



INFORMATION ITEM

Lead Scientist's Report

Summary: Delta Lead Scientist Dr. Laurel Larsen will discuss a study co-authored by the Delta Science Program's Senior Environmental Scientist Dr. Annika Keeley and her research team. The study represents an extensive data synthesis and promotes the most appropriate ecological metrics for conservation planning and monitoring. Dr. Larsen will also introduce the Council and Delta Science Program's new California Sea Grant Fellows and highlight recent events such as the 11th Biennial Bay-Delta Science Conference and the upcoming Science Actions Workshop.

CONNECTIVITY METRICS FOR CONSERVATION PLANNING AND MONITORING. A.T.H. KEELEY, P. BEIER, AND J. S. JENNESS, 2021. BIOLOGICAL CONSERVATION 255, MARCH 2021.

As the Bay-Delta science community transitions from project-scale planning to landscape-scale planning that recognizes the challenges presented by climate change and other large-scale stressors, this paper provides scientists and managers with concrete tools for quantifying the ecological relevance of different spatial configurations of land-use and conservation areas.

Biodiversity core areas (i.e., those characterized by high biodiversity) conserve biodiversity more effectively if they are part of an ecological network (a system of adjacent core areas and ecological corridors that allow species migration). Metrics for connectivity can help specify desired outcomes and required conservation actions and are typically quantified as structural—related to the physical adjacency of features on the landscape—or functional—pertaining to the ease with which organisms, genes, or chemical constituents can move through the landscape. Both structural and functional connectivity metrics abound, leading to challenges in identifying which metric is most appropriately matched with conservation objectives.

In this study, the study team summarizes 35 metrics available to quantify the structural or functional connectivity of landscapes and provides guidance for selecting the most appropriate connectivity metrics for the conservation objectives. They evaluate connectivity metrics with respect to four conservation objectives: (1) preserving remnant natural spaces, (2) protecting endangered species and ecosystems, (3) restoring habitat, and (4) maintaining or restoring connections in priority areas. Based on their review, they present a decision tree to select which

metrics are most appropriate for a given conservation goal and ecological landscape type.

To produce this synthesis, the study team used the Web of Science database to identify connectivity metrics proposed in the literature. These metrics were sorted along a spectrum from fully structural to fully functional. Three factors were used to construct the decision tree for selecting the most appropriate connectivity metrics: (1) the extent of human modification of the focal landscape, (2) which of four conservation objectives is to be assessed, and (3) the type of connectivity (structural, functional, or both) to be measured.

The team found that when conservation is focused on a particular species, or if data are available to parameterize models, functional connectivity metrics may be preferred. The study team also found that under the impending threats of climate change, landscapes need to facilitate movements of all species who need to shift their range to adapt. Because an intact ecological network may support many species' movement, structural metrics that consider the human footprint should be used in approximations of functional connectivity in shared landscapes.

The tools identified in this paper may be particularly relevant for assessing alternatives evaluated through the Delta Adapts adaptation strategy or coordinating with the new Delta Landscapes Scenario Planning tool. Relatedly, landscape-scale assessment tools such as this one could benefit planning associated with the governor's Water Resilience Portfolio. This study also satisfies the Science Action Agenda's call to capitalize on existing data through increasing science synthesis (action area 2).

ON YOUR RADAR

2021 California Sea Grant State Fellows Class

Emily Ryznar

Delta Science Program – Collaborative Science and Peer Review Unit

Emily Ryznar will earn a doctorate from the University of California (UC) Los Angeles in spring 2021. For her dissertation, Emily is investigating the mechanisms enhancing the invasion success of an invasive alga and how it may interact with important native species such as giant kelp in California. During her fellowship, Emily is excited to support the development of collaborative science initiatives in the Delta, aid science funding, and cultivate science communication skills, among other ventures.

Jennica Moffat

Delta Science Program – Science Based Adaptive Management (SBAM) Unit

Jennica will be graduating with a Master's degree in biology, focusing on ecology and evolution at California State University, Northridge in the spring. For her thesis, she explored the effects of rising temperature on the mutualistic relationship between a jellyfish and a microscopic alga in attempts to support potential coral reef restoration efforts. Previously, she worked as a field technician on monitoring projects in the Delta and Suisun Marsh at the Center for Watershed Sciences at UC Davis. Jennica excitedly anticipates assisting in synthesizing reports for the SBAM Unit and supporting the Delta Independent Science Board's efforts.

Karen V. Gutierrez

Delta Science Program – Science Communication, Synthesis, and Decision Support Unit

Karen will graduate in 2021 with a Master of Science in Earth Sciences from Scripps Institution of Oceanography at UC San Diego. Her thesis project focuses on paleoclimatology, specifically using isotope analyses of fossilized corals to reconstruct the climatic conditions of the tropical Pacific around a well-known event referred to as the 4.2 ka event. While with the Delta Science Program, Karen hopes to learn how to effectively communicate science across different audiences and be part of a team contributing to science-driven decisions in the Bay-Delta system.

Sarah Farnsworth

Delta Stewardship Council (Council) – Planning and Performance Division

Sarah graduated with a Master of Science degree in Environmental Policy and Management from UC Davis in 2020. Her work is highly focused on climate change impacts and system resilience. She has experience collaborating with various management organizations such as the California Department of Fish and Wildlife, the Nature Conservancy, and the Sacramento Area Council of Governments. She hopes to pursue a career in environmental conservation and management that incorporates education and environmental justice efforts. During her fellowship, she will work with the Council's Planning and Performance Division on projects relating to the Delta Plan, climate resilience, and adaptation through the Delta Adapts initiative.

RECENT ACTIVITIES

11th Biennial Bay-Delta Science Conference

The 11th Biennial Bay-Delta Science Conference, a forum for sharing scientific information relevant to managing the connected San Francisco Bay and Sacramento-San Joaquin Delta systems, was held virtually **April 6-9, 2021**. The entirely virtual conference was jointly sponsored by the Council and the United States Geological Survey. This year's conference theme was *Building Resilience through Diversity in Science*. Participants included, but were not limited to, natural scientists, engineers, resource managers, and stakeholders working on Bay-Delta issues. With 1,697 unique logins to the meeting, this year's conference set a record for attendance, surpassing the former attendance record, set in 2014, by approximately 300 attendees. Highlights of the meeting included daily morning plenaries focused on the conference's theme, afternoon training sessions on implicit bias, a panel discussion on diversity, equity, and inclusion in Delta Science, an on-demand primer on Delta hydrology, an art exhibition, and live and on-demand topical oral and poster sessions targeted toward a mixture of scientists and managers. Further details about the conference are available on the conference website: <https://deltacouncil.ca.gov/delta-science-program/11th-biennial-bay-delta-science-conference>.

Ask Me Anything: Office Hours with the Delta Lead Scientist

A series of monthly Delta Lead Scientist open office hours was launched on April 15 and was co-hosted by Jeff Henderson, Deputy Executive Officer of Planning and Performance at the Council. The office hours take the format of an "ask-me-anything," in which viewers can ask questions that the Delta Lead Scientist and co-host can answer live on-screen. The purpose of the ongoing office hours series is to fortify connections between the Delta Science Program and the broader scientific community and facilitate connections between scientists and managers.

Future office-hour sessions will continue to occur on the third Thursday of the month, from 12-12:30 PM. Although any questions are accepted, each office hours session is associated with a specific theme. The first session's theme was carried over from the Bay-Delta Science Conference - Building Resilience through Diversity in Science. Tune in and participate in future office-hour sessions through the Council's Instagram page (<https://www.instagram.com/deltastewardshipcouncil>) and use the hashtag, #asktheleadscientist. All live sessions will be archived and viewable through Instagram.

Science Actions Workshop

On July 13-14, 2021, from 9:00 AM to 12:00 PM, the Delta Science Program will virtually host its Science Actions Workshop. The workshop will collaboratively develop near-term priority science actions for Delta resource management as part of the update to the 2022-2026 Science Action Agenda. Priority science actions will be developed from the top 65 Delta management questions¹ that resulted from a series of previous workshops in 2020, as well as from results of the draft Science Assessment, which assesses progress made on science actions in the 2017-2021 Science Action Agenda. The detailed actions will provide a framework for science funding by the Delta Stewardship Council and relevant partners. Registration and further details are to be announced.

BY THE NUMBERS

Delta Science Program staff will provide a summary of current numbers related to Delta water and environmental management. The summary (**Attachment 1**) will inform the Council of recent counts, measurements, and monitoring figures driving water and environmental management issues.

LIST OF ATTACHMENTS

Attachment 1: By the Numbers Report (to be provided at the meeting)

CONTACT

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¹ <https://scienceactionagenda.deltacouncil.ca.gov/pdf/2021-1-13-mqs-tops-questions-list.pdf>