What can BioSum do for me?

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Orientation to a policy and planning tool founded on the forest inventory

What is BioSum ?

- A FRAMEWORK for inventory-originated,
  stand projection model-assisted,
  simulation and COMPARISON among
  multiple, alternative, multi-decade forest
  management sequences
- With respect to
  1. Effects on stand structure & composition,
  2. Resistance to stressors such as fire,
  3. Climate benefits of management,
  4. Product quantities produced (by type),
  5. Revenues & costs associated with management, and
  6. Viability of candidate mill and biorefinery locations

… continued

- …under user-specified assumptions about
  A. Management objectives (over time),
  B. Prescriptions thought to further those objectives,
  C. Product prices and implementation costs.

Concept: Extend FIA sample data to simulate management

- Builds on FIA strengths
  - Comprehensive, representative sample of all forest
  - Precisely observed/recorded vegetation attributes
  - Quasi-spatial analysis potential at some scales
    - For example, relative to wood markets
    - Not for prioritizing specific management locations or modeling spatially contagious processes
- Supports scenario development and testing
  - What can management accomplish? At what cost?
  - Off-the-shelf, public, open, free, supported models integrate into a smooth workflow for rapid analysis

What it's good for: think of an FIA Leatherman

- Evaluate management alternatives for whole forest
  - By forest type, owner class, site class, initial stocking, slope, accessibility, {any FIA PLOT/COND info}
  - Or, in aggregate for entire county, state, national forest, region, elevation zone, {any large geographic unit}
- For any number of generic, silvicultural prescription sequences applied with any harvest system…

… continued

- …With respect to
  - Wood output by tree size & species + residues by owner class, and destination, by decade
  - Management effectiveness by any stand-level metric
  - Harvest/treatment and haul costs
  - Revenues from sale of wood
- Subject to
  - User-provided prices, wood destinations, effectiveness criteria, net revenue requirements, …

Examples of questions we've addressed

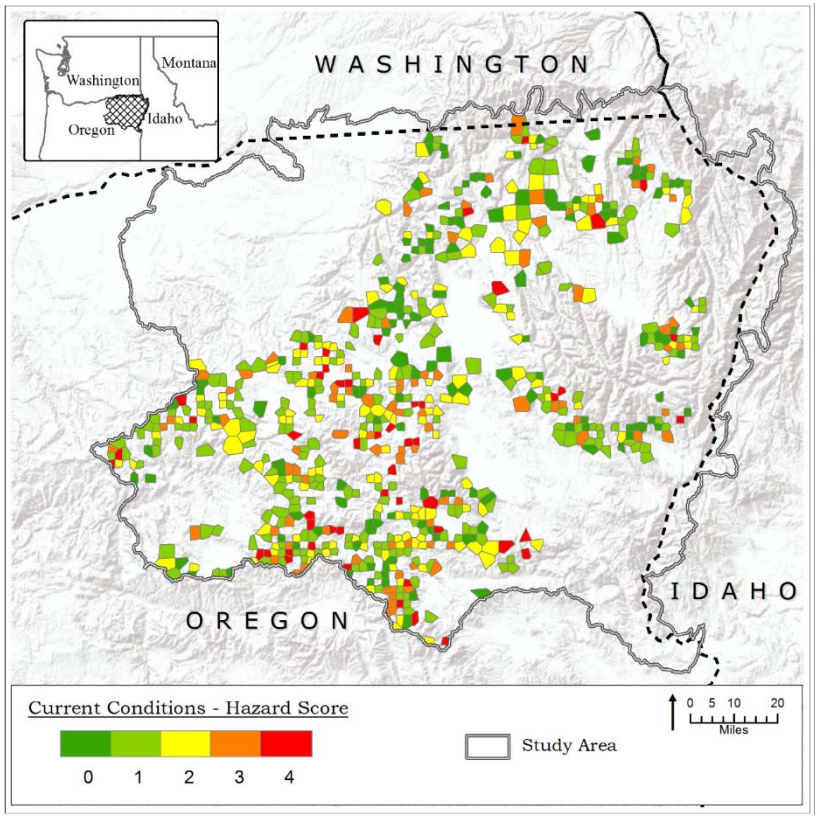
- Which fuel treatments are most effective?
- Which fuel treatments are most cost effective?
- For how many acres, by forest type and owner class, is there an effective fuels treatment for which sales of wood at least cover treatment costs?
  - What if up to $200/ac subsidy is provided?
- Where are the best locations to add wood processing capacity?
- What is the composition of the wood supply generated by landscape wide fuel treatments?

Uses will vary by user: no one right way to use BioSum

- Apply alternatives to today's forest
- Apply to today, track how effects play out over time
- Dynamic management over 4 projection cycles
- Evaluate outcomes of silvicultural alternatives on the full range of where we think they should work, to rate or rank them
- Predict what a forested landscape will produce under different policies, legal/economic restrictions and incentives, etc.
- Convert FIA data into FVS files to assess or experiment

Example of a simple question

- How much of the forest is currently at risk?
  - No need to come up with prescriptions
  - Use FVS/FFE to calculate precursors to hazard score for each FIA condition
  - Summarize hazard score over landscape
    (and optionally depict, as here, with Voroni polygons, or bin to HUCs or other tessellations)



BioSum can support monitoring requirements

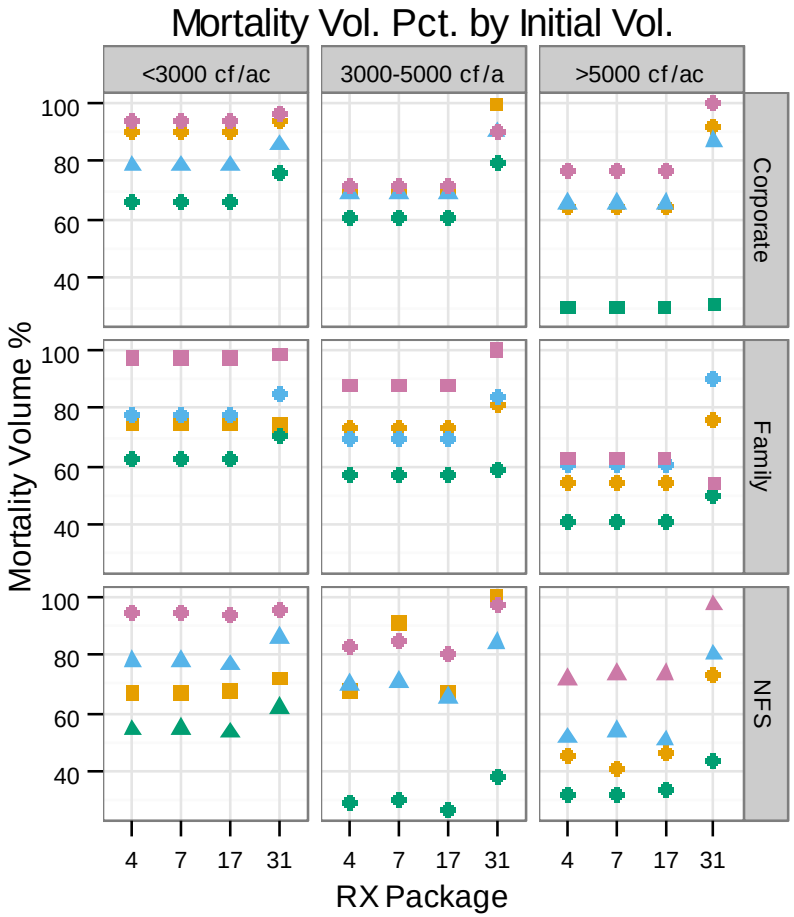
- Monitoring is continuous and provides feedback for the planning cycle by testing relevant assumptions, tracking relevant conditions over time, and measuring management effectiveness
- (§ 219.12). The monitoring program includes plan-level and broader-scale monitoring. **The plan-level monitoring program is informed by the assessment phase; developed during plan development, plan amendment, or plan revision; and implemented after plan decision**. The regional forester develops broader-scale monitoring strategies. Biennial monitoring evaluation reports document whether a change to the plan or change to the monitoring program is warranted based on new information, whether a new assessment may be needed, or whether there is no need for change at that time. (36 CFR 219.5).

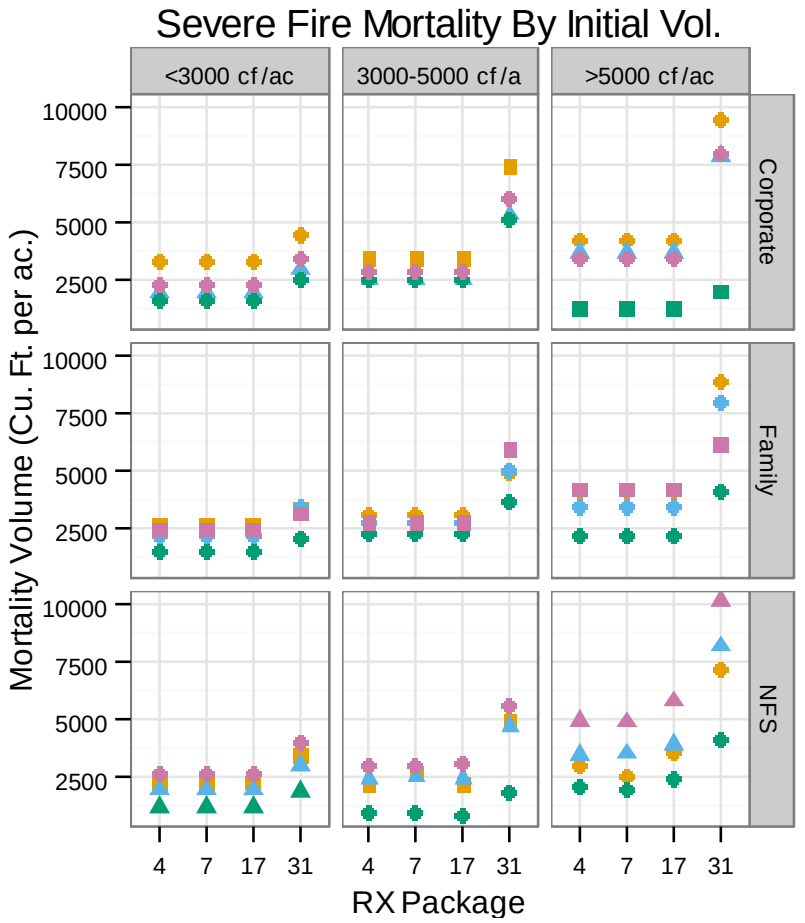
Monitoring application

1. Apply plan assumptions to Forest or Region level BioSum project dataset
2. Simulate alternative management styles, intensities and prescriptions on plots in the BioSum project
3. Summarize expected benefits and impacts of Plan, over decades, using BioSum output
4. Benefits and impacts different than expected?
   - revise prescriptions and repeat, before finalization and implementation
5. As plan implements on the ground, FIA monitoring data can assess actual accomplishment

Analysis example from all-California BioSum run:

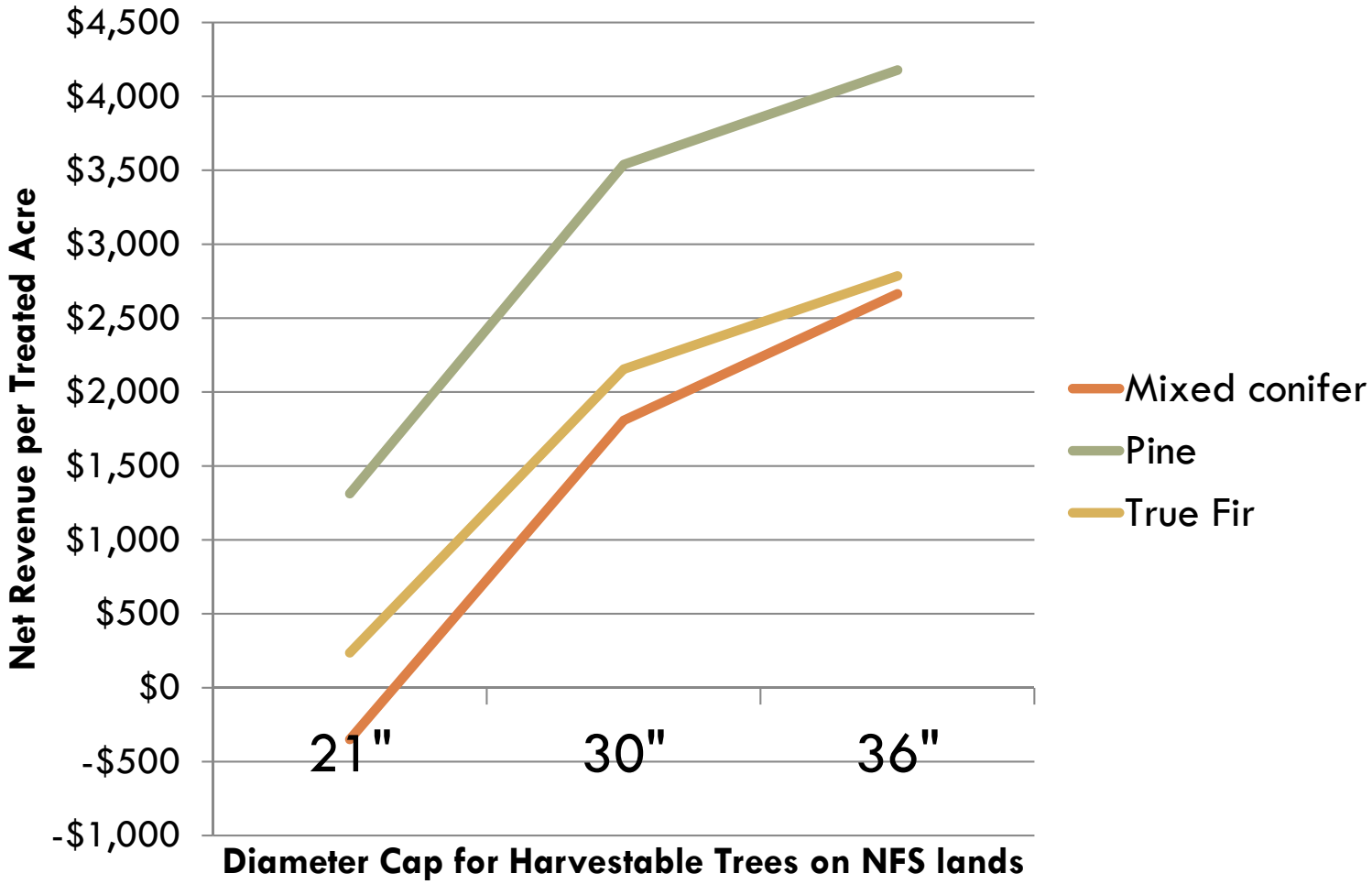
Thin to 85 ft^2 with DBH cap of 30 (#4), 36 (#7) and 21" (#17) vs no treatment (#31); effectiveness nearly independent of DBH limit





Points are means over plot-Rx combinations over 4 decades; surface fuel Rx was lop and scatter; cap was varied only on NFS

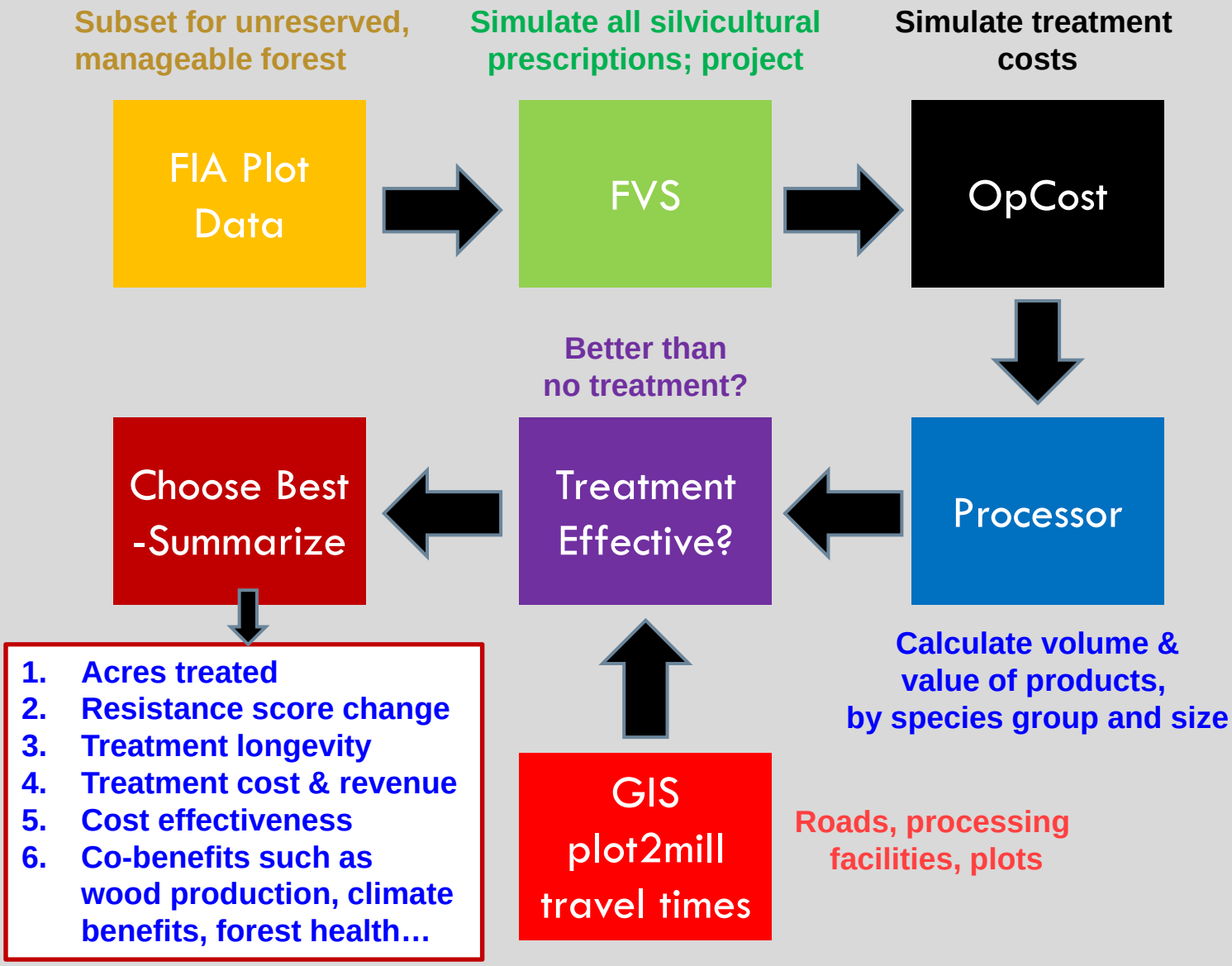
Impact of diameter caps on economic feasibility[1] was profound



[1] Did not consider planning or litigation costs.

BioSum Model Framework:

Free, supported, documented software + FIA data + BioSum Workflow Manager



Who can use?

System Requirements

- MS Access 32-bit (2010 or above)
- Admin access (to install ORACLE Express)
- FVS
- OpCost and R (installed by BioSum)
- Fast processor and ample disk space
- FIADB formatted data (downloaded from fia.fs.fed.us)

Analytic Capacity Requirements

- Experienced with FVS-FFE and undaunted by need for creative data manipulation
  - E.g., facility with database queries in Microsoft Access
- Silviculture/Fuels management acumen

Available now!

- Downloadable, by request, from www.biosum.info
- Currently operational for WA, OR, CA, ID, MT
- For more information, contact Jeremy Fried
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  - support@biosum.info