

Appendix D

Example Effluent Temperatures and Discharges within Heat Load Allocations

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Excess thermal Load (ETL) allocations are independent of the applicable river temperature criteria, T_c . Effluent temperature and flow combinations which meet the ETL allocation for a given river flow rate, however, do depend upon T_c . These may be calculated using Equations D1 and D2.

$$T_e = \frac{ETL}{Q_e C_F} + T_c \quad (\text{Eq. D1})$$

where :

TL = Excess Thermal load allocation, kcal/day

T_c = applicable river temperature criterion, °C

for flow as cms :

$$C_F = 86.4 \times 10^6 \frac{\text{kcal} \cdot \text{s}}{^\circ\text{C} \cdot \text{m}^3 \cdot \text{day}}$$

for flow as cfs :

$$C_F = 2,446,665 \frac{\text{kcal} \cdot \text{s}}{^\circ\text{C} \cdot \text{ft}^3 \cdot \text{day}}$$

$$Q_e = \frac{TL}{(T_e - T_c) C_F} \quad (\text{Eq. D2})$$

The tables of effluent temperatures and discharges in this Appendix are examples of the flow and discharge combinations that will meet the excess thermal load allocated to a particular point source. The temperatures and discharges in the tables are not the allocations. An allocation to a point source is the appropriate formula specified in the Wasteload Allocations section of this TMDL.

Studies have found the instantaneous lethal limit for cold water fish to be $\geq 32^\circ\text{C}$. Example temperatures exceeding this amount in the following tables are indicated with an asterisk. Effluent temperatures exceeding 32°C would have to be evaluated for thermal plume effects according to OAR 340-41-0053 (2)(d)(B) and may be restricted.

JLR, LLC/Bruce Pac

The applicable river temperature criterion, T_c , to use in Equation D1 and D2 is seasonally dependent, as shown in Table D- 1 for the location of Bruce Pac. Table D- 2 shows examples of the flow and discharge combinations that will meet the excess thermal load allocation.

Table D- 1: Applicable Pudding River temperature criteria, T_c , at JLR, LLC/Bruce Pac.

Time period	Applicable Criteria, T_c (°C)
June 1 to June 30	18.0
July 1 to July 14	19.6
July 15 to August 31	20.9
September 1 to September 30	18.0

Table D- 2: JLR, LLC/Bruce Pac effluent temperatures (°C), river flow, and effluent flow combinations within allocated excess thermal load.

These effluent temperatures and flows in this table are examples, not allocations.

Table D-2 a: June 1 to June 30.

Q_R at Woodburn gage (cfs):	≤15	20	25	30	35	40
Q_e (MGD)	T_e	T_e	T_e	T_e	T_e	T_e
0.010	27.7	30.9	34.2*	37.4*	40.6*	43.9*
0.015	24.5	26.6	28.8	30.9	33.1*	35.2*
0.020	22.8	24.5	26.1	27.7	29.3	30.9
0.030	21.2	22.3	23.4	24.5	25.5	26.6
0.050	19.9	20.6	21.2	21.9	22.5	23.2
0.10	19.0	19.3	19.6	19.9	20.3	20.6
0.15	18.6	18.9	19.1	19.3	19.5	19.7
0.20	18.5	18.6	18.8	19.0	19.1	19.3
0.30	18.3	18.4	18.5	18.6	18.8	18.9
0.40	18.2	18.3	18.4	18.5	18.6	18.6
0.50	18.2	18.3	18.3	18.4	18.5	18.5
1.0	18.1	18.1	18.2	18.2	18.2	18.3

Q_R at Woodburn gage (cfs):	50	60	70	80	90	100
Q_e (MGD)	T_e	T_e	T_e	T_e	T_e	T_e
0.010	50.3*	56.8*	63.2*	69.7*	76.2*	82.6*
0.015	39.5*	43.9*	48.2*	52.5*	56.8*	61.1*
0.020	34.2*	37.4*	40.6*	43.9*	47.1*	50.3*
0.030	28.8	30.9	33.1*	35.2*	37.4*	39.5*
0.050	24.5	25.8	27.0	28.3	29.6	30.9
0.100	21.2	21.9	22.5	23.2	23.8	24.5
0.150	20.2	20.6	21.0	21.4	21.9	22.3
0.200	19.6	19.9	20.3	20.6	20.9	21.2
0.300	19.1	19.3	19.5	19.7	19.9	20.2
0.400	18.8	19.0	19.1	19.3	19.5	19.6
0.500	18.6	18.8	18.9	19.0	19.2	19.3
1.000	18.3	18.4	18.5	18.5	18.6	18.6

*Studies have found the instantaneous lethal limit for cold water fish to be 32°C. Effluent temperatures exceeding 32°C would have to be evaluated for thermal plume effects according to OAR 340-41-0053 (2)(d)(B) and may be restricted.

Table D-2 b: July 1 to July 14.

These effluent temperatures and flows in this table are examples, not allocations.

Q_R at Woodburn gage (cfs):	≤15	20	25	30	35	40
<u>Q_e (MGD)</u>	T_e	T_e	T_e	T_e	T_e	T_e
0.010	29.4	32.5*	35.7*	38.9*	42.3*	45.5*
0.015	26.1	28.2	30.3	32.5*	34.8*	36.9*
0.020	24.5	26.1	27.7	29.2	31.0	32.5*
0.030	22.9	23.9	25.0	26.0	27.2	28.2
0.050	21.6	22.2	22.8	23.5	24.1	24.8
0.10	20.6	20.9	21.2	21.5	21.9	22.2
0.15	20.3	20.5	20.7	20.9	21.1	21.3
0.20	20.1	20.2	20.4	20.6	20.7	20.9
0.30	19.9	20.0	20.1	20.2	20.4	20.5
0.40	19.8	19.9	20.0	20.1	20.2	20.2
0.50	19.8	19.9	19.9	20.0	20.1	20.1
1.0	19.7	19.7	19.8	19.8	19.8	19.9

Q_R at Woodburn gage (cfs):	50	60	70	80	90	100
<u>Q_e (MGD)</u>	T_e	T_e	T_e	T_e	T_e	T_e
0.010	51.8*	58.4*	64.8*	71.4*	77.7*	84.3*
0.015	41.1*	45.5*	49.7*	54.1*	58.4*	62.8*
0.020	35.7*	39.0*	42.2*	45.5*	48.7*	52.0*
0.030	30.3	32.5*	34.7*	36.9*	39.0*	41.2*
0.050	26.0	27.4	28.6	30.0	31.2	32.5*
0.100	22.8	23.5	24.1	24.8	25.4	26.1
0.150	21.7	22.2	22.6	23.1	23.5	23.9
0.200	21.2	21.5	21.9	22.2	22.5	22.8
0.300	20.7	20.9	21.1	21.3	21.5	21.8
0.400	20.4	20.6	20.7	20.9	21.1	21.2
0.500	20.2	20.4	20.5	20.6	20.8	20.9
1.000	19.9	20.0	20.1	20.1	20.2	20.2

*Studies have found the instantaneous lethal limit for cold water fish to be 32°C. Effluent temperatures exceeding 32°C would have to be evaluated for thermal plume effects according to OAR 340-41-0053 (2)(d)(B) and may be restricted.

Table D-2 c: July 15 to August 31.

These effluent temperatures and flows in this table are examples, not allocations.

Q_R at Woodburn gage (cfs):	≤15	20	25	30	35	40
<u>Q_e (MGD)</u>	T_e	T_e	T_e	T_e	T_e	T_e
0.010	30.7	33.8*	37.0*	40.2*	43.6*	46.8*
0.015	27.4	29.5	31.6	33.8*	36.1*	38.2*
0.020	25.8	27.4	29.0	30.5	32.3*	33.8*
0.030	24.2	25.2	26.3	27.3	28.5	29.5
0.050	22.9	23.5	24.1	24.8	25.4	26.1
0.10	21.9	22.2	22.5	22.8	23.2	23.5
0.15	21.6	21.8	22.0	22.2	22.4	22.6

0.20	21.4	21.5	21.7	21.9	22.0	22.2
0.30	21.2	21.3	21.4	21.5	21.7	21.8
0.40	21.1	21.2	21.3	21.4	21.5	21.5
0.50	21.1	21.2	21.2	21.3	21.4	21.4
1.0	21.0	21.0	21.1	21.1	21.1	21.2

Q_R at Woodburn gage (cfs):	50	60	70	80	90	100
<u>Q_e (MGD)</u>	T_e	T_e	T_e	T_e	T_e	T_e
0.010	53.1*	59.7*	66.1*	72.7*	79.0*	85.6*
0.015	42.4*	46.8*	51.0*	55.4*	59.7*	64.1*
0.020	37.0*	40.3*	43.5*	46.8*	50.0*	53.3*
0.030	31.6	33.8*	36.0*	38.2*	40.3*	42.5*
0.050	27.3	28.7	29.9	31.3	32.5*	33.8*
0.100	24.1	24.8	25.4	26.1	26.7	27.4
0.150	23.0	23.5	23.9	24.4	24.8	25.2
0.200	22.5	22.8	23.2	23.5	23.8	24.1
0.300	22.0	22.2	22.4	22.6	22.8	23.1
0.400	21.7	21.9	22.0	22.2	22.4	22.5
0.500	21.5	21.7	21.8	21.9	22.1	22.2
1.000	21.2	21.3	21.4	21.4	21.5	21.5

*Studies have found the instantaneous lethal limit for cold water fish to be 32°C. Effluent temperatures exceeding 32°C would have to be evaluated for thermal plume effects according to OAR 340-41-0053 (2)(d)(B) and may be restricted.

Table D-2 d: September 1 to September 30.

These effluent temperatures and flows in this table are examples, not allocations.

Q_R at Woodburn gage (cfs):	≤15	20	25	30	35	40
Q_e (MGD)	T_e	T_e	T_e	T_e	T_e	T_e
0.010	27.7	30.9	34.2*	37.4*	40.6*	43.9*
0.015	24.5	26.6	28.8	30.9	33.1*	35.2*
0.020	22.8	24.5	26.1	27.7	29.3	30.9
0.030	21.2	22.3	23.4	24.5	25.5	26.6
0.050	19.9	20.6	21.2	21.9	22.5	23.2
0.10	19.0	19.3	19.6	19.9	20.3	20.6
0.15	18.6	18.9	19.1	19.3	19.5	19.7
0.20	18.5	18.6	18.8	19.0	19.1	19.3
0.30	18.3	18.4	18.5	18.6	18.8	18.9
0.40	18.2	18.3	18.4	18.5	18.6	18.6
0.50	18.2	18.3	18.3	18.4	18.5	18.5
1.0	18.1	18.1	18.2	18.2	18.2	18.3

Q_R at Woodburn gage (cfs):	50	60	70	80	90	100
Q_e (MGD)	T_e	T_e	T_e	T_e	T_e	T_e
0.010	50.3*	56.8*	63.2*	69.7*	76.2*	82.6*
0.015	39.5*	43.9*	48.2*	52.5*	56.8*	61.1*
0.020	34.2*	37.4*	40.6*	43.9*	47.1*	50.3*
0.030	28.8	30.9	33.1*	35.2*	37.4*	39.5*
0.050	24.5	25.8	27.0	28.3	29.6	30.9
0.100	21.2	21.9	22.5	23.2	23.8	24.5
0.150	20.2	20.6	21.0	21.4	21.9	22.3
0.200	19.6	19.9	20.3	20.6	20.9	21.2
0.300	19.1	19.3	19.5	19.7	19.9	20.2
0.400	18.8	19.0	19.1	19.3	19.5	19.6
0.500	18.6	18.8	18.9	19.0	19.2	19.3
1.000	18.3	18.4	18.5	18.5	18.6	18.6

*Studies have found the instantaneous lethal limit for cold water fish to be 32°C. Effluent temperatures exceeding 32°C would have to be evaluated for thermal plume effects according to OAR 340-41-0053 (2)(d)(B) and may be restricted.

Woodburn WWTP

Table D- 3 shows the applicable criteria for the location of the Woodburn WWTP. Table D- 4 shows examples of the flow and discharge combinations that will meet the excess thermal load allocation.

Table D- 3: Applicable Pudding River temperature criteria, T_c, at Woodburn WWTP.

Time period	Applicable Criteria, T_c (°C)
June 1 to June 30	18.0
July 1 to July 14	20.1
July 15 to August 31	21.6
September 1 to September 15	18.2
September 16 to September 30	18.0

Table D- 4: Woodburn WWTP effluent temperatures (°C), river flow, and effluent flow combinations within allocated excess thermal load.

Table D-4 a: June 1 to June 30.

These effluent temperatures and flows in this table are examples, not allocations.

Q_R at Woodburn gage (cfs):	≤15	20	25	30	35	40
<u>Q_e (MGD)</u>	T_e	T_e	T_e	T_e	T_e	T_e
0.1	37.6*	44.1*	50.5*	57.0*	63.4*	69.9*
0.2	27.9	31.1	34.4*	37.6*	40.8*	44.1*
0.3	24.7	26.8	29.0	31.1	33.3*	35.4*
0.5	22.1	23.4	24.7	26.0	27.2	28.5
0.7	21.0	21.9	22.8	23.7	24.7	25.6
1	20.1	20.8	21.4	22.1	22.7	23.4
1.5	19.5	19.9	20.4	20.8	21.2	21.6
2	19.2	19.5	19.8	20.1	20.5	20.8
2.5	19.0	19.2	19.5	19.8	20.0	20.3
3	18.8	19.1	19.3	19.5	19.7	19.9
4	18.7	18.8	19.0	19.2	19.3	19.5
5	18.6	18.7	18.8	19.0	19.1	19.2

Q_R at Woodburn gage (cfs):	50	60	70	80	90	100
<u>Q_e (MGD)</u>	T_e	T_e	T_e	T_e	T_e	T_e
0.1	82.8*	95.8*	100*	100*	100*	100*
0.2	50.5*	57.0*	63.4*	69.9*	76.4*	82.8*
0.3	39.7*	44.1*	48.4*	52.7*	57.0*	61.3*
0.5	31.1	33.7*	36.3*	38.9*	41.5*	44.1*
0.7	27.4	29.3	31.1	33.0*	34.8*	36.7*
1	24.7	26.0	27.2	28.5	29.8	31.1
1.5	22.5	23.4	24.2	25.1	26.0	26.8
2	21.4	22.1	22.7	23.4	24.0	24.7
2.5	20.8	21.3	21.8	22.3	22.9	23.4
3	20.4	20.8	21.2	21.6	22.1	22.5
4	19.8	20.1	20.5	20.8	21.1	21.4
5	19.5	19.8	20.0	20.3	20.5	20.8

*Studies have found the instantaneous lethal limit for cold water fish to be 32°C. Effluent temperatures exceeding 32°C would have to be evaluated for thermal plume effects according to OAR 340-41-0053 (2)(d)(B) and may be restricted.

Effluent flow rate and temperature combinations which meet Excess Thermal Load Allocations for Pudding river flow rates as measured at the Woodburn Gage for June 1 to June 30, when the applicable criteria (T_c) is 18.0, are shown graphically in Figure D- 1. **Error! Reference source not found..** As shown, for river flow rates equal to or less than the 7Q10 river flow rate of 15 cfs, if the effluent temperature is 19.0°C, then 2.4 MGD of effluent may be discharged to the river. However, if the effluent temperature is 22.0°C, then only 0.5 MGD of effluent may be discharged to the river.

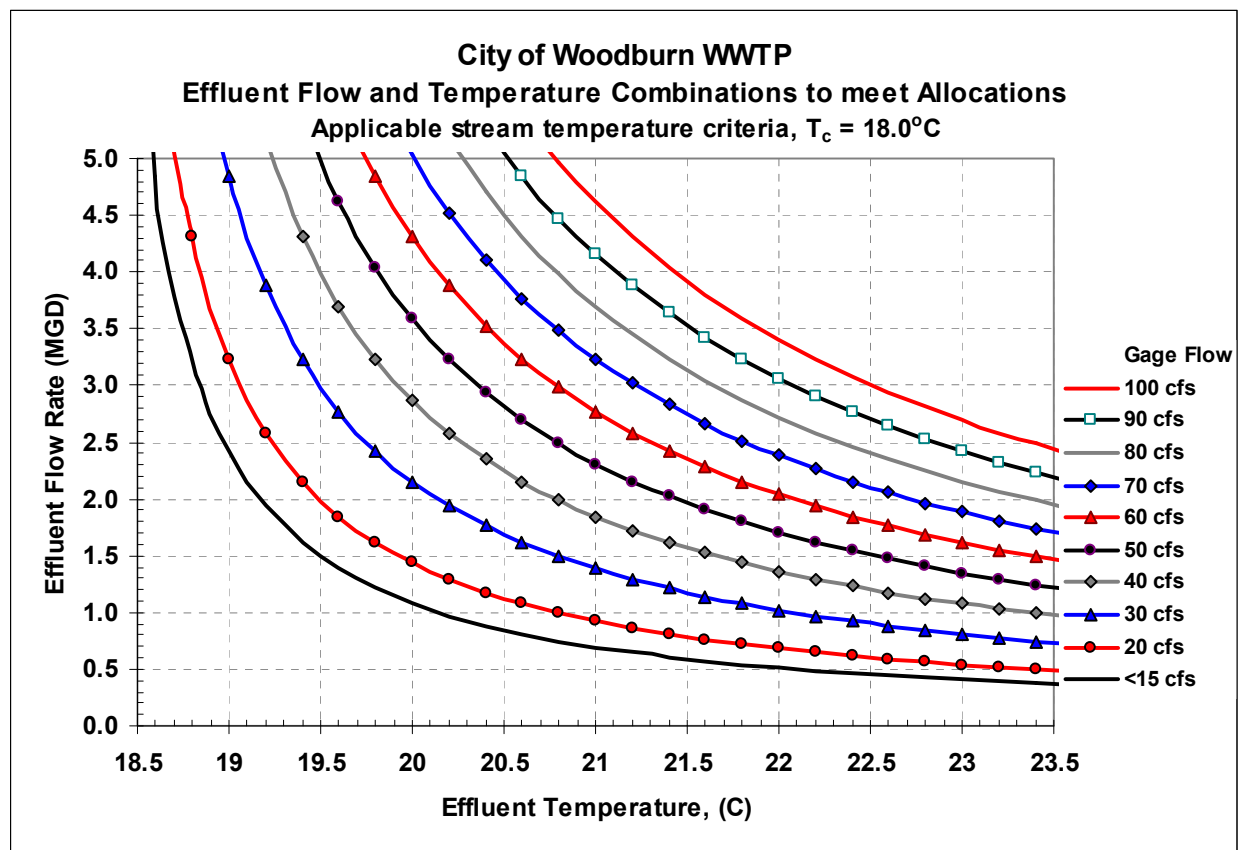


Figure D- 1: Effluent flow and temperature combinations for Woodburn WWTP that meet allocation for applicable criteria, $T_c=18.0^\circ\text{C}$.

Table D-4 b: July 1 to July 14.

These effluent temperatures and flows in this table are examples, not allocations.

Q_R at Woodburn gage (cfs):	≤15	20	25	30	35	40
<u>Q_e (MGD)</u>	T_e	T_e	T_e	T_e	T_e	T_e
0.1	39.7*	46.2*	52.6*	59.1*	65.5*	72.0*
0.2	30.0	33.2*	36.5*	39.7*	42.9*	46.2*
0.3	26.8	28.9	31.1	33.2*	35.4*	37.5*
0.5	24.2	25.5	26.8	28.1	29.3	30.6
0.7	23.1	24.0	24.9	25.8	26.8	27.7
1	22.2	22.9	23.5	24.2	24.8	25.5
1.5	21.6	22.0	22.5	22.9	23.3	23.7
2	21.3	21.6	21.9	22.2	22.6	22.9
2.5	21.1	21.3	21.6	21.9	22.1	22.4
3	20.9	21.2	21.4	21.6	21.8	22.0
4	20.8	20.9	21.1	21.3	21.4	21.6
5	20.7	20.8	20.9	21.1	21.2	21.3

Q_R at Woodburn gage (cfs):	50	60	70	80	90	100
<u>Q_e (MGD)</u>	T_e	T_e	T_e	T_e	T_e	T_e
0.1	84.9*	97.9*	110.8*	123.7*	136.7*	149.6*
0.2	52.6*	59.1*	65.5*	72.0*	78.5*	84.9*
0.3	41.8*	46.2*	50.5*	54.8*	59.1*	63.4*
0.5	33.2*	35.8*	38.4*	41.0*	43.6*	46.2*
0.7	29.5	31.4	33.2*	35.1*	36.9*	38.8*
1	26.8	28.1	29.3	30.6	31.9	33.2*
1.5	24.6	25.5	26.3	27.2	28.1	28.9
2	23.5	24.2	24.8	25.5	26.1	26.8
2.5	22.9	23.4	23.9	24.4	25.0	25.5
3	22.5	22.9	23.3	23.7	24.2	24.6
4	21.9	22.2	22.6	22.9	23.2	23.5
5	21.6	21.9	22.1	22.4	22.6	22.9

*Studies have found the instantaneous lethal limit for cold water fish to be 32°C. Effluent temperatures exceeding 32°C would have to be evaluated for thermal plume effects according to OAR 340-41-0053 (2)(d)(B) and may be restricted.

Effluent flow rate and temperature combinations which meet Excess Thermal Load Allocations for Pudding river flow rates as measured at the Woodburn Gage for July 1 to July 14, when the applicable criteria (T_c) is 20.1, are shown graphically in Figure D- 2. As shown, for river flow rates equal to or less than the 7Q10 river flow rate of 15 cfs, if the effluent temperature is 21.0°C, then 2.8 MGD of effluent may be discharged to the river. However, if the effluent temperature is 24.0°C, then only 0.5 MGD of effluent may be discharged to the river.

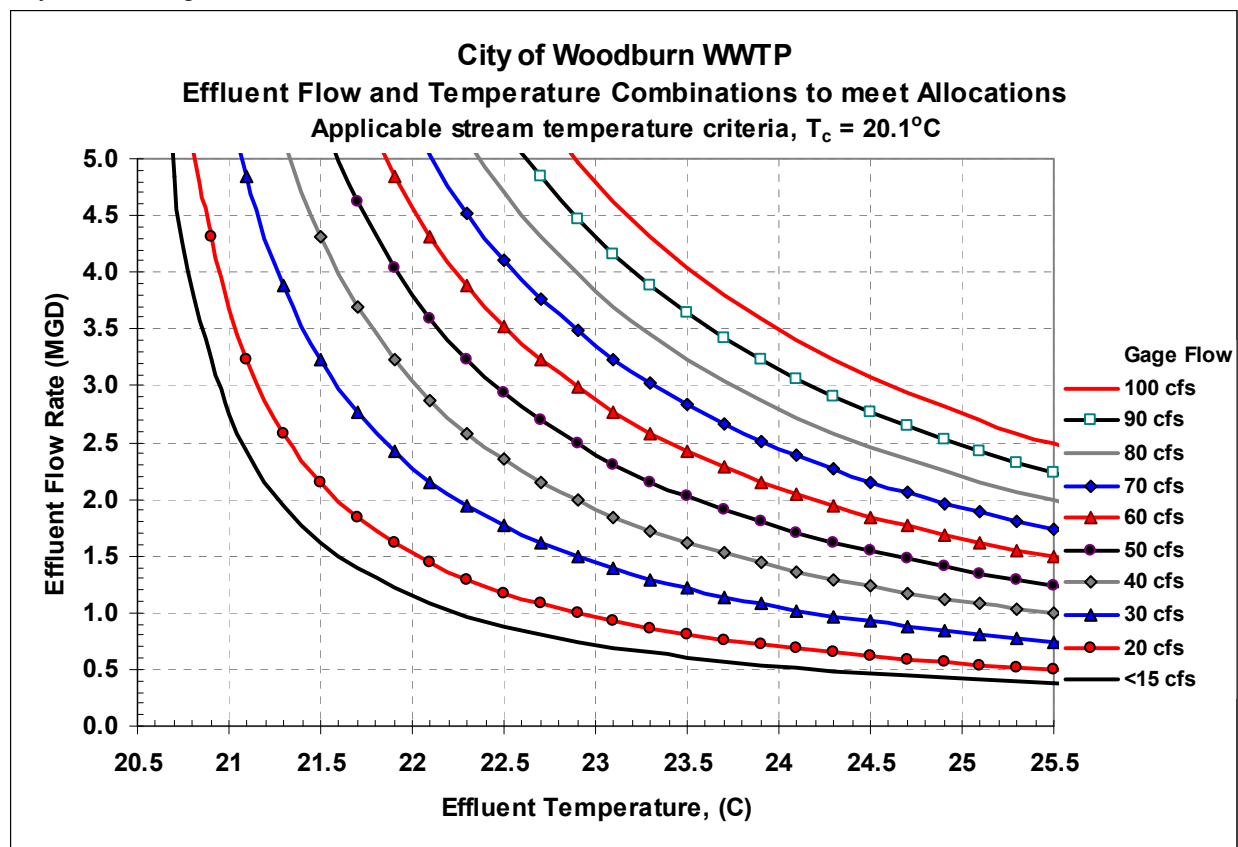


Figure D- 2: Effluent flow and temperature combinations for Woodburn WWTP that meet allocation for applicable criteria, $T_c=20.1^\circ\text{C}$.

Table D-4 c: July 15 to August 31.

These effluent temperatures and flows in this table are examples, not allocations.

Q_R at Woodburn gage (cfs):	≤15	20	25	30	35	40
<u>Q_e (MGD)</u>	T_e	T_e	T_e	T_e	T_e	T_e
0.1	41.2*	47.7*	54.1*	60.6*	67.0*	73.5*
0.2	31.5	34.7*	38.0*	41.2*	44.4*	47.7*
0.3	28.3	30.4	32.6*	34.7*	36.9*	39.0*
0.5	25.7	27.0	28.3	29.6	30.8	32.1*
0.7	24.6	25.5	26.4	27.3	28.3	29.2
1	23.7	24.4	25.0	25.7	26.3	27.0
1.5	23.1	23.5	24.0	24.4	24.8	25.2
2	22.8	23.1	23.4	23.7	24.1	24.4
2.5	22.6	22.8	23.1	23.4	23.6	23.9
3	22.4	22.7	22.9	23.1	23.3	23.5
4	22.3	22.4	22.6	22.8	22.9	23.1
5	22.2	22.3	22.4	22.6	22.7	22.8

Q_R at Woodburn gage (cfs):	50	60	70	80	90	100
<u>Q_e (MGD)</u>	T_e	T_e	T_e	T_e	T_e	T_e
0.1	86.4*	99.4*	112.3*	125.2*	138.2*	151.1*
0.2	54.1*	60.6*	67.0*	73.5*	80.0*	86.4*
0.3	43.3*	47.7*	52.0*	56.3*	60.6*	64.9*
0.5	34.7*	37.3*	39.9*	42.5*	45.1*	47.7*
0.7	31.0	32.9*	34.7*	36.6*	38.4*	40.3*
1	28.3	29.6	30.8	32.1*	33.4*	34.7*
1.5	26.1	27.0	27.8	28.7	29.6	30.4
2	25.0	25.7	26.3	27.0	27.6	28.3
2.5	24.4	24.9	25.4	25.9	26.5	27.0
3	24.0	24.4	24.8	25.2	25.7	26.1
4	23.4	23.7	24.1	24.4	24.7	25.0
5	23.1	23.4	23.6	23.9	24.1	24.4

*Studies have found the instantaneous lethal limit for cold water fish to be 32°C. Effluent temperatures exceeding 32°C would have to be evaluated for thermal plume effects according to OAR 340-41-0053 (2)(d)(B) and may be restricted.

Effluent flow rate and temperature combinations which meet Excess Thermal Load Allocations for Pudding river flow rates as measured at the Woodburn Gage for July 15 to August 31, when the applicable criteria (T_c) is 21.6°C , are also shown graphically in Figure D- 3. As shown, for river flow rates equal to or less than the 7Q10 river flow rate of 15 cfs, if the effluent temperature is 22.5°C , then 2.8 MGD of effluent may be discharged to the river. However, if the effluent temperature is 24.0°C , then only 0.9 MGD of effluent may be discharged.

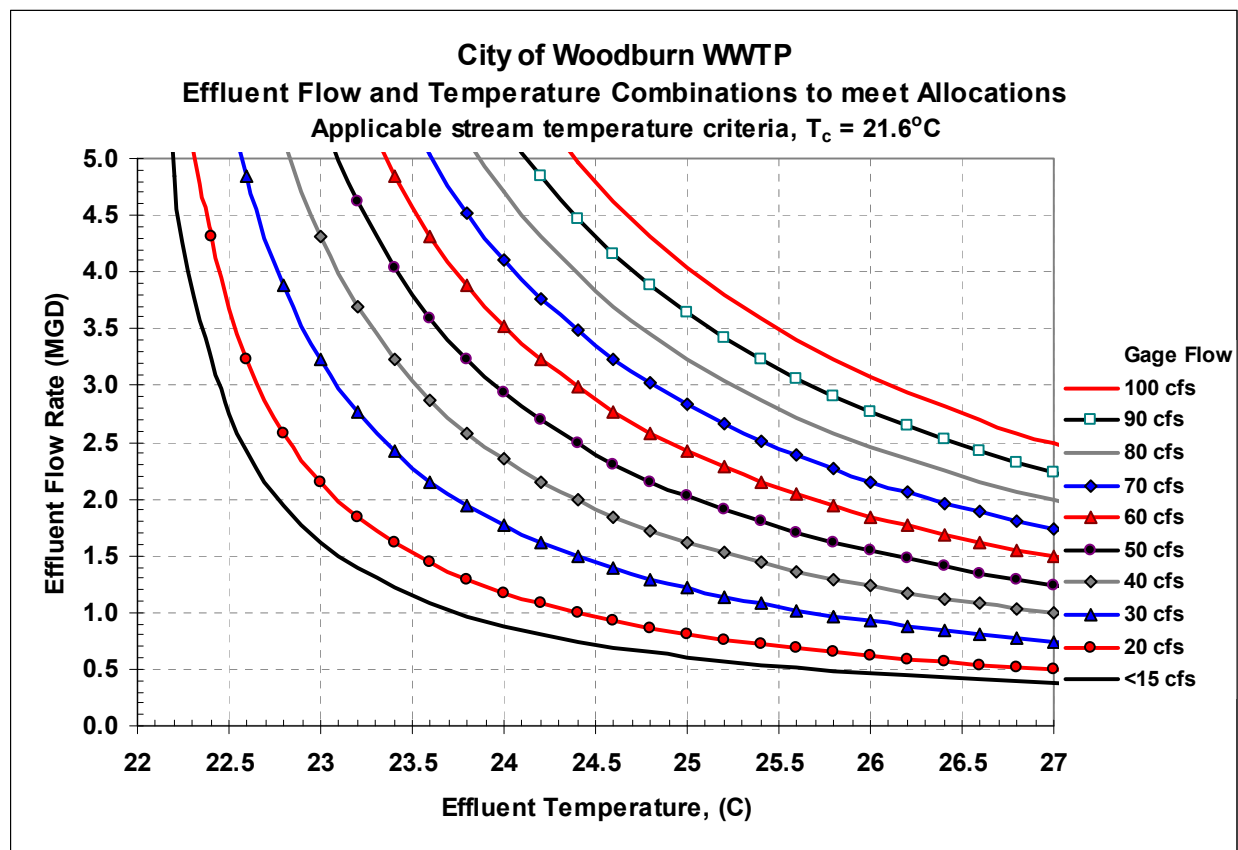


Figure D- 3: Effluent flow and temperature combinations for Woodburn WWTP that meet allocation for applicable criteria, $T_c=21.6^\circ\text{C}$.

Table D-4 d: September 1 to September 15.

These effluent temperatures and flows in this table are examples, not allocations.

Q_R at Woodburn gage (cfs):	≤15	20	25	30	35	40
<u>Q_e (MGD)</u>	T_e	T_e	T_e	T_e	T_e	T_e
0.1	37.8*	44.3*	50.7*	57.2*	63.6*	70.1*
0.2	28.1	31.3*	34.6*	37.8*	41.0*	44.3*
0.3	24.9	27.0	29.2	31.3	33.5*	35.6*
0.5	22.3	23.6	24.9	26.2	27.4	28.7
0.7	21.2	22.1	23.0	23.9	24.9	25.8
1	20.3	21.0	21.6	22.3	22.9	23.6
1.5	19.7	20.1	20.6	21.0	21.4	21.8
2	19.4	19.7	20.0	20.3	20.7	21.0
2.5	19.2	19.4	19.7	20.0	20.2	20.5
3	19.0	19.3	19.5	19.7	19.9	20.1
4	18.9	19.0	19.2	19.4	19.5	19.7
5	18.8	18.9	19.0	19.2	19.3	19.4

Q_R at Woodburn gage (cfs):	50	60	70	80	90	100
<u>Q_e (MGD)</u>	T_e	T_e	T_e	T_e	T_e	T_e
0.1	83.0*	96.0*	108.9*	121.8*	134.8*	147.7*
0.2	50.7*	57.2*	63.68	70.1*	76.6*	83.0*
0.3	39.9*	44.3*	48.6*	52.9*	57.2*	61.5*
0.5	31.3	33.9*	36.5*	39.1*	41.7*	44.3*
0.7	27.6	29.5	31.3	33.2*	35.0*	36.9*
1	24.9	26.2	27.4	28.7	30.0	31.3
1.5	22.7	23.6	24.4	25.3	26.2	27.0
2	21.6	22.3	22.9	23.6	24.2	24.9
2.5	21.0	21.5	22.0	22.5	23.1	23.6
3	20.6	21.0	21.4	21.8	22.3	22.7
4	20.0	20.3	20.7	21.0	21.3	21.6
5	19.7	20.0	20.2	20.5	20.7	21.0

*Studies have found the instantaneous lethal limit for cold water fish to be 32°C. Effluent temperatures exceeding 32°C would have to be evaluated for thermal plume effects according to OAR 340-41-0053 (2)(d)(B) and may be restricted.

Effluent flow rate and temperature combinations which meet Excess Thermal Load Allocations for Pudding river flow rates as measured at the Woodburn Gage for September 1 to September 15, when the applicable criteria (T_c) is 18.2°C , are also shown graphically in Figure D- 4. As shown, for river flow rates equal to or less than the 7Q10 river flow rate of 15 cfs, if the effluent temperature is 19.0°C , then 3.2 MGD of effluent may be discharged to the river. However, if the effluent temperature is 22.0°C , then only 0.5 MGD of effluent may be discharged.

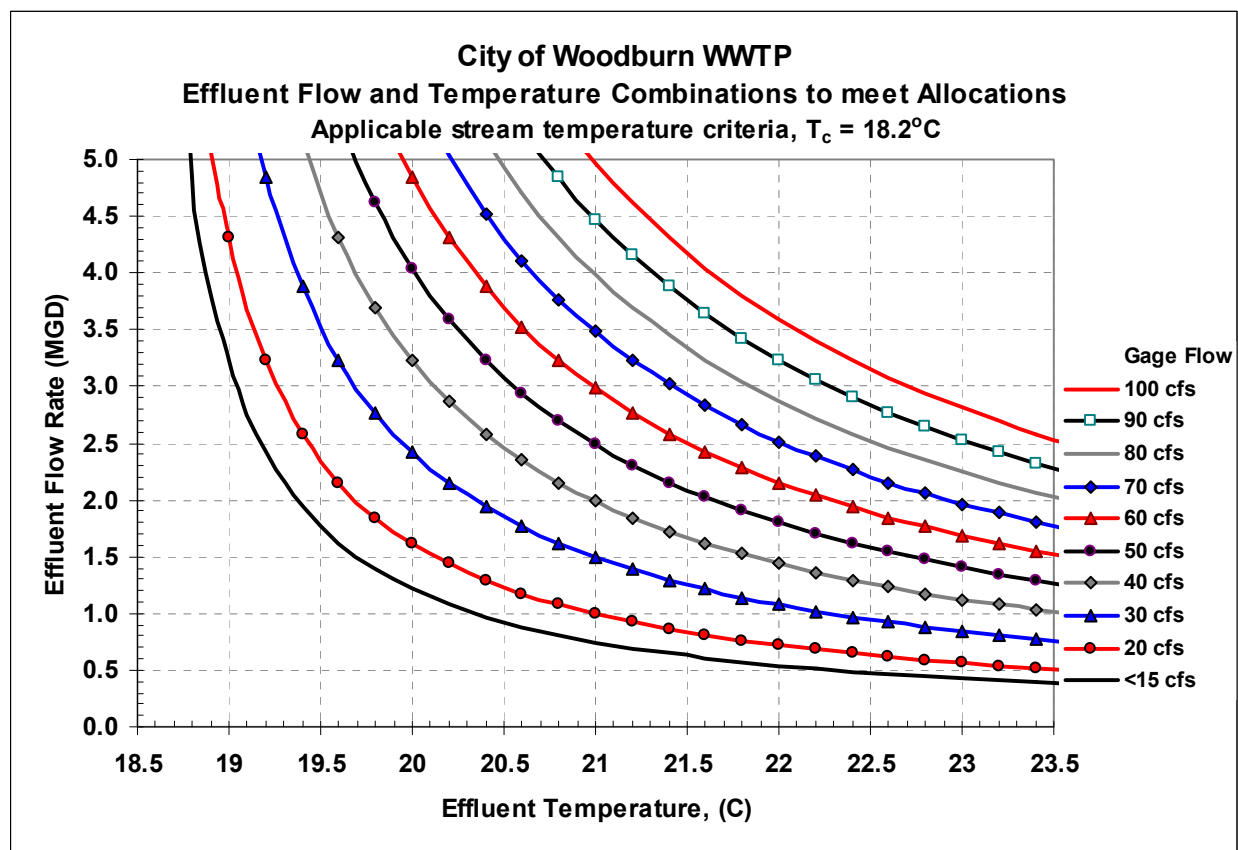


Figure D- 4: Effluent flow and temperature combinations for Woodburn WWTP that meet allocation for applicable criteria, $T_c=18.2^\circ\text{C}$.

Table D-4 e: September 15 to September 30.

These effluent temperatures and flows in this table are examples, not allocations.

Q_R at Woodburn gage (cfs):	≤15	20	25	30	35	40
<u>Q_e (MGD)</u>	T_e	T_e	T_e	T_e	T_e	T_e
0.1	37.6*	44.1*	50.5*	57.0*	63.4*	69.9*
0.2	27.9	31.1	34.4*	37.6*	40.8*	44.1*
0.3	24.7	26.8	29.0	31.1	33.3*	35.4*
0.5	22.1	23.4	24.7	26.0	27.2	28.5
0.7	21.0	21.9	22.8	23.7	24.7	25.6
1	20.1	20.8	21.4	22.1	22.7	23.4
1.5	19.5	19.9	20.4	20.8	21.2	21.6
2	19.2	19.5	19.8	20.1	20.5	20.8
2.5	19.0	19.2	19.5	19.8	20.0	20.3
3	18.8	19.1	19.3	19.5	19.7	19.9
4	18.7	18.8	19.0	19.2	19.3	19.5
5	18.6	18.7	18.8	19.0	19.1	19.2

Q_R at Woodburn gage (cfs):	50	60	70	80	90	100
<u>Q_e (MGD)</u>	T_e	T_e	T_e	T_e	T_e	T_e
0.1	82.8*	95.8*	108.7*	121.6*	134.6*	147.5*
0.2	50.5*	57.0*	63.4*	69.9*	76.4*	82.8*
0.3	39.7*	44.1*	48.4*	52.7*	57.0*	61.3*
0.5	31.1	33.7*	36.3*	38.9*	41.5*	44.1*
0.7	27.4	29.3	31.1	33.0*	34.8*	36.7*
1	24.7	26.0	27.2	28.5	29.8	31.1
1.5	22.5	23.4	24.2	25.1	26.0	26.8
2	21.4	22.1	22.7	23.4	24.0	24.7
2.5	20.8	21.3	21.8	22.3	22.9	23.4
3	20.4	20.8	21.2	21.6	22.1	22.5
4	19.8	20.1	20.5	20.8	21.1	21.4
5	19.5	19.8	20.0	20.3	20.5	20.8

*Studies have found the instantaneous lethal limit for cold water fish to be 32°C. Effluent temperatures exceeding 32°C would have to be evaluated for thermal plume effects according to OAR 340-41-0053 (2)(d)(B) and may be restricted.

Effluent flow rate and temperature combinations which meet Excess Thermal Load Allocations for Pudding river flow rates as measured at the Woodburn Gage for June 1 to June 30, when the applicable criteria (T_c) is 18.0, are shown graphically in Figure D- 5. As shown, for river flow rates equal to or less than the 7Q10 river flow rate of 15 cfs, if the effluent temperature is 19.0°C, then 2.4 MGD of effluent may be discharged to the river. However, if the effluent temperature is 22.0°C, then only 0.5 MGD of effluent may be discharged to the river.

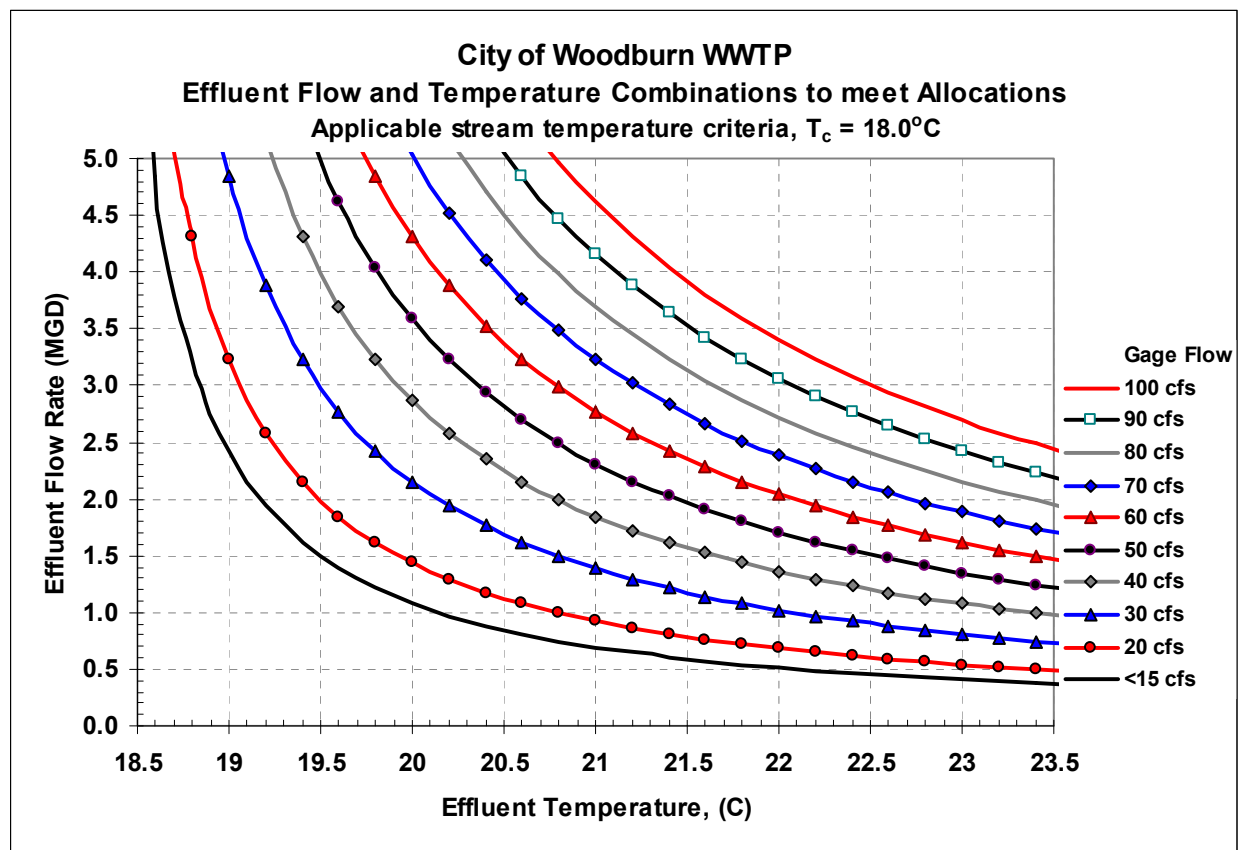


Figure D- 5: Effluent flow and temperature combinations for Woodburn WWTP that meet allocation for applicable criteria, $T_c=18.0^\circ\text{C}$.

Silverton WWTP

Table D- 5 shows the applicable criteria for the location of the Silverton WWTP. Table D- 6 shows examples of the flow and discharge combinations that will meet the excess thermal load allocation.

Table D- 5: Applicable temperature Criteria, T_c , for Silver Creek.

Time Period	Applicable Criteria, T_c ($^\circ\text{C}$)
June 1 to July 14	18
July 15 to August 31	19.1
September 1 to September 30	18

Table D- 6: Silverton WWTP effluent temperatures (°C), river flow, and effluent flow combinations within allocated excess thermal load.

Table D-6 a: June 1 to July 14.

These effluent temperatures and flows in this table are examples, not allocations.

Q_R at Silverton gage (cfs):	≤3.5	5	7.5	10	12.5	15
Q_e (MGD)	T_e	T_e	T_e	T_e	T_e	T_e
0.1	22.7	24.7	27.9	31.1	34.4*	37.6*
0.2	20.5	21.4	23.0	24.7	26.3	27.9
0.3	19.7	20.4	21.4	22.5	23.6	24.7
0.4	19.3	19.8	20.6	21.4	22.2	23.0
0.5	19.1	19.5	20.1	20.8	21.4	22.1
0.7	18.8	19.1	19.6	20.0	20.5	21.0
1.0	18.7	18.8	19.2	19.5	19.8	20.1
1.5	18.5	18.6	18.8	19.1	19.3	19.5
2.0	18.4	18.5	18.7	18.8	19.0	19.2
2.5	18.4	18.5	18.6	18.7	18.8	19.0
3.0	18.4	18.4	18.5	18.6	18.7	18.8
4.0	18.3	18.4	18.4	18.5	18.6	18.7

Q_R at Silverton gage (cfs):	17.5	20	22.5	25	27.5	30
Q_e (MGD)	T_e	T_e	T_e	T_e	T_e	T_e
0.1	40.8*	44.1*	47.3*	50.5*	53.8*	57.0*
0.2	29.5	31.1	32.7*	34.4*	36.0*	37.6*
0.3	25.7	26.8	27.9	29.0	30.1	31.1
0.4	23.9	24.7	25.5	26.3	27.1	27.9
0.5	22.7	23.4	24.0	24.7	25.3	26.0
0.7	21.4	21.9	22.4	22.8	23.3	23.7
1.0	20.5	20.8	21.1	21.4	21.8	22.1
1.5	19.7	19.9	20.1	20.4	20.6	20.8
2.0	19.3	19.5	19.7	19.8	20.0	20.1
2.5	19.1	19.2	19.4	19.5	19.6	19.8
3.0	19.0	19.1	19.2	19.3	19.4	19.5
4.0	18.8	18.8	18.9	19.0	19.1	19.2

*Studies have found the instantaneous lethal limit for cold water fish to be 32°C. Effluent temperatures exceeding 32°C would have to be evaluated for thermal plume effects according to OAR 340-41-0053 (2)(d)(B) and may be restricted.

Effluent flow rate and temperature combinations which meet Excess Thermal Load Allocations for Silver Creek flow rates as measured at Silverton for June 1 to July 14, when the applicable criteria (T_c) is 18.0°C, are shown graphically in Figure D- 6. As shown, for river flow rates equal to or less than the 7Q10 river flow rate of 3.5 cfs, if the effluent temperature is 18.5°C, then 1.5 MGD of effluent may be discharged to the river. However, if the effluent temperature is 21.5°C, then only 0.14 MGD of effluent may be discharged to the river.

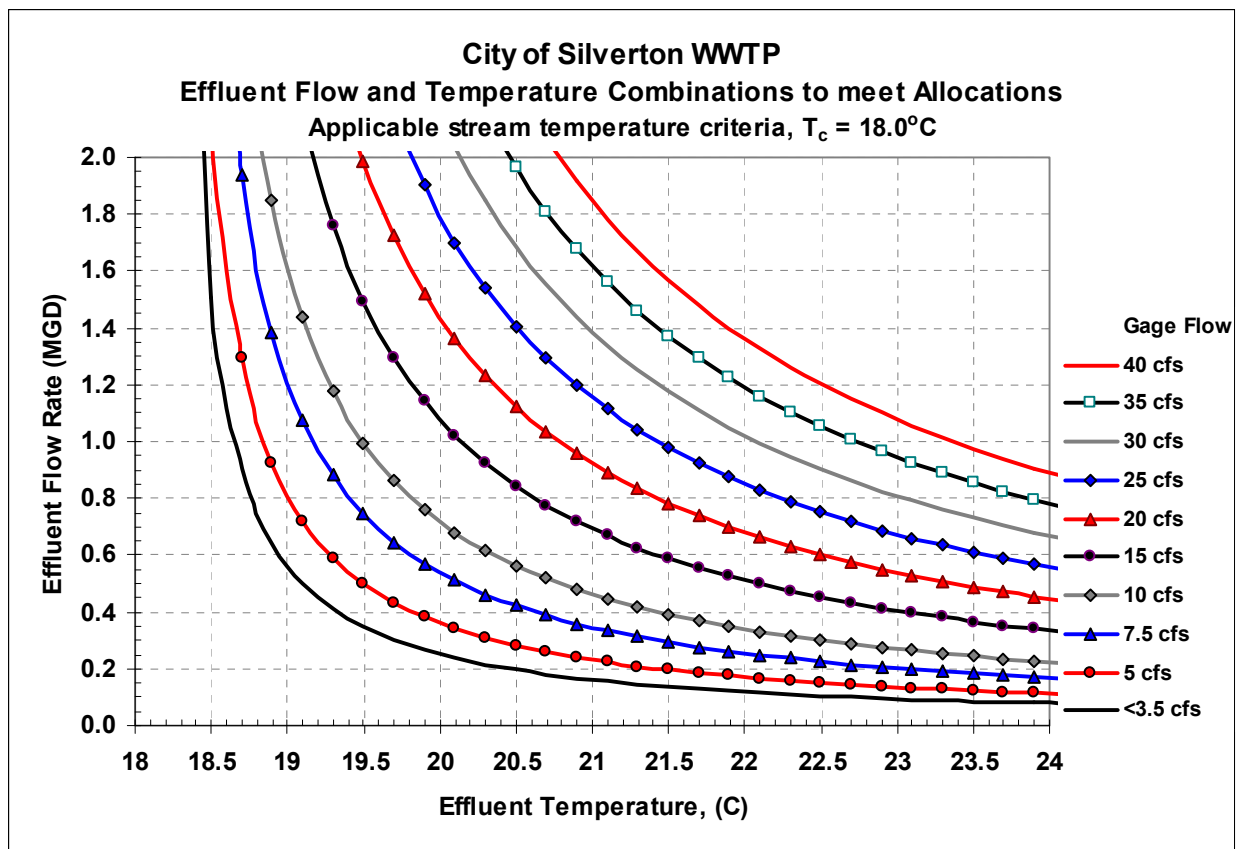


Figure D- 6: Effluent flow and temperature combinations for Silverton WWTP that meet allocation for applicable criteria, $T_c=18.0^\circ\text{C}$.

Table D-6 b: July 15 to August 31.

These effluent temperatures and flows in this table are examples, not allocations.

Q_R at Silverton gage (cfs):	3.5	5	7.5	10	12.5	15
Q_e (MGD)	T_e	T_e	T_e	T_e	T_e	T_e
0.1	23.8	25.8	29.0	32.2*	35.5*	38.7*
0.2	21.6	22.5	24.1	25.8	27.4	29.0
0.3	20.8	21.5	22.5	23.6	24.7	25.8
0.4	20.4	20.9	21.7	22.5	23.3	24.1
0.5	20.2	20.6	21.2	21.9	22.5	23.2
0.7	19.9	20.2	20.7	21.1	21.6	22.1
1.0	19.8	19.9	20.3	20.6	20.9	21.2
1.5	19.6	19.7	19.9	20.2	20.4	20.6
2.0	19.5	19.6	19.8	19.9	20.1	20.3
2.5	19.5	19.6	19.7	19.8	19.9	20.1
3.0	19.5	19.5	19.6	19.7	19.8	19.9
4.0	19.4	19.5	19.5	19.6	19.7	19.8

Q_R at Silverton gage (cfs):	17.5	20	22.5	25	27.5	30
Q_e (MGD)	T_e	T_e	T_e	T_e	T_e	T_e
0.1	41.9*	45.2*	48.4*	51.6*	54.9*	58.1*
0.2	30.6	32.2*	33.8*	35.5*	37.1*	38.7*
0.3	26.8	27.9	29.0	30.1	31.2	32.2*
0.4	25.0	25.8	26.6	27.4	28.2	29.0
0.5	23.8	24.5	25.1	25.8	26.4	27.1
0.7	22.5	23.0	23.5	23.9	24.4	24.8
1.0	21.6	21.9	22.2	22.5	22.9	23.2
1.5	20.8	21.0	21.2	21.5	21.7	21.9
2.0	20.4	20.6	20.8	20.9	21.1	21.2
2.5	20.2	20.3	20.5	20.6	20.7	20.9
3.0	20.1	20.2	20.3	20.4	20.5	20.6
4.0	19.9	19.9	20.0	20.1	20.2	20.3

*Studies have found the instantaneous lethal limit for cold water fish to be 32°C. Effluent temperatures exceeding 32°C would have to be evaluated for thermal plume effects according to OAR 340-41-0053 (2)(d)(B) and may be restricted.

Effluent flow rate and temperature combinations which meet Excess Thermal Load Allocations for Silver Creek flow rates as measured at Silverton for July 15 to August 31, when the applicable criteria (T_c) is 19.1°C, are shown graphically in Figure D- 7. As shown, for river flow rates equal to or less than the 7Q10 river flow rate of 3.5 cfs, if the effluent temperature is 20.0°C, then 0.65 MGD of effluent may be discharged to the river. However, if the effluent temperature is 23.0°C, then only 0.12 MGD of effluent may be discharged to the river.

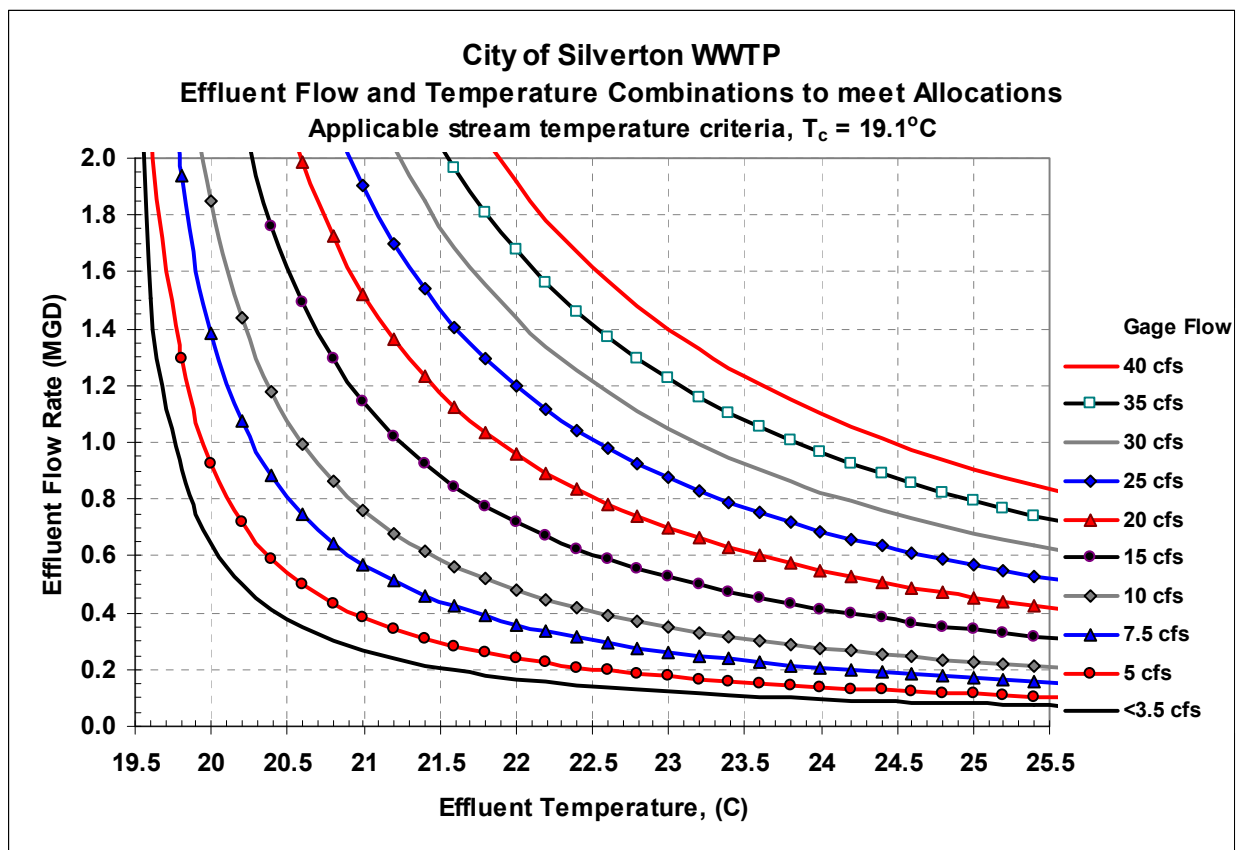


Figure D- 7: Effluent flow and temperature combinations for Silverton WWTP that meet allocation for applicable criteria, $T_c=19.1^\circ\text{C}$.

Table D-6 c: September 1 to September 30.

These effluent temperatures and flows in this table are examples, not allocations.

Q_R at Silverton gage (cfs):	≤3.5	5	7.5	10	12.5	15
Q_e (MGD)	T_e	T_e	T_e	T_e	T_e	T_e
0.1	22.7	24.7	27.9	31.1	34.4*	37.6*
0.2	20.5	21.4	23.0	24.7	26.3	27.9
0.3	19.7	20.4	21.4	22.5	23.6	24.7
0.4	19.3	19.8	20.6	21.4	22.2	23.0
0.5	19.1	19.5	20.1	20.8	21.4	22.1
0.7	18.8	19.1	19.6	20.0	20.5	21.0
1.0	18.7	18.8	19.2	19.5	19.8	20.1
1.5	18.5	18.6	18.8	19.1	19.3	19.5
2.0	18.4	18.5	18.7	18.8	19.0	19.2
2.5	18.4	18.5	18.6	18.7	18.8	19.0
3.0	18.4	18.4	18.5	18.6	18.7	18.8
4.0	18.3	18.4	18.4	18.5	18.6	18.7

Q_R at Silverton gage (cfs):	17.5	20	22.5	25	27.5	30
Q_e (MGD)	T_e	T_e	T_e	T_e	T_e	T_e
0.1	40.8*	44.1*	47.3*	50.5*	53.8*	57.0*
0.2	29.5	31.1	32.7*	34.4*	36.0*	37.6*
0.3	25.7	26.8	27.9	29.0	30.1	31.1
0.4	23.9	24.7	25.5	26.3	27.1	27.9
0.5	22.7	23.4	24.0	24.7	25.3	26.0
0.7	21.4	21.9	22.4	22.8	23.3	23.7
1.0	20.5	20.8	21.1	21.4	21.8	22.1
1.5	19.7	19.9	20.1	20.4	20.6	20.8
2.0	19.3	19.5	19.7	19.8	20.0	20.1
2.5	19.1	19.2	19.4	19.5	19.6	19.8
3.0	19.0	19.1	19.2	19.3	19.4	19.5
4.0	18.8	18.8	18.9	19.0	19.1	19.2

*Studies have found the instantaneous lethal limit for cold water fish to be 32°C. Effluent temperatures exceeding 32°C would have to be evaluated for thermal plume effects according to OAR 340-41-0053 (2)(d)(B) and may be restricted.

Effluent flow rate and temperature combinations which meet Excess Thermal Load Allocations for Silver Creek flow rates as measured at Silverton for June 1 to July 14, when the applicable criteria (T_c) is 18.0°C , are shown graphically in Figure D- 8. As shown, for river flow rates equal to or less than the 7Q10 river flow rate of 3.5 cfs, if the effluent temperature is 18.5°C , then 1.5 MGD of effluent may be discharged to the river. However, if the effluent temperature is 21.5°C , then only 0.14 MGD of effluent may be discharged to the river.

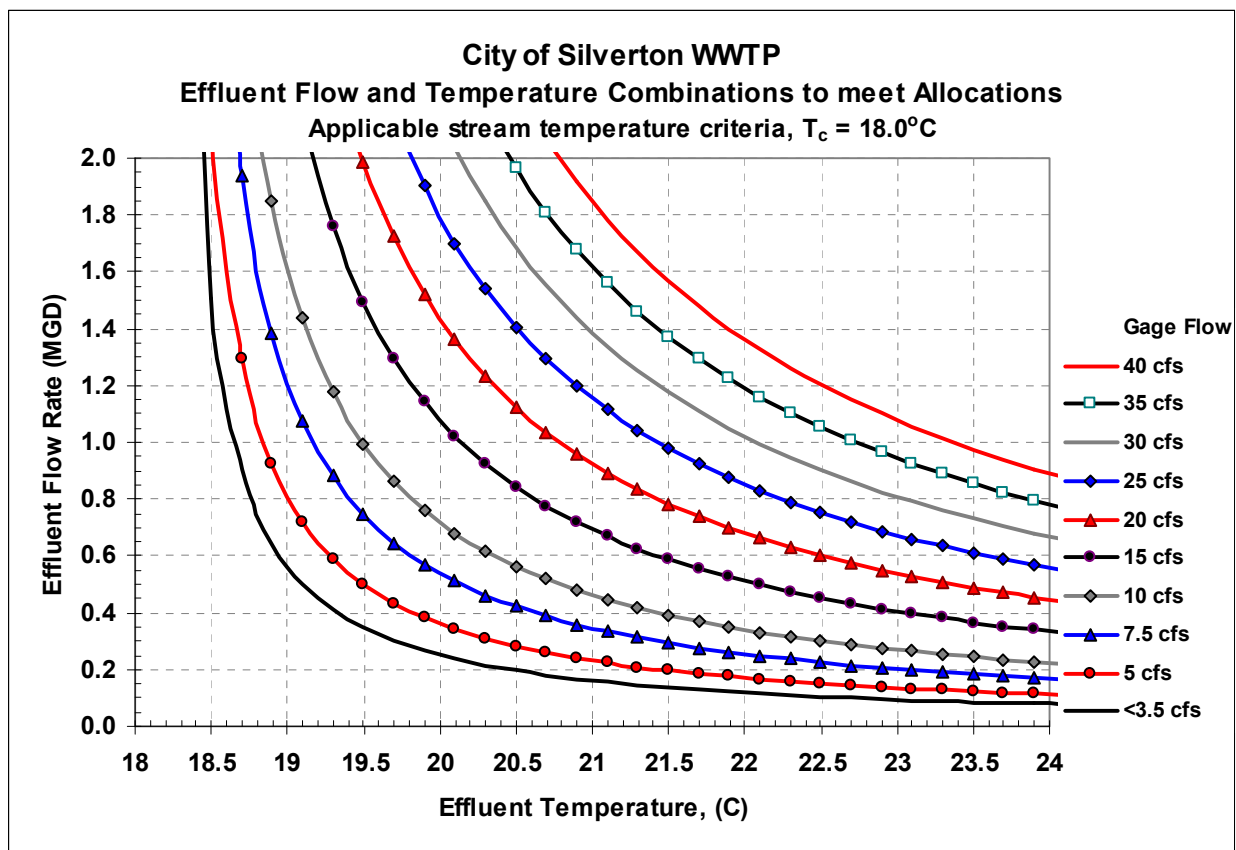


Figure D- 8: Effluent flow and temperature combinations for Silverton WWTP that meet allocation for applicable criteria, $T_c=18.0^\circ\text{C}$.

Hubbard WWTP

The applicable river temperature criteria, T_c , at the location of the City of Hubbard WWTP is 18°C. Table D- 7 shows examples of the flow and discharge combinations that will meet the excess thermal load allocation. The values in Table D- 7 assume that the stream discharge gage is located downstream from the Hubbard discharge and that the gage is close enough to be representative of stream flow immediately downstream from the discharge. Therefore, the ETL Allocations are calculated using Equation D-3 ($ETL = 0.2 \cdot Q_R \cdot C_F$).

Note also that Mill Creek in the vicinity of the Hubbard WWTP discharge is currently ungaged. A gage will need to be installed to take advantage of the flexibility provided by Table D- 7. If no gage is installed and flow is unknown, then Q_R should be set to the 7Q10 flow condition of 2.39 cfs for all ETL and allowable effluent flow and temperature calculations. In this case, only the column in Table D- 7 for Mill Creek flow rate of ≤ 2.39 cfs would apply.

Table D- 7: Hubbard WWTP effluent temperatures (°C), river flow, and effluent flow combinations within allocated excess thermal load - June 1 to September 30.

These effluent temperatures and flows in this table are examples, not allocations.

Mill Creek flow rate (cfs):	≤ 2.39	2.5	3	4	5	6
Q_e (MGD)	T_e	T_e	T_e	T_e	T_e	T_e
0.08	21.9	22.0	22.8	24.5	26.1	27.7
0.10	21.1	21.2	21.9	23.2	24.5	25.8
0.12	20.6	20.7	21.2	22.3	23.4	24.5
0.14	20.2	20.3	20.8	21.7	22.6	23.5
0.16	19.9	20.0	20.4	21.2	22.0	22.8
0.18	19.7	19.8	20.2	20.9	21.6	22.3
0.20	19.5	19.6	19.9	20.6	21.2	21.9
0.22	19.4	19.5	19.8	20.4	20.9	21.5
0.24	19.3	19.3	19.6	20.2	20.7	21.2
0.26	19.2	19.2	19.5	20.0	20.5	21.0
0.28	19.1	19.2	19.4	19.8	20.3	20.8
0.30	19.0	19.1	19.3	19.7	20.2	20.6

Mill Creek flow rate (cfs):	8	10	12.5	15	20	25
Q_e (MGD)	T_e	T_e	T_e	T_e	T_e	T_e
0.08	30.9	34.2*	38.2*	42.2*	50.3*	58.4*
0.10	28.3	30.9	34.2*	37.4*	43.9*	50.3*
0.12	26.6	28.8	31.5	34.2*	39.5*	44.9*
0.14	25.4	27.2	29.5	31.9	36.5*	41.1*
0.16	24.5	26.1	28.1	30.1	34.2*	38.2*
0.18	23.7	25.2	27.0	28.8	32.4*	36.0*
0.20	23.2	24.5	26.1	27.7	30.9	34.2*
0.22	22.7	23.9	25.3	26.8	29.8	32.7*
0.24	22.3	23.4	24.7	26.1	28.8	31.5
0.26	22.0	23.0	24.2	25.5	27.9	30.4
0.28	21.7	22.6	23.8	24.9	27.2	29.5
0.30	21.4	22.3	23.4	24.5	26.6	28.8

*Studies have found the instantaneous lethal limit for cold water fish to be 32°C. Effluent temperatures exceeding 32°C would have to be evaluated for thermal plume effects according to OAR 340-41-0053 (2)(d)(B) and may be restricted.

Effluent flow rate and temperature combinations which meet Excess Thermal Load Allocations for Mill Creek flow rates as measured downstream from the Hubbard WWTP discharge when the applicable criteria (T_c) is 18.0°C are shown graphically in Figure D- 9**Error! Reference source not found.** As shown, for river flow rates equal to or less than the 7Q10 river flow rate of 2.9 cfs, if the effluent temperature is 19.5°C , then 0.2 MGD of effluent may be discharged to the river. However, if the effluent temperature is 21.0°C , then only 0.1 MGD of effluent may be discharged.

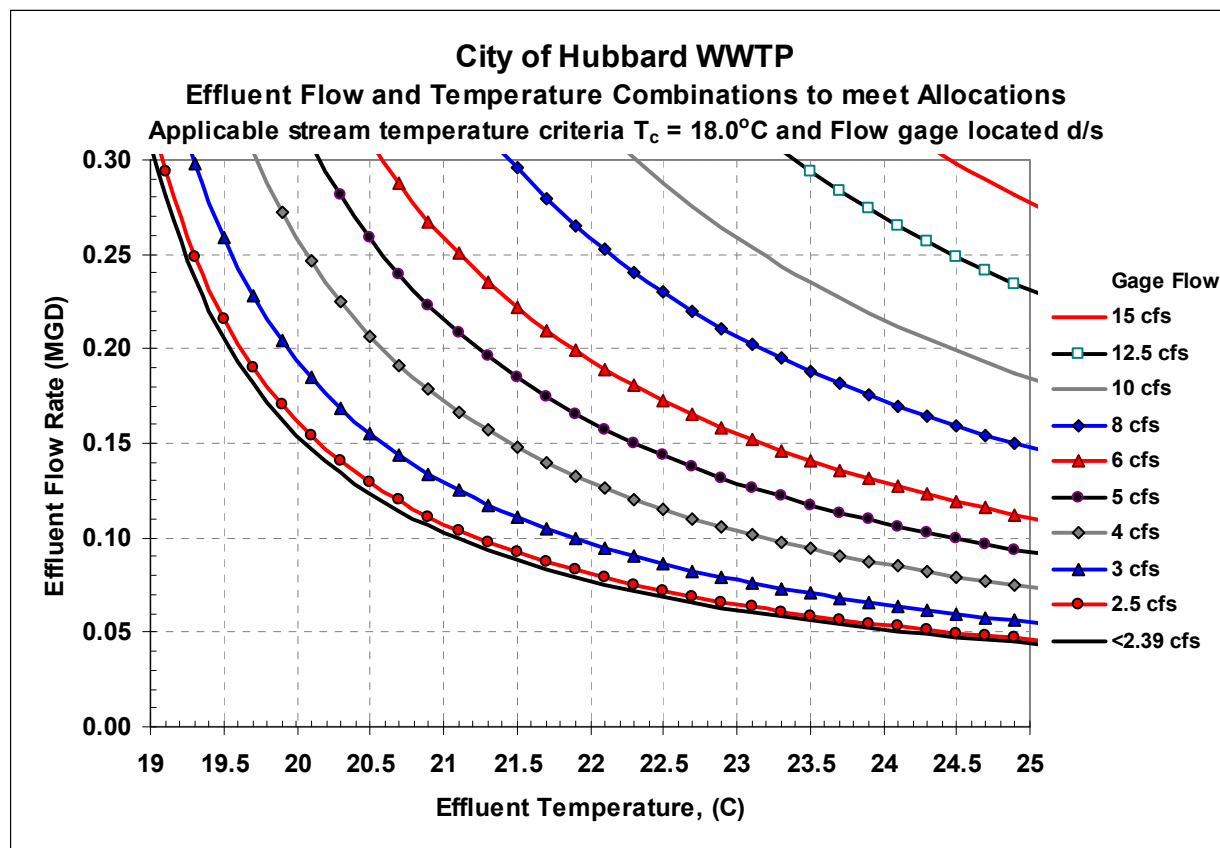


Figure D- 9: Effluent flow and temperature combinations for Hubbard WWTP that meet allocation for applicable criteria, $T_c=18.0^{\circ}\text{C}$, and gage located downstream.

Sanders Wood Products

Table D- 8 shows the applicable criteria for the location of Sanders Wood Products on the Molalla River. Table D- 9 shows examples of the flow and discharge combinations that will meet the excess thermal load allocation.

Table D- 8: Applicable temperature criteria for Molalla River at river mile 17, the locations of Sanders Wood Products..

Time period	Applicable Criteria, T _c (°C)
October 15 – May 15	13.0
May 16 to June 30	18.0
July 1 to July 15	19.2
July 16 to July 31	21.5
August 1 - 15	20.7
August 16 - 31	19.1
September 1 to October 14	18.0

Table D- 9: Sander Wood Products effluent temperatures (°C), river flow, and effluent flow combinations within allocated excess thermal load.

Table D-9 a: October 15 – October 31 and May 1 – May 15.

These effluent temperatures and flows in this table are examples, not allocations.

Molalla R. at Canby gage * 0.64 flow rate (cfs):	≤18	30	50	75	100
Q _e (MGD)	Te	Te	Te	Te	Te
0.1	31.8	44.2*	64.9*	90.7*	116.6*
0.2	22.5	28.7	39.0*	51.9*	64.9*
0.3	19.4	23.5	30.4	39.0*	47.6*
0.5	16.9	19.4	23.5	28.7	33.8*
0.7	15.8	17.6	20.5	24.2	27.9
1	15.0	16.3	18.3	20.9	23.5

*Studies have found the instantaneous lethal limit for cold water fish to be 32°C. Effluent temperatures exceeding 32°C would have to be evaluated for thermal plume effects according to OAR 340-41-0053 (2)(d)(B) and may be restricted.

Table D-9 b: May 16 – June 30 and September 1 – October 14.

These effluent temperatures and flows in this table are examples, not allocations.

Molalla R. at Canby gage * 0.64 flow rate (cfs):	≤18	30	50	75	100
Q _e (MGD)	Te	Te	Te	Te	Te
0.1	36.8*	49.2*	69.9*	95.7*	121.6*
0.2	27.5	33.7*	44.0*	56.9*	69.9*
0.3	24.4	28.5	35.4*	44.0*	52.6*
0.5	21.9	24.4	28.5	33.7*	38.8*
0.7	20.8	22.6	25.5	29.2	32.9*
1	20.0	21.3	23.3	25.9	28.5

*Studies have found the instantaneous lethal limit for cold water fish to be 32°C. Effluent temperatures exceeding 32°C would have to be evaluated for thermal plume effects according to OAR 340-41-0053 (2)(d)(B) and may be restricted.

Table D-9 c: July 1 – July 15.

These effluent temperatures and flows in this table are examples, not allocations.

Molalla R. at Canby gage * 0.64 flow rate (cfs):	≤18	30	50	75	100
<u>Q_e (MGD)</u>	Te	Te	Te	Te	Te
0.1	38.0*	50.4*	71.1*	96.9*	122.8*
0.2	28.7	34.9*	45.2*	58.1*	71.1*
0.3	25.6	29.7	36.6*	45.2*	53.8*
0.5	23.1	25.6	29.7	34.9*	40.0*
0.7	22.0	23.8	26.7	30.4	34.1*
1	21.2	22.5	24.5	27.1	29.7

*Studies have found the instantaneous lethal limit for cold water fish to be 32°C. Effluent temperatures exceeding 32°C would have to be evaluated for thermal plume effects according to OAR 340-41-0053 (2)(d)(B) and may be restricted.

Table D-9 d: July 16 – July 31.

These effluent temperatures and flows in this table are examples, not allocations.

Molalla R. at Canby gage * 0.64 flow rate (cfs):	≤18	30	50	75	100
<u>Q_e (MGD)</u>	Te	Te	Te	Te	Te
0.1	40.3*	52.7*	73.4*	99.2*	125.1*
0.2	31.0	37.2*	47.5*	60.4*	73.4*
0.3	27.9	32.0	38.9*	47.5*	56.1*
0.5	25.4	27.9	32.0	37.2*	42.3*
0.7	24.3	26.1	29.0	32.7*	36.4*
1	23.5	24.8	26.8	29.4	32.0

*Studies have found the instantaneous lethal limit for cold water fish to be 32°C. Effluent temperatures exceeding 32°C would have to be evaluated for thermal plume effects according to OAR 340-41-0053 (2)(d)(B) and may be restricted.

Table D-9 e: August 1 - 15.

These effluent temperatures and flows in this table are examples, not allocations.

Molalla R. at Canby gage * 0.64 flow rate (cfs):	≤18	30	50	75	100
<u>Q_e (MGD)</u>	Te	Te	Te	Te	Te
0.1	39.5*	51.9*	72.6*	98.4*	124.3*
0.2	30.2	36.4*	46.7*	59.6*	72.6*
0.3	27.1	31.2	38.1*	46.7*	55.3*
0.5	24.6	27.1	31.2	36.4*	41.5*
0.7	23.5	25.3	28.2	31.9	35.6*
1	22.7	24.0	26.0	28.6	31.2

*Studies have found the instantaneous lethal limit for cold water fish to be 32°C. Effluent temperatures exceeding 32°C would have to be evaluated for thermal plume effects according to OAR 340-41-0053 (2)(d)(B) and may be restricted.

Table D-9 f: August 16 - 31.

These effluent temperatures and flows in this table are examples, not allocations.

Molalla R. at Canby gage * 0.64 flow rate (cfs):	≤18	30	50	75	100
<u>Q_e (MGD)</u>	Te	Te	Te	Te	Te
0.1	37.9*	50.3*	71.0*	96.8*	122.7*
0.2	28.6	34.8*	45.1*	58.0*	71.0*
0.3	25.5	29.6	36.5*	45.1*	53.7*
0.5	23.0	25.5	29.6	34.8*	39.9*
0.7	21.9	23.7	26.6	30.3	34.0*
1	21.1	22.4	24.4	27.0	29.6

*Studies have found the instantaneous lethal limit for cold water fish to be 32°C. Effluent temperatures exceeding 32° would have to be evaluated for thermal plume effects according to OAR 340-41-0053 (2)(d)(B) and may be restricted.

Molalla Drinking Water Plant

Table D- 10 shows the applicable criteria for the location of the Molalla Drinking Water Plant. Table D- 11 shows examples of the flow and discharge combinations that will meet the excess thermal load allocation.

Table D- 10: Applicable criteria at river ile 21.6, the location of the Molalla drinking water treatment plant discharge.

Dates	Applicable Criteria T °C
June 16 – June 30	16
July 1 - 15	18.2
July 16 – 31	20.4
August 1 - 15	19.7
August 16 - 30	18.1
September 1 – October 14	16
October 15 – June 15	13

Table D- 11: Molalla DWP effluent temperatures (°C), river flow, and effluent flow combinations within allocated excess thermal load.

Table D-11 a: October 15 – October 31 and May 1 – June 15

These effluent temperatures and flows in this table are examples, not allocations.

Molalla R. at Canby gage * 0.64 flow rate (cfs):	≤18	30	50	75	100
<u>Q_e (MGD)</u>	Te	Te	Te	Te	Te
0.01	36.3*	51.8*	77.7*	110.0*	142.3*
0.02	24.7	32.4*	45.3*	61.5*	77.7*
0.03	20.8	25.9	34.6*	45.3*	56.1*
0.05	17.7	20.8	25.9	32.4*	38.9*
0.08	15.9	17.9	21.1	25.1	29.2
0.1	15.3	16.9	19.5	22.7	25.9

*Studies have found the instantaneous lethal limit for cold water fish to be 32°C. Effluent temperatures exceeding 32° would have to be evaluated for thermal plume effects according to OAR 340-41-0053 (2)(d)(B) and may be restricted.

Table D-11 b: June 16 – June 30 and September 1 – October 14.

These effluent temperatures and flows in this table are examples, not allocations.

Molalla R. at Canby gage * 0.64 flow rate (cfs):	≤18	30	50	75	100
<u>Q_e (MGD)</u>	Te	Te	Te	Te	Te
0.01	39.3	54.8	80.7	113.0	145.3
0.02	27.7	35.4	48.3	64.5	80.7
0.03	23.8	28.9	37.6	48.3	59.1
0.05	20.7	23.8	28.9	35.4	41.9
0.08	18.9	20.9	24.1	28.1	32.2
0.1	18.3	19.9	22.5	25.7	28.9

*Studies have found the instantaneous lethal limit for cold water fish to be 32°C. Effluent temperatures exceeding 32° would have to be evaluated for thermal plume effects according to OAR 340-41-0053 (2)(d)(B) and may be restricted.

Table D-11 c: July 1 – July 15

These effluent temperatures and flows in this table are examples, not allocations.

Molalla R. at Canby gage * 0.64 flow rate (cfs):	≤18	30	50	75	100
<u>Q_e (MGD)</u>	Te	Te	Te	Te	Te
0.01	41.5	57.0	82.9	115.2	147.5
0.02	29.9	37.6	50.5	66.7	82.9
0.03	26.0	31.1	39.8	50.5	61.3
0.05	22.9	26.0	31.1	37.6	44.1
0.08	21.1	23.1	26.3	30.3	34.4
0.1	20.5	22.1	24.7	27.9	31.1

*Studies have found the instantaneous lethal limit for cold water fish to be 32°C. Effluent temperatures exceeding 32° would have to be evaluated for thermal plume effects according to OAR 340-41-0053 (2)(d)(B) and may be restricted.

Table D-11 d: July 16 – 31

These effluent temperatures and flows in this table are examples, not allocations.

Molalla R. at Canby gage * 0.64 flow rate (cfs):	≤18	30	50	75	100
<u>Q_e (MGD)</u>	Te	Te	Te	Te	Te
0.01	43.7	59.2	85.1	117.4	149.7
0.02	32.1	39.8	52.7	68.9	85.1
0.03	28.2	33.3	42.0	52.7	63.5
0.05	25.1	28.2	33.3	39.8	46.3
0.08	23.3	25.3	28.5	32.5	36.6
0.1	22.7	24.3	26.9	30.1	28.9

*Studies have found the instantaneous lethal limit for cold water fish to be 32°C. Effluent temperatures exceeding 32° would have to be evaluated for thermal plume effects according to OAR 340-41-0053 (2)(d)(B) and may be restricted.

Table D-11 e: August 1 – 15

These effluent temperatures and flows in this table are examples, not allocations.

Molalla R. at Canby gage * 0.64 flow rate (cfs):	≤18	30	50	75	100
<u>Q_e (MGD)</u>	Te	Te	Te	Te	Te
0.01	43.0	58.5	84.4	116.7	149.0
0.02	31.4	39.1	52.0	68.2	84.4
0.03	27.5	32.6	41.3	52.0	62.8
0.05	24.4	27.5	32.6	39.1	45.6
0.08	22.6	24.6	27.8	31.8	35.9
0.1	22.0	23.6	26.2	29.4	32.6

*Studies have found the instantaneous lethal limit for cold water fish to be 32°C. Effluent temperatures exceeding 32° would have to be evaluated for thermal plume effects according to OAR 340-41-0053 (2)(d)(B) and may be restricted.

Table D-11 f: August 16 – 30

These effluent temperatures and flows in this table are examples, not allocations.

Molalla R. at Canby gage * 0.64 flow rate (cfs):	≤18	30	50	75	100
<u>Q_e (MGD)</u>	Te	Te	Te	Te	Te
0.01	41.4	56.9	82.8	115.1	147.4
0.02	29.8	37.5	50.4	66.6	82.8
0.03	25.9	31.0	39.7	50.4	61.2
0.05	22.8	25.9	31.0	37.5	44.0
0.08	21.0	23.0	26.2	30.2	34.3
0.1	20.4	22.0	24.6	27.8	31.0

*Studies have found the instantaneous lethal limit for cold water fish to be 32°C. Effluent temperatures exceeding 32° would have to be evaluated for thermal plume effects according to OAR 340-41-0053 (2)(d)(B) and may be restricted.