

Table 5.6-1. Species identified as among the most sensitive to elevated temperatures for at least part of their life cycle. It must be stressed that temperatures and time periods listed in this table came from a preliminary “first draft” of threshold parameters for these species. The temperature values and time periods identified were used for comparison between the species of interest to determine which resident and anadromous species appeared to have the lowest thresholds. The protective temperature limits and time periods ultimately developed were based on a number of sources and discussed fully in Sections 5.6.3 and 5.7.3 of the Determination Document (page 1 of 5).

Blueback Herring

Life Stage	Time of Year	Temp. of Interest	Reference	Comments
Adults (Spawning)	April 15 - June 30	27.0°C (80.6°F)	Loesch, J.G., and W.A. Lund, Jr., 1977, A Contribution to the Life History of the Blueback Herring, <i>Alosa aestivalis</i> , Trans. Am., Fish Soc., 106(6):583-589.	
Eggs	May 1 - June 30	28.4°C (83.1° F)	[Lawler, Matusky & Skelly Engineers, 1998] Koo, et al., 1979 (as cited in Tab 14 ¹)	
Larvae	May 1 - July 15	27.9°C (82.2°F)	Ecological Analysts, Inc., 1978 (Tab 5)	Substituting Alewife for this life stage
Juveniles	June 1 - Sept. 30	29.3°C (84.7°F)	Ecological Analysts, Inc., 1978 (Tab 5)	Substituting Alewife for this life stage
Adults	June 30 - July 30	29.0°C (84.2°F)	Meldrim, J.W, J.J. Gift, and B.R. Petrosky, 1974 (Tab 8)	

Table 5.6-1. Species identified as among the most sensitive to elevated temperatures for at least part

¹ The “Tab” number refers to tabs 3-25 containing the references in the document titled “Charles River Tolerance Information provided to the Agencies on April 26, 2001 by Marine Research, Inc.

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Alewife

Life Stage	Time of Year	Temp. of Interest	Reference	Comments
Adults (Spawning)	April 15 - June 15	21.1°C (70°F)	[Edsall, T.A.,1970]; Cooper, 1961 (as cited in Tab 3)	migration ceases (unpublished field data may indicate higher limit)
Eggs	May 1 - June 30	26.7°C (80°F)	Kellogg, R.L.,1982 (Tab 4)	
Larvae	May 1 - July 15	27.9°C (82.2°F)	Ecological Analysts, Inc., 1978 (Tab 5)	
Juveniles	June 1 - Sept. 30	29.3°C (84.7°F)	Ecological Analysts, Inc., 1978 (Tab 5)	
Adults	June 15 - July 30	26.7°C (80.1°F)	Ecological Analysts, Inc., 1978 (Tab 5)	

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White Perch

Life Stage	Time of Year	Temp. of Interest	Reference	Comments
Adults (Spawning)	April 1 - June 15	27.0°C (80.6°F)	U.S. Fish and Wildlife Survey, 1983; Jackson et al., 1995	Range from 8 to 27°C
Eggs	April 15 - June 30	27.0°C (80.6°F)	Ecological Analysts, 1983; Morgan and Rasin, 1982	12-14 °C optimal
Larvae	May 1 - July 15	31.6°C (88.9°F)	Ecological Analysts, 1983	
Juveniles	March 1 - Dec. 30	29.6°C (85.3°F)	Ecological Analysts, 1983; Meldrim and Gift, 1971	Upper Limit of optimum growth; 30.6°C – 96% lethality for 24 hours after 3 days acclimated at 20°C
Adults	March 1 - Dec. 30	32.0°C (89.6°F)	Gift and Westman, 1971	Avoidance Temp. in lab experiment

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Yellow Perch

Life Stage	Time of Year	Temp. of Interest	Reference	Comments
Adults (Spawning)	March 20 - April 30	18.3°C (65.0°F)	R. Keller, Mass. Div. Of Fisheries & Wildlife, Personal Communication, 2001; Koonce, J.F., B.F. Bagenal, R.F. Carline,, K.E.F. Hokanson, and M. Naiec, 1977 (Tab 17)	Lower limit of temp. that inhibits egg cleavage
Eggs	April 1 - May 15	21.1°C (70.0°F)	R. Keller, Mass. Div. Of Fisheries & Wildlife, Personal Communication, 2001; Koonce, et al., 1977 (Tab 17)	Upper limit of temp. that inhibits egg cleavage
Larvae	April 1 - June 30	28.1°C (82.5°F)	Krieger, D.A., J.W. Terrell, and P.C. Nelson, 1983, Habitat Suitability Information: Yellow Perch, U.S. Fish Wildl. Serv. FWS/OBS-83/10.55, 37pp.; NWRC website	
Juveniles	All Year	29.2°C (84.5°F)	Krieger, et al., 1983; NWRC website	Lower limit of incipient lethal
Adults	Nov 1 - March 30	10.0°C (50.0°F)	Krieger, et al., 1983; NWRC website	Adults must be exposed to 5-6 months of cold water temps. to ensure “ripening” of eggs
Adults	March 2 - Oct. 31	25.0°C (77.0°F)	Krieger, et al., 1983; NWRC website	Avoidance temp.

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White Sucker

Life Stage	Time of Year	Temp. of Interest	Reference	Comments
Adults (Spawning)	April 1 - May 30	-----		Move upstream to fast moving shallow water
Eggs	April 1 - May 30	-----		Move upstream to fast moving shallow water
Larvae	April 1 - May 30	26.7°C (80.0°F)	McCormick, J.H., B.R. Jones, and K.E.F. Hokanson, 1977 (Tab 21)	
Juveniles	May 30 - June 30	29.7°C (85.5°F)	McCormick, et al., 1977 (Tab 21)	
Adults	All Year	28.9°C (84°F)	Stauffer, J.R., K.L. Dickson, J. Cairns, Jr., D.S. Cherry, 1976 (Tab 23)	Avoidance temperature