HOBO Dissolved Oxygen Logger Overview

- Records **Dissolved Oxygen Concentration** and **Temperature**
- The DO Assistant in HOBOware Pro is used to get **Salinity-Adjusted DO Concentration** and **DO Percent Saturation**
- **Uses RDO Basic Sensor from In-Situ – Optical DO Sensor with easy-to-replace, 6-month sensor cap**
- Part of the HOBO water logger family: Optic USB interface & waterproof shuttle for reliable data offload in wet environments; HOBOware ease-of-use and data integration.
- Durable Delrin and PVC housing
- CE compliant
- Accuracy: 0.2 mg/L up to 8 mg/L; 0.5 mg/L from 8 to 20 mg/L
- 21,700 DO/temp measurements

Note: these stop recording temperature when the DO cap expires

DO Calibration

Lab Calibration - recommended after new DO sensor cap is installed

- 100% calibration with included calibration boot or in an air-saturated water bath; barometric pressure reading required.
- 0% calibration recommended if DO readings may be less than 4.0 mg/L. (use optional Sodium Sulfite solution)

DO Calibration

Field Calibration – use to compensate for fouling or to calibrate data instead of lab calibration…meh..

- Take precise readings at the start and end of each deployment – after stabilization
- Use both start & end points to compensate for fouling.
- A single-point calibration can be done with a reading from any time within the deployment.

Field Calibration Options

Field Meter/Sonde (Recommended) – Fastest method at around 5 minutes and logger can remain in the water

- Lake profiles – some RMN partners are using .25m profiles for QC

100% saturation method (Better than nothing) – useful if a field meter is not available

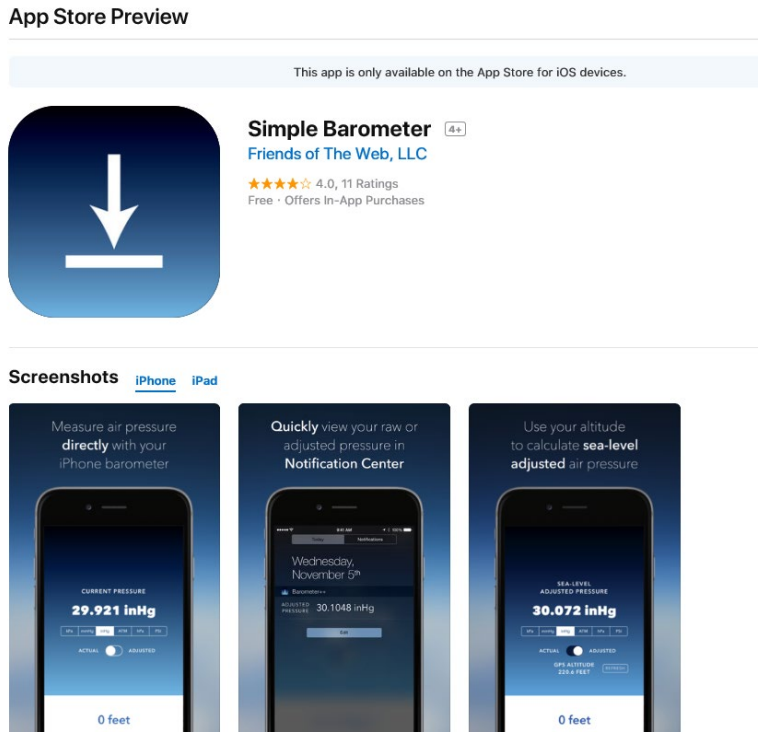
- Use Calibration Boot with freshwater for sponge.
- Allow time for air in boot to reach saturation and for logger to reach temperature equilibrium with surrounding air (time depends on temperature difference from where it was)
- Requires barometric pressure – use meter, U20 Water Level logger, or nearby weather station.

DO Calibration tips from VT DEC

Yeast method (an alternative to sodium sulfite solution)

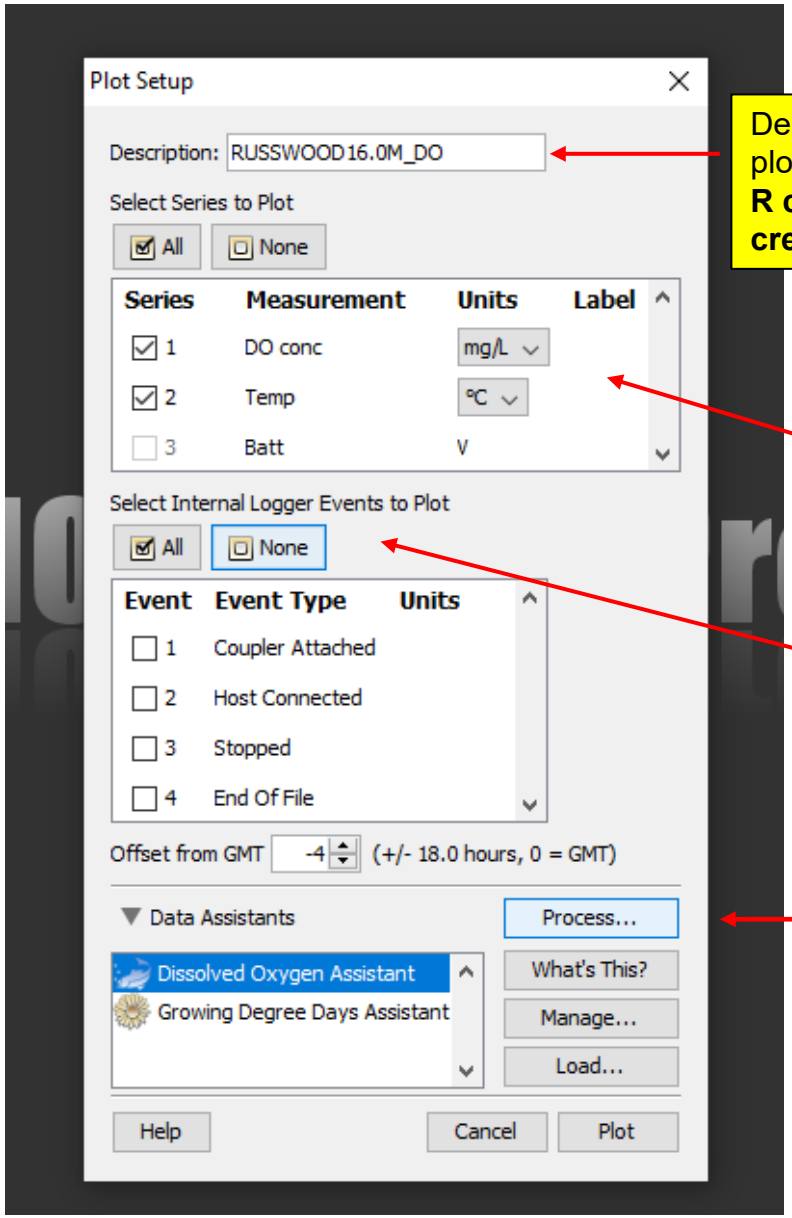
https://in-situ.com/wp-content/uploads/2015/01/RDO-Sensor-Two-Point-Dissolved-Oxygen-Calibration-Using-Yeast-Tech-Note.pdf

Free barometer apps for smartphones may be helpful for on-site calibratation of DO sensors.



Screenshots of data processing in HOBOware

Open the water sensor DO file



Description: whatever is entered here becomes the Plot title but the R code doesn't pay attention to the plot title so you should be able to leave this as is. What's key is getting the file name correct because t**he R code reads the first part of the file name (whatever comes before the first underscore) and creates a SiteID column based on that.**

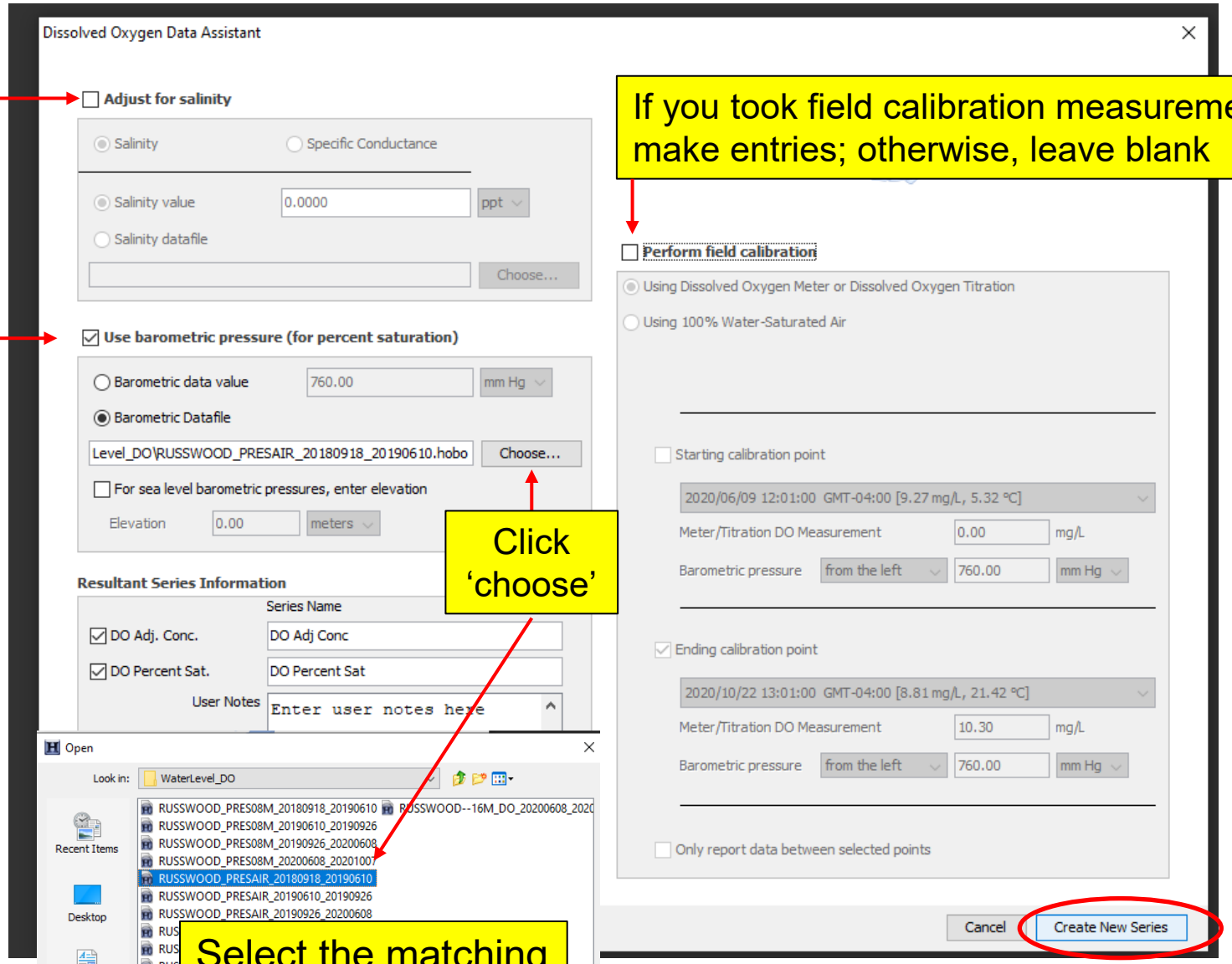
Set **Units** –
- mg/L for DO
- °C for Temp

Select **'None',** if necessary, to clear all checkboxes

Click **'Process'**

Uncheck this box if in a freshwater system

Check this box if barometric pressure from on-land (air) sensor is available and match with the appropriate file



Click 'choose'

Select the matching air sensor file

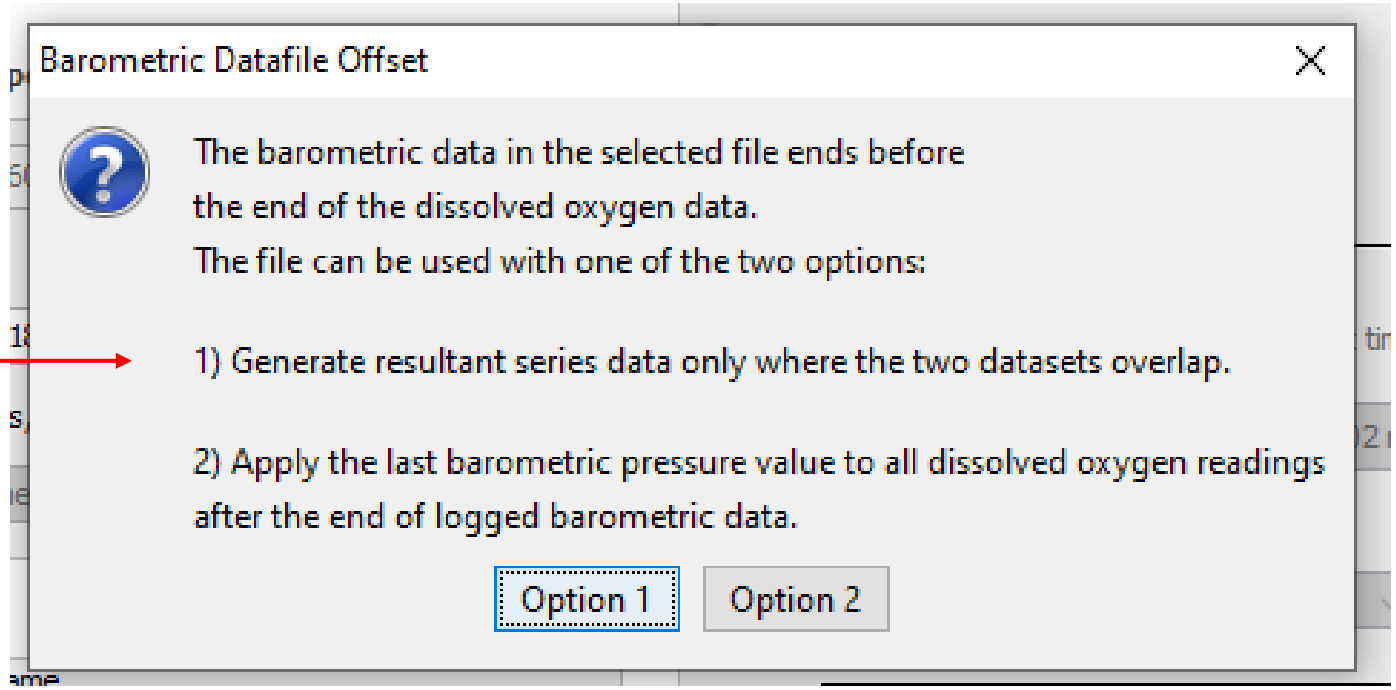
If you took field calibration measurements, make entries; otherwise, leave blank

Create New Series

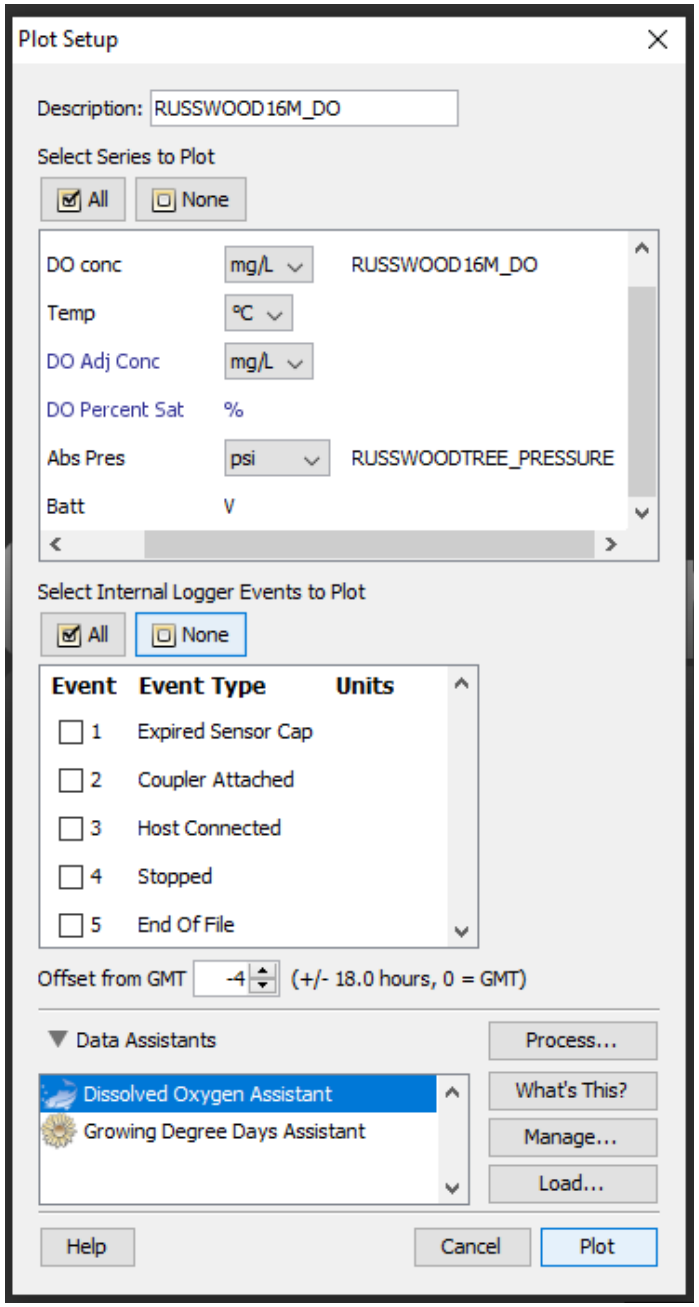
If the date/times don’t match exactly across the two files, you’ll see a box like this…

For our purposes

Select Option 1– compensate for the data only where the two datasets overlap, interpolating between points that do not exactly align.



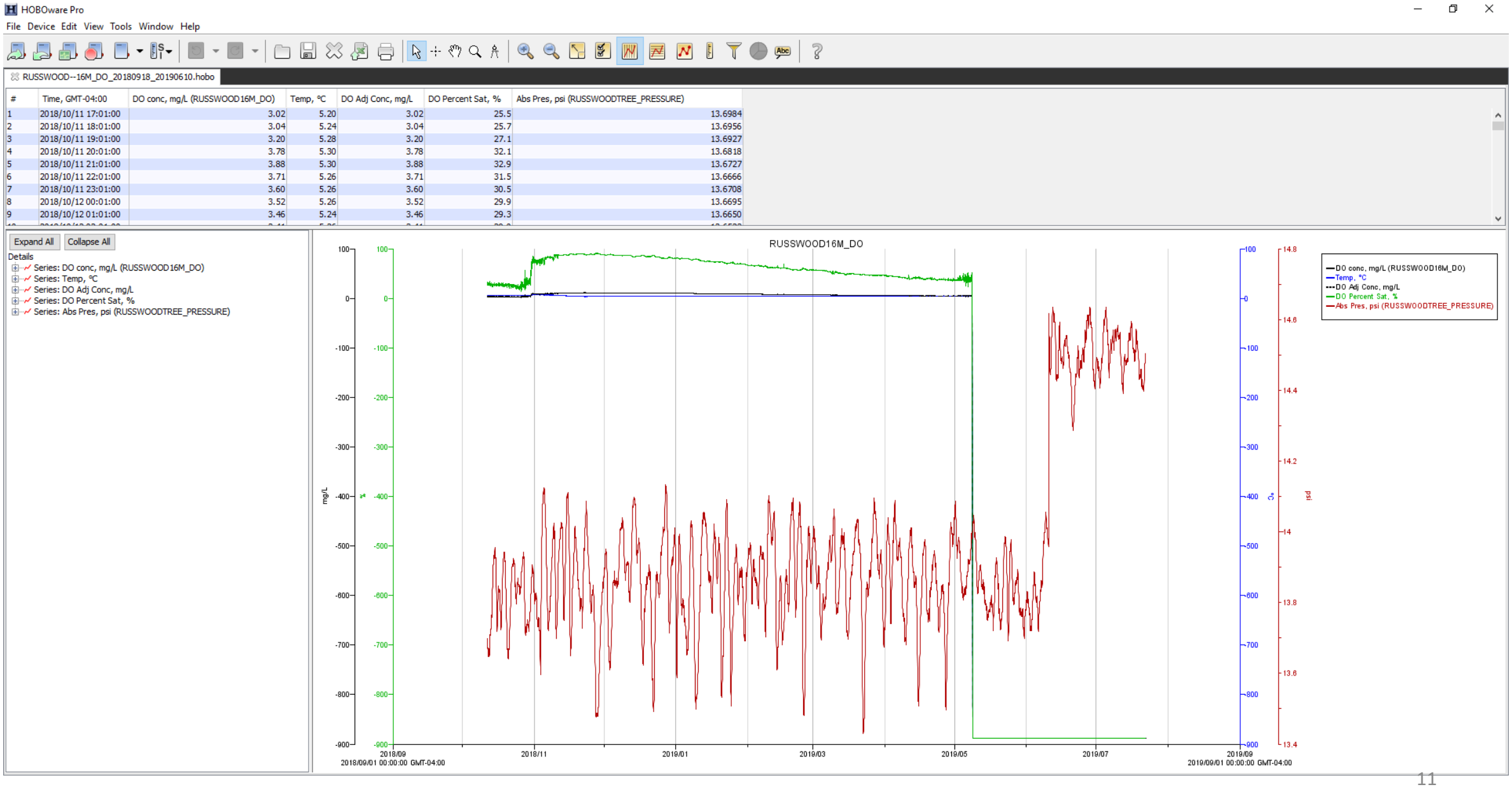
This screen will then appear



DO Adj Conc and DO Percent Sat have been added

Click ‘Plot’

A time series plot will then appear



Crop the time series if needed
(if the DO sensor cap expired, values change to -888)

HOBOware Pro

File Device Edit View Tools Window Help

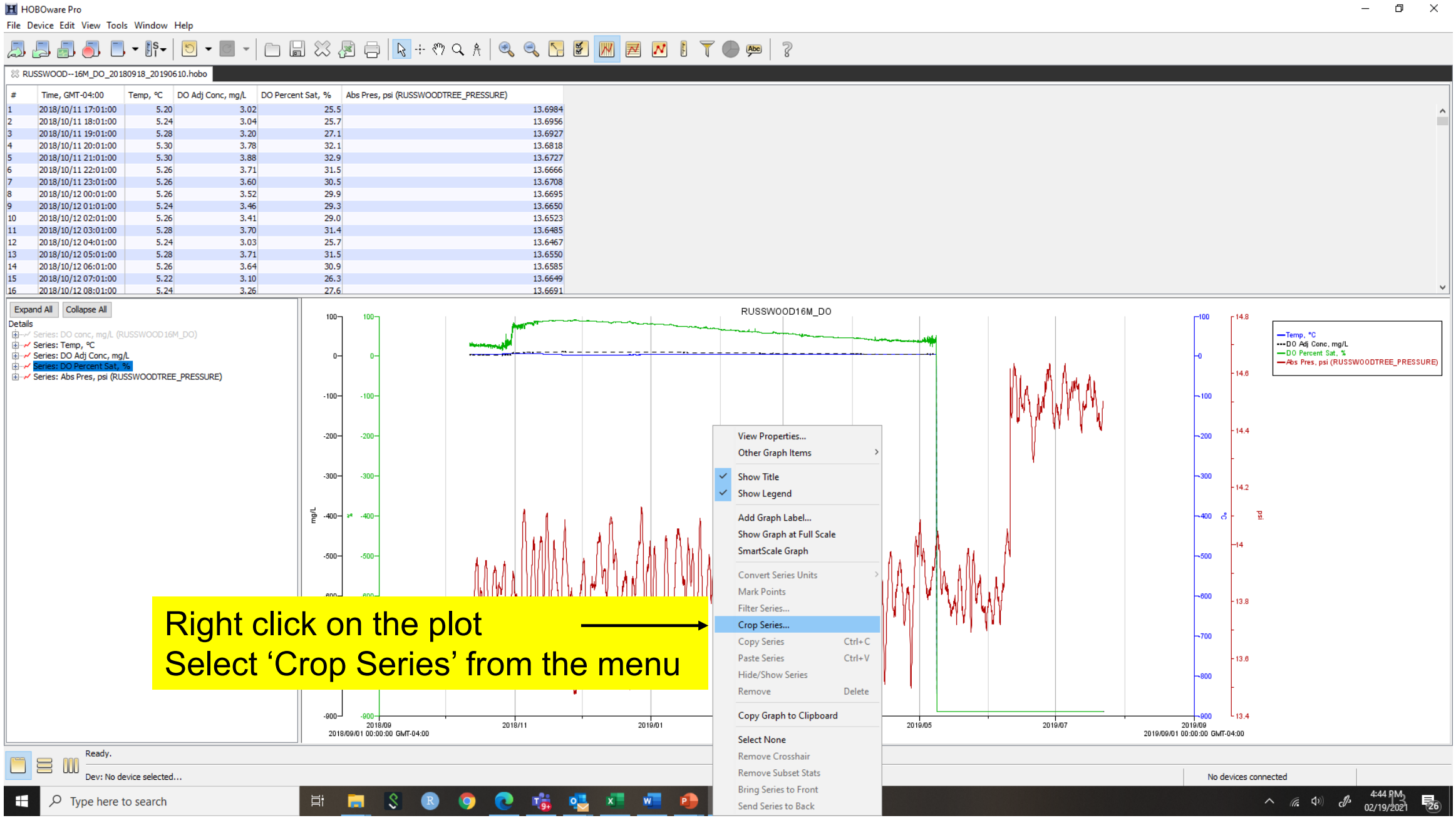
RUSSWOOD--16M_DO_20180918_20190610.hobo | RUSSWOOD_PRESAIR_20180918_20190610.hobo | RUSSWOOD--16M_DO_20180918_20190610.hobo

#	Time, GMT-04:00	DO conc, mg/L (RUSSWOOD16M_DO)	Temp, °F	Expired Sensor Cap	Coupler Attached	Host Connected	Stopped	End Of File
5006	2019/05/08 06:01:00	4.49	39.13					
5007	2019/05/08 07:01:00	4.43	39.13					
5008	2019/05/08 08:01:00	5.51	39.09					
5009	2019/05/08 09:01:00	5.38	39.06					
5010	2019/05/08 10:01:00	5.22	39.06					
5011	2019/05/08 11:01:00	4.31	39.13					
5012	2019/05/08 12:01:00	5.68	38.98					
5013	2019/05/08 13:01:00	6.36	38.95					
5014	2019/05/08 14:01:00	3.94	39.20					
5015	2019/05/08 15:01:00	5.83	39.06					
5016	2019/05/08 16:01:00	6.53	38.95					
5017	2019/05/08 17:01:00	5.45	39.02					
5018	2019/05/08 18:01:00	6.12	39.02					
5019	2019/05/08 19:01:00	-888.88	-888.88	Logged				
5020	2019/05/08 20:01:00	-888.88	-888.88					
5021	2019/05/08 21:01:00	-888.88	-888.88					
5022	2019/05/08 22:01:00	-888.88	-888.88					
5023	2019/05/08 23:01:00	-888.88	-888.88					
5024	2019/05/09 00:01:00	-888.88	-888.88					

DO sensor cap expired

Values changed to -888

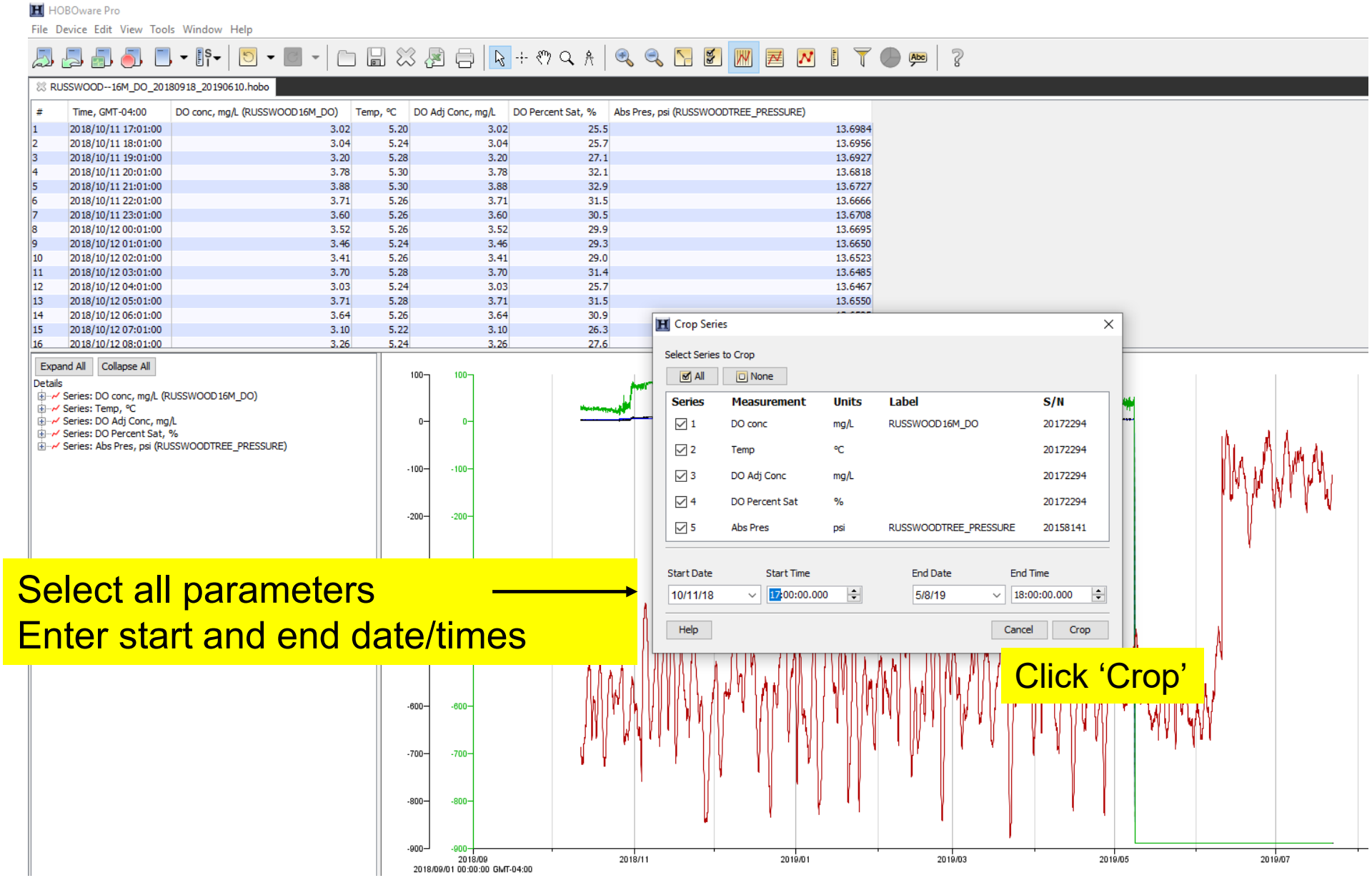
Crop the time series to remove the expired sensor cap -888.88 values



#	Time, GMT-04:00	Temp, °C	DO Adj Conc, mg/L	DO Percent Sat, %	Abs Pres, psi (RUSSWOODTREE_PRESSURE)
1	2018/10/11 17:01:00	5.20	3.02	25.5	13.6984
2	2018/10/11 18:01:00	5.24	3.04	25.7	13.6956
3	2018/10/11 19:01:00	5.28	3.20	27.1	13.6927
4	2018/10/11 20:01:00	5.30	3.78	32.1	13.6818
5	2018/10/11 21:01:00	5.30	3.88	32.9	13.6727
6	2018/10/11 22:01:00	5.26	3.71	31.5	13.6666
7	2018/10/11 23:01:00	5.26	3.60	30.5	13.6708
8	2018/10/12 00:01:00	5.26	3.52	29.9	13.6695
9	2018/10/12 01:01:00	5.24	3.46	29.3	13.6650
10	2018/10/12 02:01:00	5.26	3.41	29.0	13.6523
11	2018/10/12 03:01:00	5.28	3.70	31.4	13.6485
12	2018/10/12 04:01:00	5.24	3.03	25.7	13.6467
13	2018/10/12 05:01:00	5.28	3.71	31.5	13.6550
14	2018/10/12 06:01:00	5.26	3.64	30.9	13.6585
15	2018/10/12 07:01:00	5.22	3.10	26.3	13.6649
16	2018/10/12 08:01:00	5.24	3.26	27.6	13.6691

Right click on the plot
Select ‘Crop Series’ from the menu

Crop the time series

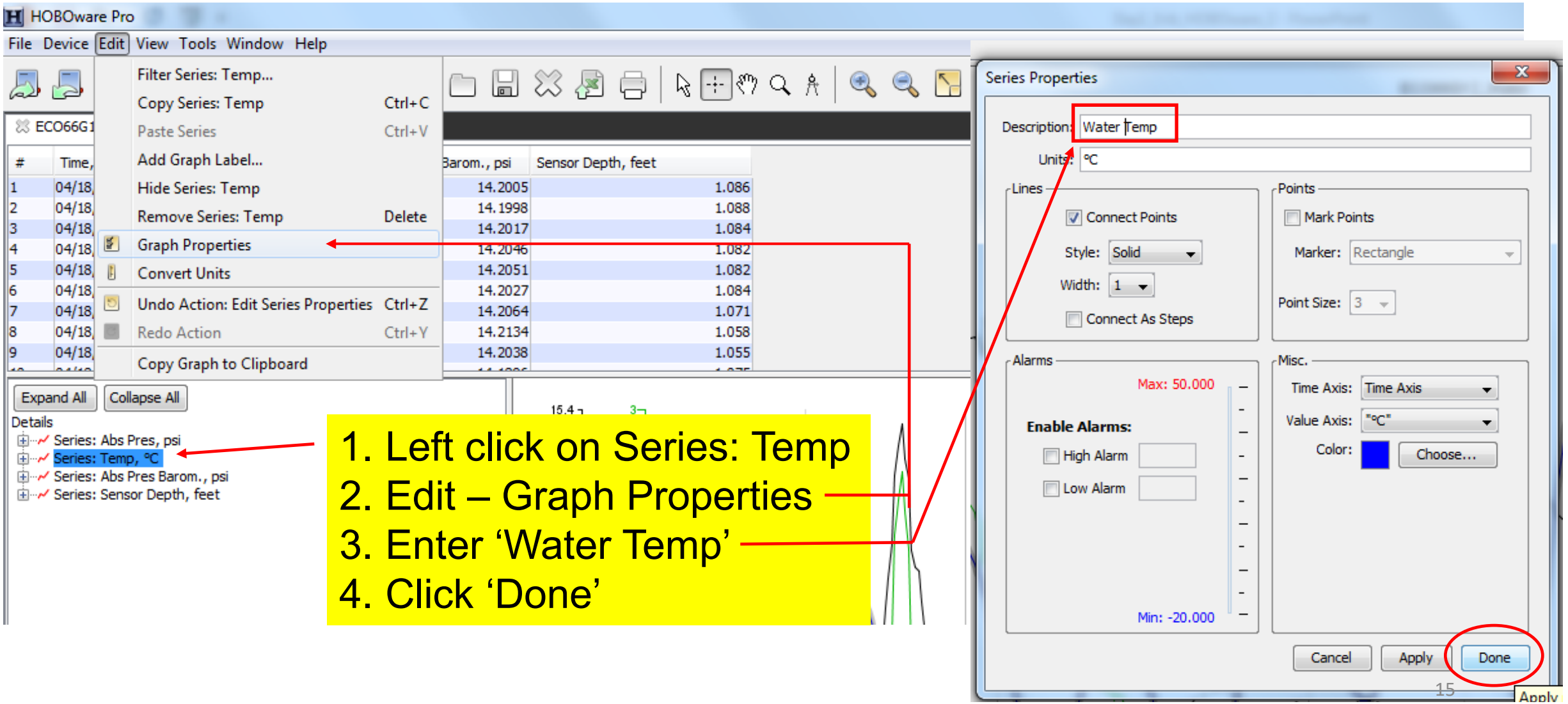


#	Time, GMT-04:00	DO conc, mg/L (RUSSWOOD16M_DO)	Temp, °C	DO Adj Conc, mg/L	DO Percent Sat, %	Abs Pres, psi (RUSSWOODTREE_PRESSURE)
1	2018/10/11 17:01:00	3.02	5.20	3.02	25.5	13.6984
2	2018/10/11 18:01:00	3.04	5.24	3.04	25.7	13.6956
3	2018/10/11 19:01:00	3.20	5.28	3.20	27.1	13.6927
4	2018/10/11 20:01:00	3.78	5.30	3.78	32.1	13.6818
5	2018/10/11 21:01:00	3.88	5.30	3.88	32.9	13.6727
6	2018/10/11 22:01:00	3.71	5.26	3.71	31.5	13.6666
7	2018/10/11 23:01:00	3.60	5.26	3.60	30.5	13.6708
8	2018/10/12 00:01:00	3.52	5.26	3.52	29.9	13.6695
9	2018/10/12 01:01:00	3.46	5.24	3.46	29.3	13.6650
10	2018/10/12 02:01:00	3.41	5.26	3.41	29.0	13.6523
11	2018/10/12 03:01:00	3.70	5.28	3.70	31.4	13.6485
12	2018/10/12 04:01:00	3.03	5.24	3.03	25.7	13.6467
13	2018/10/12 05:01:00	3.71	5.28	3.71	31.5	13.6550
14	2018/10/12 06:01:00	3.64	5.26	3.64	30.9	
15	2018/10/12 07:01:00	3.10	5.22	3.10	26.3	
16	2018/10/12 08:01:00	3.26	5.24	3.26	27.6	

Select all parameters
Enter start and end date/times

Click ‘Crop’

Change the Temp series name to ‘Water Temp’



Examine the data

Check for correspondence between turnover signals in the water temp vs DO data

HOBOware Pro

File Device Edit View Tools Window Help

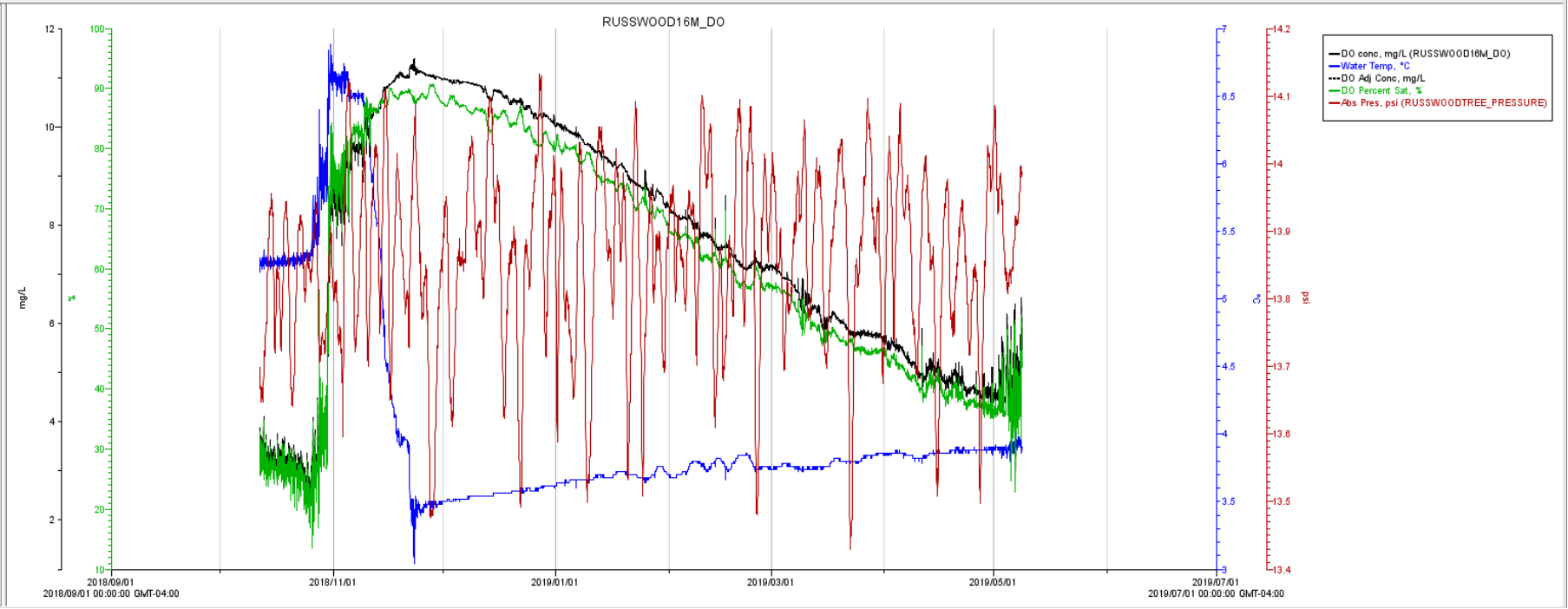
RUSSWOOD--16M_DO_20180918_20190610.hobo

#	Time, GMT-04:00	DO conc, mg/L (RUSSWOOD16M_DO)	Water Temp, °C	DO Adj Conc, mg/L	DO Percent Sat, %	Abs Pres, psi (RUSSWOODTREE_PRESSURE)
1	2018/10/11 17:01:00	3.02	5.20	3.02	25.5	13.6984
2	2018/10/11 18:01:00	3.04	5.24	3.04	25.7	13.6956
3	2018/10/11 19:01:00	3.20	5.28	3.20	27.1	13.6927
4	2018/10/11 20:01:00	3.78	5.30	3.78	32.1	13.6818
5	2018/10/11 21:01:00	3.88	5.30	3.88	32.9	13.6727
6	2018/10/11 22:01:00	3.71	5.26	3.71	31.5	13.6666
7	2018/10/11 23:01:00	3.60	5.26	3.60	30.5	13.6708
8	2018/10/12 00:01:00	3.52	5.26	3.52	29.9	13.6695
9	2018/10/12 01:01:00	3.46	5.24	3.46	29.3	13.6650
10	2018/10/12 02:01:00	3.41	5.26	3.41	29.0	13.6523
11	2018/10/12 03:01:00	3.70	5.28	3.70	31.4	13.6485
12	2018/10/12 04:01:00	3.03	5.24	3.03	25.7	13.6467
13	2018/10/12 05:01:00	3.71	5.28	3.71	31.5	13.6550
14	2018/10/12 06:01:00	3.64	5.26	3.64	30.9	13.6585
15	2018/10/12 07:01:00	3.10	5.22	3.10	26.3	13.6649
16	2018/10/12 08:01:00	3.26	5.24	3.26	27.6	13.6691

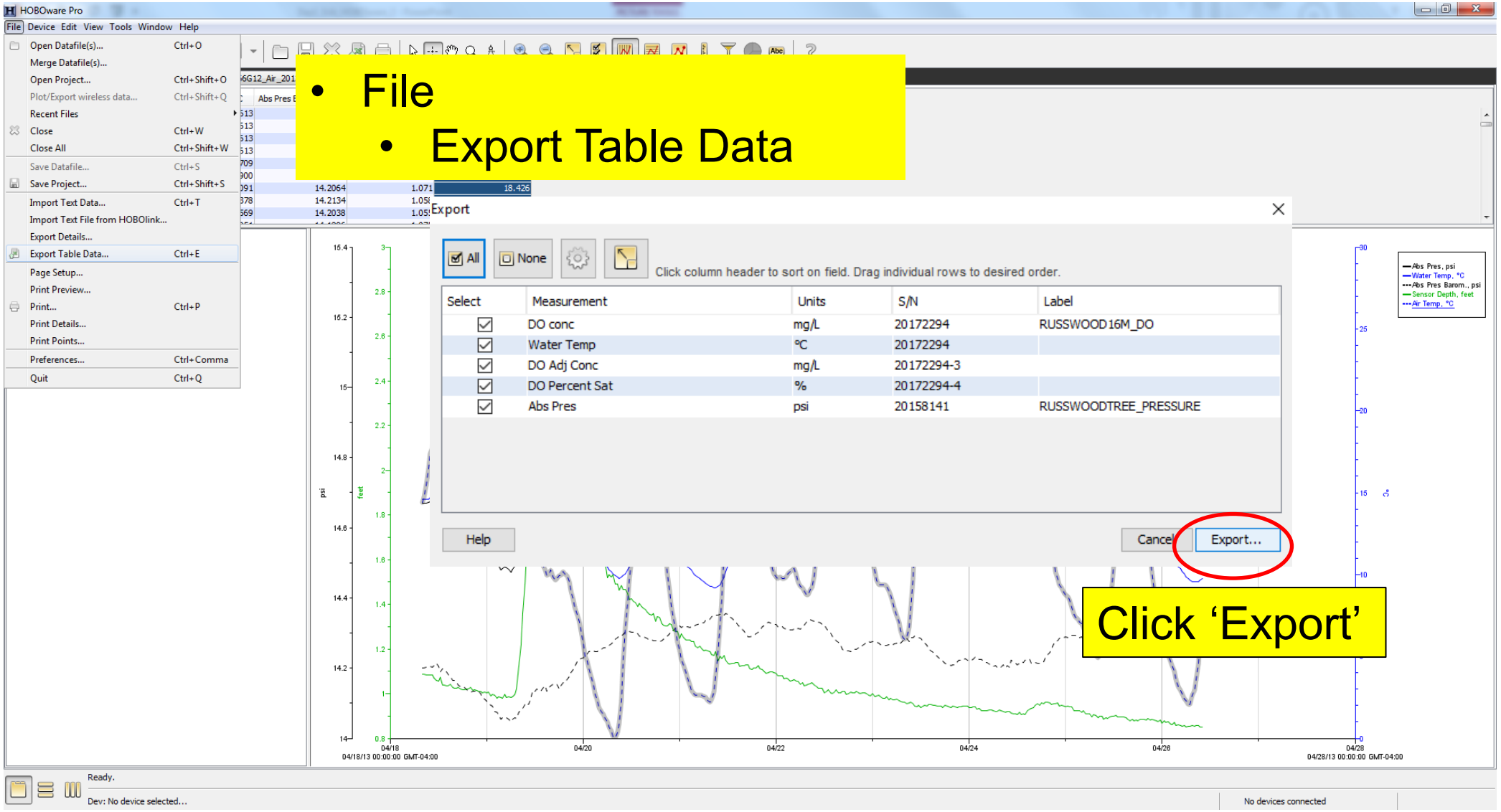
Expand All | Collapse All

Details

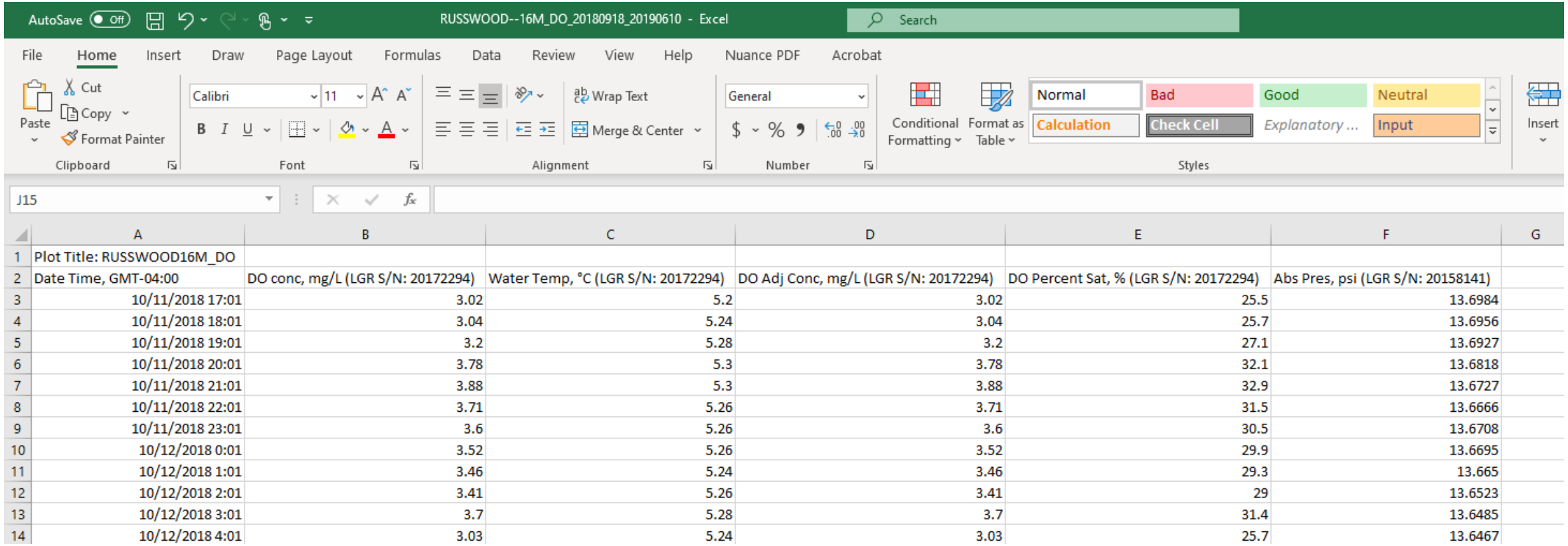
- Series: DO conc, mg/L (RUSSWOOD16M_DO)
- Series: Water Temp, °C
- Series: DO Adj Conc, mg/L
- Series: DO Percent Sat, %
- Series: Abs Pres, psi (RUSSWOODTREE_PRESSURE)



Now you're ready to export the .csv file



Save the .csv file in the Data0_Original folder.
The file should look like this…



	A	B	C	D	E	F	G
1	Plot Title: RUSSWOOD16M_DO						
2	Date Time, GMT-04:00	DO conc, mg/L (LGR S/N: 20172294)	Water Temp, °C (LGR S/N: 20172294)	DO Adj Conc, mg/L (LGR S/N: 20172294)	DO Percent Sat, % (LGR S/N: 20172294)	Abs Pres, psi (LGR S/N: 20158141)	
3	10/11/2018 17:01	3.02	5.2	3.02	25.5	13.6984	
4	10/11/2018 18:01	3.04	5.24	3.04	25.7	13.6956	
5	10/11/2018 19:01	3.2	5.28	3.2	27.1	13.6927	
6	10/11/2018 20:01	3.78	5.3	3.78	32.1	13.6818	
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9	10/11/2018 23:01	3.6	5.26	3.6	30.5	13.6708	
10	10/12/2018 0:01	3.52	5.26	3.52	29.9	13.6695	
11	10/12/2018 1:01	3.46	5.24	3.46	29.3	13.665	
12	10/12/2018 2:01	3.41	5.26	3.41	29	13.6523	
13	10/12/2018 3:01	3.7	5.28	3.7	31.4	13.6485	
14	10/12/2018 4:01	3.03	5.24	3.03	25.7	13.6467	