to the environment: (1) the fatwa for environmentally friendly mining; (2) edict on the misuse of formalin and harm material in the production of fish; (3) edict on protection of wildlife for the balance of ecosystem; and (4) edict about wastes. Lessons learned from this "soft power movement" of interacting religious MUI and goverment, conservation NGOs and academia will be shared and hopes for future success toward ecological sustainability will be expressed.

EXTRAPOLATING CETACEAN DENSITIES IN THE OFFSHORE NORTH ATLANTIC: TOWARDS A BASIN-WIDE MANAGEMENT APPROACH
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Extrapolating beyond the range of environmental variables is very risky; however, geographical extrapolation is acceptable when parsimonious habitat models are built from meaningful environmental predictors and survey datasets. We were contracted by the U.S. Navy to estimate the densities of 29 cetacean species in the Atlantic fleet testing and training (AFTT) area, extending from the shoreline of North America to 45°W and from 21 to 65°N. Most of this area has only been surveyed with line transect protocols within 200 miles from shore. Our objective was to provide reliable extrapolations of cetacean densities in the AFTT area based on available cetacean line transect surveys and environmental predictors. We built generalized additive models from over 1.2 million km of line transect surveys in the U.S. waters and a variety of environmental predictors, favoring those for which a broad range of values was covered in the surveyed area. Since the U.S. surveys mostly covered nearshore waters, we incorporated European surveys which extended farther offshore but in the other side of the North Atlantic basin. The results illustrate the difficulty of providing robust density estimates in offshore waters from surveys mainly conducted in nearshore waters. In addition, our study suggests that, for some species, different environmental variables may drive cetacean distributions on each side of the North Atlantic. For example, when we added European surveys to our fin whale model, different predictors were selected and the abundance estimate for the AFTT area doubled. In contrast, for harbor porpoise, the same predictors were selected and the estimated abundance decreased by a more modest 30%. In both cases, much of the change in abundance occurred beyond the shelf. In conclusion, our study stresses the urgent need of conducting line transect surveys in the offshore North Atlantic in order to provide the most accurate estimations of cetacean densities.

MAPPING ECOSYSTEM SERVICES AT THE SITE LEVEL: A PROXY-BASED APPROACH FOR RIZOELIA NATIONAL PARK, CYPRUS.
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Conservation and management of Natura 2000 sites should go beyond simply conserving the biodiversity they support towards managing the multitude of services they provide. This shift in management necessitates the identification and mapping of these services. The National Park of Rizoelia in Cyprus is a Natura 2000 site supporting two priority habitats at the European level, Ziziphus arborescent mattoal (*5220) and gypsum steppes (*1520), which have been well documented and mapped. However, this is not the case for other services supported by the Park. The current study aims to identify, quantify and map the range of ecosystem services (ES) in the park. We develop a framework based on widely used methodologies using tables for regulating, provisioning and cultural ecosystem service linked to related indicators for their quantification. Furthermore, spatial concepts of service providing units, benefitting areas, spatial relations, rivalry, spatial and temporal scales are elaborated. Finally, matrices linking habitat types to ecosystem service potentials, flows, demands and budget estimates are provided. The resulting maps show the spatial distribution of ES in the park, which constitute a practical and easy tool for managers to integrate the concept of ES in decision-making. Nonetheless, integrating more data and validating this approach in the future is still necessary if it is to be adopted and applied as a standard method at regional or national scale.

SYMPOSIUM NUMBER 188; NOT ALL SMALL DAMS ARE BENIGN: A STUDY ON THEIR CUMULATIVE IMPACTS IN SOUTH AFRICA
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Small dams are generally ignored in impact assessments due to the perception of their benign nature relative to large dams. This may be an oversight in catchments with a high density of small dams. In two South African regions, reduced low flows, deteriorated water quality, and impoverished macroinvertebrate communities (with dominance of opportunistic taxa and reduced abundance for specialist
**Introduction**

- **Ecosystem services** which are benefits people obtain from nature and include supporting, provisioning, regulating and cultural services (MA 2005). Measuring ecosystem services is becoming increasingly important to strengthen conservation efforts. In this paper, we identify and examine the ecosystem services generated by a peri-urban forest using the Toolkit for Ecosystem Service Site-based Assessment (TESSA v1.1) (Peh et al., 2013).

- **Rizoeia National Forest Park (RNFP)** (Fig. 1) is a Natura 2000 site (CY600006) which covers 90.7 ha. The area consists of gypsum alternating with chalky marls and marly chalks. It is home to 179 indigenous species of which 11 are endemic (7.9% of the endemic flora). In addition it hosts 3 priority habitats under the Habitats Directive (2520 * Iberian gypseum vegetation, 220C * Arbuscular matorral with Ziziphus lotus and 6220 * Pseudo-steppe with grasses and shrubs of the Thero-Brachypodietae).

- A LIFE+ project entitled “Improving the conservation status of the priority habitat types *5220 and *5220” (LIFE12 NAT/CY/000758) is currently implemented within RNFP. The present study which is part of the project, aims at measuring and mapping the ecosystem services in RNFP and assessing the plausible changes after project’s concrete actions that affect the most important ecosystem services (Table 1).

**Methods**

TESSA toolkit is designed to identify and assess the most important ecosystem services of a specific site by providing templates of assessment, which can be adapted to local conditions. The Rapid Appraisal analysis of TESSA toolkit revealed that the most important ecosystem services supported by the study area are:

1. **Nature-based recreation**
   - Census method was used to measure the volume of nature-based tourism and recreation at RNFP
   - Key information is the annual total number of visits
   - Counting of visits took place from April 2014 until February 2015 divided in 3 periods (March-May, June-November, October-February)
   - In each period, 7 census surveys (21 in a total) were conducted including weekends, weekdays and national holidays
   - Counting points were located at RNFP’s entrances (North and South) & surveys took place from 7:00 to 19:00

2. **Carbon related services involved in the Global Climate Regulation**
   - TESSA Global Climate Regulation Methods were used to estimate: Above Ground live Biomass (AGB), Below Ground Biomass (BGB), Dead Organic Matter & Soil carbon stocks
   - Data used for carbon stock estimation are shown in Fig. 2

**Results**

- **Nature-based recreation**
  - In site census survey for estimating the total number of annual visits (TANV) revealed that the TANV in RNFP is 14471.
  - Particularly, TANV for periods A (March-May), B (June-October) and C (November-February) is 3834, 4734 and 5903 respectively (Fig. 3)
  - 264 questionnaires were correctly and completely filled out during the questionnaire survey. Of the respondents, 42% stated that exercise and sports is the most important reason for their visit in RNFP while 34% to spend time with family and friends (Fig. 4)
  - One of the questions dealt with the concrete actions currently implemented (Table 1) in the RNFP and whether the results of these actions would be one more reason to visit the park. The results showed that 87% of the respondents answered positively (Fig. 5)

- **Global climate regulation**
  - The carbon stock estimation for each habitat type Needle phrygana, Arborescent matorrals with thistles, Ziziphus lotus matorrals, steppes with grass and an- thrax and Pseudo-Archipelago matorrals (shrubs and grasses) is presented in Figure 6. The results show the estimation of carbon stock for Above Ground Biomass (C_AGB), Below Ground Biomass (C_BGB), Soil (C_Soil) and Dead organic matter (C_dead). The spatial mapping of AGB, BGB, Soil and Dead organic matter is presented in Fig. 7 and the total carbon stock at Rizoeia National Forest Park in Fig. 8.

**Discussion & Conclusions**

- This is the first study in Cyprus to attempt a site-based assessment of ecosystem services.
- In terms of recreation, the results indicate the recreation is so far higher than expected or recorded in the past with annual visits (TANV) to reach the total number of 14471. In addition, RNFP is visited most often on days off from work and during November to February period. The Park provides multiple opportunities for leisure time use. In the present study, respondents declared that they undertake various forms of activities during visits to the forest ranging from sports activities to more passive recreation, such as spending time with friends and family, relaxing or picnicking. Although passive recreation is highly important in the RNFP it is less associated with the nature based activities like wildlife and forest appreciation. Only 21% of the respondents declared as main reason of their visit the nature appreciation. However, the vast majority of respondents expressed the conviction that the plausible changes after project’s concrete actions e.g. enhancement of natural vegetation, hiking trails, signs with information on the types of habitats in the park, will give them further incentive to visit it.

- Carbon storage is a global service contributing to climate change mitigation and thus the calculation of its value is very important. Apart from the grass-dominated habitat, the aboveground carbon stock measurements did not show variability. On the other hand, the greater below-ground carbon biomass was estimated in the Mediterranean shrubland habitats (5220 and 5420).

**References**

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![Image](http://www.life-rizoeia.eu/)

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