



**INTERREG V-A COOPERATION PROGRAMME
GREECE – BULGARIA 2014 – 2020**

Reinforcing Protected Areas Capacity through an Innovative
Methodology for Sustainability

– BIO2CARE –

(Reg. No: 1890)

Deliverable 5.1
Training sessions regarding the use of BIO2CARE Software



The Project is co-funded by the European Regional Development Fund and by national funds of the countries participating in the Interreg V-A "Greece-Bulgaria 2014-2020" Cooperation Programme

- Theoretical background of BIO2CARE software/tools
- BIO2CARE Decision Making Software
- BIO2CARE Calc Tool
- BIO2CARE Symbiosis Tool
- Benefits from BIO2CARE implementation

- **Theoretical background of BIO2CARE software/tools**
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Sustainability = Carrying Capacity

- (a) the idea of sustainability reflects a limit, similarly with the concept of Carrying Capacity, and
- (b) both concepts share the same challenges in formulating the objectives, practices, and actions of improvement (Saarinen, 2006).

From the early 1960s, due to the fact that **public visits** were the major threat for protected areas (Lawson et al., 2003; Needham et al., 2011; Prato, 2001;2009), research on **outdoor recreation** has utilized the concept of **Carrying Capacity** to address the **resource and social impacts of visitors** (Lawson et al., 2003; Wagar, 1964; Manning, 1999)

Carrying Capacity: *“the maximum number of visitors an area can sustain without unacceptable deterioration of the physical environment and without considerably diminishing user satisfaction”* (Prato, 2001; National Park Service, 1997; Satta, 2003).

Our literature review:

- ✓ 13 methods selected from a pool of 61 methods.
- ✓ The methods (13) analyzed, categorized, and were finally evaluated based on specific criteria (Aktsoğlu and Gaidajis, 2020; Angelakoglou and Gaidajis, 2020).
- ✓ Key conclusions related to the efficiency and the applicability of environmental sustainability assessment methods of protected areas:
 - the “**Resource Availability Assessment**” category of methods and especially the “**Ecological Footprint**” method have been indicated as the most appropriate method for the evaluation of environmental sustainability of protected areas (Aktsoğlu and Gaidajis, 2020).

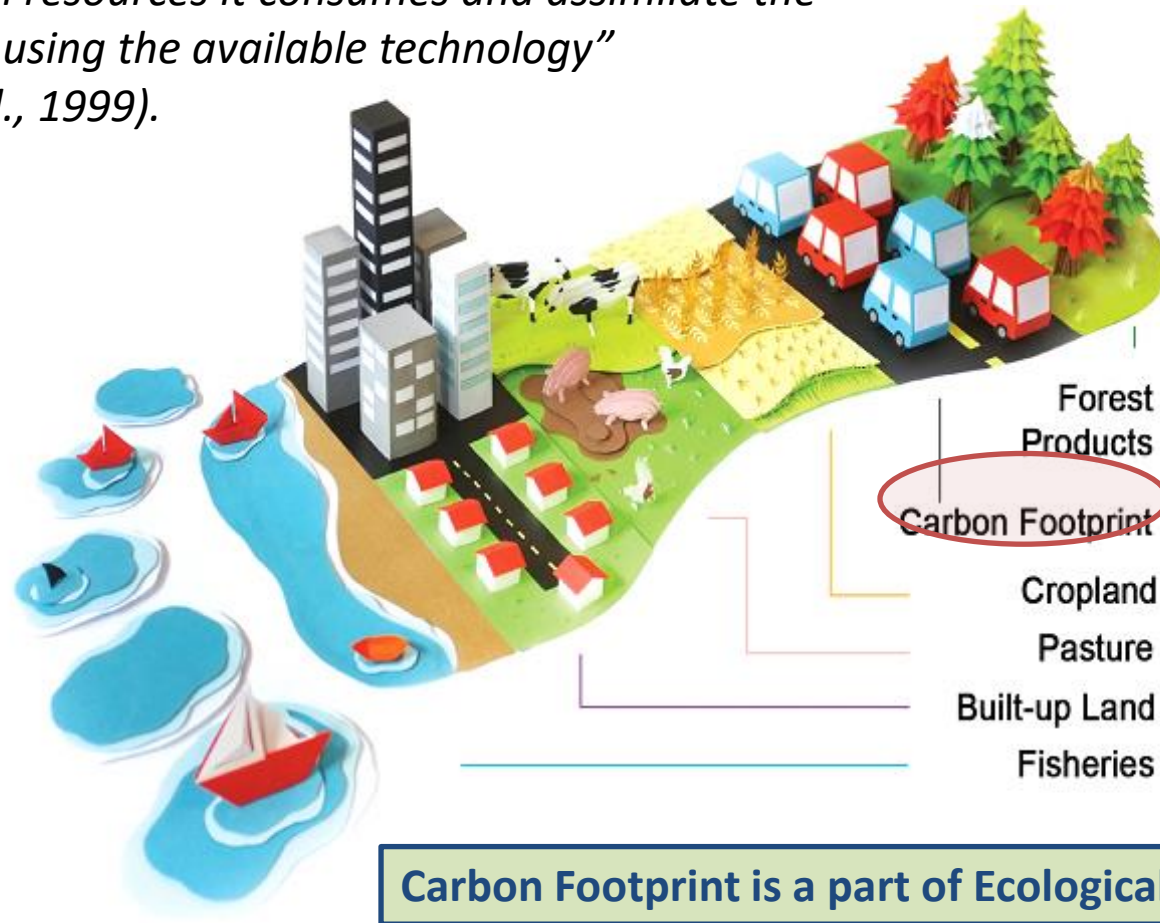
M. Wackernagel: 11.2 billion hectares of bioproductive land and / or water cover about $\frac{1}{4}$ of the planet and include:

- 2,3 billion hectares of fisheries
- 1,5 billion hectares of cropland
- 3,5 billion hectares of pasture
- 3,6 billion hectares of forests
- 0,3 billion hectares of built-up areas

✓The average bioproductive hectare, characterized by an average productivity of 11.2 billion hectares, is called the **Global hectare(Gha)**.
✓The productivity of different categories of global bioproducts differs!
✓Production areas of the same category do not have the same productivity worldwide!

Ecological Footprint

*“the amount of land and/or water that is necessary to a population or activity, in order to produce, in a sustainable way, all the natural resources it consumes and assimilate the waste it produces, using the available technology”
(Wackernagel et al., 1999).*

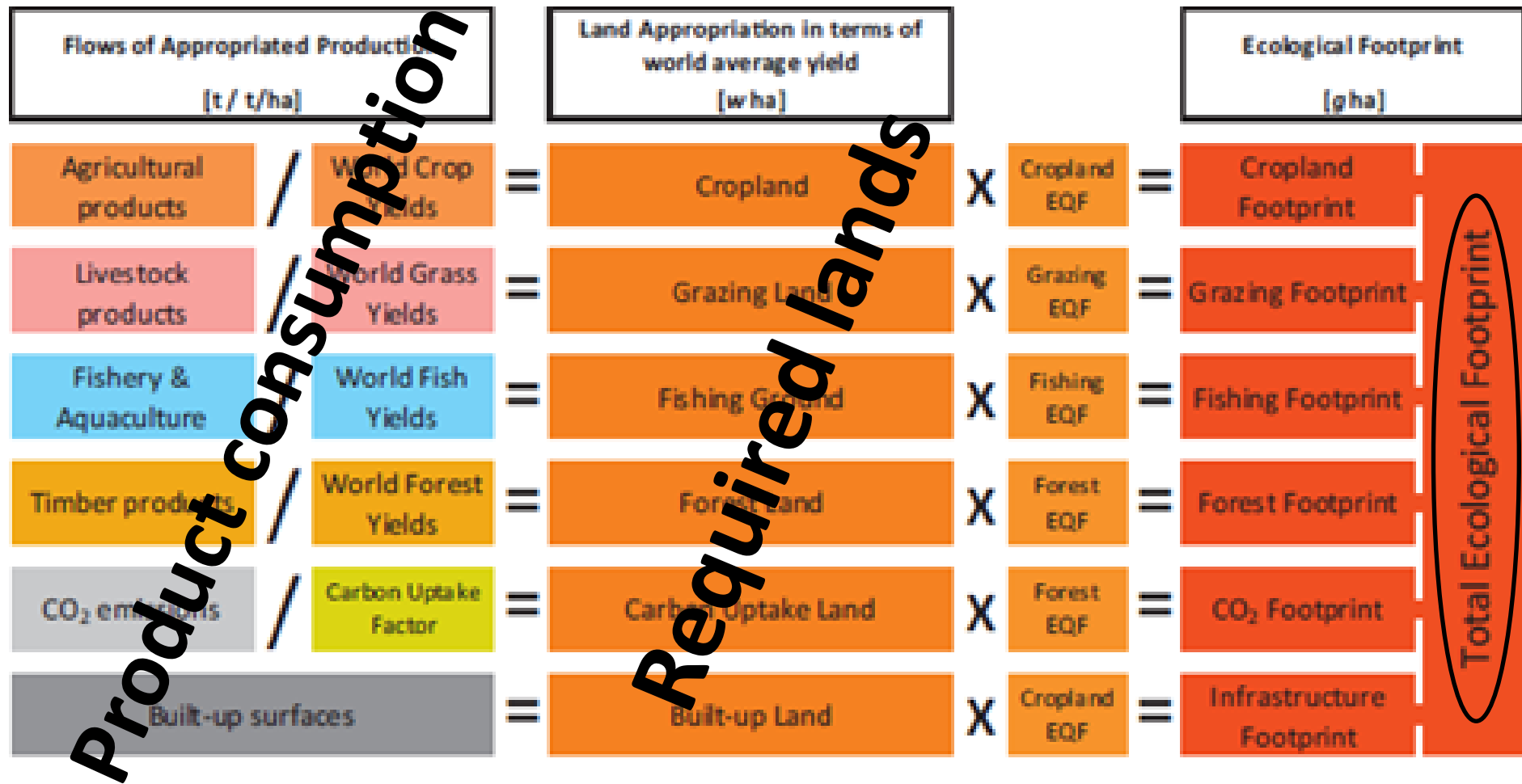


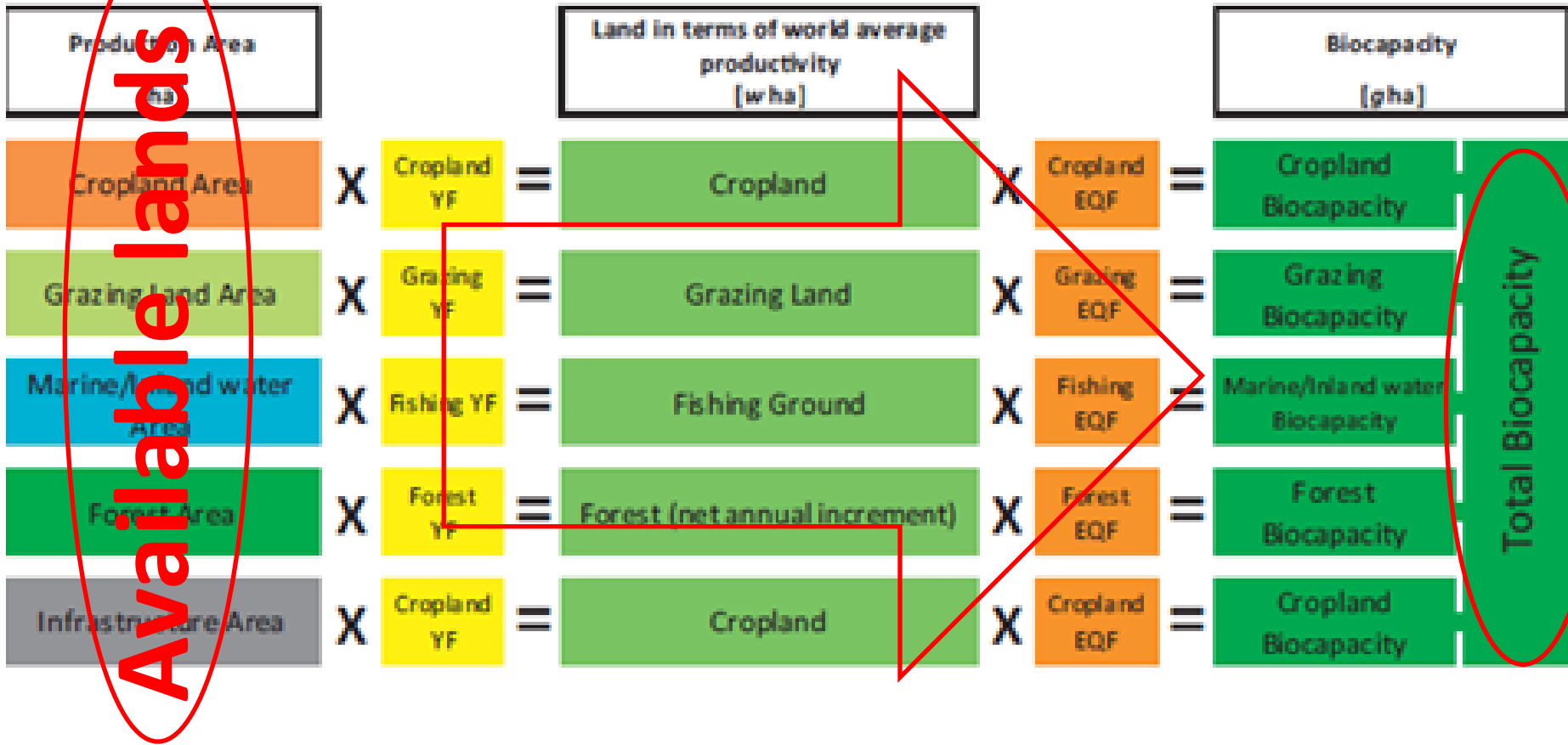
Biocapacity

Biocapacity: a term that represents the available biologically productive land that absorbs the impact of consumption along with subsequent waste (Peters et al., 2007)

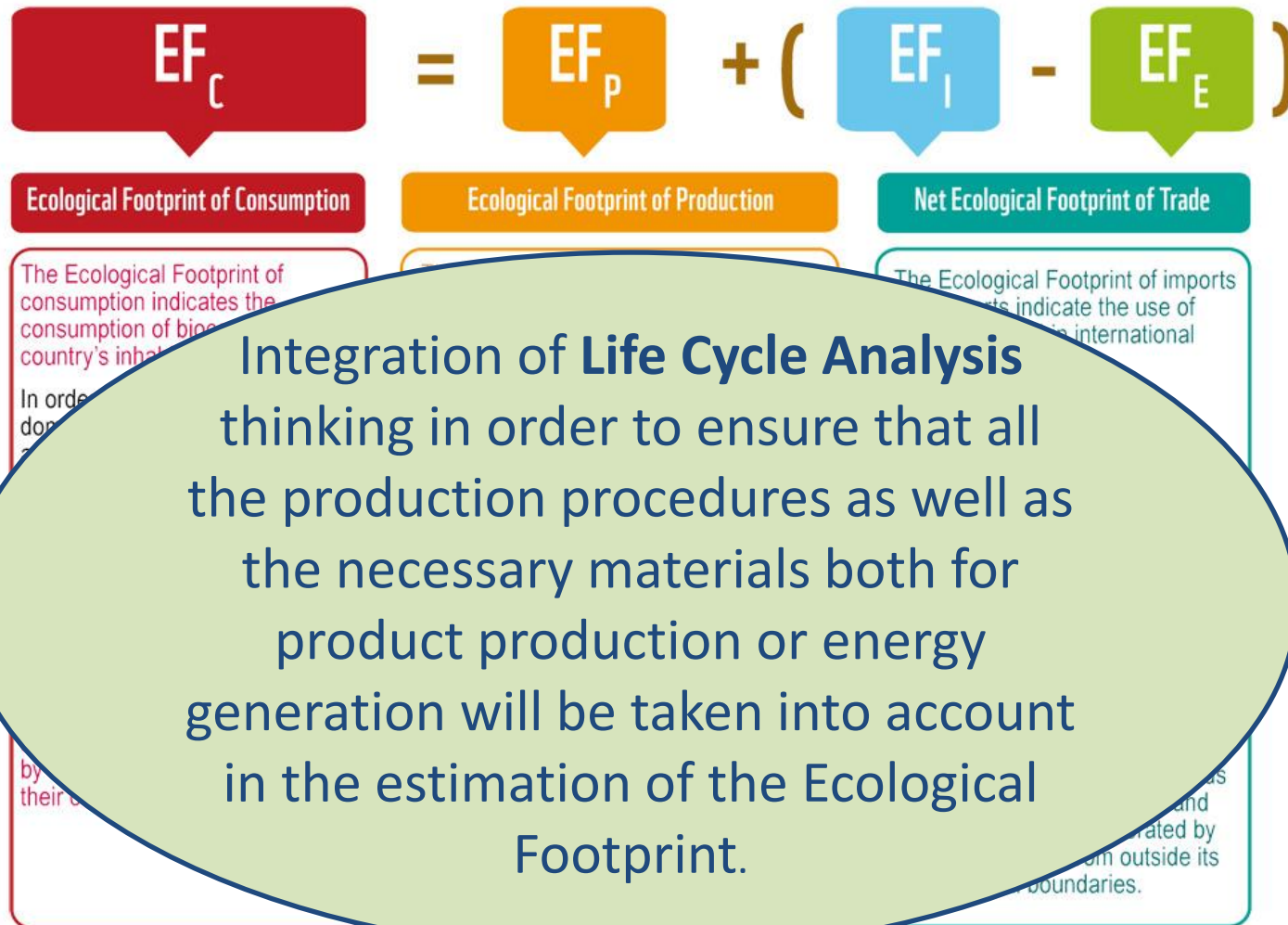


Ecological Footprint





➤ The Yield Factors are renewed every year.
➤ The Global Equivalence Factors are the same worldwide.

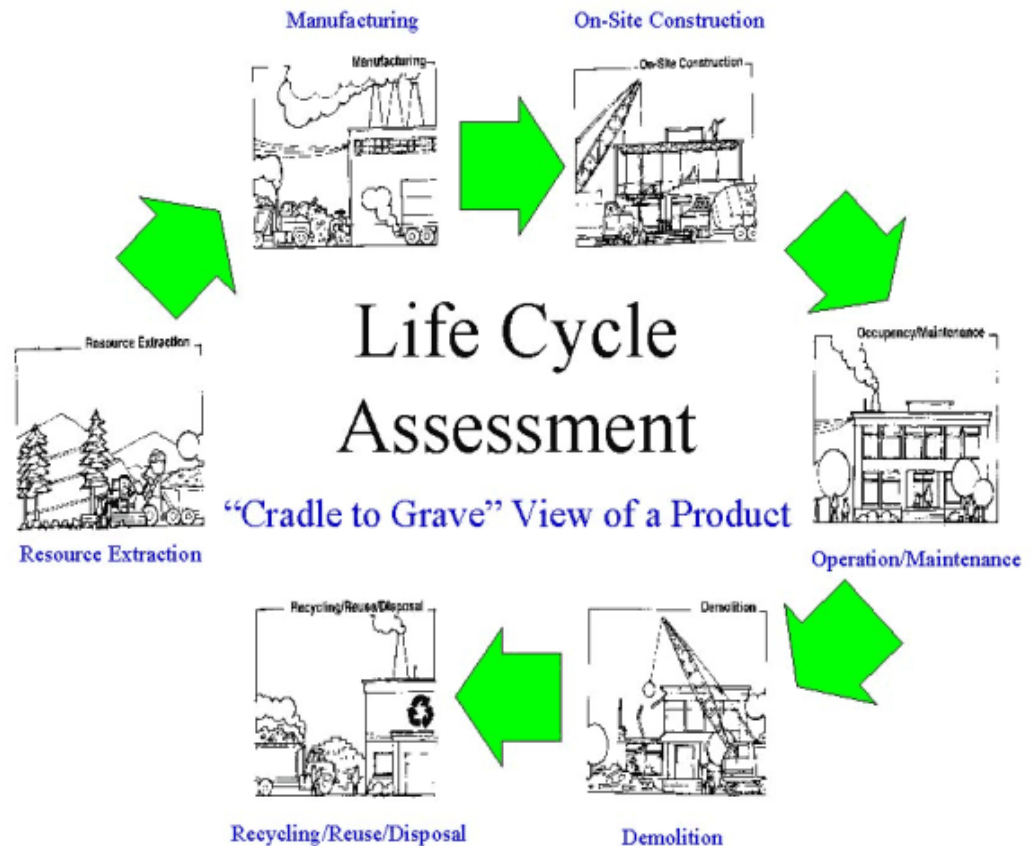


Life Cycle Assessment

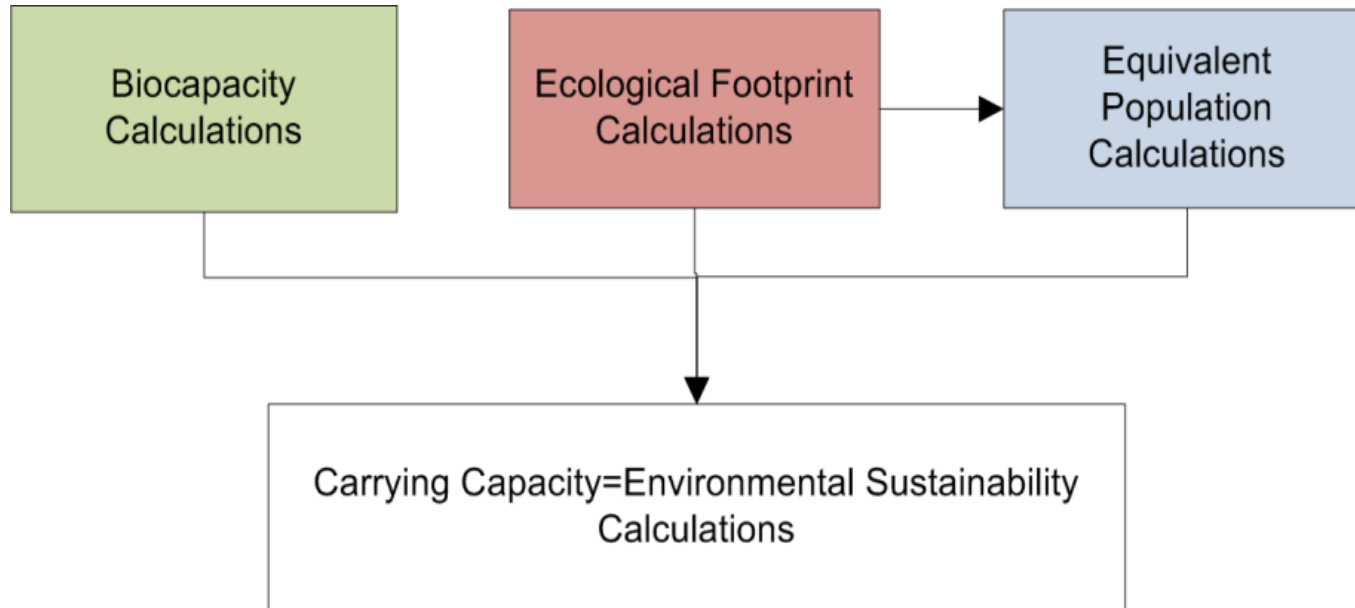
➤ Basic principle of sustainable development :
Life Cycle Analysis (LCA).

Life cycle analysis is a tool that examines the overall environmental impact of a system taking into account every step of its life.

- Extraction of raw materials
- Production
- Transfer
- Use-Maintenance
- Disposal-Deposition



The footprints (ecological, carbon and water) integrate the LCA principles.

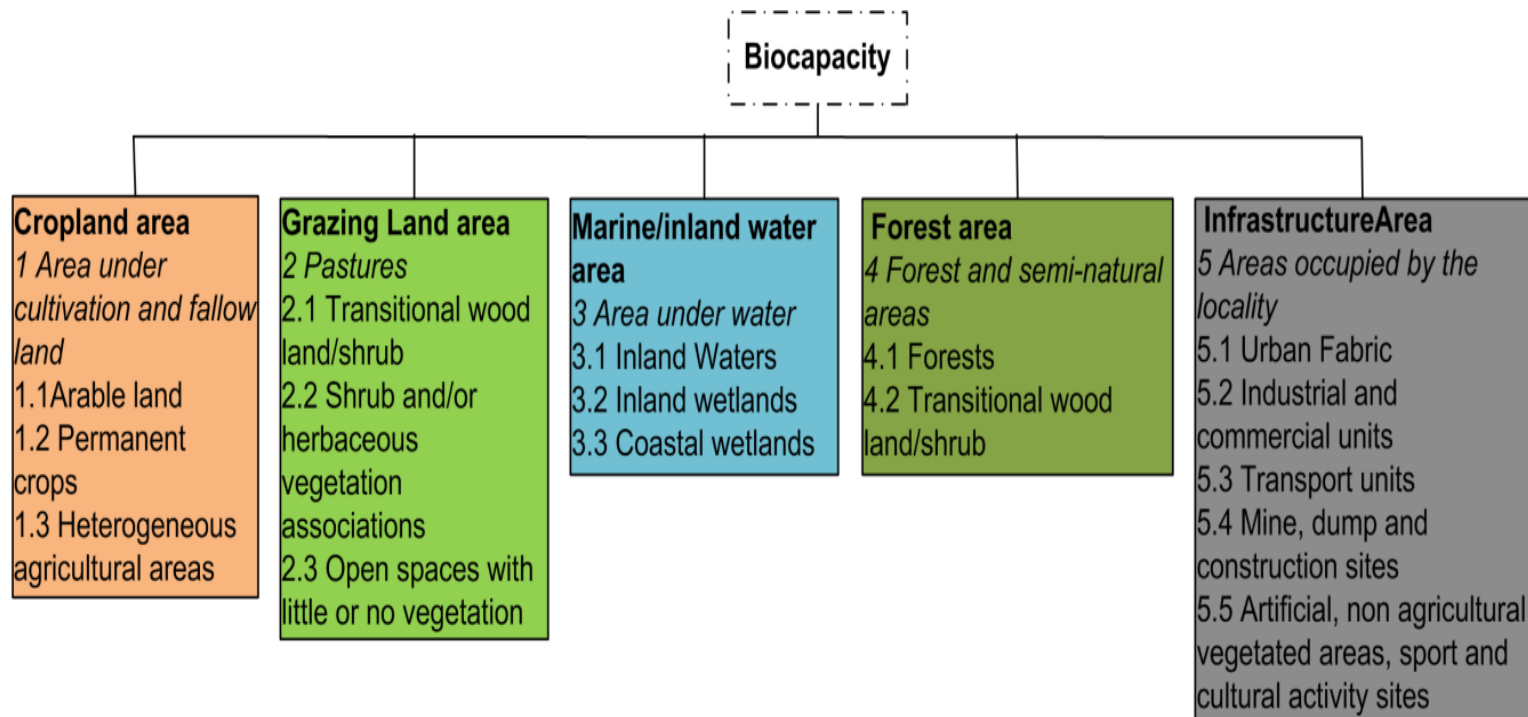


$$\text{Carrying Capacity (max equivalent population)} = \frac{\text{Biocapacity (available land)}}{\frac{\text{Ecological Footprint (required land)}}{P \text{ (existing equivalent population)}}}$$

Biocapacity's Accounts'

USE of:

- **CORINE** (Coordination of Information on the Environment) land cover methodology databases
- the application of a **GIS** (Geographic Information System) software compatible with the European databases for land uses



Biocapacity's Accounts'

➤“The **Yield Factors** (YFs) account for countries’ differing levels of productivity for particular land uses are country-specific and vary by land use type and year (Borucke et al., 2013).

➤“The **Equivalence Factors** (EQFs) convert the areas of different land uses, at their respective world average productivities, into their equivalent areas at global average bioproductivity across all land use and they vary by land use as well as by year” (Borucke et al., 2013).

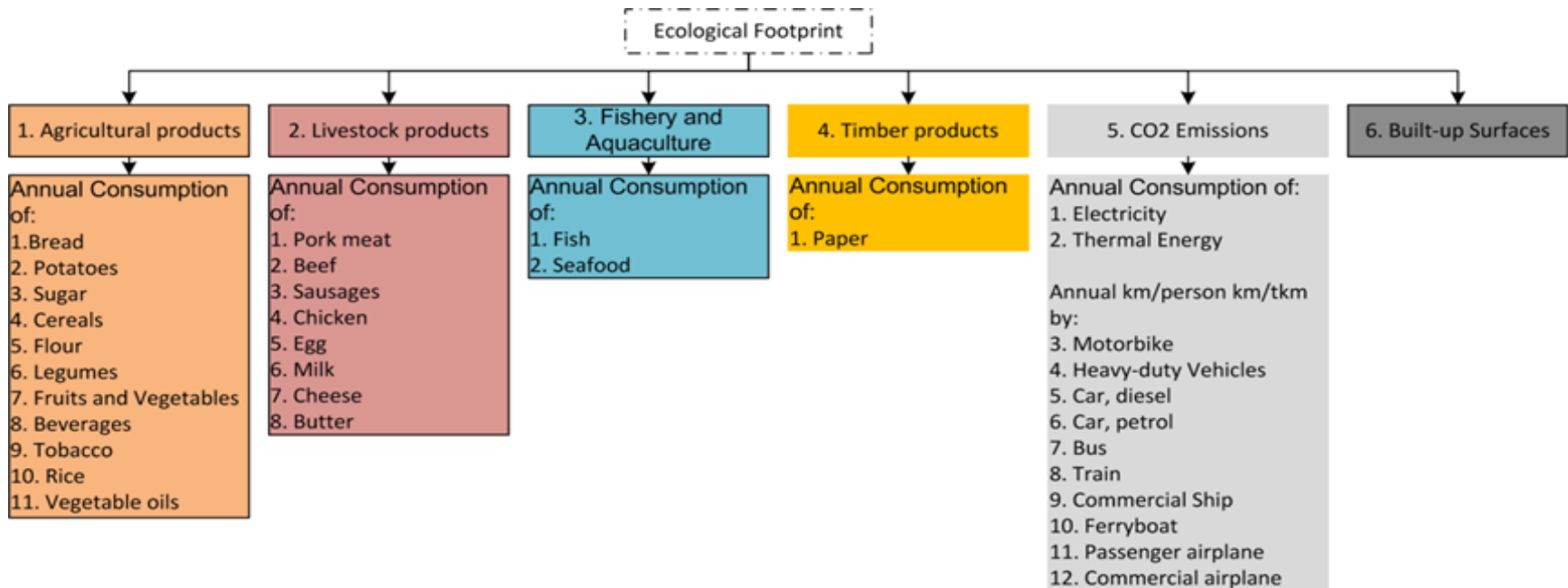
Land Uses	Area in ha	Yield Factor	Equivalence Factor	Biocapacity (Gha)
Cropland Area	52,011	1.5	2.2	171,472
Grazing Land Area	4528	2.0	0.5	4528
Marine/ Inland Water Area	12,284	0.8	0.4	3931
Forest Area	910	1.3	1.4	1657
Infrastructure Area	1800	1.5	2.2	5940
Total Biocapacity of the NPEMT		(Scotti et al., 2009)		187,528

Methodological Framework

Ecological Footprint Accounts'

USE of:

✓35 indicators concerning consumption needs
✓35 conversion factors developed by the use of the application of **LCA software** (SimaPro 7.2) and the methodology Ecological Footprint V 1.02



Methodological Framework

Equivalent
Population
Accounts'

$$P_{eq} = \frac{P^*}{EF^*} EF$$

P^* is the population of real residents
 EF^* is the Ecological Footprint of real residents
 EF is the total Ecological Footprint of the area

- The framework takes into account the annual consumption of activities that do not depend directly on the resident population, such as the annual fuels consumption for private transportation, which depends on the annual travelled km by all types of vehicles (cars, motorbikes, trucks, etc.).
- An **equivalence between the consumption needs and the equivalent resident** was created, according to the **Ecological Footprint** that these needs require.
- The real residents' population and their needs is the basis of equivalence, the consumption needs of the remaining anthropogenic activities are matched to equivalent residents.
- Every real resident is matched to one equivalent resident, while all the other activities “produce” a corresponding number of equivalent residents.

- Theoretical background of BIO2CARE software/tools
- **BIO2CARE Decision Making Software**
- BIO2CARE Calc Tool
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- ❑ The **BIO2CARE Decision Making Software** is a cartographic online application that integrates all available data for the area of interest.

- ❑ Data are presented in a dynamic/interactive map, including:
 - ❖ Cartographic backgrounds
 - ❖ Dynamic/operational levels
 - ❖ Static cartographic data

- ❑ The software allows its users (data administrators) to update the system with new data.

- ❑ **Simple Users**, with free access to application data and no certification upon entry
- ❑ **Data administrators**, with additional features to update application data – certification upon entry is needed



Reinforcing protected areas
capacity through an innovative
methodology for sustainability

Login

Username

Password

Don't have a Bio2Care account yet? Please click [here](#) to create one!



Interface of the software

Interreg Greece-Bulgaria BIO2CARE
Reinforcing protected areas capacity through an innovative methodology for sustainability

Log out

Χάρτης Αρχείο Σχετικά Οδηγίες Χρήσης

Διαχείριση

Θεματικά Επίπεδα

Προσθήκη Αφαίρεση

Επίπεδα

- Χαρτογραφικά Υπόβαθρα
 - Stamen: Terrain
 - Sentinel-2 cloudless
 - OpenStreetMap
- Επίπεδα
 - Αεροφωτογραφίες (UAV)
 - Φωτογραφίες
 - Αισθητήρες Ήχου
- Δεδομένα
 - Φυσικό Περιβάλλον
 - Σημεία Ενδιαφέροντος
 - Υποδομές
 - Διαδρομές
 - Διαικητική Διάρθρωση
 - Δίκτυα
 - Sentinel-2
- Υπόμνημα
- Επιλεγμένα
- Γενικές Ρυθμίσεις
- Ρυθμίσεις Επεξεργασίας

Πλοήγηση Επεξεργασία Αναζήτηση Μετρήσεις Εκτύπωση Αναφορά Προβλήματος Δεδομένων

Swipe Επιλέξτε ένα επίπεδο

TEMNE

45.07 46.66 47.12

Χρυσούπολη Νέα Ορμάν Δήμου Τοπίου

Νταμού Ορμάν (Αβήρων)

Κρατικός Αερολιμένας Καβάλας "Μάγας Αλέξανδρος"

Κεραμωτή

8 km

GET making better water

© OpenStreetMap contributors

Εστίαση σε κλίμακα Χ/Γεωγρ. Υ/Γεωγρ. Μετάβαση Κέντρο Χάρτη (Pseudo Mercator (EPSG:3857)): 2757403.379,

Αποτελέσματα Αναζήτησης

Εργαλεία Αναζήτησης

Ανέβασμα Φωτογραφιών

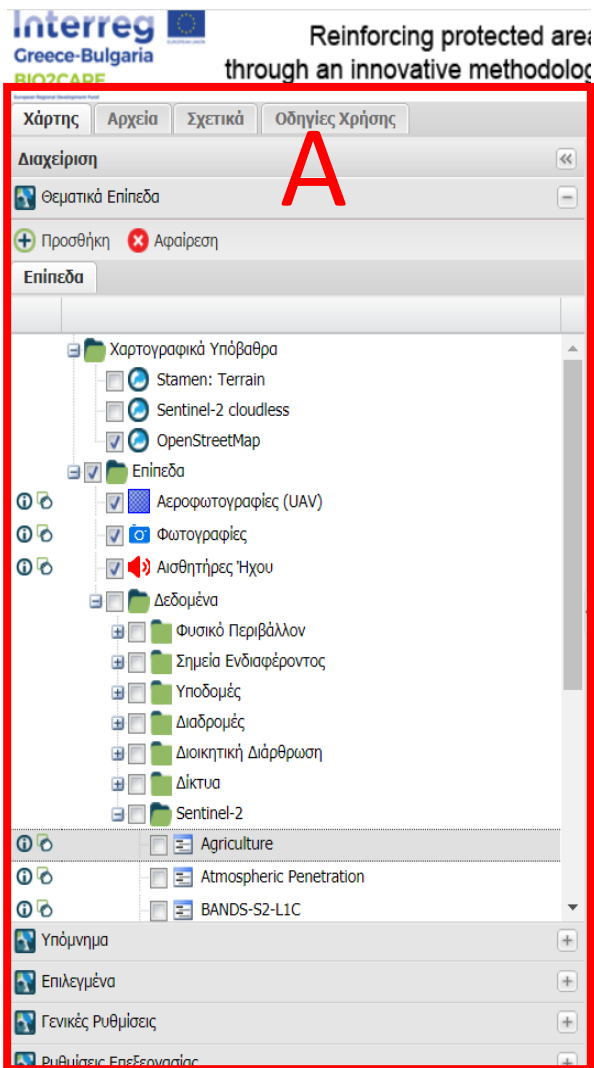
Γεωγ.πλάτος: π.χ. 41.002569

Γεωγ.μήκος: π.χ. 24.871113

Φωτογραφία: Επιλέξτε Φωτογραφία...

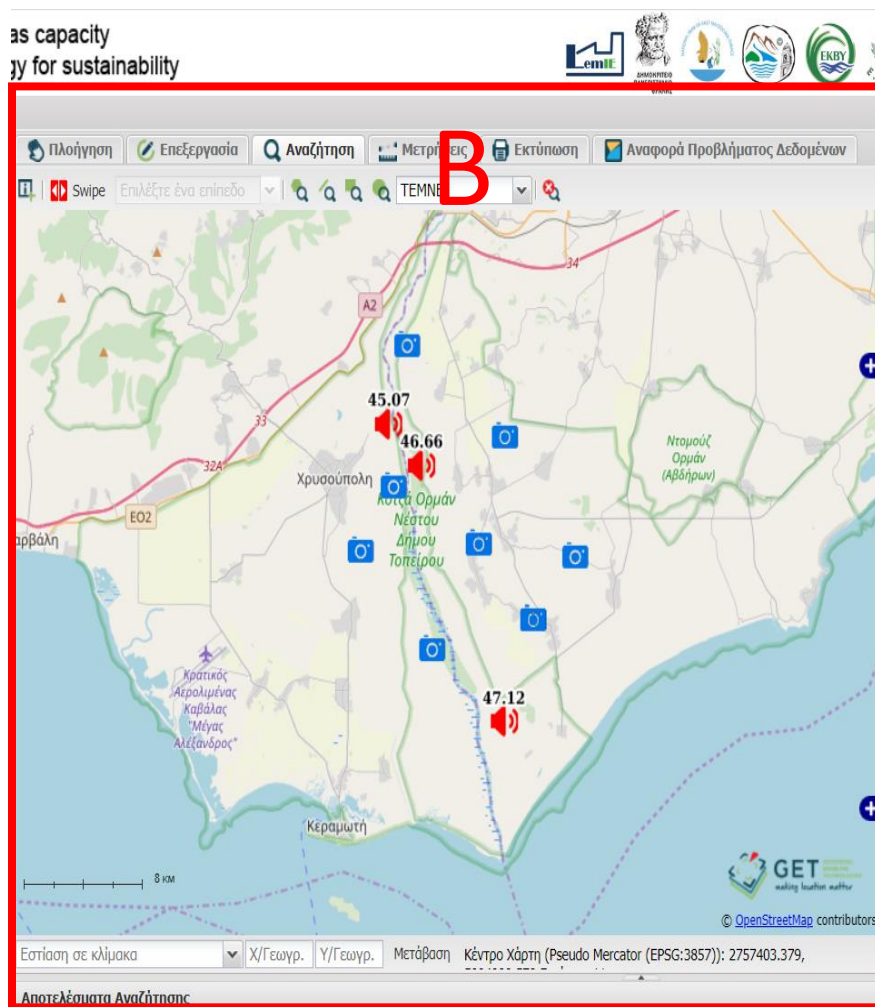
Μεταφόρτωση της φωτογραφίας...

- Ανέβασμα Δεδομένων UAV
- Αναζήτηση σε Επίπεδα
- Ρυθμίσεις Αναζήτησης
- Αποτελέσματα Λειτουργίας Αναγνώρισης Αντικειμένων
- Λίστα Αντηγραφής



Section A

- ❖ Thematic Layers
 - Cartographic backgrounds
 - Operational data
 - Static cartographic data
- ❖ Memo
- ❖ General Settings



Section B

- ❖ Interactive map
- ❖ Interaction tools
 - Navigation
 - Search
 - Measuring
 - Printing
 - Report data problem

The screenshot shows a web interface with a header containing logos of various institutions and a 'Log out' button. Below the header is a search tool titled 'Εργαλεία Αναζήτησης' (Search Tools) with a red 'C' icon. It includes a section for 'Ανέβασμα Φωτογραφιών' (Photo Upload) with input fields for 'Γεωγ.πλάτος:' (e.g., 41.002569) and 'Γεωγ.μήκος:' (e.g., 24.871113), a 'Φωτογραφία:' field, and buttons for 'Επιλέξτε Φωτογραφία...' and 'Μεταφόρτωση της φωτογραφίας...'. Below this is a list of navigation options, each with a plus icon:

- Ανέβασμα Δεδομένων UAV
- Αναζήτηση σε Επίπεδα
- Ρυθμίσεις Αναζήτησης
- Αποτελέσματα Λειτουργίας Αναγνώρισης Αντικειμένων
- Λίστα Αντιγραφής

Section C

- ❖ Multi-level search
- ❖ Photo upload (only for certified users)
- ❖ UAV data upload (only for certified users)

Point Information

Αποτελέσματα Λειτουργίας Αναγνώρισης Αντικειμένων (2)

Σύνοψη

Ζώνες Προστασίας (WMS)

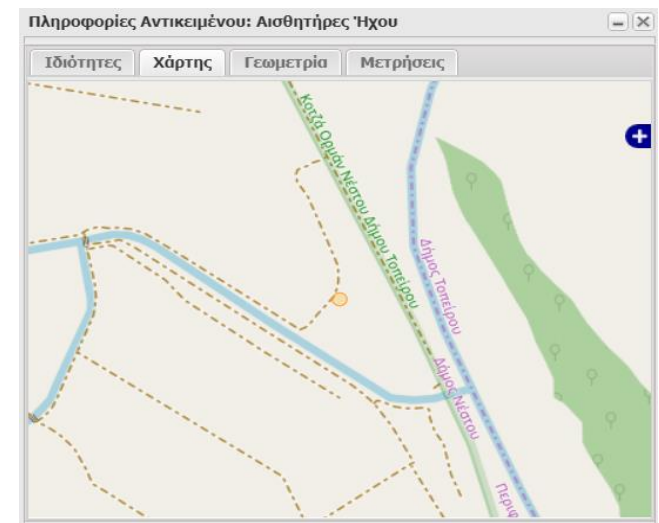
Αναγνωριστικό : 16
Ζώνη : Ζώνη Α1 (Α1-3): Περιοχή προστασίας της φύσης σε εθνικό πάρκο
Περίμετρος : 85995.607
Εκτάρια : 6263.141

Ποτάμια Υδατικά Συστήματα ΥΔ12 - Θράκης (WMS)

id : 87
wb_code : GR1207R0002000002H
continua : Y
wb_name_el : ΝΕΣΤΟΣ Π.

Πληροφορίες Αντικειμένου: Αισθητήρες Ήχου

Ιδιότητα	Τιμή
Serial Number	049A0573
Ημ/νία - Ώρα	10/03/2020 2:25:00 PM
Μέτρηση	44.47
Ελάχιστη Μέτρηση	44.47
Μέγιστη Μέτρηση	44.47



Point Information

Noise monitoring stations

Πληροφορίες Αντικειμένου: Αισθητήρες Ήχου

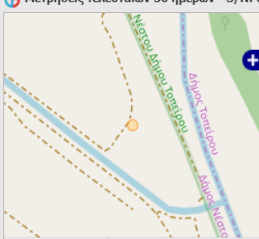
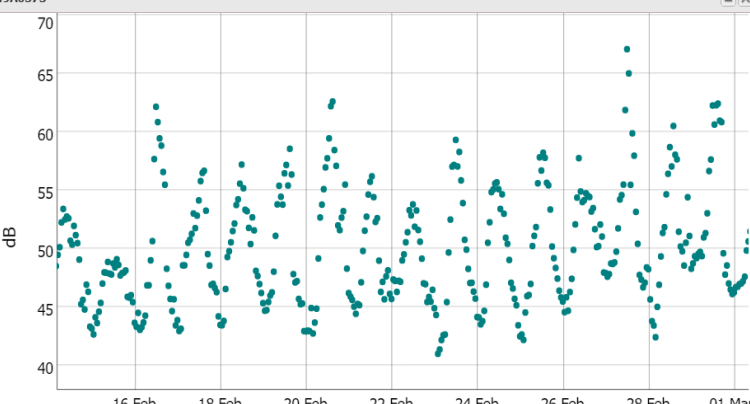
Μετρήσεις τελευταίου εικοσιτετράωρου

Μετρήσεις τελευταίων 30 ημερών

Μετρήσεις ενός χρόνου

Ιδιότητα	Τιμή
Serial Number	049A0573
Ημ/νία - Ώρα	10/03/2020 2:25:00 PM
Μέτρηση	44.47
Ελάχιστη Μέτρηση	44.47
Μέγιστη Μέτρηση	44.47

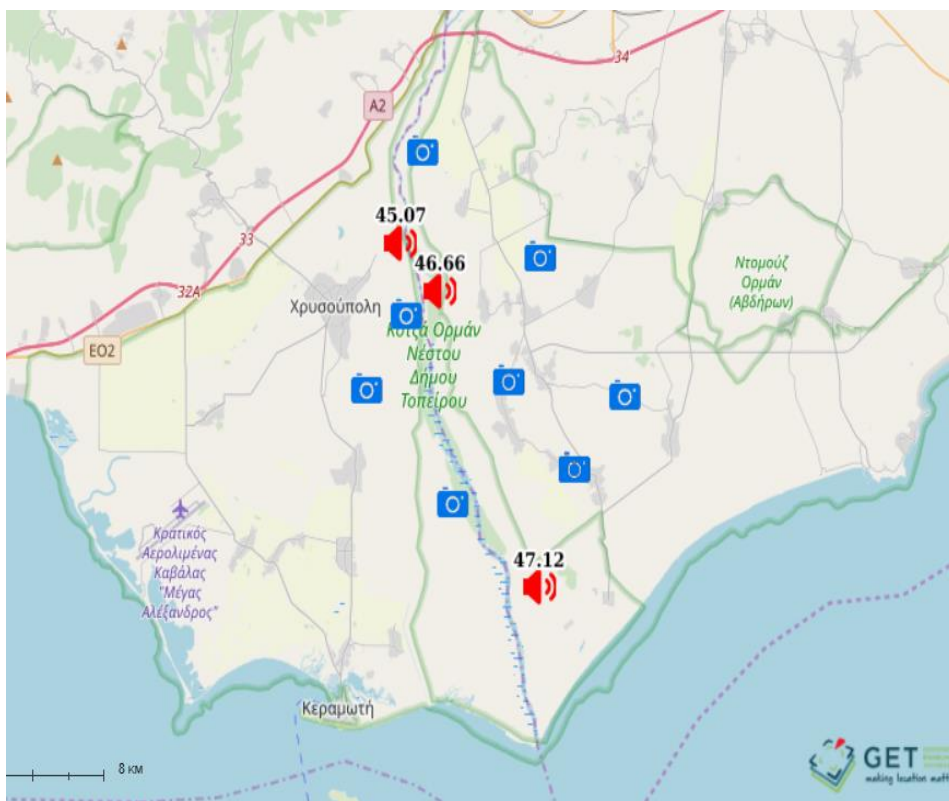
Μετρήσεις τελευταίων 30 ημερών - S/N: 049A0573


Ημερομηνία	Αριθμός Μετρήσεων	Ελάχιστη τιμή	Μέσος όρος τιμής	Μέγιστη τιμή
2020-02-10 14:00:00	6	57.46	59.32	62.53
2020-02-10 15:00:00	12	53.41	55.68	57.34
2020-02-10 16:00:00	12	49.35	52.49	56.17
2020-02-10 17:00:00	12	48.76	50.85	53.98
2020-02-10 18:00:00	12	48.34	50.28	52.62
2020-02-10 19:00:00	12	47.4	48.71	50.61
2020-02-10 20:00:00	12	46.95	48.05	49.93

Point Information

Security Cameras



Πληροφορίες Αντικειμένου: Φωτογραφίες

Ιδιότητα	Τιμή
Φωτογραφία	
Μοναδικός Κωδικός	48
Όνομασία	20191023125748_PICT0197.JPG
Ημερομηνία	11/10/2019 12:19:22 PM
Γεωγραφικό Πλάτος	40.961033
Γεωγραφικό Μήκος	24.789402

Search at thematic levels

Αναζήτηση σε Επίπεδα

Μεταβατικά Υδατικά Συστήματα ΥΔ12 - Θράκης (WMS)

Κριτήρια Δήλωση CQL Ιστορικό

ΤΕΜΝΕΙ AND

wb_name_el

LIKE θρισμός τιμής

Καθαρισμός Νέα καρτέλα Αναζήτηση

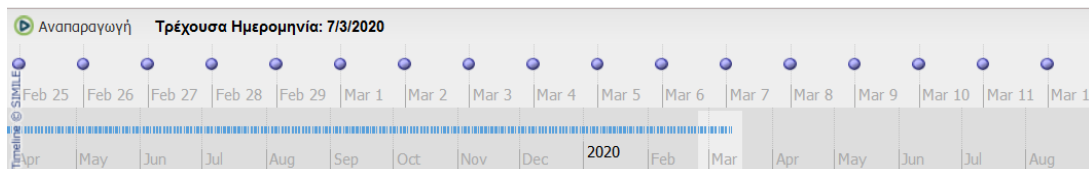
- With spatial criteria and interaction with the map
- With descriptive criteria
- Combination of the above

Sentinel Data

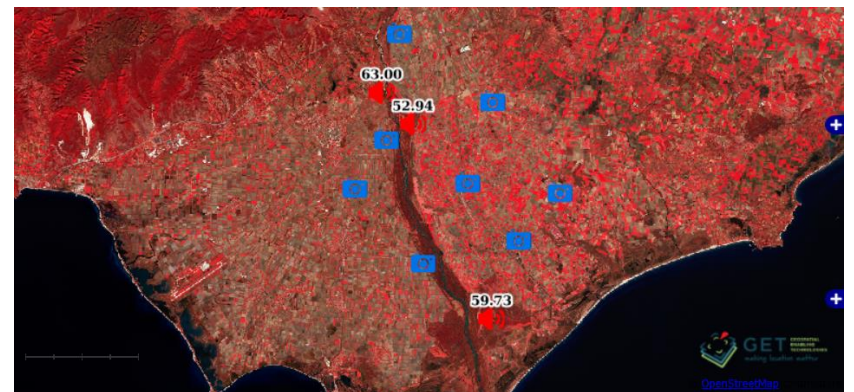
Select

- Sentinel-2
 - Agriculture
 - Atmospheric Penetration
 - BANDS-S2-L1C
 - Bathymetric
 - Burn Area Index
 - False Color Infrared
 - False Color (L2A)
 - False Color (urban)
 - Geology
 - Moisture Index
 - Normalized Burn Ratio
 - SWIR
 - True Color (L2A)
 - Vegetation Index

Select a reference time period



Appearance on the map



Data Management

Photos from the security cameras

Ανέβασμα Φωτογραφιών

Γεωγ.πλάτος:

Γεωγ.μήκος:

Φωτογραφία: Επιλέξτε Φωτογραφία...

Μεταφόρτωση της φωτογραφίας...

UAV Data

Ανέβασμα Δεδομένων UAV

Δεδομένα: Επιλέξτε Δεδομένα...

Μεταφόρτωση της δεδομένων...

<https://dpth.getmap.gr/>

Interreg Greece-Bulgaria BIO2CARE
Reinforcing protected areas capacity through an innovative methodology for sustainability

Χάρτης Αρχεία Σχετικά Οδηγίες Χρήσης

Διαχείριση
Θεματικά Επίπεδα
Προσθήκη Αφαίρεση
Επίπεδα
Χαρτογραφικά Υπόβαθρα
Stamen: Terrain
Sentinel-2 cloudless
OpenStreetMap
Επίπεδα
Αεροφωτογραφίες (UAV)
Φωτογραφίες
Αισθητήρες Ήχου
Δεδομένα
Φυσικό Περιβάλλον
Σημεία Ενδιαφέροντος
Υποδομές
Διαδρομές
Διοικητική Διάρθρωση
Δίκτυα
Sentinel-2
Αgriculture
Atmospheric Penetration
BANDS-S2-L1C

Υπόμνημα
Επιλεγμένα
Γενικές Ρυθμίσεις
Ρυθμίσεις Επεξεργασίας

Πλοήγηση Επεξεργασία Αναζήτηση Μετρήσεις Εκτύπωση Αναφορά Προβλήματος Δεδομένων

Swire Επιλέξτε ένα επίπεδο TEMΝΕΙ

Εργαλεία Αναζήτησης
Ανέβασμα Φωτογραφιών
Γεωγ.πλάτος: π.χ. 41.002569
Γεωγ.μήκος: π.χ. 24.871113
Φωτογραφία: Επιλέξτε Φωτογραφία...
Μεταφόρτωση της φωτογραφίας...

Ανέβασμα Δεδομένων UAV
Αναζήτηση σε Επίπεδα
Ρυθμίσεις Αναζήτησης
Αποτελέσματα Λειτουργίας Αναγνώρισης Αντικειμένων
Λίστα Αντηραφής

Εστίαση σε κλίμακα Χ/Γεωγρ. Υ/Γεωγρ. Μετάβαση Κέντρο Χάρτη (Pseudo Mercator (EPSG:3857)): 2757403.379, Αποτελέσματα Αναζήτησης

- Theoretical background of BIO2CARE software/tools
- BIO2CARE Decision Making Software
- **BIO2CARE Calc Tool**
- BIO2CARE Symbiosis Tool
- Benefits from BIO2CARE implementation

- The **Bio2Care Calc Tool** is an online application that provides the opportunity to the user to calculate the Carrying Capacity, the Ecological Footprint, the Biocapacity and the Carbon Footprint of a protected area
- The application has a simple and friendly work interface and integrates all the complicated calculations of the methodology included in the Deliverable 3.2, as it is available online.



Carrying Capacity in Protected Areas

In this project, a web tool for the estimation of the environmental status of a protected area has been developed.

- Carrying Capacity (CC),
- Ecological Footprint (EF),
- Carbon Footprint (CF)

The number of people, animals, or crops which a region can support without environmental damage. Carrying Capacity can be understood as the maximum number of persons (both visitors and residents) that can be supported without causing permanent damage to the productivity of the environment and without considerably reducing the ability of future generations to meet their needs.

To assess the sustainability of a protected area it is necessary to extract the following two indicators:

Ecological Footprint (EF) (expressed in hectares – Gha) that is needed for a population to produce in a sustainable way the resources it consumes and to assimilate the waste it produces. The EF calculation method is necessary to convert different types of land use in order to compare them with the Biocapacity of the examined system (actual available lands) and thus find the CC of the area.

Carbon Footprint (CF) (expressed in tones of carbon dioxide equivalent emissions – tons CO₂) emitted to the atmosphere. It is considered a sub-indicator of the EF, but it is essential to quantify and assess it on its own, as it is a major driver of Global Warming Potential and Climate Change impacts.

[documentation](#) [scenarios](#)

Partners



The homepage provides basic information about the project Bio2Care and the notions of Carrying Capacity, Ecological Footprint, Biocapacity and Carbon Footprint

scenarios (2) +

search

title	status	created	modified	
Nestos base case scenario	Carbon Footprint	2019-10-31 09:06:34.015789+01	2019-11-18 16:22:21.173149+01	  
Nestos future scenario	Carbon Footprint	2019-10-30 14:28:48.166743+01	2019-11-19 10:20:18.761752+01	  

Supports the following functionalities:

- ❖ Creation of new scenario
- ❖ Clone scenario
- ❖ Scenario management
- ❖ Search a scenario
- ❖ Edit scenario

➤ At first, the application displays the **assumptions** of the methodology for calculating the carrying capacity of protected areas.

bio2care HOME SCENARIOS MANUAL DUTHUSER1 LOGOUT

duthuser1 \ epamath \ Assumptions

Assumptions > Inputs > Ecological Footprint > Biocapacity > Population > Carrying Capacity > Carbon Footprint

index edit scenario

- Assumptions
- 1. Households
- 2. Tertiary
- 3. Municipal Buildings
- 4. Public Lighting
- 5. Private Transportation
- 6. Public Transportation
- 7. Tourism

1. Households

General

Assumption EF G.1.1 | Average weight of adults residents
70

Assumption EF G.2.1 | Average weight of minors residents
40

Assumption EF G.3.1 | Days of consumption for the residents
365

Assumption EF G.4.1 | % fuel combustion for heating due to poverty
0.7

1. Agricultural products

Assumption EF1.1.1 | average consumption of bread and rolls in g per kg of human mass per day
3.2

Assumption EF1.2.1 | average consumption of potatoes and potatoes products in g per kg of human mass per day
6.1

Assumption EF1.3.1 | average consumption of sugars per kg of human mass per day
0.4

Assumption EF1.4.1 | average consumption of breakfast cereals per kg of human mass per day
1.6

Assumption EF1.5.1 | average consumption of grain milling products in g per kg of human mass per day
0.9

Assumption EF1.6.1 | average consumption of legumes, beans, dried per kg of human mass per day
5.4

Assumption EF1.7.1 | average consumption of fruits (citrus, pome, stone, berries and small fruits, miscellaneous, dried fruits, jams, marmalade and other fruits spreads, other fruits products (excluding beverages)) and vegetables and vegetables products (including fungi, root, bulb, fruiting, brassica, leaf, legume and stem vegetables) in g per kg of human mass per day
53.9

Assumption EF1.8.1 | average consumption of beer and beer-like, wine, spirits, soft drinks per kg of human mass per day
17.9

Navigation in the 7 sectors

- Check the default assumptions of each sector
- Ability to modify default values in order to specialize the framework in each protected area

- Assumptions
- 1. Households
- 2. Terrestrial
- 3. Marine
- 4. Public Lighting
- 5. Private Transport
- 6. Public Transportation
- 7. Tourism

Assumptions for HOUSEHOLDS:

edit scenario	
1. Households	✓ Average weight of adult and minor residents
General	✓ Days of consumption for the residents
Assumption EF G.1.1 Average weight of adult residents	✓ % fuel combustion for heating due to poverty
70	
Assumption EF G.2.1 Average weight of minor residents	✓ average consumption of products in g per kg of human mass per day
40	
Assumption EF G.3.1 Average weight of children residents	
365	
Assumption EF G.4.1 % fuel combustion for heating due to poverty	
0.7	✓ average consumption of paper and board per capita in Greece per year
1. Agricultural products	
Assumption EF1.1.1 average consumption of bread and rolls in g per kg of human mass per day	✓ average electrical energy consumption per m ² for dwellings (single and apartments)
3.2	
Assumption EF1.2.1 average consumption of potatoes and potatoes products in g per kg of human mass per day	✓ average thermal energy consumption per m ² for dwellings (single and apartments)
6.1	
Assumption EF1.3.1 average consumption of sugars per kg of human mass per day	
0.4	
Assumption EF1.4.1 average consumption of breakfast cereals per kg of human mass per day	
1.6	
Assumption EF1.5.1 average consumption of grain milling products in g per kg of human mass per day	
0.9	
Assumption EF1.6.1 average consumption of legumes, beans, dried per kg of human mass per day	
5.4	✓ % of thermal energy resulting from oil burning
Assumption EF1.7.1 average consumption of fruits (citrus, pome, stone, berries and small fruits, miscellaneous, dried fruits, jam, marmalade and other fruits spreads, other fruits products (excluding beverages)) and vegetables and vegetables products (including fungi, root, bulb, fruiting, brassica, leaf, legume and other vegetables) in g per kg of human mass per day	✓ % of thermal energy resulting from logs burning
53.9	
Assumption EF1.8.1 average consumption of beer and beer like, wine, spirits, soft drinks per kg of human mass per day	✓ % of thermal energy resulting from natural gas burning
17.9	
	✓ % of thermal energy resulting from electricity use

- Assumptions
- 1. Households
- 2. Tertiary
- 3. Municipalities
- 4. Public Transportation
- 5. Private Transportation
- 6. Public Transportation
- 7. Tourism

1. Households
2. Tertiary
General
Assumption EF G.1.2 average surface of offices/commercial buildings build before 1980
450
Assumption EF G.2.2 average surface of offices/commercial buildings build between 1981-2001
900
Assumption EF G.3.2 average surface of offices/commercial buildings build after 2001
1200
Assumption EF G.4.2 average surface of healthcare buildings build before 1980
1666 ✓ average surface of buildings per use (offices/commercial use and healthcare)
Assumption EF G.5.2 average surface of healthcare buildings build between 1981-2001
8922
Assumption EF G.6.2 average surface of healthcare buildings build after 2001
10305 ✓ % reduction of fuel combustion for heating due to poverty
Assumption EF G.7.2 % reduction of fuel combustion for heating due to poverty
0.7 ✓ average electrical energy consumption per m2 per use
5. CO2 emissions
Assumption EF5.1.2a average electrical energy consumption per m2 per use
39 ✓ average thermal energy consumption per m2 per use
Assumption EF5.1.2b average electrical energy consumption per m 2 for offices/comercial buildings 2001
51
Assumption EF5.1.2c average electrical energy consumption per m 2 for offices/comercial buildings 2010
64
Assumption EF5.1.2d average electrical energy consumption per m 2 for healthcare buildings 1980
82
Assumption EF5.1.2e average electrical energy consumption per m 2 for healthcare buildings 2001
94

- Assumptions
- 1. Households
- 2. Tertiary
- 3. Municipal Buildings
- 4. Public Lighting
- 5. Private Transportation
- 6. Public Transportation
- 7. Tourism

Assumptions for MUNICIPAL BUILDINGS

1. Households
2. Tertiary
3. Municipal Buildings
General
Assumption EF G.1.3 average surface of schools build before 1980
1500
Assumption EF G.2.3 average surface of schools build between 1981-2001
1702
Assumption EF G.3.3 average surface of schools build after 2002
1801
5. CO2 emissions
Assumption EF5.1.3a average electrical energy consumption per m 2 for schools 1980
18 ✓ average surface of schools
Assumption EF5.1.3b average electrical energy consumption per m 2 for schools 2001
19 ✓ average electrical energy consumption per m2 for schools
Assumption EF5.1.3c average electrical energy consumption per m 2 for schools 2010
20 ✓ average thermal energy consumption per m2 for schools
20
Assumption EF5.2.3a average thermal energy consumption per m 2 for schools 1980
37
Assumption EF5.2.3b average thermal energy consumption per m 2 for schools 2001
36
Assumption EF5.2.3c average thermal energy consumption per m 2 for schools 2010
36
4. Public Lighting
5. Private Transportation
6. Public Transportation
7. Tourism

Assumptions for PUBLIC LIGHTING

- Assumptions
- 1. Households
- 2. Tertiary
- 3. Municipal Buildings
- 4. Public Lighting
- 5. Private Transportation
- 6. Public Transportation
- 7. Tourism

1. Households

2. Tertiary

3. Municipal Buildings

4. Public Lighting

5. CO2 emissions
Assumption EF5.1.4 | average time of lights' operation per year
4065

5. Private Transportation

6. Public Transportation

7. Tourism

save

Assumptions for PRIVATE TRANSPORTATION

- 1. Households
- 2. Tertiary
- 3. Municipal Buildings
- 4. Public Lighting
- 5. Private Transportation
 - General
 - Assumption EF G.1.5 | average km travelled by vehicle on local roads per year: 7500
 - 5. CO2 emissions
 - Assumption EF 5.5.5 | % of car in Greece fueled by diesel: 0.17
 - Assumption EF 5.6.5 | % of car in Greece fueled by petrol: 0.83
- 6. Public Transportation
- 7. Tourism

save

- 1. Households
 - 2. Tertiary
 - 3. Municipal Buildings
 - 4. Public Lighting
 - 5. Private Transportation
 - 6. Public Transportation
 - 7. Tourism
- Assumptions for PUBLIC TRANSPORTATION**

1. Households	
2. Tertiary	
3. Municipal Buildings	
4. Public Lighting	
5. Private Transportation	
6. Public Transportation	
General	✓ average km travelled by vehicle on local roads per year
Assumption EF G.1.6 average km passing by vehicle on local roads per year	
7500	✓ % of car in Greece fueled by diesel
5. CO2 emissions	✓ % of car in Greece fueled by petrol
Assumption EF 5.5.6 % of car in Greece fueled by diesel	
0.17	✓ average weight of a passenger on ferry boat
Assumption EF 5.6.6 % of car in Greece	
0.83	✓ average weight of a heavy duty vehicle on ferry boat
Assumption EF 5.10.6a average weight of a heavy duty vehicle on ferry boat	
0.0708	✓ average weight of a heavy duty vehicle on ferry boat
Assumption EF 5.10.6b average weight of a heavy duty vehicle on ferry boat	
5	✓ average weight of a bus on ferry boat
Assumption EF 5.10.6c average weight of a bus on ferry boat	
5	✓ average weight of a car on ferry boat
Assumption EF 5.10.6d average weight of a car on ferry boat	
1.5	✓ average weight of a motorbike on ferry boat
Assumption EF 5.10.6e average weight of a motorbike on ferry boat	
0.2	
7. Tourism	

save

Assumptions for TOURISM:

1. Households

2. Tertiary

3. Municipal Buildings

4. Public Lighting

5. Private Transportation

6. Public Transportation

7. Tourism

General

Assumption EF G.1.7 | Average weight of adults tourists

70

Assumption EF G.2.7 | Average weight of minors tourists

40

Assumption EF G.3.7 | Days of consumption for the tourists

3

Assumption EF G.4.7 | average surface of hotels build before 1980

1632

Assumption EF G.5.7 | average surface of hotels build between 1980 and 2002

2798

Assumption EF G.6.7 | average surface of hotels build after 2002

3496

1. Agricultural products

Assumption EF L.2.7 | average consumption of products in g per kg of human mass per day

3.2

Assumption EF L.2.7 | average consumption of potatoes and potatoes products in g per kg of human mass per day

6.1

Assumption EF L.3.7 | average consumption of sugars per kg of human mass per day

0.4

Assumption EF L.4.7 | average consumption of electrical energy per m² for hotels

1.6

Assumption EF L.5.7 | average consumption of thermal energy per m² for hotels

0.9

Assumption EF L.6.7 | average consumption of legumes, beans, dried per kg of human mass per day

5.4

Assumption EF L.7.7 | average consumption of fruits (citrus, pome, stone, berries and small fruits, miscellaneous, dried fruits, jam, marmalade and other fruits spreads, other fruits products (excluding beverages)) and vegetables and vegetables products (including fungi, root, bulb, nutting, brassica, leaf, legume and stem vegetables) in g per kg of human mass per day

53.9

Assumption EF L.8.7 | average consumption of beer and beer-like, wine, spirits, soft drinks

17.6

✓ Average weight of adult and minor tourists

✓ Days of consumption for the tourists

✓ average surface of hotels

✓ average consumption of products in g per kg of human mass per day

✓ average electrical energy consumption per m² for hotels

✓ average thermal energy consumption per m² for hotels

- The application displays the data that need to be filled in. This applied to different type of data that must be confirmed and/or provided by the user (e.g. assumptions, inputs) or data that are automatically calculated based on the BIO2CARE methodology (WP3)

The screenshot shows the bio2care application interface. At the top, there are navigation links: "bio2care", "HOME", and "SCENARIOS". Below this, the current scenario is identified as "panos \ Nestos future scenario (RCP 4.5) \ Assumptions". The interface is divided into two main sections: "index" and "edit scenario".

The "index" section on the left contains a dropdown menu for "Assumptions" with a list of categories: 1. Households, 2. Tertiary, 3. Municipal Buildings, 4. Public Lighting, 5. Private Transportation, 6. Public Transportation, and 7. Tourism. A red box highlights this list, with an arrow pointing to a callout box labeled "Navigate through data".

The "edit scenario" section on the right displays a form for editing the scenario. It lists the same categories as the index. The "5. CO2 emissions" section is expanded, showing a sub-section "Assumption EF5.1.4 | average time of lights' operation per year" with a text input field containing the value "4065". A green "save" button is located at the bottom of the form. A red box highlights the entire "edit scenario" section, with an arrow pointing to a callout box labeled "Input data".

panos \ Nestos future scenario (RCP 4.5) \ Ecological Footprint

index

edit scenario

- > Assumptions ✓
- > Inputs ✓
- ▼ Ecological Footprint +
 - 1. Households
 - 2. Tertiary
 - 3. Municipal Buildings
 - 4. Public Lighting
 - 5. Private Transportation
 - 6. Public Transportation
 - 7. Tourism

1. Households

2. Tertiary

2. Tertiary | Total Gha

11225.5348804

5. CO2 emissions

Indicator EF5.1.2 | Electricity Consumption in kWh per year

value	Gha/kwh	Gha
27889270	0.00027094	7556.3188138

Indicator EF5.2.2 | Thermal Energy Consumption in kWh per year

value	Gha/kwh	Gha
39453936.2	9.3E-5	3669.2160666

3. Municipal Buildings

4. Public Lighting

5. Private Transportation

6. Public Transportation

calculate save

➤ Data collection and import is crucial to the results of the tool.

The screenshot shows the Bio2Care web application interface. The top navigation bar includes 'bio2care HOME SCENARIOS MANUAL' and 'DUTHUSER1 LOGOUT'. The user is logged in as 'duthuser1 \ epamath \ Inputs'. The breadcrumb trail is: Assumptions > Inputs > Ecological Footprint > Biocapacity > Population > Carrying Capacity > Carbon Footprint. The main content area is titled 'edit scenario' and lists 7 sectors for data entry:

- 1. Households
 - Input 1.1 | number of adults residents: 23249
 - Input 1.2 | number of minors residents: 6027
 - Input 1.3 | surface (m2) of single dwellings build before 1980: 744404
 - Input 1.4 | surface (m2) of single dwellings build between 1981-2001: 297578
 - Input 1.5 | surface (m2) of single dwellings build after 2002: 229195.1547
 - Input 1.6 | surface (m2) of apartment buildings build before 1981: 22474
 - Input 1.7 | surface (m2) of apartment buildings build between 1981-2001: 35777
 - Input 1.8 | surface (m2) of apartment buildings build after 2001: 91090.63914
- 2. Tertiary
- 3. Municipal buildings
- 4. Public lighting
- 5. Private transportation
- 6. Public transportation
- 7. Tourism

A 'save' button is visible at the bottom of the list. A large blue text overlay reads: 'In order to specialize the tool in each protected area, the user must enter/modify 38 data inputs concerning to the 7 sectors.'

- > Assumptions
- > Inputs
 - 1. Households
 - 2. Tertiary
 - 3. Municipal buildings
 - 4. Public lighting
 - 5. Private transportation
 - 6. Public transportation
 - 7. Tourism

Inputs for HOUSEHOLDS

1. Households
Input 1.1 number of adults residents 23249
Input 1.2 number of minors residents 6027
Input 1.3 surface (m2) of single dwellings build before 1980 744404
Input 1.4 surface (m2) of single dwellings build between 1981-2001 297578
Input 1.5 surface (m2) of single dwellings build after 2002 229195.1547
Input 1.6 surface (m2) of apartment buildings build before 1980 22474
Input 1.7 surface (m2) of apartment buildings build between 1981-2001 35378
Input 1.8 surface (m2) of apartment buildings build after 2002 91090.63914

✓ Number of residents (adults and minors)
✓ surface (m2) of dwellings (single and apartments)

- 2. Tertiary
- 3. Municipal buildings
- 4. Public lighting
- 5. Private transportation
- 6. Public transportation
- 7. Tourism

save

bio2care HOME SCENARIOS MANUAL DUTHUSER1 LOGOUT

duthuser1 \ epamath \ Inputs

Assumptions > Inputs > Ecological Footprint > Biocapacity > Population > Carrying Capacity > Carbon Footprint

index

- > Assumptions
- ▼ Inputs
 - 1. Households
 - 2. **Inputs for TERTIARY SECTOR**
 - 3. Municipal buildings
 - 4. Public lighting
 - 5. Private transportation
 - 6. Public transportation
 - 7. Tourism

edit scenario

1. Households
2. Tertiary
Input 2.1 number of offices/commercial buildings build before 1980
573
Input 2.2 number of offices/commercial buildings build between 1981-2001
168
Input 2.3 number of offices/commercial buildings build after 2002
8
8. ✓ Number of buildings per use (offices/commercial use and healthcare)
Input 2.4 number of healthcare buildings build before 1980
4
Input 2.5 number of healthcare buildings build between 1981-2001
4
Input 2.6 number of healthcare buildings build after 2002
0
3. Municipal buildings
4. Public lighting
5. Private transportation
6. Public transportation
7. Tourism
save

- > Assumptions
- Inputs
- 1. Households
- 2. Inputs for MUNICIPAL BUILDINGS**
- 3. Municipal buildings
- 4. Public lighting
- 5. Private transportation
- 6. Public transportation
- 7. Tourism

1. Households

2. Tertiary

3. Municipal buildings

Input 3.1 | number of schools build before 1980

79

Input 3.2 | number of schools build between 1981-2001

16

Input 3.3 | number of schools build after 2002

7

4. Public lighting

5. Private transportation

6. Public transportation

7. Tourism

save

✓ Number of schools

- > Assumptions
- ▼ Inputs
 - 1. Households
 - 2. Tertiary
 - 3. Municipal buildings
 - 4. Public lighting
 - 5. Private transportation
 - 6. Public transportation
 - 7. Tourism

Inputs for PUBLIC LIGHTING

1. Households
2. Tertiary
3. Municipal buildings
4. Public lighting
Input 4.1 Installed power for public lighting in kW
705,18819
5. Private transportation
6. Public transportation
7. Tourism
save

✓ Installed power for public lighting in kW

Inputs for PRIVATE TRANSPORTATION

1. Households	
2. Tertiary	
3. Municipal buildings	
4. Public lighting	
5. Private transportation	
Input 5.1.1 number of private passenger cars moving on local roads (value 1)	11117
Input 5.1.2 number of private passenger cars moving on local roads (value 2)	0
Input 5.2.1 number of private passenger cars moving on highway (value 1)	2030612
Input 5.2.2 number of private passenger cars moving on highway (value 2)	1465241
Input 5.3.1 number of private motorbikes moving on local roads (value 1)	4196
Input 5.3.2 number of private scooters moving on local roads (value 2)	0
Input 5.4.1 number of private lorries moving on local roads (value 1)	3991
Input 5.4.2 number of private lorries moving on local roads (value 2)	0
Input 5.5.1 number of private lorries moving on highway (value 1)	386783
Input 5.5.2 number of private lorries moving on highway (value 2)	279094
Input 5.6.1 km of highway set within the boundaries of protected area (value 1)	1.8
Input 5.6.2 km of highway set within the boundaries of protected area (value 2)	17.6
6. Public transportation	
7. Tourism	
SAVE	

✓ number of private vehicles (cars, motorbikes and heavy-duty vehicles) moving on local roads

✓ km of highway set within the boundaries of protected area

Inputs for PUBLIC TRANSPORTATION

1. Households	
2. Tertiary	
3. Municipal buildings	
4. Public transportation	✓ number of public vehicles (cars, motorbikes and heavy-duty vehicles) moving on local roads
5. Private transportation	
6. Public transportation	
7. Tourism	
input 6.1.1 number of public passenger cars moving on local roads (value 1)	72
input 6.1.2 number of public passenger motorbikes moving on local roads (value 1)	0
input 6.2.1 number of public scooters moving on local roads (value 1)	7
input 6.2.2 number of public scooters moving on local roads (value 2)	0
input 6.3.1 number of passengers loaded or unloaded from or/and to barge tanker in each port	125
input 6.3.2 number of public lorries moving on local roads (value 2)	0
input 6.4.1 number of annual passengers loaded in ferry boat in each port	146000
input 6.4.2 number of annual heavy-duty vehicles loaded in ferry boat in each port	0
input 6.5.1 km of local railway set within the boundaries of the protected area (value 1)	10.5
input 6.5.2 km of local railway set within the boundaries of the protected area (value 2)	0
input 6.6.1 number of cars loaded in ferry boat in each port	132502.9281
input 6.6.2 number of motorbikes loaded in ferry boat in each port	61196
input 6.7.1 number of passengers arrived/left by airplane in each airport	1.852
input 6.7.2 km boarding in each port (value 2)	1.852
input 6.8.1 passengers loaded in ferry boat in each port (value 1)	1402331
input 6.8.2 passengers loaded in ferry boat in each port (value 2)	0
input 6.9.1 km travelled by bus within the boundaries of protected area	0

index

- > Assumptions
- ▼ Inputs
- 1. Households
- 2. Tertiary
- 3. **Inputs for TOURISM**
- 4. Public lighting
- 5. Private transportation
- 6. Public transportation
- 7. Tourism

edit scenario

- Households
- Tertiary
- Municipal buildings
- Public lighting
- Private transportation
- Public transportation
- Tourism

Input 7.1 number of adults tourists	18947.25
Input 7.2 number of minors tourists	6315.75
Input 7.3 number of hotels build before 1980	12
Input 7.4 number of hotels build between 1981-2001	16
Input 7.5 number of hotels build after 2002	3

save

✓ Number of tourists (adults and minors)
✓ surface (m2) of hotels

➤The tool automatically calculates the Ecological and Carbon Footprints of the protected area by entering the required inputs.

The screenshot shows the 'bio2care' web application interface. The user is logged in as 'duthuser1' and is viewing the 'Ecological Footprint' section. The navigation menu on the left includes 'Assumptions', 'Inputs', 'Ecological Footprint', 'Biocapacity', 'Population', 'Carrying Capacity', and 'Carbon Footprint'. The main content area displays a table of indicators and their conversion factors. A red box highlights the 'edit scenario' section, and a green box highlights the 'index' section. Two callout boxes provide additional information: one on the left states that 35 conversion factors have been set for each indicator, and one on the right states that the results are presented per sector and per indicator.

Indicator	value	Conversion Factor (Gha/ty)
1. Households		
1. Households Total Gha	143628.33178802	
1. Agricultural products		
Indicator EF1.1.1 Bread Consumption in t per year	2182.41968	0.3076
Indicator EF1.2.1 Potatoes Consumption in t per year	4160.237515	0.096
Indicator EF1.3.1 Sugar Consumption in t per year	272.80246	0.3355
Indicator EF1.4.1 Cereals Consumption in t per year	1091.20984	0.667
Indicator EF1.5.1 Flour Consumption in t per year	613.805535	0.423
Indicator EF1.6.1 Legumes Consumption in t per year	3682.83321	0.6813
Indicator EF1.7.1 Fruits and Vegetables Consumption in t per year	36760.131485	0.743
Indicator EF1.8.1 Beverage Consumption in t per year	12207.810085	2.11
Indicator EF1.9.1 Tobacco Consumption in t per year	67.88708	1.14
Indicator EF1.10.1 Rice consumption in t per year	6820.0615	0.5736
Indicator EF1.11.1 Vegetable oils Consumption in t per year	886.607995	2.592
2. Livestock products		
Indicator EF2.1.1 Pork meat Consumption in t per year		

For the Ecological Footprint calculation 35 conversion factors have been set, one for each indicator of consumption needs.

The results of the Ecological Footprint calculations are presented per sector and per indicator of consumption needs.

The screenshot displays the Bio2Care Calc Tool interface. The top navigation bar includes 'bio2care', 'HOME', 'SCENARIOS', and 'MANUAL'. The user is logged in as 'duthuser1'. The main title is 'Test GET GM clone \ Carbon Footprint'. The breadcrumb trail is: 'Assumptions > Inputs > Ecological Footprint > Biocapacity > Population > Carrying Capacity > Carbon Footprint'. A sidebar on the left shows a navigation menu with 'index' and sub-items: 'Assumptions', 'Inputs', 'Ecological Footprint', and 'Biocapacity'. The main content area is titled 'edit scenario' and shows the following results:

Carbon Footprint	
Total Carbon Footprint (tonnes CO2eq) calculated	225365.93013338
Total Carbon Footprint per capita (tonnes CO2eq) calculated	7.6979754793476
Total Carbon Footprint (per Equivalent Person-Population) calculated	6.2009243155393
1. Households	
2. Tertiary	
3. Municipal Buildings	
4. Public Lighting	
5. Private Transportation	
6. Public Transportation	
7. Tourism	

At the bottom of the results table are 'calculate' and 'save' buttons.

For the Carbon Footprint calculation 35 conversion factors have been set, one for each indicator of consumption needs.

The results of the Carbon Footprint calculations are presented per sector and per indicator of consumption needs.

- Data input concerning available land uses.
- For each land use of Biocapacity, in addition to the main indicators, data can be entered for the secondary indicators and the individual land uses can be calculated automatically.

The screenshot shows the Bio2Care Calc Tool interface. The top navigation bar includes 'bio2care', 'HOME', 'SCENARIOS', and 'MANUAL'. The user is logged in as 'DUTHUSER1'. The main navigation menu is expanded to show 'Biocapacity', with sub-menus for 'Assumptions', 'Inputs', 'Ecological Footprint', 'Population', 'Carrying Capacity', and 'Carbon Footprint'. The 'Biocapacity' section is active, displaying a list of land uses: 1. Cropland Area, 2. Grazing Land Area, 3. Marine/Inland water Area, 4. Energy Land and Forest Land, and 5. Infrastructure Area. The 'Cropland Area' section is expanded, showing 'Indicator BC 1.1 | Area under cultivation and fallow land in ha' with a value of 52011.17. Below this, there is a 'Generate Indicator BC 1.1 | Set Indicator BC 1.1=0 to use these instead' section, with 'Indicator BC 1.1.1 | Arable land in ha' set to 108390 and another indicator set to 2280. There are 'calculate' and 'save' buttons at the bottom of the section.

Navigation to the land uses of Biocapacity for data input

Data input for each land use, e.g. area under cultivation and fallow land in ha, pastures in ha, area under water in ha, forests and semi-natural areas in ha, area under cultivation and fallow land that produces energy in ha, Areas occupied by the locality (buildings, roads, etc) in ha.

- > Assumptions
- > Inputs
- > Ecological Footprint
- ▼ Biocapacity
 - 1. Cropland Area
 - 2. Grazing Land Area
 - 3. Marine/Inland water Area
 - 4. Energy Land and Forest Land
 - 5. Infrastructure Area
 - Total

1. Cropland Area
 2. Grazing Land Area
 3. Marine/Inland water Area
 4. Energy Land and Forest Land
 5. Infrastructure Area
- Total

	Values in ha	Global Equivalent Factor (EqF)	Yield Factor	Values in Gha
1. Cropland Area	51961.07	2.2	1.5	171471.531
2. Grazing Land Area	4528.36	0.5	2	4528.36
3. Marine/Inland water Area	12283.86	0.4	0.8	3930.8352
4. Energy Land and Forest Land	910.64	1.4	1.3	1657.3648
5. Infrastructure Area	799.99	2.2	1.5	5939.967
Total				

The calculation of the Biocapacity is implemented by multiplying the available areas per land use with the respective yield and equivalence factors

- > Assumptions
- > Inputs
- > Ecological Footprint
- > Biocapacity
- Population
 - 1. Households
 - 2. Tertiary
 - 3. Municipal buildings
 - 4. Public lighting
 - 5. Private transportation
 - 6. Public transportation
 - 7. Tourism

- 1. Households
 - 2. Tertiary
 - 3. Municipal buildings
 - Indicator P 3.1 | squared meters of schools
343432324
 - 4. Public lighting
 - 5. Private transportation
 - 6. Public transportation
 - 7. Tourism
- calculate save

In the **Population** tab, the user can be informed about the unit(-s) of each sector, π.χ. Number of residents, number of tourists, surface in m² per use, installed power for public lighting, km travelled per mean of transportation, personkm travelled per mean of transportation, tkm travelled per mean of transportation.

- The **maximum equivalent population or Carrying Capacity** is automatically calculated by entering Input data concerning Ecological Footprint and the available areas per land use of Biocapacity.

The screenshot shows the Bio2Care web application interface. The user is logged in as 'duthuser1' and is viewing the 'Carrying Capacity' scenario. The breadcrumb navigation is: Assumptions > Inputs > Ecological Footprint > Biocapacity > Population > Carrying Capacity > Carbon Footprint. The 'Carrying Capacity' section displays the following results:

Parameter	Value
Carrying Capacity	
Carrying capacity in %	89.376842085973
carrying capacity in person equivalent	40660.420699406
Ecological Footprint	
Biocapacity	
Population	


Buttons for 'calculate' and 'save' are visible at the bottom of the results section. A large green circle is overlaid on the right side of the screenshot, containing text that explains the final score.

The tool calculates a final score: **the maximum equivalent population** that can be sustained in the protected area without compromising the productivity ability of its environment!

- The status of a scenario varies depending on the phase of implementation
- To avoid inconsistencies between input data and results, it is not possible to make changes to previous phases
- If desired, the user can choose to change the status of the scenario to an earlier. In this way he/she can repeat the calculations from this point onwards
- Alternatively, it is possible to clone a scenario, that is, to use one scenario as a basis for calculating another scenario. This way both scenarios are stored and are available on the system

<https://calctool.getmap.gr>

bio2care HOME SCENARIOS PANOS LOGOUT



Carrying Capacity in Protected Areas

Under the framework of BIO2CARE project, a web tool for the estimation of the environmental status of a protected area has been developed.

1. Carrying Capacity (CC),
2. Ecological Footprint (EF),
3. Carbon Footprint (CF)


In modern ecology, carrying capacity is the number of people, animals, or crops which a region can support without environmental degradation. In the case of protected areas, the Carrying Capacity can be understood as the maximum number of persons (both visitors and residents) that the protected area can sustain without permanent damage to the productivity of the environment and without considerably diminishing the capacity of future generations to meet their needs.

In order to estimate the carrying capacity and further assess the sustainability of a protected area it is necessary to extract the following two footprints:


- The **Ecological Footprint** is the amount of theoretical land (expressed in hectares – Gha) that is needed for a population to produce in a sustainable way all the natural resources it consumes and assimilate the waste it produces. The EF calculation method is necessary to convert the energy and food consumption needs in land requirements in order to compare them with the Biocapacity of the examined system (actual production from available lands) and thus find the CC of the area.
- The **Carbon Footprint** is the quantity of greenhouse gases (expressed in tones of carbon dioxide equivalent emissions – tons CO₂) emitted to the atmosphere by the examined system. It can be considered a sub-indicator of the EF, but it is essential to quantify and assess it on its own, since it provides a much clearer image of Global Warming Potential and Climate Change impacts.

documentation scenarios

Partners



Developed By



- Theoretical background of BIO2CARE software/tools
- BIO2CARE Decision Making Software
- BIO2CARE Calc Tool
- **BIO2CARE Symbiosis Tool**
- Benefits from BIO2CARE implementation

- ❑ The **BIO2CARE Symbiosis Tool** is an online cartographic/mapping application that allows users to search for potential symbiotic activities, using as data the inputs and outputs of their own production activity, but also the production activities of other users.
- ❑ The application has a simple and friendly work interface and it was based upon the case study developed in the Deliverable 3.4.
- ❑ The development of the application contributes to the implementation of circular economy/industrial symbiosis principles at local scale.

- ❑ Entry of activity data. The entry is initially made by selecting the location from the map. Then the users enter the requested data regarding the type of activity (Industry, Municipal Authority, Regional Authority, etc.) as well as the basic input and output material flow.
- ❑ Tool for finding activities with common input-output material flow. Users can search for activities that have common input-output material (raw materials, by-products etc.) with a selected activity. The search results are presented in a table and on the map, along with the relevant distances.
- ❑ Connectivity tool. Users have the ability to import links between activities with common input-output material flow. The application allows you to display all related activities on the map.
- ❑ Management environment. Enables users with the corresponding rights to manage the database, updating price lists and other data used in the system.



Reinforcing protected areas capacity through an innovative methodology for sustainability

BIO2CARE - Symbiosis

Login

Username

Password

Don't have a Bio2Care account yet? Please click [here](#) to create one!



Interface of the software

Interreg Greece-Bulgaria BIO2CARE
Reinforcing protected areas capacity through an innovative methodology for sustainability BIO2CARE - Symbiosis

Χάρτης Διαχείριση Σχετικά Οδηγίες Χρήσης

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Swipe Επιλέξτε ένα επίπεδο

TEMNEI

Λίμνη Βιστωνίδα
Λίμνη Βιστωνίδα
Χαρτοβέικτες
ΔΕΛΤΑ ΝΕΣΤΟΥ
ΔΑΣΟΣ ΚΟΤΣΑ ΟΡΜΑΝ

Ντομούς Ορμάν (Αβόθρων)

Κοτά Ορμάν Νέστου Δήμου Τοπίρου

8 km

Εστίαση σε κλίμακα Χ/Γεωγρ. Υ/Γεωγρ. Μετάβαση Κέντρο Χάρτη (Pseudo Mercator (EPSG:3857)): 2761148.794, 5005067.016 Εστίαση: 11 | Κλίμακα: 1:272989 | Συντεταγμένες Κέρσορα

Αποτελέσματα Αναζήτησης

Εργαλεία Αναζήτησης

GET making location matter
© OpenStreetMap contributors

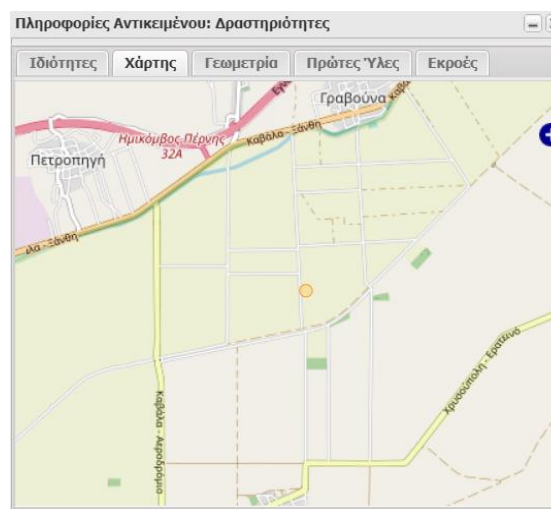
Point Information

General Activity Information

Πληροφορίες Αντικειμένου: Δραστηριότητες

Τίτλος:
 Κατηγορία:
 Διεύθυνση:
 Υπεύθυνος Επικοινωνίας:
 Τηλέφωνο:
 url:

Position



Raw materials / outputs

Πληροφορίες Αντικειμένου: Δραστηριότητες

Κωδικός	Περιγραφή	Κατηγορία	Τιμή	
1	1	υλικό 1	1	
	ΤΕΣΤ ΤΕΣΤ	υλικό 3	80	

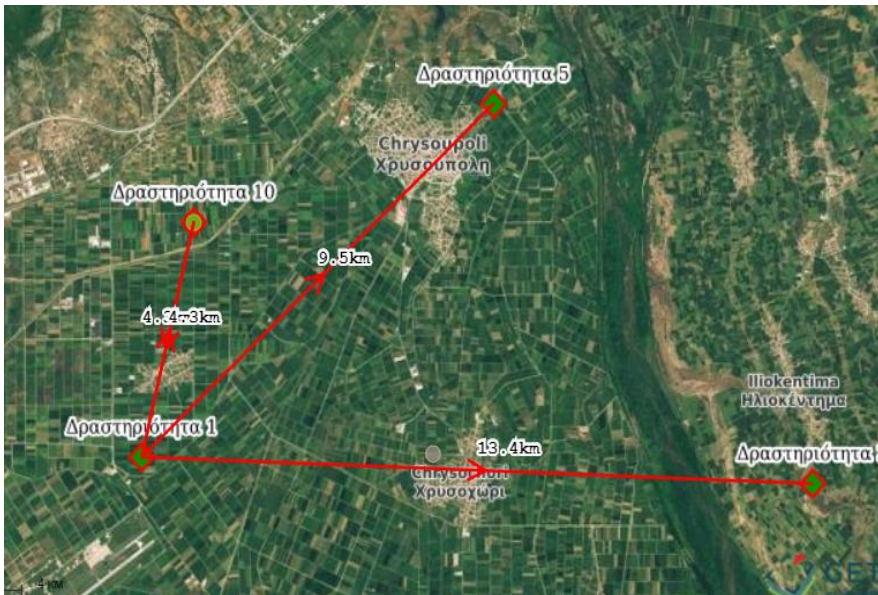
Editing tools



- **Object selection**
- Rectangular selection tool
- De-selecting object
- **Creating a new activity**
- Copy object
- Move object
- Delete object
- Undo action
- Redo action
- **Database update – save changes**
- Renew map / update user

Finding activities with common raw materials - outputs

The “find activities” tool allows the user to select an activity and see what other activities on the database have common input-output material flows. The result is shown schematically on the map and in a form.



Δραστηριότητα 1

Δραστηριότητες με εκροές τις πρώτες ύλες της επιλεγμένης δραστηριότητας | Δραστηριότητες με πρώτες ύλες τις εκροές της επιλεγμένης δραστηριότητας

Δραστηριότητα	Υλη (κατηγορία)	Περιγραφή ύλης	Απόσταση
Δραστηριότητα 3	υλικό 1	1	13.423 km
Δραστηριότητα 5	υλικό 1	11	9.471 km
Δραστηριότητα 10	υλικό 1	1	4.335 km

Δημιουργία Διασύνδεσης

Symbiotic Connections

The form allows the user to create a symbiotic relationship. Selecting the relevant option opens up a new form in which the user specifies the connection. This connection then will be available exclusively for the user.

Step 1

	Δραστηριότητα	Ύλη (κατηγορία)	Περιγραφή ύλης	Απόσταση
<input type="checkbox"/>	Δραστηριότητα 3	υλικό 1	1	13.423 km
<input type="checkbox"/>	Δραστηριότητα 5	υλικό 1	11	9.471 km
<input type="checkbox"/>	Δραστηριότητα 10	υλικό 1	1	4.335 km

Δημιουργία Διασύνδεσης

Step 2

Δραστηριότητα 10: Δημιουργία Διασύνδεσης

Με δραστηριότητα: Δραστηριότητα 2

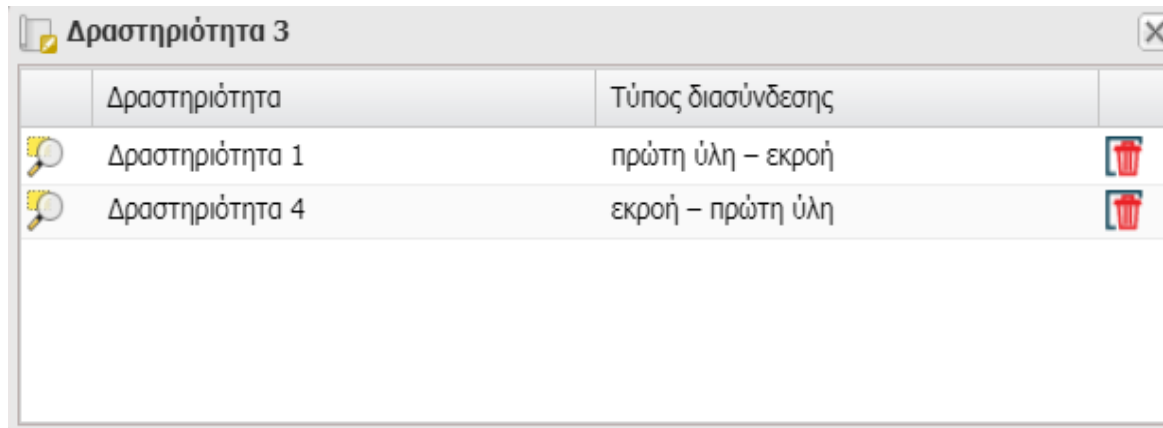
Τύπος διασύνδεσης: πρώτη ύλη - εκροή

Προσθήκη



Create Connection

Symbiotic Connections

The “Symbiotic connections” tool allows the user to select a connection and see the data specified for the specific connection.



The screenshot shows a window titled "Δραστηριότητα 3" with a close button in the top right corner. The window contains a table with the following data:

Δραστηριότητα	Τύπος διασύνδεσης	
Δραστηριότητα 1	πρώτη ύλη – εκροή	
Δραστηριότητα 4	εκροή – πρώτη ύλη	

Databases

Administrators have the ability to manage their database and content using the PGAdmin software

The screenshot displays the PGAdmin 4 web interface. The left sidebar shows a tree view of the database structure, with the 'photos' schema selected. The main area contains a 'Query Editor' with the following SQL query:

```
1 SELECT * FROM photos.photos
2 ORDER BY id ASC LIMIT 100
3
```

Below the query editor, the 'Data Output' tab is active, showing a table with 10 rows of data. The table columns are: id (PK integer), photo (text), date (timestamp without time zone), lat (double precision), lng (double precision), and url (text).

id	photo	date	lat	lng	url	
1	47	2019102...	2019-10-11 11:16:06	40.961033	24.789402	https://...
2	48	2019102...	2019-10-11 12:19:22	40.961033	24.789402	https://...
3	49	2019102...	2019-10-11 13:21:00	40.98203	24.737904	https://...
4	50	2019102...	2019-10-11 13:21:00	40.933805	24.822018	https://...
5	51	2019102...	2019-10-11 11:15:52	40.933805	24.822018	https://...
6	52	2019102...	2019-10-11 11:16:06	40.933805	24.822018	https://...
7	53	2019102...	2019-10-11 12:19:22	40.933805	24.822018	https://...
8	54	2019102...	2019-10-11 12:19:27	40.933805	24.822018	https://...
9	55	2019102...	2019-10-11 11:15:52	40.922651	24.76125	https://...

Geospatial Data Services

Administrators have the ability to manage geospatial services through GEOSERVER's online management environment

GeoServer

Logged in as admin. Logout

Layers

Manage the layers being published by GeoServer

- Add a new layer
- Remove selected layers

<< < 1 2 > >> Results 1 to 25 (out of 41 items) Search

<input type="checkbox"/>	Type	Title	Name	Store	Enabled	Native SRS
<input type="checkbox"/>	Image	uav	uav:uav	uav	✓	EPSG:4326
<input type="checkbox"/>	Image	photos	photos:photos	photos	✓	EPSG:4326
<input type="checkbox"/>	Image	sound_last_measurements	symmetron:sound_last_measurements	symmetron	✓	EPSG:4326
<input type="checkbox"/>	Image	Σημεία Πρόσβασης	bio2care:access_points	geodata	✓	EPSG:2100
<input type="checkbox"/>	Image	Όριο Διοικητικής Διάρεσης	bio2care:adm_in_bounds	geodata	✓	EPSG:2100
<input type="checkbox"/>	Image	Ονόματα Οικισμών	bio2care:adm_poi_okismo_i_rest2	geodata	✓	EPSG:2100
<input type="checkbox"/>	Image	Δημοτικές Ενότητες	bio2care:adm_pol_dimotikes_enottes	geodata	✓	EPSG:2100
<input type="checkbox"/>	Image	Τοπικές Κοινότητες	bio2care:adm_pol_local_communities	geodata	✓	EPSG:2100
<input type="checkbox"/>	Image	Καλλικρατικοί Δήμοι	bio2care:adm_pol_municipalities	geodata	✓	EPSG:2100
<input type="checkbox"/>	Image	Όρια Νομών	bio2care:adm_pol_nomoi	geodata	✓	EPSG:2100
<input type="checkbox"/>	Image	Περιφέρειες	bio2care:adm_pol_periferieis_kdeida	geodata	✓	EPSG:2100
<input type="checkbox"/>	Image	Σημεία Πολτισμού	bio2care:ct_poi_cultural_points	geodata	✓	EPSG:2100
<input type="checkbox"/>	Image	Ακτογραμμή	bio2care:env_in_aktogrammi	geodata	✓	EPSG:2100
<input type="checkbox"/>	Image	Υδρογραφικό Δίκτυο	bio2care:env_in_hydro_final	geodata	✓	EPSG:2100
<input type="checkbox"/>	Image	Σημεία Ενδιαφέροντος Φύσης	bio2care:env_poi_nature_points	geodata	✓	EPSG:2100
<input type="checkbox"/>	Image	Cornie 2000	bio2care:env_pol_dc2000_epamath	geodata	✓	EPSG:2100
<input type="checkbox"/>	Image	Όριο ΕΠΙΜΑΘ	bio2care:env_pol_ep_bounds	geodata	✓	EPSG:2100

<https://dpth.getmap.gr/symbiosis/admin/>

Interreg Greece-Bulgaria BIO2CARE Reinforcing protected areas capacity through an innovative methodology for sustainability BIO2CARE - Symbiosis

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Δραστηριότητα 1

Δραστηριότητα 2

Δραστηριότητα 3

Δραστηριότητα 4

Δραστηριότητα 5

Δραστηριότητα 6

Δραστηριότητα 10/ισοούπλη

Δραστηριότητα AAA

Νέα Καρβάλη

Κρατικός Αγρολιμένας Καβάλας "Μέγας Αλέξανδρος"

Κεραμωτή

Κοτσα Ορμάν Νέστου Δήμου Τοπίου

Μπαρούζ Ορμάν (Αβήρων)

Λίμνη Βιστωνίδα

Χαρτοδίκτυες

ΔΕΛΤΑ ΝΕΣΤΟΥ

ΔΑΣΟΣ ΚΟΤΖΑ ΟΡΜΑΝ

GET making location matter

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- BIO2CARE Calc Tool
- BIO2CARE Symbiosis Tool
- **Benefits from BIO2CARE implementation**

CONTRIBUTION FROM STRATOS MANOS



**INTERREG V-A COOPERATION PROGRAMME
GREECE – BULGARIA 2014 – 2020**

Reinforcing Protected Areas Capacity through an Innovative
Methodology for Sustainability

– BIO2CARE –

(Reg. No: 1890)

Thank for your participating!



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