Refining prescriptions for ruffed grouse habitat burns in interior Alaska

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Background

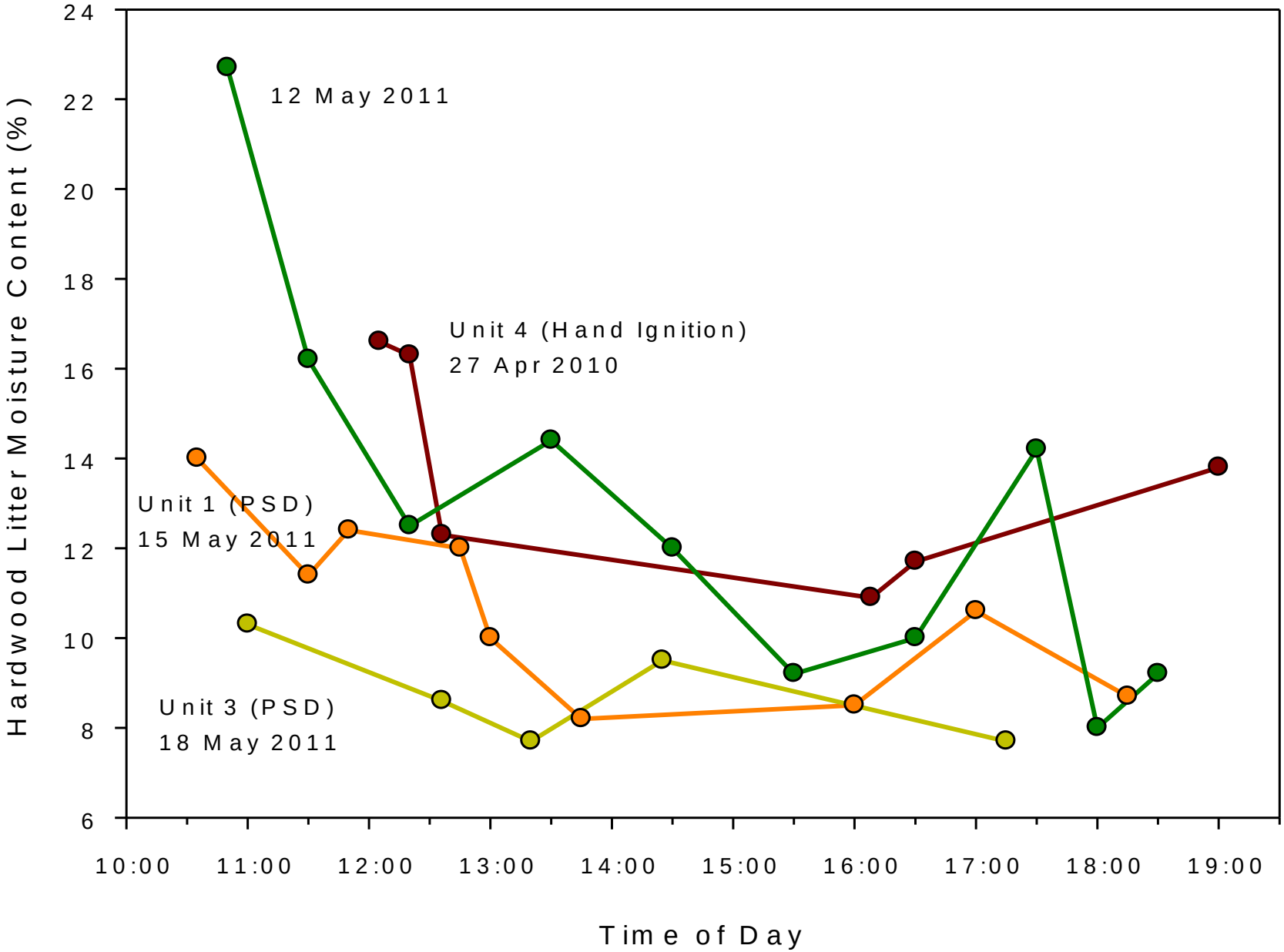
- Ruffed Grouse Habitat Burn
- Top-kill aspen, stimulate suckering
- 4 Units Burned 2010, 2011

Unit	Date	Ignition Pattern
Unit 4	4/27/2010	Hand Ignition
Units 1,2	5/15/2011	PSD
Unit 3	5/18/2011	PSD
Moose Mountain	5/20/2011	Wildfire

27 April 2010
GROUSE 1
E
4-27-10

9 June 2010

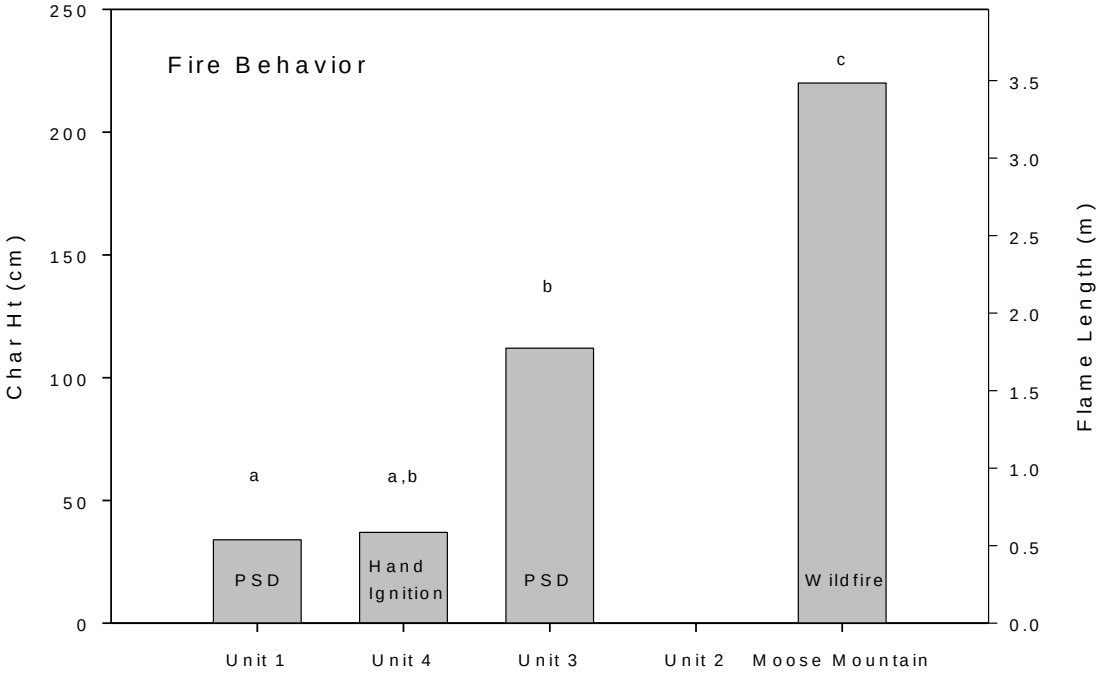
22 June 2011

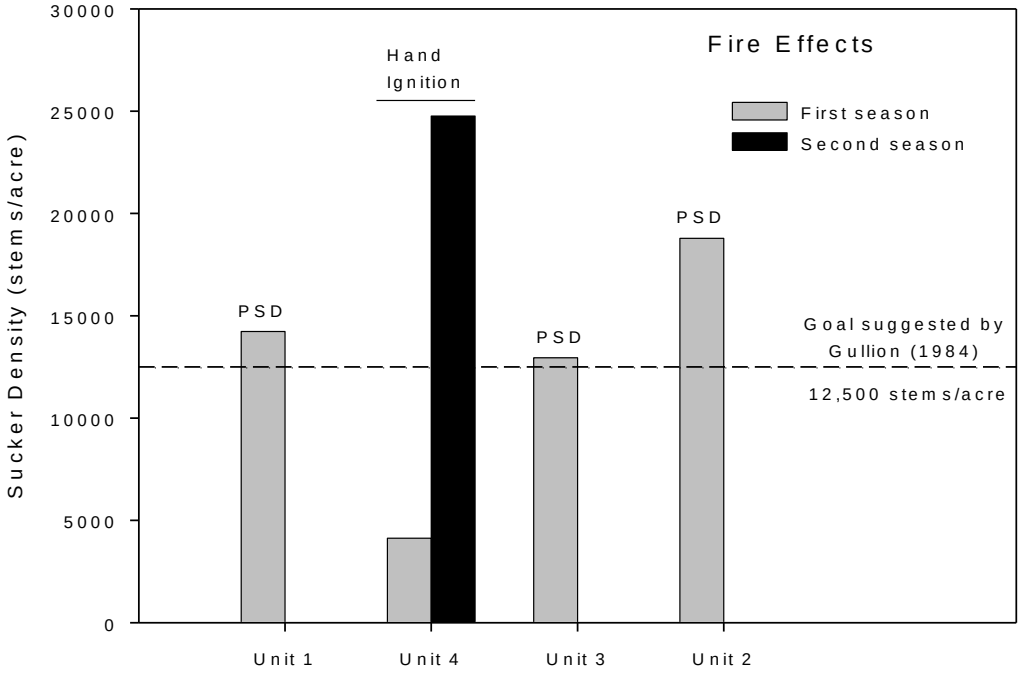

Hardwood Litter Moisture Content (%)
24
22
20
18
16
14
12
10
8
6
12 May 2011
Unit 4 (Hand Ignition)
27 Apr 2010
Unit 1 (PSD)
15 May 2011
Unit 3 (PSD)
18 May 2011
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
Time of Day

Fire Effects Monitoring

- Fire Effects
  - Part 1. Aspen regeneration (sucker density)
    - Rees' crew, (DOD)
  - Part 2. Predicting aspen top-kill from char height
    - Miller (AFS)

Part 1. Aspen Suckering

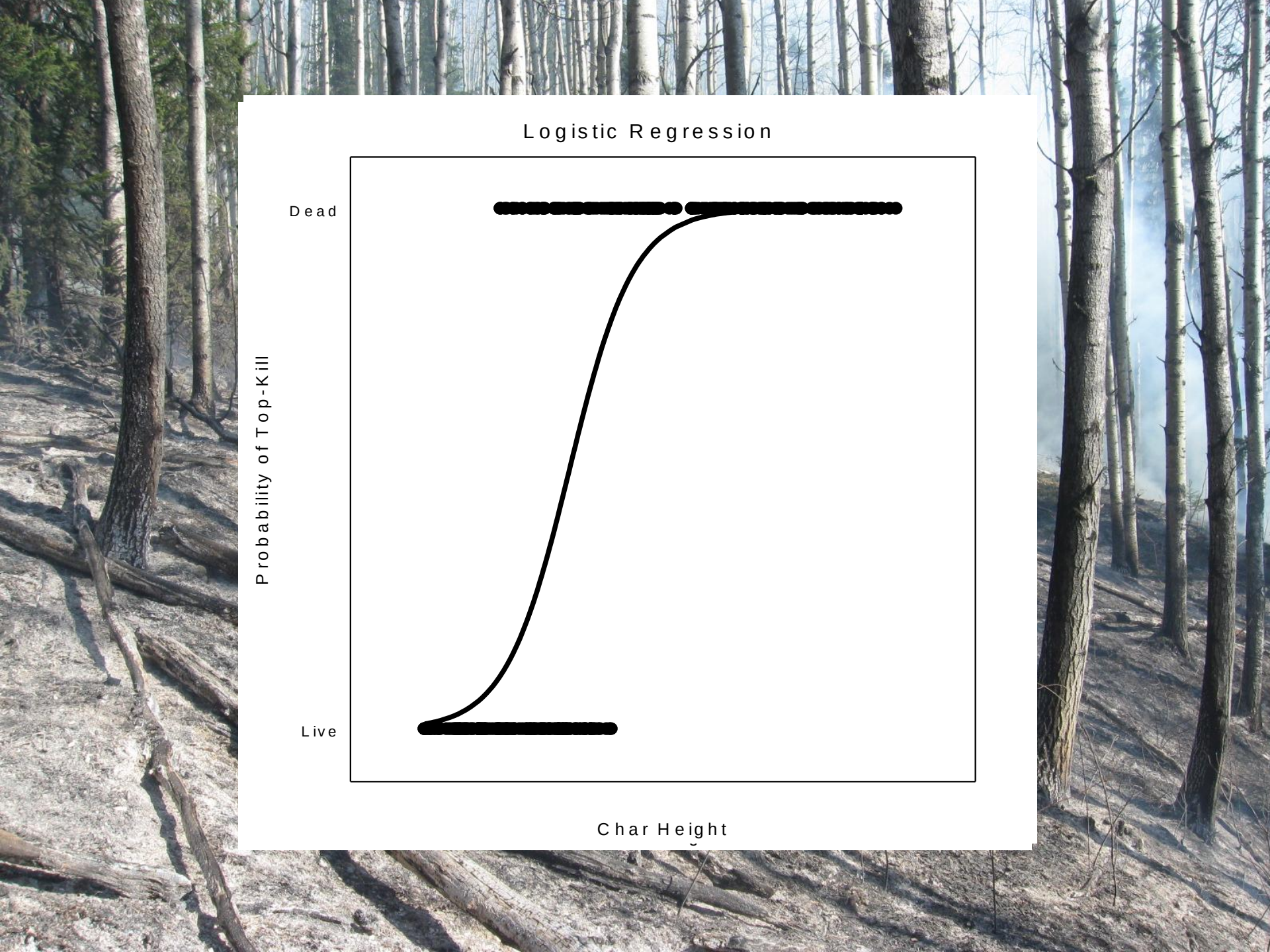

Fire Behavior
Char Ht (cm)
Flame Length (m)
250
200
150
100
50
0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
a
a,b
b
c
PSD
Hand Ignition
PSD
Wildfire
Unit 1
Unit 4
Unit 3
Unit 2
Moose Mountain

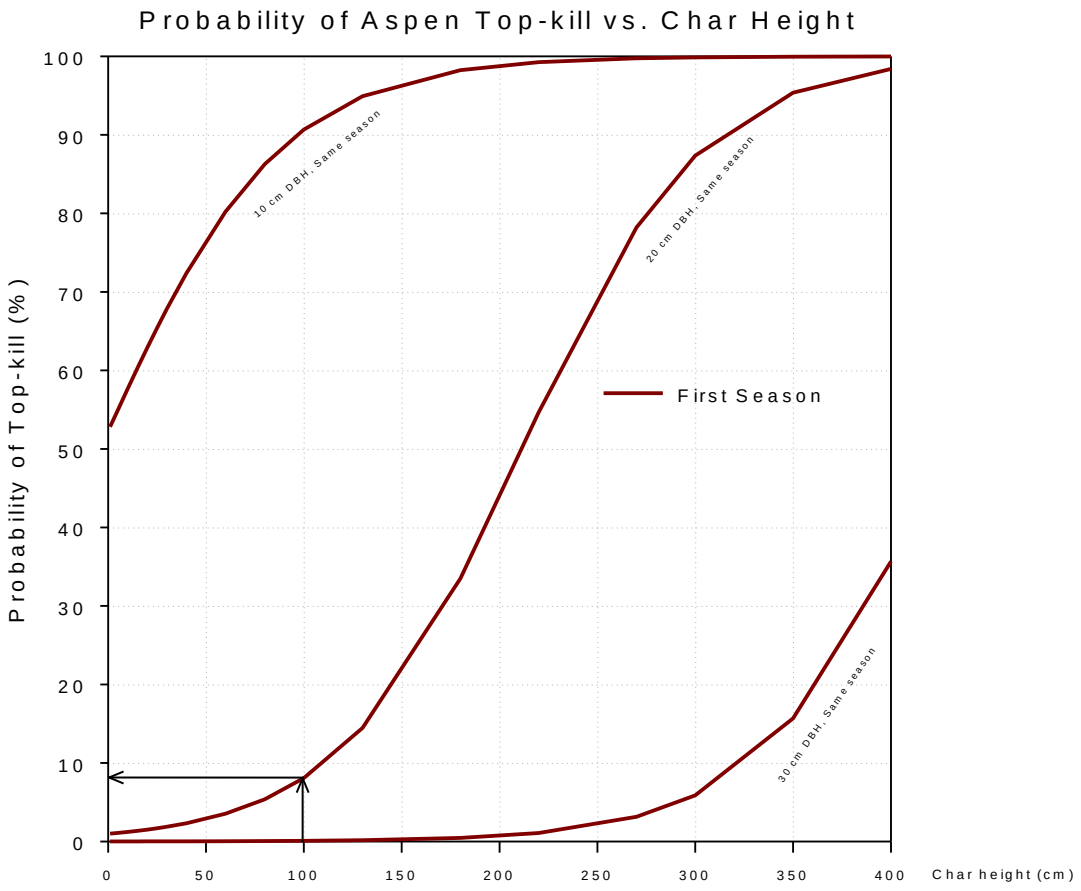

Fire Effects
Sucker Density (stems/acre)
30000
25000
20000
15000
10000
5000
0
Hand Ignition
First season
Second season
PSD
PSD
PSD
PSD
Goal suggested by Gullion (1984)
12,500 stems/acre
Unit 1
Unit 4
Unit 3
Unit 2

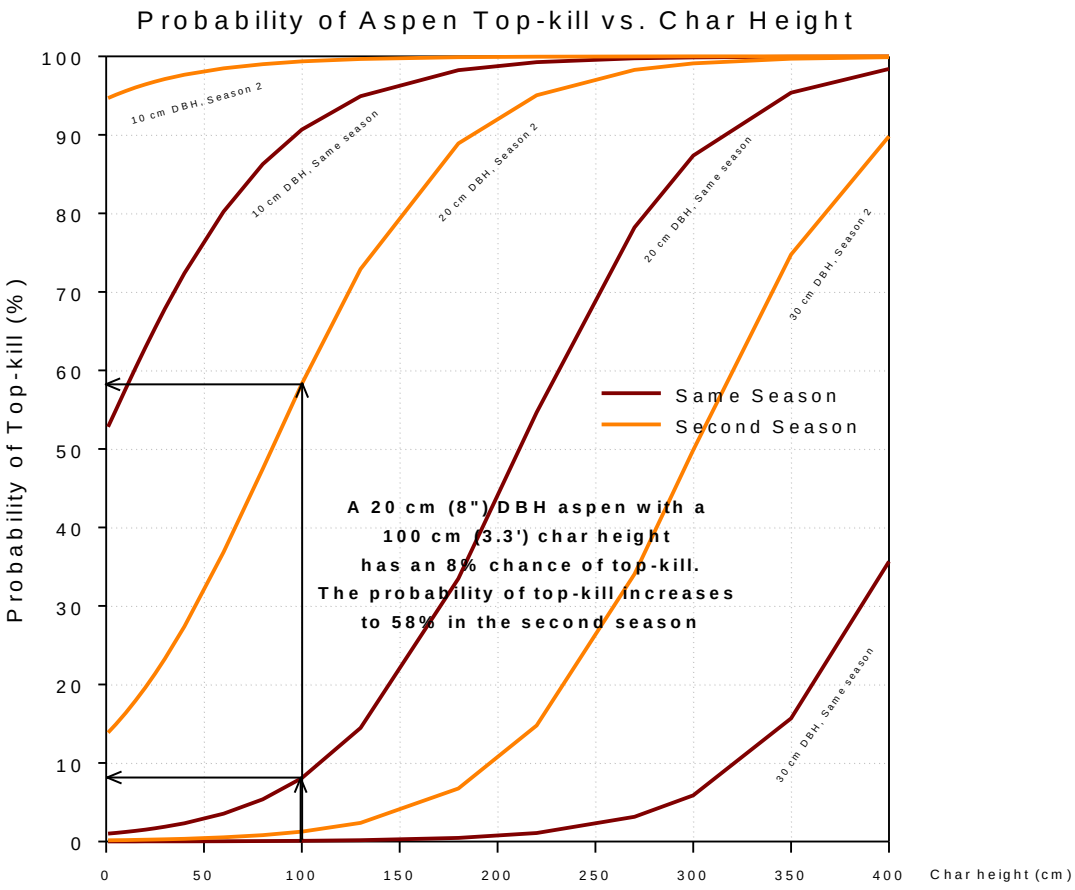
Part 2. Predicting Top-kill in Aspen

Predicting Top-kill in Aspen

- Is top-kill a function of:
  - Char height (Flame length)?
  - DBH?
  - Season?
- Binary Y data → Logistic Regression Analysis


Logistic Regression
Dead
Live
Probability of Top-Kill
Char Height


Probability of Aspen Top-kill vs. Char Height
Probability of Top-kill (%)
100
90
80
70
60
50
40
30
20
10
0
0
50
100
150
200
250
300
350
400
Char height (cm)
10 cm DBH, Same season
20 cm DBH, Same season
30 cm DBH, Same season
First Season

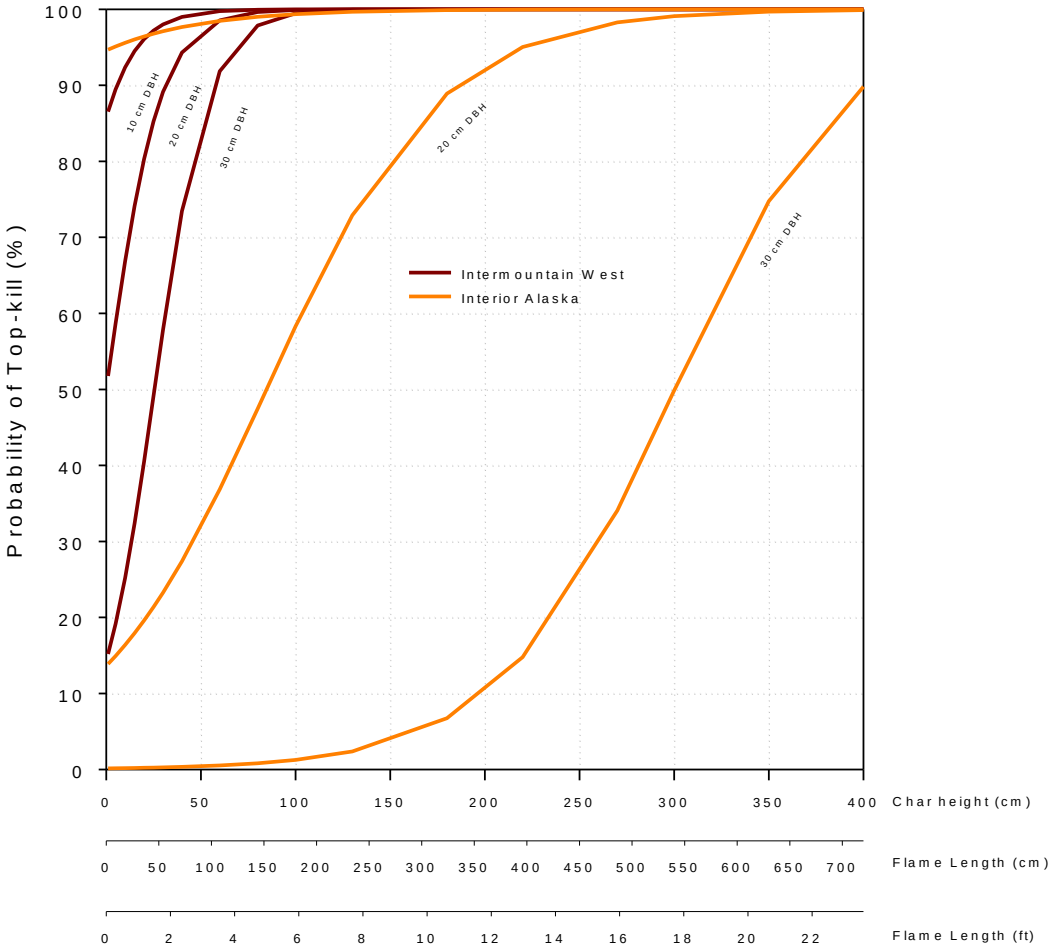

Probability of Aspen Top-kill vs. Char Height
Probability of Top-kill (%)
Char height (cm)
0
10
20
30
40
50
60
70
80
90
100
0
50
100
150
200
250
300
350
400
10 cm DBH, Season 2
10 cm DBH, Same season
20 cm DBH, Season 2
20 cm DBH, Same season
30 cm DBH, Season 2
30 cm DBH, Same season
Same Season
Second Season
A 20 cm (8") DBH aspen with a
100 cm (3.3') char height
has an 8% chance of top-kill.
The probability of top-kill increases
to 58% in the second season

Findings

- Is top-kill a function of:
  - Char height (Flame length)? Yes
  - DBH? Yes
  - Season? Yes
- Fairly strong relationship
  - ~83% correctly classified

Other Studies

- IM West
  - Fall burn
  - Duff consumption
  - Root kill
- Alaska
  - Spring burn
  - Bole heating



Uses

- FOFEM (First Order Fire Effects Model
- Prescribed fire planning
- Habitat and vegetation management