

APPENDIX I

Temperature Monitoring Data and Evaluation of Relevant Criteria for Streams within the Upper Middle Fork, Lower Middle Fork and Slide Creek Allotments

Stream temperature is an important factor affecting distribution and abundance of salmonids within the Middle Fork John Day River Sub-basin. Water temperatures influence water chemistry, as well as every phase of salmonid life history. Optimal temperatures for steelhead are 50° to 61° F (10° to 16° C), and the lethal temperature is approximately 77° F (25° C). Bull trout have the coldest water temperature requirements of any native salmonid in the Pacific Northwest. The US Fish and Wildlife Service have identified water temperatures ranging from 36 to 59° F (2 - 15° C) as essential for the conservation of various life-history stages of bull trout (USDI FWS 2010). Water temperatures in excess of 59° F (15° C) are thought to limit the distribution of bull trout (Buchanan and Gregory 1997). Within the Middle Fork John Day River, high stream temperatures occur near the end of July or the beginning of August and coincide with low stream flows and warm daytime temperatures. By the end of August, stream temperatures are typically dropping.

A variety of water temperature standards/desired conditions/criteria are addressed by the MNF when designing land management actions and evaluating their effects. They are described below.

Current Condition & Forest Plan Standards & Guidelines

The Forest Plan water temperature standard and RMO directs the Forest to meet state water quality standards and prevent measurable increases in water temperature (1990 Forest Plan Watershed S&G-2, 1995 PACFISH Water Temperature RMO), and maintain maximum water temperatures below 64°F within migration and rearing habitat and below 60°F within spawning habitats (PACFISH). The Forest Plan Watershed Standards and Guidelines are:

2. Water Quality Standards and BMP's. Meet Water Quality Standards for waters of the States of Oregon (Oregon Administrative Rules, Chapter 340-41) and Idaho through planning, application, and monitoring of Best Management Practices (BMP's) in conformance with the Clean Water Act, regulations, and federal guidance issued there to.

7. Stream Temperatures. Prevent measurable temperature increases in Class I Streams. Temperature increases on SMU Class II (and fish bearing Stream Management Unit Class III) streams will be limited to the criteria in State standards. Temperatures on other streams may be increased only to the extent that water quality goals on downstream, fish-bearing streams will still be met. Normally, stream shade management on Class III streams will differ little from treatment on Class II streams

Oregon State Water Quality Standards

In addition to meeting the Forest Plan standard, the Forest must meet Oregon water quality standards under the Clean Water Act. EPA approved new water quality standards for Oregon in March 2004. Streams in the aquatic effects analysis are considered “salmon and trout rearing and migration habitat” for Oregon water temperature standards. Therefore, the following water temperature standard applies:

The seven-day-average maximum temperature of streams identified as having salmon and trout rearing and migration use; may not exceed **17.8** degrees Celsius (**64.4** degrees Fahrenheit).

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Amendment 29 DFC

1. Bull trout spawning and rearing habitat- 7 Day Mean Max $\leq 55^{\circ}\text{F}$. *Amendment 29 originally identified the above water temperature for bull trout. However, bull trout have the coldest water temperature requirements of any native salmonid in the Pacific Northwest. The Inland Native Fish Strategy RMO for water temperature identified maximum water temperatures below 59°F within adult holding habitat and below 48°F within spawning and rearing habitats. The MNF considers the INFS water temperature standard to be the best available, favorable water temperatures for inland native fish such as bull trout. Therefore, the MNF applies the INFS RMO for water temperature to bull trout rather than standards from Amendment 29 or PACFISH.*
2. Chinook and/or Westslope cutthroat trout spawning & rearing habitat - 7 Day Mean Max 55°F (12.8°C)
3. All other John Day Basin streams – 7 Day Mean Max 64°F (17.8°C) - *Amendment 29 specifies DFCs for temperature to result in compliance with Oregon State Water Quality Standards, including instantaneous reading at any time of less than 68°F (20°C) in all anadromous streams without Chinook, bull trout, or Westslope cutthroat trout spawning and rearing habitat. This water quality standard has been revised since Amendment 29 was issued, thus the revised standard is applied.*

PACFISH RMO

1. No measurable increase in 7 Day Mean Max – *MNF data insufficient to determine whether this RMO is being met.*
2. Migration & rearing habitat - 7 Day Mean Max Below 64°F (17.8°C)
3. Spawning habitat - 7 day Mean Max Below 60°F (15.6°C)

Matrix of Pathways and Indicators:

STEELHEAD (S)

1. Functioning Appropriately (FA): 7 Day Mean Max $50\text{-}57^{\circ}\text{F}$ ($10\text{-}13.9^{\circ}\text{C}$)
2. Functioning At Risk (FAR): 7 Day Mean Max - Spawning habitat $57\text{-}61^{\circ}\text{F}$ ($13.9\text{-}16.1^{\circ}\text{C}$), Migration & rearing habitat $57\text{-}64^{\circ}\text{F}$ ($13.9\text{-}17.8$)
3. Functioning At Unacceptable Risk (FAUR): 7 Day Mean Max - Spawning habitat $>61^{\circ}\text{F}$ (16.1°C), Migration & rearing habitat $>64^{\circ}\text{F}$ (17.8°C)
- 4.

BULL TROUT (B)

1. Functioning Appropriately (FA): 7 Day Mean Max for the following life history stages – Incubation $35.6\text{-}41^{\circ}\text{F}$ ($2\text{-}5^{\circ}\text{C}$), Rearing $39.2\text{-}53.6^{\circ}\text{F}$ ($4\text{-}12^{\circ}\text{C}$), Spawning $39.2\text{-}48.2^{\circ}\text{F}$ ($4\text{-}9^{\circ}\text{C}$), Migration $<59^{\circ}\text{F}$ (15°C).
2. Functioning At Risk (FAR): 7 Day Mean Max for the following life history stages – Incubation <35.6 or at 42.8°F (<2 or at 6°C), Rearing <39.2 or $55.4\text{-}59^{\circ}\text{F}$ (<4 or $13\text{-}15^{\circ}\text{C}$), Spawning <39.2 or at 50°F (<4 or at 10°C), Migration sometimes $>59^{\circ}\text{F}$ (15°C).
3. Functioning At Unacceptable Risk (FAUR): 7 Day Mean Max for the following life history stages – Incubation <33.8 or $>42.8^{\circ}\text{F}$ (<1 or $>6^{\circ}\text{C}$), Rearing $>59^{\circ}\text{F}$ ($>15^{\circ}\text{C}$), Spawning <39.2 or $>50^{\circ}\text{F}$ (<4 or $>10^{\circ}\text{C}$), Migration regularly $>59^{\circ}\text{F}$ (15°C).

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Table I-1 presents water temperature monitoring data for streams in the Upper Middle Fork Allotment. Data sets range from a single year to as many as five consecutive years from 1995 to 2005. Locations of monitoring sites are shown in Figure I-1. Table I-2 presents water temperature monitoring data for streams in the Lower Middle Fork Allotment. Data sets range from a single year to as many as five consecutive years from 1998 to 2005. Locations of monitoring sites are shown in Figure I-2. Table I-3 presents water temperature monitoring data for streams in the Slide Creek Allotment. Data sets range from two consecutive years of data to as many as five consecutive years from 1996 to 2000. Locations of monitoring sites are shown in Figure I-1.

Each table displays whether or not the temperature data meets or fails to meet each standard described above: 1) State water quality standards; 2) Amendment 29 DFC; 3) PACFISH RMO; and, 4) NMFS MPI / Bull Trout Matrix. With very few exceptions, the data failed to meet each standard and would have a designation of FAUR using the NMFS MPI for steelhead and bull trout (when present).

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Table I-1. Temperature data and relevant criteria for MCR Steelhead and/or CR Bull Trout critical habitat streams in the Upper Middle Fork Allotment.

Stream Name and Map Reference Number	Pasture	Years Analyzed	Mean Yearly Max of 7 Day Rolling Means of Daily Max (°F) (7 Day Mean Max)	Daily Max Over 64°F (Mean Days Per Year)	State Water Quality Standards (Meet/Fail)	303d Listed (Y/N)	Amendment 29 DFC (Meet/Fail)	PACFISH RMO (Meet/Fail)	MPI / Matrix (FA, FAR, FAUR)
Mill Cr - 1	Austin	1997-2001	65.7	12	Fail 4	Y	Fail 3	Fail 2, 3	FAUR S
Vinegar Cr - 2	Lower Vinegar	2002,2003,2005	75.5	67	Fail 3, 4	Y	Fail 1, 3	Fail 2, 3	FAUR S, B
Vinegar Cr - 3	Lower Vinegar	2001	72.9	73	Fail 3, 4	Y	Fail 1, 3	Fail 2, 3	FAUR S, B
Vinegar Cr - 4	Lower Vinegar	1999-2001	63.2	5	Fail 3 Meet 4	Y	Fail 1 Meet 3	Meet 2 Fail 3	FAUR S, B
Vinegar Cr - 5	Upper Vinegar	2002-2005	62.5	2	Fail 3 Meet 4	Y	Fail 1 Meet 3	Meet 2 Fail 3	FAUR S, B
Vincent Cr - 6	Lower Vinegar	2001	75.9	63	Fail 4	N ¹	Fail 3	Fail 2, 3	FAUR S
Vincent Cr - 7	Lower Vinegar	1999-2001	65.1	10	Fail 4	N ¹	Fail 3	Fail 2, 3	FAUR S
Placer Gulch - 8	Deerhorn	1999-2001	77.0	74	Fail 4	Y	Fail 3	Fail 2, 3	FAUR S
Davis Cr - 9	Deerhorn	1999-2001	68.9	36	Fail 4	Y	Fail 2, 3	Fail 2, 3	FAUR S
Davis Cr - 10	Deerhorn	1999-2001	56.3	0	Meet 4	Y	Fail 2 Meet 3	Meet 2, 3	FA S
MF John Day R - 11	Tailings	2002-2005	76.5	77	Fail 1, 2	Y	Fail 2, 3	Fail 2, 3	FAUR S
Caribou Cr - 12	Caribou	2000,2001	72.3	73	Fail 4	Y	Fail 3	Fail 2, 3	FAUR S
Little Boulder Cr - 13	Caribou	2000,2001	73.7	71	Fail 4	Y	Fail 3	Fail 2, 3	FAUR S
Little Boulder Cr - 14	Caribou	1999-2001	62.5	2	Meet 4	Y	Meet 3	Meet 2 Fail 3	FAUR S
Deerhorn Cr - 15	Deerhorn	2001	81.5	86	Fail 4	N ¹	Fail 2, 3	Fail 2, 3	FAUR S
East Fork Little Butte Cr - 16	Deerhorn	1995	64.9	15	Fail 4	N ¹	Fail 3	Fail 2, 3	FAUR S
Little Butte Cr - 17	Butte	1995	65.5	16	Fail 4	Y	Fail 3	Fail 2, 3	FAUR S
MF John Day R - 18	River	2002,2003,2005	79.6	79	Fail 1, 2	Y	Fail 2, 3	Fail 2, 3	FAUR S
Butte Cr - 19	Butte	1999-2001	65.5	14	Fail 4	N ¹	Fail 2, 3	Fail 2, 3	FAUR S
Granite Boulder Cr - 20	Granite Boulder Exclosure (Lower Middle Fork Allotment)	1999-2001, 2005	67.5	32	Fail 3, 4	Y	Fail 1, 2, 3	Fail 2, 3	FAUR S, B
Granite Boulder Cr - 21	Caribou	1999-2001, 2005	61.7	1	Fail 3 Meet 4	Y	Fail 1, 2 Meet 3	Meet 2 Fail 3	FAUR S, B
Granite Boulder Cr - 22	Caribou	1999-2001, 2003, 2005	61.1	0	Fail 3 Meet 4	Y	Fail 1, 2 Meet 3	Meet 2 Fail 3	FAUR S, B
Granite Boulder Cr - 23	Granite Boulder (Lower Middle Fork Allotment)	2001	50.7	0	Meet 3, 4	Y	Meet 1, 2, 3	Meet 2, 3	FA S FAUR B
Ruby Cr - 24	Butte	1999-2001	66.3	21	Fail 4	N ¹	Fail 3	Fail 2, 3	FAUR S

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Ruby Cr - 25	Butte	1998-2001	57.7	0	Meet 4	N	Meet 3	Meet 2, 3	FAR S
Ragged Cr - 26	Butte	1999-2001	64.7	10	Fail 4	Y	Fail 3	Fail 2, 3	FAUR S

Notes: 1) MNF data indicates State Water Quality Standards are not being met, but Oregon DEQ determined the data was insufficient to include the stream on Oregon's 2004/2006 Integrated Report as 303d listed.

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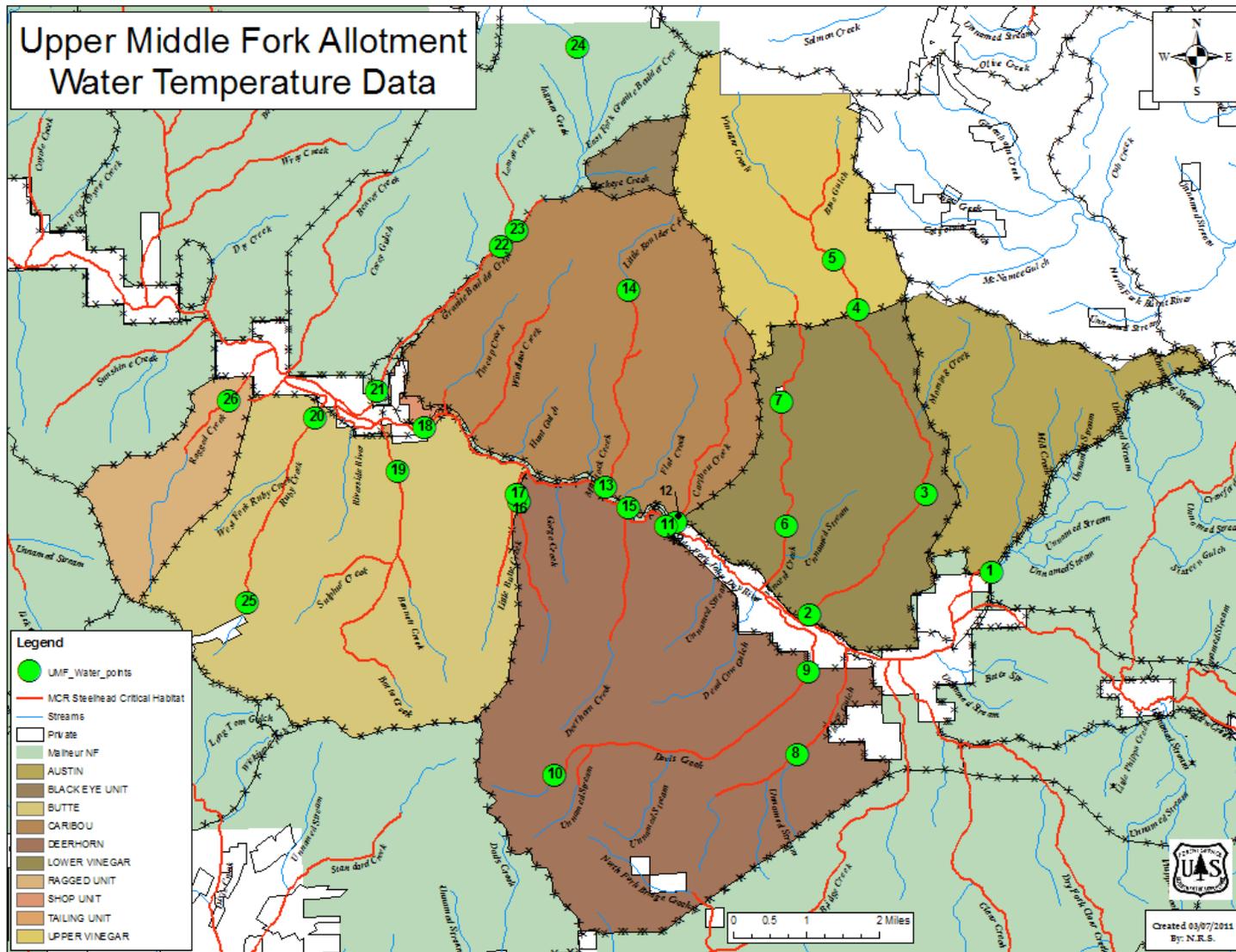


Figure I-1. Temperature monitoring sites within the Upper Middle Fork John Day Allotment.

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Table I-2. Temperature data and relevant criteria for MCR Steelhead and/or CR Bull Trout critical habitat streams in the Lower Middle Fork Allotment.

Stream Name and Map Reference Number	Pasture	Years Analyzed	Mean Yearly Max of 7 Day Rolling Means of Daily Max (°F) (7 Day Mean Max)	Daily Max Over 64°F (Mean Days Per Year)	State Water Quality Standards (Meet/Fail)	303d Listed (Y/N)	Amendment 29 DFC (Meet/Fail)	PACFISH RMO (Meet/Fail)	MPI (FA, FAR, FAUR)
Granite Boulder Cr - 1	Granite Boulder Exclosure	1999-2001, 2005	67.5	32	Fail 3, 4	Y	Fail 1, 2, 3	Fail 2, 3	FAUR S, B
Granite Boulder Cr - 2	Caribou (Upper Middle Fork Allotment)	1999-2001, 2005	61.7	1	Fail 3 Meet 4	Y	Fail 1, 2 Meet 3	Meet 2 Fail 3	FAUR S, B
Granite Boulder Cr - 3	Caribou (Upper Middle Fork Allotment)	1999-2001, 2003, 2005	61.1	0	Fail 3 Meet 4	Y	Fail 1, 2 Meet 3	Meet 2 Fail 3	FAUR S, B
Granite Boulder Cr - 4	Granite Boulder	2001	50.7	0	Meet 3, 4	Y	Meet 1, 2, 3	Meet 2, 3	FA S FAUR B
Lemon Cr - 5	Granite Boulder	1999-2001, 2005	66.3	26	Fail 4	N ¹	Fail 3	Fail 2, 3	FAUR S
MF John Day R - 6	Sunshine	2002-2005	77.3	78	Fail 1, 2	Y	Fail 2, 3	Fail 2, 3	FAUR S
Sunshine Cr - 7	Sunshine	2001	79.2	73	Fail 4	N ¹	Fail 3	Fail 2, 3	FAUR S
Big Boulder Cr - 8	Susanville	2002-2003	76.6	75	Fail 4	N ¹	Fail 1, 2, 3	Fail 2, 3	FAUR S
Big Boulder Cr - 9	Susanville	1999-2001	69.5	49	Fail 4	N ¹	Fail 1, 2, 3	Fail 2, 3	FAUR S
Big Boulder Cr - 10	Susanville	1998-2001	62.5	3	Meet 4	N	Fail 1, 2 Meet 3	Meet 2 Fail 3	FAUR S
Wray Cr - 11	Susanville	2002-2003	73.5	66	Fail 4	N ¹	Fail 3	Fail 2, 3	FAUR S
Badger Cr - 12	Susanville	2002-2004	75.9	77	Fail 4	N ¹	Fail 3	Fail 2, 3	FAUR S
Myrtle Cr - 13	Susanville	2002-2003	76.4	75	Fail 4	N ¹	Fail 3	Fail 2, 3	FAUR S
Coyote Cr - 14	Susanville	1999-2001	62.7	1	Meet 4	Y	Fail 2 Meet 3	Meet 2 Fail 3	FAUR S

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Balance Cr - 15	Balance	2007	65.5	20	Fail 4	N ¹	Fail 3	Fail 2, 3	FAUR S
Mosquito Cr - 16	Mosquito Riparian		64.2	2	Fail 4	N ¹	Fail 3	Fail 2, 3	FAUR S
Big Cr - 17	Chickenhouse	2002-2003, 2005	69.2	34	Fail 3, 4	Y	Fail 1, 2, 3	Fail 2, 3	FAUR S, B
Big Cr - 18	Pizer	1999-2001	62.7	2	Fail 3 Meet 4	Y	Fail 1, 2 Meet 3	Meet 2 Fail 3	FAUR S
Big Cr - 19	Pizer	1999-2003, 2005	64.4	12	Fail 3, 4	Y	Fail 1, 2, 3	Fail 2, 3	FAUR S
Big Cr - 20	Pizer	2000-2001	62.9	3	Fail 3 Meet 4	Y	Fail 1, 2 Meet 3	Meet 2 Fail 3	FAUR S
Deadwood Cr - 21	Pizer	1999-2003, 2005	64.9	7	Fail 3, 4	N ¹	Fail 1, 3	Fail 2, 3	FAUR S
Deadwood Cr - 22	Pizer	1998-2003, 2005	57.6	0	Fail 3 Meet 4	N ¹	Fail 1 Meet 3	Meet 2, 3	FAR S FAUR B

Notes: 1) MNF data indicates State Water Quality Standards are not being met, but Oregon DEQ determined the data was insufficient to include the stream on Oregon's 2004/2006 Integrated Report as 303d listed.

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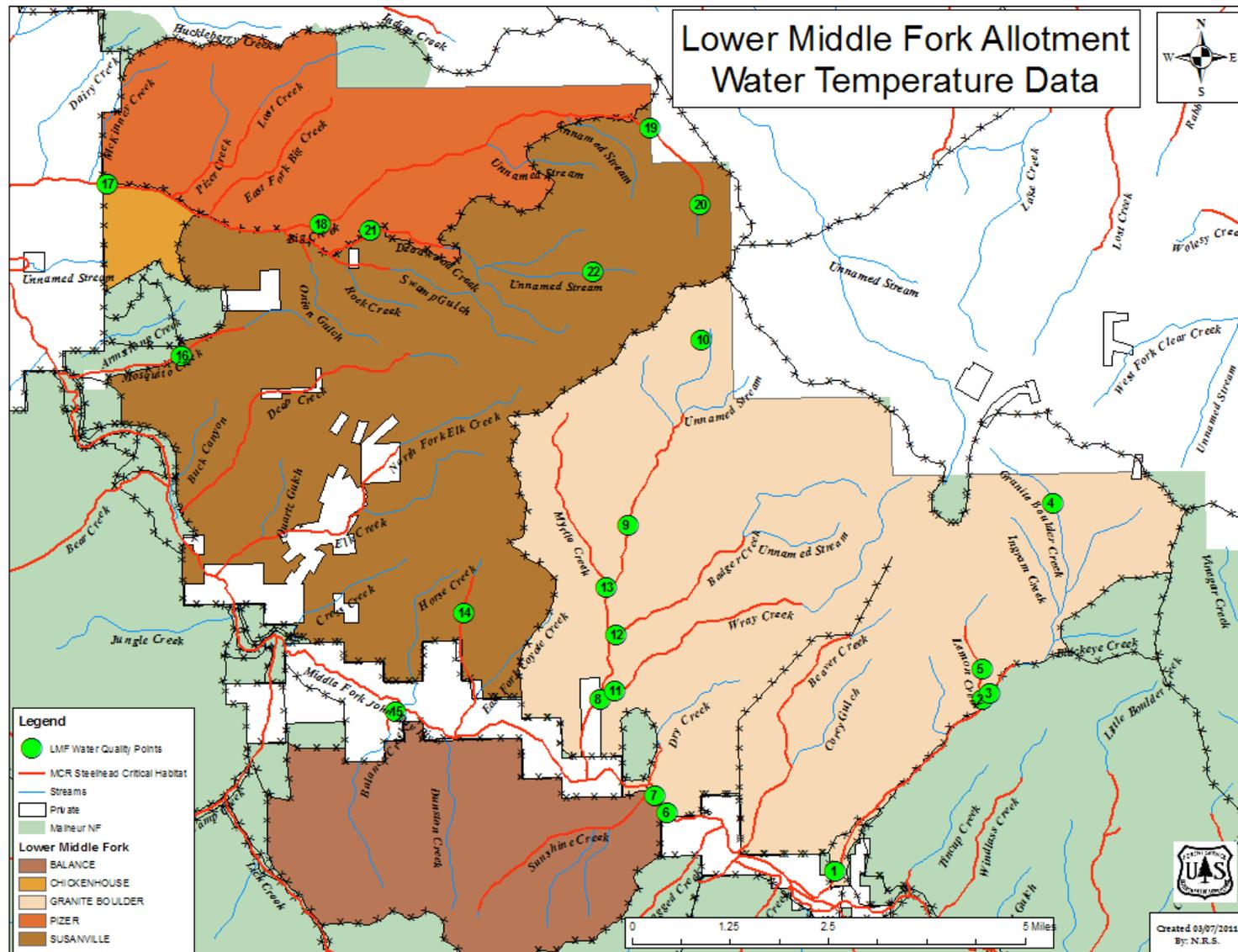


Figure I-2. Temperature monitoring sites within the Lower Middle Fork John Day Allotment.

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Table I-3. Temperature data and relevant criteria for MCR Steelhead critical habitat streams in the Slide Creek Allotment.

Stream Name	Pasture	Years Analyzed	Mean Yearly Max of 7 Day Rolling Means of Daily Max (°F) (7 Day Mean Max)	Daily Max Over 64°F (Mean Days Per Year)	State Water Quality Standards (Meet/Fail)	303d Listed (Y/N)	Amendment 29 DFC (Meet/Fail)	PACFISH RMO (Meet/Fail)	NMFS MPI (FA, FAR, FAUR)
below Lick	Camp Creek Riparian	1996-2000	76.3	82	Fail 1	Y	Fail 1, 2	Fail 2, 3	FAUR S
Slide Cr, lower	Slide Riparian	1998-2000	67.4	31	Fail 1	N ²	Fail 2	Fail 2, 3	FAUR S
Slide Cr, upper	West	1999-2000	63.2	3	Meet 1	N	Meet 2	Meet 2 Fail 3	FAUR S
Rice Cr, lower	Slide Riparian	1999-2000	64.4	8	Fail 1	N ²	Fail 2	Fail 2, 3	FAUR S
Rice Cr, upper	West	1999-2000	57.9	0	Meet 1	N	Meet 2	Meet 2, 3	FAR S

¹ MNF data currently identifies Rice Creek as non-fishbearing; this status needs to be validated.

² MNF data indicates State Water Quality Standards are not being met, but Oregon DEQ determined the data was insufficient to include the stream on Oregon's 2004/2006 Integrated Report as 303d listed.

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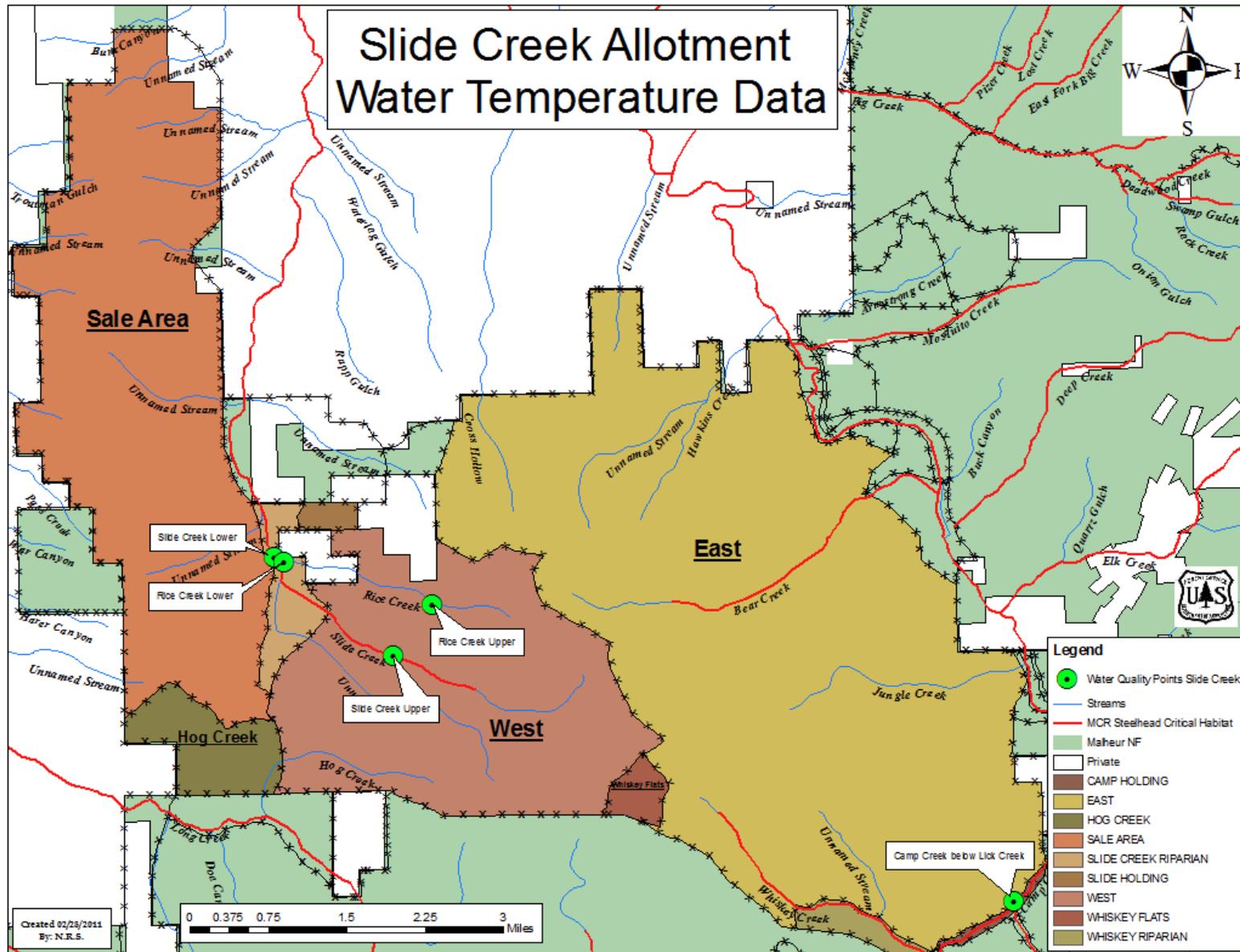


Figure I-3. Temperature monitoring sites within the Slide Creek Allotment.