



Forest Health Monitoring



Detection Monitoring

Purpose

- Establishes baseline conditions for analysis of future changes and trends
- Provides continuing flow of data over time from fixed plots and surveys
- Triggers suppression or evaluation monitoring actions

History

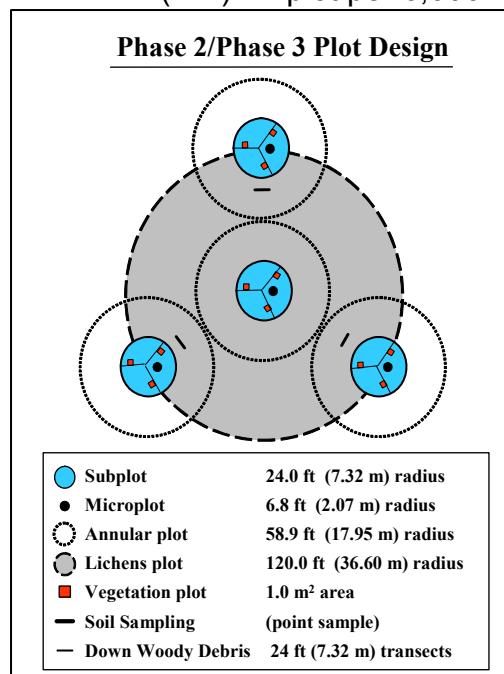
- Originally established in 1990 as a cooperative effort between USDA-FS and USEPA-EMAP, with State Foresters as key partners. EPA soon dropped out, leaving it as a partnership between the Forest Service's FHM and FIA programs. In 2000 FIA assumed control of all plot measurement activities, while FHM continued off-plot aerial and ground surveys.
- Activity began in 1990 in six New England states; in 1991 three Mid-Atlantic and three Southern states were added; and in 1992 two eastern states joined the program. In 1999, FHM plots were integrated with FIA plots and by 2000 all plot measurements were handed over to FIA. All states but OK, NM, WY, and northern/central AK are now covered by the integrated plot network.

Program Structure

- Plot network and design
 - Plot design developed by EMAP



- Nation-wide hexagonal grid pattern with randomized plot in each hex
- P1 (not a plot system) – broadly classifies land as forest or non-forest
- P2 (FIA) - 1 plot per 6,000



Revised 03/2009

FHM website: <http://www.fs.fed.us/foresthealth/fhm>

- ac. (approximately 125,000 nation-wide)
 - P3 (FHM) - 1 plot per 96,000 ac. (approximately 8,000 nation-wide)
 - Each plot measured once every 5-10 years
- Indicators: measurements that provide quantitative data about specific ecosystem components
 - Tree crown condition (example: live crown ratio, light exposure, canopy position, crown density, dieback, and foliage transparency indicate overall tree health and predict its ability to survive and grow)
 - Tree growth
 - Tree regeneration
 - Tree damage
 - Tree mortality
 - Down woody material
 - Lichen communities
 - Ozone bioindicator plants
 - Soil morphology and chemistry
 - Vegetation structure
 - Plant diversity
- Remote sensing – detects changes in forest cover, fragmentation and land use at a regional scale using space-based platforms
 - Aerial surveys – detect visible damage to tree crowns from insects, diseases, and weather; may be conducted annually or seasonally based on local needs
 - Ground surveys – detect conditions such as presence of invasive species not visible by satellite or aerial observation; verify reported aerial survey damage
- Special detection surveys – monitor spread of damage agents such as invasive exotic species
 - *Phytophthora ramorum* (SOD) national detection survey based on a SOD risk map. Detection protocols for field surveys. Stream baiting pilot.
 - Southwest pine mortality – age, stand density, drought, and bark beetles producing widespread regional mortality
 - Aspen decline – age, drought, frost injury, and elk browsing adversely affecting an important species that requires periodic stand-replacing disturbance
 - Red Bay mortality – exotic ambrosia beetle vectoring *Ophiostoma spp.* in Southeastern coastal states, killing red bay, sassafras, and two rare coastal shrubs
 - Ohia rust – a new race of *Puccinia psidi* affecting Ohia, Hawaii's most common forest tree
 - Emerald ash borer – rapidly spreading exotic wood boring beetle in the upper Midwest
- Forest fragmentation – ongoing monitoring of the status of urbanization and development relating to the integrity and ecological function of forested lands