



Moreno Valley College, a two-year community college in Southern California, experiences an annual migration of cliff swallows. The presence of these birds inspired the development of the undergraduate research program Flying with Swallows. The assessment of the project indicated significant increases in qualitative student outcomes, such as inspiration or global awareness, and in the retention and success rates as compared to nonparticipating courses in the project. The lessons learned from designing, developing, and administering the project for five years are provided as a model adaptable to other institutions, with the following elements: research topic, goals and objectives, faculty, intra- and extra-curricular activities, collaboration, administrative support, assessment, dissemination and sustainability. The data from Flying with Swallows supports each element of the model.

Species Selection

Ecosystem Survey Biology

**External Collaboration** 

**Ecosystem Investigation** 

**Biology and Chemistry** 

Intra- and Inter-Disciplinary Curriculum

Administrative Support

Dissemination

College, Community, State, National

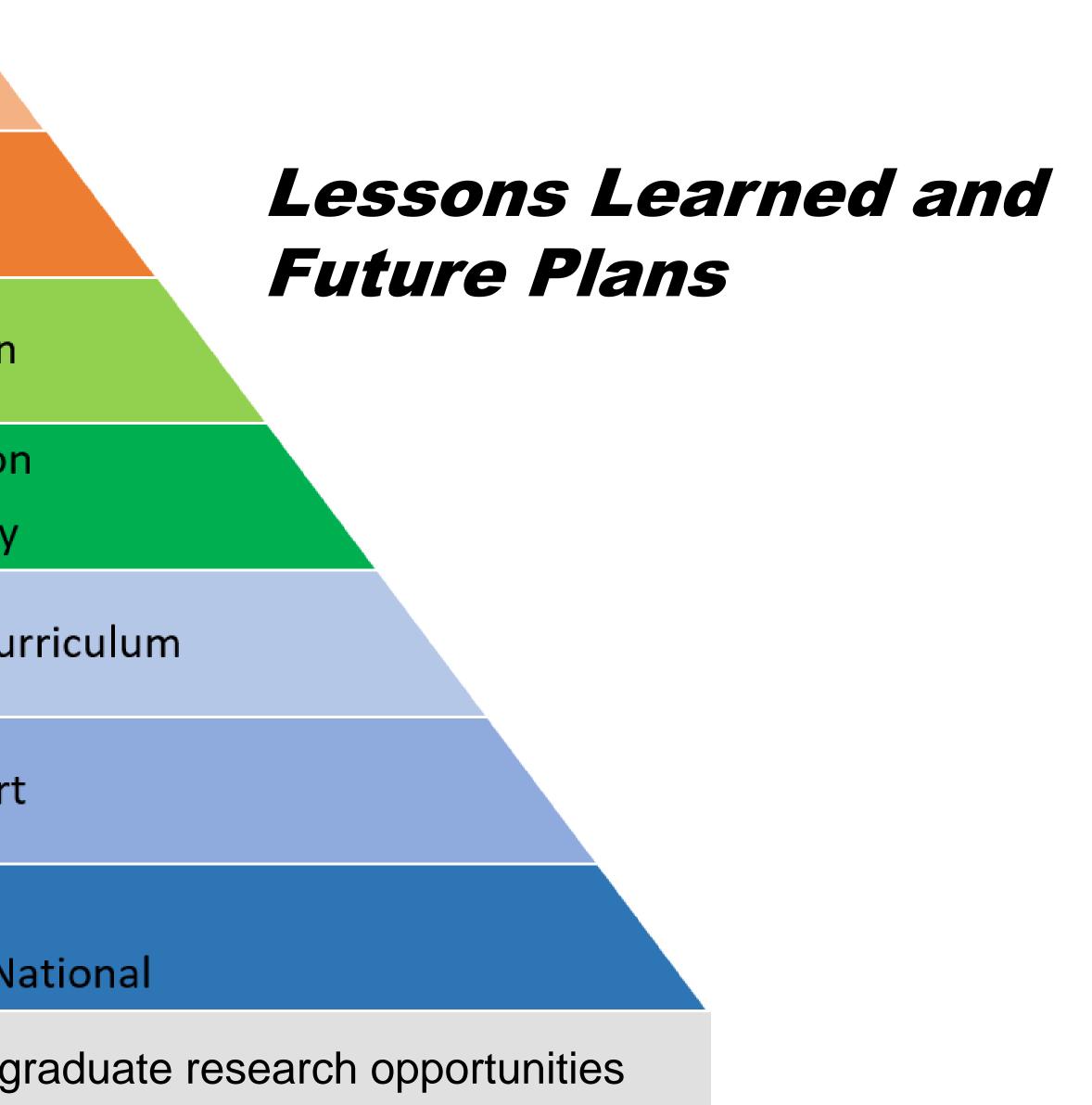
The surroundings of MVC have presented unique undergraduate research opportunities and experiences for STEM students

## Research

Students have monitored nesting habits of swallows on campus since 2014 using Esri software. The five-year observations indicate fluctuations in population size of swallows at MVC and time of their arrival. DNA barcoding technique for the CO1 gene has been used to analyze the stomach contents of the birds found deceased on campus. Cliff swallows are insectivores consuming flying fire ants, western dry wood termites and scentless weed bugs. The college's ongoing research with these birds contributes to our understanding of the cliff swallow as a migratory bird and a model organism for biomonitoring.



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# Flying With Swallows – a Model for Undergraduate Research-Based Learning

## Joanna Werner-Fraczek Moreno Valley College, CA





Biology – observations, collection and analysis of biological materials

Computer Science develop database to manage data

> Mathematics – conduct statistical data analysis

Geography – development of interactive maps including meteorological data

The goal of the FWS is to expand to more disciplines, so the project becomes a unifying umbrella for MVC students and an identification beacon to other institutions.

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Chemistry – collection and analysis of abiotic matters: water, soil used for nests

