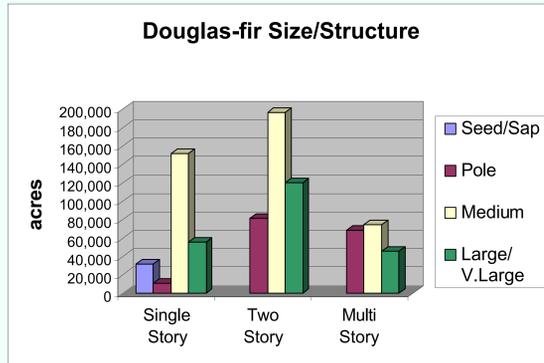


Montana FIA Plot Analysis for Fire Hazard Using Forest Vegetation Simulator Model
 by Dave Atkins, Janet Krivacek, Renee Lundberg
 USDA Forest Service, Forest Health Protection, Missoula, MT

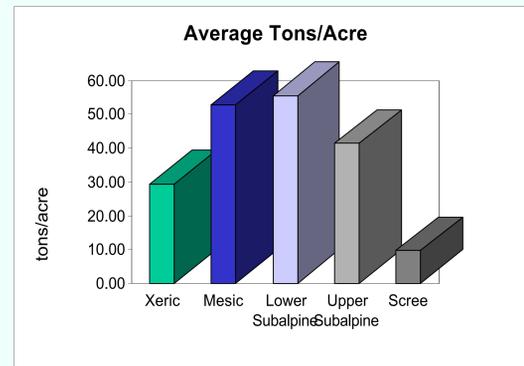
Objectives:

- A) Develop Methods to use FIA data in FVS
- B) Characterize Fire Hazard in Montana Forests

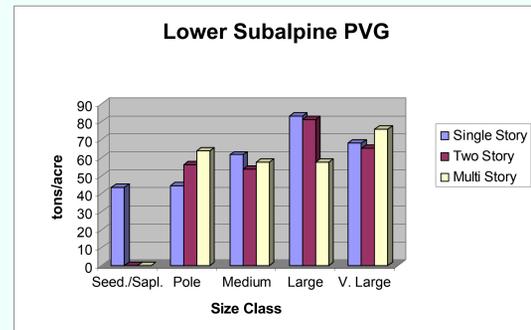
Existing Conditions in West Central Ecoregion



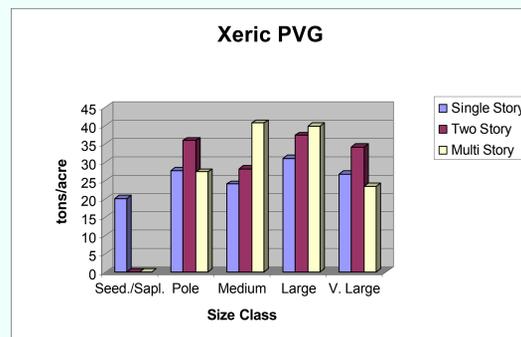
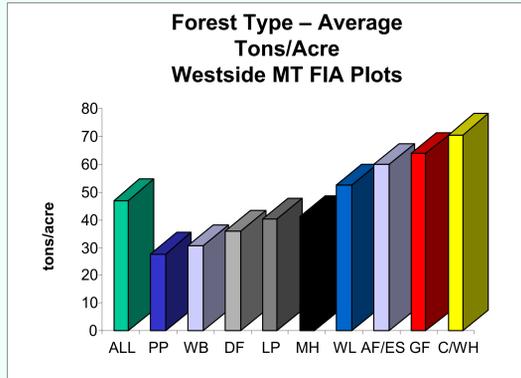
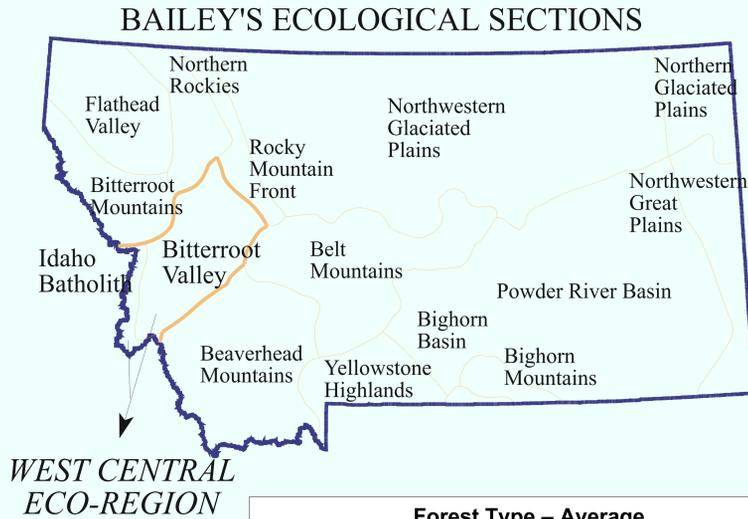
Note the abundance of medium and large size classes and the scarcity of seed/sap sizes. Also note that two and multi-storied stands that contribute to fire ladders are the majority of conditions.



Fuel Loading varies considerably by forest type reflecting differing productivity levels and fire regimes.



These two charts show the variation in fuel loading between PVG, with the Lower subalpine being about twice the level of the xeric. The fuel loading in some instances varies considerably by size class and layering.

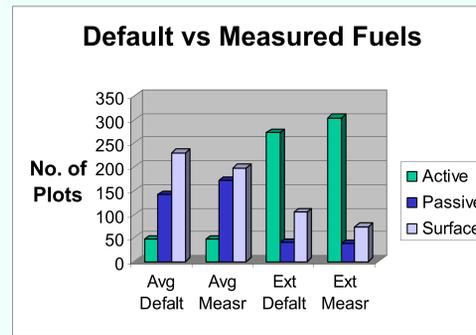


Modeling:

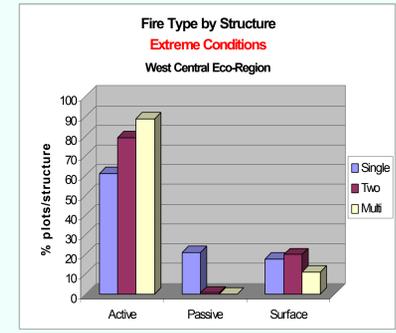
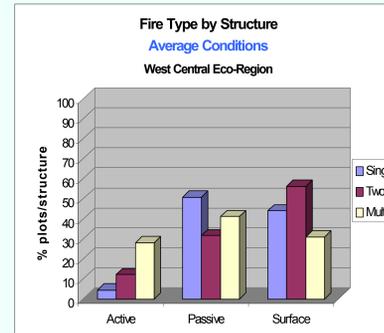
FVS Keyword	Parameter	Average Conditions	Extreme Conditions
FireCond	20 Ft Wind	15 mph	40 mph
	Temp	70	90
Moisture	1 hr	6%	4%
	10 hr	8%	6%
	100 hr	10%	7%
	3 in +	15%	12%
Duff	100%	65%	
	Live	90%	60%

Varying Fire Conditions:
 We are modeling two weather and moisture conditions to represent average and extreme summer burning conditions.

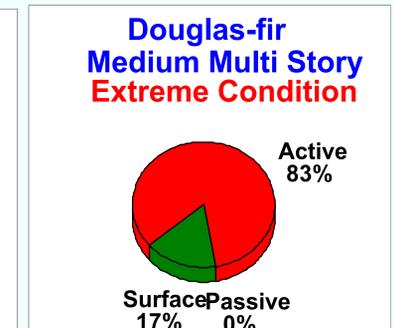
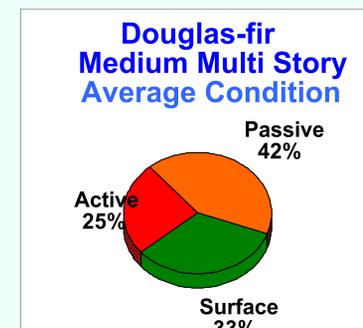
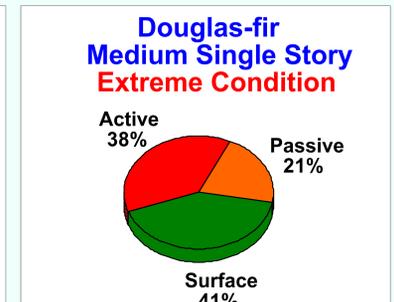
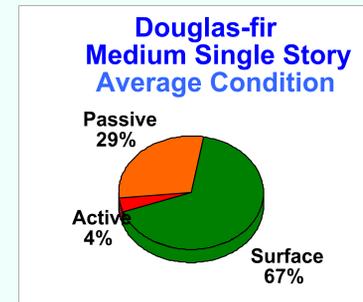
- Active Fire: a crowning stand replacement fire.
- Surface Fire: a fire on the ground no crowning.
- Passive Fire: a ground fire with torching occurring in individual trees or patches of trees.



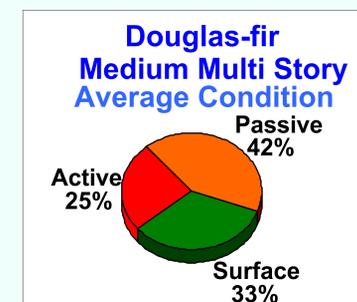
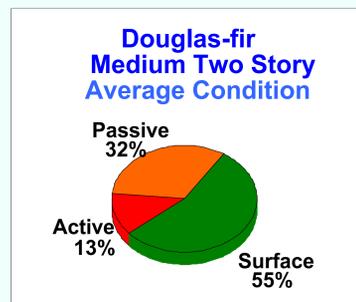
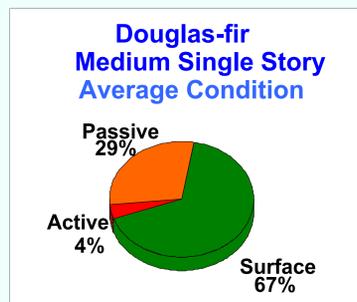
The FVS model has default values that can be used or actual measured values may be input. The graph to the left illustrates the differences in fire type achieved by using each of the different fuel load values. The relative differences are similar regardless of fire conditions, the shift occurs between surface and passive under average conditions and between surface and active for the extreme conditions.



The amount of fire type is greatly affected by the fire weather and fuel conditions but it is also affected by the stand structure. Notice the relative amounts of single, two and multi-storied stands that burn as active fire remain similar regardless of fire condition.



The pie charts above show the dramatic affect of weather and fuel moisture has on the type of fire regardless of the forest type and structure, evidenced by the substantial increase in Active or crowning fires.



The pie charts above illustrate the affect of stand structure on the type of fire, and thus mortality, as a result of stand structure. The changes are similar regardless of forest type. Although mortality will vary considerable between forest type based on bark thickness and tolerance to fire.

