The Scenario Investment Planning Platform

A USDA Forest Service initiative to improve prioritization of restoration and forest management investments.

The *USDA Forest Service Scenario Investment Planning Platform* was developed by Forest Service Research & Development to help the agency modernize its approach to prioritizing land management investments. This website describes the system and its application to modeling spatially explicit management scenarios across scales ranging from projects, forests, regions, states, and nationwide. The framework can be coupled with other models and management assessments and applied to a wide range of scenarios. Example case studies where scenario planning and associated tools have been deployed are described below.

The core of the scenario platform is the ForSys model, a versatile planning model that evolved over a decade of research on operational forest and fuel management problems at the Rocky Mountain Research Station.

Background and context for scenario planning

Prioritizing investments in forest and fuel management projects and measuring outcomes from is a significant challenge for large, decentralized agencies like the Forest Service.

Over the past decade, numerous assessments of land conditions in terms of fuels, fire risk, watershed health, and terrestrial conditions have been completed. However, models or tools to integrate these assessments into prioritization strategies and measure outcomes do not exist.

The need for prioritization tools continues to grow as the agency is increasingly challenged to meet management targets while producing a wide range of ecosystem services, in coordination with partner agencies as specified in Shared Stewardship agreements.

Beyond using this system to examine agency priorities, scenario planning can be used to identify cross-boundary opportunities and prioritize activities to expand the scale of land treatments with stakeholders.
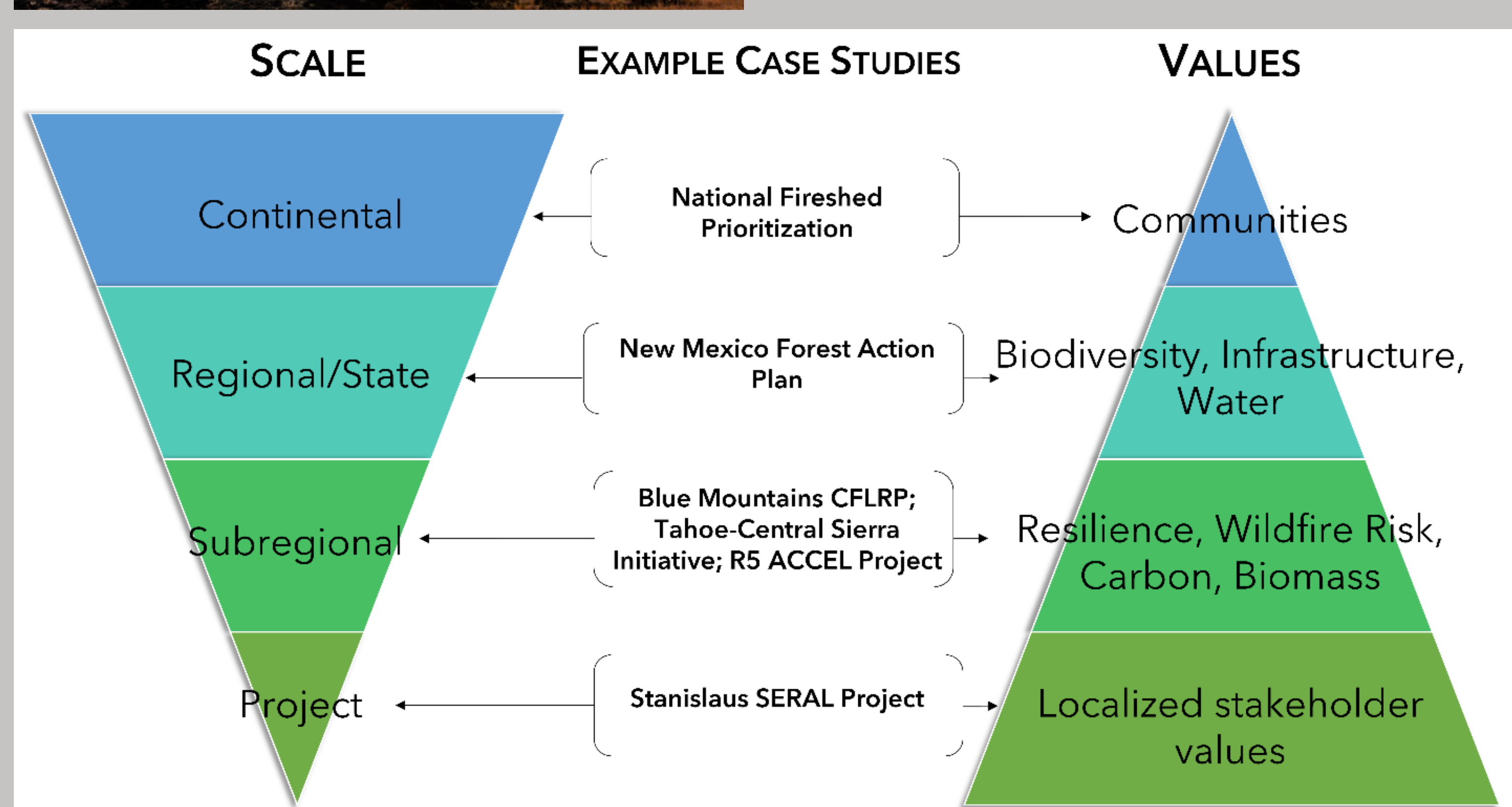
Application and case studies

Scenario planning has been applied in support of land management agencies in their development of forest management plans and fire and fuels management operations at a range of landscape scales. A number of these are described in the publications listed in the Research & Publications section. The assessments completed for these scenarios include tradeoff analysis and predicted outcomes for a wide range of issues including wildfire risk, economics, water resources, biodiversity, carbon, and other attributes describing land conditions and management objectives. SIPP has or is being used to support the following land management planning efforts:

- Umatilla and Wallowa-Whitman National Forest 5-year vegetation action plans.
- Stanislaus National Forest SERAL project prioritization for WUI risk, forest resilience, and spotted owl habitat.
- New Mexico State Forest Action Plan priority map.
- Washington State DNR prioritization of fuels treatments in response to House Bill 1784.
- Agency response to Executive Order 13855 *Promoting Active Management of America's Forests, Rangelands, and Other Federal Lands to Improve Conditions and Rescue Wildfire Risk.*
- FY19-21 national hazardous fuels budget allocation.
- Four Forest Restoration Initiative prioritization of project areas.
- Tahoe-Central Sierra Initiative

[More Information on Case Studies]

SCALE	EXAMPLE CASE STUDIES	VALUES
Continental	National Fireshed Prioritization	Communities
Regional/State	New Mexico Forest Action Plan	Biodiversity, Infrastructure, Water
Subregional	Blue Mountains CFLRP; Tahoe-Central Sierra Initiative; R5 ACCEL Project	Resilience, Wildfire Risk, Carbon, Biomass
Project	Stanislaus SERAL Project	Localized stakeholder values

Case studies are completed at a range of scales - as the scale decreases the number of values and resource issues increases to bring in local context to the case studies.

The latest project completed by the SIPP team was the development of a plan to reduce wildfire risk to communities over the next decade. This effort used the national fireshed map developed by the SIPP team for continental-scale scenario modeling that identified planning areas and stands to treat. The Forest Service is now examining how the priorities developed from national scale data and modeling compare to current regional and forest scale on the ground projects and plans.
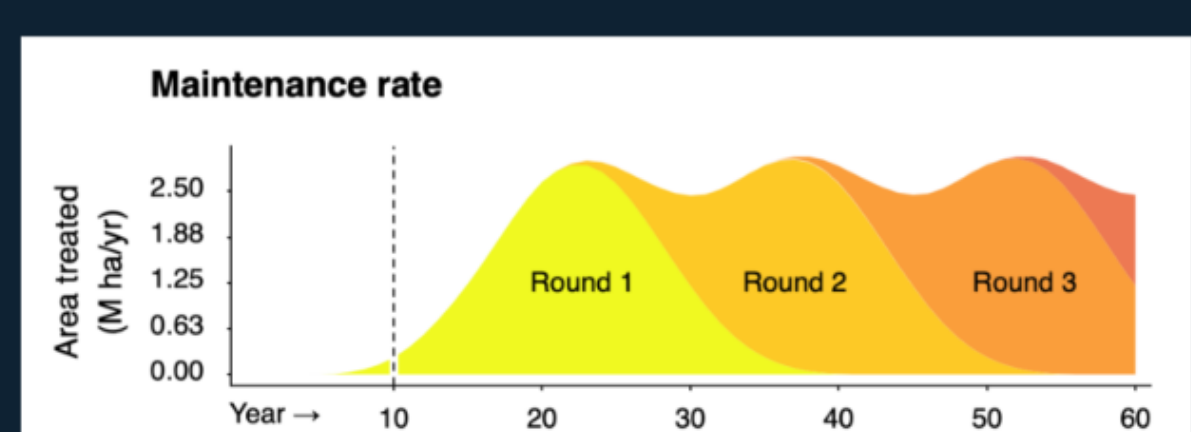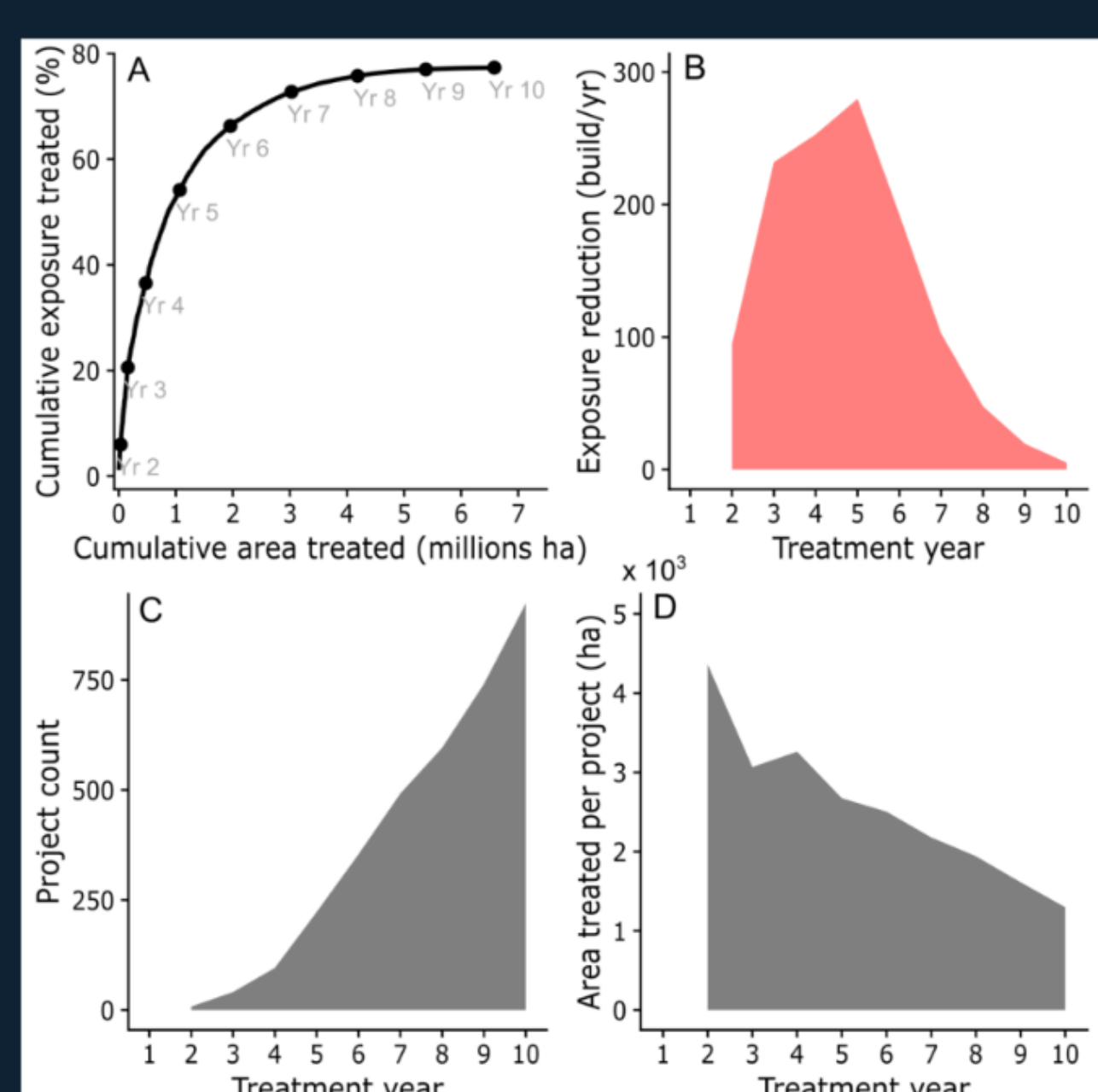

The ForSys scenario planning model

The Scenario Planning Platform uses the ForSys model as the core analytical engine. ForSys is used to simulate and optimize management activities and examine outcomes. The model evolved from an earlier system, the landscape treatment designer. The ForSys model provides planners with a wide range of analytical capability including:

- Spatial optimization of projects and treatments
- Simulation of 5-10 year action plans
- Tradeoff analysis to understand the opportunity cost of specific priorities
- Replication of forest plan constraints and management intent
- Assessment of the effect of future wildfire uncertainty on forest

The ForSys model inputs GIS data on land conditions and assessments along with treatment thresholds and constraints that dictate where and what management activities are suitable for specific stands in a study area. Scenarios are simulated by weighting the relative importance of the different assessments for the allocation of treatments. Thousands of scenarios can be run in a single execution to examine alternative weighting schemes and quantify tradeoffs. Outputs include maps of priority project areas, and production graphs illustrating tradeoffs and outcomes from management activities.
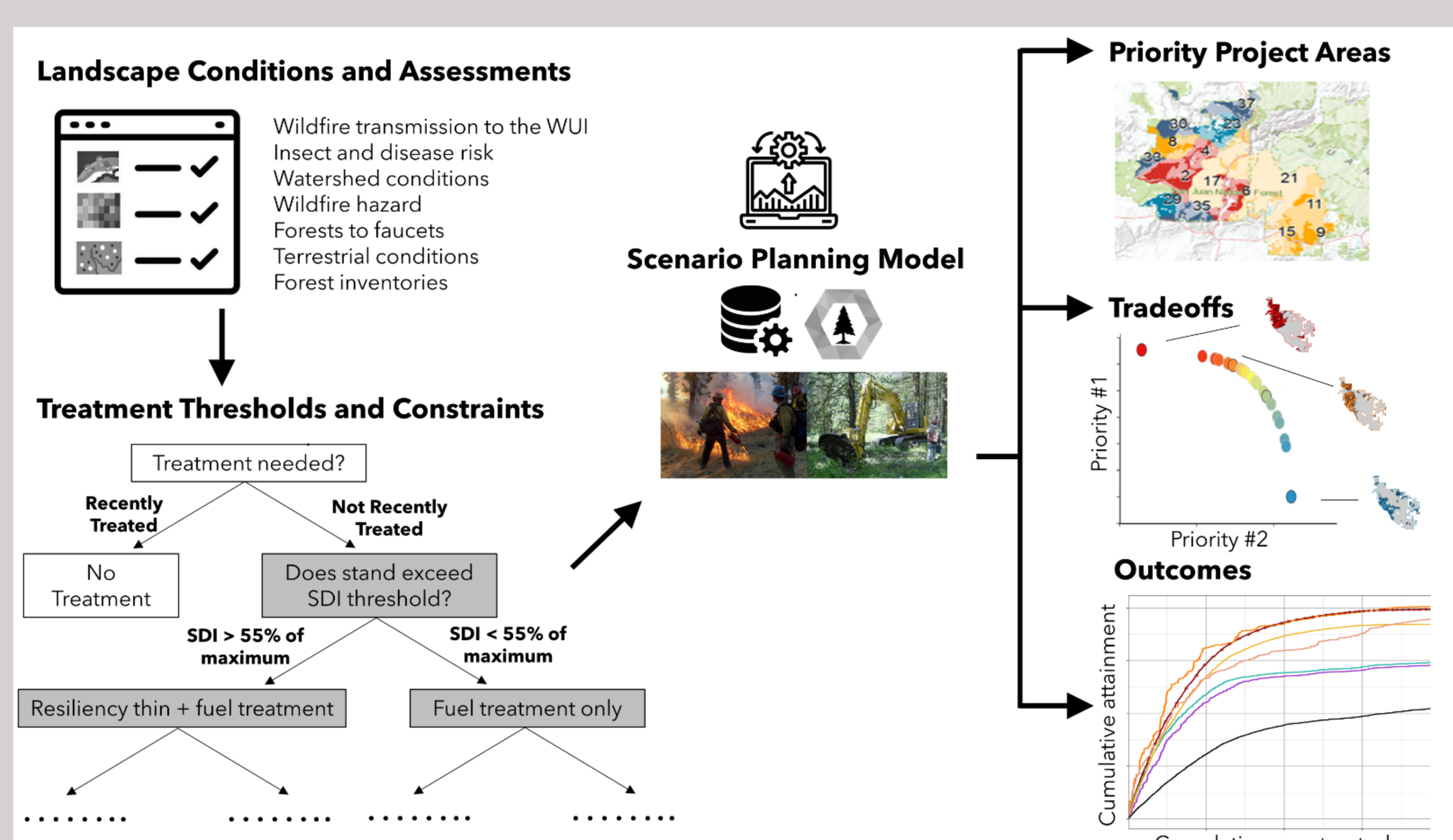
The model is implemented in three different versions: (1) windows desktop, (2) an R package, and (3) a Shiny R app that is hosted in the cloud and accessed with a web browser. Using the model to simulate management scenarios requires basic knowledge and understanding of GIS, forest planning, and operations research.

The model and tutorial are available from the authors on a case-by-case basis. Potential users can contact the team to discuss how they envision using the model and the specific land management problem of interest. The team will work with potential users to ensure that the problem at hand is an appropriate application of the model.

Scenario planning links to the Fireshed Registry

The Fireshed Registry was built as a data warehouse for the scenario planning model and stores data for simulating specific investment scenarios related to reducing wildfire risk to communities.

The Registry also provides a geospatial dashboard to allow managers and specialists to view and map a vast array of data related to wildfire transmission, past and planned management, and past and predicted wildfires. The all lands geography of the Fireshed Registry makes it a useful platform for shared stewardship as well.

Work is in progress to make the Fireshed Registry publicly available; in the meantime, contact the SIPP team for access.

Commonly Asked Questions

- What is scenario investment planning and how is it going to help me?
- How is scenario investment planning different from the various assessments like terrestrial condition assessment (TCA), watershed condition framework (WCF), risk, etc.?
- What support is/will be available to help forests use scenario planning, such as help accessing required data, running models, and engaging the public about model outputs?
- To what extent is scenario investment planning useful for Shared Stewardship activities, plans, and agreements?
- The Pacific Southwest Region has already updated forest plans for several national forests. Why would we use scenario planning?

[Find the answers to common questions here]