



The Yecla de Yeltes Dam in Spain is being demolished in the largest project of its kind ever in Europe.

Centre (JRC) in Ispra, Italy.

In the United States, about 1,200 barriers have been dismantled in recent decades, with generally positive effects on local ecosystems, says Laura Wildman, a fisheries engineer at eco-consultants Princeton Hydro in South Glastonbury, Connecticut.

But restoration projects need to be monitored for negative effects, too, experts say. Decommissioning existing river barriers might mobilize toxic sediment, or affect buildings or bridges downstream. And existing dams could help to prevent the spread of invasive species such as the North American signal crayfish (*Pacifastacus leniusculus*) or the Asian topmouth gudgeon (*Pseudorasbora parva*). There are also historic dams, such as the Roman-built, 22-metre-high Prosperina Dam near Mérida in Spain,

which need to be preserved as cultural heritage.

Dams were built with little regard for the impacts they might have on ecosystems, says Carlos Garcia de Leaniz, an ecologist at Swansea University, UK, who coordinates the US\$6.2-million, EU-funded Adaptive Management of Barriers in European Rivers (AMBER) project. “We must not make the same mistake when dams are being removed.”

In collaboration with the JRC, AMBER is managing an exercise to map the location of all registered dams and weirs in 38 countries across the continent, including some that aren't EU members. The project database currently holds information on 230,000 river barriers in 13 EU countries. Drawing from nine case studies, the project also aims to develop tools to help water authorities assess the costs,

benefits and damage potential of dam-removal projects.

Inventories are important for planners and policymakers to understand the scale of issues caused by river fragmentation, says Wildman.

A number of small dams in the Netherlands, Denmark and Spain are scheduled for removal later this year. And starting in 2019, French scientists plan to systematically monitor the impacts of a removal project even larger than Yecla de Yeltes: the demolition of two hydropower dams in the Sélune Valley in Normandy, one 35 metres tall and the other 15 metres.

But while old barriers are being removed, new dams are built elsewhere. Some 2,800 hydropower plants are currently being planned across the Balkans — a threat, says van de Bund, to many of the continent's last untouched rivers. ■

BIBLIOMETRICS

Wikipedia's top-cited scholarly articles — revealed

Gene studies dominate lists of DOI publications referenced highly in the encyclopaedia.

BY GIORGIA GUGLIELMI

The most-cited journal articles on Wikipedia include papers on the names of lunar craters and the DNA sequences of genes — and many of these works are referenced more times in the online encyclopaedia

than they are in the scientific literature.

“It is pretty incredible that almost all the highly cited articles are science articles,” says Matt Miller, a data scientist and librarian based in New York City. Miller analysed citation data released in March by the Wikimedia Foundation, the non-profit organization in San

Francisco, California, that runs Wikipedia. The data set — which contains some 15.7 million records — shows how many times sources with formal identifiers such as ISBNs (international standard book numbers) and DOIs (digital object identifiers) are referenced across all of Wikipedia's nearly 300 language editions. ►

WIKIPEDIA'S TOP JOURNAL ARTICLES

The five most-cited DOIs across language editions

2,830,341 citations 'Updated world map of the Köppen–Geiger climate classification' (2007)

21,350 citations 'Prediction of hydrophobic (lipophilic) properties of small organic molecules using fragmental methods' (1998)

20,247 citations 'The status, quality, and expansion of the NIH full-length cDNA project: The Mammalian Gene Collection (MGC)' (2004)

5,937 citations 'Generation and initial analysis of more than 15,000 full-length human and mouse cDNA sequences' (2002)

5,854 citations 'The Asiago supernova catalogue — 10 years after' (1999)

► Most publications cited using identifiers on Wikipedia are books, but Miller looked at the numbers for publications with DOIs — the most widely used identifier for journal articles — on English-language Wikipedia. His data set contains 1.2 million citations that used DOIs, referencing more than 835,000 unique articles.

The most-referenced paper, with 4,702 citations across English Wikipedia, is a 2002 collection of more than 15,000 sequences of human and mouse genes. The Wikipedia pages that reference the study are mostly entries about single genes or proteins. In all, five articles in the top ten are about DNA catalogues. (Wikimedia's original post notes: "Unsurprisingly, Wikipedians love reference works.")

Four astronomy articles feature in the top ten, including studies on star distances, asteroids and the names of lunar craters (the last in a 1971 paper that has just 16 citations in the scientific literature, according to Google Scholar).

A separate analysis of the wider Wikimedia data by Ross Mounce, who directs open-access programmes at the London-based philanthropic foundation Arcadia Fund, reveals the most-cited DOI articles across all of the encyclopaedia's language editions (see 'Wikipedia's top journal articles'; for the full lists, see go.nature.com/2gfnfui). Six articles in the top ten are the same as for the English-language version, but the first entry is notably different: a 2007 paper on the global climate, which has 2.8 million

citations — but only 169 on English Wikipedia.

The climate study is so heavily referenced because millions of its citations come from pages created by an automated computer program. The bot, developed by physicist Sverker Johansson at Dalarna University in Falun, Sweden, had produced nearly 3 million articles as of July 2014, according to Wikipedia. One-third of the articles, many of them about geographical locations, are in Swedish and the rest are in Cebuano and Waray, two languages spoken in the Philippines.

"One of the most interesting things is that this information is available at all," says John Chodacki, director of the University of California Curation Center, who is based in Berkeley. Analysing and comparing citation data across scholarly papers has historically been possible only using paywalled services. ■

Additional reporting by Richard Van Noorden.

CORRECTION

The News Feature 'After the violence' (*Nature* **557**, 19–24; 2018) erroneously stated that Colombia's reincorporation efforts would cost 129.5 billion pesos (US\$46 million). Actually, they would cost 129.5 trillion pesos (US\$46 billion).