

Weed Susceptibility Modeling— Adapting an Existing GIS-Based Model

i ADVANTAGES

Advantages of adapting an existing model over building a new one include:

- Less upfront work to develop theory
- Known data requirements
- Easy implementation into a GIS (e.g. an extension)
- An easy-to-use interface (possibly)

i DISADVANTAGES

Disadvantages of using an existing model over building a new one include:

- Requirements for specific data layers that may not be available
- Special data format requirements
- Necessity to adjust and adapt the model to your weed and specific area

i KEYWORDS

For internet searches, try combinations of these words in your favorite search engine:

- “model”
- “prediction”
- “susceptibility”
- “vulnerability”
- “invasion”
- “weed”
- “invasive species”

You can also try adding the common or Latin name of your weed although this will reduce the number of hits.

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Summary

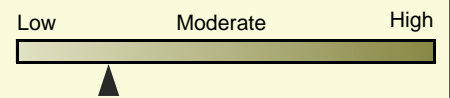
Weed susceptibility models are used to assess the risk of weed invasion into specific areas. Susceptibility is based on the degree to which a favorable environment exists for a specific species. Data layers such as existing vegetation cover, disturbance, proximity to water, elevation, slope, and other environmental and biophysical characteristics are ranked according to the degree to which weed habitat requirements are met. This information is compiled and locations at risk for a specific invasive species are identified. Different weed species generally have unique habitat requirements and preferences. Therefore, modeling susceptibility is best done for individual species in a customized fashion within a GIS environment.

QUICK LOOK

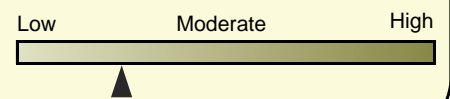
Objective:

This document outlines how to adapt an existing GIS-based weed susceptibility model to your specific weed and area.

Cost:



Expertise:



Major Steps

1. Acquire an existing weed susceptibility model.
2. Evaluate the adaptability of the model.
3. Assemble required data.
4. Run the model and assess the results.

Acquire an Existing Weed Susceptibility Model

Currently, relatively few weed susceptibility models are available. However, with increased awareness of invasive species and interest in identifying areas at risk, more models will likely become available. An internet search is recommended to find additional models. Though this guide does not recommend one model over any others, links to some predictive weed models are provided below to get you started.

Predictive Weed Susceptibility Models

- Weed Invasion Susceptibility Prediction (WISP) model
(<http://w3.uwyo.edu/~annhild/WISP.html>)
- DesktopGarp
(<http://www.lifemapper.org/desktopgarp/>)
- Aquatic plant models—US Army Corps of Engineers Environmental Laboratory
(<http://el.erdc.usace.army.mil/products.cfm?Topic=models&Type=aquatic>)





IMPORTANT

- Does your model have adequate documentation?
- Do you have the required data sets?
- Has the model been used for weeds with similar requirements?



DATA SOURCES

Try searching federal, state, county, and local government agency web sites for data. The data may be more general than you would like, but at least you can run the model for a first cut at addressing your invasive species issues.



ASSISTANCE?

For more information or assistance, please contact

USDA Forest Service
Remote Sensing
Applications Center
(RSAC)

2222 S. 2300 W.
Salt Lake City, UT 84119
(801) 975-3750

RSAC Intranet
<http://fsweb.rsac.fs.fed.us>
RSAC Internet
<http://www.fs.fed.us/eng/rsac>

Assess the Adaptability of the Model

Weeds are incredibly adaptive and will have slightly different environmental requirements across various landscapes. Any model you choose will need to be adjusted based on your knowledge of the weed's habitat requirements and spread characteristics in your specific area.

It is recommended that you carefully examine the data requirements for a particular model in order to determine which model is best for your situation. There should also be reasonable documentation on how to use the model and what weed species it has been successfully used with in the past. Inadequate documentation can cause much frustration and possibly inaccurate results. The weed species that a model has been used for should have similar characteristics to the species you are trying to model. Different models have different degrees of specificity. Some models can be easily adapted to a variety of weed species while others cannot. Make sure to choose a model that can be adapted to your weed species with relative ease.

If a sample dataset is provided, run the model with the dataset to assess:

- How the model works
- Ease of use
- Data format requirements
- Whether the model output is what you would expect
- Whether the model can be adapted to fit your needs

Assemble the Required Data

An advantage of using or refining an existing model is that the data inputs have already been established. Review the model's data requirements to determine what data you already have and what data you will need to gather or generate. Local GIS shops or the internet are good places to start your search for data. Though this guide does not recommend one data source over any others, links to a few of the more common data clearinghouses are provided below. Note that your data may require special formatting before it can be used in the model. Check the model documentation and sample dataset, if provided, for guidance.

Geospatial Data Clearinghouses

- USDA Forest Service Geospatial Data Clearinghouse* (<http://fsweb.clearinghouse.fs.fed.us/>) (*only available to Forest Service users)
- USDA Geospatial Data Gateway (<http://datagateway.nrcs.usda.gov>)
- Geospatial One-Stop (<http://www.geo-one-stop.gov>)

Run the Model and Assess the Results

Once the data are prepared, run the existing model for a small area that you are familiar with or where there is good historic weed data available. This allows you to evaluate the model results and determine what adjustments need to be made. You may need to modify data parameters and/or incorporate additional data to improve the model output. Continue running and adjusting the model for the small area until the results are satisfactory. When the model is satisfactory, apply it to the entire study area and assess the results, adjusting and re-running the model if needed.

