Overwintering DC in Alaska

Overwintering DC in Alaska

* What we did and why
* How that worked
* What we found
  * 100 Mile Fire
* Lots of data to work with
* What differences do the differences make?

Why?

* Not all springs are equal
* Areas of Alaska where it may matter most
  * Delta Junction
  * Upper Yukon Valley
* Areas where it is rare
  * South of Alaska Range
  * Western Alaska

Two Past Years

CIK 2004-2005

* 2004 ending DC 774
  * Overwinter precip. of 7.30" needed to for default
  * Snowpack reports estimate 5.00" water content
  * Starting DC of 138 if overwintered

PABI 1998-1999

* 1998 ending DC 504
  * Overwinter precip. 6.10" needed for default
  * Snowpack reports estimate 2.20" water content
  * Starting DC of 252 if overwintered

Where do we get the numbers?

Weather Station	Carryover fraction of last fall's moisture (Table 1)	Effectiveness of winter precip (table 2)	Last Fall's DC (freezeup)	This Winter's Precip (mm)	Last Fall's Moisture (%)	This Spring's Moisture (%)	This Spring's DC	Remarks
PADQ	1	0.9	1		798	798	1	Very wet
JBR	1	0.9	76	31	661	771	14	31mm to default
GRZ	1	0.9	120	51	592	773	13	51mm to default
FBK	1	0.9	421	100	279	633	93	Precip from PAFA-139mm needed to default
PAFA	1	0.9	496	100	231	586	124	Precip from PAFA-152mm needed to default
SLR	1	0.9	400	100	294	648	83	Precip from PAFA-135mm needed to default
PANN	1	0.9	377	100	311	666	73	Precip from PAFA-130mm needed to default
BTA	0.75	0.5	380	100	309	429	249	Precip from Basin precip reports NRCS
DON	0.75	0.5	500	100	229	368	310	Precip from Basin precip reports NRCS
JCK	0.75	0.5	450	100	259	391	286	Precip from Basin precip reports NRCS
OKL	0.75	0.75	520	100	218	459	222	Precip from Basin precip reports NRCS

Where do we get the numbers?

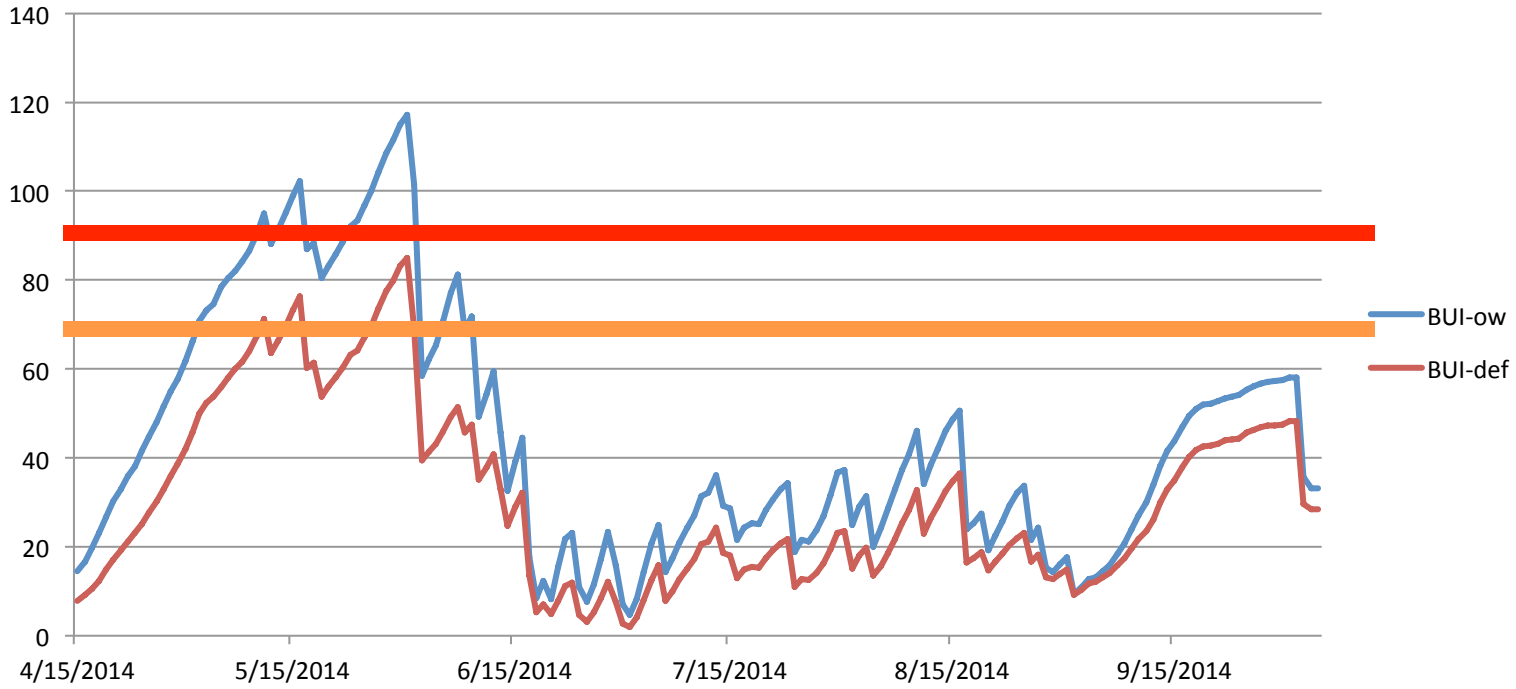
Stn	Carry over	Precip. Effective-ness	Fall DC	Winter Precip.	Fall moist. %	Spring moist. %	Spring DC	Notes
OKL	0.75	0.75	520	100	218	459	222	Precip from Basin precip reports NRCS

* ***Carryover***-Fraction of Moisture present in fall at freeze-up that will still be there in the spring.
* ***Precip. Effectiveness***-How much of the overwinter precipitation will end up in the soil.
* ***Fall DC***
* ***Winter Precip.***-From a nearby weather station or estimated from snow pack reports.

What's a DC do?

* Reflects the moisture content of the "deep, compact, organic matter."
* We don't use it directly in fire behavior calculations but more in it's influence on the BUI
* The BUI is used more directly in the fire behavior calculation.
* Let's look at the OKL BUI for 2014…..

OKL-BUI 2014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120
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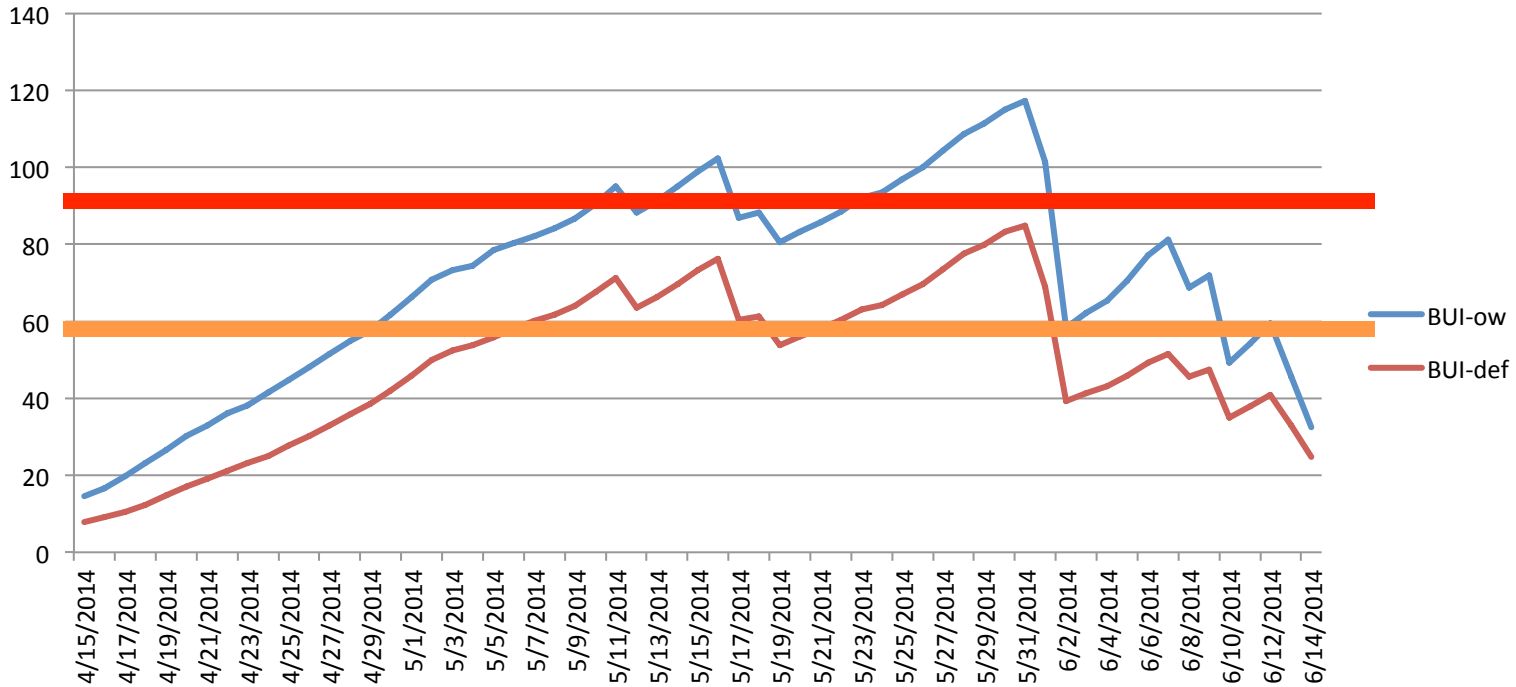
4/15/2014
5/15/2014
6/15/2014
7/15/2014
8/15/2014
9/15/2014
BUI-ow
BUI-def

OKL-BUI 2014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5/31/2014
6/2/2014
6/4/2014
6/6/2014
6/8/2014
6/10/2014
6/12/2014
6/14/2014
BUI-ow
BUI-def

2014-OKL-DC started at 222

* BUI crossed from **Moderate** to **High** (60)
  * defBUI-May 8th
  * owBUI-May 1st
* BUI crosses from **High** to **Extreme** (90)
  * defBUI-never, maxed at 85 June 1st
  * owBUI-May 11th, maxed at 117 June 1st

* What do these dates tell you?
* Do you expect certain fire behavior certain times of the year?
* Do your firefighting expectations change through the season?

2014-OKL-DC started at 222

* If a fire started **May 1st**
  * DC-***61***, owDC-***273***
  * BUI-***42***, owBUI-***62***
  * FWI-***17***, owFWI-***20***
* If a fire started **June 1st**
  * DC-***138***, owDC-***421***
  * BUI-***85***, owBUI-***117***
  * FWI-***21***, owFWI-***25***

* What do these numbers tell you?
* What would you expect from fire behavior?
* What would you expect would be needed to fight these fires?

What are the Differences in Fire Behavior Calculations?

* Rates of spread tables use BUI ranges of **20**.
* This means that the intensity rating would generally only differ by one class, if at all. The greatest differences would be with a high ISI.
* Are these differences relevant and are they seen in the observed fire behavior?

2.5.5 C-2, Boreal Spruce

Open, Rate of Spread in ch/hr

Multiply by 1.1 to get feet/min

Divide by 80 to get miles/hour

Divide by 3 to get meters/min

Torching, **Active Crown Fire**

Intensity Class		Flame Length	FLI kW/m	FLI BTU/ft/sec
1	up to	1	10	3
2	up to	4	500	145
3	up to	8	2000	578
4	up to	12	4000	1156
5	up to	18	10000	2891
6	> than	18	10000	2891

ISI	Buildup Index (BUI) 10	30	50	70	90	110	130	150	170	190
1	0.3	1	1	2	2	2	2	2	2	2
2	0.9	3	4	4	5	5	5	5	5	5
3	2	6	7	8	8	9	9	9	9	9
4	3	8	11	12	12	13	13	13	14	14
5	4	11	15	16	17	18	18	18	19	19
6	5	15	19	21	22	23	23	24	24	24
7	6	18	23	26	27	28	29	29	30	30
8	7	22	28	31	32	34	34	35	35	36
9	8	25	32	36	38	39	40	41	41	42
10	9	29	37	41	43	45	46	47	48	48
11	10	33	42	46	49	51	52	53	54	54
12	11	37	47	52	55	57	58	59	60	61
13	12	41	52	57	61	63	64	66	66	67
14	14	45	57	63	66	69	70	72	73	74
15	15	49	62	68	72	75	77	78	79	80
16	16	52	66	74	78	81	83	84	85	86
17	17	56	71	79	84	87	89	91	92	93
18	18	60	76	84	89	93	95	97	98	99
19	20	64	81	90	95	99	101	103	104	105
20	21	68	86	95	101	104	107	109	111	112
21	22	72	91	100	106	110	113	115	117	118
22	23	75	95	106	112	116	119	121	123	124
23	24	79	100	111	117	122	125	127	129	130
24	25	83	105	116	123	127	130	133	135	136
25	26	86	109	121	128	133	136	139	141	142
26	27	90	114	126	133	138	142	144	146	148
27	28	93	118	131	138	143	147	150	152	154

PREDICTIVE SERVICES

Theoretical fire-May 1st

Default

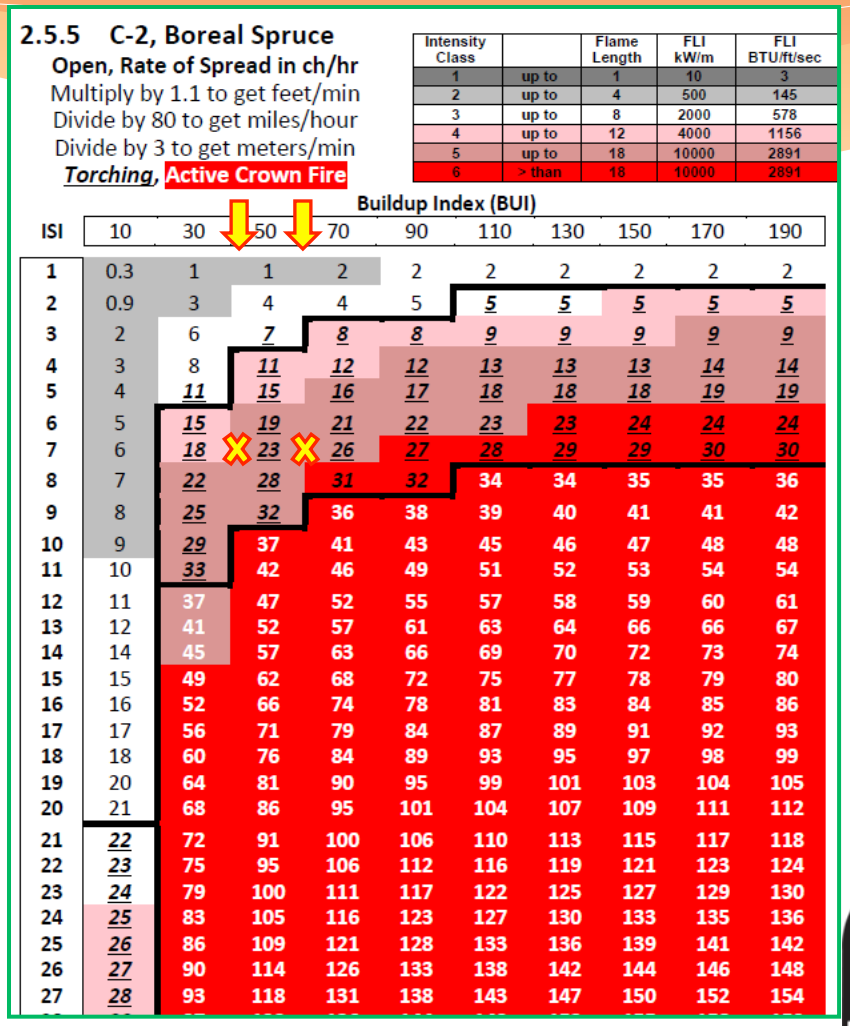
* DC-61
  * Low
* BUI-42
  * Moderate
* FWI-17
  * Moderate

Overwintered

* DC-273
  * Moderate
* BUI-62
  * High
* FWI-20
  * High

What are the Differences in Fire Behavior Calculations?

* Rates of spread tables use BUI ranges of ***20***.
* Default
  * BUI ***42***
  * ***21 ch/hr*** ROS
* Overwinter
  * BUI ***62***
  * ***25 ch/hr*** ROS
* Are these differences relevant and are they seen in the observed fire behavior?



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Divide by 3 to get meters/min

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ISI \ Buildup Index (BUI)	10	30	50	70	90	110	130	150	170	190
1	0.3	1	1	2	2	2	2	2	2	2
2	0.9	3	4	4	5	5	5	5	5	5
3	2	6	7	8	8	9	9	9	9	9
4	3	8	11	12	12	13	13	13	14	14
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11	10	33	42	46	49	51	52	53	54	54
12	11	37	47	52	55	57	58	59	60	61
13	12	41	52	57	61	63	64	66	66	67
14	14	45	57	63	66	69	70	72	73	74
15	15	49	62	68	72	75	77	78	79	80
16	16	52	66	74	78	81	83	84	85	86
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18	18	60	76	84	89	93	95	97	98	99
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PREDICTIVE SERVICES

Theoretical Fire-Fire Behavior

Default

* 21 ch/hr
* Intensity class 4
* Flame length up to 12
* FLI 1156 BTU/ft/sec
* Torching

Overwintered

* 25 ch/hr
* Intensity class 5
* Flame length up to 18
* FLI 2891 BTU/ft/sec
* Torching

Intensity Class		Flame Length	FLI kW/m	FLI BTU/ft/sec
1	up to	1	10	3
2	up to	4	500	145
3	up to	8	2000	578
4	up to	12	4000	1156
5	up to	18	10000	2891
6	> than	18	10000	2891

Theoretical fire-June 1st

Default

* DC-138
  * Low
* BUI-85
  * High
* FWI-21
  * High

Overwintered

* DC-421
  * High
* BUI-117
  * Very High
* FWI-25
  * High

What are the Differences in Fire Behavior Calculations?

- Rates of spread tables use BUI ranges of **20**.
- Default
  - BUI ***85***
  - ***22 ch/hr*** ROS
- Overwinter
  - BUI ***117***
  - ***23 ch/hr*** ROS
- Not much difference with low ISI but at ISI of ***25***
- Are these differences relevant and are they seen in the observed fire behavior?

2.5.5 C-2, Boreal Spruce

Open, Rate of Spread in ch/hr

Multiply by 1.1 to get feet/min

Divide by 80 to get miles/hour

Divide by 3 to get meters/min

Torching, **Active Crown Fire**

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Buildup Index (BUI)

ISI	10	30	50	70	90	110	130	150	170	190
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2	0.9	3	4	4	5	5	5	5	5	5
3	2	6	7	8	8	9	9	9	9	9
4	3	8	11	12	12	13	13	13	14	14
5	4	11	15	16	17	18	18	18	19	19
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27	28	93	118	131	138	143	147	150	152	154

PREDICTIVE SERVICES

Theoretical Fire-Fire Behavior

Default

* 22 ch/hr
* Intensity class 5
* Flame length up to 18
* FLI up to 2891 BTU/ft/sec
* Torching

Overwintered

* 23 ch/hr
* Intensity class 6
* Flame length greater than 18
* FLI greater than 2891 BTU/ft/sec
* Torching

Intensity Class		Flame Length	FLI kW/m	FLI BTU/ft/sec
1	up to	1	10	3
2	up to	4	500	145
3	up to	8	2000	578
4	up to	12	4000	1156
5	up to	18	10000	2891
6	> than	18	10000	2891

What differences do the differences make?

- DC
- BUI
- FWI
- Spread Rates
- Fireline intensity
- Adjective ratings
- Behavior-How deep are things burning?

FMO-Dispatch-Operations Actions

* Staffing?
* Prepositioning resources?
* Rx burn decisions?
* IA response?
* Tactics?
* ?

Thank you!

* Discussion then lunch…..