EC@CSA

Reserva de Biodiversidad

LafargeHolcim

Development of a biodiversity and ES valuation and accounting tool associated with quarry restoration works

October 18th 2018

A bit about what do we do at EC@CSA

Reserva de Biodiversidad

Ecoacsa was founded in 2012 with the aim of **disseminating, promoting and developing environmental markets** within Spain. We firstly put our focus on contributing to the introduction of **habitat banking** in our country.

Currently, our main task is to help to mainstream natural capital approaches into private and public sectors. To achieve this, we foster all tools that enable **natural capital valuation and biodiversity integration** into business and organizations strategies, with the objective of **conserving nature, funding and promoting sustainable development.**

We are Full Members of:

— **EU Platform Business @ Biodiversity Advisory Committee**

—**European Commission Working Group on No Net Loss of Ecosystems and their Services**

—**Business and Biodiversity Offsets Programme (BBOP)**

— **Natural Capital Coalition**

Natural Capital Summit

natural capital summit

@NatCapSummit #NatCapSummit
www.naturalcapitalsummit.com

Natural Capital Factory

natural capital [factory]

NATURAL CAPITAL COALITION
Regional Platform

@NatCapSummit #NatCapSummit
www.naturalcapitalfactory.com

LafargeHolcim Group

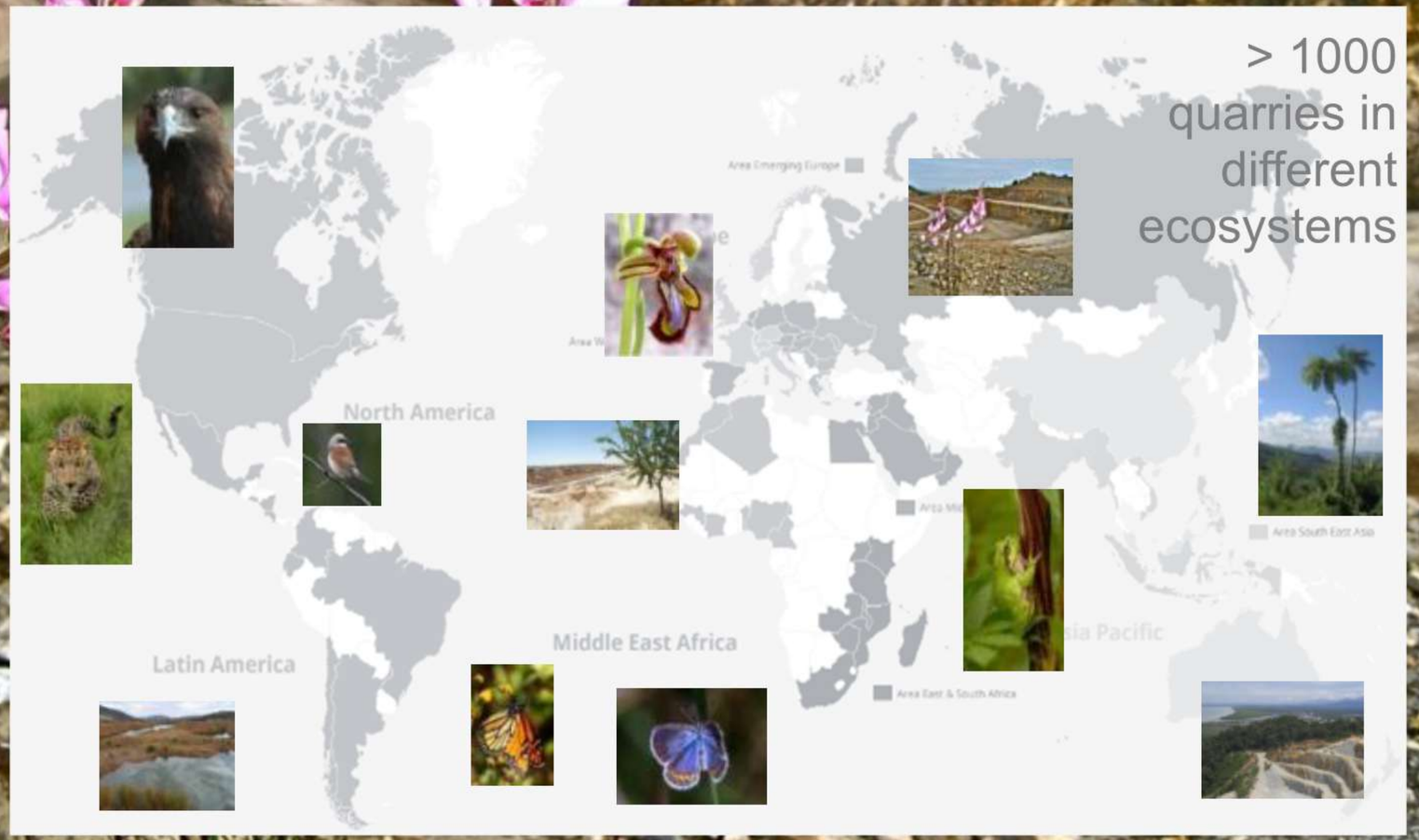
Worldwide presence

2,300
operations

26,9
Billion CHF (Swiss francs) net sales

80,000
employees

Listed on SIX Swiss Exchange and Euronext



> 1000 quarries in different ecosystems

Why this project? Why to promote a new conception of quarry restoration?

https://www.youtube.com/watch?v=qGy9xBq19hs

The WHY

— We are working with conservation experts who are exploring new opportunities to enhance biodiversity in mining spaces. These opportunities **(biodiversity hotspot)** usually **don't suit official restoration plans**.

Barriers identified

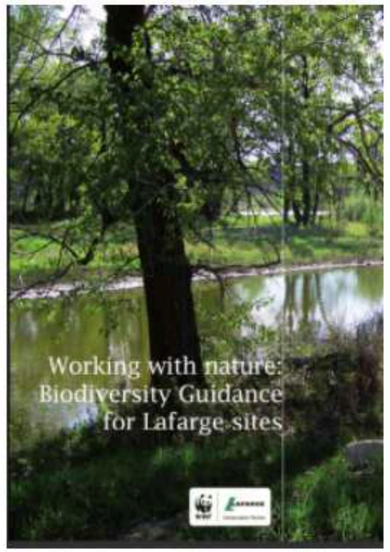
— From vision (Global Net Positive Impact) to action (how quarry managers can apply and work to achieve group´s).

— Obsolete restoration plans and administrative barriers (fillings to adopt homogeneous and smooth final morphologies; quick-growing reforestation).

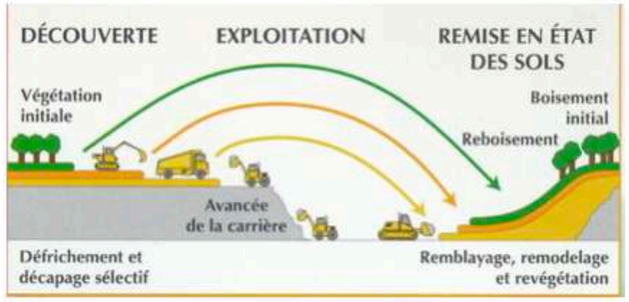
— How to make **understandable** the **coexistence between mining activity** and **endangered species.**

PROBLEMS of implementing Biodiversity Actions

From VISION TO ACTION



OBSOLETE Restoration Plans and ADMINISTRATIVE OBSTACLES



Understand posible COEXISTANCE of MINING activity and ENDANGERED SPECIES

EC@CSA
Reserva de Biodiversidad

LafargeHolcim

We realized that to be able to objectively assess and value positive outcomes we are obtaining through restoration actions that **GO BEYOND LEGAL REQUIREMENTS** and aim to achieve **GLOBAL NET POSITIVE IMPACT**, we need a **SCIENCE-BASED TOOL.**

THE 2030 PLAN
BUILDING FOR TOMORROW

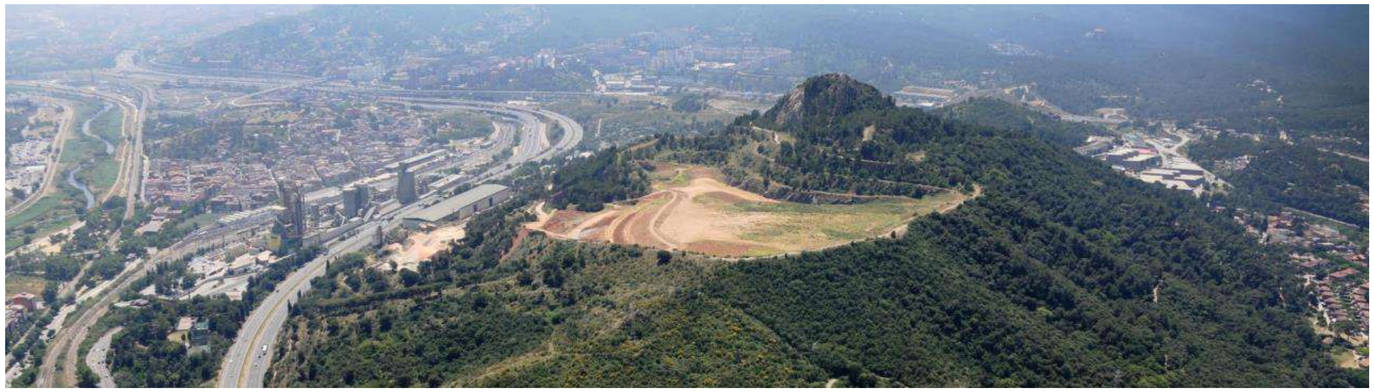
NET GLOBAL POSITIVE IMPACT

The WHY

LH Spain has 2 examples of restoration that are generating many ecosystem services:

Yepes-Ciruelos quarry: In collaboration with Castilla-La Mancha University where we are developing experimentation works based on ecological restoration through natural succession.

https://view.genial.ly/57fbb37894fe1f6ad0b13f8d/recovery-of-the-ecological-value

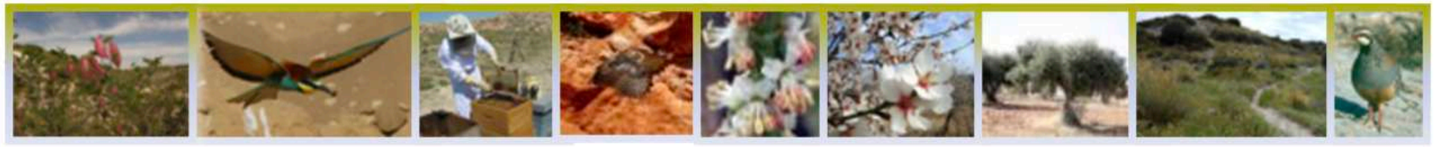


Land stewardship project in Turó de Montcada quarry along with NGO

ACER

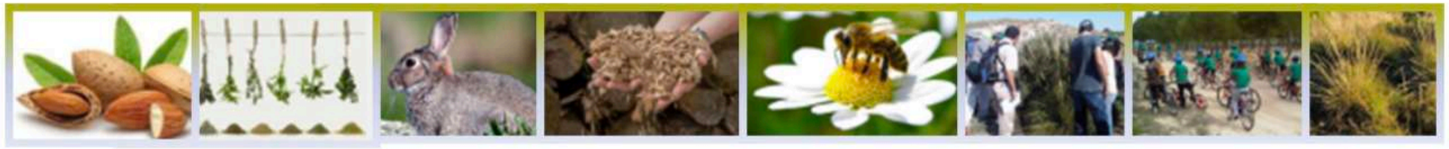
EC@CSA
Reserva de Biodiversidad

IDENTIFY ENVIRONMENTAL RESOURCES



Habitats, plant species, crops, aromatic plants, mushrooms, endangered plant species, animal species, bees, game species, birds, threatened animal species, soil, LANDSCAPE

IDENTIFY ENVIRONMENTAL SERVICES



Food, biotic raw material, hunting stock, renewable energy, pollination, soil fertility, biological control, climate regulation, scientific knowledge, aesthetic enjoyment, cultural identity.

CLASIFY ENVIRONMENTAL SERVICES

CICES: (i) **Supply** (food , wood, honey...); (ii) **Regulation and Maintenance** (pollination, soil fertility ...); (iii) **Cultural** (scientific knowledge conservation threatened species, aesthetic-sport enjoyment ...)

ECONOMIC VALUATION

Value of **"use"** and **"not use"**; Declared preferences; Revealed preferences; Market prices; Transfer of value for travel cost ...

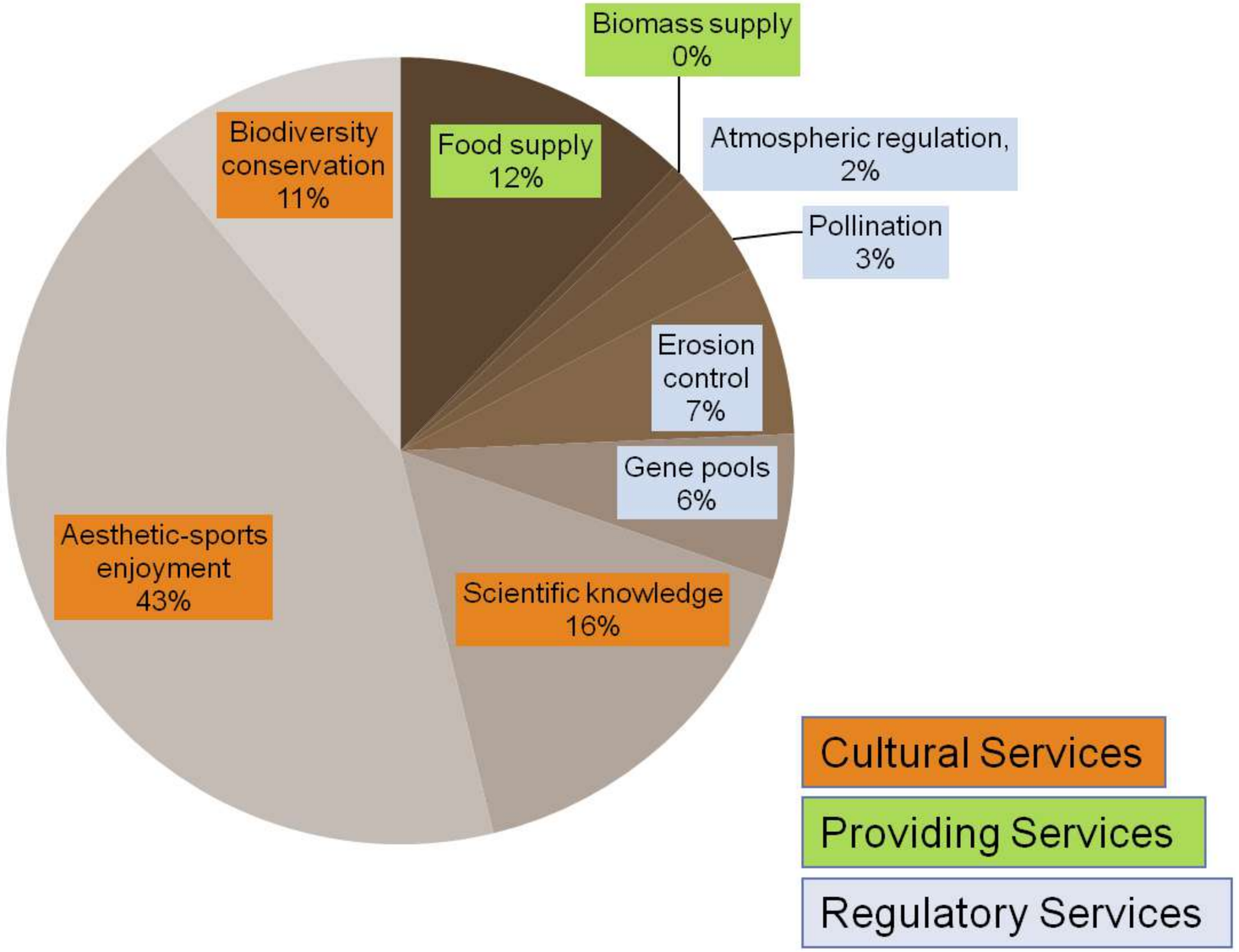
V feed = V hives + V ekinetics + aromatic V + V almond + V olives + V c. dry land
V biomass energy = V almonds + V olive trees + V vines
V atmospheric regulation = V forest masses and woody crops + V soil absorption
V pollination = V bees
V scientific and biological knowledge = V scientific studies + V experimentation + V classroom nature
...

COST-BENEFIT ANALYSIS

Investment and restoration costs in ecosystem services

During a first ES assessment carried out in Yepes quarry (Toledo) in 2016, outcomes showed many ES value generated by restoration actions were related to provisioning services which contributed to improve local economy (such us grazing, agriculture, forest biomass exploitation …).

LafargeHolcim Spain wants a **different approach** for its restoration works to foster the generation of value **based on biodiversity conservation and with the aim of achieving Global Net Positive Impact objectives.**



The WHY

— The aim of this project is to **objectively assess and value ES generated** in the aforementioned two projects (Yepes-Ciruelos) and Turó de Montcada and other 20 restoration initiatives we are working on, according to an internationally-accepted scientific framework.

— We need an **easy-to-use tool** to be used by quarry managers, other practitioners and Communication department which **provides real and understandable information to persuade.**

To develop the desired easy-to-use and Science-based tool we need to achieve 3 milestones

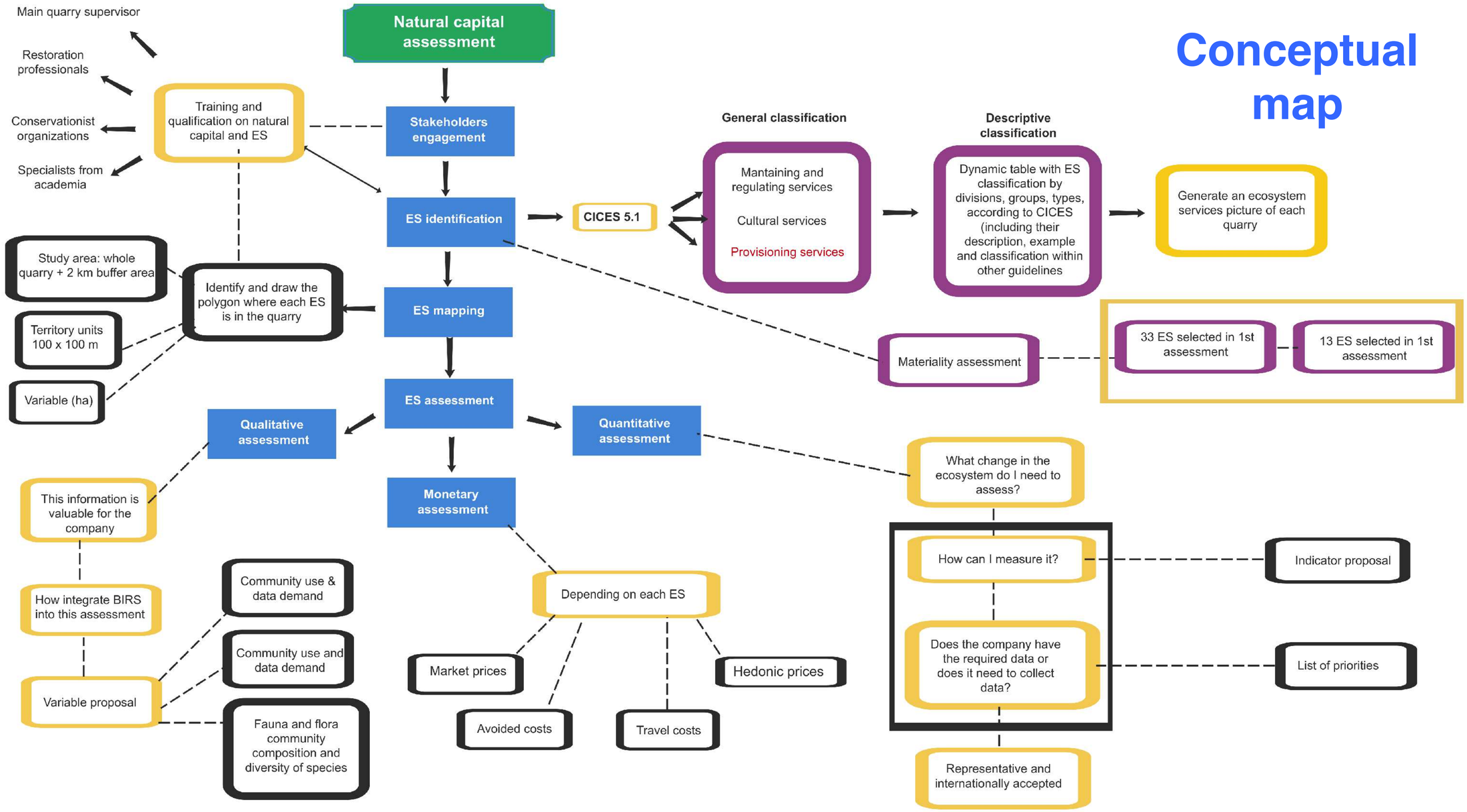
Project milestones

Milestone 1: To identify the existing ecosystem services in LafargeHolcim Spain quarries or those that are likely to be included for future restorations.

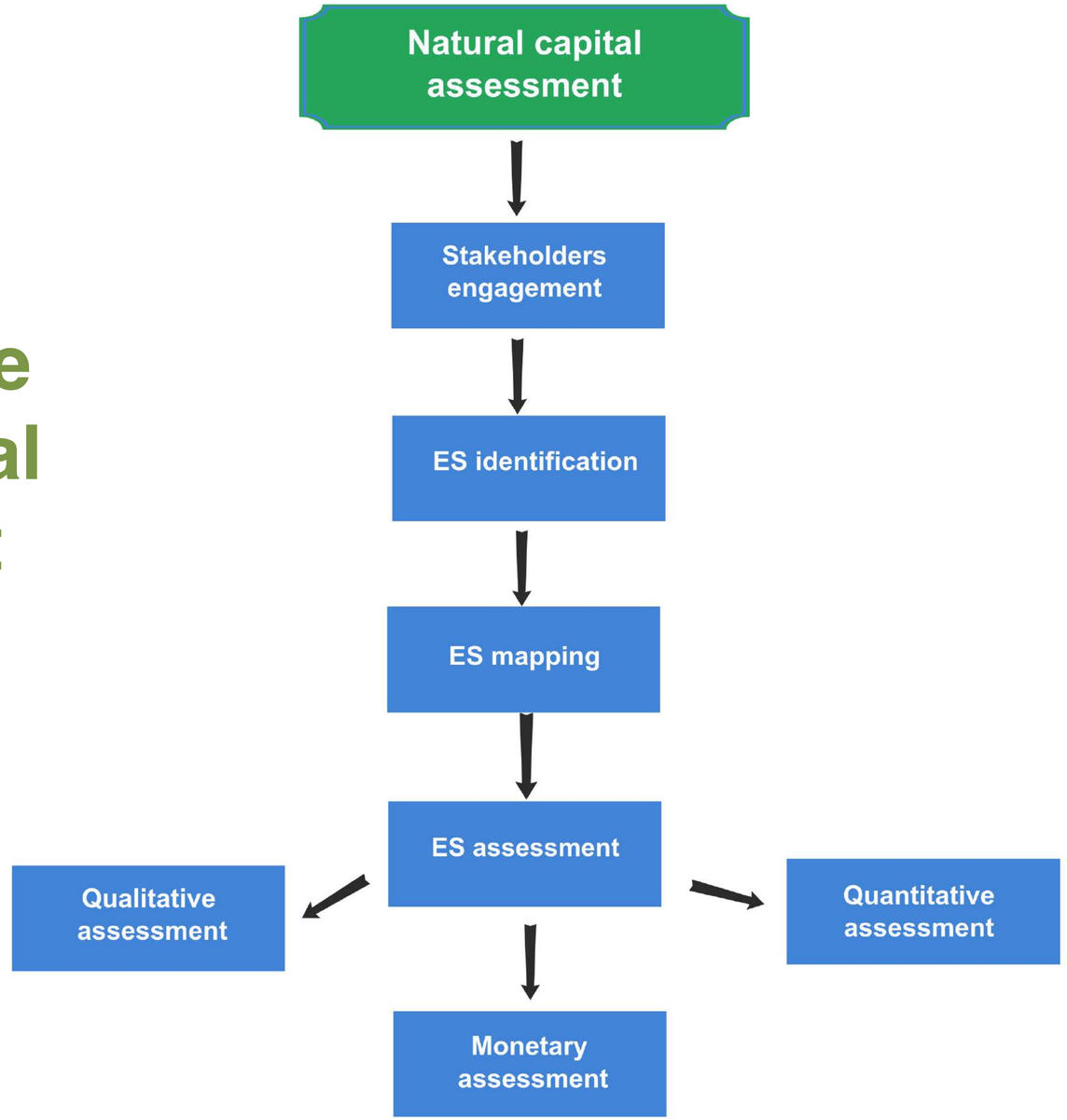
Milestone 2: To development a methodology for qualitative, quantitative and monetary analysis of the ES identified by LafargeHolcim Spain.

Milestone 3: To integrate the aforementioned methodology into an internal implementation tool. Develop two case studies as sensitivity and validation analysis.

To be successful with these tasks, we are developing an ES-based natural capital assessment according to conservation criteria of LH Spain Quarry Restoration Strategy



Phases of the natural capital assessment carried out

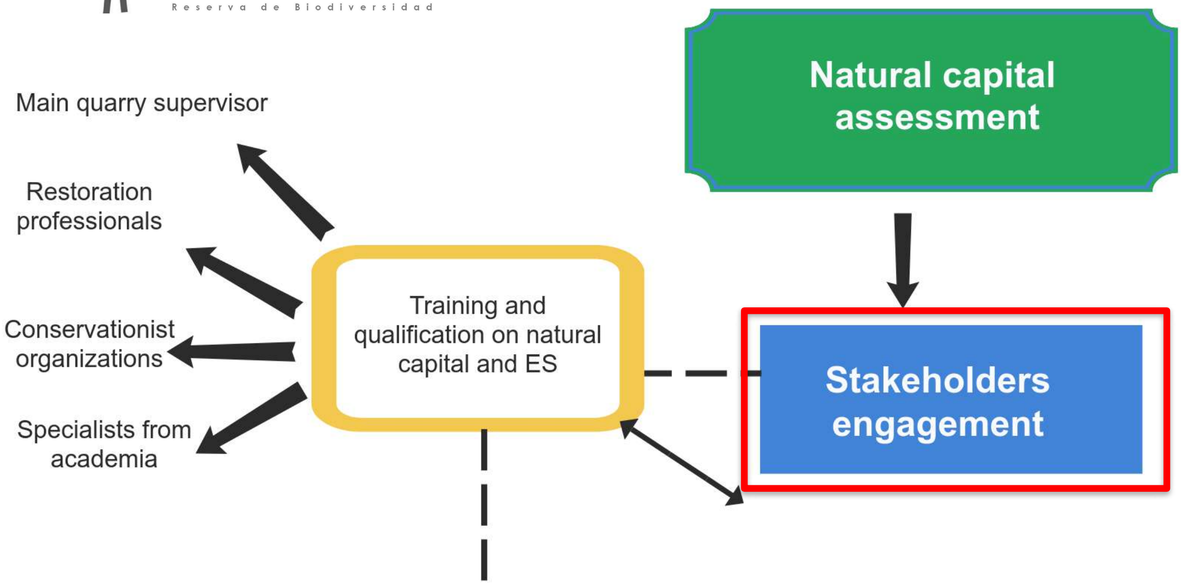


Project milestones

Milestone 1: To identify the existing ecosystem services in LafargeHolcim Spain quarries or those that are likely to be included for future restorations.

Milestone 2: Development of a methodology for qualitative, quantitative and monetary analysis of ecosystem services identified as relevant by LafargeHolcim Spain.

Milestone 3: To integrate the aforementioned methodology into an internal implementation tool. Develop two case studies as sensitivity and validation analysis.



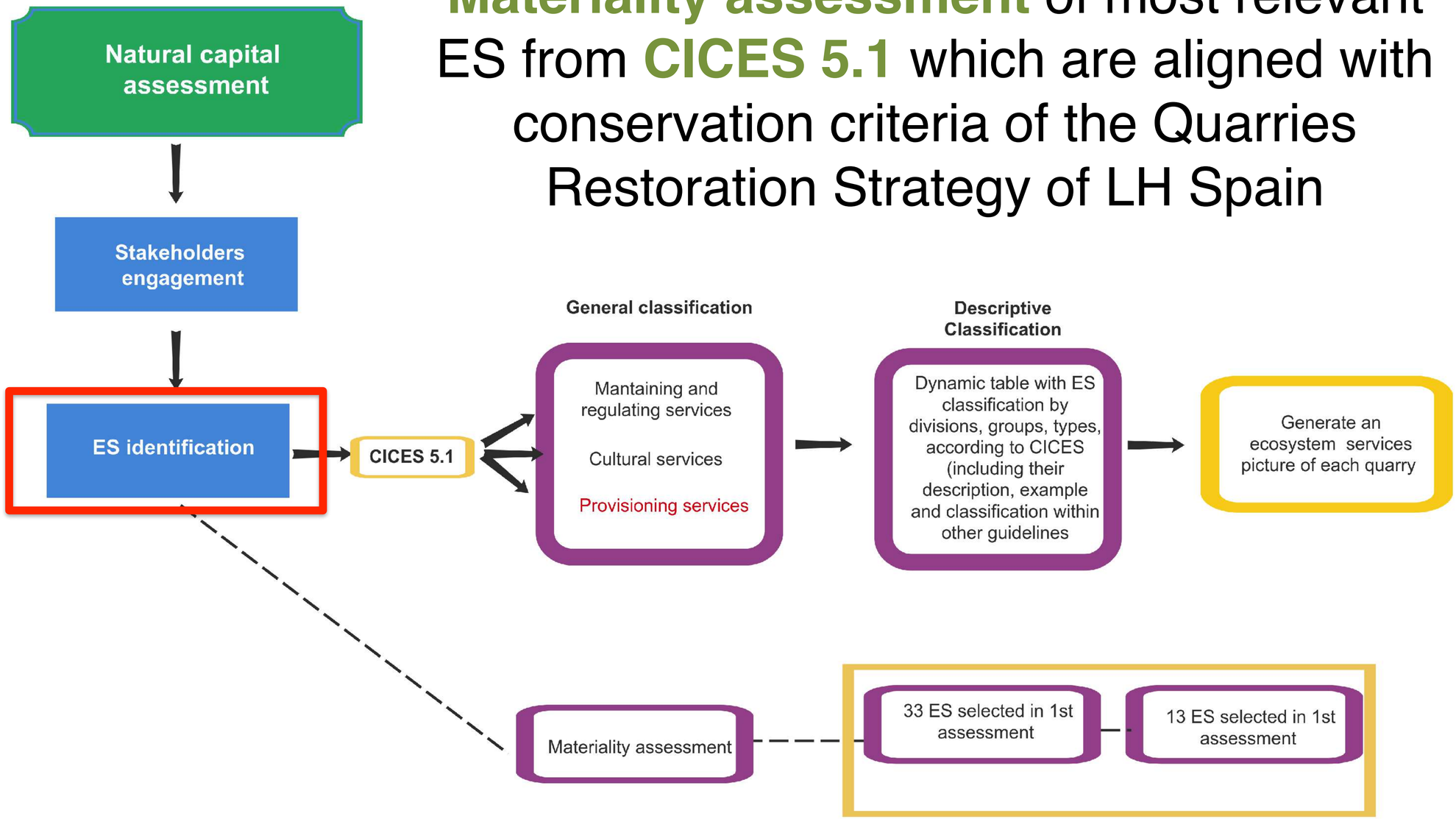
Multidisciplinary group

Common language and framework

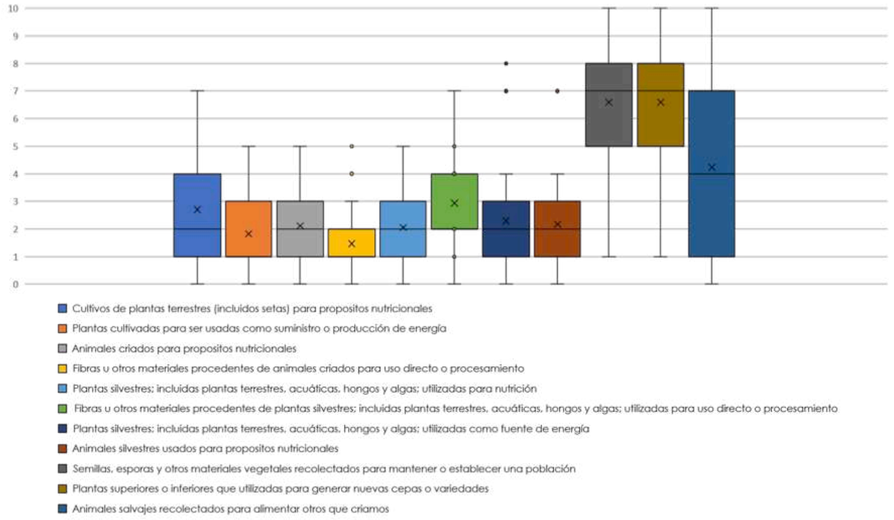
We selected stakeholders according to conservation objectives and brought together specialists from academia, NGOs, conservation organisations, consultancy sector and LF Spain staff to create a multidisciplinary working group. We provided specific training and qualification on natural capital and ES so all members can speak de same language and work under the same framework.

To be able to apply BIRS tool in its quarries, LH Spain has trained quarry and environment managers with the support of conservationists collaborators.

Materiality assessment of most relevant ES from **CICES 5.1** which are aligned with conservation criteria of the Quarries Restoration Strategy of LH Spain



Due to this focus, one of the first decisions taken consisted in **removing most provisioning ES** from the final list.

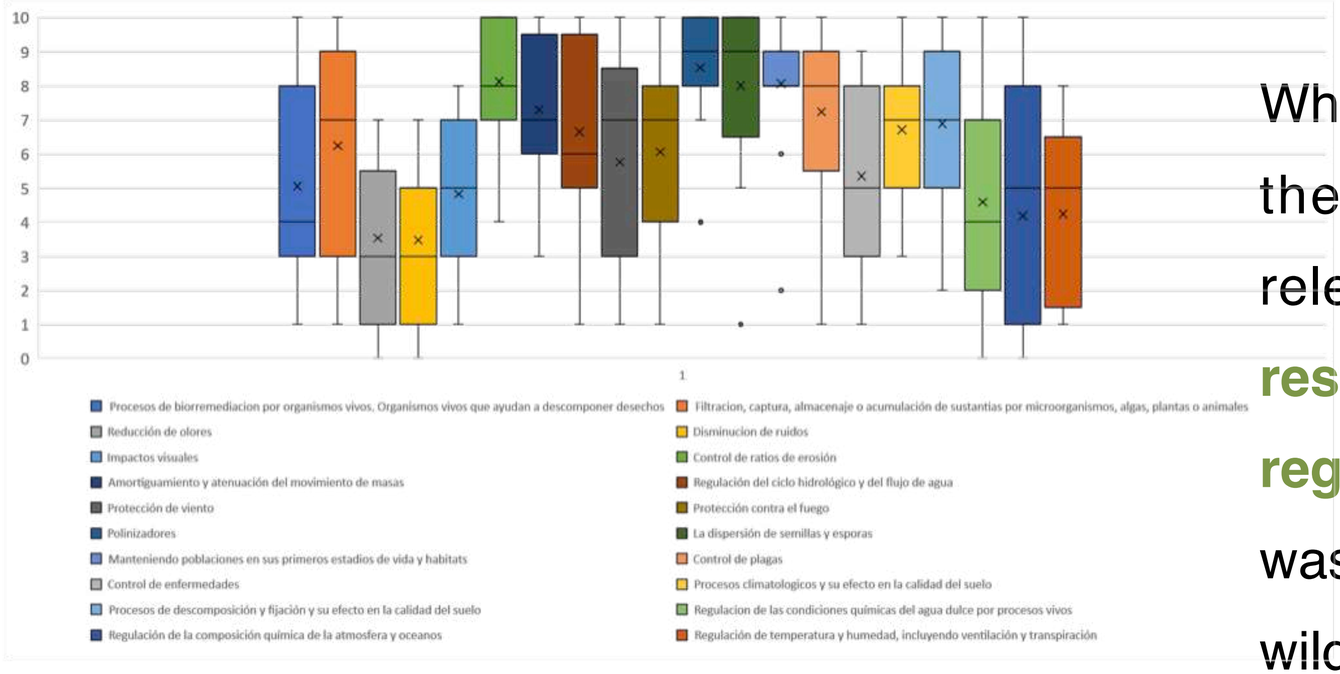


Expert group members first identified those **ES that best comply** with restoration criteria for biodiversity conservation defined by LH Spain. Among all CICES ecosystem services, **52** 'provisioning', 'regulation and maintenance' and 'cultural' **ESs** —both existing or that are likely to be included for future restorations— **were selected.**

qualtrics

We used **Qualtrics** to collect the opinions from consultations with all experts to evaluate the materiality and relevance of these 52 ES to decide which to be part of the methodological tool.

Some results from consultations…

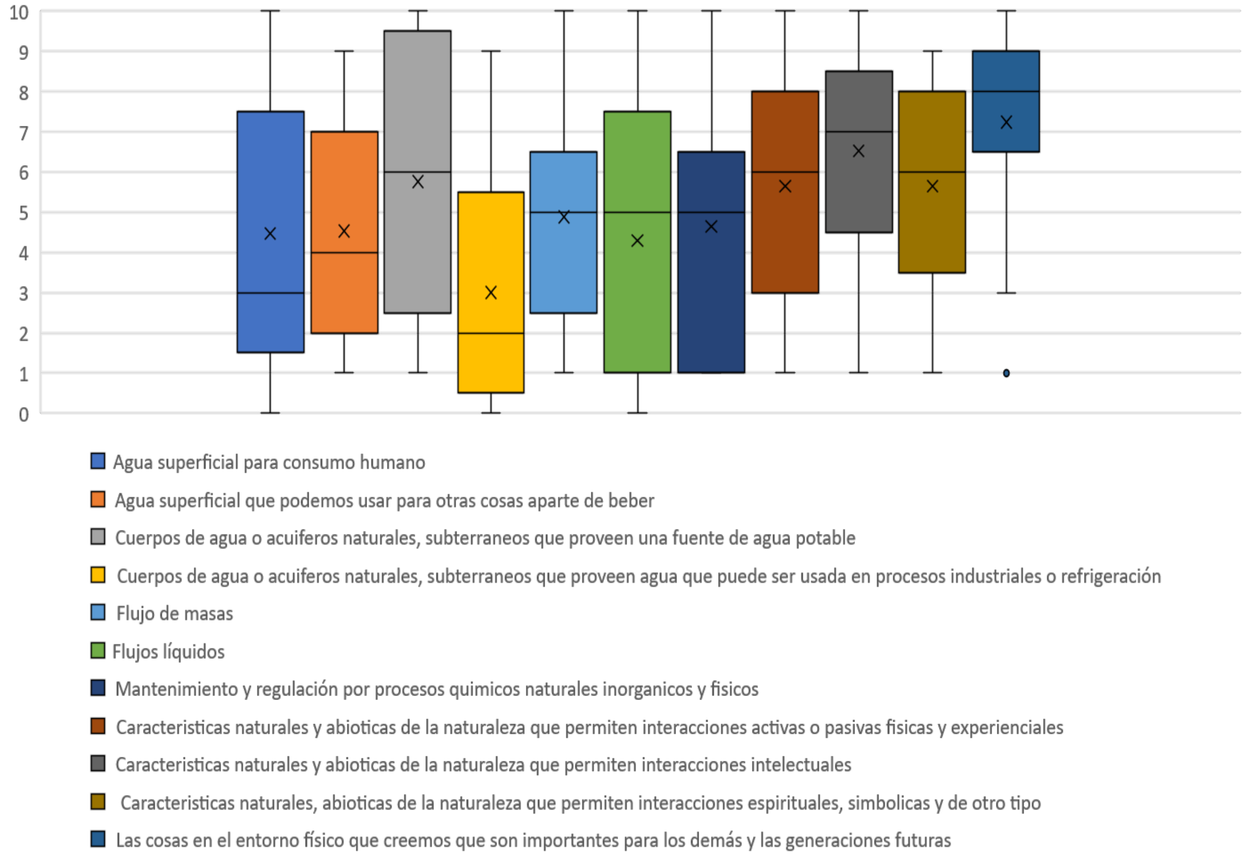


When talking about biotic provisioning services, there was a **general consensus** on the relevance of the **availability of seeds for restoration processes** or **adult plants in the regeneration** of an ecosystem. However, there was a widespread difference of opinions about wildlife trapping to feed other semi-captive reared animals.

Main ecosystem services linked to **increase local economy**, such as grazing, agriculture or harvest of forest biomass exploitation and wild raw materials were considered to be of **little relevance** within LH Spain restoration strategy. This strategy pursues natural conservation purposes that are not compatible with these uses.

As regards **biotic regulation and maintenance ESs**, only two of them —**pollination and seed dispersal**— gained general **consensus** in terms of high relevance.

In relation to **biotic cultural ecosystem services**, there was a **lot of consensus** and **all of them** were considered as **particularly important** for LH Spain quarry restoration strategy.



Only **few abiotic ecosystem services** were categorized as relevant in the first place by members of the expert group so we decided to open another discussion with the working group to better analyze if any of the abiotic ESs is crucial to actions and decisions taken in LH Spain quarries restoration strategy.

Final outcomes shows:

— Among all 52 ES selected, **33** were identified as **potentially relevant** when carrying out actions on the ground to help maintain and improve natural capital.

We have used SMART concepts

Our tool has to comply with SMART principles: be Simple, Measurable, Applicable, Relevant (internationally-accepted) and Time-related (scaling up).

A practical suit of tools for measuring and monitoring ES at site scale

Challenge identified using SMART:

How to measure some ES involving species that still don´t have recognized metrics

Challenge identified during ES identification

33 ES were still considered **too much** to assess to comply with SMART principles and the objective of developing a tool to be used by practitioners in the field. That's why we decided **to group most relevant ES** and potentially important ES and of course we removed those **ES generated by restoring actions implemented due to legal requirements** (erosion control, visual impact).

We finally decided to focus on 13 maintaining and regulating and cultural ES in order to remain faithful to get an easy-to-use tool and value those ES which enhance biodiversity

Seed bank and plants developed for reproduction

Biodiversity generation and maintenance and individuals´ extraction

Pollinators

Seed dispersal

Filtration / sequestration / storage

S & P

Fire protection

Pest and disease control

Pedogenesis and organic material generation

CO_2 sequestration

Regulation of temperature and humidity, including ventilation and transpiration

Active or passive enjoiment of the ecosystem by society

Educating and generating knowledge

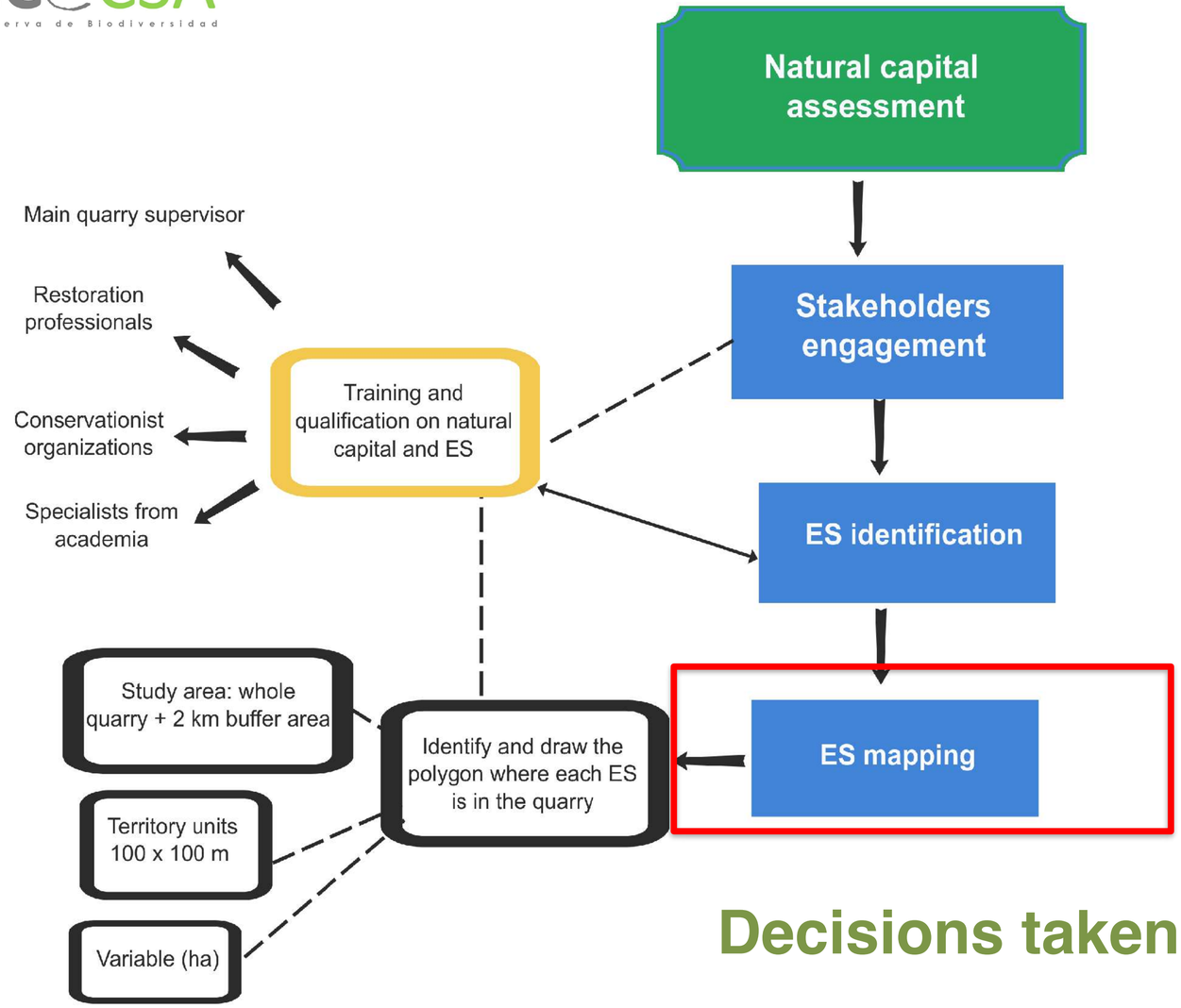
Unique value areas to be conserved for future generations

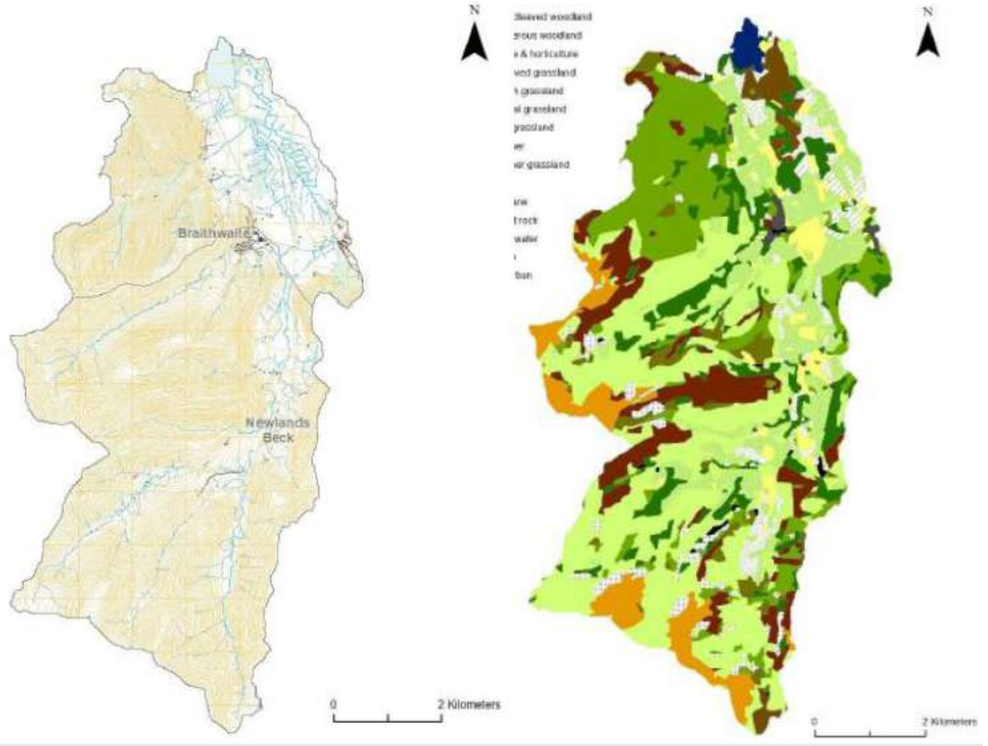
Project milestones

Milestone 1: To identify the existing ecosystem services in LafargeHolcim Spain quarries or those that are likely to be included for future restorations.

Milestone 2: Development of a methodology for qualitative, quantitative and monetary analysis of ecosystem services identified as relevant by LafargeHolcim Spain.

Milestone 3: To integrate the aforementioned methodology into an internal implementation tool. Develop two case studies as sensitivity and validation analysis.





Decisions taken during ES mapping

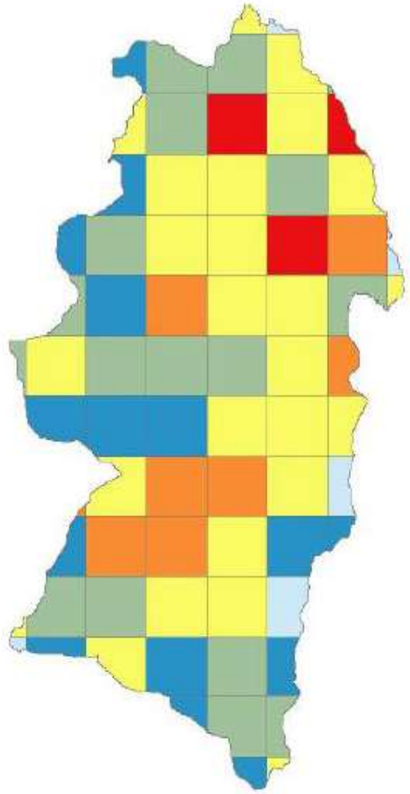
— Use SIG to draw polygon layers to delimit and identify each ES in each quarry.

We worked in the development of a methodology to carry out the **mapping and quantification** of the ES identified as potentially relevant.

For this purpose, different variables were proposed and **indicators** were created to measure the status of each ES and their **evolution over time**, as well as to determine the type of service offered to society in order to carry out an **economic valuation.**

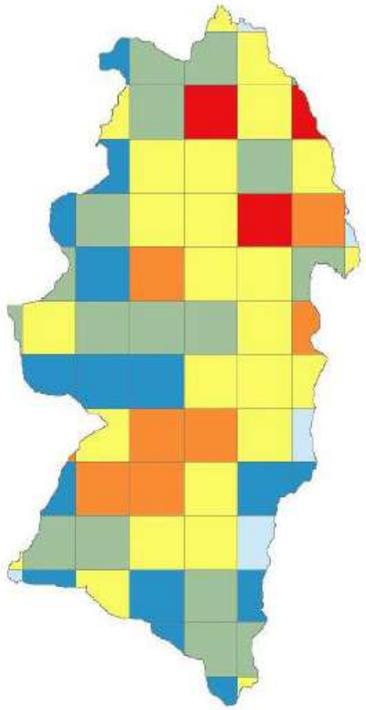
The first step consisted in identifying which ES are offered to society by each of the quarries that will be analyzed.

To show restoration works in the best understandable and visual way we used **geographical information systems (SIG)** which allowed us to show through color maps measured variables by category.



Restored areas with a greater number of ES

Restored areas with a smaller number of ES



Second step: Defining the level of resolution and detail of our natural capital analysis. To do this, we selected a framework defined by:

— Total area occupied by a quarry (in hectares).

— Area occupied by each ecosystem service (ha).

— Information availability.

— Level of detail and bias accepted by analysis.

Decision making tool to develop actions in restorations according if they provide more or less ecosystem services

Decisions taken during ES mapping

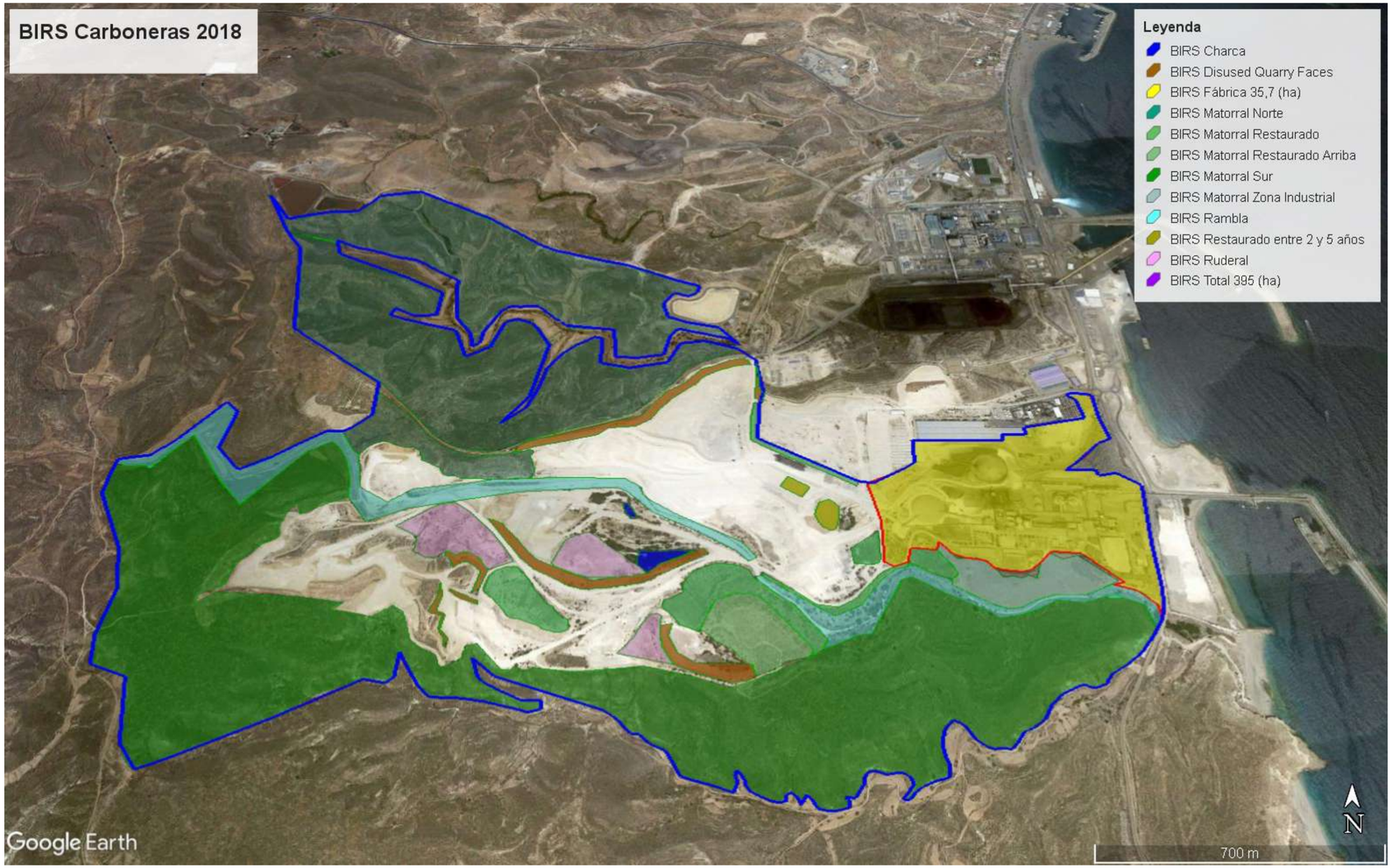
1. – Match influence area with **BIRS (Biodiversity Indicator and Reporting System, IUCN)**.
2 .– Area to be measured (quarry area + 2 km buffer)
3.– Territorial unit of measurement 100 x 100 m

Technical needs

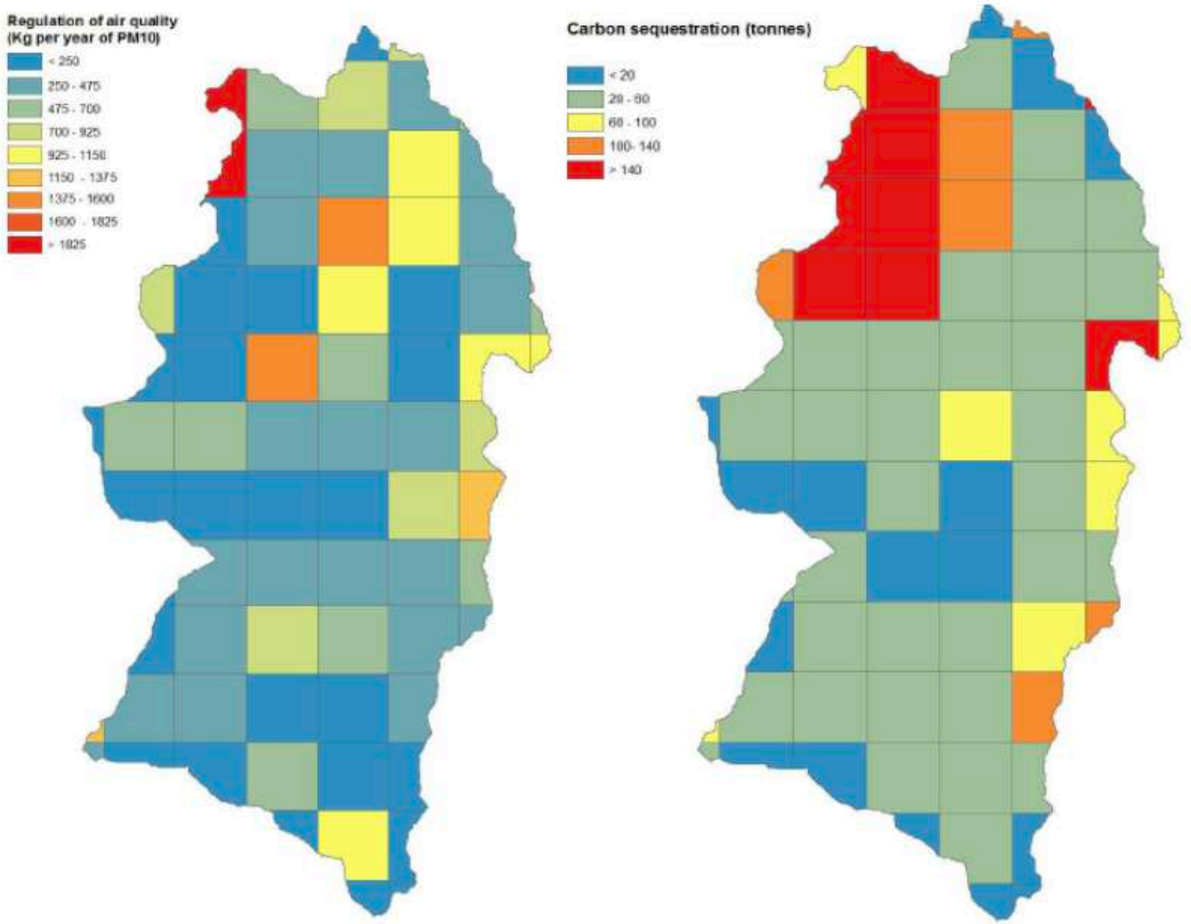
1.- Minimun level of SIG knowledge.

2.– ES identification knowledge.

Carboneras quarry identification map



The third and final step is to **extract the information and generate our database.**



Air quality regulation CO_2 sequestration

Examples of quantitative representation of ecosystem services using this methodology

Proposal of measurement and evolution indicators for each ES

We (working group) are developing a proposal of variables to be measured to each ES, along with:

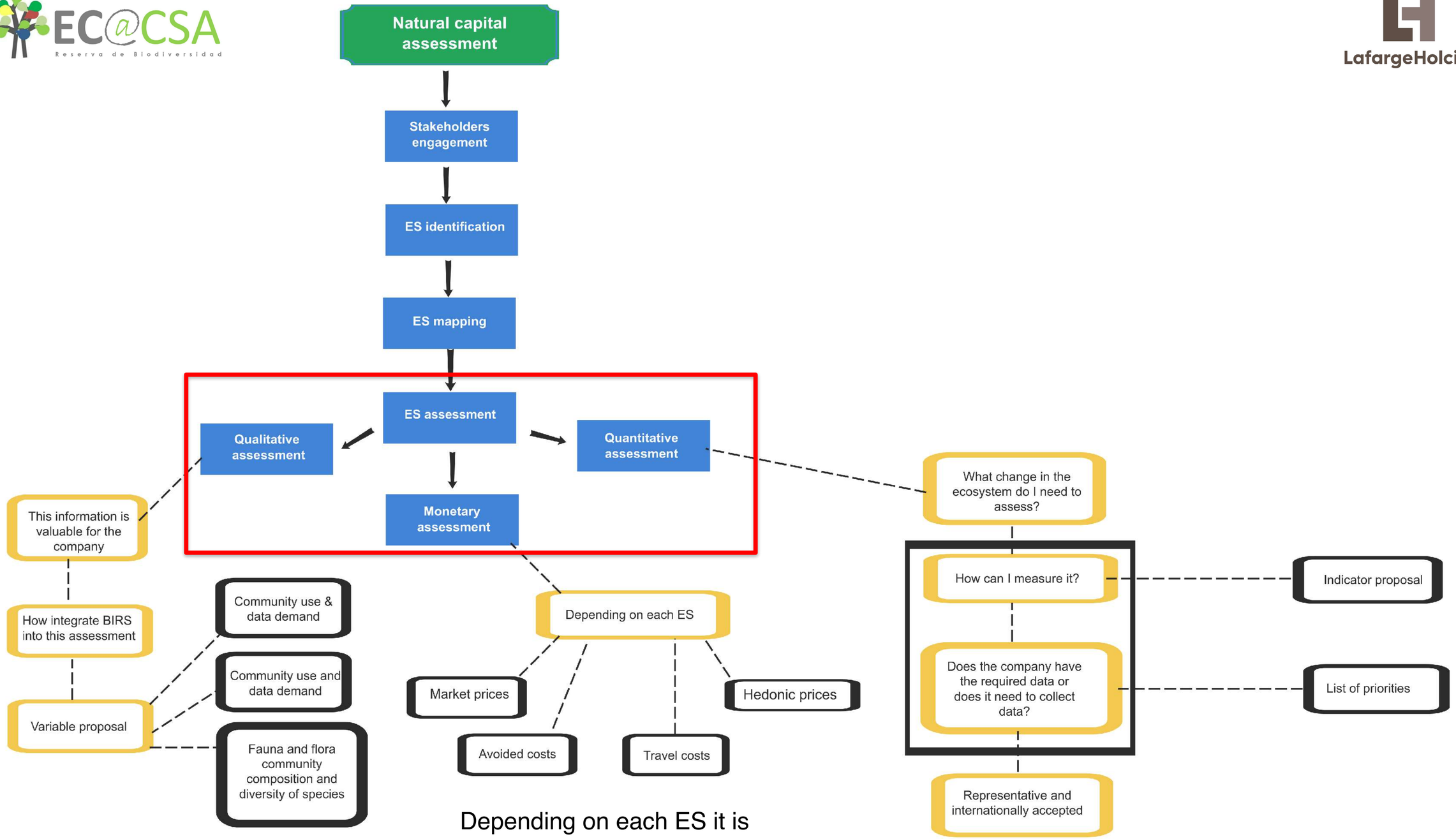
1.- An indicator that assess its evolution.

2.- An indicator to measure its qualitative level and,

3.- A proposal for its economic valuation.

Availability of specific data (number/type of species, market prices, etc.), is key to assess ES identified as relevant.

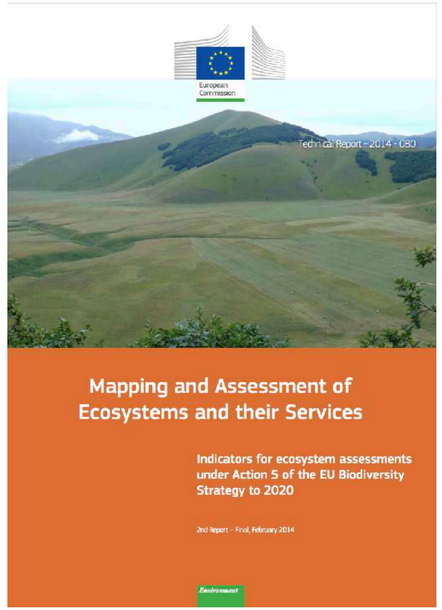
A key issue will be to be able to delimite population data of most characteristic species taking into account quarry managers expertise/knowledge and complying with conservation goals.

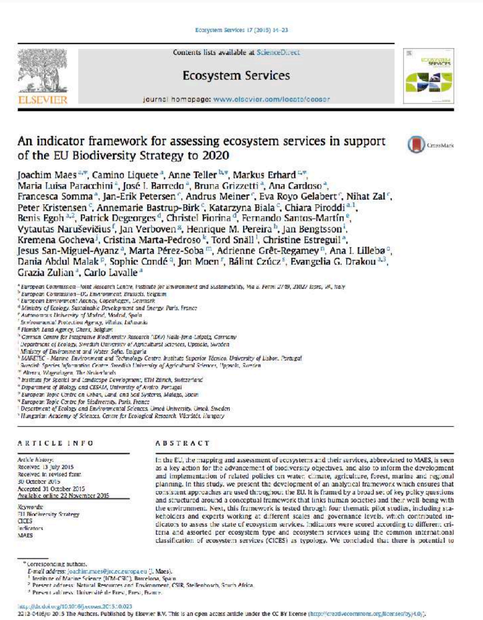


Depending on each ES it is applicable one or other methodology

Some indicators are based on proposals made by **TESSA** and **InVEST** tools and we have also developed other metrics for ES which did not have references (lack of information on cultural and abiotic services, which are very relevant to a quarry).

We have done a literacy review of publications such us **MAES** to make proposals on indicators aligned with a global accepted framework.





Project milestones

Milestone 1: To identify the existing ecosystem services in LafargeHolcim Spain quarries or those that are likely to be included for future restorations.

Milestone 2: Development of a methodology for qualitative, quantitative and monetary analysis of ecosystem services identified as relevant by LafargeHolcim Spain.

Milestone 3: To integrate the aforementioned methodology into an internal implementation tool. Develop two case studies as sensitivity and validation analysis.

The case studies will be developed in Turó de Montcada and Yepes (so we can compare the outcomes obtained in the first ecosystem valuation carried out in 2016 with those resulting from current natural capital assessment).

Key messages

We have found that there is a big need of Science-based references to enhance natural value generated through restoring and conservation actions.

There are very few businesses dedicating efforts and resources to ES valuation. We need to spread the word and find a proper narrative to involve other companies.

— We can involve other mining companies by demonstrating that through this new way of restoring quarries they could reduce mining costs.

— All mining companies have financial guarantees to undertake rehabilitation projects. If this new rehabilitation pattern is adopted extensively, economic resources will be used to **create green jobs and achieve Natura 2000 Network objectives.**

Key messages

Why conservation is insufficiently valued? It is widely believed that conservation is an issue exclusive to Science. This is why we have found very relevant ES related to environmental education and conservation, so these values cross conservationist arena to reach general public.

We need to bring Science closer to business for the benefit of a better way of restoring which prioritize conservation objectives and provide valuable al reliable information to monitor progress towards achieving Global Net Positive Impact goal.

Questions for the audience

- What is your perception of public and policy makers´ opinion about our bet on ES assessment and restoring actions focused on conservation improvement?
- How to involve governments in the task of promoting this new model of quarries restoration?
- How to persuade media to improve their accuracy when they inform about biodiversity to raise awareness among general public on the importance of conservation?
- Existing regulatory framework makes it easier to exploit than to conserve? How can we turn the tide? Is time to turn from conservation focus to restoration action?
- What do you think about the process and tool we are developing? Could it be useful an efficient to place biodiversity at the same level as climate change?

Bibliography

Methodological process

— Cowling, R.M. *An operational model for mainstreaming ecosystem services for implementation*. 2008.
— King, H. *Introducing an ecosystem services approach to quarry restoration.* 2007.
— Egoh, B. et al. *Integrating ecosystem services into conservation assessments: A review.* 2007.
— Fisher, B. et al. *Defining and classifying ecosystem services for decision making.* 2009.
— UNEP-WCMC, LWEC, UK. *The UK National Ecosystem Assessment: Synthesis of the Key Findings.* 2014.
— Villegas-Palacio, C. et al. *Lessons from the integrated valuation of ecosystem services in a developing country: Three case studies on ecological, socio-cultural and economic valuation.* 2016.

Identification and mapping

— Brown, G & Fagerholm, N. *Empirical PPGIS mapping of ecosystem services a review evaluation.* 2014.
— Burkhard, B & Maes, J. Mapping Ecosystem Services. 2017.
— Haines-Young, R. & Potschin, M.B. *Common International Classification of Ecosystem Services (CICES) V5.1 and Guidance on the Application of the Revised Structure.* 2018.
—IFAD. *Good practices in participatory mapping. A review prepared for the International Fund for Agricultural Development (IFAD). 2009.*

Bibliography

Quantification

— UNEP. *Biodiversity Indicators for Extractive Companies -an Assessment of Needs, Current Practices and Potential Indicators Models.* 2017.

— Chan, K.M.A, et al. *Where are Cultural and Social in Ecosystem Services? A Framework for Constructive Engagement.* 2012.

—Devatha, *C.P. Estimation of Soil loss using USLE model for Kulhan Watershed, Chattisgarh- A case study.* 2015.

—MAES. *Technical Report.* 2014.

—Gaston, K. et al. *Population Abundance and Ecosystem Service Provision: The Case of Birds.* 2018.

—Prasannakumar, V. et al. *Estimation of soil erosion risk within a small mountainous sub-watershed in Kerala, India, using Revised Universal Soil Loss Equation (RUSLE) and geo-information technology.* 2012.

—IUCN. *Biodiversity managemement in the cement and aggregates sector: Biodiversity Indicator and Reporting System (BIRS).* 2014.

— Langemeyer, J. et al. *Contrasting values of cultural ecosystem services in urban areas: The case of Park Montjuïc in Barcelona.* 2015.

— Maes, J. et al. *An indicator framework for assessing ecosystem services in support of the EU Biodiversity Strategy to 2020.* 2016.

Bibliography

Quantification

—McCarthy, D. & Morling, P. *A Guidance Manual for Assessing Ecosystem Services at Natura 2000 Sites.* 2014.
— Brown, C. et al. *Measuring ecosystem services: Guidance on developing ecosystem service indicators.* 2014.
— Nelson, E. et al. *Modeling multiple ecosystem services, biodiversity conservation, commodity production, and tradeoffs at landscape scales.* 2009.
— Gary, W. L. et al. *Quantifying the Contribution of Organisms to the Provision of Ecosystem Services.* 2009.
— Taylor, P.J et al. *Economic value of bat predation services – A review and new estimates from macadamia orchards.* 2018.
— Peh, K. S-H. et al. *TESSA: A tool kit for rapid assessment of ecosystem services at sites.* 2013.
— Turner, R.K. et al. *Valuing ecosystem services : the case of multi-functional wetlands.* 2011.
— Sharp, R. et al. *InVEST +VERSION+ User's Guide.* 2016.


EC@CSA
Reserva de Biodiversidad
LafargeHolcim
TerimaKasih
DankuWel
谢谢
Obrigada
Shukran
Tack
EskerrikAsko
Tak
ThankYou
Dank
Köszönöm
Gracias
ขอบคุณค่ะ
Merci
Matondi
Salamat
ευχαριστώ

@Ecoacsa

jesuscarrasco@ecoacsa.com

davidalvarez@ecoacsa.com

mpferrer@ecoacsa.com

@LafargeHolcimES

pilar.gegundez@lafargeholcim.com