

120°W

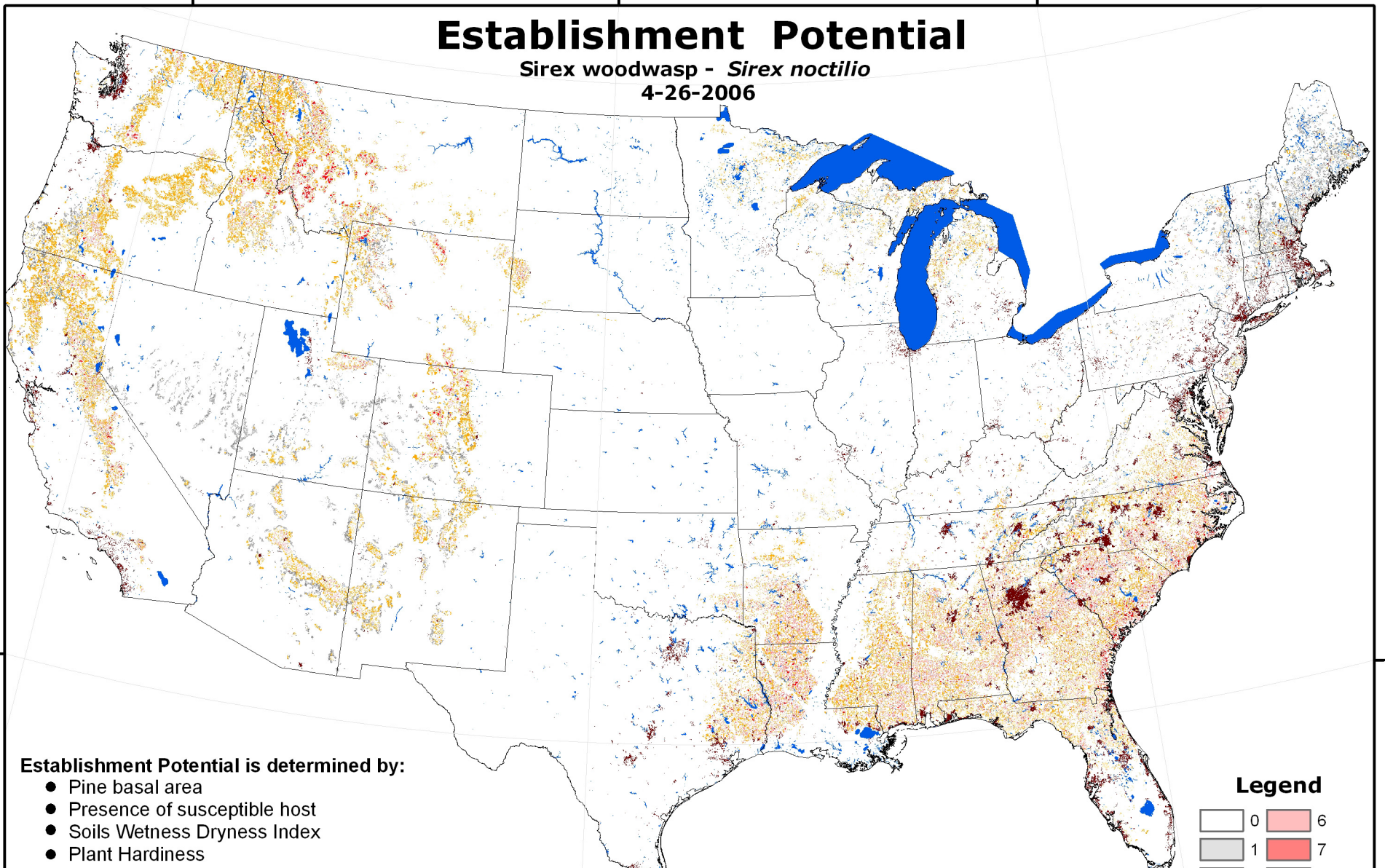
100°W

80°W

# Establishment Potential

## *Sirex woodwasp* - *Sirex noctilio*

4-26-2006



30°N

30°N

### Establishment Potential is determined by:

- Pine basal area
- Presence of susceptible host
- Soils Wetness Dryness Index
- Plant Hardiness

### Susceptibility Potential is the sum of an equal weighted overlay of:

The Introduction Potential and Establishment Potential

[http://www.fs.fed.us/foresthealth/technology/invasives\\_sirexnoctilio\\_riskmaps.shtml](http://www.fs.fed.us/foresthealth/technology/invasives_sirexnoctilio_riskmaps.shtml)

### Legend



A value of 0 is the lowest potential and a value of 10 is highest potential of establishment.



Albers Equal Area Conic Projection  
Resolution = one-kilometer

file: establishment7.mdx  
GRID: estab4\_msk  
Tool = Sirex\_NewYork model = Sirex\_fin

Map Produced by FHTET  
Fort Collins, CO on 5-9-2006. MFT

100°W

80°W

## Summary of Establishment Potential for Sirex woodwasp - *Sirex noctilio*: April 26, 2006

Website URL: <http://www.fs.fed.us/foresthealth/technology/products.shtml>

The Establishment Potential Surface for *Sirex noctilio* was produced for the Conterminous United States (CUS) in 1 square kilometer (km<sup>2</sup>) units by the U.S. Forest Service, Forest Health Technology Enterprise Team's (FHTET) Invasive Species Steering Committee (Table 1). The product's intended use in conjunction with the Introduction Potential Surface is to develop a Susceptibility Potential Surface for *Sirex noctilio*. Four datasets with standardized values from 0 to 10 were used as variables in the analysis. Each dataset was multiplied by its arithmetic weight (Table 2) and the resultant values were combined in a weighted overlay. The output values also range from 0 to 10; with 10 having the highest establishment potential.

**Total Pine Basal Area.** Source: Basal Area (BA) measurements from the US Forest Service, Forest Inventory and Analysis (FIA) data. North American pine species data from FIA were used. In places where *Sirex noctilio* currently exists, dense areas are attacked while thinned areas within the same stand are not. Therefore, total BA for host species were used to assign a risk value from 0 - 10 to each 1 km<sup>2</sup> pixel. Total BA was used to assign an attack value to each pixel as shown in Table 3.

**Soil Wetness Dryness Index.** Source: USDA Forest Service Forest Health Technology Enterprise Team (FHTET) Fort Collins, Colorado. The Dryness Index (DI) is a measure of the wetness of a soil. The DI is designed to parallel the amount of water that a soil contains and makes available to plants under normal climatic conditions. Maps were generated by assigning a DI value to the dominate soil series in each of the polygons comprising the State Soil Geographic (STATSGO) database. The DI values for each soil series were determined from the taxonomic subgroup, textural family, drainage class, and slope class of every soil series. These data have values that range from 0 – 100. Where 0 is very dry, 100 is open water, values close to 50 are considered optimal with respect to soil wetness dryness. These data were reclassified using Table 4.

**Host Species.** Source: FIA pine species data; and USDA Forest Service, Remote Sensing Lab, Sacramento, CA, Monterey Pine data.

**Urban Forest.** Source: Two primary data sets were used: **A)** A polygon data set that depicts Cities in the United States and **B)** National Land Cover Data (NLCD) Evergreen Forest Type. The Cities were overlain with the NLCD Evergreen Forest type. These data were then combined with the Host Species data using a maximum overlay process. The Urban Forest was considered to contain highly susceptible host species.

**Table 1**  
**Steering Committee**

Marla C. Downing, FHTET Lead  
Daniel M. Borchert, APHIS PPQ  
Donald A. Duerr, USFS R8  
Dennis A. Haugen, USFS NA  
Frank H. Koch, USFS SRS  
Frank J. Krist Jr., USFS FHTET  
Frank J. Sapio, USFS FHTET  
Bill D. Smith, USFS SRS  
Borys M. Tkacz, USFS FHP

**Table 2**  
Establishment Variables  
and Arithmetic Weights.

Variable	Weight
Total Pine Basal Area	40%
Soil Wetness Dryness	20%
Host Species and Urban Forest	40%

**Table 3**  
Increased basal area equates to an increased risk of attack.

Basal Area	GRID Value
0	0
> 0 - 5	1
> 5 - 16	2
> 16 - 29	3
> 29 - 44	4
> 44 - 62	5
> 62 - 82	6
> 82 - 106	7
> 106 - 136	8
> 136 - 181	9
> 181	10

**Table 4**  
Soil Wetness dryness ranks

DI Value	Grid Value
0 - 5	10
6 - 10	9
11 - 15	8
16 - 20	7
21 - 25	6
26 - 30	5
31 - 35	4
36 - 40	3
41 - 45	2
46 - 50	1
51 - 55	2
56 - 60	3
61 - 65	4
66 - 70	5
71 - 75	6
76 - 80	7
81 - 85	8
86 - 90	9
91 - 95	10
96 - 100	0

### Point of Contact

Marla C. Downing Forest Health  
Technology Enterprise Team  
Forest Health Protection  
USDA Forest Service  
2150 Centre Avenue, Bldg A  
Suite 331 Fort Collins, CO  
80526-1891 Phone: 970-295-5843  
[mdowning@fs.fed](mailto:mdowning@fs.fed)

### Contractor Support

Michael F. Tuffly  
ERIA Consultants, LLC