PERSEUS

Promoting Economic Resilience & Sustainability of the Eastern US Forests

Delphi Findings Factsheet

exploration *ingenuity* *collaboration*

Research Objective

To understand informational and digital technological needs among forestry professionals in the Eastern U.S. These findings will help inform research and extension to facilitate (1) development of relevant forest digital technology products, and (2) adoption of sustainable climate-smart management practices.

Funded by the USDA NIFA, the aim of the **PERSEUS** project is to provide the necessary foundation for redefining national forest inventory in the US, while also providing the much-needed ability to project future forest conditions and provided ecosystem services across contrasting scales.

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PERSEUS website

	Round 1	Round 2	Round 3
GOAL	Obtain eastern U.S. forestry professionals' perspectives regarding digital information & technology needed to support sustainable forest management.	Determine relative importance of forest management tools and characteristics that emerged from forestry professionals' responses in Round 1	Provide an opportunity for forestry professionals to re-evaluate their forest management tool priorities after reviewing collective results of Round 2
METHODS	56 forestry professionals representing diverse organizations, backgrounds, and roles were invited to respond to 5 open-ended questions All 22 responses received were thematically analyzed to identify priority tools & topics, and synthesize distinct categories & characteristics of support tools	57 forestry professionals representing diverse organizations, backgrounds, and roles were invited to complete an online questionnaire All 28 responses received were used to generate descriptive statistics and perform tests for statistical significance	Individualized spreadsheets containing original point allocations and collective results were shared with each of the 28 respondents from Round 2 25 respondents chose to reallocate points and/or provide comments on their priorities & reasoning
RESULTS	9 categories of useful support tools for forestry professionals 10 desired characteristics of support tools for forestry professionals	Overall priorities for forestry professionals among 9 categories of support tools Perceived importance for 10 desired characteristics of support tools	Consensus on overall priorities for forestry professionals among 9 categories of support tools Additional insight on reason(s) behind forestry professionals' tool priorities

Key Takeaways for Research & Development

- Access to reliable and high-quality forest imagery is a top priority for forestry professionals: Imagery-related capabilities and improvements upon existing systems would be highly welcomed avenues of research and development for PERSEUS to pursue.
- While important enough to be mentioned by forestry professionals, timber market access & planning is not a top priority compared to other avenues PERSEUS can pursue in developing useful decision support tools & capabilities for long-term forest management.
- Ideal PERSEUS research and development for forestry professionals will produce refined information or new solutions for technological shortfalls in foresters' toolkits, without straying too far from systems and tools that are already known, trusted, and implemented.

Key Findings: Support Tool Characteristics

Recurring Desires

Reliability – Can the data and results of the tool be trusted by foresters?

Compatibility - Does the tool work with what foresters are already using?

Recurring Cautions

Redundancy – Do foresters already have a tool that works well enough?

Utility – What will the tool provide that foresters aren't currently able to do?

Support Tool Characteristics and Definitions	Mean (SD)*
Reliability The tool can provide estimations and models that are grounded in trustworthy, up-to-date databases and information sources.	4.43 (0.79)
Adaptability The tool can provide a robust decision support system that informs timely decision-making for a wide range of scenarios and outputs.	4.18 (0.86)
Compatibility The tool can work well with different sources of data and/or fits within already-existing values, patterns, or systems.	4.18 (0.98)
Relevance The tool can provide targeted information and/or capabilities that cater to specific forest management needs.	4.14 (0.71)
Innovation The tool can provide new capabilities beyond what already exists and/or will significantly improve upon current systems.	4.07 (0.94)
Accessibility The tool can be obtained easily, with minimal barriers or prerequisites for access.	3.93 (0.98)
Consolidation The tool can integrate multiple layers of information across and between sources to produce a coherent "bigger picture".	3.68 (1.23)
Simplicity The tool can be learned and utilized quickly, with minimal time required for teaching or training.	3.64 (1.03)
Profitability The tool can be acquired for minimal expense and/or will produce a positive return on investment.	3.57 (1.14)
Uncertainty The tool can provide outputs tempered by real-world elements of unpredictability and random chance.	3.50 (0.96)

*Measured along a 5-point scale where 1 = Not important; 2 = Slightly important; 3 = Moderately important; 4 = Important; and 5 = Very important

Key Findings: Support Tool Priorities

Highest Development Priorities

Imagery

Forest Structure & Species Composition

Lowest Development Priorities

Market Availability & Accessibility

Harvest Mapping

Support Tool Category and Definitions	Mean (SD)* Round 2	Mean (SD)* Round 3
Imagery This tool would feature low-cost, freely accessible 2D/3D imagery, including 3DNAIP, GEDI, and LiDAR. These data would allow new opportunities to extract important information for management, including forest canopy height and biomass estimates.	16.4 (10.1)	17.2 (11.4)
Forest Structure & Species Composition Maps This tool would allow use of remote sensing-derived forest structure and species composition information for objectively identifying and classifying specific forest structural information, such as density and basal area by species within a given area.	15.7 (9.4)	17.0 (9.0)
Inventory & Decision-Support Software Systems This tool would provide up-to date, precise forest inventory assessment software to aid in forest management. This would involve stand optimization and planning applications that can inform stand-level decision-making, like assigning relevant metrics (e.g., habitat, site quality, volume, etc.).	13.8 (9.4)	13.0 (9.3)
Forecasting Climate Change Impacts This tool would allow users to explore models that help explain predicted ranges of future climate change impacts on forest ecosystems (e.g., tree species distributions, growth and productivity, etc.). This includes tools that help forecast potential climatic changes to aid in forest management (e.g., culvert planning, disturbances, extreme weather events, etc.).	10.1 (7.4)	10.2 (6.9)
Digital Soil Maps This tool would describe soil types within a designated area and provide applicable management options, as well as include metrics for site productivity.	9.7 (7.9)	10.2 (7.9)
Improved Forest Volume, Biomass, & Carbon Models This tool would allow users to explore forest volume, biomass, and carbon models, and use improved estimation methods for evaluating these tree- and stand-level attributes.	10.1 (6.5)	9.7 (7.5)
Mapping/Classifying Land Use & Cover This tool would provide land coverage and land use delineations that can distinguish plantations, areas of operability, and forest type (e.g., dominant size class, hardwood vs softwood).	8.9 (7.2)	8.8 (6.8)
Harvest Mapping This tool would collect and maintain data surrounding harvests that could support decision-making in real-time. This would include the ability to efficiently record and update stands post-harvest, as well as select future areas for timber extraction.	9.1 (6.5)	7.8 (5.8)
Market Availability & Accessibility This tool would show all available markets and distance to mills. This would give managers more confidence to make decisions when planning tree planting or providing harvest recommendations.	6.1 (6.8)	6.0 (7.1)

*Participants distributed a total of 100 points across all nine tools. More points assigned to a tool signifies that forestry professionals consider that tool a higher priority for development.