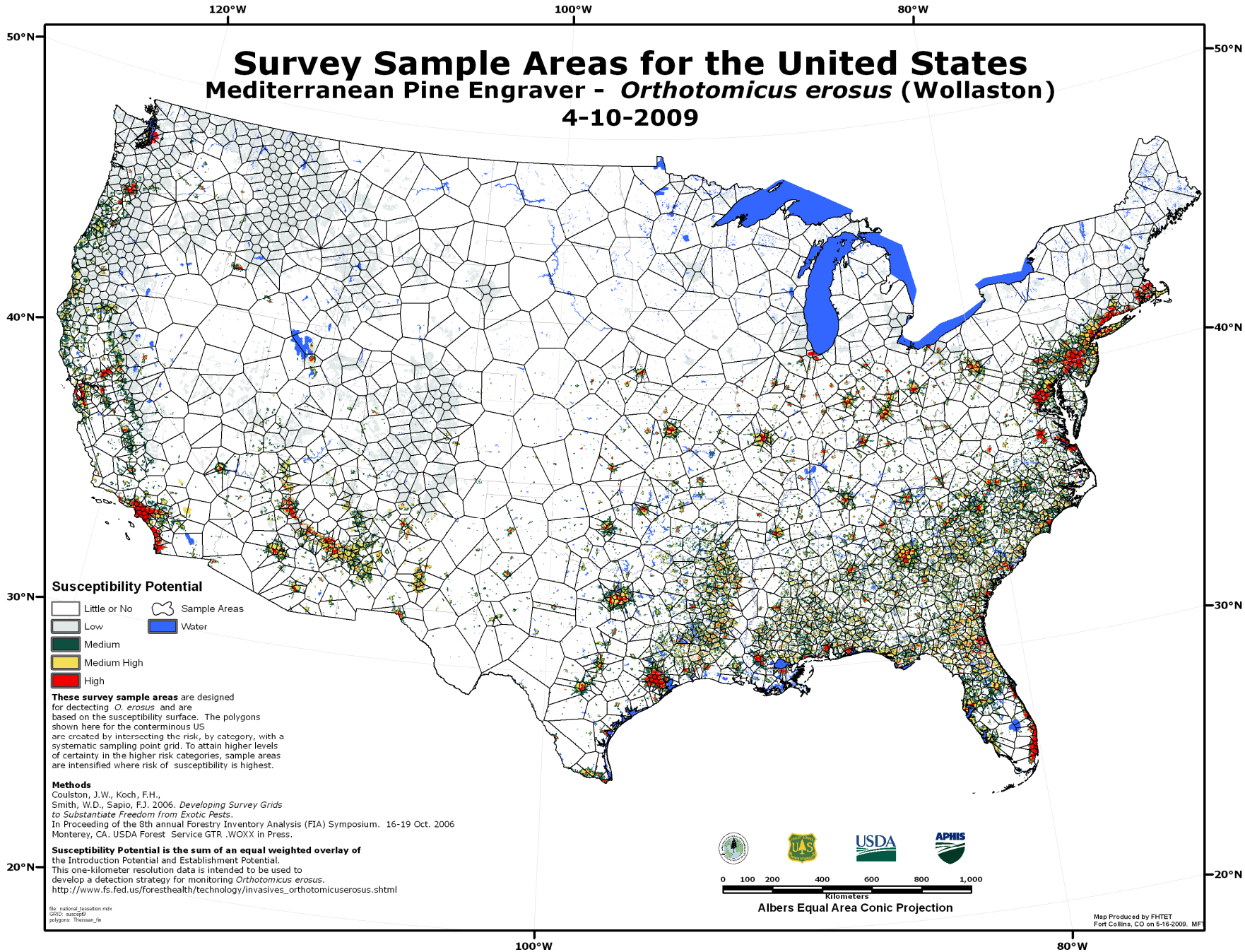
Survey Sample Areas for the United States

Mediterranean Pine Engraver - *Orthotomicus erosus* (Wollaston)

4-10-2009



These survey sample areas are designed for dectecting *O. erosus* and are based on the susceptibility surface. The polygons shown here for the conterminous US are created by intersecting the risk, by category, with a systematic sampling point grid. To attain higher levels of certainty in the higher risk categories, sample areas are intensified where risk of susceptibility is highest.

Methods

Coulston, J.W., Koch, F.H., Smith, W.D., Sapio, F.J. 2006. *Developing Survey Grids to Substantiate Freedom from Exotic Pests*. In Proceeding of the 8th annual Forestry Inventory Analysis (FIA) Symposium. 16-19 Oct. 2006 Monterey, CA. USDA Forest Service GTR .WOXX in Press.

Susceptibility Potential is the sum of an equal weighted overlay of the Introduction Potential and Establishment Potential. This one-kilometer resolution data is intended to be used to develop a detection strategy for monitoring *Orthotomicus erosus*. http://www.fs.fed.us/foresthealth/technology/invasives_orthotomicuserosus.shtml

file: national_tessaltion.mdx
GRID: suscept0
polygons: Thiessan_fin

Map Produced by FHTET
Fort Collins, CO on 5-16-2009. MF

Summary of Survey Sample Areas for the Conterminous US
Orthotomicus erosus (Wollaston): Mediterranean Pine Engraver; April 10, 2009
Website URL: http://www.fs.fed.us/foresthealth/technology/invasives_orthotomicuserosus_riskmaps.shtml

This project incorporates methods developed by Coulston, et al. (2006) to develop national scale sampling areas based on the Forest Health Technology Enterprise Team (FHTET) *Orthotomicus erosus* Susceptibility Surface.

National Scale Sample Methods:

1) reclassification of the susceptibility risk potential surface into four classes from the original five classes (0 - Little/No, 1 – Low, 2 – Medium, 3 – High) Table 1
2) estimating the intensification factor based on the required number of samples and the relative certainty for each risk category
3) intensifying EMAP's North American hexagon to develop a systematic point grid for each risk stratum
4) spatially intersecting the intensified point grids with the corresponding risk stratum
5) merging each set of selected points from the stratum intersection
6) creating the sample areas that are semi-regular tessellations of Theissen polygons created from the merged grid intensification points.

The FHTET *Orthotomicus erosus* susceptibility risk potential surface was used and reclassed into the required four classes to develop the survey sample areas. A total of 1,000 sample areas were used for the intensification model. Relative certainties were assigned in order to create increasing plot intensifications for increasing risk stratum. A custom Microsoft ©EXCEL application calculates the intensification factor and sequence number based on the number of points and desired relative certainty. The sequence for the point intensification is determined from a table supplied by the authors. Table 1 shows the risk class, area by class, and number of sample areas used for this project. The point grid intensification is based on the Environmental Monitoring and Assessment (EMAP) hexagon for the conterminous United States and is iteratively intensified using a custom ArcView 3.3 application. A new point file is created for each iterative intensification. The final intensification iterations for each class is intersected with a vector version of the susceptibility surface and merged to create a single point shape file. A sample area tessellation is then performed from the merged intensification points using a custom function in the ArcView 3.3 application that creates theissen polygons. These polygons become the sample areas, where the sample areas are based on the risk class. It is intended that each sample area is given the same number of sample plots.

Citation

Coulston, John W., Koch, F.H., Smith, W.D., Sapio, F.J. 2006. *Developing Survey Grids to Substantiate Freedom from Exotic Pests*. FIA Symposium Proceedings. In Press.

Table 1. Summary Statistics

Original Risk Class	Risk Class for Sampling	Relative Certainty	Area (km^2)	Sample Frequency
NoData & Low (1)	Little/No (0)	0.1	6,280,514	42
Medium (2)	Low (1)	0.25	740,529	114
Medium High (3)	Mod (2)	0.6	682,389	364
High (4)	High (3)	0.7	79,434	479
		Total	**7,782,866**	**999**

Point of Contact

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