

The BBVA Foundation recognizes Daily and Mace for developing tools to quantify nature's value that facilitate effective conservation policies

- Gretchen Daily (United States) and Georgina Mace (United Kingdom) are described by the committee as "visionary" ecologists who have devised indispensable tools to compute "the value of the services performed by nature" and inform science-based policies "to combat species loss"
- Daily developed the InVEST framework to map, quantify and value the services ecosystems provide to human society. InVEST has been used to date to guide conservation policies in 185 countries
- Mace established quantitative scientific criteria that served to redraw the Red List of threatened species compiled by the International Union for the Conservation of Nature, a comprehensive inventory documenting global biodiversity loss in wide use to ensure effective conservation measures

Madrid, 5 February 2019.- The BBVA Foundation Frontiers of Knowledge Award in the Ecology and Conservation Biology category has gone in this eleventh edition to Gretchen Daily and Georgina Mace, two "visionary" ecologists who have developed vital tools facilitating science-based policies "to combat species loss."

At the heart of both women's approach, the citation adds, is a "recognition of the value of the services provided by nature," which are habitually taken for granted and, for that reason, excluded from the costs of growth.

"While they have never worked directly together, their impact on global conservation has been strongly synergistic," the committee continues. "The two are leaders in documenting the alarming declines in global biodiversity in the midst of our planet's sixth extinction crisis," and have developed "policy and economic instruments for effective biodiversity protection."

Daily (Washington DC, United States, 1964) of Stanford University, and Mace (London, United Kingdom, 1953) of University College London, are at pains to

point out the gravity of today's biodiversity crisis: "Over the course of human history, we have gradually eroded both the diversity and the abundance of all the rest of life on Earth," warns Mace. Not only that, "the loss of species is continuing, with no evidence that it has slowed, so we do need to act on it."

Daily too insists on this point: "We are destroying so much of nature that we are on a suicidal course. We have to recognize the role that different elements of nature play in sustaining our lives before it is too late."

That said, the committee perceives in both what chair Emily Bernhardt calls, "the effort to shine a light not just on the difficulties before us but the ways they might be overcome, creating a space for solutions."

Scientific criteria for the Red List

Mace's first major contribution was to define the scientific criteria for assigning species to a given category of threat in the famous Red List of the International Union for the Conservation of Nature (IUCN).

When the list came into use in the 1960s, it was drawn up on the sole basis of experts' subjective recommendations. This was before Mace stepped in during the late 1980s early 1990s, coordinating the effort to define ecological parameters that would indicate a relatively high risk of species extinction; factors like "population size, the rate at which the population is declining, area of distribution and the extent to which this area is fragmented," explained Mace herself on the phone yesterday after hearing of the award.

The Red List was adopted as a yardstick for conservation policies in 2005, and now includes information on 90,000 species.

After her work on the Red List, Mace turned her research attention to the concept of "ecosystem services," an area where the two laureates' interests overlap. "One of the reasons that we worry about species going extinct is that the wellbeing of many people worldwide depends on having natural communities of species interacting and ecosystems functioning in a relatively robust way," says Mace. For without functioning natural systems, "human societies would definitely lose out on benefits that we now take for granted."

Mace refers here not only to the evident monetary value of services like pollination or natural pest control, but also "value in the broadest sense, that is, the net contribution to human wellbeing." This means factoring in aesthetic and cultural values, as well as the benefits for our physical and mental health.

Of course there are biodiversity services, Mace admits, that we cannot do without. Services like nutrient cycling or the water cycle "are fundamental processes of the Earth system, and without them life itself would not be possible. So in a sense they have infinite value."

Nature enters the equation

Daily has made this concept of ecosystem services the basis of an innovative instrument for conservation decision-making: a software program called InVEST (Integrated Valuation of Ecosystem Services and Trade-offs) that allows the value of the goods provided by nature to be factored in decision-making, and is now in use by organizations in 185 countries.

InVEST compares different environmental scenarios to provide an understanding of the real cost – including all consequences – of draining a wetland or removing the mangrove cover along a coast. The open-source software is free to access and has been developed with experts in multiple areas – including social sciences and economics – under the aegis of the Natural Capital Project co-founded by Daily. The Natural Capital project works with over 250 research groups and collaborators around the world.

As an example of an InVEST user, Daily points to China. Since deforestation caused severe flooding in the late 1980s, the country has spent huge sums on reforesting and restoring vast tracts of land, with resource allocation guided by InVEST.

For Daily, “a key question is how we can switch over to inclusive, green development, so that we secure people and nature and create a future in which the two can thrive.”

“Both Georgina and I have worked to help decision-makers understand and implement science-based policies,” she continues. “The goal is to bring nature’s values into our formal decision-making, in order to protect it.”

Despite the scale of the challenge, both laureates are clear that we cannot give in to despair: “Conserving world nature is not a luxury, it is a necessity,” Mace affirms. “People have developed and evolved by building an intimate relationship with nature, and it is not at all clear that we can survive and thrive on a changing planet unless we take that relationship seriously. The good news is that all the analyses suggest we have the scientific tools necessary to reverse the current biodiversity crisis.”

“We all, as individuals and a society, depend utterly on nature for almost every aspect of our survival, wellbeing and happiness,” Daily concurs. “If we consider what Earth looks like from outer space, it’s that tiny blueish sphere in the deep black cosmos. It’s the only place we know of with life, and it’s life that has created the conditions that allow people to thrive.”

Bio notes

Gretchen Daily

Gretchen Daily (Washington DC, United States, 1964) earned a BS and PhD in Biological Sciences at Stanford University, where she is currently Bing Professor in Environmental Science in the Department of Biology at the School of Humanities and Sciences, and a Senior Fellow at the Woods Institute for the Environment.

Her academic career has also taken her to centers like the Worldwatch Institute in Washington (United States), the Ludwig Maximilian University of Munich (Germany) or the Royal Swedish Academy of Sciences.

In her time at Stanford, she has held appointments as Associate Professor (Research) and Senior Fellow in the Institute for International Studies. In 2006 she helped set up the Natural Capital Project, a partnership initiative centered at Stanford with core partners at the University of Minnesota, the Chinese Academy of Sciences, and non-governmental organizations World Wildlife Fund and The Nature Conservancy.

Her publication record extends to over 200 papers in international journals and a total of thirteen books, notably *The New Economy of Nature*, of which she is co-author. A member of the editorial board of *The Year in Ecology and Conservation Biology*, she has also served on the boards of other publications like *Ecological Economics* and *Ecosystems*.

Georgina Mace

Georgina Mace (London, United Kingdom, 1953) holds a BSc in Zoology from the University of Liverpool and a PhD in Evolutionary Ecology from the University of Sussex. Her research career has taken her to the Smithsonian Institution (United States), the University of Newcastle-upon-Tyne and the Zoological Society of London, where she was Director of Science from 2000 to 2006.

In 2006, she was appointed Director of the NERC Centre for Population Biology at Imperial College London. Since 2012, she has held the post of Professor of Biodiversity and Ecosystems at University College London, founding its Centre for Biodiversity and Environment Research, which she also headed until last year.

She has served on numerous committees in Britain and abroad, including the Council of the Royal Society, the Natural Capital Committee of the UK Government and various commissions of the International Union for the Conservation of Nature, as well as working on the UN's Millennium Ecosystem Assessment. A member of the editorial board of journals like *Trends in Ecology and Evolution* or *PLoS Biology*, she also undertakes peer review for *Science*, *Nature* and *Conservation Biology*, among other publications.

Ecology and Conservation Biology committee and evaluation support panel

The rigor, quality and independence of the judging process have earned these awards the attention of the international scientific community and a firm place among the world's foremost prize families.

The jury in this category was chaired by **Emily Bernhardt**, Jerry G. and Patricia Crawford Hubbard Professor in the Department of Biology at Duke University (United States). The secretary was **Pedro Jordano**, Research Professor in the Department of Integrative Ecology at the Estación Biológica de Doñana, CSIC (Spain). Remaining members were **Paul Brakefield**, Professor of Zoology and Director of the University Museum of Zoology at the University of Cambridge (United Kingdom); **Anna-Liisa Laine**, Professor of Ecology in the Department of

Evolutionary Biology and Environmental Studies at the University of Zurich (Switzerland); **Joanna Lambert**, Professor of Environmental Studies, Ecology and Evolutionary Biology at the University of Colorado Boulder (United States); and **Rik Leemans**, Professor in Environmental Systems Analysis at Wageningen University (the Netherlands).

The BBVA Foundation is aided in the evaluation process by the Spanish National Research Council (CSIC), the country's premier public research organization. The Foundation and CSIC jointly appoint the evaluation support panels charged with undertaking an initial assessment of the candidates proposed by institutions across the world and drawing up a reasoned shortlist for the consideration of the award committees. CSIC is also responsible for designating each committee chair.

The **CSIC Technical Committee** in this category was coordinated by **María Victoria Moreno**, the Council's Deputy Vice President for Scientific and Technical Areas, and formed by: **Eulalia Moreno**, Coordinator of the Natural Resources Area and Research Professor at the Arid Zones Experimental Station (EEZA); **Ángel Ruiz**, Coordinator of the Agricultural Sciences Area and Research Professor at the Mountain Stockbreeding Institute (IGM); and **Anna Traveset**, Research Professor in the Mediterranean Institute for Advanced Studies (IMEDEA).

About the BBVA Foundation Frontiers of Knowledge Awards

The BBVA Foundation centers its activity on the promotion of world-class scientific research and cultural creation, and the encouragement of talent.

The BBVA Foundation Frontiers of Knowledge Awards, established in 2008, recognize and reward contributions of singular impact in science, art and the humanities, privileging achievements that significantly expand the frontiers of the known world, open up new fields, or emerge from the interaction of various disciplinary areas. Their eight categories are congruent with the knowledge map of the 21st century, ranging from basic sciences to key challenges for the natural environment by way of domains at the crossroads of disciplines – Biology and Medicine; Economics, Finance and Management – or the supremely creative realms of music and the opera.

LAUREATE'S FIRST DECLARATIONS AND IMAGES

A video recording of the new laureate's first interview on receiving news of the award is available from the Atlas FTP with the following coordinates:

Server: **5.40.40.61**

Username: **agenciaatlas2**

Password: **fronteras**

The video is in the folder labelled:

"PREMIO ECOLOGÍA Y BIOLOGÍA DE LA CONSERVACIÓN"

In the event of connection difficulties, please contact **Miguel Gil** at production company Atlas:

Mobile: 619 30 8774

E-mail: mgil@mediaset.es

CALENDAR OF ANNOUNCEMENT EVENTS

Information and Communication Technologies (ICT)	Tuesday, 19 February, 2019
Basic Sciences	Tuesday, 5 March, 2019
Economics, Finance and Management	Tuesday, 26 March, 2019
Music and Opera	Tuesday, 9 April, 2019
Humanities and Social Sciences	Tuesday, 30 April, 2019

