

3rd International Conference on Ecology, Ecosystem and Conservation Biology

3rd International Conference on & Microbial Ecology & Eco Systems

March 18-19, 2019 | Chicago, USA

POSTERS PRESENTATIONS | DAY 2

JOURNAL OF ECOSYSTEM & ECOGRAPHY 2019, VOLUME 9 | DOI: 10.4172/2157-7625-C1-045

A study of Avian biodiversity changes after habitat restoration – A novel approach using remote sensing and ebird observation data

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During the last two centuries, the contiguous United States has lost over half of its wetland habitats. Restoration of wetland habitats is critical for improving the health and diversity of wildlife populations. Fernhill Wetlands in Forest Grove, Oregon is a natural wastewater treatment site that was transformed from unused wastewater ponds to a complex natural wetland habitat in 2014-15. This study aimed to assess the avian biodiversity change after habitat restoration at Fernhill Wetlands by developing a novel and reusable technique combining

remote sensing satellite imagery and geospatial climate data and performing quantitative correlations to community science bird observation data. LANDSAT-8 and SENTINEL-2 satellite imagery and PRISM climate data were processed in the cloud using Google Earth Engine and vegetation, water and climate indices for pre- and post-restoration periods were calculated. Quantitative correlations were then established in R between these indices and bird observation data from the Cornell University's eBird database. Finally, supervised classification was used to obtain clarity on land, vegetation and water changes in the region of interest. Several terrestrial and deep-water species correlated well with vegetation and water indices. Shorebirds, marsh birds and others at the water's edge showed subtler and sometimes unexpected reactions to habitat change. The technique also revealed differences not seen in conventional analyses such as the response of dabbling ducks. A powerful methodology was developed to study the impact

of habitat restoration on Avian populations combining remote sensing and bird observation data. It showed that the habitat restoration had a positive impact on several species, while also revealing interesting and unexpected effects on others. It is expected that the technique will be very useful for ongoing habitat management by wetland managers.

Biography

Ashwin Sivakumar is a student at Flintridge Preparatory School in La Canada-Flintridge, CA. He has been an active birder since childhood and is extremely interested in ornithology, ecology, conservation, and evolutionary biology. Having lived on the Pacific Flyway of North America, he has always been interested in observing the birds as they migrate and has had the joy of participating in pelagic trips off the coast of Oregon to observe albatrosses and jaegers. A few years ago, he traveled with his family to the Osa Peninsula in Costa Rica and added more than 100 species to his life bird list.

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