iFAST: The International Forum on Advanced Environmental Sciences and Technology

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7 p.m. CST; 8 p.m. EST; 1 a.m. GMT (March 11); 9 a.m. Beijing (March 11)

Wednesday, Mar. 10, 2021

Mary Power

University of California, Berkeley

https://ib.berkeley.edu/labs/power/

Mary E. Power is a professor in the Department of Integrative Biology at the University of California, Berkeley, and faculty director of the Angelo Coast Range Reserve. She has studied algal-based food webs in tropical and temperate rivers, and their linkages to upland and estuarine ecosystems. She combines field experiments and long-term, place-based research to investigate how key traits of web members underlie strong interactions that determine ecosystem states, and why these change under different hydrologic or productivity regimes. Power is a member of the National Academy of Sciences and the American Academy of Arts and Sciences and a Fellow in the California Academy of Sciences, the Ecological Society of America and the Society of Freshwater Science. She has served as president of the Ecological Society of America and the American Society of Naturalists, and as a Holiday Lecturer for the Howard Hughes Medical Institute. She was awarded the G. Evelyn Hutchinson Medal, American Society of Limnology and Oceanography, the Kempe Award for Distinguished Ecologists, the Award of Excellence from the Society of Freshwater Science and an Honorary Doctorate from Umea University. Her work was featured in *The Serengeti Rules*, a feature film and a PBS Nature documentary.

Floods, drought, and alternate states in algal-based river food webs

In sunlit rivers under Mediterranean seasonality, winter and summer flow regimes determine the state of algal-based food webs. Flow regimes depend not only on precipitation, but also on how water is stored and released from "Critical Zone" storage in a river's basin. Thirty years of research and an 83-year record from sediment cores off the mouth of the Eel River in northwest California suggest that following scouring winter floods, green macroalga (*Cladophora glomerata*) proliferate due to their release from large, predator-resistant grazers. These *Cladophora* streamers become overgrown with nutritious epiphytic diatoms over the summer. (Similar succession occurs in streams of Oklahoma!) *Cladophora*-diatom growth fuels long food chains that support rearing salmonids and other predators. *Cladophora*-diatom drift may also subsidize coastal waters. When these riverine algae were introduced into an estuary, they disappeared within minutes, devoured by benthic amphipods and isopods (important salmon prey) in strong preference to local green seaweeds. These nutritious diatom-*Cladophora* assemblages, however, require summer flows high enough to cool and gently flush sunlit pools. When drought or human water extraction deplete flows, pools warm and stagnate. Under these conditions, nutritious diatoms and structural green macroalgae perish, and are overgrown by benthic cyanobacteria, some of which are toxic. Over the last decade, neurotoxic cyanobacteria have killed scores of dogs in northern California. Santa Cruz researchers have linked sea otter deaths off Monterrey Bay to hepatotoxins produced by cyanobacteria in agriculturally contaminated rivers. As we confront global warming and climate disruption, we need vigilant stewardship of our linked river and nearshore food webs to guide our use of water and land.

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Register for the Zoom conference at www.ou.edu/ieg/seminars

Organizing Committee Chair: Jizhong Zhou (University of Oklahoma, USA; https://www.ou.edu/ieg)
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