L'ACQUA NELLE TERRE ALTE:
un percorso di ricerca attraverso il sistema alpino
CNR ISE Verbania Pallanza, 4 dicembre 2015

CNR Consiglio Nazionale delle Ricerche

ISE Istituto per lo Studio degli Ecosistemi

Il contributo della *citizen science* allo studio dei laghi nelle Terre Alte

Citizen science contribution to the study of mountain lakes

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CNR - Istituto per lo Studio degli Ecosistemi I.S.E. Verbania Pallanza

irea istituto per il rilevamento elettromagnetico dell'ambiente

FONDAZIONE EDMUND MACH

What is citizen science?

HISTORY

CS has a history that dates back to the beginning of human civilisation e.g. domestication of crops and animals by farmers and the study of birds and butterflies by amateur naturalists

DEFINITIONS

✓ Research techniques that enlist the help of members of the public to gather scientific data (Bonney et al., 2009)

✓ Involvement of volunteers in science (Roy et al., 2012)

Today CS is used to refer to:

- Knowledge of local environments
- Knowledge gained through experience
- Submission of scientific data by large numbers of volunteers

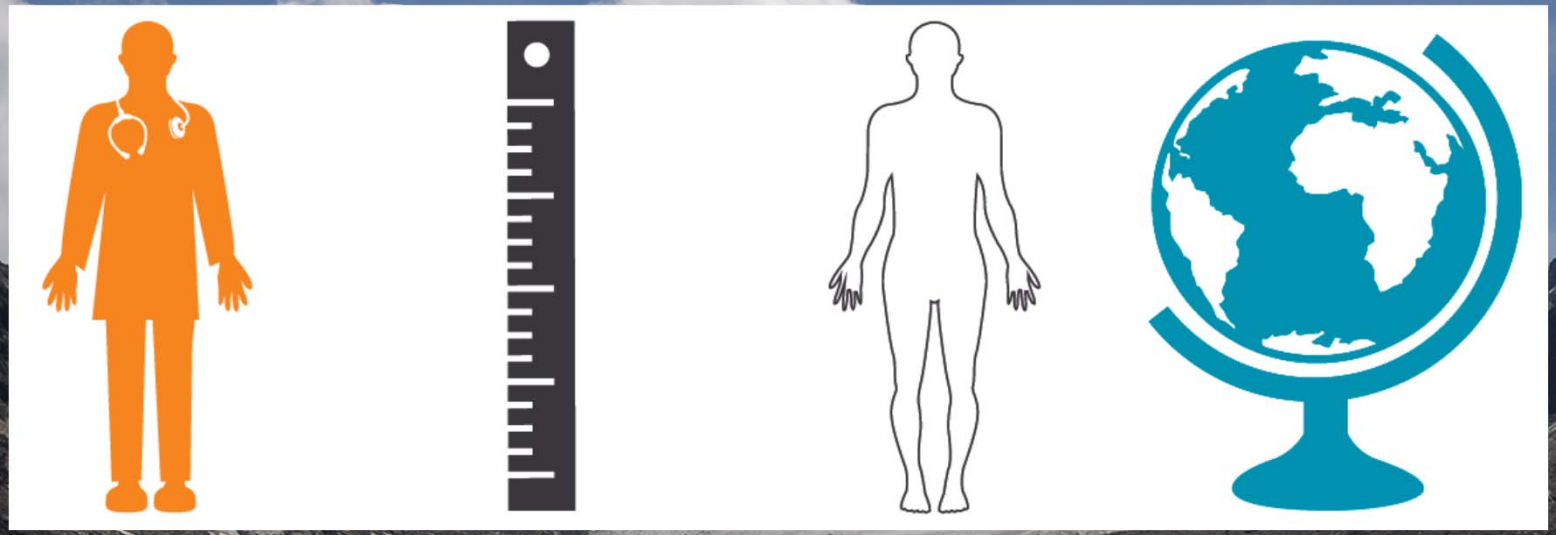
EUROPEAN CITIZEN SCIENCE ASSOCIATION

IN PRACTICE

CS refers to a diverse range of projects with widely different aims and objectives

Section 16.
Science with and for Society

What is the value of citizen science?



Scientific

The value of CS is dependent on the quality of data collected

Educational

The educational benefits of CS are found in formal education or as part of informal learning

Social

CS has the potential to bring society closer to science and to nature

Policy

CS can serve policy makers by
- raising awareness about an environmental issue
- providing evidence

Citizen science categories

Level 1
«Crowdsourcing»

- Citizens as sensors
- Volunteered computing

Level 4
«Extreme citizen science»

- Collaborative science: problem definition, data collection and analysis

PARTICIPATION LEVEL

Level 2
«Distributed intelligence»

- Citizens as basic interpreters
- Volunteered thinking

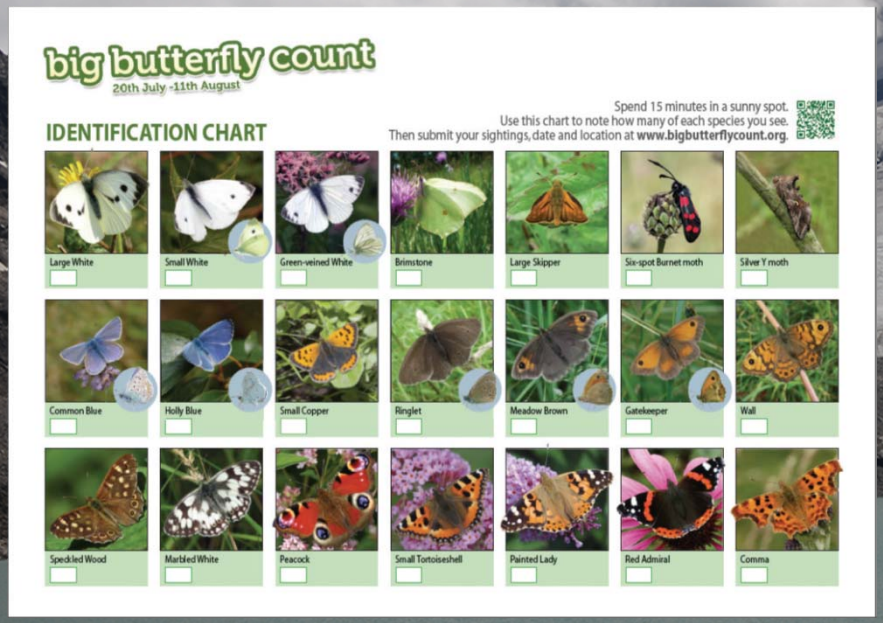
Level 3
«Participatory Science»

- Participation in problem definition and data collection

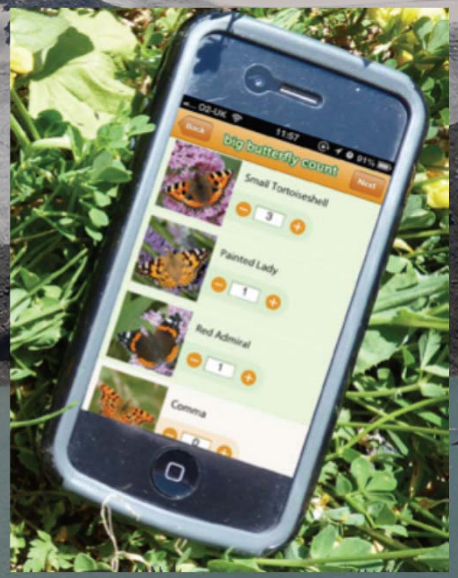
TECHNOLOGY generated a new 'wave' of CS projects

- Internet
- Smartphone sensors
- Online or phone-based games

offer new ways to influence how science and policymaking are carried out



http://www.bigbutterflycount.org/



For more information:

- Report "Environmental Citizen Science"
http://ec.europa.eu/environment/integration/research/newsalert/pdf/IR9_en.pdf

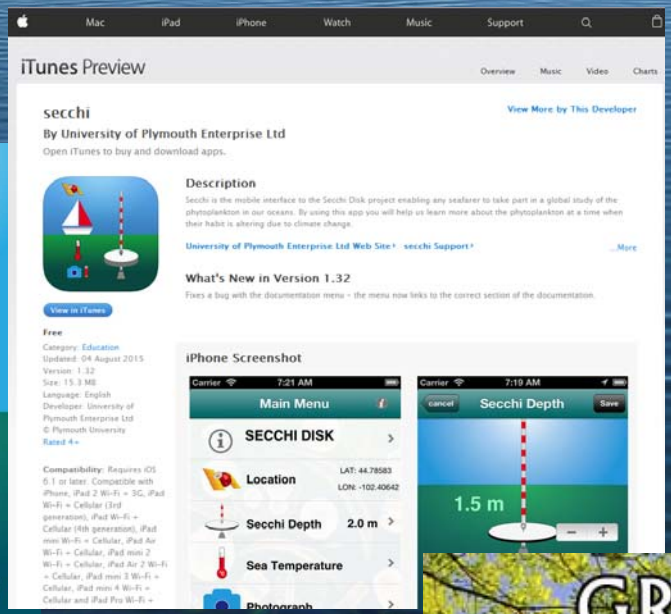
- Science for Environment Policy website
http://ec.europa.eu/environment/integration/research/newsalert/index_en.htm

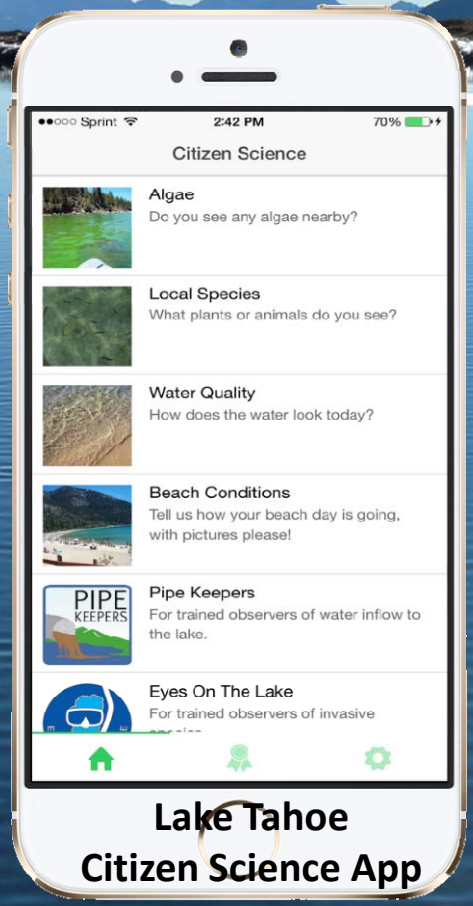
European Commission

Citizen science and and lakes

Citizen participation in the gathering and dissemination of credible scientific information pertaining to lake health, through, e.g.

- monitoring indicators of water quality (e.g. transparency, temperature, dissolved oxygen)
- tracking Ice-In & Ice-Out
- screening lakes for specific aquatic plants and animals





Lake Tahoe Citizen Science App

EU experience: NETLAKE (NETworking LAKE Observatories in Europe)

Making citizens AWARE of their water resources

↓

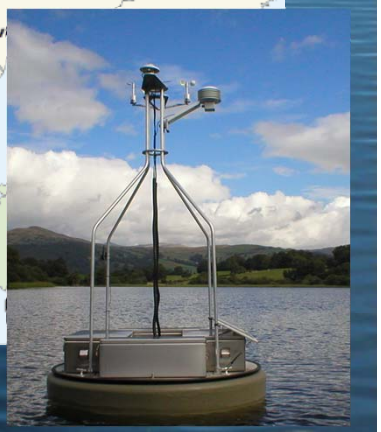
PROTECTION of water resources

25 COST countries + 3 NON COST

A network of sites and individuals that will support the development and deployment of sensor-based systems in lakes and reservoirs and promote the use of these systems to address both current and future water quality issues

Chair:
Eleanor Jennings, DkIt, Ireland

MC members for Italy:
Michela Rogora, CNR ISE
Giovanna Flaim, FEMS



Working Group 1
Data management and acquisition

Working Group 2
Data analysis and modelling tools

Working Group 3
Citizen science initiative

Working Group 4
Informing policy and management

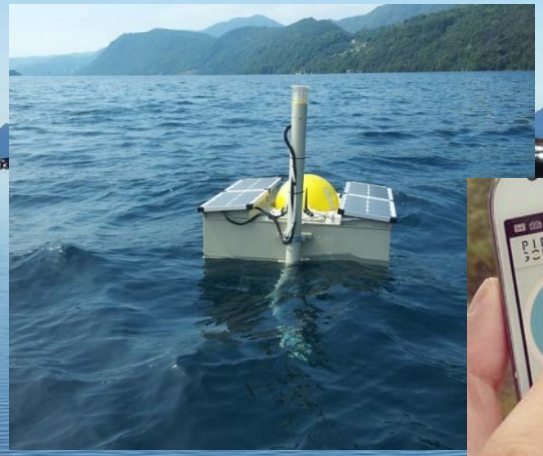
Citizen science in NETLAKE

Involving citizens and end-users

LIVING LAB

PITAGORA

REGIONE PIEMONTE



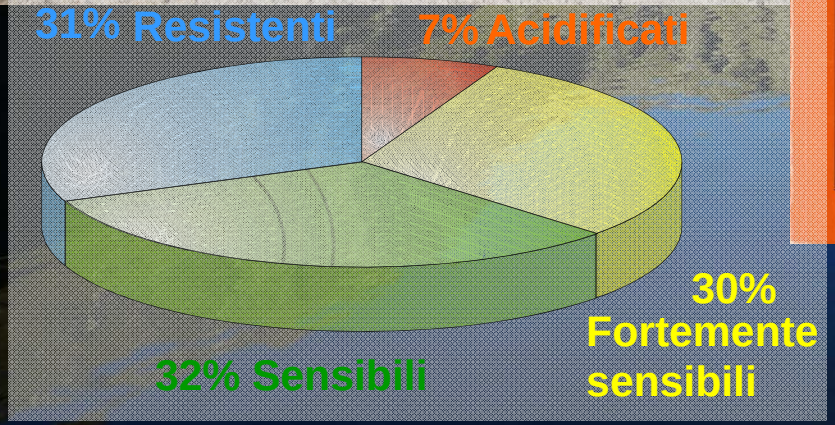
Involving Schools

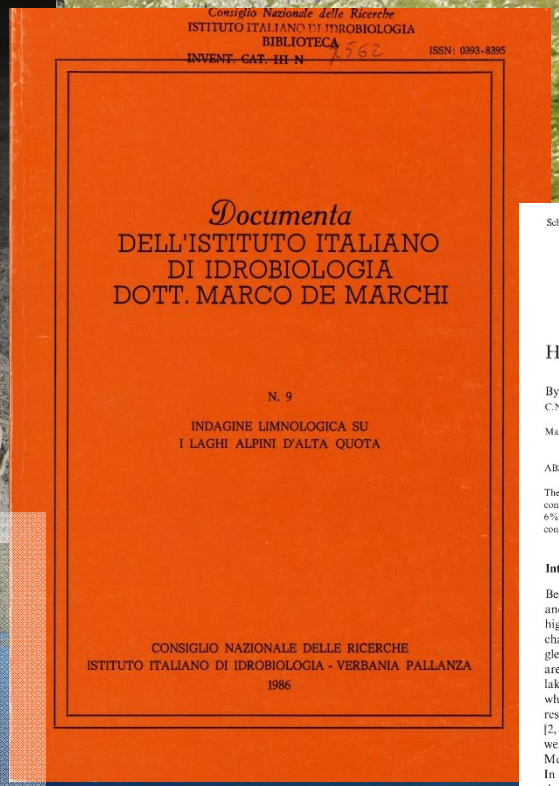
World Water Monitoring CHALLENGE
Test. Share. Protect.

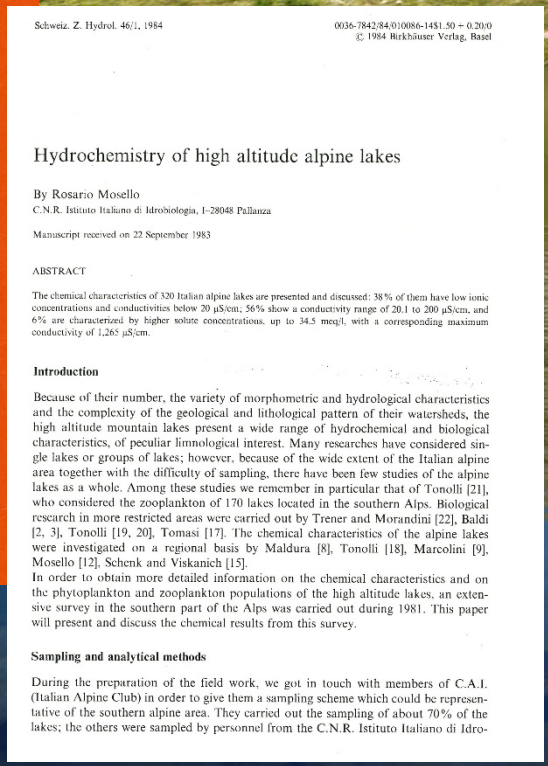
FONDAZIONE EDMUND MACH

What about mountain lakes?

- ✓ 1978: research study on acidification of lakes by CNR Istituto Italiano di Idrobiologia
- ✓ 1979: official «call» on the national journal of CAI «Lo Scarpone»
- ✓ 1981: 370 samples collected from 207 lakes (900-2800 m a.s.l.) over the Alps







Schweiz. Z. Hydrol. 46/1, 1984 0036-7842/84/010086-14$1.50 + 0.20/0
© 1984 Birkhäuser Verlag, Basel

Hydrochemistry of high altitude alpine lakes

By Rosario Mosello
C.N.R. Istituto Italiano di Idrobiologia, I-28048 Pallanza

Manuscript received on 22 September 1983

ABSTRACT

The chemical characteristics of 320 Italian alpine lakes are presented and discussed: 38% of them have low ionic concentrations and conductivities below 20 µS/cm; 56% show a conductivity range of 20.1 to 200 µS/cm, and 6% are characterized by higher solute concentrations, up to 34.5 meq/l, with a corresponding maximum conductivity of 1,265 µS/cm.

Introduction

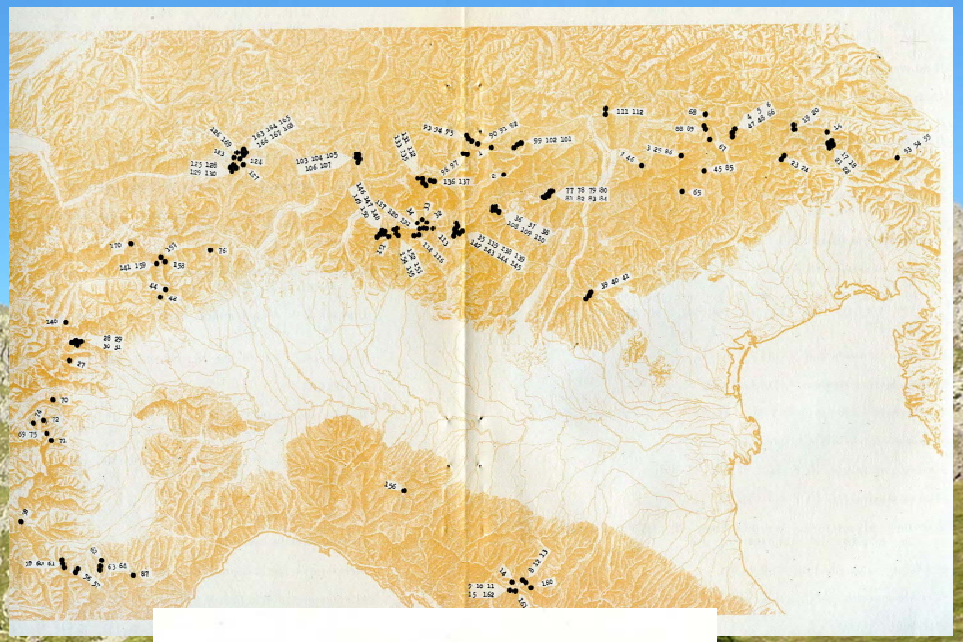
Because of their number, the variety of morphometric and hydrological characteristics and the complexity of the geological and lithological pattern of their watersheds, the high altitude mountain lakes present a wide range of hydrochemical and biological characteristics, of peculiar limnological interest. Many researches have considered single lakes or groups of lakes; however, because of the wide extent of the Italian alpine area together with the difficulty of sampling, there have been few studies of the alpine lakes as a whole. Among these studies we remember in particular that of Tonolli [21], who considered the zooplankton of 170 lakes located in the southern Alps. Biological research in more restricted areas were carried out by Trener and Morandini [22], Baldi [2, 3], Tonolli [19, 20], Tomasi [17]. The chemical characteristics of the alpine lakes were investigated on a regional basis by Maldura [8], Tonolli [18], Marcolini [9], Mosello [12], Schenk and Viskanich [15].
In order to obtain more detailed information on the chemical characteristics and on the phytoplankton and zooplankton populations of the high altitude lakes, an extensive survey in the southern part of the Alps was carried out during 1981. This paper will present and discuss the chemical results from this survey.

Sampling and analytical methods

During the preparation of the field work, we got in touch with members of C.A.I. (Italian Alpine Club) in order to give them a sampling scheme which could be representative of the southern alpine area. They carried out the sampling of about 70% of the lakes; the others were sampled by personnel from the C.N.R. Istituto Italiano di Idro-

«pristine» citizen science

- ✓ Livia e Vittorio Tonolli, 1951: Biology and ecology of zooplankton in 170 high altitude lakes in Italy



Istituto Italiano di Idrobiologia 'Dott. Marco De Marchi', Pallanza

VITTORIO e LIVIA TONOLLI

OSSERVAZIONI SULLA BIOLOGIA ED ECOLOGIA DI 170 POPOLAMENTI ZOOPLANCTONICI DI LAGHI ITALIANI DI ALTA QUOTA

Mem.Ist.Ital.Idrobiol.,
6: 53-136 (1951)

The LTER Italy netwok

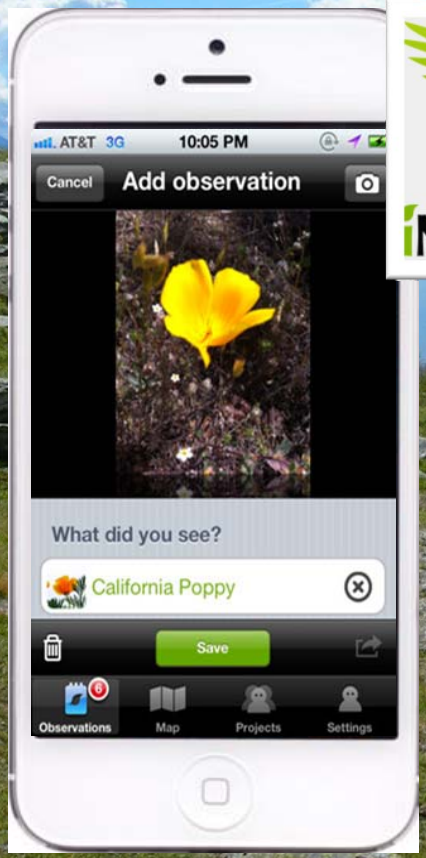
The Italian network for Long-Term Ecological Research consists in 25 terrestrial, lacustrine and marine sites spread all over Italy

Ecological studies at these sites cover pluriannual periods (usually > 15 years)

Citizen science in LTER

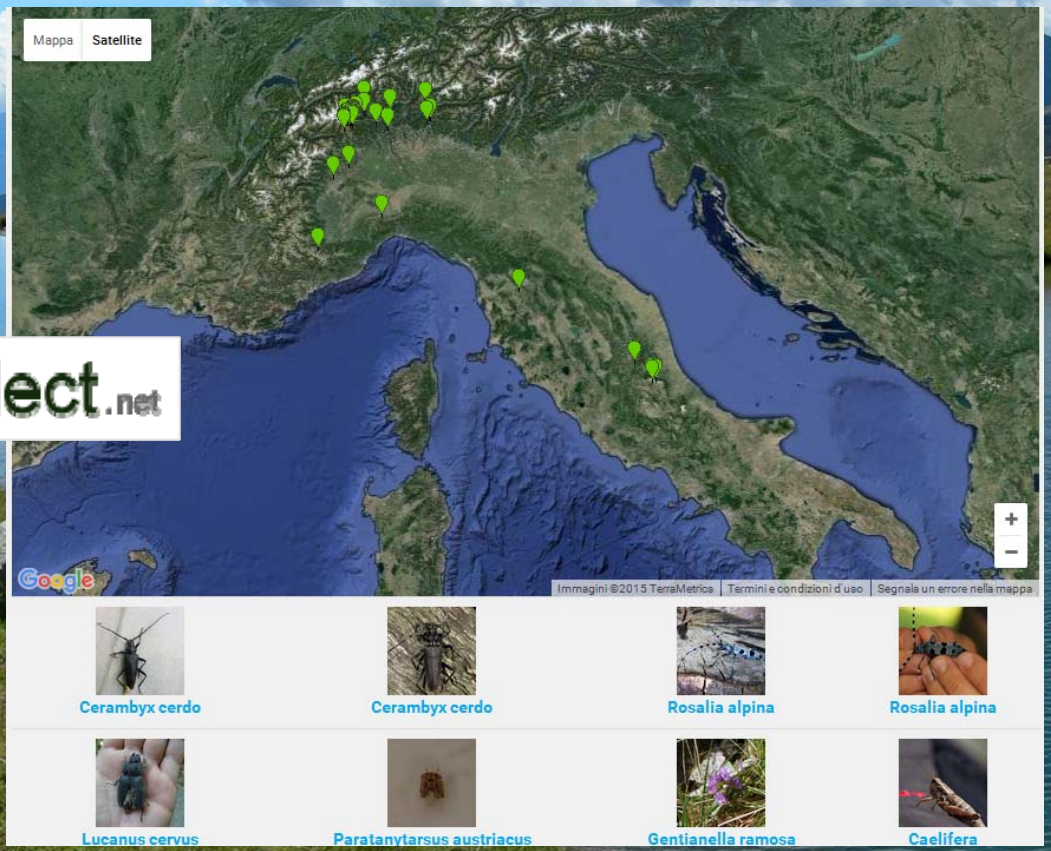
LTER Italy collects biotic and abiotic data, often in remote environments. With mobile technologies, the general public can contribute to collate relevant infomation for ecological reaserch.

The network will benefit of a wider amount of observatioons, while citizens may account on reseacrher experience to get scientific support on their observations



iNaturalist

EpiCollect.net



http://www.inaturalist.org/projects/lter-italy

Cammini LTER

Italian researchers, engaged in Long Term Ecological Researches on ecosystems (LTER-Italy network) and biodiversity studies (LifeWatch), covered, together with citizens, three routes of popular science on ecosystems and biodiversity, like events of scientific communication in EXPO2015, endorsed by the National Research Council of Italy (CNR)

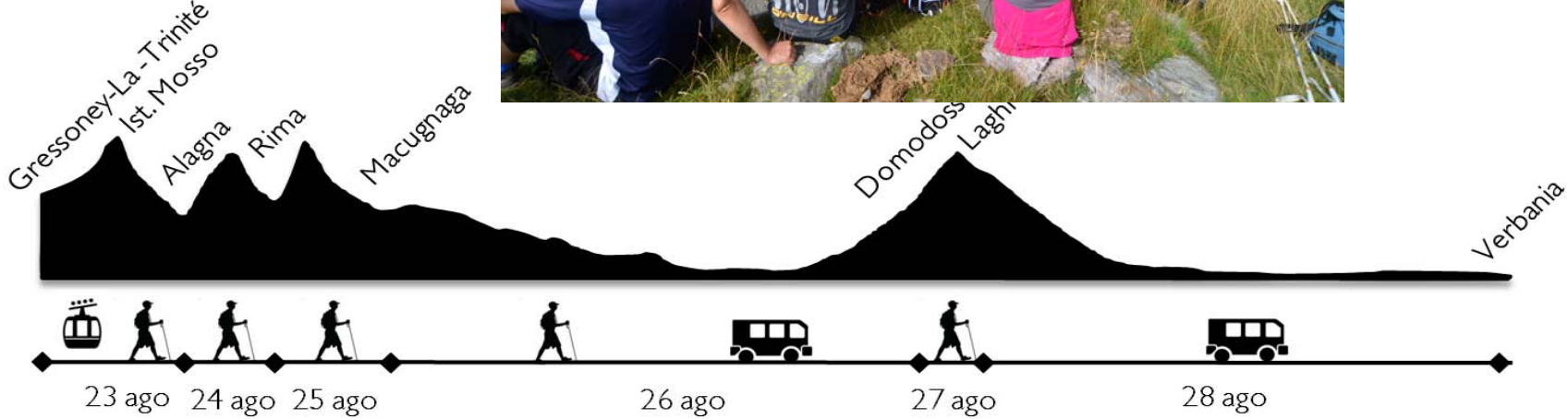
Mesothalassia: ciclo-staffetta ecologica dalle dune del Molise al Golfo di Napoli

Sugli Appennini Centrali dal Velino al Gran Sasso, l'avventura della biodiversità

Rosa…azzurro…verde! Eco-staffetta tra i siti LTER dal Monte Rosa al Lago Maggiore

Pink … blue… green! Eco-relay trail through LTER sites from Monte Rosa to Lake Maggiore

Cammino «Rosa»
23-28 August 2015



CS: benefits and challenges

Both the professional scientists and the citizen scientists benefit from taking part:

- publication of research outputs
- learning opportunities
- personal enjoyment
- social benefits
- satisfaction through contributing to scientific evidence
- addressing local, national and international issues, potentially influencing policy

Citizen science projects have a genuine science outcome: answering a research question or informing conservation action, management decisions or environmental policy

Citizen science is considered a research approach like any other, with limitations and biases that should be considered and controlled for

CS and remote lakes: some ideas

SAMPLING

Increase the number of study sites/spatial coverage

Contribute to the maintenance of time series

IN SITU OBSERVATIONS

Provide information on abiotic parameters
(e.g. lake level, ice-cover and break up)

Add information on species distribution


Grazie a ....
Il personale tecnico e scientifico del CNR ISE
di Verbania Pallanza
Gli instancabili “cercatori” di laghi…