Water Temperature: How to measure and Interpret the Data

Philip A. Russell
Littleton/Englewood Waste Water Treatment Plant
Englewood, Colorado
Why the Interest in Stream Temperature?

State of Colorado Implemented Limits
Toxicity and Temperature?

Limnology, Wetzel.
Toxicity Reduction, Ford.
Environmental Toxicology, Landis and Yu.
Aquatic Toxicology (1125pgs), Rand.
SPCURE
(South Platte Coalition for Urban River Evaluation)
SPCURE Members

- Metro District
- L/E WWTP
- Centennial W&SD
- Coors Brewing
- Xcel Energy
- S. Adams Cty W&SD
- Brighton
- Aurora

- Suncor Energy USA
- Denver Wastewater
- Golden
- DEH
- Thornton
- FRICO
- ECCV
- UDFCD
Intro: The Area of Interest
How do we collect good temperature data?

(Lots of Data!)
Practical Considerations:

1. Cost, accuracy, precision
2. Location ... watershed and river
3. Access ... and Locating Again
4. Anchoring and Camouflage
5. Data retrieval - Frequency and Duplication
What does the high resolution temperature data look like?
What about regulations?
Regulatory Impact
Temperatures Near LE Effluent 2007 - 2009

- Upstream
- Effluent
- Downstream
- Chronic Limit
- Acute Limit

Date:
09/05/07 10/05/07 11/04/07 12/04/07 01/03/08 02/02/08 03/03/08 04/02/08 05/01/08 06/01/08 07/01/08 08/30/08 09/29/08 10/28/08 11/29/08 12/28/08 01/27/09 02/26/09 03/25/09 04/24/09 05/24/09 06/23/09 07/23/09 08/22/09

Temperature (°C):
0 5 10 15 20 25 30 35

Graph showing temperature changes over time.
Why use fine time increments?
Facility Impact
In Summary:

1. Temperature is a relatively new toxicity concept
2. It’s relatively easy to measure
3. It will produce a lot of data
4. It’s not difficult to make it manageable
5. How to use it in a Regulatory environment could be a challenge
6. It is important to collect high resolution data