Wildlife Surveys at Solar Facilities: Guide to Recommended Methodologies

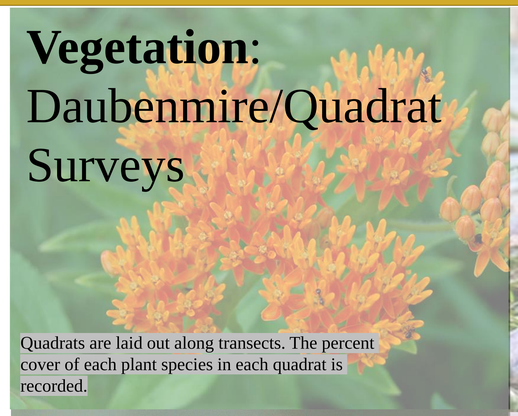
Jack Soucie, UMass CAFE Scholar
Zara Dowling, UMass CEE Research Fellow

Introduction

There is no one way to survey all biodiversity at a site. Different types of organisms require different types of surveys that have varying efficacy and efficiency. When considering surveying biodiversity at a solar facility, new challenges arise because of the unique habitat type these facilities create. A guide for what survey types to use at a solar facility when surveying all types of biodiversity does not exist, and the creation of that guide was the purpose of this project. An easy to access list of all the methods needed to survey one or many different types of plants and animals will make assessing the biodiversity at these facilities much easier.

Methods

The proposed methods were compiled by doing an in-depth literature review about wildlife surveys at solar facilities, those done at wind facilities, and other surveys in general. The methods chosen for each taxa provide the most efficient way to monitor several different types of wildlife with the least amount of effort, training, funding, and permitting. The methods were compiled into a guide with explanations of each survey type, list of equipment needed, sample size, any other necessary information needed to complete the survey, and references.



Vegetation: Daubenmire/Quadrat Surveys

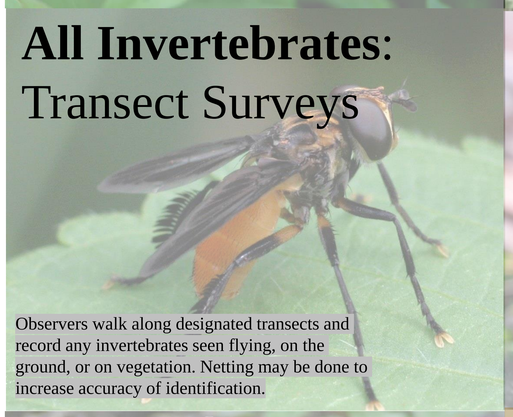
Quadrats are laid out along transects. The percent cover of each plant species in each quadrat is recorded.

Small mammals: Live Trapping

These non-lethal traps in a grid are designed for catch and release of small mammals. These may be baited to increase capture rates.

Mesocarnivores: Camera Trapping

Game/trail cameras are located throughout a facility to record larger mammals. These may be placed randomly or in places of high activity.

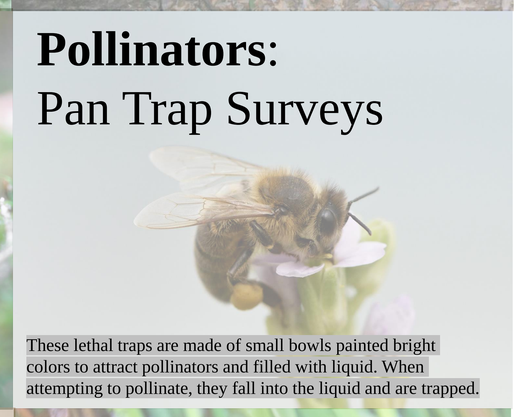


All Invertebrates: Transect Surveys

Observers walk along designated transects and record any invertebrates seen flying, on the ground, or on vegetation. Netting may be done to increase accuracy of identification.

Ground Invertebrates: Pitfall Trapping

These lethal traps made of cups are dug into the ground to catch any ground invertebrates, like ants or beetles, that fall into the liquid inside.



Pollinators: Pan Trap Surveys

These lethal traps are made of small bowls painted bright colors to attract pollinators and filled with liquid. When attempting to pollinate, they fall into the liquid and are trapped.

Herpetofauna: Pitfall Trapping

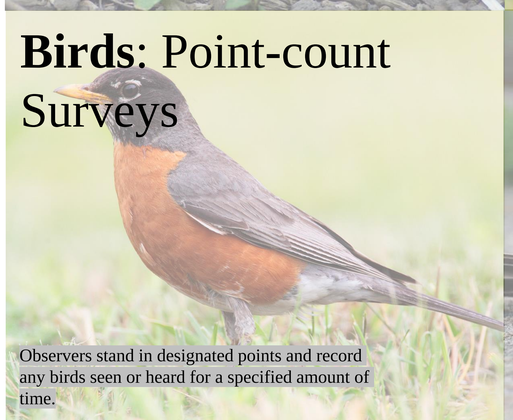
Non-lethal traps made of buckets are dug into the ground to catch any reptiles and amphibians that walk over them.

Snakes and Salamanders: Coverboard Surveys

Coverboards are placed randomly or in a grid. They are flipped over and checked for snakes and salamanders using them as cover.

Breeding Amphibians: Call Surveys

Observers record snippets of vocalizations of breeding amphibians. These are then identified to species manually or with AI software.



Birds: Point-count Surveys

Observers stand in designated points and record any birds seen or heard for a specified amount of time.

Birds and Bats: Carcass Collection

Any carcasses of birds and bats found throughout the facility should be collected and identified to species.

Bats: Acoustic Surveys and Mist-netting

Acoustic detectors are placed in locations that will record bat calls at night. Observers also deploy mist-nets to catch and identify bats that fly into the nets.

Results

Most of the results can be done with limited funding. Most of the best methods for this project require materials that are easily found at a local hardware store, with only a few methods requiring specialized equipment. This, in addition to the lack of extensive permitting and needed experience, creates a very accessible system for biodiversity monitoring.

Discussion

This protocol is not yet complete. The next steps are to spend time trying out the methods to see if they work well in practicality, not just theory. The foundation has been laid with the compilation of sources and methods, but it will continue to evolve with field research. The research will try the methods as listed, and then adapt them to be more thorough and complete. Hopefully, this will eventually become a standardized protocol used at many different solar facilities as easy-to-follow methods to survey biodiversity.

Full list of references

Complete protocol