WASHINGTON STATE UNIVERSITY

World Class. Face to Face.

Cooling of Dairy Plate Cooler Water Prior to Entry Into Surface Water - Two Case Studies

Joe Harrison and Debbie Davidson
Washington State University

Livestock Nutrient Management

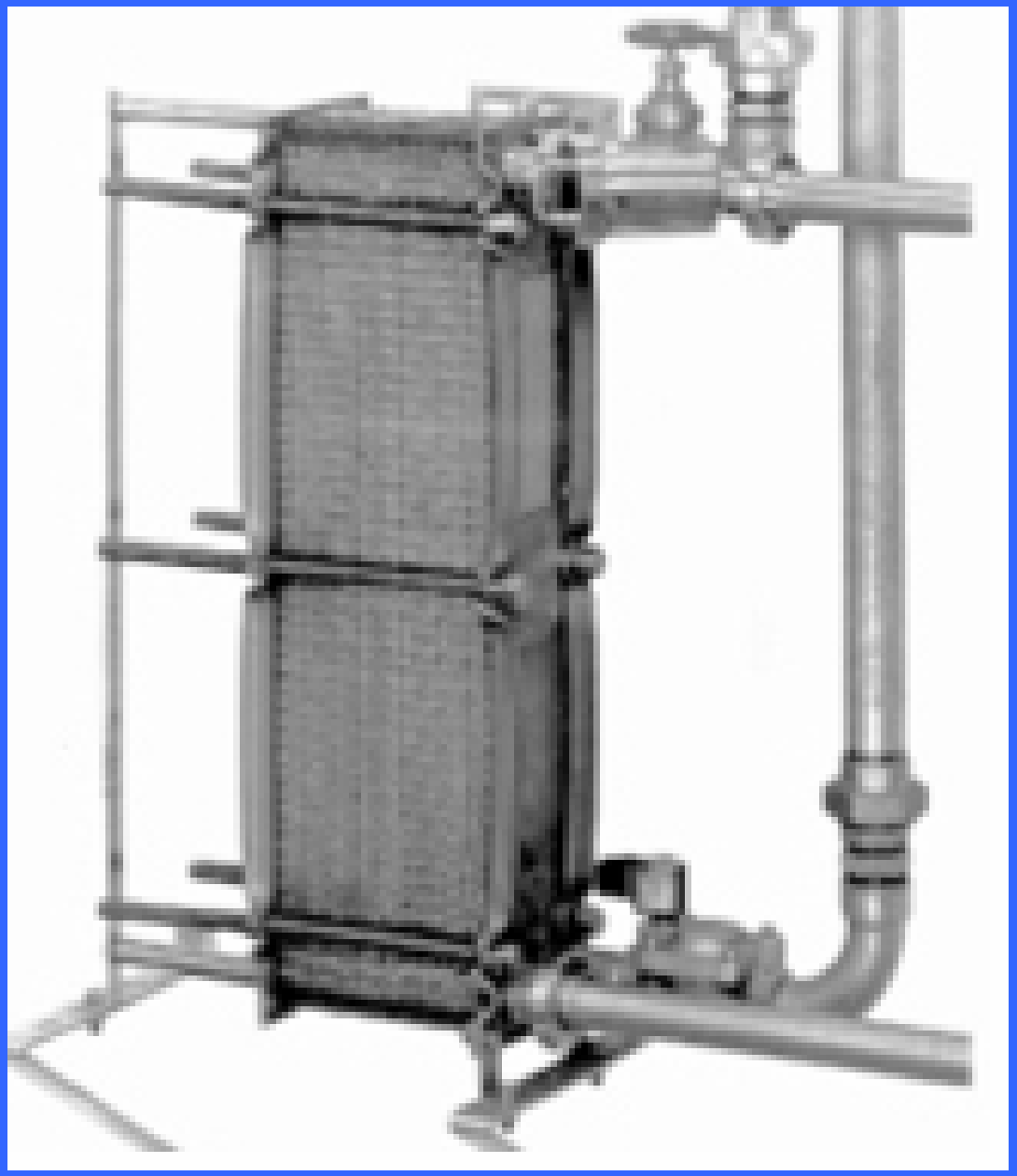


Plate Cooler for Initial Chilling of Milk

xx gallons of water/milk

Livestock Nutrient Management

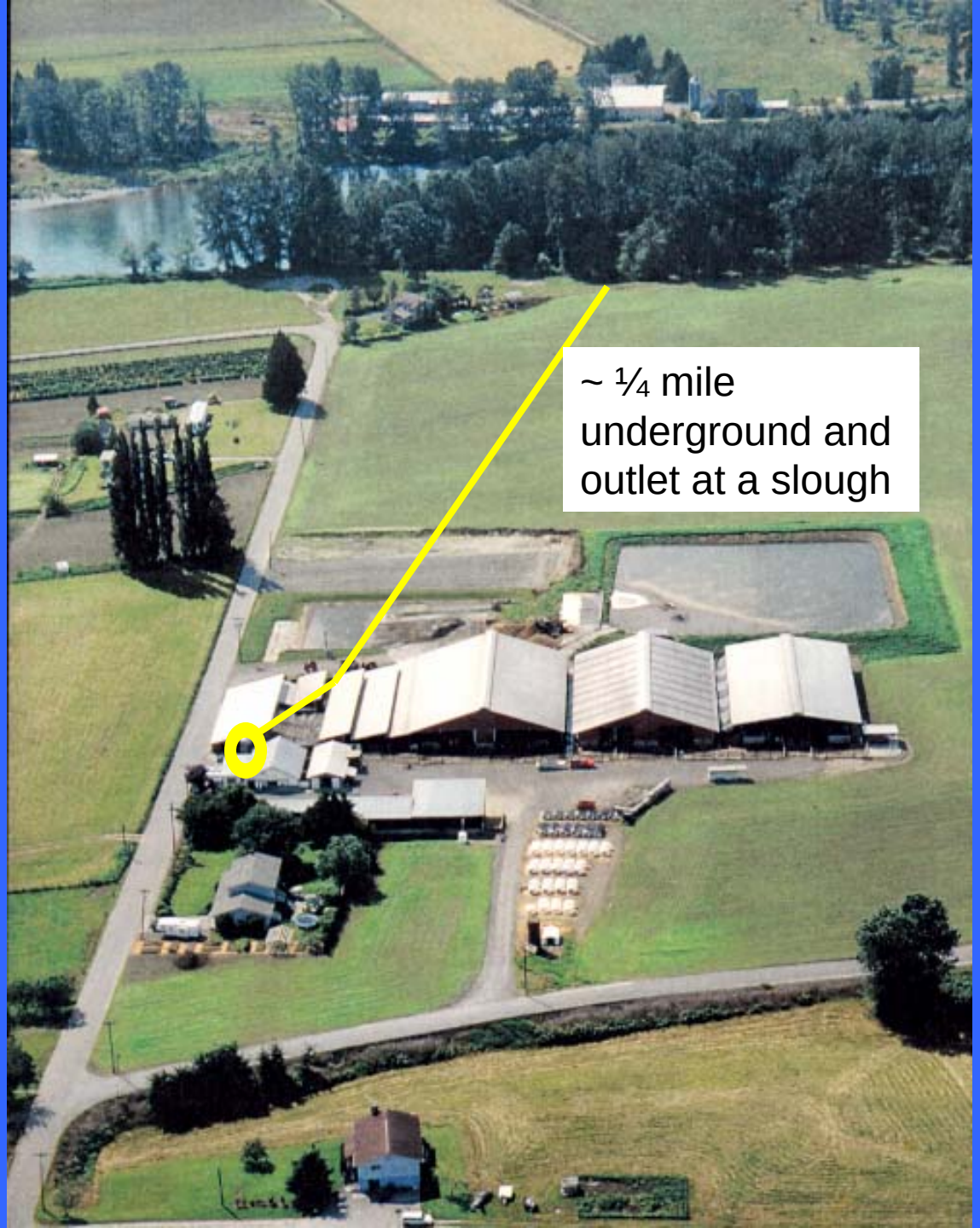
920

Two case studies

1) 600 cow dairy herd in Western WA
   - Study begun in 2002 after routine inspection by WA State Dept of Ecology
   - Located near local river
   - Diverted plate cooler water per guidance during farm plan development in 1990

2) 1500 cow dairy herd in Eastern WA
   - Study begun in 2007 after US EPA flyover
   - Located ~ 1.5 miles from irrigation canal
   - Had been diverting plate cooler water for ~ 15 years into surface water drainage ditch

Articulated Concern – Discharge, possibly considered process waste-water temperature



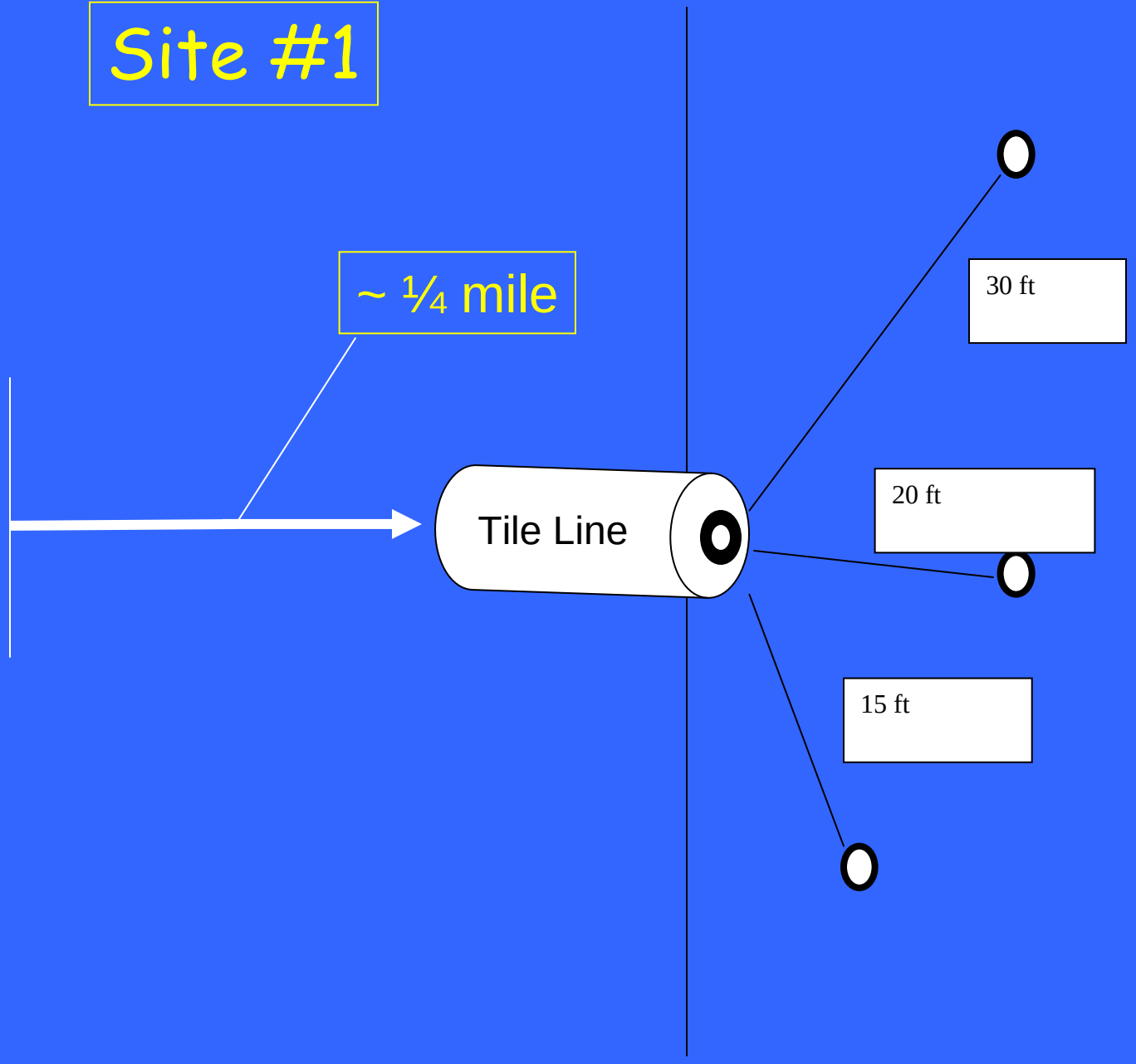
Site # 1

Monitoring protocol

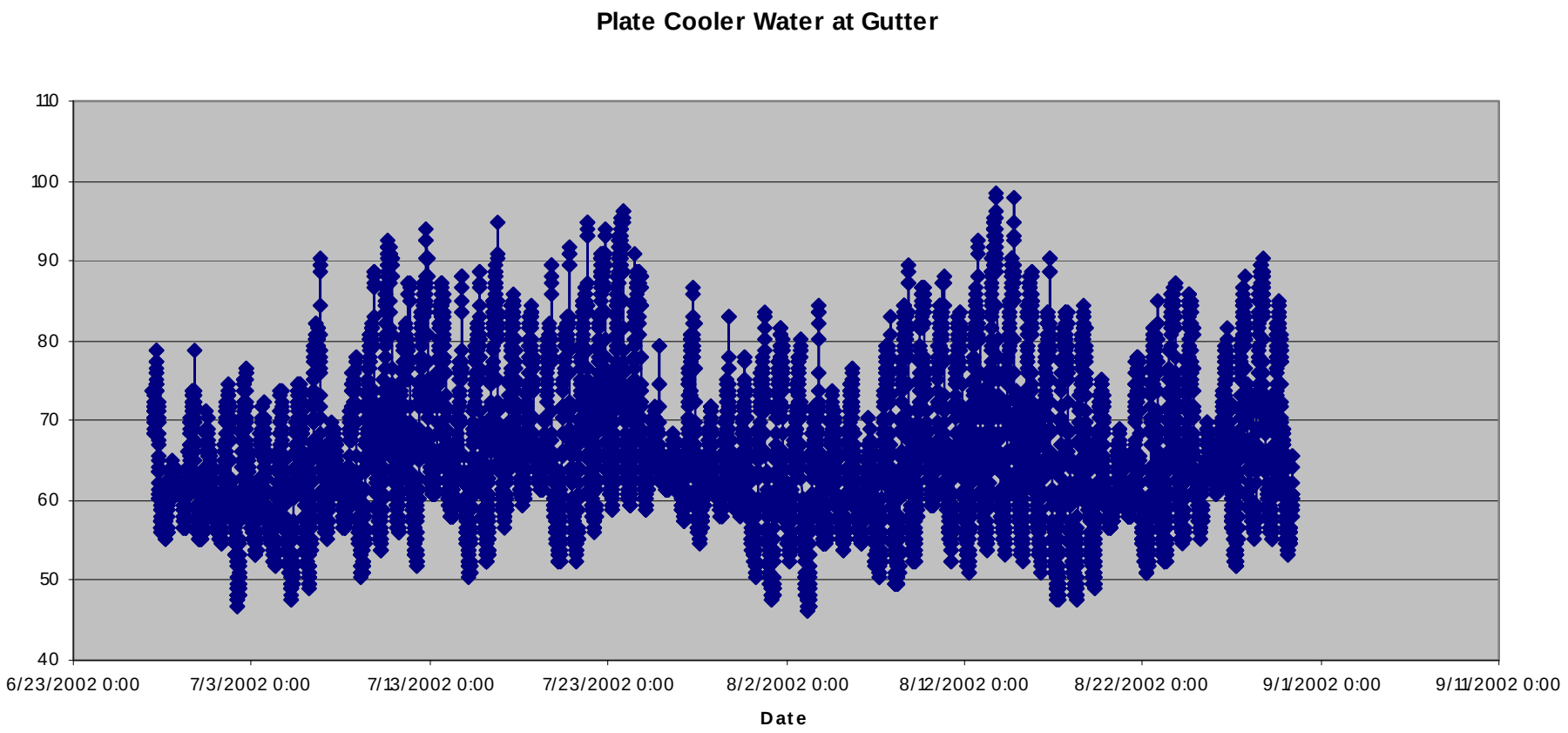
8 minute intervals

Livestock Nutrient Management

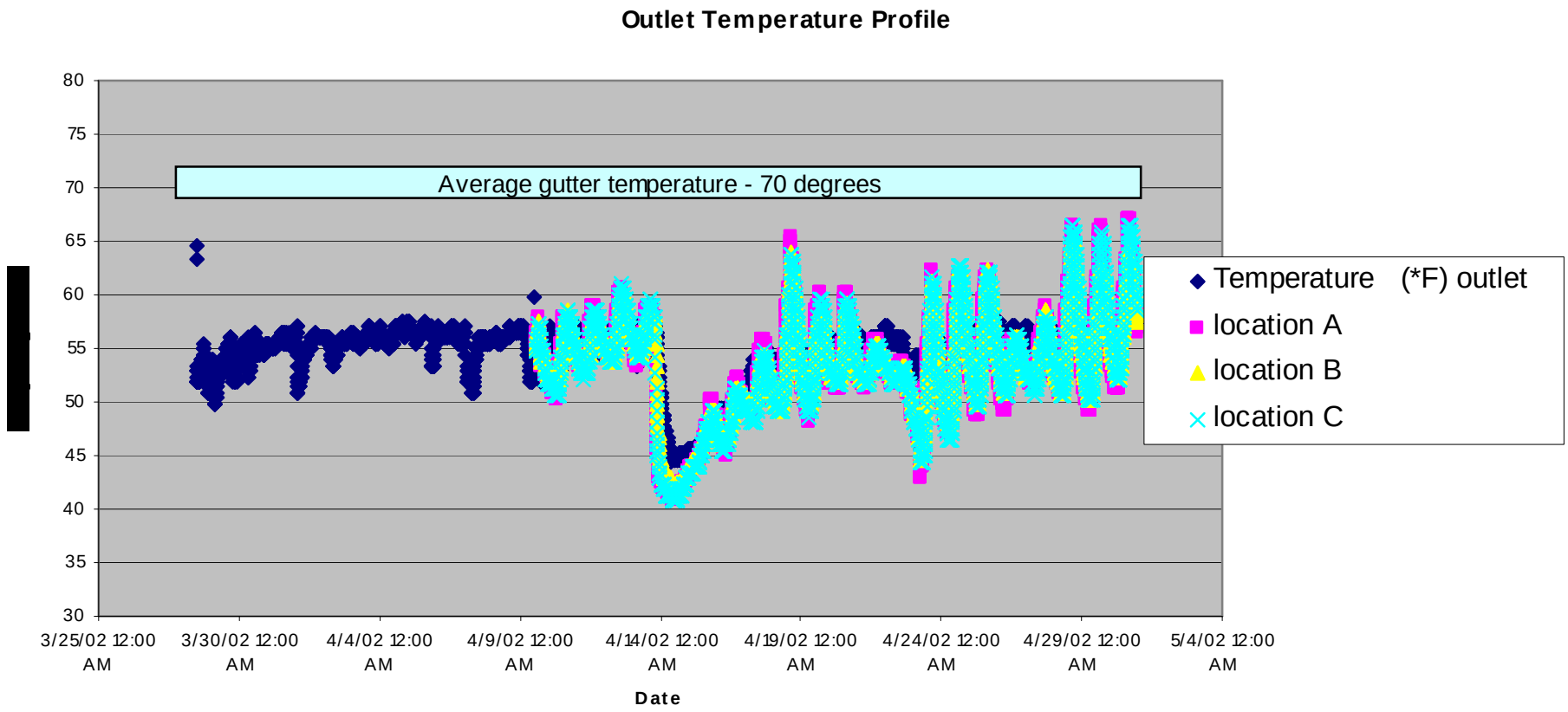
Site #1



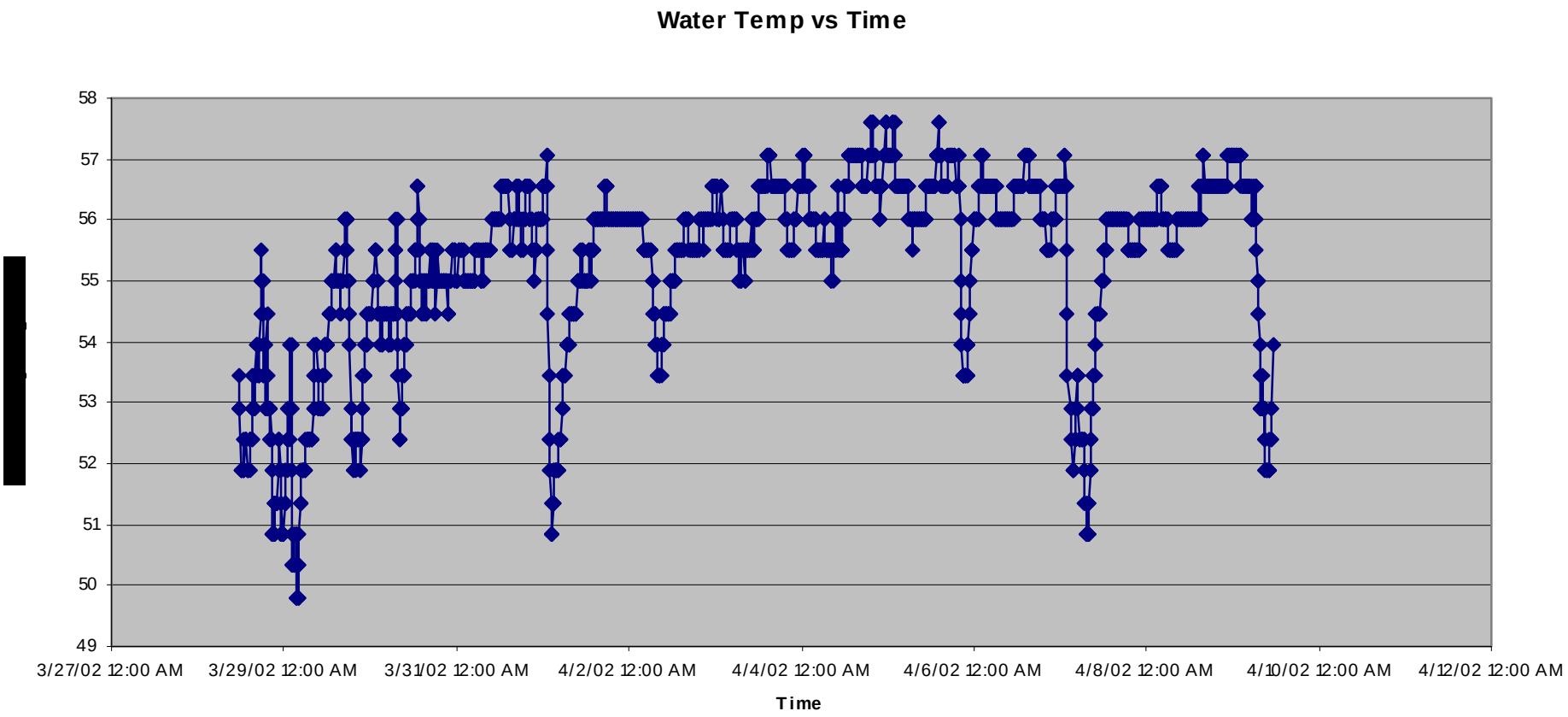
Site #1 – water temperature at gutter (7 to 9 02)



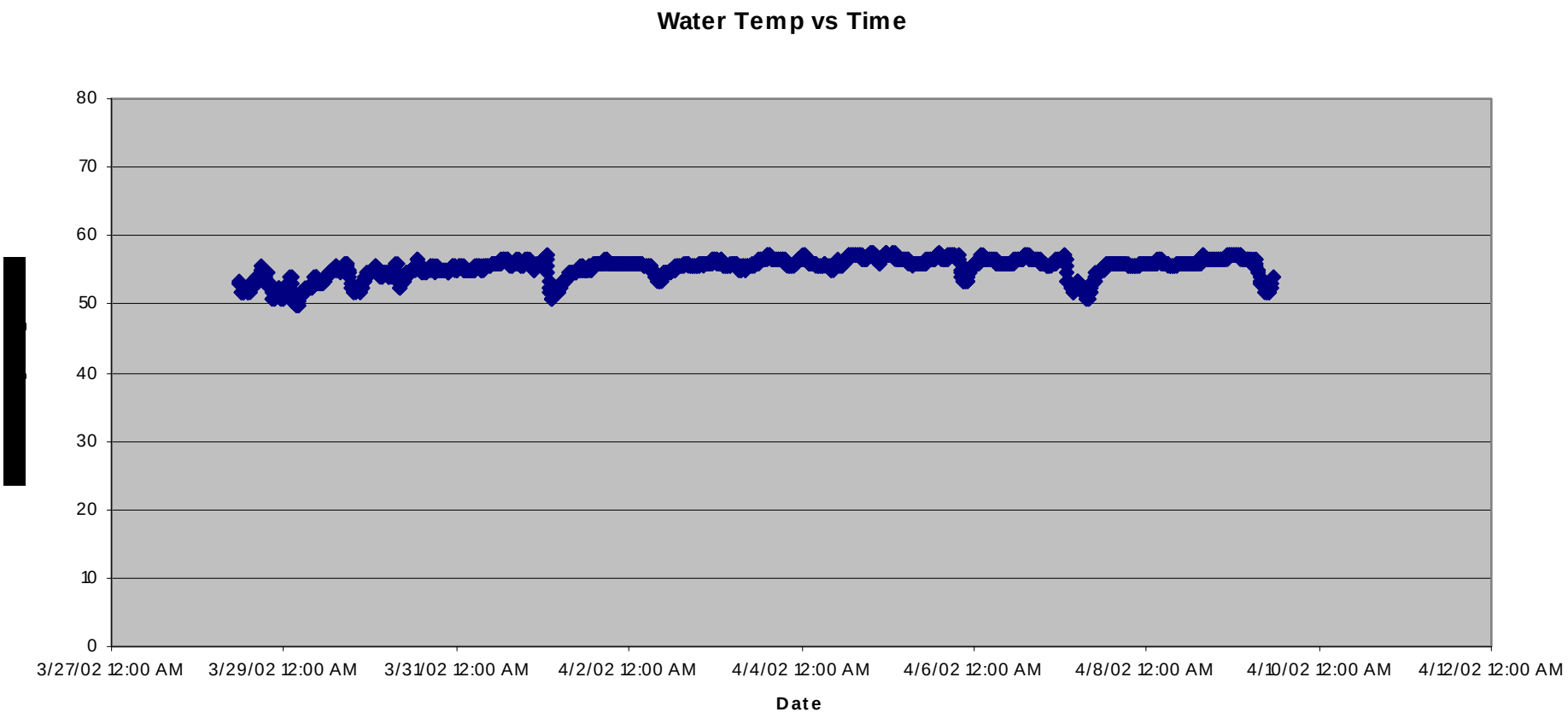
Site #1 – water temperature at outlet (3 to 4 02)



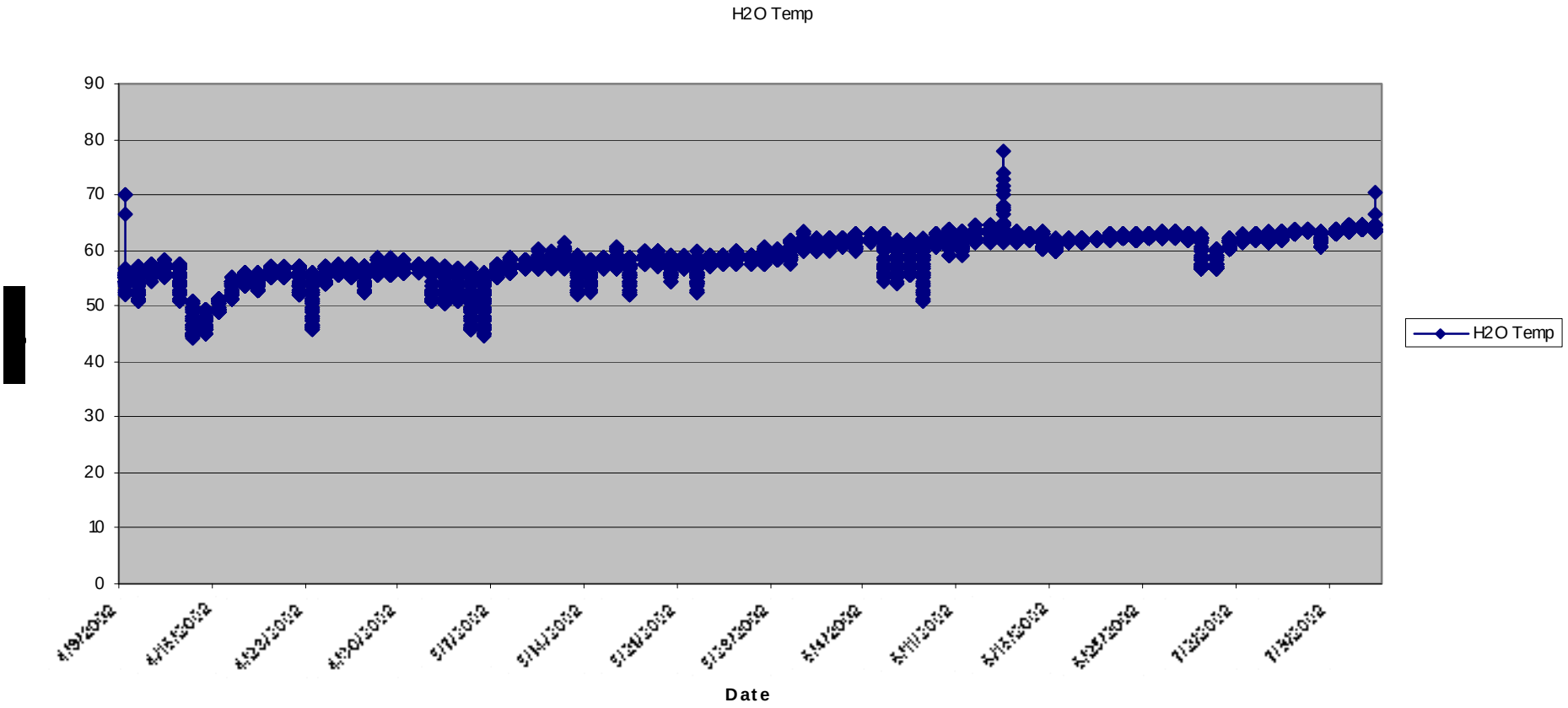
Site #1 – water temperature at outlet (3 to 4 02)



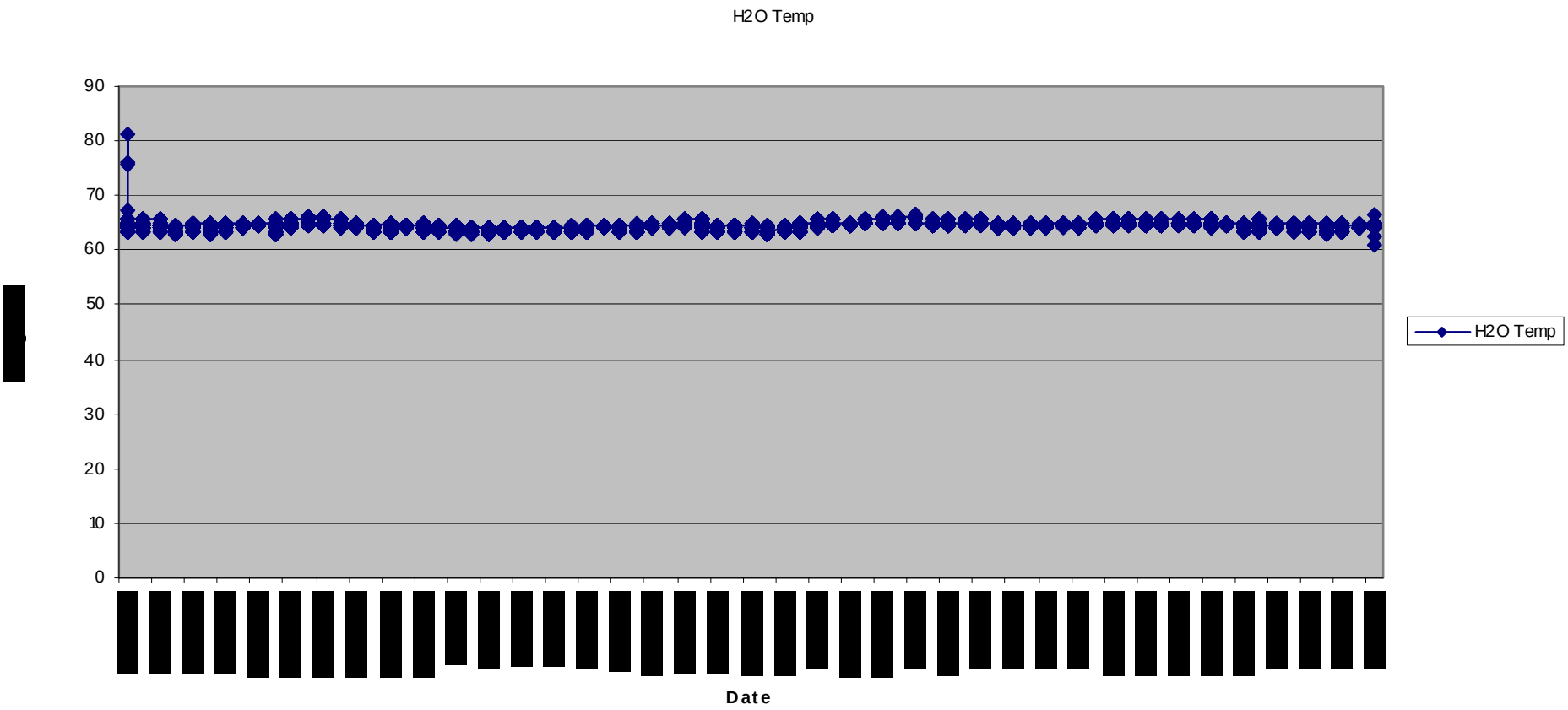
Site #1 – water temperature at outlet (3 to 4 02)



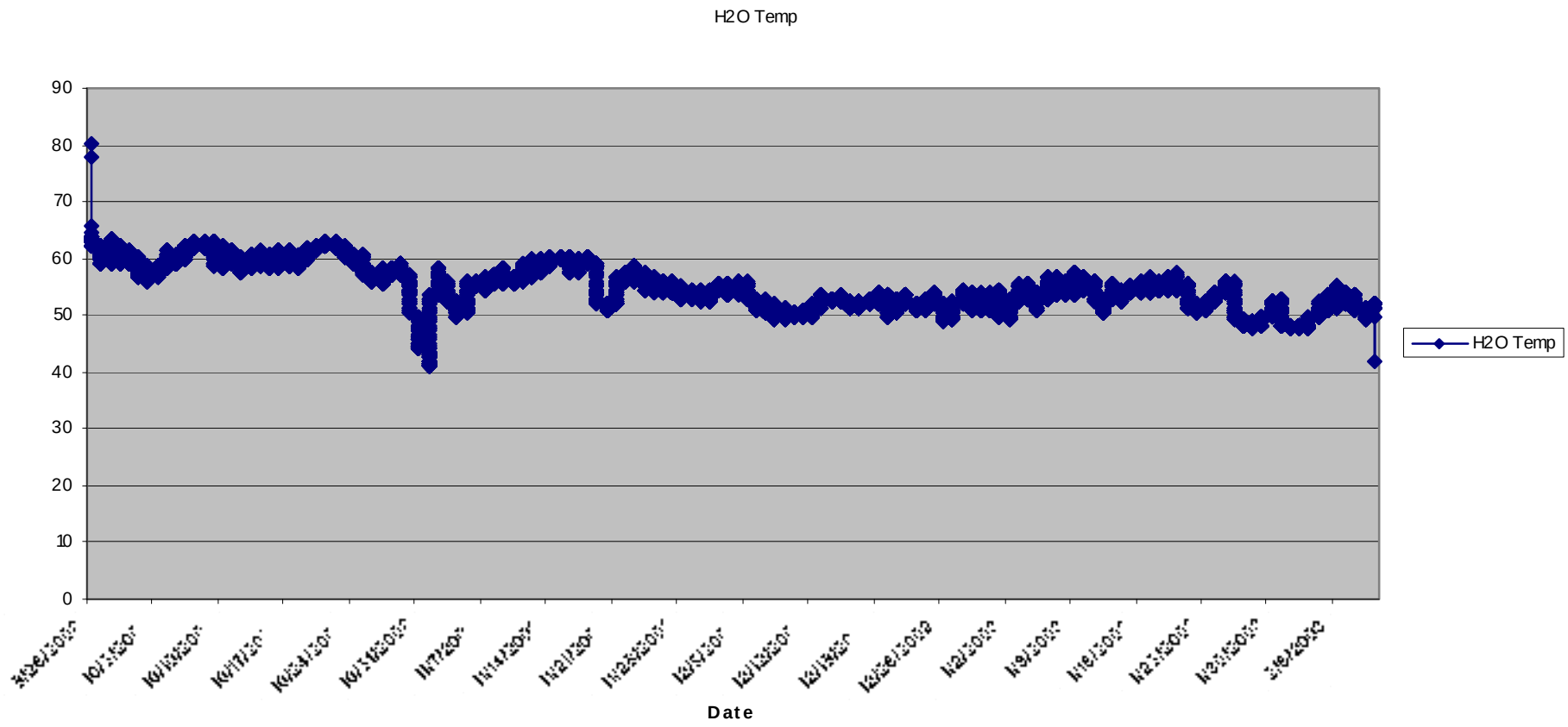
Site #1 – water temperature at outlet (4 to 7 02)

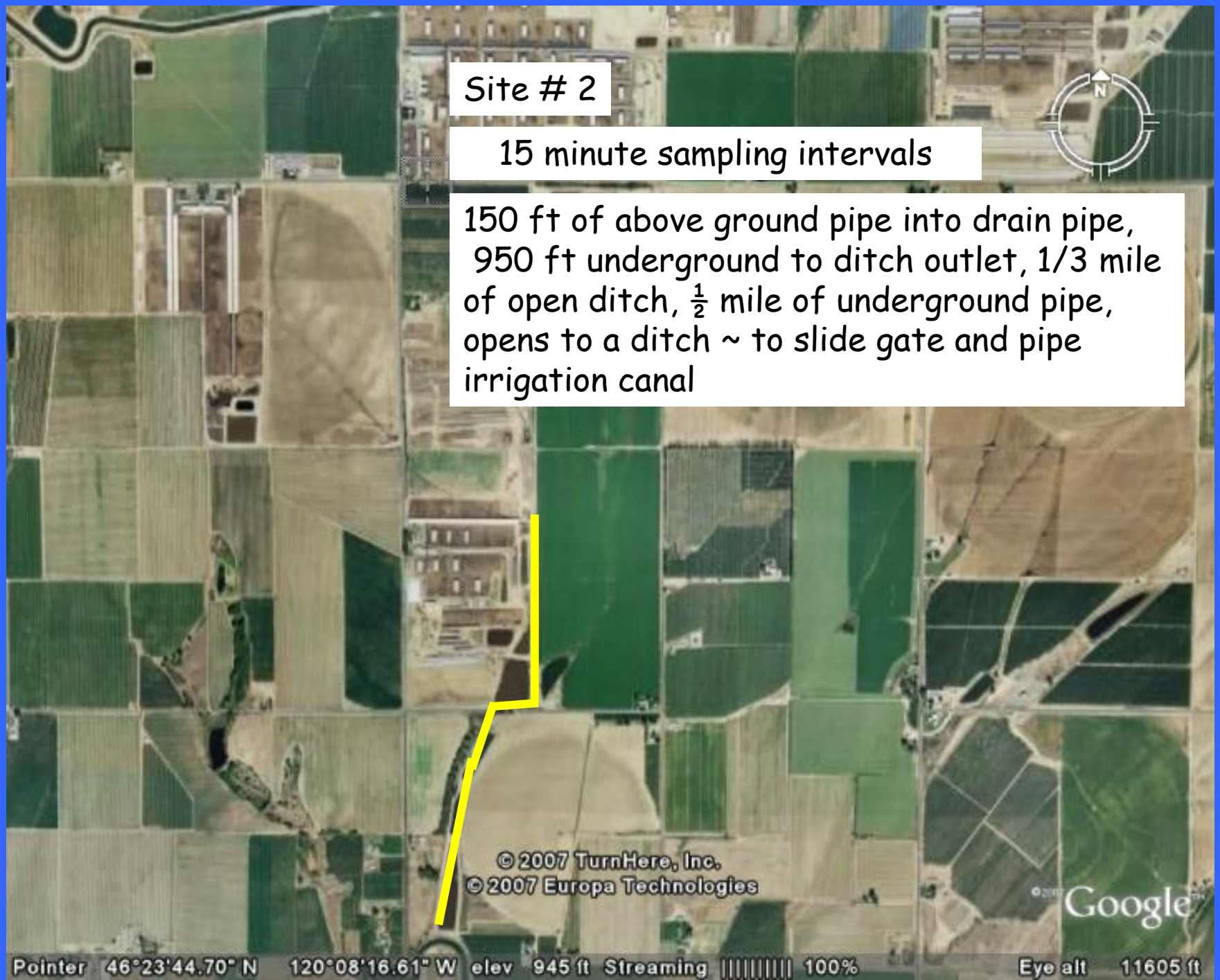


Site #1 – water temperature at outlet (7 to 9 02)

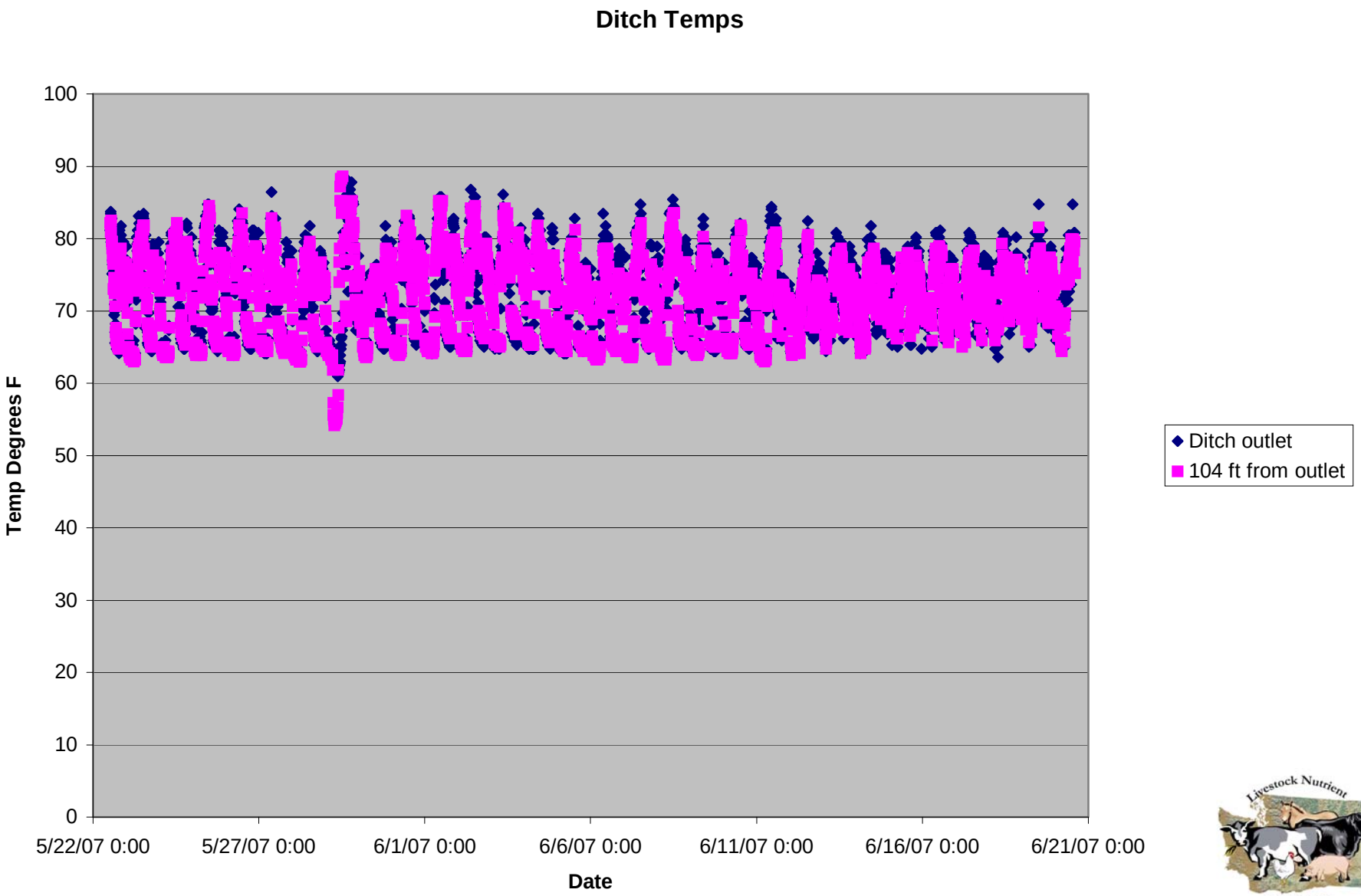


Site #1 – water temperature at outlet (9 02 to 2 03)

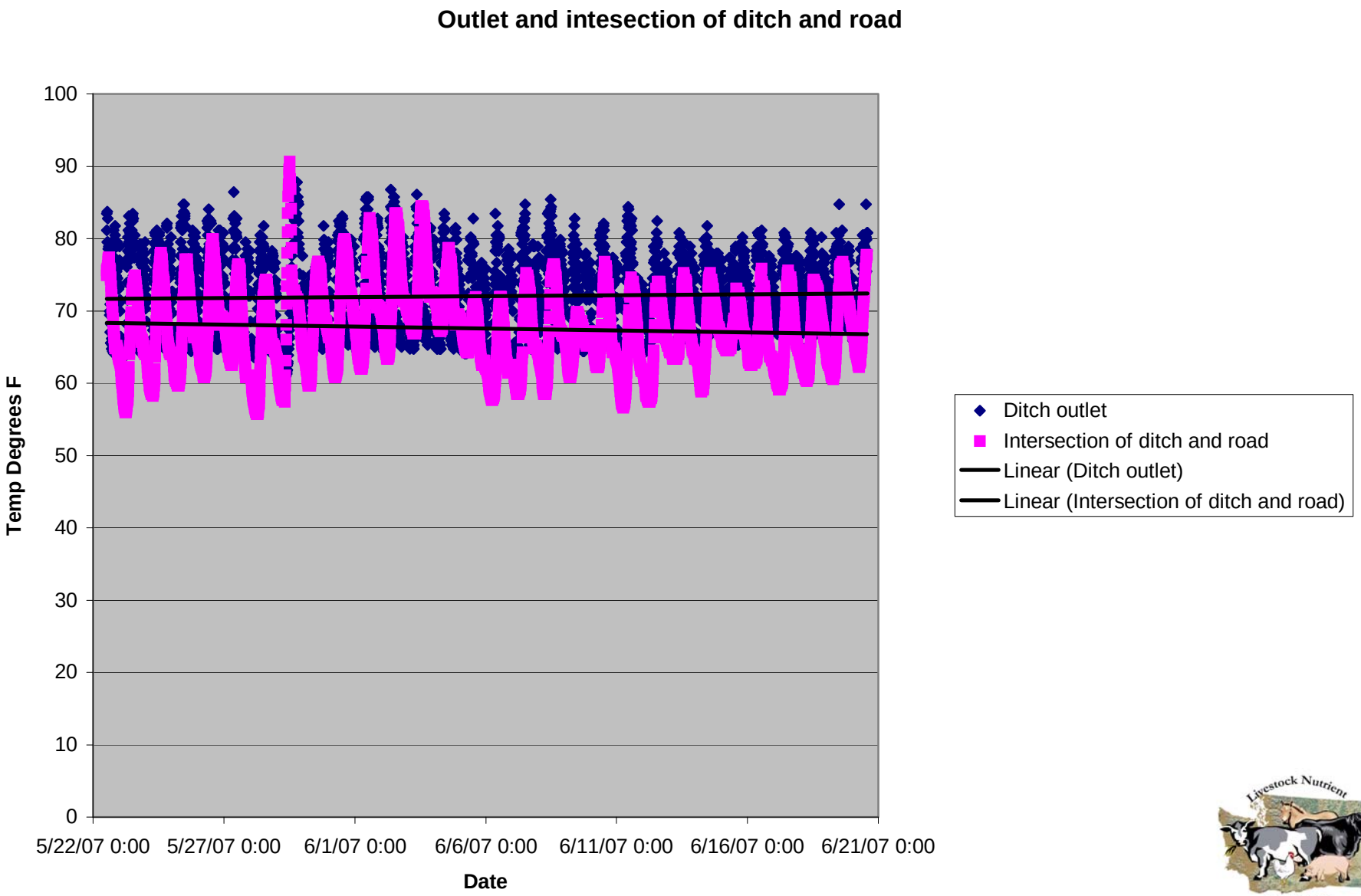



Site # 2
15 minute sampling intervals
150 ft of above ground pipe into drain pipe, 950 ft underground to ditch outlet, 1/3 mile of open ditch, ½ mile of underground pipe, opens to a ditch ~ to slide gate and pipe irrigation canal
© 2007 TurnHere, Inc.
© 2007 Europa Technologies
Google
Pointer 46°23'44.70" N 120°08'16.61" W elev 945 ft Streaming 100%
Eye alt 11605 ft

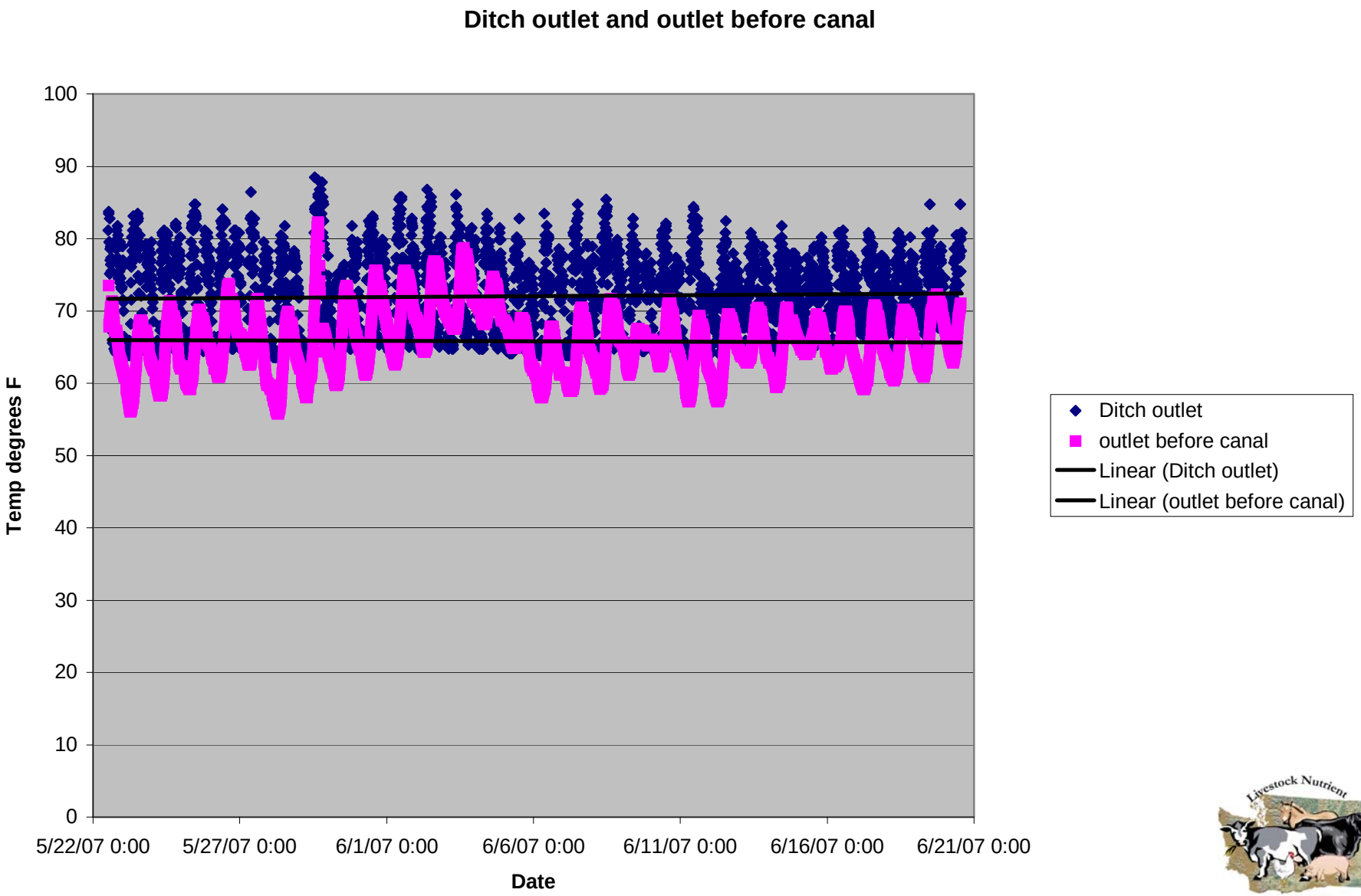
Site #2 – water temperature at outlet and 104 ft down ditch



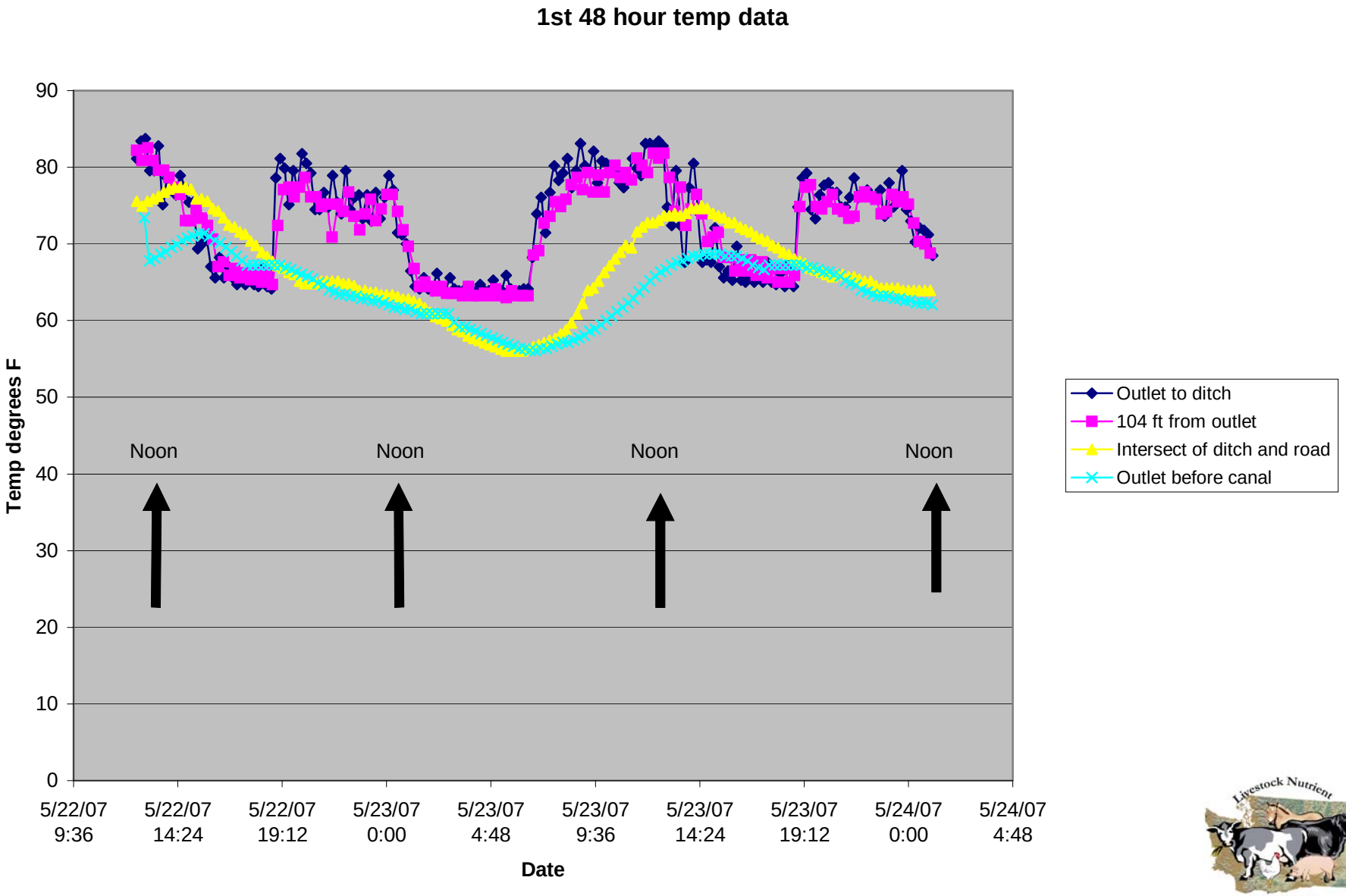
Site #2 – water temperature at outlet and 1/3 mile down ditch



Site #2 – water temperature at outlet and near canal



Temporal change in temperature during first 48 hours



WASHINGTON STATE UNIVERSITY

World Class. Face to Face.

Take Home Message

The transfer of plate cooler water via underground tile-line was an effective management strategy in providing cooling of warmed plate cooler water before entry to surface water.

Livestock Nutrient Management