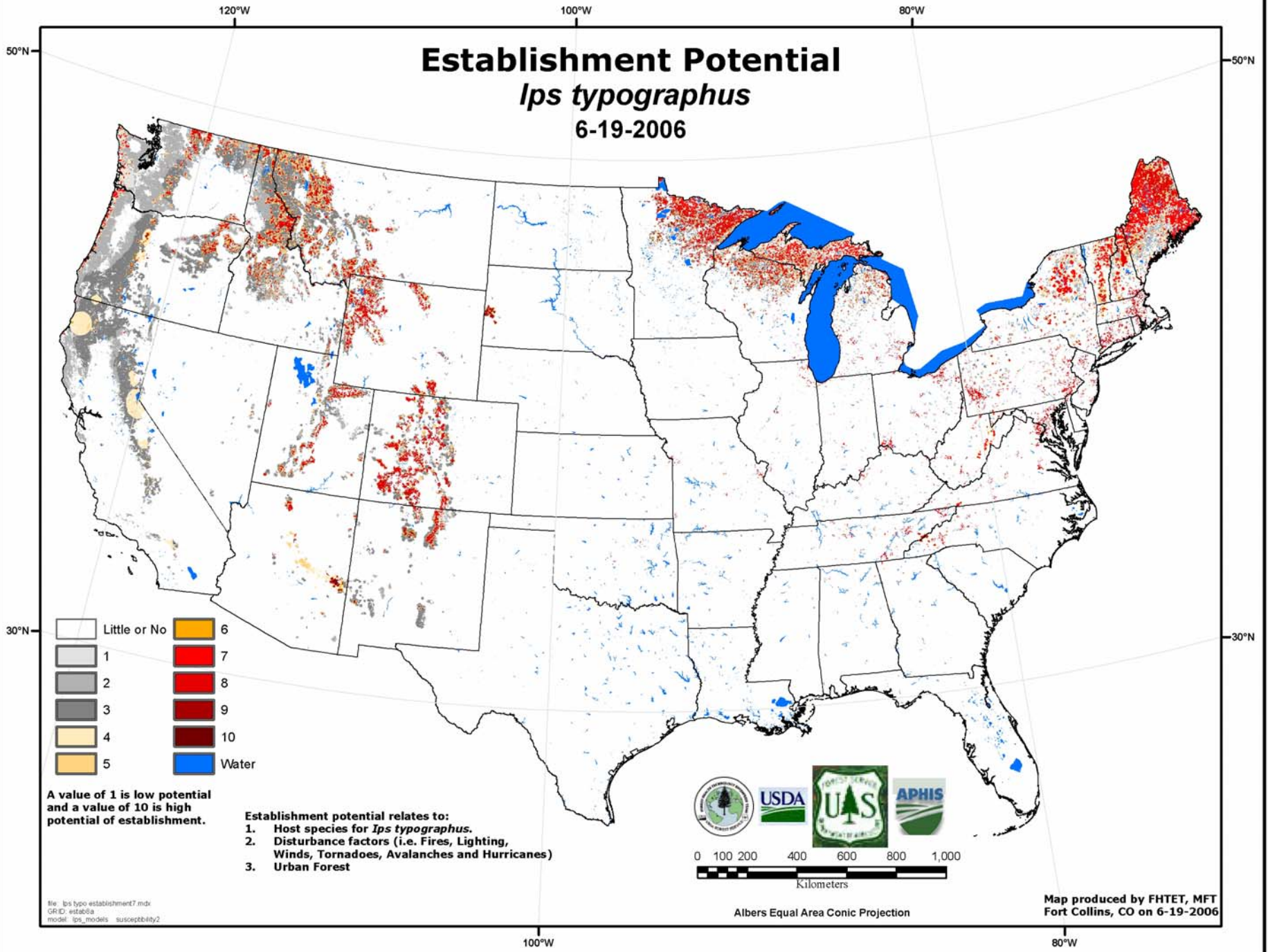


# Establishment Potential *Ips typographus* 6-19-2006



**Summary of Establishment Potential for *Ips typographus*: June 20, 2006 Website URL:  
<http://www.fs.fed.us/foresthealth/technology/products.shtml>**

The Establishment Potential Surface for *Ips typographus* 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 *Ips typographus*. Supporting information was taken from Exotic Forest Pest (ExFor) website (<http://spfnic.fs.fed.us/exfor/>). Eight datasets with standardized values from 0 to 10 were used as variables in the analysis. The output values also range from 0 to 10; with 10 having the highest establishment potential. These data sets were broken down into two primary data themes: 1) Disturbances, and 2) Host. The Disturbance consists of: Tornadoes, Maximum High Winds, Hurricanes, Fire, Lightning, and Avalanche Potential. Host data consists of: Urban Forests and FIA host species data. Data were combined in a weighted overlay (Table 4).

**Disturbance**

**Tornadoes:** Source: National Climate Atlas. Tornado line density from the year 1950 – 2004. These tornadoes events were calculated into tornadoes events per square kilometer; then, reclassified into 10 classes using Jenk's natural breaks.

**Hurricanes:** Source: National Climate Atlas. Hurricane line density from the year 1851 – 2003. These hurricane events were calculated into hurricane events per square kilometer; then, reclassified into 10 classes using Jenk's natural breaks.

**Fire:** Source: Desert Research Institute (DRI) Program for Climate, Ecosystem and Fire Applications. Fire point events density on federal lands from 1970 – 2004. These fire events were calculated into fire events per square kilometer, then reclassified into Jenk's 10 classes using natural breaks.

**Maximum Winds:** Source: National Climate Atlas The extreme 5% wind speed for a 30 year time period (1972 – 1992).

**Lightning:** Source: NASA Lightning Imaging Sensor / Optical Transient Detector (LIS/OTD) Science Team. The product is a 0.5° x 0.5° gridded composite of total (IC+CG) lightning bulk production, expressed as a flash rate density (fl/km<sup>2</sup>/yr). Climatologies from the 5-yr OTD (4/95-3/00) and 5-yr LIS (12/97-12/02) missions are included, as well as a combined OTD+LIS climatology and supporting base data (flash counts and viewing times).

**Avalanche:** Source: FHTET. Avalanche potential areas were calculated by the following parameters: 1) Areas greater than 5,000 feet above mean sea level, 2) Areas that are greater than 30° and less than 60° in slope, and 3) Areas that have 60 inches or more annual average snow accumulation. Data was created by FHTET via parameters illustrated by Margherita Maggioni, Urs Gruber, and Andreas Stoffel, "Definition and characterization of potential avalanche release areas" Proceedings of the 2001 ESRI International User Conference July 9-13, 2001, San Diego. <http://gis.esri.com/library/userconf/proc02/pap1161/p1161.htm>

Data from Tornadoes, Hurricanes and Fire were partitioned via the last three years of data and combined using a maximum overlay process. These data are referred to as the Current data. The remaining data from Tornadoes, Hurricanes and Fire coupled with Maximum available Winds, Lightning, and Avalanche are called the Historical data. Finally these data were combined into an equal weighted overlay (Table 2) to create the final disturbance surface.

**Host**

**Host Species:** Source: US Forest Service Inventory and Analysis (FIA) spruce, larch and fir species data (Table 3).

**Urban Forest:** Source: Four primary data sets were used: A) Environment Systems Research Institutes (ESRI) polygon data set that depicts Cities in the United States, B) National Land Cover Data (NLCD) Evergreen Forest Type, C) NLCD Mixed Forest Type, and E) USDA Plant Hardiness Zones. All data were combined to create the Urban Forest.

Finally the Urban Forest was combined with the FIA Host Species data using a maximum overlay process. The Urban Forest was considered to contain highly susceptible host species in Plant Hardiness Zones 2a – 7a, inclusive. (Table 3)

**Table 1  
Steering Committee**

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 C. Wayne Berisford, U of G  
 Daniel M. Borchert, APHIS PPQ  
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**Table 2  
Disturbance**

Variable	Weight
Current Data	50%
Historical Data	50%

**Table 3  
Host Species**

Species	Value
Spruce	10
Mixed Spruce	5
Fir	1
Larch	1
Urban Forest	10

**Table 4  
Establishment Variables and Arithmetic Weights.**

Variable	Weight
Disturbance	40%
Host	60%

**Point of Contact**

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