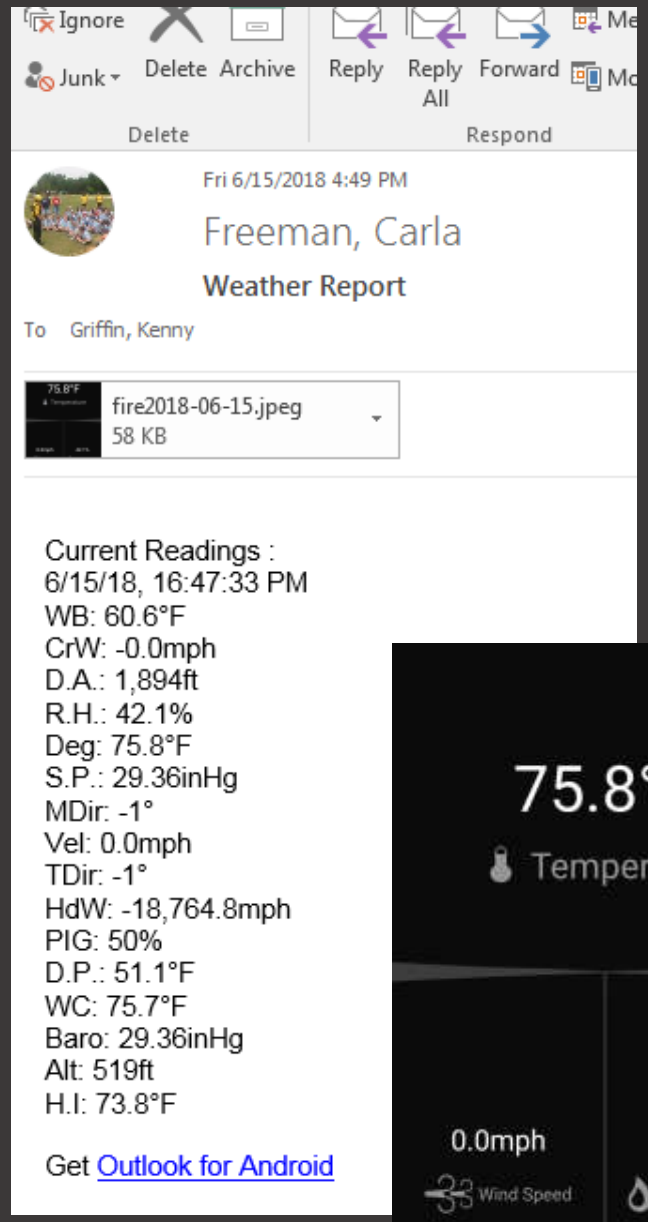
Handheld Weather Meters

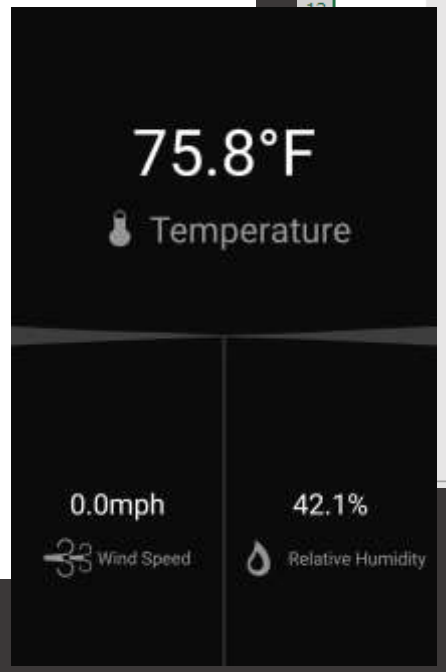
Carla Freeman
NC Forest Service District 5
Management Ranger

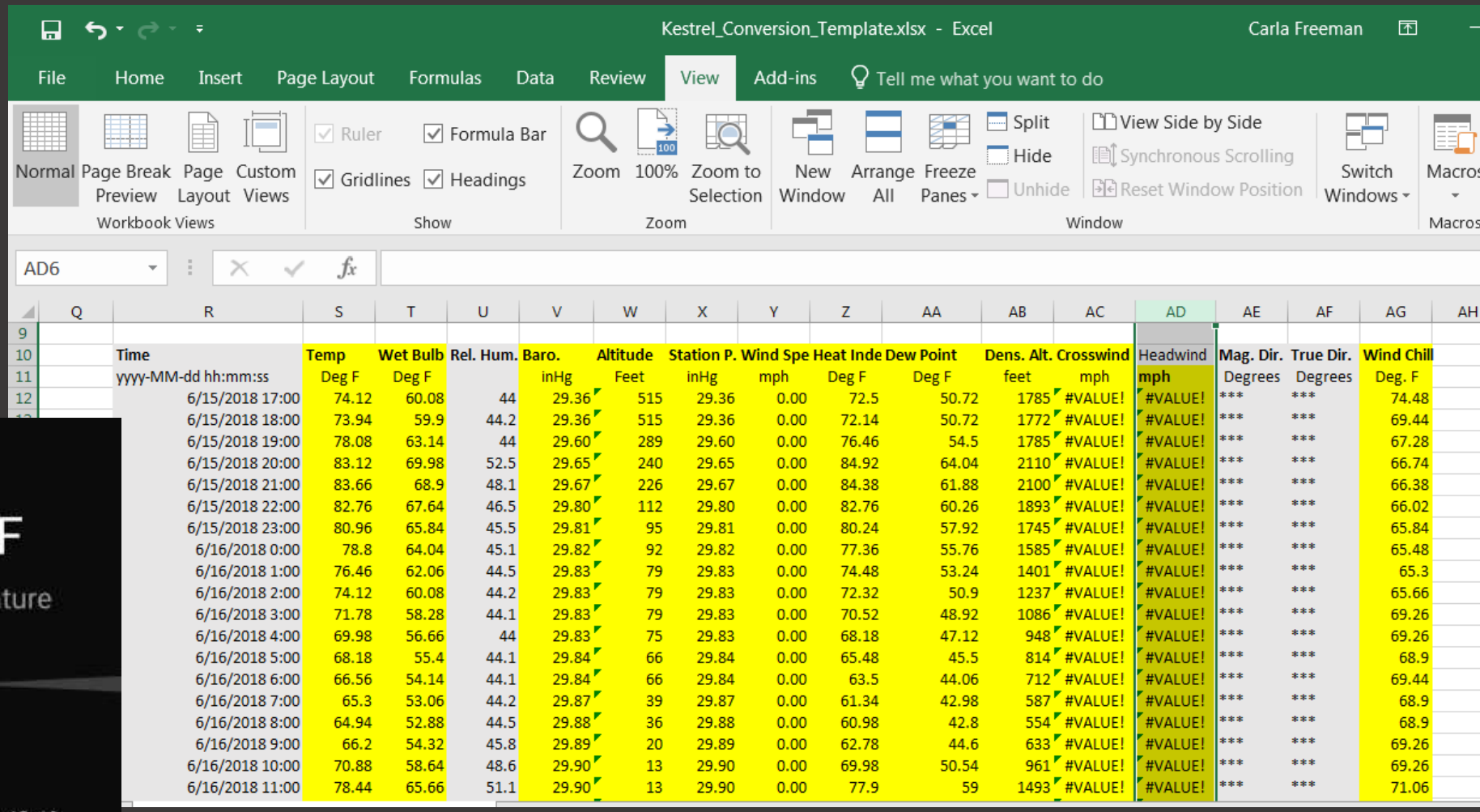
Kestrel- Fire Weather Pro with LINK

- **Cost: $420.00-500.00**
- Provides MORE data
- SUPER easy to share dashboard but only one device can connect at a time
- During test dropped connection 1 time in two hours
- Continuous reading and updating
- Can be stored on device and retrieved for printing on PC

Shared/Downloaded Data Views





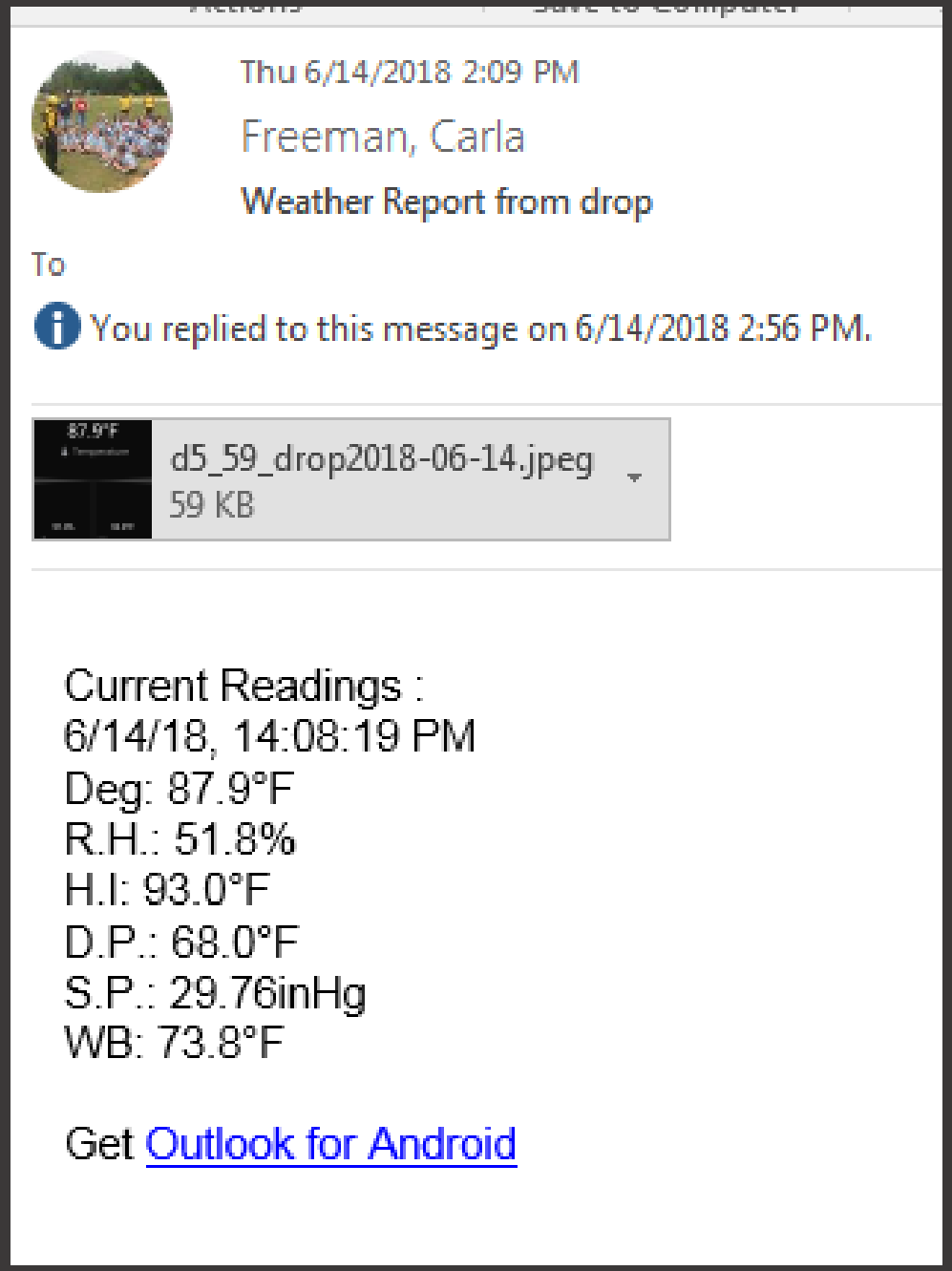


	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG
9																	
10		Time	Temp	Wet Bulb	Rel. Hum.	Baro.	Altitude	Station P.	Wind Spe	Heat Inde	Dew Point	Dens. Alt.	Crosswind	Headwind	Mag. Dir.	True Dir.	Wind Chill
11		yyyy-MM-dd hh:mm:ss	Deg F	Deg F		inHg	Feet	inHg	mph	Deg F	Deg F	feet	mph	mph	Degrees	Degrees	Deg. F
12		6/15/2018 17:00	74.12	60.08	44	29.36	515	29.36	0.00	72.5	50.72	1785	#VALUE!	#VALUE!	***	***	74.48
		6/15/2018 18:00	73.94	59.9	44.2	29.36	515	29.36	0.00	72.14	50.72	1772	#VALUE!	#VALUE!	***	***	69.44
		6/15/2018 19:00	78.08	63.14	44	29.60	289	29.60	0.00	76.46	54.5	1785	#VALUE!	#VALUE!	***	***	67.28
		6/15/2018 20:00	83.12	69.98	52.5	29.65	240	29.65	0.00	84.92	64.04	2110	#VALUE!	#VALUE!	***	***	66.74
		6/15/2018 21:00	83.66	68.9	48.1	29.67	226	29.67	0.00	84.38	61.88	2100	#VALUE!	#VALUE!	***	***	66.38
		6/15/2018 22:00	82.76	67.64	46.5	29.80	112	29.80	0.00	82.76	60.26	1893	#VALUE!	#VALUE!	***	***	66.02
		6/15/2018 23:00	80.96	65.84	45.5	29.81	95	29.81	0.00	80.24	57.92	1745	#VALUE!	#VALUE!	***	***	65.84
		6/16/2018 0:00	78.8	64.04	45.1	29.82	92	29.82	0.00	77.36	55.76	1585	#VALUE!	#VALUE!	***	***	65.48
		6/16/2018 1:00	76.46	62.06	44.5	29.83	79	29.83	0.00	74.48	53.24	1401	#VALUE!	#VALUE!	***	***	65.3
		6/16/2018 2:00	74.12	60.08	44.2	29.83	79	29.83	0.00	72.32	50.9	1237	#VALUE!	#VALUE!	***	***	65.66
		6/16/2018 3:00	71.78	58.28	44.1	29.83	79	29.83	0.00	70.52	48.92	1086	#VALUE!	#VALUE!	***	***	69.26
		6/16/2018 4:00	69.98	56.66	44	29.83	75	29.83	0.00	68.18	47.12	948	#VALUE!	#VALUE!	***	***	69.26
		6/16/2018 5:00	68.18	55.4	44.1	29.84	66	29.84	0.00	65.48	45.5	814	#VALUE!	#VALUE!	***	***	68.9
		6/16/2018 6:00	66.56	54.14	44.1	29.84	66	29.84	0.00	63.5	44.06	712	#VALUE!	#VALUE!	***	***	69.44
		6/16/2018 7:00	65.3	53.06	44.2	29.87	39	29.87	0.00	61.34	42.98	587	#VALUE!	#VALUE!	***	***	68.9
		6/16/2018 8:00	64.94	52.88	44.5	29.88	36	29.88	0.00	60.98	42.8	554	#VALUE!	#VALUE!	***	***	68.9
		6/16/2018 9:00	66.2	54.32	45.8	29.89	20	29.89	0.00	62.78	44.6	633	#VALUE!	#VALUE!	***	***	69.26
		6/16/2018 10:00	70.88	58.64	48.6	29.90	13	29.90	0.00	69.98	50.54	961	#VALUE!	#VALUE!	***	***	69.26
		6/16/2018 11:00	78.44	65.66	51.1	29.90	13	29.90	0.00	77.9	59	1493	#VALUE!	#VALUE!	***	***	71.06

Kestrel DROP D3

- Cost: $100.00-150.00
- **No wind readings**
- Stays connected well
- Easy to use, dashboard easy to share
- One user access at a time
- Continuous Reading and updating

Dashboard Shared: Emailed



Thu 6/14/2018 2:09 PM

Freeman, Carla

Weather Report from drop

To

You replied to this message on 6/14/2018 2:56 PM.

d5_59_drop2018-06-14.jpeg
59 KB

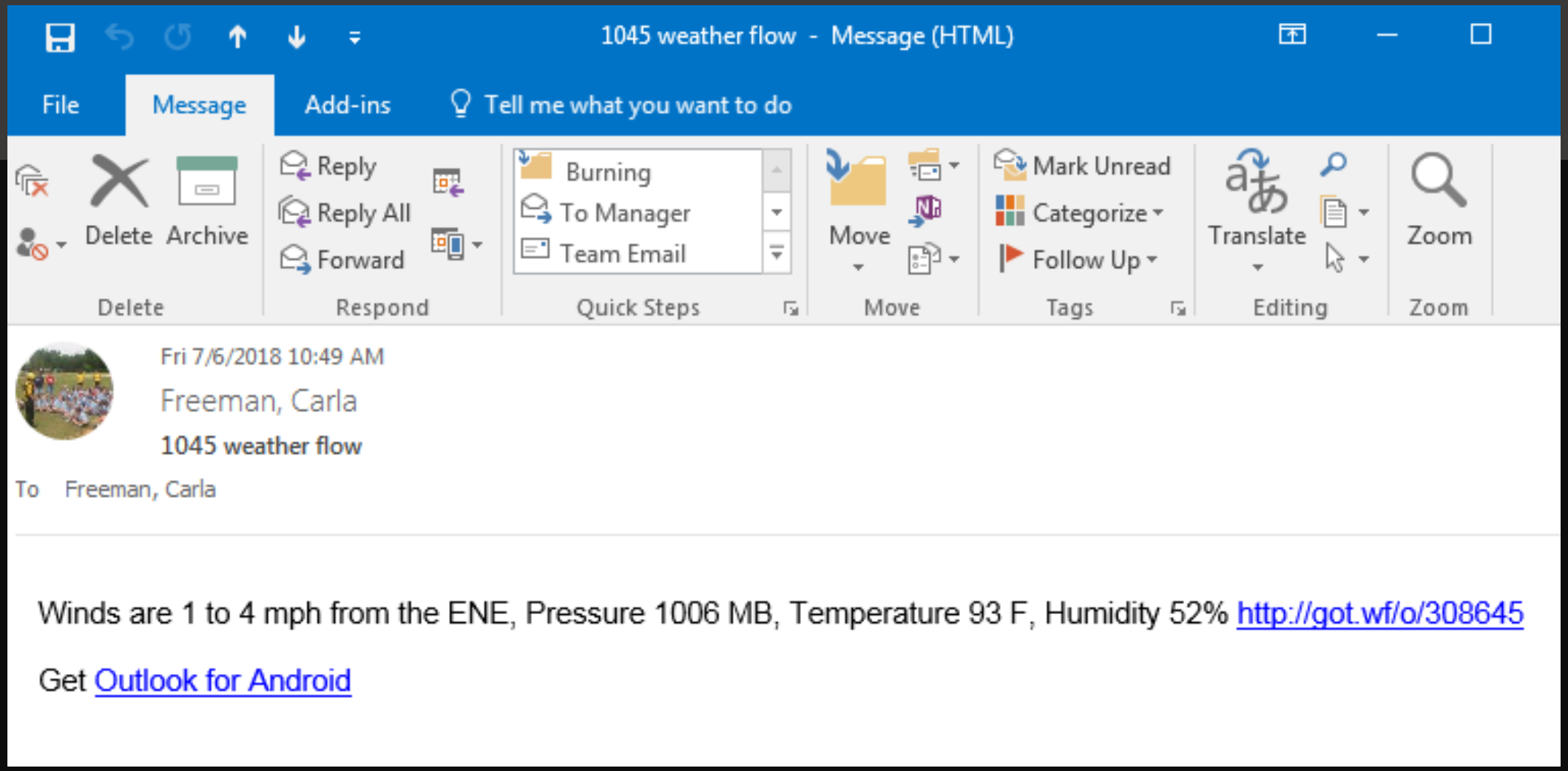
Current Readings :
6/14/18, 14:08:19 PM
Deg: 87.9°F
R.H.: 51.8%
H.I: 93.0°F
D.P.: 68.0°F
S.P.: 29.76inHg
WB: 73.8°F

Get Outlook for Android

Weatherflow Meter

- Cost: $72.00-79.00
- Averages 1 minute of readings each time. Not a continuous reading device
- Can be stored on device and retrieve for printing on PC.
- Can be shared directly off your phone as a text/email
- During test this meter seemed to disconnected more often than the kestrel links
- Provides wind data as well

Emailed Dashboard Information



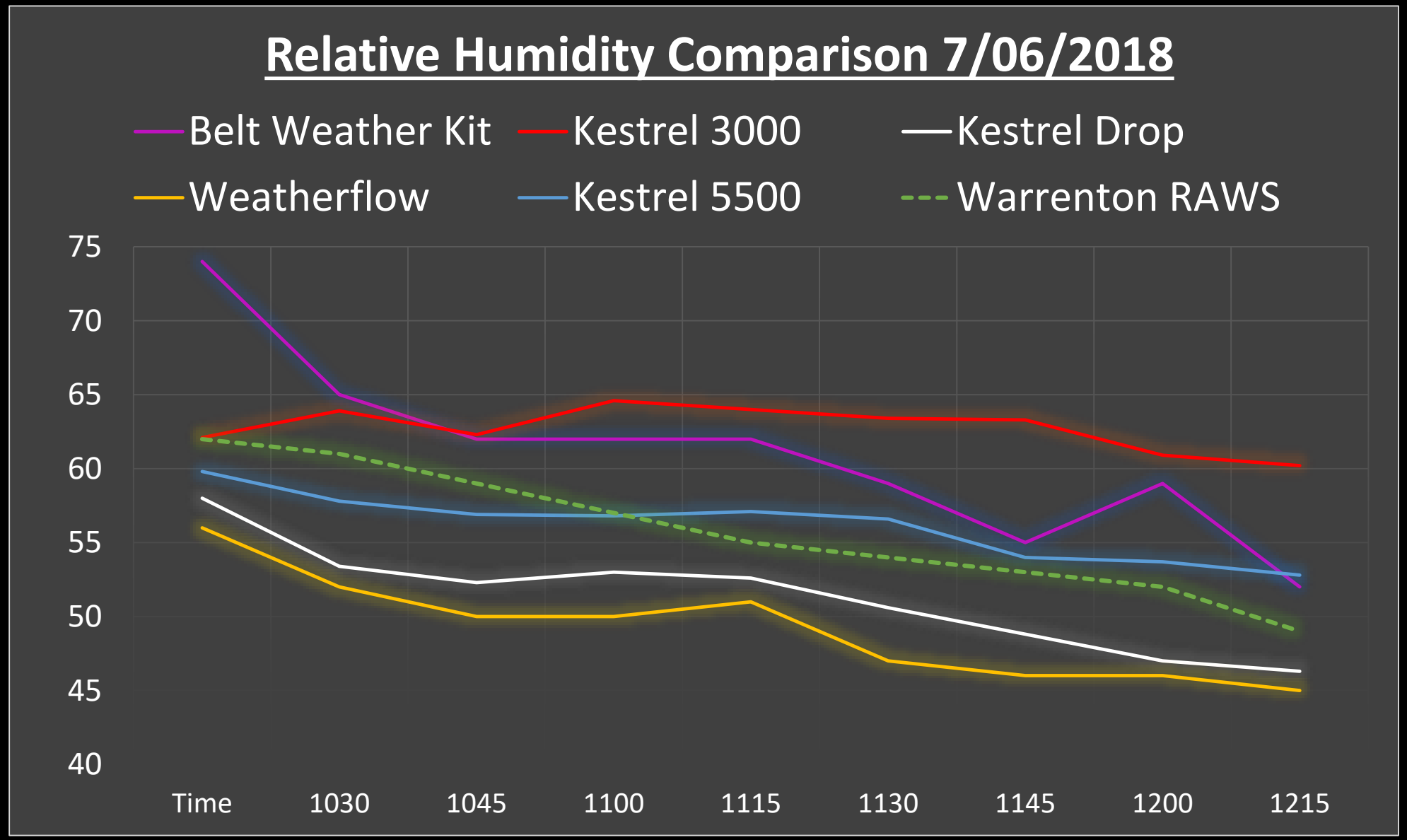
Belt Weather Kit

- Cost: $110.00-130.00
- General wind speeds
- Wet and Dry bulb temps
- Calculate RH from included tables
- If used correctly it is accurate. Operator Error!

RH Results from Field Test

Relative Humidity Comparison RAWS Warrenton -7/06/2018																		
Time	1030	% Diff.	1045	% Diff.	1100	% Diff.	1115	% Diff.	1130	% Diff.	1145	% Diff.	1200	% Diff.	1215	% Diff.	1230	% Diff.
Belt Weather Kit	74	-16.2	65	-6.2	62	-4.8	62	-8.1	62	-11.3	59	-8.5	55	-3.6	59	-11.9	52	-5.8
Kestrel 3000	62.1	-0.2	63.9	-4.5	62.3	-5.3	64.6	-11.8	64	-14.1	63.4	-14.8	63.3	-16.3	60.9	-14.6	60.2	-18.6
Kestrel Drop	58	6.9	53.4	14.2	52.3	12.8	53	7.5	52.6	4.6	50.6	6.7	48.8	8.6	47	10.6	46.3	5.8
Weatherflow	56	10.7	52	17.3	50	18.0	50	14.0	51	7.8	47	14.9	46	15.2	46	13.0	45	8.9
Kestrel 5500 Fire Pro	59.8	3.7	57.8	5.5	56.9	3.7	56.8	0.4	57.1	3.7	56.6	-4.6	54	-1.9	53.7	-3.2	52.8	-7.2
RAWS Warrenton	**62**		**61**		**59**		**57**		**55**		**54**		**53**		**52**		**49**	

Device	Avg. % Difference
Belt Weather Kit	8.49
Kestrel 3000	11.13
Kestrel Drop	8.65
Weatherflow	13.32
Kestrel 5500 Fire Pro	3.76


Relative Humidity Comparison 7/06/2018
Belt Weather Kit
Kestrel 3000
Kestrel Drop
Weatherflow
Kestrel 5500
Warrenton RAWS
75
70
65
60
55
50
45
40
Time
1030
1045
1100
1115
1130
1145
1200
1215

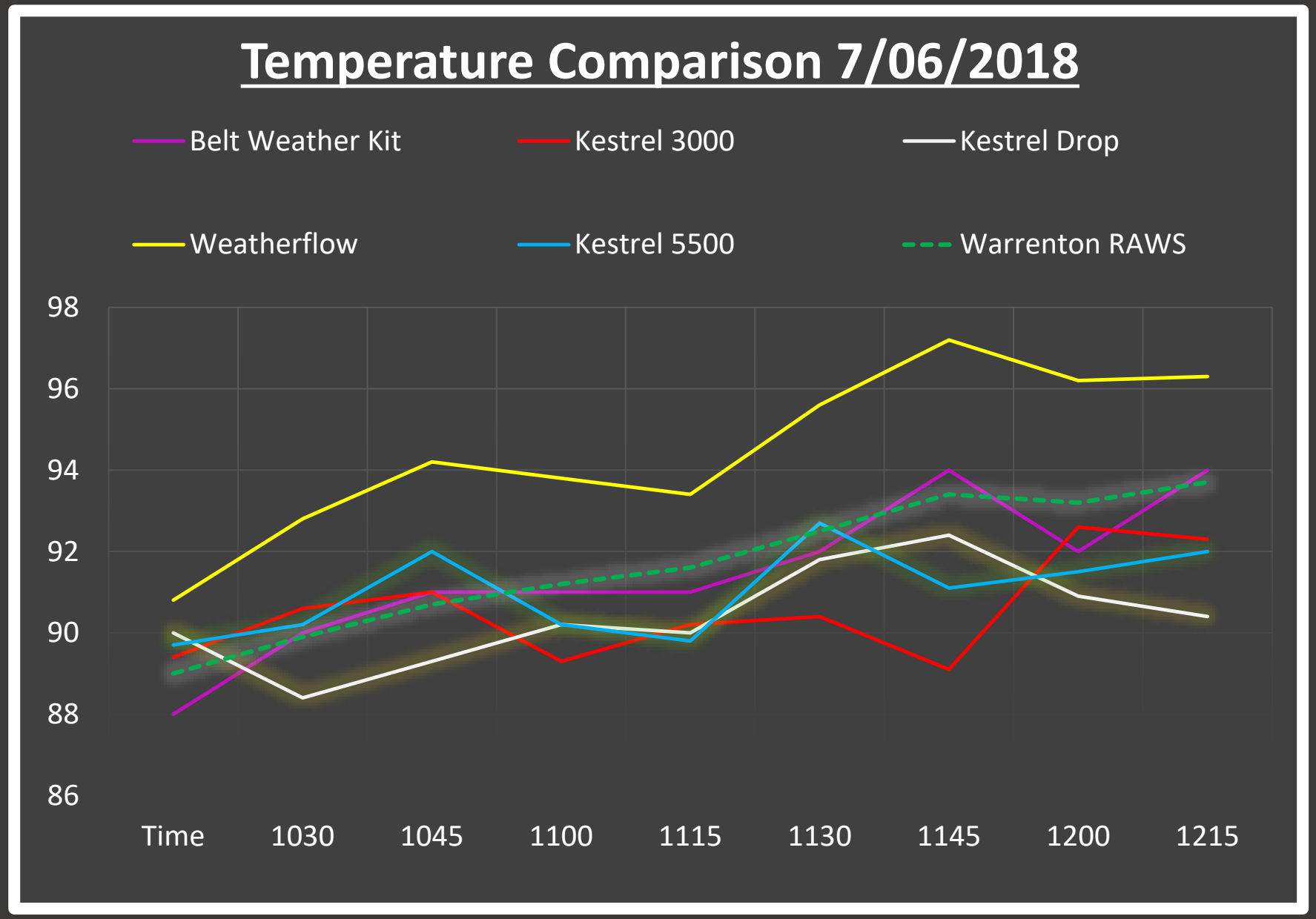
Temperature Results from Field Test

Temperature Comparison RAWS Warrenton -7/06/2018																		
Time	1030	% Diff.	1045	% Diff.	1100	% Diff.	1115	% Diff.	1130	% Diff.	1145	% Diff.	1200	% Diff.	1215	% Diff.	1230	% Diff.
Belt Weather Kit	88	1.1	90	-0.1	91	-0.3	91	0.2	91	0.7	92	0.5	94	-0.6	92	1.3	94	-0.3
Kestrel 3000	89.4	-0.4	90.6	-0.8	91	-0.3	89.3	2.1	90.2	1.6	90.4	2.3	89.1	4.8	92.6	0.6	92.3	1.5
Kestrel Drop	90	-1.1	88.4	1.7	89.3	1.6	90.2	1.1	90	1.8	91.8	0.8	92.4	1.1	90.9	2.5	90.4	3.7
Weatherflow	90.8	-2.0	92.8	-3.1	94.2	-3.7	93.8	-2.8	93.4	-1.9	95.6	-3.2	97.2	-3.9	96.2	-3.1	96.3	-2.7
Kestrel 5500 Fire Pro	89.7	-0.8	90.2	-0.3	92	-1.4	90.2	1.1	89.8	-2.0	92.7	-0.2	91.1	2.5	91.5	1.9	92	1.8
RAWS Warrenton	**89**		**89.9**		**90.7**		**91.2**		**91.6**		**92.5**		**93.4**		**93.2**		**93.7**	

Device	Avg. % Difference
Belt Weather Kit	0.57
Kestrel 3000	1.61
Kestrel Drop	1.51
Weatherflow	2.93
Kestrel 5500 Fire Pro	1.34

% Diff. = Precentage Difference from RAWS Warrenton

Comparison conducted at the Warrenton RAWS station by Carla Freeman (NCFS-D5) and Kenny Griffin (NCFS-D11) 7/6/2018


Temperature Comparison 7/06/2018
Belt Weather Kit
Kestrel 3000
Kestrel Drop
Weatherflow
Kestrel 5500
Warrenton RAWS
98
96
94
92
90
88
86
Time
1030
1045
1100
1115
1130
1145
1200
1215

DEPENDS…..Amount <u>you</u> are willing to spend, how often <u>you</u> will use it, and what <u>you</u> are comfortable using.

Carla Freeman
District 5 Management Ranger

Free Online Precipitation Tool

SC

Fri 7/6/2018 9:38 PM

State Climate Office of N@climate.ncsu.edu>

[External] Precipitation ALERT for Griffin Home - 0.23 inches within 24 hours

To Freeman, Carla

You forwarded this message on 7/6/2018 9:57 PM.

This is an automatically generated precipitation alert message from the State Climate Office of North Carolina.

PROJECT: Testing
SITE:
LOCATION: 36.388213893171, -78.856997452125
THRESHOLD: 0.1 inches within 24 hours

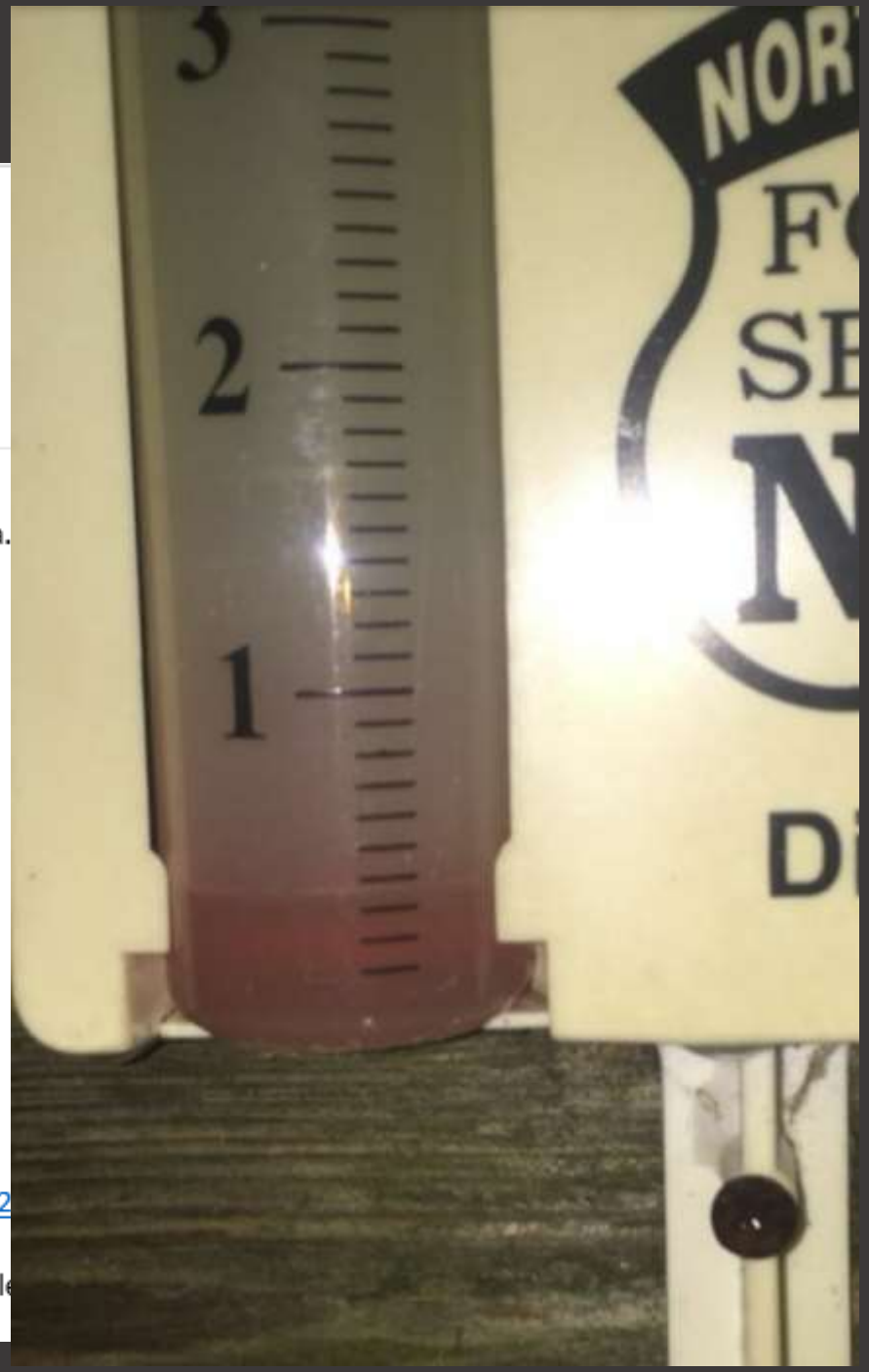
ALERT: estimated 0.23 inches during the previous 24 hours ending at 7pm EST, Jul 6.

MPE webpage
http://climate.ncsu.edu/dot

Site Details:
http://climate.ncsu.edu/dot/projects.php#5805

Site Forecast
http://forecast.weather.gov/MapClick.php?site=slc&textField1=36.388213893171&textField2=-78.856997452

There are possible errors associated with these radar-based precipitation estimates. The calculations in this al



Sent: Saturday, July 7, 2018 3:37:52 AM
To: Freeman, Carla
Subject: [External] Precipitation ALERT for Finch - 0.84 inches within 6 hours

CAUTION: External email. Do not click links or open attachments unless verified. Send all suspicious email as an attachment to Report Spam.<mailto:report.spam@nc.gov>

This is an automatically generated precipitation alert message from the State Climate Office of North Carolina. This alert is for...

PROJECT: RAWS STATIONS
SITE: Finch
LOCATION: 35.431051891532, -78.030493640493
THRESHOLD: 0.1 inches within 6 hours

ALERT: estimated 0.84 inches during the previous 6 hours ending at 1am EST, Jul 7.

Ver. 5.0 FastPath EOBS Go **Weather Information Management System** Show Navigation Tree

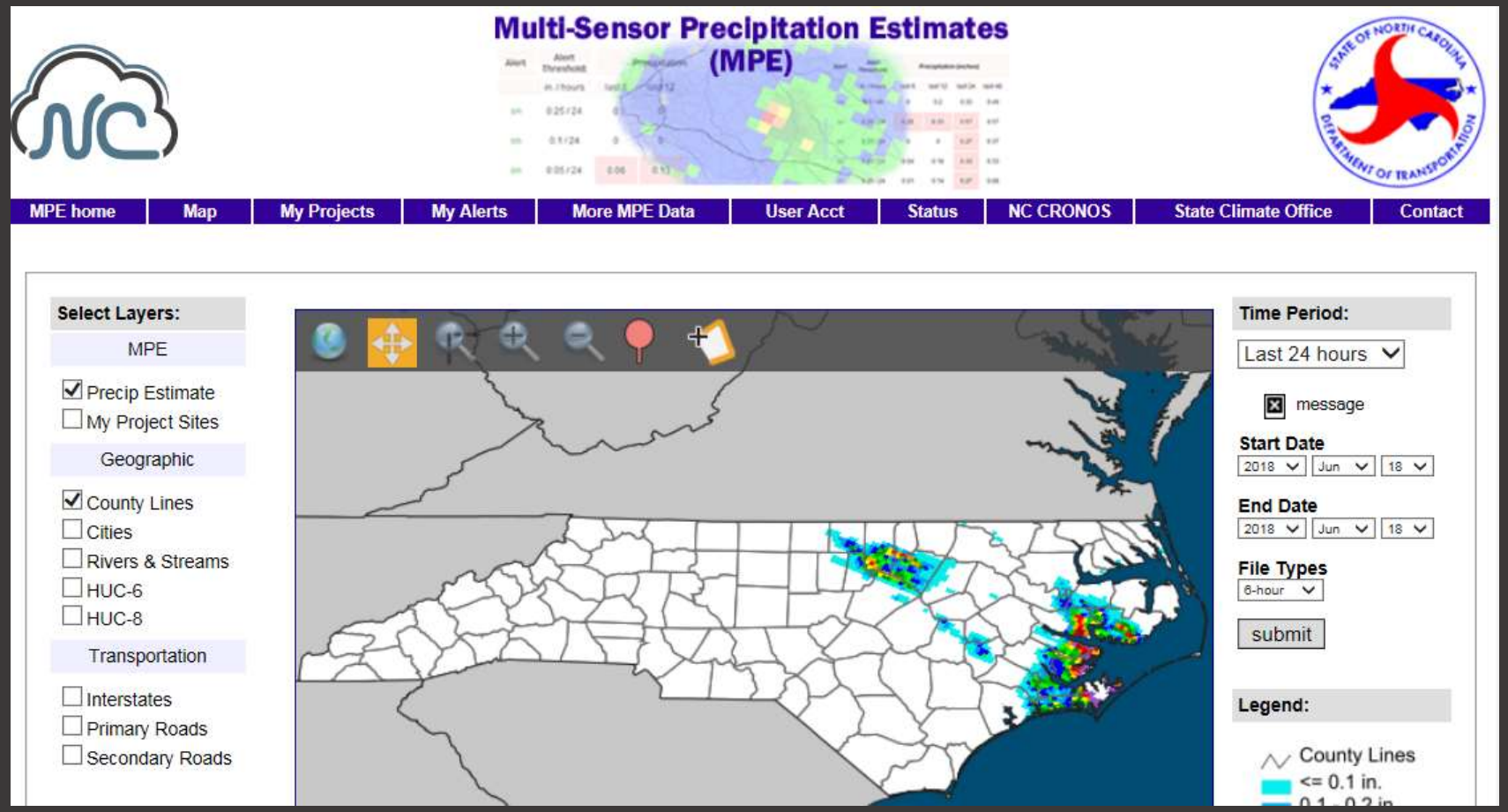
Edit Observations EOBS Back to Menu

on ID: List or SIG D5 Type: R Date: 07-JUL-18 Time: 13 Find Reset Save/Publish DIDM DIDX

Station ID	Obs Tm	Obs Type	W	Dry Tmp	RH	M L	HC Rsk	Wind Dir	Wind SP	10 Hr	Temp Max	Temp Min	RH% Max	RH% Min	Dur	Amt	Y L
311001	13	O	3	76	66		0	36	7		94	70	97	47	9	1.39	
312940	13	O	6	71	90		0	22	7		95	71	95	43	8	0.82	
317501	13	O	3	73	89		0	41	12		98	72	100	40	8	0.9	

Info: Observation successfully saved.[317501/07-Jul-18/13/O]

Free Online Precipitation Tool



- Sign In: Request a login required

https://climate.ncsu.edu/dot/

Free Online Precipitation Tool

RAWS STATIONS

Created by Carla Freeman on Jun 22,2018 1 people subscribed. This project is public. It can be seen by anyone using this website

unsubscribe from alerts modify project access rights [delete project] [edit project] [add site]	Lat, Lon	Last Alert:	Alert Switch	Alert Threshold:	Precipitation (in.) previous hours				Sums ending at	More Data
				in. / hours	6	12	24	48	(EST)	All Past Data
Finch	35.431051891532° N, -78.030493640493° E	Jul 7, 2:38pm	On	0.1" / 6h	0	0	0	0.99	Jul 8, 1pm	[past] [forecast]
Upper Coastal	35.891585839315° N, -77.681715915132° E	Jul 7, 2:38pm	On	0.1" / 6h	0	0	0.01	0.8	Jul 8, 1pm	[past] [forecast]
Warrenton	36.370845626683° N, -78.111546934361° E	Jul 7, 2:37am	On	0.1" / 6h	0	0	0	1.56	Jul 8, 1pm	[past] [forecast]

- Setup Project Files

https://climate.ncsu.edu/dot/

Free Online Precipitation Tool

Add a Site to a Project

You may use the map or TopoZone.com to help determine your specific latitude/longitude.

Select the project for this site: RAWS STATIONS or create a new project

Site Name:

Site Latitude: decimal degrees

Site Longitude: decimal degrees

Alert Threshold: >= 0.25 inches within 24 hours

Alert Status:
- (●) On
- ( ) Off

Alert Delivery:
- (●) Email
- ( ) Text message (Make sure your cell phone number is provided in the user profile.)
- ( ) Both

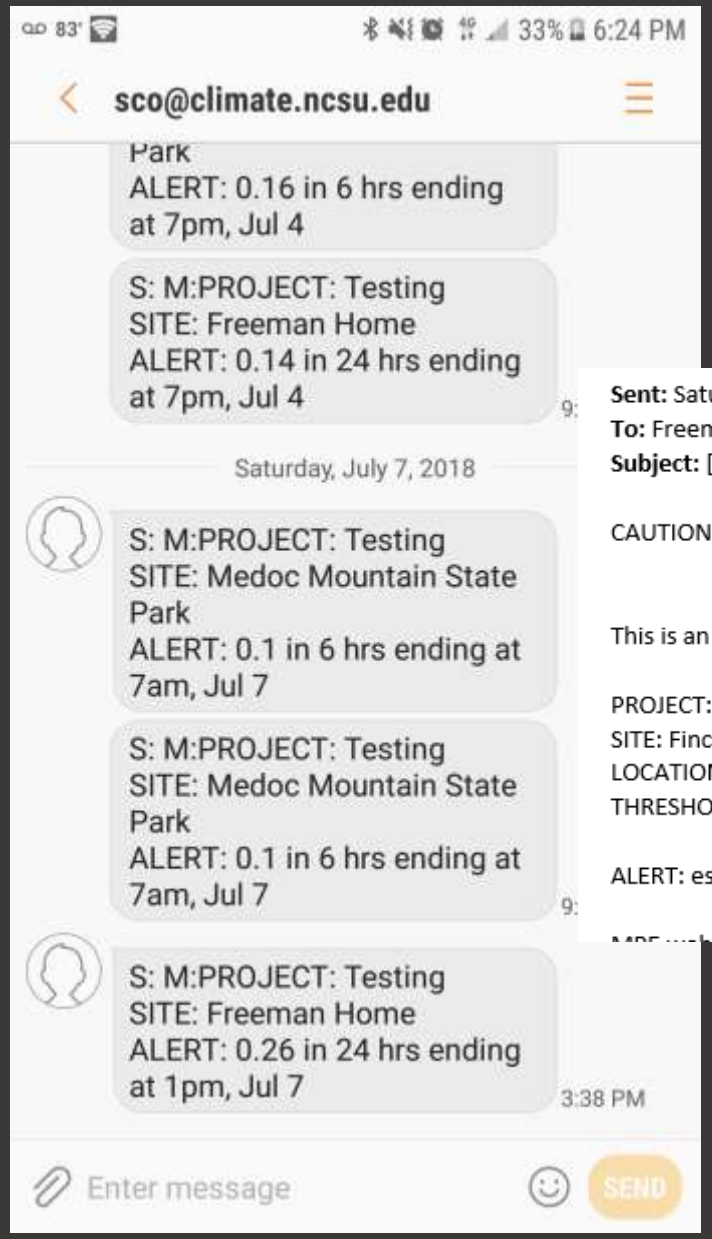
Delivery Frequency:
- (●) Anytime estimates are updated (up to 4 times per day)
- ( ) No more than once per day

Submit and go to My Projects | Submit and add another

- Add Sites

https://climate.ncsu.edu/dot/

Free Online Precipitation Tool



- Either get alerts by email and/or text

Sent: Saturday, July 7, 2018 3:37:52 AM
To: Freeman, Carla
Subject: [External] Precipitation ALERT for Finch - 0.84 inches within 6 hours

CAUTION: External email. Do not click links or open attachments unless verified. Send all suspicious email as an attachment to Report Spam.<mailto:report.spam@nc.gov>

This is an automatically generated precipitation alert message from the State Climate Office of North Carolina. This alert is for...

PROJECT: RAWS STATIONS
SITE: Finch
LOCATION: 35.431051891532, -78.030493640493
THRESHOLD: 0.1 inches within 6 hours

ALERT: estimated 0.84 inches during the previous 6 hours ending at 1am EST, Jul 7.

https://climate.ncsu.edu/dot/