# Data Logger Program: Continuous Water Quality Monitoring

Kiski-Conemaugh Stream Team

Conemaugh Valley Conservancy

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# Project Objectives

- Establish an efficient, continuous Water Quality Monitoring Network throughout Kiski-Conemaugh River Basin and other partnering watersheds.
- Monitor conductivity trends in streams to assess historic pollutants, detect new pollutants and acquire baseline water quality.
- Empower watershed groups with advanced technology to produce more accurate data collection with less effort.
- Guide future restoration work.
- Monitor Cold Water Fisheries

# How are we obtaining these objectives?

- Continuous recording Data Loggers
  - Solinst Level Logger LTC Jr.
- Strategic placement of loggers in areas of known disturbance and areas of future disturbance
- Decreasing the number of volunteers necessary to monitor streams 24/7
- Decreasing hours and cost of monitoring

# Project Funding

- Pilot project in Somerset County funded primarily by conservation organizations
- Expanded program funded largely by Colcom Foundation
- Trainings and technical support funded primarily through C-SAW

# Partners/Contributors

- Colcom Foundation
- C-SAW
- Laurel Highlands Coalition:
  - Loyalhanna Watershed Association
  - Conemaugh Valley Conservancy
  - Mountain Watershed Association
  - Somerset Conservation District
  - Jacobs Creek Watershed Association
  - Powdermill Nature Reserve
- USGS
- West Virginia University Water Research Institute

# The Loggers

# Installations

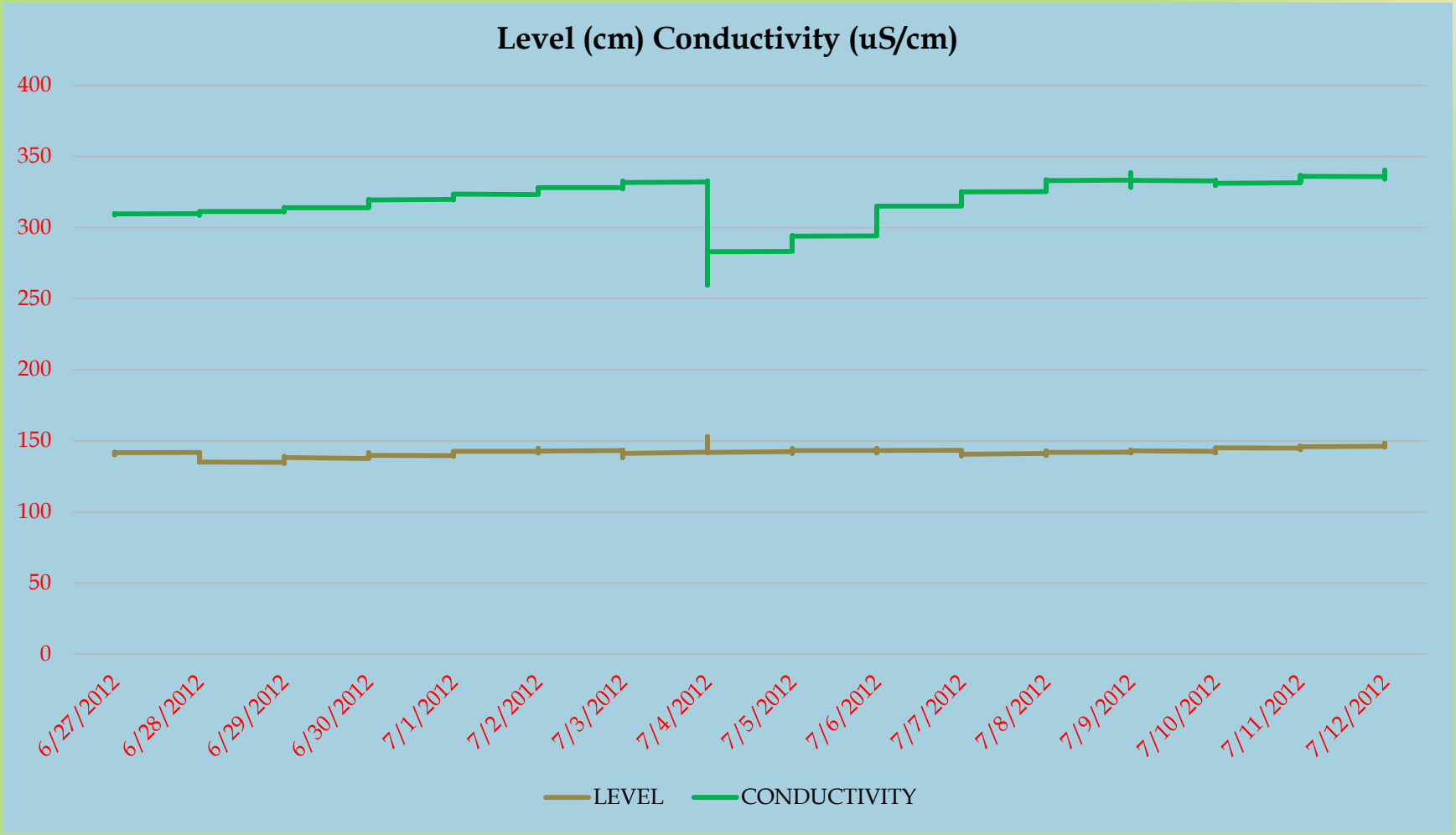
# Conductivity

- The ability of water to conduct an electrical current
- Almost everything affects conductivity
- Large fluctuations
- Good indicator parameter

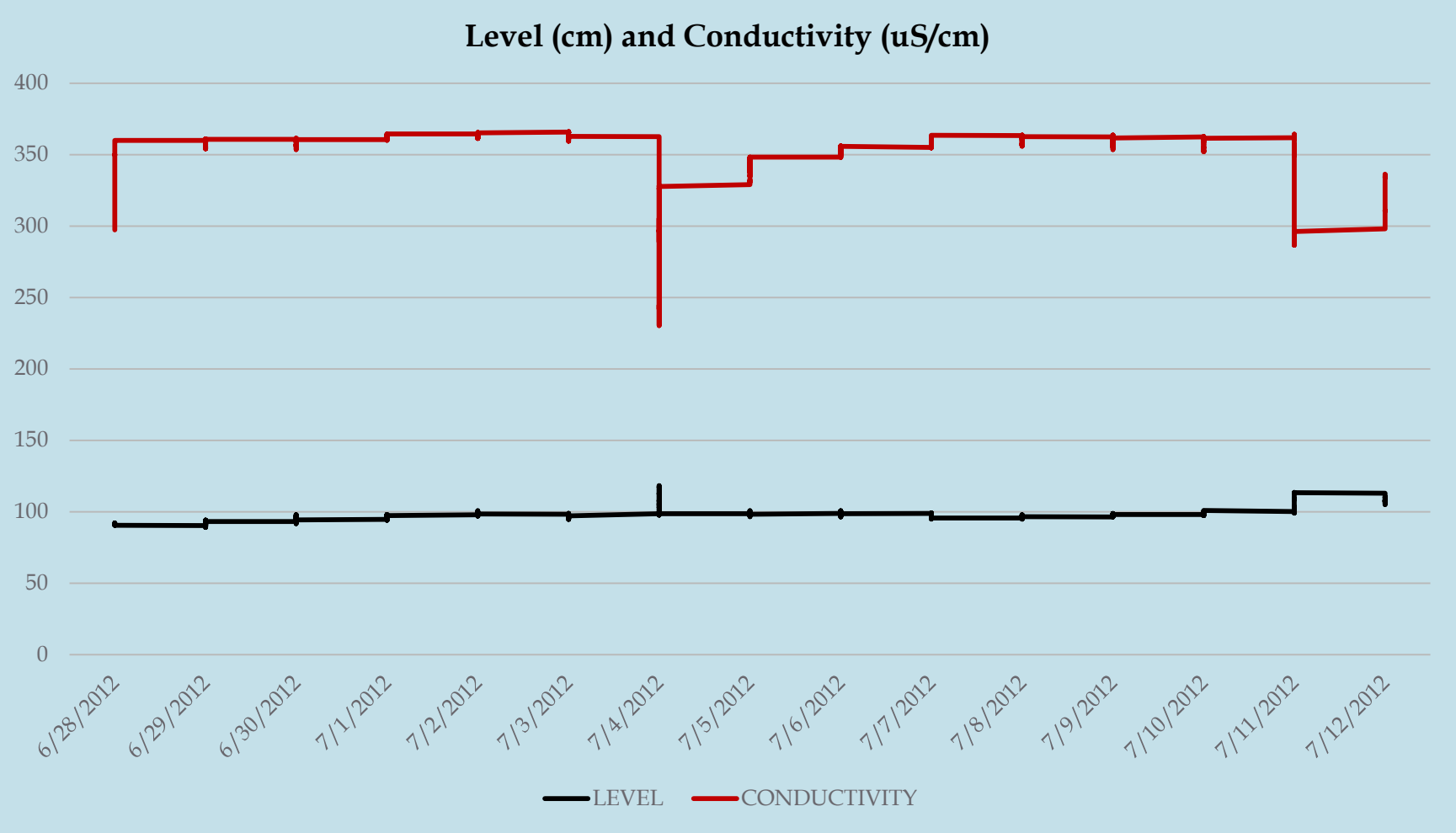
# Natural Conductivity Fluctuations

- Can be very large depending on many factors
- Temperature, pH, geology, biological processes, etc…
- Graphs of unimpacted streams can be alarming
- Only experienced and trained personnel should interpret the data.
- NO Whistle Blowing until data is properly interpreted

# Limestone Stream



# Conductivity Trends

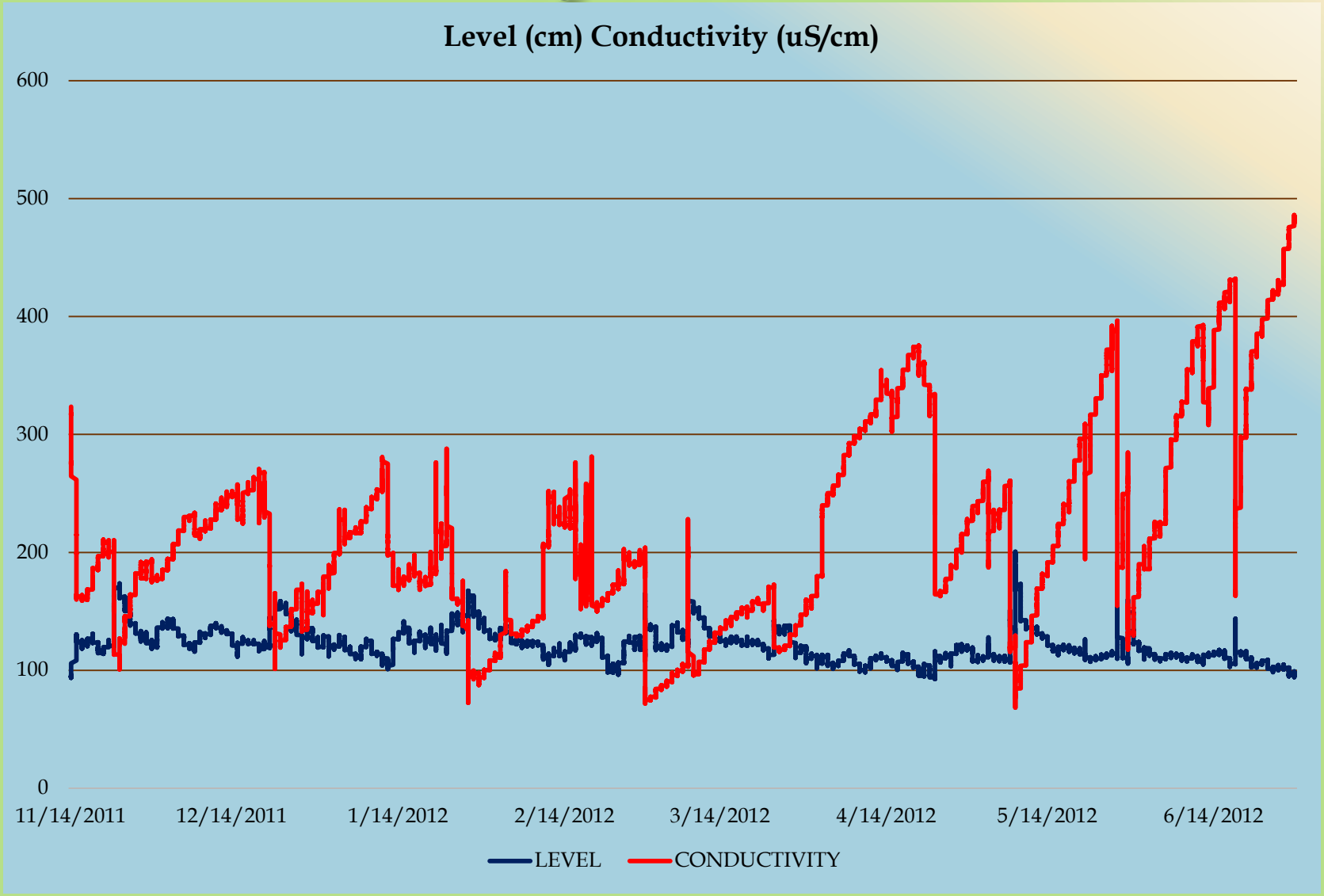


# Inverse Relationship

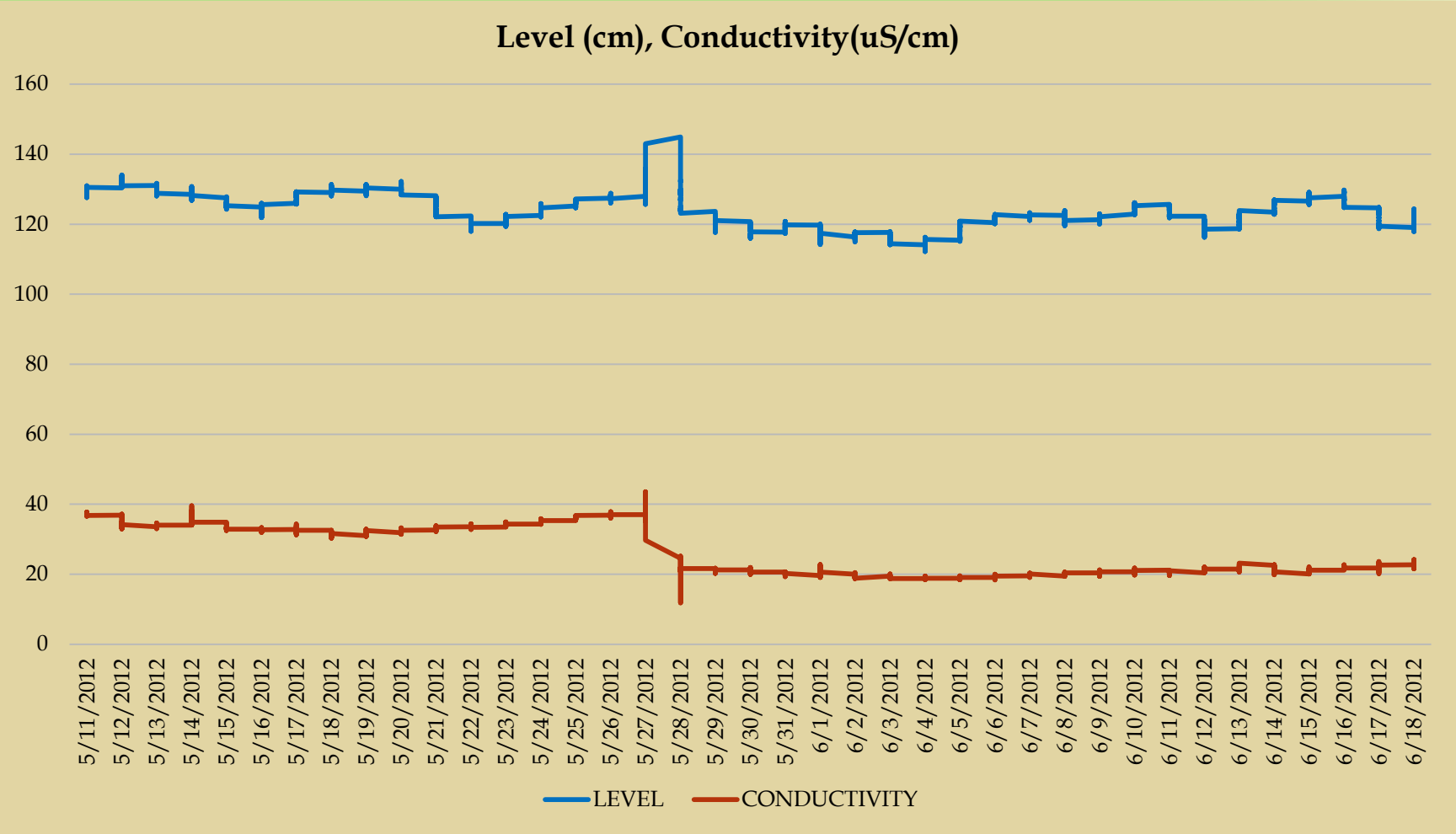
- Typical stream pattern
- Conductivity increases when water level decreases
- Dilution

# Conductivity Spikes

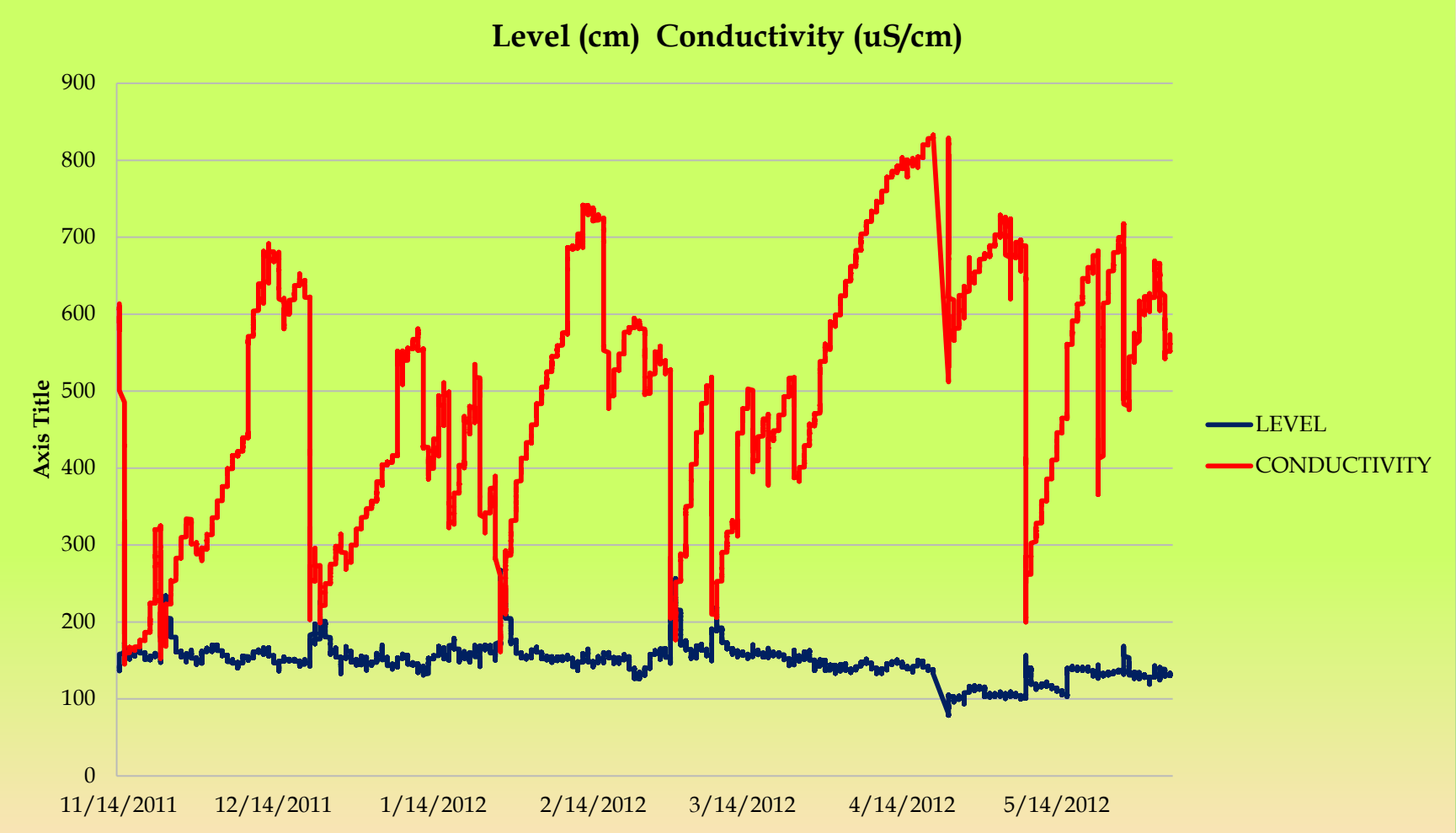
# Malfunctioning Treatment System



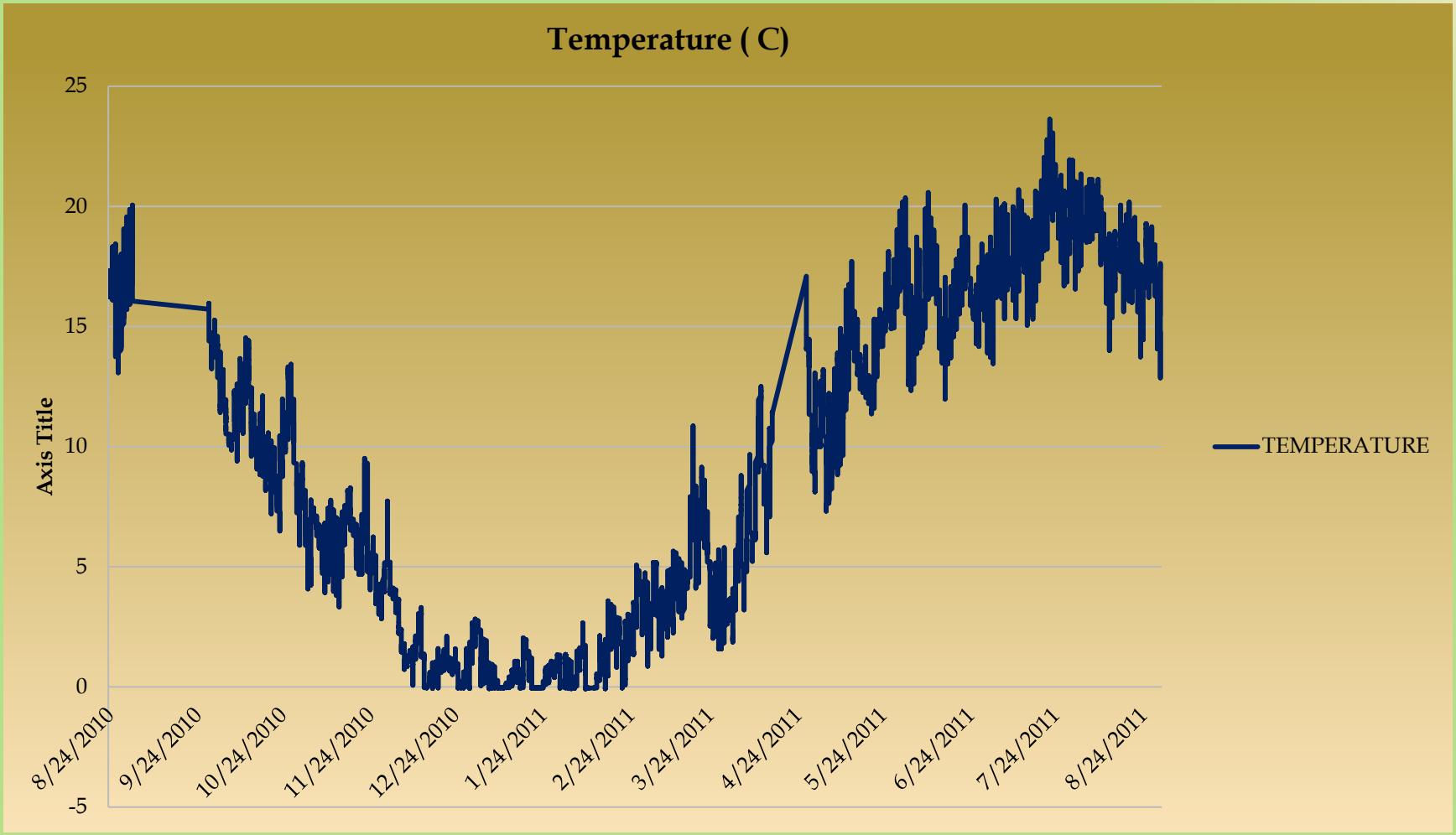
# Acid Deposition



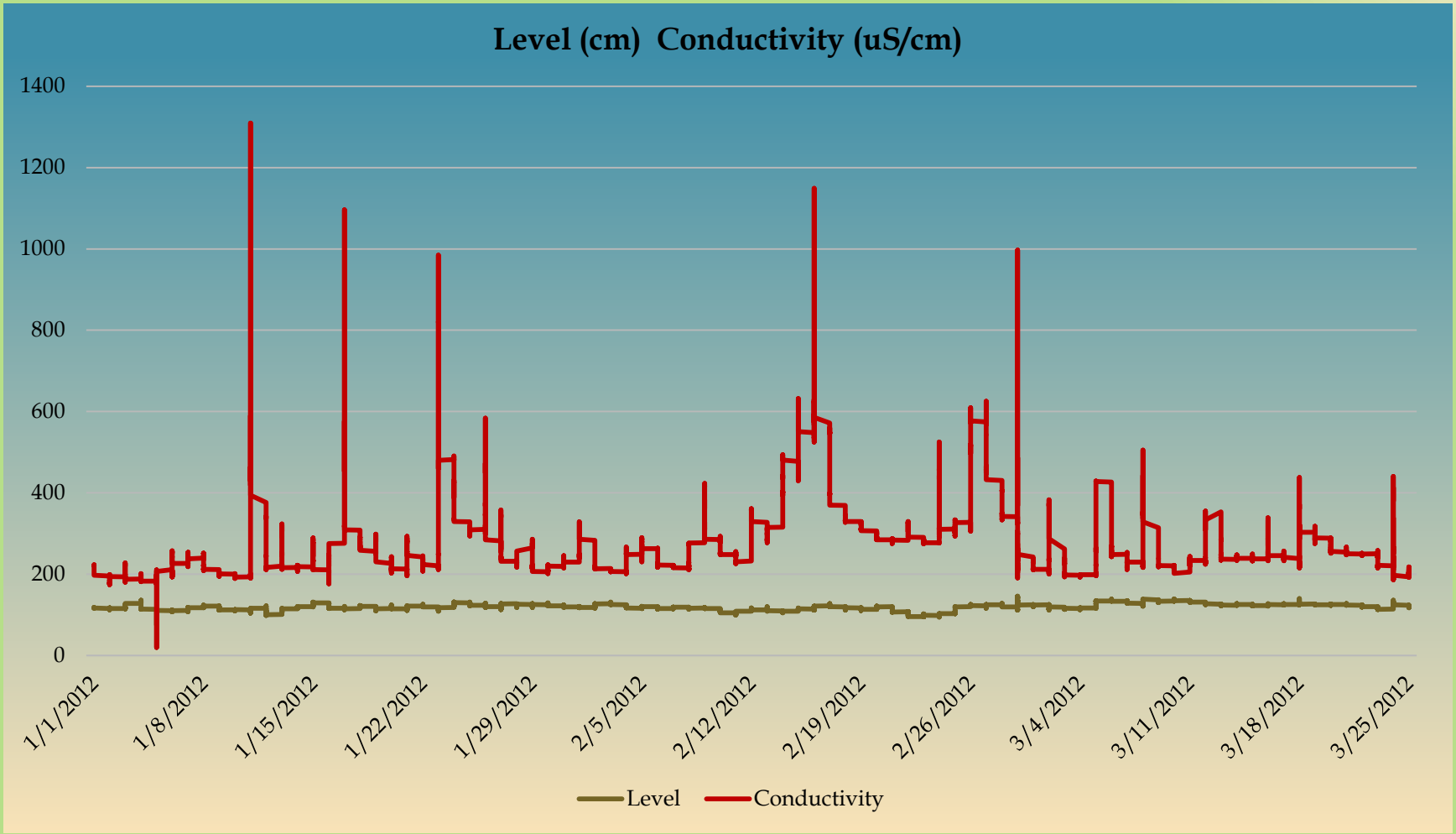
# Organic Loading



# Thermal Pollution



# Road Salt


Level (cm) Conductivity (uS/cm)
1400
1200
1000
800
600
400
200
0
1/1/2012
1/8/2012
1/15/2012
1/22/2012
1/29/2012
2/5/2012
2/12/2012
2/19/2012
2/26/2012
3/4/2012
3/11/2012
3/18/2012
3/25/2012
Level
Conductivity

# Field Data

- Hanna All-in-One Combo Meter
  - Temperature
  - Conductivity
  - pH
  - TDS
- LaMotte Chloride Test Kit
- Alkalinity
- Sulfates
- Visual Assessment

# Macroinvertebrates

- Provide a Biological Baseline
- Macroinvertebrates were sampled in spring and fall
- 25 Sites were sampled
- Macroinvertebrates provide historic analysis
- Can be compared to conductivity trends

# Macroinvertebrate Sampling Protocol

- Macroinvertebrates were collected from the immediate riffle are from the logger
- EPA 1990, 1999 Protocols
- A Surber Sampler was used to collect five subsamples from across the riffle area
- Samples were preserved and classified to genus level

# Macroinvertebrate Data

- Currently being analyzed
- Pin-pointing pollution sources using loggers and macros
- Generation of a large biological database for the Basin

# By-Products of Macroinvertebrate Data

- Possible stream reclassification
- Potential for new public fisheries
- Possible impaired stream delisting
- Knowing where to fish

# Future Projects

- AMD treatment system monitoring
- Limestone dosing
- In-depth biological evaluations
- Developing and housing data in an accessible research database

# Future of Water Quality Monitoring

- Technology is evolving fast
- Volunteer hours will be less but more productive
- Technology will be a standard public education tool
- Increased interest by the public
- Precise locations of restoration projects
- More recovered stream for less money

# Future of CVC's Continuous Water Quality Monitoring

- Large reference biological database
- Large chemical database
- More implementation of projects
- Education
- Expansion of Water Quality Monitoring

# Contact

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# Questions?