

Climate change and its implications for local forest management

A northern Saskatchewan case study

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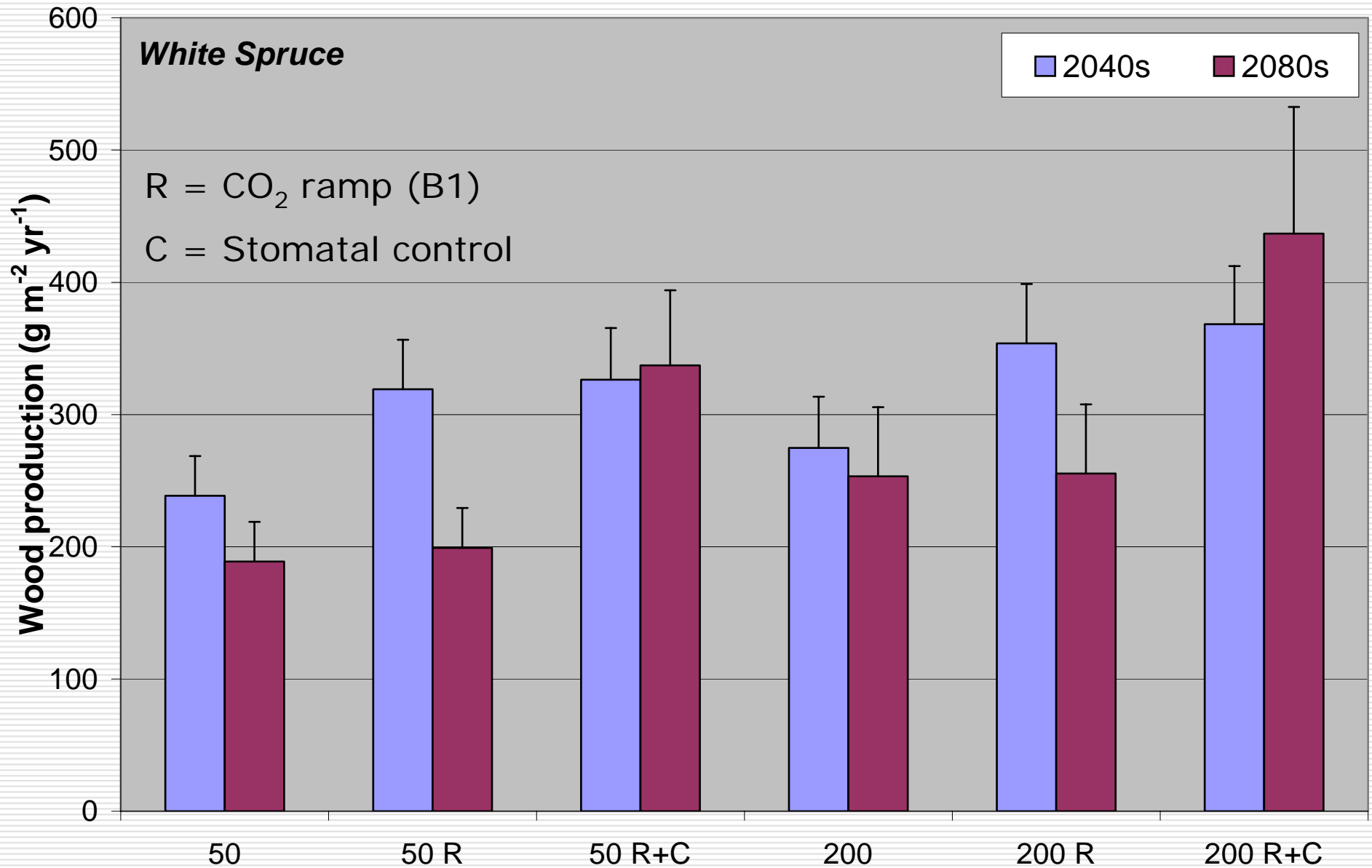
Objectives

- ❑ To develop potential future productivity scenarios for white spruce in Saskatchewan
 - ❑ To identify the implications for yield modeling
 - ❑ To show the implications of changes in yield and burn rate on site values
 - ❑ To demonstrate the effect of uncertainty for integrated assessment of climate change impacts
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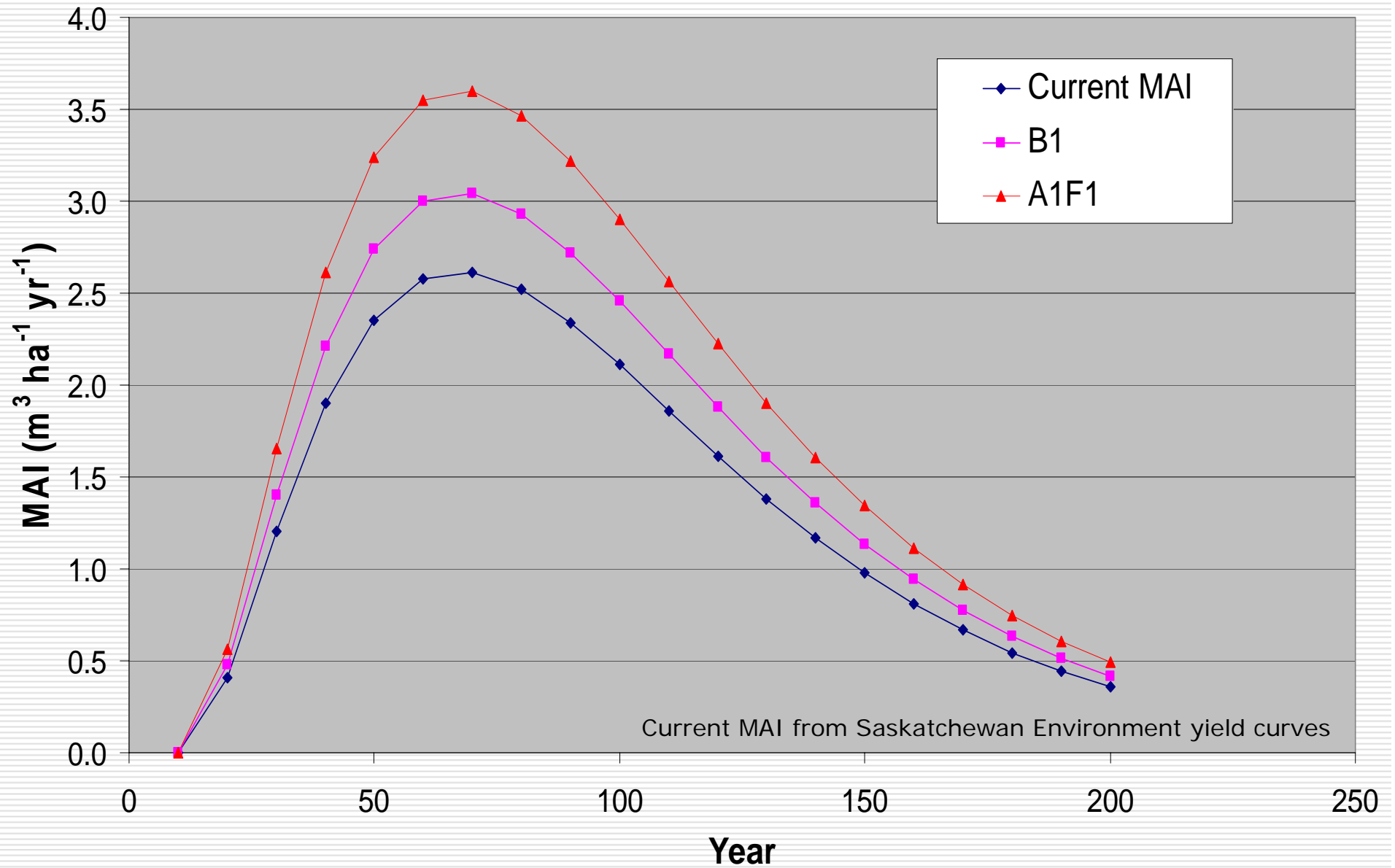
Productivity scenarios

- ❑ Used forest ecosystem model PnET (J. Aber, University of New Hampshire)
 - ❑ Parameterized for white spruce (BOREAS)
 - ❑ Input: climate data from Canadian Regional Climate Model II (CCCMA)
 - ❑ Included CO₂ fertilization and WUE effects
 - ❑ Used SRES B1 and A1F1 emission scenarios
 - ❑ Assumed either 50 mm or 200 mm WHC
 - ❑ Also modeled aspen, jack pine
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Productivity results



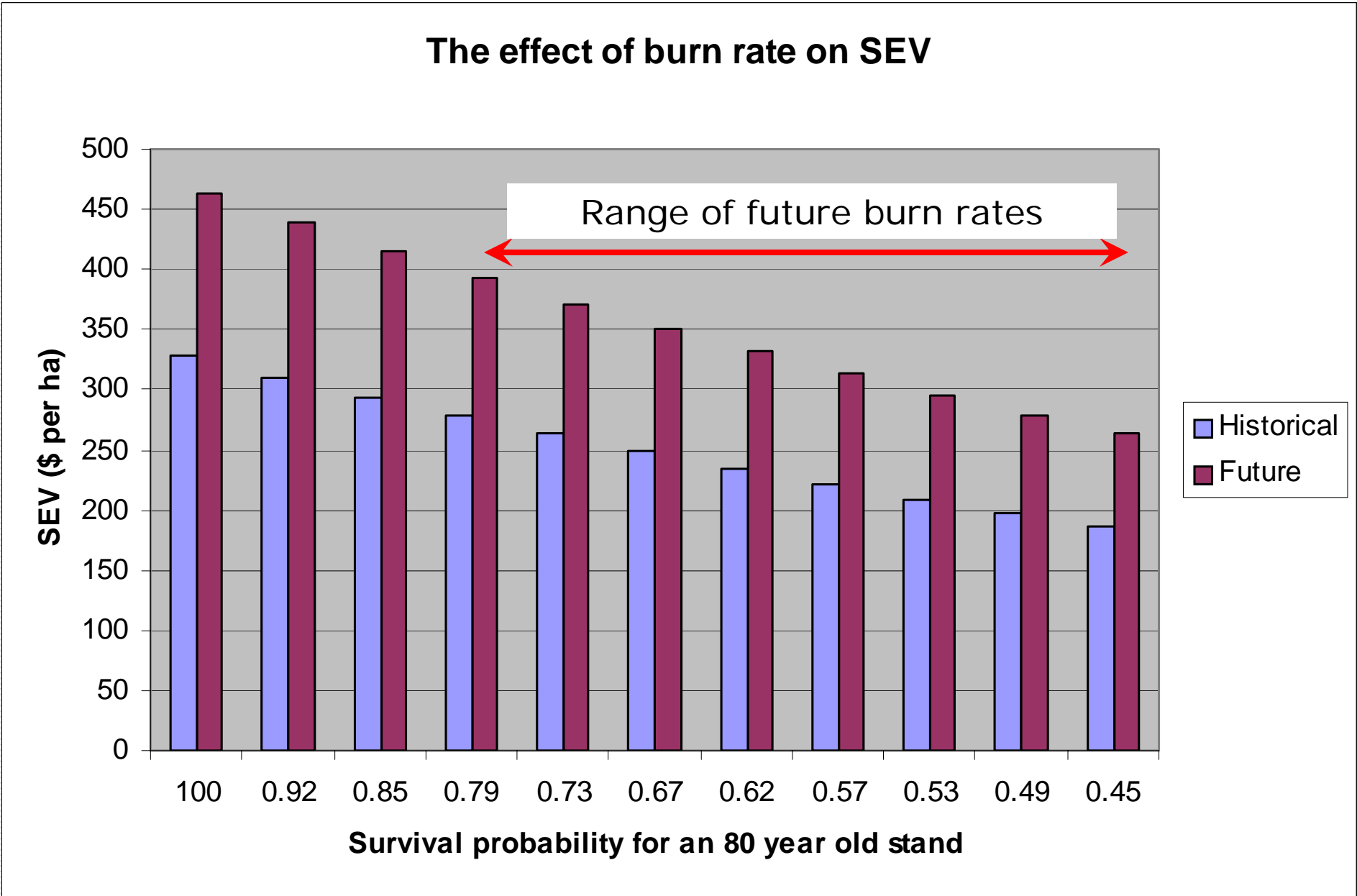
Yield modeling



Fire frequency

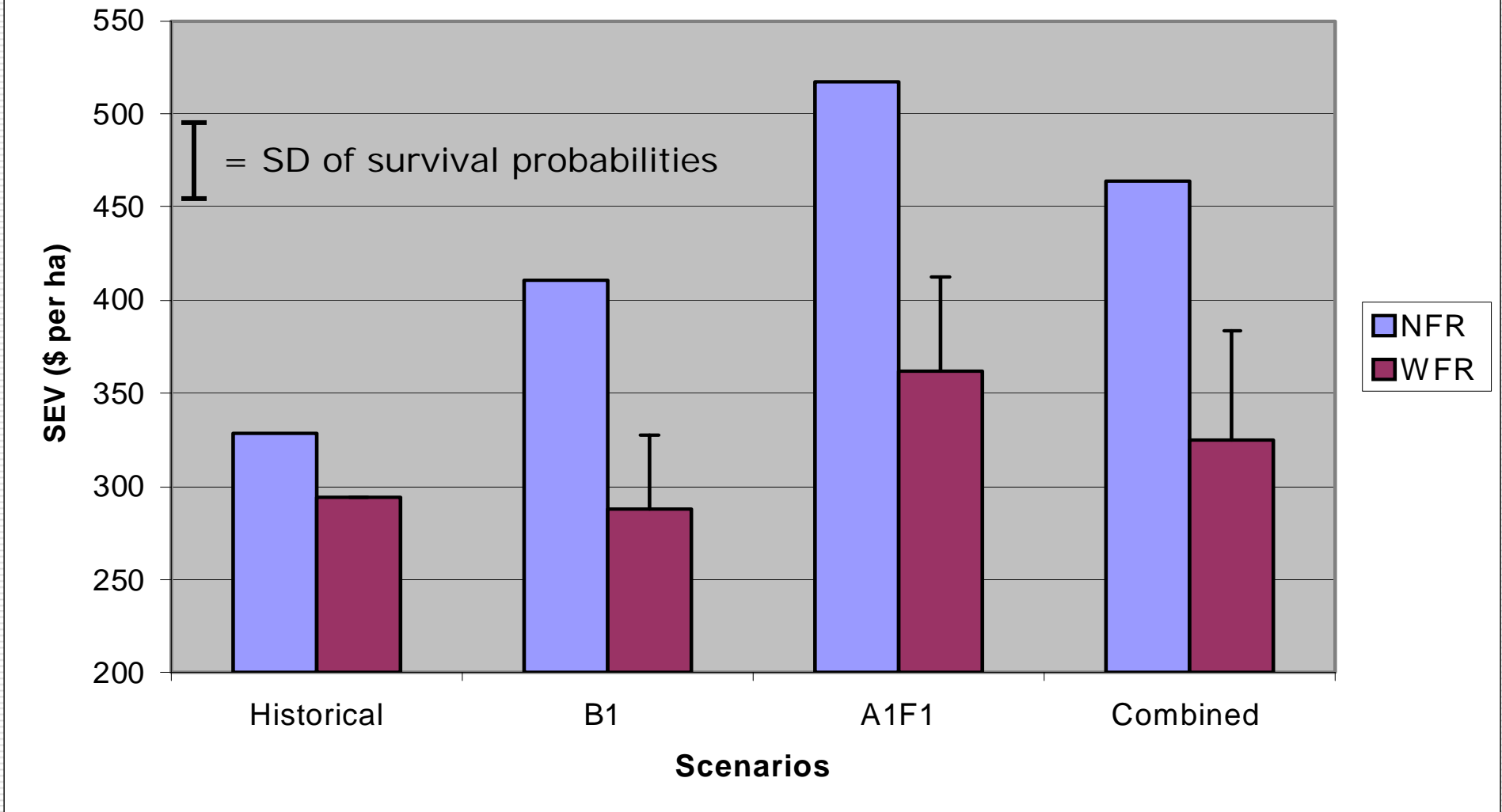
- Base case: Burn rate of 0.49% area per year
 - Current survival probability: 80 yr old stand=0.85
 - Scenarios based on increases in burn rates from Flannigan et al. (2004) for the BP ecozone
 - Best case = 9% increase in area burned by 2090s
 - Worst case = 245% increase in area burned by 2090s
 - Sample of survival probabilities for SEV assumed to range from 0.45 to 0.79
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Impacts on site expectation values (I)



Impacts on site expectation values (II)

Combined effects of productivity change and fire risk on white spruce site expectation value in northern Saskatchewan



Uncertainty in integrated assessment

- This analysis is a first step at illustrating some combined effects of CC
 - Other sources of uncertainty: productivity model, climate scenarios, burn rate analysis, other disturbances, uncertainty about prices and discount rates
 - There are direct economic costs related to uncertainty that are not included in this analysis (e.g. for risk averse consumers expected utility declines as uncertainty increases)
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Implications for local forest management

- Long-term forest management planning
 - Current status: 3 efforts underway
 - Millar-Western, LP Corp., Weyerhaeuser
 - Risk management: need to incorporate these analyses into existing approaches
 - Strategies: Companies can start now including this type of thinking into long-term management plans
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Thanks!

- Prince Albert Model Forest
 - Saskatchewan Research Council
 - Canadian Forest Service
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