

Ecology and Conservation Biology is the fifth category decided in this edition

## The BBVA Foundation Frontiers of Knowledge Award goes to Jane Lubchenco for experimentally characterizing marine ecosystems and providing the science behind the design of protected areas

- Lubchenco's experiments shifted the paradigm on marine ecosystem dynamics, showing that they were driven, not by predation, but by the interaction of low-food-chain species with light and other factors
- Her research provided the groundwork for the current model of marine protected areas based on networks of interconnected areas of varying size

**Madrid, February 5 2013.-** The BBVA Foundation Frontiers of Knowledge Award in the Ecology and Conservation Biology category has been granted in this fifth edition to U.S. marine ecologist Jane Lubchenco for her experimental work, which has advanced understanding of coastal ecosystems and laid the scientific groundwork for the design of marine reserves. Lubchenco, in the words of the jury's citation, "has been a leader in establishing marine reserves based on solid principles of ecological science. Her work established a scientific framework for defining the optimal locations, size, and connectivity of marine reserve networks, effectively integrating her scientific expertise into science-based principles for public policy."

Lubchenco, it continues, has the ability to "conceptually expand her basic ecological insights to marine conservation at a global scale, including the design of marine reserves based on solid principles of ecological science." Through her efforts, marine ecology grew from being an observation-led science to one based on the experimental method. Producing conclusions of immense practical worth, like the fact that "you don't need to protect the whole sea to protect it

effectively." The key, according to her research, is to develop networks of interconnected protected areas of varying size.

Jane Lubchenco (Denver, 1947) "is a global leader in marine ecology and conservation," reads the first line of the citation. One of her major findings is that species at the base of the food chain, like plankton and herbivorous sea snails, are among the main drivers of coastal ecosystem dynamics, in a process scientists define as "bottom-up".

This research, which she conducted in the 1970s, marked a move away from the "top-down" paradigm dominating at the time, which held that it was predators that determined the dynamics of these communities.

"My scientific contribution has focused on understanding how near-shore coastal ecosystems work, how they are changing and how we can do a better job of managing our activities to help the oceans and coast," said Lubchenco yesterday on the phone. On the subject of her methods, she explains: "My approach has been to test ideas with experiments so we can truly understand how marine ecosystems work. I have worked a lot with sea stars and snails and fishes to understand the role they play in keeping an ecosystem healthy."

## **Impact on fisheries**

"Lubchenco," adds the jury, "showed experimentally that the structure and function of coastal ecosystems are controlled by the joint effects of nutrients, light, temperature, and herbivores. Her work demonstrated that coastal upwelling affects both top-down and bottom-up processes."

These are results whose implications stretch far beyond the bounds of basic knowledge, because they help to elucidate the biological phenomenon known as "upwelling", whereby nutrients ascend from the sea bed to surface waters, creating areas rich in fish stocks. Indeed many of the world's most important fisheries are supported by upwelling systems: "Professor Lubchenco's insights on those ecological processes have been fundamental to understanding that the links between those systems, ocean climate, and ecological perturbation are critical for the long-term sustainability of fisheries."

It is precisely the stewardship of fishery resources that has been one of her main labors as head of the National Oceanic and Atmospheric Administration (NOAA), a post to which she was appointed in 2009 by President Barack Obama, and from which she will step down voluntarily on February 27. "We have made huge progress in ending overfishing in U.S. waters, and have worked with colleagues in other countries and the European Union to make fishing more sustainable. Because if we want to continue having fish to eat, and for fisherman to have jobs to go to, then we need to fish responsibly today."

Lubchenco is a firm believer that scientists need to collaborate at global level. Her own field, she points out, has become much more international, "And that has brought many opportunities to compare near-shore marine systems from one

place to another. In the process, we have learned a lot about what it takes to have a healthy ocean, including that biodiversity plays a key role." This knowledge is vital to understand and confront realities like overfishing, ocean acidification or climate change. Or as she puts it: "We are trying to understand how to make sure oceans stay healthy despite all these changes."

This was also the motive for her efforts to set up the Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO), a consortium of scientists and academics from Oregon State University; the University of California, Santa Barbara; the University of California, Santa Cruz; and Stanford University, whose mission is to advance understanding of the coastal ocean ecosystem and share that knowledge with society.

Herself an able communicator, Lubchenco is adamant that science and society must engage with each other. "Scientists must learn to talk about their science in ways that are understandable and relevant to real world issues. There is a lot that is exciting about science, and sharing that excitement, the thrill of discovery, the importance of new knowledge and how it is relevant to solving tangible problems is something that scientists need to work at continuously."

## **Bio notes**

Jane Lubchenco was born in Denver (Colorado) on December 4, 1947, the oldest of six sisters. Her parents were doctors and the young Jane got excellent grades throughout school. She studied biology at Colorado College then went on to take a master's degree in zoology at the University of Washington. While researching her thesis there, on sea stars, she met a fellow student, Bruce Menge, who was working on the same species. They decided to help each other out and, not long afterwards, decided to get married. After she obtained her MS, the couple moved to Massachusetts. Jane enrolled at Harvard, where she earned her PhD then stayed on for two years as assistant professor.

In 1977, Lubchenco and Menge moved to Oregon State University, where they would remain for the next thirty years. They struck a deal with the university that made them both part-time professors, allowing them to continue their research and teaching activities at the same time as raising two young children.

Lubchenco's academic career, which took her to a full professorship in 1988, was punctuated by fieldwork research in the United States and such far-flung places as Jamaica, Panama, Chile, Qingdao (China) and New Zealand.

In 2009, Barack Obama named her head of the National Oceanic and Atmospheric Administration (NOAA) as part of the presidential "Science Team". This made her the first woman and the first marine ecologist to lead the organization, which she will be leaving voluntarily on February 27.

Lubchenco is an influential figure in the science community: eight of her papers

have been recognized as 'Science Citation Classics' and her projects are linked to no fewer than 150 papers published by other researchers.

Testimony to this leadership is the fact that she has served as president for the American Association for the Advancement of Sciences (AAAS), the International Council for Science, and the Ecological Society of America, as well as sitting for ten years on the National Science Board. She is also an elected member of the National Academy of Sciences, the American Academy of Arts and Sciences and the Royal Society, among other institutions.

Lubchenco's lifelong concern that social and policy decisions should be properly informed by scientific knowledge led her to create the Aldo Leopold Leadership Program which trains environmental scientists to communicate in plain language with the media and opinion leaders, and the Communication Partnership for Science and Sea, an organization devoted to educating public and private policy-makers about issues in oceanic ecology.

Jane Lubchenco holds honorary doctorates from 18 universities among numerous other distinctions, and was chosen by *Nature* as its "2010 Newsmaker of the Year".

### **BBVA Foundation Frontiers of Knowledge Awards**

The BBVA Foundation primarily engages in the generation and diffusion of scientific knowledge and culture, through ongoing programs in the areas of basic sciences, biomedicine, ecology and conservation biology, social sciences, literary and musical creation, and the visual arts.

Its focus on the core concerns of today's society, like health or the environment, has materialized in major research projects, including those involving the study of cancer. The Foundation's support for research, advanced training and knowledge dissemination is also manifest in a series of award families which not only honor the winners' contributions but also shed a wider light on their fields of work, the values they represent and the combined endeavors of the research and creative communities.

The BBVA Foundation established its Frontiers of Knowledge Awards in 2008 to recognize the authors of outstanding contributions and radical advances in a broad range of scientific and technological areas characteristic of our times. They are in this sense a prize family congruent with the knowledge map and central challenges of the 21st century.

The nominations received from leading universities and research and cultural centers all round the world, the independence and objectivity of the prize juries formed by reputed specialists in their respective fields, and the excellence of the laureates in their earlier editions have earned these awards, devised and organized from Spain, a firm place among the world's foremost award schemes. The BBVA Foundation is assisted in this initiative by the country's premier

multidisciplinary research organization, the Spanish National Research Council (CSIC), and by the presence of Spanish scientists and creative practitioners on the international juries.

The CSIC collaborates in the appointment of Technical Evaluation Committees for each prize category made up of acknowledged experts in the relevant domain. This Committee undertakes an initial assessment of candidates and draws up a reasoned shortlist for the consideration of the juries.

In the Ecology and Conservation Biology category, Committee members were Xavier Querol, Research Professor in the Institute of Environmental Assessment and Water Research (CSIC); Rafael Simó, research scientist in the Institute of Marine Sciences (CSIC); Fernando Valladares, Research Professor in the National Museum of Natural Sciences (CSIC); and Daniel Oró de Rivas, Research Professor in the Mediterranean Institute for Advanced Studies (IMEDEA), a joint center of CSIC and the University of the Balearic Islands.

The Frontiers awards provide an international showcase for the best qualities of Spain and Spanish science, and have achieved the endorsement of the world scientific community, whose members have served on the juries and put forward nominations from their posts in eminent Spanish and international academic and research institutions.

In their fifth edition, the BBVA Foundation Frontiers of Knowledge Awards wish to offer support and recognition to the individuals and teams working for a better future for people through the advancement of knowledge, innovation and culture and their dissemination to society; goals and practices that are also at the center of the BBVA Group culture.

In an economic context marked by a prolonged economic crisis and the adoption of short-term measures to tackle its multiple causes and manifestations, science, the environment and culture have dropped further down the list of public priorities. The BBVA Foundation Frontiers of Knowledge Awards, and the Foundation's broader program to foster scientific knowledge and culture, wish to drive home the message that these three areas are of transcendental importance for our collective wellbeing and individual opportunities.

The eight categories of the BBVA Foundation Frontiers of Knowledge Awards, each carrying prize money of 400,000 euros, respond to the knowledge map of the early 21st century, but also to key global challenges that have never before merited a specific honor on this scale, as with the two environmental categories – Ecology and Conservation Biology and Climate Change – and the category of Development Cooperation. These stand alongside the classic categories of Basic Sciences, Biomedicine and Economics, Finance and Management. Finally, the award family is completed by Contemporary Music, an art at the leading edge of cultural innovation to which the BBVA Foundation devotes a broad-ranging support program, and where Spain is home to a wide and talented community of authors, conductors and performers.

## **International jury**

The jury in this category was chaired by **Daniel Pauly**, Professor of Fisheries at the University of British Columbia Fisheries Centre (Canada), with **Jordi Bascompte**, professor in the Integrative Ecology Department of Estación Biológica de Doñana (CSIC) acting as secretary. Remaining members were **Joanna Burger**, Distinguished Professor of Biology and professor in the Department of Environmental Sciences at Rutgers University (United States); **Gerardo Ceballos**, professor in the Wildlife Ecology and Conservation Laboratory of the Instituto de Ecología, Universidad Nacional Autónoma de México (Mexico); **Pedro Jordano**, Research Professor at Estación Biológica de Doñana (CSIC); and **Gary K. Meffe**, Adjunct Professor in the Department of Wildlife Ecology and Conservation at the University of Florida (United States).

The jury's deliberations take place behind closed doors in the BBVA Foundation's Madrid headquarters, with the winner announced to the media the following day.

Last year's winner in this category was **Daniel H. Janzen** "for his pioneering work in tropical ecology and the conservation of tropical ecosystems." In the third edition, the award went to **Edward O. Wilson** for "for "coining and popularizing the term biodiversity," in the words of the citation. In the second edition, the winner was **Peter Reich** of the University of Minnesota (United States,) for work that "radically improves our understanding of and ability to predict terrestrial ecosystem compositional and functional responses to global environmental change, including climate change (...) and biodiversity loss." Finally, the award in the inaugural edition was shared by biologists **Thomas Lovejoy** and **William Laurance**, of the Smithsonian Institute (United States), whose studies showed that the degradation of the Amazon rainforest is advancing much faster than predicted.

The BBVA Foundation Frontiers of Knowledge Awards, in their eight categories, recognize research and creative work of excellence as embedded in theoretical advances, technological developments or innovative artistic works and styles, as well as fundamental contributions in addressing key challenges of the 21st century. The Foundation has been assisted in the selection of jury members and candidates by the Spanish National Research Council (CSIC), the country's premier research organization. Nominations have been put forward by the world's most prestigious teaching and research institutions.

#### UPCOMING AWARD ANNOUNCEMENTS

<b>CATEGORY</b>	<b>DATE</b>
<b>Contemporary Music</b>	February 12, 2013
<b>Economics, Finance and Management</b>	February 19, 2013
<b>Development Cooperation</b>	February 26, 2013

#### 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 name and coordinates.

Server: **213.0.38.61**  
Username: **agenciaatlas1**  
Password: **amapola**

The name of the video is:  
"FBBVA PREMIO ECOLOGÍA"

In the event of connection difficulties, please contact Alejandro Martín at ATLAS:

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