

ProUCL Utilization 2020

BTVs and UCLs

Presenters:

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Summary of Session 1: ProUCL A to Z

- Objective:
 - Get familiar with ProUCL and some commonly used data analysis features
- We talked about:
 - Starting ProUCL
 - Preparing data for analysis and loading in ProUCL
 - Basics of dealing with missing values and NDs
 - Exploratory Data Analysis
 - Outliers
 - Hypothesis testing



Learning Objectives

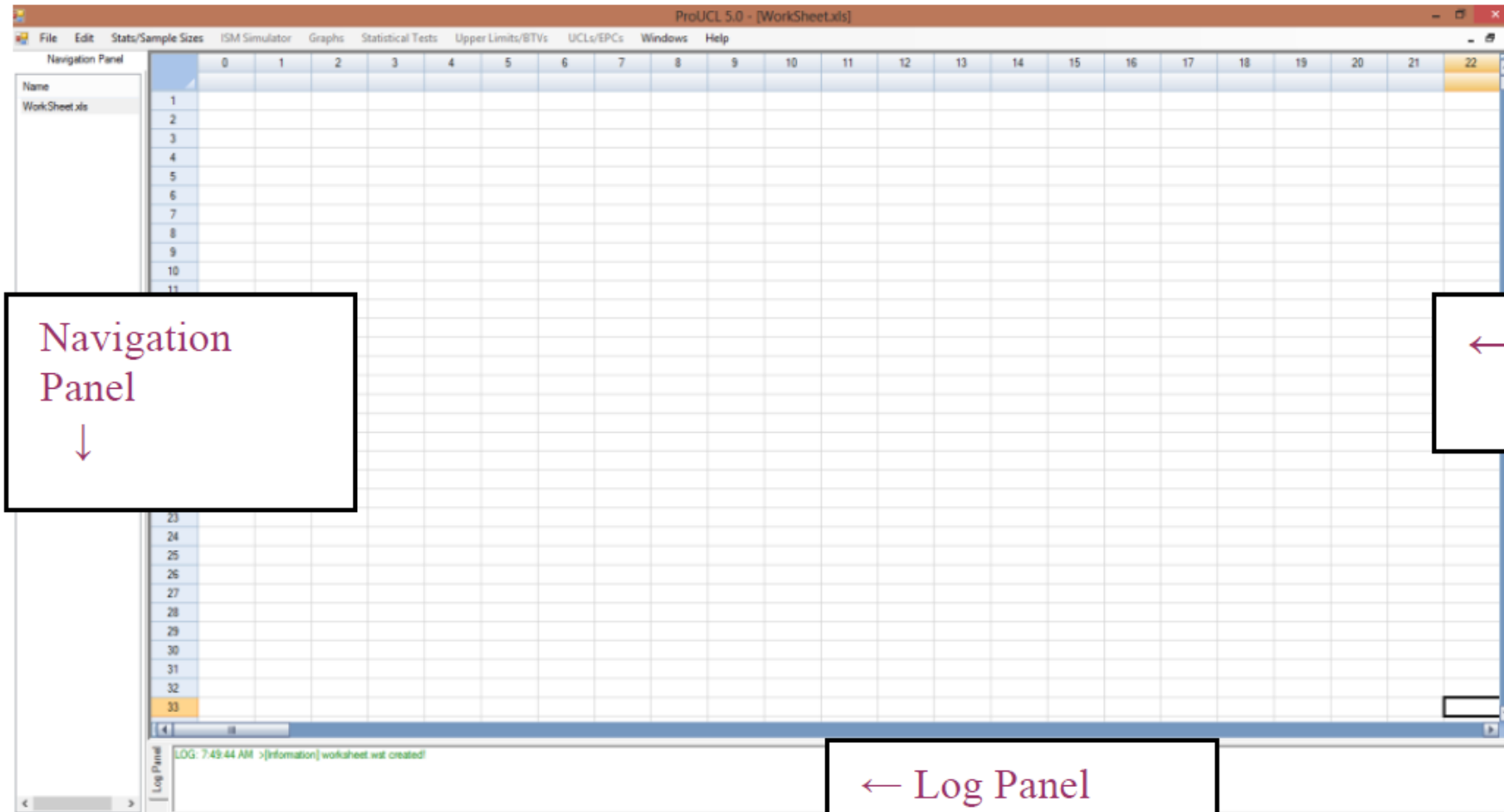
- Objectives
 - Dive into Background threshold values and UCLs within ProUCL
- Today we will discuss:
 - Background threshold values/Upper Tolerance Limits (UTLs)
 - Upper confidence limits (UCLs)



ProUCL Software

- Statistical software for environmental data analysis
- User Guide
 - Provides instructions on how to use ProUCL
- Technical Guide
 - Provides detailed background on statistical methods

Navigating ProUCL



Navigation
Panel
↓

← Main
Window

← Log Panel

Data Sets

- Superfund.xls
 - In ProUCL Data folder
- TCE-NDs-Blanks-data.xls
 - In ProUCL Data folder

Coverage vs Confidence

- Confidence : We believe an something will occur 95% of the time.
- Coverage : We believe that 95% of our future samples will be below our value
- Combined UTL95-95 : We believe that 95% of all future samples will be below our value, 95% of the time.

Background Threshold Values

- Upper percentiles
- Upper prediction limits (UPLs)
- Upper tolerance limits (UTLs)
- Upper Simultaneous Limits (USLs) – New in ProUCL 5.0/ProUCL 5.1

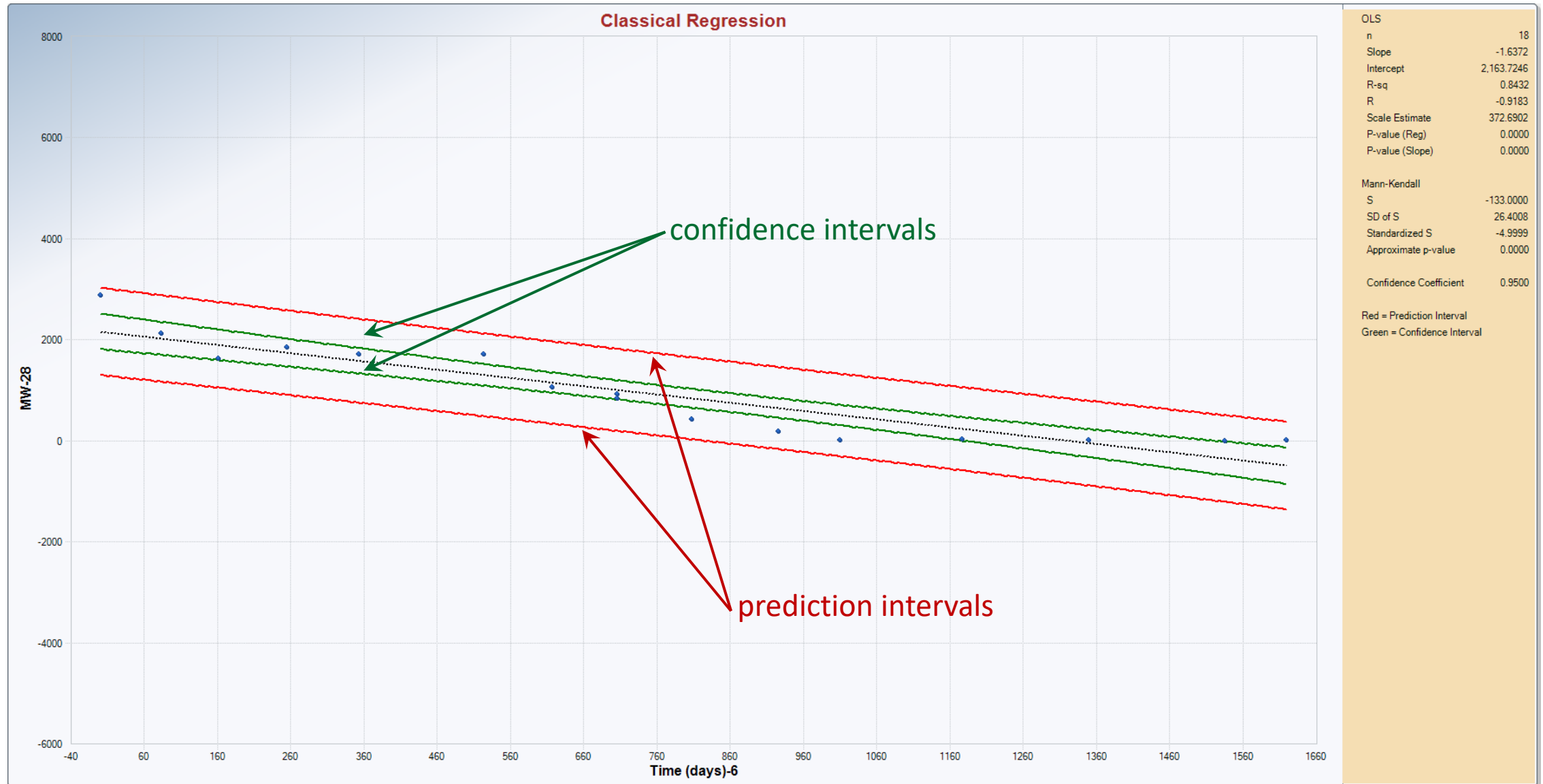
Background Threshold Values

- **Upper percentiles**
 - Upper prediction limits (UPLs)
 - Upper tolerance limits (UTLs)
 - Upper Simultaneous Limits (USLs) – New in ProUCL 5.0/ProUCL 5.1
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- Based upon an established background data set, a 95th percentile represents that statistic such that 95% of sampled data will be less than or equal to the value of the 95th percentile.

Background Threshold Values

- Upper percentiles
 - Upper prediction limits (UPLs)
 - Upper tolerance limits (UTLs)
 - Upper Simultaneous Limits (USLs) – New in ProUCL 5.0/ProUCL 5.1
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- 95% UPL is the value such that we are 95% sure that a single sample from an established population will fall below it.

UPLs and UCLs



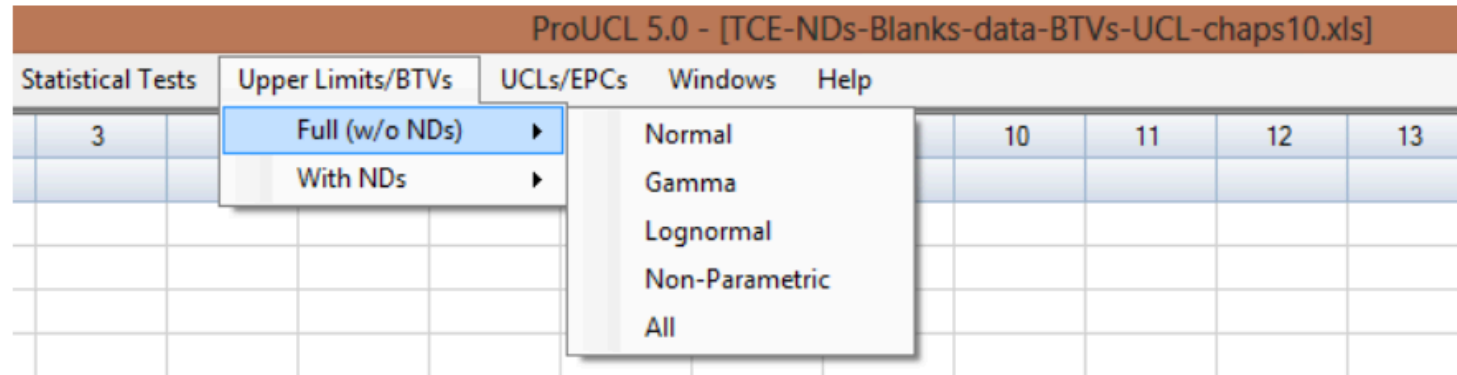
Background Threshold Values

- Upper percentiles
 - Upper prediction limits (UPLs)
 - **Upper tolerance limits (UTLs)**
 - Upper Simultaneous Limits (USLs) – New in ProUCL 5.0/ProUCL 5.1
-
- UTL95-95 is the value such that 95% of recorded samples will fall below it 95% of the time.

Background Threshold Values

- Upper percentiles
 - Upper prediction limits (UPLs)
 - Upper tolerance limits (UTLs)
 - **Upper Simultaneous Limits (USLs) – New in ProUCL 5.0/ProUCL 5.1**
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- USL95 is the value such that ALL sample values fall below it with 95% confidence.

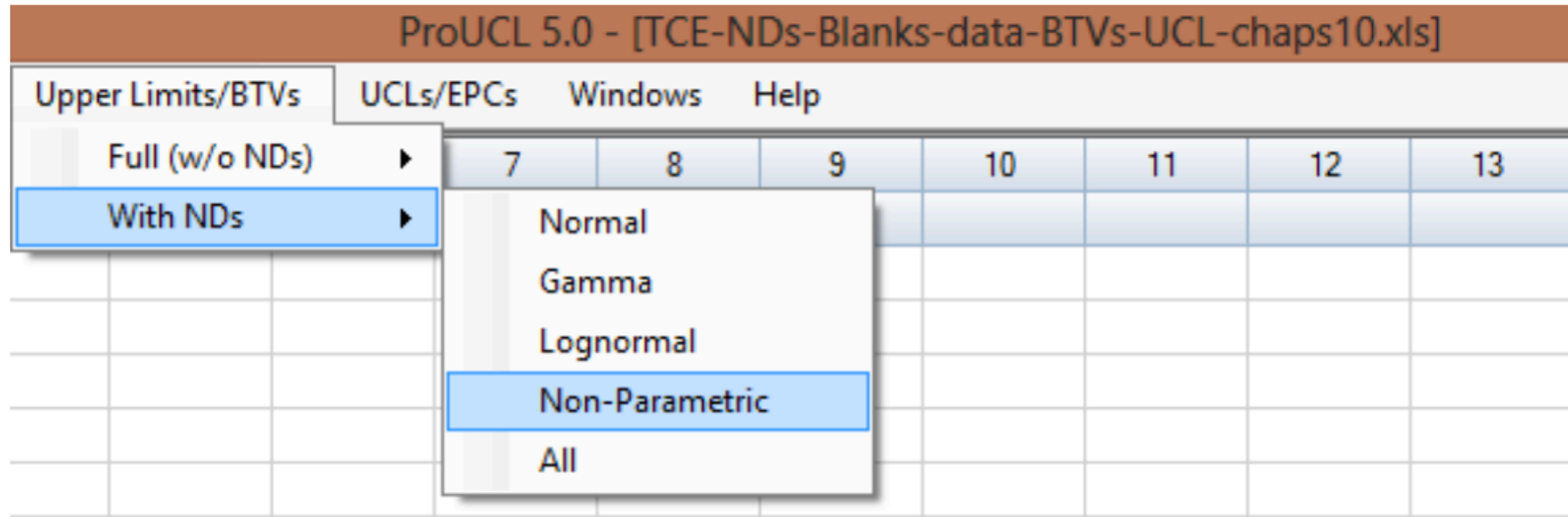
1. Click **Upper Limits/BTVs** ► **Full (w/o NDs)**



UTLs Without NDs

- Options for Normal, Gamma, and Non-parametric
- Represent not to exceed background values
- Can compute for next K observations
- Bare minimum 6 background samples

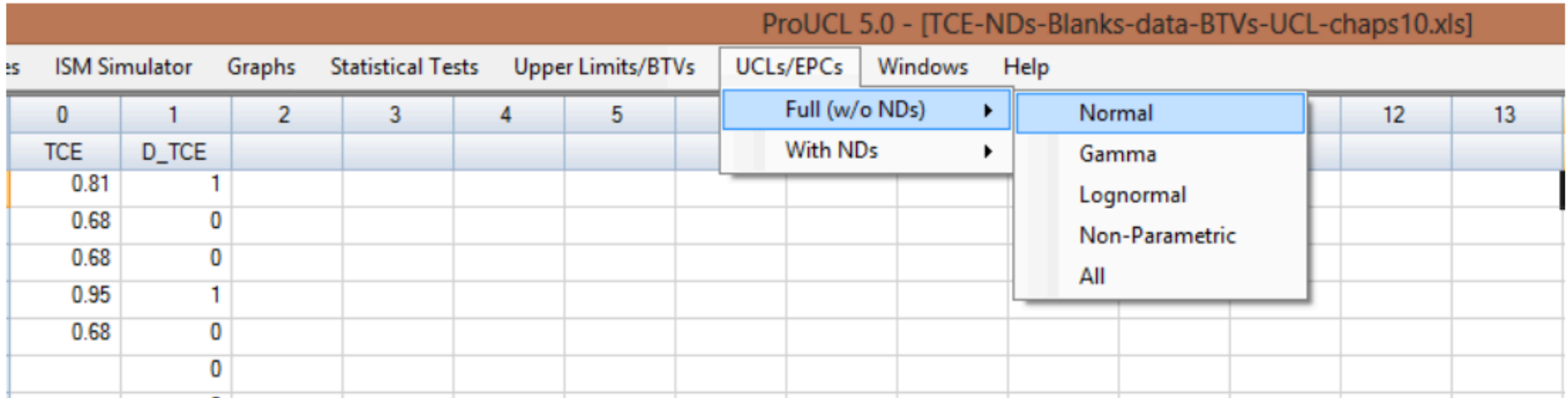
1. Click **Upper Limits/BTVs** ► **With NDs** ► **Non-Parametric**



UTLs with NDs

- Options for Normal, Gamma, and Non-parametric
- Represent not to exceed background values
- Can compute for next K observations
- Bare minimum 6 background samples

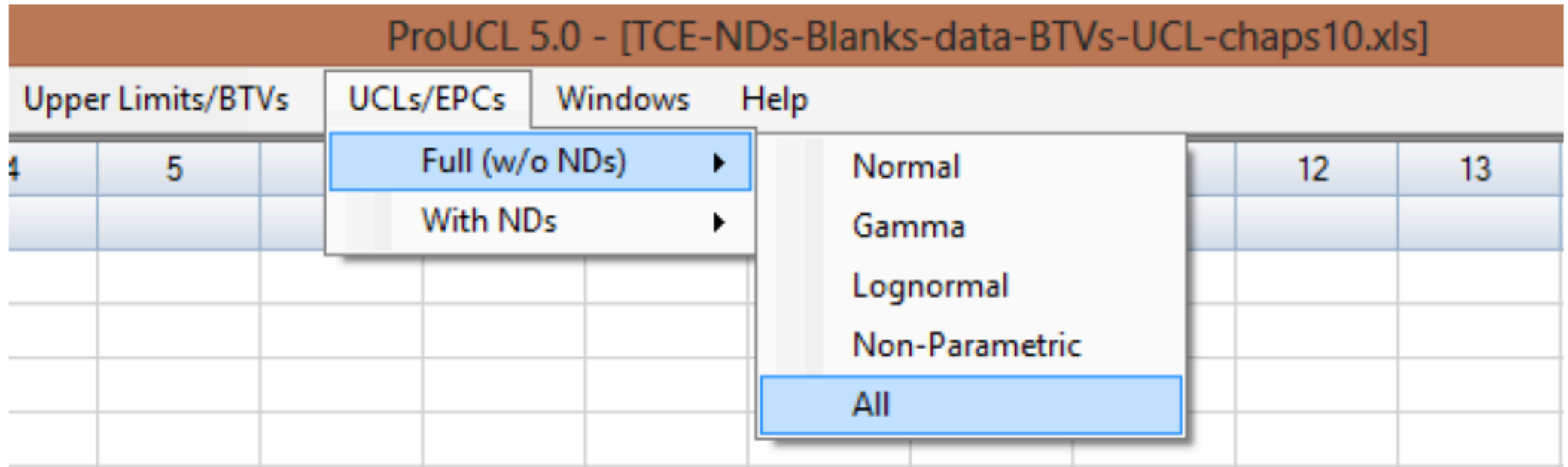
Click **UCLs/EPCs** ► **Full (w/o NDs)** ► **Normal**



UCLs without NDs

- Options for Normal, Gamma, and Non-parametric
- Represent upper estimate of the mean
- Minimum 8 samples for parametric
- Minimum 14 samples for non-parametric

1. Click **UCLs/EPCs** ► **Full (w/o NDs)** ► **Gamma, Lognormal, Non-Parametric, or All**



UCLs with NDs

- Options for Normal, Gamma, and Non-parametric
- Represent upper estimate of the mean
- Minimum 8 Detects for parametric
- Minimum 14 Detects for non-parametric

Limits summary

Limit	Meaning
95% - UCL	Mean of sample set falls below UCL 95% of the time
95% - UTL	95th percentile of sample data falls below UTL 95% of the time
95% - UPL	Next observed point falls below UPL 95% of the time
95% - USL	All values in sample data fall below USL 95% of the time

Final remarks

- Consider which BTV make sense for your site
- Consider the benefits of different limit generating methodology
- Double check your sample size
- When in doubt consult statistician
- Document any analysis steps and decisions made



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