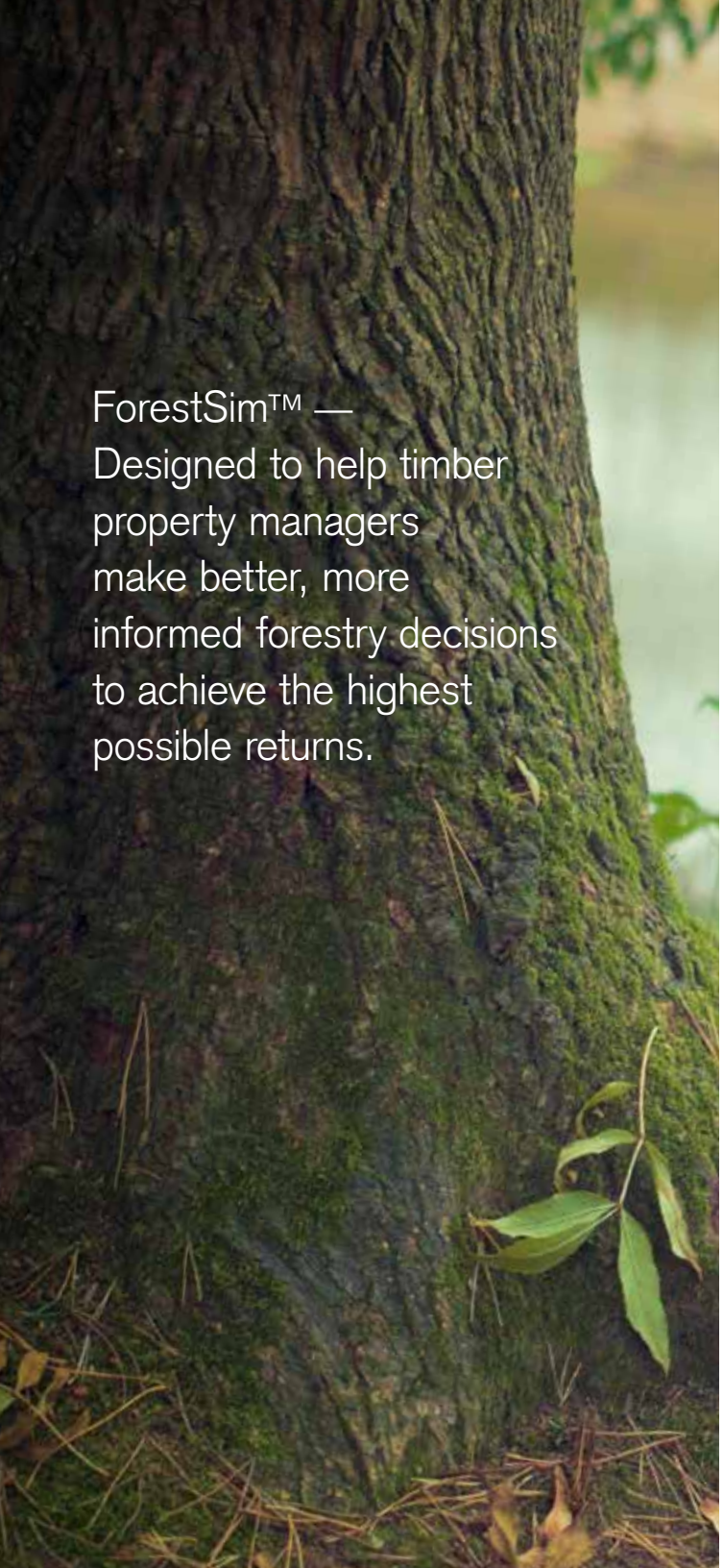

Introducing
FORECON ForestSim™ Suite of Services
FORECON
FORESTSIM
Improved Hardwood Asset Management Through Advanced Growth and Yield Modeling



INTRODUCTION

Hardwood Growth and Yield Modeling

If you're focused on managing a forest property with the goal of highest possible returns, sustainable outcomes, and optimal asset management but you don't have a truly data-driven model guiding your efforts, stop what you're doing –immediately. Predictive forest asset modeling is now available.

Designed to help timber property managers make better, more informed forestry decisions, the ForestSim™ Suite of Services provides actionable data analysis and reports to help managers achieve the highest possible returns.

WHEN TO HARVEST? THE DATA IS OUT THERE

ForestSim™ Suite of Services provides answers to the most common, and yet most complex questions:

How and when should I harvest a forest stand to achieve the highest possible return?

These simple questions have at their roots numerous variables, each with assumptions that can dramatically impact the present and future value of the investment. In addition to each stand's unique characteristics such as tree size, density and species mix, other inputs include current stumpage prices, site conditions, price appreciation, harvest prescriptions, and discount rates.

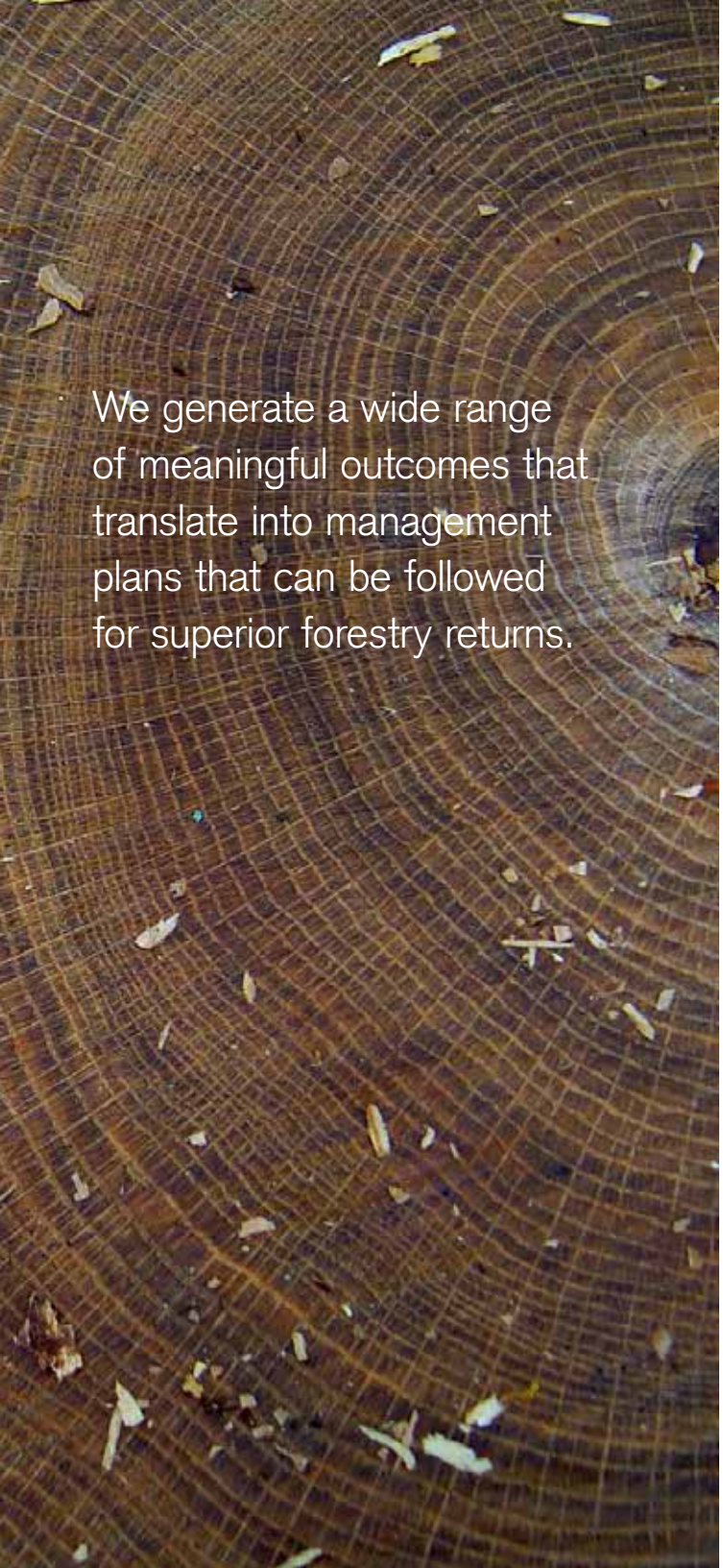
Wouldn't it be nice to know (not guess) how much basal area should be left after a harvest, or what species could be harvested first for maximum profit and long-term appreciation? Or, what should be expected in timber sale proceeds and when a given stand will be ready to harvest again?

How about being able to do this for every stand that you manage across an entire portfolio?

UNDERSTANDING YOUR DATA

The suite provides access to expert consulting and management, as well as the new ForestSim™ Hardwood Growth and Yield Modeling capabilities, including:

- Forest Management
- Opportunity Planning
- Risk Reduction
- Timber Harvest Optimization, Including:
  - Harvest Timing
  - Harvest Prescriptions
- Evaluation Scenarios
- Due Diligence
- Asset Appreciation



MANAGEMENT PROTOCOL BASED ON DATA = THE HIGHEST POSSIBLE RETURN

A simulation model is a tool used to generate estimates of outcomes based on a variety of inputs. All models are subject to some degree of uncertainty. A wide range of variables, like those inherent in the forest management industry, can dramatically influence modeling outcomes, any of which can significantly alter the overall predictive value of a model.

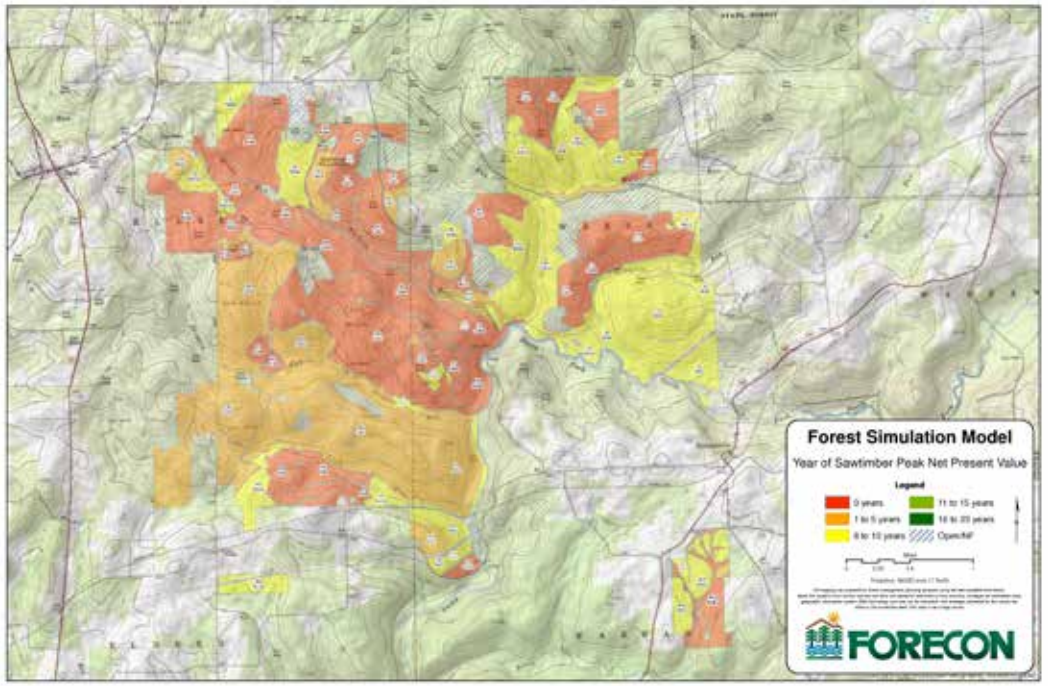
ForestSim™ is a dynamic model capable of simulating forest growth, harvest and dynamic interactions to facilitate optimization of forest management and timber harvesting. The models are developed on the unique strengths of Monte Carlo simulation algorithms, which are designed to accommodate complex interactions across multiple scenarios. All growth estimates are generated from U.S. Forest Service TWIGS Growth Models and overseen by FORECON's professional forestry consultants providing professional levels of detailed predictive outputs with unprecedented levels of support.

As the realities of global economic factors become more fluid and dynamic, reliable and accurate simulations become even more important. Using advanced simulation tools that consider input variability, FORECON ForestSim™ provides never-before-seen clarity on hardwood forest management questions.

IMPLEMENTING A DATA-DRIVEN MANAGEMENT PROTOCOL

For demonstration purposes, we selected a hardwood ownership previously managed by FORECON.

In our first example, we determined Year of Peak Net Present Value (Year of Target Basal Area and Target Size are also available) for all stands in an ownership and, with some consolidations, have portrayed these on a stand map.

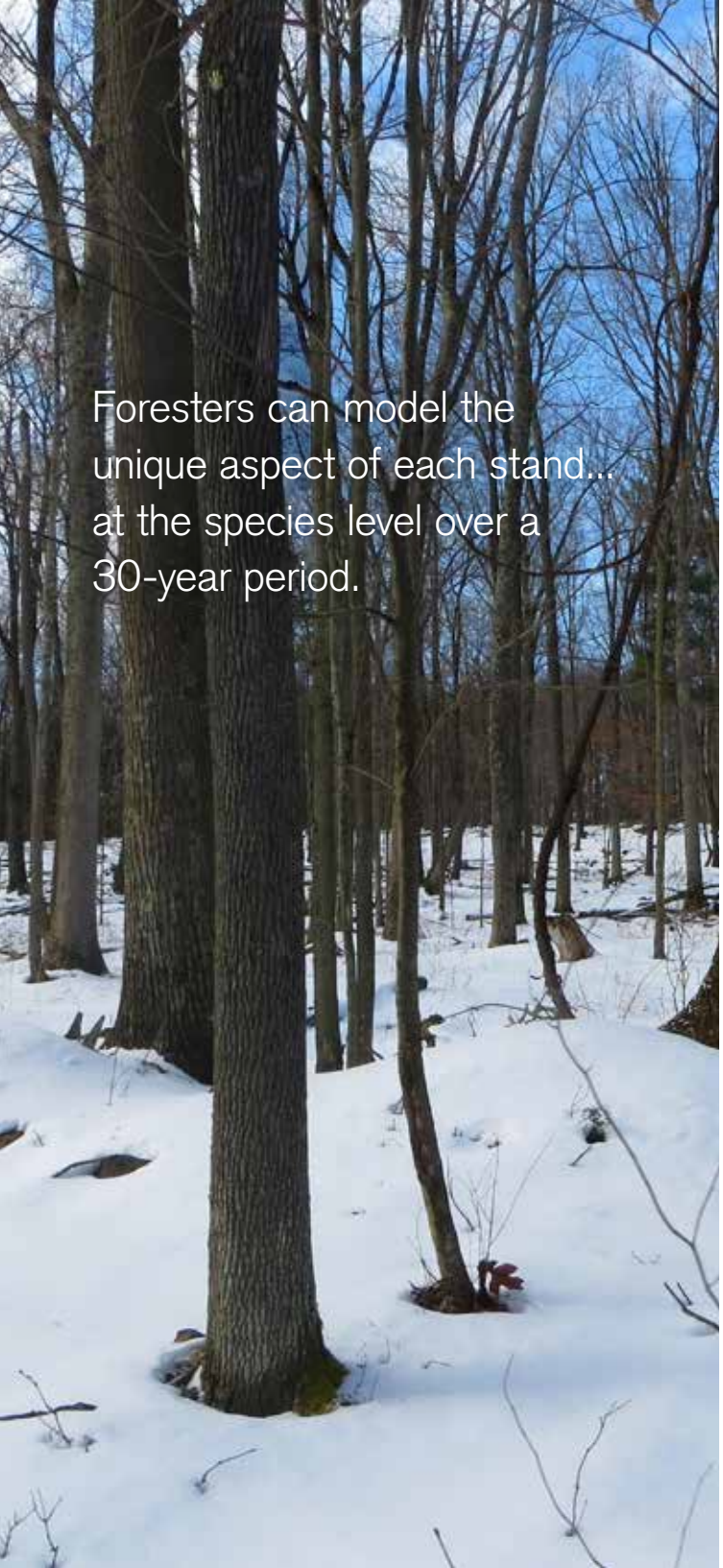


FORECON TIGERWEB

FORECON's online web mapping and forest inventory growth and yield modeling service designed to help manage your forest enterprise.

ForestSim™ can provide meaningful feedback from existing forest stand data across a range of harvest scenarios supporting a wide variety of harvest options per stand. ForestSim™ returns clear evidence-based guidance to improve and support management decision-making. With stand level data, including those as provided by our TIGERWeb management tools, any stand or ownership can be analyzed through a variety of different harvest prescriptions. Example harvest prescriptions include:

- aggressive cutting early in a management term
- selective harvests over different years of an ownership
- residual basal area harvests
- species (or diameter) specific harvests
- a no harvest scenario.



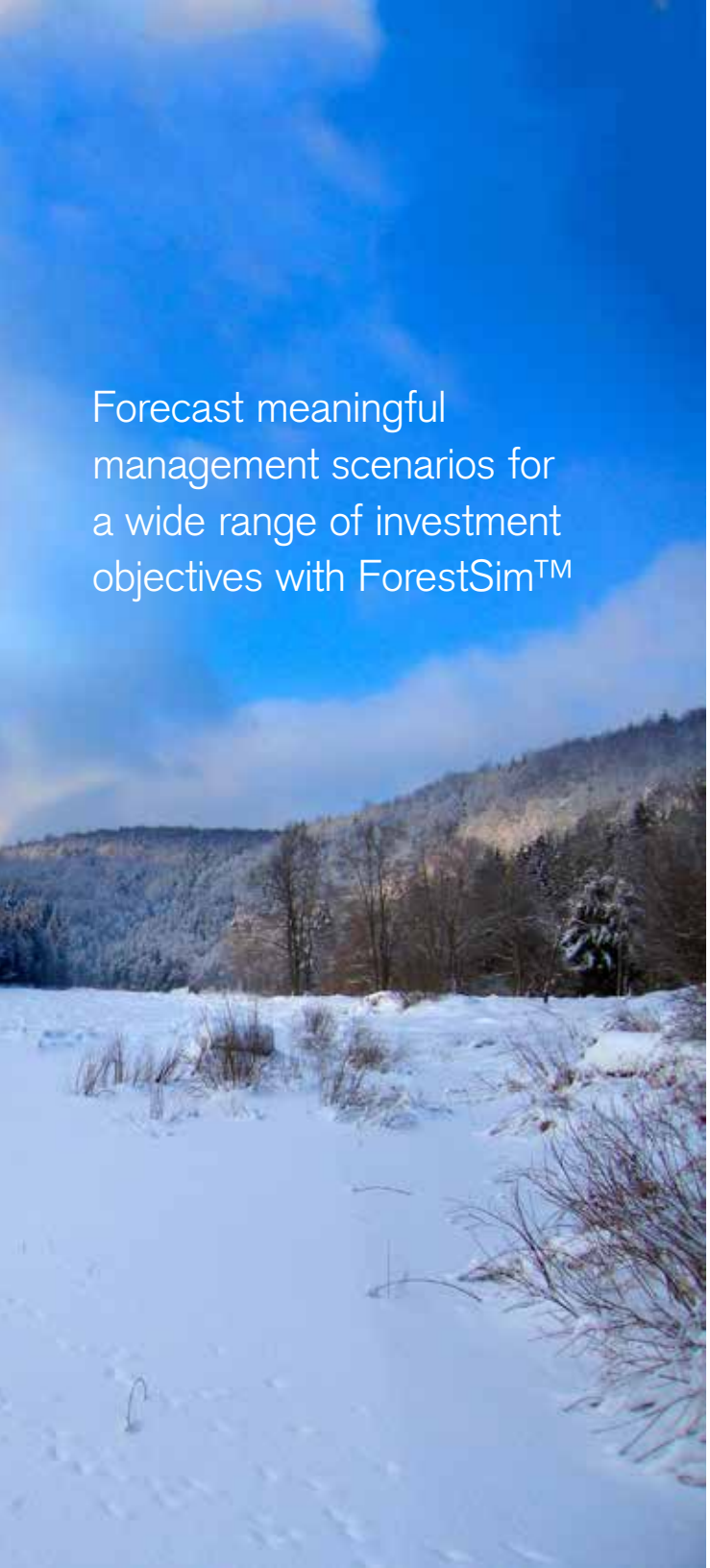
SCENARIO EXPLORATION

Foresters can model the unique aspects of each stand to monitor such attributes as timber value, volume, basal area, and net present value for standing and harvested timber at the species level over a thirty-year period.

Models can be both deterministic and probabilistic*, and input variables can accommodate a number of different management attributes, including:

- pricing by diameter
- price appreciation by year
- discount rate
- site conditions
- costs and other income

* *(Probabilistic modeling introduces user-defined uncertainty in inputs such as inventory reliability, growth rates, appreciation rates and discount rates. Further discussion of these features is outside the scope of this presentation.)*



SCENARIO EXPLORATION

The value of ForestSim™ modeling lies in the ability to forecast meaningful management scenarios for a wide range of investment objectives. If ownership horizons are far-ranging, we can align management protocols to achieve maximum standing sawtimber value. If objectives are varied, with harvests required, scenarios can be produced with multiple harvests, showing when each harvest will produce favorable returns.

Harvests impact near and long-term values, but carefully planned harvests can produce improved results, and ForestSim™ models can help illustrate the most favorable scenarios managers should prescribe to achieve investment goals. Working with a FORECON forester, investment managers can explore a wide range of management scenarios and articulate the most productive option for each unique stand or an entire ownership.

ForestSim™ Input & Output Options >

Input Variables

By adjusting the input variables below within the ForestSim™ system, we can model changes in the forest and calculate the impacts on the development of the forest stand.

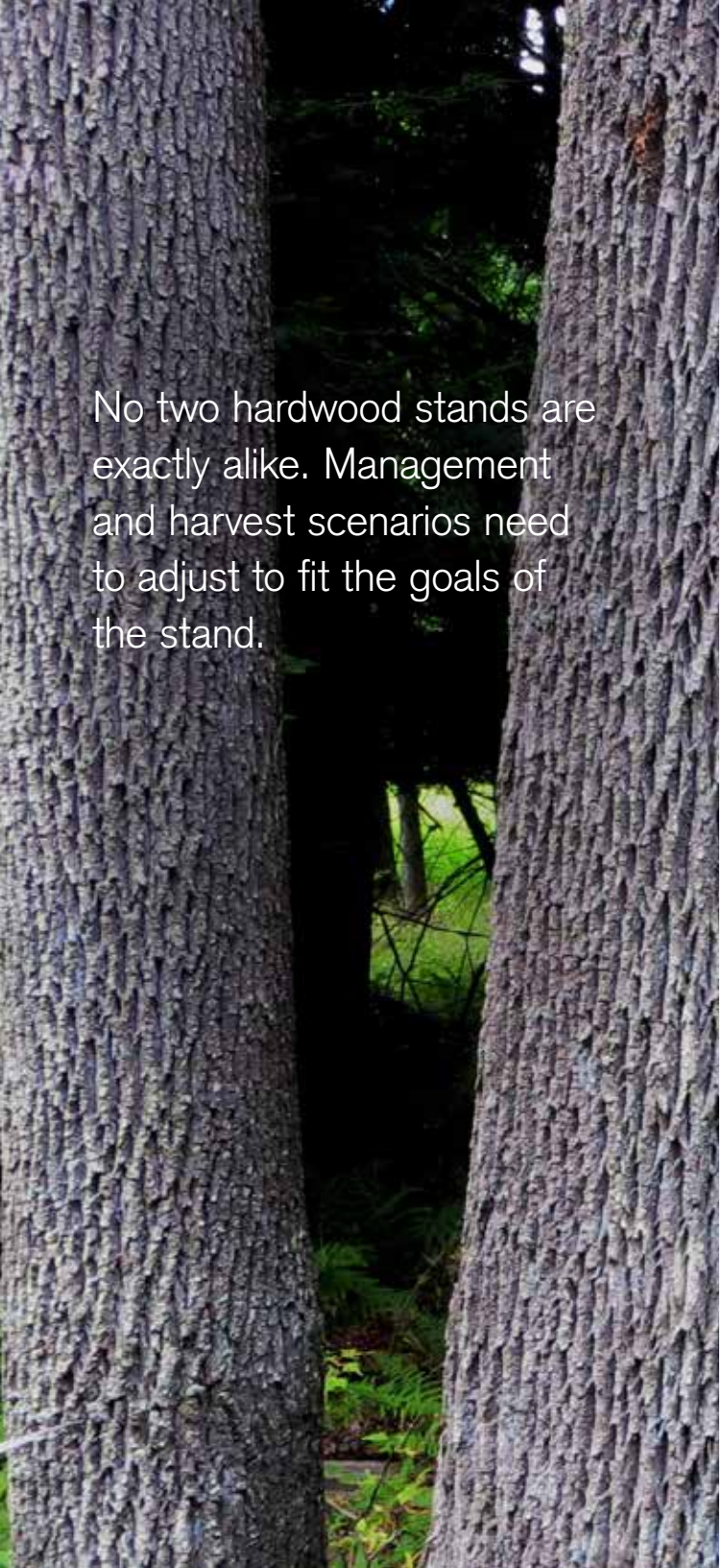
- Stumpage value by species and diameter (grade appreciation)
- Stumpage annual price appreciation rates (up to 30 years) by species
- Discount rate
- Other income and management costs
- A growing condition index at the species level, if desired
- Inflation rate, if desired
- Harvest routines, all years, any year, or multiple times over 30 years, which include:
  - No harvest
  - based on target residual basal area (saw and pulp) with species and diameter priorities
  - all species by % per year
  - some species by % per year
  - based on user defined table (species/diameter/year)
  - growth or percent of growth
  - based on desired Q-Ratio
- Harvest timing based on Peak Net Present Value; Target Basal Area; Target Size (sawtimber or overall) with harvest prescriptions based on projected stand type at those points in time.

Output Examples

Output reports can be tabular data or charts (with uncertainty, if selected), and can include up to thirty years (30) of projections.

- Total sawtimber volumes, trees and values, standing and harvested by species
- Total pulpwood volumes, trees and values, standing and harvested by species
- Sawtimber volume principal species
- Basal area sawtimber and pulpwood
- Annual Cash Flow
- Net Present Value
- Year of Peak Net Present Value
- Year of Target Basal Area
- Year of Target Size (sawtimber or all)

Each run of the model provides a wealth of information in a variety of reports.



FORESTSIM™ IN ACTION

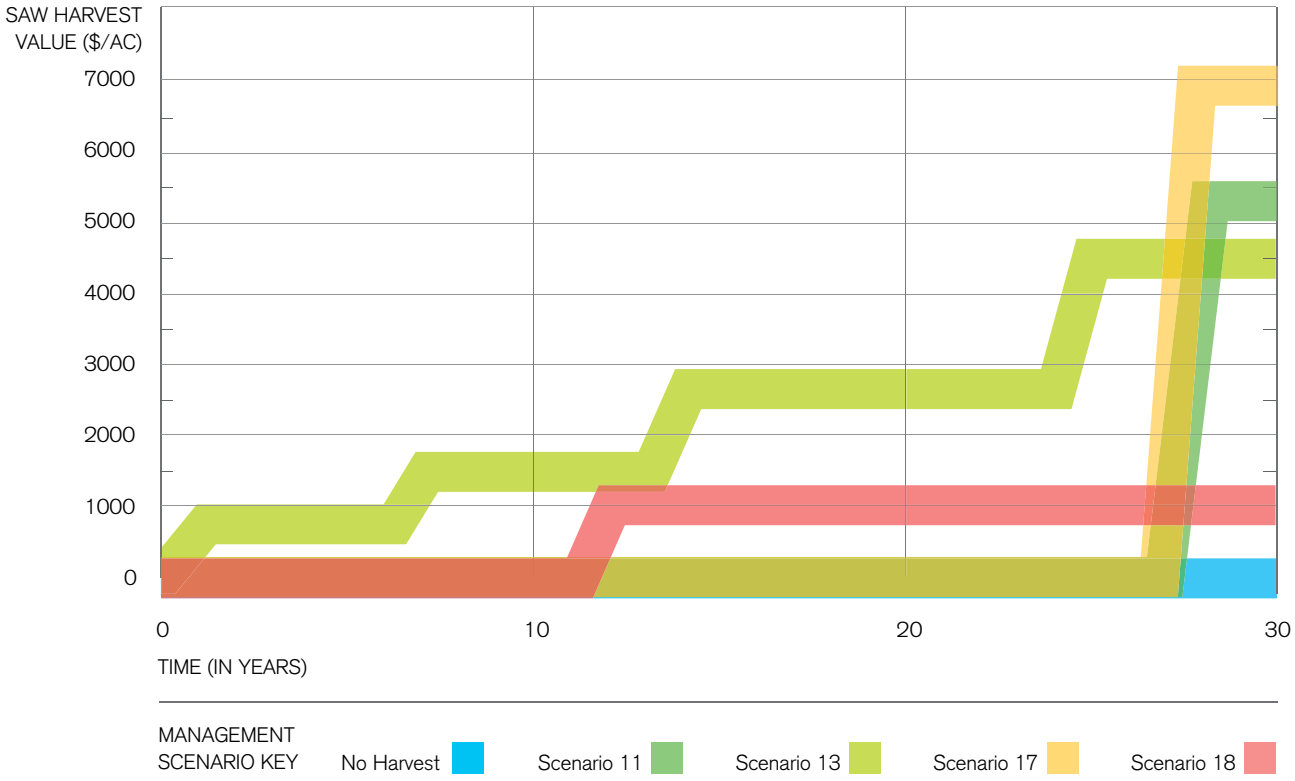
No two hardwood stands are exactly alike. Management and harvest scenarios need to adjust to fit the goals and the stand. Anything less is potentially leaving money on the table. Take for example a large pole / small sawtimber hardwood stand with an initial basal area (BA) of 82 square feet per acre (45% sawtimber, 55% pulpwood) with an average diameter breast high (DBH) of 10.2 inches. What management scenario should be followed to achieve a given investment objective? ForestSim™ can provide insight and answers. Consider the five management scenarios below:

1. (#11) Target residual BA of 60 (80% sawtimber) cut all sawtimber above 23" DBH, cut all pulpwood above 11" DBH, harvest at Peak Net Present Value (PNPV)
2. (#13) cut all sawtimber above 15" DBH, cut no pulpwood, harvest at initial year and at target BA of 80 for multiple harvests.
3. (#17) use Q Ratio of maximum DBH 22", 2 trees at 22", Q Ratio 1.5, harvest at PNPV
4. (#18) Target residual BA of 60 (50% sawtimber), cut all sawtimber above 23" DBH, cut all pulpwood above 11" DBH, harvest at target BA of 118
5. No harvest

Each of the previous management scenarios, including a no harvest scenario, are potentially viable options for achieving investment objectives. However, each scenario offers the investor different outcomes, including cash flow, peak net present value, and maximum yield – but which scenario is preferred by the owner?

ForestSim™ can show the way.
Examine the output chart at right.

Cumulative Sawtimber Harvest Value (per acre over time)



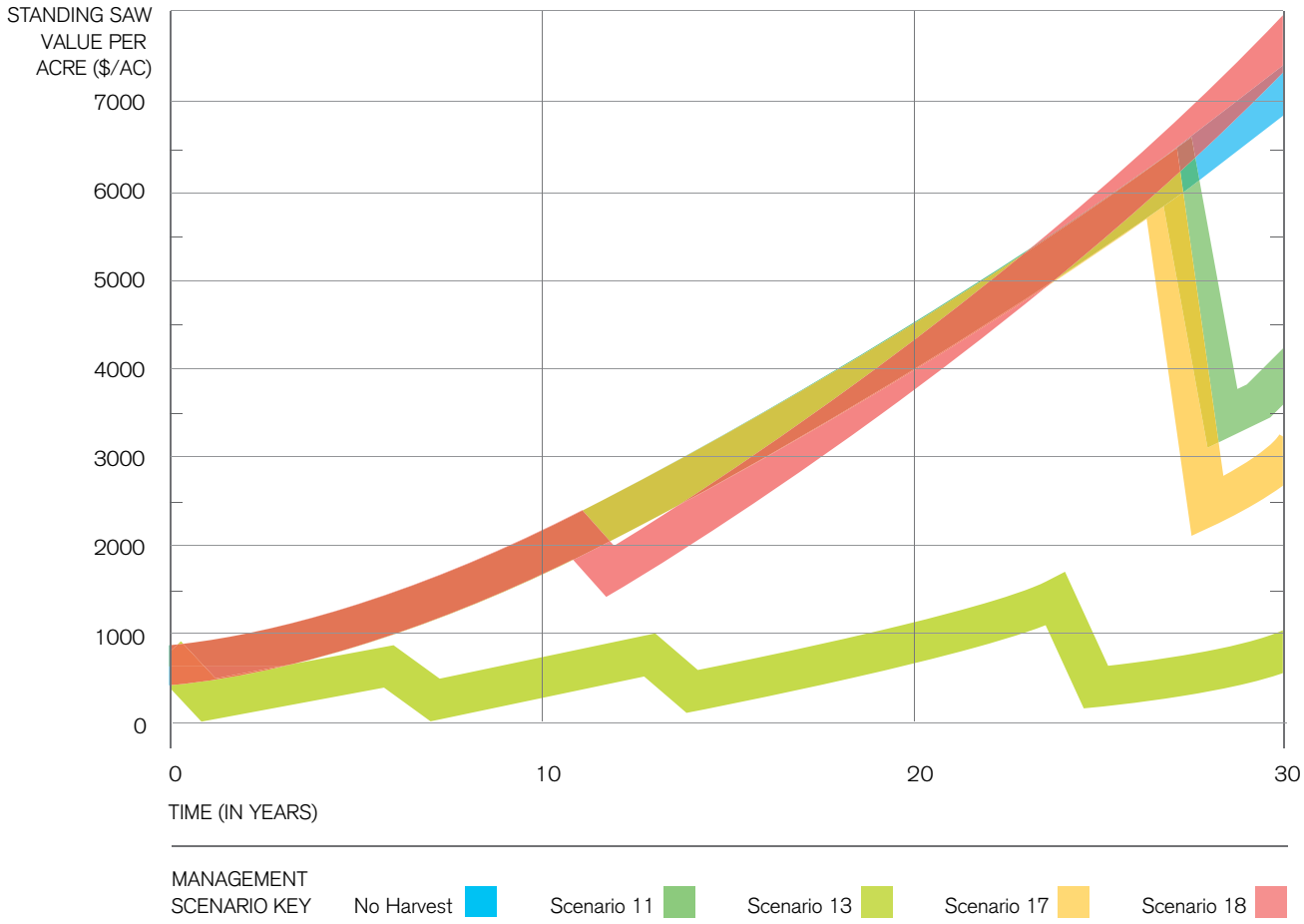
FORESTSIM™ IN ACTION (continued)

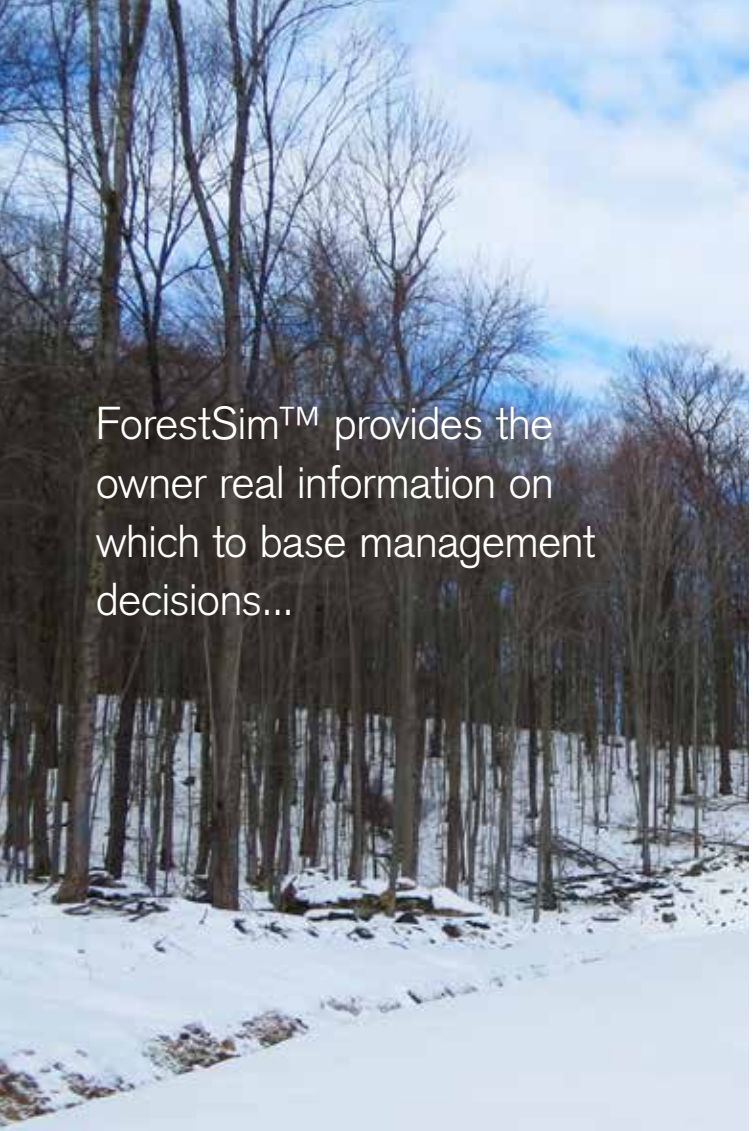
As common sense might suggest, Cumulative Harvest Saw Value is shown to be greatest if the owner has a long investment horizon, making scenarios #11 and #17 favorable. And yet, from a periodic cash flow perspective, scenario #13 stands out from all the others (which is why we included it here). Scenario #13's multi-harvest protocol produces more consistent cash return over the 30-year term, with harvests occurring in years 1, 7, 14 and 25.

On the other hand, the residual standing timber value for each scenario appears as follows.

Note that at the end of the 30-year term, the #18 harvest scenario has more timber value per acre than the no harvest choice.

Standing Sawtimber Value (per acre over time)





FORESTSIM™ IN ACTION (continued)

As stated above, every stand will differ and investment goals per stand within an ownership may differ as well. Modeling the cash flow options of this hardwood stand provides the owner real information on which to base management decisions, especially when multiple stands and a variety of outputs can be evaluated, each with their unique attributes and objectives. With ForestSim™, managers can pick and choose their ideal harvest scenarios at the species and diameter level for optimum portfolio performance.

Articulating more detailed multi-variate scenarios for a single stand is beyond the scope of this presentation.

To appreciate the full capabilities of the ForestSim™ Service offering, contact us today to arrange a presentation.

ADVANCED DATA-DRIVEN ACTION PLANS

FORECON helps forest managers implement long-term timber management programs through effective asset analysis, expert on-site management, and superior planning capabilities.

Your ForestSim™ Team

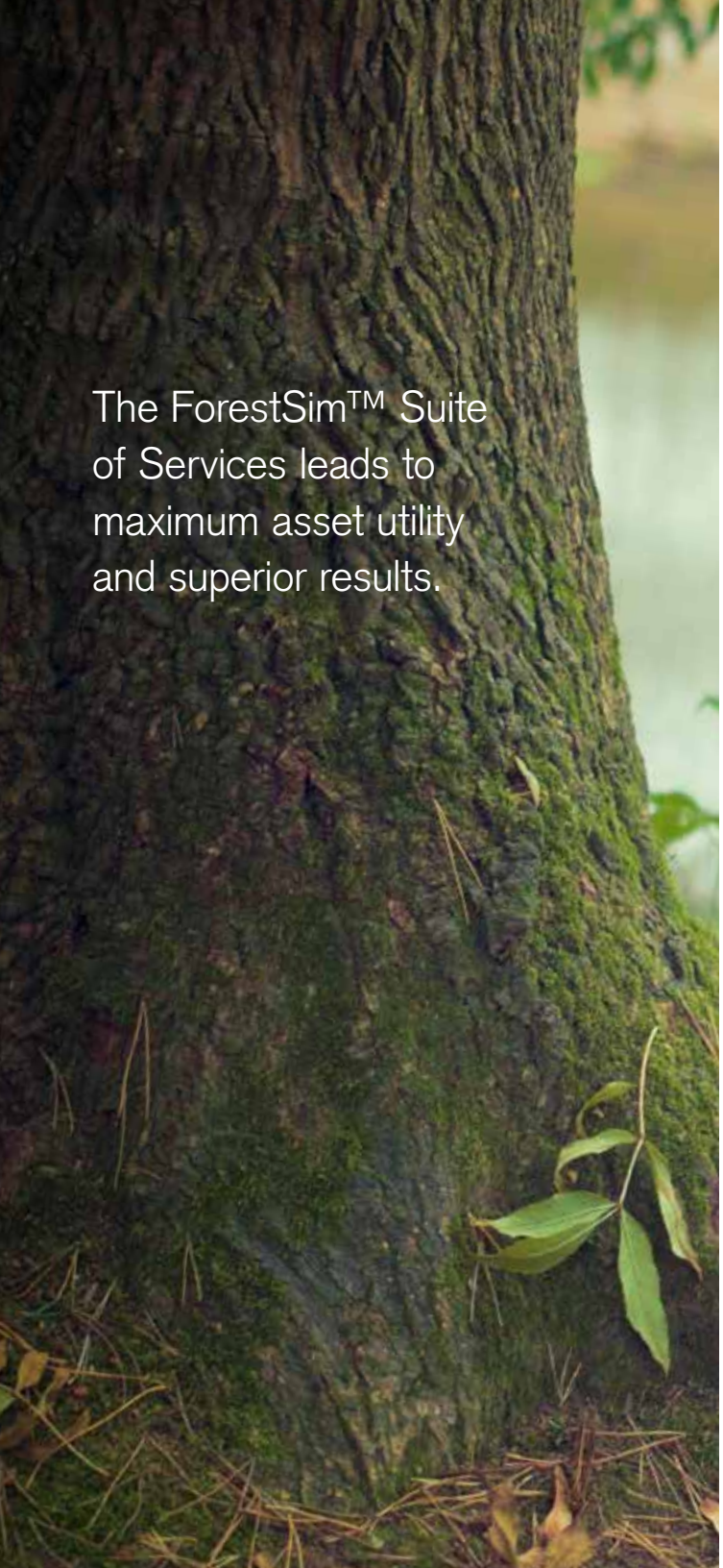
Working with a FORECON consultant, forest managers can easily revise input variables within the ForestSim™ suite to answer complex “what if” types of scenarios.

ForestSim™ creates predictive models of a forest asset at the following levels:

- stand
- tract
- stratum
- ownership

Time frames can be short-term or up to 30 years, with the aim of predicting when individual management units reach economic maturity.

Your consultant can introduce harvest scenarios, cash flow projections and more for easy assessment and evaluation of alternative management protocols. You see the outcomes of choices before they happen, giving you the ability to focus your efforts on the most productive management plans.



Along with our expert forestry consultants, FORECON has been an industry leader in developing tools and services to assist property owners seeking the highest possible returns from their forest investments since 1954.

We introduced the first-of-its-kind TIGERWeb hardwood timber inventory and forest management portal. TIGERWeb allows clients access to unprecedented forest inventory data, growth analysis, maps, and reports, all of which can be easily distributed to field personnel, land managers, and data managers across the portfolio for improved management oversight.

CONCLUSION

The ForestSim™ Suite of Services leads to maximum asset utility and superior results. Designed to help timber property managers make better, more informed hardwood forest management decisions, the ForestSim™ Suite of Services seeks to provide data analysis leading to active management protocols with a focus on maximum goal oriented returns.

To appreciate the full capabilities of the ForestSim™ Suite of Services, contact us today to arrange a presentation.