Water Quality Monitoring Report

Chimacum Creek Clean Water Project

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Prepared for

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Water Quality Program

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BACKGROUND

Introduction

Chimacum Creek is located in Water Resource Inventory Area 17 in the northeastern corner of the Olympic Peninsula in Eastern Jefferson County, Washington (Figure 1). Chimacum Creek flows south from the source, turns east toward the community of Center, then flows north toward the community of Chimacum and eventually drains into Port Townsend Bay near the community of Irondale. East Chimacum Creek, a major tributary, flows north and joins the main stem on its right bank at River Mile 2.7 near the community of Chimacum. Putaansuu Creek joins the main stem on its left bank at River Mile 2.4, Naylors Creek on the left bank at River Mile 5.3, Barnhouse Creek on the right bank at River Mile 9.0, and Peterson Creek on the right bank at River Mile 11.1. The main stem of Chimacum Creek originates from Delanty Lake and is 13 miles in length. The East Fork originates in forested wetlands and is about 6 miles long. Besides Delanty Lake, other lakes in the basin are Anderson, Beausite, Gibbs, and Peterson. Flow from all the lakes is seasonal, occurring mainly from November to April.

The Chimacum watershed comprises about 37 square miles and receives an average of 30 inches of rain per year (measured at Center, Washington). Stream flow varies from as little as 4 cfs in summer to as much as 200 cfs in winter. Salmonids in Chimacum Creek include coho (*Oncorhyncus kitsutch*), summer and fall chum (*Oncorhyncus keta*), steelhead (*Oncorhyncus mykiss*), and cutthroat trout (*Oncorhyncus clarki*). Other species include sculpin (family Cottidae), threespine stickleback (*Gasterosteus aculeatus*), and western brook lamprey (*Lampetra richardsoni*).

In a study on the connectivity between surface water and groundwater, Simonds et al (2004) reported that the Chimacum Creek basin is comprised of six geologic units: Quaternary Alluvium, Vashon Recessional Outwash deposits, Vashon Lodgement Till, Vashon Advanced Outwash deposits, Older Glacial Deposits, and Bedrock. Lowland areas and small depressions contained Quaternary Alluvium, which locally consists of thick accumulations of peat. Vashon Recessional Outwash deposits occupy glacial outwash channels that are incised into Vashon Lodgement Till, which forms a hardened and conspicuously grooved surface over much of the area. Sands and gravels within the underlying Vashon Advanced Outwash deposits are significant sources of groundwater in the basin. The Older Glacial Deposits are an undifferentiated mixture of deposits related to multiple glaciations. The bedrock, including sedimentary, igneous, and intrusive igneous rocks, is exposed in scattered localities around the margins of the basin and underlies the basin at depths ranging from 0 ft. to more than 1,000 ft. deep.

The upper reaches of Chimacum Creek and its tributaries are forested and have good gradient. The main stem leaves the forest at RM 9.3 and passes through agricultural land to RM 3.4 at Highway 19 in Chimacum. Peat soil predominates through most of this section and the gradient is very flat. East Chimacum Creek leaves its forested

headwaters at RM 5.4 and flows through predominantly agricultural land (with mostly peat soil) all the way to its confluence with Chimacum Creek at RM 2.7. Throughout the agricultural areas, residences are fairly scattered, but from RM 2.7 downstream to RM 1.1 at Irondale Road, houses become more concentrated as Chimacum Creek passes through the towns of Chimacum, Port Hadlock, and Irondale. Downstream from RM 1.1 to its mouth in Port Townsend Bay, the gradient increases and the stream passes through a forested ravine, offering a natural setback from houses.

At about the turn of the 20th century most of the lowlands in the Chimacum watershed were cleared of the existing spruce/cedar forest and converted to pasture. To facilitate farming, much of Chimacum Creek and its tributaries were channelized, tile drains were installed, and ditches were excavated to improve drainage. Numerous dairy farms were operated in the Chimacum watershed at one time. Although only one dairy remain active today, most of the original dairy farms have remained in some form of agriculture. Today, the most common agricultural activities are pasturing beef cattle, horses, and sheep and growing hay.

Fecal Coliform

In the early days of farming in the Chimacum watershed, livestock had access to much of the Chimacum Creek and fecal coliform concentrations were high. Failing septic systems could also have contributed to the high levels. In the last 15 years many miles of fencing have been installed along the banks of Chimacum Creek and its tributaries. In the early days, buffers were narrow (usually 10 ft. or less). Since the start of the Conservation Reserve Enhanced Program (CREP), landowners receive rent for land put into buffers varying in width from 50 ft. to180 ft. More recently, landowners may receive rent for a “hedge row” with a buffer width of 15 ft. Through fencing and other Best Management Practices (BMPs), progress has been made in reducing fecal coliform levels in Chimacum Creek. In the past several years, the Jefferson County Conservation District (JCCD) has been installing solar-powered drinking troughs to eliminate or minimize livestock access to the creek.

Temperature

Conversion of forestland to pasture land has caused the water temperature in Chimacum Creek to be higher than what would be expected in pre-settlement times. Water temperature is highest downstream of agricultural areas where shade is lacking. As has been mentioned, fenced-buffers have been created on most of Chimacum Creek’s agricultural land. All of the CREP buffers along with some of the non-CREP buffers have been planted with a variety of deciduous and coniferous trees. However, most of the trees planted have not reached sufficient size to provide adequate shade and there are still long reaches that lack trees altogether.

Water Quality Standards

Chimacum Creek's main stem is currently on Washington Department of Ecology's non-compliance list (303 d) for fecal coliform and temperature. East Chimacum Creek is listed for temperature alone, but JCCD's data shows that it also fails to meet the fecal coliform standard.

Water quality standards for the surface waters of Washington State are listed in Chapter WAC 173-201A amended November 20, 2006. As a tributary of Puget Sound, Chimacum Creek is required to meet the criteria for "extraordinary primary contact recreation" (Table 200 (2)(b)). The standard states that **"fecal coliform organism levels must not exceed the geometric mean value of 50 colonies/100 mL, with not more than 10 percent of all samples (or any single sample when less than 10 sample points exist) obtained for calculating the geometric mean value exceeding 100 colonies/100 mL."**

Temperature criteria for Chimacum Creek are listed in Table 200 (1)(c) of WAC 173-201A. **The temperature standard is based on the 7-day average of the daily maximum temperatures (7-DADMax).** Chimacum Creek and tributaries are categorized as "core summer salmonid habitat," which calls for a 7-DADMax of 16^{o}C. However, more restrictive criteria apply to the Chimacum Creek main stem. Ecology publication 06-10-038 titled "Waters Requiring Supplemental Spawning and Incubation Protection for Salmonid Species" requires that the 7-DADMax not exceed 13^{o}C from September 15 to July 1. These criteria are compiled in the following table:

	Temperature (7-DADMax) Criteria for Chimacum Creek	
Time Period	**Chimacum Creek Main Stem**	**East Chimacum Creek and Other Tributaries**
July 2-Sept 14	16^{o}C	16^{o}C
Sept 15-July 1	13^{o}C	16^{o}C

METHODS

Fecal Coliform Concentration

Monitoring stations were selected using two criteria: 1) sites that were used in previous studies so that comparisons could be made, and 2) sites bracketing (i. e., upstream and downstream) BMPs. Twenty-eight stations were monitored in this study; sixteen of these were monitored in previous studies (Figure 2).

Monitoring station numbers contain the river mile (RM), which is the distance measured upstream from the river's mouth. For instance, water quality station CH/1.1 on Chimacum Creek is located 1.1 miles upstream from the mouth. Water Resource Inventory Area 17 maps (Williams et al. 1975), topographic maps, and aerial photos were used in establishing station numbers. Monitoring station coordinates are provided in Appendix Table D-1.

Monitoring was conducted once per month from October to May and twice per month from June to September in the 2007-08 and 2009-10 water years. For purposes of comparison to previously collected data (e.g., Figure 6) in which samples were collected once per month during the entire year, arithmetic averages were obtained for fecal coliform concentrations for months monitored twice. Geometric mean values (GMVs) were then calculated on 12 monthly values. This was to avoid giving extra weight to months sampled twice.

Fecal coliform samples were collected in sterilized bottles and analyzed within 30 hours at the Twiss Analytical Laboratory (accredited by the Department of Ecology) in Poulsbo, Washington. All sample bottles were placed in a cooler containing crushed ice at the time of sampling. Twiss Analytical Laboratory carried out dilutions of 10 mL and 50 mL on all samples.
Replicate fecal coliform samples were collected at three stations on each sampling date. On each date a different set of three stations were selected. The *absolute difference* and *relative standard deviation* (RSD) was calculated for each replicate pair to assess precision. The RSD is usually inversely proportional to the magnitude of the results. Because the RSD is often small, it is multiplied by 100 to express it as a percent.

The RSD (in percent) is given by the formula:

$$\mathbf{RSD\ (\%) = (s / x)\ X\ 100}$$

where **s** is the estimate of the standard deviation of the individual results;
and **x** is the mean of the replicate results (Zar 1984).

Twiss Analytical Laboratory analyzed a lab blank with each batch of samples. When fecal coliform was detected in a blank, results for the entire batch were rejected.

Fecal Coliform Loading

Fecal coliform loading, the number of fecal coliform bacteria flowing past a point in a given period of time, was calculated by the formula:

FC loading (billions per day) = FC x Q x 0.0246

where **FC** is the fecal coliform count per 100 mL of water;
and **Q** is the stream flow (cfs).

Stream Flow

The stream flow at station CH/0.1 was obtained from the 15-minute interval tables on Ecology's web site (https://fortress.wa.gov/ecy/wrx/wrx/flows/station.asp?sta=17B050#block2). Flows at the other stations were obtained by establishing relationships (based on regressions) between flows on these streams and ditches to the flow at CH/0.1. Flows were measured at CH/0.1 and the other streams and ditches on the same day within a few hours of one another.

Flows used for the regression analysis were obtained by taking numerous velocity measurements across each stream with a Marsh-McBirney current meter (Model 201D), calculating flows for the individual subsections, and summing them.
The formula used was:

$$\mathbf{Q = \Sigma\ (A \times V)}$$

where **Q** is the total flow (cubic feet per second or cfs);
A is the area ($ft.^2$) of an individual subsection;
and **V** is the corresponding mean velocity (feet per second) of that subsection.

Regression analyses yielded the following equations:

Stream/Ditch	Station	Equation
Barnhouse Creek	BH/0.0	BH/0.0=0.0229*CH/0.1
Chimacum Creek	CH/3.4	CH/3.4=0.601*CH/0.1
East Chimacum Creek	ECH/0.2	ECH/0.2=0.186*CH/0.1
Ditch@CH/8.4	EG/0.0	EG/0.0=0.00972*CH/0.1
Naylors Creek	NA/0.2	NA/0.2=0.070*CH/0.1
Putaansuu Creek	PU/0.4	PU/0.4=0.0254*CH/0.1
Swansonville Creek	SW/0.0	SW/0.0=0.00505*CH/0.1
West Valley Ditch	WV/0.1	WV/0.1=0.00789*CH/0.1

Temperature

Hobo U22 Water Temp Pro v2 data loggers, manufactured by Onset Computer Corporation, were used in this study. Accuracy was verified before and after deployment (except in 2010) by the following procedure. A 4-gallon bucket was filled with tap water adjusted to approximately room temperature. After a period of time in which the water in the bucket came to room temperature, approximately 6 temperature data loggers were placed in the bucket. The data loggers were programmed to record temperature at 5-minute intervals. At these intervals the water temperature was measured with a glass, laboratory-grade thermometer. The thermometer had a range of 0-30 ^{o}C and had tenth of a degree gradations. Temperature was recorded to the nearest hundredth degree Celsius. The temperature data loggers were downloaded and their 5-minute interval temperatures compared to the temperatures taken with the laboratory-grade thermometer. Temperature data loggers that differed by more than 0.3^{o}C from the laboratory-grade thermometer were rejected.

Data loggers were programmed to record temperature every hour and were maintained at 33 stations in the Chimacum Creek watershed from mid-May to mid-October in 2007, 2008, 2009, and 2010 (Figure 3). Twenty-two of these stations were monitored in the past by the Conservation District. Coordinates of station locations are provided in Appendix Table D-1. Data loggers were placed on the stream bottom in low areas of the stream and were attached to 0.5 inch rebar with #14 black, single-strand electrical wire.

A temperature graph was made for each station and the number of days on which the 7-DADMax exceeded the standard was calculated. Prior to 2004 the state standard was based on a single temperature measurement that was not to exceed 16 degrees Celsius. During those pre-2004 years, JCCD reported the number of hourly measurements that exceeded 16 degree Celsius. For the purpose of evaluating trends with pre-2004 data, the number of hourly measurements exceeding 16 degrees Celsius was calculated in addition to the number of days that the 7-DADMax exceeded 16 degrees Celsius.

Because the data loggers were not in the streams all year (loggers are easily lost during winter high flows), the number of days that the 13 degree Celsius standard was exceeded should be considered a minimum.

RESULTS AND DISCUSSION

Quality Control

Fecal coliform replicate results are shown in Table A-1 of Appendix A. Absolute differences between field replicate concentrations ranged between 0 FC/100 mL and 996 FC /100 mL. The mean absolute difference was 48 FC/100 mL. Relative standard deviations ranged from 0 % to 120 % with a mean of 28%. Unlike replicate samples of dissolved ions like sodium or calcium, which are usually evenly distributed in stream water, fecal coliform bacteria are often unevenly distributed. Thus differences in replicate values can be attributed to natural variation as well as to analytical error.

Temperature accuracy results are shown in Table A-2 of Appendix A. All temperature data loggers had accuracy better than 0.23 ^{o}C when compared to a laboratory thermometer.

Fecal Coliform

Fecal coliform bacteria originate in the digestive tract of warm-blooded animals and are released into the environment by excretion. They serve as an indicator of disease-causing organisms released with them. The rationale is that an increase in the bacteria's concentration indicates an increased chance that pathogens are also present. The higher that the concentration of fecal coliform is, the greater is the chance for disease.

The state standard for fecal coliform has two parts. For all of Jefferson County's streams, Part 1 requires that the geometric mean value (GMV) not exceed 50 FC/100mL. Part 2 requires that not more than 10% of the samples exceed 100 FC/100 mL. Both parts need to be met to pass the standard.

In the 2007-08 water-year only 2 of 28 stations passed the standard for the October-May period; in contrast, 21 of the 28 stations passed the standard for the same period in 2009-10 (Table 1; Figure 4). For the June-September period, only one station passed the standard in 2007-08 and only two passed in 2009-10 (Table 1; Figure5). Overall for both time periods, most GMVs were less than 100 FC/100 mL. The worst offenders in order of decreasing importance were NA/0.1 and NA/0.7 on Naylors Creek, CH/7.8 and CH/4.1 on Chimacum Creek, ECH/4.8 and ECH/3.3 on East Chimacum Creek, BH/0.0 on Barnhouse Creek, and EG/0.0 on a ditch entering Chimacum Creek at CH/8.4. Fecal coliform concentrations (along with flow data) for individual sampling dates are provided in Appendix Table B-1.

In comparison to past years, the GMV calculated for all 12 months in 2007-08 was considerably higher at several stations than it was in other years except for the earliest years monitored (Figure 6). Especially notably high were stations NA/0.1 (GMV 255 FC/100 mL) and NA/0.7 (178 FC/100 mL) on Naylors Creek). Other stations with GMVs

higher than in former years were CH/7.8 (145 FC/100 mL), CH/8.8 (88 FC/100 mL), CH/6.7 (86 FC/100 mL), CH/1.1 (74 FC/100 mL), CH/5.3 (79 FC/100 mL), and CH/3.4 (63 FC/100 mL) on Chimacum Creek; ECH/4.8 (109 FC/100 mL) and ECH/3.3 (95 FC/100 mL) on East Chimacum Creek; and PU/0.0 (59 FC/100 mL) on Putaansuu Creek. It is notable that control station CH/9.4 had a GMV of 27 FC/100 mL in 2007-08, which is the highest GMV since monitoring began in 1988-89.

In contrast to the higher than usual levels in 2007-08, GMVs in 2009-10 were for the most part similar to those of previous recent years with the exception of the two stations on Naylor's Creek. The GMV at station NA/0.1 was 133 FC/100 mL and station NA/0.7 had a GMV of 225 FC/100 mL.

Average fecal coliform loading for the October-May period was substantially higher at most stations in 2007-08 than in 2009-10 (Figure 7). Average loading for this time period was especially high at station CH/0.1 (156.4 billion FC/day) in 2007-08. Loading was considerably higher coming from the main stem (CH/3.4) than from the East Fork (ECH/0.2). Naylors Creek (NA/0.1) was contributing considerably to the main stem. Relative loading contributions in the June-September period were similar to those of the October-May period (Figure 8). Loadings for individual sample dates are provided in Appendix Table B-2.

Compared to previous years, average loading in 2007-08 was higher at station CH/1.1, NA/0.1 and PU/0.0 than it was in all previous years monitored (Figure 9). In 2009-10 average loading at CH/1.1 was more than twice what it was in other years monitored since 2000.

Jefferson County Environmental Health Department and Conservation District have been trying to locate the cause of the high fecal coliform levels occurring on Naylors Creek and will continue to do so. The high fecal coliform levels at station CH/7.8 may be due mostly by livestock access to the creek at two drinking points. The District will continue working with landowners to replace these accesses with away-from-channel troughs fed by solar-powered pumps.

Temperature

Water temperature has the greatest impact on salmonids during the hot periods of summer. The optimal range for most salmonids is 12-14^{o}C (MacDonald et al. 1991). Lethal levels for adults are dependent on such factors as acclimation and duration, but they are generally in the range of 20-25^{o}C. Salmonid eggs and juveniles are much more sensitive to high temperatures than adults. Juvenile coho salmon, steelhead trout, and resident rainbow and cutthroat trout, which are present during the warmer summer months, are most likely to be affected by elevated stream temperatures.

Prior to 2004, the state temperature standard required that the water temperature in Jefferson County streams not exceed 16 degrees Celsius and it was based on a single measurement. In 2004, the standard was changed to a 7-day average daily maximum

(7-DADMax). In other words, the average of the maximum temperatures measured on seven consecutive days should not exceed 16 degrees Celsius. In 2006, in order to better protect spawning salmon and incubating eggs, some additional criteria were added to the temperature standard for certain streams within the state including Chimacum Creek. From September 15 to July 1 the 7-DADMax should not exceed 13 degrees Celsius. For the remainder of the year it should not exceed 16 degrees Celsius.

In this 4-year study, the number of stations that exceeded the 16 degree Celsius 7-DADMax standard ranged from 38 percent in 2010 to 84 percent in 2009 (Table 2). The percentage of stations on Chimacum Creek's main stem that exceeded the 13 degree DADMax standard ranged from 88 percent to 94 percent. Station CH/3.9, near the downstream end of the agricultural area on Chimacum Creek's main stem, had the highest number of days exceeding the 16 degree standard (118 days in 2009) and the highest number of days exceeding the 13 degree standard (65 days in 2009). East Chimacum Creek, which in addition to tree shading benefits from a narrow, incised stream channel, faired better. Downstream station ECH/0.1, the worst station on East Chimacum Creek, exceeded the standard on 44 days in 2009, but not at all during the other 3 years of the study. Judging from all of the data in Table 2, 2009 was a particularly warm year. Of the other three tributaries monitored, Putaansuu Creek had the highest temperatures with downstream station PU/0.0 exceeding the standard 69 days in 2009 and 64 days in 2008. Naylors Creek and Barnhouse Creek did comparatively well.

Table 3 shows the number of *hourly* measurements recorded by data loggers that exceeded 16 degrees Celsius and includes data from 1998 to 2010. Figure 10 shows the same thing graphically for downstream stations which have the longest history. In spite of the thousands of trees that have been planted in the Chimacum Creek watershed under the Conservation Reserve Enhanced Program, there appears to be no obvious downward trend at any of the stations. Two reasons probably account for this. First, the natural variation in air temperature from year to year masks trends. Second, most of the trees planted have not reached sufficient height to provide enough shade to make a difference.

Individual temperature graphs are provided in Appendix C.

Although there are presently no discernable decreasing trends in stream temperature, we should at some point start seeing them. The Conservation District will continue to encourage landowners to enroll in the Conservation Reserve Enhanced Program.

REFERENCES

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Figures

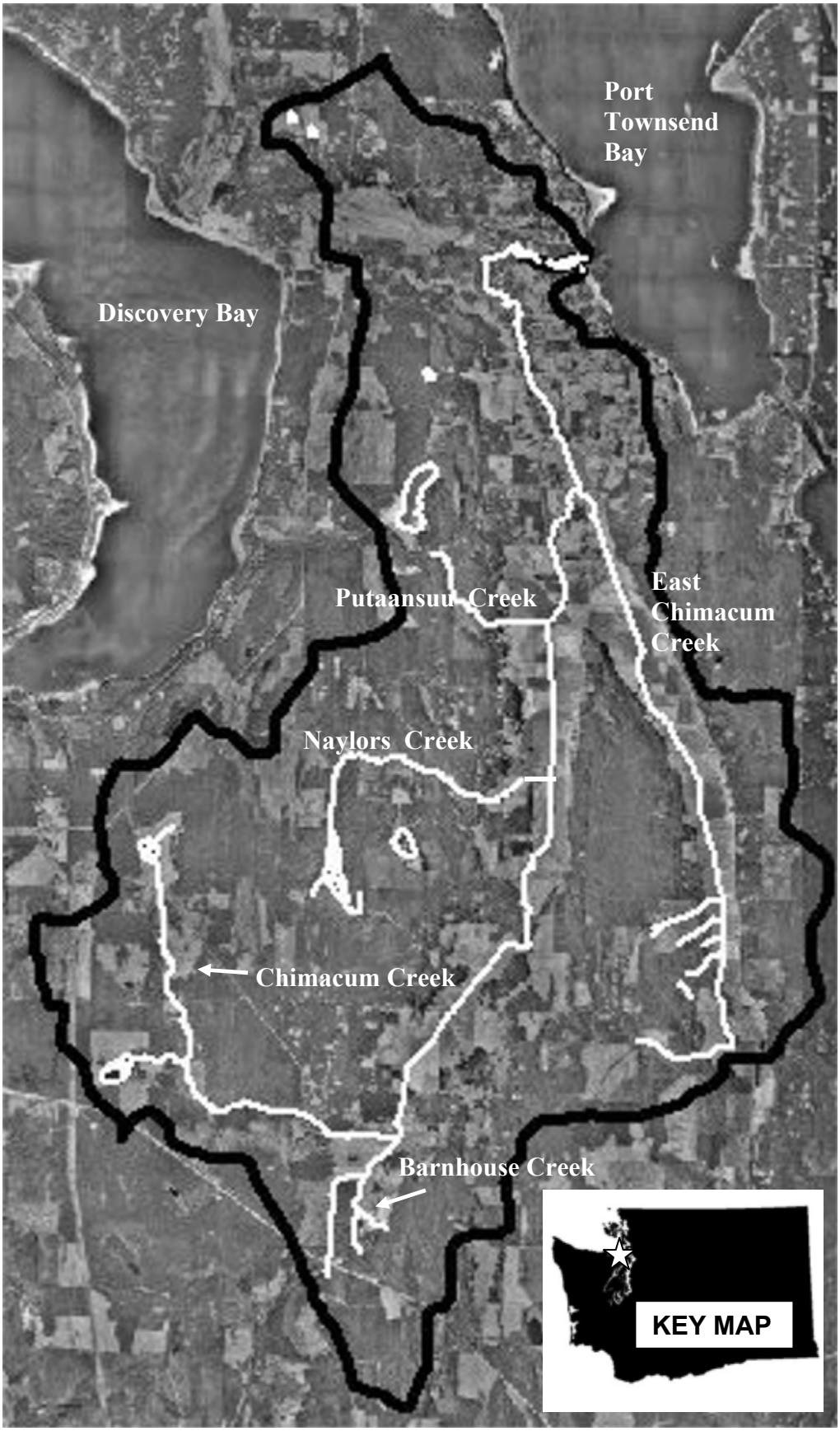


Figure 1. Map of Chimacum watershed showing Chimacum Creek and its major tributaries.

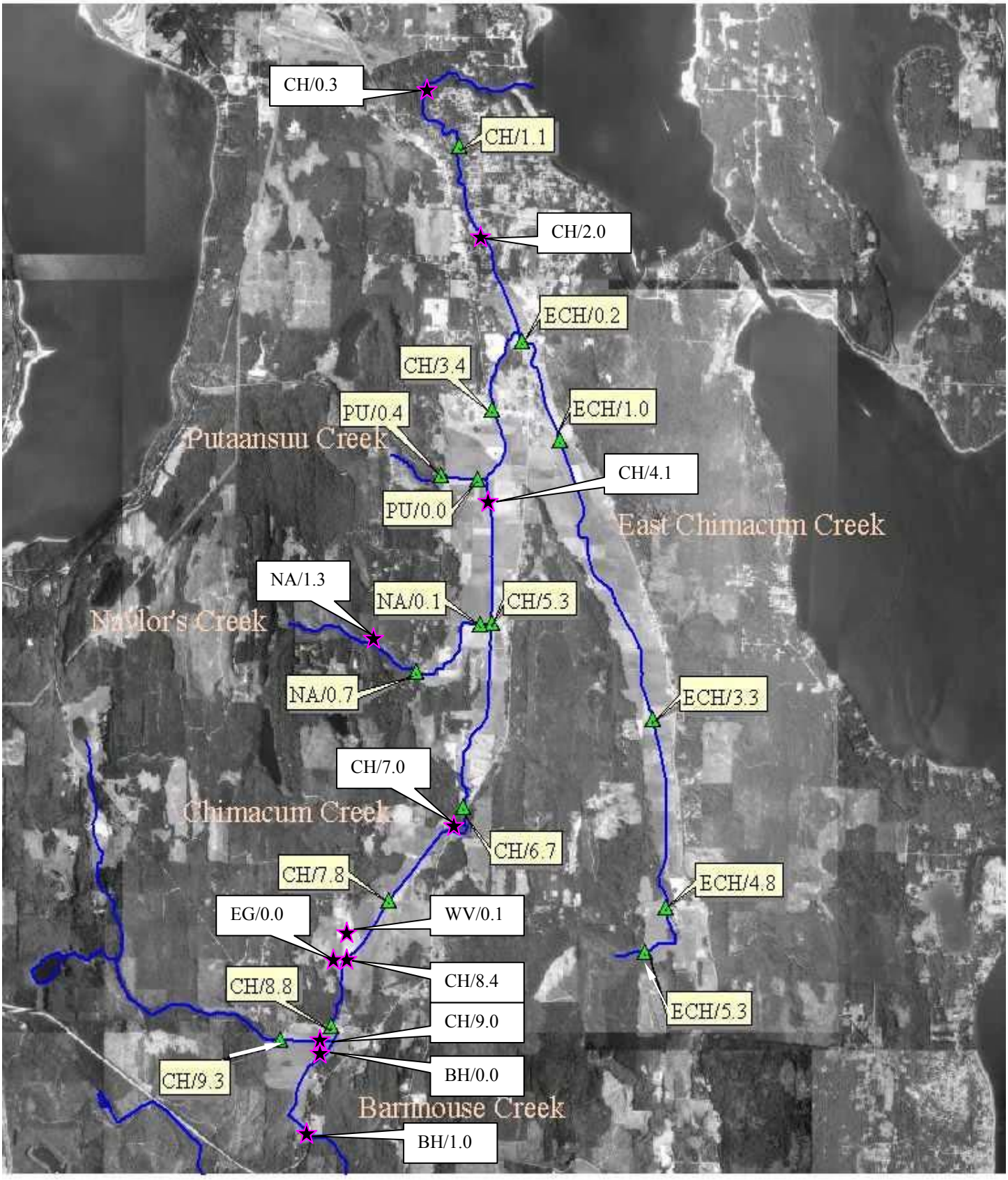


Figure 2. Map of Chimacum watershed showing existing (▲) and new (★) fecal coliform monitoring stations.

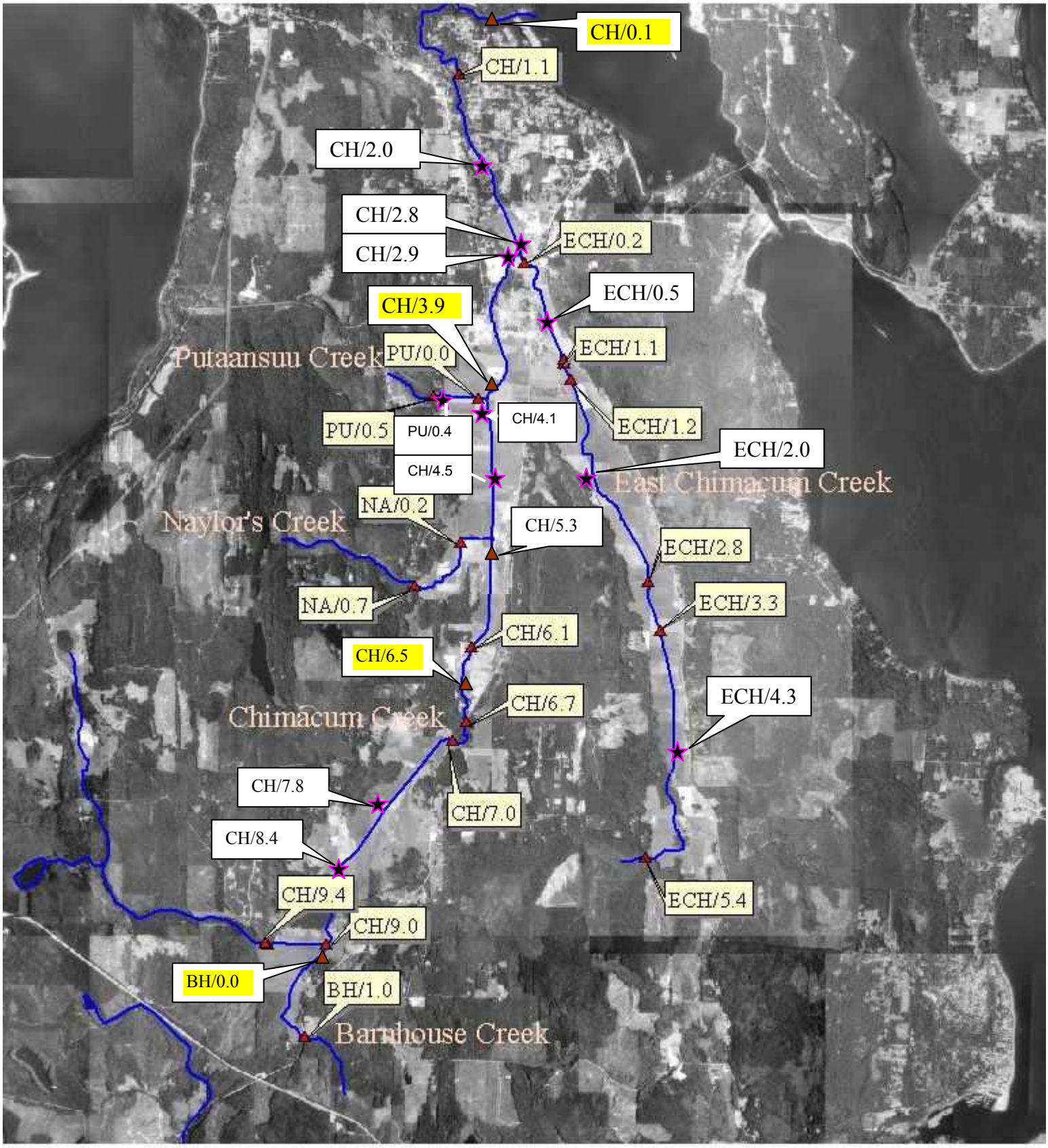


Figure 3. Map of Chimacum watershed showing existing (▲) and new (★) temperature data logger stations.

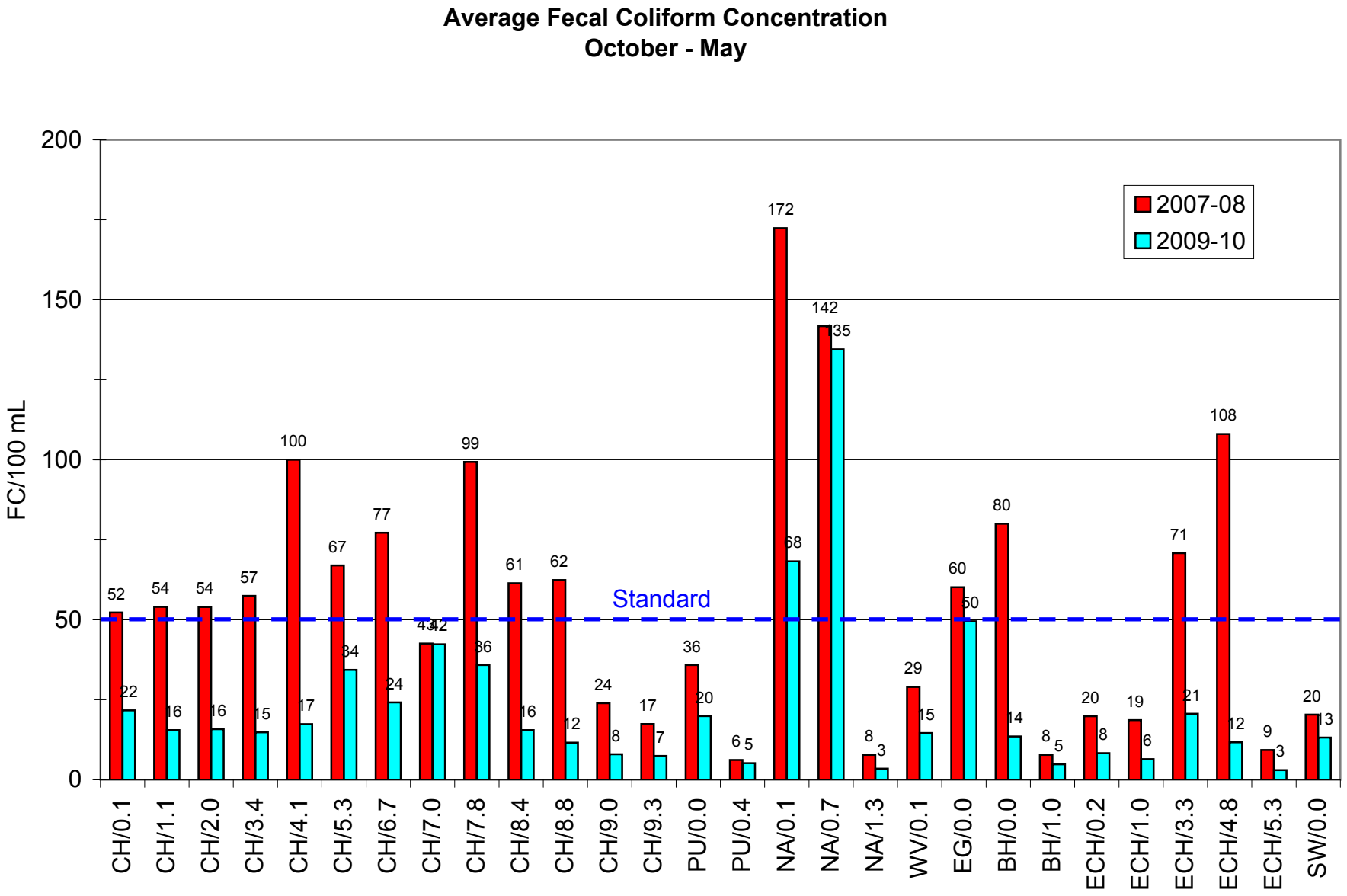


Figure 4. Fecal coliform geometric mean values (GMVs) for stations in the Chimacum Creek watershed monitored once per month from October to May in 2007-08 and 2009-10. The dotted line shows the state standard. M:\Water Quality\DATA\10-11\Final Report 10

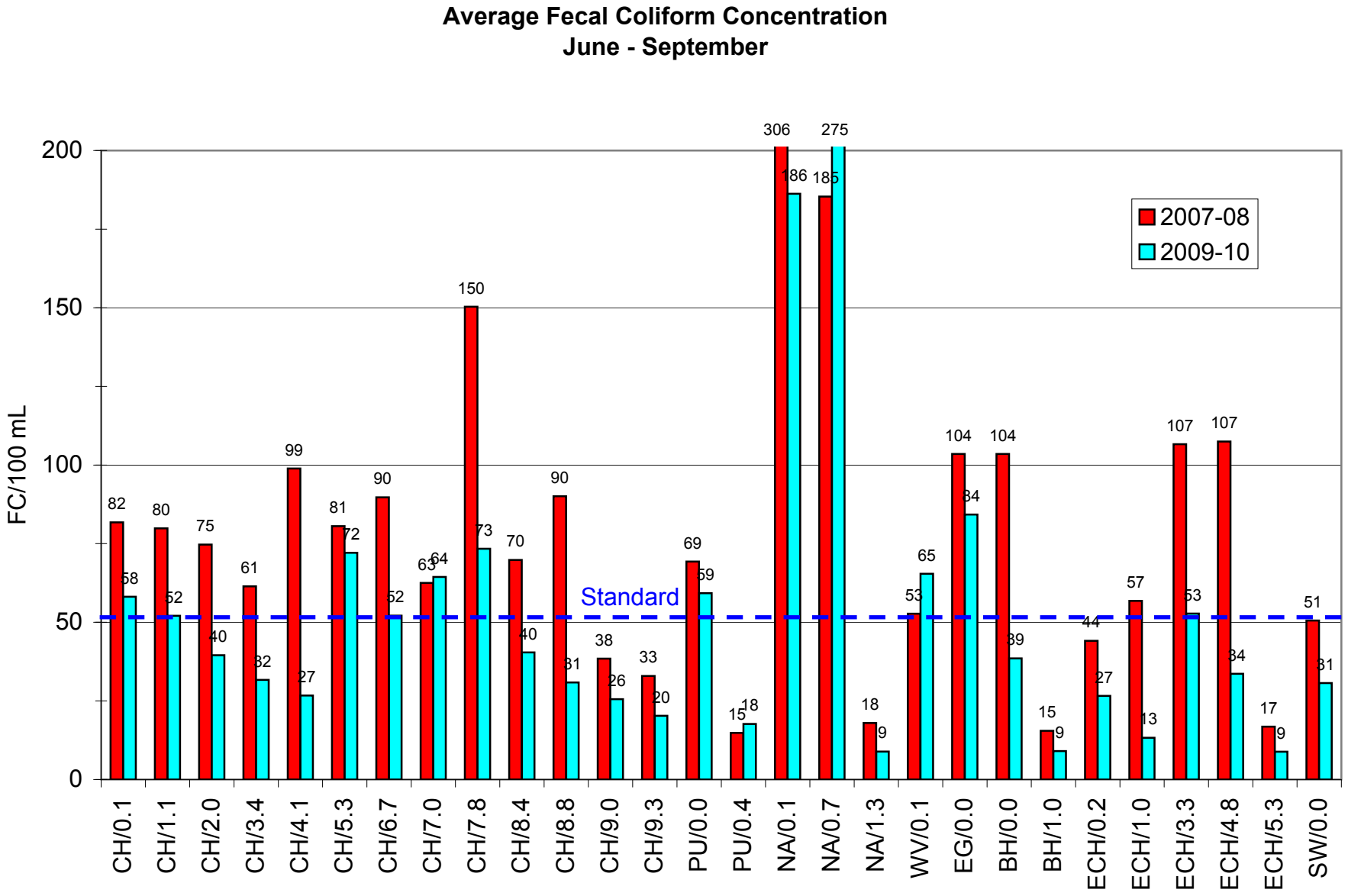


Figure 5. Fecal coliform geometric mean values (GMVs) for stations in the Chimacum Creek watershed monitored twice per month from June to September in 2007-08 and 2009-10. The dotted lines shows the state standard. M:\Water Quality\DATA\10-11\Final

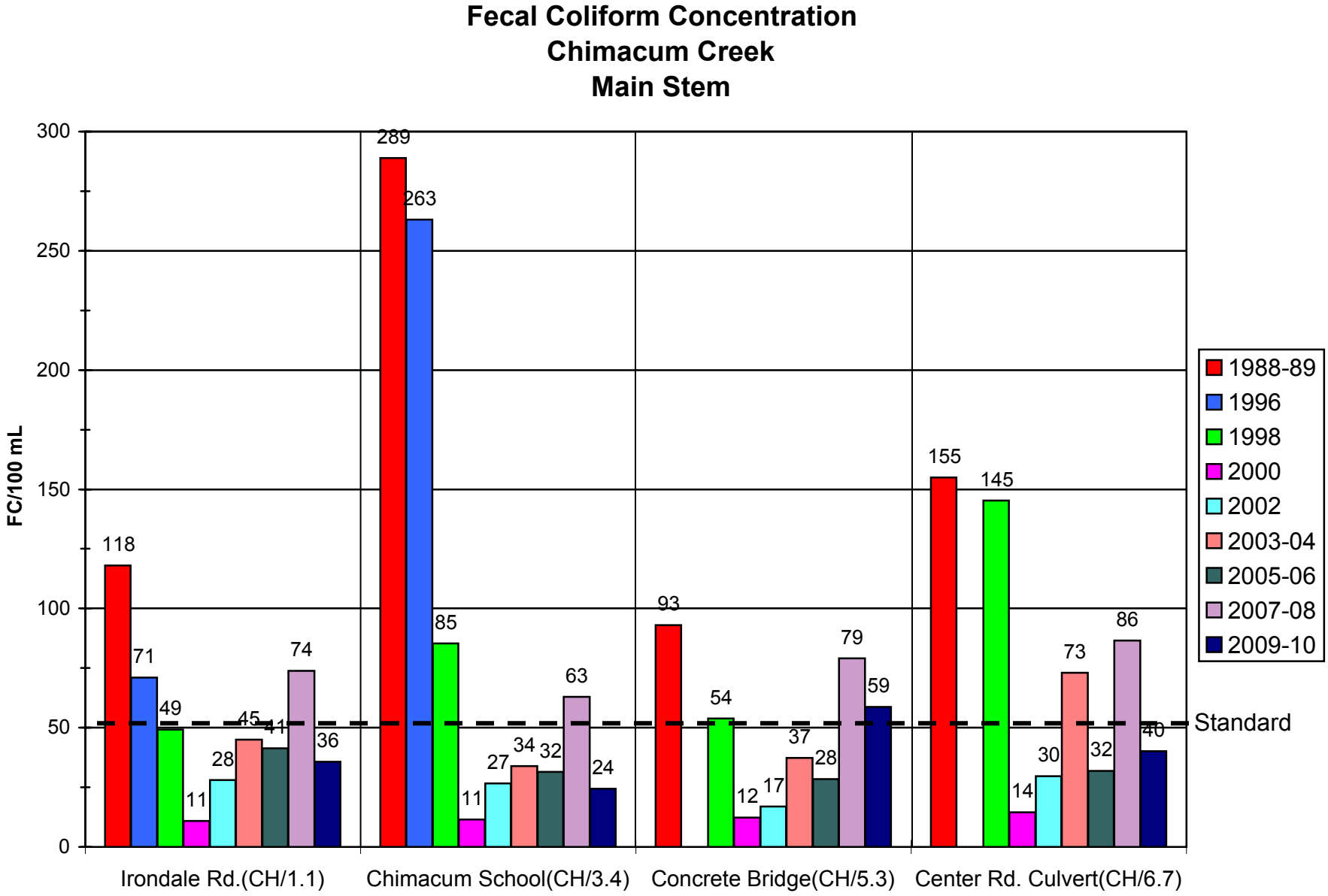
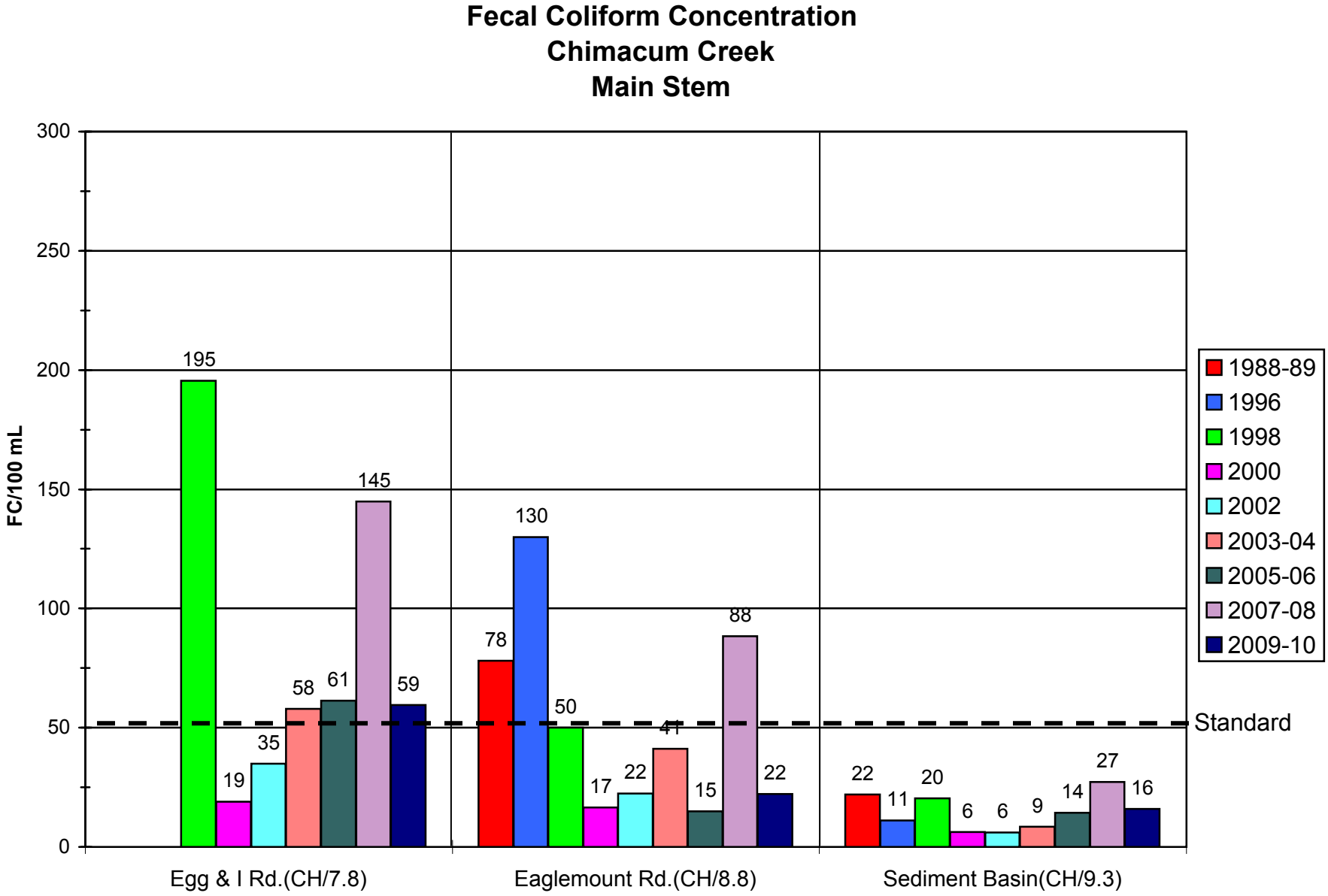


Figure 6. Fecal coliform geometric mean values (GMVs) for stations monitored monthly in the Chimacum Creek Watershed . The dashed line represents the state standard. M:\Water Quality\DATA\10-11\Final Report 10-11\Chimacum Final 10-11\Fig 6_Chim_FC_all_m



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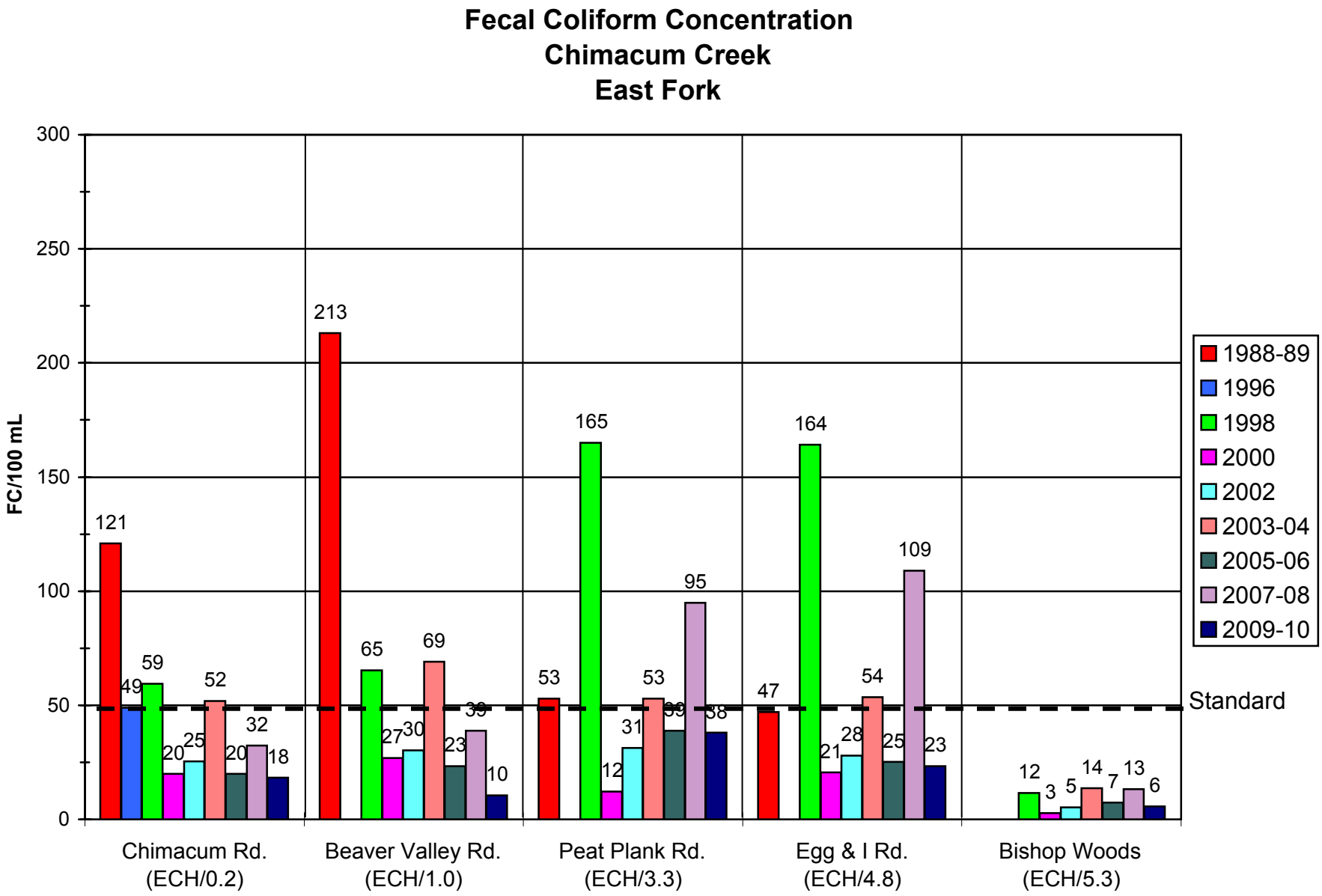

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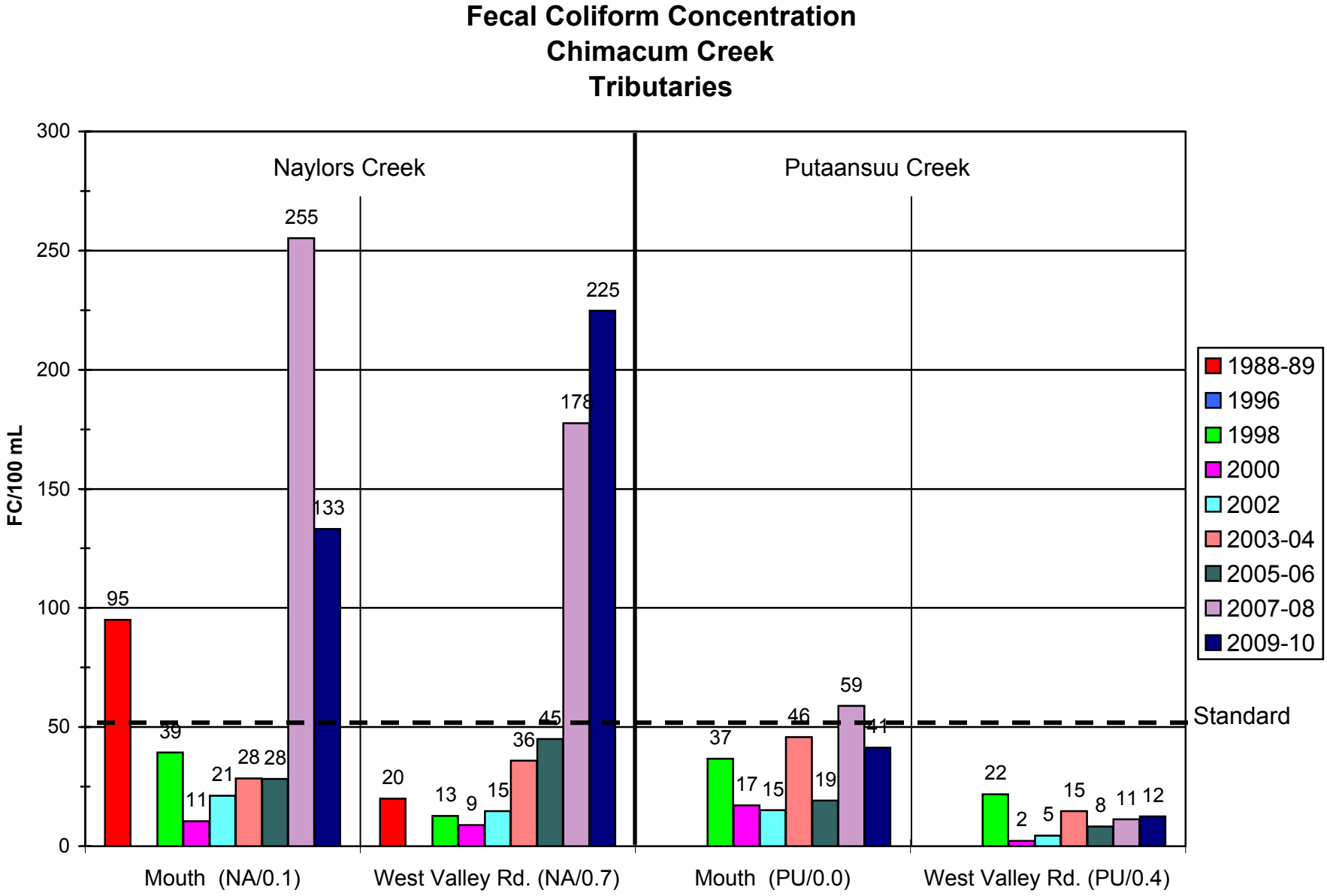

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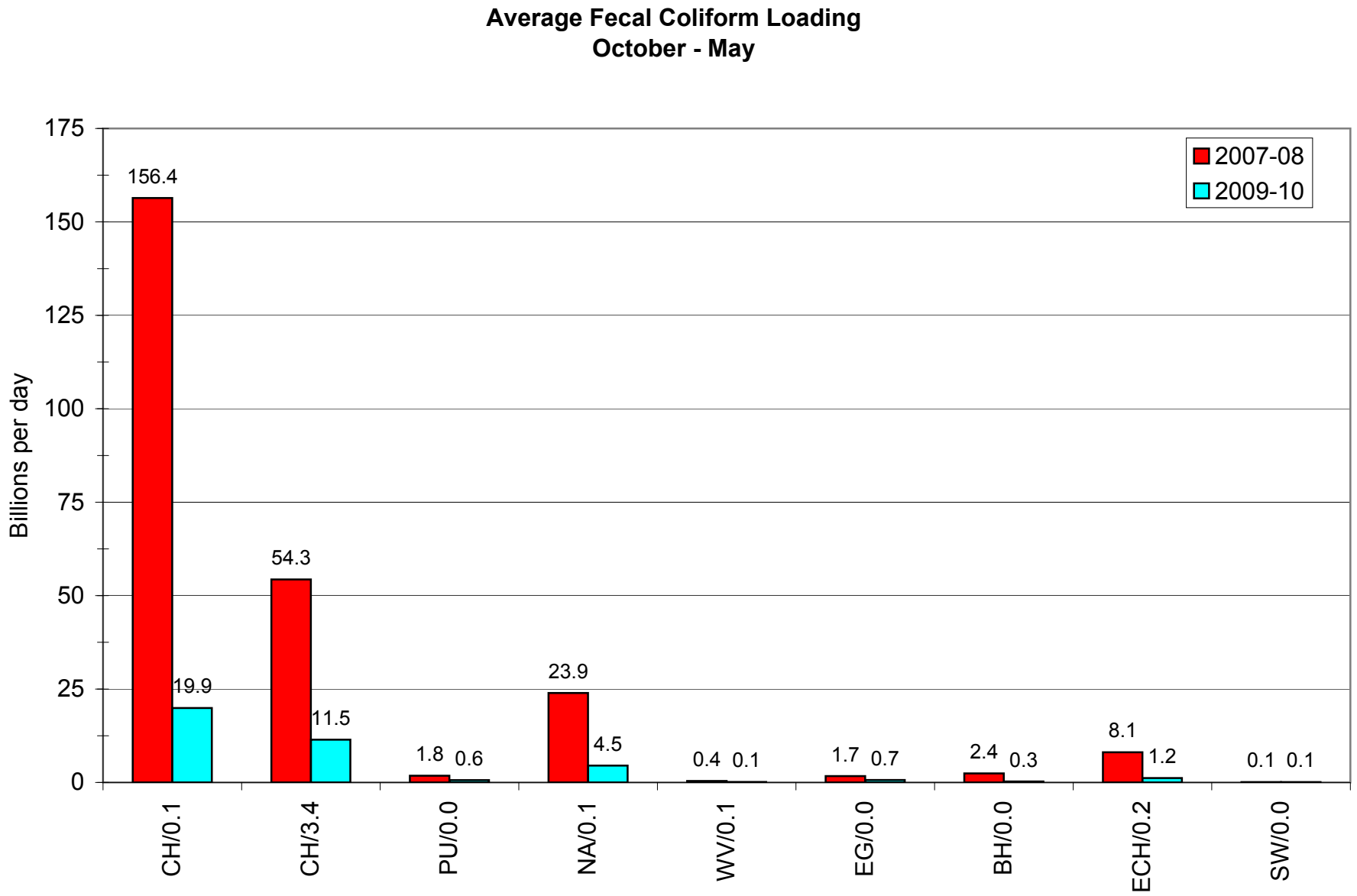

Figure 7. Average fecal coliform loading for stations monitored once per month from October to May in 2007-08 and 2009-10 in the Chimacum Creek watershed.

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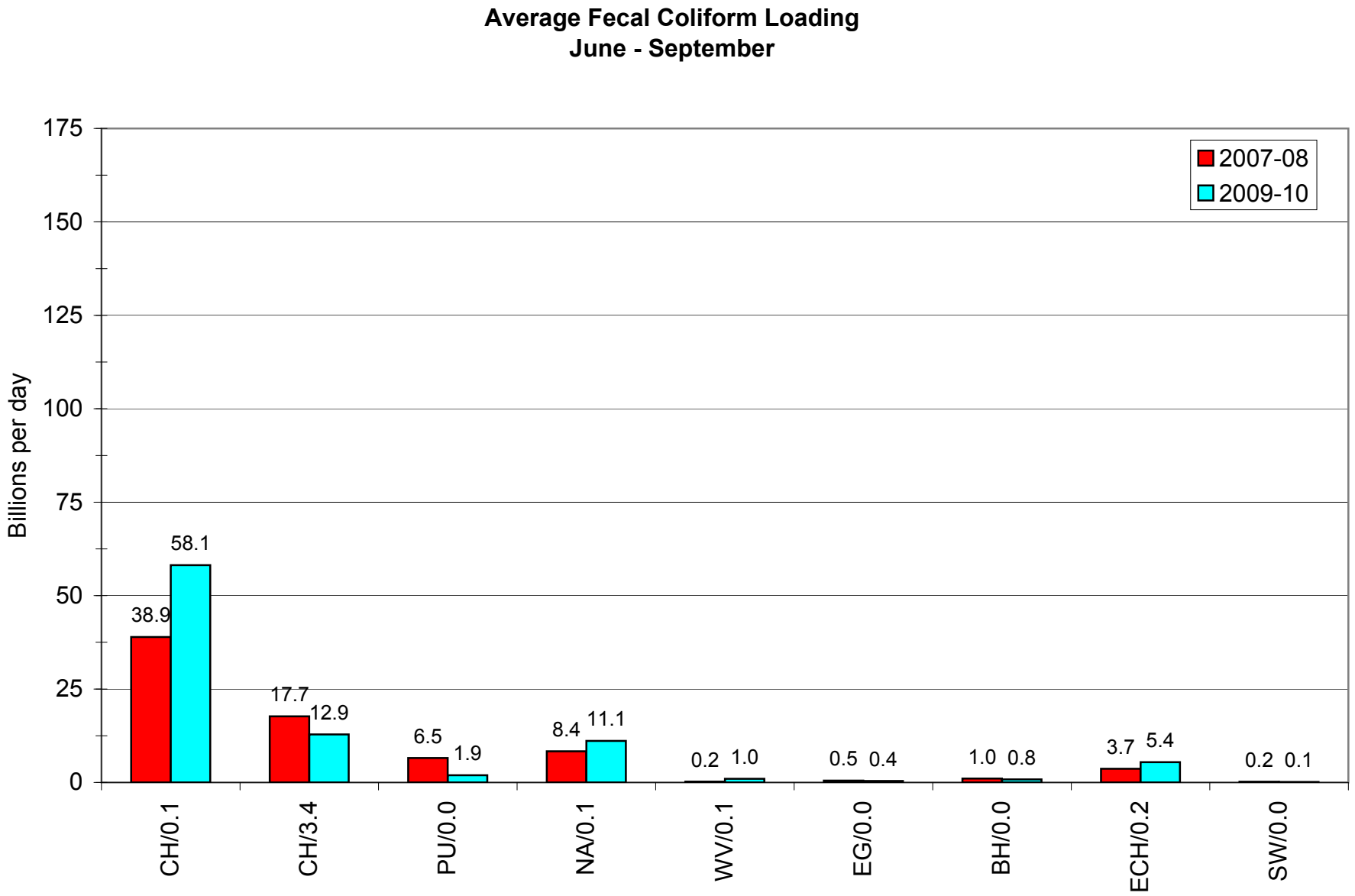

Figure 8. Average fecal coliform loading for stations monitored twice per month from June to September in 2007-08 and 2009-10 in the Chimacum Creek watershed. M:\Water Quality\DATA\10-11\Final Report 10-11\Chimacum Final 10-11\Fig 7&8_FC_loading.x

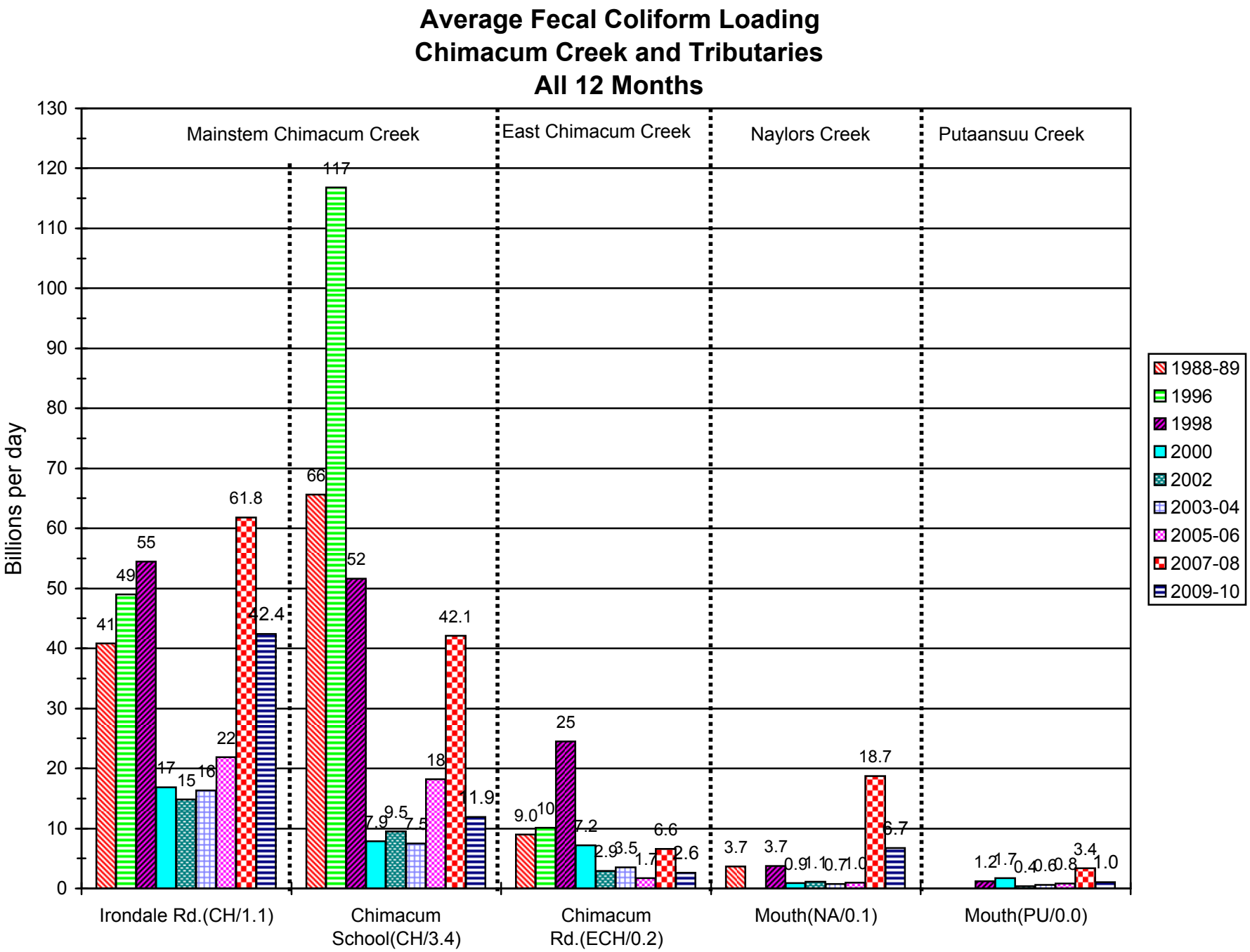

Figure 9.. Average fecal coliform loading at stations monitored monthly during 1988-89, 1996, 1998, 2000, 2002, 2003-04, 2005-06, 2007-08, and 2009-10 in the Chimacum Creek Watershed. M:\Water Quality\DATA\10-11\Final Report 10-11\Chimacum Final 10-11\F

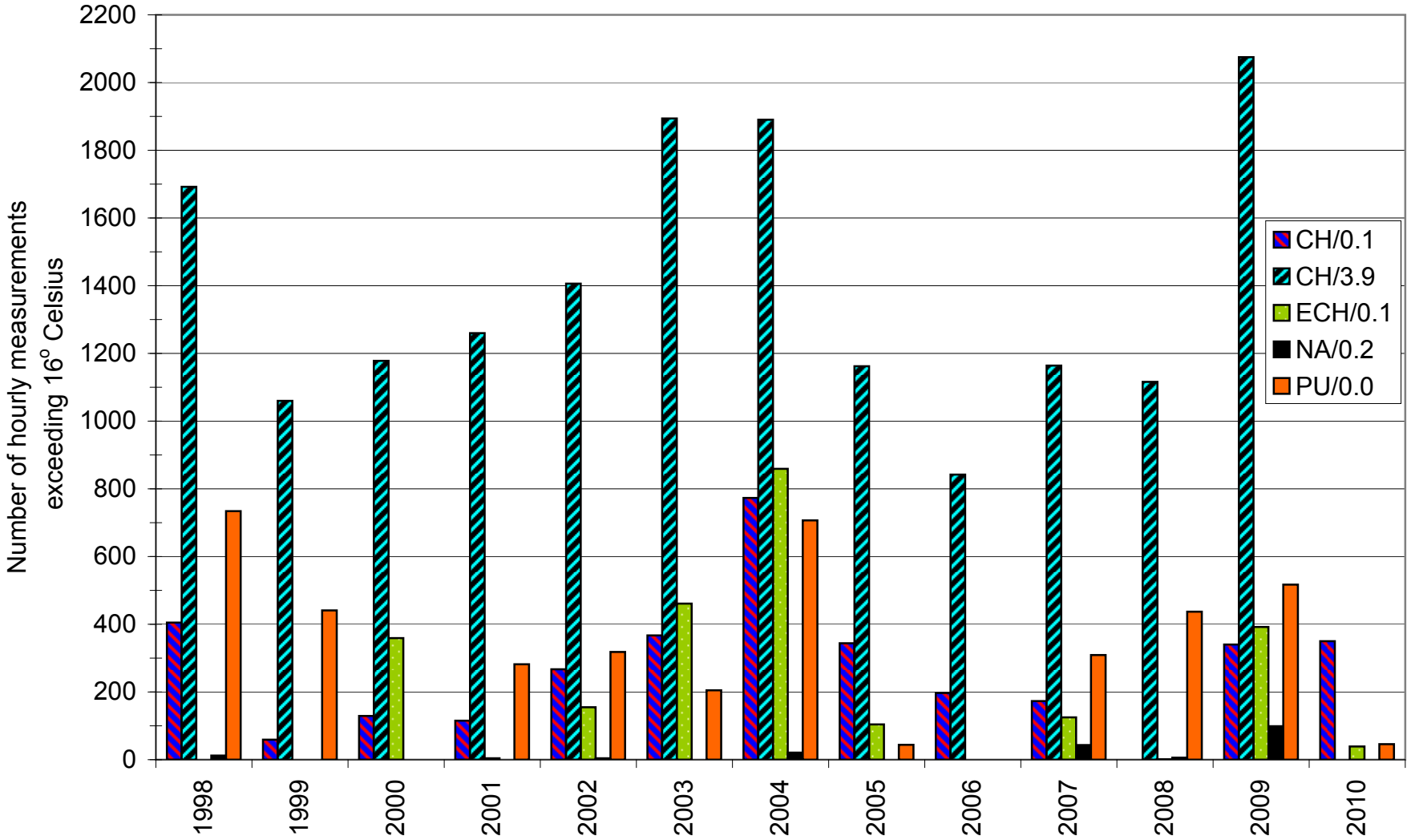

Figure 10. Number of hourly measurements exceeding 16 degrees Celsius made by temperature data loggers on downstream stations of Chimacum Creek and its tributaries from 1998 to 2010.

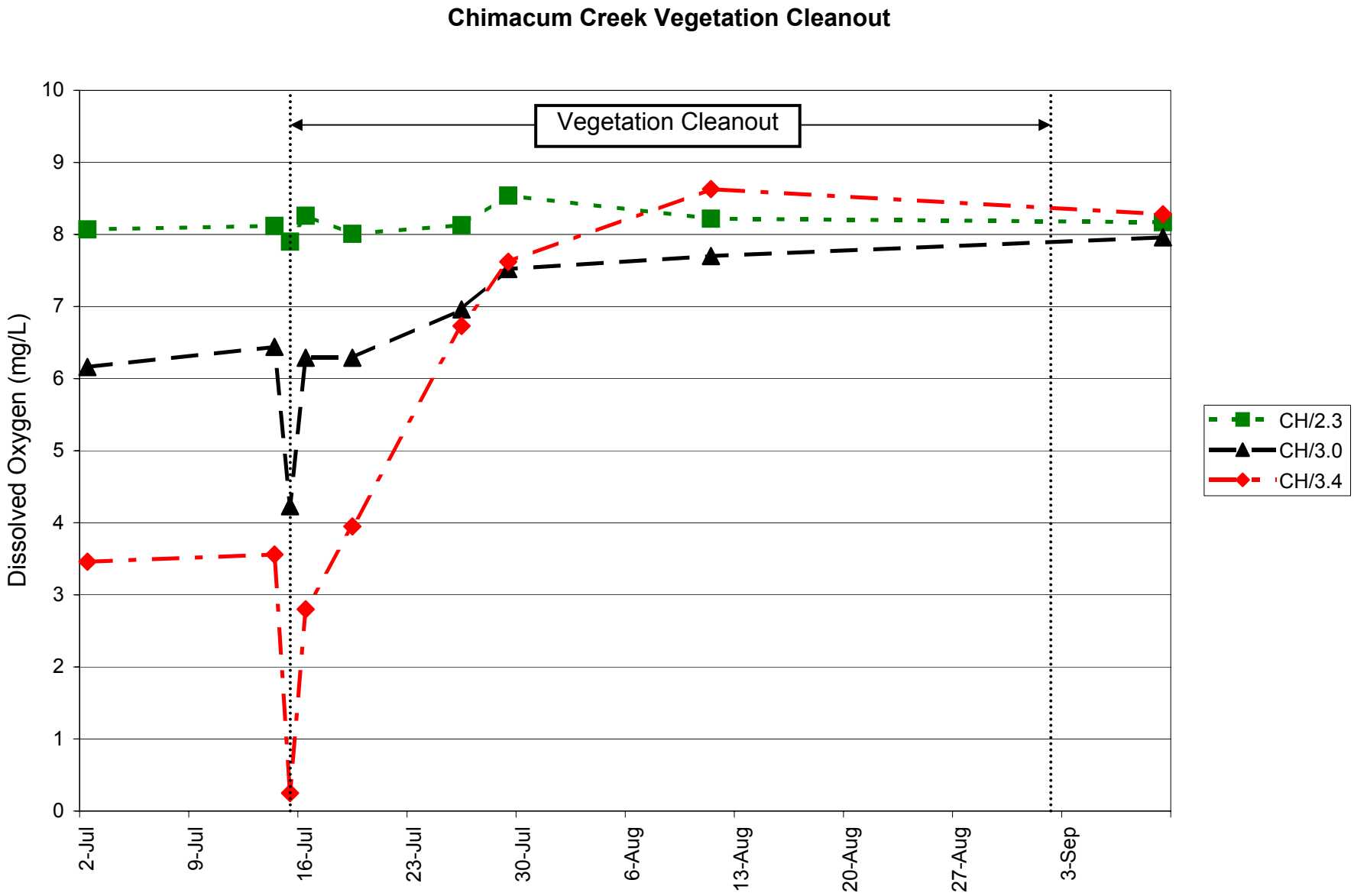

Figure 11. Dissolved Oxygen levels at three stations on Chimacum Creek monitored approximately weekly during the summer of 2010 when vegetation was removed from the creek. Vegetation was removed from RM 3.4 to RM 5.8. M:\Water Quality\DATA\10

TABLES

Table 1. Chimacum watershed stations, monitored once per month from October to May and twice per month from June to September in 2007-08 and 2009-10, showing status relative to the state fecal coliform standard. Part 1 of the standard requires that the geometric mean value (GMV) not exceed 50 FC/100 mL and part 2 requires that not more than 10% of the samples exceed 100 FC/100 mL. Both parts need to pass for the standard to be met.

Station	October to May				June to September			
	2007-08		2009-10		2007-08		2009-10	
	Part 1	Part 2	Part 1	Part 2	Part 1	Part 2	Part 1	Part 2
CH/0.1	Fail	Fail	Pass	Pass	Fail	Fail	Fail	Fail
CH/1.1	Fail	Fail	Pass	Pass	Fail	Fail	Fail	Fail
CH/2.0	Fail	Fail	Pass	Pass	Fail	Fail	Pass	Fail
CH/3.4	Fail	Fail	Pass	Pass	Fail	Fail	Pass	Fail
CH/4.1	Fail	Fail	Pass	Pass	Fail	Fail	Pass	Fail
CH/5.3	Fail	Fail	Pass	Pass	Fail	Fail	Fail	Fail
CH/6.7	Fail	Fail	Pass	Pass	Fail	Fail	Fail	Fail
CH/7.0	Pass	Fail	Pass	Fail	Fail	Fail	Fail	Fail
CH/7.8	Fail	Fail	Pass	Fail	Fail	Fail	Fail	Fail
CH/8.4	Fail	Fail	Pass	Pass	Fail	Fail	Pass	Fail
CH/8.8	Fail	Fail	Pass	Pass	Fail	Fail	Pass	Fail
CH/9.0	Pass	Fail	Pass	Pass	Pass	Fail	Pass	Fail
CH/9.3	Pass	Fail	Pass	Pass	Pass	Fail	Pass	Fail
PU/0.0	Pass	Fail	Pass	Pass	Fail	Fail	Fail	Fail
PU/0.4	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Fail
NA/0.1	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail
NA/0.7	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail
NA/1.3	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass
WV/0.1	Pass	Fail	Pass	Pass	Fail	Fail	Fail	Fail
EG/0.0	Fail	Fail	Pass	Fail	Fail	Fail	Fail	Fail
BH/0.0	Fail	Fail	Pass	Fail	Fail	Fail	Fail	Fail
BH/1.0	Pass	Fail	Pass	Pass	Pass	Fail	Pass	Fail
ECH/0.2	Pass	Fail	Pass	Pass	Pass	Fail	Pass	Fail
ECH/1.0	Pass	Fail	Pass	Pass	Fail	Fail	Pass	Pass
ECH/3.3	Fail	Fail	Pass	Fail	Fail	Fail	Fail	Fail
ECH/4.8	Fail	Fail	Pass	Pass	Fail	Fail	Pass	Fail
ECH/5.3	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Fail
SW/0.0	Pass	Fail	Pass	Pass	Fail	Fail	Pass	Fail

Table 2. Number of days that the 7-DADMax exceeded the state temperature standards of 13 degrees Celsius and 16 degrees Celsius at stations monitored in the Chimacum Creek watershed in 2007, 2008, 2009, and 2010. The 13 degree standard applies only to the main stem of Chimacum Creek. The percentage of stations failing the stanard is shown at the bottom.

Station	Number of 7-DADMax days exceeding 16° C	Number of 7-DADMax days exceeding 13° C between 9/15 and 7/1	Number of 7-DADMax days exceeding 16° C	Number of 7-DADMax days exceeding 13° C between 9/15 and 7/1	Number of 7-DADMax days exceeding 16° C	Number of 7-DADMax days exceeding 13° C between 9/15 and 7/1	Number of 7-DADMax days exceeding 16° C	Number of 7-DADMax days exceeding 13° C between 9/15 and 7/1
	2007		2008		2009		2010	
CH/0.1	14	30			30	47	30	55
CH/1.1	34	44			58	51	33	57
CH/2.0	38	43	22	35	63	52	76	55
CH/2.8	39	45	34	40	70	52	77	56
CH/2.9	54	49	54	50	74	52	94	62
CH/3.9	70	49	83	57	118	65		
CH/4.1	63	48	81	57	111	54		
CH/4.5	43	50	50	50	115	53		
CH/5.3			41	32	85[a]	43[a]		
CH/6.1	8	17	0	23	75	50		
CH/6.5	8	22	4	31				
CH/6.7	20	36			82	52		
CH/7.0	36	46	39	41	116	55		
CH/7.8	10	27	0	18	31	42	0	30
CH/8.4	7	21	0	16	12	41	0	20
CH/9.0	0	9	0	5	5	19	0	7
CH/9.4	0	0	0	0	0	0		
ECH/0.1	0		0		44		0	
ECH/0.5	3		0		21		0	
ECH/1.0	0		0		32		0	
ECH/1.2	0		0		9			
ECH/2.0	0		0		11			
ECH/2.8	0				6			
ECH/3.3	0				6			
ECH/4.3	0		0		4		0	
ECH/5.4	0		0		0			
BH/0.0	6		0		9		6	
BH/1.0	0				0			
NA/0.2	8		0		9			
NA/0.7	0		0		0		0	
PU/0.0	32		64		69		2	
PU/0.4	35		19		10		0	
PU/0.5	0		0		0		0	
Percentage of stations failing the standard	59	94	41	93	84	94	38	88

[a]Data logging ended on 8/28/2009

Table 3. Number of hourly measurements exceeding 16 degrees Celsius made by temperature data loggers at stations in the Chimacum Creek watershed from 1998 to 2010.

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
CH/0.1	405	59	129	115	267	367	773	344	197	173		340	350
CH/1.1			411	62	507	908	1169	415	339	479		624	472
CH/2.0										556	248	772	780
CH/2.3			350	287	437								
CH/2.8										575	397	954	777
CH/2.9										822	603	1143	1115
CH/3.9	1692	1060	1178	1260	1406	1894	1890	1162	842	1164	1116	2075	
CH/4.1										1121	1099	1972	
CH/4.5										797	719	1898	
CH/5.3	936	168[a]		389	764	1194	1061	434	338		430	1457[b]	
CH/6.1				11	85	287	323	56	135	103	73	711	
CH/6.5							64	0	25	84	57		
CH/6.7			1	5	0	50	28	0	56	148		742	
CH/7.0			67		143	107	0	0	73	259	242	1037	
CH/7.8										90	23	302	30
CH/8.4										62	22	196	36
CH/9.0	120	20	0	0	3	38	15	0	19	16	0	35	0
CH/9.4	0	0	0	0	0	0	0	0	0	0	0	0	
ECH/0.1			359	4	155	461	859	104		125	1	392	39
ECH/0.5										35	0	416	0
ECH/1.0	265	23	425	270	290	976	448	32		14	0	399	0
ECH/1.2					0	856	552	30		9	0	188	
ECH/2.0										20	0	161	
ECH/2.2			0	0	0								
ECH/2.8						0	14	0		0		100	
ECH/3.3	19	0	0	0	0	0	4	0		10		63	
ECH/4.3										17	0	39	0
ECH/5.4	0	0	0	0	0	0	0	0		0	0	0	
BH/0.0			0		130	29	158	35		50	27	148	84
BH/1.0			0		0	0		0		0		0	
NA/0.2	12	0	0	0	4	0	21	0		43	6	99	
NA/0.7			0	0	0	0		0		0	0	0	0
PU/0.0	734	441		282	318	205	707	44		309	437	517	46
PU/0.4										234	98	109	7
PU/0.5			0		0	0		0		0	0	0	0

[a]Data logging ended on 8/21/1999

[b]Data logging ended on 8/28/2009

Appendix A

Quality Control Results

Table A-1. Quality control results (absolute differences and relative standard deviations) for fecal coliform field replicates sampled in the Chimacum watershed in 2007-08 and 2009-10. Minimum, maximum, and mean values are also shown.

Fecal Coliform						
Station	DATE	TIME	Rep 1 (FC/100 mL)	Rep 2 (FC/100 mL)	Absolute Difference (FC/100 mL)	Relative Standard Deviation (Percent)
BH/0.0	5/14/2008	1130	426	368	58	10
BH/0.0	8/21/2008	1127	38	26	12	27
BH/0.0	3/2/2010	1150	14	6	8	57
BH/0.0	8/31/2010	1207	480	560	80	11
BH/1.0	9/9/2008	1311	10	10	0	0
BH/1.0	4/14/2010	1303	72	50	22	26
BH/1.0	7/20/2010	1216	56	58	2	2
BH/1.0	9/14/2010	1330	6	4	2	28
CH/0.1	2/6/2008	930	20	22	2	7
CH/0.1	8/5/2008	1025	48	96	48	47
CH/0.1	8/17/2010	949	188	176	12	5
CH/1.1	10/18/2007	945	82	62	20	20
CH/1.1	8/17/2010	1011	168	170	2	1
CH/2.0	2/6/2008	1000	22	16	6	22
CH/2.0	8/5/2008	1120	58	104	46	40
CH/2.0	8/17/2010	1027	160	112	48	25
CH/3.4	10/18/2007	1007	26	51	25	46
CH/3.4	6/10/2008	1045	332	374	42	8
CH/3.4	9/22/2008	1005	62	42	20	27
CH/3.4	5/4/2010	942	32	30	2	5
CH/3.4	9/28/2010	944	84	86	2	2
CH/4.1	2/6/2008	1010	38	42	4	7
CH/4.1	6/29/2010	1122	12	2	10	101
CH/5.3	10/18/2007	1026	42	118	76	67
CH/5.3	6/10/2008	1102	394	332	62	12
CH/5.3	9/22/2008	1027	72	76	4	4
CH/5.3	5/4/2010	952	52	44	8	12
CH/5.3	9/28/2010	1004	158	134	24	12
CH/6.7	3/11/2008	1256	50	28	22	40
CH/6.7	7/20/2010	1239	80	114	34	25
CH/7.0	3/11/2008	1240	18	24	6	20
CH/7.0	7/20/2010	1228	74	80	6	6
CH/7.8	11/15/2007	1048	52	32	20	34
CH/7.8	6/24/2008	1043	43	38	5	9
CH/7.8	10/6/2009	1027	336	200	136	36
CH/7.8	6/1/2010	1035	134	76	58	39
CH/8.4	4/16/2008	1050	60	56	4	5
CH/8.4	8/21/2008	1055	96	52	44	42
CH/8.4	3/2/2010	1110	12	10	2	13
CH/8.4	8/31/2010	1140	1470	586	884	61
CH/8.8	4/16/2008	1220	54	52	2	3
CH/8.8	9/9/2008	1256	370	330	40	8
CH/8.8	4/14/2010	1249	10	4	6	61
CH/8.8	9/14/2010	1315	42	34	8	15

Table A-1. Quality control results (absolute differences and relative standard deviations) for fecal coliform field replicates sampled in the Chimacum watershed in 2007-08 and 2009-10. Minimum, maximum, and mean values are also shown.

Fecal Coliform						
Station	DATE	TIME	Rep 1 (FC/100 mL)	Rep 2 (FC/100 mL)	Absolute Difference (FC/100 mL)	Relative Standard Deviation (Percent)
CH/9.0	5/14/2008	1130	20	24	4	13
CH/9.0	8/21/2008	1120	20	40	20	47
CH/9.0	3/2/2010	1141	14	24	10	37
CH/9.0	8/31/2010	1202	88	94	6	5
CH/9.3	5/14/2008	1145	10	24	14	58
CH/9.3	9/9/2008	1238	360	500	140	23
CH/9.3	4/14/2010	1234	2	1	1	47
CH/9.3	9/14/2010	1228	4	10	6	61
ECH/0.2	12/5/2007	1146	144	144	0	0
ECH/0.2	7/1/2008	1223	244	228	16	5
ECH/0.2	11/3/2009	1200	6	4	2	28
ECH/0.2	6/29/2010	1153	26	22	4	12
ECH/1.0	1/9/2008	1142	10	18	8	40
ECH/1.0	7/1/2008	1244	228	208	20	6
ECH/1.0	11/3/2009	1247	12	24	12	47
ECH/1.0	7/6/2010	1129	14	20	6	25
ECH/3.3	1/9/2008	1157	58	50	8	10
ECH/3.3	7/22/2008	1148	228	292	64	17
ECH/3.3	7/6/2010	1154	336	264	72	17
ECH/4.8	1/9/2008	1231	28	146	118	96
ECH/4.8	7/22/2008	1220	188	208	20	7
ECH/4.8	12/1/2009	1311	16	2	14	110
ECH/5.3	7/22/2008	1235	76	42	34	41
ECH/5.3	10/6/2009	1342	8	8	0	0
ECH/5.3	12/1/2009	1327	1	12	11	120
EG/0.0	4/16/2008	1100	10	10	0	0
EG/0.0	2/3/2010	1107	22	22	0	0
NA/0.1	11/15/2007	1032	240	200	40	13
NA/0.1	6/10/2008	1115	664	1660	996	61
NA/0.1	9/22/2008	1041	768	560	208	22
NA/0.1	5/4/2010	1000	248	178	70	23
NA/0.1	9/28/2010	1011	416	374	42	8
NA/0.7	11/15/2007	1101	410	230	180	40
NA/0.7	6/24/2008	1101	44	32	12	22
NA/0.7	10/6/2009	1047	650	670	20	2
NA/0.7	6/1/2010	1048	136	200	64	27
NA/1.3	12/5/2007	1112	56	68	12	14
NA/1.3	6/24/2008	1115	6	10	4	35
NA/1.3	6/1/2010	1114	62	50	12	15
PU/0.0	3/11/2008	1020	2	1	1	47
PU/0.0	11/3/2009	1121	30	8	22	82
PU/0.0	6/29/2010	1112	436	416	20	3
PU/0.4	12/5/2007	1130	30	38	8	17
PU/0.4	7/1/2008	1203	126	186	60	27

Table A-1. Quality control results (absolute differences and relative standard deviations) for fecal coliform field replicates sampled in the Chimacum watershed in 2007-08 and 2009-10. Minimum, maximum, and mean values are also shown.

Fecal Coliform						
Station	DATE	TIME	Rep 1 (FC/100 mL)	Rep 2 (FC/100 mL)	Absolute Difference (FC/100 mL)	Relative Standard Deviation (Percent)
PU/0.4	2/3/2010	1036	12	16	4	20
SW/0.0	12/1/2009	1232	20	2	18	116
SW/0.0	7/6/2010	1213	42	60	18	25
WV/0.1	2/3/2010	1057	50	86	36	37
Minimum					0	0
Maximum					996	120
Mean					48	28

Table A-2. Comparison of data logger temperature to that of a mercury-filled thermometer with tenth of a degree gradations.

Date Tested	Serial No	Station	Mercury Thermometer	Temperature Data Logger	Difference
1/10/2007	1088586		20.21	20.20	-0.01
1/10/2007	1088628		20.21	20.17	-0.04
1/10/2007	1098608		20.21	20.25	0.04
1/10/2007	1088602		20.21	20.20	-0.01
1/10/2007	1098636		20.21	20.17	-0.04
1/10/2007	1098609		20.21	20.20	-0.01
1/10/2007	1098613		23.88	23.86	-0.02
1/10/2007	1098600		23.88	23.81	-0.07
1/10/2007	1088616		23.88	23.93	0.05
1/10/2007	1098597		23.88	23.86	-0.02
1/10/2007	1098610		23.88	23.91	0.03
1/10/2007	1098634		20.09	20.13	0.04
1/10/2007	1098624		19.97	20.01	0.04
1/10/2007	1098618		23.88	23.83	-0.05
1/10/2007	1098625		19.97	20.01	0.04
1/10/2007	1098623		19.97	20.01	0.04
1/10/2007	1098605		20.09	20.08	-0.01
1/10/2007	1098611		20.18	20.10	-0.08
1/10/2007	1098612		20.09	20.03	-0.06
1/10/2007	1098627		20.09	20.01	-0.08
1/10/2007	1098601		20.09	20.13	0.04
1/10/2007	1098622		20.09	20.15	0.06
1/10/2007	1098606		20.18	20.13	-0.05
1/10/2007	1098602		20.18	20.10	-0.08
1/10/2007	1098604		20.18	20.13	-0.05
1/10/2007	1098603		20.18	20.10	-0.08
1/10/2007	1098599		20.18	20.17	-0.01
1/10/2007	1098596		20.09	20.06	-0.04
1/11/2007	1098619		19.78	19.77	-0.01
1/11/2007	1098635		19.70	19.67	-0.03
1/11/2007	1098620		19.70	19.70	0.00
1/11/2007	1098621		19.70	19.65	-0.05
1/11/2007	1098633		19.78	19.72	-0.06
1/11/2007	1098617		19.78	19.82	0.04
1/11/2007	1098631		19.58	19.51	-0.07
1/11/2007	1098614		19.70	19.65	-0.05
1/11/2007	1098616		19.78	19.82	0.04
1/11/2007	1098612		19.78	19.72	-0.06
1/11/2007	1098626		19.78	19.82	0.04
1/11/2007	1086517		19.58	19.58	0.00
1/11/2007	1098607		19.70	19.65	-0.05
1/11/2007	1098595		19.58	19.58	0.00
1/11/2007	1088669		19.64	19.58	-0.06
1/11/2007	1098630		19.58	19.53	-0.05
1/11/2007	1098629		19.64	19.65	0.01
1/11/2007	1088635		19.64	19.63	-0.01
1/11/2007	1098632		19.64	19.60	-0.04
1/11/2007	1098628		19.64	19.70	0.06
1/11/2007	1088585		19.70	19.72	0.02

Table A-2. Comparison of data logger temperature to that of a mercury-filled thermometer with tenth of a degree gradations.

Date Tested	Serial No	Station	Mercury Thermometer	Temperature Data Logger	Difference
1/11/2007	1098598		19.64	19.65	0.01
11/6/2007	1098629		21.00	20.91	-0.09
11/6/2007	1098607		21.00	20.96	-0.04
11/6/2007	1098632		21.00	20.91	-0.09
11/6/2007	1098619		21.00	20.91	-0.09
11/6/2007	1098617		21.00	20.98	-0.02
11/6/2007	1088635		21.00	20.91	-0.09
11/6/2007	1098627		21.00	20.91	-0.09
11/6/2007	1088585		21.00	20.94	-0.06
11/6/2007	1098621		21.00	20.89	-0.11
11/6/2007	1098636		21.02	20.89	-0.13
11/6/2007	1098595		21.00	20.91	-0.09
11/6/2007	1088692		21.00	20.89	-0.11
11/6/2007	1098604		21.08	21.03	-0.05
11/6/2007	1098635		21.02	20.96	-0.06
11/6/2007	1098597		21.00	20.89	-0.11
11/6/2007	1098628		21.08	21.08	0.00
11/6/2007	1088669		21.08	20.96	-0.12
11/6/2007	1098620		21.08	21.06	-0.02
11/6/2007	1098614		21.08	21.03	-0.05
11/6/2007	1098626		21.08	21.08	0.00
11/6/2007	1098598		21.02	20.98	-0.04
11/6/2007	1086517		21.02	20.98	-0.04
11/6/2007	1098631		21.02	20.91	-0.11
11/6/2007	1098633		21.02	20.91	-0.11
11/6/2007	1098611		21.02	20.94	-0.08
11/6/2007	1088673		21.08	21.06	-0.02
3/25/08	1088635	BH/0.0	20.04	20.13	0.09
3/25/08	1088673	BH/1.0	19.93	19.98	0.05
3/25/08	1098636	CH/2.0	19.71	19.65	-0.06
3/25/08	1088669	CH/2.8	19.93	19.89	-0.04
3/25/08	1098598	CH/2.9	19.71	19.75	0.04
3/25/08	1098627	CH/4.1	19.93	19.94	0.01
3/25/08	1098632	CH/4.5	20.11	20.10	-0.01
3/25/08	1098614	CH/6.1	20.11	20.15	0.04
3/25/08	1098589	CH/6.5	19.60	19.63	0.03
3/25/08	1098619	CH/6.7	20.11	20.10	-0.01
3/25/08	1098604	CH/7.0	19.93	19.96	0.03
3/25/08	1088585	CH/7.8	19.60	19.65	0.05
3/25/08	1098628	CH/8.4	20.04	20.22	0.18
3/25/08	1098621	CH/9.0	19.60	19.60	0.00
3/25/08	1098626	ECH/0.5	20.11	20.17	0.06
3/25/08	1086517	ECH/1.1	19.60	19.65	0.05
3/25/08	1088692	ECH/1.2	19.60	19.58	-0.02
3/25/08	1098629	ECH/2.0	19.71	19.72	0.01
3/25/08	1098597	ECH/2.8	19.93	19.94	0.01
3/25/08	1098617	ECH/3.3	20.04	20.22	0.18
3/25/08	1098620	ECH/4.3	20.04	20.15	0.11
3/25/08	1098611	NA/0.2	19.60	19.58	-0.02

Table A-2. Comparison of data logger temperature to that of a mercury-filled thermometer with tenth of a degree gradations.

Date Tested	Serial No	Station	Mercury Thermometer	Temperature Data Logger	Difference
3/25/08	1098631	NA/0.7	19.71	19.67	-0.04
3/25/08	1098607	PU/0.0	19.93	19.96	0.03
3/25/08	1098633	PU/0.4	19.71	19.70	-0.01
3/25/08	1098635	PU/0.5	19.71	19.72	0.01
12/17/08	1088635	BH/0.0	19.56	19.58	0.02
12/17/08	1098598	CH/2.9	19.97	20.03	0.06
12/17/08	1098627	CH/4.1	19.97	20.06	0.09
12/17/08	1292242	CH/5.3	19.97	20.19	0.22
12/17/08	1098614	CH/6.1	19.43	19.46	0.03
12/17/08	1098595	CH/6.5	19.43	19.58	0.15
12/17/08	1098619	CH/6.7	19.43	19.51	0.08
12/17/08	1098604	CH/7.0	19.56	19.63	0.07
12/17/08	1088585	CH/7.8	19.78	19.91	0.13
12/17/08	1098628	CH/8.4	19.56	19.67	0.11
12/17/08	1098621	CH/9.0	19.78	19.84	0.06
12/17/08	1098626	ECH/0.5	19.71	19.77	0.06
12/17/08	1086517	ECH/1.0	19.56	19.65	0.09
12/17/08	1088692	ECH/1.2	19.71	19.72	0.01
12/17/08	1098629	ECH/2.0	19.43	19.49	0.06
12/17/08	1098620	ECH/4.3	18.49	18.63	0.14
12/17/08	1098632	ECH/4.5	18.49	18.55	0.06
12/17/08	1098611	NA/0.2	19.78	19.84	0.06
12/17/08	1098631	NA/0.7	19.71	19.70	-0.01
12/17/08	1098607	PU/0.0	19.97	20.06	0.09
12/17/08	1098633	PU/0.4	19.78	19.82	0.04
12/17/08	1098635	PU/0.5	19.88	19.94	0.06
1/28/09	1088669	CH/2.8	19.60	19.53	-0.07
1/28/09	1098597	ECH/2.8	19.60	19.53	-0.07
11/18/09	1088635	BH/0.0	24.21	24.10	-0.11
11/18/09	2324285	CH/2.0	24.31	24.24	-0.07
11/18/09	1088669	CH/2.8	24.21	24.01	-0.20
11/18/09	1098598	CH/2.9	24.31	24.27	-0.04
11/18/09	1098627	CH/4.1	24.09	23.95	-0.14
11/18/09	1292242	CH/5.3	24.09	24.12	0.03
11/18/09	1098628	CH/8.4	24.31	24.27	-0.04
11/18/09	1098621	CH/9.0	24.31	24.24	-0.07
11/18/09	1098597	ECH/2.8	24.31	24.22	-0.09
11/18/09	1098636	ECH/3.3	24.21	24.03	-0.18
11/18/09	1098620	ECH/4.3	24.31	24.22	-0.09
11/18/09	1098611	NA/0.2	24.09	23.95	-0.14
11/18/09	1098631	NA/0.7	24.21	24.07	-0.14
11/18/09	1098607	PU/0.0	24.09	24.00	-0.09
11/18/09	1098633	PU/0.4	24.31	24.17	-0.14
11/18/09	1098635	PU/0.5	24.21	24.12	-0.09

Appendix B

Fecal Coliform, Loading, and Flow Data

Table B-1. Fecal coliform and flow data collected at stations in the Chimacum Creek watershed in 2007-08 and 2009-10. An "R" represents a replicate value.

Station	Date	Time	Fecal Coliform (FC/100 mL)	Replicate	Flow (cfs)
BH/0.0	10/18/2007	1241	2030		
BH/0.0	11/15/2007	1240	32		
BH/0.0	12/5/2007	1255	62		
BH/0.0	1/9/2008	1215	16		
BH/0.0	2/6/2008	1130	40		
BH/0.0	3/11/2008	1135	24		
BH/0.0	4/16/2008	1135	58		
BH/0.0	5/14/2008	1130	426		
BH/0.0	5/14/2008	1130	368	R	
BH/0.0	6/10/2008	1255	124		
BH/0.0	6/24/2008	1235	58		
BH/0.0	7/1/2008	1147	208		
BH/0.0	7/22/2008	1117	72		
BH/0.0	8/5/2008	1238	624		
BH/0.0	8/21/2008	1127	38		
BH/0.0	8/21/2008	1128	26	R	
BH/0.0	9/9/2008	1222	1020		
BH/0.0	9/22/2008	1110	38		
BH/0.0	10/6/2009	1050	112		
BH/0.0	11/3/2009	1103	34		
BH/0.0	12/1/2009	1118	4		
BH/0.0	1/5/2010	1123	12		
BH/0.0	2/3/2010	1150	14		
BH/0.0	3/2/2010	1150	14		
BH/0.0	3/2/2010	1152	6	R	
BH/0.0	4/14/2010	1215	1		
BH/0.0	5/4/2010	1158	16		
BH/0.0	6/1/2010	1240	44		
BH/0.0	6/29/2010	1143	38		
BH/0.0	7/6/2010	1139	36		
BH/0.0	7/20/2010	1120	230		
BH/0.0	8/17/2010	1146	336		
BH/0.0	8/31/2010	1207	480		
BH/0.0	8/31/2010	1209	560	R	
BH/0.0	9/14/2010	1211	66		
BH/0.0	9/28/2010	1233	110		
BH/1.0	10/18/2007	1322	450		
BH/1.0	11/15/2007	1324	1		
BH/1.0	12/5/2007	1330	2		
BH/1.0	1/9/2008	1300	72		
BH/1.0	2/6/2008	1158	8		
BH/1.0	3/11/2008	1225	1		
BH/1.0	4/16/2008	1230	1		
BH/1.0	5/14/2008	1230	4		
BH/1.0	6/10/2008	1335	6		
BH/1.0	6/24/2008	1258	8		
BH/1.0	7/1/2008	1240	34		
BH/1.0	7/22/2008	1201	146		
BH/1.0	8/5/2008	1325	56		

Table B-1. Fecal coliform and flow data collected at stations in the Chimacum Creek watershed in 2007-08 and 2009-10. An "R" represents a replicate value.

Station	Date	Time	Fecal Coliform (FC/100 mL)	Replicate	Flow (cfs)
BH/1.0	8/21/2008	1220	370		
BH/1.0	9/9/2008	1311	10		
BH/1.0	9/9/2008	1312	10	R	
BH/1.0	9/22/2008	1145	10		
BH/1.0	10/6/2009	1130	2		
BH/1.0	11/3/2009	1212	2		
BH/1.0	12/1/2009	1221	2		
BH/1.0	1/5/2010	1225	2		
BH/1.0	2/3/2010	1241	1		
BH/1.0	3/2/2010	1302	12		
BH/1.0	4/14/2010	1303	72		
BH/1.0	4/14/2010	1304	50	R	
BH/1.0	5/4/2010	1258	8		
BH/1.0	6/1/2010	1331	4		
BH/1.0	6/29/2010	1308	12		
BH/1.0	7/6/2010	1245	12		
BH/1.0	7/20/2010	1216	56		
BH/1.0	7/20/2010	1217	58	R	
BH/1.0	8/17/2010	1242	170		
BH/1.0	8/31/2010	1304	8		
BH/1.0	9/14/2010	1330	6		
BH/1.0	9/14/2010	1332	4	R	
BH/1.0	9/28/2010	1354	14		
CH/0.1	10/18/2007	910	40		8.5
CH/0.1	11/15/2007	930	1340		21.6
CH/0.1	12/5/2007	1000	220		66.4
CH/0.1	1/9/2008	945	36		127.0
CH/0.1	2/6/2008	930	20		29.2
CH/0.1	2/6/2008		22	R	
CH/0.1	3/11/2008	945	4		16.3
CH/0.1	4/16/2008	935	50		26.0
CH/0.1	5/14/2008	925	26		17.2
CH/0.1	6/10/2008	1015	312		21.8
CH/0.1	6/24/2008	930	78		10.6
CH/0.1	7/1/2008	940	208		7.0
CH/0.1	7/22/2008	1020	292		5.4
CH/0.1	8/5/2008	1025	48		5.4
CH/0.1	8/5/2008	1025	96	R	
CH/0.1	8/21/2008	938	76		5.7
CH/0.1	9/9/2008	1030	156		5.7
CH/0.1	9/22/2008	925	82		5.1
CH/0.1	10/6/2009	915	18		4.6
CH/0.1	11/3/2009	908	20		18.9
CH/0.1	12/1/2009	916	14		68.7
CH/0.1	1/5/2010	930	16		63.7
CH/0.1	2/3/2010	934	16		42.0
CH/0.1	3/2/2010	936	18		46.2
CH/0.1	4/14/2010	931	26		25.7
CH/0.1	5/4/2010	940	78		23.9

Table B-1. Fecal coliform and flow data collected at stations in the Chimacum Creek watershed in 2007-08 and 2009-10. An "R" represents a replicate value.

Station	Date	Time	Fecal Coliform (FC/100 mL)	Replicate	Flow (cfs)
CH/0.1	6/1/2010	1001	304		28.5
CH/0.1	6/29/2010	1002	120		20.1
CH/0.1	7/6/2010	1002	94		15.4
CH/0.1	7/20/2010	939	206		9.6
CH/0.1	8/17/2010	949	188		6.2
CH/0.1	8/17/2010	951	176	R	
CH/0.1	8/31/2010	955	252		6.3
CH/0.1	9/14/2010	1002	136		7.2
CH/0.1	9/28/2010	955	66		10.2
CH/1.1	10/18/2007	945	82		
CH/1.1	10/18/2007	945	62	R	
CH/1.1	11/15/2007	955	60		
CH/1.1	12/5/2007	940	178		
CH/1.1	1/9/2008	940	58		
CH/1.1	2/6/2008	945	22		
CH/1.1	3/11/2008	940	18		
CH/1.1	4/16/2008	936	62		
CH/1.1	5/14/2008	945	56		
CH/1.1	6/10/2008	1024	478		
CH/1.1	6/24/2008	944	44		
CH/1.1	7/1/2008	1018	166		
CH/1.1	7/22/2008	925	118		
CH/1.1	8/5/2008	1059	112		
CH/1.1	8/5/2008	1059	94	R	
CH/1.1	8/21/2008	949	104		
CH/1.1	9/9/2008	1053	128		
CH/1.1	9/22/2008	948	60		
CH/1.1	10/6/2009	940	26		
CH/1.1	11/3/2009	936	12		
CH/1.1	12/1/2009	945	18		
CH/1.1	1/5/2010	958	20		
CH/1.1	2/3/2010	1004	20		
CH/1.1	3/2/2010	1002	14		
CH/1.1	4/14/2010	1005	4		
CH/1.1	5/4/2010	957	24		
CH/1.1	6/1/2010	1029	88		
CH/1.1	6/29/2010	1021	86		
CH/1.1	7/6/2010	1020	268		
CH/1.1	7/20/2010	957	2332		
CH/1.1	8/17/2010	1011	168		
CH/1.1	8/17/2010	1013	170	R	
CH/1.1	8/31/2010	1010	74		
CH/1.1	9/14/2010	1023	114		
CH/1.1	9/28/2010	1020	100		
CH/2.0	10/18/2007	945	70		
CH/2.0	11/15/2007	1000	68		
CH/2.0	12/5/2007	1020	180		
CH/2.0	1/9/2008	1030	72		
CH/2.0	2/6/2008	1000	22		

Table B-1. Fecal coliform and flow data collected at stations in the Chimacum Creek watershed in 2007-08 and 2009-10. An "R" represents a replicate value.

Station	Date	Time	Fecal Coliform (FC/100 mL)	Replicate	Flow (cfs)
CH/2.0	2/6/2008		16	R	
CH/2.0	3/11/2008	1010	14		
CH/2.0	4/16/2008	1010	82		
CH/2.0	5/14/2008	949	44		
CH/2.0	6/10/2008	1037	250		
CH/2.0	6/24/2008	1000	36		
CH/2.0	7/1/2008	1010	208		
CH/2.0	7/22/2008	1239	128		
CH/2.0	8/5/2008	1120	58		
CH/2.0	8/5/2008	1120	104	R	
CH/2.0	8/21/2008	1001	166		
CH/2.0	9/9/2008	1108	170		
CH/2.0	9/22/2008	1008	32		
CH/2.0	10/6/2009	1000	38		
CH/2.0	11/3/2009	955	10		
CH/2.0	12/1/2009	958	18		
Ch/2.0	1/5/2010	1009	10		
CH/2.0	2/3/2010	1022	20		
CH/2.0	3/2/2010	1018	14		
CH/2.0	4/14/2010	1018	8		
CH/2.0	5/4/2010	1010	24		
CH/2.0	6/1/2010	1044	60		
CH/2.0	6/29/2010	1033	82		
CH/2.0	7/6/2010	1031	94		
CH/2.0	7/20/2010	1009	140		
CH/2.0	8/17/2010	1027	160		
CH/2.0	8/17/2010	1029	112	R	
CH/2.0	8/31/2010	1023	76		
CH/2.0	9/14/2010	1035	152		
CH/2.0	9/28/2010	1038	64		
CH/3.4	10/18/2007	1007	26		
CH/3.4	10/18/2007	1007	51	R	
CH/3.4	11/15/2007	1012	48		
CH/3.4	12/5/2007	959	154		
CH/3.4	1/9/2008	955	98		
CH/3.4	2/6/2008	1012	40		
CH/3.4	3/11/2008	955	18		
CH/3.4	4/16/2008	952	96		
CH/3.4	5/14/2008	1001	88		
CH/3.4	6/10/2008	1045	332		
CH/3.4	6/10/2008	1050	374	R	
CH/3.4	6/24/2008	1001	34		
CH/3.4	7/1/2008	1038	64		
CH/3.4	7/22/2008	940	80		
CH/3.4	8/5/2008	950	60		
CH/3.4	8/21/2008	946	46		
CH/3.4	9/9/2008	1022	34		
CH/3.4	9/22/2008	1005	62		
CH/3.4	9/22/2008	1010	42	R	

Table B-1. Fecal coliform and flow data collected at stations in the Chimacum Creek watershed in 2007-08 and 2009-10. An "R" represents a replicate value.

Station	Date	Time	Fecal Coliform (FC/100 mL)	Replicate	Flow (cfs)
CH/3.4	10/6/2009	946	8		
CH/3.4	11/3/2009	937	4		
CH/3.4	12/1/2009	948	20		
CH/3.4	1/5/2010	1001	22		
CH/3.4	2/3/2010	942	24		
CH/3.4	3/2/2010	1004	30		
CH/3.4	4/14/2010	940	6		
CH/3.4	5/4/2010	942	32		
CH/3.4	5/4/2010	944	30	R	
CH/3.4	6/1/2010	951	28		
CH/3.4	6/29/2010	955	18		
CH/3.4	7/6/2010	938	126		
CH/3.4	7/20/2010	953	76		
CH/3.4	8/17/2010	1000	56		
CH/3.4	8/31/2010	953	84		
CH/3.4	9/14/2010	948	194		
CH/3.4	9/28/2010	944	84		
CH/3.4	9/28/2010	946	86	R	
CH/4.1	10/18/2007	1019	500		
CH/4.1	11/15/2007	1030	96		
CH/4.1	12/5/2007	1058	246		
CH/4.1	1/9/2008	1110	48		
CH/4.1	2/6/2008	1010	38		
CH/4.1	2/6/2008		42	R	
CH/4.1	3/11/2008	1030	32		
CH/4.1	4/16/2008	1030	160		
CH/4.1	5/14/2008	1010	88		
CH/4.1	6/10/2008	1120	208		
CH/4.1	6/24/2008	1045	42		
CH/4.1	7/1/2008	1032	166		
CH/4.1	7/22/2008	1055	104		
CH/4.1	8/5/2008	1053	26		
CH/4.1	8/21/2008	1111	860		
CH/4.1	9/9/2008	1155	24		
CH/4.1	9/22/2008	1138	98		
CH/4.1	10/6/2009	1145	8		
CH/4.1	11/3/2009	1134	16		
CH/4.1	12/1/2009	1129	16		
CH/4.1	1/5/2010	1124	20		
CH/4.1	2/3/2010	1102	12		
CH/4.1	3/2/2010	1141	30		
CH/4.1	4/14/2010	1120	18		
CH/4.1	5/4/2010	1125	30		
CH/4.1	6/1/2010	1149	78		
CH/4.1	6/29/2010	1122	12		
CH/4.1	6/29/2010	1124	2	R	
CH/4.1	7/6/2010	1054	6		
CH/4.1	7/20/2010	1120	48		
CH/4.1	8/17/2010	1114	34		

Table B-1. Fecal coliform and flow data collected at stations in the Chimacum Creek watershed in 2007-08 and 2009-10. An "R" represents a replicate value.

Station	Date	Time	Fecal Coliform (FC/100 mL)	Replicate	Flow (cfs)
CH/4.1	8/31/2010	1059	70		
CH/4.1	9/14/2010	1113	132		
CH/4.1	9/28/2010	1114	80		
CH/5.3	10/18/2007	1026	42		
CH/5.3	10/18/2007	1026	118	R	
CH/5.3	11/15/2007	1024	70		
CH/5.3	12/5/2007	1015	158		
CH/5.3	1/9/2008	1010	40		
CH/5.3	2/6/2008	1025	48		
CH/5.3	3/11/2008	1008	50		
CH/5.3	4/16/2008	1004	54		
CH/5.3	5/14/2008	1017	166		
CH/5.3	6/10/2008	1102	394		
CH/5.3	6/10/2008	1105	332	R	
CH/5.3	6/24/2008	1012	78		
CH/5.3	7/1/2008	1053	110		
CH/5.3	7/22/2008	952	44		
CH/5.3	8/5/2008	1000	46		
CH/5.3	8/21/2008	959	82		
CH/5.3	9/9/2008	1043	188		
CH/5.3	9/22/2008	1027	72		
CH/5.3	9/22/2008	1029	76	R	
CH/5.3	10/6/2009	959	32		
CH/5.3	11/3/2009	1003	20		
CH/5.3	12/1/2009	1002	14		
CH/5.3	1/5/2010	1014	40		
CH/5.3	2/3/2010	943	32		
CH/5.3	3/2/2010	1017	54		
CH/5.3	4/14/2010	950	58		
CH/5.3	5/4/2010	952	52		
CH/5.3	5/4/2010	954	44	R	
CH/5.3	6/1/2010	1002	384		
CH/5.3	6/29/2010	1008	44		
CH/5.3	7/6/2010	948	92		
CH/5.3	7/20/2010	1006	58		
CH/5.3	8/17/2010	1012	206		
CH/5.3	8/31/2010	1005	360		
CH/5.3	9/14/2010	1001	242		
CH/5.3	9/28/2010	1004	158		
CH/5.3	9/28/2010	1005	134	R	
CH/6.7	10/18/2007	1105	2100		
CH/6.7	11/15/2007	1100	130		
CH/6.7	12/5/2007	1130	8		
CH/6.7	1/9/2008	1325	26		
CH/6.7	2/6/2008	1210	6		
CH/6.7	3/11/2008	1256	50		
CH/6.7	3/11/2008	1250	28	R	
CH/6.7	4/16/2008	1245	156		
CH/6.7	5/14/2008	1255	372		

Table B-1. Fecal coliform and flow data collected at stations in the Chimacum Creek watershed in 2007-08 and 2009-10. An "R" represents a replicate value.

Station	Date	Time	Fecal Coliform (FC/100 mL)	Replicate	Flow (cfs)
CH/6.7	6/10/2008	1400	292		
CH/6.7	6/24/2008	1324	58		
CH/6.7	7/1/2008	1310	98		
CH/6.7	7/22/2008	1221	190		
CH/6.7	8/5/2008	1340	92		
CH/6.7	8/21/2008	1235	146		
CH/6.7	9/9/2008	1334	44		
CH/6.7	9/22/2008	1202	74		
CH/6.7	10/6/2009	1150	94		
CH/6.7	11/3/2009	1230	34		
CH/6.7	12/1/2009	1237	4		
CH/6.7	1/5/2010	1242	10		
CH/6.7	2/3/2010	1303	8		
CH/6.7	3/2/2010	1327	34		
CH/6.7	4/14/2010	1324	36		
CH/6.7	5/4/2010	1321	74		
CH/6.7	6/1/2010	1357	108		
CH/6.7	6/29/2010	1329	52		
CH/6.7	7/6/2010	1306	80		
CH/6.7	7/20/2010	1239	80		
CH/6.7	7/20/2010	1242	114	R	
CH/6.7	8/17/2010	1259	238		
CH/6.7	8/31/2010	1318	84		
CH/6.7	9/14/2010	1358	136		
CH/6.7	9/28/2010	1423	236		
CH/7.0	10/18/2007	1115	146		
CH/7.0	11/15/2007	1110	54		
CH/7.0	12/5/2007	1140	20		
CH/7.0	1/9/2008	1315	26		
CH/7.0	2/6/2008	1205	18		
CH/7.0	3/11/2008	1240	18		
CH/7.0	3/11/2008	1240	24	R	
CH/7.0	4/16/2008	1240	38		
CH/7.0	5/14/2008	10	200		
CH/7.0	6/10/2008	1345	118		
CH/7.0	6/24/2008	1308	80		
CH/7.0	7/1/2008	1300	140		
CH/7.0	7/22/2008	1218	228		
CH/7.0	8/5/2008	1335	62		
CH/7.0	8/21/2008	1228	80		
CH/7.0	9/9/2008	1325	50		
CH/7.0	9/22/2008	1150	66		
CH/7.0	10/6/2009	1140	78		
CH/7.0	11/3/2009	1222	38		
CH/7.0	12/1/2009	1231	40		
CH/7.0	1/5/2010	1236	16		
CH/7.0	2/3/2010	1255	18		
CH/7.0	3/2/2010	1316	50		
CH/7.0	4/14/2010	1316	24		

Table B-1. Fecal coliform and flow data collected at stations in the Chimacum Creek watershed in 2007-08 and 2009-10. An "R" represents a replicate value.

Station	Date	Time	Fecal Coliform (FC/100 mL)	Replicate	Flow (cfs)
CH/7.0	5/4/2010	1312	238		
CH/7.0	6/1/2010	1345	100		
CH/7.0	6/29/2010	1320	36		
CH/7.0	7/6/2010	1256	78		
CH/7.0	7/20/2010	1228	74		
CH/7.0	7/20/2010	1230	80	R	
CH/7.0	8/17/2010	1252	188		
CH/7.0	8/31/2010	1312	360		
CH/7.0	9/14/2010	1345	46		
CH/7.0	9/28/2010	1409	126		
CH/7.8	10/18/2007	1059	2760		
CH/7.8	11/15/2007	1048	52		
CH/7.8	11/15/2007	1048	32	R	
CH/7.8	12/5/2007	1042	144		
CH/7.8	1/9/2008	1038	48		
CH/7.8	2/6/2008	1052	178		
CH/7.8	3/11/2008	1027	24		
CH/7.8	4/16/2008	1038	44		
CH/7.8	5/14/2008	1037	48		
CH/7.8	6/10/2008	1142	292		
CH/7.8	6/24/2008	1043	43		
CH/7.8	6/24/2008	1047	38	R	
CH/7.8	7/1/2008	1121	72		
CH/7.8	7/22/2008	1011	160		
CH/7.8	8/5/2008	1018	276		
CH/7.8	8/21/2008	1030	1610		
CH/7.8	9/9/2008	1111	118		
CH/7.8	9/22/2008	1105	916		
CH/7.8	10/6/2009	1027	336		
CH/7.8	10/6/2009	1028	200	R	
CH/7.8	11/3/2009	1035	38		
CH/7.8	12/1/2009	1025	16		
CH/7.8	1/5/2010	1032	20		
CH/7.8	2/3/2010	1008	6		
CH/7.8	3/2/2010	1038	16		
CH/7.8	4/14/2010	1012	78		
CH/7.8	5/4/2010	1026	76		
CH/7.8	6/1/2010	1035	134		
CH/7.8	6/1/2010	1037	76	R	
CH/7.8	6/29/2010	1031	22		
CH/7.8	7/6/2010	1009	88		
CH/7.8	7/20/2010	1027	54		
CH/7.8	8/17/2010	1033	560		
CH/7.8	8/31/2010	1026	1800		
CH/7.8	9/14/2010	1023	138		
CH/7.8	9/28/2010	1027	120		
CH/8.4	10/18/2007	1146	460		
CH/8.4	11/15/2007	1150	26		
CH/8.4	12/5/2007	1155	96		

Table B-1. Fecal coliform and flow data collected at stations in the Chimacum Creek watershed in 2007-08 and 2009-10. An "R" represents a replicate value.

Station	Date	Time	Fecal Coliform (FC/100 mL)	Replicate	Flow (cfs)
CH/8.4	1/9/2008	1125	44		
CH/8.4	2/6/2008	1105	22		
CH/8.4	3/11/2008	1055	24		
CH/8.4	4/16/2008	1050	60		
CH/8.4	4/16/2008	1055	56	R	
CH/8.4	5/14/2008	1114	120		
CH/8.4	6/10/2008	1210	278		
CH/8.4	6/24/2008	1140	58		
CH/8.4	7/1/2008	1110	98		
CH/8.4	7/22/2008	1045	94		
CH/8.4	8/5/2008	1155	86		
CH/8.4	8/21/2008	1055	96		
CH/8.4	8/21/2008	1056	52	R	
CH/8.4	9/9/2008	1151	26		
CH/8.4	9/22/2008	1039	48		
CH/8.4	10/6/2009	1030	70		
CH/8.4	11/3/2009	1035	36		
CH/8.4	12/1/2009	1027	4		
CH/8.4	1/5/2010	1057	12		
CH/8.4	2/3/2010	1115	8		
CH/8.4	3/2/2010	1110	12		
CH/8.4	3/2/2010	1112	10	R	
CH/8.4	4/14/2010	1106	10		
CH/8.4	5/4/2010	1052	24		
CH/8.4	6/1/2010	1152	58		
CH/8.4	6/29/2010	1103	30		
CH/8.4	7/6/2010	1108	94		
CH/8.4	7/20/2010	1047	160		
CH/8.4	8/17/2010	1115	72		
CH/8.4	8/31/2010	1140	1470		
CH/8.4	8/31/2010	1142	586	R	
CH/8.4	9/14/2010	1135	46		
CH/8.4	9/28/2010	1137	96		
CH/8.8	10/18/2007	1308	700		
CH/8.8	11/15/2007	1312	26		
CH/8.8	12/5/2007	1320	50		
CH/8.8	1/9/2008	1235	42		
CH/8.8	2/6/2008	1150	12		
CH/8.8	3/11/2008	1215	50		
CH/8.8	4/16/2008	1220	54		
CH/8.8	4/16/2008	1225	52	R	
CH/8.8	5/14/2008	1220	172		
CH/8.8	6/10/2008	1323	164		
CH/8.8	6/24/2008	1248	42		
CH/8.8	7/1/2008	1230	270		
CH/8.8	7/22/2008	1149	70		
CH/8.8	8/5/2008	1315	520		
CH/8.8	8/21/2008	1205	68		
CH/8.8	9/9/2008	1256	370		

Table B-1. Fecal coliform and flow data collected at stations in the Chimacum Creek watershed in 2007-08 and 2009-10. An "R" represents a replicate value.

Station	Date	Time	Fecal Coliform (FC/100 mL)	Replicate	Flow (cfs)
CH/8.8	9/9/2008	1257	330	R	
CH/8.8	9/22/2008	1135	46		
CH/8.8	10/6/2009	1123	72		
CH/8.8	11/3/2009	1158	10		
CH/8.8	12/1/2009	1211	2		
CH/8.8	1/5/2010	1215	12		
CH/8.8	2/3/2010	1229	10		
CH/8.8	3/2/2010	1242	14		
CH/8.8	4/14/2010	1249	10		
CH/8.8	4/14/2010	1252	4	R	
CH/8.8	5/4/2010	1237	10		
CH/8.8	6/1/2010	1315	64		
CH/8.8	6/29/2010	1254	34		
CH/8.8	7/6/2010	1235	94		
CH/8.8	7/20/2010	1204	236		
CH/8.8	8/17/2010	1233	198		
CH/8.8	8/31/2010	1230	50		
CH/8.8	9/14/2010	1315	42		
CH/8.8	9/14/2010	1316	34	R	
CH/8.8	9/28/2010	1306	80		
CH/9.0	10/18/2007	1234	168		
CH/9.0	11/15/2007	1235	2		
CH/9.0	12/5/2007	1250	94		
CH/9.0	1/9/2008	1210	48		
CH/9.0	2/6/2008	1130	10		
CH/9.0	3/11/2008	1130	10		
CH/9.0	4/16/2008	1130	24		
CH/9.0	5/14/2008	1130	20		
CH/9.0	5/14/2008	1130	24	R	
CH/9.0	6/10/2008	1245	194		
CH/9.0	6/24/2008	1216	16		
CH/9.0	7/1/2008	1145	42		
CH/9.0	7/22/2008	1115	56		
CH/9.0	8/5/2008	1230	52		
CH/9.0	8/21/2008	1120	20		
CH/9.0	8/21/2008	1122	40	R	
CH/9.0	9/9/2008	1219	940		
CH/9.0	9/22/2008	1108	26		
CH/9.0	10/6/2009	1045	38		
CH/9.0	11/3/2009	1100	2		
CH/9.0	12/1/2009	1115	12		
CH/9.0	1/5/2010	1121	40		
CH/9.0	2/3/2010	1146	4		
CH/9.0	3/2/2010	1141	14		
CH/9.0	3/2/2010	1143	24	R	
CH/9.0	4/14/2010	1208	2		
CH/9.0	5/4/2010	1150	2		
CH/9.0	6/1/2010	1234	88		
CH/9.0	6/29/2010	1139	40		

Table B-1. Fecal coliform and flow data collected at stations in the Chimacum Creek watershed in 2007-08 and 2009-10. An "R" represents a replicate value.

Station	Date	Time	Fecal Coliform (FC/100 mL)	Replicate	Flow (cfs)
CH/9.0	7/6/2010	1136	190		
CH/9.0	7/20/2010	1117	200		
CH/9.0	8/17/2010	1139	80		
CH/9.0	8/31/2010	1202	88		
CH/9.0	8/31/2010	1203	94	R	
CH/9.0	9/14/2010	1208	28		
CH/9.0	9/28/2010	1230	48		
CH/9.3	10/18/2007	1257	254		
CH/9.3	11/15/2007	1257	4		
CH/9.3	12/5/2007	1310	42		
CH/9.3	1/9/2008	1230	52		
CH/9.3	2/6/2008	1145	1		
CH/9.3	3/11/2008	1145	8		
CH/9.3	4/16/2008	1145	22		
CH/9.3	5/14/2008	1145	10		
CH/9.3	5/14/2008	1145	24	R	
CH/9.3	6/10/2008	1312	152		
CH/9.3	6/24/2008	1218	18		
CH/9.3	7/1/2008	1205	56		
CH/9.3	7/22/2008	1132	28		
CH/9.3	8/5/2008	1248	68		
CH/9.3	8/21/2008	1140	58		
CH/9.3	9/9/2008	1238	360		
CH/9.3	9/9/2008	1239	500	R	
CH/9.3	9/22/2008	1126	32		
CH/9.3	10/6/2009	1113	32		
CH/9.3	11/3/2009	1126	4		
CH/9.3	12/1/2009	1133	4		
CH/9.3	1/5/2010	1141	8		
CH/9.3	2/3/2010	1207	10		
CH/9.3	3/2/2010	1210	4		
CH/9.3	4/14/2010	1234	2		
CH/9.3	4/14/2010	1235	1	R	
CH/9.3	5/4/2010	1219	20		
CH/9.3	6/1/2010	1257	90		
CH/9.3	6/29/2010	1201	40		
CH/9.3	7/6/2010	1157	26		
CH/9.3	7/20/2010	1136	624		
CH/9.3	8/17/2010	1201	50		
CH/9.3	8/31/2010	1221	68		
CH/9.3	9/14/2010	1228	4		
CH/9.3	9/14/2010	1229	10	R	
CH/9.3	9/28/2010	1251	60		
ECH/0.2	10/18/2007	1149	92		
ECH/0.2	11/15/2007	1154	36		
ECH/0.2	12/5/2007	1146	144		
ECH/0.2	12/5/2007	1146	144	R	
ECH/0.2	1/9/2008	1130	18		
ECH/0.2	2/6/2008	1144	1		

Table B-1. Fecal coliform and flow data collected at stations in the Chimacum Creek watershed in 2007-08 and 2009-10. An "R" represents a replicate value.

Station	Date	Time	Fecal Coliform (FC/100 mL)	Replicate	Flow (cfs)
ECH/0.2	3/11/2008	1115	8		
ECH/0.2	4/16/2008	1126	10		
ECH/0.2	5/14/2008	1152	18		
ECH/0.2	6/10/2008	1243	50		
ECH/0.2	6/24/2008	1154	24		
ECH/0.2	7/1/2008	1223	244		
ECH/0.2	7/1/2008	1225	228	R	
ECH/0.2	7/22/2008	1114	100		
ECH/0.2	8/5/2008	1111	104		
ECH/0.2	8/21/2008	1132	156		
ECH/0.2	9/9/2008	1213	136		
ECH/0.2	9/22/2008	1200	114		
ECH/0.2	10/6/2009	1211	70		
ECH/0.2	11/3/2009	1200	6		
ECH/0.2	11/3/2009	1204	4	R	
ECH/0.2	12/1/2009	1150	4		
ECH/0.2	1/5/2010	1202	4		
ECH/0.2	2/3/2010	1123	10		
ECH/0.2	3/2/2010	1222	8		
ECH/0.2	4/14/2010	1148	4		
ECH/0.2	5/4/2010	1147	8		
ECH/0.2	6/1/2010	1213	48		
ECH/0.2	6/29/2010	1153	26		
ECH/0.2	6/29/2010	1155	22	R	
ECH/0.2	7/6/2010	1117	36		
ECH/0.2	7/20/2010	1141	396		
ECH/0.2	8/17/2010	1137	176		
ECH/0.2	8/31/2010	1129	202		
ECH/0.2	9/14/2010	1133	64		
ECH/0.2	9/28/2010	1136	44		
ECH/1.0	10/18/2007	1201	52		
ECH/1.0	11/15/2007	1202	74		
ECH/1.0	12/5/2007	1159	132		
ECH/1.0	1/9/2008	1142	10		
ECH/1.0	1/9/2008	1142	18	R	
ECH/1.0	2/6/2008	1157	1		
ECH/1.0	3/11/2008	1126	6		
ECH/1.0	4/16/2008	1135	12		
ECH/1.0	5/14/2008	1206	20		
ECH/1.0	6/10/2008	1255	54		
ECH/1.0	6/24/2008	1207	24		
ECH/1.0	7/1/2008	1244	228		
ECH/1.0	7/1/2008	1248	208	R	
ECH/1.0	7/22/2008	1130	292		
ECH/1.0	8/5/2008	1124	106		
ECH/1.0	8/21/2008	1144	920		
ECH/1.0	9/9/2008	1230	184		
ECH/1.0	9/22/2008	1211	416		
ECH/1.0	10/6/2009	1247	6		

Table B-1. Fecal coliform and flow data collected at stations in the Chimacum Creek watershed in 2007-08 and 2009-10. An "R" represents a replicate value.

Station	Date	Time	Fecal Coliform (FC/100 mL)	Replicate	Flow (cfs)
ECH/1.0	11/3/2009	1247	12		
ECH/1.0	11/3/2009	1248	24	R	
ECH/1.0	12/1/2009	1201	10		
ECH/1.0	1/5/2010	1214	8		
ECH/1.0	2/3/2010	1134	6		
ECH/1.0	3/2/2010	1232	1		
ECH/1.0	4/14/2010	1154	2		
ECH/1.0	5/4/2010	1156	24		
ECH/1.0	6/1/2010	1226	36		
ECH/1.0	6/29/2010	1206	14		
ECH/1.0	7/6/2010	1129	14		
ECH/1.0	7/6/2010	1132	20	R	
ECH/1.0	7/20/2010	1151	90		
ECH/1.0	8/17/2010	1156	12		
ECH/1.0	8/31/2010	1142	48		
ECH/1.0	9/14/2010	1148	34		
ECH/1.0	9/28/2010	1152	18		
ECH/3.3	10/18/2007	1220	372		
ECH/3.3	11/15/2007	1215	144		
ECH/3.3	12/5/2007	1215	346		
ECH/3.3	1/9/2008	1157	58		
ECH/3.3	1/9/2008	1157	50	R	
ECH/3.3	2/6/2008	1212	8		
ECH/3.3	3/11/2008	1140	4		
ECH/3.3	4/16/2008	1156	106		
ECH/3.3	5/14/2008	1225	132		
ECH/3.3	6/10/2008	1309	352		
ECH/3.3	6/24/2008	1220	64		
ECH/3.3	7/1/2008	1301	208		
ECH/3.3	7/22/2008	1148	228		
ECH/3.3	7/22/2008	1150	292	R	
ECH/3.3	8/5/2008	1138	352		
ECH/3.3	8/21/2008	1156	104		
ECH/3.3	9/9/2008	1248	128		
ECH/3.3	9/22/2008	1224	86		
ECH/3.3	10/6/2009	1301	106		
ECH/3.3	11/3/2009	1301	10		
ECH/3.3	12/1/2009	1215	8		
ECH/3.3	1/5/2010	1227	92		
ECH/3.3	2/3/2010	1146	14		
ECH/3.3	3/2/2010	1245	6		
ECH/3.3	4/14/2010	1211	26		
ECH/3.3	5/4/2010	1210	16		
ECH/3.3	6/1/2010	1238	58		
ECH/3.3	6/29/2010	1218	72		
ECH/3.3	7/6/2010	1154	336		
ECH/3.3	7/6/2010	1156	264	R	
ECH/3.3	7/20/2010	1205	410		
ECH/3.3	8/17/2010	1222	280		

Table B-1. Fecal coliform and flow data collected at stations in the Chimacum Creek watershed in 2007-08 and 2009-10. An "R" represents a replicate value.

Station	Date	Time	Fecal Coliform (FC/100 mL)	Replicate	Flow (cfs)
ECH/3.3	8/31/2010	1156	480		
ECH/3.3	9/14/2010	1159	24		
ECH/3.3	9/28/2010	1207	50		
ECH/4.8	10/18/2007	1239	1590		
ECH/4.8	11/15/2007	1249	116		
ECH/4.8	12/5/2007	1242	790		
ECH/4.8	1/9/2008	1231	28		
ECH/4.8	1/9/2008	1231	146	R	
ECH/4.8	2/6/2008	1243	12		
ECH/4.8	3/11/2008	1205	18		
ECH/4.8	4/16/2008	1224	84		
ECH/4.8	5/14/2008	1315	222		
ECH/4.8	6/10/2008	1356	146		
ECH/4.8	6/24/2008	1255	36		
ECH/4.8	7/1/2008	1352	186		
ECH/4.8	7/22/2008	1220	188		
ECH/4.8	7/22/2008	1222	208	R	
ECH/4.8	8/5/2008	1217	196		
ECH/4.8	8/21/2008	1238	104		
ECH/4.8	9/9/2008	1300	70		
ECH/4.8	9/22/2008	1237	64		
ECH/4.8	10/6/2009	1327	16		
ECH/4.8	11/3/2009	1336	8		
ECH/4.8	12/1/2009	1311	16		
ECH/4.8	12/1/2009	1314	2	R	
ECH/4.8	1/5/2010	1342	76		
ECH/4.8	2/3/2010	1240	30		
ECH/4.8	3/2/2010	1355	1		
ECH/4.8	4/14/2010	1247	10		
ECH/4.8	5/4/2010	1311	4		
ECH/4.8	6/1/2010	1339	36		
ECH/4.8	6/29/2010	1329	54		
ECH/4.8	7/6/2010	1300	132		
ECH/4.8	7/20/2010	1232	800		
ECH/4.8	8/17/2010	1318	126		
ECH/4.8	8/31/2010	1209	116		
ECH/4.8	9/14/2010	1225	20		
ECH/4.8	9/28/2010	1242	92		
ECH/5.3	10/18/2007	1259	114		
ECH/5.3	11/15/2007	1304	2		
ECH/5.3	12/5/2007	1259	46		
ECH/5.3	1/9/2008	1247	6		
ECH/5.3	2/6/2008	1258	16		
ECH/5.3	3/11/2008	1220	10		
ECH/5.3	4/16/2008	1237	2		
ECH/5.3	5/14/2008	1328	1		
ECH/5.3	6/10/2008	1408	52		
ECH/5.3	6/24/2008	1315	6		
ECH/5.3	7/1/2008	1403	36		

Table B-1. Fecal coliform and flow data collected at stations in the Chimacum Creek watershed in 2007-08 and 2009-10. An "R" represents a replicate value.

Station	Date	Time	Fecal Coliform (FC/100 mL)	Replicate	Flow (cfs)
ECH/5.3	7/22/2008	1235	76		
ECH/5.3	7/22/2008	1236	42	R	
ECH/5.3	8/5/2008	1232	94		
ECH/5.3	8/21/2008	1251	54		
ECH/5.3	9/9/2008	1318	6		
ECH/5.3	9/22/2008	1250	20		
ECH/5.3	10/6/2009	1342	8		
ECH/5.3	10/6/2009	1344	8	R	
ECH/5.3	11/3/2009	1350	2		
ECH/5.3	12/1/2009	1327	1		
ECH/5.3	12/1/2009	1329	12	R	
ECH/5.3	1/5/2010	1359	2		
ECH/5.3	2/3/2010	1252	8		
ECH/5.3	3/2/2010	1407	2		
ECH/5.3	4/14/2010	1328	4		
ECH/5.3	5/4/2010	1337	2		
ECH/5.3	6/1/2010	1404	134		
ECH/5.3	6/29/2010	1340	44		
ECH/5.3	7/6/2010	1313	36		
ECH/5.3	7/20/2010	1244	42		
ECH/5.3	8/17/2010	1333	14		
ECH/5.3	8/31/2010	1221	10		
ECH/5.3	9/14/2010	1235	6		
ECH/5.3	9/28/2010	1314	10		
NA/0.1	10/18/2007	1041	700		
NA/0.1	11/15/2007	1032	240		
NA/0.1	11/15/2007	1032	200	R	
NA/0.1	12/5/2007	1023	1280		
NA/0.1	1/9/2008	1019	46		
NA/0.1	2/6/2008	1035	82		
NA/0.1	3/11/2008	1014	126		
NA/0.1	4/16/2008	1010	32		
NA/0.1	5/14/2008	1024	230		
NA/0.1	6/10/2008	1115	664		
NA/0.1	6/10/2008	1117	1660	R	
NA/0.1	6/24/2008	1022	220		
NA/0.1	7/1/2008	1104	456		
NA/0.1	7/22/2008	958	294		
NA/0.1	8/5/2008	1006	832		
NA/0.1	8/21/2008	1015	880		
NA/0.1	9/9/2008	1054	664		
NA/0.1	9/22/2008	1041	768		
NA/0.1	9/22/2008	1045	560	R	
NA/0.1	10/6/2009	1008	152		
NA/0.1	11/3/2009	1019	128		
NA/0.1	12/1/2009	1009	32		
NA/0.1	1/5/2010	1020	8		
NA/0.1	2/3/2010	950	78		
NA/0.1	3/2/2010	1022	106		

Table B-1. Fecal coliform and flow data collected at stations in the Chimacum Creek watershed in 2007-08 and 2009-10. An "R" represents a replicate value.

Station	Date	Time	Fecal Coliform (FC/100 mL)	Replicate	Flow (cfs)
NA/0.1	4/14/2010	1000	42		
NA/0.1	5/4/2010	1000	248		
NA/0.1	5/4/2010	1002	178	R	
NA/0.1	6/1/2010	1017	328		
NA/0.1	6/29/2010	1017	544		
NA/0.1	7/6/2010	956	584		
NA/0.1	7/20/2010	1012	576		
NA/0.1	8/17/2010	1020	1120		
NA/0.1	8/31/2010	1011	616		
NA/0.1	9/14/2010	1009	246		
NA/0.1	9/28/2010	1011	416		
NA/0.1	9/28/2010	1013	374	R	
NA/0.7	10/18/2007	1112	3440		
NA/0.7	11/15/2007	1101	410		
NA/0.7	11/15/2007	1101	230	R	
NA/0.7	12/5/2007	1055	368		
NA/0.7	1/9/2008	1048	34		
NA/0.7	2/6/2008	1104	134		
NA/0.7	3/11/2008	1040	192		
NA/0.7	4/16/2008	1048	10		
NA/0.7	5/14/2008	1052	32		
NA/0.7	6/10/2008	1154	394		
NA/0.7	6/24/2008	1101	44		
NA/0.7	6/24/2008	1102	32	R	
NA/0.7	7/1/2008	1134	106		
NA/0.7	7/22/2008	1024	272		
NA/0.7	8/5/2008	1029	292		
NA/0.7	8/21/2008	1041	560		
NA/0.7	9/9/2008	1123	436		
NA/0.7	9/22/2008	1117	328		
NA/0.7	10/6/2009	1047	650		
NA/0.7	10/6/2009	1049	670	R	
NA/0.7	11/3/2009	1047	680		
NA/0.7	12/1/2009	1037	16		
NA/0.7	1/5/2010	1044	48		
NA/0.7	2/3/2010	1018	104		
NA/0.7	3/2/2010	1049	120		
NA/0.7	4/14/2010	1028	62		
NA/0.7	5/4/2010	1041	384		
NA/0.7	6/1/2010	1048	136		
NA/0.7	6/1/2010	1051	200	R	
NA/0.7	6/29/2010	1043	624		
NA/0.7	7/6/2010	1020	1200		
NA/0.7	7/20/2010	1037	998		
NA/0.7	8/17/2010	1046	660		
NA/0.7	8/31/2010	1038	282		
NA/0.7	9/14/2010	1041	1260		
NA/0.7	9/28/2010	1040	408		
NA/1.0	2/3/2010		12		

Table B-1. Fecal coliform and flow data collected at stations in the Chimacum Creek watershed in 2007-08 and 2009-10. An "R" represents a replicate value.

Station	Date	Time	Fecal Coliform (FC/100 mL)	Replicate	Flow (cfs)
NA/1.0	3/2/2010	1100	2		
NA/1.0	4/14/2010	1033	1		
NA/1.0	5/4/2010	1051	1		
NA/1.0	6/1/2010	1105	46		
NA/1.15	2/3/2010		1		
NA/1.15	3/2/2010	1115	2		
NA/1.15	4/14/2010	1038	2		
NA/1.15	5/4/2010	105	16		
NA/1.15	6/1/2010	1113	68		
NA/1.3	11/15/2007	1120	8		
NA/1.3	12/5/2007	1112	56		
NA/1.3	12/5/2007	1112	68	R	
NA/1.3	1/9/2008	1104	12		
NA/1.3	2/6/2008	1115	8		
NA/1.3	3/11/2008	1050	2		
NA/1.3	4/16/2008	1057	1		
NA/1.3	5/14/2008	1103	10		
NA/1.3	6/10/2008	1206	394		
NA/1.3	6/24/2008	1115	6		
NA/1.3	6/24/2008	1116	10	R	
NA/1.3	7/1/2008	1146	46		
NA/1.3	8/21/2008	1050	224		
NA/1.3	11/3/2009	1057	4		
NA/1.3	12/1/2009	1102	2		
NA/1.3	1/5/2010	1108	10		
NA/1.3	2/3/2010	1035	1		
NA/1.3	3/2/2010	1111	2		
NA/1.3	4/14/2010	1043	4		
NA/1.3	5/4/2010	1059	6		
NA/1.3	6/1/2010	1114	62		
NA/1.3	6/1/2010	1116	50	R	
NA/1.3	6/29/2010	1053	46		
NA/1.3	7/6/2010	1030	14		
NA/1.3	7/20/2010	1051	56		
PU/0.0	10/18/2007	1035	430		
PU/0.0	11/15/2007	1025	12		
PU/0.0	12/5/2007	1050	100		
PU/0.0	1/9/2008	1100	16		
PU/0.0	2/6/2008	1015	2		
PU/0.0	3/11/2008	1020	2		
PU/0.0	3/11/2008	1025	1	R	
PU/0.0	4/16/2008	1025	80		
PU/0.0	5/14/2008	1010	484		
PU/0.0	6/10/2008	1115	3430		
PU/0.0	6/24/2008	1045	288		
PU/0.0	7/1/2008	1030	208		
PU/0.0	7/22/2008	1049	292		
PU/0.0	8/5/2008	1047	500		
PU/0.0	8/21/2008	1105	28		

Table B-1. Fecal coliform and flow data collected at stations in the Chimacum Creek watershed in 2007-08 and 2009-10. An "R" represents a replicate value.

Station	Date	Time	Fecal Coliform (FC/100 mL)	Replicate	Flow (cfs)
PU/0.0	9/9/2008	1150	16		
PU/0.0	9/22/2008	1132	6		
PU/0.0	10/6/2009	1131	12		
PU/0.0	11/3/2009	1121	30		
PU/0.0	11/3/2009		8	R	
PU/0.0	12/1/2009	1120	2		
PU/0.0	1/5/2010	1125	20		
PU/0.0	2/3/2010	1055	10		
PU/0.0	3/2/2010	1135	68		
PU/0.0	4/14/2010	1107	32		
PU/0.0	5/4/2010	1117	56		
PU/0.0	6/1/2010	1140	236		
PU/0.0	6/29/2010	1112	436		
PU/0.0	6/29/2010	1114	416	R	
PU/0.0	7/6/2010	1049	152		
PU/0.0	7/20/2010	1114	184		
PU/0.0	8/17/2010	1108	102		
PU/0.0	8/31/2010	1054	320		
PU/0.0	9/14/2010	1110	44		
PU/0.0	9/28/2010	1111	190		
PU/0.4	10/18/2007	1135	10		
PU/0.4	11/15/2007	1142	1		
PU/0.4	12/5/2007	1130	30		
PU/0.4	12/5/2007	1130	38	R	
PU/0.4	1/9/2008	1118	2		
PU/0.4	2/6/2008	1131	1		
PU/0.4	3/11/2008	1101	6		
PU/0.4	4/16/2008	1111	18		
PU/0.4	5/14/2008	1119	12		
PU/0.4	6/10/2008	1221	352		
PU/0.4	6/24/2008	1130	14		
PU/0.4	7/1/2008	1203	126		
PU/0.4	7/1/2008	1206	186	R	
PU/0.4	7/22/2008	925	16		
PU/0.4	8/5/2008	1128	50		
PU/0.4	8/21/2008	1013	44		
PU/0.4	9/9/2008	1119	4		
PU/0.4	9/22/2008	1017	16		
PU/0.4	10/6/2009	1005	2		
PU/0.4	11/3/2009	1005	2		
PU/0.4	12/1/2009	1007	2		
PU/0.4	1/5/2010	1035	36		
PU/0.4	2/3/2010	1036	12		
PU/0.4	2/3/2010	1038	16	R	
PU/0.4	3/2/2010	1034	2		
PU/0.4	4/14/2010	1030	4		
PU/0.4	5/4/2010	1023	10		
PU/0.4	6/1/2010	1101	30		
PU/0.4	6/29/2010	1043	1572		

Table B-1. Fecal coliform and flow data collected at stations in the Chimacum Creek watershed in 2007-08 and 2009-10. An "R" represents a replicate value.

Station	Date	Time	Fecal Coliform (FC/100 mL)	Replicate	Flow (cfs)
PU/0.4	7/6/2010	1044	82		
PU/0.4	7/20/2010	1022	114		
PU/0.4	8/17/2010	1039	86		
PU/0.4	8/31/2010	1059	18		
PU/0.4	9/14/2010	1106	6		
PU/0.4	9/28/2010	1110	18		

Table B-2. Fecal coliform loadings at downstream stations on Chimacum Creek and its tributaries for dates sampled in 2007-08 and 2009-10. Mean loadings are shown for wet (October-May) and dry (June-September) seasons.

Fecal Coliform Loading (billions per day)									
DATE	CH/0.1	CH/3.4	PU/0.0	NA/0.1	WV/0.1	EG/0.0	BH/0.0	ECH/0.2	SW/0.0
October - May 2007-08									
10/18/2007	8.36	3.27	2.28	10.25	2.14	9.96	9.72	3.58	0.00
11/15/2007	712.02	15.33	0.16	8.93	0.34	0.30	0.39	3.56	0.08
12/5/2007	359.36	151.18	4.15	146.36	0.52	0.76	2.32	43.75	0.33
1/9/2008	112.47	184.01	1.27	10.06	0.10	0.36	1.14	10.46	0.13
2/6/2008	14.37	17.27	0.04	4.12	0.06	0.11	0.66	0.13	0.05
3/11/2008	1.60	4.34	0.02	3.54	0.01	0.04	0.22	0.60	0.02
4/16/2008	31.98	36.90	1.30	1.43	0.00	0.06	0.85	1.19	0.04
5/14/2008	11.00	22.38	5.20	6.81	0.00	2.12	4.13	1.42	0.21
Mean	**156.40**	**54.33**	**1.80**	**23.94**	**0.40**	**1.72**	**2.43**	**8.09**	**0.11**
June - September 2007-08									
6/10/2008	167.32	107.01	46.72	24.93	1.24	0.50	1.52	4.99	0.84
6/24/2008	20.34	5.33	1.91	4.02	0.15	0.02	0.35	1.16	0.05
7/1/2008	35.82	6.62	0.91	5.50	0.25	0.28	0.82	7.82	0.14
7/22/2008	38.79	6.39	0.99	2.73	0.11	1.47	0.22	2.47	0.43
8/5/2008	6.38	4.79	1.69	7.74	0.06	0.14	1.90	2.57	0.09
8/21/2008	10.66	3.88	0.10	8.64	0.04	0.66	0.12	4.07	0.04
9/9/2008	21.87	2.87	0.06	6.52	0.08	0.56	3.28	3.55	0.00
9/22/2008	10.29	4.67	0.02	6.74	0.03	0.36	0.11	2.66	0.00
Mean	**38.93**	**17.69**	**6.55**	**8.35**	**0.24**	**0.50**	**1.04**	**3.66**	**0.20**
October - May 2009-10									
10/6/2009	2.04	0.54	0.03	1.20	0.01	1.32	0.29	1.47	0.00
11/3/2009	9.30	1.12	0.35	4.17	0.11	2.62	0.36	0.52	0.03
12/1/2009	23.66	20.31	0.09	3.79	0.05	0.10	0.15	1.26	0.17
1/5/2010	25.07	20.72	0.80	0.88	0.07	0.12	0.43	1.17	0.19
2/3/2010	16.53	14.90	0.26	5.64	0.41	0.22	0.33	1.92	0.01
3/2/2010	20.46	20.49	1.96	8.43	0.02	0.13	0.36	1.69	0.14
4/14/2010	16.44	2.28	0.51	1.86	0.32	0.50	0.01	0.47	0.01
5/4/2010	45.86	11.31	0.84	10.21	0.11	0.22	0.22	0.87	0.13
Mean	**19.92**	**11.46**	**0.61**	**4.52**	**0.14**	**0.65**	**0.27**	**1.17**	**0.09**
June - September 2009-10									
6/1/2010	213.13	11.80	4.20	16.10	0.43	0.44	0.71	6.26	0.12
6/29/2010	59.34	5.35	5.48	18.83	0.38	0.40	0.43	2.39	0.55
7/6/2010	35.61	28.69	1.46	15.49	0.49	0.24	0.31	2.54	0.08
7/20/2010	48.65	10.79	1.10	9.52	0.18	0.39	1.24	17.39	0.16
8/17/2010	28.67	5.13	0.40	11.96	1.12	0.34	1.17	4.99	0.00
8/31/2010	39.05	7.82	1.26	6.68	0.27	0.31	1.70	5.82	0.00
9/14/2010	24.09	20.65	0.20	3.05	1.15	0.38	0.27	2.11	0.11
9/28/2010	16.56	12.67	1.21	7.31	3.92	0.66	0.63	2.05	0.06
Mean	**58.14**	**12.86**	**1.91**	**11.12**	**0.99**	**0.40**	**0.81**	**5.44**	**0.14**

Appendix C

Temperature Graphs

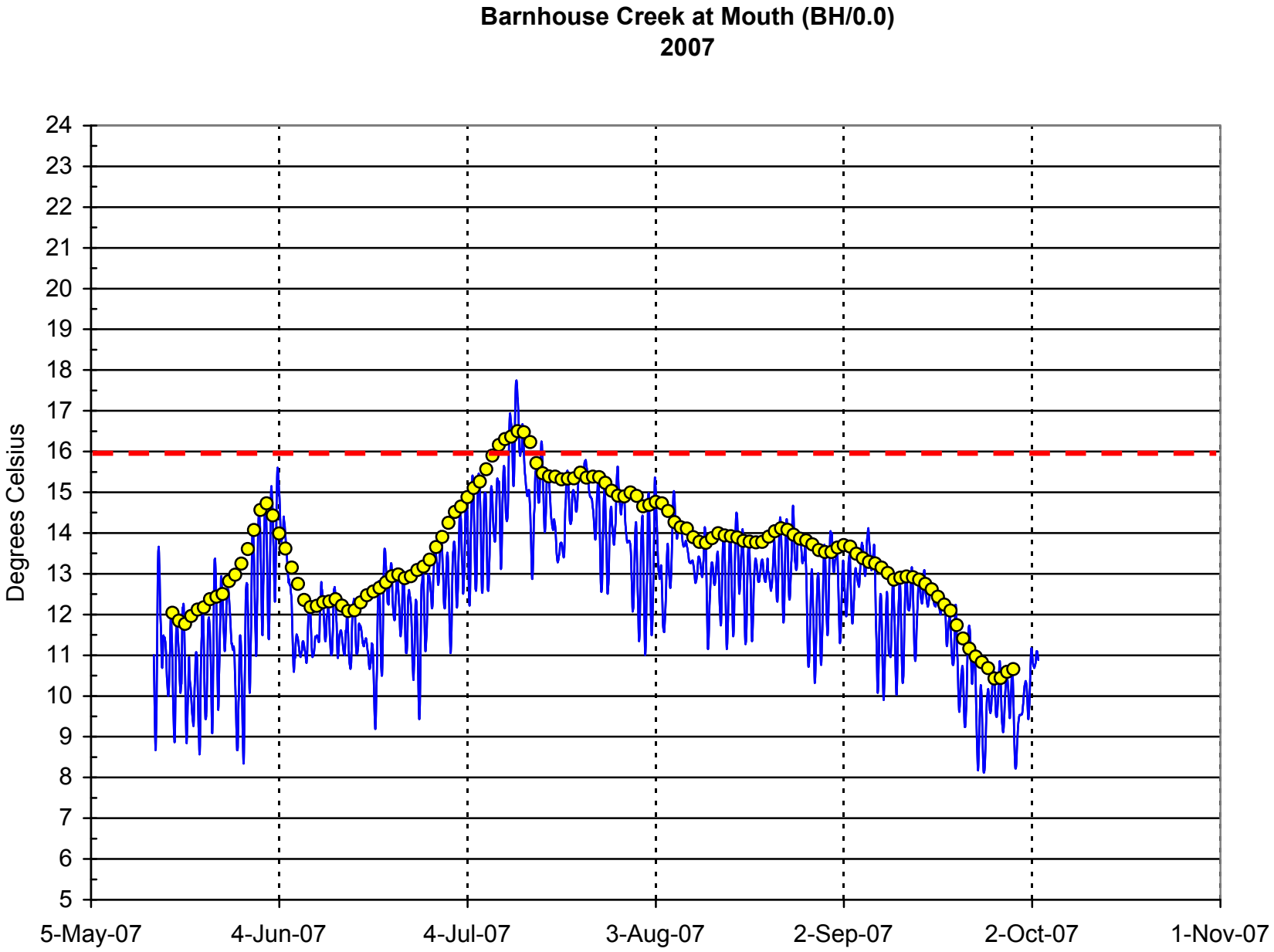

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station BH/0.0 on Barnhouse Creek in 2007. Dashed line shows the 7-DADMax criteria for spawning and rearing. BH_0_0 cht.xls 6/3/2011

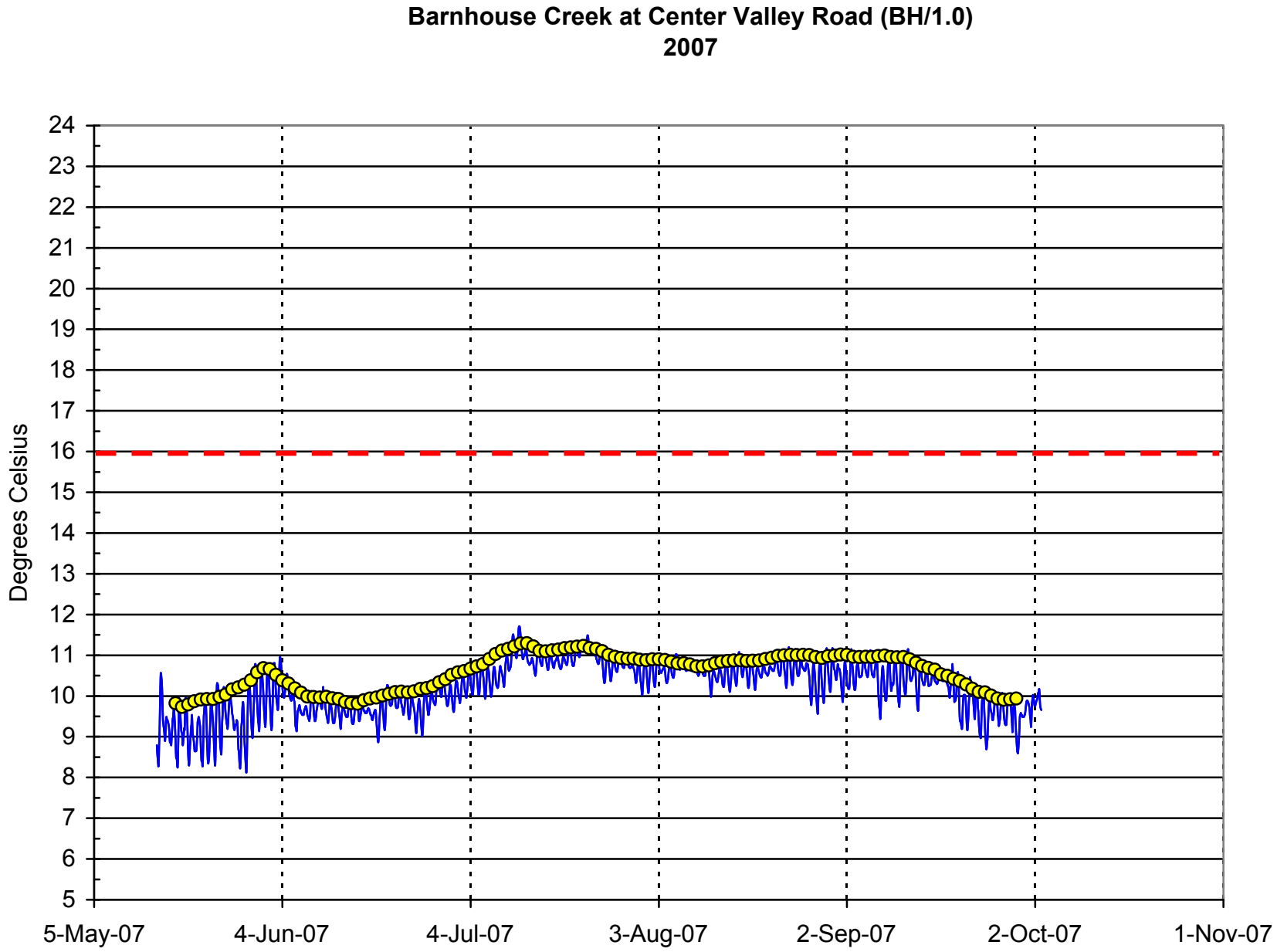

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station BH/1.0 on Barnhouse Creek in 2007. Dashed line shows the 7-DADMax criteria for spawning and rearing. BH_1_0 cht.xls 6/3/2011

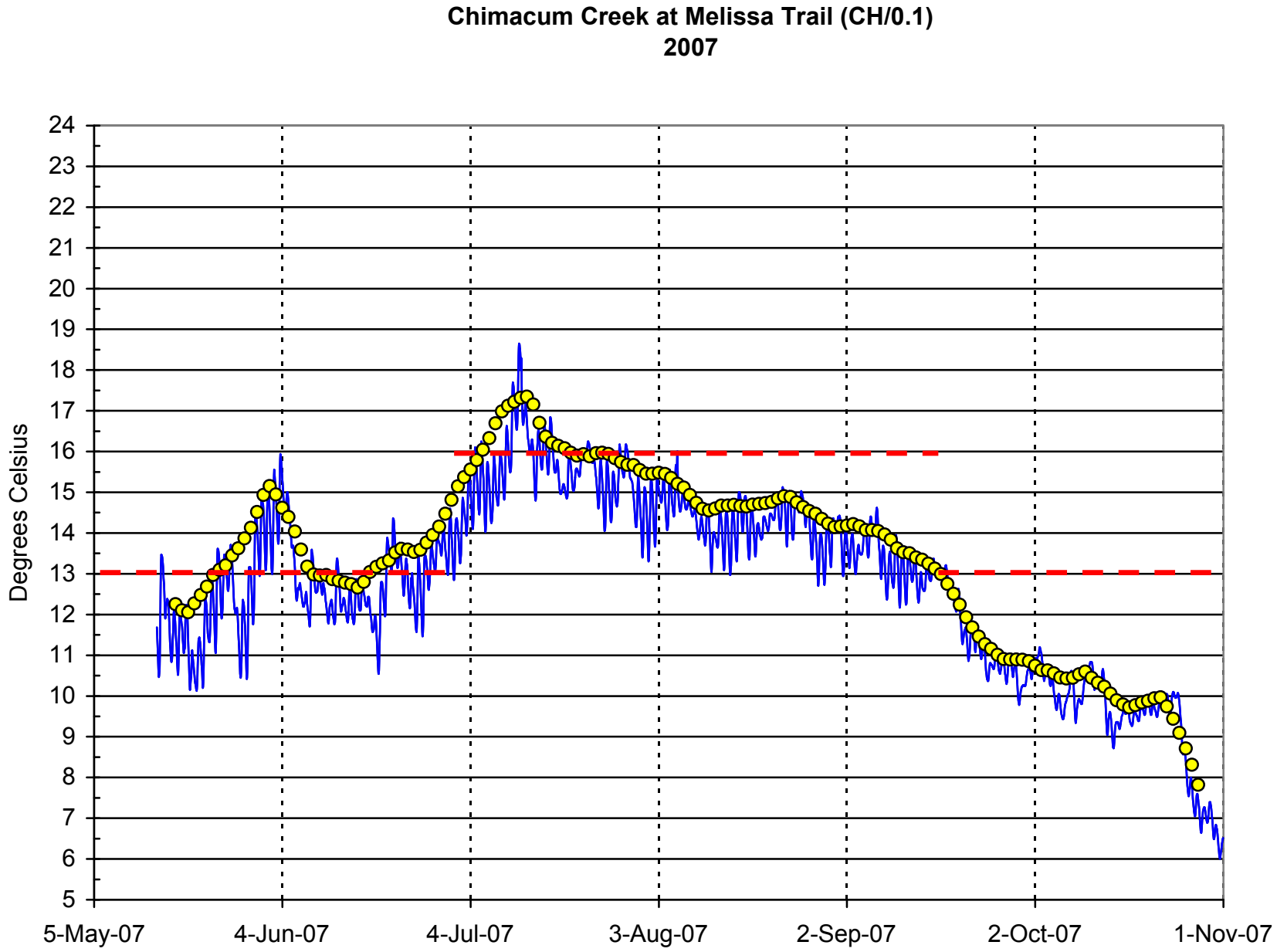

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station CH/0.1 on Chimacum Creek in 2007. Dashed line shows the 7-DADMax criteria. CH_0_1 cht.xls 6/3/2011

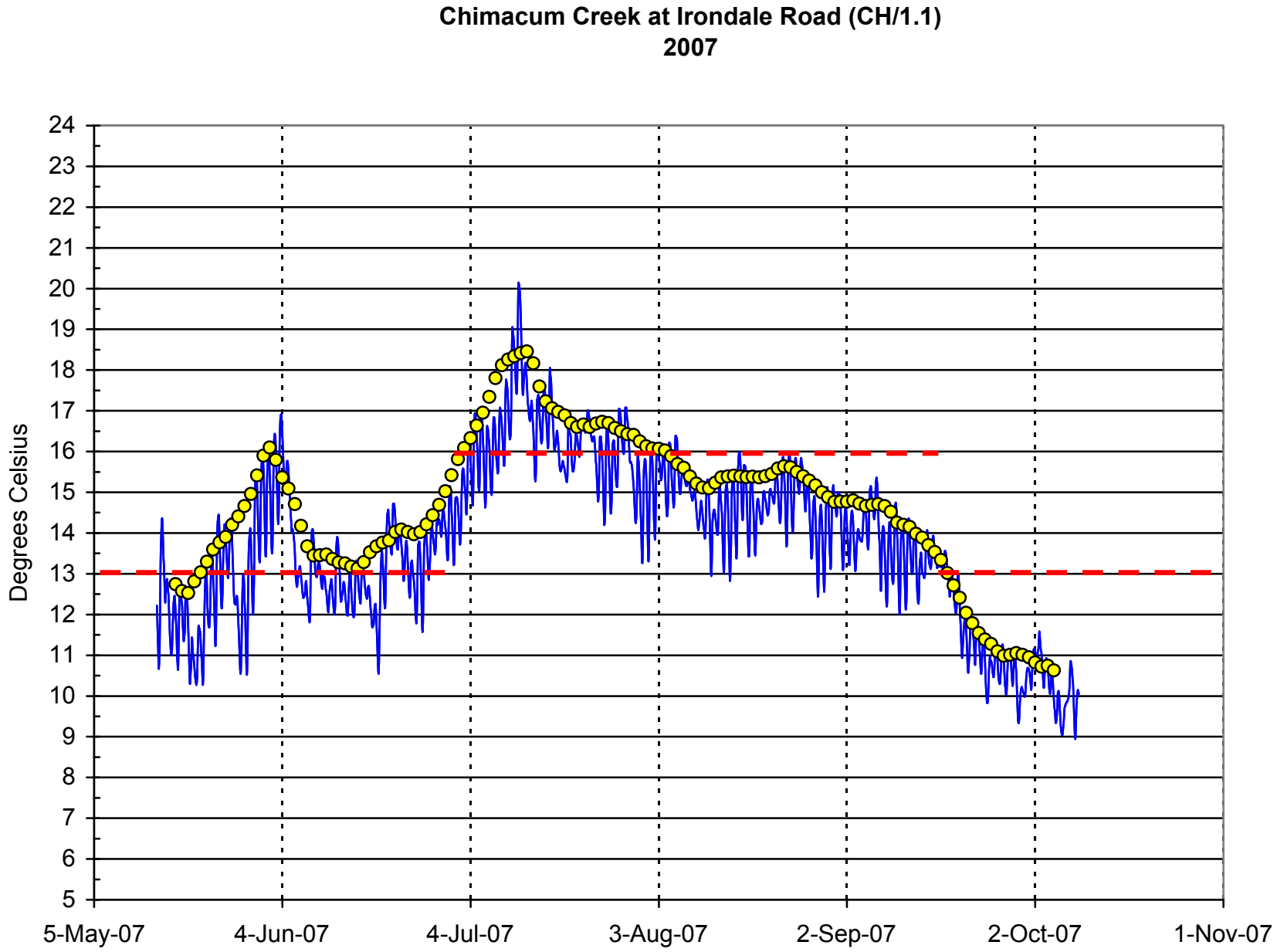

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station CH/1.1 on Chimacum Creek in 2007. Dashed line shows the 7-DADMax criteria. CH_1_1 cht.xls 6/3/2011

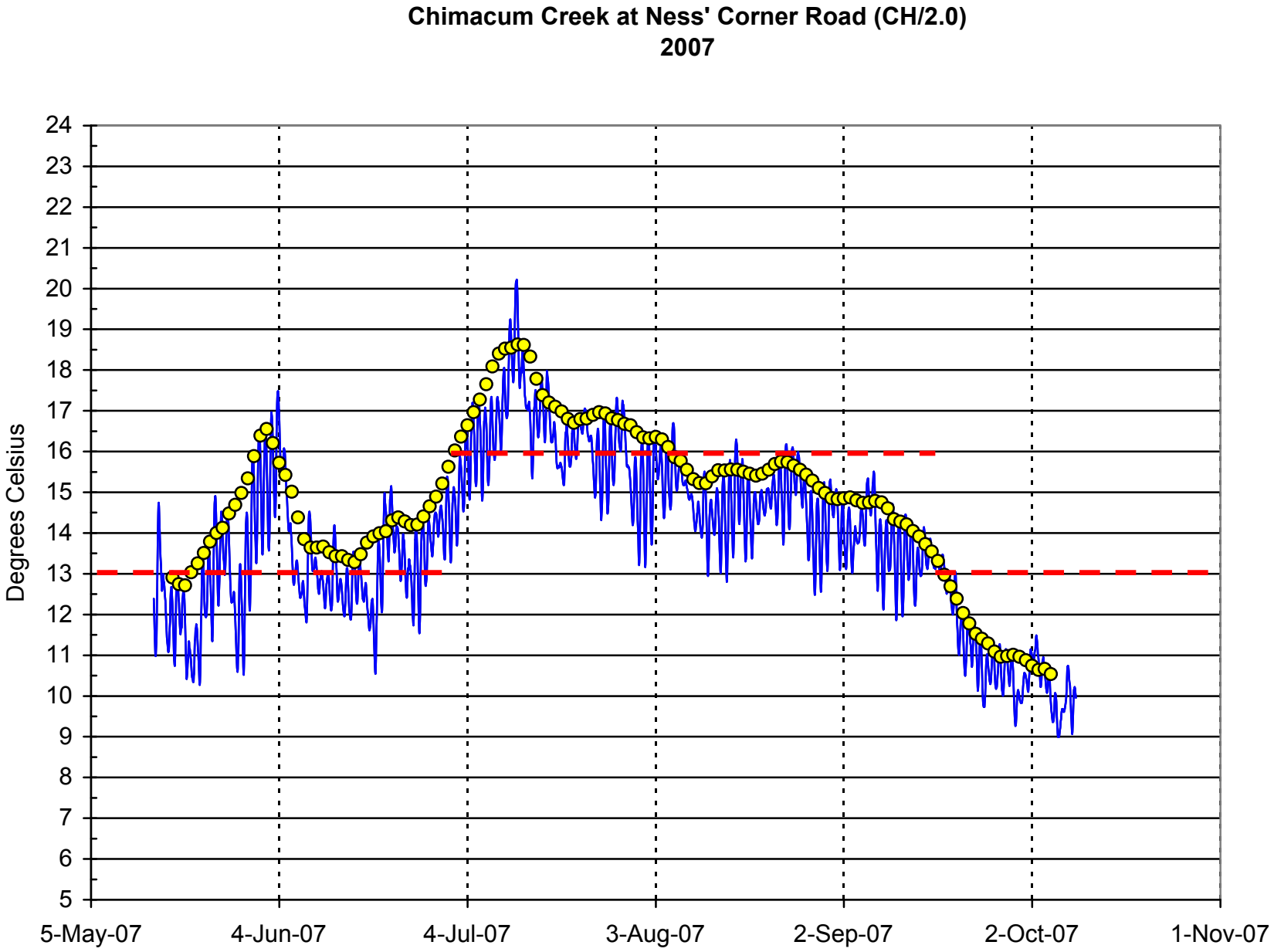

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station CH/2.0 on Chimacum Creek in 2007. Dashed line shows the 7-DADMax criteria. CH_2_0 cht.xls 6/3/2011

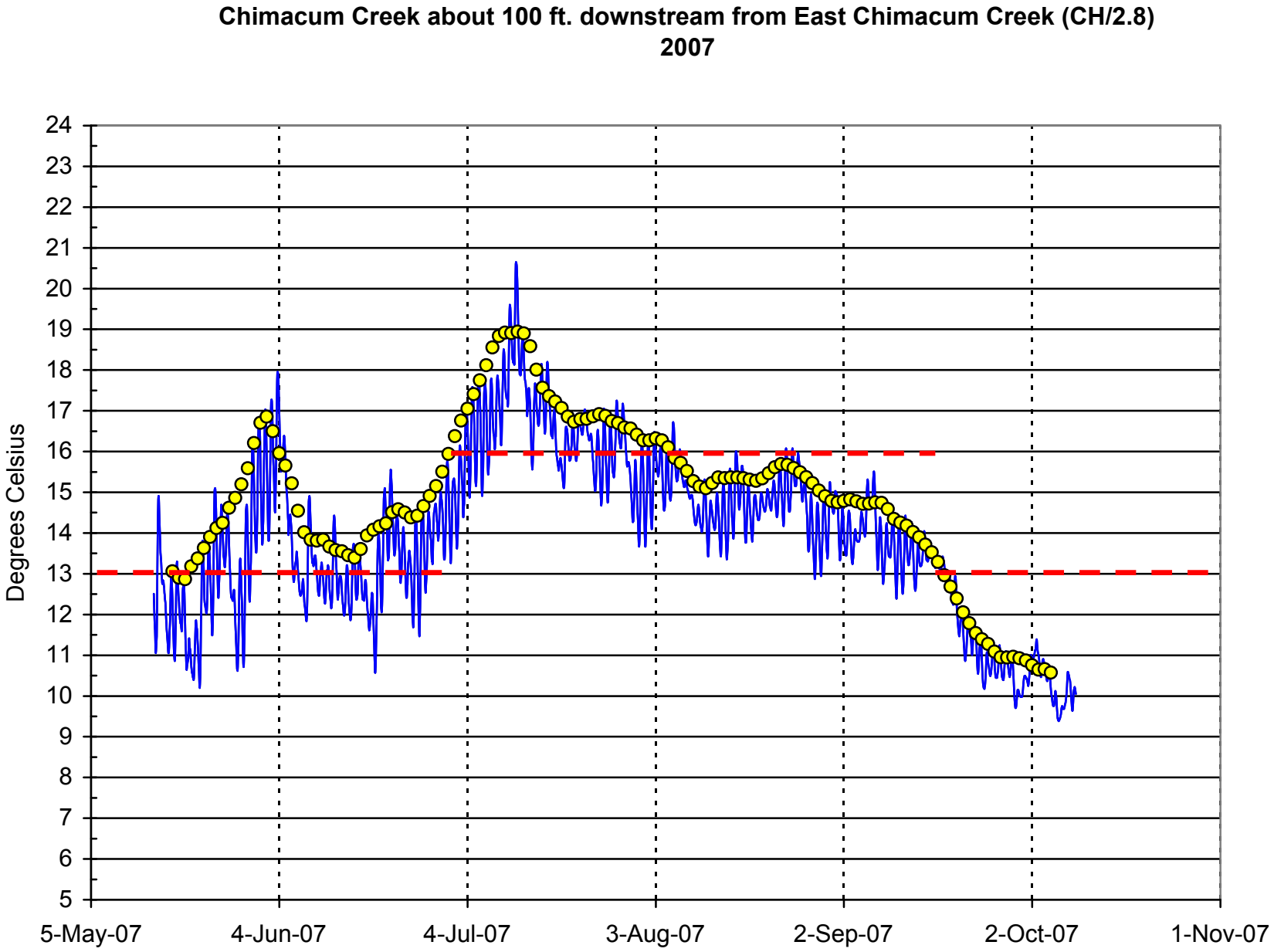

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station CH/2.8 on Chimacum Creek in 2007. Dashed line shows the 7-DADMax criteria. CH_2_8 cht.xls 6/3/2011

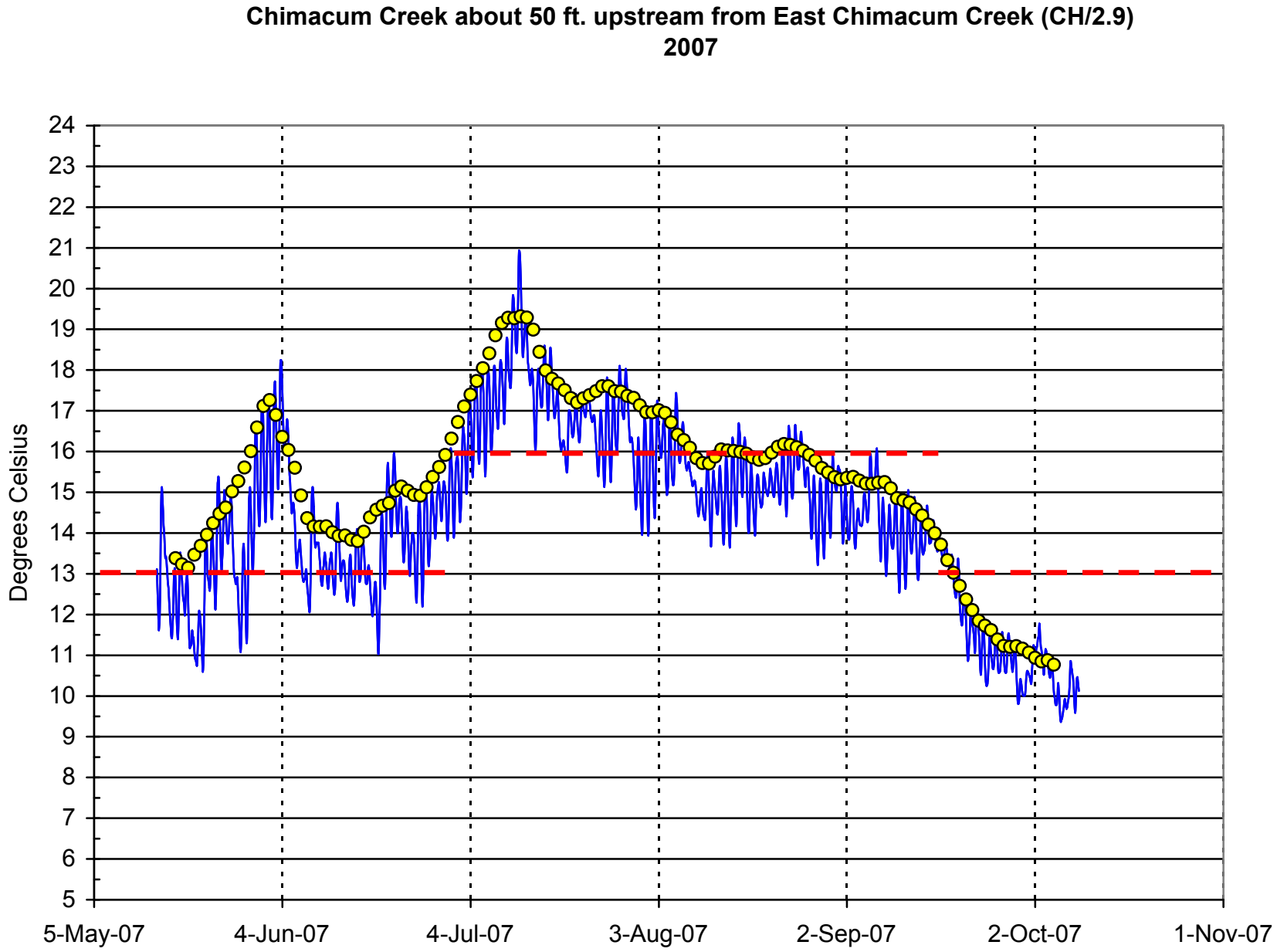

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station CH/2.9 on Chimacum Creek in 2007. Dashed line shows the 7-DADMax criteria. CH_2_9 cht.xls 6/3/2011

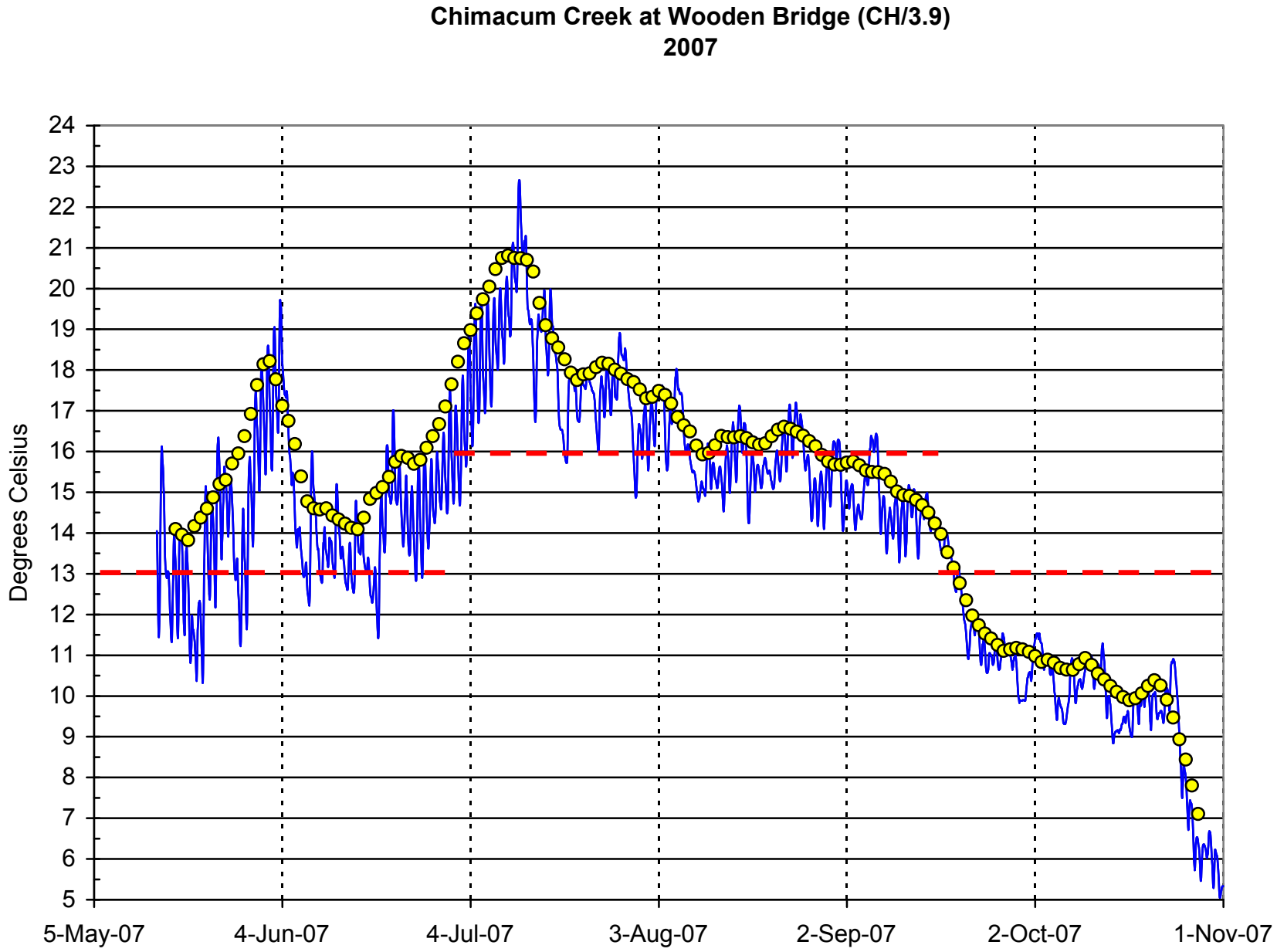

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station CH/3.9 on Chimacum Creek in 2007. Dashed line shows the 7-DADMax criteria. CH_3_9 cht.xls 6/3/2011

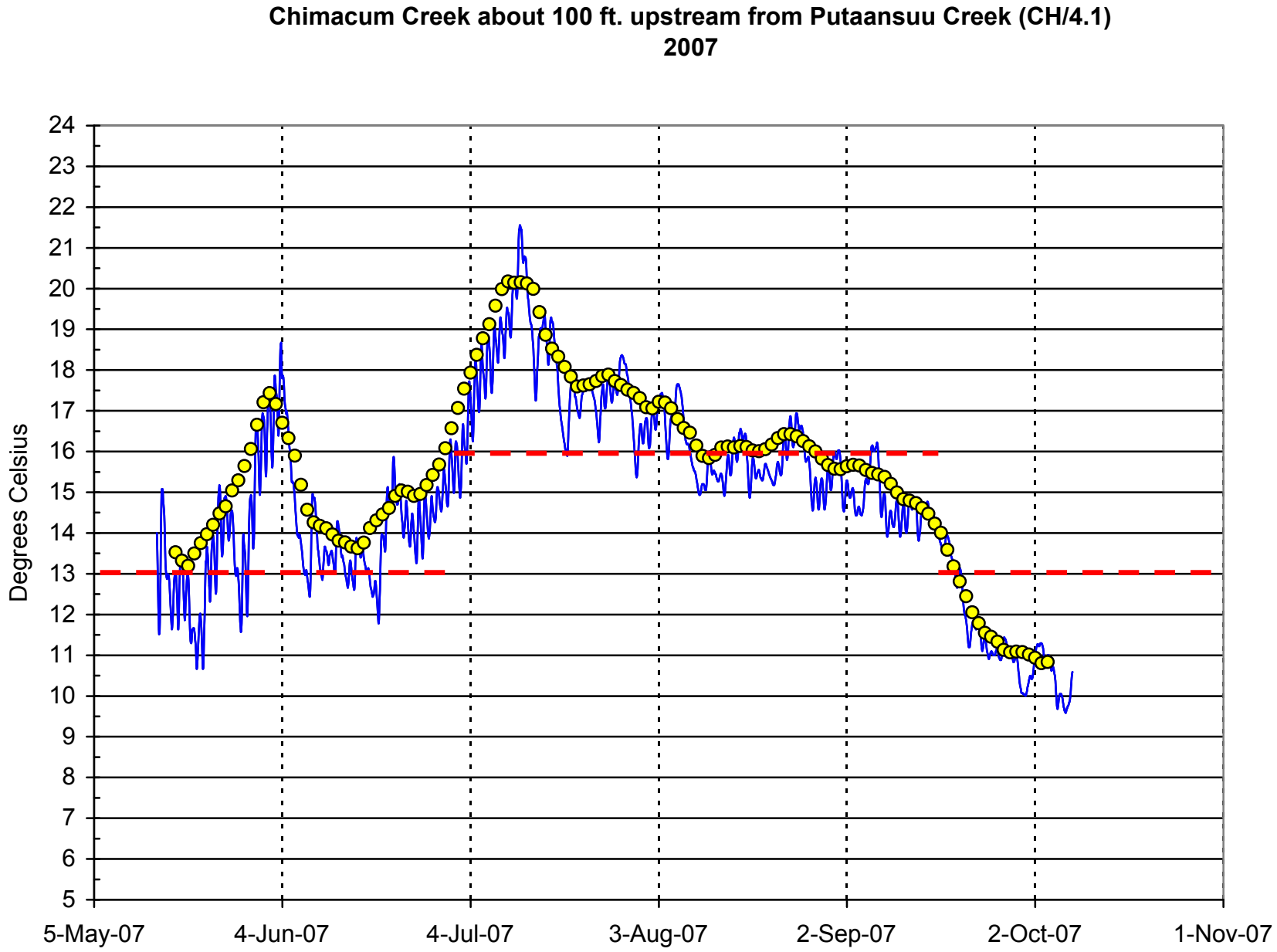

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station CH/4.1 on Chimacum Creek in 2007. Dashed line shows the 7-DADMax criteria. CH_4_1 cht.xls 6/3/2011

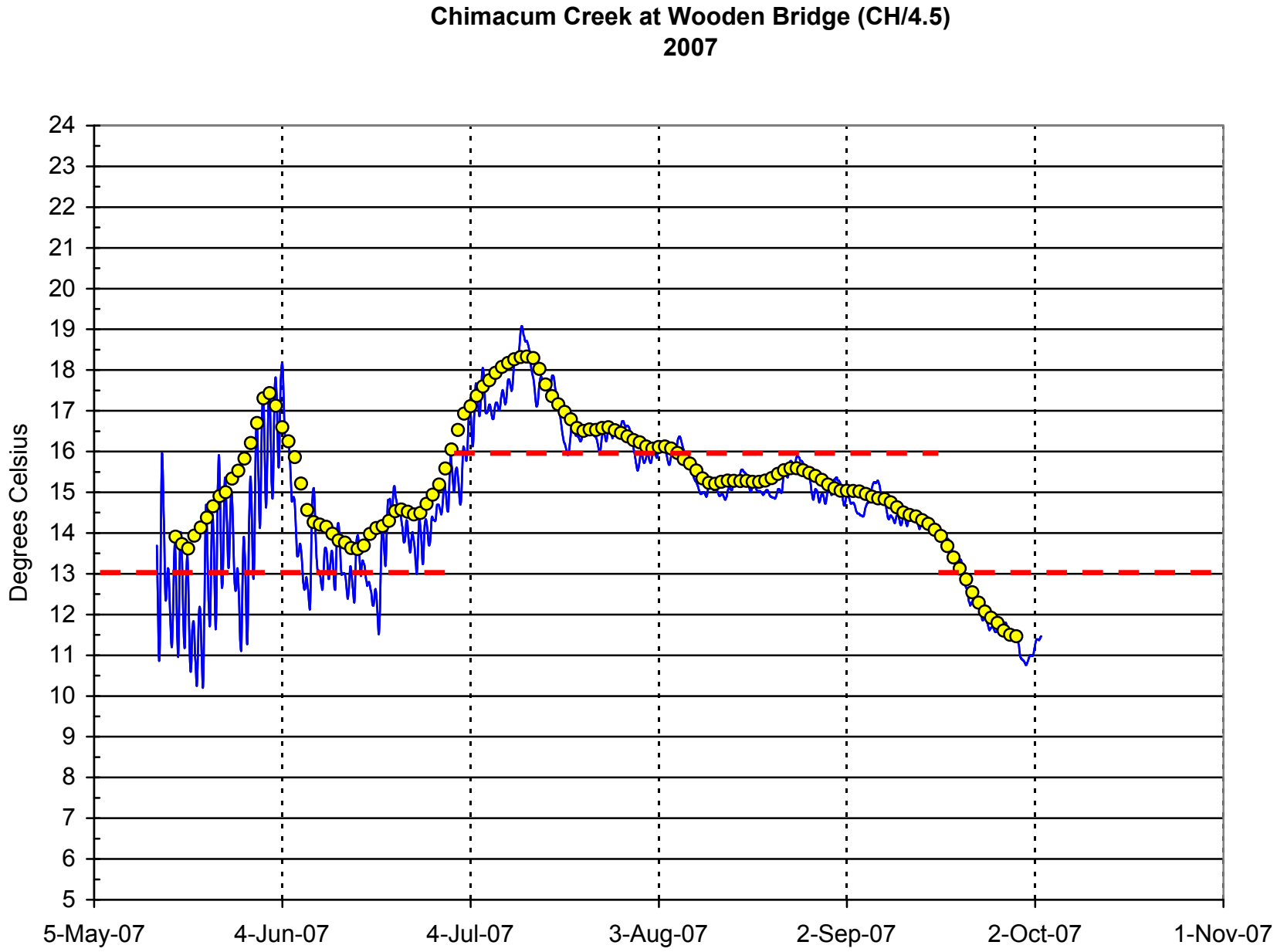

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station CH/4.5 on Chimacum Creek in 2007. Dashed line shows the 7-DADMax criteria. CH_4_5 cht.xls 6/3/2011

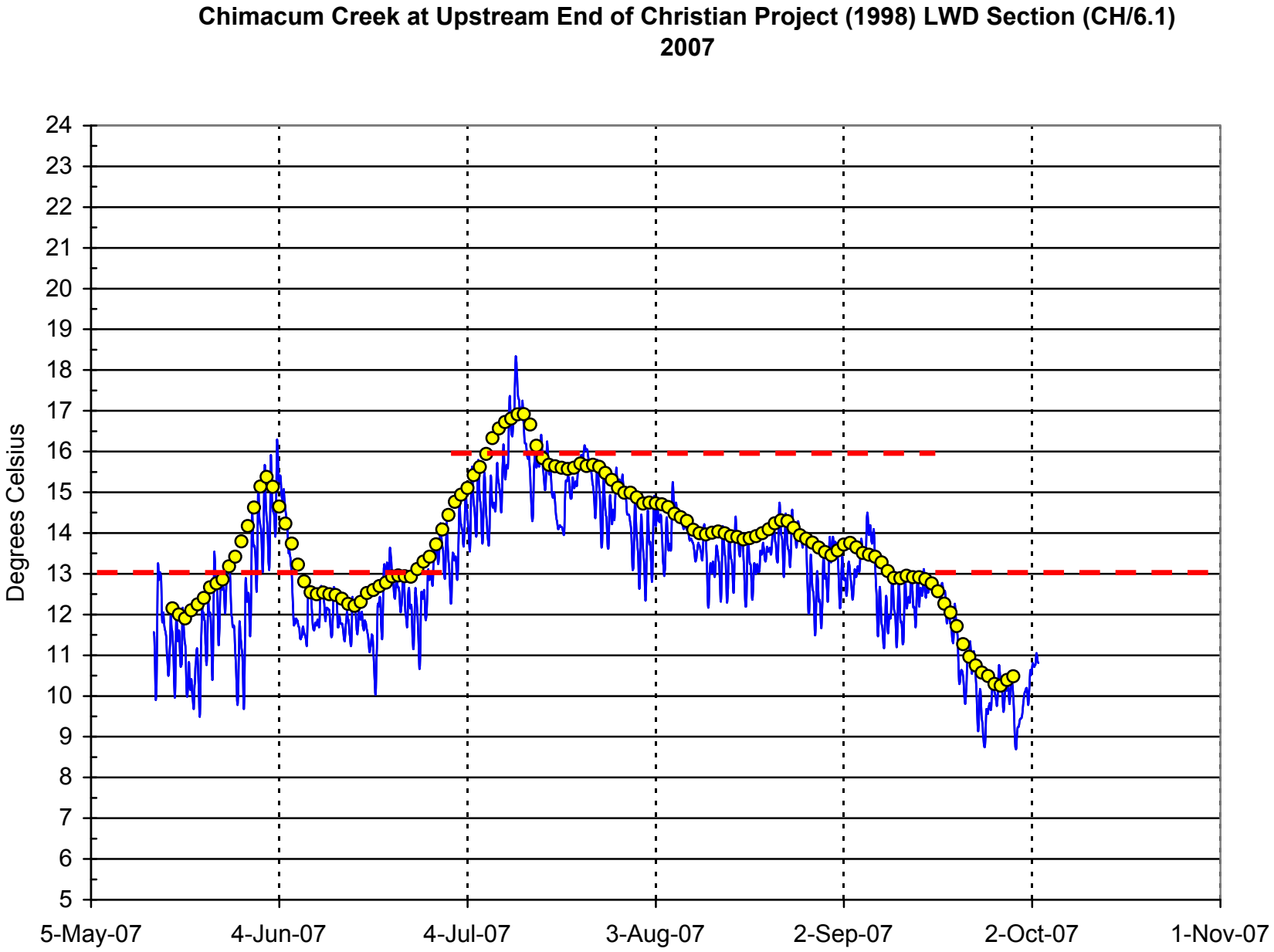

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station CH/6.1 on Chimacum Creek in 2007. Dashed line shows the 7-DADMax criteria. CH_6_1 cht.xls 6/3/2011

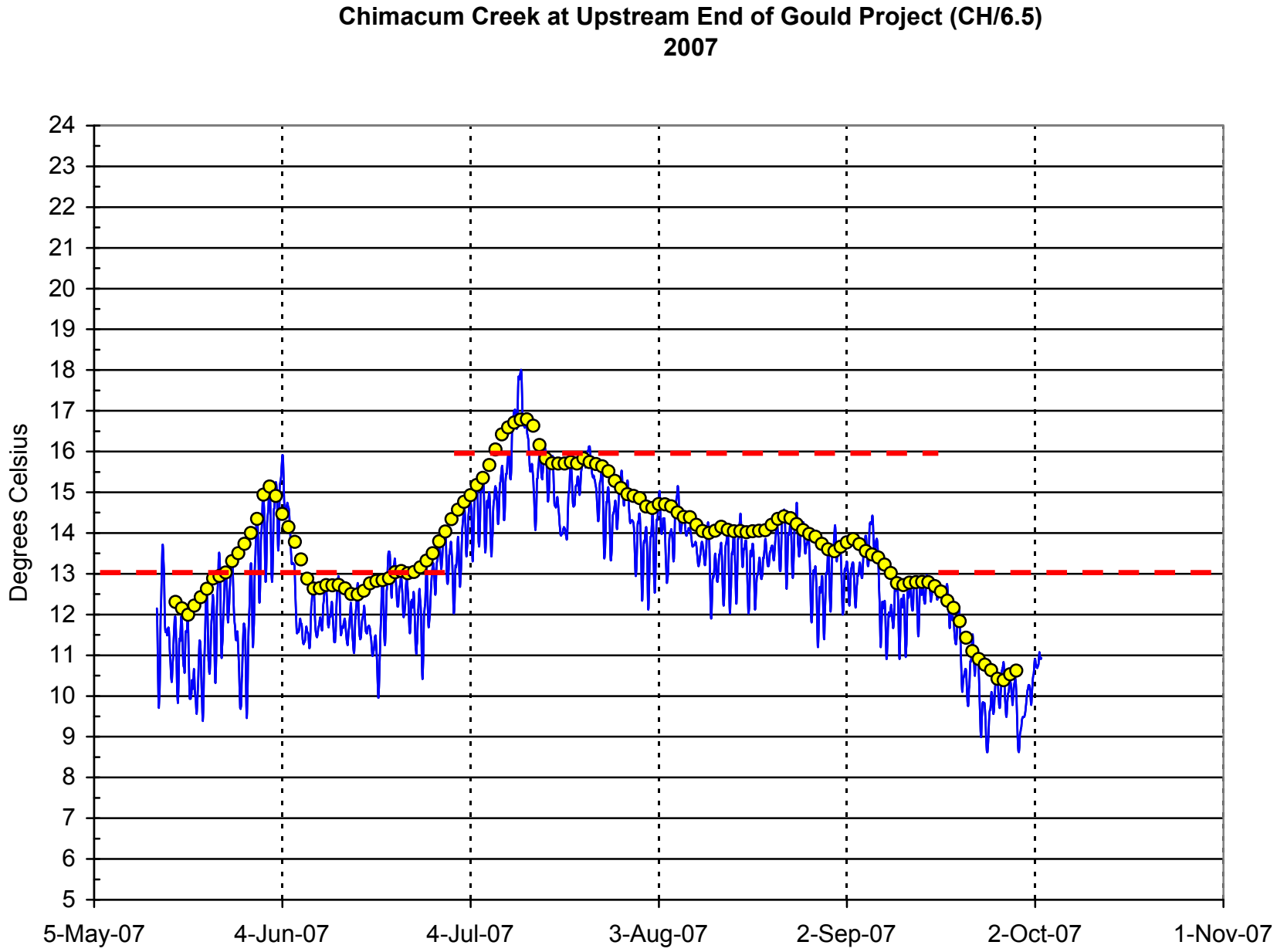

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station CH/6.5 on Chimacum Creek in 2007. Dashed line shows the 7-DADMax criteria. CH_6_5 cht.xls 6/3/2011

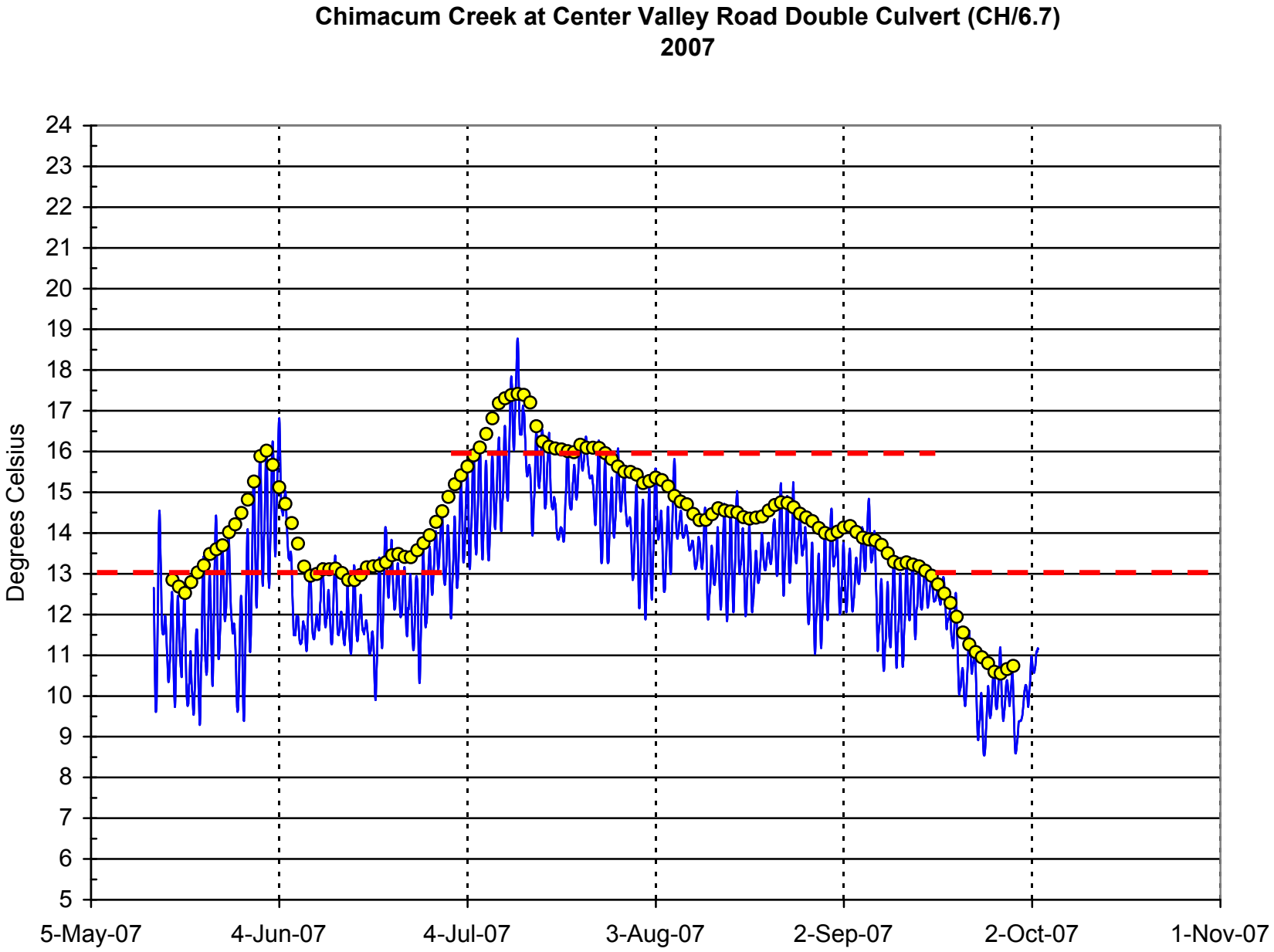

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station CH/6.7 on Chimacum Creek in 2007. Dashed line shows the 7-DADMax criteria. CH_6_7 cht.xls 6/3/2011

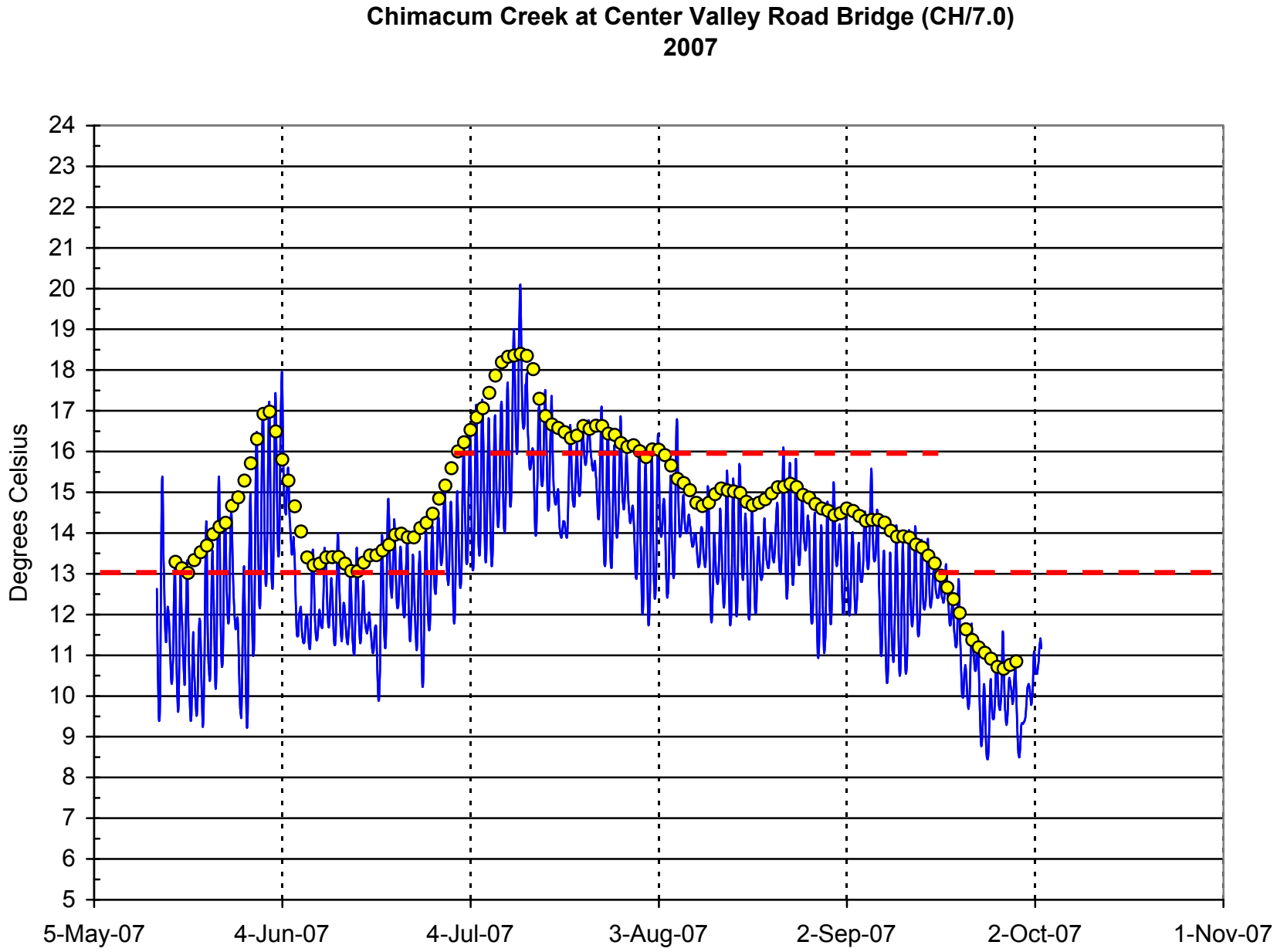

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station CH/7.0 on Chimacum Creek in 2007. Dashed line shows the 7-DADMax criteria. CH_7_0 cht.xls 6/3/2011

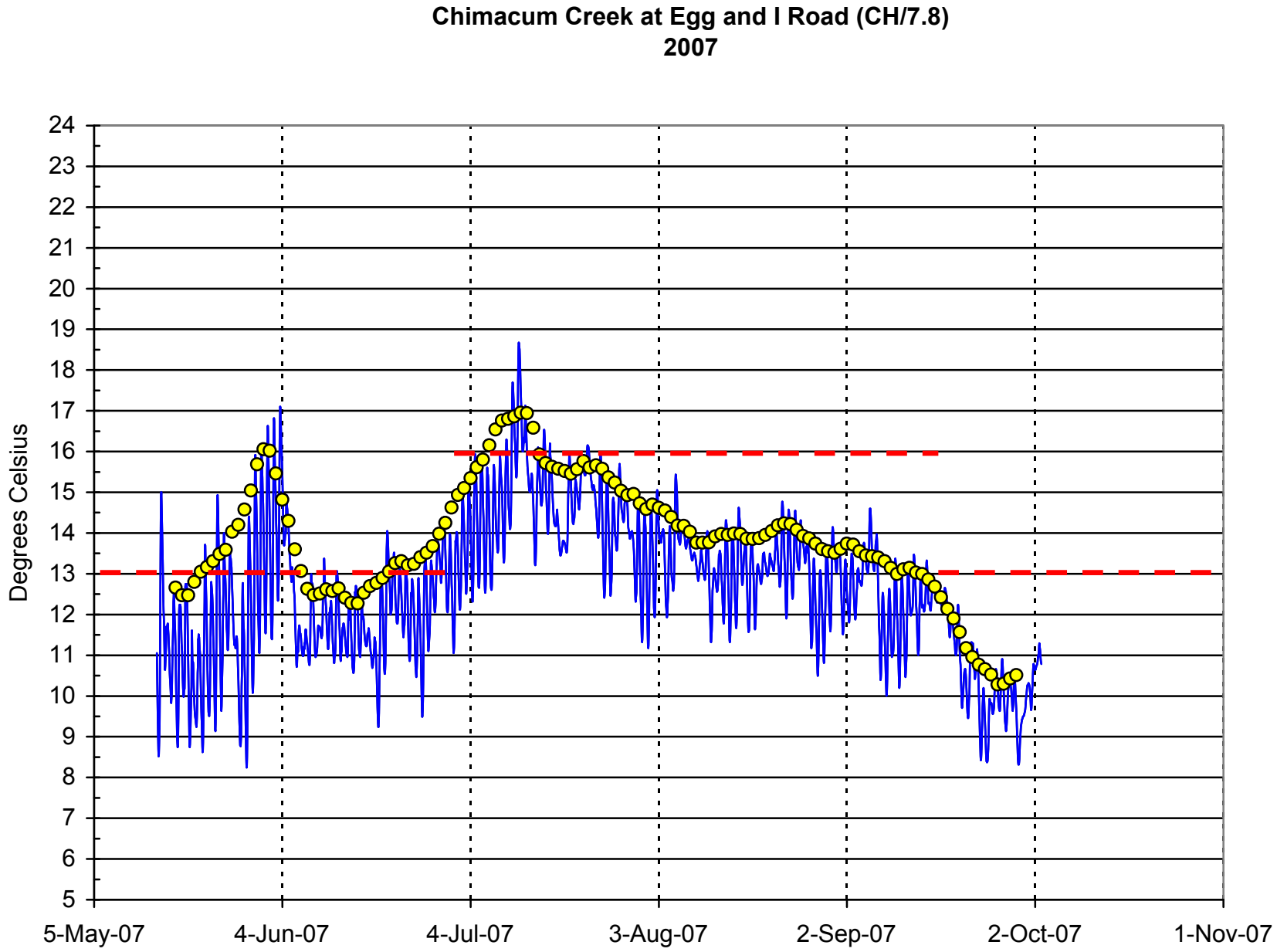

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station CH/7.8 on Chimacum Creek in 2007. Dashed line shows the 7-DADMax criteria. CH_7_8 cht.xls 6/3/2011

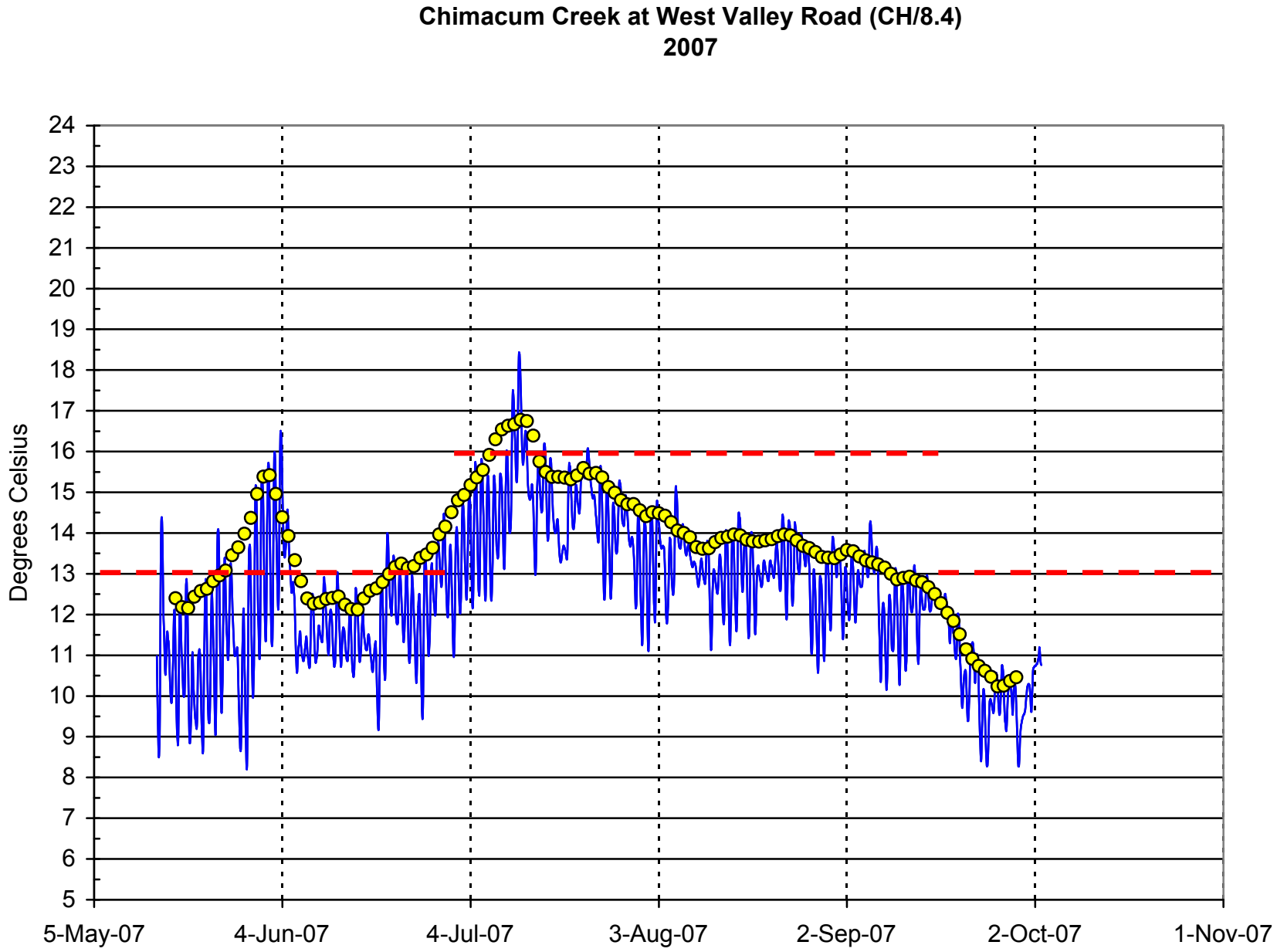

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station CH/8.4 on Chimacum Creek in 2007. Dashed line shows the 7-DADMax criteria. CH_8_4 cht.xls 6/3/2011

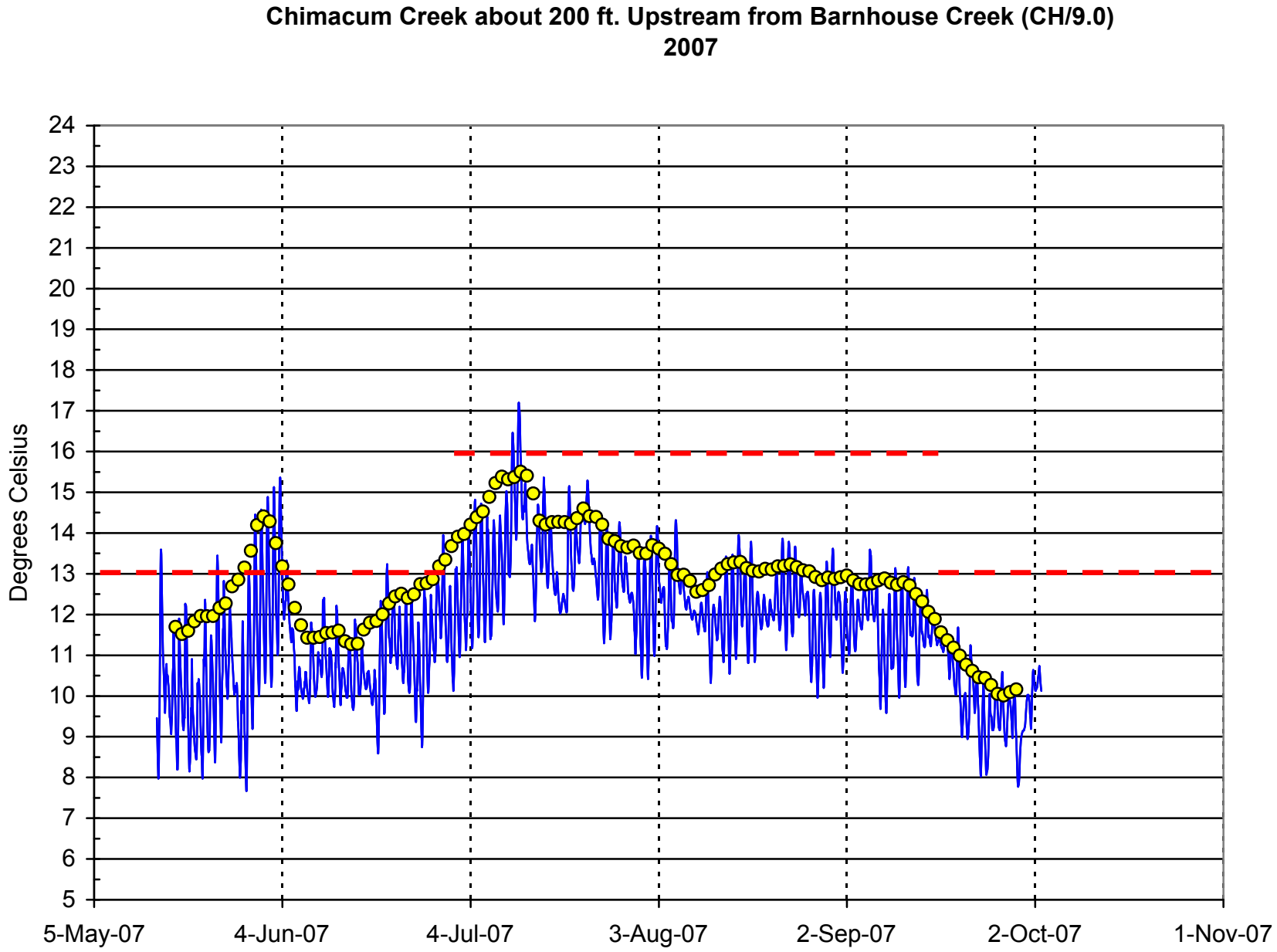

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station CH/9.0 on Chimacum Creek in 2007. Dashed line shows the 7-DADMax criteria. CH_9_0 cht.xls 6/3/2011

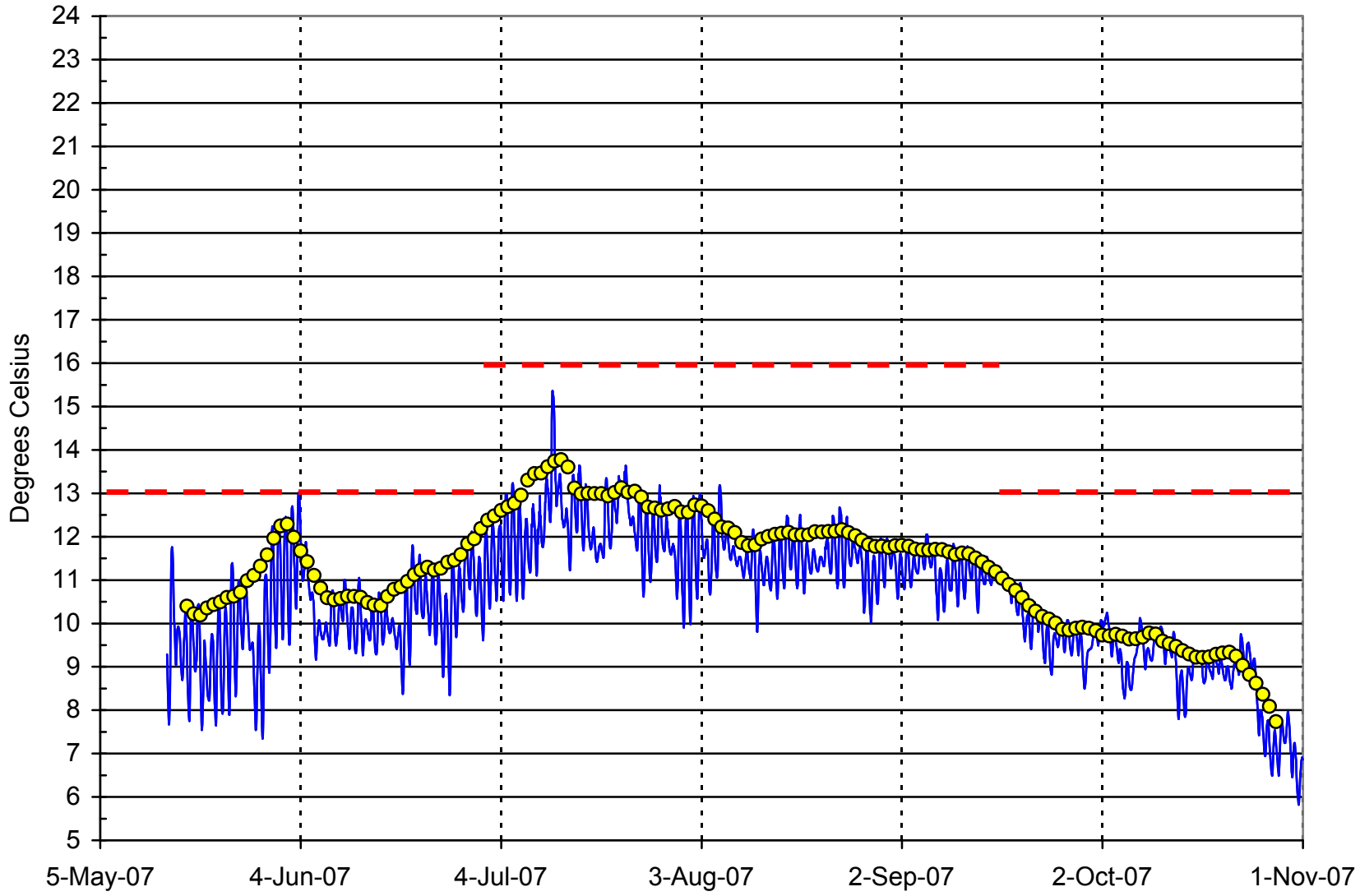

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station CH/9.4 on Chimacum Creek in 2007. Dashed line shows the 7-DADMax criteria. CH_9_4 cht.xls 6/3/2011

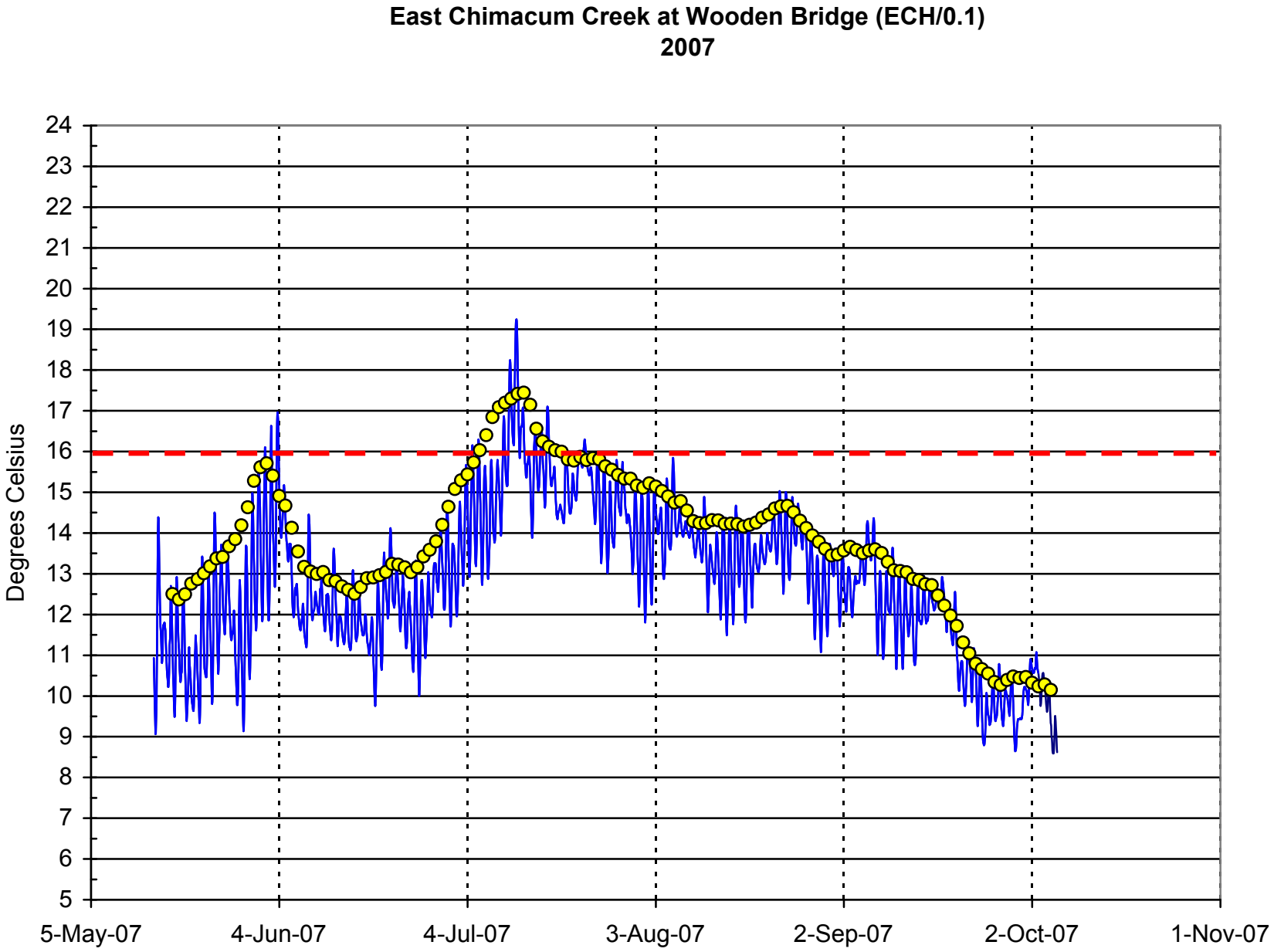

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station ECH/0.1 on East Chimacum Creek in 2007. Dashed line shows the 7-DADMax criteria for spawning and rearing. ECH_0_1 cht.xls 6/3/

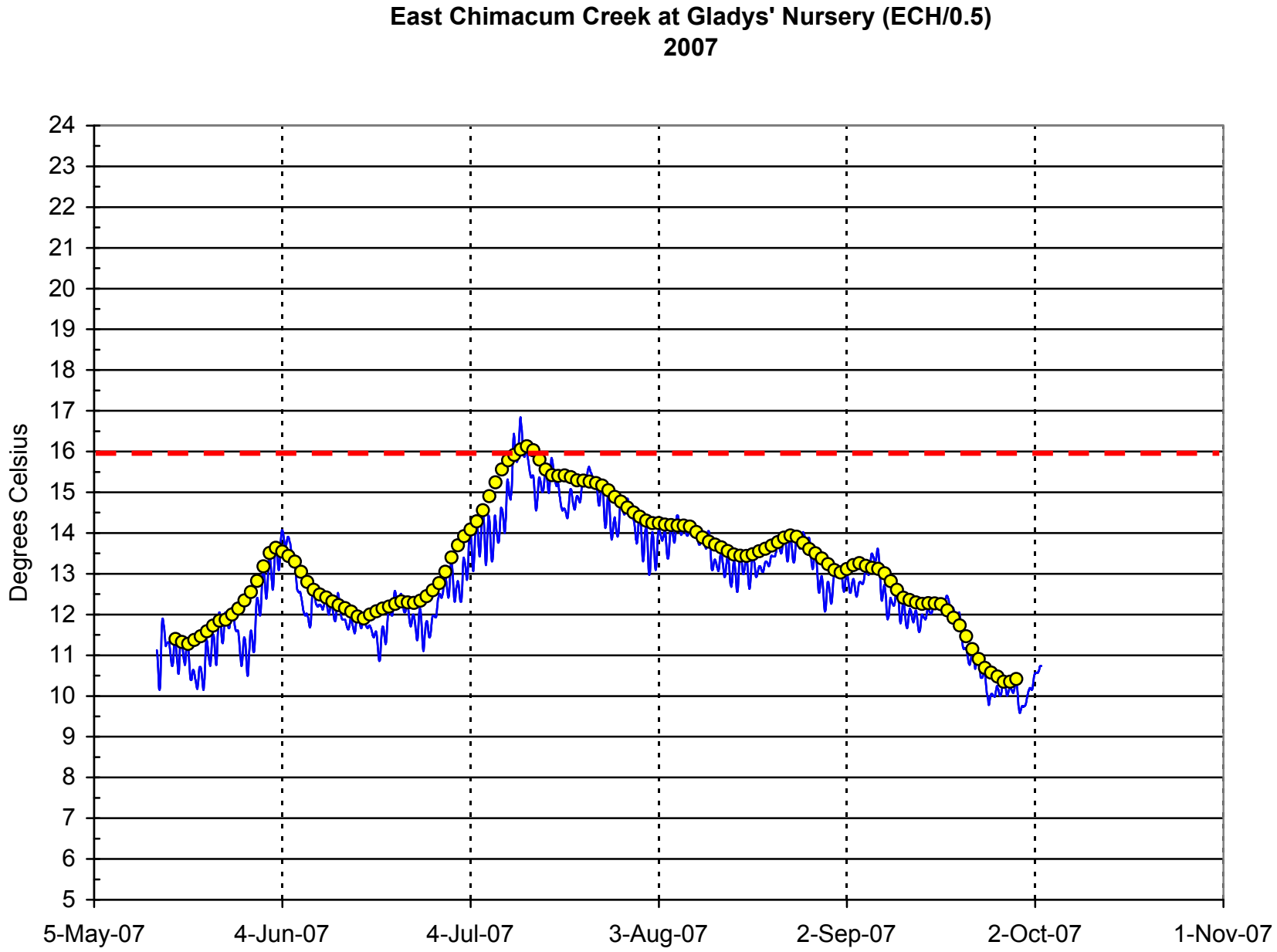

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station ECH/0.5 on East Chimacum Creek in 2007. Dashed line shows the 7-DADMax criteria for spawning and rearing. ECH_0_5 cht.xls 6/3/

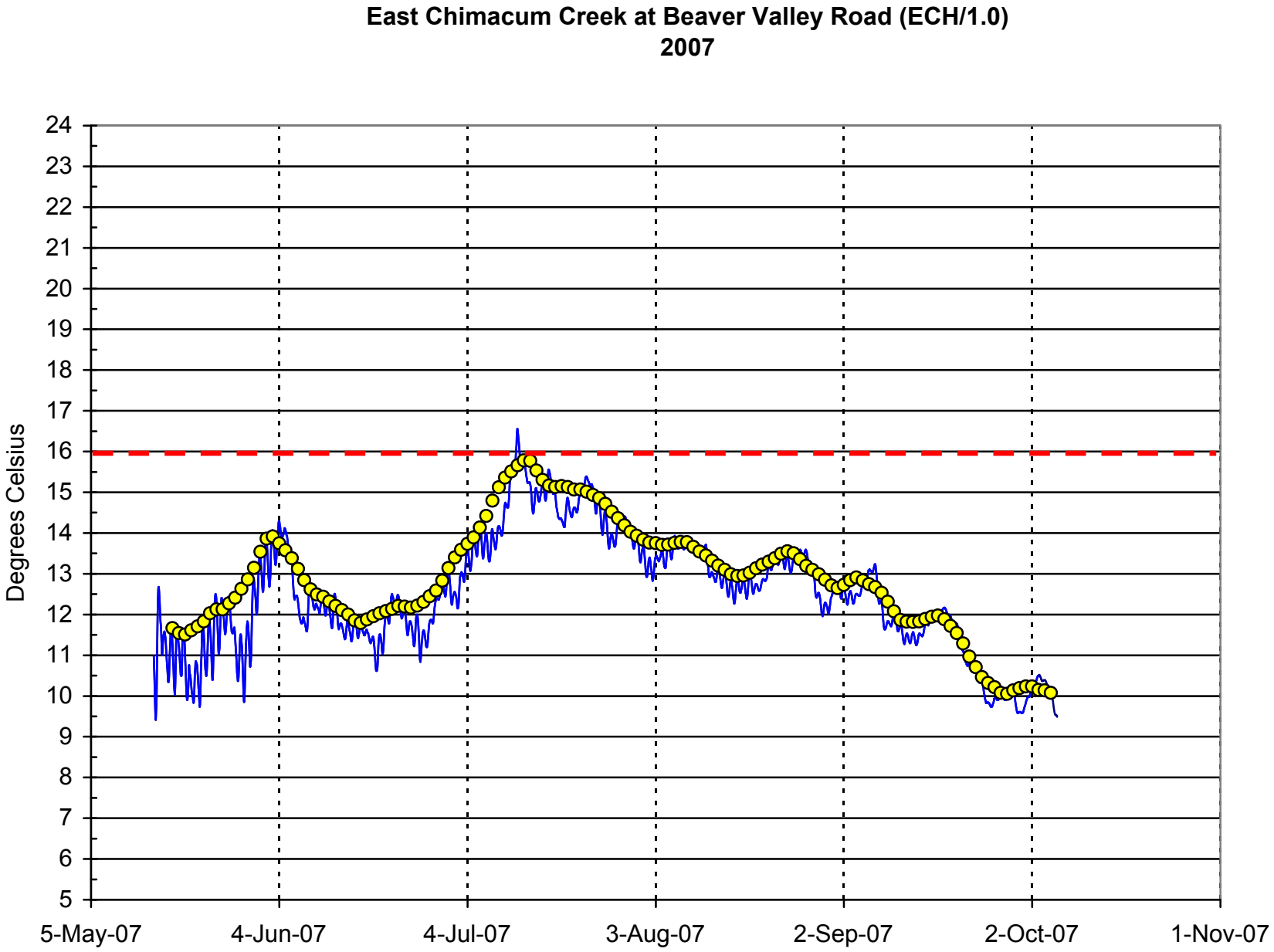

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station ECH/1.0 on East Chimacum Creek in 2007. Dashed line shows the 7-DADMax criteria for spawning and rearing. ECH_1_0 cht.xls 6/3/

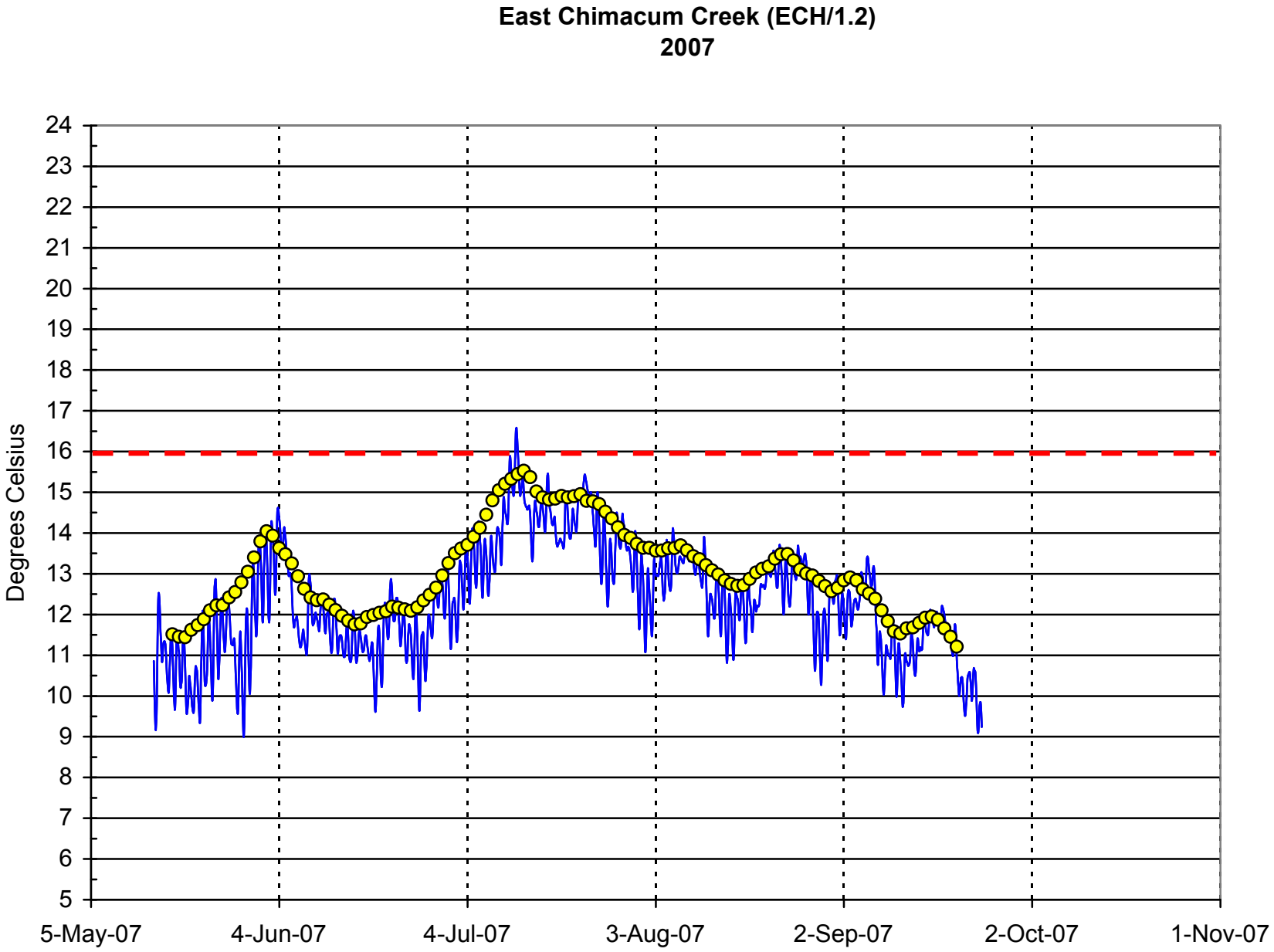

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station ECH/1.2 on East Chimacum Creek in 2007. Dashed line shows the 7-DADMax criteria for spawning and rearing. ECH_1_2 cht.xls 6/3/

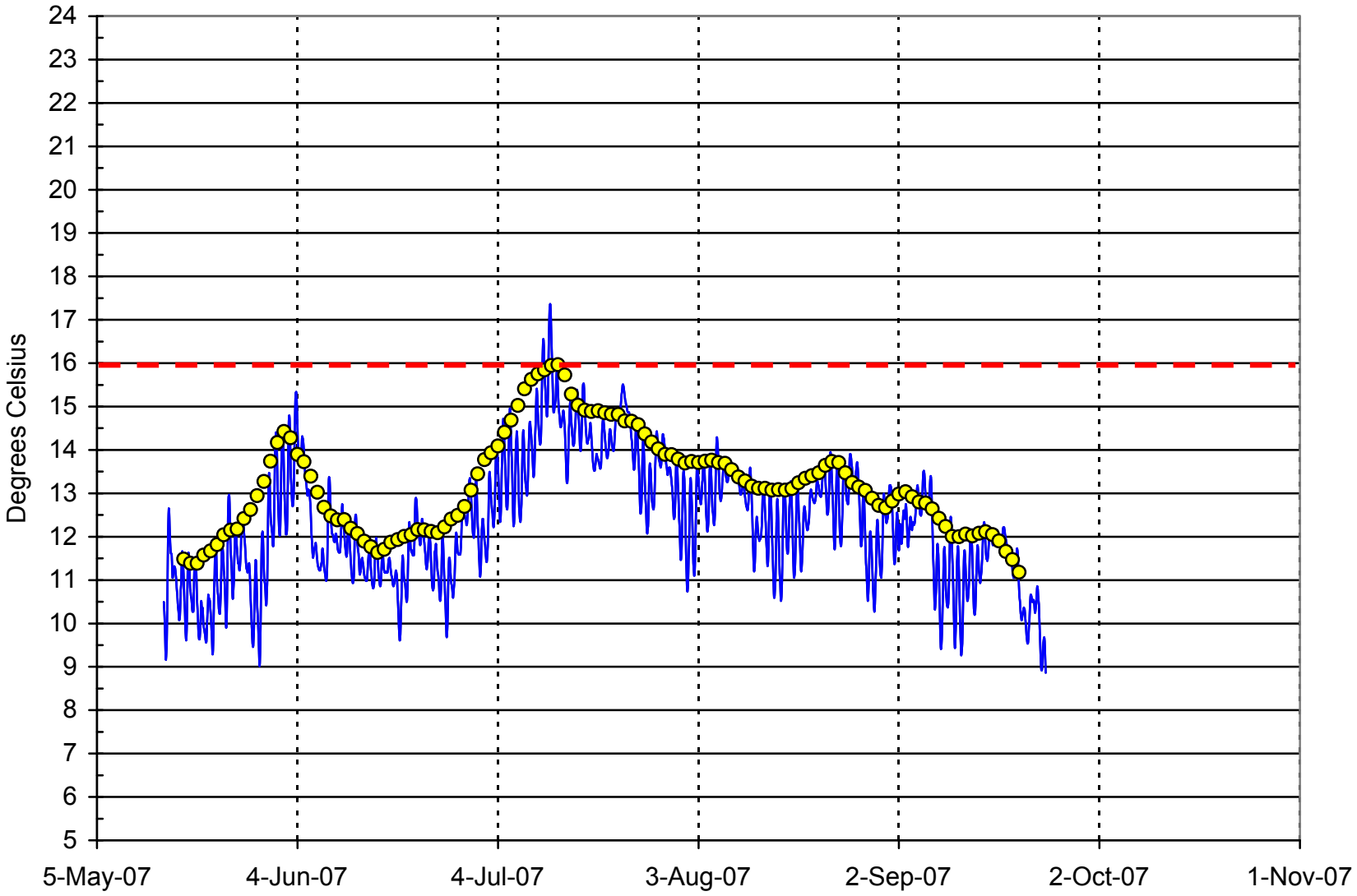

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station ECH/2.0 on East Chimacum Creek in 2007. Dashed line shows the 7-DADMax criteria for spawning and rearing. ECH_2_0 cht.xls 6/3/

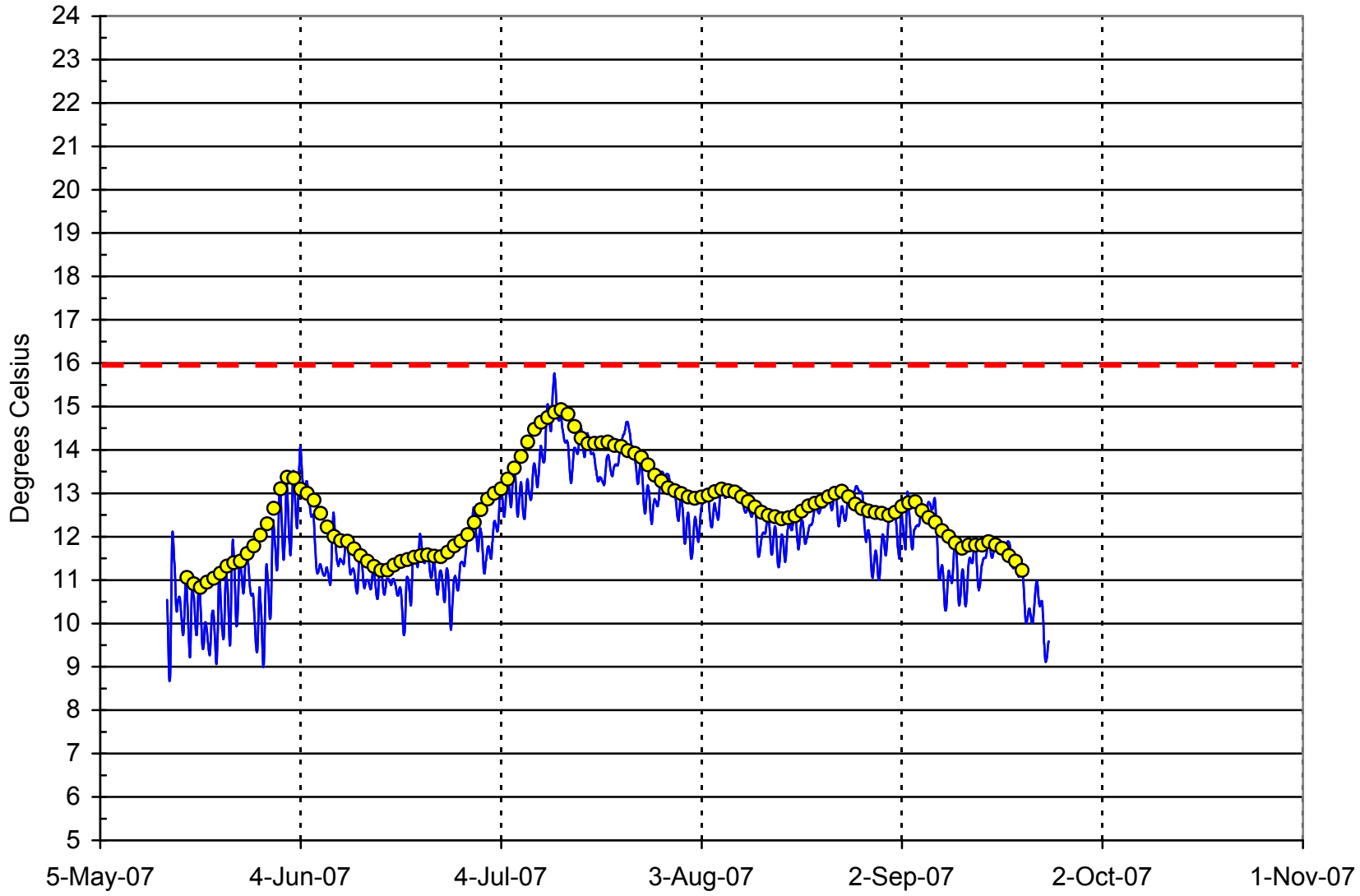

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station ECH/2.8 on East Chimacum Creek in 2007. Dashed line shows the 7-DADMax criteria for spawning and rearing. ECH_2_8 cht.xls 6/3/

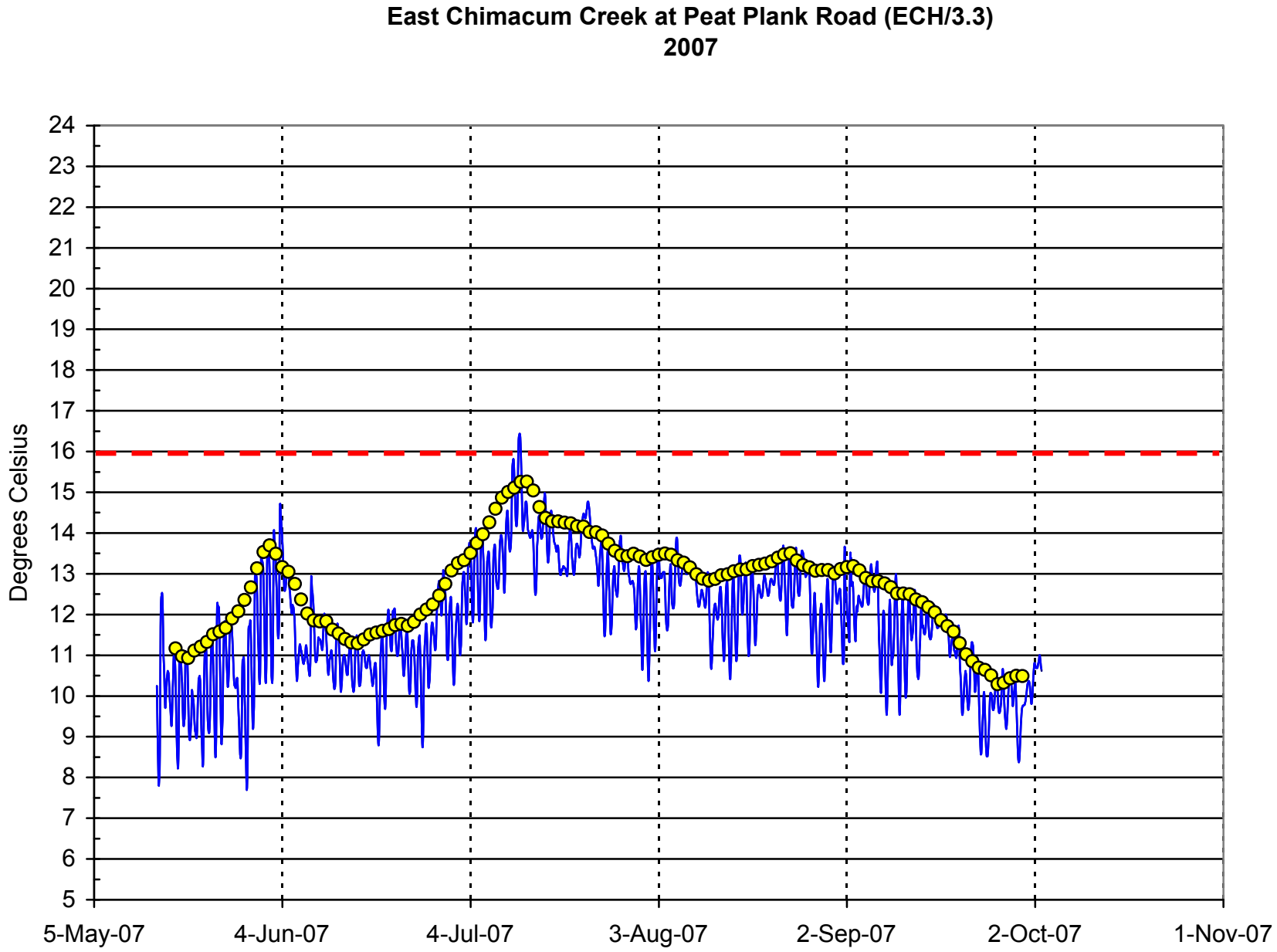

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station ECH/3.3 on East Chimacum Creek in 2007. Dashed line shows the 7-DADMax criteria for spawning and rearing. ECH_3_3 cht.xls 6/3/

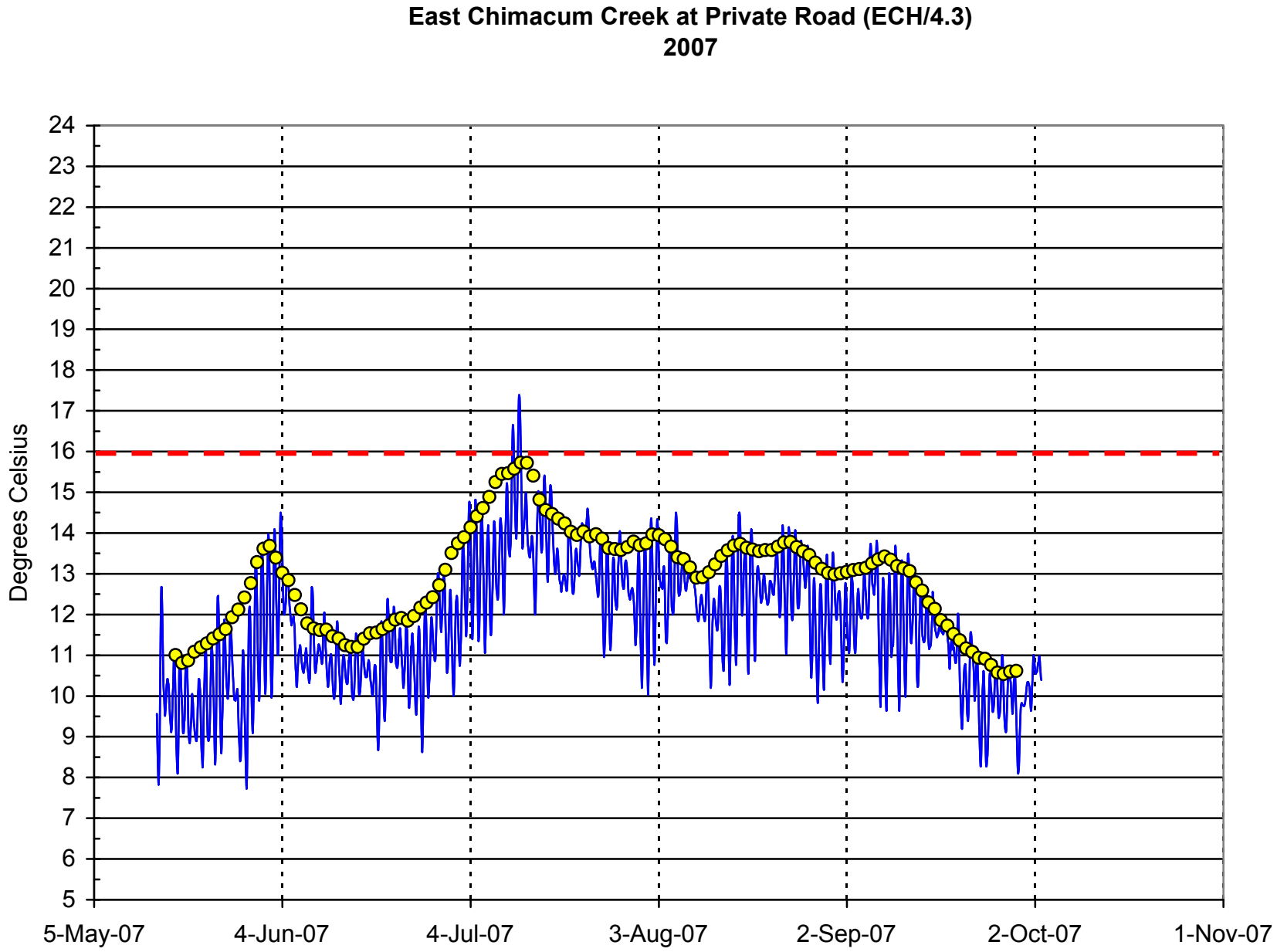

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station ECH/4.3 on East Chimacum Creek in 2007. Dashed line shows the 7-DADMax criteria for spawning and rearing. ECH_4_3 cht.xls 6/3/

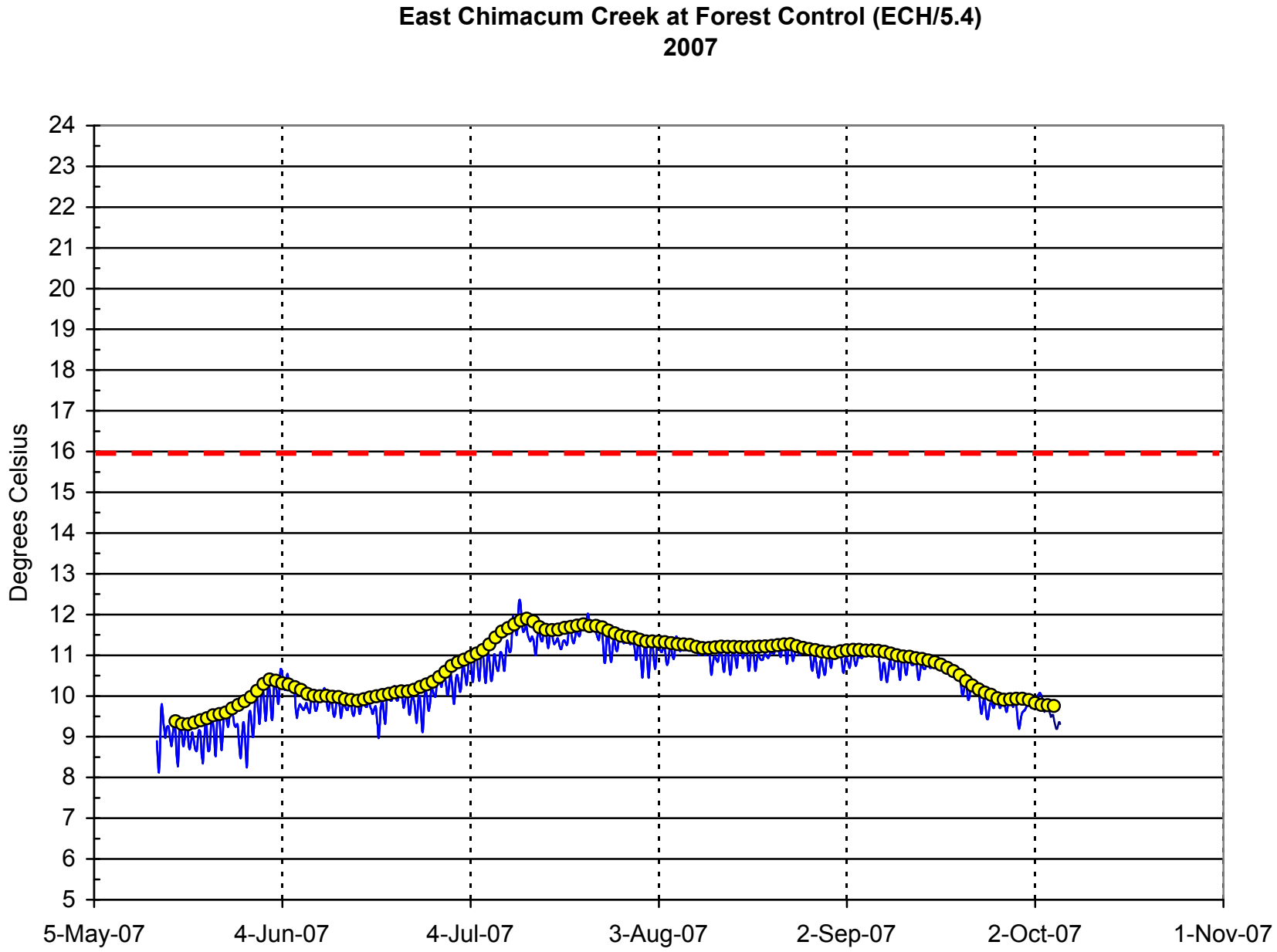

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station ECH/5.4 on East Chimacum Creek in 2007. Dashed line shows the 7-DADMax criteria for spawning and rearing. ECH_5_4 cht.xls 6/3/

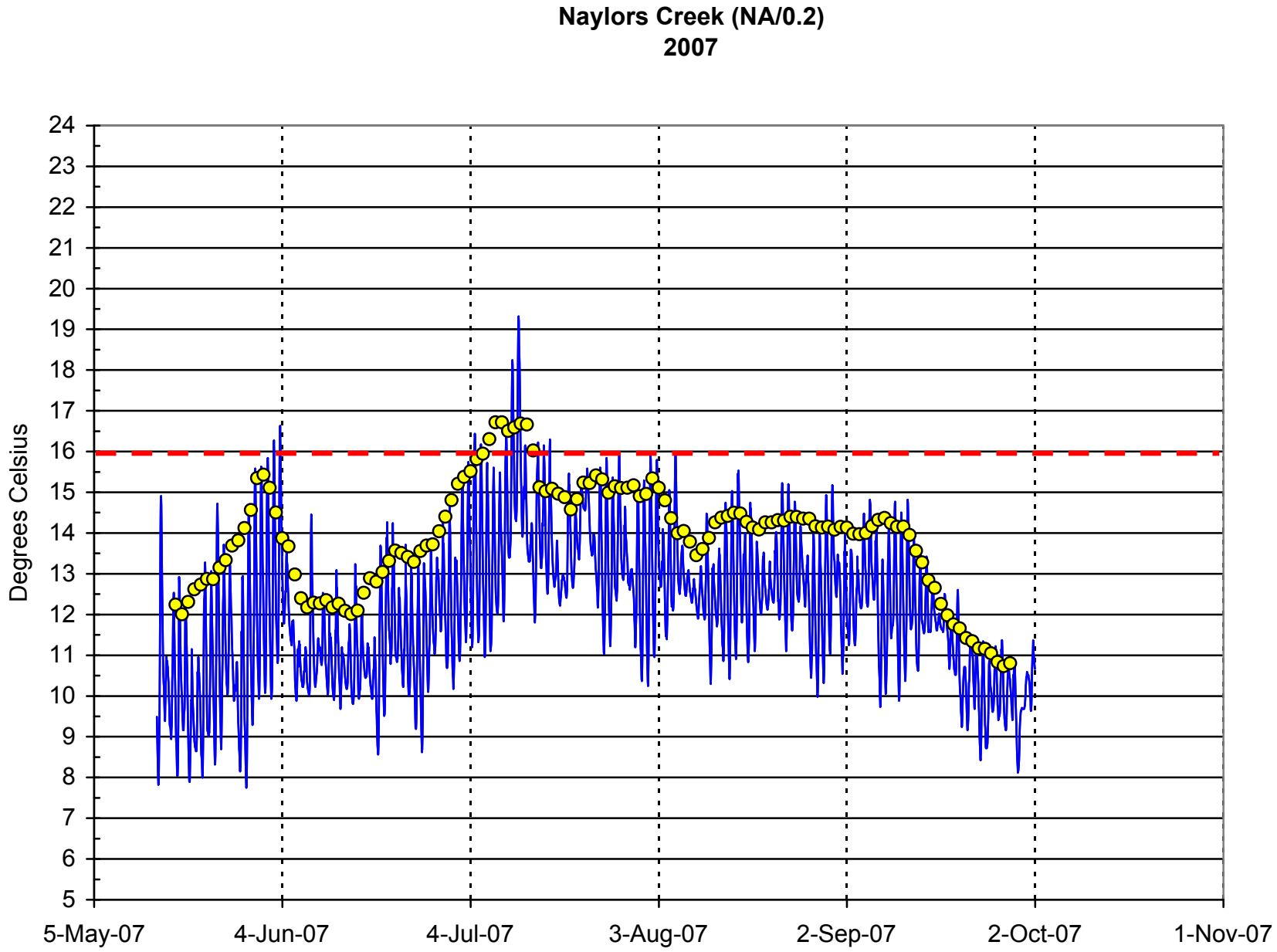

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station NA/0.2 on Naylors Creek in 2007. Dashed line shows the 7-DADMax criteria for spawning and rearing. NA_0_2 cht.xls 6/3/2011

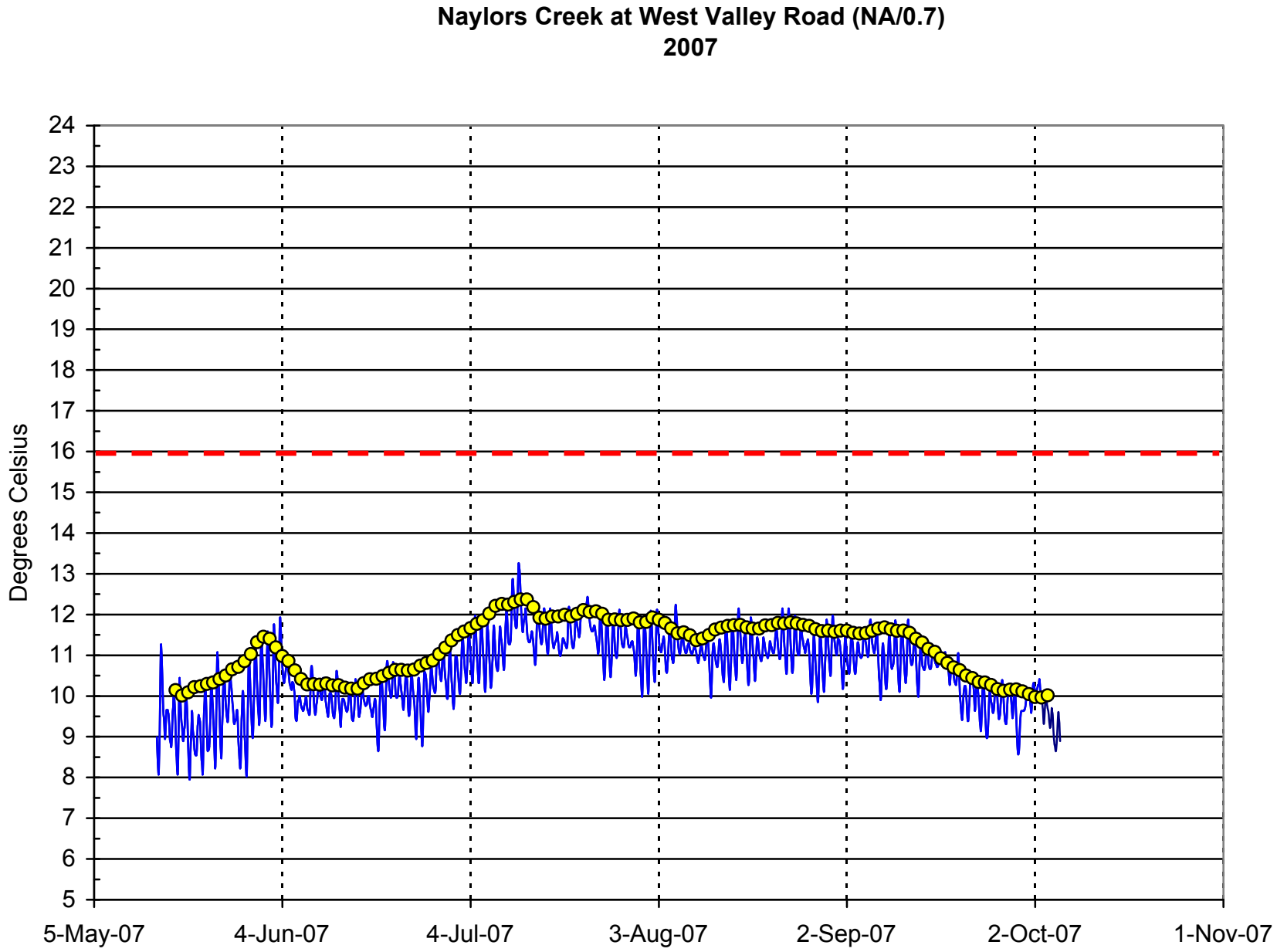

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station NA/0.7 on Naylors Creek in 2007. Dashed line shows the 7-DADMax criteria for spawning and rearing. NA_0_7 cht.xls 6/3/2011

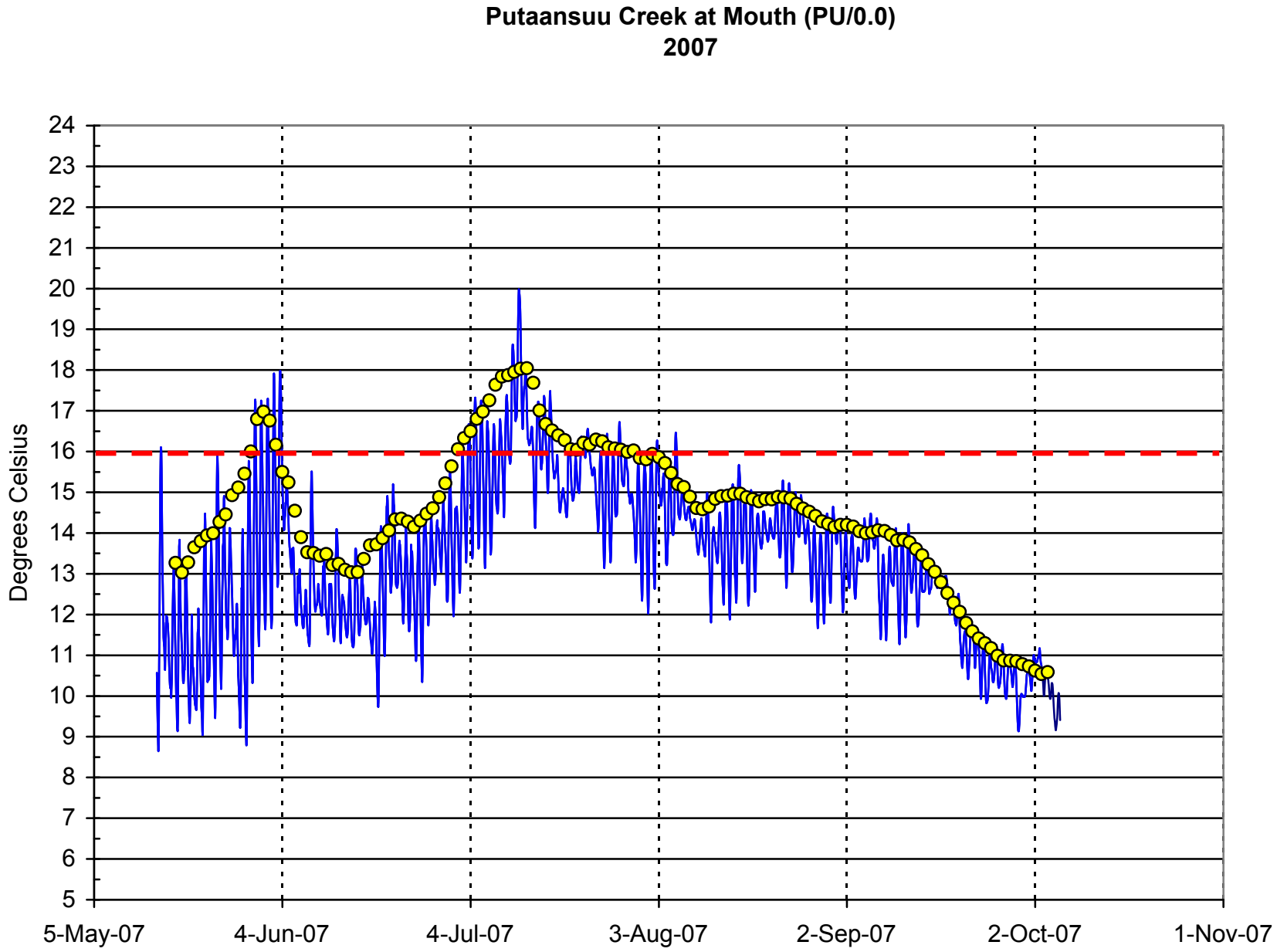

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station PU/0.0 on Putaansuu Creek in 2007. Dashed line shows the 7-DADMax criteria for spawning and rearing. PU_0_0 cht.xls 6/3/2011

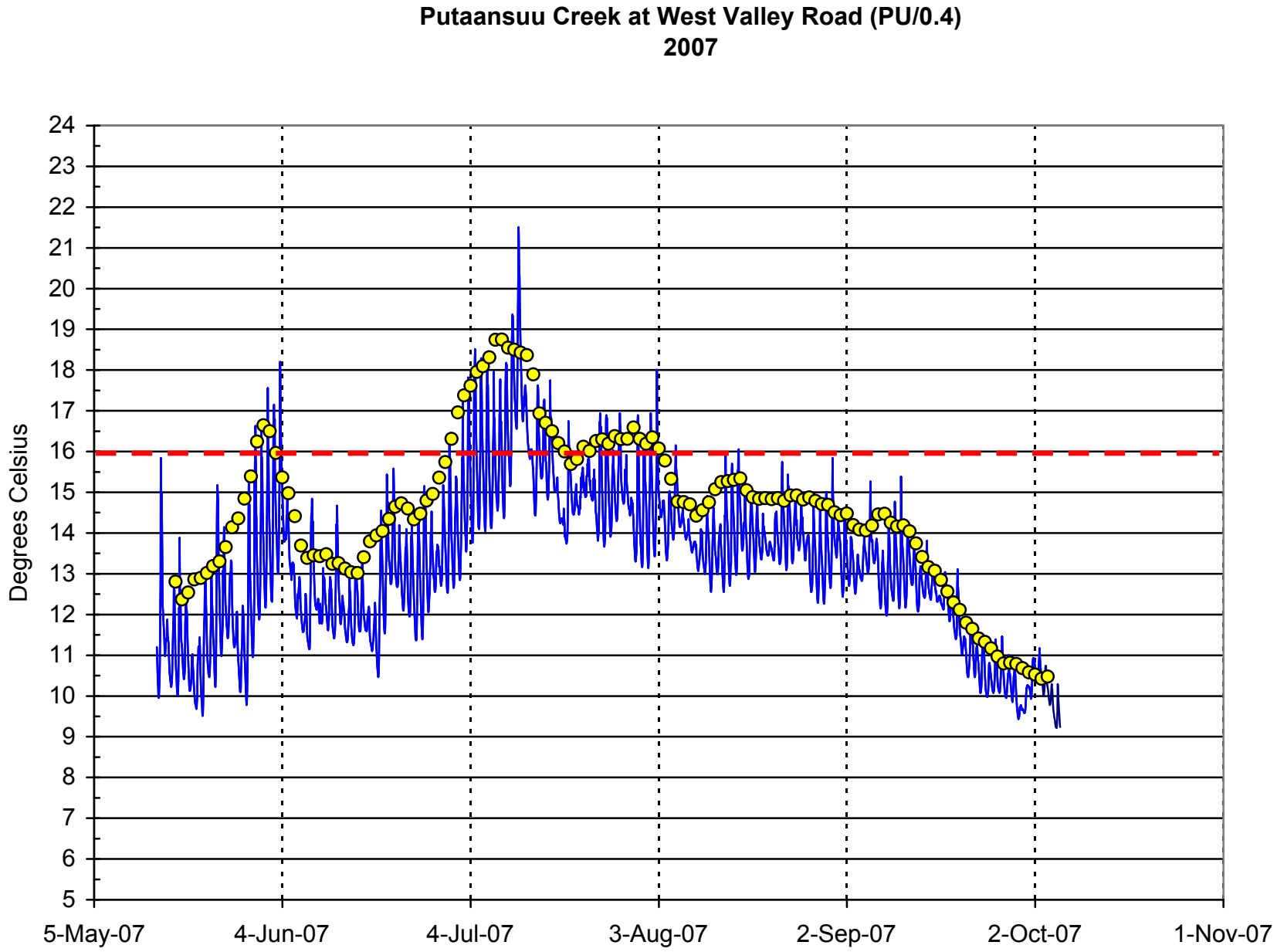

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station PU/0.4 on Putaansuu Creek in 2007. Dashed line shows the 7-DADMax criteria for spawning and rearing. PU_0_4 cht.xls 6/3/2011

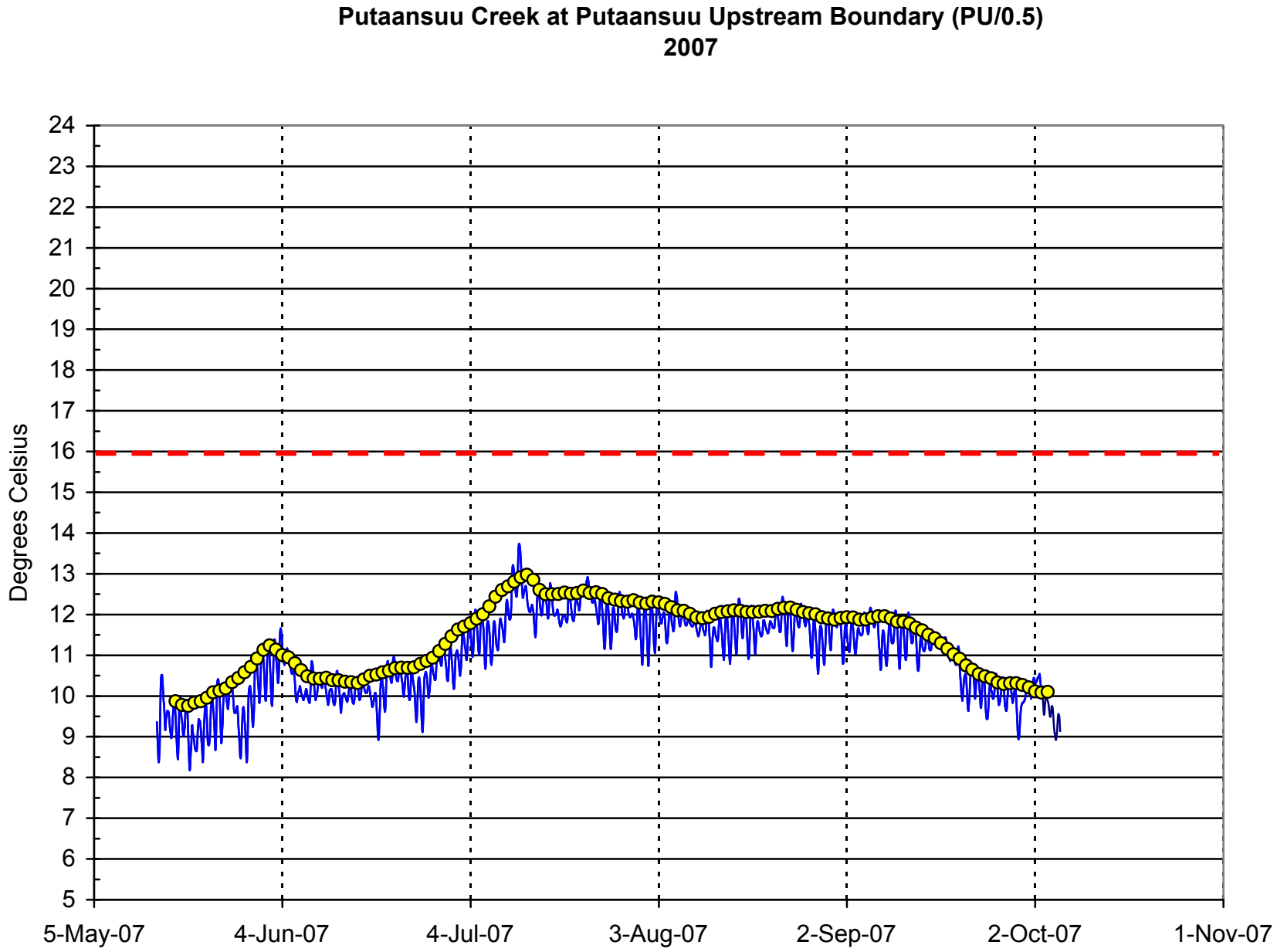

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station PU/0.5 on Putaansuu Creek in 2007. Dashed line shows the 7-DADMax criteria for spawning and rearing. PU_0_5 cht.xls 6/3/2011

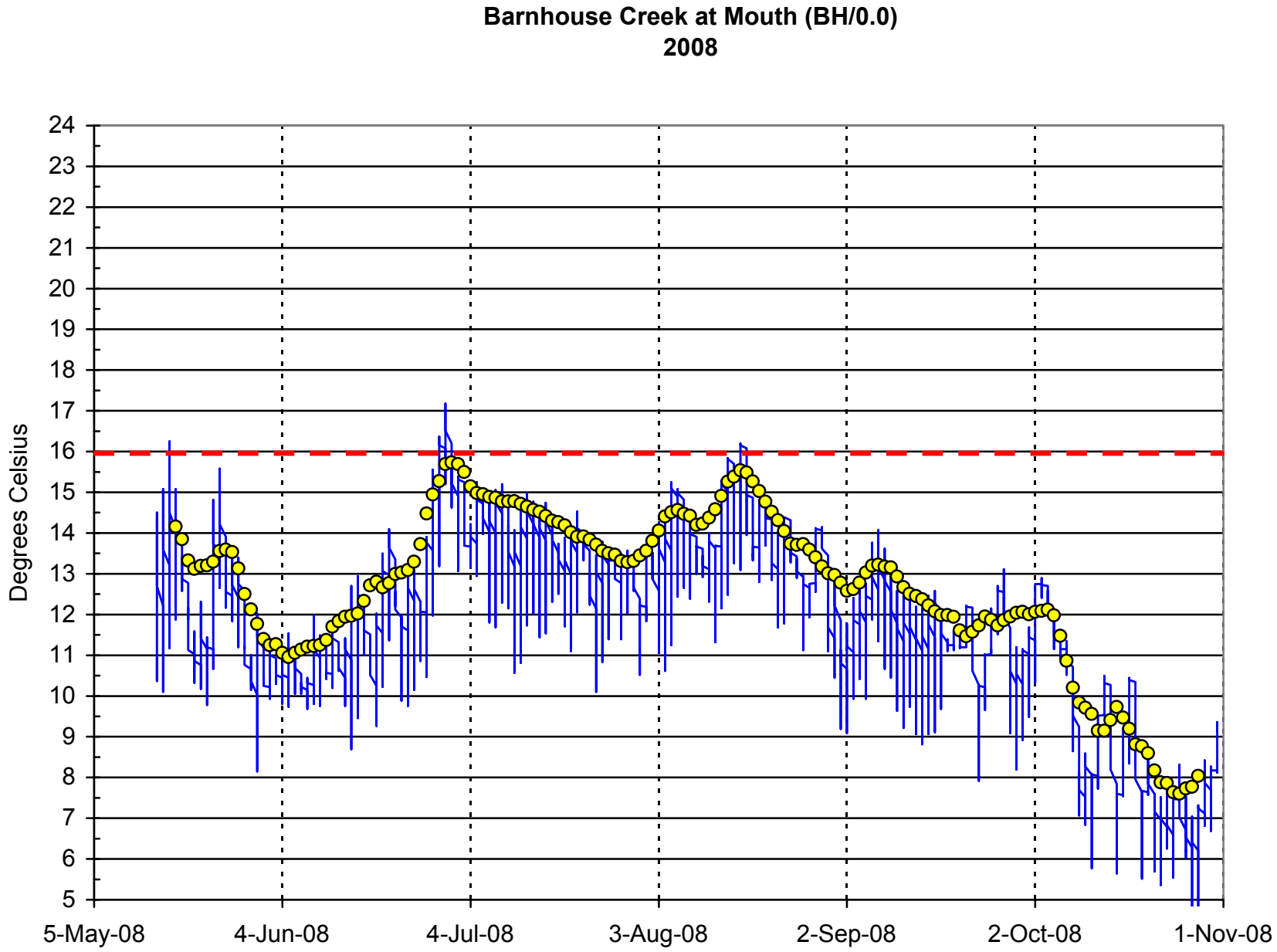

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station BH/0.0 on Barnhouse Creek in 2008. Dashed line shows the 7-DADMax criteria. BH0.0_2008.xls 6/3/2011

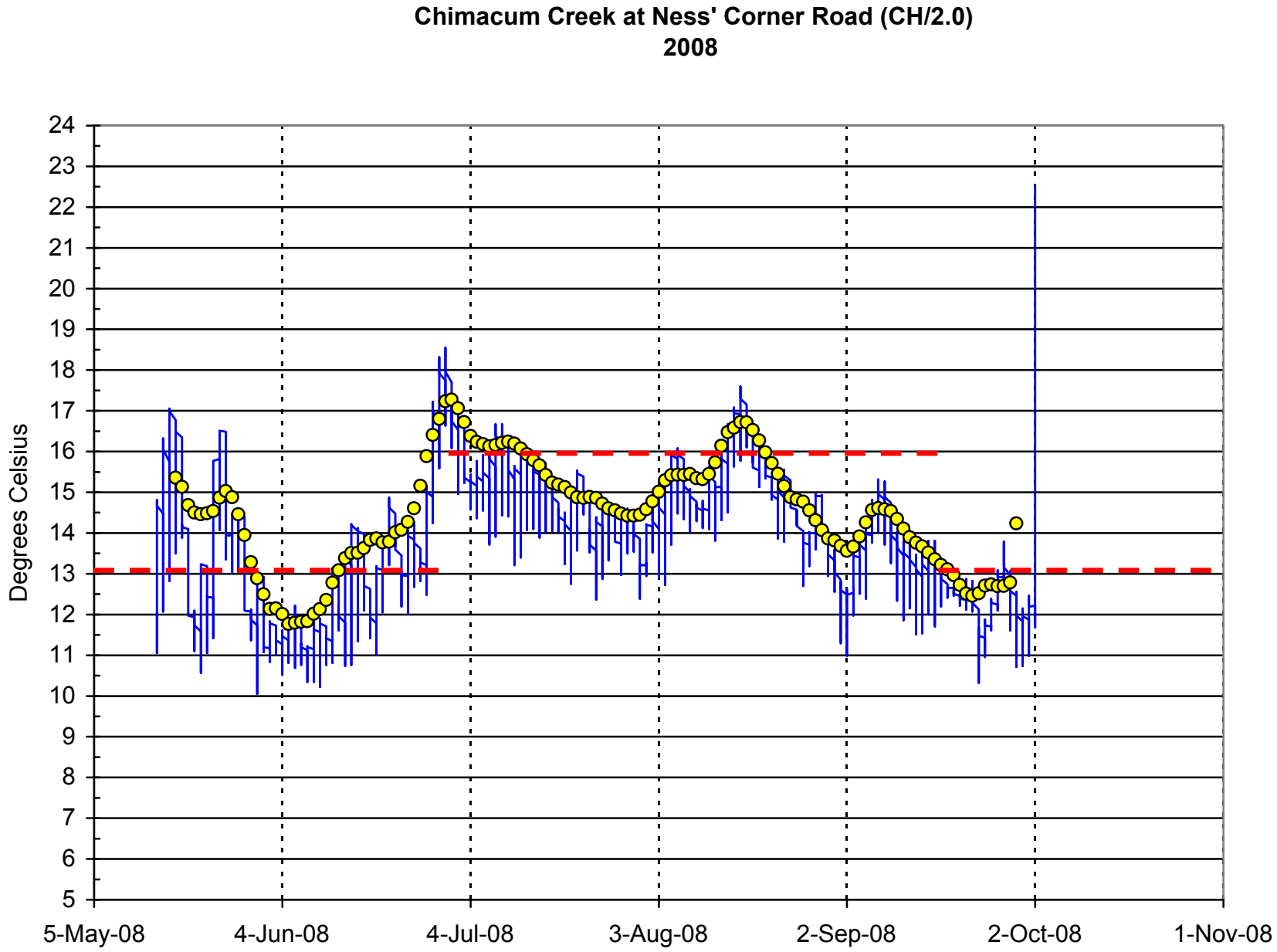

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station CH/2.0 on Chimacum Creek in 2008. Dashed line shows the 7-DADMax criteria. CH2.0_2008.xls 6/3/2011

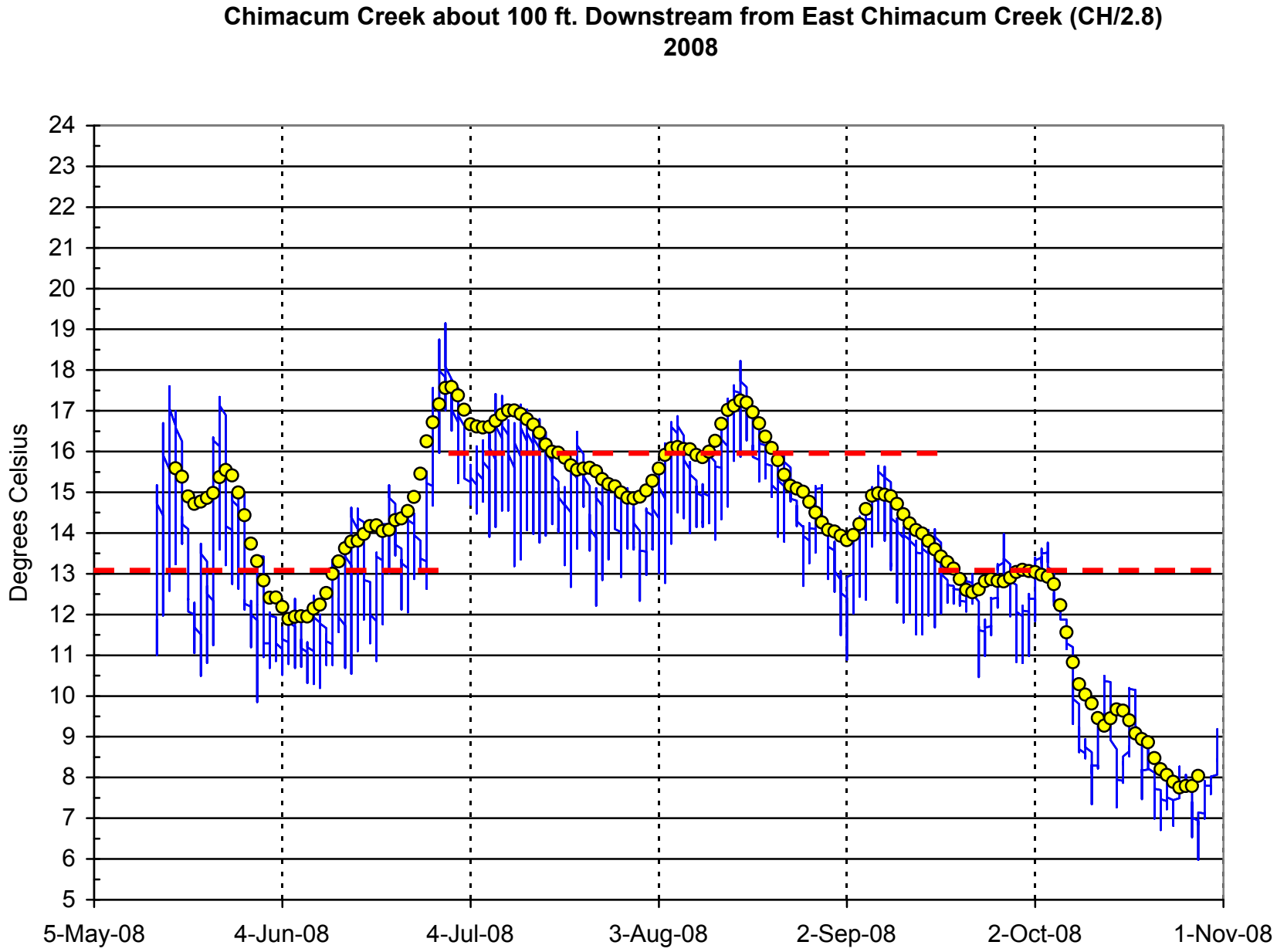

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station CH/2.8 on Chimacum Creek in 2008. Dashed line shows the 7-DADMax criteria. CH2.8_2008.xls 6/3/2011

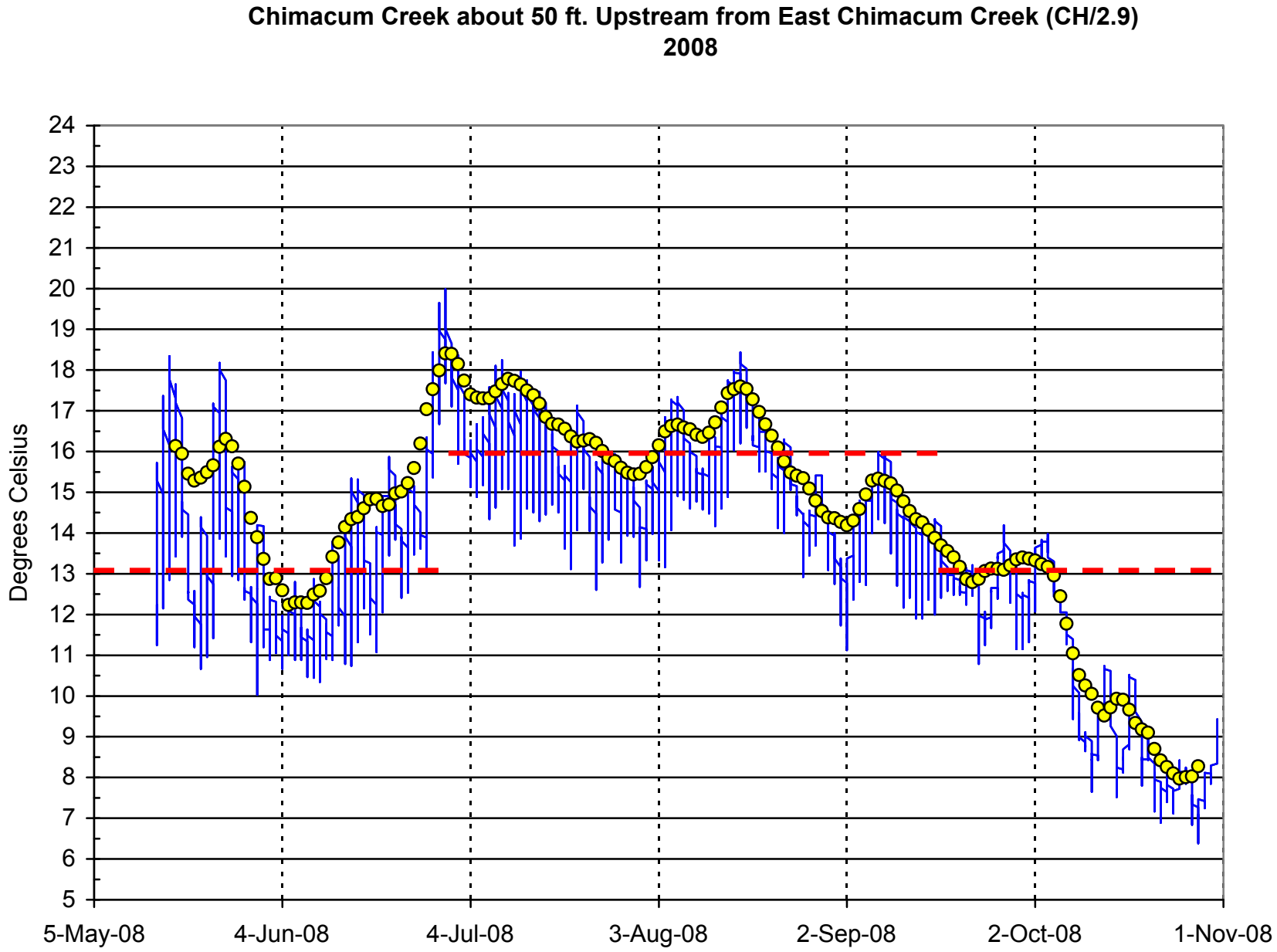

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station CH/2.9 on Chimacum Creek in 2008. Dashed line shows the 7-DADMax criteria. CH2.9_2008.xls 6/3/2011

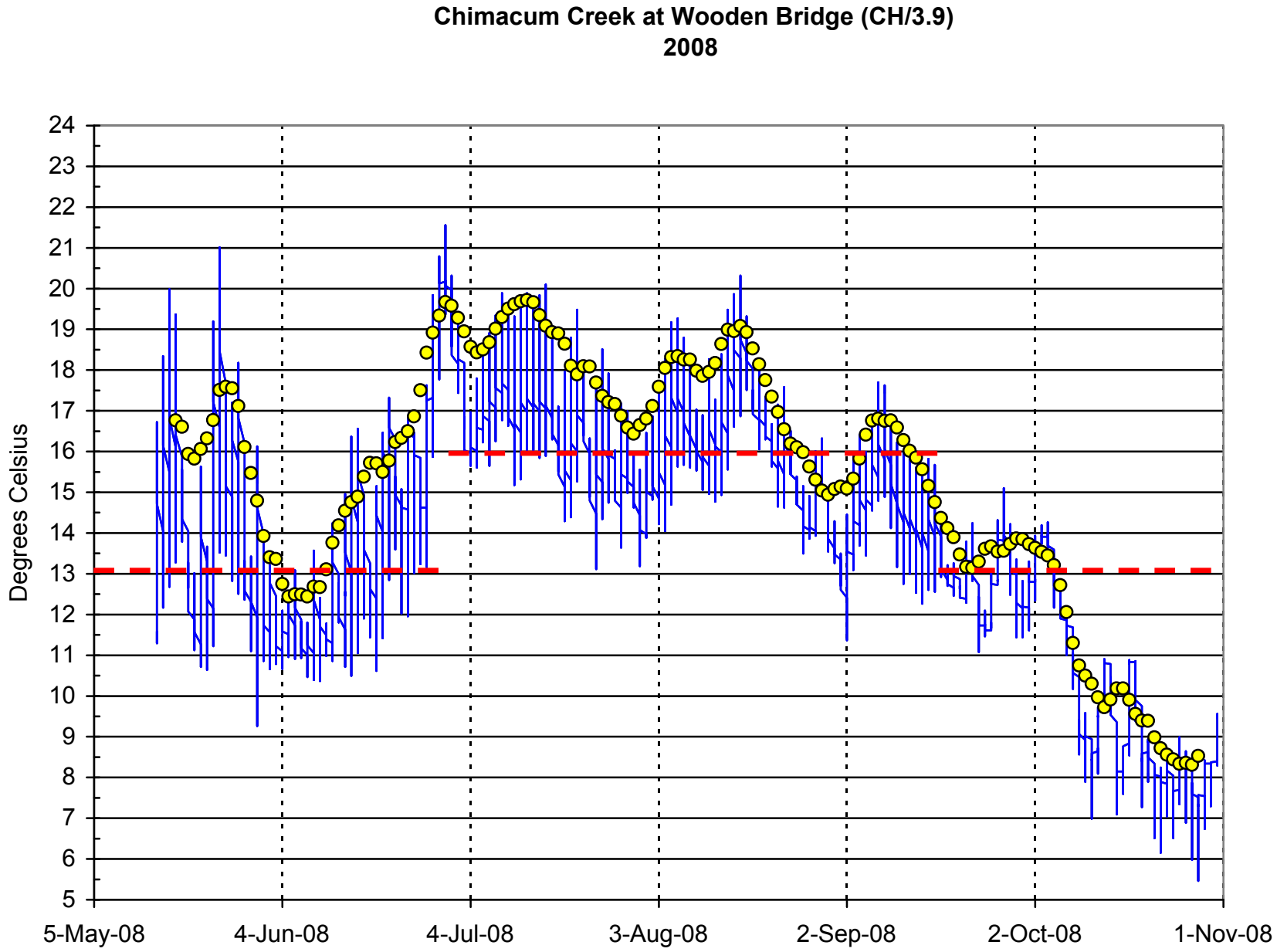

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station CH/3.9 on Chimacum Creek in 2008. Dashed line shows the 7-DADMax criteria. CH3.9_2008.xls 6/3/2011

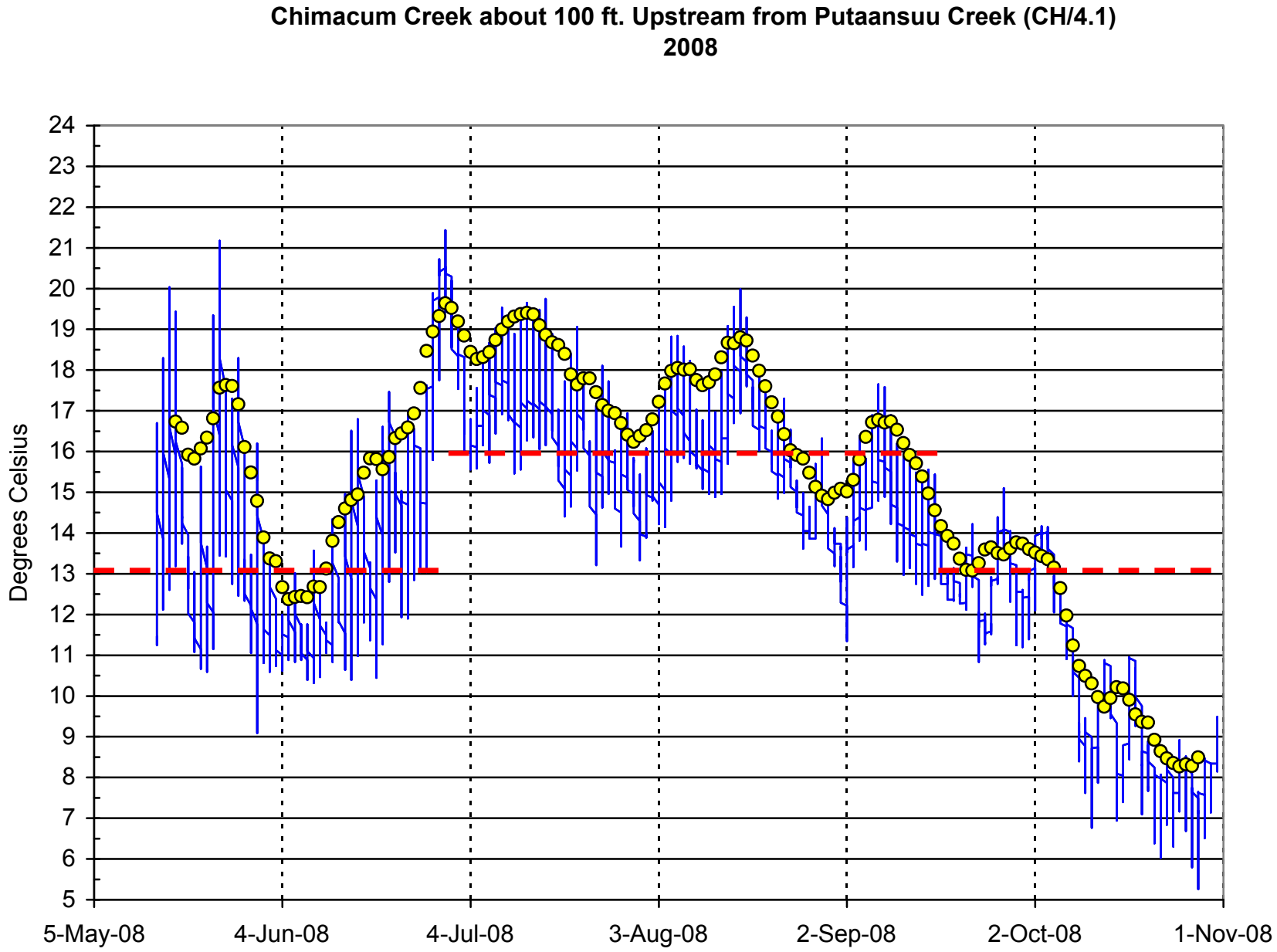

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station CH/4.1 on Chimacum Creek in 2008. Dashed line shows the 7-DADMax criteria. CH4.1_2008.xls 6/3/2011

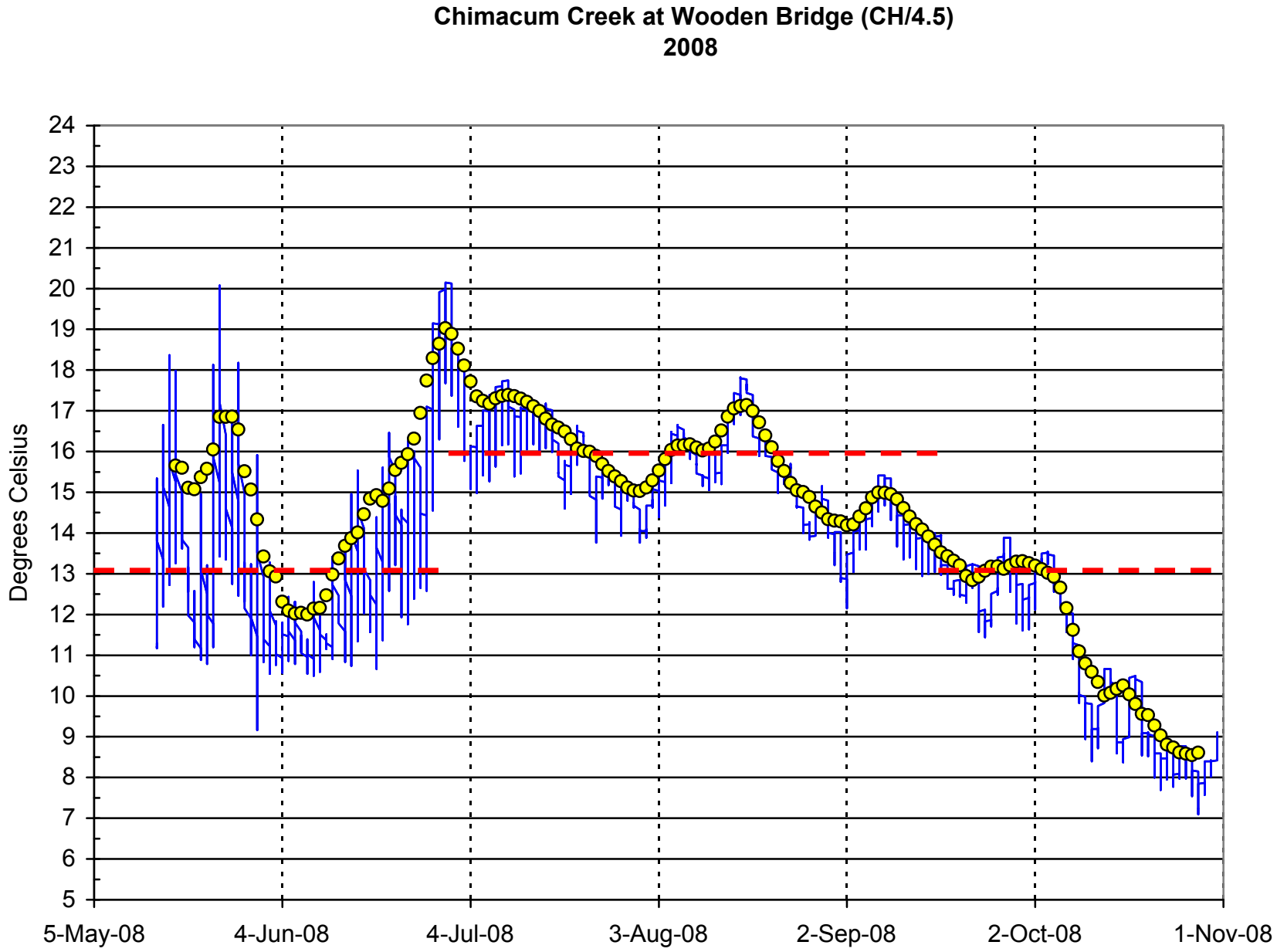

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station CH/4.5 on Chimacum Creek in 2008. Dashed line shows the 7-DADMax criteria. CH4.5_2008.xls 6/3/2011

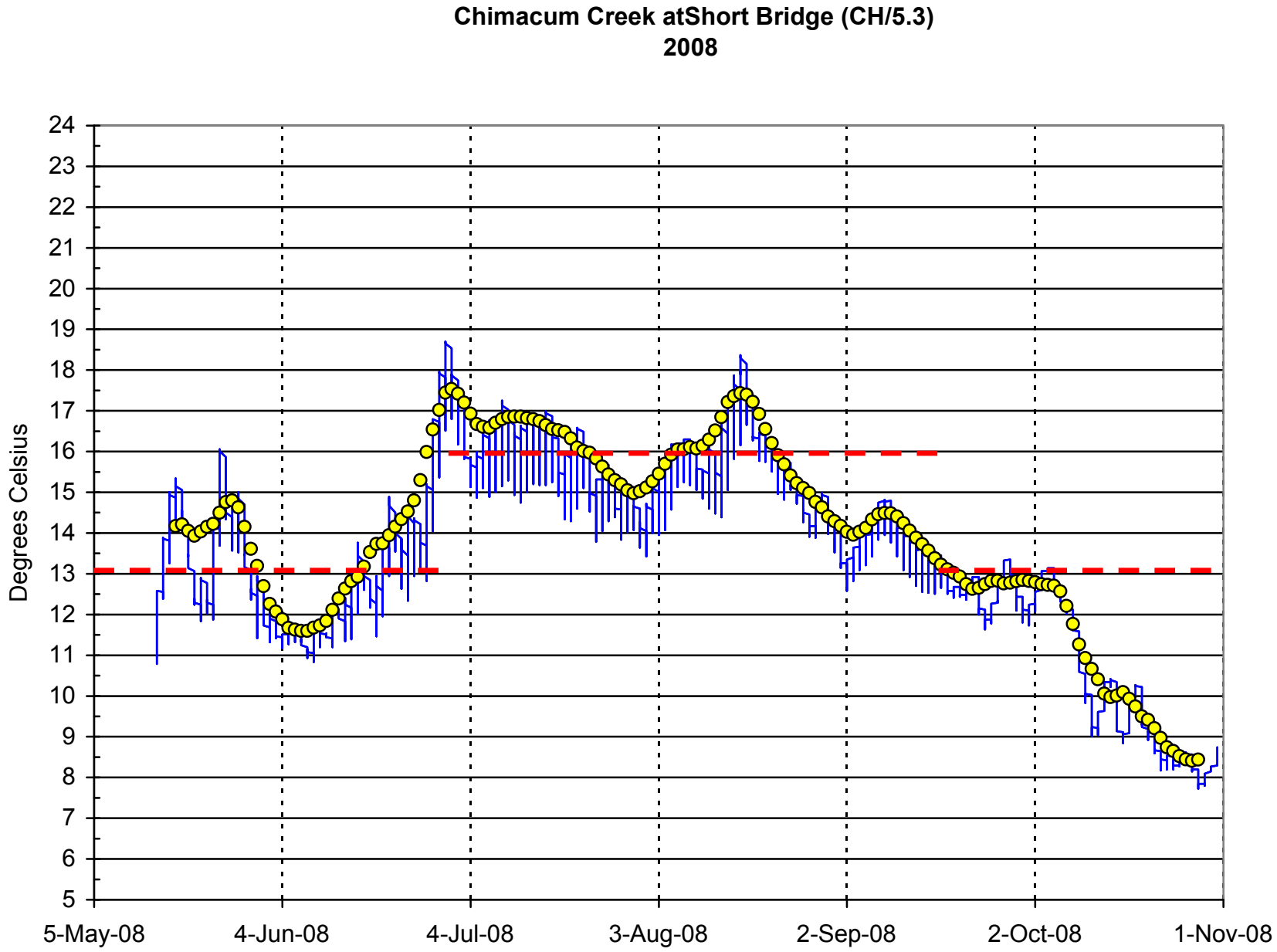

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station CH/5.3 on Chimacum Creek in 2008. Dashed line shows the 7-DADMax criteria. CH5.3_2008.xls 6/3/2011

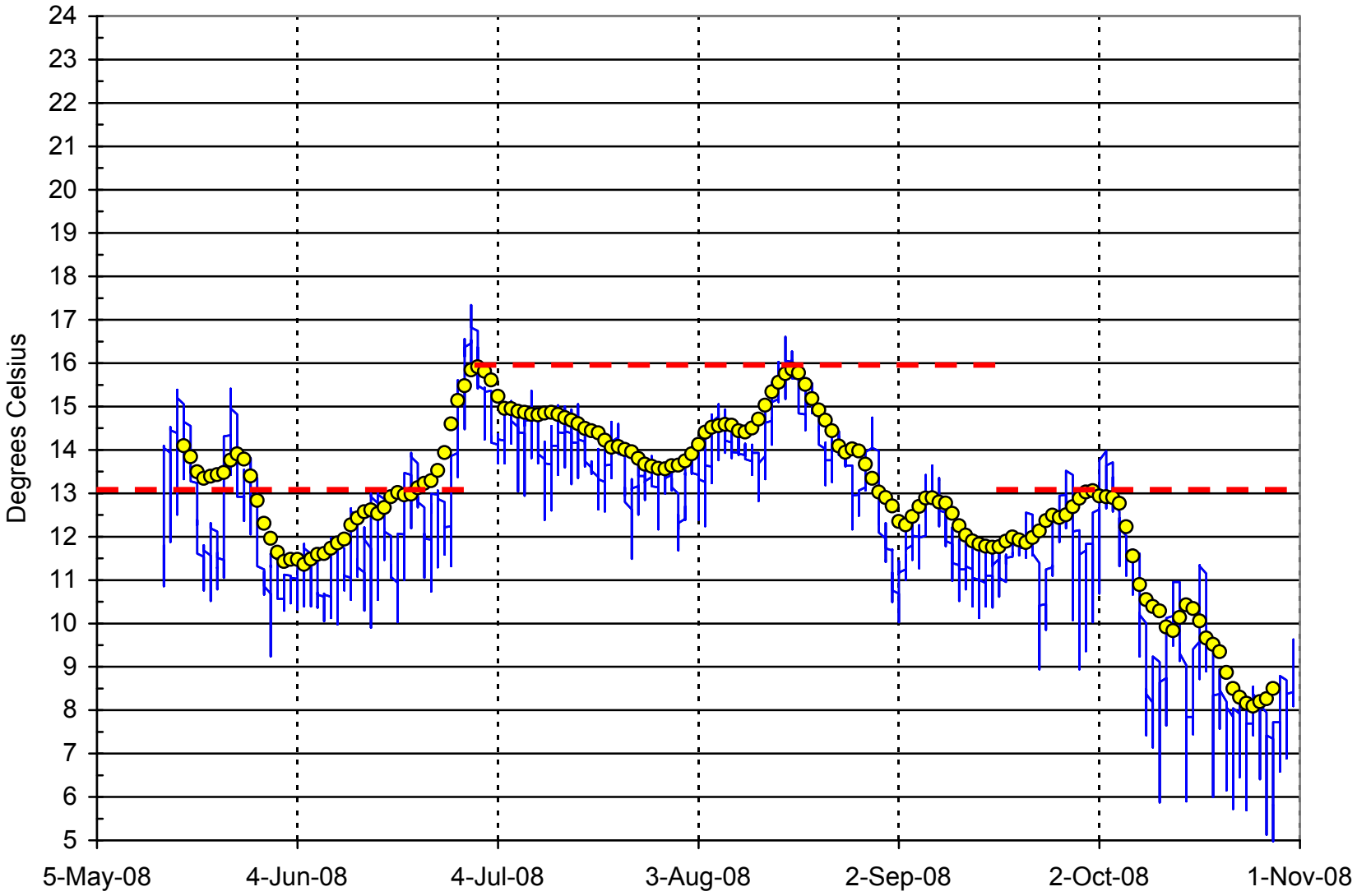

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station CH/6.1 on Chimacum Creek in 2008. Dashed line shows the 7-DADMax criteria. CH6.1_2008.xls 6/3/2011

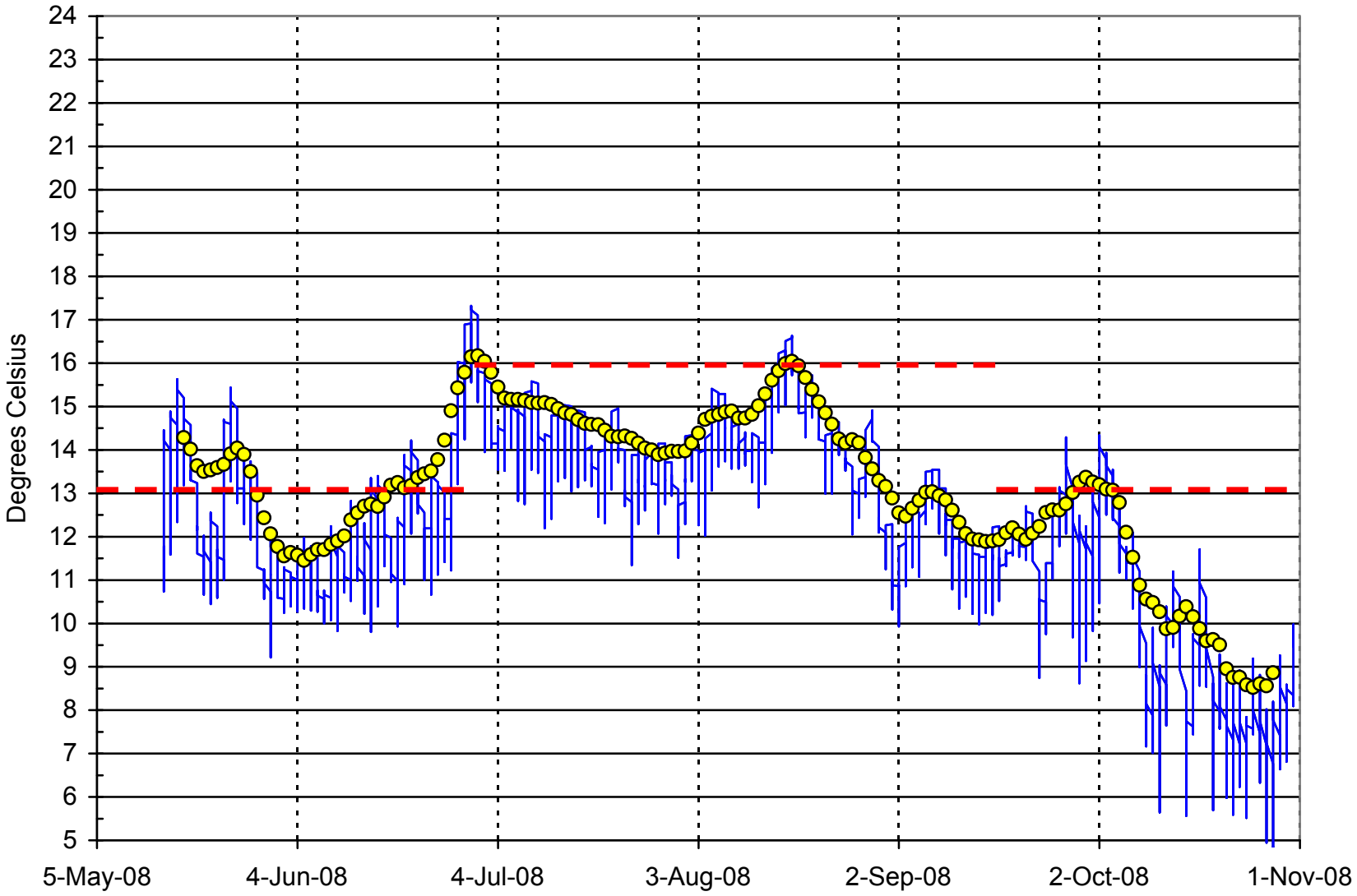

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station CH/6.5 on Chimacum Creek in 2008. Dashed line shows the 7-DADMax criteria. CH6.5_2008.xls 6/3/2011

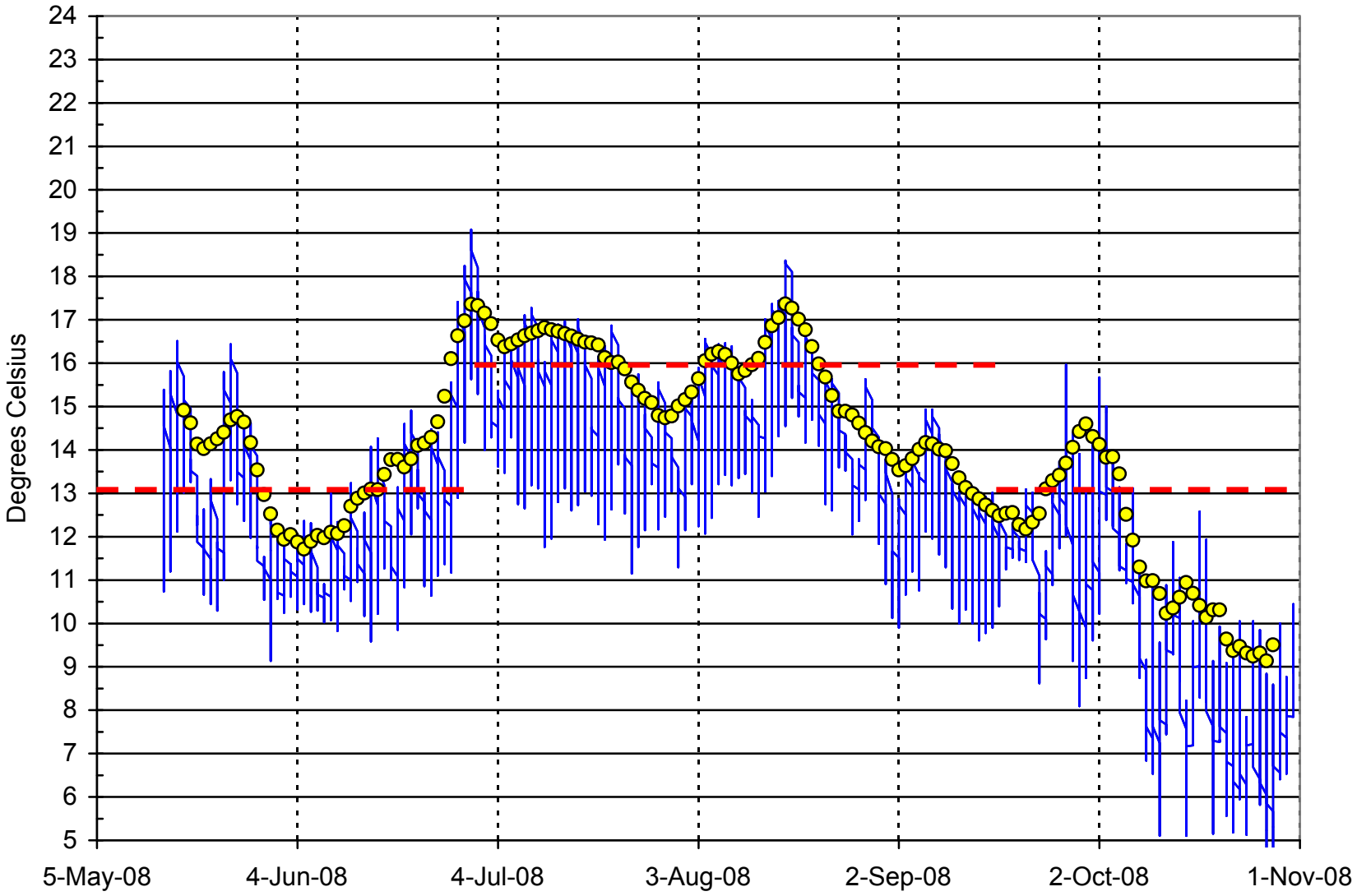

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station CH/7.0 on Chimacum Creek in 2008. Dashed line shows the 7-DADMax criteria. CH7.0_2008.xls 6/3/2011

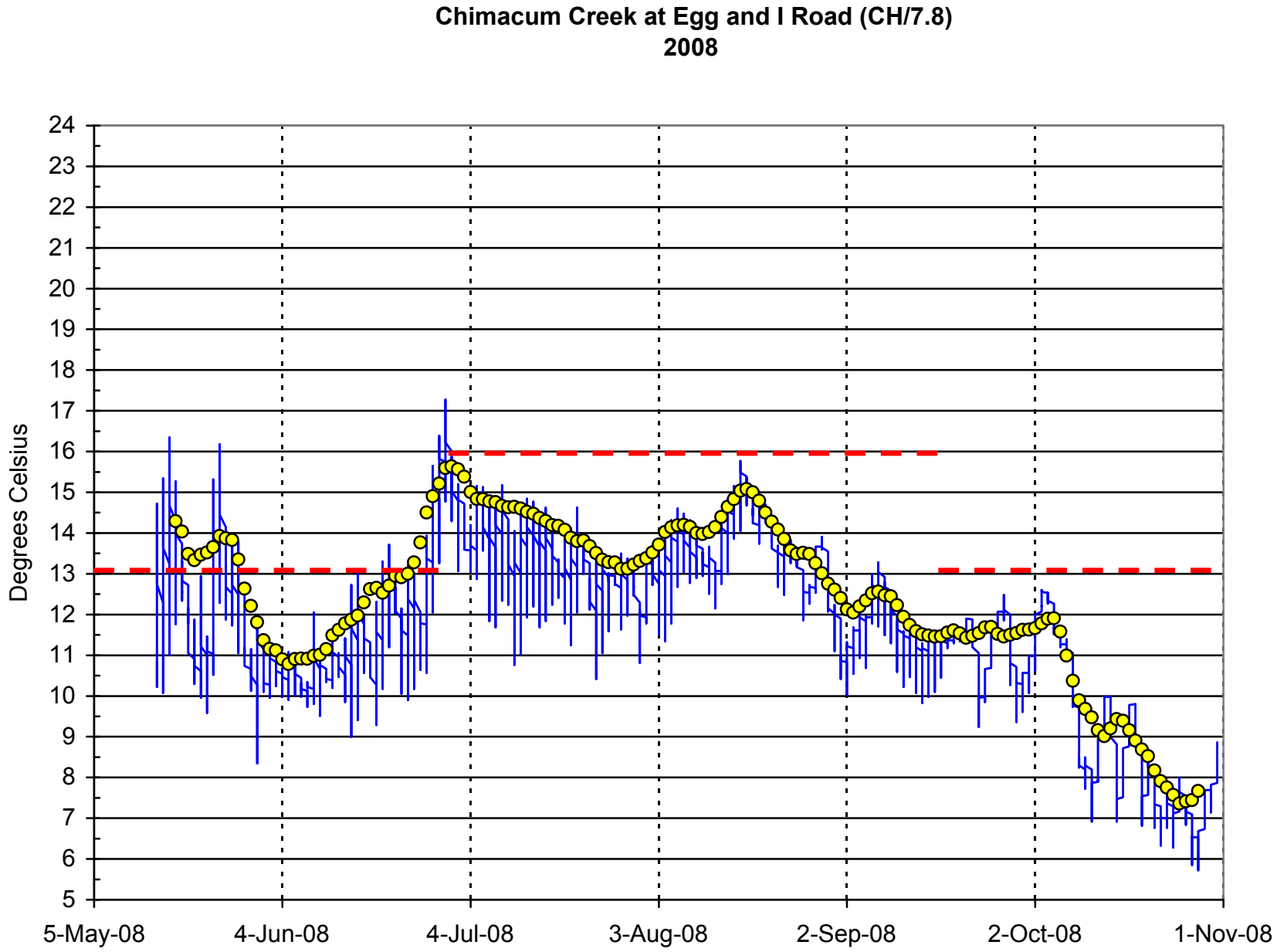

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station CH/7.8 on Chimacum Creek in 2008. Dashed line shows the 7-DADMax criteria. CH7.8_2008.xls 6/3/2011

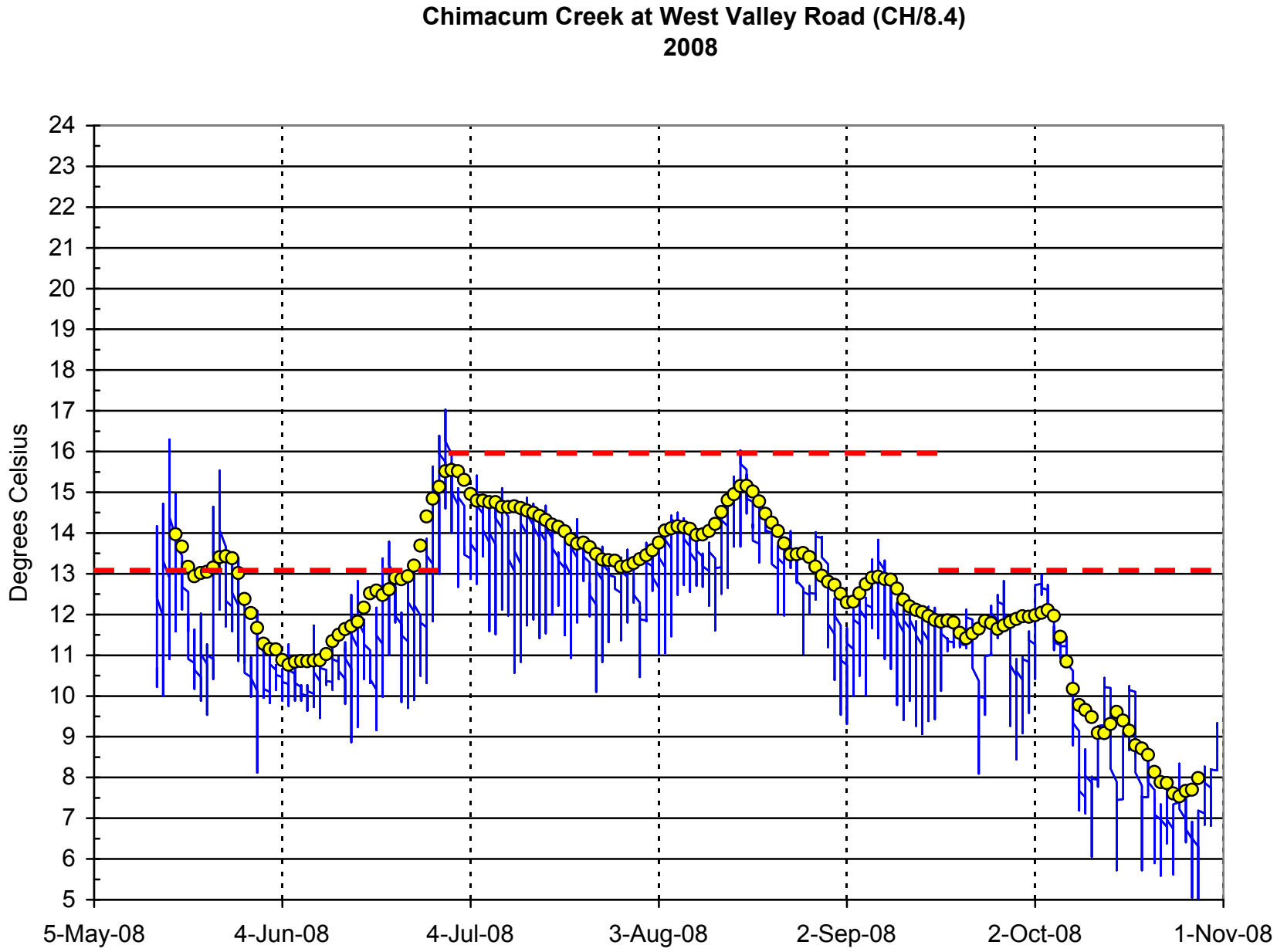

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station CH/8.4 on Chimacum Creek in 2008. Dashed line shows the 7-DADMax criteria. CH8.4_2008.xls 6/3/2011

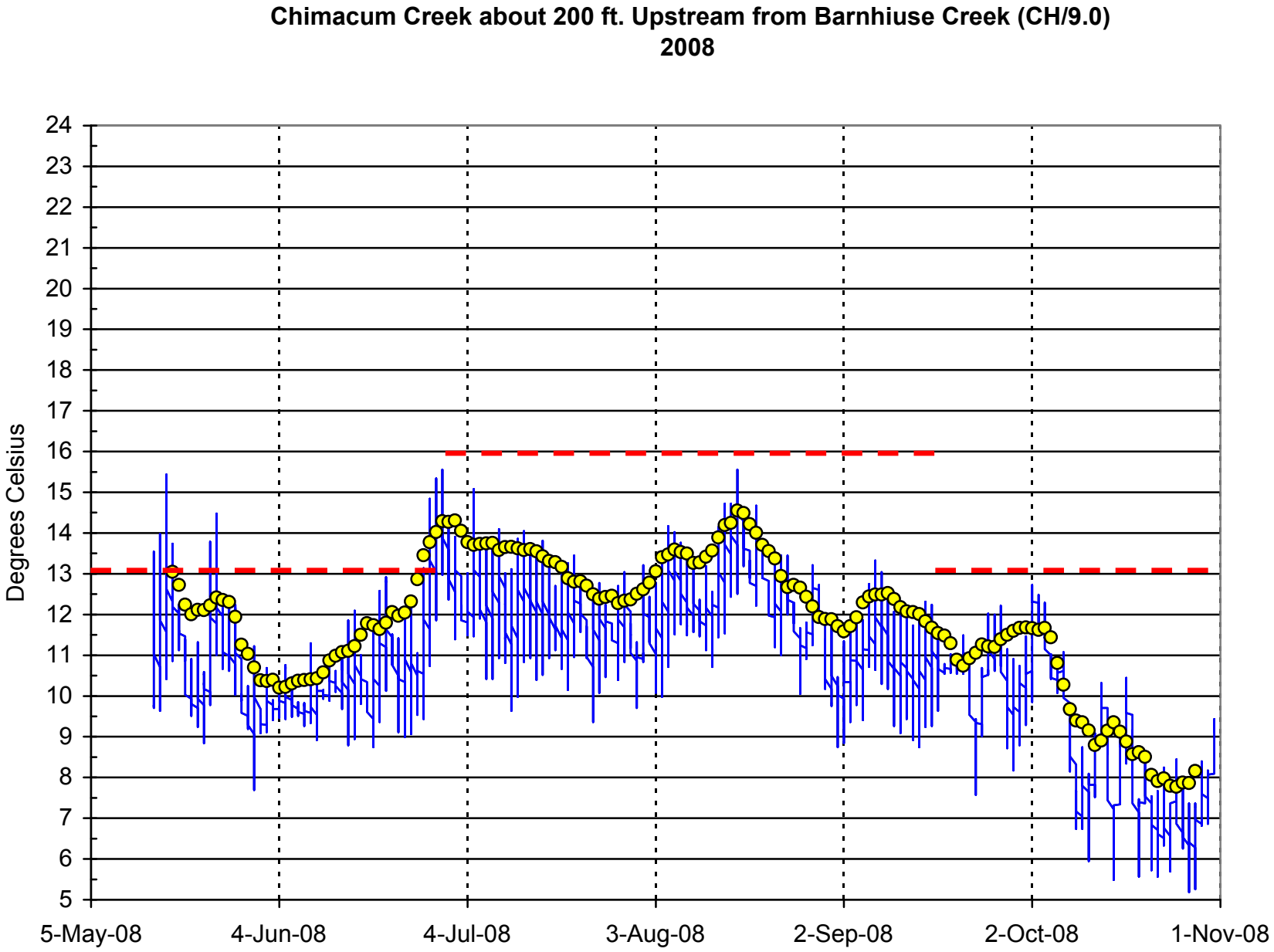

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station CH/9.0 on Chimacum Creek in 2008. Dashed line shows the 7-DADMax criteria. CH9.0_2008.xls 6/3/2011

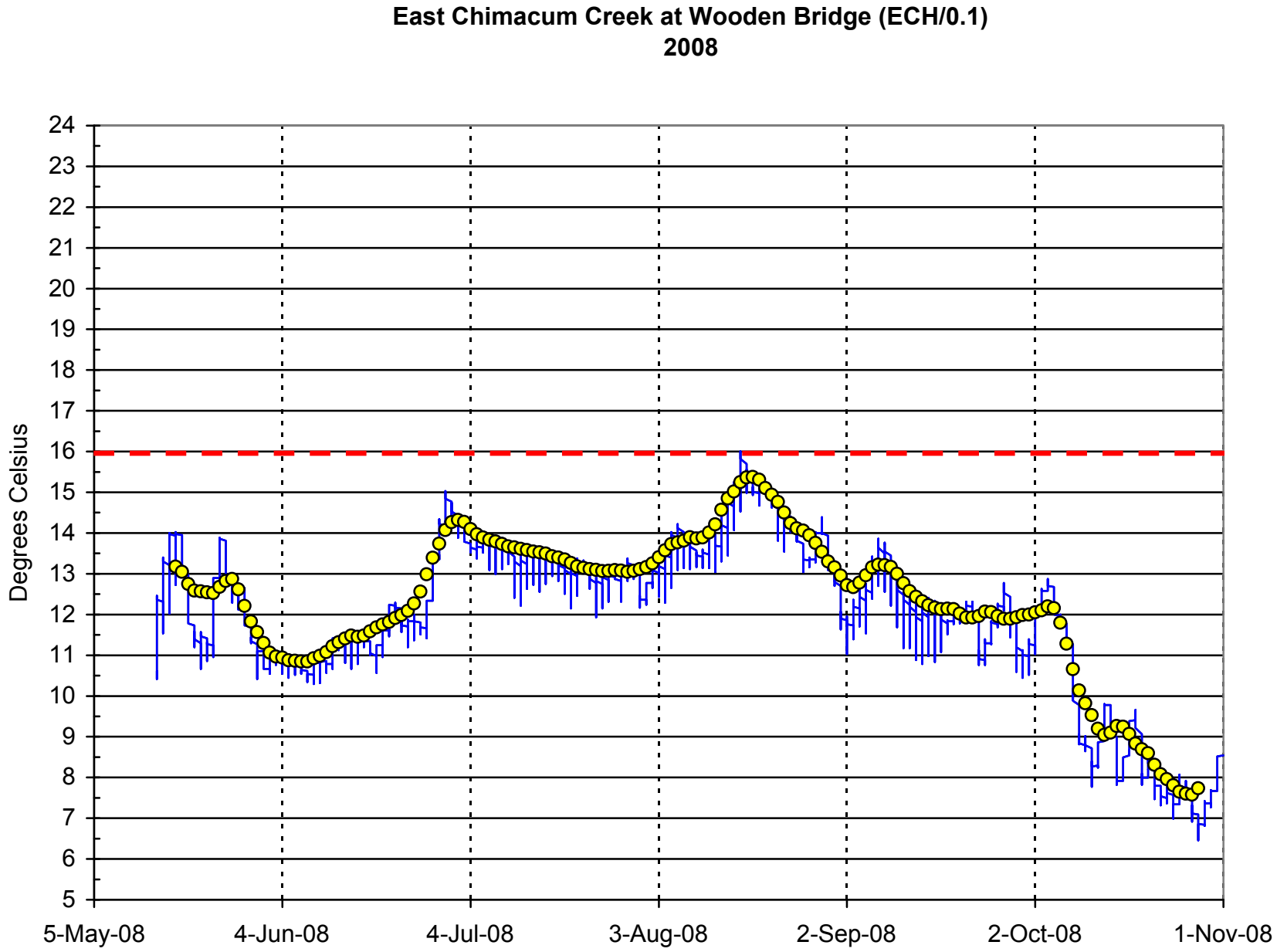

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station ECH/0.1 on East Chimacum Creek in 2008. Dashed line shows the 7-DADMax criteria. ECH0.1_2008.xls 6/3/2011

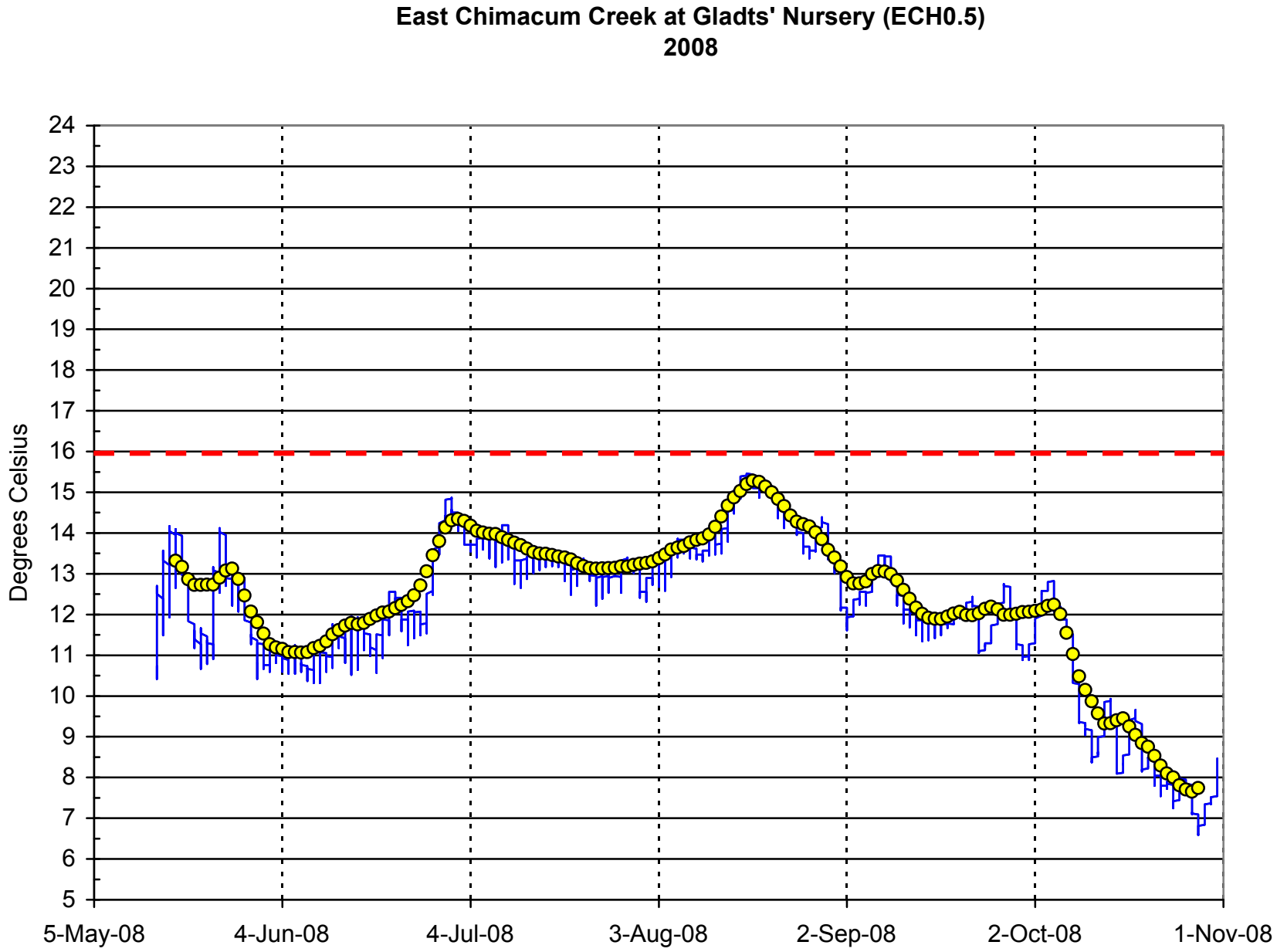

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station ECH/0.5 on East Chimacum Creek in 2008. Dashed line shows the 7-DADMax criteria. ECH0.5_2008.xls 6/3/2011

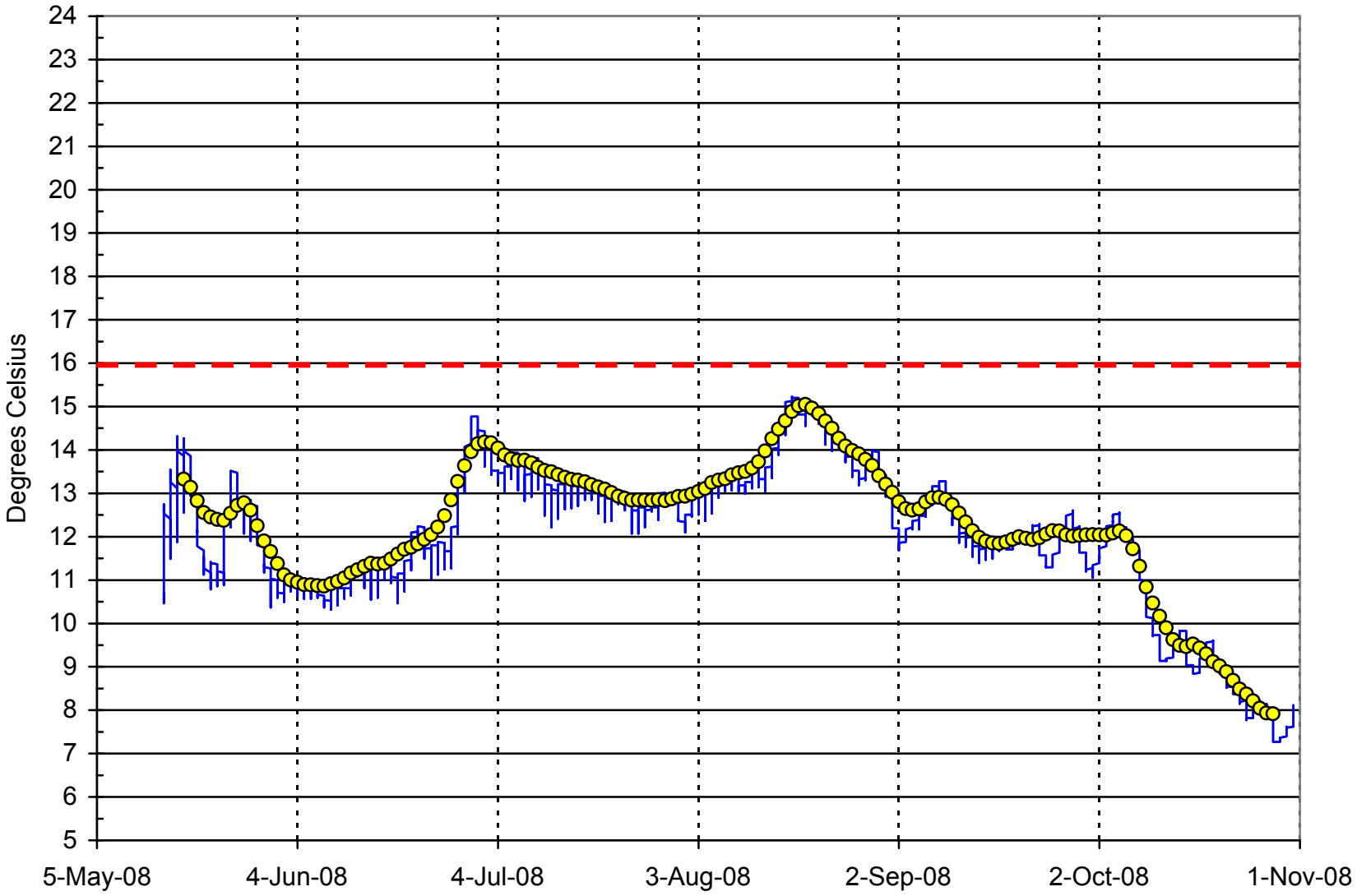

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station ECH/1.0 on East Chimacum Creek in 2008. Dashed line shows the 7-DADMax criteria. ECH1.0_2008.xls 6/3/2011

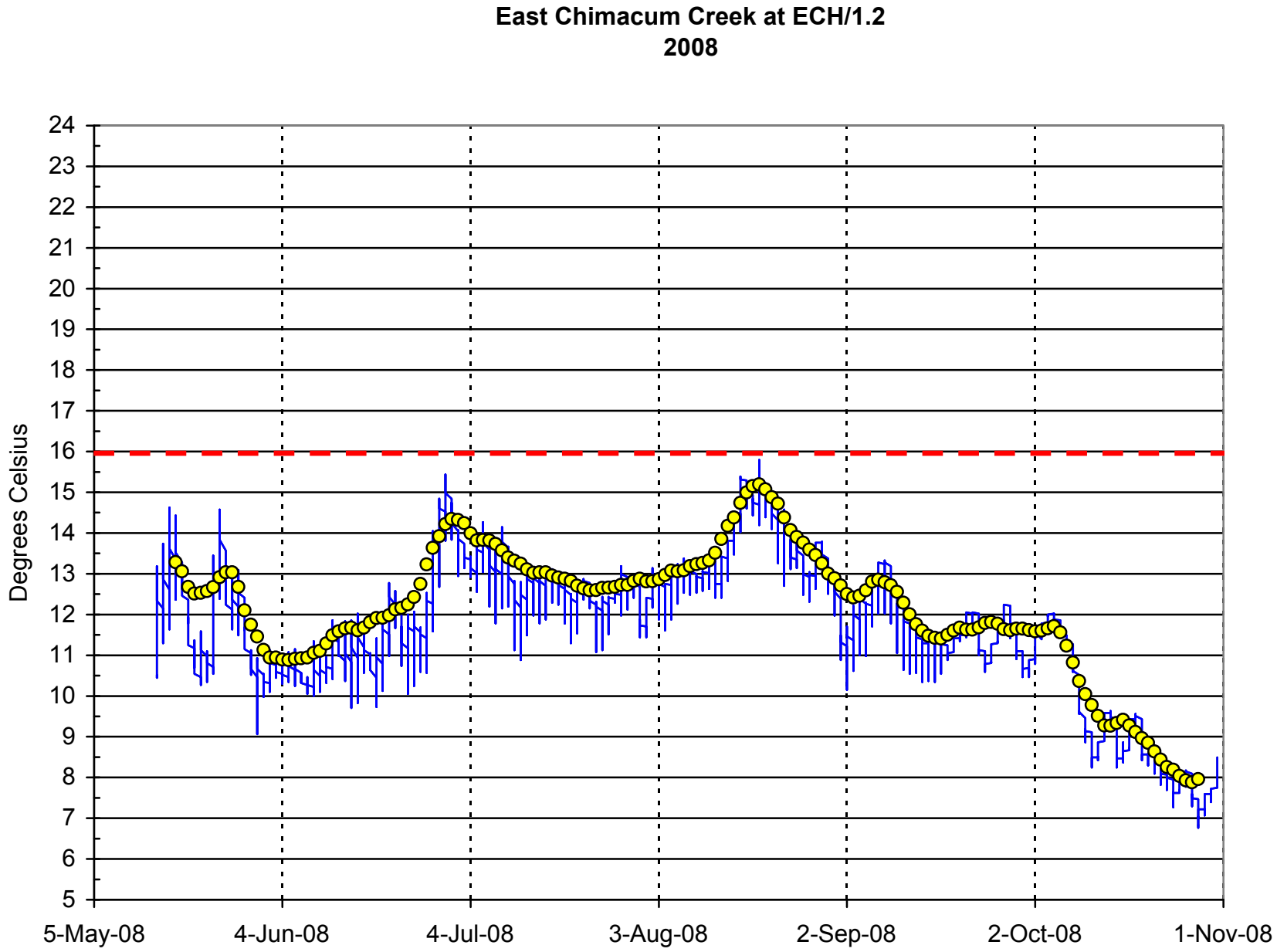

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station ECH/1.2 on East Chimacum Creek in 2008. Dashed line shows the 7-DADMax criteria. ECH1.2_2008.xls 6/3/2011

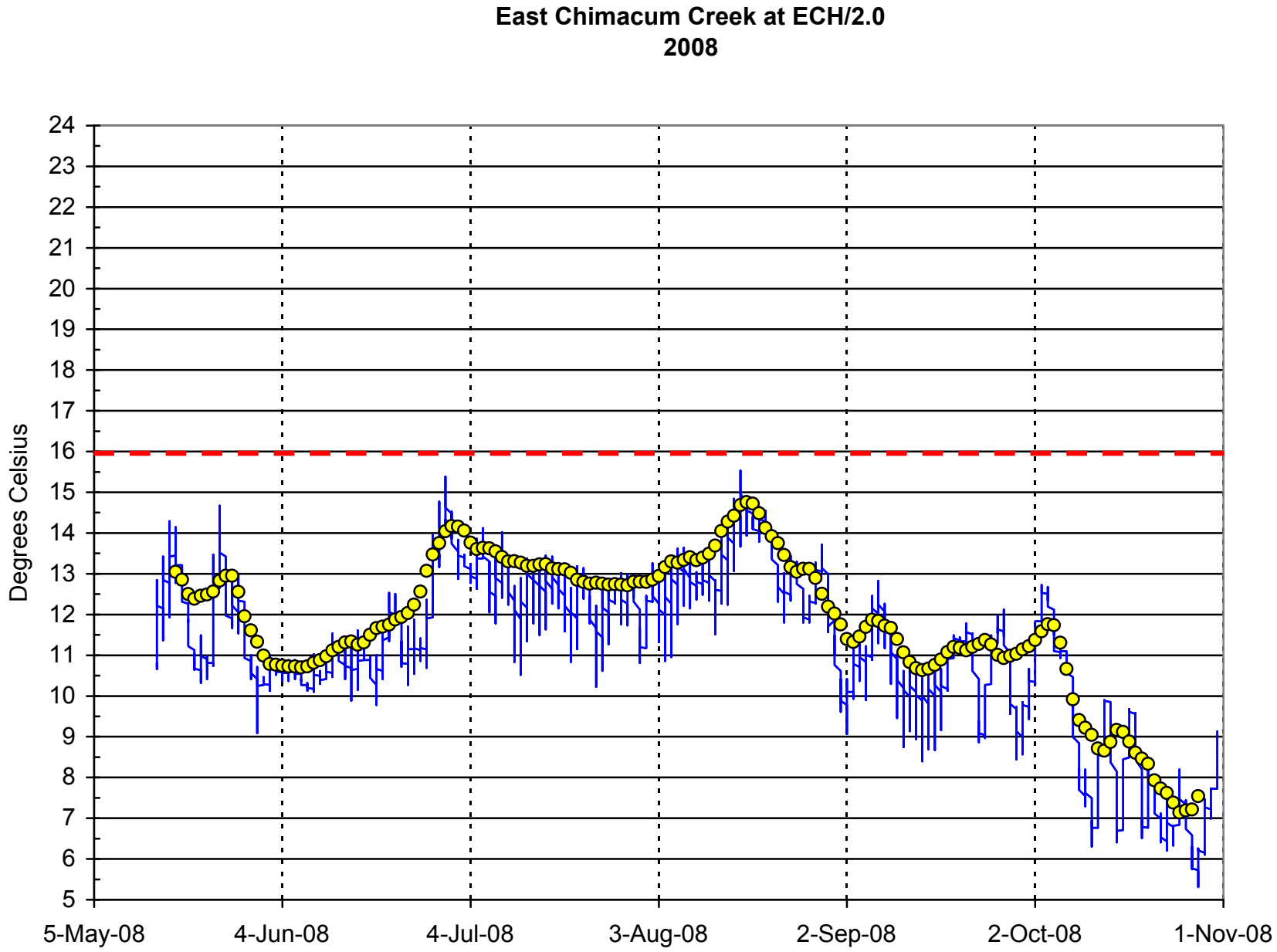

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station ECH/2.0 on East Chimacum Creek in 2008. Dashed line shows the 7-DADMax criteria. ECH2.0_2008.xls 6/3/2011

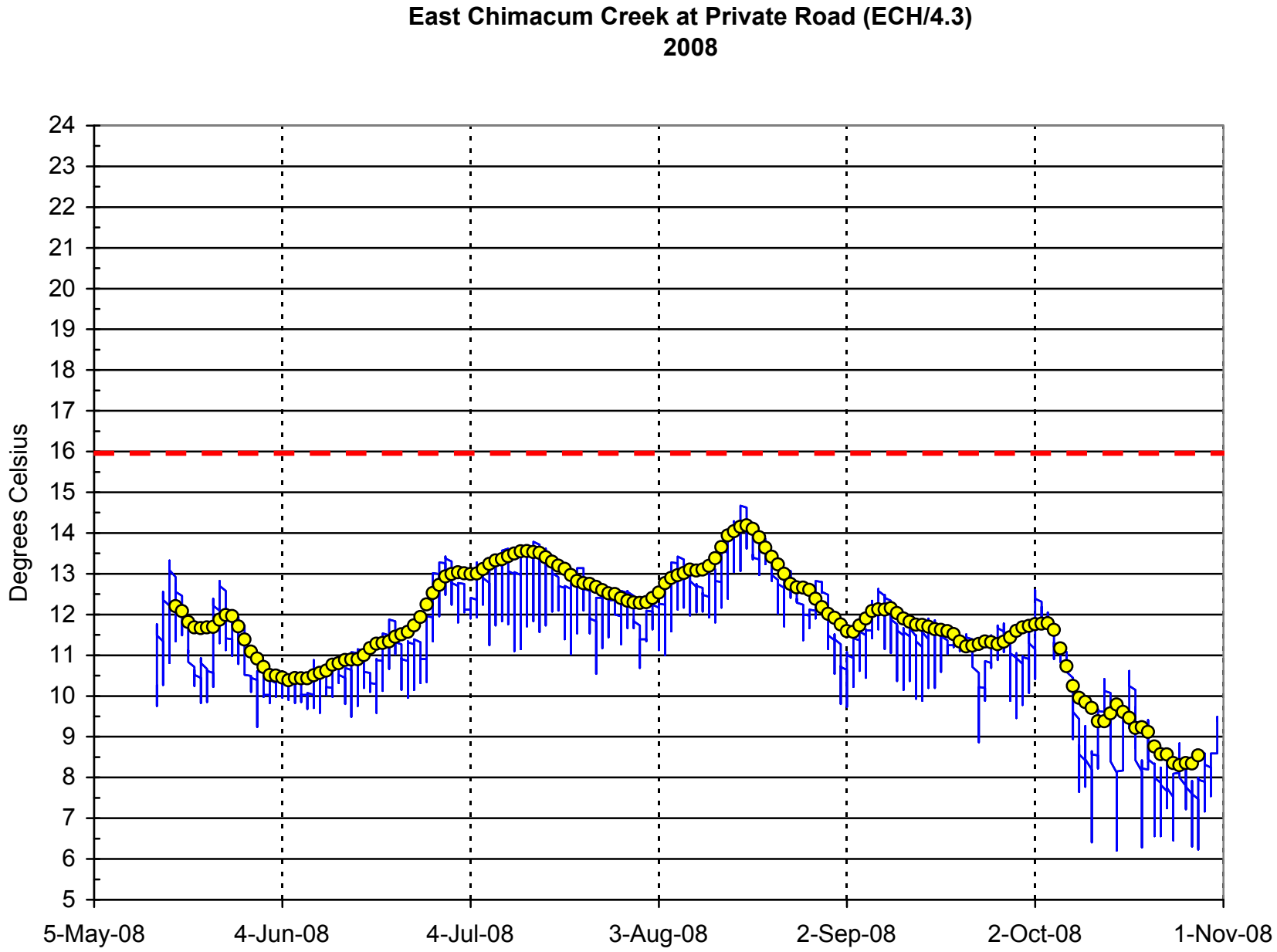

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station ECH/4.3 on East Chimacum Creek in 2008. Dashed line shows the 7-DADMax criteria. ECH4.3_2008.xls 6/3/2011

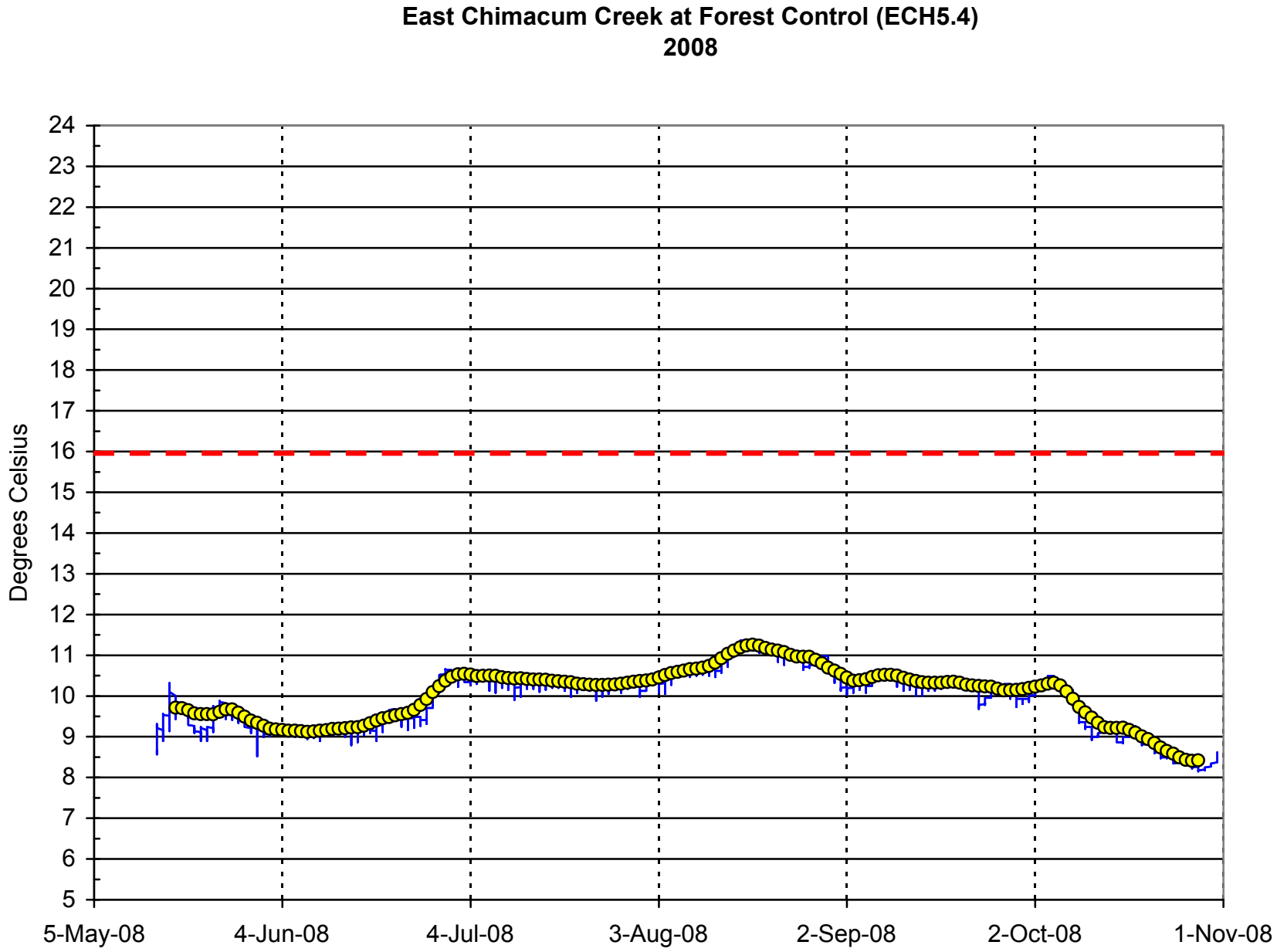

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station ECH/5.4 on East Chimacum Creek in 2008. Dashed line shows the 7-DADMax criteria. ECH5.4_2008.xls 6/3/2011

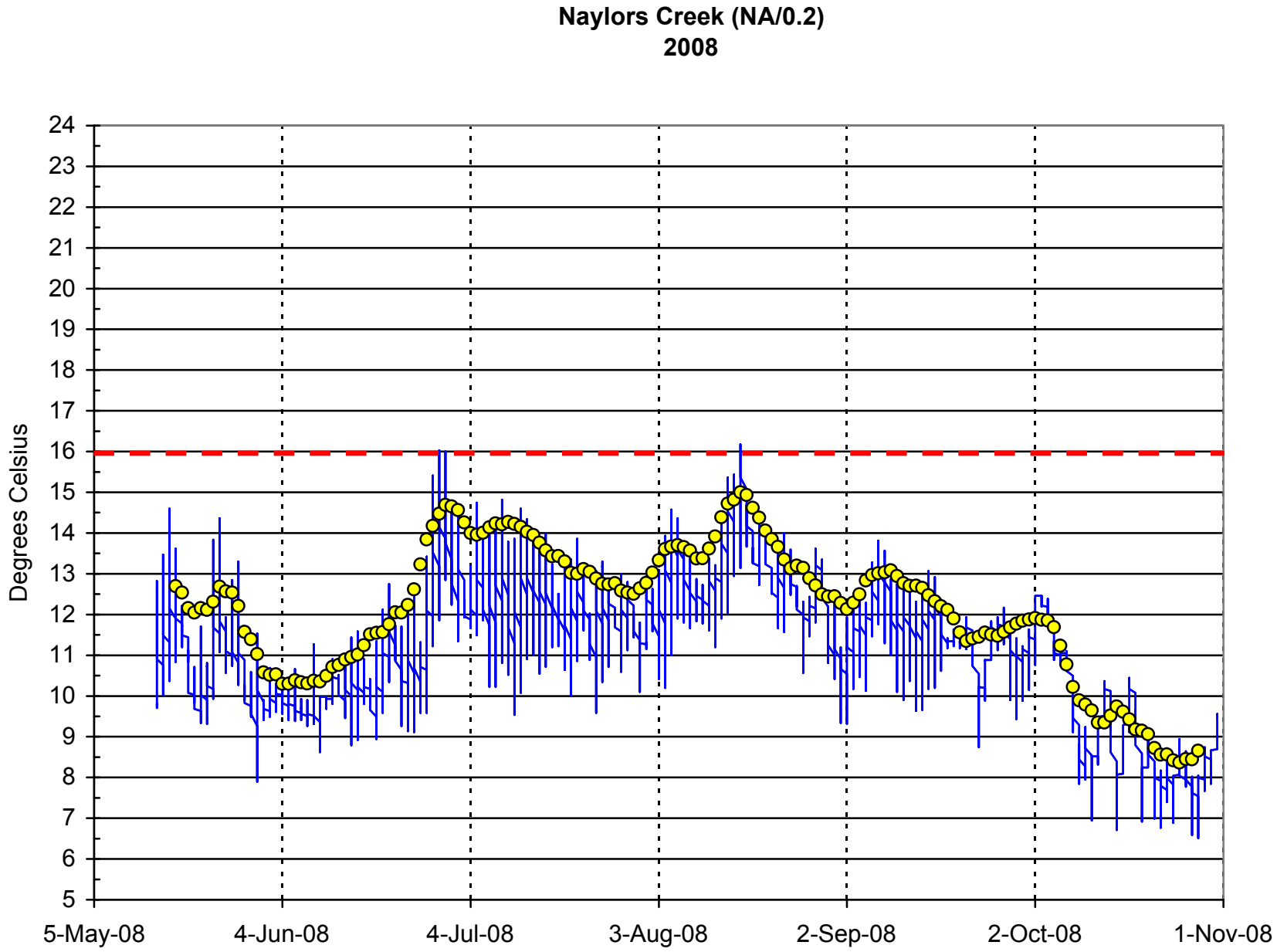

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station NA/0.2 on Naylors Creek in 2008. Dashed line shows the 7-DADMax criteria. NA0.2_2008.xls 6/3/2011

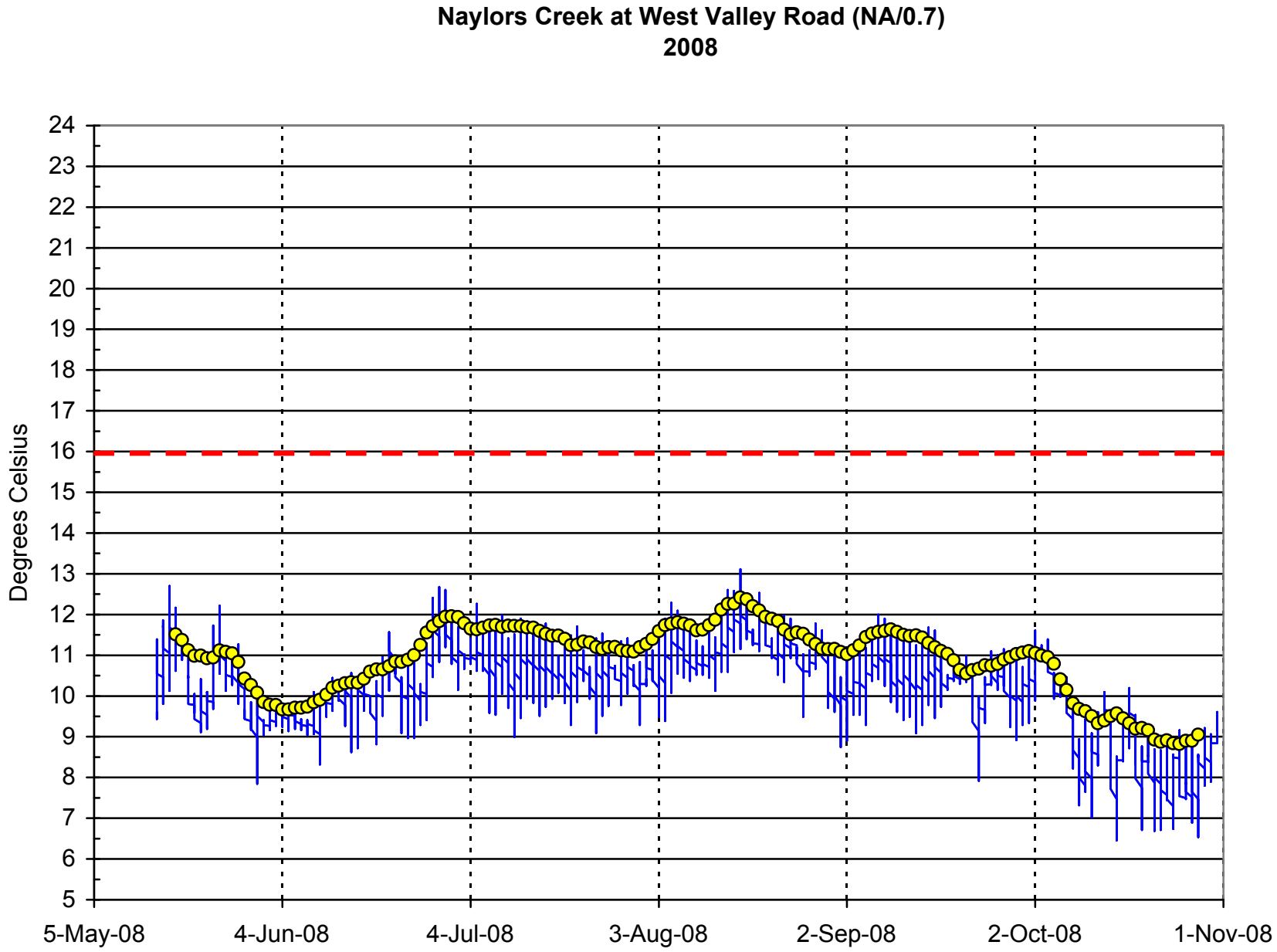

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station NA/0.7 on Naylors Creek in 2008. Dashed line shows the 7-DADMax criteria. NA0.7_2008.xls 6/3/2011

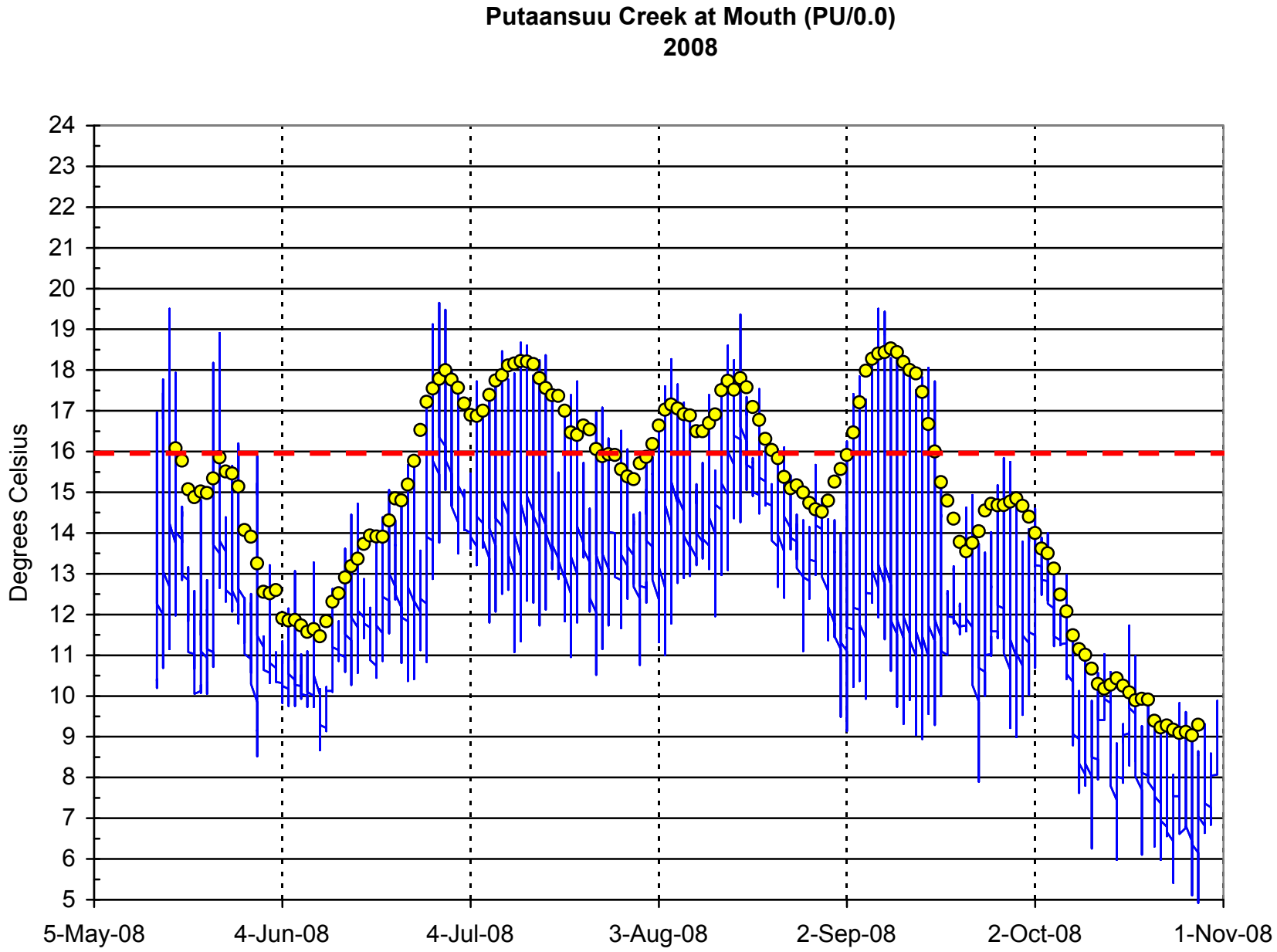

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station PU/0.0 on Putaansuu Creek in 2008. Dashed line shows the 7-DADMax criteria. PU0.0_2008.xls 6/3/2011

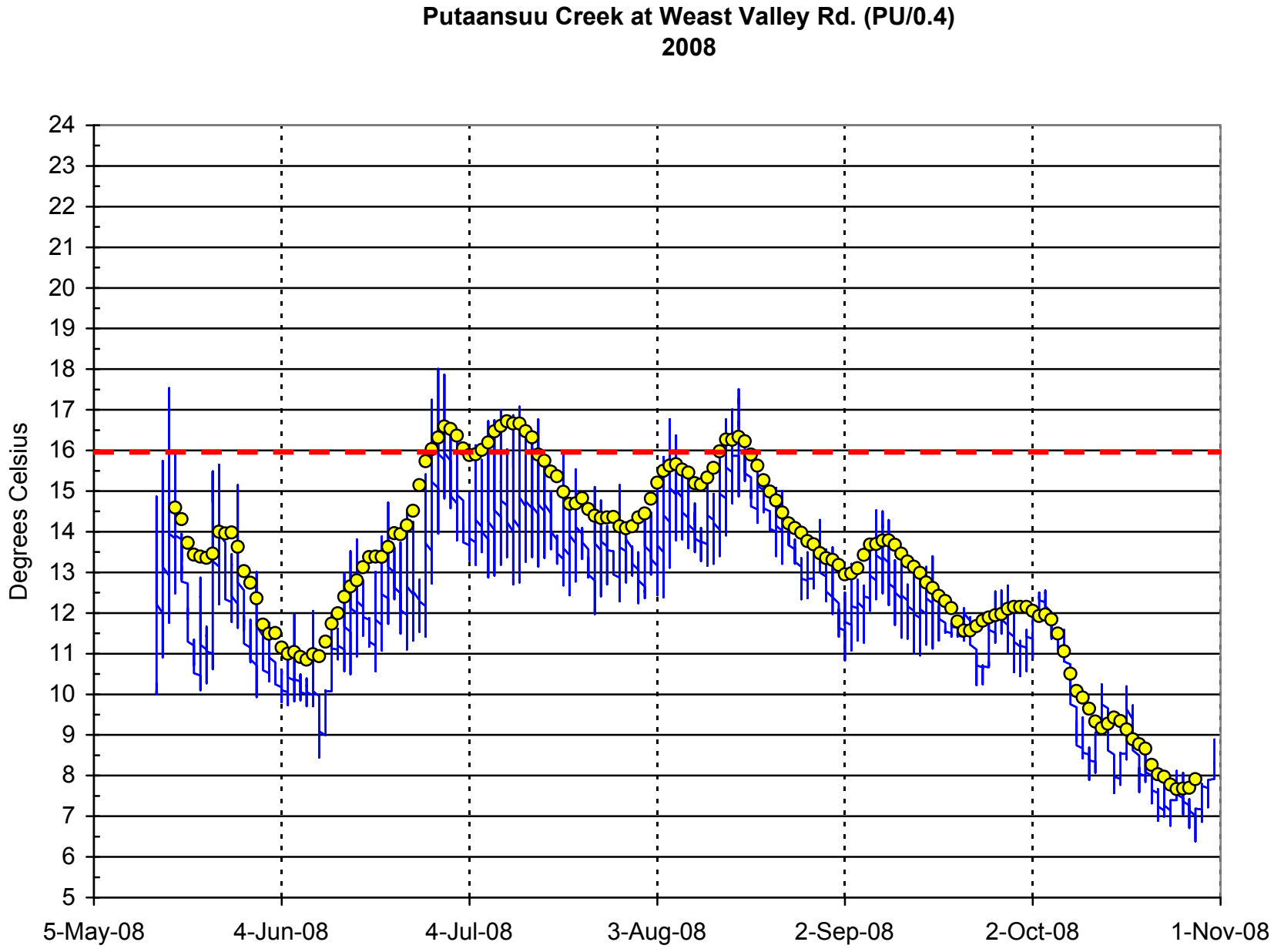

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station PU/0.4 on Putaansuu Creek in 2008. Dashed line shows the 7-DADMax criteria. PU0.4_2008.xls 6/3/2011

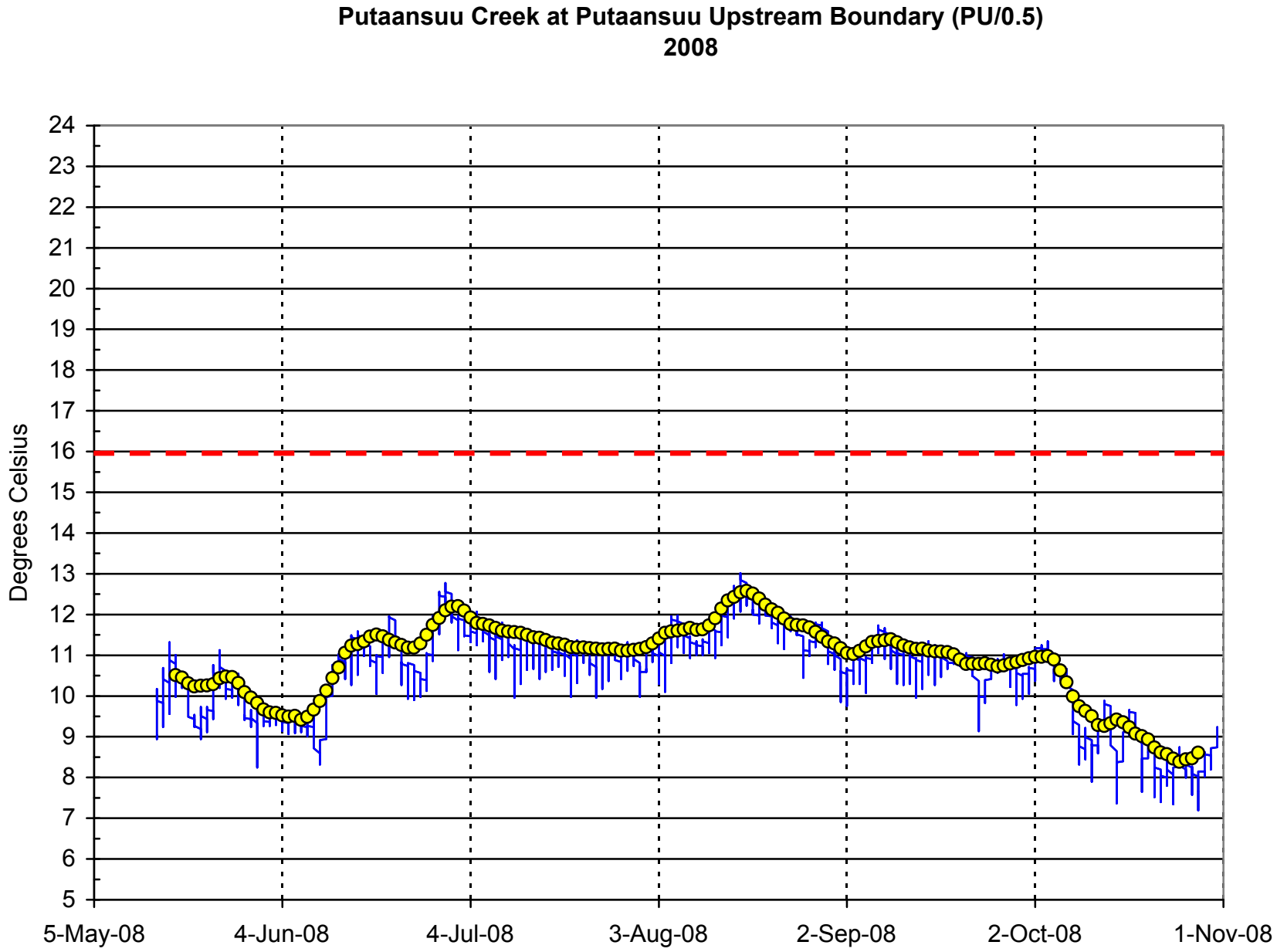

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station PU/0.5 on Putaansuu Creek in 2008. Dashed line shows the 7-DADMax criteria. PU0.5_2008.xls 6/3/2011

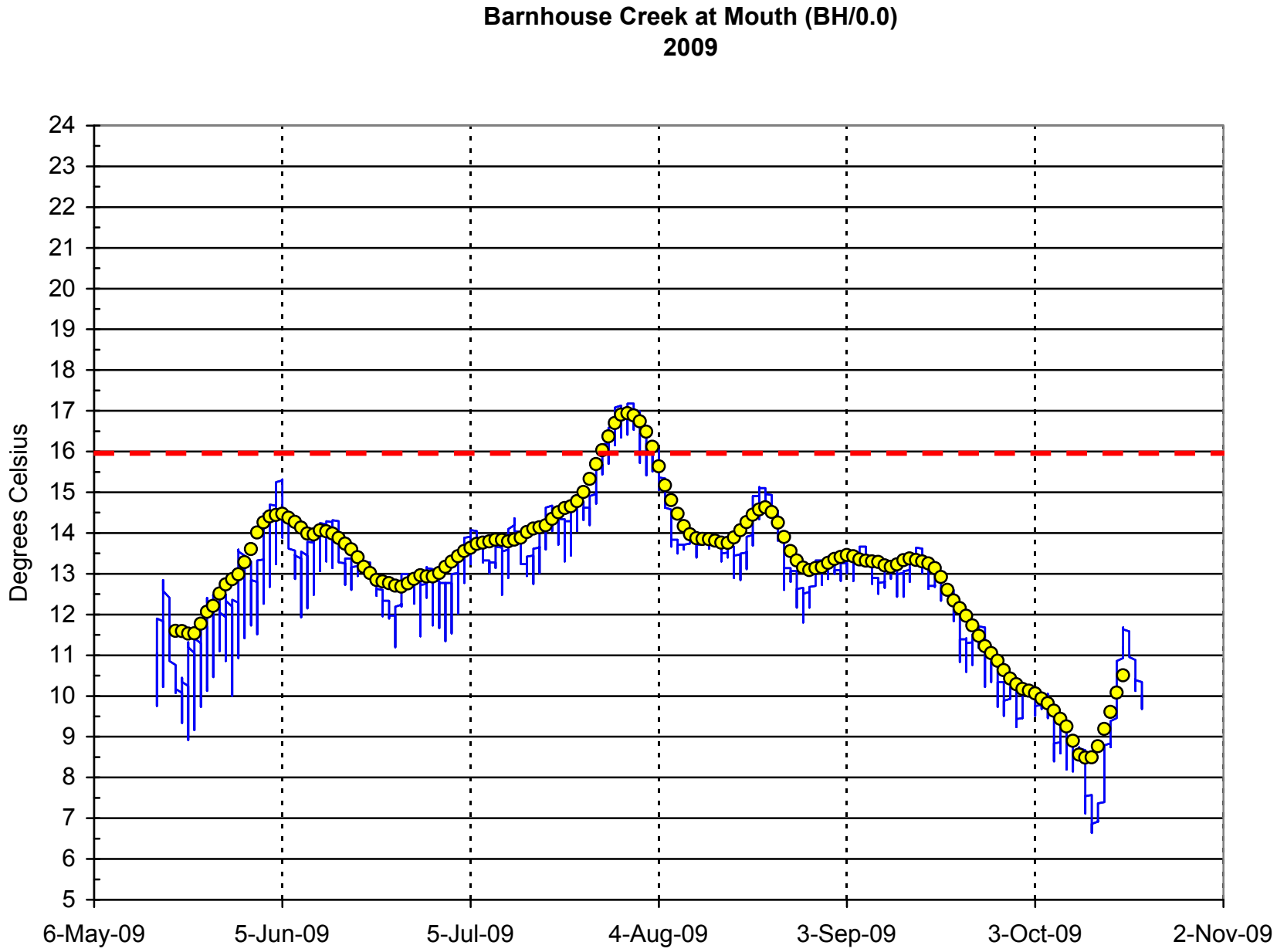

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station BH/0.0 on Barnhouse Creek in 2009. Dashed line shows the 7-DADMax criteria. BH0.0_2009.xls 6/3/2011

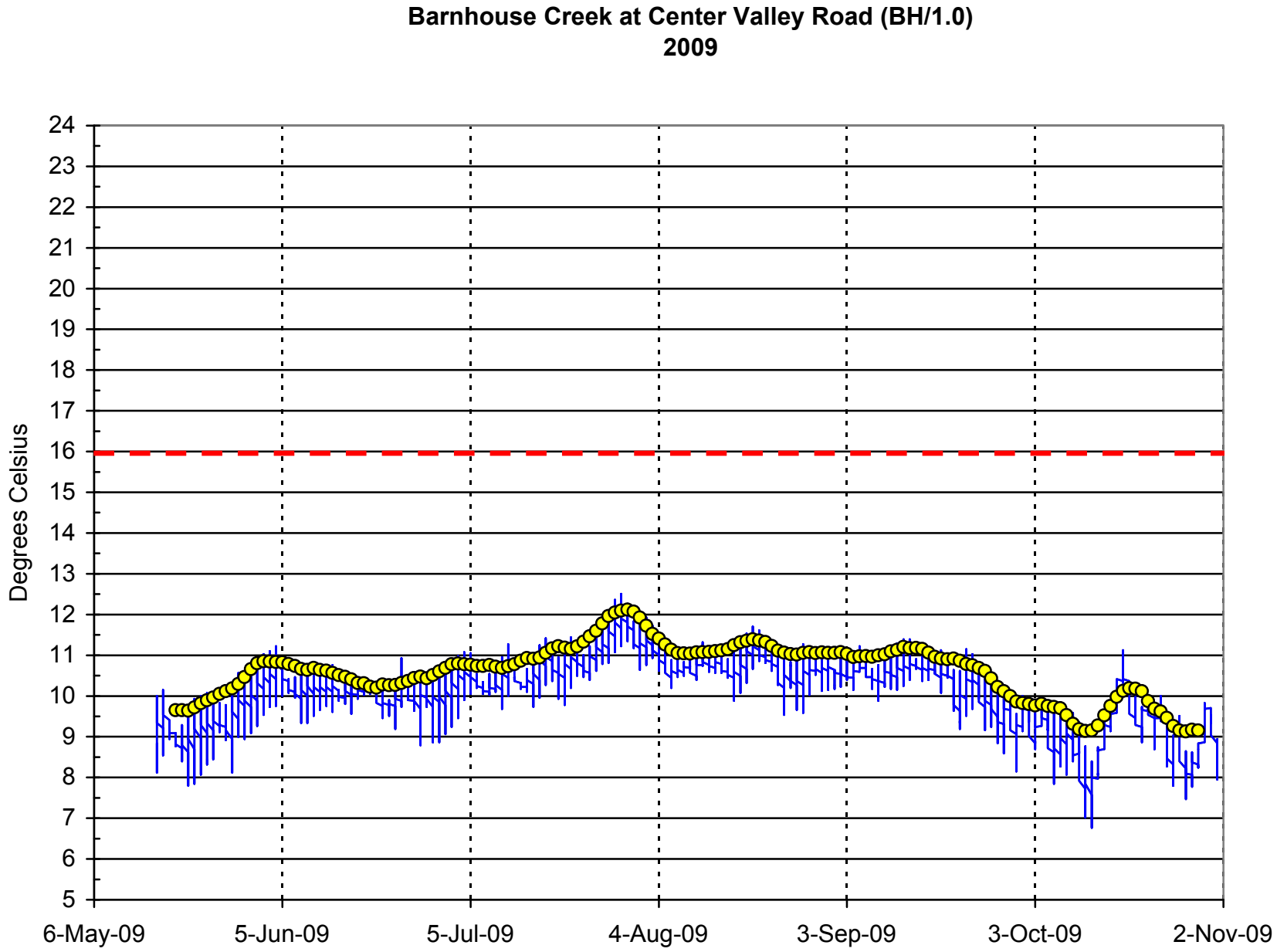

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station BH/1.0 on Barnhouse Creek in 2009. Dashed line shows the 7-DADMax criteria. BH1.0_2009.xls 6/3/2011

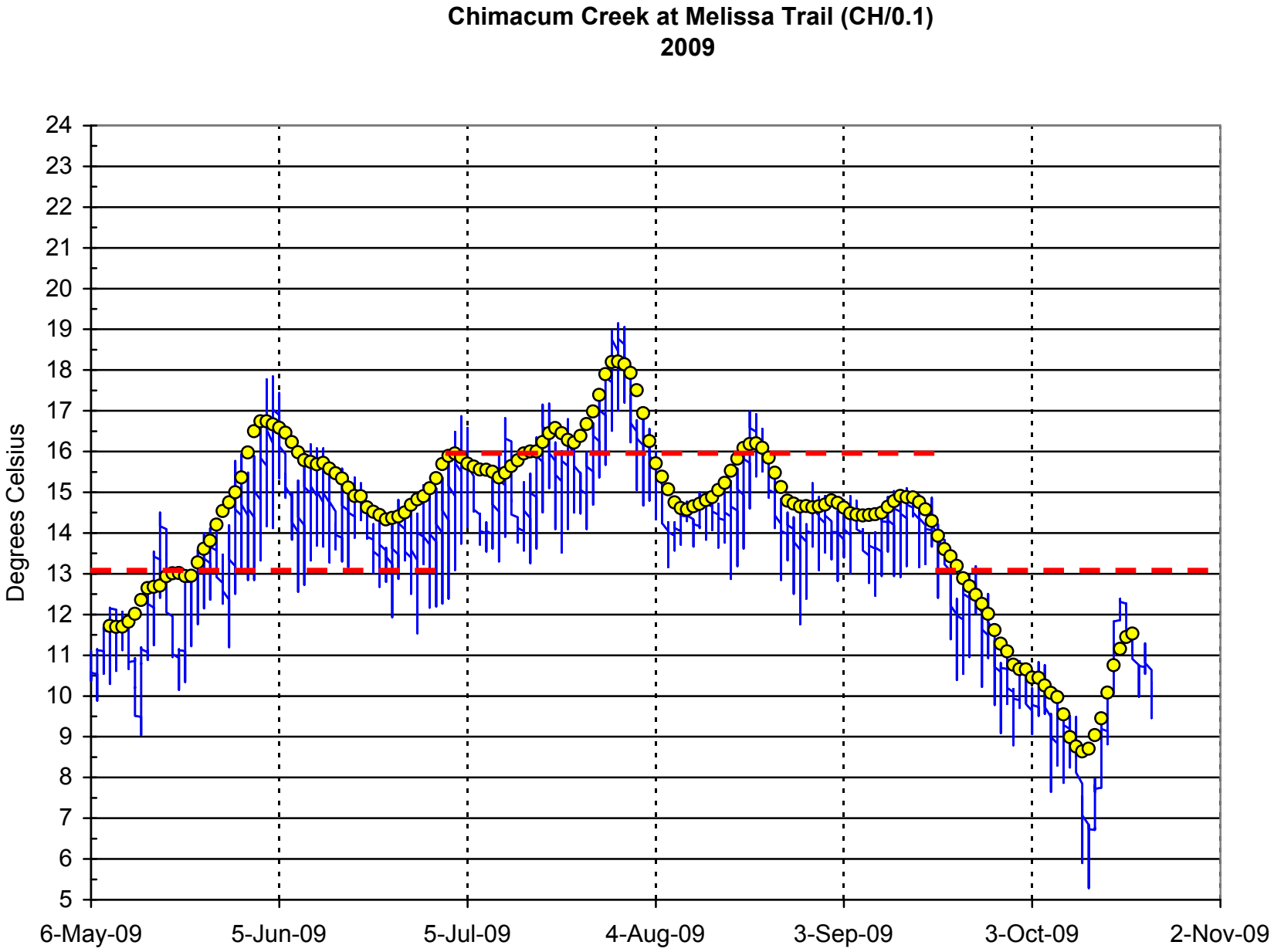

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station CH/0.1 on Chimacum Creek in 2009. Dashed line shows the 7-DADMax criteria. CH0.1_2009.xls 6/3/2011

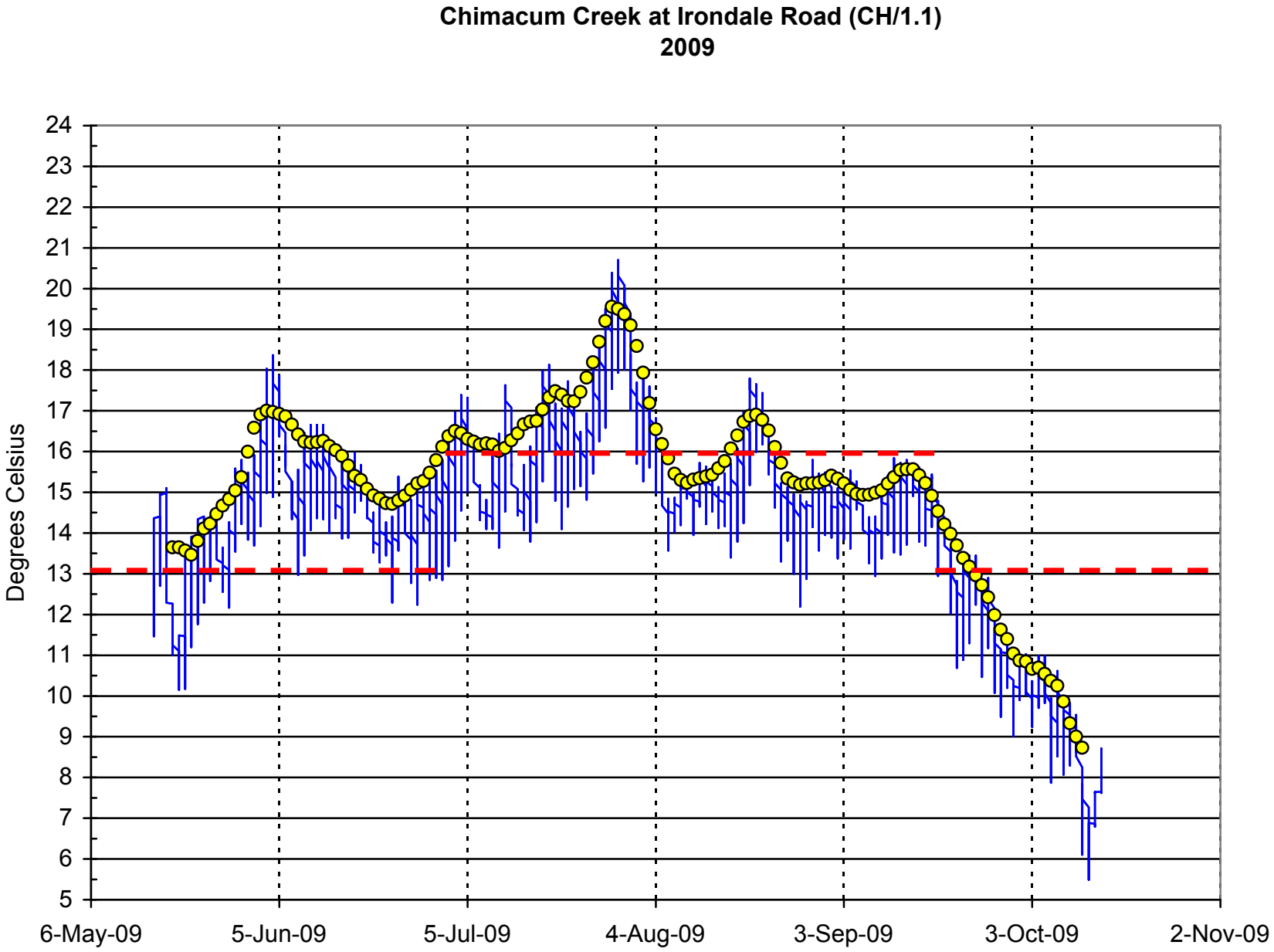

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station CH/1.1 on Chimacum Creek in 2009. Dashed line shows the 7-DADMax criteria. CH1.1_2009.xls 6/3/2011

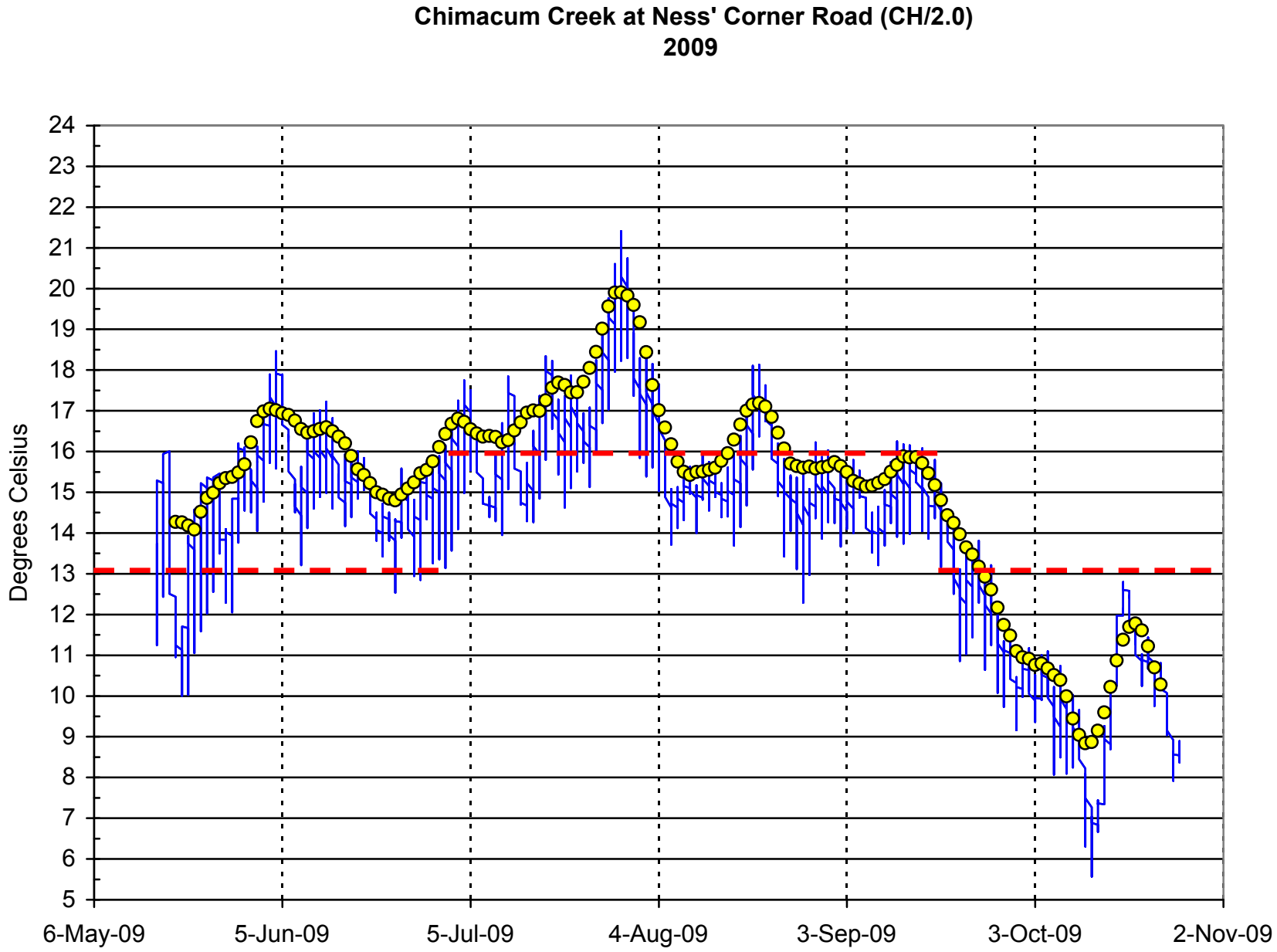

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station CH/2.0 on Chimacum Creek in 2009. Dashed line shows the 7-DADMax criteria. CH2.0_2009.xls 6/3/2011

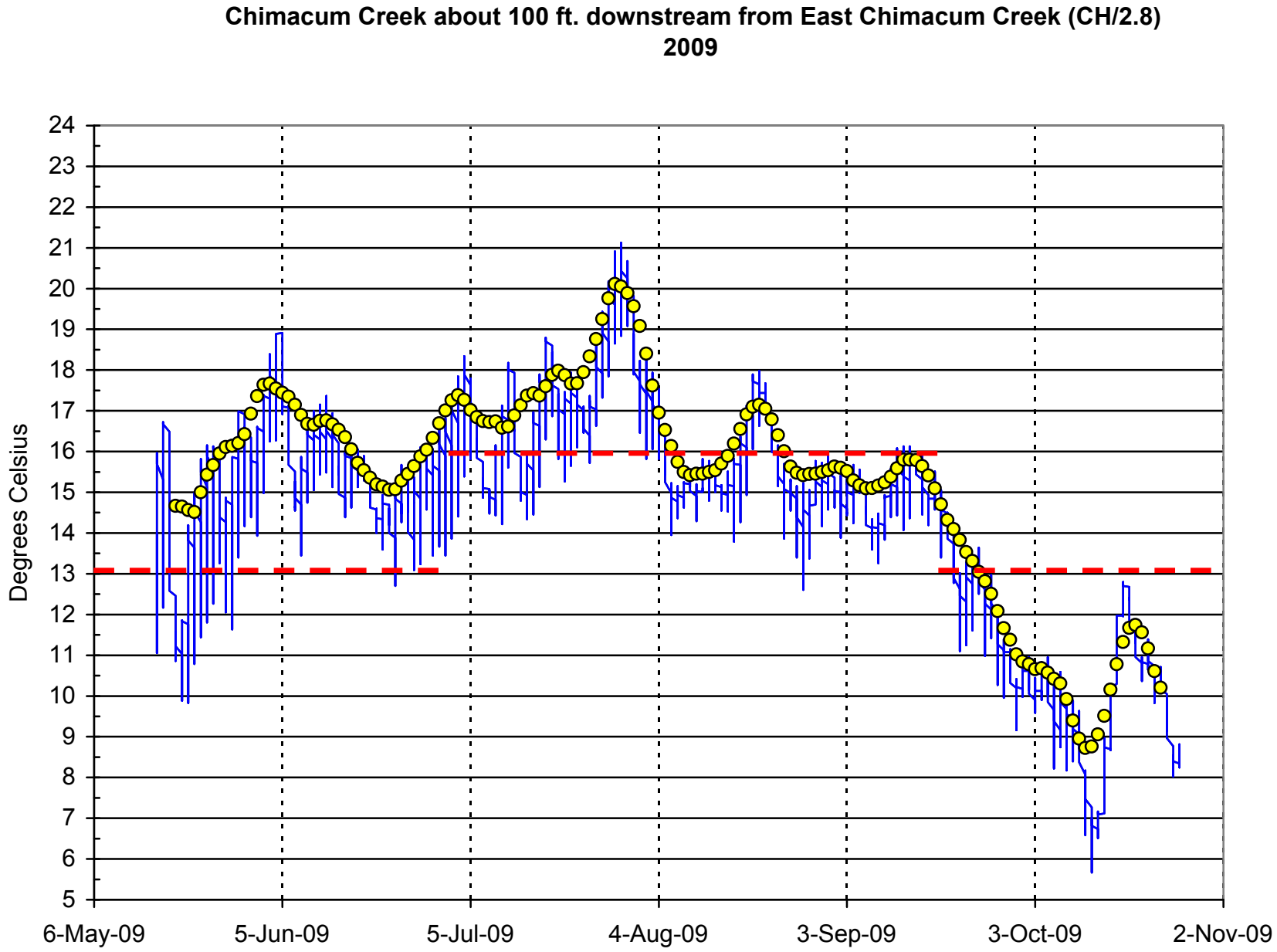

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station CH/2.8 on Chimacum Creek in 2009. Dashed line shows the 7-DADMax criteria. CH2.8_2009.xls 6/3/2011

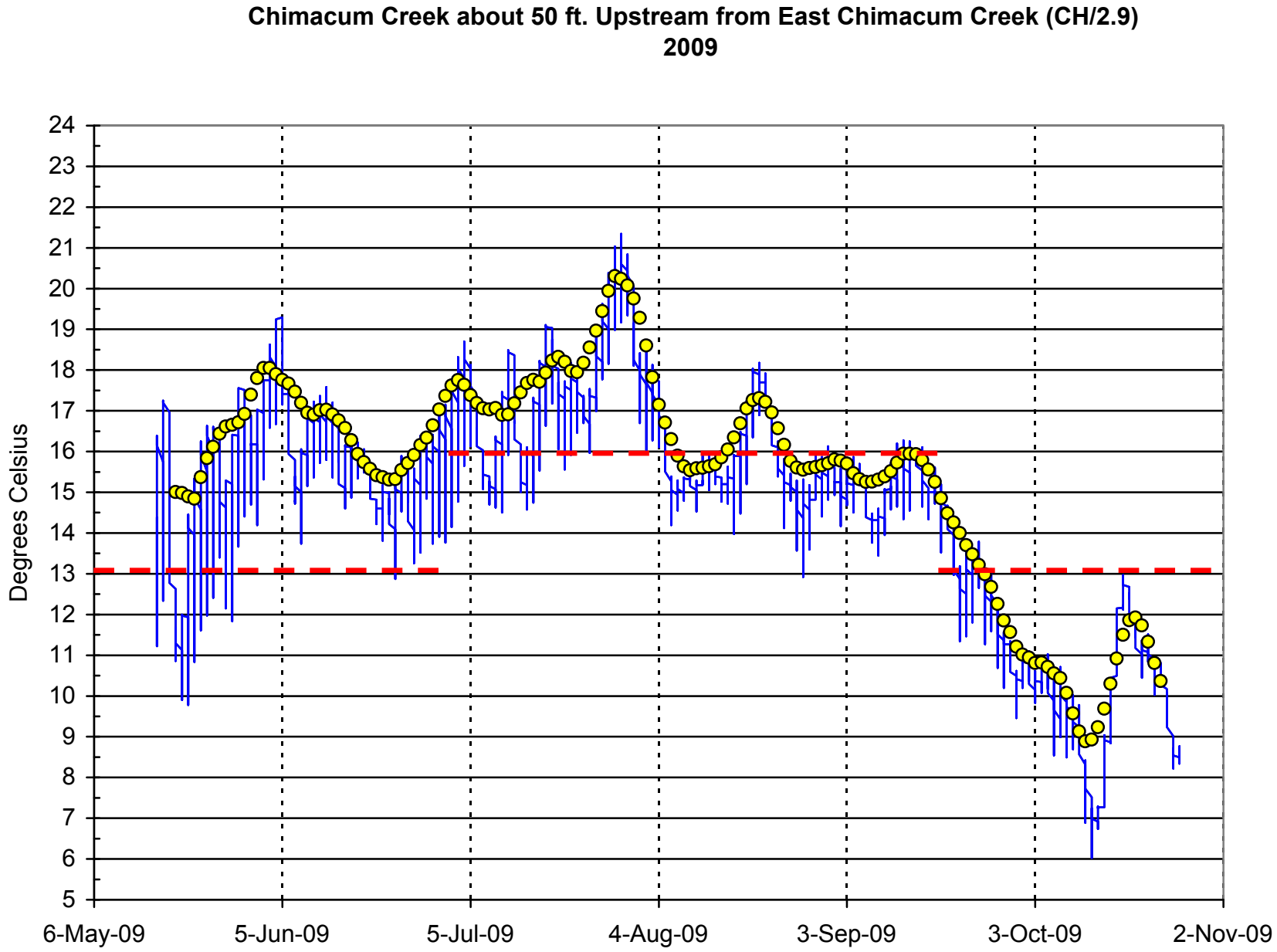

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station CH/2.9 on Chimacum Creek in 2009. Dashed line shows the 7-DADMax criteria. CH2.9_2009.xls 6/3/2011

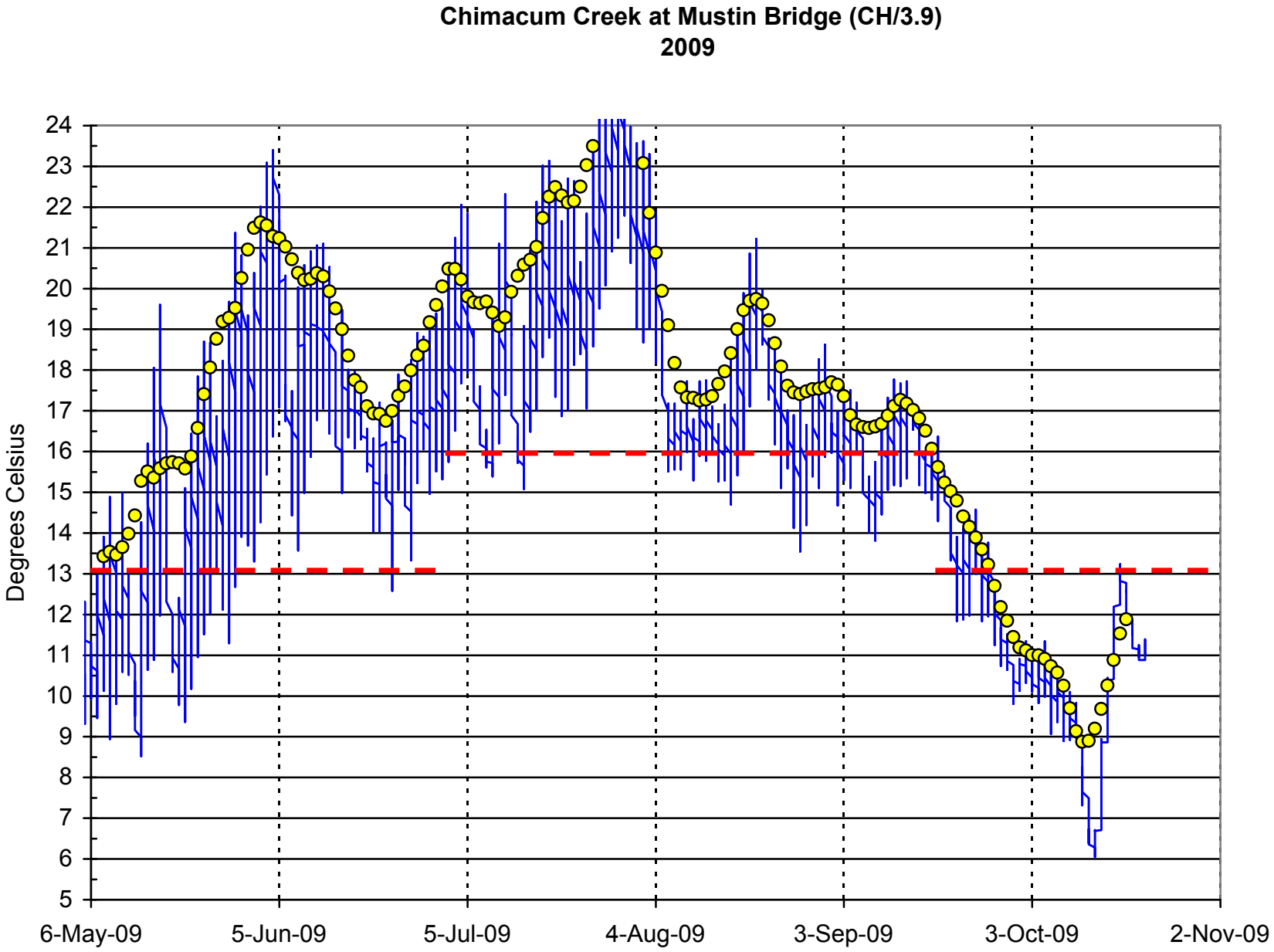

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station CH/3.9 on Chimacum Creek in 2009. Dashed line shows the 7-DADMax criteria. CH3.9_2009.xls 6/3/2011

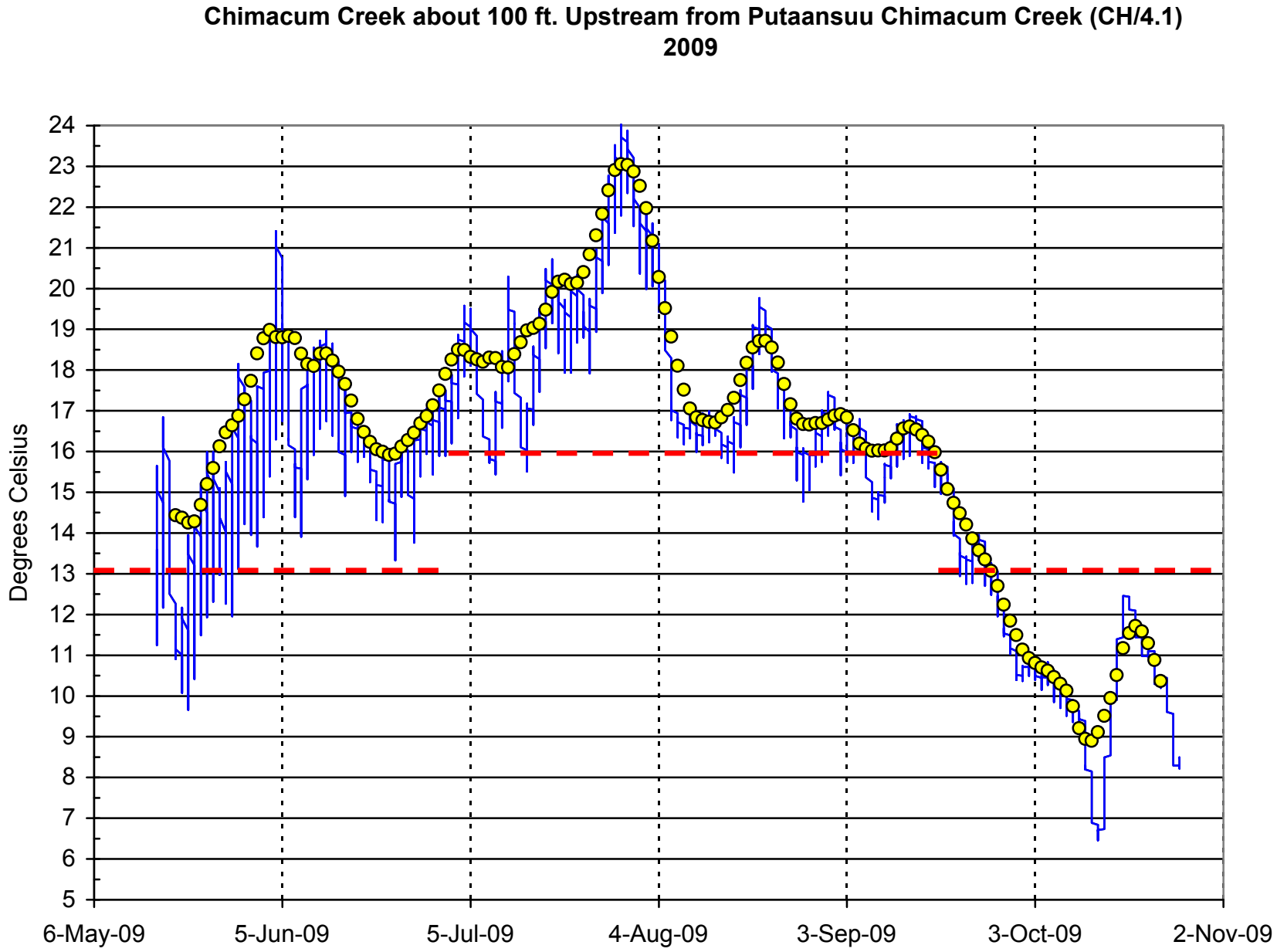

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station CH/4.1 on Chimacum Creek in 2009. Dashed line shows the 7-DADMax criteria. CH4.1_2009.xls 6/3/2011

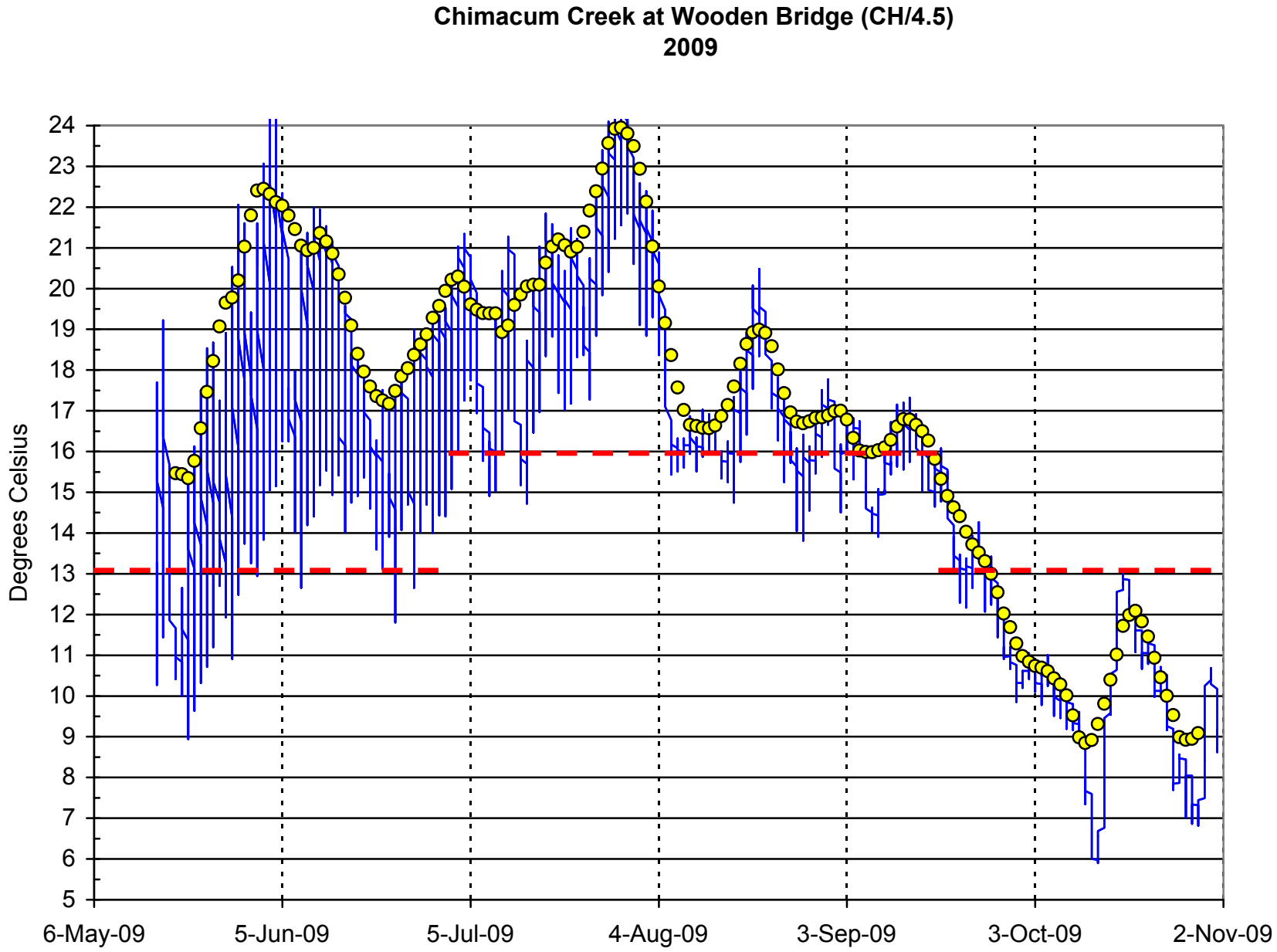

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station CH/4.5 on Chimacum Creek in 2009. Dashed line shows the 7-DADMax criteria. CH4.5_2009.xls 6/3/2011

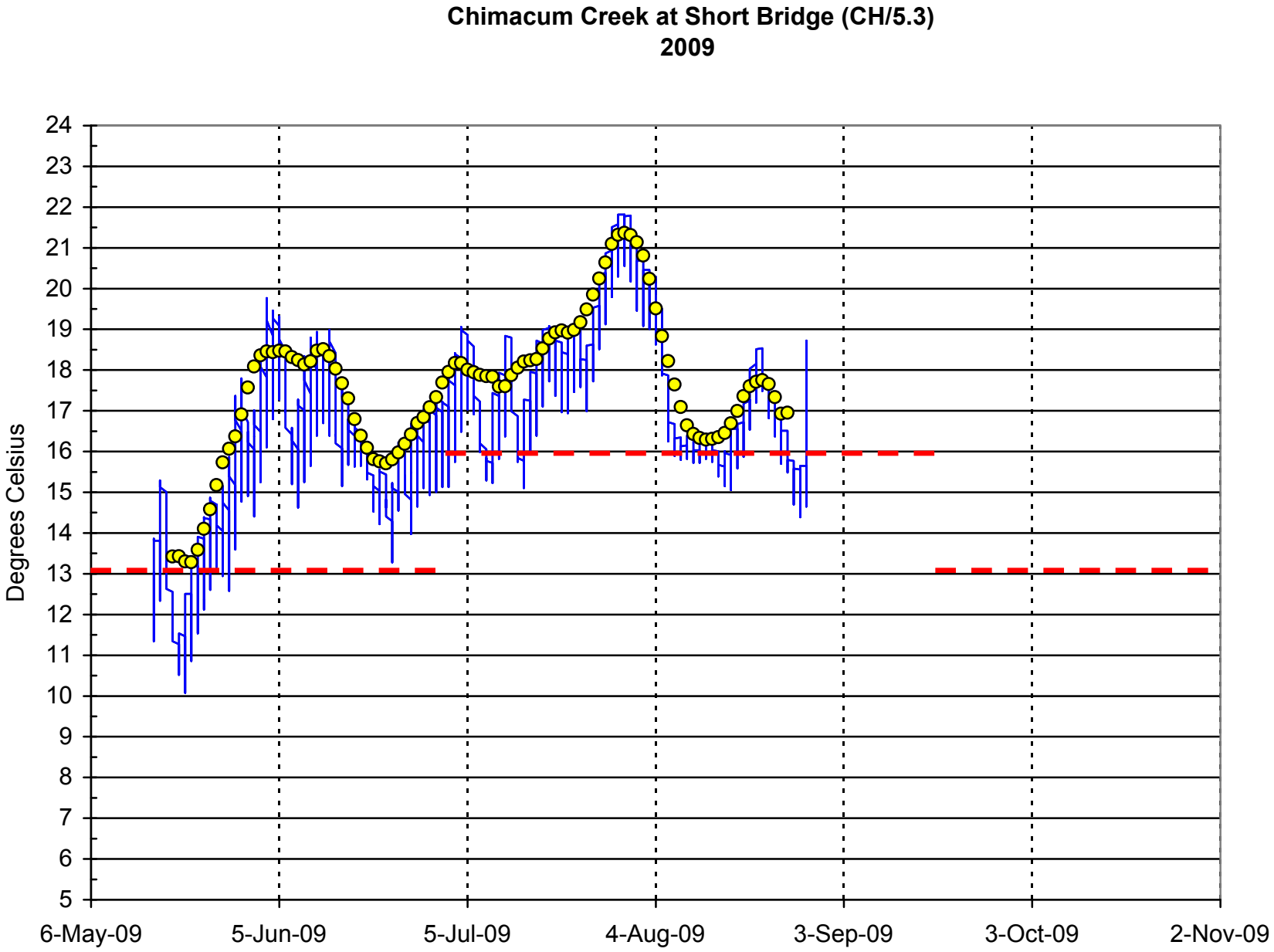

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station CH/5.3 on Chimacum Creek in 2009. Dashed line shows the 7-DADMax criteria. CH5.3_2009.xls 6/3/2011

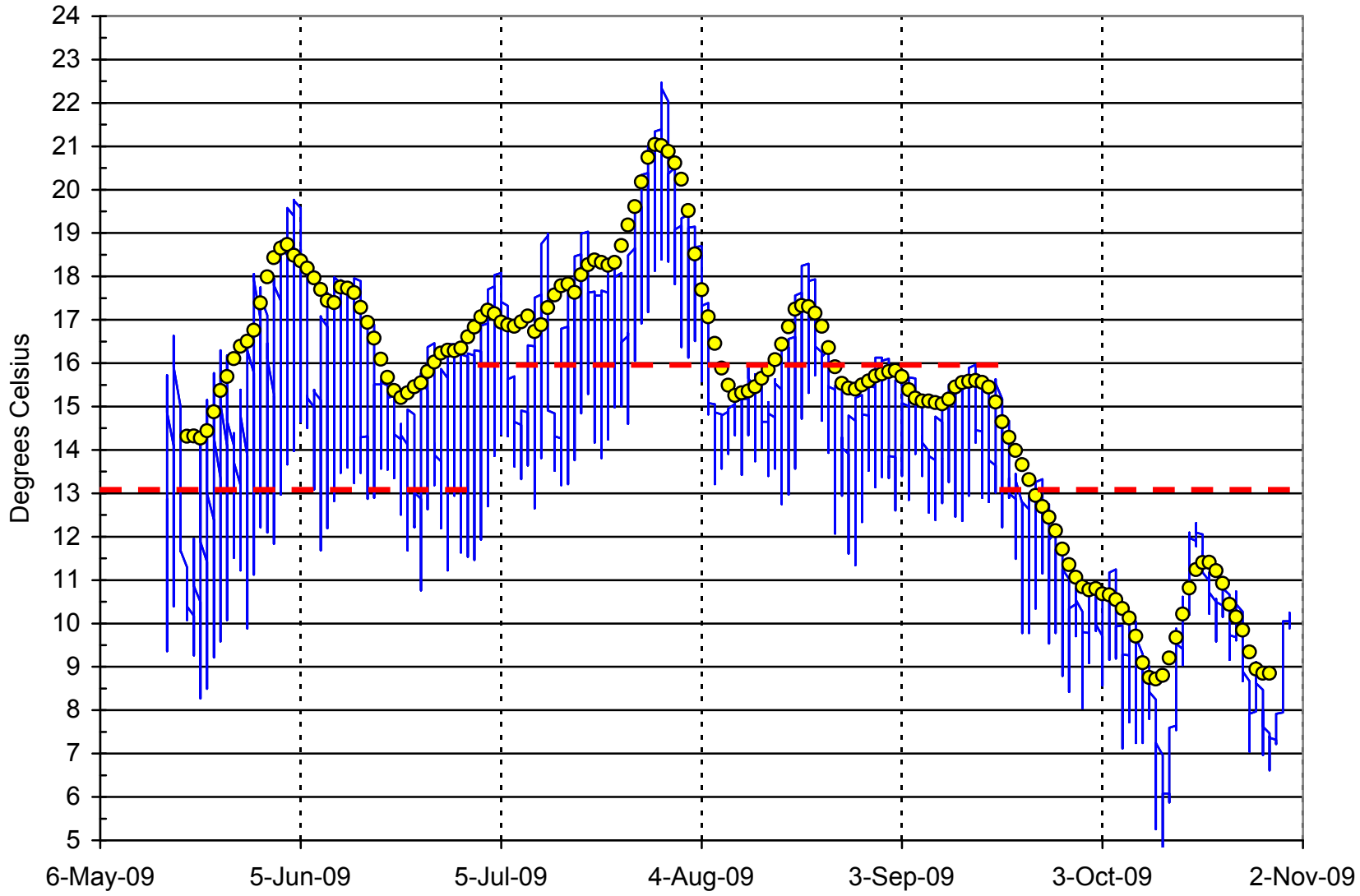

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station CH/6.1 on Chimacum Creek in 2009. Dashed line shows the 7-DADMax criteria. CH6.1_2009.xls 6/3/2011

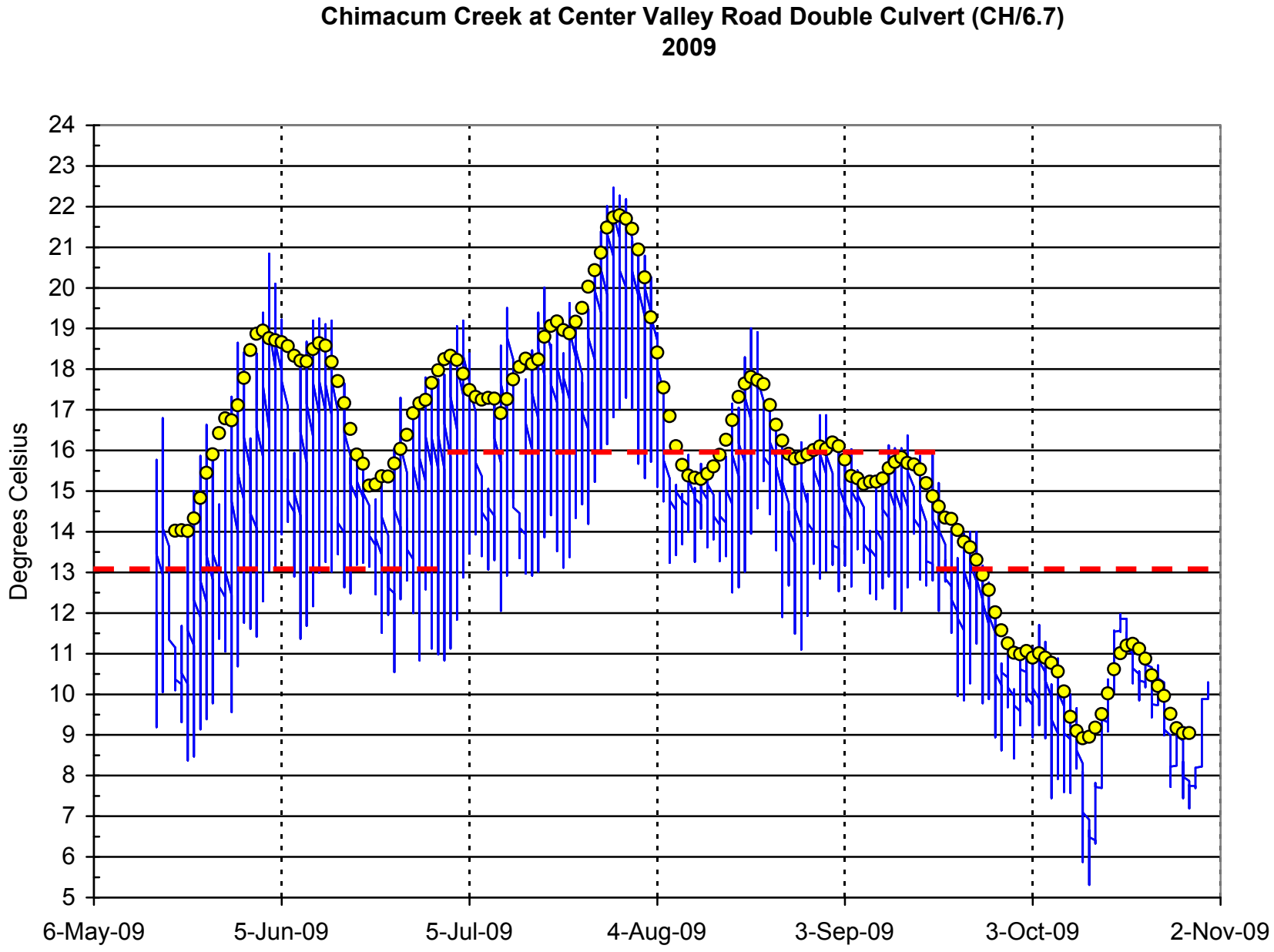

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station CH/6.7 on Chimacum Creek in 2009. Dashed line shows the 7-DADMax criteria. CH6.7_2009.xls 6/3/2011

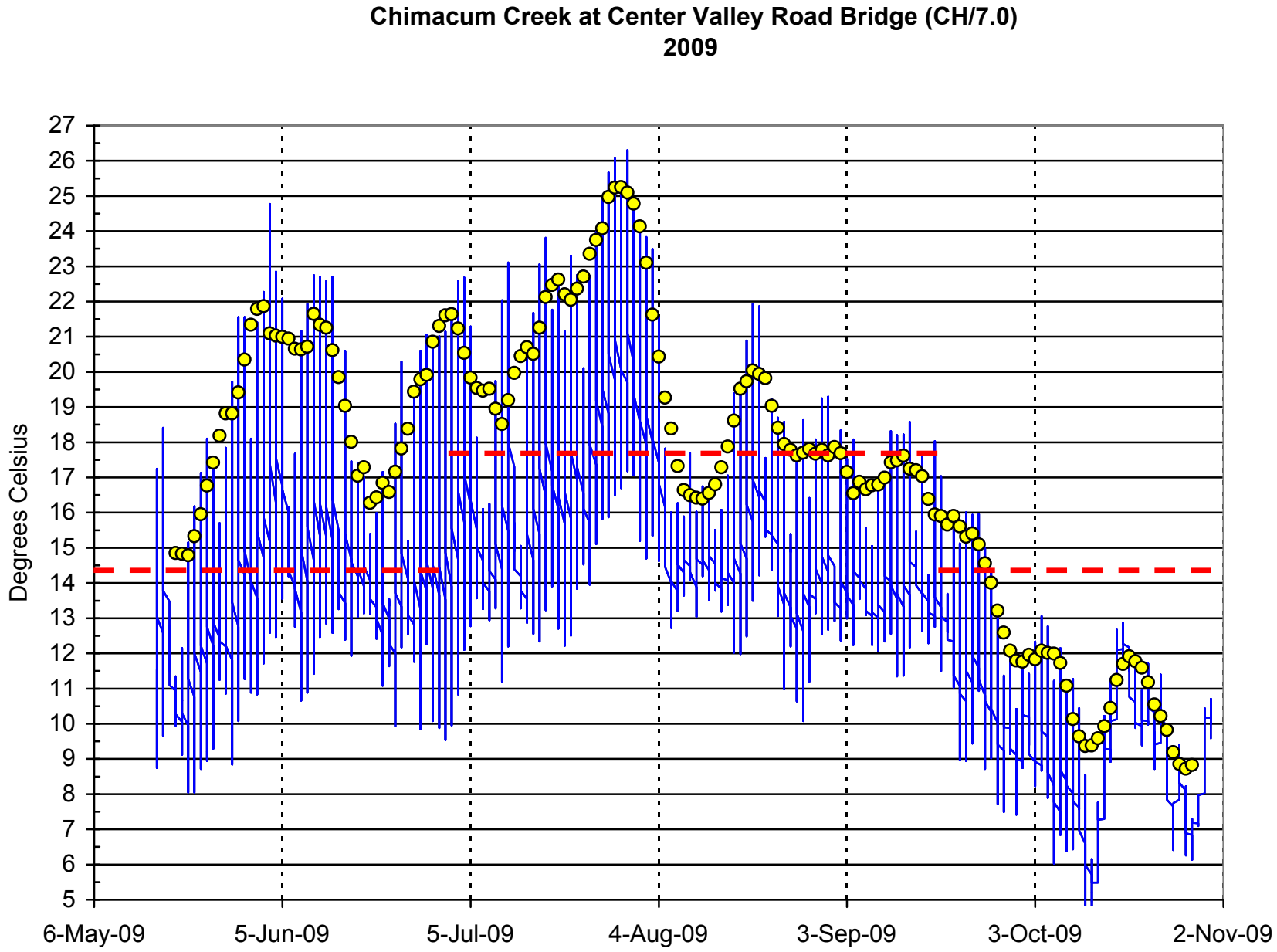

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station CH/7.0 on Chimacum Creek in 2009. Dashed line shows the 7-DADMax criteria. CH7.0_2009.xls 6/3/2011

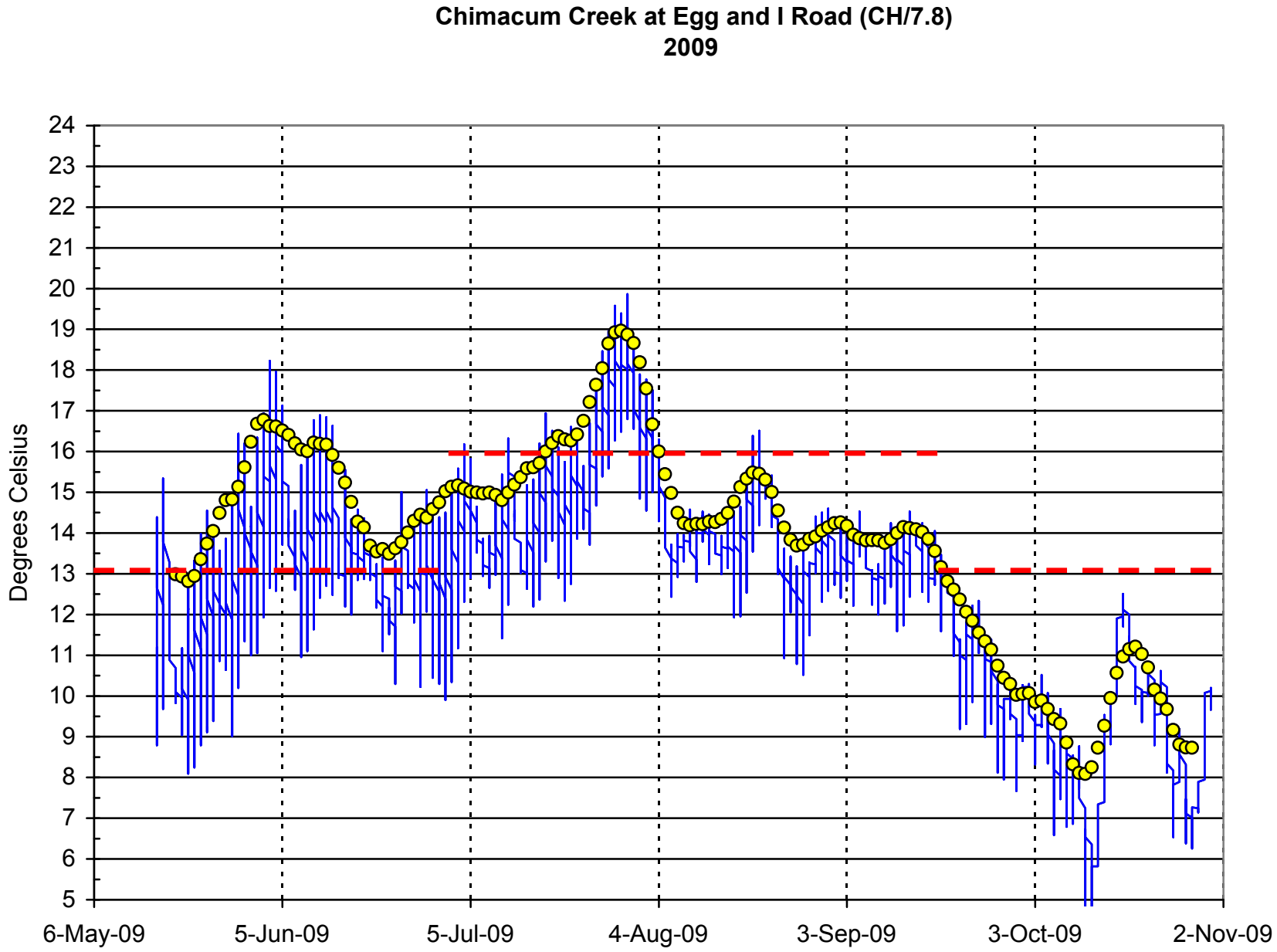

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station CH/7.8 on Chimacum Creek in 2009. Dashed line shows the 7-DADMax criteria. CH7.8_2009.xls 6/3/2011

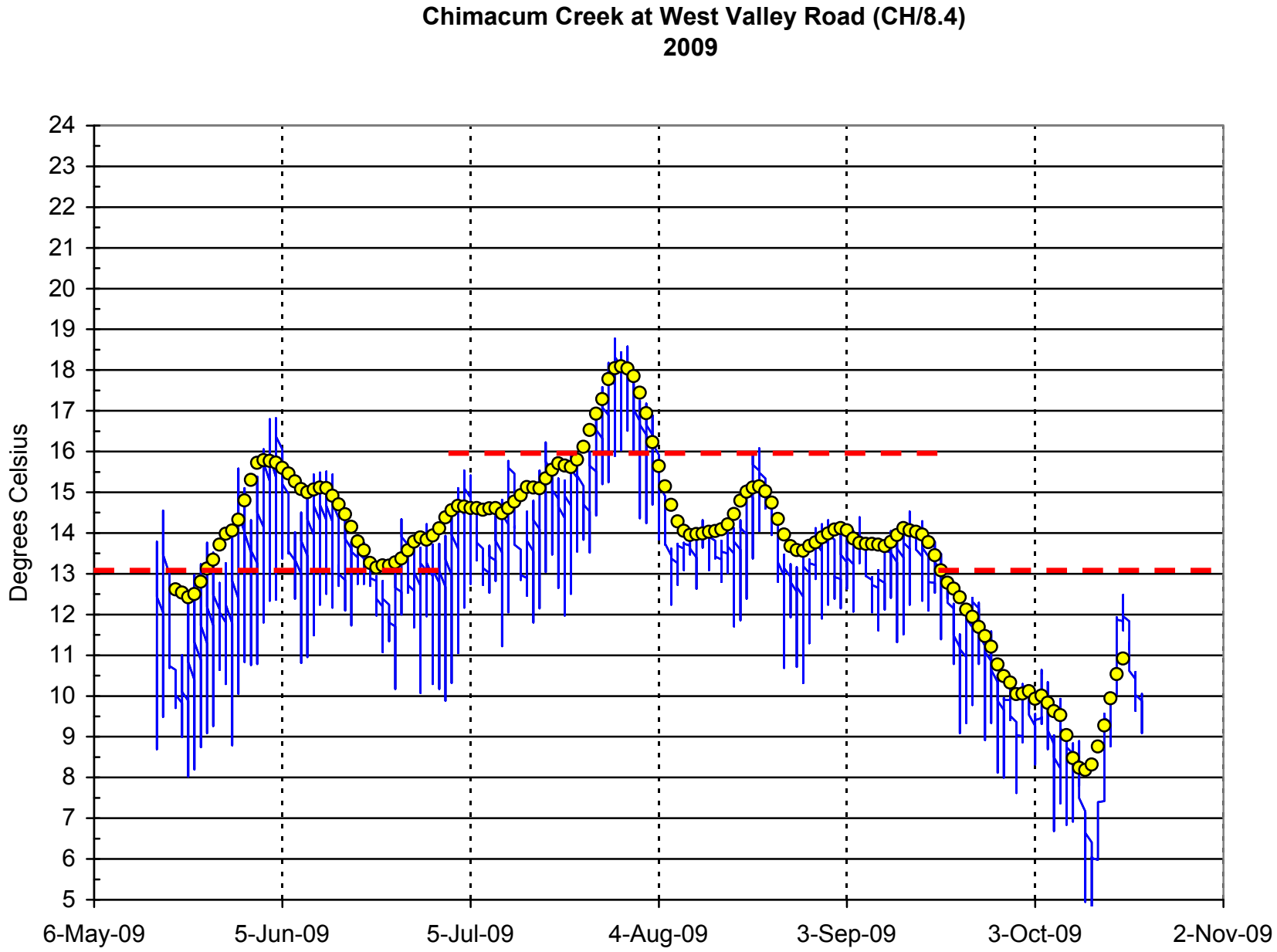

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station CH/8.4 on Chimacum Creek in 2009. Dashed line shows the 7-DADMax criteria. CH8.4_2009.xls 6/3/2011

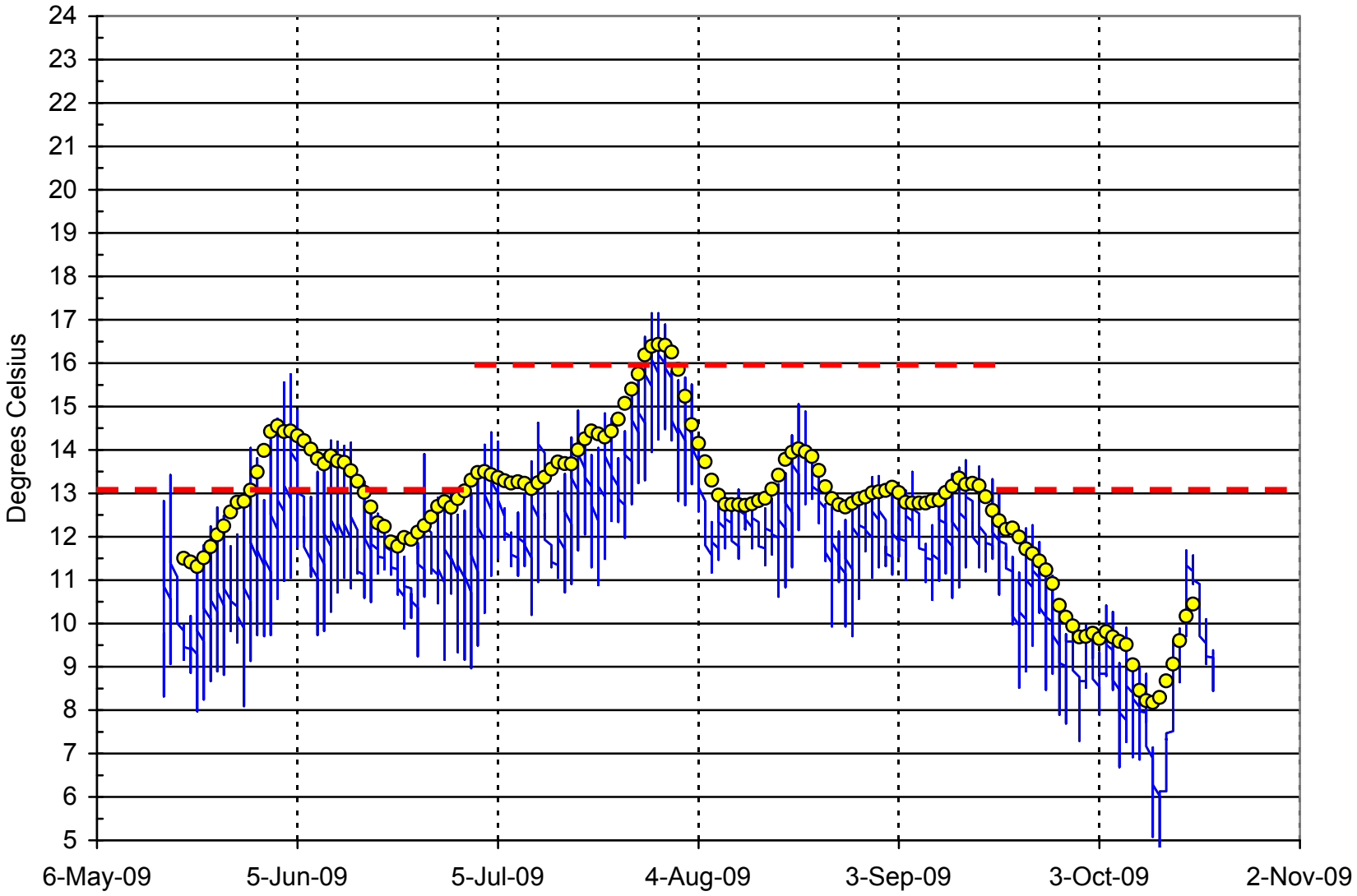

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station CH/9.0 on Chimacum Creek in 2009. Dashed line shows the 7-DADMax criteria. CH9.0_2009.xls 6/3/2011

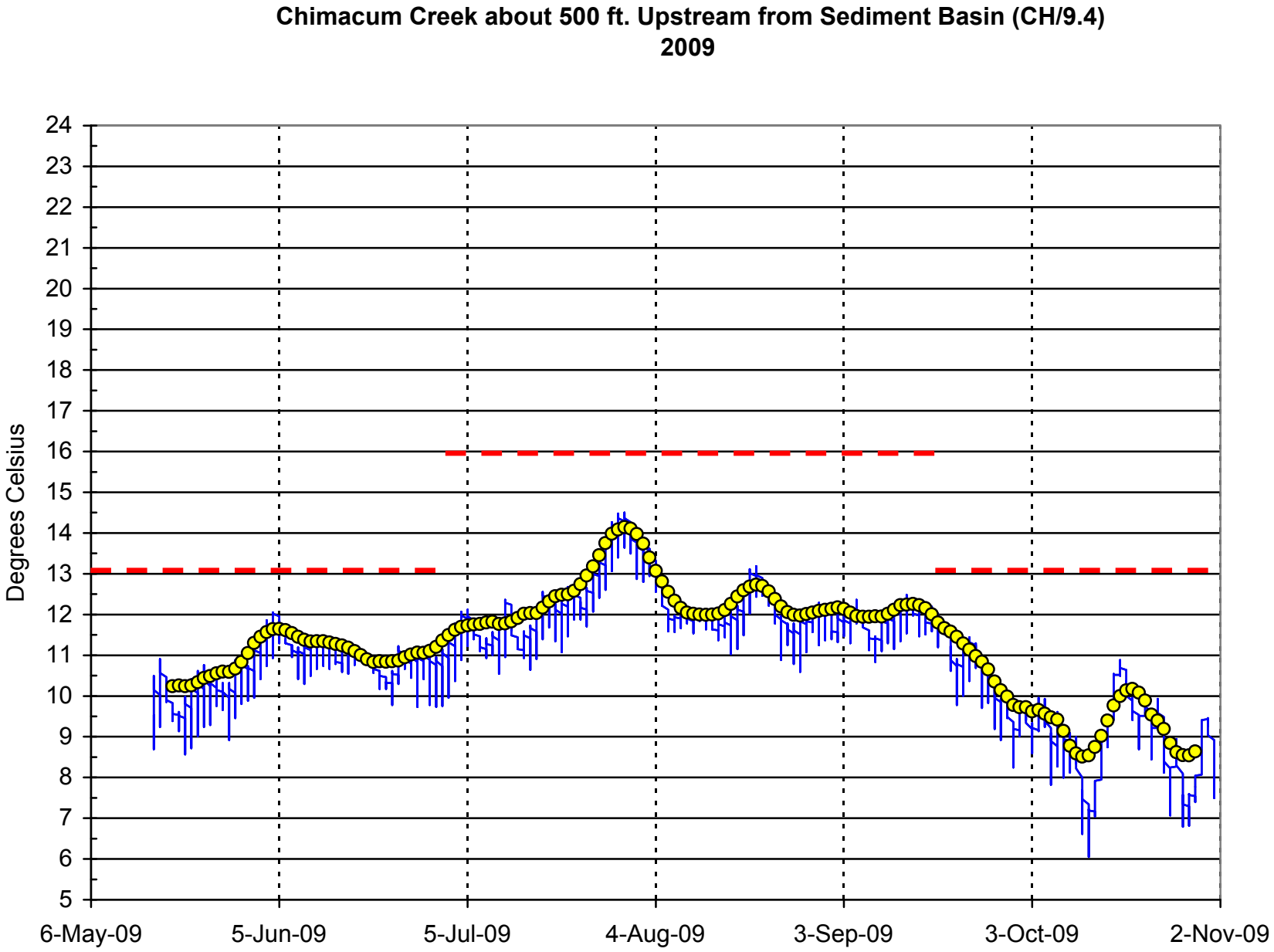

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station CH/9.4 on Chimacum Creek in 2009. Dashed line shows the 7-DADMax criteria. CH9.4_2009.xls 6/3/2011

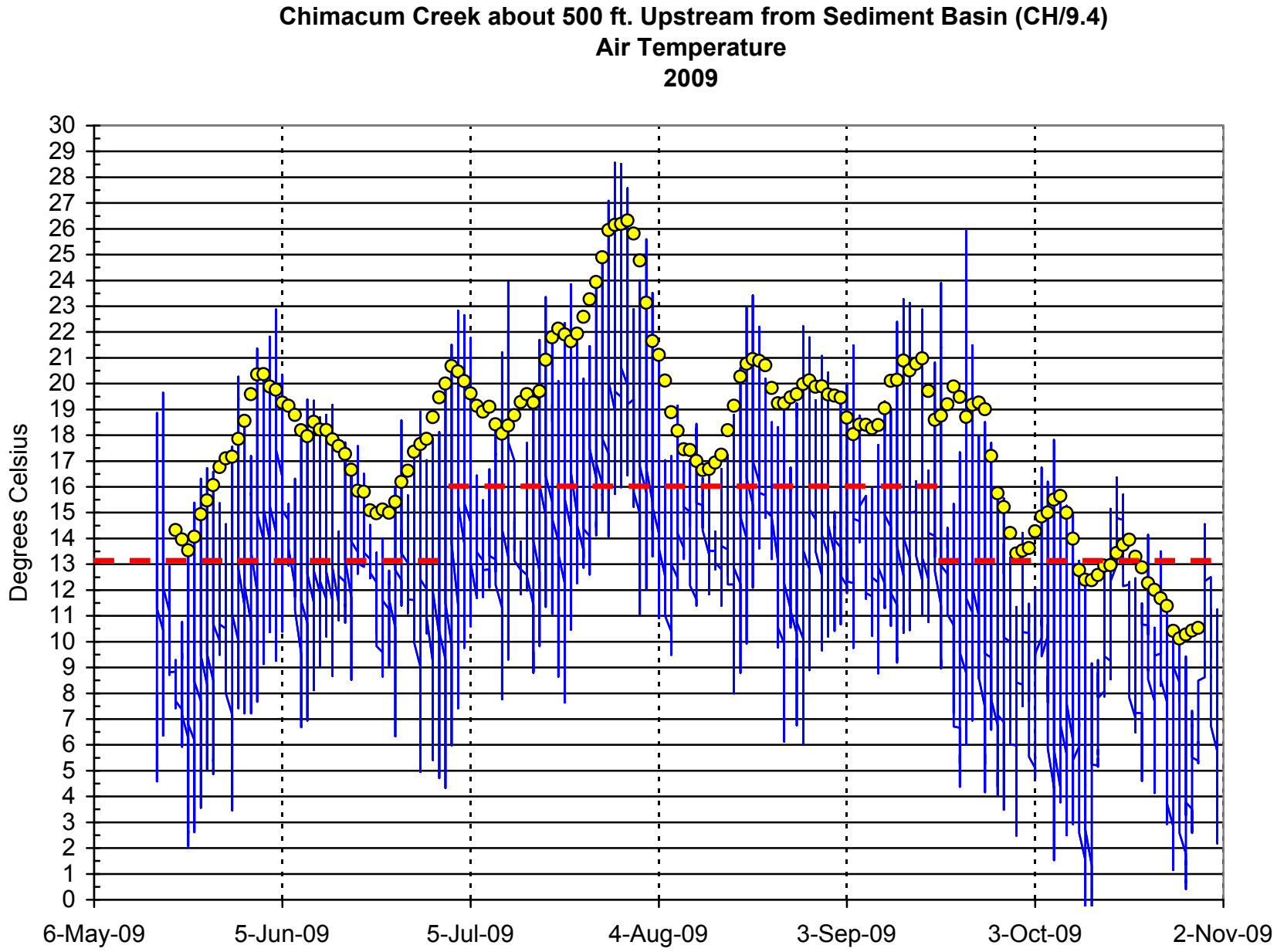

Figure . Air temperature profile at station CH/9.4 with 7-day average daily maximum temperatures (7-DADMax; circles). Dashed line shows the 7-DADMax criteria for water. CH9.4_Air_2009.xls 6/3/2011

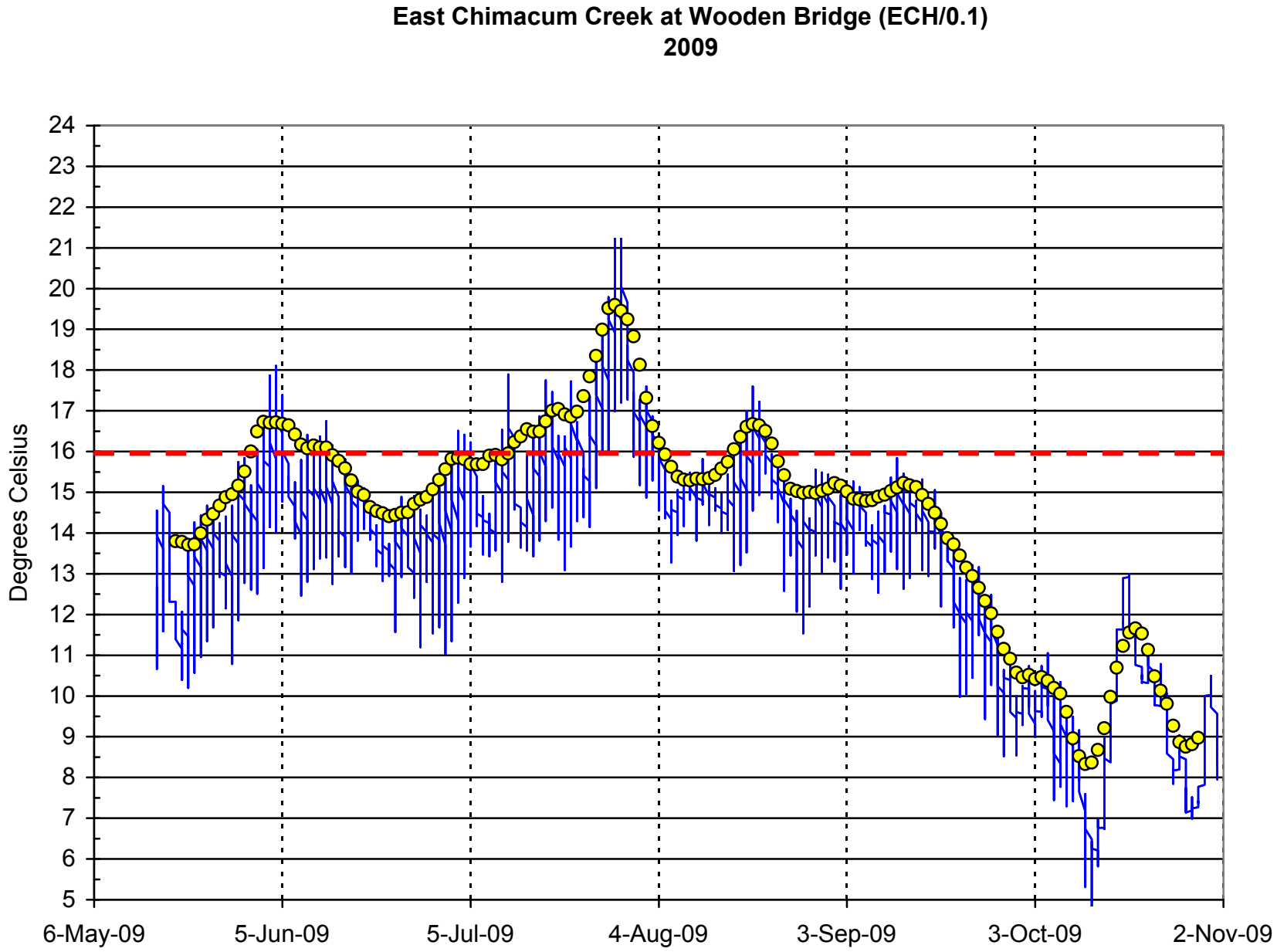

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station ECH/0.1 on East Chimacum Creek in 2009. Dashed line shows the 7-DADMax criteria. ECH0.1_2009.xls 6/3/2011

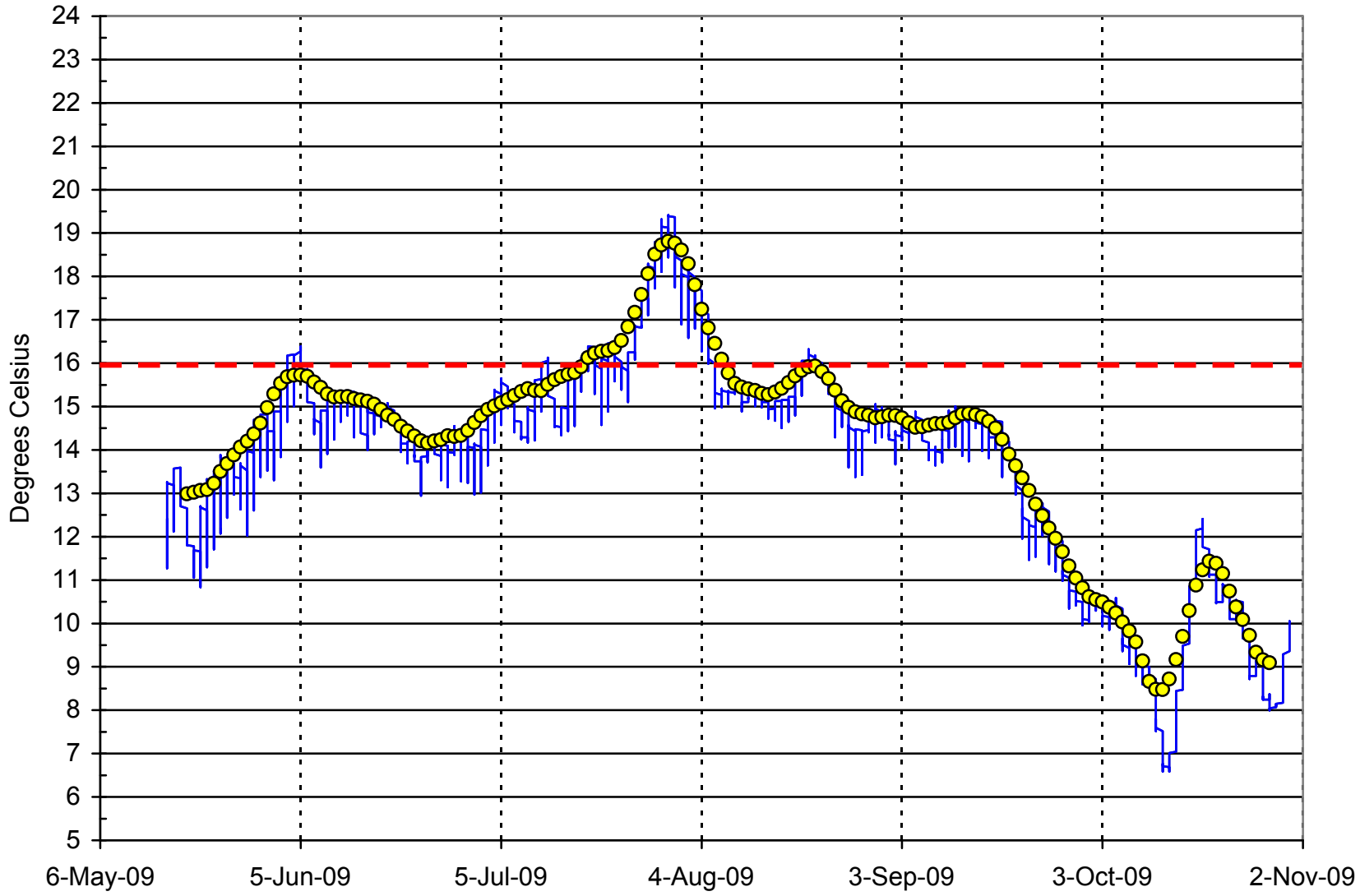

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station ECH/0.5 on East Chimacum Creek in 2009. Dashed line shows the 7-DADMax criteria. ECH0.5_2009.xls 6/3/2011

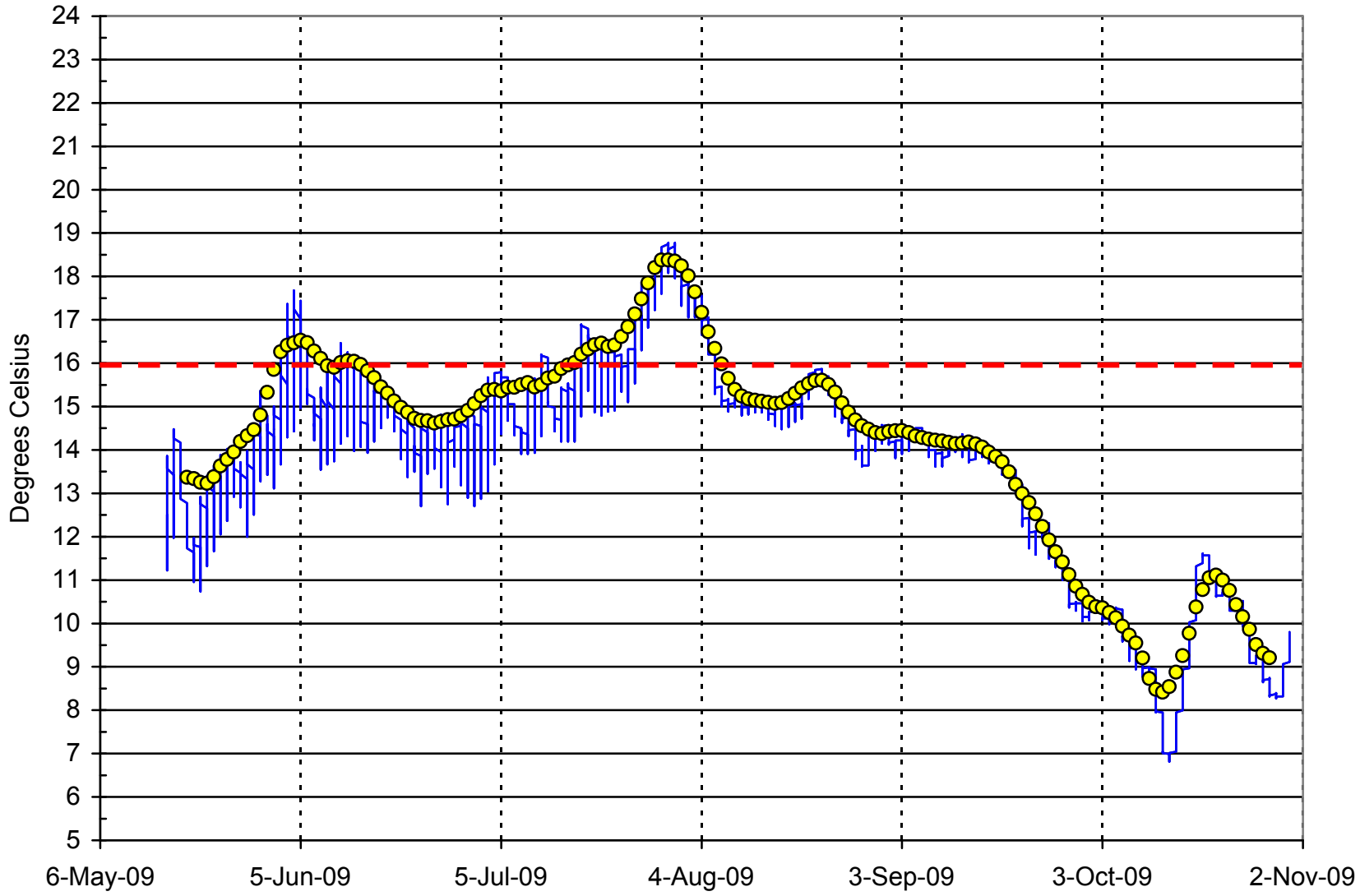

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station ECH/1.0 on East Chimacum Creek in 2009. Dashed line shows the 7-DADMax criteria. ECH1.0_2009.xls 6/3/2011

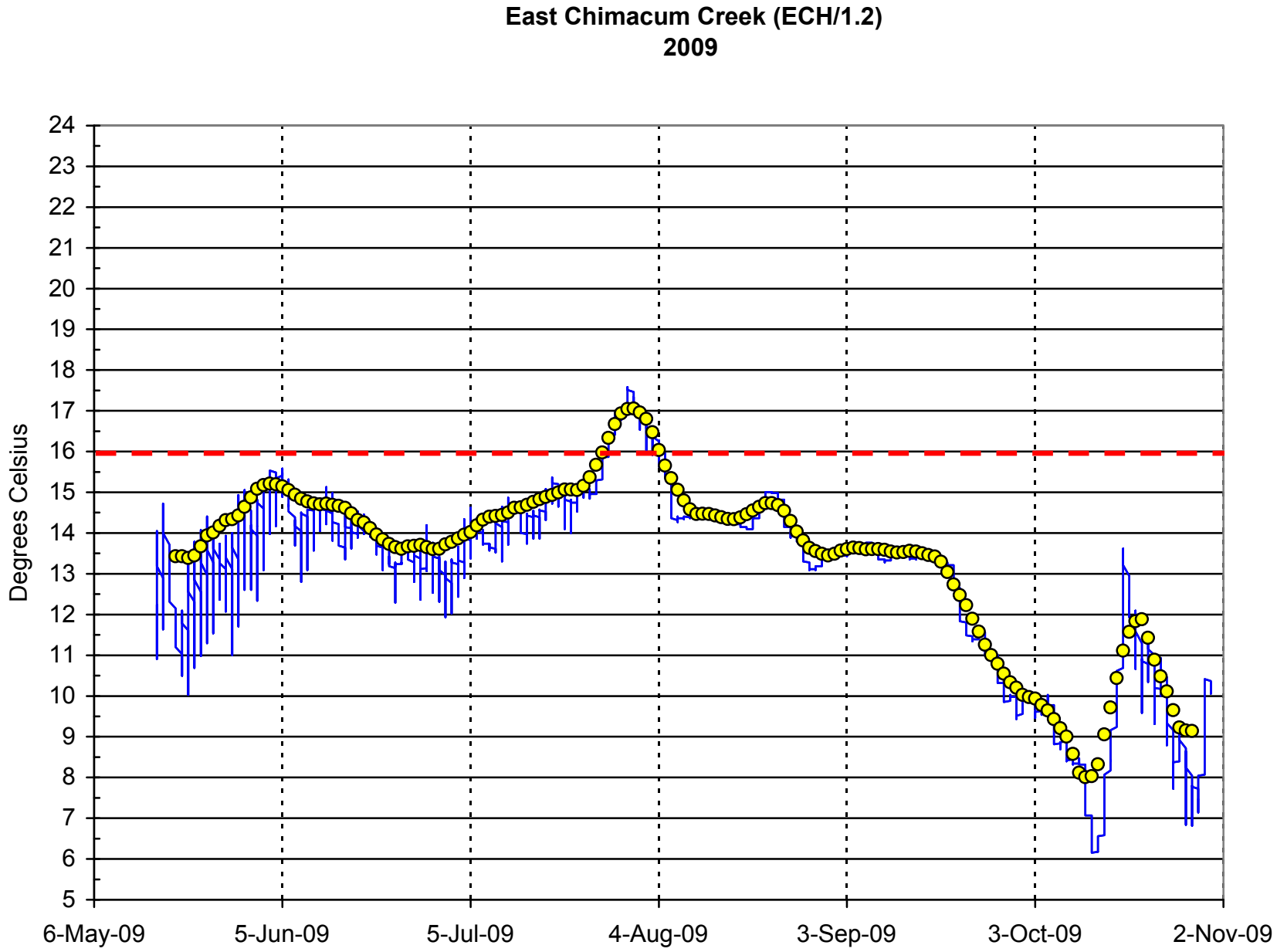

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station ECH/1.2 on East Chimacum Creek in 2009. Dashed line shows the 7-DADMax criteria. ECH1.2_2009.xls 6/3/2011

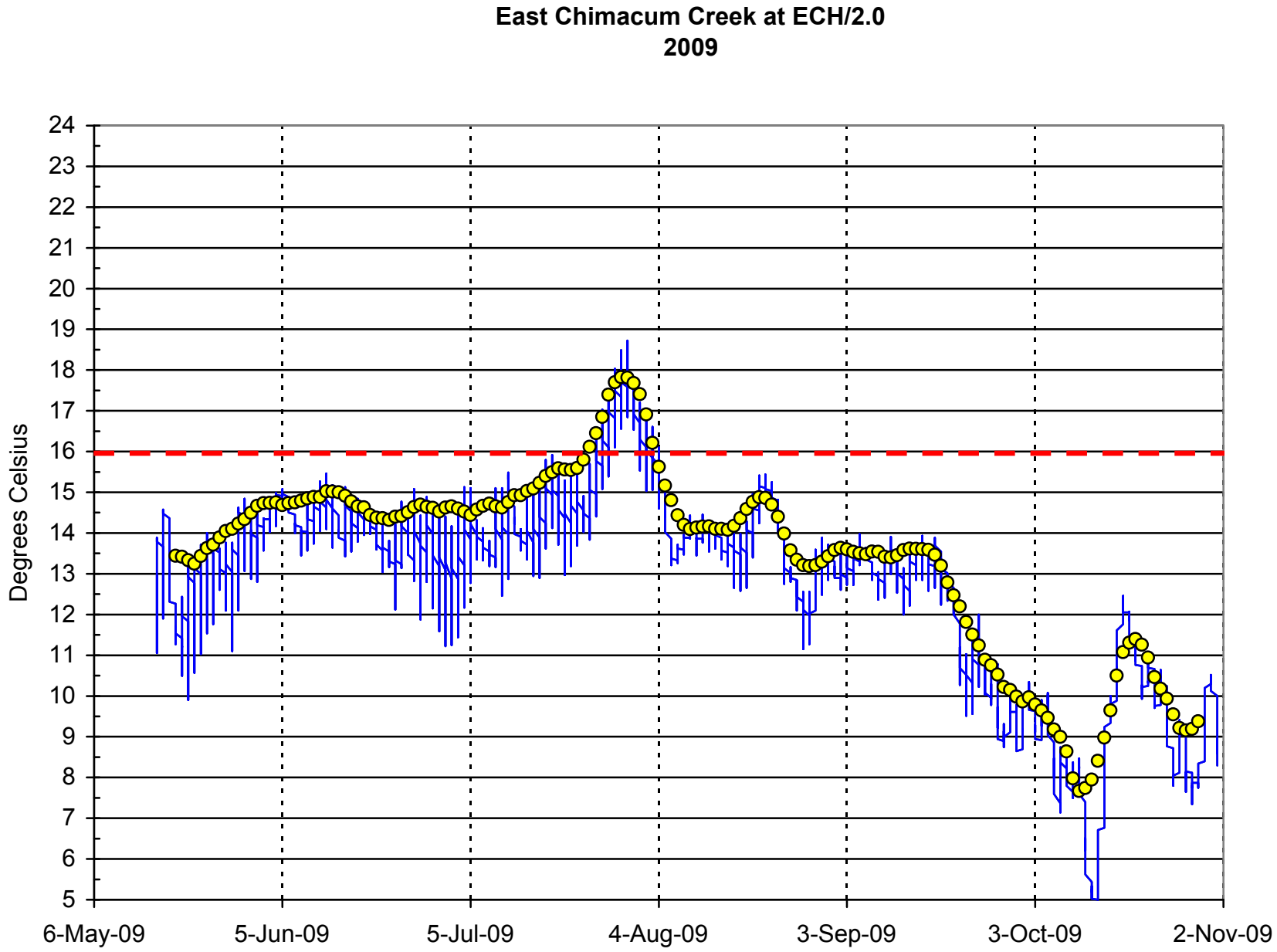

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station ECH/2.0 on East Chimacum Creek in 2009. Dashed line shows the 7-DADMax criteria. ECH2.0_2009.xls 6/3/2011

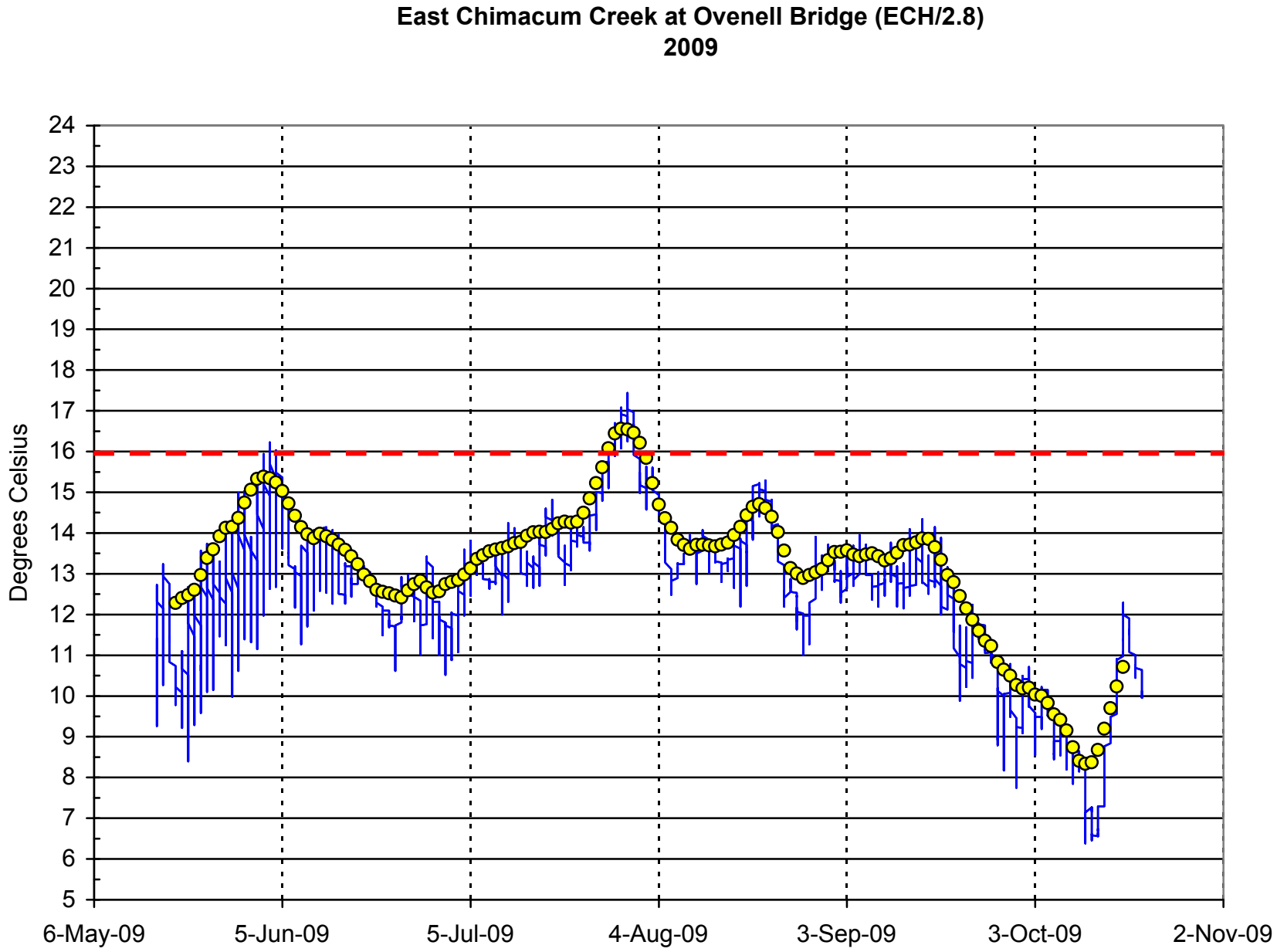

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station ECH/2.8 on East Chimacum Creek in 2009. Dashed line shows the 7-DADMax criteria. ECH2.8_2009.xls 6/3/2011

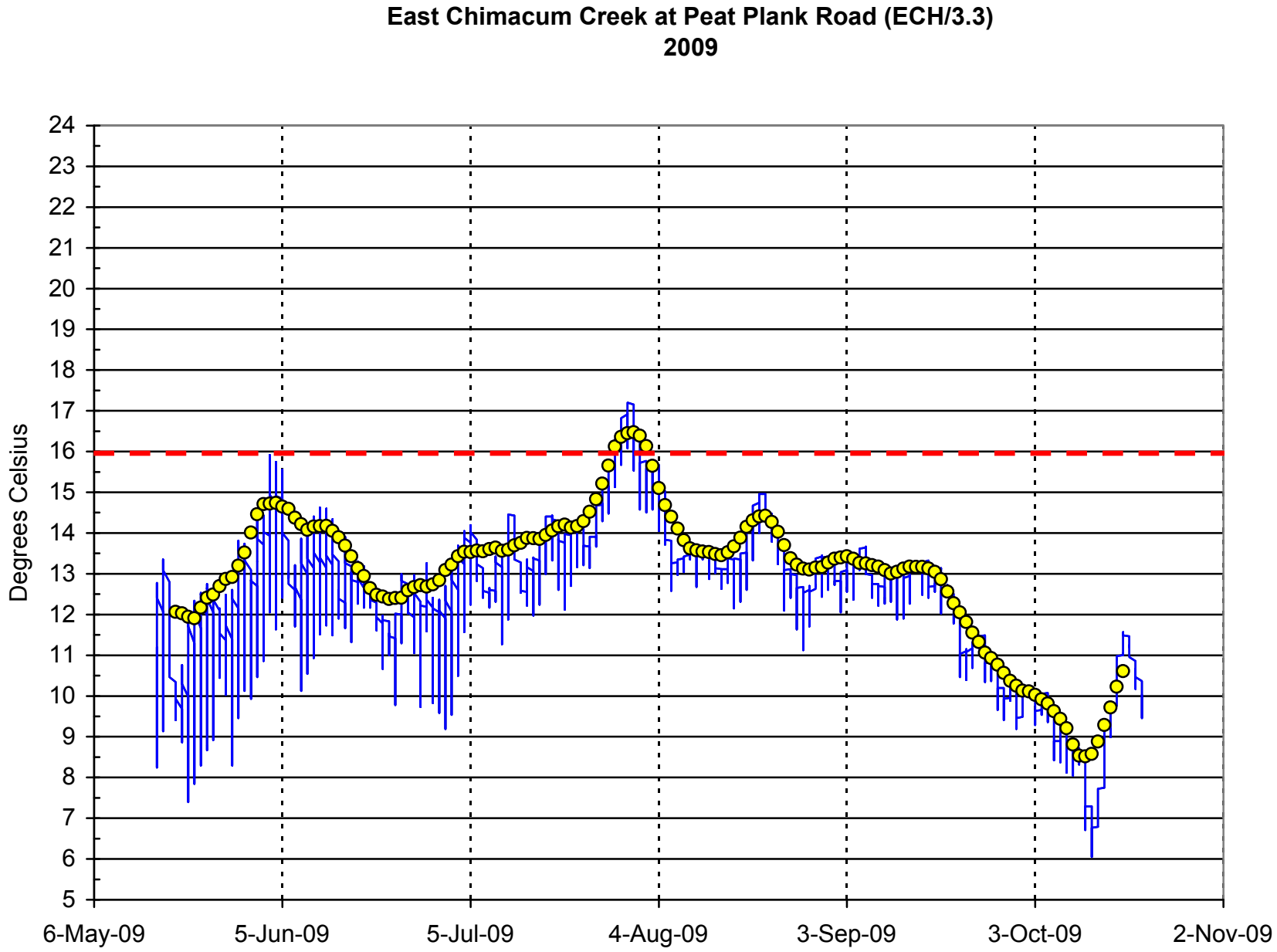

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station ECH/3.3 on East Chimacum Creek in 2009. Dashed line shows the 7-DADMax criteria. ECH3.3_2009.xls 6/3/2011

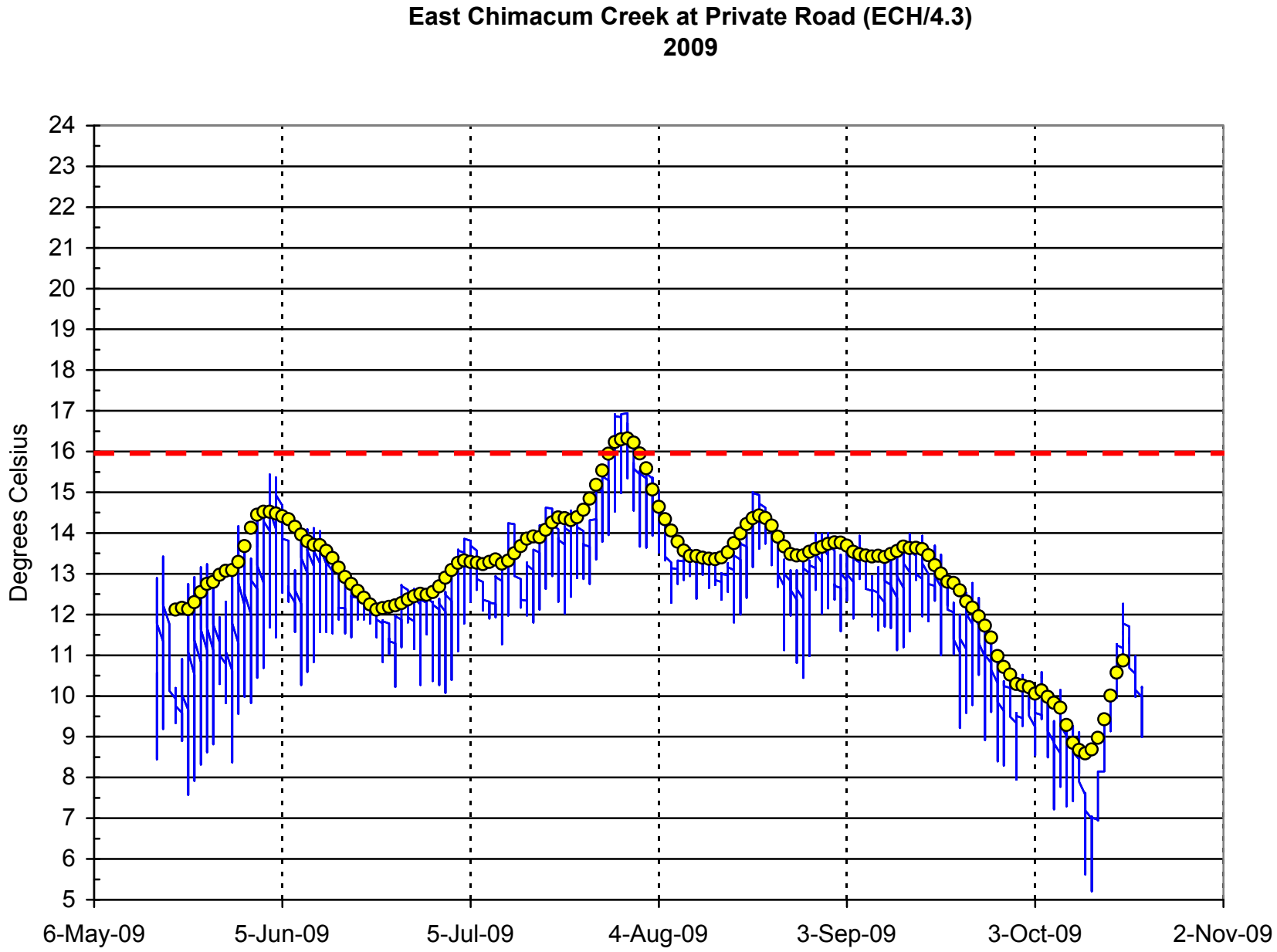

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station ECH/4.3 on East Chimacum Creek in 2009. Dashed line shows the 7-DADMax criteria. ECH4.3_2009.xls 6/3/2011

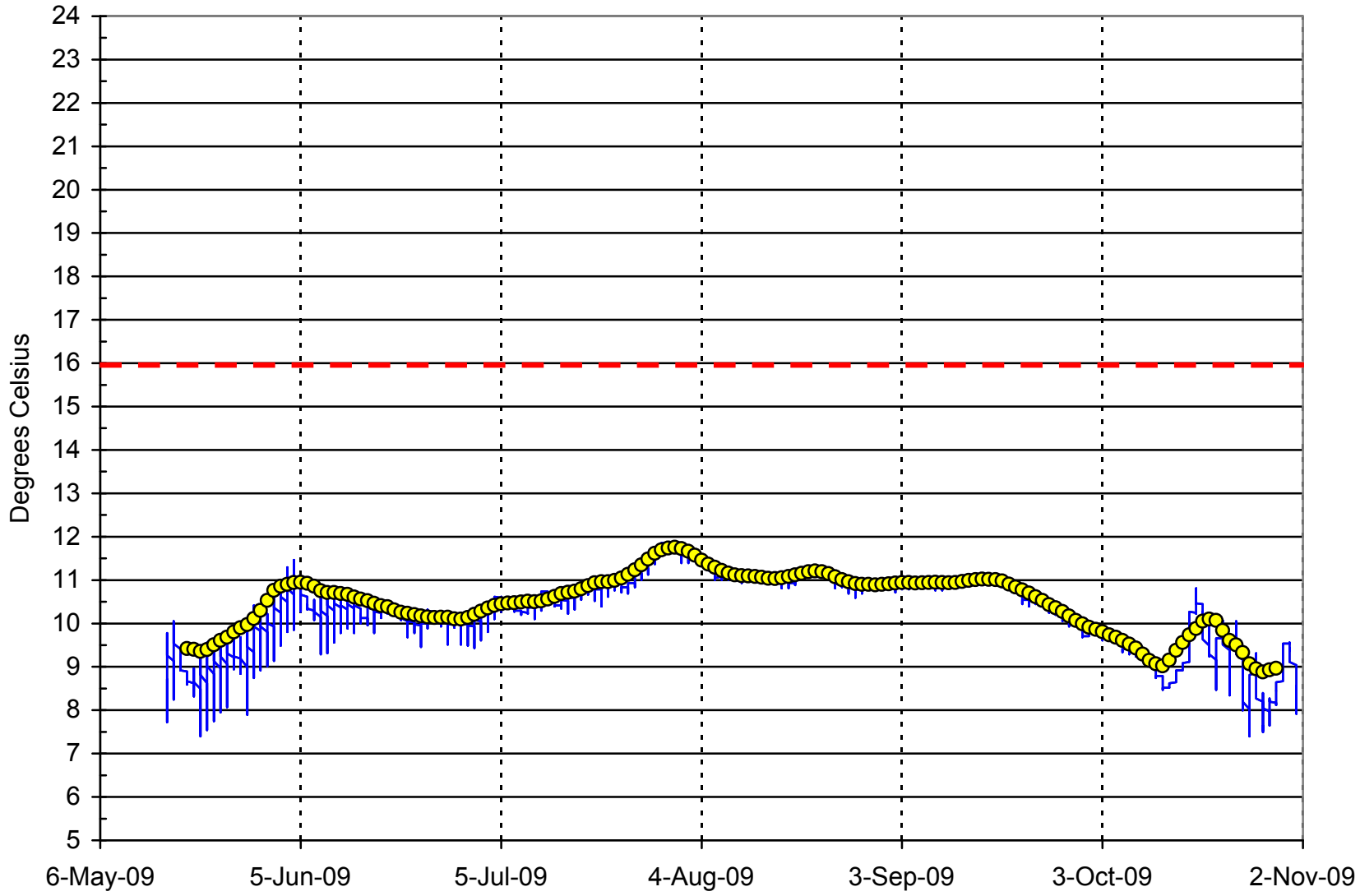

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station ECH/5.4 on East Chimacum Creek in 2009. Dashed line shows the 7-DADMax criteria. ECH5.4_2009.xls 6/3/2011

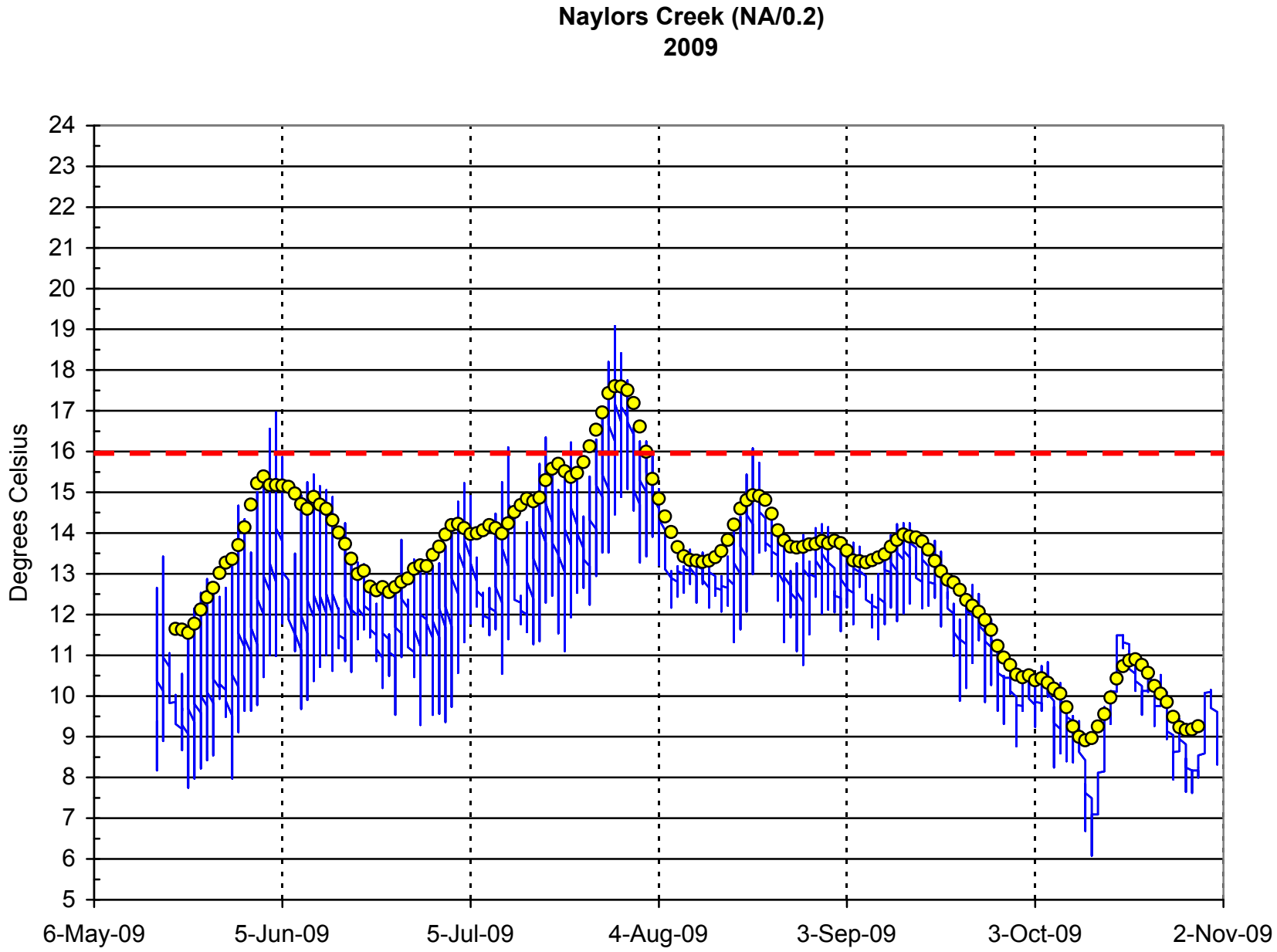

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station NA/0.2 on Naylors Creek in 2009. Dashed line shows the 7-DADMax criteria. NA0.2_2009.xls 6/3/2011

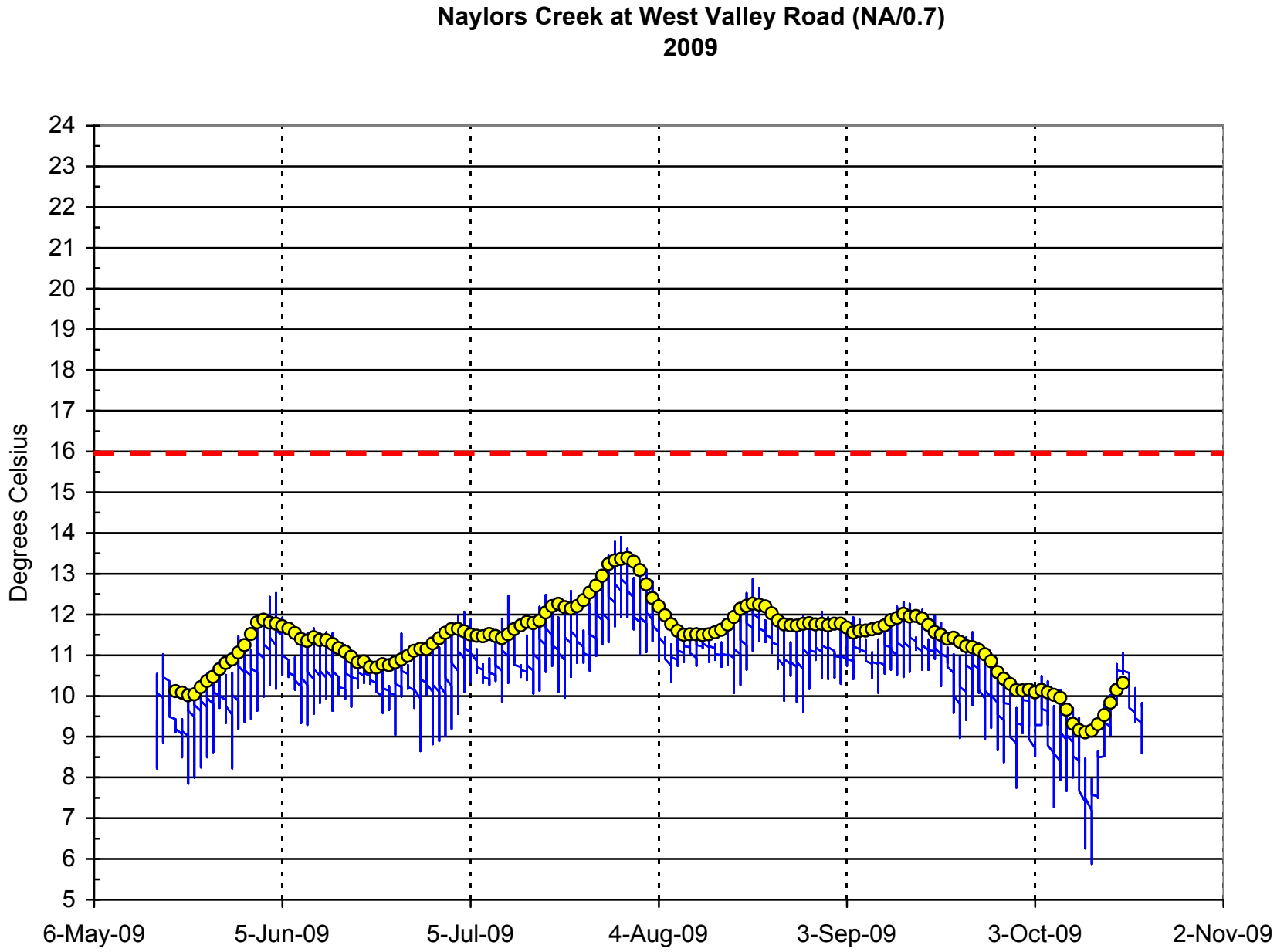

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station NA/0.7 on Naylors Creek in 2009. Dashed line shows the 7-DADMax criteria. NA0.7_2009.xls 6/3/2011

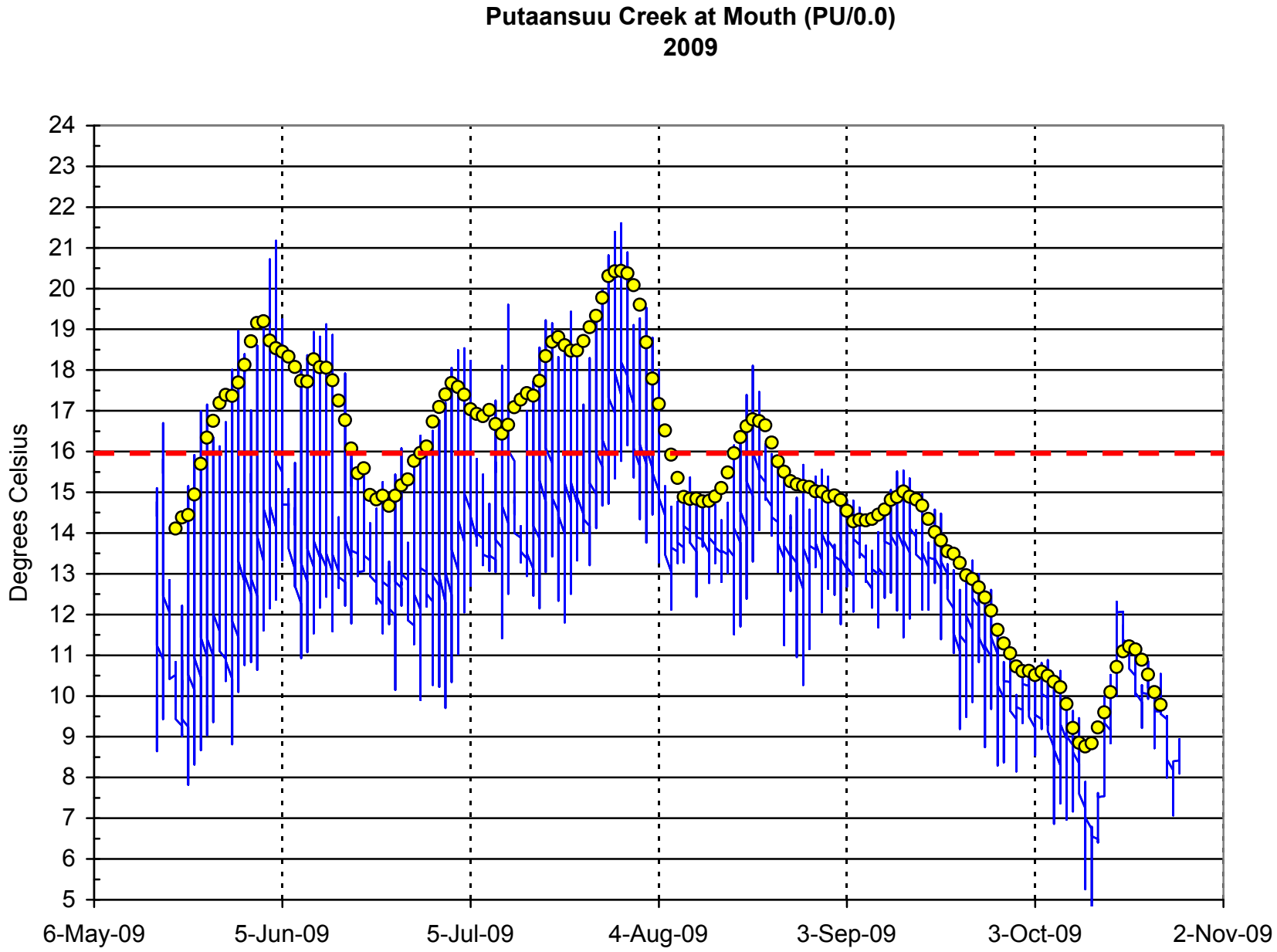

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station PU/0.0 on Putaansuu Creek in 2009. Dashed line shows the 7-DADMax criteria. PU0.0_2009.xls 6/3/2011

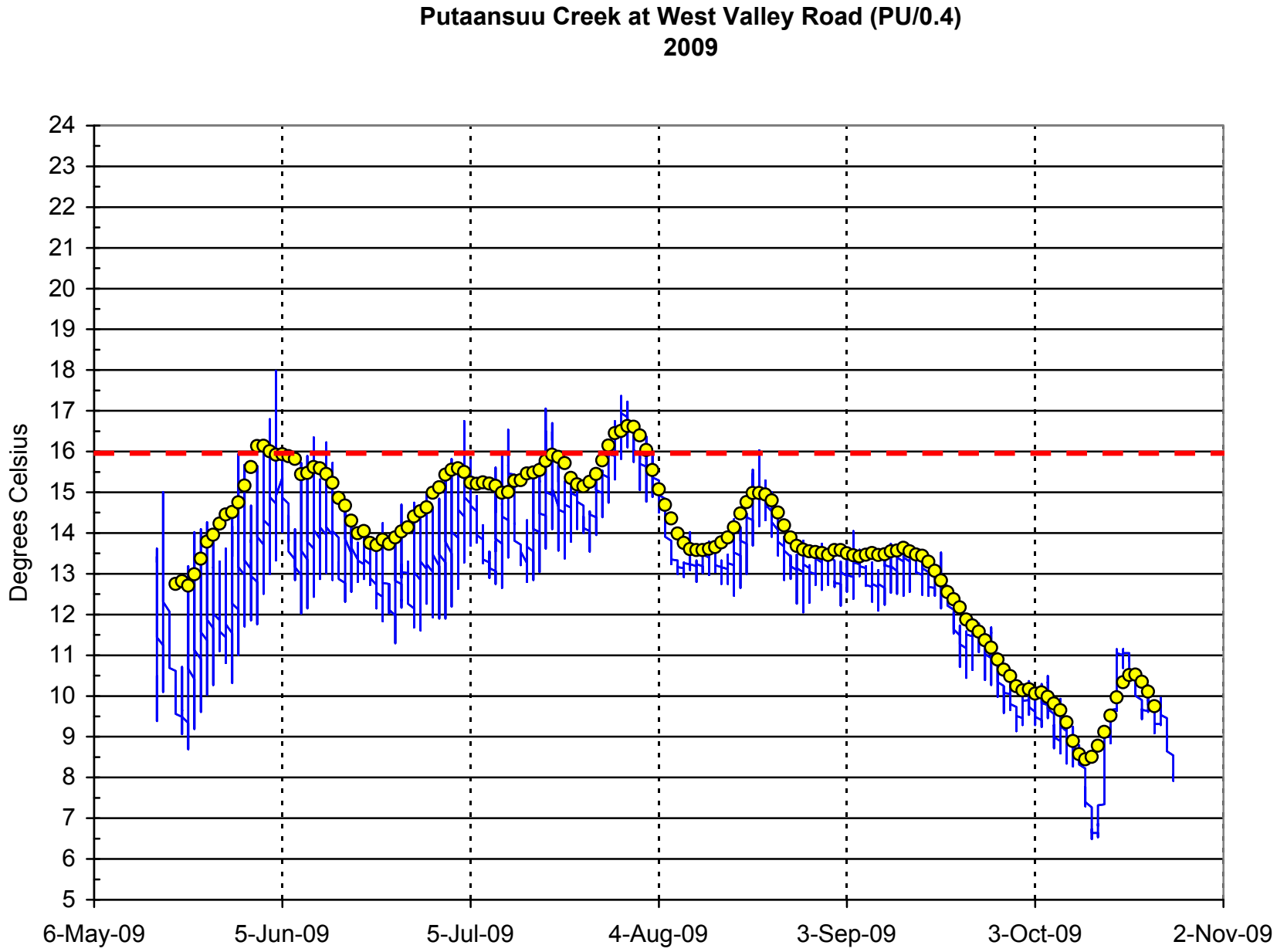

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station PU/0.4 on Putaansuu Creek in 2009. Dashed line shows the 7-DADMax criteria. PU0.4_2009.xls 6/3/2011

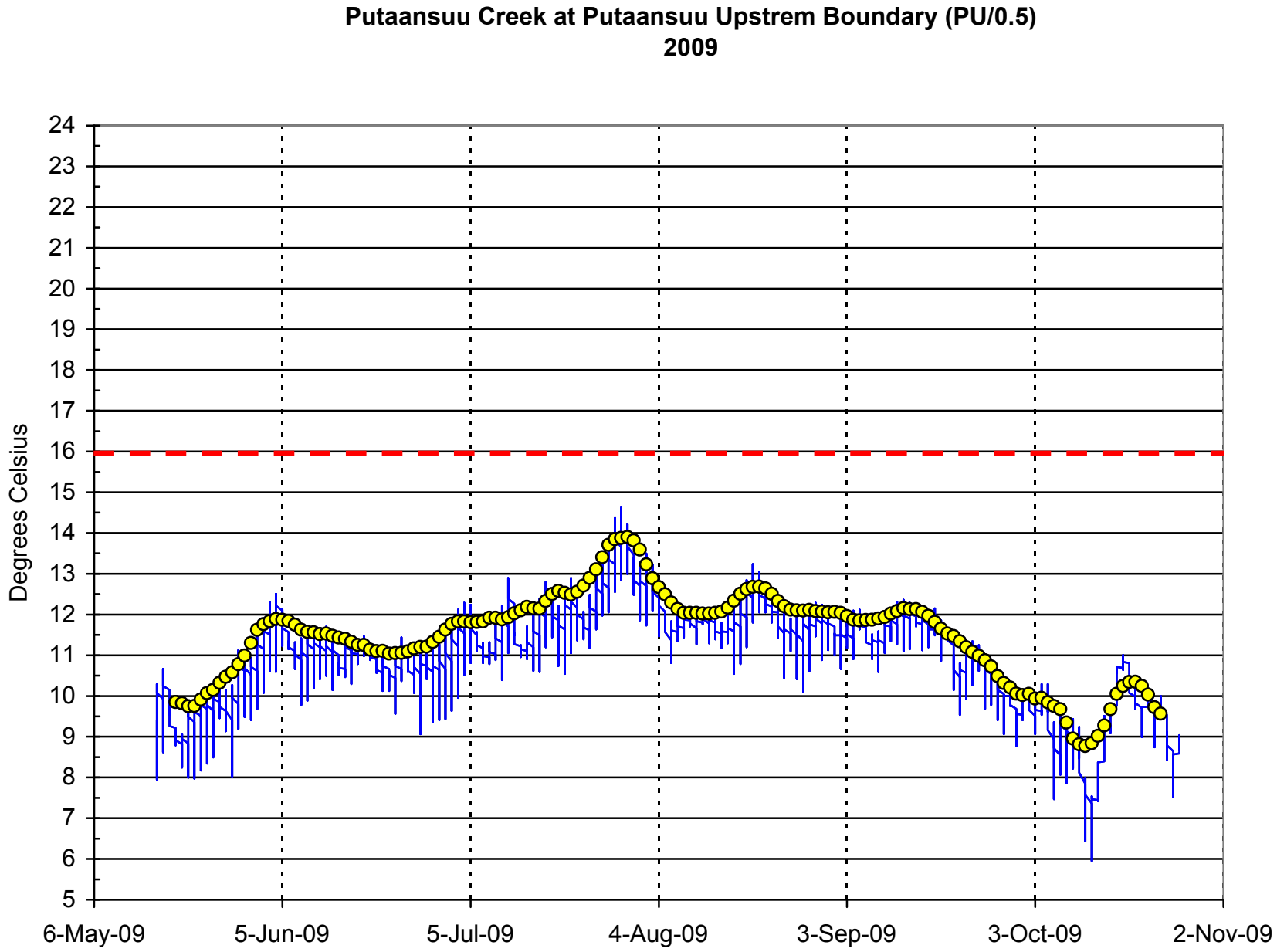

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station PU/0.5 on Putaansuu Creek in 2009. Dashed line shows the 7-DADMax criteria. PU0.5_2009.xls 6/3/2011

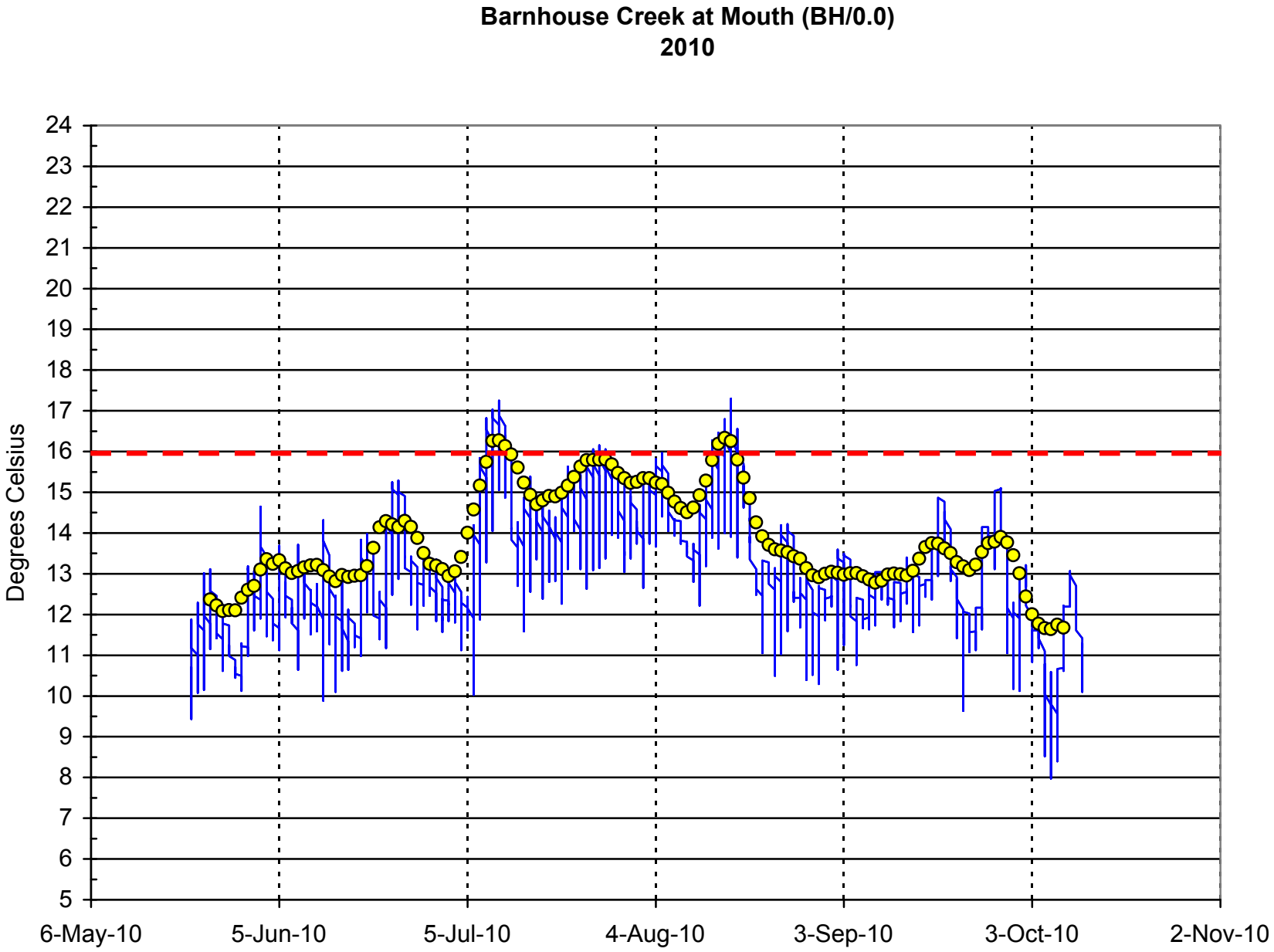

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station BH/0.0 on Barnhouse Creek in 2010. Dashed line shows the 7-DADMax criteria. BH0.0_2010.xls 6/3/2011

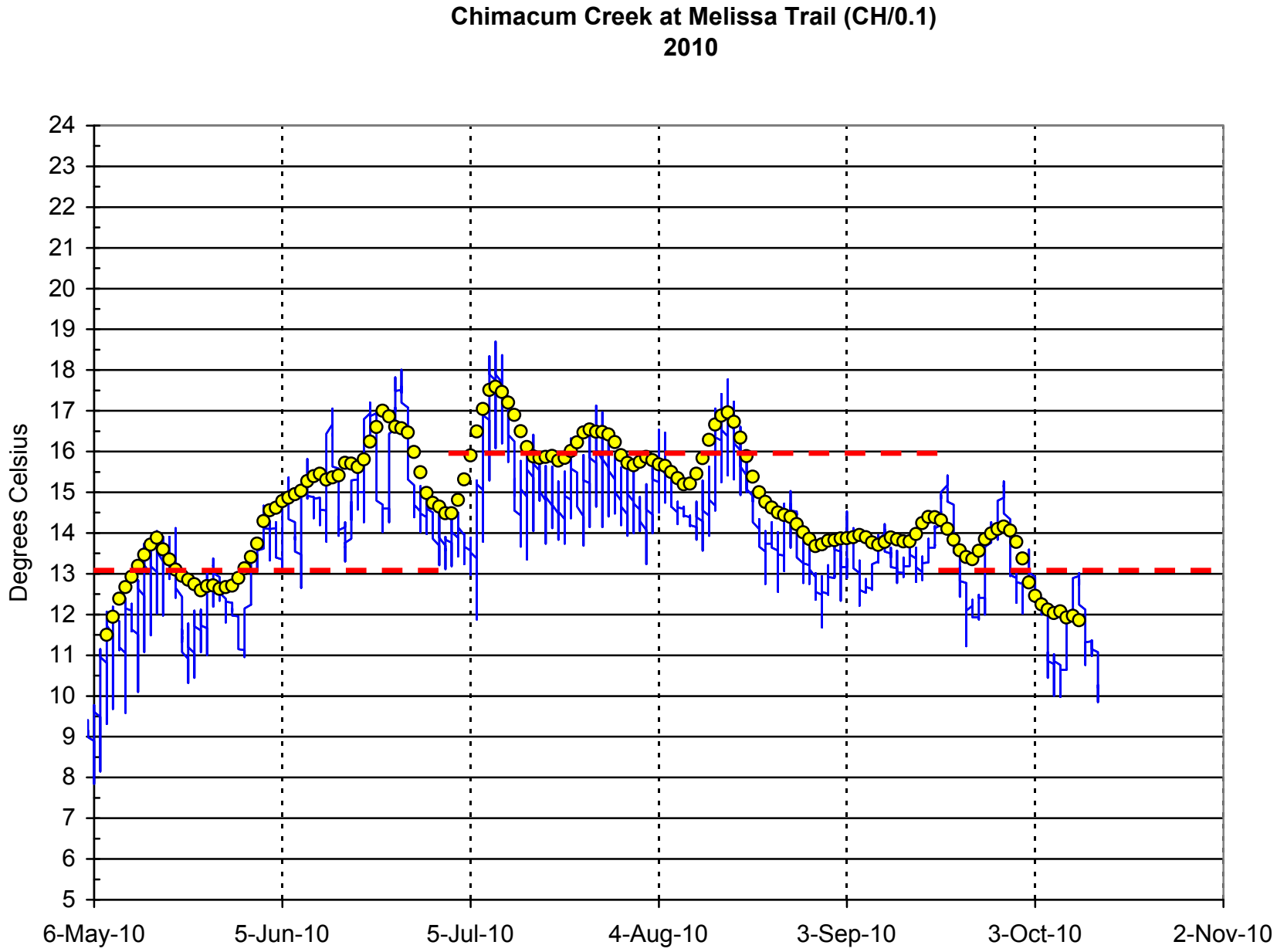

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station CH/0.1 on Chimacum Creek in 2010. Dashed line shows the 7-DADMax criteria. CH0.1_2010.xls 6/3/2011

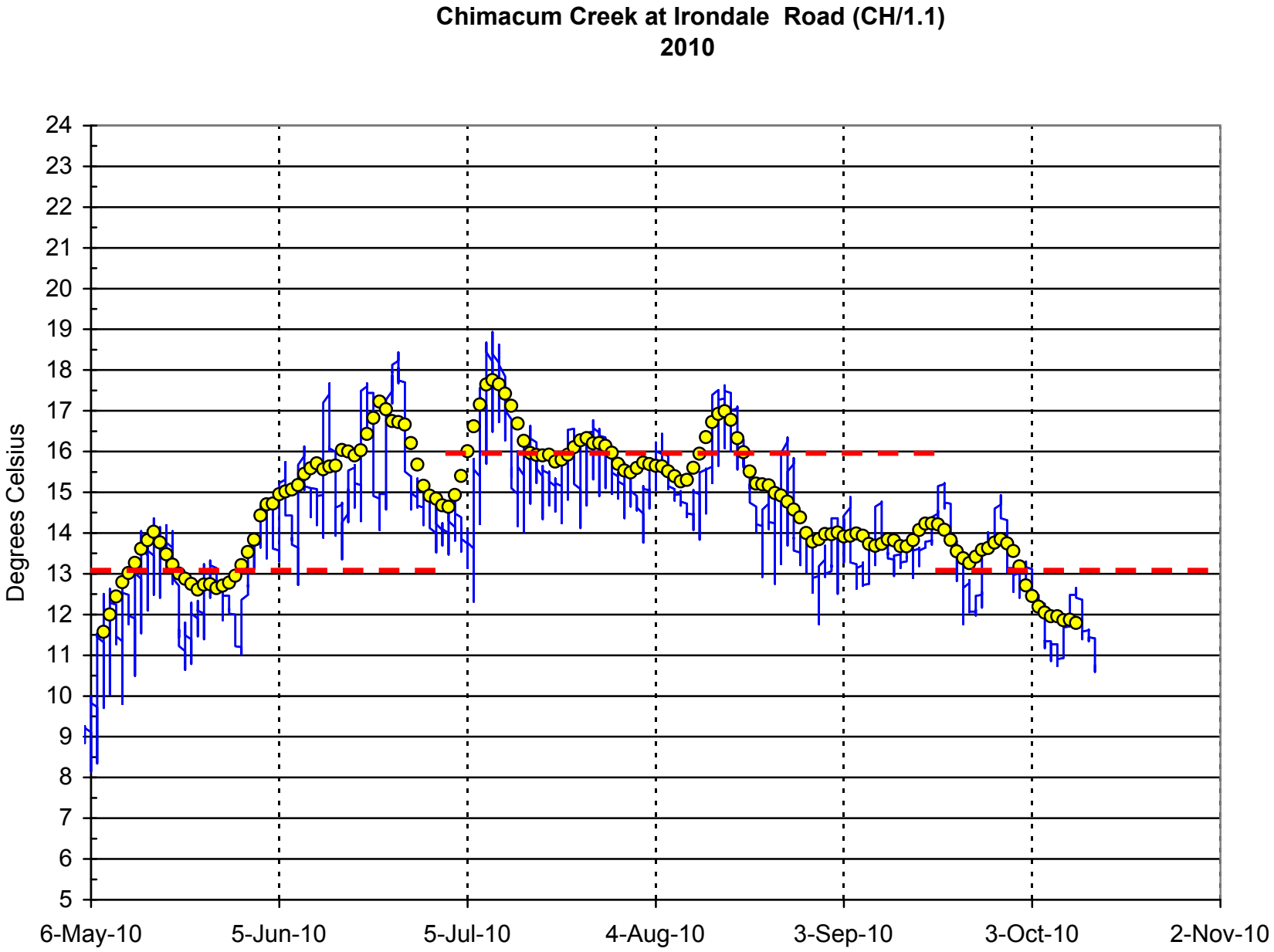

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station CH/1.1 on Chimacum Creek in 2010. Dashed line shows the 7-DADMax criteria. CH1.1_2010.xls 6/3/2011

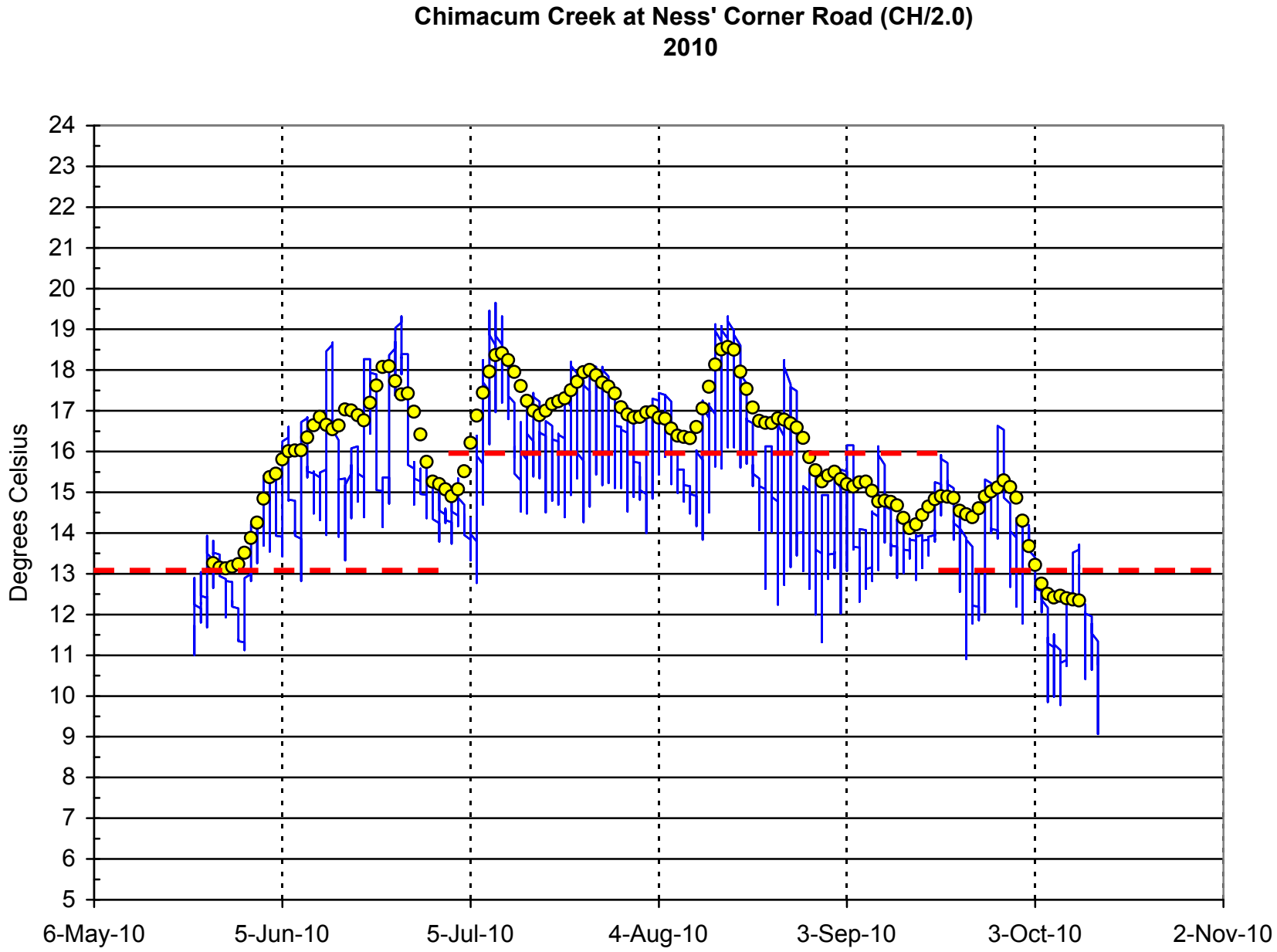

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station CH/2.0 on Chimacum Creek in 2010. Dashed line shows the 7-DADMax criteria. CH2.0_2010.xls 6/3/2011

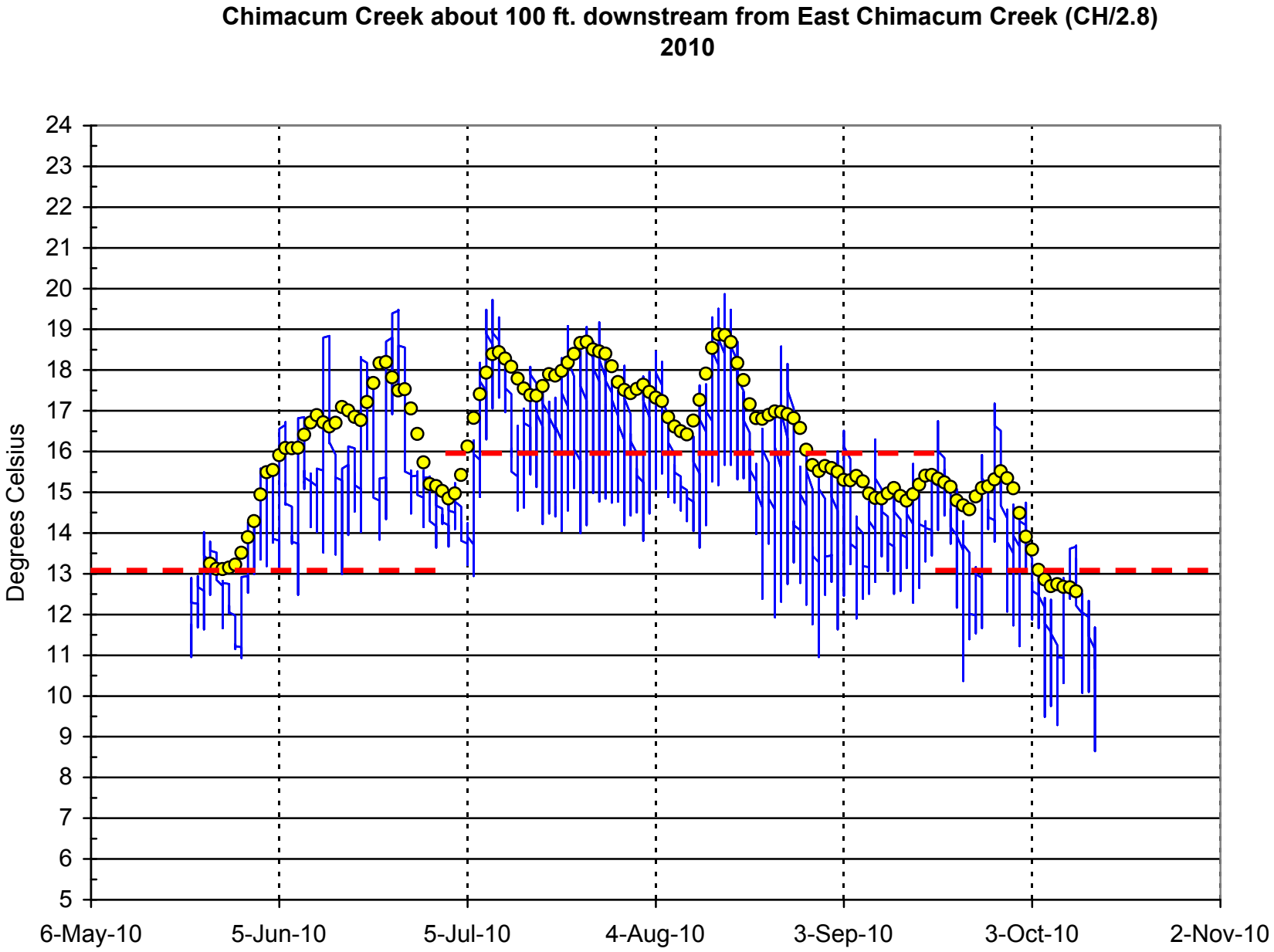

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station CH/2.8 on Chimacum Creek in 2010. Dashed line shows the 7-DADMax criteria. CH2.8_2010.xls 6/3/2011

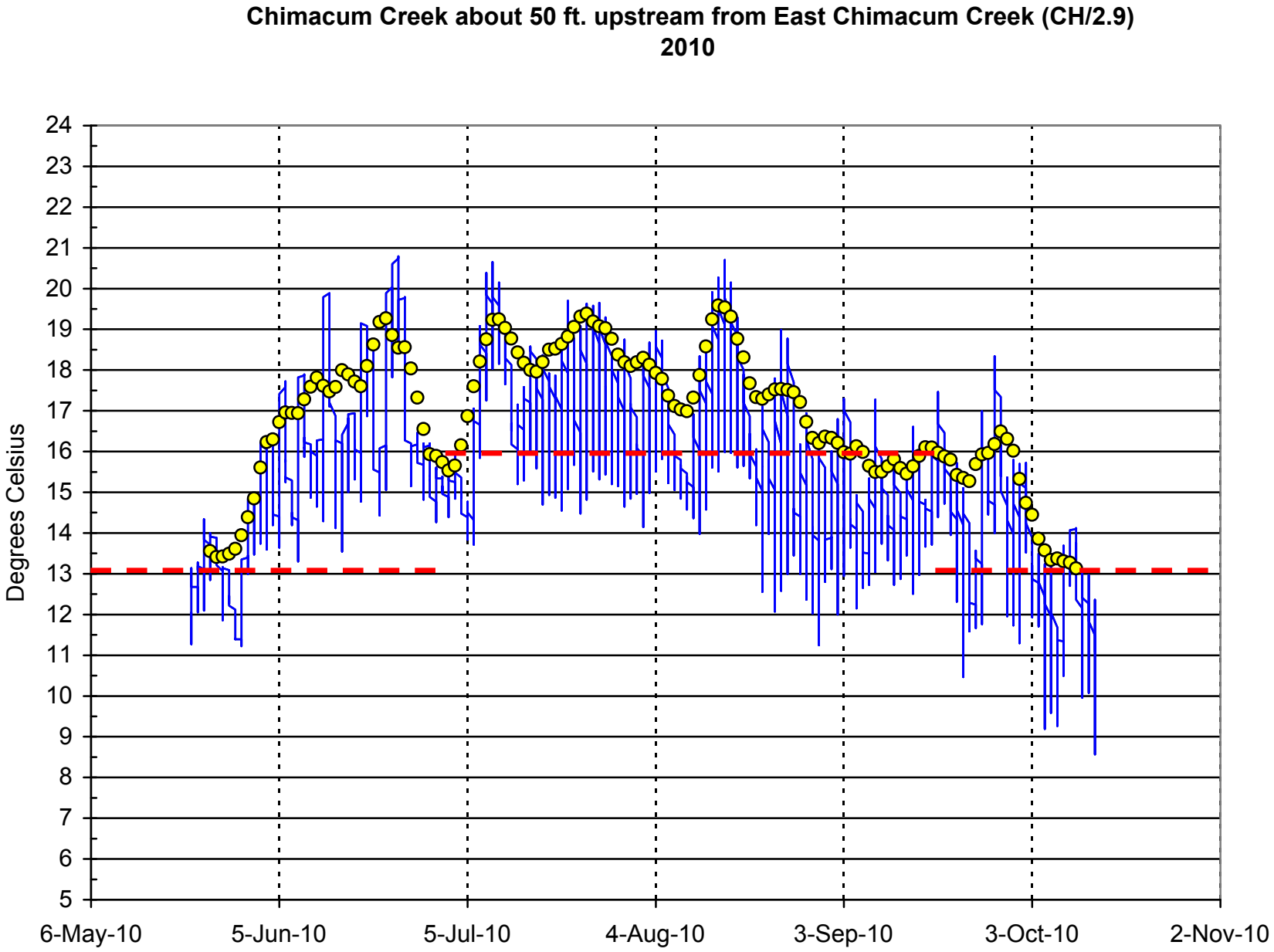

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station CH/2.9 on Chimacum Creek in 2010. Dashed line shows the 7-DADMax criteria. CH2.9_2010.xls 6/3/2011

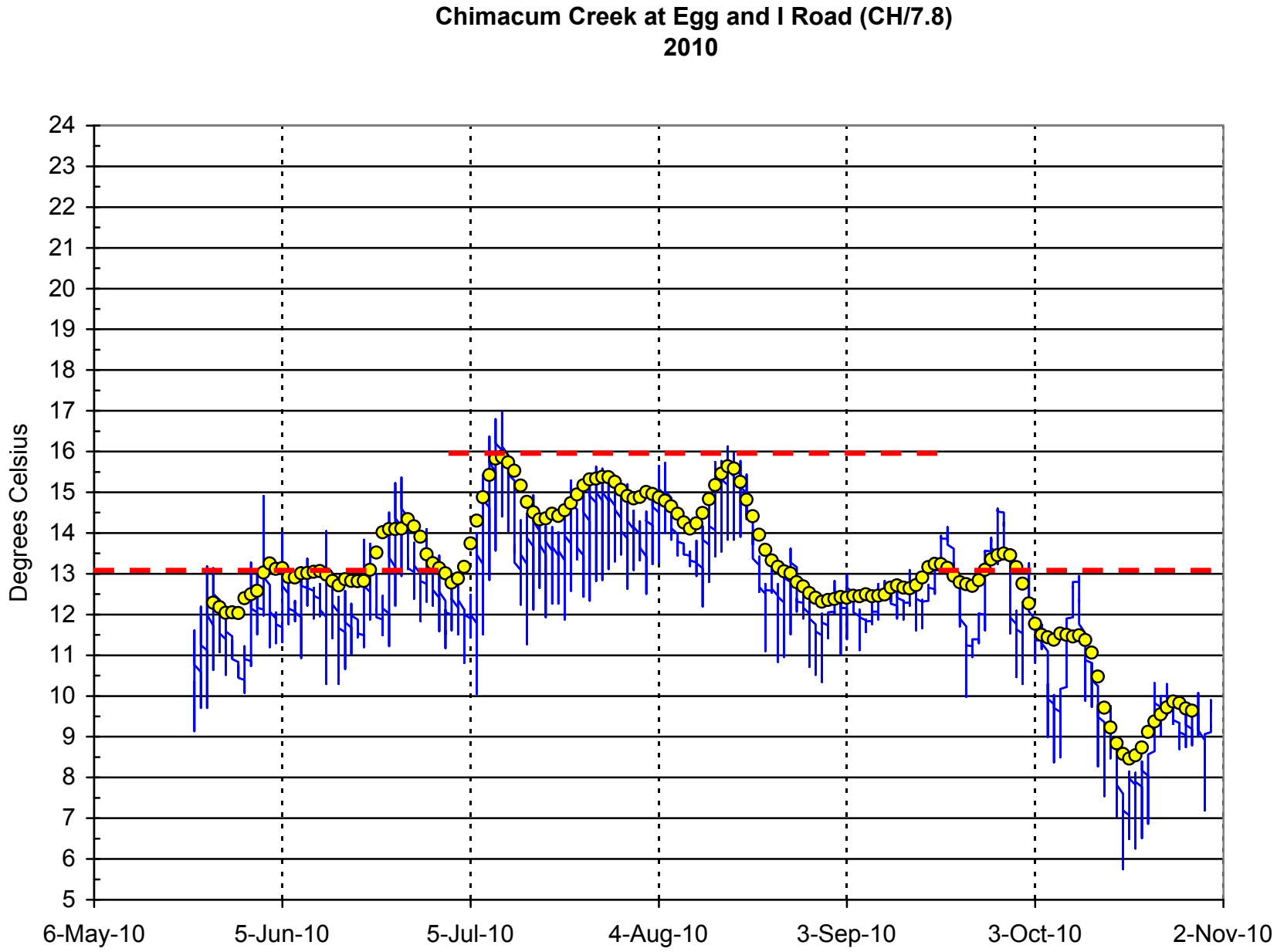

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station CH/7.8 on Chimacum Creek in 2010. Dashed line shows the 7-DADMax criteria. CH7.8_2010.xls 6/3/2011

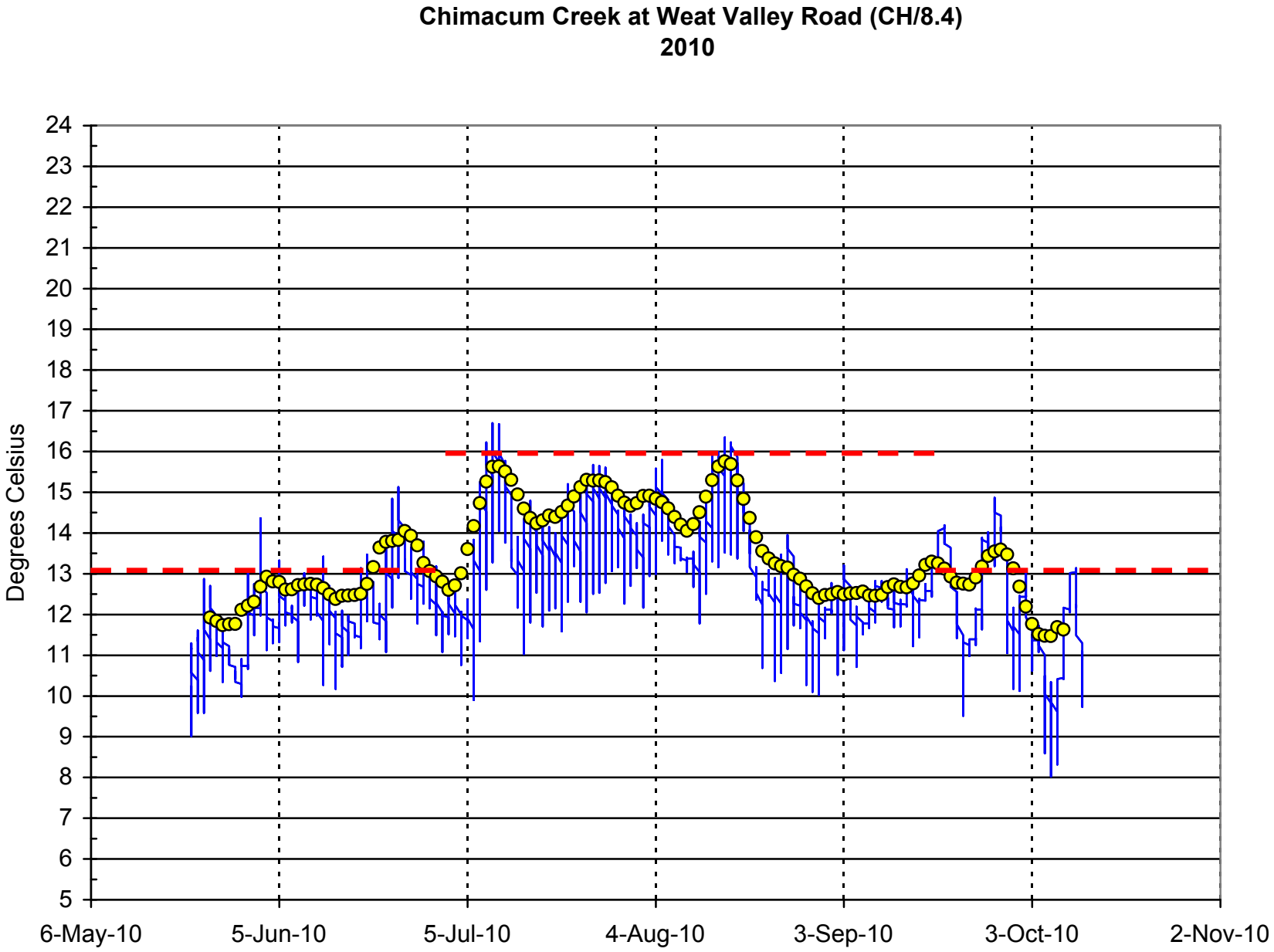

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station CH/8.4 on Chimacum Creek in 2010. Dashed line shows the 7-DADMax criteria. CH8.4_2010.xls 6/3/2011

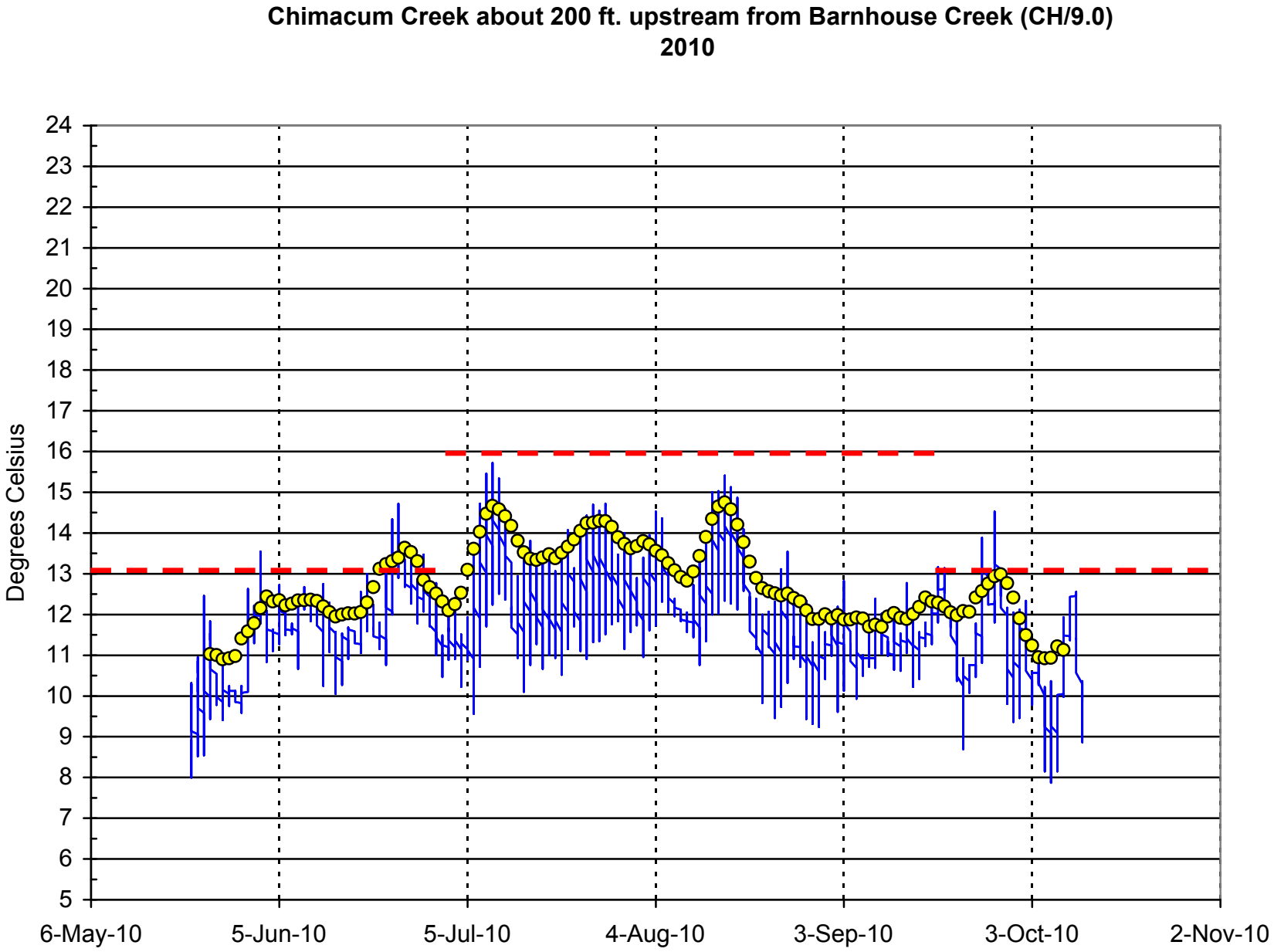

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station CH/9.0 on Chimacum Creek in 2010. Dashed line shows the 7-DADMax criteria. CH9.0_2010.xls 6/3/2011

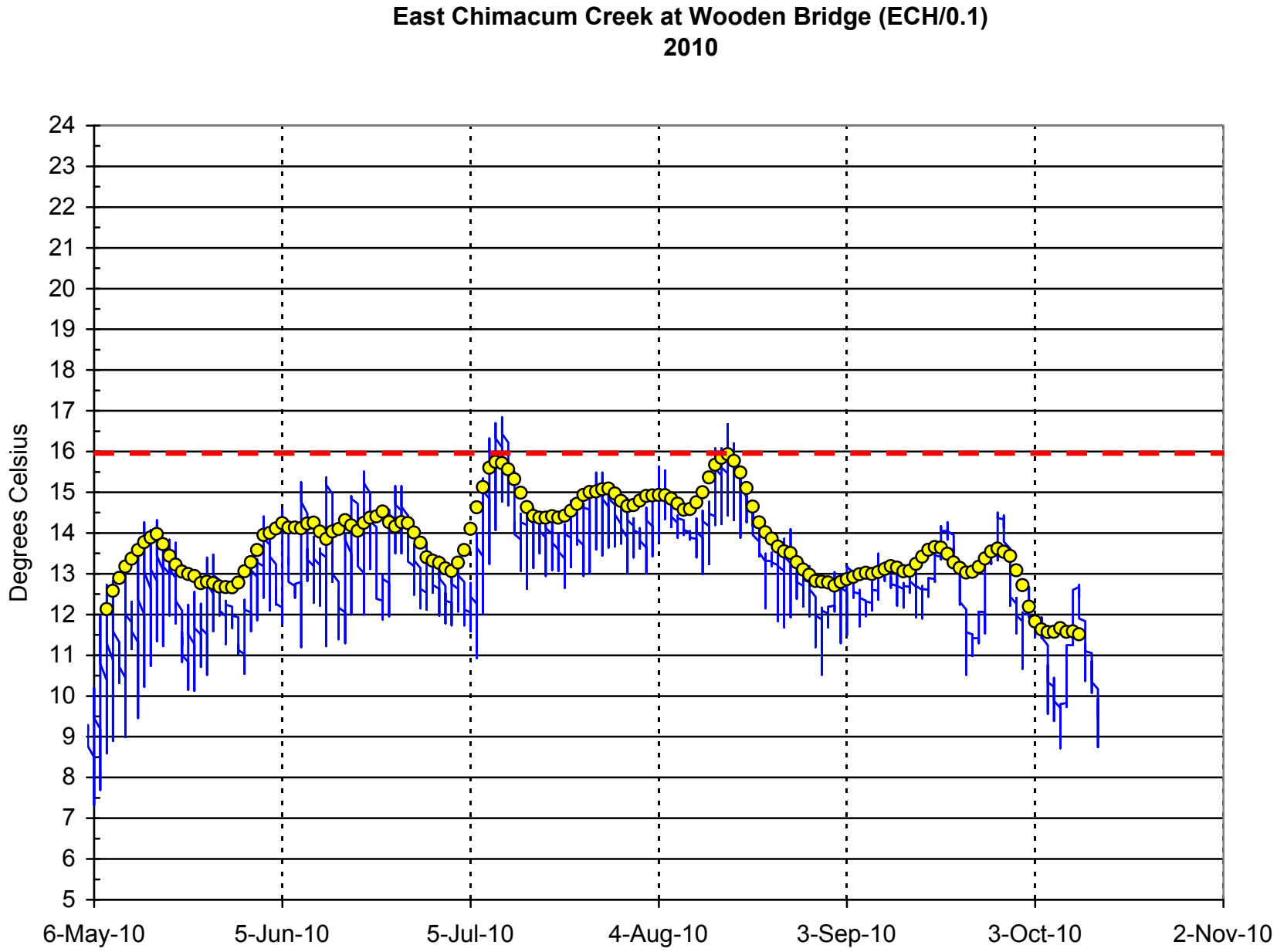

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station ECH/0.1 on East Chimacum Creek in 2010. Dashed line shows the 7-DADMax criteria. ECH0.1_2010.xls 6/3/2011

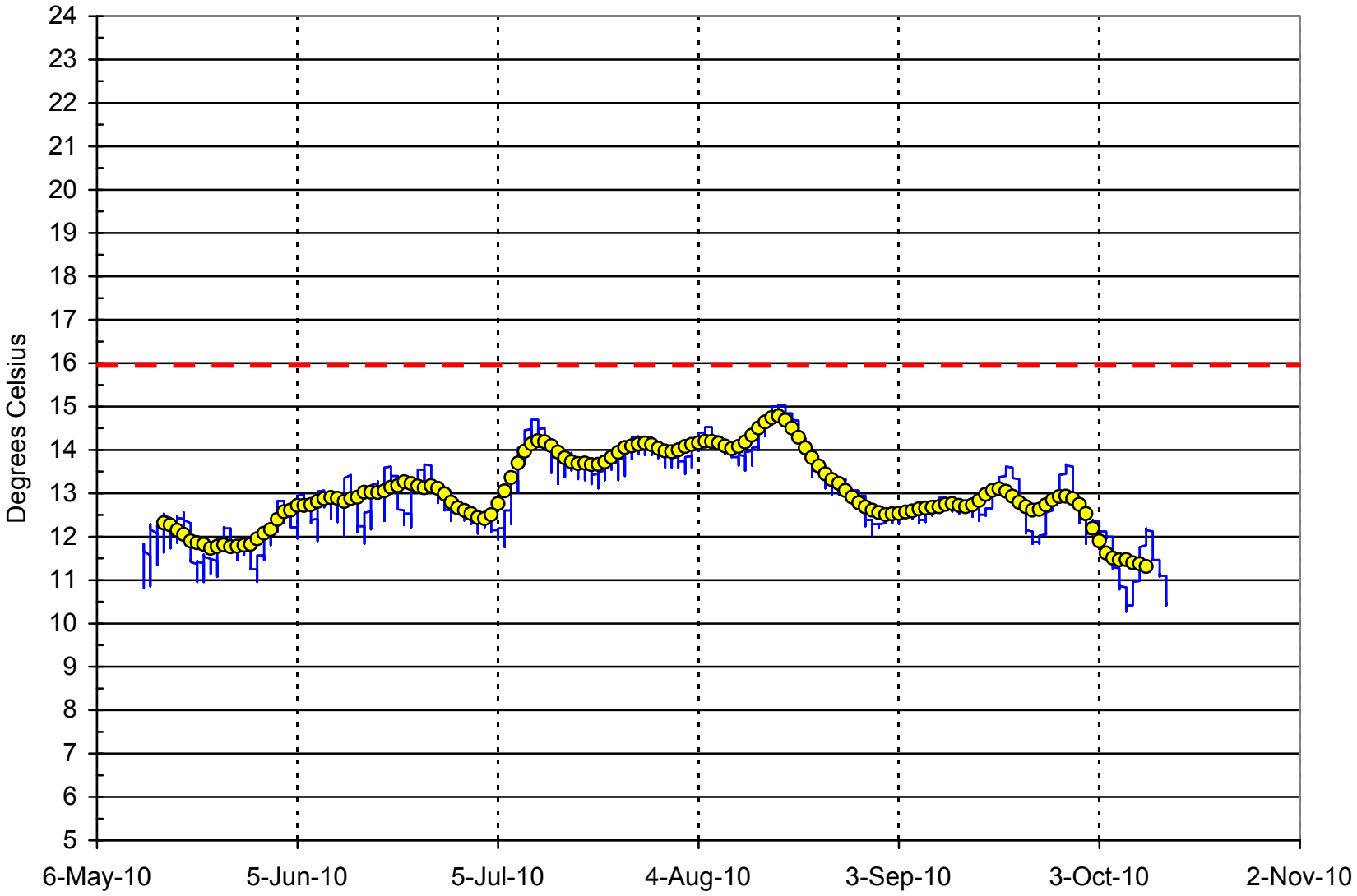

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station ECH/0.5 on East Chimacum Creek in 2010. Dashed line shows the 7-DADMax criteria. ECH0.5_2010.xls 6/3/2011

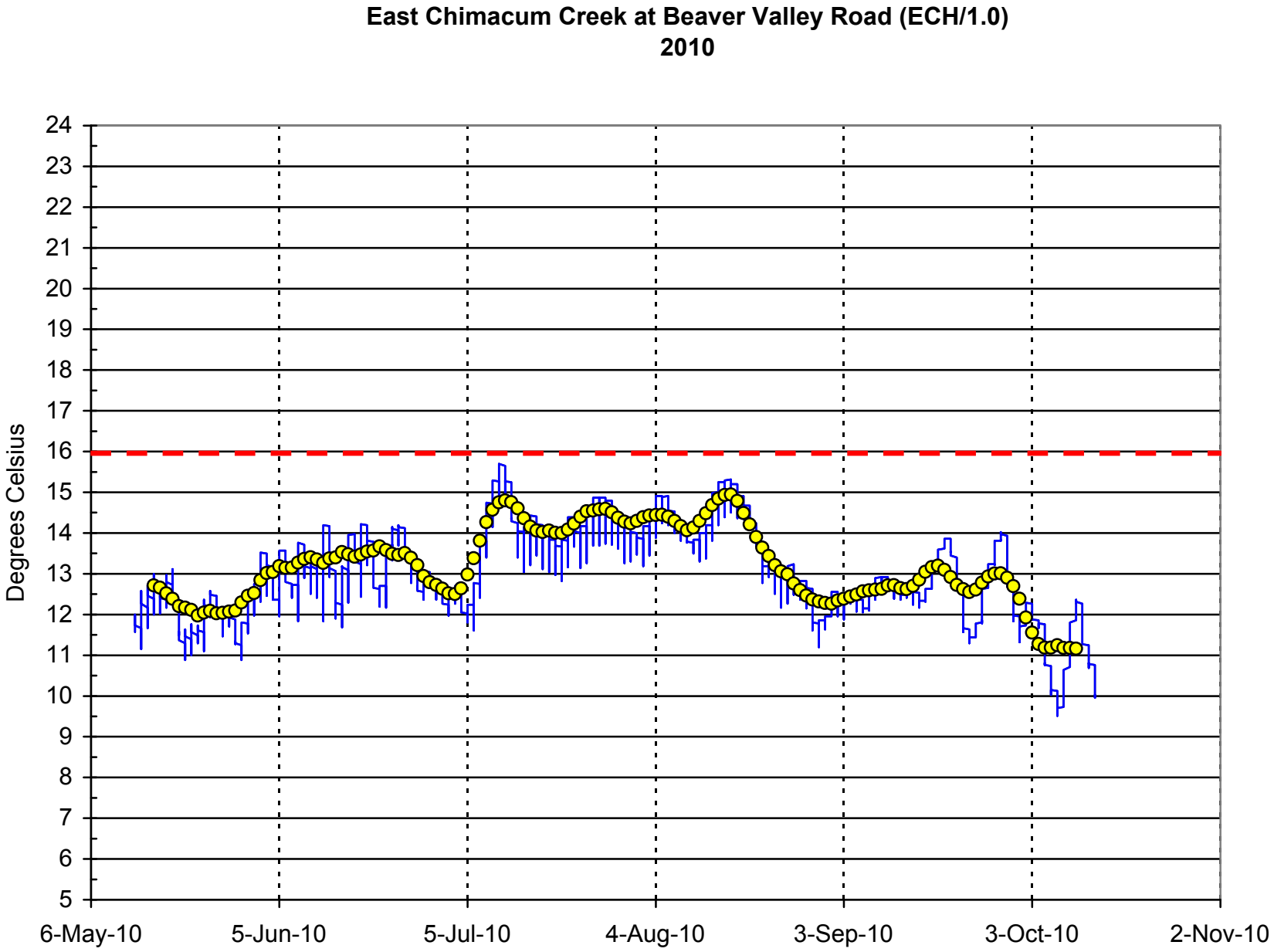

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station ECH/1.0 on East Chimacum Creek in 2010. Dashed line shows the 7-DADMax criteria. ECH1.0_2010.xls 6/3/2011

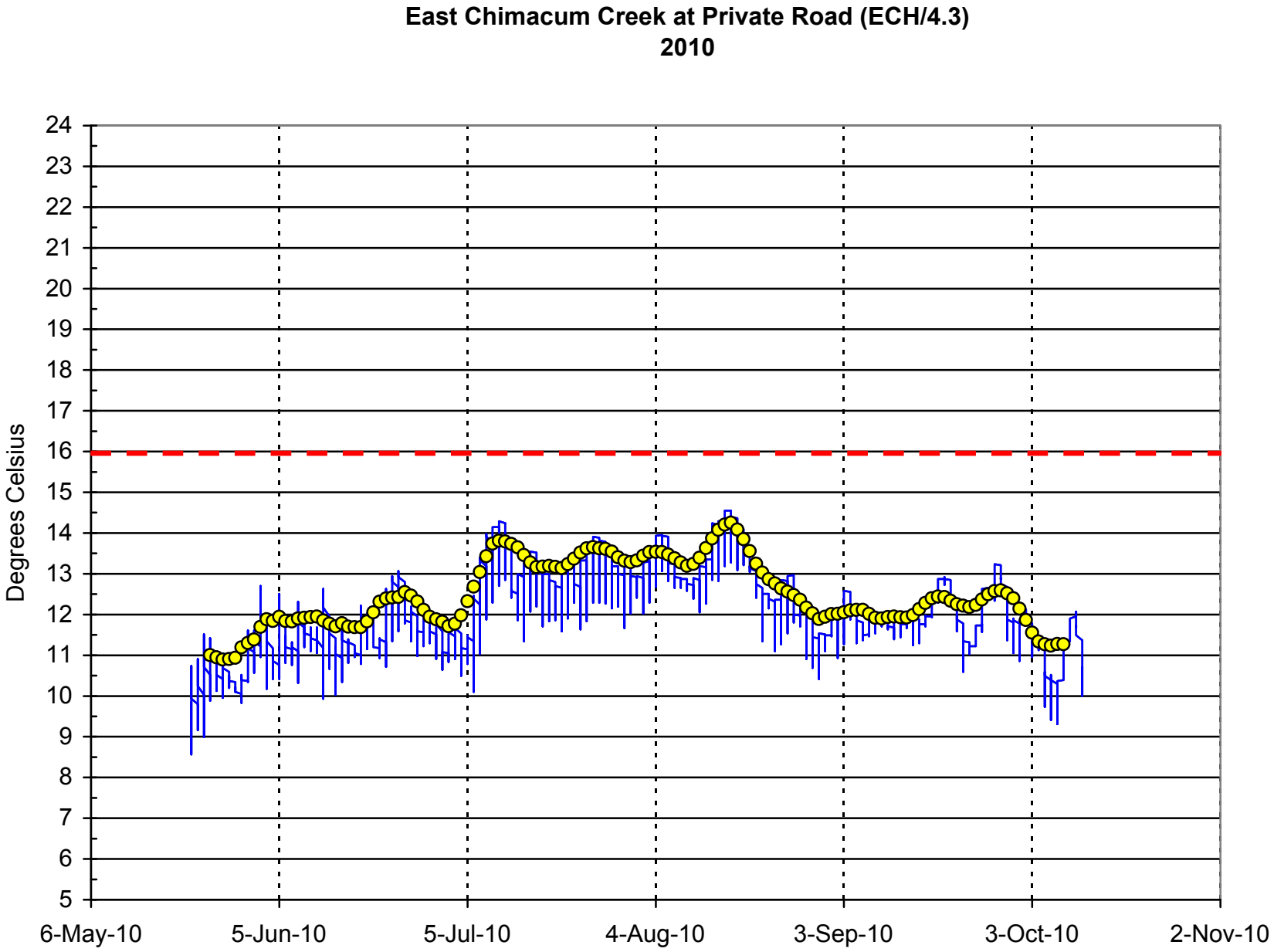

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station ECH/4.3 on East Chimacum Creek in 2010. Dashed line shows the 7-DADMax criteria. ECH4.3_2010.xls 6/3/2011

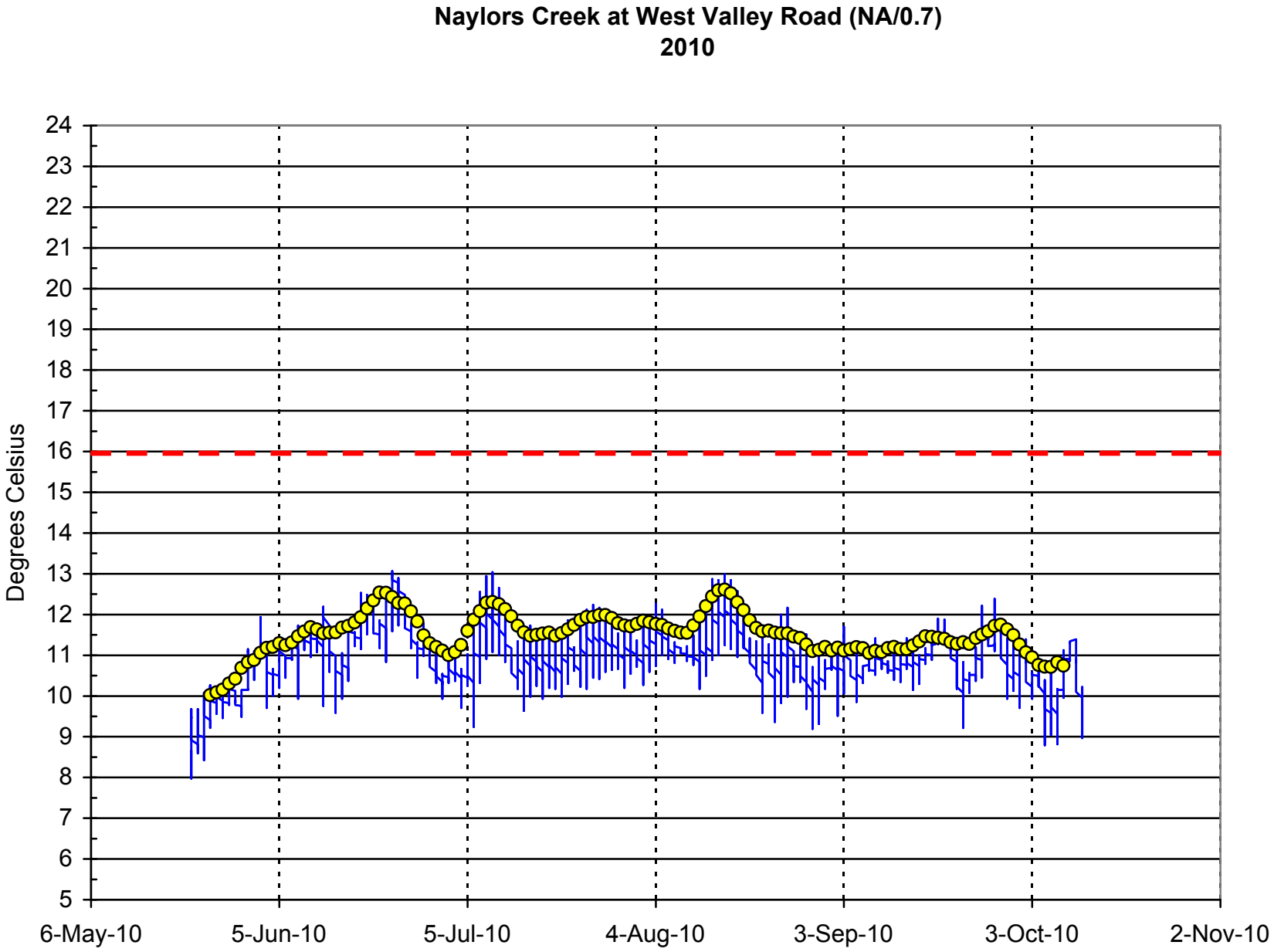

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station NA/0.7 on Naylors Creek in 2010. Dashed line shows the 7-DADMax criteria. NA0.7_2010.xls 6/3/2011

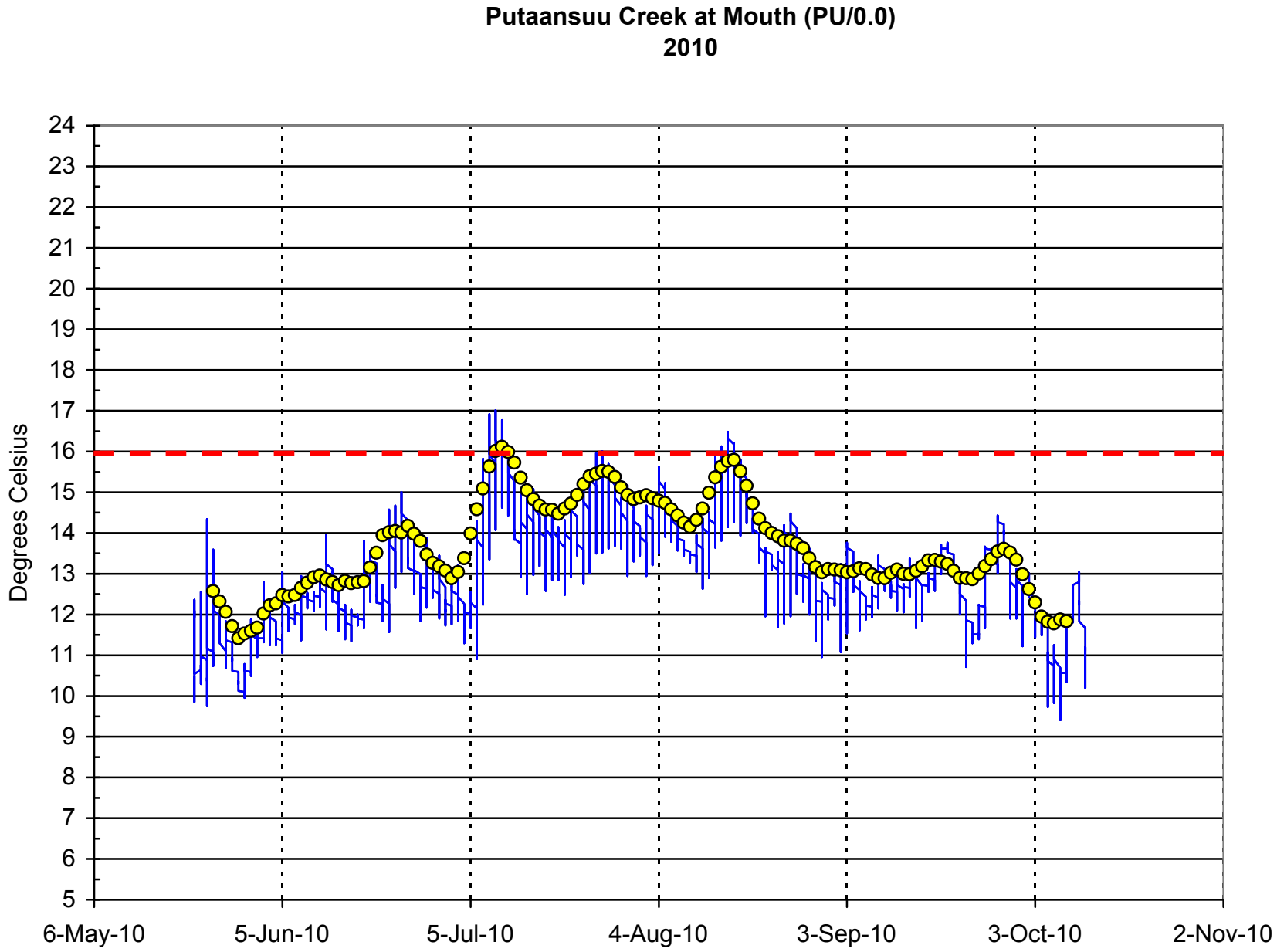

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station PU/0.0 on Putaansuu Creek in 2010. Dashed line shows the 7-DADMax criteria. PU0.0_2010.xls 6/3/2011

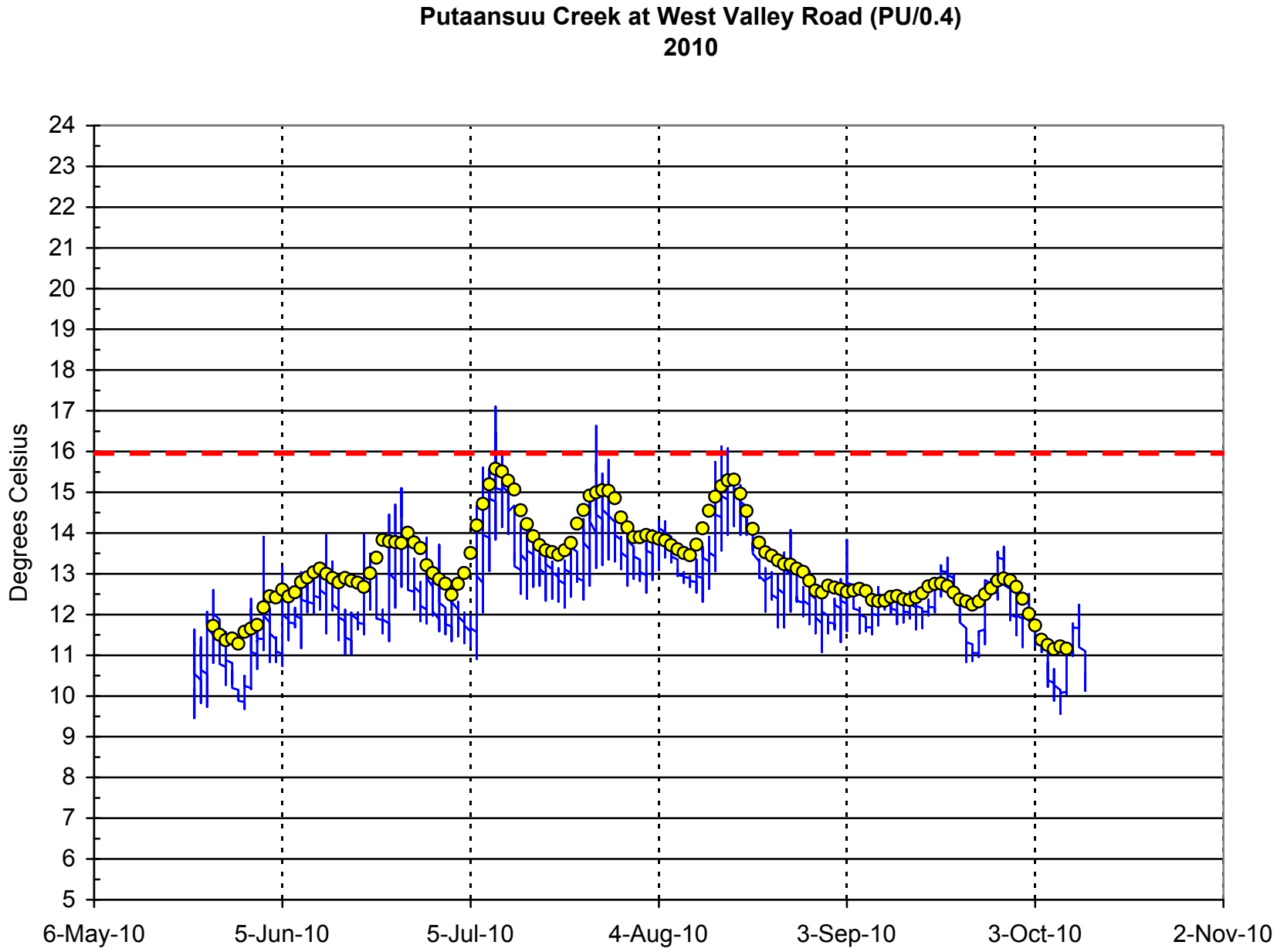

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station PU/0.4 on Putaansuu Creek in 2010. Dashed line shows the 7-DADMax criteria. PU0.4_2010.xls 6/3/2011

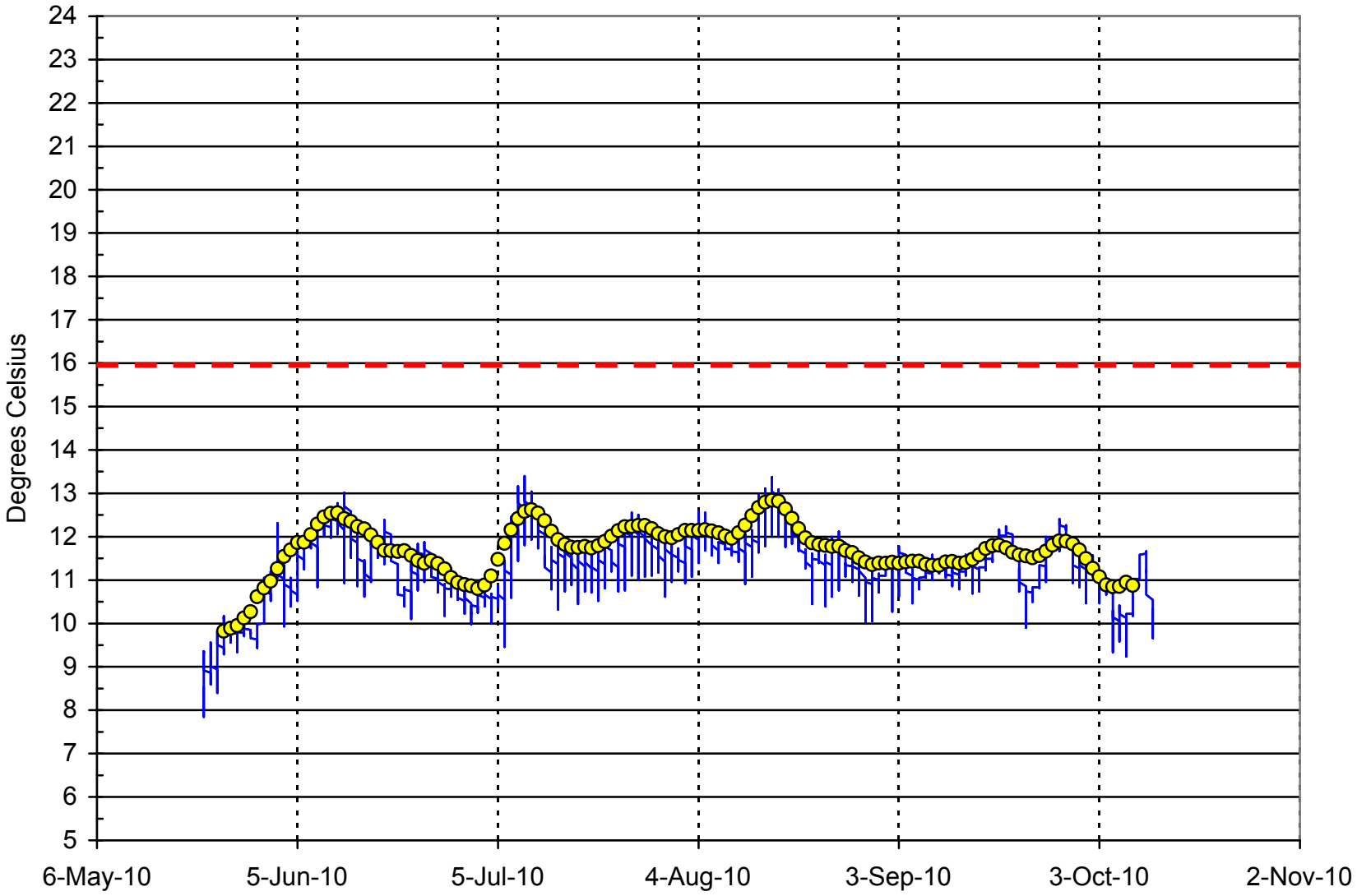

Figure . Hourly temperature profile with 7-day average daily maximum temperatures (7-DADMax; circles) occurring at station PU0.5 on Putaansuu Creek in 2010. Dashed line shows the 7-DADMax criteria. PU0.5_rev_2010.xls 6/3/2011

Appendix D

Station Coordinates

Table D-1. Coordinates of the fecal coliform (FC) and temperature (T) stations monitored in the Chimacum Creek watershed in 2007-08 and 2009-10.

Station	Northing	Easting	Latitude	Longitude	Type
CH/0.1	388978.197	1162860.782	48.049754717	-122.786075091	FC
CH/1.1	386116.094	1163728.989	48.041969299	-122.782231313	FC
CH/2.0	381988.162	1165021.815	48.030746286	-122.776521937	FC
CH/2.3	380682.115	1165345.986	48.027189475	-122.775062783	FC
CH/3.0	377151.087	1165530.883	48.017525414	-122.773943534	FC
CH/3.4	375056.123	1165283.293	48.011769914	-122.774730587	FC
CH/3.9	372838.800	1165506.735	48.005705825	-122.773597973	FC
CH/4.1	372057.892	1164909.763	48.003526646	-122.775945137	FC
CH/5.3	366110.399	1165140.614	47.987249843	-122.774401692	FC
CH/6.0	362360.905	1164970.221	47.976953754	-122.774709305	FC
CH/6.2	360901.774	1164054.432	47.972891572	-122.778296555	FC
CH/6.5	359984.173	1163829.973	47.970361301	-122.779117905	FC
CH/6.7	358389.291	1163902.439	47.965995495	-122.778657613	FC
CH/7.8	354485.937	1160556.818	47.955065625	-122.791904358	FC
CH/8.4	351917.072	1158506.125	47.947886005	-122.799993464	FC
CH/8.8	349241.850	1157979.645	47.940513827	-122.801871177	FC
CH/9.0	348628.168	1158024.730	47.938837853	-122.801611538	FC
CH/9.3	348668.902	1155681.252	47.938782115	-122.811185296	FC
ECH/0.2	377958.686	1166556.232	48.019809456	-122.769838295	FC
ECH/0.4	376859.732	1167057.512	48.016832304	-122.767677751	FC
ECH/1.0	373793.632	1168239.344	48.008510883	-122.762536321	FC
ECH/1.3	372775.376	1168564.604	48.005742659	-122.761103759	FC
ECH/1.7	370217.534	1169013.743	47.998763619	-122.759008125	FC
ECH/1.8	369849.468	1169101.984	47.997760971	-122.758610207	FC
ECH/2.2	367499.735	1170483.754	47.991416032	-122.752728842	FC
ECH/2.8	364223.287	1171865.463	47.982531069	-122.746755093	FC
ECH/3.3	362123.502	1172377.993	47.976811393	-122.744450049	FC
ECH/4.8	354209.319	1172980.008	47.955162992	-122.741191926	FC
ECH/5.3	352358.096	1172043.517	47.950025881	-122.744825010	FC
EG/0.0	351935.509	1158478.469	47.947934596	-122.800108201	FC
NA/0.1	366100.408	1164630.927	47.987178507	-122.776479602	FC
NA/0.7	364071.614	1161821.143	47.981423511	-122.787739600	FC
NA/1.3	365258.088	1159319.722	47.984502633	-122.798064260	FC
PU/0.0	372147.597	1164835.515	48.003775695	-122.776255183	FC
PU/0.4	372327.312	1162926.623	48.004125289	-122.784081592	FC
SW/0.0	352043.872	1173867.464	47.949291351	-122.737346707	FC
TUD/0.0	366654.889	1136649.602	47.986685442	-122.890738289	FC
TUD/0.4	365834.564	1135676.101	47.984385192	-122.894651119	FC
TUD/0.5	366093.029	1135354.240	47.985042614	-122.895968627	FC
UVD/0.0	365375.525	1136809.081	47.983160458	-122.889928808	FC
WV/0.1	352592.136	1158542.750	47.949781675	-122.800015416	FC
BH/0.0	348539.293	1157976.277	47.938589235	-122.801804441	T
BH/1.0	344615.998	1157064.265	47.927772334	-122.805121122	T
CH/0.1	388829.859	1162590.522	48.049329534	-122.787156012	T
CH/1.1	386116.094	1163728.989	48.041969299	-122.782231313	T
CH/2.0	382379.459	1164728.432	48.031800197	-122.777756890	T
CH/2.8	378543.470	1166290.279	48.021395657	-122.770975709	T
CH/2.9	378371.990	1166276.791	48.020927546	-122.771013752	T
CH/3.9	372682.645	1165341.709	48.005266544	-122.774247445	T

Table D-1. Coordinates of the fecal coliform (FC) and temperature (T) stations monitored in the Chimacum Creek watershed in 2007-08 and 2009-10.

Station	Northing	Easting	Latitude	Longitude	Type
CH/4.1	372057.892	1164909.763	48.003526646	-122.775945137	T
CH/4.5	370386.334	1165097.853	47.998958705	-122.775005568	T
CH/5.3	365879.191	1165143.732	47.986611012	-122.774359005	T
CH/6.1	361422.720	1164234.446	47.974331710	-122.777615612	T
CH/6.5	359984.173	1163829.973	47.970361301	-122.779117905	T
CH/6.7	358192.872	1164037.977	47.965466594	-122.778084268	T
CH/7.0	357413.636	1163413.129	47.963287757	-122.780553549	T
CH/7.8	354407.555	1160494.051	47.954848541	-122.792142895	T
CH/8.4	351564.303	1158460.032	47.946914318	-122.800144639	T
CH/9.0	348629.360	1157841.176	47.938824967	-122.802361006	T
CH/9.4 (Air)	348642.512	1155486.749	47.938696085	-122.811975797	T
CH/9.4	348649.515	1155370.098	47.938707057	-122.812452285	T
ECH/0.1	377926.547	1166547.686	48.019724424	-122.769856423	T
ECH/0.5	376078.921	1167383.010	48.014712630	-122.766257490	T
ECH/1.0	373793.632	1168239.344	48.008510883	-122.762536321	T
ECH/1.1	373665.098	1168229.350	48.008157944	-122.762563976	T
ECH/1.2	372913.945	1168496.692	48.006120092	-122.761386048	T
ECH/2.0	369942.940	1169301.553	47.998033006	-122.757795407	T
ECH/2.8	364223.287	1171865.463	47.982531069	-122.746755093	T
ECH/3.3	362123.502	1172377.993	47.976811393	-122.744450049	T
ECH/4.3	356789.761	1172965.538	47.962235500	-122.741503091	T
ECH/5.4	352366.978	1171736.833	47.950029335	-122.746077006	T
NA/0.2	365934.587	1163809.457	47.986667165	-122.779815974	T
NA/0.7	364071.614	1161821.143	47.981423511	-122.787739600	T
PU/0.0	372147.597	1164835.515	48.003775695	-122.776255183	T
PU/0.4	372327.312	1162926.623	48.004125289	-122.784081592	T
PU/0.5	372214.665	1162626.687	48.003795731	-122.785294757	T