

Rocky Mountain Research Station Science You Can Use *(in 5 minutes)*



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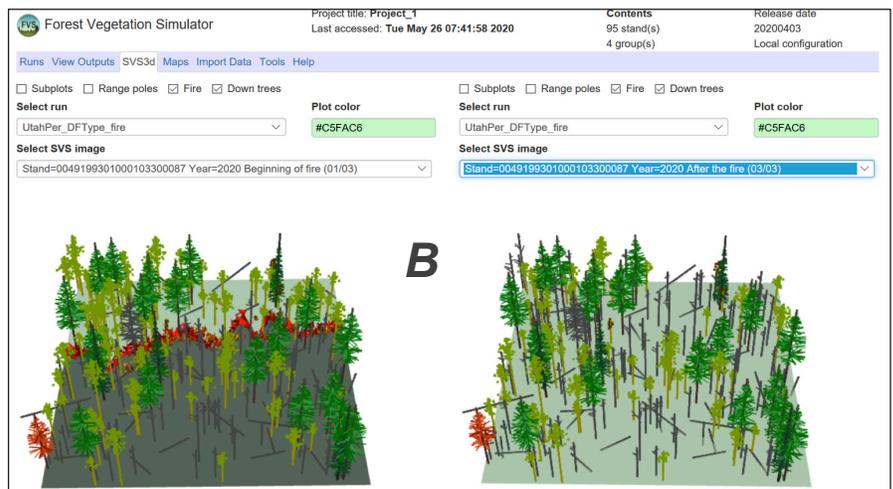
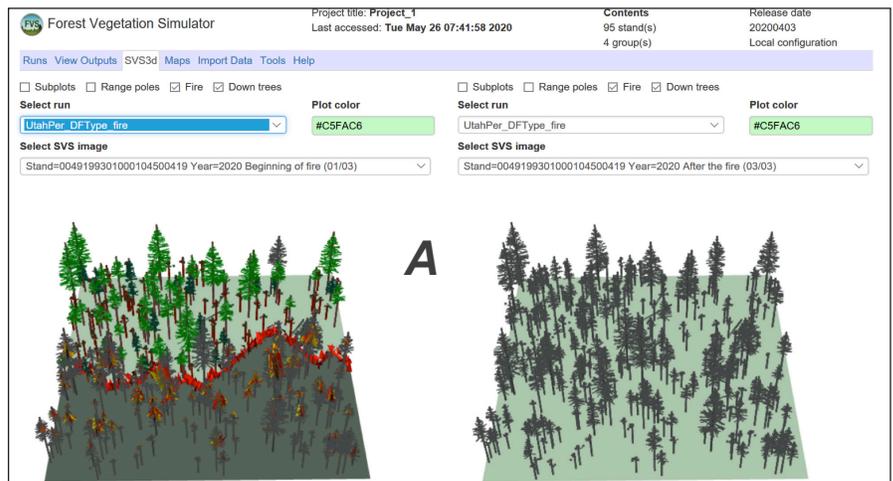
New Conversion of FIA Data Simplifies Use in Forest Vegetation Simulator

Combined Analytical Power

A breakthrough in data translation and conversion combines the power of two forestry analysis tools in answering forestry management questions.

Together the Forest Inventory and Analysis (FIA) database and the Forest Vegetation Simulator (FVS) comprise a powerful toolset that allows managers and researchers to assess the status and trends of a wide variety of forest types over large areas. Users can also evaluate the outcomes of possible future management scenarios.

The FIA program collects data on forest characteristics in all forest types and across all ownerships in the United States (nonforest locations in many regions are also visited to quantify rates of land use change). The FIA database represents the largest and most diverse forest database in the world. FVS is a computer program used by a variety of managers and scientists to project today's forest conditions into the future. For almost two decades there has been increasing demand to use FIA data in FVS, but translating the data from one format to the other has been a difficult task. Previous translations were either incomplete or contained errors, so the combination of the data and program could not be used to its full potential.



FIA data from a 1993 inventory of Utah was used to construct two forest stands, one pure Douglas fir (A), and the other mixed Douglas fir and aspen (B). Both were grown forward in FVS to the year 2020, at which point a fire was simulated in FVS (left image shows stand during the fire; right image shows stand after the fire). Default fire conditions were used, so the effect on each stand is based primarily on factors from the inventory data—species composition and stand structure. The mixed stand burned relatively lightly; however, the pure stand burned catastrophically (graphic: J. Shaw, USDA Forest Service).



John Shaw, an RMRS Research Forester and analyst for the FIA Program, has played a key role in developing a new translation process, which converted FIA data from over 1 million plot visits into a format that is read directly by the FVS. This new datamart URL is easily accessible at <https://apps.fs.usda.gov/fia/datamart/datamart.html>

“Some of the variables we use for FIA purposes are very different from what FVS expects. The main one that took the most work was site quality, or site index,” said Shaw. “And if you brought data across without paying attention to the mismatch, FVS would greatly overestimate or underestimate the quality of the site and, of course, throw the growth model off.”

Shaw said FVS users now only need to download the compressed databases from whatever state they are interested in, import the data, and run their simulations.

Prior attempts at formatting data had limitations, such as differences between FIA and FVS standards, incomplete translations, and leaving the responsibility for the conversion process with the end-user. The current translation process improves on previous efforts by:

- 1) Correcting existing data issues.
- 2) Preserving FIA plot design information, when possible.
- 3) Removing the translation burden from the end-user.
- 4) Providing data in multiple formats, allowing users to project data from FIA plots, subplots, or conditions.
- 5) Packaging the FVS-ready data together with all other FIA plot data.

Enhancing FVS Capability

Together, these improvements provide convenience and add capabilities that have not been available to users of the FIA database or FVS. The improved availability of data in this format will ease forest analysis and planning, enhancing FVS capability to simulate a wide variety of forest treatments and disturbances.

“We’ve had people chomping at the bit for years to get some of this stuff, and some of them have created their own translations, but it was always a lot of work on the side of the user,” said Shaw. “But having this where they can just download it and run it, it’s just super-convenient for all those folks.”

Michael Van Dyck, the FVS group leader in the WO–Forest Management Service Center, said the direct availability to the translated FIA data gives FVS users access to an immense set of data.

“This is a tremendous resource, ideal for large-scale analyses such as forest planning, watershed analysis, biomass prediction, carbon accounting, habitat determination, disturbance effects and recovery, and much more,” said Van Dyck.

Shaw said the next steps in the project include development of a series of user guides to help managers and planners handle FIA data to inform the development of FVS simulations.

PROJECT LEAD

John Shaw is a Research Forester with the Rocky Mountain Research Station in Ogden Utah. His research interests include stand dynamics, forest management and quantitative silviculture. Connect with John at www.fs.usda.gov/rmrs/people/jdshaw.

KEY MANAGEMENT CONSIDERATIONS

- New translation process corrects past translation error and allows FVS to directly read FIA data without the need for data conversion by the FVS user.
- Managers and researchers can now more easily and effectively assess the status and trends of a wide variety of forest types over large areas. They can evaluate the outcomes of possible future management scenarios.
- Data availability in the new format allows users to project data from FIA plots, subplots, or conditions.

FURTHER READING

Shaw, John D.; Gagnon, Aaron. 2019. [Field note: A new conversion of Forest Inventory and Analysis data for use in the Forest Vegetation Simulator](#). Journal of Forestry. doi: 10.1093/jofore/fvz050.

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