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Predicting the Population Dynamics and Economic Impact of *Lycorma delicatula*

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Mathematics

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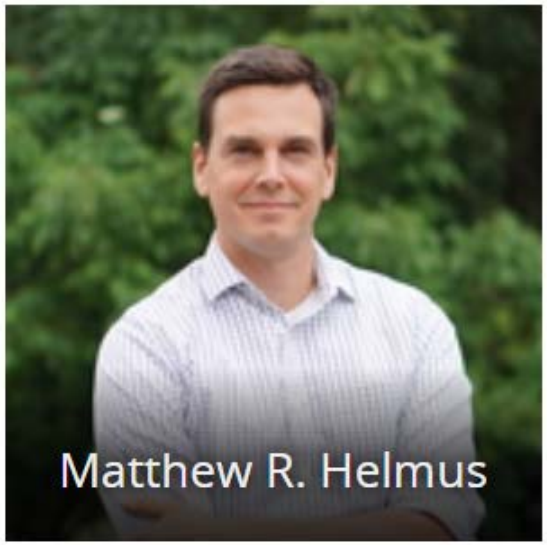
iEcoLab.org

Integrative Ecology Lab



Center for Computational Mathematics and Modeling

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Predicting the Population Dynamics and Economic Impact of *Lycorma delicatula*

PA Department of Agriculture funded research May to August 2018

Model *Lycorma* population dynamics

Predict crop and export economic loss

Map risk-of-spread

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Lycorma delicatula system model

Global Scale

Landscape Scale

Local Scale

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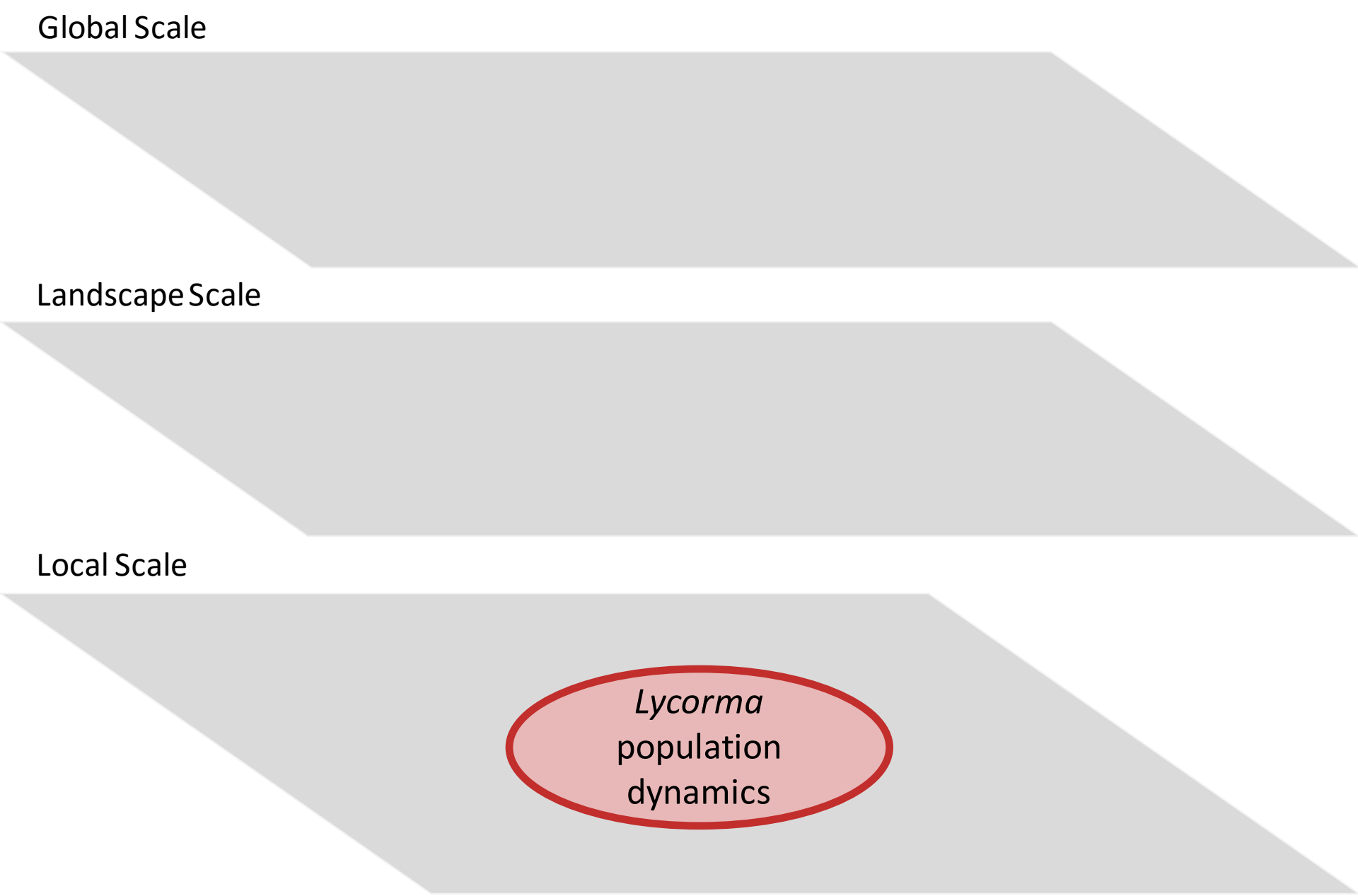
Lycorma delicatula system model



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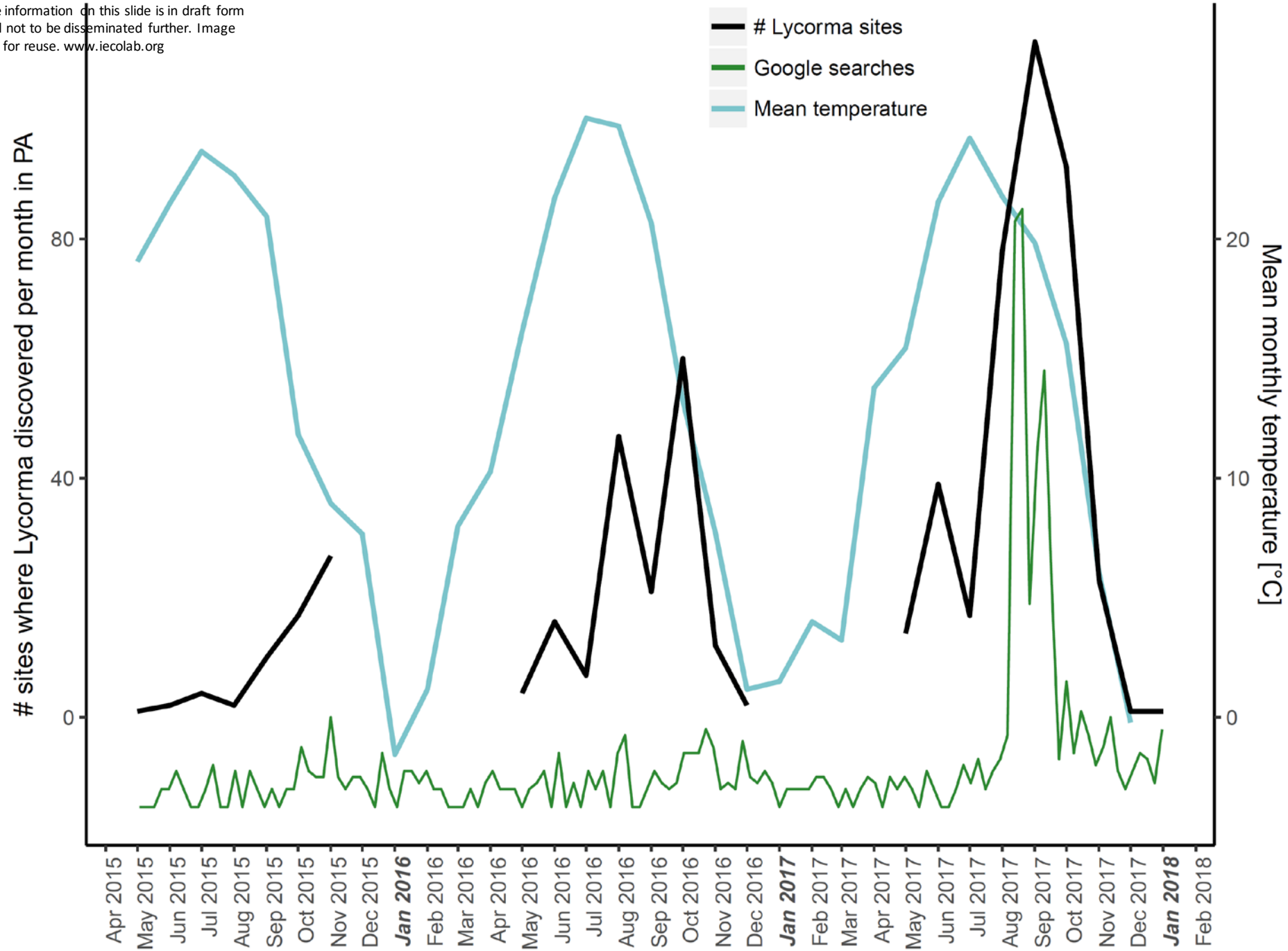

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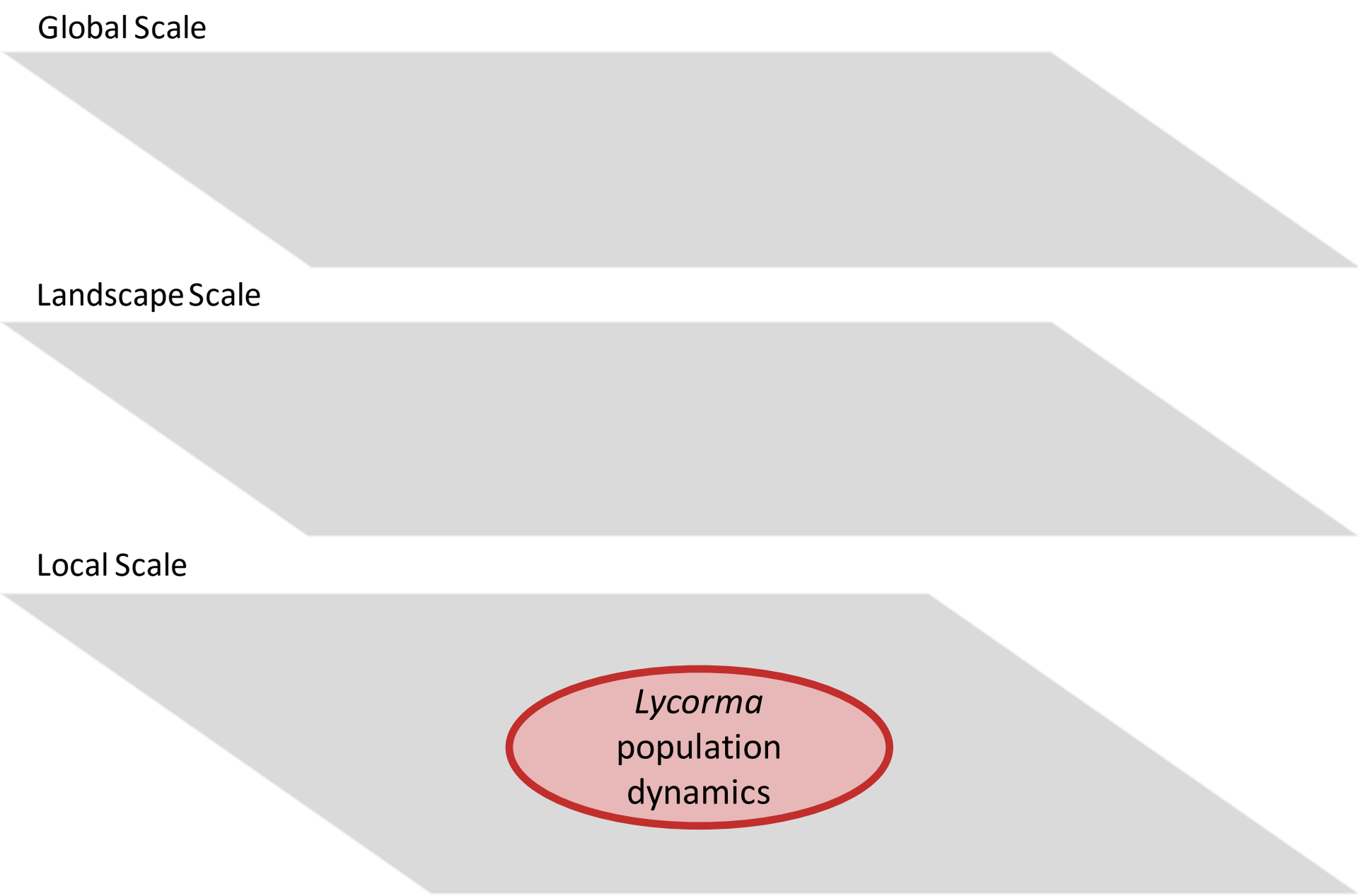
Lycorma delicatula system model



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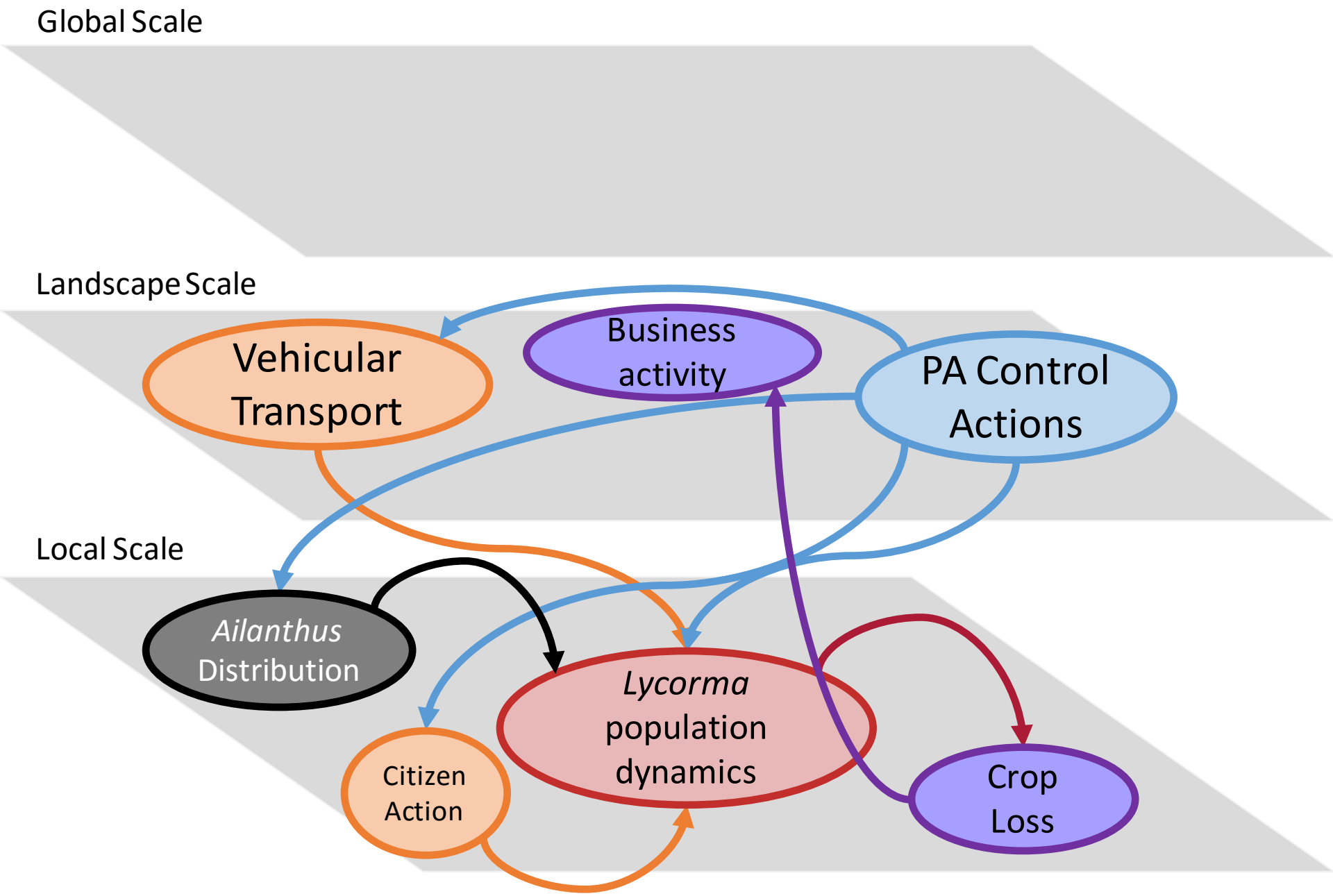
Lycorma delicatula system model



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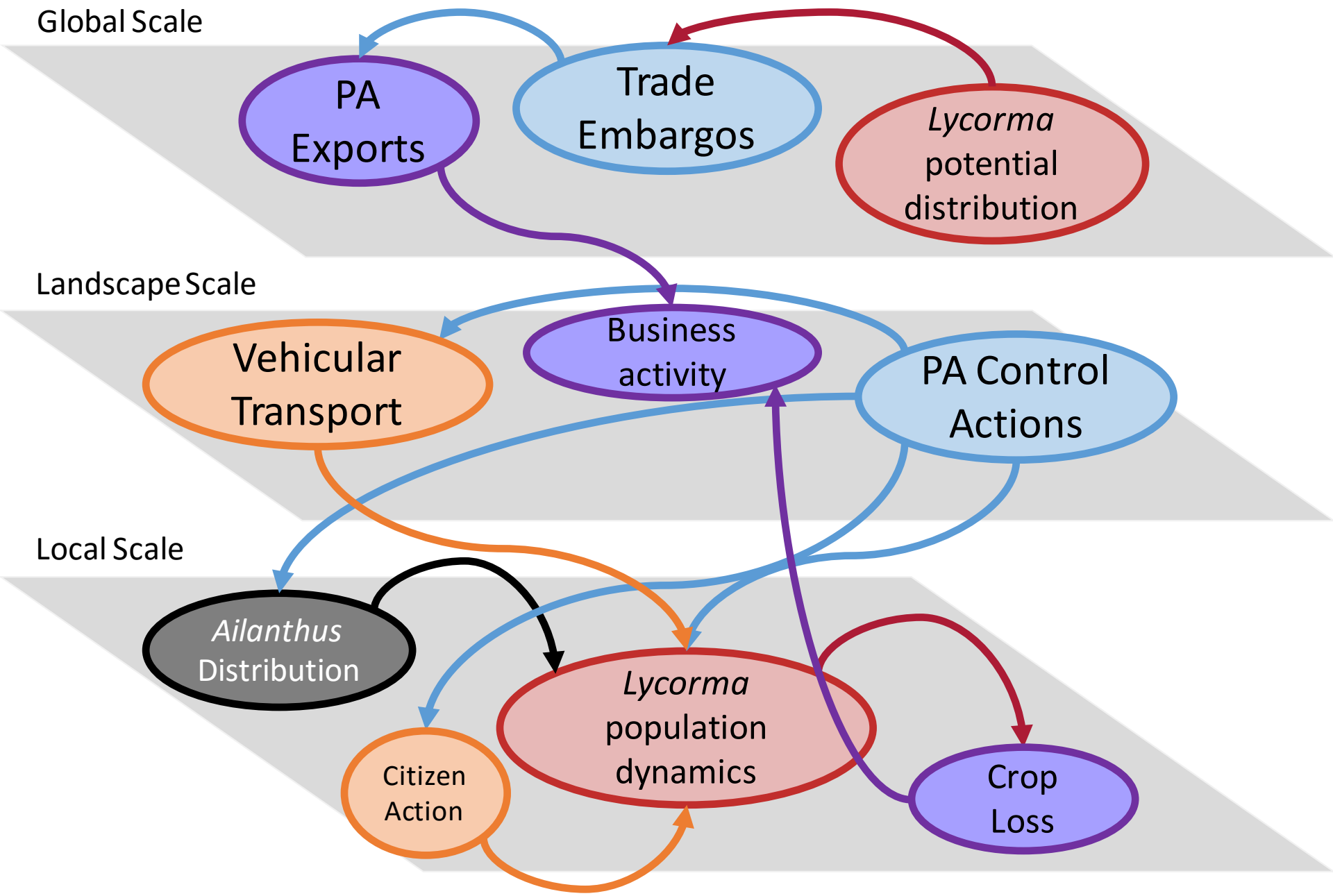
Lycorma delicatula system model



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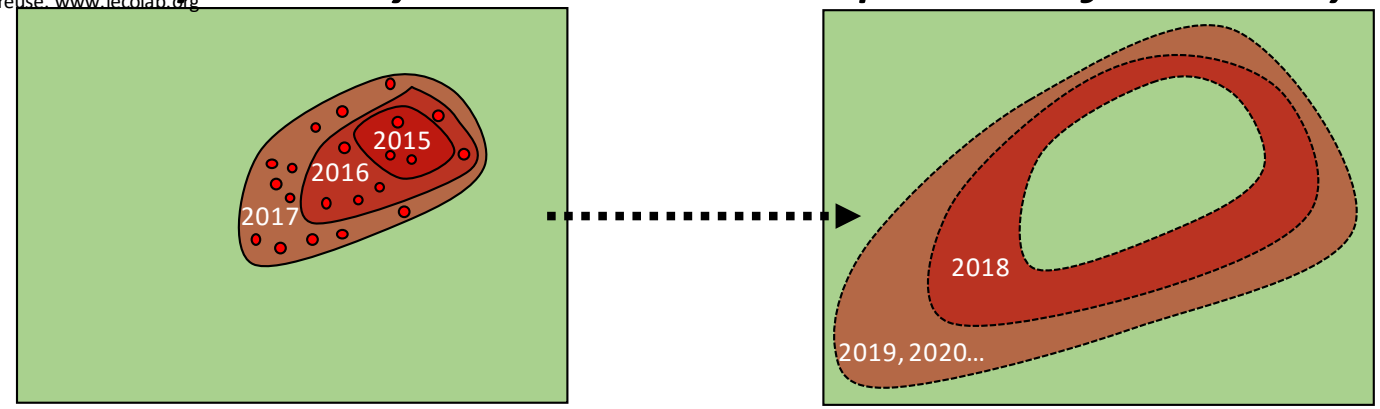
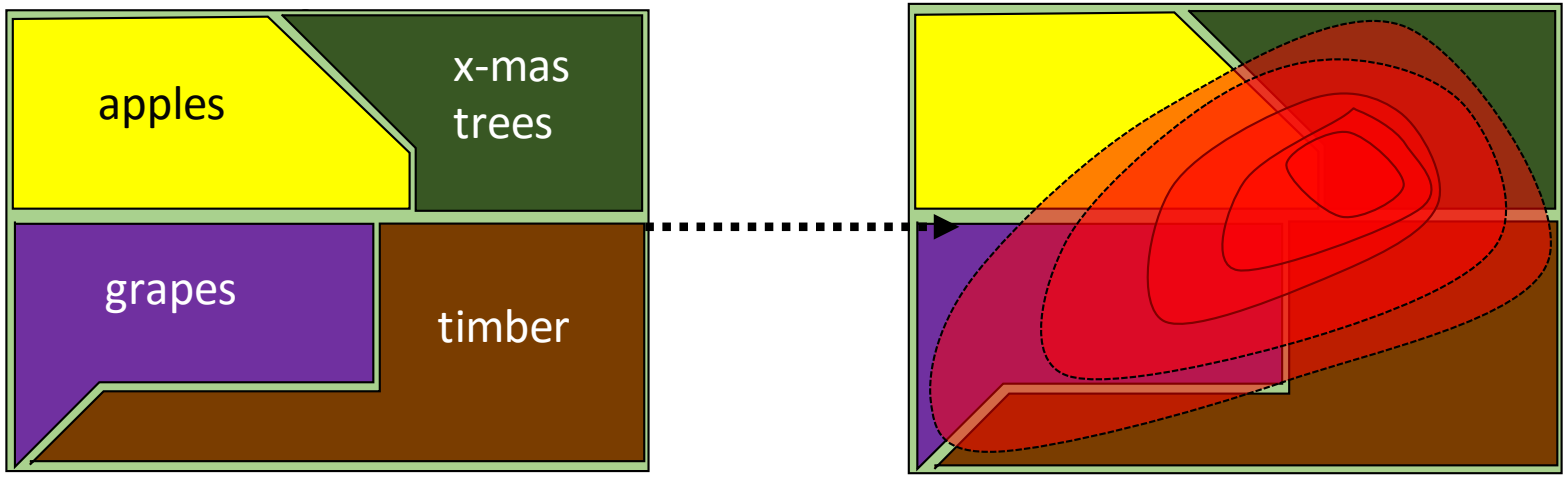
model past dynamics *to predict future dynamics*



observed SLF localities (●) and model estimates (⬬)
of SLF spread across the PA landscape (▭)

crops produced *predict timing of economic loss*



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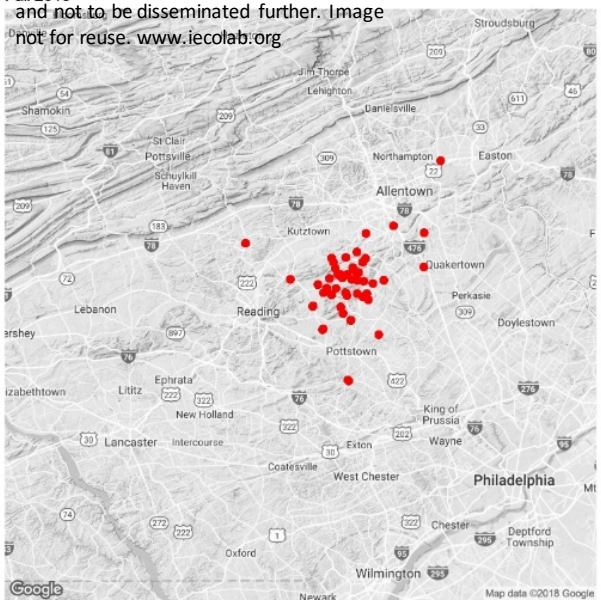
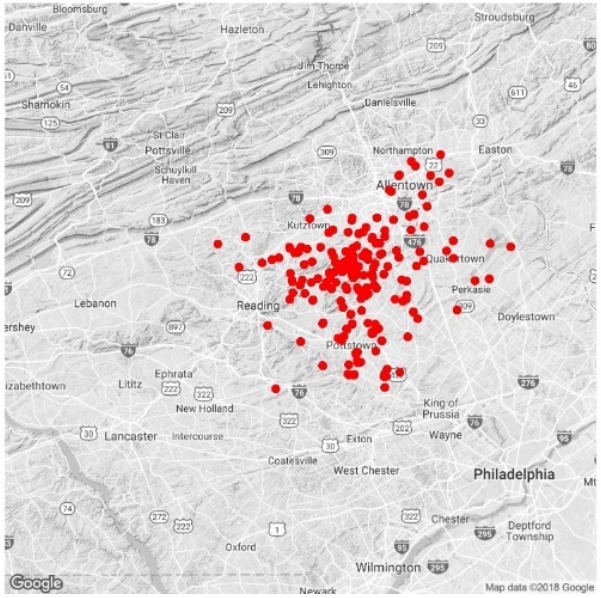
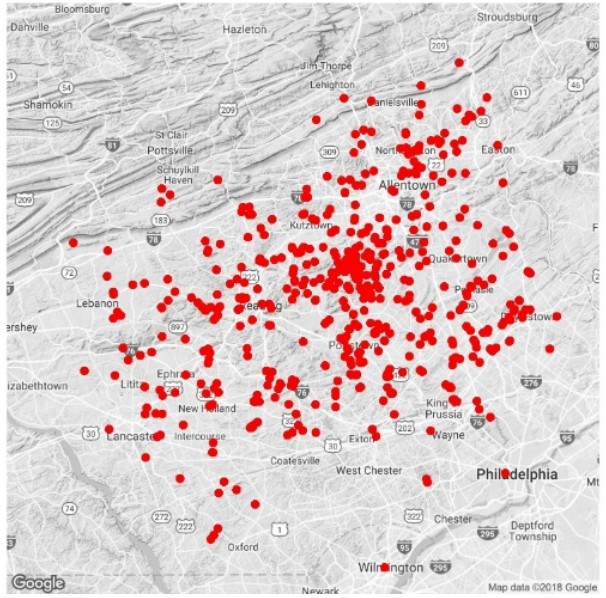
Fall 2015



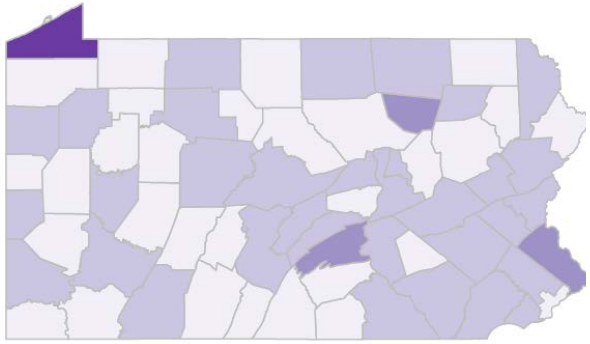
Fall 2016



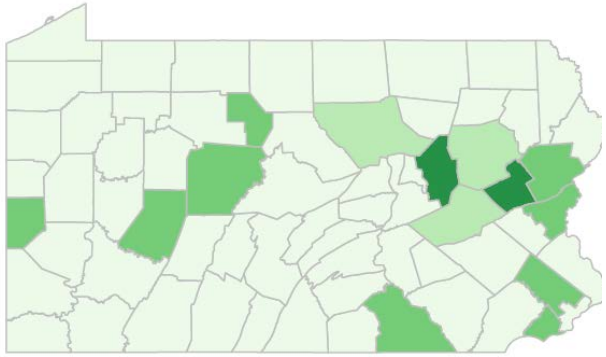
Fall 2017



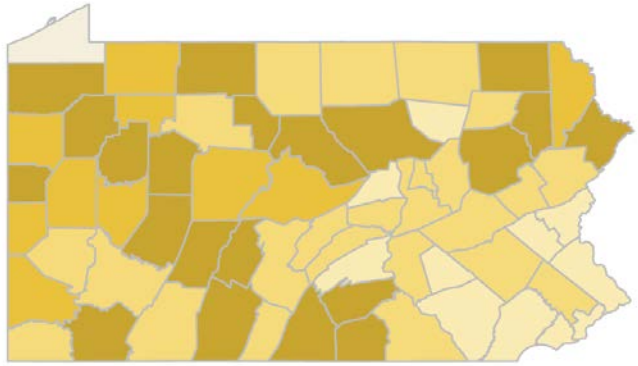
Grapes



Christmas Trees



Apples



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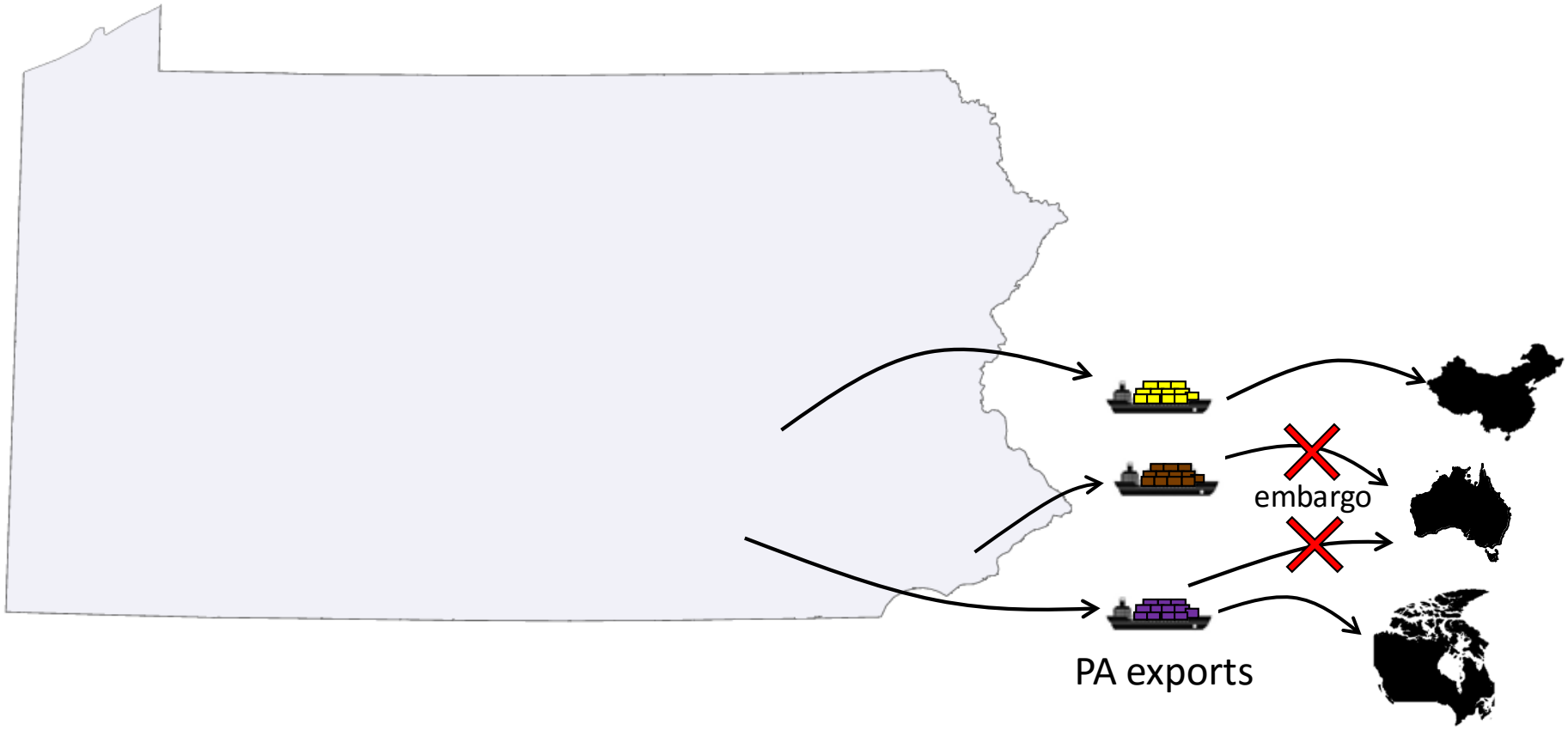

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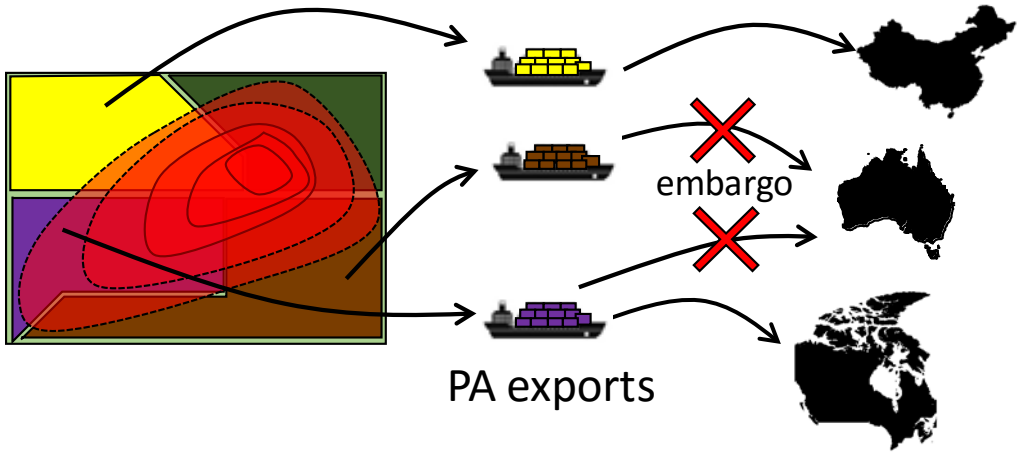
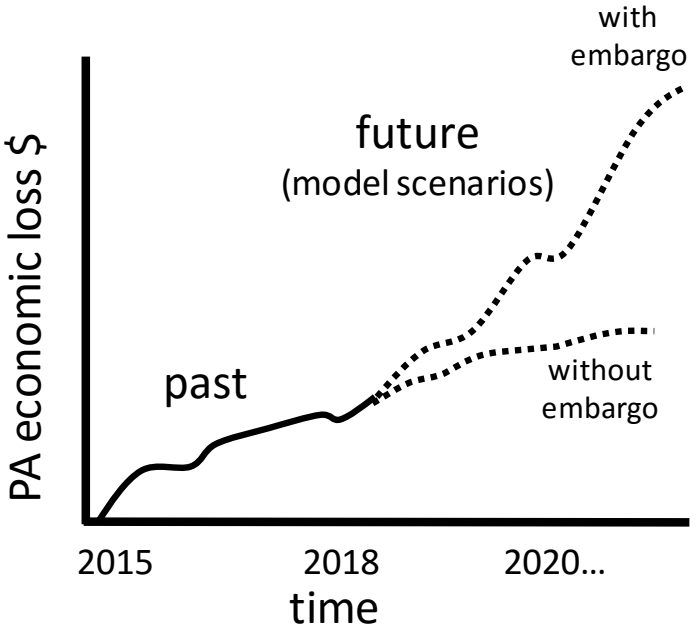


simulations



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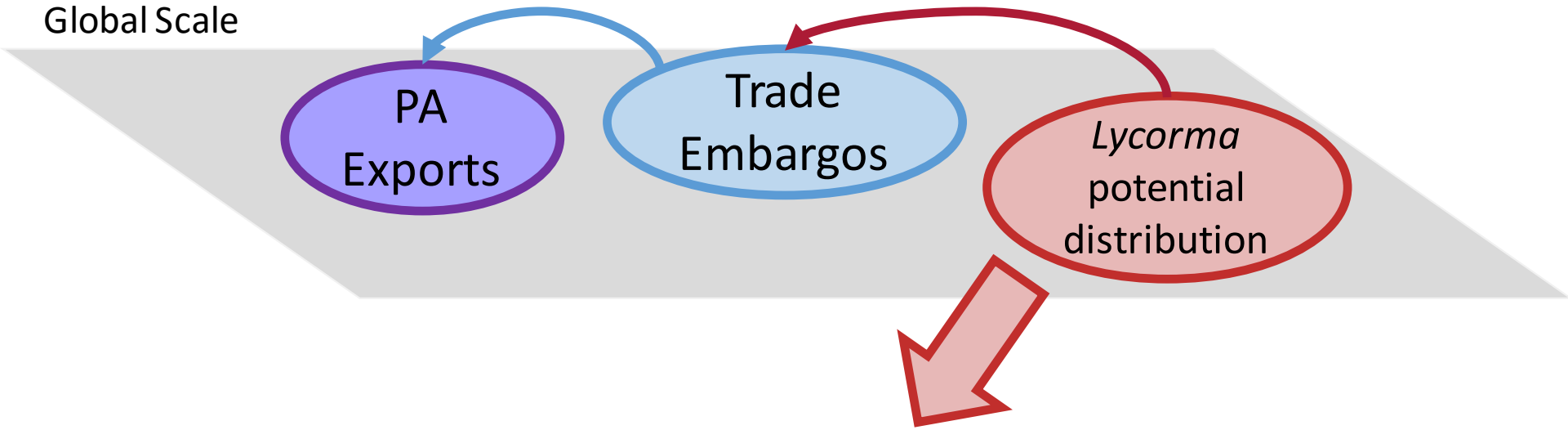
Lycorma potential distribution



Climatic Niche Models

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Climatic Niche Model for Lycorma

Lycorma potential distribution

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Climatic Niche Model for *Ailanthus*

- *Ailanthus* distribution is much larger

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Lycorma invasion epicenter

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Lycorma population dynamics model prediction at epicenter in 2017

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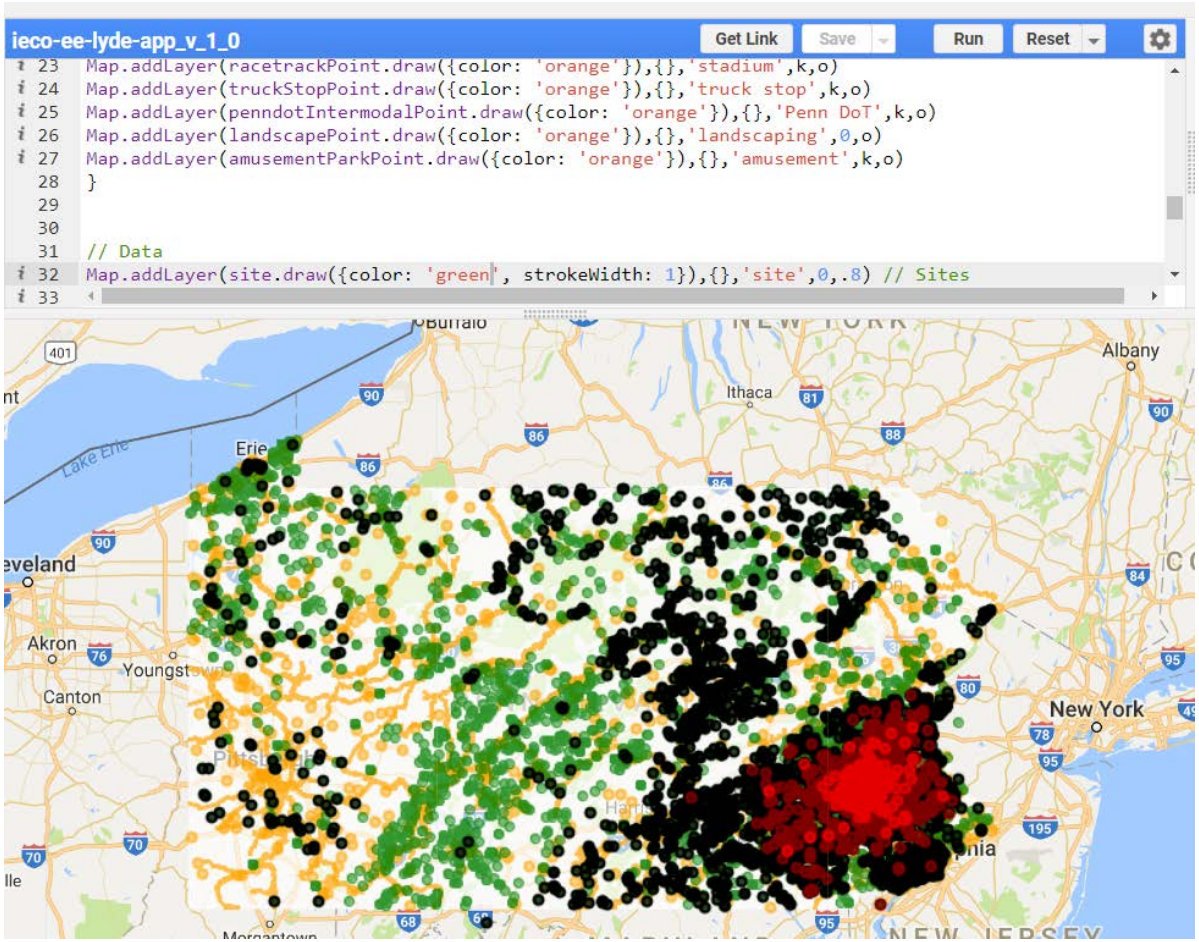
The Lanternfly Application



Thank you!

mrhelmus@temple.edu

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