a dense cover of mostly maquis, with some garrigue, and these habitats include many important fruit-bearing shrubs that support large passerine populations during passage periods and in winter. The slopes of the Rock also serve as a staging site for large numbers of passerine and near-passerine migrants. Most migratory western European species can occur at Gibraltar during the northward or southward migration periods. Some of the passerine and near-passerine species that occur within the Nature Reserve, as resident or on migration, are shown below.

European Bee- Eater - Migratory (Charles Perez)

Sardinian Warbler – Resident (Stewart Finlayson)

Hoopoe – Migratory (Wikimedia Commons: Author Dûrzan cîrano)

Blue Rock Thrush – Resident (Wikimedia Commons: Author: AquilaGib)

Short-toed Eagle - Migratory (Stewart Finlayson)

In addition, many migratory birds of prey and storks congregate at the Straits of Gibraltar on their way towards their wintering grounds in Africa. When westerly winds blow across the Straits, Gibraltar itself sees the majority of raptor passages during both the pre-nuptial (northerly) and post-nuptial (southerly) migrations. Most of these birds fly directly over the Upper Rock Nature Reserve.

Gibraltar's Reefs

British Gibraltar Territorial Waters (BGTW) hold numerous natural and artificial reefs and outcrops. The reefs support a diversity of fish, mollusc, echinoderm and coral species. Typical fish species found are white seabream *Diplodus sargus*, common two-banded seabream *Diplodus vulgaris*, Salema porgy *Sarpa salpa*, Black scorpionfish *Scorpaena porcus*, Moray eel *Muraena helena*, Conger eel *Conger conger*, Cardinal fish *Apogon imberbis*, and Dusky grouper *Epinephelus marginatus*.

Artificial reefs

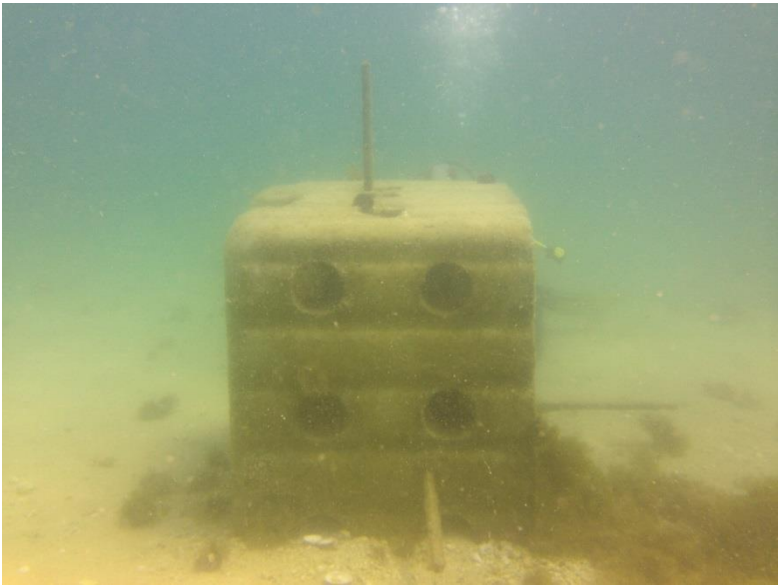
During the 1970s work on the construction of an artificial reef network commenced in the Southern Waters of Gibraltar just off Camp Bay and Rosia Bay. The project is on-going and numerous vessels of a relatively large tonnage have been sunk in different areas within BGTW. A dramatic increase in diversity of mid-water and bottom-dwelling species has been recorded including an increase in the number of sessile organisms on the artificial reef structures themselves.

Some of the more common and endangered molluscs, including gastropods, found, are the common octopus *Octopus vulgaris*, common cuttlefish *Sepia officinalis*, noble pen shell *Pinna nobilis*, date mussels *Lithophaga lithophaga*, *Charonia lampas*, and various nudibranchs including *Babakina anadoni* and *Roboastra eurropaea*.

Echinoderm species, such as the endangered long-spined sea urchin *Centrostephanus longispinus* and corals, are also found in the reefs throughout BGTW.

A comprehensive habitat and species surveillance monitoring programme is coordinated by The Department of the Environment and Climate Change and this is constantly providing new data on the marine species and habitats found in BGTW. The current and future status of Gibraltar's reefs is deemed as favourable if the relevant management measures continue as implemented.

North West Artificial Reef



The initial phase of deployment began in July 2013, involving the submerging and placement of 70 concrete modules in order to provide the basis for an artificial reef system within a predetermined site in the northwest area of British Gibraltar Territorial Waters (BGTW).

The creation of an artificial reef in the northwest area of Gibraltar will primarily help regenerate the area's marine biodiversity and benthic habitat. Each artificial reef module was created specifically and solely for the aims of this project.

The artificial reef was designed to act as a Fish Aggregating Device (FAD) whilst providing protection and shelter for the area's marine biodiversity and

ecosystem. A FAD refers to a man-made object used to encourage and attract marine life. This includes the provision of a spawning area for fish and marine life, provision of natural protection for the recolonization of Annex IV species (as listed under the EU Habitats Directive), and provision of habitat for benthic communities to develop.

The Department of the Environment and Climate Change will monitor the area of the North West Artificial Reef System in order to determine the success of the project as well as ensuring it does not have a detrimental impact on the surrounding area.

Completed artificial reef module prior to deployment.

Coastal and Ground water sampling

Under the EU water policy of the Water Framework Directive, The Department of the Environment and Climate Change has, since 2009, conducted a monitoring programme of Gibraltar's coastal waters. The coastal waters are managed by The Department of the Environment and Climate Change under the coastal water management plan.

The coastal monitoring programme is by far the most elaborate exercise ever undertaken with regards to assessing the state of our coastal water. Water quality samples amongst other scientific data are being collected on a monthly basis.

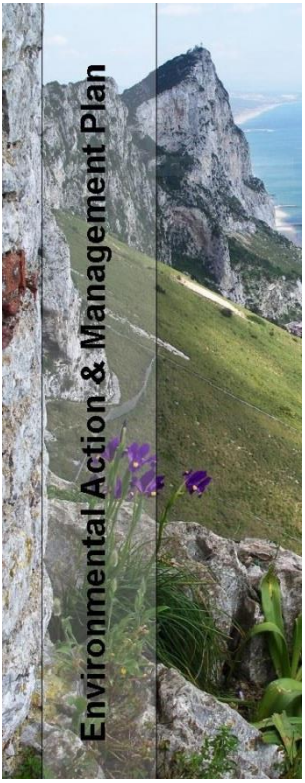
The monitoring programme is meant to address any pressures that could potentially affect our coastal environment. Results gathered from this monitoring project are providing The Department of the Environment and Climate Change with an accurate picture of Gibraltar's coastal waters; whilst also providing a basis for future decision making, in terms of aiding the implementation of any necessary programme of measures that need to be introduced, to ensure that our water quality is maintained at a good level.

The Department also collects groundwater data from the two aquifers found in Gibraltar, namely the bedrock aquifer and the Northern Isthmus aquifer.

Environment officers at the Department of the Environment and Climate Change use a variety of instruments to determine the quality of coastal water, including secchi disks (to measure water clarity), probes, nets, gauges and meters.

Water quality is not just measured by direct sampling. Information is also being derived by observing the surrounding environment such as the seashore and by collecting organisms that live in our coasts, such as plankton.

Environmental Action and Management Plan



This document acts as a blueprint for the Government's environmental policy and reflects the commitments and policy goals of the Government for the coming years. The plan went out to consultation with all Government departments and environmental NGO's to encompass the views of all those who will be working to ensure its delivery.

Notable changes in the new version of the document include specific chapters dedicated to development and planning issues, green buildings and traffic and transport, indicating the Government's increased awareness of the importance of these matters for effective environmental management.

The revised plan also contains more tangible goals and time frames within which these are to be delivered, looking up to 2015. The plan is a live document and consequently will be reviewed and updated as circumstances require. In 2015 progress will be evaluated and a new plan developed to carry Gibraltar forward to 2020.

Barbary Macaque Tagging Project

A team led by Professor Agustin Fuentes, Professor of Anthropology at Notre Dame University in Indiana, USA, and Dr. Lisa Jones-Engel, of the National Primate Research Center, University of Washington, together with the Gibraltar Macaque teams from the Ornithological & Natural History Society and the Veterinary Clinic, worked intensely on the Barbary macaques over the Easter period during 2013. The team stepped up the then current monitoring programme of research in order to help reduce the impact of the monkeys on built up areas of Gibraltar.

Up to 30 macaques were trapped under scientific research licenses. Up to 21 of these (approximately 10% of the population) had samples taken for health and physiological tests. This served to review the health status of the animals.

In addition, three individual macaques had High Definition cameras attached to them, as part of the internationally acclaimed National Geographic "crittercam" project. This work was funded by National Geographic who was also in Gibraltar to cover the initiative. GPS tracking collars were also attached to an additional 6 trapped macaques, allowing the team to remotely track macaque movements for several months. The data collected (Figure 2) served to ascertain the movement ranges of each macaque troop.

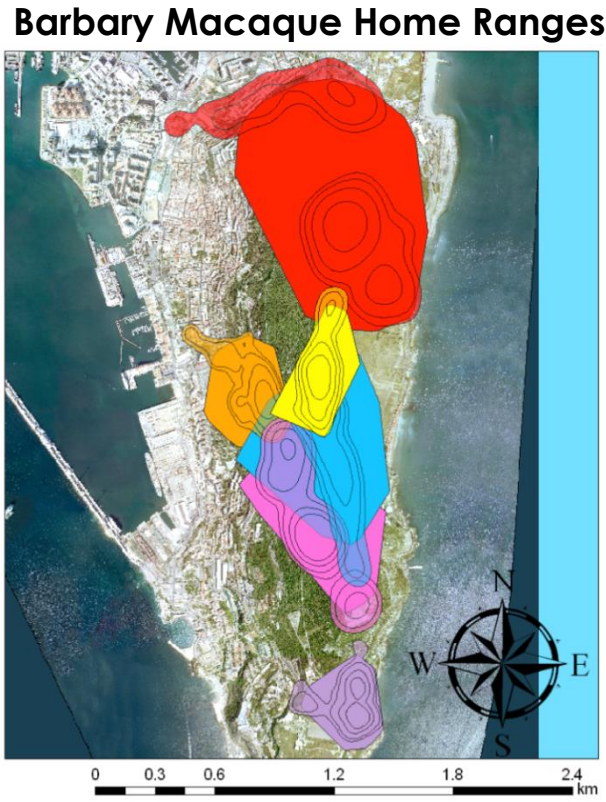


Figure 2: Barbary Macaque troop Ranges

These data also highlight the particular movement habits of the 6 individual macaques. Below, information has been presented on the sleeping habits of one macaque named Coral (Figure 3).

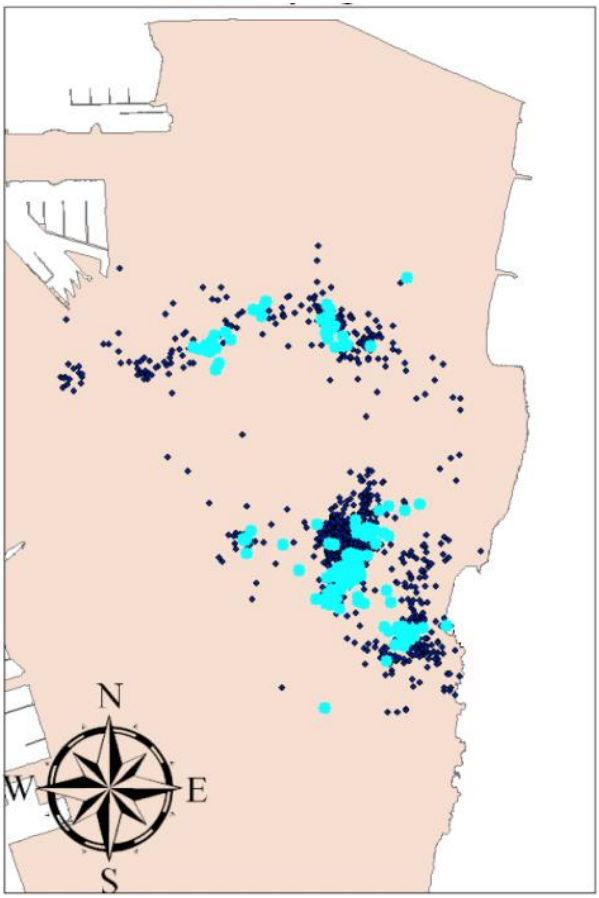


Figure 3: Coral's sleeping habits

Macaques were held for no longer than 2-3 hours and were monitored for 2-3 days post-trapping. The three HD cameras were removed after 48 hours via automatic drop-off mechanisms and the GPS collars removed, in the same manner, after a period of 4 to 6 months.

This project, and its methods, were vetted and approved by the University of Notre Dame Animal Care and Use Committee (ND-IACUC) and Office of Research and is supported by the National Geographic Waitt Fund and the University of Notre Dame.

As part of this initiative, and plans to increase local knowledge of the biology of our monkeys, a public talk on the macaques was also held on Wednesday 3rd April at 7pm at the Rock View Room of the O'Callaghan Eliott Hotel.

Commenting on the matter Minister for the Environment and Climate Change, Dr. Cortes noted, 'the information they will gather is vital, and we are using top of the range monitoring equipment. We must remember that our macaques are an important resource. This work will help us understand them better, which will in turn help us to reduce the nuisance factor. Once we have done this, we can start enjoying and being proud of them once again.'

Barbary Macaque Management Plan

HM Government of Gibraltar continued work on the Barbary Macaque Management Plan, and began to implement some of its measures.

The Plan, which is being prepared in consultation with experts in Gibraltar and abroad, incorporates a number of actions aimed at improving a wide range of aspects of Gibraltar's famous monkeys.

The main aims of the Plan include: Stabilising the Barbary Macaque population, minimizing incursions into built-up areas and preventing the establishment of urbanised groups, improving monitoring of the macaques, increasing the research and knowledge base, increasing veterinary involvement in the care of the macaques, improving communications of macaque matters to the public, maximizing the use of the macaques as an educational resource, and improving their value as a tourist product.

Measures to achieve these will include:

- Greater presence at the main sites on the Upper Rock, with operatives working with tourism operators in helping both in interpretation and in discouraging illegal feeding and other interactions.
- Greater and more active monitoring of group size, structure and movements.
- Greater ability to attend to call-outs and deter monkeys becoming established in urban areas.
- Improvements to the feeding sites on the Upper Rock.
- Provision of ponds on the Upper Rock.
- Interpretation facilities on the Upper Rock.
- Better education of visitors including production of leaflets and other literature.
- Establishment of a research and a conservation advisory panel of Gibraltar and international experts.
- Continuing research into the species.
- Pursuance of contraception, active management and relocation abroad as the preferred management tools.

Bathymetric Survey of British Gibraltar Territorial Waters

Her Majesty's Government of Gibraltar commissioned a bathymetric survey of British Gibraltar Territorial Waters. This technologically advanced survey is the most extensive of its kind in Gibraltar and will produce results which will be used to inform decisions made for both environmental management and navigational reasons.

Commenting on this survey, the Minister of the Environment and Climate Change, the Hon Dr John Cortes, said that this initiative would provide incontrovertible evidence of the position and extent of some of our most important natural habitats and would be a major contribution to the management of these invaluable national assets for many years to come.

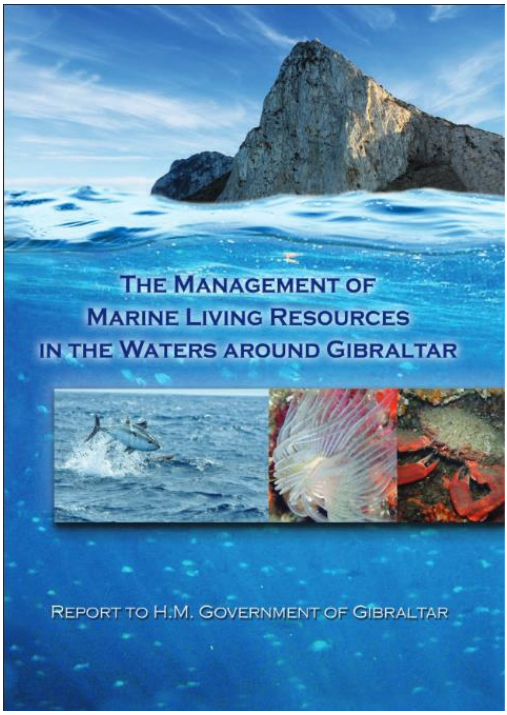
"The Government takes its responsibilities as custodians of British Gibraltar Territorial Waters very seriously. This survey will provide vital information on our marine habitat, which we need to have as part of our proper management of the Southern Waters of Gibraltar Special Area of Conservation (SAC) which is a designated EU Natura 2000 site."

Spider Crab Relocation

During May 2013, The Department of the Environment and Climate Change was involved in the relocation of Spider Crabs, a protected species under the Nature Protection Act 1990, from the area around Ocean Village as a result of preparatory works for the arrival of the Sunborn Yacht Hotel.

These spider crabs were relocated to Rosia Bay as part of the Department's protection programme.

The Management of Marine Living Resources in the Waters around Gibraltar Report



The explanatory memorandum, of the Nature Protection Act 1991, states that it is "*An Act to provide for the protection of wild birds, animals and plants and for the designation and preservation of protected areas of the purpose of nature conservation and matters incidental thereto.*"

The Act is not specific to fisheries legislation and was put in place for environmental purposes and includes restrictions of specific practices and other marine activities. This was because HM Government of Gibraltar believed that the fishing grounds around Gibraltar had been overexploited and believed that fishermen themselves accept that catches had declined seriously.

HM Government of Gibraltar has a good record in respect of environmental protection, with its own Environmental Charter and being a party to all of the major multilateral environmental agreements. In addition, it also implements all requirements under EU environmental legislation.

As a result, an analysis was undertaken of fishing activities in the waters around Gibraltar to consider their sustainability in management terms as a fishery and as part of the management regime.

The Mediterranean is a biodiversity hotspot. There are believed to be around 17,000 species occurring in the Mediterranean Sea which is about 7% of the world's known marine species in an area that represents less than 1% of the world's ocean surface. Many of the ecological characteristics in the Mediterranean Sea are problematic with over 20% of the known species under threat. These species include the critically endangered Mediterranean Monk Seal, Sea Turtles, skates and rays, and other overexploited species such as Atlantic Bluefin Tuna.

A report entitled "*The Management of Marine Living Resources in the Waters around Gibraltar*" was commissioned and published at the beginning of the year (Tydeman & Lutchman, 2013). Included in the recommendations and conclusions of this report is the fact that artificial reefs have had a strong beneficial impact on the biodiversity in BGTW. In addition, a precautionary approach to the management of fisheries in BGTW is recommended due to the level of uncertainty relating to the status and impact of fisheries on the marine environment within BGTW. It also records that the precautionary approach should be applied to fishing activities on shared or highly migratory stocks, such as Bluefin Tuna which are currently under a recovery plan established by the International Commission for the Management of Atlantic Tuna (ICCAT).

The report, containing further information on the conclusions and recommendations presented to HM Government of Gibraltar, can be found under the publications section of The Department of the Environment and Climate Change's webpages at www.gibraltar.gov.gi.

Energy

Renewable Energy

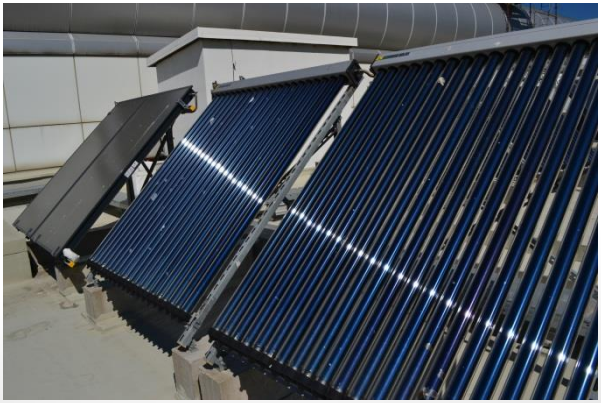
H.M. Government of Gibraltar, through The Department of the Environment and Climate Change, is committed to producing energy in an environmentally sound and sustainable manner by investing in renewable energy sources. Studies suggest that there are four viable options for Gibraltar in terms of renewable energy: offshore wind, energy from waste, solar and marine current energy.

Government remains open to the possibility of exploring new technologies and is committed to producing at least 15% of its energy from renewables by 2020, as required under the Directive on Promotion of the Use of Energy from Renewable Sources (2009/28/EC), with a view to increasing these further in the long term.

Solar Thermal Installation at the Tercentenary Hall

Solar thermal technologies have been installed at the Tercentenary Hall as part of a pilot project. Four flat plate collectors and four evacuated tube collectors have been installed; half of these have been installed facing south and the other half facing south-west.

These systems will be monitored over a period of twelve months to gather data and ascertain which orientation and system are the most efficient. The collected data will allow for an effective introduction of solar thermal energy and accelerate the integration of renewable technologies. Similar works are planned at other sites in Gibraltar.



Solar Powered Street Lighting

In 2012, solar powered street lighting was introduced in the area of British Lines Road (frontier loop) and at the Kings Wharf car park. The Gibraltar Electricity Authority (GEA) continues to work on a programme for the roll-out of LED or solar street lighting throughout Gibraltar.

Green Business

Environmental challenges in recent years have increased the trend of "going green" in businesses like never before. There are two main factors behind the drive toward environmental-friendly business practices: more stringent international and local regulations, and the high costs of fossil-fuel prices.

The Government is encouraging a greener, more sustainable business economy by requiring contractors to manage their impact on the environment, increase energy efficiency and commit to environmental initiatives.

Energy Performance of Buildings Regulations & the Energy Efficiency Directive

It is estimated that at present, buildings contribute as much as one third of total global greenhouse gas emissions, primarily through the use of fossil fuels during their operational phase. The Energy Performance of Buildings Directive (EPBD) is an EU initiative aimed at reducing the amount of energy consumed in buildings in an attempt to reduce carbon emissions. It is a legal requirement to obtain an Energy Performance Certificate for buildings with fixed heating, cooling or mechanical ventilation, upon construction and prior to sale or rental. Failure to do so constitutes an offence and is liable on summary conviction to a fine of up to £5000.

The EPBD was transposed into Gibraltar's legislation via the Building (Energy Performance) Rules which came into force in 2009. In 2010, the EU recast the EPBD in order to make it more comprehensive and this has been transposed via the Environment (Energy Performance of Buildings) Regulations 2012. These Regulations seek to promote the improvement of the energy performance of buildings, taking into account outdoor climatic and local conditions, as well as indoor climate requirements and cost-effectiveness.

The revised regulations mean that new buildings, of any size, must be constructed to meet the minimum energy performance requirements. Developers of new buildings must also ensure that before the construction starts, the technical, environmental and economic feasibility of

high-efficiency alternative systems such as decentralised energy supply systems based on energy from renewable sources; cogeneration; district or block heating, or cooling and heat pumps, are considered.

Existing buildings undergoing major renovation must ensure that the energy performance of the building, or the renovated part, is upgraded in order to meet minimum energy performance requirements; in so far as this is technically, functionally and economically feasible.

Further to the EPBD, the Energy Efficiency Directive (EED) came into force in 2012 and is the most comprehensive directive on energy efficiency. It establishes a common framework of measures for improving energy efficiency throughout the EU Member States.

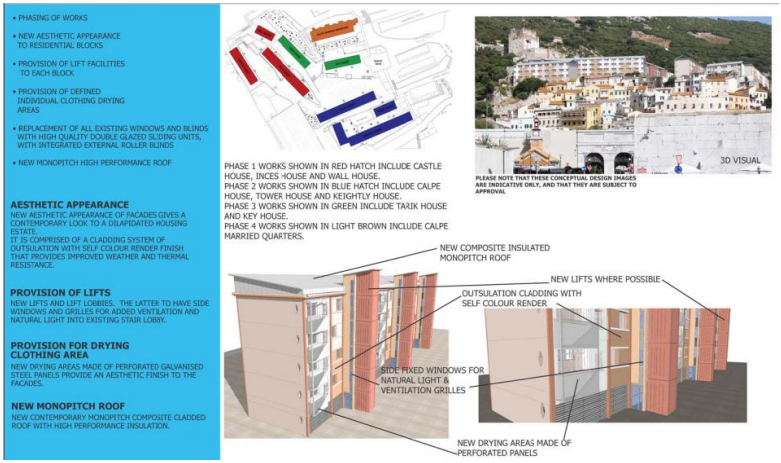


Figure 4: Renovation proposal for Government Housing Estate.

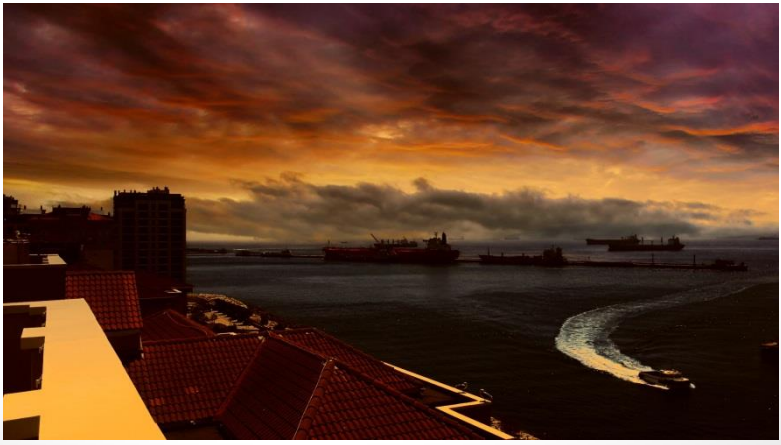
Climate Change

Climate change has ceased to be a scientific debate, and is no longer just one of our many environmental and regulatory concerns. Climate Change has become the overriding environmental issue of our time, and the single greatest challenge facing environmental regulators. It is a growing crisis, which will not only impact the environment but all aspects of human activity including the economy, food production, and health.

There is alarming evidence that important climatic tipping points, leading to irreversible changes in major ecosystems and the planetary climate system, may already have been reached.

Ecosystems as diverse as the Amazon rainforest and the Arctic tundra may be approaching thresholds of dramatic change through warming and drying. Mountain glaciers are in alarming retreat and the downstream effects of reduced water supply in the driest months will have repercussions that could transcend generations. Climate feedback systems and cumulative environmental effects are building across Earth's systems demonstrating consequences we cannot anticipate.

The most dangerous climate changes may still be avoided if we transform our hydrocarbon based energy systems. The tools are available; we just need to apply them. Raising awareness about climate change is extremely important, as it is an issue which is affecting many and will eventually affect us all. Awareness can lead to change and a better future for us and our environment.



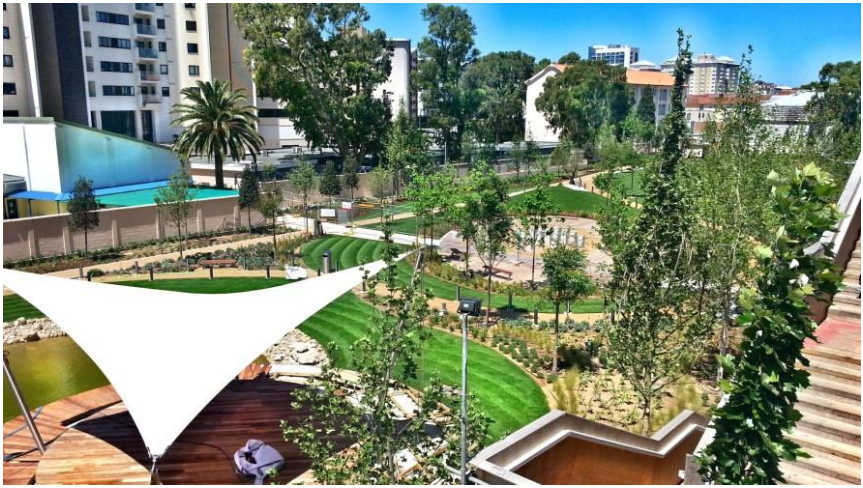
Climate Change Task Force

In its 2011 manifesto, Government made a commitment to work towards achieving carbon neutrality. In responding to the ambitious nature of this goal, a Climate Change Task Force was set up to help deliver these.

The purpose of the Task Force is to provide the Cabinet with affordable, actionable and time-defined recommendations. These will identify the optimum route to carbon neutrality and recognise the need to sustain competitiveness, jobs and investment within Gibraltar.

Meetings of the Task Force are chaired by the Deputy Chief Minister, the Hon Dr Joseph Garcia. The committee also includes the Minister for the Environment, Dr John Cortes, who is driving the project together with The Department of the Environment and Climate Change. Other members consist of individuals from both the private and the public sector, including the Gibraltar Electricity Authority, AquaGib, the Finance Centre, Gibtelecom, the Port Authority, the Chief Technical Officer and the Financial Secretary. Furthermore, members of the Chamber of Commerce and the Federation of small businesses are also active participants.

The Task Force has a number of different ongoing projects, including cleaner power generation, the introduction of renewable energy, uptake of energy efficiency and the decarbonisation of the territory. The outcome of this will be the publication of a new Climate Change Strategy to be published in autumn 2015.



Sustainable Traffic, Transport and Parking Plan

Gibraltar is an international centre for trade, business and tourism, with a population of approximately 30,000 people. It has a high level of vehicle ownership and usage, relative to its size, which generates significant flows along its limited network of major and minor roads. Vehicular and pedestrian traffic increase substantially on a daily basis due to the large influx of commuters, tourists, and commercial vehicles arriving from Spain.

Traffic is generally acknowledged to be one of Gibraltar's most long standing problems. The situation verges at times on gridlock, especially during the morning and evening rush hours and particularly when these coincide with aircraft movements at the airport or with major road-works.

This problem affects local residents and visitors alike and is contributing to environmental problems in terms of noise and air pollution.

Gibraltar, as part of the EU, has commitments under various EU Directives, such as:

- CAFE Air Quality Directive (2008/50/EC),
- Environmental Noise Directive (2002/49/EC),
- Directive on Energy End Use Efficiency (2006/32/EC)
- Renewable Energy Directive (2009/28/EC).

These directives require a reduction in air pollution, noise and energy for transport as well as demanding an increase in the share of renewable energy in transport to 10% by 2020.

For all these reasons, HM Government of Gibraltar commissioned a comprehensive traffic, transport and parking plan, with a view to properly understand the current problems and identify possible solutions, in order to:

- Reduce transport emissions of carbon dioxide and other pollutants;
- Increase the fluidity of traffic throughout Gibraltar;
- Improving quality of life for transport and non-transport users and to promote a healthy natural environment;
- Discourage unnecessary car use; and
- Encourage the use of public transport and/or environmentally friendly means of transport such as bicycle or walking.

Results of the study will be published in due course and the Department of the Environment and Climate Change is particularly keen to implement measures which will help improve Gibraltar's air quality.

Green Roofs

Climate change is expected to result in higher temperatures and increased rainfall variability in the Mediterranean; which would lead to a greater urban heat island effect. Gibraltar is one of the most densely populated countries in the world with a large proportion of the population living at the foot of the Rock in an urbanised area.

In order to help minimise the urban heat island effect, a 1100m^2 green roof was created on top of the new Engineer Lane Car Park to act as a carbon sink.

For the plantings, the Department of the Environment and Climate Change consulted local experts, including Minister Cortes, Leslie Linares and Keith Bensusan, to suggest the most adequate species for this specific initiative. A selection of more than 10 different Sedum varieties were used, including:

- Sedum album "Coral carpet",
- Sedum album "Murale",
- Sedum acre,
- Sedum sexangulare,
- Sedum "Hispanicum minus",
- Sedum spurium "Fuldaglut",
- Sedum floriferum,
- Sedum kamschaticum,
- Sedum hybridum "Immergrunchen",
- Sedum reflexum "Blue Spruce",
- Sedum reflexum "Green Spruce", and
- Sedum reflexum "Angelina".

The genus Sedum is characterized by having an enormous capacity for resistance to dry climates, poor soils (low organic matter content), intense sun, snow, strong winds and sudden temperature variations. Having the ability to store water in the leaves, they also have less demand for water.

A resource-efficient underground drip line irrigation system was also installed to mitigate against the uneven distribution of rainfall.

Green roofs increase the albedo and therefore help decrease the urban heat island effect. Green roofs are also important for wildlife. They can also reduce energy use by acting as insulators for buildings, reducing the energy needed to provide heating and cooling. The vegetation can also help remove air pollutants and greenhouse gas emissions, through dry deposition and carbon sequestration and storage. Green roofs can also reduce and slow storm-water runoff and filter pollutants from rainfall. The Department of the Environment and Climate Change supports the development of further green roofs in Gibraltar.

Meteorological Stations

Climate is generally defined as average weather, and it is recognized that climate change and weather are intertwined. Observations can show that there have been variations in weather patterns, and it is the fluctuation in statistics of weather over time, that helps to identify any changes in climate.

In 2013, in order to identify how climate is changing specifically in Gibraltar, The Department of the Environment and Climate Change set up a network of three weather stations around the Rock to gather data; including wind speed, wind direction, ambient temperature, ambient pressure, solarimetry and rainfall. In the future this information will give us an indication as to how our local weather may be changing.

EU Cities Adapt Project

EU Cities Adapt was a project commissioned by the European Commission's Directorate-General for Climate Action DG CLIMA.

The aim of the project was to provide capacity building and assistance for cities across Europe (in developing and implementing a climate change adaptation strategy) by raising awareness throughout Europe on the importance of preparing for climate change in cities, exchanging knowledge and good practices, including developing tools and guidance for cities on adaptation.

The Department of the Environment and Climate Change applied to participate in this project and was delighted to have been chosen as one of the cities to take part. Generally, climate change adaptation is not an issue which has been widely considered and this project served to initiate discussion and thinking on the matter. With the support of the Minister for the Environment, a working group was formed. Participants included members from the Government's Departments

of the Environment, Town Planning and Technical Services, AquaGib, the Environmental Agency, the Gibraltar Electricity Authority, the Gibraltar Health Authority and the Gibraltar Museum.

The group's message and function is to collate information on past and present weather events and projected climate for Gibraltar; to interpret this information on climate change and identify possible impacts for Gibraltar, and how to adapt to these.

The group's aim is to raise awareness and to increase Gibraltar's capacity to adapt to future climate change impacts, including higher temperatures, sea-level rise, greater variability in precipitation, drought etc. The intention is to identify Gibraltar's current and future areas vulnerable to climate change and to further incorporate climate change adaptation measures across all disciplines.

The Department of the Environment and Climate Change was successful in hosting one of the peer review visits. This event allowed the Department to share Gibraltar's unique characteristics with other European Cities, such as Rotterdam, Zadar, Ancona and Barcelona.

The project served to highlight that Gibraltar is, in many respects, already quite resilient to climate change. For historical political reasons, Gibraltar has had to develop a high degree of self-sufficiency, i.e. its own power generation and water desalination plants. Gibraltar's

small size can also be considered a positive factor in its ability to adapt to climate change.

Furthermore, planning policies are already in place to account for a half metre rise in sea-level and measures have already been taken to try and reduce the level and impact of flooding and to reduce the risks of rock-falls where possible. As far as specific adaptation projects are concerned, Gibraltar will be focusing on encouraging the introduction of green walkways and green roofs, which would not only improve Gibraltar's environment in the short term, but also increase its resilience to climate change impacts in the long term.

Gibraltar is also hoping to become a member of other sustainable city networks such as ICLEI and the Resilient Cities network, with the view to continue to learn about the work being conducted in other parts of Europe, and the world, that might provide valuable lessons to be applied locally.

The Department will seek to further links with academic and research institutions with the intention of conducting a vulnerability assessment for Gibraltar, within an already established framework (e.g. UK Local Climate Impact Profile framework or similar). Our objective is to maintain and cultivate network links for future projects and to obtain possible EU funding opportunities.

UK Overseas Territories Geographical Information Systems Conference Gibraltar

The GIS (Geographical Information Systems) Conference, which took place in Gibraltar on Tuesday 8th October 2013 and Wednesday 9th October 2013, hosted by the Department of the Environment and Climate Change, was hailed a success.

The conference brought together representatives from across the UK Overseas Territories and Crown Dependencies to examine the use of geographical information systems as a management tool.

Although the main focus was on the environment, systems of this nature can be applied in any management situation to help analyse and understand spatial data. GIS is also an important tool for the networking of the UK Overseas Territories as we together strive to combat environmental problems and learn and share from each other's success.

"As Governments we need to manage a whole series of issues, many of which are interrelated and almost all of which have a spatial dimension of some form," Minister for the Environment and Climate Change Dr. John Cortes said.

"As managers and leaders we need to make informed decisions, and GIS is an invaluable asset which allows for decision support". Dr. Cortes hoped the conference would pave the way for future events both on GIS and on other issues of natural interest and concern.

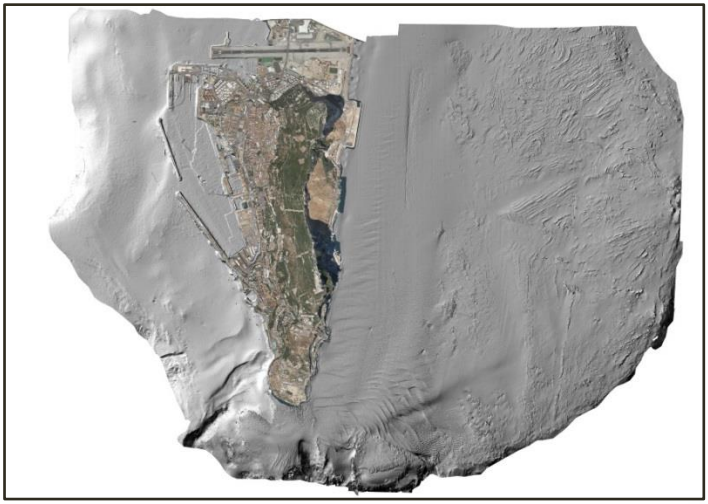


Figure 5: Bathymetry and Aerial GIS map of Gibraltar and British Gibraltar Territorial Waters.

Waste

Everyone produces waste as part of their everyday lives. The nature of the waste produced varies from relatively harmless materials to noxious and potentially hazardous substances.

In order to safeguard public health, the environment and water resources, all waste arisings must be properly handled and disposed of.

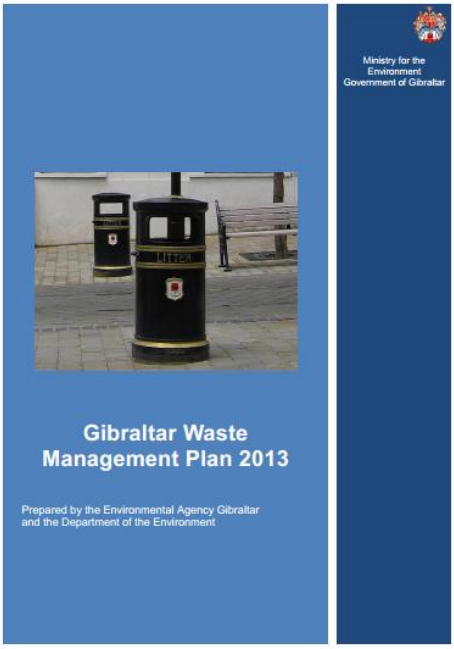
The disposal of waste by any means may produce pollution that places a burden on the environment to which it is released, be it air, water or land.

Inadequate waste disposal, such as through the release of methane gas from unmanaged landfill sites, can contribute to Climate Change. Therefore, it is crucial to ensure that the best practicable environmental option (BPEO) is chosen for the disposal of wastes and that the principles of best available technique not entailing excessive cost (BATNEEC) are applied where appropriate to achieve sustainable waste management.

Waste Management Plan

The management of waste has become an issue of utmost importance as the social, economic and environmental costs of waste disposal rise.

Since 2003, Gibraltar's waste has been sent to landfill in Spain. The EU Landfill Directive (1991/31/EC) set demanding targets to reduce the amount of biodegradable municipal waste sent to landfill. The Gibraltar Waste Management Plan investigates different waste treatment technologies which will enable Gibraltar to become more self-reliant in dealing with its waste and minimise the amount of waste to be sent to landfill. A waste prevention programme has also been prepared and is incorporated within Gibraltar's Waste Management Plan.



The Waste Prevention Programme aims to protect the environment and human health by preventing or reducing the adverse impacts of the generation and management of waste, by reducing overall impacts of resource use and improving the efficiency of such use. It will:

- Improve the environment in support of sustainable economic growth.
- Help businesses recognise and act upon potential savings through better resource efficiency and waste prevention.
- Help businesses recognise the opportunities for growth through offering new and improved products and services.
- Make it easier for people to find out how to reduce their waste, and how to repair broken items, and reuse items they no longer want.
- Support action by businesses and the public to capitalise on these opportunities.

This document can be found on HM Government of Gibraltar's Website under The Department of the Environment and Climate Change's Publication section.

Waste Hierarchy

The concept of a waste hierarchy is underlined in the latest EU Waste Framework Directive and provides a preferred order of priorities for selecting and deciding upon waste management practices.

The aim of the waste hierarchy is to extract the maximum practical benefits from products and to generate the minimum amount of waste. The proper application of the waste hierarchy can have several benefits. It can help prevent emissions of greenhouse gases, reduce pollutants, save energy, conserve resources, create jobs and stimulate the development of green technologies.

The Waste Hierarchy needs to be considered in conjunction with other principles, in particular the 'Best Practicable Environmental Option' (BPEO). The waste management strategy discussed in the Waste Management Plan focuses on management and action across all steps of the waste hierarchy.

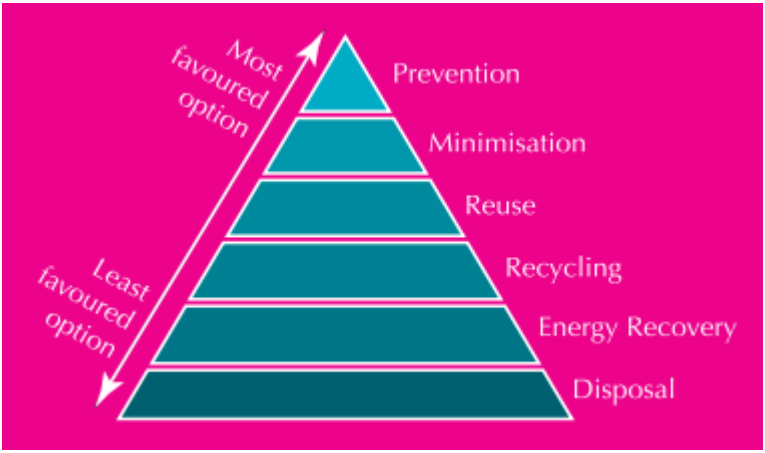


Figure 6: The Waste Hierarchy

Municipal Waste

Municipal waste in Gibraltar is collected by Gibraltar Industrial Cleaners (GIC), a wholly owned Government company, and Master Service (Gib) Ltd, a private company, under contract to the Government.

A reduction in the amount of waste generated for landfill has been noted through the encouragement of local businesses and residents to decrease the amount of waste generated and recycle more of their waste.

Recycling

Recycling rates in Gibraltar have progressively increased. Please refer to our Statistics Digest for more detailed information.

Prior to 2013, recycling bins only catered for the collection of glass and cans. During December 2012, the Department of the Environment and Climate Change introduced recycling bins to help further promote recycling as well as capture new waste streams, including paper and plastics. In 2013, Waste Electrical and Electronic Equipment (WEEE) bins were introduced to facilitate the disposal of WEEE in addition to other arrangements such as the Gibraltar Civic Amenities Site. Furthermore, HM Government of Gibraltar awarded a tender for the collection of waste paper, small WEEE, small batteries, and Toner and Ink Cartridges from Government premises.

Figure 7: Latest collection of Recycling Bins to be deployed at strategic locations around Gibraltar.

For further information, please refer to our Statistics Report available on HM Government of Gibraltar's Website under The Department of the Environment and Climate Change's Publication section.

Clinical Waste

The Clinical Waste Incinerator is located at Governor's Cottage, Europa Advance Road and is run by Environmental Waste Management Services (EWMS) Ltd. The facility provides collection, transport and incineration services to all local clinical and medical waste producers (hospitals, laboratories, surgeries, medical, dental and veterinary clinics).

During 2013, a total of 2,977,500 litres of clinical waste were collected for incineration. Whilst Gibraltar has facilities for the incineration of locally generated clinical waste, on occasion, clinical waste is still exported for incineration. Reasons for this include: preventative maintenance of the incinerator plant, requirements for providing cremation services, and local incineration plant break-downs.

Clinical waste is a perishable, hazardous waste and therefore not suitable for accumulation and storage. When, due to any of the above mentioned reasons, there is a small accumulation of clinical waste which cannot be incinerated locally, EWMS Ltd arrange for its exportation. During 2013, 803,520 litres of clinical waste were exported for incineration to Spain.

Industrial Waste

Due to the absence of heavy industry in Gibraltar, the main sources of industrial waste are shipping, the Ministry of Defence (MOD), light industry and clinical/medical practices. A limited amount of hazardous material is also produced from municipal sources and via construction and demolition activities.

Other Waste Materials

The recycling of other waste materials continues. Recyclable material from our municipal waste is manually and mechanically separated and processed at the Complejo Medioambiental Sur De Europa in Los Barrios (non-recyclable waste then goes into landfill). In addition to this, wood and metal items are sorted at the former incinerator site at Europa Advance Road. A separate Civic Amenities Site is operated by Gibraltar General Support Services Ltd, located at Europa Advance Road. At this site, the public can also dispose of their bulky timber items, paint, white goods and other electrical items, mattresses, building debris and metal scrap.

New Waste Treatment Facility

HM Government of Gibraltar initiated a tender process in 2013 to provide a waste treatment facility with the aim of achieving the highest environmental standards in the treatment of its Municipal Solid Waste (MSW). Additionally, Gibraltar has to meet the requirements of self-sufficiency and proximity principles, as stipulated under article 16 of the Waste Framework Directive (2008/98/EC).

The Waste Treatment Facility to be constructed is to be comprised of:

- a Waste reception, sorting and storing facility for specific and separate waste-streams;
- a Facility to recover recyclable waste;
- a Waste Treatment Plant (technologies of advanced thermal treatment are being procured).

The Waste Treatment Facility will receive the general MSW collections on a daily basis and separate the different waste streams before extracting 'dirty' recyclables from the mainstream MSW. The general waste stream will then be processed in the treatment plant, which will involve an advanced thermal treatment process, e.g. pyrolysis, gasification, anaerobic digestion or similar.

Government requires that the treatment processes be capable of:

i. Generating electricity and/or;
ii. Producing potable water and/or;
iii. Producing biodiesel and/or;
iv. Producing syngas.

When the Waste Treatment Facility is commissioned, Gibraltar's waste management will become more self-sufficient.

Educational Awareness

Environmental education explains how natural environments function and, in particular, how human beings can seek to manage their behaviour and ecosystems in order to live sustainably. It refers not only to education within the school system but also to all efforts to educate the public, including print materials, websites and media campaigns. The Department of the Environment and Climate Change considers educational awareness of utmost importance and devotes a major part of its efforts to creating a better and more sustainable environment.

World Environment Day

World Environment Day (WED) is an annual event which aims to be the biggest and most widely celebrated global day for positive environmental action. WED activities take place all year round but culminate on 5th June every year, involving people from all over the world.

WED celebrations began in 1972 and have grown to become one of the main vehicles through which the UN stimulates worldwide awareness of the environment and

encourages political attention and action. Gibraltar has now been taking part in the WED celebrations for many years. Through WED, the UN Environment Programme (UNEP) is able to personalise environmental issues and enable everyone to realise not only their responsibility, but also their power to become agents for change in support of sustainable and equitable development. WED is also a day for people from all walks of life to come together to ensure a cleaner, greener and brighter outlook for themselves and future generations.

The theme for WED during 2013 was Food Waste. A study revealed that about one third of all food production worldwide gets lost or wasted in the food production and consumption systems, amounting to 1.3 billion tons. In industrialized nations, retailers and consumers discard around 300 million tons that is fit for consumption, around half of the total food squandered in these regions. This is more than the total net food production of Sub-Saharan Africa and would be sufficient to feed the estimated 900 million people in the world suffering from hunger (FAO).

What was the Food Waste Campaign all about?

The down side: food waste is a massive global problem that has negative humanitarian, environmental and financial implications.

The up side: with relative ease and a few simple changes to our habits, we can significantly shift this paradigm.
Many regional campaigns have recently been launched, echoing the challenge of food waste at the national level and in major sectors, including hotels, restaurants, supermarkets and households. Perhaps surprisingly, one-third of all unused food in developed countries is wasted by households.

The Think.Act.Save campaign of the Save Food Initiative, is a partnership between UNEP, FAO and Messe Düsseldorf, and in support of the UN Secretary-General's Zero Hunger Challenge, which seeks to add its authority and voice to these efforts in order to galvanize widespread global, regional and national actions, catalyze more sectors of society to be aware and to act, including through exchange of inspiring ideas and projects between those players already involved and new ones that are likely to come on board.

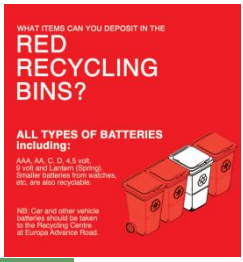
School Presentations

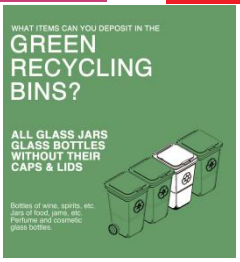
As part of its educational awareness programme, every year The Department of the Environment and Climate Change visits all schools and presents them with an environmental issue. The yearly theme is determined by the United Nations Environmental Programme.

The theme for 2013, Food Waste, was very well received by pupils and teachers alike.

Recycling Awareness Campaign

An awareness campaign was devised to further encourage local residents to recycle as much waste as possible during 2013. This included awareness days, TV adverts and information leaflets for distribution to the public.





Awareness Days at the Piazza (City Centre)

Recycling programmes can play a role in helping to reduce greenhouse gas emissions by reducing emissions generated due to waste disposal, extraction of raw materials, and manufacturing of new products.
In 2007, a kerbside recycling scheme for glass and cans was introduced and separate collection bins for these recyclables have been strategically sited throughout Gibraltar at 42 different locations.

Awareness Days have been held at the Piazza over the past two years to inform the public of the recycling facilities available and the environmental benefits and importance of recycling.

Thinking Green Website

The Government's vision for a sustainable future is a rich, diverse & healthy environment in Gibraltar for present and future generations to enjoy. In line with HM Government of Gibraltar's commitment to greater environmental awareness and a need for local action, the Department of the Environment and Climate Change launched its THINKING GREEN website.

Figure 8: Thinking Green Website Home Page.

The site provides users with a comprehensive selection of articles pertaining to all aspects of Gibraltar's local environment. This information ranges from articles relating to our diverse biodiversity to tips on how to become more environmentally friendly. Information will also be posted of upcoming events organised by the Department of the Environment and Climate Change and will also provide an opportunity to catch up with past events and topics.

The Government's vision for a sustainable future involves the commitment from all generations to contribute to a greener local environment.

Visit our THINKING GREEN website at:
www.thinkinggreen.gov.gi

Mike Horn Visits Gibraltar

Mike Horn first grabbed the media's attention when he completed a solo journey around the equator without motorized transport back in 2000. He has since completed a solo circumnavigation of the Arctic Circle and more recently, in 2006, became one of first men to travel without dogs or motorized transport to the North Pole during permanent darkness.

Mike Horn now uses his experiences to motivate people, particularly the younger generation, to protect the environment. As part of his campaign, Mike and a group

of selected young explorers from around the world will embark on a worldwide expedition to investigate endemic environmental issues and to engage in clean-up projects.

As part of his visit to the Rock on 5th June 2013, Mike was shown Gibraltar's own national treasures and delivered a presentation to secondary school children based on his travels and projects carried out around the globe.