



# Temperature Criteria for Various Fish Species as Recommended to NDEP during the 1980s

## Introduction

A majority of the numeric temperature criteria currently contained in Nevada's water quality regulations were based upon recommendations from the Nevada Department of Wildlife (NDOW) and the U.S. Fish and Wildlife Service (USFWS). This fact sheet provides a brief summary of these recommendations dating back to the 1980s.

## Background on Water Quality Standards

Nevada's water quality standards, contained in the Nevada Administrative Code (NAC) 445A.119 – 445A.225, define the water quality goals for a waterbody by: 1) designating beneficial uses of the water; and 2) setting criteria necessary to protect the beneficial uses. Beneficial uses consist of such things as irrigation, recreation, aquatic life, fisheries, irrigation and drinking water. Once beneficial uses are determined for a waterbody, numeric water quality criteria are set to protect these uses. Typically, these criteria are based upon either: 1) U.S. Environmental Protection Agency guidance; 2) site-specific criteria derived from national criteria; and 3) recommendations from other agencies.

## Recommendations for Temperature Criteria

Prior to the mid-1980s, Nevada's regulations defined aquatic life as a beneficial use for most waters in the state. However the regulations did not provide any further explanation of which species were to be protected. During the 1980s, Nevada Division of Environmental Protection (NDEP) undertook an effort to expand the aquatic life uses for main western Nevada waters to include lists of fish species of concern, such as rainbow trout, brown trout, Lahontan cutthroat trout, catfish and walleye. At the same time, NDEP solicited NDOW and USFWS for temperature criteria recommendations needed to support the various species. In addition, NDEP reviewed EPA guidance ("Quality Criteria for Water" (Red Book), EPA, 1976) for temperature recommendations for the warmwater fishes. The results of these efforts have been taken from available NDEP files and documents, and are summarized in Table 1. The sources relied upon by



NDOW and USFWS were not identified in the available NDEP documents. However according to Mark Warren, NDOW biologist, available literature values and field observations were used in developing NDOW recommendations.



In general, temperature criteria recommendations were given for the five main stages: spawning, incubation, nursery-fry, juvenile, and adult; and the associate time frame for these stages. As shown in Table 1, much more detail was provided for the coldwater species than for the warmwater species. While not explicitly described as such in the NDEP support documents, it is assumed that these recommendations are intended to represent maximum daily temperature limits.

It is interesting to note that NDOW's recommendation for rainbow trout (spawning) was significantly higher during the Truckee River standards review when compared to their recommendations found in the standards reviews for the Carson, Walker and other waters. However, it appears that the Carson basin recommendations were used in setting temperature criteria for some of the Truckee River reaches. Documentation explaining this difference could not be found in NDEP files.

## From Recommendations to Regulations

The recommendations in Table 1 served as guidance to NDEP for the development of the temperature standards. However, these values were not directly used in all cases. According to the Truckee River Water Quality Standards Revisions Rationale Supplement (NDEP, 8/15/1984), modifications (less restrictive) to the agency recommendations were agreed upon due to attainability problems.

## For More Information

To find out more, contact:

Randy Pahl, TMDL Coordinator  
Nevada Division of Environmental Protection  
901 S. Stewart Street, Suite 4001  
Carson City, NV 89701  
(775) 687-9453; rpahl@ndep.nv.gov

Or visit NDEP's website at <http://ndep.nv.gov/>

## Summary of Recommended Temperature Criteria for Various Fish Species

Species	Source of Recommendation	Life stage	Value (Degrees C)	Date Range	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ref.		
<b>Coldwater Species</b>																			
Rainbow Trout	NDOW - for Truckee River	Spawning	17.8	3/1-5/15				17.8									1		
		Incubate	16.7	3/1-6/30				16.6											
		Nursery	21.1	4/1-7/31					21.1										
		Juvenile	22.2	5/1-9/15						22.2									
		Adult	23.3	1/1-12/31							23.3								
	NDOW	Spawning	13.3	3/1-5/15				13.3										2, 3, 4	
		Incubate	16.7	3/1-6/30				16.7											
		Nursery	21.1	4/1-7/31					21.1										
		Juvenile	22.2	5/1-9/15						22.2									
		Adult	23.3	1/1-12/31							23.3								
Brown Trout	NDOW	Spawning	13.3	10/15-12/15												13.3	1, 2, 3, 4		
		Incubate	13.3	10/15-3/15			13.3									13.3			
		Nursery	21.1	11/15-4/15			21.1										21.1		
		Juvenile	22.2	2/15-6/30				22.2											
		Adult	23.3	1/1-12/31							23.3								
Mountain Whitefish	NDOW	Spawning	7.2	10/15-12/15												7.2	1		
		Incubate	7.2	10/15-3/15			7.2									7.2			
		Nursery	16.7	11/15-4/15			16.7												
		Juvenile	20	2/15-6/30				20											
		Adult	20	1/1-12/31							20								
Lahontan Cutthroat Trout	NDOW	Spawning	13.3	4/1-5/31				13.3									1		
		Incubate	16.7	4/1-8/1				16.7											
		Nursery	20	5/1-9/1					20										
		Juvenile	21.1	6/1-10/15						21.1									
		Adult	22.2	1/1-12/31							22.2								
	USFWS - 1/9/1984	Not Specified	Spawning	13.3	10/1-3/31				13.3								13.3		
			Incubate	13.9	4/1-6/30				13.9										
			Nursery	21.1	7/1-9/30					21.1									
			Juvenile	13.3	11/1-3/31			13.3										13.3	
			Adult	18.3	4/1-6/30				18.3										
USFWS - 7/3/1984	Not Specified	Spawning	21.1	7/1-10/31					21.1										
		Incubate	13.3	10/1 - 3/31			13.3									13.3			
		Nursery	13.9	4/1 - 6/30				13.9											
		Juvenile	21.1	7/1 - 9/30					21.1										
		Adult	13.8	4/1 - 6/15				13.8											
Cui-ui	USFWS - 1/9/1984	Not Specified	Spawning	17.2	6/16 - 6/30					17									
			Incubate	20	7/1 - 7/31						20								
			Adult	20	7/1 - 7/31							20							
	USFWS - 7/3/1984	Not Specified	Spawning	13.3	10/1 - 3/31			13.3									13.3	1	
			Incubate	13.9	4/1 - 6/30				13.9										
<b>Warmwater Species</b>																			
Cattfish	NDOW; EPA Guidance (Red Book)	Spawning	24	6/15-7/15						24							2, 3, 4		
		Incubate	29	none given															
		Nursery	none given	none given															
		Juvenile	32	none given															
		Adult	32	none given															
Smallmouth Bass	NDOW; EPA Guidance (Red Book)	Spawning	18	4/15 - 7/15				18									2		
		Incubate	23	none given															
		Nursery	none given	none given															
		Juvenile	29	none given															
		Adult	29	none given															
Largemouth Bass	NDOW; EPA Guidance (Red Book)	Spawning	21	4/15 - 7/15				21									3, 4		
		Incubate	23	none given															
		Nursery	none given	none given															
		Juvenile	none given	none given															
		Adult	32	none given															
Bluegill	NDOW; EPA Guidance (Red Book)	Spawning	25	none given													4		
		Incubate	34	none given															
		Nursery	none given	none given															
		Juvenile	none given	none given															
		Adult	32	none given															
Black Crappie	NDOW; EPA Guidance (Red Book)	Spawning	17	none given													4		
		Incubate	20	none given															
		Nursery	none given	none given															
		Juvenile	none given	none given															
		Adult	27	none given															
Striped Bass	NDOW; EPA Guidance (Red Book)	Spawning	18	none given													4		
		Incubate	24	none given															
		Nursery	none given	none given															
		Juvenile	none given	none given															
		Adult	none given	none given															
White Bass	NDOW; EPA Guidance (Red Book)	Spawning	17	none given													2		
		Incubate	26	none given															
		Nursery	none given	none given															
		Juvenile	none given	none given															
		Adult	none given	none given															
Walleye	NDOW; EPA Guidance (Red Book)	Spawning	11	10/15-4/15			11									11	2		
		Incubate	none given	none given															
		Nursery	none given	none given															
		Juvenile	none given	none given															
		Adult	28	4/15-10/15							28								

### References

1. Truckee River Water Quality Standards Revisions Rationale Supplement - 8/15/84
2. Carson River Water Quality Standards Revisions Rationale - 11/8/84
3. Walker River Water Quality Standards Revisions Rationale - 6/20/1985
4. Colorado River Basin and Miscellaneous Southern Nevada Streams Water Quality Standards Revisions Rationale- 1/15/1984

### Abbreviations

NDOW - Nevada Department of Wildlife  
 USFWS - United States Fish and Wildlife Service  
 EPA - United States Environmental Protection Agency