

**Appendix A1.** Estimated non-point source loads for the Upper Wye and Queenstown Harbor watersheds under current land cover conditions (MDP 2002).

HUC_ID	MDP LULC Code	LULC Description	Area (acres)	Percent Impervious Surface	Nitrogen Loading Rate for Pervious Surfaces (lbs/acre/yr)	Nitrogen Loading Rate for Impervious Surfaces (lbs/acre/yr)	Phosphorus Loading Rate for Pervious Surfaces (lbs/acre/yr)	Phosphorus Loading Rate for Impervious Surfaces (lbs/acre/yr)	Total Nitrogen Non-Point Source Load (lbs/year)	Total Phosphorus Non-Point Source Load (lbs/year)
QT01	11	Low Density Residential	9.9	14%	9.0	7.9	1.3	0.5	88.1	11.9
QT01	11	Low Density Residential	84.5	14%	9.0	7.9	1.3	0.5	748.9	101.0
QT01	12	Medium Density Residential	6.1	28%	9.0	7.9	1.3	0.5	52.8	6.6
QT01	14	Commercial	2.0	72%	9.0	7.9	1.3	0.5	16.7	1.5
QT01	14	Commercial	0.3	72%	9.0	7.9	1.3	0.5	2.8	0.2
QT01	14	Commercial	0.4	72%	9.0	7.9	1.3	0.5	3.0	0.3
QT01	14	Commercial	0.4	72%	9.0	7.9	1.3	0.5	3.1	0.3
QT01	14	Commercial	0.8	72%	9.0	7.9	1.3	0.5	6.7	0.6
QT01	14	Commercial	2.5	72%	9.0	7.9	1.3	0.5	20.1	1.8
QT01	16	Institutional	0.0	34%	9.0	7.9	1.3	0.5	0.2	0.0
QT01	16	Institutional	0.7	34%	9.0	7.9	1.3	0.5	5.7	0.7
QT01	16	Institutional	1.0	34%	9.0	7.9	1.3	0.5	9.0	1.1
QT01	16	Institutional	0.3	34%	9.0	7.9	1.3	0.5	2.8	0.3
QT01	16	Institutional	0.3	34%	9.0	7.9	1.3	0.5	2.5	0.3
QT01	16	Institutional	0.3	34%	9.0	7.9	1.3	0.5	2.2	0.3
QT01	18	Open Urban Land	0.1	9%	9.0	7.9	1.3	0.5	0.8	0.1
QT01	21	Cropland	45.5	0%	15.7	0.0	1.1	0.0	715.1	49.2
QT01	41	Deciduous Forest	20.7	0%	1.5	0.0	0.0	0.0	30.7	0.5
QT01	41	Deciduous Forest	1.9	0%	1.5	0.0	0.0	0.0	2.8	0.0
QT01	228	Deciduous Forest	1.3	0%	1.5	0.0	0.0	0.0	1.9	0.0
QT01	41	Deciduous Forest	0.4	0%	1.5	0.0	0.0	0.0	0.7	0.0
QT01	41	Deciduous Forest	6.3	0%	1.5	0.0	0.0	0.0	9.4	0.1
QT01	43	Mixed Forest	0.4	0%	1.5	0.0	0.0	0.0	0.6	0.0
QT02	11	Low Density Residential	15.1	14%	9.0	7.9	1.3	0.5	133.4	18.0
QT02	14	Commercial	1.6	72%	9.0	7.9	1.3	0.5	12.7	1.1
QT02	16	Institutional	0.2	34%	9.0	7.9	1.3	0.5	1.5	0.2
QT02	16	Institutional	1.6	34%	9.0	7.9	1.3	0.5	13.6	1.6
QT02	16	Institutional	1.2	34%	9.0	7.9	1.3	0.5	10.5	1.3
QT02	17	Extractive	9.2	2%	9.0	7.9	1.3	0.5	83.2	11.9
QT02	21	Cropland	315.8	0%	15.7	0.0	1.1	0.0	4962.4	341.5
QT02	22	Pasture	1.0	0%	9.7	0.0	1.4	0.0	9.9	1.5
QT02	41	Deciduous Forest	1.4	0%	1.5	0.0	0.0	0.0	2.1	0.0
QT02	41	Deciduous Forest	31.0	0%	1.5	0.0	0.0	0.0	46.1	0.7
QT02	41	Deciduous Forest	17.8	0%	1.5	0.0	0.0	0.0	26.4	0.4
QT02	43	Mixed Forest	7.7	0%	1.5	0.0	0.0	0.0	11.5	0.2
QT02	60	Wetlands	5.5	0%	1.5	0.0	0.0	0.0	8.2	0.1
QT03	11	Low Density Residential	9.0	14%	9.0	7.9	1.3	0.5	79.6	10.7
QT03	11	Low Density Residential	0.4	14%	9.0	7.9	1.3	0.5	3.9	0.5
QT03	12	Medium Density Residential	8.7	28%	9.0	7.9	1.3	0.5	76.0	9.4
QT03	12	Medium Density Residential	6.9	28%	9.0	7.9	1.3	0.5	60.3	7.5
QT03	14	Commercial	5.5	72%	9.0	7.9	1.3	0.5	44.9	4.0
QT03	14	Commercial	0.8	72%	9.0	7.9	1.3	0.5	6.5	0.6
QT03	14	Commercial	0.2	72%	9.0	7.9	1.3	0.5	2.0	0.2
QT03	14	Commercial	3.3	72%	9.0	7.9	1.3	0.5	27.2	2.4
QT03	14	Commercial	10.8	72%	9.0	7.9	1.3	0.5	88.2	7.8
QT03	14	Commercial	15.0	72%	9.0	7.9	1.3	0.5	123.1	10.9
QT03	21	Cropland	2.7	0%	15.7	0.0	1.1	0.0	41.7	2.9
QT03	21	Cropland	90.7	0%	15.7	0.0	1.1	0.0	1425.1	98.1
QT03	21	Cropland	63.2	0%	15.7	0.0	1.1	0.0	993.3	68.4
QT03	41	Deciduous Forest	203.1	0%	1.5	0.0	0.0	0.0	301.3	4.6
QT03	41	Deciduous Forest	1.8	0%	1.5	0.0	0.0	0.0	2.6	0.0
QT03	242	Agricultural Buildings	8.2	2%	9.7	0.0	1.4	0.0	78.1	11.5
QT04	14	Commercial	0.2	72%	9.0	7.9	1.3	0.5	1.9	0.2
QT04	17	Extractive	26.1	2%	9.0	7.9	1.3	0.5	235.0	33.7
QT04	21	Cropland	153.9	0%	15.7	0.0	1.1	0.0	2418.7	166.4
QT04	21	Cropland	395.9	0%	15.7	0.0	1.1	0.0	6221.1	428.1
QT04	21	Cropland	42.7	0%	15.7	0.0	1.1	0.0	671.0	46.2
QT04	21	Cropland	148.1	0%	15.7	0.0	1.1	0.0	2326.3	160.1
QT04	21	Cropland	82.1	0%	15.7	0.0	1.1	0.0	1290.2	88.8
QT04	22	Pasture	15.8	0%	9.7	0.0	1.4	0.0	153.1	22.5
QT04	41	Deciduous Forest	3.4	0%	1.5	0.0	0.0	0.0	5.1	0.1
QT04	41	Deciduous Forest	210.4	0%	1.5	0.0	0.0	0.0	312.1	4.7
QT04	41	Deciduous Forest	125.2	0%	1.5	0.0	0.0	0.0	185.7	2.8
QT04	41	Deciduous Forest	16.9	0%	1.5	0.0	0.0	0.0	25.1	0.4
QT04	41	Deciduous Forest	4.5	0%	1.5	0.0	0.0	0.0	6.7	0.1
QT04	41	Deciduous Forest	2.8	0%	1.5	0.0	0.0	0.0	4.2	0.1
QT04	60	Wetlands	6.8	0%	1.5	0.0	0.0	0.0	10.1	0.2
QT05	14	Commercial	5.2	72%	9.0	7.9	1.3	0.5	42.5	3.8
QT05	17	Extractive	25.1	2%	9.0	7.9	1.3	0.5	225.8	32.4
QT05	21	Cropland	8.1	0%	15.7	0.0	1.1	0.0	128.0	8.8
QT05	21	Cropland	328.5	0%	15.7	0.0	1.1	0.0	5162.0	355.2
QT05	41	Deciduous Forest	71.2	0%	1.5	0.0	0.0	0.0	105.6	1.6
QT05	41	Deciduous Forest	96.5	0%	1.5	0.0	0.0	0.0	143.1	2.2

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QT06	11	Low Density Residential	18.7	14%	9.0	7.9	1.3	0.5	165.8	22.4
QT06	21	Cropland	603.3	0%	15.7	0.0	1.1	0.0	9480.2	652.4
QT06	41	Deciduous Forest	44.2	0%	1.5	0.0	0.0	0.0	65.5	1.0
QT06	41	Deciduous Forest	61.0	0%	1.5	0.0	0.0	0.0	90.6	1.4
QT06	41	Deciduous Forest	37.1	0%	1.5	0.0	0.0	0.0	55.0	0.8
QT07	17	Extractive	41.9	2%	9.0	7.9	1.3	0.5	377.3	54.2
QT07	21	Cropland	44.1	0%	15.7	0.0	1.1	0.0	693.0	47.7
QT07	21	Cropland	85.0	0%	15.7	0.0	1.1	0.0	1336.0	91.9
QT07	41	Deciduous Forest	41.6	0%	1.5	0.0	0.0	0.0	61.7	0.9
QT08	11	Low Density Residential	4.2	14%	9.0	7.9	1.3	0.5	37.2	5.0
QT08	14	Commercial	8.0	72%	9.0	7.9	1.3	0.5	65.2	5.8
QT08	15	Industrial	33.3	53%	9.0	7.9	1.3	0.5	280.0	29.3
QT08	21	Cropland	160.0	0%	15.7	0.0	1.1	0.0	2513.7	173.0
QT08	21	Cropland	15.9	0%	15.7	0.0	1.1	0.0	250.2	17.2
QT08	41	Deciduous Forest	44.4	0%	1.5	0.0	0.0	0.0	65.9	1.0
QT08	41	Deciduous Forest	1.4	0%	1.5	0.0	0.0	0.0	2.1	0.0
QT09	11	Low Density Residential	5.8	14%	9.0	7.9	1.3	0.5	51.6	7.0
QT09	11	Low Density Residential	1.3	14%	9.0	7.9	1.3	0.5	11.9	1.6
QT09	11	Low Density Residential	18.1	14%	9.0	7.9	1.3	0.5	160.6	21.7
QT09	12	Medium Density Residential	10.2	28%	9.0	7.9	1.3	0.5	88.8	11.0
QT09	12	Medium Density Residential	3.7	28%	9.0	7.9	1.3	0.5	32.1	4.0
QT09	14	Commercial	57.7	72%	9.0	7.9	1.3	0.5	472.7	41.9
QT09	14	Commercial	2.7	72%	9.0	7.9	1.3	0.5	22.0	2.0
QT09	16	Institutional	2.0	34%	9.0	7.9	1.3	0.5	17.4	2.1
QT09	18	Open Urban Land	3.4	9%	9.0	7.9	1.3	0.5	30.0	4.2
QT09	21	Cropland	27.9	0%	15.7	0.0	1.1	0.0	438.5	30.2
QT09	21	Cropland	1.0	0%	15.7	0.0	1.1	0.0	15.9	1.1
QT09	21	Cropland	1.8	0%	15.7	0.0	1.1	0.0	27.9	1.9
QT09	21	Cropland	49.8	0%	15.7	0.0	1.1	0.0	782.3	53.8
QT09	41	Deciduous Forest	8.4	0%	1.5	0.0	0.0	0.0	12.4	0.2
QT09	41	Deciduous Forest	67.7	0%	1.5	0.0	0.0	0.0	100.5	1.5
QT09	41	Deciduous Forest	42.8	0%	1.5	0.0	0.0	0.0	63.5	1.0
QT09	41	Deciduous Forest	3.8	0%	1.5	0.0	0.0	0.0	5.6	0.1
QT09	60	Wetlands	17.9	0%	1.5	0.0	0.0	0.0	26.5	0.4
QT09	60	Wetlands	6.0	0%	1.5	0.0	0.0	0.0	8.9	0.1
QT10	11	Low Density Residential	153.0	14%	9.0	7.9	1.3	0.5	1355.0	182.8
QT10	11	Low Density Residential	7.3	14%	9.0	7.9	1.3	0.5	64.5	8.7
QT10	11	Low Density Residential	0.0	14%	9.0	7.9	1.3	0.5	0.1	0.0
QT10	14	Commercial	0.8	72%	9.0	7.9	1.3	0.5	6.4	0.6
QT10	14	Commercial	10.0	72%	9.0	7.9	1.3	0.5	82.0	7.3
QT10	21	Cropland	14.1	0%	15.7	0.0	1.1	0.0	221.9	15.3
QT10	21	Cropland	174.5	0%	15.7	0.0	1.1	0.0	2741.5	188.7
QT10	21	Cropland	0.0	0%	15.7	0.0	1.1	0.0	0.4	0.0
QT10	41	Deciduous Forest	68.4	0%	1.5	0.0	0.0	0.0	101.4	1.5
QT10	41	Deciduous Forest	12.5	0%	1.5	0.0	0.0	0.0	18.6	0.3
QT10	60	Wetlands	0.1	0%	1.5	0.0	0.0	0.0	0.1	0.0
QT10	60	Wetlands	0.2	0%	1.5	0.0	0.0	0.0	0.2	0.0
QT10	242	Agricultural Buildings	61.8	2%	9.7	0.0	1.4	0.0	587.4	86.3
QT11	18	Open Urban Land	74.6	9%	9.0	7.9	1.3	0.5	665.2	92.2
QT11	60	Wetlands	3.9	0%	1.5	0.0	0.0	0.0	5.8	0.1
QT11	60	Wetlands	6.4	0%	1.5	0.0	0.0	0.0	9.5	0.1
QT11	18	Open Urban Land	127.7	9%	9.0	7.9	1.3	0.5	1138.6	157.7
QT11	60	Wetlands	8.5	0%	1.5	0.0	0.0	0.0	12.7	0.2
QT11	18	Open Urban Land	246.4	9%	9.0	7.9	1.3	0.5	2197.3	304.4
QT11	21	Cropland	55.2	0%	15.7	0.0	1.1	0.0	867.5	59.7
QT11	41	Deciduous Forest	17.8	0%	1.5	0.0	0.0	0.0	26.4	0.4
QT11	41	Deciduous Forest	0.7	0%	1.5	0.0	0.0	0.0	1.1	0.0
QT11	60	Wetlands	8.6	0%	1.5	0.0	0.0	0.0	12.7	0.2
QT11	11	Low Density Residential	2.5	14%	9.0	7.9	1.3	0.5	22.6	3.0
QT11	11	Low Density Residential	5.8	14%	9.0	7.9	1.3	0.5	51.4	6.9
QT11	12	Medium Density Residential	7.3	28%	9.0	7.9	1.3	0.5	63.7	7.9
QT11	16	Institutional	0.2	34%	9.0	7.9	1.3	0.5	1.7	0.2
QT11	16	Institutional	0.4	34%	9.0	7.9	1.3	0.5	3.2	0.4
QT11	18	Open Urban Land	153.7	9%	9.0	7.9	1.3	0.5	1370.3	189.8
QT11	41	Deciduous Forest	6.7	0%	1.5	0.0	0.0	0.0	9.9	0.2
QT11	41	Deciduous Forest	6.7	0%	1.5	0.0	0.0	0.0	9.9	0.1
QT11	41	Deciduous Forest	2.6	0%	1.5	0.0	0.0	0.0	3.8	0.1
QT12	11	Low Density Residential	11.2	14%	9.0	7.9	1.3	0.5	99.1	13.4
QT12	11	Low Density Residential	79.4	14%	9.0	7.9	1.3	0.5	703.8	94.9
QT12	11	Low Density Residential	10.5	14%	9.0	7.9	1.3	0.5	93.0	12.5
QT12	11	Low Density Residential	13.3	14%	9.0	7.9	1.3	0.5	117.7	15.9
QT12	14	Commercial	2.1	72%	9.0	7.9	1.3	0.5	17.4	1.5
QT12	16	Institutional	1.8	34%	9.0	7.9	1.3	0.5	15.7	1.9

**Appendix A1.** Estimated non-point source loads for the Upper Wye and Queenstown Harbor watersheds under current land cover conditions (MDP 2002).

HUC_ID	MDP LULC Code	LULC Description	Area (acres)	Percent Impervious Surface	Nitrogen Loading Rate for Pervious Surfaces (lbs/acre/yr)	Nitrogen Loading Rate for Impervious Surfaces (lbs/acre/yr)	Phosphorus Loading Rate for Pervious Surfaces (lbs/acre/yr)	Phosphorus Loading Rate for Impervious Surfaces (lbs/acre/yr)	Total Nitrogen Non-Point Source Load (lbs/year)	Total Phosphorus Non-Point Source Load (lbs/year)
QT12	21	Cropland	20.2	0%	15.7	0.0	1.1	0.0	317.4	21.8
QT12	21	Cropland	145.6	0%	15.7	0.0	1.1	0.0	2287.0	157.4
QT12	21	Cropland	157.2	0%	15.7	0.0	1.1	0.0	2470.8	170.0
QT12	41	Deciduous Forest	31.2	0%	1.5	0.0	0.0	0.0	46.3	0.7
QT12	41	Deciduous Forest	19.6	0%	1.5	0.0	0.0	0.0	29.0	0.4
QT12	42	Evergreen Forest	1.5	0%	1.5	0.0	0.0	0.0	2.3	0.0
QT12	60	Wetlands	6.8	0%	1.5	0.0	0.0	0.0	10.1	0.2
QT12	60	Wetlands	7.2	0%	1.5	0.0	0.0	0.0	10.7	0.2
QT13	11	Low Density Residential	0.4	14%	9.0	7.9	1.3	0.5	3.1	0.4
QT13	14	Commercial	0.4	72%	9.0	7.9	1.3	0.5	3.0	0.3
QT13	14	Commercial	1.3	72%	9.0	7.9	1.3	0.5	10.8	1.0
QT13	18	Open Urban Land	79.5	9%	9.0	7.9	1.3	0.5	708.7	98.2
QT13	21	Cropland	8.4	0%	15.7	0.0	1.1	0.0	131.7	9.1
QT13	21	Cropland	849.6	0%	15.7	0.0	1.1	0.0	13349.6	918.7
QT13	21	Cropland	12.3	0%	15.7	0.0	1.1	0.0	193.7	13.3
QT13	41	Deciduous Forest	37.9	0%	1.5	0.0	0.0	0.0	56.2	0.9
QT13	41	Deciduous Forest	447.1	0%	1.5	0.0	0.0	0.0	663.3	10.0
QT13	41	Deciduous Forest	5.6	0%	1.5	0.0	0.0	0.0	8.4	0.1
QT13	41	Deciduous Forest	0.7	0%	1.5	0.0	0.0	0.0	1.0	0.0
QT13	60	Wetlands	21.1	0%	1.5	0.0	0.0	0.0	31.4	0.5
QT13	60	Wetlands	8.4	0%	1.5	0.0	0.0	0.0	12.4	0.2
QT13	242	Agricultural Buildings	4.0	2%	9.7	0.0	1.4	0.0	37.6	5.5
QT13	242	Agricultural Buildings	9.7	2%	9.7	0.0	1.4	0.0	92.1	13.5
QT14	11	Low Density Residential	1.9	14%	9.0	7.9	1.3	0.5	16.5	2.2
QT14	11	Low Density Residential	18.6	14%	9.0	7.9	1.3	0.5	164.6	22.2
QT14	11	Low Density Residential	13.9	14%	9.0	7.9	1.3	0.5	123.6	16.7
QT14	14	Commercial	1.8	72%	9.0	7.9	1.3	0.5	15.0	1.3

**Appendix A2.** Estimated non-point source loads for the Upper Wye and Queenstown Harbor watersheds under distributed, county-based growth scenario (LULC class modified from MDP 2002).

HUC_ID	MDP LULC Code	LULC Description	Area (acres)	Percent Impervious Surface	Nitrogen Loading Rate for Pervious Surfaces (lbs/acre/yr)	Nitrogen Loading Rate for Impervious Surfaces (lbs/acre/yr)	Phosphorus Loading Rate for Pervious Surfaces (lbs/acre/yr)	Phosphorus Loading Rate for Impervious Surfaces (lbs/acre/yr)	Total Nitrogen Non-Point Source Load (lbs/year)	Total Phosphorus Non-Point Source Load (lbs/year)
QT01	11	Low Density Residential	9.9	14%	9.0	7.9	1.3	0.5	88.1	11.9
QT01	11	Low Density Residential	45.2	14%	9.0	7.9	1.3	0.5	400.3	54.0
QT01	11	Low Density Residential	0.3	14%	9.0	7.9	1.3	0.5	2.7	0.4
QT01	12	Medium Density Residential	6.1	28%	9.0	7.9	1.3	0.5	52.8	6.6
QT01	12	Medium Density Residential	84.5	28%	9.0	7.9	1.3	0.5	734.9	91.4
QT01	14	Commercial	0.3	72%	9.0	7.9	1.3	0.5	2.8	0.2
QT01	14	Commercial	2.0	72%	9.0	7.9	1.3	0.5	16.7	1.5
QT01	14	Commercial	0.4	72%	9.0	7.9	1.3	0.5	3.0	0.3
QT01	14	Commercial	0.8	72%	9.0	7.9	1.3	0.5	6.7	0.6
QT01	14	Commercial	0.4	72%	9.0	7.9	1.3	0.5	3.1	0.3
QT01	14	Commercial	2.5	72%	9.0	7.9	1.3	0.5	20.1	1.8
QT01	16	Institutional	0.3	34%	9.0	7.9	1.3	0.5	2.2	0.3
QT01	16	Institutional	1.0	34%	9.0	7.9	1.3	0.5	9.0	1.1
QT01	16	Institutional	0.3	34%	9.0	7.9	1.3	0.5	2.8	0.3
QT01	16	Institutional	0.3	34%	9.0	7.9	1.3	0.5	2.5	0.3
QT01	16	Institutional	0.7	34%	9.0	7.9	1.3	0.5	5.7	0.7
QT01	16	Institutional	0.0	34%	9.0	7.9	1.3	0.5	0.2	0.0
QT01	18	Open Urban Land	0.1	9%	9.0	7.9	1.3	0.5	0.8	0.1
QT01	41	Deciduous Forest	1.3	0%	1.5	0.0	0.0	0.0	1.9	0.0
QT01	212	Deciduous Forest	6.3	0%	1.5	0.0	0.0	0.0	9.4	0.0
QT01	41	Deciduous Forest	0.4	0%	1.5	0.0	0.0	0.0	0.7	0.0
QT01	41	Deciduous Forest	20.7	0%	1.5	0.0	0.0	0.0	30.7	0.5
QT01	41	Deciduous Forest	1.9	0%	1.5	0.0	0.0	0.0	2.8	0.0
QT01	43	Mixed Forest	0.4	0%	1.5	0.0	0.0	0.0	0.6	0.0
QT02	11	Low Density Residential	57.6	14%	9.0	7.9	1.3	0.5	510.5	68.9
QT02	11	Low Density Residential	64.1	14%	9.0	7.9	1.3	0.5	568.0	76.6
QT02	11	Low Density Residential	100.9	14%	9.0	7.9	1.3	0.5	893.8	120.5
QT02	12	Medium Density Residential	15.1	28%	9.0	7.9	1.3	0.5	130.9	16.3
QT02	14	Commercial	1.6	72%	9.0	7.9	1.3	0.5	12.7	1.1
QT02	16	Institutional	1.2	34%	9.0	7.9	1.3	0.5	10.5	1.3
QT02	16	Institutional	1.6	34%	9.0	7.9	1.3	0.5	13.6	1.6
QT02	16	Institutional	0.2	34%	9.0	7.9	1.3	0.5	1.5	0.2
QT02	17	Extractive	9.2	2%	9.0	7.9	1.3	0.5	83.1	11.9
QT02	21	Cropland	86.5	0%	15.7	0.0	1.1	0.0	1359.2	93.5
QT02	21	Cropland	6.5	0%	15.7	0.0	1.1	0.0	102.9	7.1
QT02	22	Pasture	1.0	0%	9.7	0.0	1.4	0.0	9.9	1.5
QT02	41	Deciduous Forest	31.0	0%	1.5	0.0	0.0	0.0	46.0	0.7
QT02	41	Deciduous Forest	1.4	0%	1.5	0.0	0.0	0.0	2.1	0.0
QT02	41	Deciduous Forest	17.8	0%	1.5	0.0	0.0	0.0	26.4	0.4
QT02	43	Mixed Forest	7.7	0%	1.5	0.0	0.0	0.0	11.5	0.2
QT02	60	Wetlands	5.5	0%	1.5	0.0	0.0	0.0	8.2	0.1
QT03	11	Low Density Residential	40.2	14%	9.0	7.9	1.3	0.5	356.0	48.0
QT03	11	Low Density Residential	5.0	14%	9.0	7.9	1.3	0.5	44.4	6.0
QT03	11	Low Density Residential	0.4	14%	9.0	7.9	1.3	0.5	3.9	0.5
QT03	11	Low Density Residential	85.5	14%	9.0	7.9	1.3	0.5	757.8	102.2
QT03	11	Low Density Residential	11.2	14%	9.0	7.9	1.3	0.5	98.8	13.3
QT03	11	Low Density Residential	2.4	14%	9.0	7.9	1.3	0.5	20.9	2.8
QT03	11	Low Density Residential	9.0	14%	9.0	7.9	1.3	0.5	79.6	10.7
QT03	12	Medium Density Residential	8.7	28%	9.0	7.9	1.3	0.5	75.9	9.4
QT03	12	Medium Density Residential	6.9	28%	9.0	7.9	1.3	0.5	60.3	7.5
QT03	14	Commercial	5.5	72%	9.0	7.9	1.3	0.5	44.9	4.0
QT03	14	Commercial	10.8	72%	9.0	7.9	1.3	0.5	88.2	7.8
QT03	14	Commercial	3.3	72%	9.0	7.9	1.3	0.5	27.2	2.4
QT03	14	Commercial	0.2	72%	9.0	7.9	1.3	0.5	2.0	0.2
QT03	14	Commercial	15.0	72%	9.0	7.9	1.3	0.5	123.0	10.9
QT03	14	Commercial	0.8	72%	9.0	7.9	1.3	0.5	6.5	0.6
QT03	21	Cropland	3.6	0%	15.7	0.0	1.1	0.0	55.8	3.8
QT03	41	Deciduous Forest	16.5	0%	1.5	0.0	0.0	0.0	24.5	0.4
QT03	41	Deciduous Forest	203.4	0%	1.5	0.0	0.0	0.0	301.8	4.6
QT03	41	Deciduous Forest	0.0	0%	1.5	0.0	0.0	0.0	0.0	0.0
QT03	41	Deciduous Forest	1.8	0%	1.5	0.0	0.0	0.0	2.6	0.0
QT04	14	Commercial	0.2	72%	9.0	7.9	1.3	0.5	1.9	0.2
QT04	17	Extractive	0.0	2%	9.0	7.9	1.3	0.5	0.2	0.0
QT04	17	Extractive	26.1	2%	9.0	7.9	1.3	0.5	234.9	33.7
QT04	21	Cropland	395.7	0%	15.7	0.0	1.1	0.0	6218.1	427.9
QT04	21	Cropland	148.0	0%	15.7	0.0	1.1	0.0	2325.3	160.0
QT04	21	Cropland	42.7	0%	15.7	0.0	1.1	0.0	670.7	46.2
QT04	21	Cropland	82.1	0%	15.7	0.0	1.1	0.0	1289.7	88.8
QT04	21	Cropland	0.0	0%	15.7	0.0	1.1	0.0	0.4	0.0
QT04	21	Cropland	153.9	0%	15.7	0.0	1.1	0.0	2417.7	166.4
QT04	22	Pasture	15.8	0%	9.7	0.0	1.4	0.0	153.1	22.5
QT04	41	Deciduous Forest	3.4	0%	1.5	0.0	0.0	0.0	5.1	0.1
QT04	41	Deciduous Forest	4.5	0%	1.5	0.0	0.0	0.0	6.7	0.1

**Appendix A2.** Estimated non-point source loads for the Upper Wye and Queenstown Harbor watersheds under distributed, county-based growth scenario (LULC class modified from MDP 2002).

HUC_ID	MDP LULC Code	LULC Description	Area (acres)	Percent Impervious Surface	Nitrogen Loading Rate for Pervious Surfaces (lbs/acre/yr)	Nitrogen Loading Rate for Impervious Surfaces (lbs/acre/yr)	Phosphorus Loading Rate for Pervious Surfaces (lbs/acre/yr)	Phosphorus Loading Rate for Impervious Surfaces (lbs/acre/yr)	Total Nitrogen Non-Point Source Load (lbs/year)	Total Phosphorus Non-Point Source Load (lbs/year)
QT04	41	Deciduous Forest	125.1	0%	1.5	0.0	0.0	0.0	185.6	2.8
QT04	41	Deciduous Forest	2.8	0%	1.5	0.0	0.0	0.0	4.2	0.1
QT04	41	Deciduous Forest	16.9	0%	1.5	0.0	0.0	0.0	25.1	0.4
QT04	41	Deciduous Forest	0.0	0%	1.5	0.0	0.0	0.0	0.0	0.0
QT04	41	Deciduous Forest	210.3	0%	1.5	0.0	0.0	0.0	312.0	4.7
QT04	60	Wetlands	6.8	0%	1.5	0.0	0.0	0.0	10.1	0.2
QT05	11	Low Density Residential	0.1	14%	9.0	7.9	1.3	0.5	1.0	0.1
QT05	14	Commercial	5.2	72%	9.0	7.9	1.3	0.5	42.4	3.8
QT05	17	Extractive	19.4	2%	9.0	7.9	1.3	0.5	174.5	25.0
QT05	17	Extractive	0.1	2%	9.0	7.9	1.3	0.5	1.0	0.1
QT05	21	Cropland	8.1	0%	15.7	0.0	1.1	0.0	127.9	8.8
QT05	21	Cropland	328.2	0%	15.7	0.0	1.1	0.0	5156.4	354.9
QT05	21	Cropland	0.1	0%	15.7	0.0	1.1	0.0	1.7	0.1
QT05	41	Deciduous Forest	102.1	0%	1.5	0.0	0.0	0.0	151.5	2.3
QT05	41	Deciduous Forest	71.1	0%	1.5	0.0	0.0	0.0	105.5	1.6
QT05	41	Deciduous Forest	0.1	0%	1.5	0.0	0.0	0.0	0.2	0.0
QT06	11	Low Density Residential	18.7	14%	9.0	7.9	1.3	0.5	165.8	22.4
QT06	21	Cropland	603.1	0%	15.7	0.0	1.1	0.0	9476.1	652.1
QT06	41	Deciduous Forest	61.0	0%	1.5	0.0	0.0	0.0	90.5	1.4
QT06	41	Deciduous Forest	37.0	0%	1.5	0.0	0.0	0.0	55.0	0.8
QT06	41	Deciduous Forest	44.2	0%	1.5	0.0	0.0	0.0	65.5	1.0
QT07	11	Low Density Residential	23.9	14%	9.0	7.9	1.3	0.5	211.5	28.5
QT07	11	Low Density Residential	29.1	14%	9.0	7.9	1.3	0.5	257.6	34.7
QT07	11	Low Density Residential	27.0	14%	9.0	7.9	1.3	0.5	239.1	32.2
QT07	11	Low Density Residential	0.0	14%	9.0	7.9	1.3	0.5	0.2	0.0
QT07	11	Low Density Residential	0.0	14%	9.0	7.9	1.3	0.5	0.0	0.0
QT07	17	Extractive	37.2	2%	9.0	7.9	1.3	0.5	334.8	48.1
QT07	17	Extractive	0.0	2%	9.0	7.9	1.3	0.5	0.0	0.0
QT07	21	Cropland	32.0	0%	15.7	0.0	1.1	0.0	503.3	34.6
QT07	41	Deciduous Forest	63.3	0%	1.5	0.0	0.0	0.0	93.9	1.4
QT07	41	Deciduous Forest	0.0	0%	1.5	0.0	0.0	0.0	0.0	0.0
QT07	41	Deciduous Forest	0.0	0%	1.5	0.0	0.0	0.0	0.0	0.0
QT08	11	Low Density Residential	4.2	14%	9.0	7.9	1.3	0.5	37.2	5.0
QT08	11	Low Density Residential	15.4	14%	9.0	7.9	1.3	0.5	136.3	18.4
QT08	14	Commercial	8.0	72%	9.0	7.9	1.3	0.5	65.2	5.8
QT08	15	Industrial	33.3	53%	9.0	7.9	1.3	0.5	279.9	29.3
QT08	21	Cropland	0.5	0%	15.7	0.0	1.1	0.0	8.5	0.6
QT08	21	Cropland	159.9	0%	15.7	0.0	1.1	0.0	2512.6	172.9
QT08	41	Deciduous Forest	1.4	0%	1.5	0.0	0.0	0.0	2.1	0.0
QT08	41	Deciduous Forest	44.4	0%	1.5	0.0	0.0	0.0	65.9	1.0
QT09	11	Low Density Residential	18.1	14%	9.0	7.9	1.3	0.5	160.5	21.6
QT09	11	Low Density Residential	68.3	14%	9.0	7.9	1.3	0.5	605.0	81.6
QT09	11	Low Density Residential	1.3	14%	9.0	7.9	1.3	0.5	11.9	1.6
QT09	11	Low Density Residential	1.0	14%	9.0	7.9	1.3	0.5	9.0	1.2
QT09	11	Low Density Residential	5.8	14%	9.0	7.9	1.3	0.5	51.6	7.0
QT09	12	Medium Density Residential	3.7	28%	9.0	7.9	1.3	0.5	32.1	4.0
QT09	12	Medium Density Residential	10.2	28%	9.0	7.9	1.3	0.5	88.7	11.0
QT09	14	Commercial	2.7	72%	9.0	7.9	1.3	0.5	22.0	2.0
QT09	14	Commercial	57.7	72%	9.0	7.9	1.3	0.5	472.5	41.9
QT09	16	Institutional	2.0	34%	9.0	7.9	1.3	0.5	17.4	2.1
QT09	18	Open Urban Land	0.0	9%	9.0	7.9	1.3	0.5	0.0	0.0
QT09	21	Cropland	1.8	0%	15.7	0.0	1.1	0.0	27.9	1.9
QT09	41	Deciduous Forest	3.8	0%	1.5	0.0	0.0	0.0	5.6	0.1
QT09	41	Deciduous Forest	67.7	0%	1.5	0.0	0.0	0.0	100.4	1.5
QT09	41	Deciduous Forest	8.4	0%	1.5	0.0	0.0	0.0	12.4	0.2
QT09	41	Deciduous Forest	0.0	0%	1.5	0.0	0.0	0.0	0.0	0.0
QT09	41	Deciduous Forest	0.0	0%	1.5	0.0	0.0	0.0	0.0	0.0
QT09	41	Deciduous Forest	50.7	0%	1.5	0.0	0.0	0.0	75.2	1.1
QT09	41	Deciduous Forest	1.4	0%	1.5	0.0	0.0	0.0	2.1	0.0
QT09	43	Mixed Forest	3.4	0%	1.5	0.0	0.0	0.0	5.0	0.1
QT09	60	Wetlands	17.9	0%	1.5	0.0	0.0	0.0	26.5	0.4
QT09	60	Wetlands	6.0	0%	1.5	0.0	0.0	0.0	8.9	0.1
QT10	11	Low Density Residential	0.0	14%	9.0	7.9	1.3	0.5	0.1	0.0
QT10	11	Low Density Residential	7.3	14%	9.0	7.9	1.3	0.5	64.4	8.7
QT10	11	Low Density Residential	152.9	14%	9.0	7.9	1.3	0.5	1354.5	182.7
QT10	14	Commercial	10.0	72%	9.0	7.9	1.3	0.5	82.0	7.3
QT10	14	Commercial	0.8	72%	9.0	7.9	1.3	0.5	6.4	0.6
QT10	21	Cropland	14.1	0%	15.7	0.0	1.1	0.0	221.8	15.3
QT10	21	Cropland	146.8	0%	15.7	0.0	1.1	0.0	2307.4	158.8
QT10	21	Cropland	0.0	0%	15.7	0.0	1.1	0.0	0.4	0.0
QT10	41	Deciduous Forest	12.5	0%	1.5	0.0	0.0	0.0	18.5	0.3
QT10	41	Deciduous Forest	68.3	0%	1.5	0.0	0.0	0.0	101.4	1.5
QT10	41	Deciduous Forest	27.6	0%	1.5	0.0	0.0	0.0	40.9	0.6

**Appendix A2.** Estimated non-point source loads for the Upper Wye and Queenstown Harbor watersheds under distributed, county-based growth scenario (LULC class modified from MDP 2002).

HUC_ID	MDP LULC Code	LULC Description	Area (acres)	Percent Impervious Surface	Nitrogen Loading Rate for Pervious Surfaces (lbs/acre/yr)	Nitrogen Loading Rate for Impervious Surfaces (lbs/acre/yr)	Phosphorus Loading Rate for Pervious Surfaces (lbs/acre/yr)	Phosphorus Loading Rate for Impervious Surfaces (lbs/acre/yr)	Total Nitrogen Non-Point Source Load (lbs/year)	Total Phosphorus Non-Point Source Load (lbs/year)
QT10	60	Wetlands	0.1	0%	1.5	0.0	0.0	0.0	0.1	0.0
QT10	60	Wetlands	0.2	0%	1.5	0.0	0.0	0.0	0.2	0.0
QT10	242	Agricultural Buildings	61.8	2%	9.7	0.0	1.4	0.0	587.1	86.2
QT11	18	Open Urban Land	74.6	9%	9.0	7.9	1.3	0.5	664.9	92.1
QT11	60	Wetlands	3.9	0%	1.5	0.0	0.0	0.0	5.8	0.1
QT11	60	Wetlands	6.4	0%	1.5	0.0	0.0	0.0	9.5	0.1
QT11	18	Open Urban Land	125.5	9%	9.0	7.9	1.3	0.5	1119.3	155.1
QT11	43	Mixed Forest	2.1	0%	1.5	0.0	0.0	0.0	3.1	0.0
QT11	60	Wetlands	8.5	0%	1.5	0.0	0.0	0.0	12.7	0.2
QT11	18	Open Urban Land	125.8	9%	9.0	7.9	1.3	0.5	1121.6	155.4
QT11	18	Open Urban Land	0.0	9%	9.0	7.9	1.3	0.5	0.3	0.0
QT11	18	Open Urban Land	0.1	9%	9.0	7.9	1.3	0.5	0.5	0.1
QT11	21	Cropland	55.2	0%	15.7	0.0	1.1	0.0	867.1	59.7
QT11	41	Deciduous Forest	0.7	0%	1.5	0.0	0.0	0.0	1.1	0.0
QT11	41	Deciduous Forest	17.8	0%	1.5	0.0	0.0	0.0	26.4	0.4
QT11	43	Mixed Forest	120.5	0%	1.5	0.0	0.0	0.0	178.7	2.7
QT11	60	Wetlands	8.6	0%	1.5	0.0	0.0	0.0	12.7	0.2
QT11	11	Low Density Residential	2.5	14%	9.0	7.9	1.3	0.5	22.6	3.0
QT11	12	Medium Density Residential	7.3	28%	9.0	7.9	1.3	0.5	63.7	7.9
QT11	12	Medium Density Residential	5.8	28%	9.0	7.9	1.3	0.5	50.5	6.3
QT11	16	Institutional	0.4	34%	9.0	7.9	1.3	0.5	3.2	0.4
QT11	16	Institutional	0.2	34%	9.0	7.9	1.3	0.5	1.7	0.2
QT11	18	Open Urban Land	151.6	9%	9.0	7.9	1.3	0.5	1351.5	187.2
QT11	41	Deciduous Forest	6.7	0%	1.5	0.0	0.0	0.0	9.9	0.2
QT11	41	Deciduous Forest	2.6	0%	1.5	0.0	0.0	0.0	3.8	0.1
QT11	41	Deciduous Forest	6.7	0%	1.5	0.0	0.0	0.0	9.9	0.1
QT11	43	Mixed Forest	2.0	0%	1.5	0.0	0.0	0.0	3.0	0.0
QT12	11	Low Density Residential	11.2	14%	9.0	7.9	1.3	0.5	99.1	13.4
QT12	11	Low Density Residential	79.4	14%	9.0	7.9	1.3	0.5	703.5	94.9
QT12	11	Low Density Residential	10.5	14%	9.0	7.9	1.3	0.5	93.0	12.5
QT12	11	Low Density Residential	13.3	14%	9.0	7.9	1.3	0.5	117.7	15.9
QT12	14	Commercial	2.1	72%	9.0	7.9	1.3	0.5	17.4	1.5
QT12	16	Institutional	1.8	34%	9.0	7.9	1.3	0.5	15.7	1.9
QT12	21	Cropland	157.2	0%	15.7	0.0	1.1	0.0	2469.8	170.0
QT12	21	Cropland	20.2	0%	15.7	0.0	1.1	0.0	317.3	21.8
QT12	21	Cropland	145.5	0%	15.7	0.0	1.1	0.0	2286.0	157.3
QT12	41	Deciduous Forest	19.5	0%	1.5	0.0	0.0	0.0	29.0	0.4
QT12	41	Deciduous Forest	31.2	0%	1.5	0.0	0.0	0.0	46.3	0.7
QT12	42	Evergreen Forest	1.5	0%	1.5	0.0	0.0	0.0	2.3	0.0
QT12	60	Wetlands	7.2	0%	1.5	0.0	0.0	0.0	10.7	0.2
QT12	60	Wetlands	6.8	0%	1.5	0.0	0.0	0.0	10.0	0.2
QT13	11	Low Density Residential	0.4	14%	9.0	7.9	1.3	0.5	3.1	0.4
QT13	11	Low Density Residential	61.5	14%	9.0	7.9	1.3	0.5	544.6	73.5
QT13	14	Commercial	1.3	72%	9.0	7.9	1.3	0.5	10.8	1.0
QT13	14	Commercial	0.4	72%	9.0	7.9	1.3	0.5	3.0	0.3
QT13	18	Open Urban Land	79.4	9%	9.0	7.9	1.3	0.5	708.4	98.1
QT13	21	Cropland	258.1	0%	15.7	0.0	1.1	0.0	4055.9	279.1
QT13	21	Cropland	529.6	0%	15.7	0.0	1.1	0.0	8322.0	572.7
QT13	21	Cropland	8.4	0%	15.7	0.0	1.1	0.0	131.7	9.1
QT13	21	Cropland	12.3	0%	15.7	0.0	1.1	0.0	193.6	13.3
QT13	41	Deciduous Forest	37.9	0%	1.5	0.0	0.0	0.0	56.2	0.9
QT13	41	Deciduous Forest	446.9	0%	1.5	0.0	0.0	0.0	663.0	10.0
QT13	41	Deciduous Forest	5.6	0%	1.5	0.0	0.0	0.0	8.4	0.1
QT13	41	Deciduous Forest	0.7	0%	1.5	0.0	0.0	0.0	1.0	0.0
QT13	60	Wetlands	21.1	0%	1.5	0.0	0.0	0.0	31.3	0.5
QT13	60	Wetlands	8.4	0%	1.5	0.0	0.0	0.0	12.4	0.2
QT13	242	Agricultural Buildings	9.7	2%	9.7	0.0	1.4	0.0	92.0	13.5
QT13	242	Agricultural Buildings	4.0	2%	9.7	0.0	1.4	0.0	37.6	5.5
QT14	11	Low Density Residential	13.9	14%	9.0	7.9	1.3	0.5	123.5	16.7
QT14	11	Low Density Residential	18.6	14%	9.0	7.9	1.3	0.5	164.6	22.2
QT14	11	Low Density Residential	1.9	14%	9.0	7.9	1.3	0.5	16.5	2.2
QT14	14	Commercial	1.8	72%	9.0	7.9	1.3	0.5	15.0	1.3
QT14	16	Institutional	1.4	34%	9.0	7.9	1.3	0.5	11.8	1.4
QT14	16	Institutional	0.1	34%	9.0	7.9	1.3	0.5	0.5	0.1
QT14	16	Institutional	1.2	34%	9.0	7.9	1.3	0.5	10.3	1.2
QT14	21	Cropland	0.2	0%	15.7	0.0	1.1	0.0	3.9	0.3
QT14	21	Cropland	41.2	0%	15.7	0.0	1.1	0.0	647.3	44.5
QT14	21	Cropland	104.9	0%	15.7	0.0	1.1	0.0	1648.7	113.5
QT14	21	Cropland	47.5	0%	15.7	0.0	1.1	0.0	745.6	51.3
QT14	21	Cropland	7.6	0%	15.7	0.0	1.1	0.0	119.3	8.2
QT14	21	Cropland	24.2	0%	15.7	0.0	1.1	0.0	380.8	26.2
QT14	41	Deciduous Forest	136.3	0%	1.5	0.0	0.0	0.0	202.2	3.1
QT14	41	Deciduous Forest	4.9	0%	1.5	0.0	0.0	0.0	7.2	0.1

**Appendix A2.** Estimated non-point source loads for the Upper Wye and Queenstown Harbor watersheds under distributed, county-based growth scenario (LULC class modified from MDP 2002).

HUC_ID	MDP LULC Code	LULC Description	Area (acres)	Percent Impervious Surface	Nitrogen Loading Rate for Pervious Surfaces (lbs/acre/yr)	Nitrogen Loading Rate for Impervious Surfaces (lbs/acre/yr)	Phosphorus Loading Rate for Pervious Surfaces (lbs/acre/yr)	Phosphorus Loading Rate for Impervious Surfaces (lbs/acre/yr)	Total Nitrogen Non-Point Source Load (lbs/year)	Total Phosphorus Non-Point Source Load (lbs/year)
QT14	41	Deciduous Forest	22.0	0%	1.5	0.0	0.0	0.0	32.6	0.5
QT14	41	Deciduous Forest	21.0	0%	1.5	0.0	0.0	0.0	31.2	0.5
QT14	41	Deciduous Forest	13.3	0%	1.5	0.0	0.0	0.0	19.7	0.3
QT14	42	Evergreen Forest	7.0	0%	1.5	0.0	0.0	0.0	10.4	0.2
QT14	42	Evergreen Forest	47.2	0%	1.5	0.0	0.0	0.0	70.0	1.1
QT14	43	Mixed Forest	27.1	0%	1.5	0.0	0.0	0.0	40.2	0.6
QT14	60	Wetlands	8.2	0%	1.5	0.0	0.0	0.0	12.2	0.2
QT14	60	Wetlands	2.7	0%	1.5	0.0	0.0	0.0	3.9	0.1
QT14	60	Wetlands	1.8	0%	1.5	0.0	0.0	0.0	2.6	0.0
QT15	11	Low Density Residential	2.2	14%	9.0	7.9	1.3	0.5	19.1	2.6
QT15	11	Low Density Residential	93.0	14%	9.0	7.9	1.3	0.5	823.9	111.1
QT15	11	Low Density Residential	308.5	14%	9.0	7.9	1.3	0.5	2732.5	368.5
QT15	11	Low Density Residential	16.9	14%	9.0	7.9	1.3	0.5	149.7	20.2
QT15	14	Commercial	2.6	72%	9.0	7.9	1.3	0.5	21.5	1.9
QT15	21	Cropland	123.6	0%	15.7	0.0	1.1	0.0	1942.7	133.7
QT15	21	Cropland	37.2	0%	15.7	0.0	1.1	0.0	584.4	40.2
QT15	41	Deciduous Forest	39.7	0%	1.5	0.0	0.0	0.0	58.9	0.9
QT15	41	Deciduous Forest	1.7	0%	1.5	0.0	0.0	0.0	2.6	0.0
QT15	41	Deciduous Forest	95.8	0%	1.5	0.0	0.0	0.0	142.1	2.2

**Appendix A3.** Estimated non-point source loads for the Upper Wye and Queenstown Harbor watersheds under consolidated growth scenario (LULC class modified from MDP 2002).

HUC_ID	MDP LULC Code	LULC Description	Area (acres)	Percent Impervious Surface	Nitrogen Loading Rate for Pervious Surfaces (lbs/acre/yr)	Nitrogen Loading Rate for Impervious Surfaces (lbs/acre/yr)	Phosphorus Loading Rate for Pervious Surfaces (lbs/acre/yr)	Phosphorus Loading Rate for Impervious Surfaces (lbs/acre/yr)	Total Nitrogen Non-Point Source Load (lbs/year)	Total Phosphorus Non-Point Source Load (lbs/year)
QT01	11	Low Density Residential	9.9	14%	9.0	7.9	1.3	0.5	88.1	11.9
QT01	12	Medium Density Residential	84.5	28%	9.0	7.9	1.3	0.5	734.9	91.4
QT01	12	Medium Density Residential	6.1	28%	9.0	7.9	1.3	0.5	52.8	6.6
QT01	12	Medium Density Residential	0.3	28%	9.0	7.9	1.3	0.5	2.6	0.3
QT01	14	Commercial	0.3	72%	9.0	7.9	1.3	0.5	2.8	0.2
QT01	14	Commercial	0.8	72%	9.0	7.9	1.3	0.5	6.7	0.6
QT01	14	Commercial	0.4	72%	9.0	7.9	1.3	0.5	3.0	0.3
QT01	14	Commercial	2.0	72%	9.0	7.9	1.3	0.5	16.7	1.5
QT01	14	Commercial	0.4	72%	9.0	7.9	1.3	0.5	3.1	0.3
QT01	14	Commercial	2.5	72%	9.0	7.9	1.3	0.5	20.1	1.8
QT01	16	Institutional	0.3	34%	9.0	7.9	1.3	0.5	2.2	0.3
QT01	16	Institutional	0.7	34%	9.0	7.9	1.3	0.5	5.7	0.7
QT01	16	Institutional	1.0	34%	9.0	7.9	1.3	0.5	9.0	1.1
QT01	16	Institutional	0.3	34%	9.0	7.9	1.3	0.5	2.8	0.3
QT01	16	Institutional	0.3	34%	9.0	7.9	1.3	0.5	2.5	0.3
QT01	16	Institutional	0.0	34%	9.0	7.9	1.3	0.5	0.2	0.0
QT01	18	Open Urban Land	0.1	9%	9.0	7.9	1.3	0.5	0.8	0.1
QT01	21	Cropland	45.2	0%	15.7	0.0	1.1	0.0	710.0	48.9
QT01	41	Deciduous Forest	1.3	0%	1.5	0.0	0.0	0.0	1.9	0.0
QT01	220	Deciduous Forest	6.3	0%	1.5	0.0	0.0	0.0	9.4	0.1
QT01	41	Deciduous Forest	0.4	0%	1.5	0.0	0.0	0.0	0.7	0.0
QT01	41	Deciduous Forest	20.7	0%	1.5	0.0	0.0	0.0	30.7	0.5
QT01	41	Deciduous Forest	1.9	0%	1.5	0.0	0.0	0.0	2.8	0.0
QT01	43	Mixed Forest	0.4	0%	1.5	0.0	0.0	0.0	0.6	0.0
QT02	12	Medium Density Residential	57.6	28%	9.0	7.9	1.3	0.5	501.2	62.3
QT02	12	Medium Density Residential	15.1	28%	9.0	7.9	1.3	0.5	130.9	16.3
QT02	12	Medium Density Residential	100.9	28%	9.0	7.9	1.3	0.5	877.5	109.1
QT02	14	Commercial	1.6	72%	9.0	7.9	1.3	0.5	12.7	1.1
QT02	16	Institutional	0.2	34%	9.0	7.9	1.3	0.5	1.5	0.2
QT02	16	Institutional	1.2	34%	9.0	7.9	1.3	0.5	10.5	1.3
QT02	16	Institutional	1.6	34%	9.0	7.9	1.3	0.5	13.6	1.6
QT02	17	Extractive	9.2	2%	9.0	7.9	1.3	0.5	83.1	11.9
QT02	21	Cropland	86.5	0%	15.7	0.0	1.1	0.0	1359.2	93.5
QT02	21	Cropland	6.5	0%	15.7	0.0	1.1	0.0	102.9	7.1
QT02	21	Cropland	64.1	0%	15.7	0.0	1.1	0.0	1007.4	69.3
QT02	22	Pasture	1.0	0%	9.7	0.0	1.4	0.0	9.9	1.5
QT02	41	Deciduous Forest	31.0	0%	1.5	0.0	0.0	0.0	46.0	0.7
QT02	41	Deciduous Forest	1.4	0%	1.5	0.0	0.0	0.0	2.1	0.0
QT02	41	Deciduous Forest	17.8	0%	1.5	0.0	0.0	0.0	26.4	0.4
QT02	43	Mixed Forest	7.7	0%	1.5	0.0	0.0	0.0	11.5	0.2
QT02	60	Wetlands	5.5	0%	1.5	0.0	0.0	0.0	8.2	0.1
QT03	11	Low Density Residential	9.0	14%	9.0	7.9	1.3	0.5	79.6	10.7
QT03	11	Low Density Residential	0.4	14%	9.0	7.9	1.3	0.5	3.9	0.5
QT03	12	Medium Density Residential	85.5	28%	9.0	7.9	1.3	0.5	744.0	92.5
QT03	12	Medium Density Residential	2.4	28%	9.0	7.9	1.3	0.5	20.5	2.6
QT03	12	Medium Density Residential	5.0	28%	9.0	7.9	1.3	0.5	43.6	5.4
QT03	12	Medium Density Residential	6.9	28%	9.0	7.9	1.3	0.5	60.3	7.5
QT03	12	Medium Density Residential	8.7	28%	9.0	7.9	1.3	0.5	75.9	9.4
QT03	12	Medium Density Residential	40.2	28%	9.0	7.9	1.3	0.5	349.5	43.5
QT03	14	Commercial	3.3	72%	9.0	7.9	1.3	0.5	27.2	2.4
QT03	14	Commercial	5.5	72%	9.0	7.9	1.3	0.5	44.9	4.0
QT03	14	Commercial	10.8	72%	9.0	7.9	1.3	0.5	88.2	7.8
QT03	14	Commercial	15.0	72%	9.0	7.9	1.3	0.5	123.0	10.9
QT03	14	Commercial	0.2	72%	9.0	7.9	1.3	0.5	2.0	0.2
QT03	14	Commercial	0.8	72%	9.0	7.9	1.3	0.5	6.5	0.6
QT03	21	Cropland	11.2	0%	15.7	0.0	1.1	0.0	175.3	12.1
QT03	21	Cropland	3.6	0%	15.7	0.0	1.1	0.0	55.8	3.8
QT03	21	Cropland	16.5	0%	15.7	0.0	1.1	0.0	259.7	17.9
QT03	41	Deciduous Forest	203.4	0%	1.5	0.0	0.0	0.0	301.8	4.6
QT03	41	Deciduous Forest	0.0	0%	1.5	0.0	0.0	0.0	0.0	0.0
QT03	41	Deciduous Forest	1.8	0%	1.5	0.0	0.0	0.0	2.6	0.0
QT04	14	Commercial	0.2	72%	9.0	7.9	1.3	0.5	1.9	0.2
QT04	17	Extractive	0.0	2%	9.0	7.9	1.3	0.5	0.2	0.0
QT04	17	Extractive	26.1	2%	9.0	7.9	1.3	0.5	234.9	33.7
QT04	21	Cropland	395.7	0%	15.7	0.0	1.1	0.0	6218.1	427.9
QT04	21	Cropland	148.0	0%	15.7	0.0	1.1	0.0	2325.3	160.0
QT04	21	Cropland	42.7	0%	15.7	0.0	1.1	0.0	670.7	46.2
QT04	21	Cropland	82.1	0%	15.7	0.0	1.1	0.0	1289.7	88.8
QT04	21	Cropland	0.0	0%	15.7	0.0	1.1	0.0	0.4	0.0
QT04	21	Cropland	153.9	0%	15.7	0.0	1.1	0.0	2417.7	166.4
QT04	22	Pasture	15.8	0%	9.7	0.0	1.4	0.0	153.1	22.5
QT04	41	Deciduous Forest	3.4	0%	1.5	0.0	0.0	0.0	5.1	0.1

**Appendix A3.** Estimated non-point source loads for the Upper Wye and Queenstown Harbor watersheds under consolidated growth scenario (LULC class modified from MDP 2002).

HUC_ID	MDP LULC Code	LULC Description	Area (acres)	Percent Impervious Surface	Nitrogen Loading Rate for Pervious Surfaces (lbs/acre/yr)	Nitrogen Loading Rate for Impervious Surfaces (lbs/acre/yr)	Phosphorus Loading Rate for Pervious Surfaces (lbs/acre/yr)	Phosphorus Loading Rate for Impervious Surfaces (lbs/acre/yr)	Total Nitrogen Non-Point Source Load (lbs/year)	Total Phosphorus Non-Point Source Load (lbs/year)
QT04	41	Deciduous Forest	4.5	0%	1.5	0.0	0.0	0.0	6.7	0.1
QT04	41	Deciduous Forest	125.1	0%	1.5	0.0	0.0	0.0	185.6	2.8
QT04	41	Deciduous Forest	2.8	0%	1.5	0.0	0.0	0.0	4.2	0.1
QT04	41	Deciduous Forest	16.9	0%	1.5	0.0	0.0	0.0	25.1	0.4
QT04	41	Deciduous Forest	0.0	0%	1.5	0.0	0.0	0.0	0.0	0.0
QT04	41	Deciduous Forest	210.3	0%	1.5	0.0	0.0	0.0	312.0	4.7
QT04	60	Wetlands	6.8	0%	1.5	0.0	0.0	0.0	10.1	0.2
QT05	14	Commercial	5.2	72%	9.0	7.9	1.3	0.5	42.4	3.8
QT05	17	Extractive	19.4	2%	9.0	7.9	1.3	0.5	174.5	25.0
QT05	17	Extractive	0.1	2%	9.0	7.9	1.3	0.5	1.0	0.1
QT05	21	Cropland	8.1	0%	15.7	0.0	1.1	0.0	127.9	8.8
QT05	21	Cropland	0.1	0%	15.7	0.0	1.1	0.0	1.7	0.1
QT05	21	Cropland	328.2	0%	15.7	0.0	1.1	0.0	5156.4	354.9
QT05	21	Cropland	0.1	0%	15.7	0.0	1.1	0.0	1.7	0.1
QT05	41	Deciduous Forest	102.1	0%	1.5	0.0	0.0	0.0	151.5	2.3
QT05	41	Deciduous Forest	71.1	0%	1.5	0.0	0.0	0.0	105.5	1.6
QT05	41	Deciduous Forest	0.1	0%	1.5	0.0	0.0	0.0	0.2	0.0
QT06	11	Low Density Residential	18.7	14%	9.0	7.9	1.3	0.5	165.8	22.4
QT06	21	Cropland	603.1	0%	15.7	0.0	1.1	0.0	9476.1	652.1
QT06	41	Deciduous Forest	61.0	0%	1.5	0.0	0.0	0.0	90.5	1.4
QT06	41	Deciduous Forest	37.0	0%	1.5	0.0	0.0	0.0	55.0	0.8
QT06	41	Deciduous Forest	44.2	0%	1.5	0.0	0.0	0.0	65.5	1.0
QT07	11	Low Density Residential	23.9	14%	9.0	7.9	1.3	0.5	211.5	28.5
QT07	12	Medium Density Residential	27.0	28%	9.0	7.9	1.3	0.5	234.7	29.2
QT07	12	Medium Density Residential	0.0	28%	9.0	7.9	1.3	0.5	0.0	0.0
QT07	12	Medium Density Residential	0.0	28%	9.0	7.9	1.3	0.5	0.2	0.0
QT07	17	Extractive	0.0	2%	9.0	7.9	1.3	0.5	0.0	0.0
QT07	17	Extractive	37.2	2%	9.0	7.9	1.3	0.5	334.8	48.1
QT07	21	Cropland	29.1	0%	15.7	0.0	1.1	0.0	457.0	31.4
QT07	21	Cropland	32.0	0%	15.7	0.0	1.1	0.0	503.3	34.6
QT07	41	Deciduous Forest	63.3	0%	1.5	0.0	0.0	0.0	93.9	1.4
QT07	41	Deciduous Forest	0.0	0%	1.5	0.0	0.0	0.0	0.0	0.0
QT07	41	Deciduous Forest	0.0	0%	1.5	0.0	0.0	0.0	0.0	0.0
QT08	11	Low Density Residential	4.2	14%	9.0	7.9	1.3	0.5	37.2	5.0
QT08	14	Commercial	8.0	72%	9.0	7.9	1.3	0.5	65.2	5.8
QT08	15	Industrial	33.3	53%	9.0	7.9	1.3	0.5	279.9	29.3
QT08	21	Cropland	0.5	0%	15.7	0.0	1.1	0.0	8.5	0.6
QT08	21	Cropland	15.4	0%	15.7	0.0	1.1	0.0	241.7	16.6
QT08	21	Cropland	159.9	0%	15.7	0.0	1.1	0.0	2512.6	172.9
QT08	41	Deciduous Forest	1.4	0%	1.5	0.0	0.0	0.0	2.1	0.0
QT08	41	Deciduous Forest	44.4	0%	1.5	0.0	0.0	0.0	65.9	1.0
QT09	11	Low Density Residential	18.1	14%	9.0	7.9	1.3	0.5	160.5	21.6
QT09	11	Low Density Residential	5.8	14%	9.0	7.9	1.3	0.5	51.6	7.0
QT09	11	Low Density Residential	1.3	14%	9.0	7.9	1.3	0.5	11.9	1.6
QT09	12	Medium Density Residential	68.3	28%	9.0	7.9	1.3	0.5	593.9	73.9
QT09	12	Medium Density Residential	10.2	28%	9.0	7.9	1.3	0.5	88.7	11.0
QT09	12	Medium Density Residential	1.0	28%	9.0	7.9	1.3	0.5	8.8	1.1
QT09	12	Medium Density Residential	3.7	28%	9.0	7.9	1.3	0.5	32.1	4.0
QT09	14	Commercial	2.7	72%	9.0	7.9	1.3	0.5	22.0	2.0
QT09	14	Commercial	57.7	72%	9.0	7.9	1.3	0.5	472.5	41.9
QT09	16	Institutional	2.0	34%	9.0	7.9	1.3	0.5	17.4	2.1
QT09	18	Open Urban Land	0.0	9%	9.0	7.9	1.3	0.5	0.0	0.0
QT09	21	Cropland	1.8	0%	15.7	0.0	1.1	0.0	27.9	1.9
QT09	41	Deciduous Forest	3.8	0%	1.5	0.0	0.0	0.0	5.6	0.1
QT09	41	Deciduous Forest	67.7	0%	1.5	0.0	0.0	0.0	100.4	1.5
QT09	41	Deciduous Forest	8.4	0%	1.5	0.0	0.0	0.0	12.4	0.2
QT09	41	Deciduous Forest	0.0	0%	1.5	0.0	0.0	0.0	0.0	0.0
QT09	41	Deciduous Forest	0.0	0%	1.5	0.0	0.0	0.0	0.0	0.0
QT09	41	Deciduous Forest	50.7	0%	1.5	0.0	0.0	0.0	75.2	1.1
QT09	41	Deciduous Forest	1.4	0%	1.5	0.0	0.0	0.0	2.1	0.0
QT09	43	Mixed Forest	3.4	0%	1.5	0.0	0.0	0.0	5.0	0.1
QT09	60	Wetlands	17.9	0%	1.5	0.0	0.0	0.0	26.5	0.4
QT09	60	Wetlands	6.0	0%	1.5	0.0	0.0	0.0	8.9	0.1
QT10	11	Low Density Residential	0.0	14%	9.0	7.9	1.3	0.5	0.1	0.0
QT10	11	Low Density Residential	7.3	14%	9.0	7.9	1.3	0.5	64.4	8.7
QT10	11	Low Density Residential	152.9	14%	9.0	7.9	1.3	0.5	1354.5	182.7
QT10	14	Commercial	10.0	72%	9.0	7.9	1.3	0.5	82.0	7.3
QT10	14	Commercial	0.8	72%	9.0	7.9	1.3	0.5	6.4	0.6
QT10	21	Cropland	14.1	0%	15.7	0.0	1.1	0.0	221.8	15.3
QT10	21	Cropland	146.8	0%	15.7	0.0	1.1	0.0	2307.4	158.8
QT10	21	Cropland	0.0	0%	15.7	0.0	1.1	0.0	0.4	0.0
QT10	21	Cropland	27.6	0%	15.7	0.0	1.1	0.0	433.0	29.8

**Appendix A3.** Estimated non-point source loads for the Upper Wye and Queenstown Harbor watersheds under consolidated growth scenario (LULC class modified from MDP 2002).

HUC_ID	MDP LULC Code	LULC Description	Area (acres)	Percent Impervious Surface	Nitrogen Loading Rate for Pervious Surfaces (lbs/acre/yr)	Nitrogen Loading Rate for Impervious Surfaces (lbs/acre/yr)	Phosphorus Loading Rate for Pervious Surfaces (lbs/acre/yr)	Phosphorus Loading Rate for Impervious Surfaces (lbs/acre/yr)	Total Nitrogen Non-Point Source Load (lbs/year)	Total Phosphorus Non-Point Source Load (lbs/year)
QT10	41	Deciduous Forest	12.5	0%	1.5	0.0	0.0	0.0	18.5	0.3
QT10	41	Deciduous Forest	68.3	0%	1.5	0.0	0.0	0.0	101.4	1.5
QT10	60	Wetlands	0.1	0%	1.5	0.0	0.0	0.0	0.1	0.0
QT10	60	Wetlands	0.2	0%	1.5	0.0	0.0	0.0	0.2	0.0
QT10	242	Agricultural Buildings	61.8	2%	9.7	0.0	1.4	0.0	587.1	86.2
QT11	18	Open Urban Land	74.6	9%	9.0	7.9	1.3	0.5	664.9	92.1
QT11	60	Wetlands	3.9	0%	1.5	0.0	0.0	0.0	5.8	0.1
QT11	60	Wetlands	6.4	0%	1.5	0.0	0.0	0.0	9.5	0.1
QT11	18	Open Urban Land	125.5	9%	9.0	7.9	1.3	0.5	1119.3	155.1
QT11	43	Mixed Forest	2.1	0%	1.5	0.0	0.0	0.0	3.1	0.0
QT11	60	Wetlands	8.5	0%	1.5	0.0	0.0	0.0	12.7	0.2
QT11	18	Open Urban Land	125.8	9%	9.0	7.9	1.3	0.5	1121.6	155.4
QT11	18	Open Urban Land	0.0	9%	9.0	7.9	1.3	0.5	0.3	0.0
QT11	18	Open Urban Land	0.1	9%	9.0	7.9	1.3	0.5	0.5	0.1
QT11	21	Cropland	55.2	0%	15.7	0.0	1.1	0.0	867.1	59.7
QT11	41	Deciduous Forest	0.7	0%	1.5	0.0	0.0	0.0	1.1	0.0
QT11	41	Deciduous Forest	17.8	0%	1.5	0.0	0.0	0.0	26.4	0.4
QT11	43	Mixed Forest	120.5	0%	1.5	0.0	0.0	0.0	178.7	2.7
QT11	60	Wetlands	8.6	0%	1.5	0.0	0.0	0.0	12.7	0.2
QT11	11	Low Density Residential	2.5	14%	9.0	7.9	1.3	0.5	22.6	3.0
QT11	12	Medium Density Residential	7.3	28%	9.0	7.9	1.3	0.5	63.7	7.9
QT11	12	Medium Density Residential	5.8	28%	9.0	7.9	1.3	0.5	50.5	6.3
QT11	16	Institutional	0.4	34%	9.0	7.9	1.3	0.5	3.2	0.4
QT11	16	Institutional	0.2	34%	9.0	7.9	1.3	0.5	1.7	0.2
QT11	18	Open Urban Land	151.6	9%	9.0	7.9	1.3	0.5	1351.5	187.2
QT11	41	Deciduous Forest	6.7	0%	1.5	0.0	0.0	0.0	9.9	0.2
QT11	41	Deciduous Forest	2.6	0%	1.5	0.0	0.0	0.0	3.8	0.1
QT11	41	Deciduous Forest	6.7	0%	1.5	0.0	0.0	0.0	9.9	0.1
QT11	43	Mixed Forest	2.0	0%	1.5	0.0	0.0	0.0	3.0	0.0
QT12	11	Low Density Residential	11.2	14%	9.0	7.9	1.3	0.5	99.1	13.4
QT12	11	Low Density Residential	13.3	14%	9.0	7.9	1.3	0.5	117.7	15.9
QT12	11	Low Density Residential	10.5	14%	9.0	7.9	1.3	0.5	93.0	12.5
QT12	11	Low Density Residential	79.4	14%	9.0	7.9	1.3	0.5	703.5	94.9
QT12	14	Commercial	2.1	72%	9.0	7.9	1.3	0.5	17.4	1.5
QT12	16	Institutional	1.8	34%	9.0	7.9	1.3	0.5	15.7	1.9
QT12	21	Cropland	157.2	0%	15.7	0.0	1.1	0.0	2469.8	170.0
QT12	21	Cropland	20.2	0%	15.7	0.0	1.1	0.0	317.3	21.8
QT12	21	Cropland	145.5	0%	15.7	0.0	1.1	0.0	2286.0	157.3
QT12	41	Deciduous Forest	19.5	0%	1.5	0.0	0.0	0.0	29.0	0.4
QT12	41	Deciduous Forest	31.2	0%	1.5	0.0	0.0	0.0	46.3	0.7
QT12	42	Evergreen Forest	1.5	0%	1.5	0.0	0.0	0.0	2.3	0.0
QT12	60	Wetlands	7.2	0%	1.5	0.0	0.0	0.0	10.7	0.2
QT12	60	Wetlands	6.8	0%	1.5	0.0	0.0	0.0	10.0	0.2
QT13	11	Low Density Residential	0.4	14%	9.0	7.9	1.3	0.5	3.1	0.4
QT13	14	Commercial	1.3	72%	9.0	7.9	1.3	0.5	10.8	1.0
QT13	14	Commercial	0.4	72%	9.0	7.9	1.3	0.5	3.0	0.3
QT13	18	Open Urban Land	79.4	9%	9.0	7.9	1.3	0.5	708.4	98.1
QT13	21	Cropland	258.1	0%	15.7	0.0	1.1	0.0	4055.9	279.1
QT13	21	Cropland	529.6	0%	15.7	0.0	1.1	0.0	8322.0	572.7
QT13	21	Cropland	8.4	0%	15.7	0.0	1.1	0.0	131.7	9.1
QT13	21	Cropland	61.5	0%	15.7	0.0	1.1	0.0	966.0	66.5
QT13	21	Cropland	12.3	0%	15.7	0.0	1.1	0.0	193.6	13.3
QT13	41	Deciduous Forest	37.9	0%	1.5	0.0	0.0	0.0	56.2	0.9
QT13	41	Deciduous Forest	446.9	0%	1.5	0.0	0.0	0.0	663.0	10.0
QT13	41	Deciduous Forest	5.6	0%	1.5	0.0	0.0	0.0	8.4	0.1
QT13	41	Deciduous Forest	0.7	0%	1.5	0.0	0.0	0.0	1.0	0.0
QT13	60	Wetlands	21.1	0%	1.5	0.0	0.0	0.0	31.3	0.5
QT13	60	Wetlands	8.4	0%	1.5	0.0	0.0	0.0	12.4	0.2
QT13	242	Agricultural Buildings	9.7	2%	9.7	0.0	1.4	0.0	92.0	13.5
QT13	242	Agricultural Buildings	4.0	2%	9.7	0.0	1.4	0.0	37.6	5.5
QT14	11	Low Density Residential	18.6	14%	9.0	7.9	1.3	0.5	164.6	22.2
QT14	11	Low Density Residential	13.9	14%	9.0	7.9	1.3	0.5	123.5	16.7

**Appendix A4.** Estimated non-point source loads for the Upper Wye and Queenstown Harbor watersheds under consolidated growth scenario with BMPs emplaced for development and agriculture across the Planning Area (LULC class modified from MDP 2002).

HUC_ID	MDP LULC Code	LULC Description	Area (acres)	Percent Impervious Surface	Nitrogen Loading Rate for Pervious Surfaces (lbs/acre/yr)	Nitrogen Loading Rate for Impervious Surfaces (lbs/acre/yr)	Phosphorus Loading Rate for Pervious Surfaces (lbs/acre/yr)	Phosphorus Loading Rate for Impervious Surfaces (lbs/acre/yr)	Total Nitrogen Non-Point Source Load (lbs/year)	Total Phosphorus Non-Point Source Load (lbs/year)
QT01	11.0	Low Density Residential	9.9	14%	9.0	7.9	1.3	0.5	88.1	11.9
QT01	12.0	Medium Density Residential	84.5	28%	6.1	5.8	0.8	0.4	510.6	60.0
QT01	12.0	Medium Density Residential	0.3	28%	6.1	5.8	0.8	0.4	1.8	0.2
QT01	12.0	Medium Density Residential	6.1	28%	6.1	5.8	0.8	0.4	36.7	4.3
QT01	14.0	Commercial	2.5	72%	9.0	7.9	1.3	0.5	20.1	1.8
QT01	14.0	Commercial	2.0	72%	9.0	7.9	1.3	0.5	16.7	1.5
QT01	14.0	Commercial	0.4	72%	9.0	7.9	1.3	0.5	3.0	0.3
QT01	14.0	Commercial	0.3	72%	9.0	7.9	1.3	0.5	2.8	0.2
QT01	14.0	Commercial	0.8	72%	9.0	7.9	1.3	0.5	6.7	0.6
QT01	14.0	Commercial	0.4	72%	9.0	7.9	1.3	0.5	3.1	0.3
QT01	16.0	Institutional	0.7	34%	9.0	7.9	1.3	0.5	5.7	0.7
QT01	16.0	Institutional	0.3	34%	9.0	7.9	1.3	0.5	2.5	0.3
QT01	16.0	Institutional	0.3	34%	9.0	7.9	1.3	0.5	2.2	0.3
QT01	16.0	Institutional	0.3	34%	9.0	7.9	1.3	0.5	2.8	0.3
QT01	16.0	Institutional	1.0	34%	9.0	7.9	1.3	0.5	9.0	1.1
QT01	16.0	Institutional	0.0	34%	9.0	7.9	1.3	0.5	0.2	0.0
QT01	18.0	Open Urban Land	0.1	9%	9.0	7.9	1.3	0.5	0.8	0.1
QT01	25.0	Pasture	45.2	0%	8.7	0.0	0.8	0.0	393.3	35.2
QT01	41.0	Deciduous Forest	20.7	0%	1.5	0.0	0.0	0.0	30.7	0.5
QT01	220.0	Deciduous Forest	1.9	0%	1.5	0.0	0.0	0.0	2.8	0.0
QT01	41.0	Deciduous Forest	1.3	0%	1.5	0.0	0.0	0.0	1.9	0.0
QT01	41.0	Deciduous Forest	6.3	0%	1.5	0.0	0.0	0.0	9.4	0.1
QT01	41.0	Deciduous Forest	0.4	0%	1.5	0.0	0.0	0.0	0.7	0.0
QT01	43.0	Mixed Forest	0.4	0%	1.5	0.0	0.0	0.0	0.6	0.0
QT02	12.0	Medium Density Residential	100.9	28%	6.1	5.8	0.8	0.4	609.7	71.6
QT02	12.0	Medium Density Residential	15.1	28%	6.1	5.8	0.8	0.4	91.0	10.7
QT02	12.0	Medium Density Residential	57.6	28%	6.1	5.8	0.8	0.4	348.2	40.9
QT02	14.0	Commercial	1.6	72%	9.0	7.9	1.3	0.5	12.7	1.1
QT02	16.0	Institutional	1.6	34%	9.0	7.9	1.3	0.5	13.6	1.6
QT02	16.0	Institutional	1.2	34%	9.0	7.9	1.3	0.5	10.5	1.3
QT02	16.0	Institutional	0.2	34%	9.0	7.9	1.3	0.5	1.5	0.2
QT02	17.0	Extractive	9.2	2%	9.0	7.9	1.3	0.5	83.1	11.9
QT02	21.0	Cropland	6.5	0%	15.7	0.0	1.1	0.0	102.9	7.1
QT02	21.0	Cropland	86.5	0%	15.7	0.0	1.1	0.0	1359.2	93.5
QT02	25.0	Pasture	1.0	0%	8.7	0.0	0.8	0.0	8.9	0.8
QT02	25.0	Pasture	64.1	0%	8.7	0.0	0.8	0.0	558.0	50.0
QT02	41.0	Deciduous Forest	1.4	0%	1.5	0.0	0.0	0.0	2.1	0.0
QT02	41.0	Deciduous Forest	31.0	0%	1.5	0.0	0.0	0.0	46.0	0.7
QT02	41.0	Deciduous Forest	17.8	0%	1.5	0.0	0.0	0.0	26.4	0.4
QT02	43.0	Mixed Forest	7.7	0%	1.5	0.0	0.0	0.0	11.5	0.2
QT02	60.0	Wetlands	5.5	0%	1.5	0.0	0.0	0.0	8.2	0.1
QT03	11.0	Low Density Residential	9.0	14%	9.0	7.9	1.3	0.5	79.6	10.7
QT03	11.0	Low Density Residential	0.4	14%	9.0	7.9	1.3	0.5	3.9	0.5
QT03	12.0	Medium Density Residential	6.9	28%	6.1	5.8	0.8	0.4	41.9	4.9
QT03	12.0	Medium Density Residential	40.2	28%	6.1	5.8	0.8	0.4	242.8	28.5
QT03	12.0	Medium Density Residential	5.0	28%	6.1	5.8	0.8	0.4	30.3	3.6
QT03	12.0	Medium Density Residential	8.7	28%	6.1	5.8	0.8	0.4	52.8	6.2
QT03	12.0	Medium Density Residential	85.5	28%	6.1	5.8	0.8	0.4	517.0	60.7
QT03	12.0	Medium Density Residential	2.4	28%	6.1	5.8	0.8	0.4	14.3	1.7
QT03	14.0	Commercial	15.0	72%	9.0	7.9	1.3	0.5	123.0	10.9
QT03	14.0	Commercial	10.8	72%	9.0	7.9	1.3	0.5	88.2	7.8
QT03	14.0	Commercial	0.2	72%	9.0	7.9	1.3	0.5	2.0	0.2
QT03	14.0	Commercial	3.3	72%	9.0	7.9	1.3	0.5	27.2	2.4
QT03	14.0	Commercial	0.8	72%	9.0	7.9	1.3	0.5	6.5	0.6
QT03	14.0	Commercial	5.5	72%	9.0	7.9	1.3	0.5	44.9	4.0
QT03	21.0	Cropland	3.6	0%	15.7	0.0	1.1	0.0	55.8	3.8
QT03	25.0	Pasture	11.2	0%	8.7	0.0	0.8	0.0	97.1	8.7
QT03	25.0	Pasture	16.5	0%	8.7	0.0	0.8	0.0	143.8	12.9
QT03	41.0	Deciduous Forest	0.0	0%	1.5	0.0	0.0	0.0	0.0	0.0
QT03	41.0	Deciduous Forest	1.8	0%	1.5	0.0	0.0	0.0	2.6	0.0
QT03	41.0	Deciduous Forest	203.4	0%	1.5	0.0	0.0	0.0	301.8	4.6
QT04	14.0	Commercial	0.2	72%	9.0	7.9	1.3	0.5	1.9	0.2
QT04	17.0	Extractive	0.0	2%	9.0	7.9	1.3	0.5	0.2	0.0
QT04	17.0	Extractive	26.1	2%	9.0	7.9	1.3	0.5	234.9	33.7
QT04	21.0	Cropland	0.0	0%	15.7	0.0	1.1	0.0	0.4	0.0
QT04	21.0	Cropland	153.9	0%	15.7	0.0	1.1	0.0	2417.7	166.4
QT04	21.0	Cropland	82.1	0%	15.7	0.0	1.1	0.0	1289.7	88.8
QT04	21.0	Cropland	395.7	0%	15.7	0.0	1.1	0.0	6218.1	427.9
QT04	21.0	Cropland	42.7	0%	15.7	0.0	1.1	0.0	670.7	46.2
QT04	21.0	Cropland	148.0	0%	15.7	0.0	1.1	0.0	2325.3	160.0
QT04	25.0	Pasture	15.8	0%	8.7	0.0	0.8	0.0	137.4	12.3
QT04	41.0	Deciduous Forest	2.8	0%	1.5	0.0	0.0	0.0	4.2	0.1
QT04	41.0	Deciduous Forest	210.3	0%	1.5	0.0	0.0	0.0	312.0	4.7

**Appendix A4.** Estimated non-point source loads for the Upper Wye and Queenstown Harbor watersheds under consolidated growth scenario with BMPs emplaced for development and agriculture across the Planning Area (LULC class modified from MDP 2002).

HUC_ID	MDP LULC Code	LULC Description	Area (acres)	Percent Impervious Surface	Nitrogen Loading Rate for Pervious Surfaces (lbs/acre/yr)	Nitrogen Loading Rate for Impervious Surfaces (lbs/acre/yr)	Phosphorus Loading Rate for Pervious Surfaces (lbs/acre/yr)	Phosphorus Loading Rate for Impervious Surfaces (lbs/acre/yr)	Total Nitrogen Non-Point Source Load (lbs/year)	Total Phosphorus Non-Point Source Load (lbs/year)
QT04	41.0	Deciduous Forest	125.1	0%	1.5	0.0	0.0	0.0	185.6	2.8
QT04	41.0	Deciduous Forest	4.5	0%	1.5	0.0	0.0	0.0	6.7	0.1
QT04	41.0	Deciduous Forest	3.4	0%	1.5	0.0	0.0	0.0	5.1	0.1
QT04	41.0	Deciduous Forest	0.0	0%	1.5	0.0	0.0	0.0	0.0	0.0
QT04	41.0	Deciduous Forest	16.9	0%	1.5	0.0	0.0	0.0	25.1	0.4
QT04	60.0	Wetlands	6.8	0%	1.5	0.0	0.0	0.0	10.1	0.2
QT05	14.0	Commercial	5.2	72%	9.0	7.9	1.3	0.5	42.4	3.8
QT05	17.0	Extractive	0.1	2%	9.0	7.9	1.3	0.5	1.0	0.1
QT05	17.0	Extractive	19.4	2%	9.0	7.9	1.3	0.5	174.5	25.0
QT05	21.0	Cropland	328.2	0%	15.7	0.0	1.1	0.0	5156.4	354.9
QT05	21.0	Cropland	0.1	0%	15.7	0.0	1.1	0.0	1.7	0.1
QT05	21.0	Cropland	8.1	0%	15.7	0.0	1.1	0.0	127.9	8.8
QT05	25.0	Pasture	0.1	0%	8.7	0.0	0.8	0.0	0.9	0.1
QT05	41.0	Deciduous Forest	71.1	0%	1.5	0.0	0.0	0.0	105.5	1.6
QT05	41.0	Deciduous Forest	102.1	0%	1.5	0.0	0.0	0.0	151.5	2.3
QT05	41.0	Deciduous Forest	0.1	0%	1.5	0.0	0.0	0.0	0.2	0.0
QT06	11.0	Low Density Residential	18.7	14%	9.0	7.9	1.3	0.5	165.8	22.4
QT06	21.0	Cropland	603.1	0%	15.7	0.0	1.1	0.0	9476.1	652.1
QT06	41.0	Deciduous Forest	37.0	0%	1.5	0.0	0.0	0.0	55.0	0.8
QT06	41.0	Deciduous Forest	61.0	0%	1.5	0.0	0.0	0.0	90.5	1.4
QT06	41.0	Deciduous Forest	44.2	0%	1.5	0.0	0.0	0.0	65.5	1.0
QT07	11.0	Low Density Residential	23.9	14%	9.0	7.9	1.3	0.5	211.5	28.5
QT07	12.0	Medium Density Residential	27.0	28%	6.1	5.8	0.8	0.4	163.1	19.1
QT07	12.0	Medium Density Residential	0.0	28%	6.1	5.8	0.8	0.4	0.2	0.0
QT07	12.0	Medium Density Residential	0.0	28%	6.1	5.8	0.8	0.4	0.0	0.0
QT07	17.0	Extractive	0.0	2%	9.0	7.9	1.3	0.5	0.0	0.0
QT07	17.0	Extractive	37.2	2%	9.0	7.9	1.3	0.5	334.8	48.1
QT07	21.0	Cropland	32.0	0%	15.7	0.0	1.1	0.0	503.3	34.6
QT07	25.0	Pasture	29.1	0%	8.7	0.0	0.8	0.0	253.1	22.7
QT07	41.0	Deciduous Forest	63.3	0%	1.5	0.0	0.0	0.0	93.9	1.4
QT07	41.0	Deciduous Forest	0.0	0%	1.5	0.0	0.0	0.0	0.0	0.0
QT07	41.0	Deciduous Forest	0.0	0%	1.5	0.0	0.0	0.0	0.0	0.0
QT08	11.0	Low Density Residential	4.2	14%	9.0	7.9	1.3	0.5	37.2	5.0
QT08	14.0	Commercial	8.0	72%	9.0	7.9	1.3	0.5	65.2	5.8
QT08	15.0	Industrial	33.3	53%	9.0	7.9	1.3	0.5	279.9	29.3
QT08	21.0	Cropland	0.5	0%	15.7	0.0	1.1	0.0	8.5	0.6
QT08	21.0	Cropland	159.9	0%	15.7	0.0	1.1	0.0	2512.6	172.9
QT08	25.0	Pasture	15.4	0%	8.7	0.0	0.8	0.0	133.9	12.0
QT08	41.0	Deciduous Forest	1.4	0%	1.5	0.0	0.0	0.0	2.1	0.0
QT08	41.0	Deciduous Forest	44.4	0%	1.5	0.0	0.0	0.0	65.9	1.0
QT09	11.0	Low Density Residential	18.1	14%	9.0	7.9	1.3	0.5	160.5	21.6
QT09	11.0	Low Density Residential	1.3	14%	9.0	7.9	1.3	0.5	11.9	1.6
QT09	11.0	Low Density Residential	5.8	14%	9.0	7.9	1.3	0.5	51.6	7.0
QT09	12.0	Medium Density Residential	3.7	28%	6.1	5.8	0.8	0.4	22.3	2.6
QT09	12.0	Medium Density Residential	68.3	28%	6.1	5.8	0.8	0.4	412.7	48.5
QT09	12.0	Medium Density Residential	1.0	28%	6.1	5.8	0.8	0.4	6.1	0.7
QT09	12.0	Medium Density Residential	10.2	28%	6.1	5.8	0.8	0.4	61.6	7.2
QT09	14.0	Commercial	57.7	72%	9.0	7.9	1.3	0.5	472.5	41.9
QT09	14.0	Commercial	2.7	72%	9.0	7.9	1.3	0.5	22.0	2.0
QT09	16.0	Institutional	2.0	34%	9.0	7.9	1.3	0.5	17.4	2.1
QT09	18.0	Open Urban Land	0.0	9%	9.0	7.9	1.3	0.5	0.0	0.0
QT09	21.0	Cropland	1.8	0%	15.7	0.0	1.1	0.0	27.9	1.9
QT09	41.0	Deciduous Forest	8.4	0%	1.5	0.0	0.0	0.0	12.4	0.2
QT09	41.0	Deciduous Forest	0.0	0%	1.5	0.0	0.0	0.0	0.0	0.0
QT09	41.0	Deciduous Forest	50.7	0%	1.5	0.0	0.0	0.0	75.2	1.1
QT09	41.0	Deciduous Forest	3.8	0%	1.5	0.0	0.0	0.0	5.6	0.1
QT09	41.0	Deciduous Forest	67.7	0%	1.5	0.0	0.0	0.0	100.4	1.5
QT09	41.0	Deciduous Forest	1.4	0%	1.5	0.0	0.0	0.0	2.1	0.0
QT09	41.0	Deciduous Forest	0.0	0%	1.5	0.0	0.0	0.0	0.0	0.0
QT09	43.0	Mixed Forest	3.4	0%	1.5	0.0	0.0	0.0	5.0	0.1
QT09	60.0	Wetlands	17.9	0%	1.5	0.0	0.0	0.0	26.5	0.4
QT09	60.0	Wetlands	6.0	0%	1.5	0.0	0.0	0.0	8.9	0.1
QT10	11.0	Low Density Residential	7.3	14%	9.0	7.9	1.3	0.5	64.4	8.7
QT10	11.0	Low Density Residential	152.9	14%	9.0	7.9	1.3	0.5	1354.5	182.7
QT10	11.0	Low Density Residential	0.0	14%	9.0	7.9	1.3	0.5	0.1	0.0
QT10	14.0	Commercial	0.8	72%	9.0	7.9	1.3	0.5	6.4	0.6
QT10	14.0	Commercial	10.0	72%	9.0	7.9	1.3	0.5	82.0	7.3
QT10	21.0	Cropland	0.0	0%	15.7	0.0	1.1	0.0	0.4	0.0
QT10	21.0	Cropland	14.1	0%	15.7	0.0	1.1	0.0	221.8	15.3
QT10	21.0	Cropland	146.8	0%	15.7	0.0	1.1	0.0	2307.4	158.8
QT10	25.0	Pasture	27.6	0%	8.7	0.0	0.8	0.0	239.8	21.5
QT10	41.0	Deciduous Forest	68.3	0%	1.5	0.0	0.0	0.0	101.4	1.5
QT10	41.0	Deciduous Forest	12.5	0%	1.5	0.0	0.0	0.0	18.5	0.3

**Appendix A4.** Estimated non-point source loads for the Upper Wye and Queenstown Harbor watersheds under consolidated growth scenario with BMPs emplaced for development and agriculture across the Planning Area (LULC class modified from MDP 2002).

HUC_ID	MDP LULC Code	LULC Description	Area (acres)	Percent Impervious Surface	Nitrogen Loading Rate for Pervious Surfaces (lbs/acre/yr)	Nitrogen Loading Rate for Impervious Surfaces (lbs/acre/yr)	Phosphorus Loading Rate for Pervious Surfaces (lbs/acre/yr)	Phosphorus Loading Rate for Impervious Surfaces (lbs/acre/yr)	Total Nitrogen Non-Point Source Load (lbs/year)	Total Phosphorus Non-Point Source Load (lbs/year)
QT10	60.0	Wetlands	0.2	0%	1.5	0.0	0.0	0.0	0.2	0.0
QT10	60.0	Wetlands	0.1	0%	1.5	0.0	0.0	0.0	0.1	0.0
QT10	242.0	Agricultural Buildings	61.8	2%	9.7	0.0	1.4	0.0	587.1	86.2
QT11	11.0	Low Density Residential	2.5	14%	9.0	7.9	1.3	0.5	22.6	3.0
QT11	12.0	Medium Density Residential	7.3	28%	6.1	5.8	0.8	0.4	44.2	5.2
QT11	12.0	Medium Density Residential	5.8	28%	6.1	5.8	0.8	0.4	35.1	4.1
QT11	16.0	Institutional	0.4	34%	9.0	7.9	1.3	0.5	3.2	0.4
QT11	16.0	Institutional	0.2	34%	9.0	7.9	1.3	0.5	1.7	0.2
QT11	18.0	Open Urban Land	0.1	9%	9.0	7.9	1.3	0.5	0.5	0.1
QT11	18.0	Open Urban Land	0.0	9%	9.0	7.9	1.3	0.5	0.3	0.0
QT11	18.0	Open Urban Land	151.6	9%	9.0	7.9	1.3	0.5	1351.5	187.2
QT11	18.0	Open Urban Land	125.8	9%	9.0	7.9	1.3	0.5	1121.6	155.4
QT11	18.0	Open Urban Land	125.5	9%	9.0	7.9	1.3	0.5	1119.3	155.1
QT11	18.0	Open Urban Land	74.6	9%	9.0	7.9	1.3	0.5	664.9	92.1
QT11	21.0	Cropland	55.2	0%	15.7	0.0	1.1	0.0	867.1	59.7
QT11	41.0	Deciduous Forest	2.6	0%	1.5	0.0	0.0	0.0	3.8	0.1
QT11	41.0	Deciduous Forest	6.7	0%	1.5	0.0	0.0	0.0	9.9	0.1
QT11	41.0	Deciduous Forest	17.8	0%	1.5	0.0	0.0	0.0	26.4	0.4
QT11	41.0	Deciduous Forest	0.7	0%	1.5	0.0	0.0	0.0	1.1	0.0
QT11	41.0	Deciduous Forest	6.7	0%	1.5	0.0	0.0	0.0	9.9	0.2
QT11	43.0	Mixed Forest	120.5	0%	1.5	0.0	0.0	0.0	178.7	2.7
QT11	43.0	Mixed Forest	2.0	0%	1.5	0.0	0.0	0.0	3.0	0.0
QT11	43.0	Mixed Forest	2.1	0%	1.5	0.0	0.0	0.0	3.1	0.0
QT11	60.0	Wetlands	8.5	0%	1.5	0.0	0.0	0.0	12.7	0.2
QT11	60.0	Wetlands	8.6	0%	1.5	0.0	0.0	0.0	12.7	0.2
QT11	60.0	Wetlands	3.9	0%	1.5	0.0	0.0	0.0	5.8	0.1
QT11	60.0	Wetlands	6.4	0%	1.5	0.0	0.0	0.0	9.5	0.1
QT12	11.0	Low Density Residential	11.2	14%	9.0	7.9	1.3	0.5	99.1	13.4
QT12	11.0	Low Density Residential	13.3	14%	9.0	7.9	1.3	0.5	117.7	15.9
QT12	11.0	Low Density Residential	10.5	14%	9.0	7.9	1.3	0.5	93.0	12.5
QT12	11.0	Low Density Residential	79.4	14%	9.0	7.9	1.3	0.5	703.5	94.9
QT12	14.0	Commercial	2.1	72%	9.0	7.9	1.3	0.5	17.4	1.5
QT12	16.0	Institutional	1.8	34%	9.0	7.9	1.3	0.5	15.7	1.9
QT12	21.0	Cropland	20.2	0%	15.7	0.0	1.1	0.0	317.3	21.8
QT12	21.0	Cropland	157.2	0%	15.7	0.0	1.1	0.0	2469.8	170.0
QT12	21.0	Cropland	145.5	0%	15.7	0.0	1.1	0.0	2286.0	157.3
QT12	41.0	Deciduous Forest	19.5	0%	1.5	0.0	0.0	0.0	29.0	0.4
QT12	41.0	Deciduous Forest	31.2	0%	1.5	0.0	0.0	0.0	46.3	0.7
QT12	42.0	Evergreen Forest	1.5	0%	1.5	0.0	0.0	0.0	2.3	0.0
QT12	60.0	Wetlands	6.8	0%	1.5	0.0	0.0	0.0	10.0	0.2
QT12	60.0	Wetlands	7.2	0%	1.5	0.0	0.0	0.0	10.7	0.2
QT13	11.0	Low Density Residential	0.4	14%	9.0	7.9	1.3	0.5	3.1	0.4
QT13	14.0	Commercial	1.3	72%	9.0	7.9	1.3	0.5	10.8	1.0
QT13	14.0	Commercial	0.4	72%	9.0	7.9	1.3	0.5	3.0	0.3
QT13	18.0	Open Urban Land	79.4	9%	9.0	7.9	1.3	0.5	708.4	98.1
QT13	21.0	Cropland	8.4	0%	15.7	0.0	1.1	0.0	131.7	9.1
QT13	21.0	Cropland	529.6	0%	15.7	0.0	1.1	0.0	8322.0	572.7
QT13	21.0	Cropland	258.1	0%	15.7	0.0	1.1	0.0	4055.9	279.1
QT13	21.0	Cropland	12.3	0%	15.7	0.0	1.1	0.0	193.6	13.3
QT13	25.0	Pasture	61.5	0%	8.7	0.0	0.8	0.0	535.0	48.0
QT13	41.0	Deciduous Forest	5.6	0%	1.5	0.0	0.0	0.0	8.4	0.1
QT13	41.0	Deciduous Forest	37.9	0%	1.5	0.0	0.0	0.0	56.2	0.9
QT13	41.0	Deciduous Forest	0.7	0%	1.5	0.0	0.0	0.0	1.0	0.0
QT13	41.0	Deciduous Forest	446.9	0%	1.5	0.0	0.0	0.0	663.0	10.0
QT13	60.0	Wetlands	21.1	0%	1.5	0.0	0.0	0.0	31.3	0.5
QT13	60.0	Wetlands	8.4	0%	1.5	0.0	0.0	0.0	12.4	0.2
QT13	242.0	Agricultural Buildings	4.0	2%	9.7	0.0	1.4	0.0	37.6	5.5
QT13	242.0	Agricultural Buildings	9.7	2%	9.7	0.0	1.4	0.0	92.0	13.5
QT14	11.0	Low Density Residential	18.6	14%	9.0	7.9	1.3	0.5	164.6	22.2
QT14	11.0	Low Density Residential	1.9	14%	9.0	7.9	1.3	0.5	16.5	2.2

Appendix B1

Watershed Segment (HUC ID)	Watershed	Acres	Percent Impervious Surface	Impervious Surface Area (Acres)	NPS TN from Development	NPS TN from Septic Systems	NPS TN from Agriculture	NPS TN from Forest	NPS TN Load	TN Yield (lbs/acre/yr)
QT01	Queenstown Creek	186.2	11.0	20.4	965	37	715	46	1,763	9.5
QT02	Queenstown Creek	409.3	1.1	4.4	255	2,437	4,972	94	7,758	19.0
QT04	Queenstown Creek	1234.9	0.1	0.7	237	7,913	13,080	549	21,779	17.6
QT11	Queenstown Creek	735.7	7.8	57.6	5,514	1,339	868	92	7,812	10.6
QT14	Chester River	556.1	1.7	9.5	584	1,523	3,547	392	6,046	10.9
QT03	Upper Wye	430.4	7.3	31.5	512	4,594	2,538	304	7,948	18.5
QT05	Upper Wye	534.6	0.8	4.2	268	3,446	5,290	249	9,253	17.3
QT06	Upper Wye	764.3	0.3	2.6	166	1,471	9,480	211	11,328	14.8
QT07	Upper Wye	212.6	0.4	0.8	377	436	2,029	62	2,904	13.7
QT08	Upper Wye	267.2	9.0	24.0	382	1,700	2,764	68	4,914	18.4
QT09	Upper Wye	332.1	15.6	51.9	887	992	1,265	217	3,361	10.1
QT10	Upper Wye	502.6	6.3	31.4	1,508	2,331	3,551	120	7,511	14.9
QT12	Upper Wye	507.6	3.6	18.2	1,047	1,311	5,075	98	7,531	14.8
QT13	Upper Wye	1486.3	0.6	8.7	726	9,288	13,805	773	24,591	16.5
QT15	Upper Wye	721.5	0.3	2.0	21	3,043	9,101	204	12,370	17.1

Table 2. Current total phosphorus (TP) loads for watershed segments connected to the Queenstown Planning Area. All non-point source (NPS) nutrient loads predicted from MDP Nutrient Assessment Spreadsheet are in pounds per year.

Watershed Segment (HUC ID)	Watershed	Acres	Percent Impervious Surface	Impervious Surface Area (Acres)	NPS TP from Development	NPS TP from Agriculture	NPS TP from Forest	NPS TP Load	TP Yield (lbs/acre/yr)
QT01	Queenstown Creek	186.2	11.0	20.4	127	49	1	177	0.9
QT02	Queenstown Creek	409.3	1.1	4.4	34	343	1	379	0.9
QT04	Queenstown Creek	1234.9	0.1	0.7	34	912	8	954	0.8
QT11	Queenstown Creek	735.7	7.8	57.6	763	60	1	824	1.1
QT14	Chester River	556.1	1.7	9.5	79	244	6	329	0.6
QT03	Upper Wye	430.4	7.3	31.5	54	181	5	239	0.6
QT05	Upper Wye	534.6	0.8	4.2	36	364	4	404	0.8
QT06	Upper Wye	764.3	0.3	2.6	22	652	3	678	0.9
QT07	Upper Wye	212.6	0.4	0.8	54	140	1	195	0.9
QT08	Upper Wye	267.2	9.0	24.0	40	190	1	231	0.9
QT09	Upper Wye	332.1	15.6	51.9	95	87	3	186	0.6
QT10	Upper Wye	502.6	6.3	31.4	199	290	2	491	1.0
QT12	Upper Wye	507.6	3.6	18.2	140	349	1	491	1.0
QT13	Upper Wye	1486.3	0.6	8.7	100	960	12	1,072	0.7
QT15	Upper Wye	721.5	0.3	2.0	2	631	3	636	0.9

Appendix B2

Watershed Segment (HUC ID)	Watershed	Acres	Percent Impervious Surface	Impervious Surface Area (Acres)	NPS TN from Development	NPS TN from Septic Systems	NPS TN from Agriculture	NPS TN from Forest	NPS TN Load	TN Yield (lbs/acre/yr)
QT01	Queenstown Creek	186.1	20.7	38.6	1354	37	0	46	1,437	7.7
QT02	Queenstown Creek	409.1	9.2	37.7	2225	2611	1472	94	6,402	15.7
QT04	Queenstown Creek	1234.4	0.1	0.7	237	7913	13075	549	21,773	17.6
QT11	Queenstown Creek	735.4	6.4	47.2	4400	1339	867	277	6,882	9.4
QT14	Chester River	555.9	1.3	7.0	342	1523	3546	432	5,843	10.5
QT03	Upper Wye	430.2	12.0	51.5	1789	5688	56	329	7,862	18.3
QT05	Upper Wye	534.6	0.8	4.1	219	3446	5286	257	9,208	17.2
QT06	Upper Wye	764.0	0.3	2.6	166	1471	9476	211	11,323	14.8
QT07	Upper Wye	212.6	5.6	11.9	1043	840	503	94	2,481	11.7
QT08	Upper Wye	267.1	9.8	26.1	519	1930	2521	68	5,038	18.9
QT09	Upper Wye	331.9	18.5	61.3	1471	1111	28	236	2,846	8.6
QT10	Upper Wye	502.4	6.3	31.4	1507	2331	3117	161	7,117	14.2
QT12	Upper Wye	507.4	3.6	18.2	1046	1311	5073	98	7,529	14.8
QT13	Upper Wye	1485.7	1.2	17.3	1270	9932	12833	772	24,807	16.7
QT15	Upper Wye	721.2	8.4	60.8	3747	6621	2527	204	13,098	18.2

Table 2. Predicted total phosphorus (TP) loads with full build-out under current county zoning for watershed segments connected to the Queenstown Planning Area. All non-point source (NPS) nutrient loads predicted from MDP Nutrient Assessment Spreadsheet are in pounds per year.

Watershed Segment (HUC ID)	Watershed	Acres	Percent Impervious Surface	Impervious Surface Area (Acres)	NPS TP from Development	NPS TP from Agriculture	NPS TP from Forest	NPS TP Load	TP Yield (lbs/acre/yr)
QT01	Queenstown Creek	186.1	20.7	38.6	172	-	1	172	1.0
QT02	Queenstown Creek	409.1	9.2	37.7	298	102	1	402	1.1
QT04	Queenstown Creek	1234.4	0.1	0.7	34	912	8	954	0.9
QT11	Chester River	735.4	6.4	47.2	608	60	4	672	1.0
QT14	Chester River	555.9	1.3	7.0	45	244	7	296	0.6
QT03	Upper Wye	430.2	12.0	51.5	226	4	5	235	0.6
QT05	Upper Wye	534.6	0.8	4.1	29	364	4	397	0.8
QT06	Upper Wye	764.0	0.3	2.6	22	652	3	678	1.0
QT07	Upper Wye	212.6	5.6	11.9	144	35	1	180	0.9
QT08	Upper Wye	267.1	9.8	26.1	58	173	1	233	1.0
QT09	Upper Wye	331.9	18.5	61.3	174	2	4	179	0.6
QT10	Upper Wye	502.4	6.3	31.4	199	260	2	462	1.0
QT12	Upper Wye	507.4	3.6	18.2	140	349	1	491	1.1
QT13	Upper Wye	1485.7	1.2	17.3	173	893	12	1,078	0.8
QT15	Upper Wye	721.2	8.4	60.8	504	174	3	681	1.1

Appendix B3

Watershed Segment (HUC ID)	Watershed	Acres	Percent Impervious Surface	Impervious Surface Area (Acres)	NPS TN from Development	NPS TN from Septic Systems	NPS TN from Agriculture	NPS TN from Forest	NPS TN Load	TN Yield (lbs/acre/yr)
QT01	Queenstown Creek	186.1	17.4	32.3	954	37	710	46	1,747	9.4
QT02	Queenstown Creek	409.1	12.4	50.9	1,631	2,437	2,479	94	6,641	16.2
QT04	Queenstown Creek	1234.4	0.1	0.7	237	7,913	13,075	549	21,773	17.6
QT11	Queenstown Creek	735.4	6.4	47.2	4,400	1,339	867	277	6,882	9.4
QT14	Chester River	555.9	1.3	7.0	342	1,523	3,546	432	5,843	10.5
QT03	Upper Wye	430.2	16.0	68.6	1,669	4,594	491	304	7,058	16.4
QT05	Upper Wye	534.6	0.8	4.1	218	3,446	5,288	257	9,209	17.2
QT06	Upper Wye	764.0	0.3	2.6	166	1,471	9,476	211	11,323	14.8
QT07	Upper Wye	212.6	5.5	11.7	781	436	960	94	2,271	10.7
QT08	Upper Wye	267.1	9.0	24.0	382	1,700	2,763	68	4,913	18.4
QT09	Upper Wye	331.9	21.4	71.0	1,459	992	28	236	2,715	8.2
QT10	Upper Wye	502.4	6.3	31.4	1,507	2,331	3,550	120	7,509	14.9
QT12	Upper Wye	507.4	3.6	18.2	1,046	1,311	5,073	98	7,529	14.8
QT13	Upper Wye	1485.7	0.6	8.7	725	9,288	13,799	772	24,585	16.5
QT15	Upper Wye	721.2	1.0	6.9	188	3,043	8,835	204	12,270	17.0

Table 2. Predicted total phosphorus (TP) loads with full build-out under consolidated growth scenario for watershed segments connected to the Queenstown Planning Area. All non-point source (NPS) nutrient loads predicted from MDP Nutrient Assessment Spreadsheet are in pounds per year.

Watershed Segment (HUC ID)	Watershed	Acres	Percent Impervious Surface	Impervious Surface Area (Acres)	NPS TP from Development	NPS TP from Agriculture	NPS TP from Forest	NPS TP Load	TP Yield (lbs/acre/yr)
QT01	Queenstown Creek	186.1	17.4	32.3	118	49	1	167	0.9
QT02	Queenstown Creek	409.1	12.4	50.9	204	171	1	377	0.9
QT04	Queenstown Creek	1234.4	0.1	0.7	34	912	8	954	0.8
QT11	Queenstown Creek	735.4	6.4	47.2	608	60	4	672	0.9
QT14	Chester River	555.9	1.3	7.0	45	244	7	296	0.5
QT03	Upper Wye	430.2	16.0	68.6	198	34	5	236	0.5
QT05	Upper Wye	534.6	0.8	4.1	29	364	4	397	0.7
QT06	Upper Wye	764.0	0.3	2.6	22	652	3	678	0.9
QT07	Upper Wye	212.6	5.5	11.7	106	66	1	173	0.8
QT08	Upper Wye	267.1	9.0	24.0	40	190	1	231	0.9
QT09	Upper Wye	331.9	21.4	71.0	166	2	4	172	0.5
QT10	Upper Wye	502.4	6.3	31.4	199	290	2	491	1.0
QT12	Upper Wye	507.4	3.6	18.2	140	349	1	491	1.0
QT13	Upper Wye	1485.7	0.6	8.7	100	960	12	1,071	0.7
QT15	Upper Wye	721.2	1.0	6.9	23	608	3	634	0.9

Appendix B4

Watershed Segment (HUC ID)	Watershed	Acres	Percent Impervious Surface	Impervious Surface Area (Acres)	NPS TN from Development	NPS TN from Septic Systems	NPS TN from Agriculture	NPS TN from Forest	NPS TN Load	TN Yield (lbs/acre/yr)
QT01	Queenstown Creek	186.1	17.4	32.3	713	37	393	46	1,189	6.4
QT02	Queenstown Creek	409.1	12.4	50.9	1,170	2,437	2,029	94	5,730	14.0
QT04	Queenstown Creek	1234.4	0.1	0.7	237	7,913	13,059	549	21,758	17.6
QT11	Queenstown Creek	735.4	6.4	47.2	4,365	1,339	867	277	6,847	9.3
QT14	Chester River	555.9	1.3	7.0	342	1,523	3,546	432	5,843	10.5
QT03	Upper Wye	430.2	16.0	68.6	1,274	4,594	297	304	6,469	15.0
QT05	Upper Wye	534.6	0.8	4.1	218	3,446	5,287	257	9,208	17.2
QT06	Upper Wye	764.0	0.3	2.6	166	1,471	9,476	211	11,323	14.8
QT07	Upper Wye	212.6	5.5	11.7	710	436	756	94	1,996	9.4
QT08	Upper Wye	267.1	9.0	24.0	382	1,700	2,655	68	4,805	18.0
QT09	Upper Wye	331.9	21.4	71.0	1,239	992	28	236	2,495	7.5
QT10	Upper Wye	502.4	6.3	31.4	1,507	2,331	3,356	120	7,315	14.6
QT12	Upper Wye	507.4	3.6	18.2	1,046	1,311	5,073	98	7,529	14.8
QT13	Upper Wye	1485.7	0.6	8.7	725	9,288	13,368	772	24,154	16.3
QT15	Upper Wye	721.2	1.0	6.9	143	3,043	6,021	204	9,411	13.0

Table 2. Predicted total phosphorus (TP) loads with full build-out under consolidated growth scenario and BMPs for development and agriculture emplaced across the Queenstown Planning Area for watershed segments connected to the Queenstown Planning Area. All non-point source (NPS) nutrient loads predicted from MDP Nutrient Assessment Spreadsheet are in pounds per year.

Watershed Segment (HUC ID)	Watershed	Acres	Percent Impervious Surface	Impervious Surface Area (Acres)	NPS TP from Development	NPS TP from Agriculture	NPS TP from Forest	NPS TP Load	TP Yield (lbs/acre/yr)
QT01	Queenstown Creek	186.1	17.4	32.3	84	35	1	120	0.6
QT02	Queenstown Creek	409.1	12.4	50.9	139	151	1	292	0.7
QT04	Queenstown Creek	1234.4	0.1	0.7	34	902	8	944	0.8
QT11	Queenstown Creek	735.4	6.4	47.2	603	60	4	667	0.9
QT14	Chester River	555.9	1.3	7.0	45	244	7	296	0.5
QT03	Upper Wye	430.2	16.0	68.6	143	25	5	173	0.4
QT05	Upper Wye	534.6	0.8	4.1	29	364	4	397	0.7
QT06	Upper Wye	764.0	0.3	2.6	22	652	3	678	0.9
QT07	Upper Wye	212.6	5.5	11.7	96	57	1	155	0.7
QT08	Upper Wye	267.1	9.0	24.0	40	185	1	227	0.8
QT09	Upper Wye	331.9	21.4	71.0	135	2	4	141	0.4
QT10	Upper Wye	502.4	6.3	31.4	199	282	2	483	1.0
QT12	Upper Wye	507.4	3.6	18.2	140	349	1	491	1.0
QT13	Upper Wye	1485.7	0.6	8.7	100	941	12	1,053	0.7
QT15	Upper Wye	721.2	1.0	6.9	16	487	3	507	0.7

## **APPENDIX A:**

## **APPENDIX B:**

## **APPENDIX C: Design Standards for Queenstown and its Planning Area**

### **Create Human Scale**

Human scale is the proportional relationship of buildings and spaces to people. When components in the built environment are ordered in such a way that people feel comfortable then human scale has most likely been used. By contrast, a place that is out of human scale, either too small or too large, will tend to make people feel uncomfortable. The reaction is to avoid such a place or to move through it quickly. Significant buildings and sites use monumental scale to create a sense of importance. In these cases, the human scale elements are often incorporated into the project as well. Human scale can be further reinforced by the choice of materials, textures, patterns, colors, and details.

#### Characteristics of Human Scale Development

- a. The dimensions of building height and width, street width, streetscape elements, building setback, and other elements are combined so that they establish a comfortable realm for people to move around in and interact in. The dimensions of human interaction govern the design rather than the dimensions of vehicular circulation and convenience.
- b. Buildings are arranged to enclose and define space. This may include locating buildings close to a sidewalk, creating spatial definition.
- c. Buildings have limited height at pedestrian paths and sidewalks. Taller buildings have upper stories that are set back. There is a gradual transition of heights and mass, with the greatest concentration in the center of activity centers.
- d. Building articulation and design details reduce the perceived mass of large buildings. Elements such as openings at street level, decorative elements that mark floor heights such as cornices, porches, and awnings are used to break the building down to human dimensions.
- e. Residential forms and proportions are used on commercial and office buildings next to residential areas.
- f. Street trees with protective canopies enclose and define the streetscape.
- g. Street widths are limited when possible, bump-outs are used at crosswalks, and medians are used to break the street into dimensions comfortable for pedestrians.
- h. Streetscape elements such as sidewalks wide enough for comfortable pedestrian movement,

distinctive sidewalk paving, pedestrian- scale streetlights and other fixtures are used to relate to the human dimension.

### **Create a Sense of Place**

A “sense of place” creates an image that remains in your mind when you leave that area. This sense can be built on a particular distinctive element, such as a landmark building or a grove of mature trees or a special view. It also can be a mosaic of details that creates a fine-grained streetscape. Individuality of design can give a sense of place, and so can a theme of common design elements, particularly in the public realm.

#### Characteristics of Sense of Place

- a. Civic open spaces may be located in central parts of a development.
- b. Amenities such as fountains, clocks, or seating areas are provided.
- c. Gateways into an area are marked with signature architecture, public art, and/or landscaping.
- d. A landscaping and/or streetscape theme is used to define the area or the inherent features of a place.
- e. The architecture relates to human scale, is pedestrian friendly and is harmonious with neighboring buildings and the setting.
- f. Outdoor spaces are defined by building arrangement, landscaping, and/or site elements such as fences or walls.
- g. A materials palette or architectural theme may be established for specific areas.
- h. Special features and buildings may be used to terminate vistas.
- i. While an architectural style or landscape theme may create a unified design, some variety and individual expression within that theme provides vitality to an area.

### **Connect Uses**

A community is made up of both social and physical connections. Connecting uses means making clear pedestrian and vehicular pathways between developments. It also means intermingling compatible uses. A strong sense of community, the highly valued “small-town atmosphere,” depends on having such convenient and easy access to a variety of activities and uses. This connection of uses is very important to the function of a livable, pedestrian-oriented community such as Queenstown desires. Because many policies of recent decades have resulted in or even required the separation of projects and uses, this all-important design principle perhaps will require the greatest adjustment in how development occurs.

## Characteristics of Connectivity

- a. Individual developments are joined together with roads and continuous sidewalks and paths versus a collection of separate development pods. Within a development, easy-to-use internal circulation is provided not only for cars but for pedestrians and bicyclists between all buildings and spaces.
- b. Street stubs to adjacent developable sites are provided in existing developments for future connections between new projects and uses.
- c. Common streetscape elements, materials and designs are used to visually link different areas.
- d. Buildings are oriented to roads and sidewalks with orientation to parking areas being secondary. Buildings and whole developments are not isolated from one another with extensive buffers.
- e. Pedestrian and vehicular links are provided to parks, schools, and other public destinations.

## **Provide Transitions**

As Queenstown moves into a pattern of integrated uses and development projects, transitions become more important than ever to ensure compatible neighbors. Traditionally, uses have been separated and projects were designed to stand alone, buffered by landscaping and spatial separation. Queenstown's vision calls for bringing activity centers closer together and requiring connections. With good transitions, potential conflicts can be forestalled.

## Characteristics of Transitions Among Uses

- a. Complementary architectural design including building height, style, color, materials, mass, footprint and decoration is used to make a transition between diverse land uses.
- b. Manipulation of massing is used to buffer abrupt changes of scale. For instance, the mass of a multistory development can be stepped back from the street when adjacent to smaller scale development.
- c. Transitions between residential and larger commercial areas are created with mid-sized developments that may include higher density residential, small office and/or retail uses.
- d. Primary building elevations that are visible from the street or neighboring developments generally are not devoted to service functions such as delivery, loading docks, maintenance areas, utility equipment, etc.
- e. Planted buffers or fences and walls are used when architectural transitions would not be sufficient to reduce negative impacts such as rear service entries.
- f. Parks and open spaces can be transition zones between residential and commercial uses.

## **Reduce Parking Impacts**

A key principle of Queenstown's design vision is to reduce the visual impact of parking. This goal includes reducing the image of the "sea of parking" one finds along corridors at retail centers and the "garage-scape" in neighborhoods. Parking is necessary at work, at home, and at destinations throughout the Town. However, there is no reason why it needs to dominate the view. Following the Town's design principles should result in a decreased need for parking spaces, as more sites are accessible on foot and in combined trips. At the same time, the careful placement and design of parking areas will do much to determine how successfully Queenstown can achieve its other goals of full pedestrian access and good connections.

### Characteristics of Reduced Parking Impacts

- a. A portion of parking is placed to the rear or sides of commercial buildings that face a street. This parking is essentially overflow parking for peak usage during the year.
- b. Buildings are more prominent than parking lots.
- c. On-street parking is provided when feasible to reduce the area of parking lots.
- d. Parking is shared between complementary uses such as churches and office buildings.
- e. Plantings and pedestrian paths are used to divide large lots into smaller lots.
- f. Parking lots are screened with low walls and/or year-round plantings.
- g. Parking lots are well-shaded with trees in order to create a more desirable parking area.
- h. Garages do not dominate the residential street view. In some cases, access and parking are provided at the rear of some residential units.
- i. Structured parking is used in high-density commercial/office areas to reduce the area of necessary surface parking.

### Plan for Pedestrians, Bicyclists, and Transit Users

Emphasis on the pedestrian experience looms large throughout the vision for Queenstown. It is intended that it be possible to bike or walk between most destinations. Overcoming obstacles to walking from place to place requires evaluation of all components of development, from road dimensions to building arrangement and to parking lot design. It also requires amenities such as sidewalks, plantings, and street furniture. Continuous routes are the key.

### Characteristics of Planning for Pedestrians, Bicyclists, and Transit Users

- a. Overall, sidewalks, paths and greenways are connectors between communities, between and within

neighborhoods, block-to-block and at mid-block to schools and other high volume pedestrian destinations.

- b. Sidewalks are continuous along public streets.
- c. Sidewalks connect buildings to the public sidewalk and to each other.
- d. A system of bicycle and pedestrian paths is provided Town-wide.
- e. Sidewalks are designed to match the future volume of pedestrian traffic.
- f. Safe and frequent crossings are provided for pedestrians.
- g. Amenities such as street furniture, shade, and shelter are provided for pedestrians where there is a high volume of usage.
- h. Sites for transit stops are reserved at locations appropriate for commuters and activity center users.
- i. Bicycle storage is provided at appropriate locations, including parks, focus areas, and office parks.

### **Provide Open Space**

Even as the amount of land consumed generally has outstripped raw population growth, modern patterns of development generally offer little space for recreation, social gathering, and preservation of natural areas. This design principle calls for outdoor space to be just as integral to the overall development plan as the construction of buildings, roads, and other structures. A wide range of open spaces is possible: public gathering areas in activity centers and office parks; common play areas and mini-parks shared by nearby residences; and natural preserves. Setting aside well-designed open areas makes the immediate environs pleasant and fulfilling, giving citizens a convenient outlet for recreation and socialization and doing much to make continued development sustainable in the long run.

#### Characteristics of Usable Community Open Space

- a. Open space is provided in central, pedestrian-oriented areas in activity centers, neighborhoods, and in large office/industrial parks.
- b. Scenic views, mature woods or specimen trees, and riparian areas are preserved in new development.
- c. Residential areas have recreation areas within a five-minute walk of each home.

**APPENDIX D: Assessment of Riparian buffers in the Queenstown Planning Area**

There are several factors that are considered in this analysis; the size of a riparian buffer, its connectivity to other areas, and if it is a habitat for a protected species. Edge effects were not rated, as they are prevalent in all riparian environments due to their linear shape. Connectivity was measured based on the number of potential connections that an area has to other stream buffers.

Table B-1: Riparian Buffer Quality

	Buffer Width (in feet)	Connections	Possible Connections	% Connected	Protected Species Habitat	Notes
Little Queenstown Creek		2	3	67%	yes	
in Town	100					
At Golf Course	100					
Queenstown Creek	300+	2	2	100	yes	
Salthouse Cove	100	1	2	50%	yes	Some areas at 300'
Wosley Creek	300	2	3	67%	yes	Some areas at 200'
Wye River		12	22	55%	yes	
Section A	0					
Section B	100					
Section C	300					
Section D	100					Some areas at 0'
Section E	100					One area at 0'
East Branch		7	14	50%	yes	
Section F	300					Some areas at 100'
Section G	0					
Section H	0					North bank 300'+ in places
Section I	200					Some areas 300'+
Wye East River		2	15	13%	yes	
Section J	300					Some areas at 100'
Section K	200					
Section L	0					

Several features are of note regarding the quality of riparian environments in Queenstown.

- Queenstown Creek, Wosley Creek, Section C of the Wye River, Section F of the East Branch, and Section J of the Wye East River are the only areas that have full adequate buffers.

- There are very few sections of Riparian environment that provide the full benefits of a 300 foot buffer.

Many lower-order streams lack sufficient buffer (Sections D, E, H, and G). These streams often begin amid agricultural uses.

- Buffers are missing from three of the streams that feed into the Eastern Branch of the Wye River (Sections H and G).

- Little Queenstown Creek only has buffers of 100 feet. This does not provide an adequate buffer to filter the residential pollutants.
- The buffer is often only 100 feet or less along the floodplain and storm surge areas of the Wye River and Queenstown Creek. This does not provide the full benefits of storm surge mitigation.

#### Implications/Opportunities

- The size and quality of riparian buffers have implications for Queenstown's future. Opportunities exist for improved quality of the water in streams and rivers as well as the Chesapeake Bay.
- Nutrient and pollutant removal from water before it enters major water bodies is possible through expanded buffers.
- Lower order streams without existing buffers such as sections G, H, D, and E could be buffered, allowing an opportunity to remove nutrients and pollutants before they enter the stream network.
- The lack of buffer along the Wye River is detrimental to its overall health and the health of the Bay.
- The small buffer around Little Queenstown Creek can cause this area to be subject to more pollutants and runoff from the golf course and residential uses nearby.

**APPENDIX E: Assessment of Forest Areas in the Queenstown Planning Area**

Vegetation in forested areas absorbs and stores carbon dioxide, removing this greenhouse gas from the atmosphere. Carbon dioxide is a contributor to global warming, which in the Chesapeake Bay region is a component of sea level rise among other things. Afforestation—converting lands to forest—increases the rate at which carbon is removed. Converting cultivated lands to forest provides that two to ten tons of carbon per year are removed for every 2.5 acres; making afforestation an important ecological tool to mitigate local carbon emissions [From Richards, K.R. and C. Stokes. 2004. “A Review of Forest Carbon Sequestration Cost Studies: A Dozen Years of Research.” Climatic Change 63(1-2): 1-48.]

Several factors were considered in the evaluation of forested areas in Queenstown: the size of an area, its connectivity to other areas, its edge effects, if it is a habitat for a protected species, and whether or not it provides tree cover for wetlands.

**Table C-1 Forested Area Quality**

	Size	Possible Connections	Possible connections	% Connected	Edge Effects	Protected Species	Wetland Tree Cover
Lower Chester Watershed							
Area 17	170.7	2	2	100%	high		yes
Area 20	157.3	4	5	80%	low	yes	yes
Area 2	94.1	0	3	0%	low		yes
Area 1	62.6	2	3	67%	high		yes
Area 24	49.3	0	0	n/a	high	yes	yes
Area 18	31.5	0	2	0%	high		yes
Area 23	25.0	1	2	50%	high	yes	yes
Area 3	22.1	1	2	50%	high		yes
Area 19	18.0	0	0	n/a	high	yes	yes
Area 22	3.4	0	0	n/a	high		yes
Wye River Watershed							
Sub A Area 14	97.8	2	2	100%	high	yes	yes
Area 12	77.1	1	2	50%	low		yes
Area 9	75.6	2	3	67%	high		yes
Area 15	69.4	2	3	67%	high	yes	yes
Area 13	60.8	3	4	75%	low		yes
Area 16	41.4	1	2	50%	high		yes
Area 10	28.3	2	3	67%	high		yes
Area 6	27.2	2	3	67%	high		yes
Area 5	16.1	1	1	100%	high		no
Area 4	12.3	2	2	100%	high		no
Area 7	10.5	1	2	50%	high		yes
Area 21	9.6	2	2	100%	high	yes	yes

	Size	Connections	Possible connections	% Connected	Edge Effects	Protected Species	Wetland Tree Cover
Sub B Area 11	98.8	1	4	25%	low		yes
Area 8	85.8	1	2	50%	low		yes

Forested areas analyzed for their benefits were all above three acres in size. There are smaller areas that were not considered but these still provide benefits. Several conclusions can be drawn from the information presented in the table above.

- In general, all areas that have a low connectivity score could realize benefits from increased connections; this is particularly true in endangered species habitat.
- Water quality improvement effects are reduced by the edge created by Rt. 301, Rt. 50, and other roads in the Queenstown Area.
- The largest stands of forest around Queenstown are areas 17 and 20.
- Forest areas that ranked high in their current state include 13, 14, 17, and 20.
- Areas that are fragmented by existing highways include 3, 16, 18-22, and 24
- Routes 301 and 50 inhibit connectivity between forested areas.
- Water quality improvements are realized from the forested areas near the Wye and Wye East Rivers.
- Edge effects for areas 9-12 and 14 could be reduced through broad connections between these forest stands. Connecting these areas would also have the greatest effect on overall connectivity between the three major river tributaries.
- Connections between areas 6, 7, and 9-11 and expansion of area 13 could improve water quality.

#### Implications/Opportunities

The quality of forested areas has implications for Queenstown's future. Opportunities exist for expansion and connectivity in ways that will improve the overall environment and quality of life in Queenstown.

- Nutrient and pollutant removal from water before it enters major water bodies is possible through enhanced connectivity and expansion of existing forested areas. This would have the most impact in areas along the watershed lines (1, 6-8, 9-12, 17-23)
- A high-quality Forest Interior Dwelling Bird Species (FIDS) habitat could be created through connections among areas 9-12 and 14. The existing forest network contains a high proportion of edge

environment in relation to high-quality FIDS environment. To realize the full benefits from forested areas some high-quality FIDS environment is necessary. Since preserving existing forested areas is paramount, the recommended way to create these high quality forest stands is to forest around the existing areas, creating forest edges of newer growth, thereby protecting existing old growth forests.

- Future road upgrades and expansions do not have to reduce existing forested areas.
- Given watershed configurations, forested areas are not all distributed in such a way as to create filters between run-off and local waterbodies.
- The Delmarva Fox squirrel is a protected endangered species and is largely found in one area near the Town of Queenstown. Bald Eagle nesting sites and a heron rookery are also present.

