Reservoir emissions from selected Welsh and Scottish reservoirs

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1 Global parameters

1.1 Global Warming Potentials (GWPs) over 100 years

GWP100 for CO_2: 1.0

GWP100 for CH_4: 34.0

GWP100 for N_2O: 298.0

1.2 Unit conversion factors

Conversion from mg CO_2-C m^{-2} d^{-1} to g $CO_{2,eq}$ m^{-2} yr^{-1}: 3.667

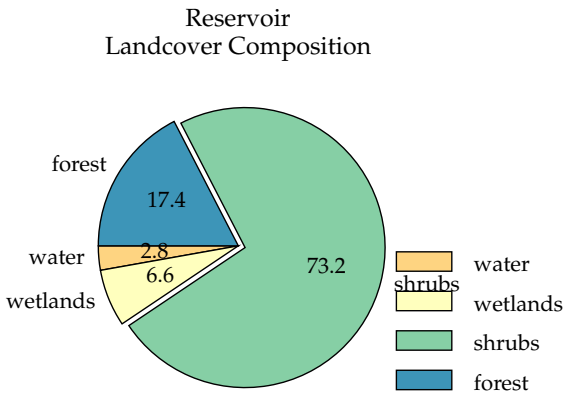
Conversion from mg CH_4 m^{-2} d^{-1} to g $CO_{2,eq}$ m^{-2} yr^{-1}: 16.55

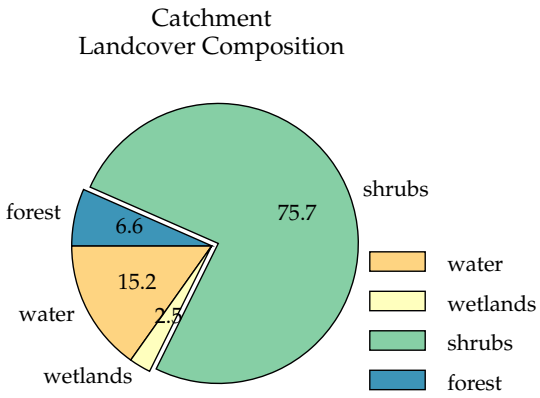
Conversion from μg N_2O m^{-2} d^{-1} to g $CO_{2,eq}$ m^{-2} yr^{-1}: 0.1709

2 Katrine

2.1 Inputs

Input Name	Unit	Value(s)
Reservoir ID		7
Reservoir type		potable
Reservoir coordinates (lat/lon)	^{o}	LAT: 56.2306760012, LON: -4.4391143601
Monthly Temperatures	^{o}C	2.9, 3.1, 4.3, 6.4, 9.3, 11.6, 13.4, 13.3, 11.3, 8.4, 5.3, 3.6
Year vector for emission profiles	yr	1, 5, 10, 20, 30, 40, 50, 65, 80, 100
Calculated gas emissions	-	CO_2, CH_4, N_2O
Biogenic factors		
Biome	-	temperate broadleaf and mixed
Climate	-	temperate
Soil Type	-	organic
Treatment Factor	-	secondary biological treatment
Landuse Intensity	-	low intensity
Inputs for catchment-level process calculations		
Annual runoff	mm/year	1687
Catchment area	km^2	95.48
Length of inundated river	km	13.66
Population	capita	138.0
Area fractions	-	0.0, 0.0, 0.0, 0.152, 0.025, 0.0, 0.758, 0.066, 0.0
Mean catchment slope	%	22.00
Mean annual precipitation	mm/year	2192
Mean annual evapotranspiration	mm/year	519.0
Soil wetness	mm over profile	21.00
Soil Olsen P content	kgP ha^{-1}	17.50
Inputs for reservoir-level process calculations		
Reservoir volume	m^3	804 700 000
Reservoir area	km^2	15.31
Maximum reservoir depth	m	150.9
Mean reservoir depth	m	60.70
Inundated area fractions	-	0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.023, 0.066, 0.0, 0.731, 0.173, 0.0, 0.0, 0.0, 0.0, 0.005, 0.0, 0.0, 0.0, 0.001, 0.0
Soil carbon in inundated area	kgC m^{-2}	9.152
Mean monthly horizontal radiance	kWh m^{-2} d^{-1}	2.350
Mean monthly horizontal radiance: May - Sept	kWh m^{-2} d^{-1}	3.840
Mean monthly horizontal radiance: Nov - Mar	kWh m^{-2} d^{-1}	0.8940
Mean monthly wind speed	m s^{-1}	5.010
Water intake depth below surface	m	N/A

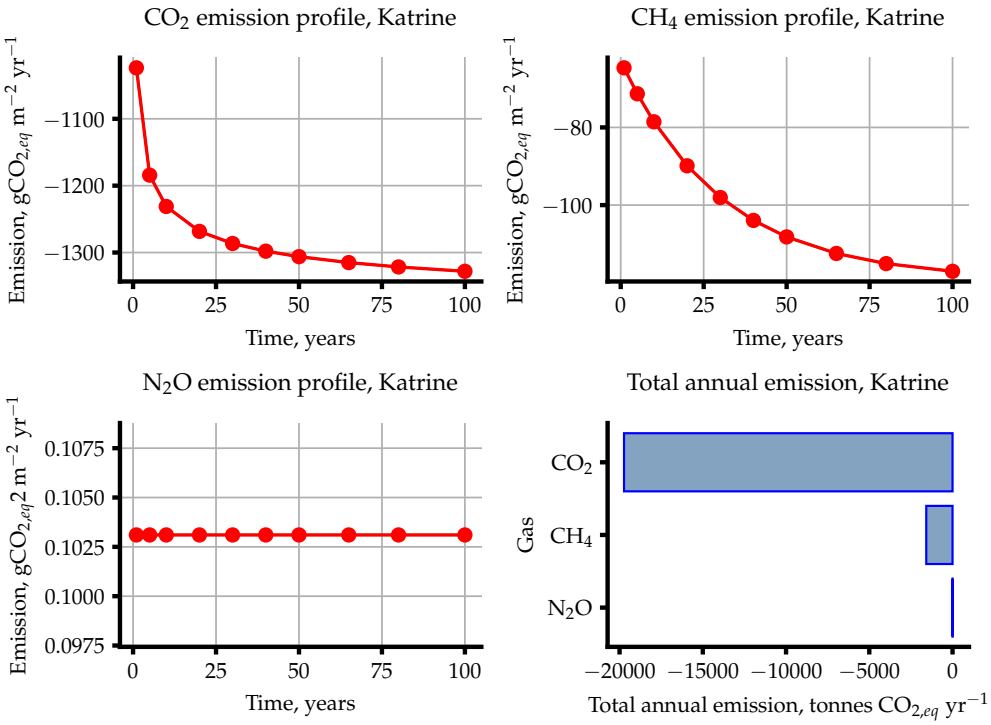




2.2 Outputs

Name	Unit	Value
CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	124.2
Nonanthropogenic CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	85.22
Preimpoundment CO_2 emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	1328
CO_2 emission minus non-anthropogenic	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	38.96
Net CO_2 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−1289
Total CO_2 emission per year	$tCO_{2,eq}\ yr^{-1}$	−19 730
Total CO_2 emission per lifetime	$ktCO_{2,eq}$	−1973
CH_4 emission via diffusion	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	15.61
CH_4 emission via ebullition	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	9.985
CH_4 emission via degassing	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.4603
Pre-impounment CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	129.2
Net CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−103.1
Total CH_4 emission per year	$tCO_{2,eq}\ yr^{-1}$	−1578
Total CH_4 emission per lifetime	$ktCO_{2,eq}$	−157.8
Net N_2O emission, method A	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.1031
Net N_2O emission, method B	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.021 30
Net N_2O emission, mean value	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.062 20
Total N_2O emission per year	$tCO_{2,eq}\ yr^{-1}$	1.578
Total N_2O emission per lifetime	$ktCO_{2,eq}$	0.1578
CO_2+CH_4 net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−1392
CO_2+CH_4+N_2O net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−1392

2.3 Emission plots



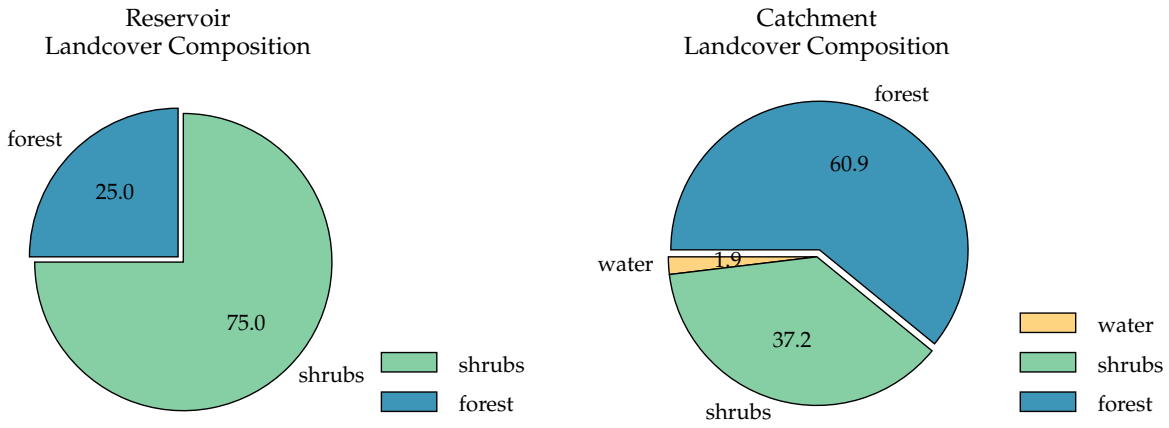
2.4 Intermediate variables

Name	Unit	Value
Influent total P concentration	μg L^{-1}	12.33
Retention coefficient	-	0.8001
Influent total N concentration	μg L^{-1}	1.899
Reservoir TN concentration	μg L^{-1}	0.3796
Reservoir TP concentration	μg L^{-1}	2.460
Percentage of reservoir's surface area that is littoral	%	2.940
Mean radiance at the reservoir	kWh m^{-2} d^{-1}	3.840
Cumulative global horizontal radiance at the reservoir	kWh m^{-2} d^{-1}	46.08
Bottom (hypolimnion) temperature in the reservoir	^{o}C	12.60
Water density at the bottom of the reservoir	kg m^{-3}	999.5
Surface (epilimnion) temperature in the reservoir	^{o}C	12.40
Water density at the surface of the reservoir	kg m^{-3}	999.5
Thermocline depth	m	11.51
Influent total N load	kgN yr^{-1}	305.8
Influent total P load	kgP yr^{-1}	1986
Downstream TN concentration	mg L^{-1}	0.000 279 8

3 Black Esk

3.1 Inputs

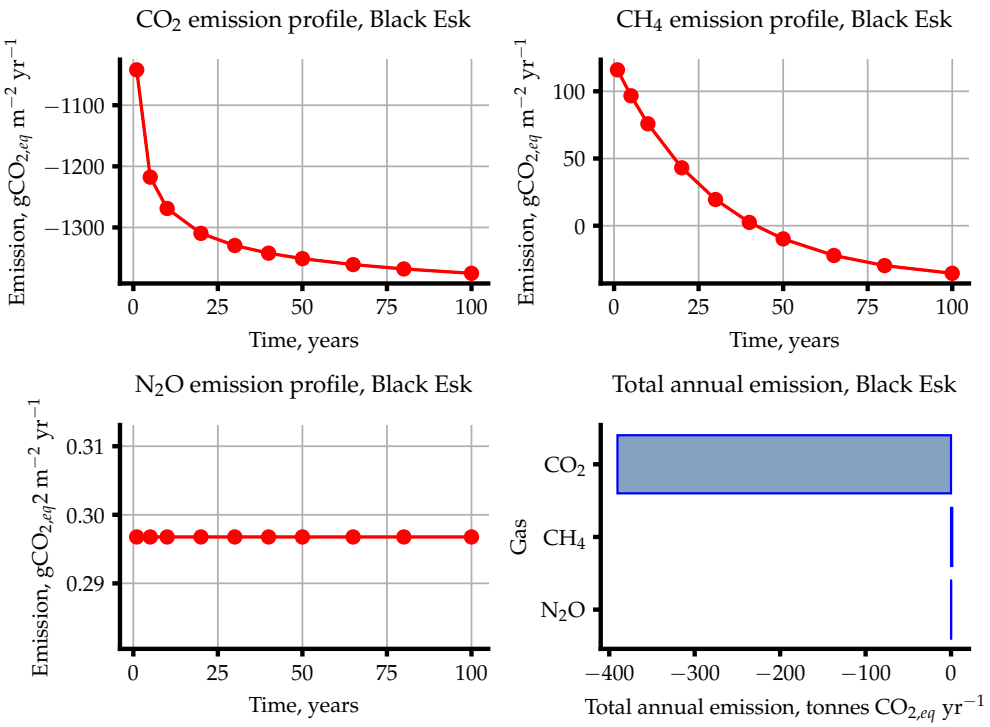
Input Name	Unit	Value(s)
Reservoir ID		3
Reservoir type		potable
Reservoir coordinates (lat/lon)	^{o}	LAT: 55.2528289078, LON: -3.252589492
Monthly Temperatures	^{o}C	2.1, 2.4, 3.9, 5.7, 8.8, 11.5, 13.4, 13.2, 10.8, 7.8, 4.6, 2.9
Year vector for emission profiles	yr	1, 5, 10, 20, 30, 40, 50, 65, 80, 100
Calculated gas emissions	-	CO_2, CH_4, N_2O
Biogenic factors		
Biome	-	temperate broadleaf and mixed
Climate	-	temperate
Soil Type	-	organic
Treatment Factor	-	secondary biological treatment
Landuse Intensity	-	low intensity
Inputs for catchment-level process calculations		
Annual runoff	mm/year	1278
Catchment area	km^2	19.32
Length of inundated river	km	0.8770
Population	capita	31.00
Area fractions	-	0.0, 0.0, 0.0, 0.019, 0.0, 0.0, 0.372, 0.609, 0.0
Mean catchment slope	%	11.00
Mean annual precipitation	mm/year	1792
Mean annual evapotranspiration	mm/year	530.0
Soil wetness	mm over profile	47.00
Soil Olsen P content	kgP ha^{-1}	16.76
Inputs for reservoir-level process calculations		
Reservoir volume	m^3	1 688 000
Reservoir area	km^2	0.2930
Maximum reservoir depth	m	12.37
Mean reservoir depth	m	5.000
Inundated area fractions	-	0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.75, 0.25, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0
Soil carbon in inundated area	kgC m^{-2}	12.31
Mean monthly horizontal radiance	kWh m^{-2} d^{-1}	2.470
Mean monthly horizontal radiance: May - Sept	kWh m^{-2} d^{-1}	3.934
Mean monthly horizontal radiance: Nov - Mar	kWh m^{-2} d^{-1}	1.044
Mean monthly wind speed	m s^{-1}	4.990
Water intake depth below surface	m	N/A



3.2 Outputs

Name	Unit	Value
CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	135.9
Nonanthropogenic CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	93.23
Preimpoundment CO_2 emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	1375
CO_2 emission minus non-anthropogenic	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	42.62
Net CO_2 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−1332
Total CO_2 emission per year	$tCO_{2,eq}\ yr^{-1}$	−390.4
Total CO_2 emission per lifetime	$ktCO_{2,eq}$	−39.04
CH_4 emission via diffusion	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	46.39
CH_4 emission via ebullition	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	90.94
CH_4 emission via degassing	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.0
Pre-impounment CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	132.5
Net CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	4.795
Total CH_4 emission per year	$tCO_{2,eq}\ yr^{-1}$	1.405
Total CH_4 emission per lifetime	$ktCO_{2,eq}$	0.1405
Net N_2O emission, method A	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.2968
Net N_2O emission, method B	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.2504
Net N_2O emission, mean value	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.2736
Total N_2O emission per year	$tCO_{2,eq}\ yr^{-1}$	0.086 95
Total N_2O emission per lifetime	$ktCO_{2,eq}$	0.008 695
CO_2+CH_4 net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−1328
CO_2+CH_4+N_2O net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−1327

3.3 Emission plots



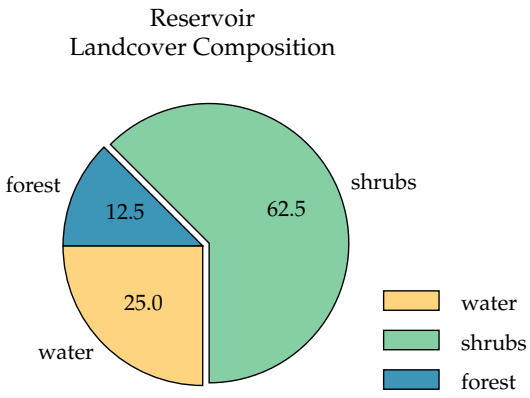
3.4 Intermediate variables

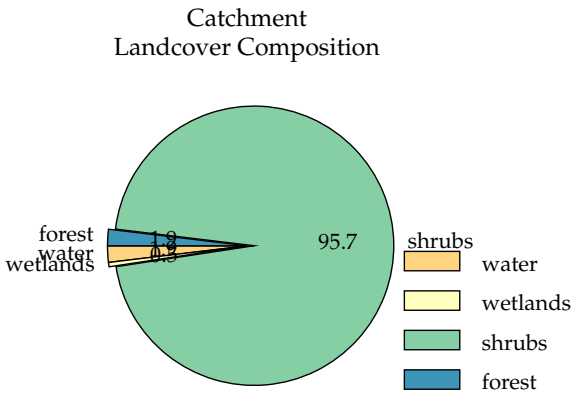
Name	Unit	Value
Influent total P concentration	μg L^{-1}	11.62
Retention coefficient	-	0.051 93
Influent total N concentration	μg L^{-1}	22.26
Reservoir TN concentration	μg L^{-1}	21.1
Reservoir TP concentration	μg L^{-1}	10.94
Percentage of reservoir's surface area that is littoral	%	33.59
Mean radiance at the reservoir	kWh m^{-2} d^{-1}	3.934
Cumulative global horizontal radiance at the reservoir	kWh m^{-2} d^{-1}	47.21
Bottom (hypolimnion) temperature in the reservoir	^{o}C	12.08
Water density at the bottom of the reservoir	kg m^{-3}	999.5
Surface (epilimnion) temperature in the reservoir	^{o}C	12.23
Water density at the surface of the reservoir	kg m^{-3}	999.5
Thermocline depth	m	21.48
Influent total N load	kgN yr^{-1}	549.5
Influent total P load	kgP yr^{-1}	286.9
Downstream TN concentration	mg L^{-1}	0.028 25

4 Whiteadder

4.1 Inputs

Input Name	Unit	Value(s)
Reservoir ID		15
Reservoir type		potable
Reservoir coordinates (lat/lon)	^{o}	LAT: 55.8603447154, LON: -2.5446352884
Monthly Temperatures	^{o}C	2.1, 2.2, 3.7, 5.6, 8.5, 11.4, 13.2, 12.9, 10.7, 7.8, 4.4, 2.6
Year vector for emission profiles	yr	1, 5, 10, 20, 30, 40, 50, 65, 80, 100
Calculated gas emissions	-	CO_2, CH_4, N_2O
Biogenic factors		
Biome	-	temperate broadleaf and mixed
Climate	-	temperate
Soil Type	-	organic
Treatment Factor	-	secondary biological treatment
Landuse Intensity	-	low intensity
Inputs for catchment-level process calculations		
Annual runoff	mm/year	614.0
Catchment area	km^2	44.81
Length of inundated river	km	1.080
Population	capita	130.0
Area fractions	-	0.0, 0.0, 0.0, 0.019, 0.005, 0.0, 0.957, 0.019, 0.0
Mean catchment slope	%	11.00
Mean annual precipitation	mm/year	1167
Mean annual evapotranspiration	mm/year	589.0
Soil wetness	mm over profile	55.00
Soil Olsen P content	kgP ha^{-1}	24.83
Inputs for reservoir-level process calculations		
Reservoir volume	m^3	4 239 000
Reservoir area	km^2	0.3610
Maximum reservoir depth	m	14.49
Mean reservoir depth	m	5.500
Inundated area fractions	-	0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.125, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.5, 0.125, 0.0, 0.0, 0.0, 0.0, 0.25, 0.0, 0.0, 0.0, 0.0, 0.0
Soil carbon in inundated area	kgC m^{-2}	8.364
Mean monthly horizontal radiance	kWh m^{-2} d^{-1}	2.470
Mean monthly horizontal radiance: May - Sept	kWh m^{-2} d^{-1}	3.934
Mean monthly horizontal radiance: Nov - Mar	kWh m^{-2} d^{-1}	1.044
Mean monthly wind speed	m s^{-1}	6.480
Water intake depth below surface	m	N/A

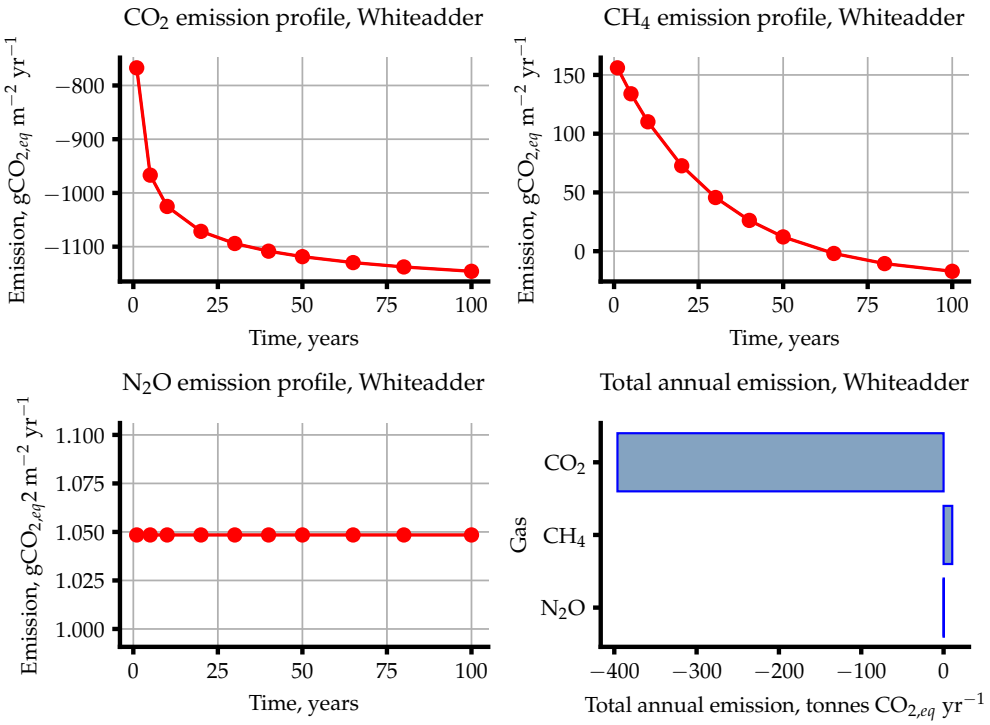




4.2 Outputs

Name	Unit	Value
CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	154.5
Nonanthropogenic CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	106.0
Preimpoundment CO_2 emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	1146
CO_2 emission minus non-anthropogenic	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	48.47
Net CO_2 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−1097
Total CO_2 emission per year	$tCO_{2,eq}\ yr^{-1}$	−396.1
Total CO_2 emission per lifetime	$ktCO_{2,eq}$	−39.61
CH_4 emission via diffusion	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	44.39
CH_4 emission via ebullition	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	86.24
CH_4 emission via degassing	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	8.968
Pre-impounment CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	110.4
Net CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	29.14
Total CH_4 emission per year	$tCO_{2,eq}\ yr^{-1}$	10.52
Total CH_4 emission per lifetime	$ktCO_{2,eq}$	1.052
Net N_2O emission, method A	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	1.048
Net N_2O emission, method B	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.8338
Net N_2O emission, mean value	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.9411
Total N_2O emission per year	$tCO_{2,eq}\ yr^{-1}$	0.3785
Total N_2O emission per lifetime	$ktCO_{2,eq}$	0.037 85
CO_2+CH_4 net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−1068
CO_2+CH_4+N_2O net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−1067

4.3 Emission plots



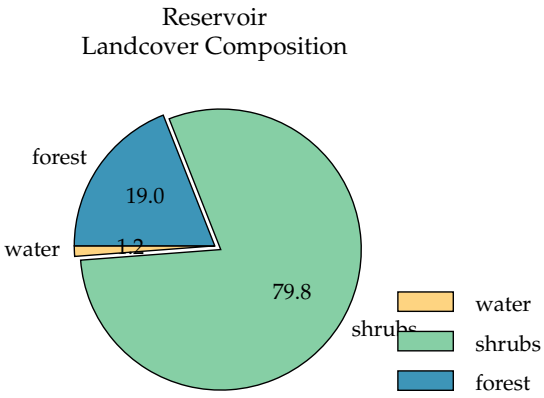
4.4 Intermediate variables

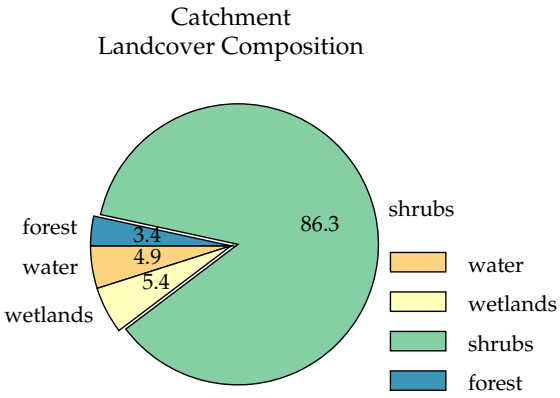
Name	Unit	Value
Influent total P concentration	μg L^{-1}	41.90
Retention coefficient	-	0.1099
Influent total N concentration	μg L^{-1}	36.97
Reservoir TN concentration	μg L^{-1}	32.91
Reservoir TP concentration	μg L^{-1}	37.39
Percentage of reservoir's surface area that is littoral	%	31.56
Mean radiance at the reservoir	kWh m^{-2} d^{-1}	3.934
Cumulative global horizontal radiance at the reservoir	kWh m^{-2} d^{-1}	47.21
Bottom (hypolimnion) temperature in the reservoir	^{o}C	12.08
Water density at the bottom of the reservoir	kg m^{-3}	999.5
Surface (epilimnion) temperature in the reservoir	^{o}C	12.05
Water density at the surface of the reservoir	kg m^{-3}	999.5
Thermocline depth	m	5.756
Influent total N load	kgN yr^{-1}	1017
Influent total P load	kgP yr^{-1}	1153
Downstream TN concentration	mg L^{-1}	0.046 98

5 St Mary's

5.1 Inputs

Input Name	Unit	Value(s)
Reservoir ID		11
Reservoir type		potable
Reservoir coordinates (lat/lon)	^{o}	LAT: 55.5014309986, LON: -3.1584095542
Monthly Temperatures	^{o}C	1.9, 2.2, 3.7, 5.5, 8.7, 11.4, 13.4, 13.1, 10.6, 7.8, 4.4, 2.9
Year vector for emission profiles	yr	1, 5, 10, 20, 30, 40, 50, 65, 80, 100
Calculated gas emissions	-	CO_2, CH_4, N_2O
Biogenic factors		
Biome	-	temperate broadleaf and mixed
Climate	-	temperate
Soil Type	-	organic
Treatment Factor	-	secondary biological treatment
Landuse Intensity	-	low intensity
Inputs for catchment-level process calculations		
Annual runoff	mm/year	1185
Catchment area	km^2	113.7
Length of inundated river	km	3.192
Population	capita	80.00
Area fractions	-	0.0, 0.0, 0.0, 0.049, 0.054, 0.0, 0.863, 0.034, 0.0
Mean catchment slope	%	21.00
Mean annual precipitation	mm/year	1734
Mean annual evapotranspiration	mm/year	566.0
Soil wetness	mm over profile	53.00
Soil Olsen P content	kgP ha^{-1}	26.54
Inputs for reservoir-level process calculations		
Reservoir volume	m^3	63 950 000
Reservoir area	km^2	3.355
Maximum reservoir depth	m	46.60
Mean reservoir depth	m	22.20
Inundated area fractions	-	0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.006, 0.0, 0.0, 0.797, 0.19, 0.0, 0.0, 0.0, 0.0, 0.006, 0.0, 0.0, 0.0, 0.0, 0.0
Soil carbon in inundated area	kgC m^{-2}	9.800
Mean monthly horizontal radiance	kWh m^{-2} d^{-1}	2.470
Mean monthly horizontal radiance: May - Sept	kWh m^{-2} d^{-1}	3.934
Mean monthly horizontal radiance: Nov - Mar	kWh m^{-2} d^{-1}	1.044
Mean monthly wind speed	m s^{-1}	4.810
Water intake depth below surface	m	N/A

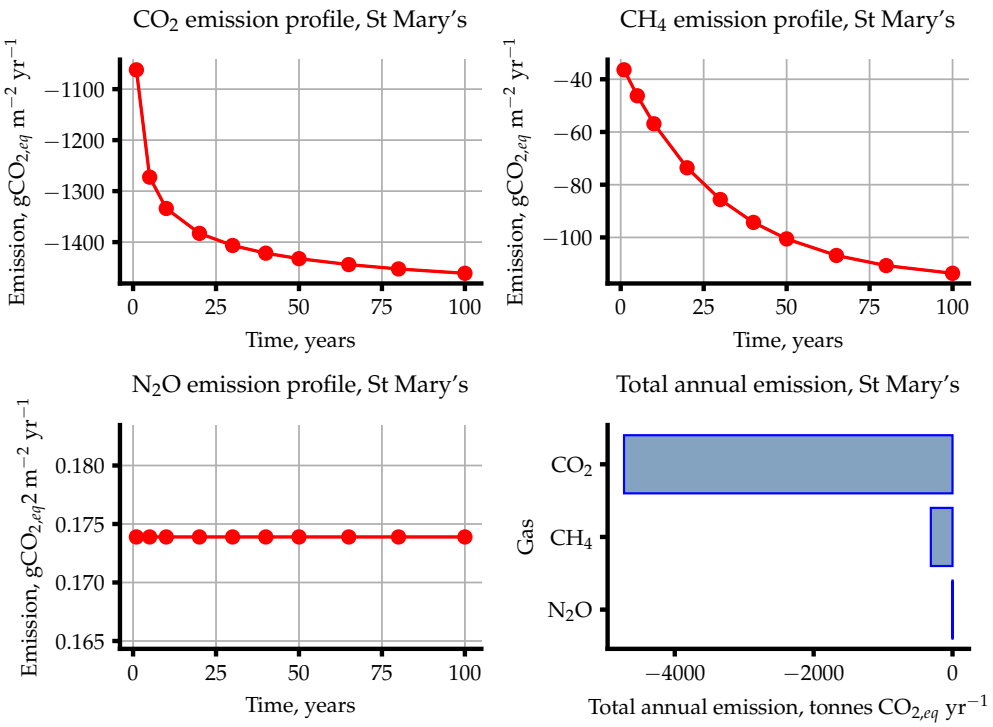




5.2 Outputs

Name	Unit	Value
CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	162.8
Nonanthropogenic CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	111.7
Preimpoundment CO_2 emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	1461
CO_2 emission minus non-anthropogenic	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	51.08
Net CO_2 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−1410
Total CO_2 emission per year	$tCO_{2,eq}\ yr^{-1}$	−4731
Total CO_2 emission per lifetime	$ktCO_{2,eq}$	−473.1
CH_4 emission via diffusion	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	22.45
CH_4 emission via ebullition	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	24.07
CH_4 emission via degassing	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	1.245
Pre-impounment CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	140.8
Net CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−93.07
Total CH_4 emission per year	$tCO_{2,eq}\ yr^{-1}$	−312.3
Total CH_4 emission per lifetime	$ktCO_{2,eq}$	−31.23
Net N_2O emission, method A	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.1739
Net N_2O emission, method B	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.1188
Net N_2O emission, mean value	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.1464
Total N_2O emission per year	$tCO_{2,eq}\ yr^{-1}$	0.5834
Total N_2O emission per lifetime	$ktCO_{2,eq}$	0.058 34
CO_2+CH_4 net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−1503
CO_2+CH_4+N_2O net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−1503

5.3 Emission plots



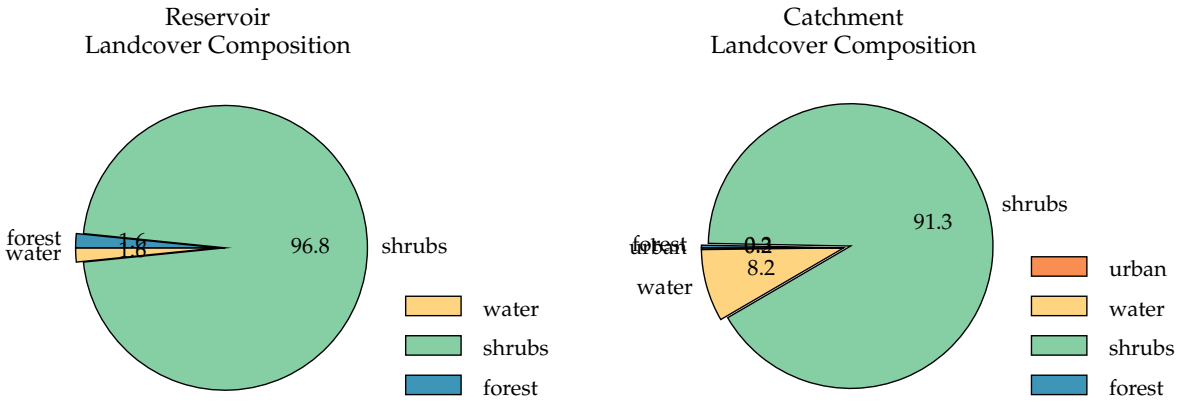
5.4 Intermediate variables

Name	Unit	Value
Influent total P concentration	μg L^{-1}	19.75
Retention coefficient	-	0.2754
Influent total N concentration	μg L^{-1}	3.821
Reservoir TN concentration	μg L^{-1}	2.769
Reservoir TP concentration	μg L^{-1}	14.33
Percentage of reservoir's surface area that is littoral	%	7.053
Mean radiance at the reservoir	kWh m^{-2} d^{-1}	3.934
Cumulative global horizontal radiance at the reservoir	kWh m^{-2} d^{-1}	47.21
Bottom (hypolimnion) temperature in the reservoir	^{o}C	11.95
Water density at the bottom of the reservoir	kg m^{-3}	999.5
Surface (epilimnion) temperature in the reservoir	^{o}C	12.13
Water density at the surface of the reservoir	kg m^{-3}	999.5
Thermocline depth	m	34.80
Influent total N load	kgN yr^{-1}	515.0
Influent total P load	kgP yr^{-1}	2662
Downstream TN concentration	mg L^{-1}	0.004 077

6 Alaw

6.1 Inputs

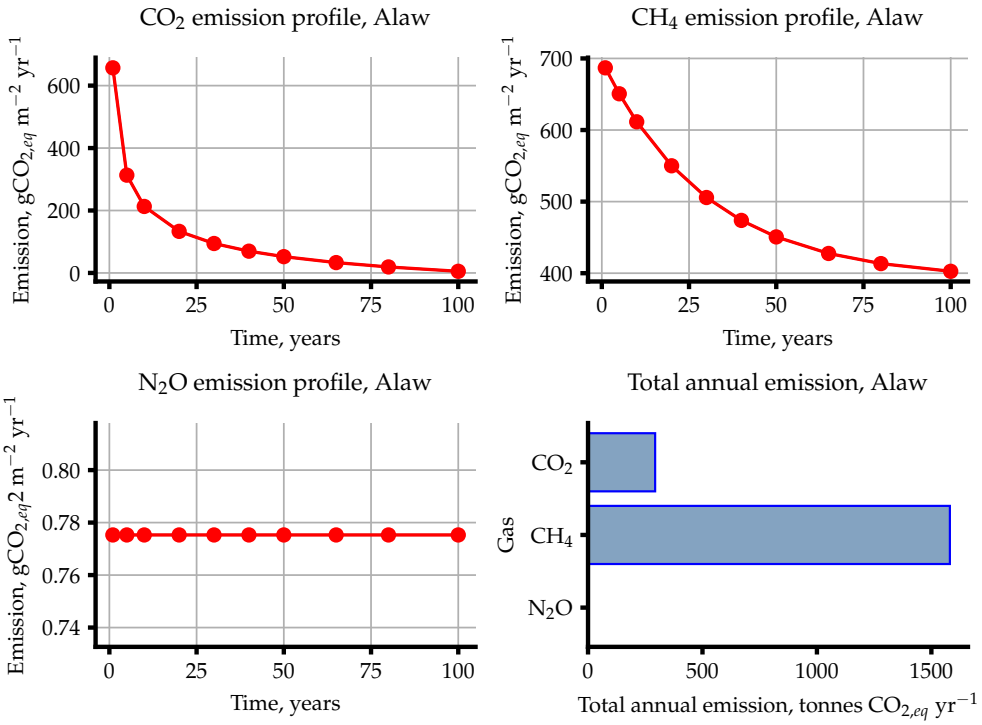
Input Name	Unit	Value(s)
Reservoir ID		16
Reservoir type		potable
Reservoir coordinates (lat/lon)	^{o}	LAT: 53.3400541722, LON: -4.4414762976
Monthly Temperatures	^{o}C	5.4, 5.3, 6.6, 8.2, 11.1, 13.4, 15.5, 15.5, 13.6, 11.1, 8.1, 6.3
Year vector for emission profiles	yr	1, 5, 10, 20, 30, 40, 50, 65, 80, 100
Calculated gas emissions	-	CO_2, CH_4, N_2O
Biogenic factors		
Biome	-	temperate broadleaf and mixed
Climate	-	temperate
Soil Type	-	mineral
Treatment Factor	-	secondary biological treatment
Landuse Intensity	-	low intensity
Inputs for catchment-level process calculations		
Annual runoff	mm/year	404.0
Catchment area	km^2	37.29
Length of inundated river	km	0.2880
Population	capita	1594
Area fractions	-	0.0, 0.0, 0.002, 0.082, 0.0, 0.0, 0.913, 0.003, 0.0
Mean catchment slope	%	4.000
Mean annual precipitation	mm/year	974.0
Mean annual evapotranspiration	mm/year	662.0
Soil wetness	mm over profile	44.00
Soil Olsen P content	kgP ha^{-1}	36.43
Inputs for reservoir-level process calculations		
Reservoir volume	m^3	7 401 000
Reservoir area	km^2	3.305
Maximum reservoir depth	m	5.400
Mean reservoir depth	m	2.400
Inundated area fractions	-	0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.969, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.016, 0.0, 0.0, 0.0, 0.016, 0.0
Soil carbon in inundated area	kgC m^{-2}	8.443
Mean monthly horizontal radiance	kWh m^{-2} d^{-1}	2.880
Mean monthly horizontal radiance: May - Sept	kWh m^{-2} d^{-1}	4.570
Mean monthly horizontal radiance: Nov - Mar	kWh m^{-2} d^{-1}	1.208
Mean monthly wind speed	m s^{-1}	5.460
Water intake depth below surface	m	N/A



6.2 Outputs

Name	Unit	Value
CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	265.9
Nonanthropogenic CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	182.5
Preimpoundment CO_2 emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−5.280
CO_2 emission minus non-anthropogenic	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	83.43
Net CO_2 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	88.71
Total CO_2 emission per year	$tCO_{2,eq}\ yr^{-1}$	293.2
Total CO_2 emission per lifetime	$ktCO_{2,eq}$	29.32
CH_4 emission via diffusion	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	80.96
CH_4 emission via ebullition	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	391.0
CH_4 emission via degassing	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	6.346
Pre-impounment CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.0
Net CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	478.3
Total CH_4 emission per year	$tCO_{2,eq}\ yr^{-1}$	1581
Total CH_4 emission per lifetime	$ktCO_{2,eq}$	158.1
Net N_2O emission, method A	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.7753
Net N_2O emission, method B	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.5247
Net N_2O emission, mean value	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.6500
Total N_2O emission per year	$tCO_{2,eq}\ yr^{-1}$	2.562
Total N_2O emission per lifetime	$ktCO_{2,eq}$	0.2562
CO_2+CH_4 net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	567.0
CO_2+CH_4+N_2O net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	567.7

6.3 Emission plots



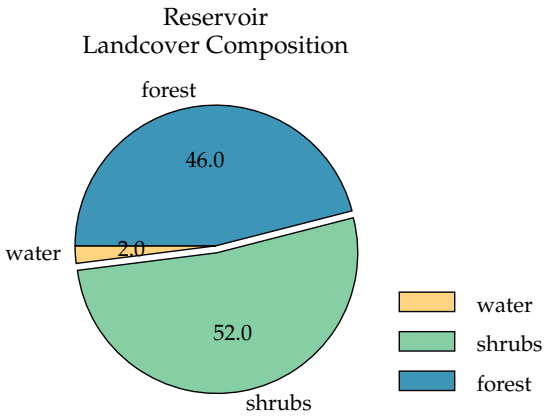
6.4 Intermediate variables

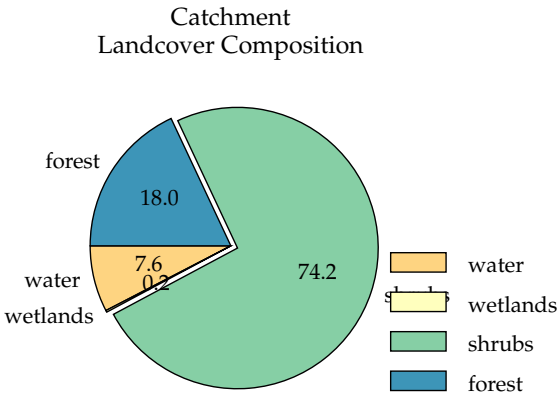
Name	Unit	Value
Influent total P concentration	μg L^{-1}	83.37
Retention coefficient	-	0.2824
Influent total N concentration	μg L^{-1}	145.4
Reservoir TN concentration	μg L^{-1}	104.3
Reservoir TP concentration	μg L^{-1}	61.27
Percentage of reservoir's surface area that is littoral	%	63.71
Mean radiance at the reservoir	kWh m^{-2} d^{-1}	4.570
Cumulative global horizontal radiance at the reservoir	kWh m^{-2} d^{-1}	54.84
Bottom (hypolimnion) temperature in the reservoir	^{o}C	14.18
Water density at the bottom of the reservoir	kg m^{-3}	999.2
Surface (epilimnion) temperature in the reservoir	^{o}C	14.50
Water density at the surface of the reservoir	kg m^{-3}	999.2
Thermocline depth	m	2.962
Influent total N load	kgN yr^{-1}	2190
Influent total P load	kgP yr^{-1}	1256
Downstream TN concentration	mg L^{-1}	0.1533

7 Alwen

7.1 Inputs

Input Name	Unit	Value(s)
Reservoir ID		18
Reservoir type		potable
Reservoir coordinates (lat/lon)	^{o}	LAT: 53.0614887214, LON: -3.561582049
Monthly Temperatures	^{o}C	2.9, 2.6, 4.0, 5.7, 8.9, 11.6, 13.8, 13.4, 11.2, 8.5, 5.4, 3.8
Year vector for emission profiles	yr	1, 5, 10, 20, 30, 40, 50, 65, 80, 100
Calculated gas emissions	-	CO_2, CH_4, N_2O
Biogenic factors		
Biome	-	temperate broadleaf and mixed
Climate	-	temperate
Soil Type	-	mineral
Treatment Factor	-	secondary biological treatment
Landuse Intensity	-	low intensity
Inputs for catchment-level process calculations		
Annual runoff	mm/year	986.0
Catchment area	km^2	23.34
Length of inundated river	km	0.8610
Population	capita	167.0
Area fractions	-	0.0, 0.0, 0.0, 0.076, 0.002, 0.0, 0.741, 0.18, 0.0
Mean catchment slope	%	8.000
Mean annual precipitation	mm/year	1481
Mean annual evapotranspiration	mm/year	515.0
Soil wetness	mm over profile	62.00
Soil Olsen P content	kgP ha^{-1}	40.60
Inputs for reservoir-level process calculations		
Reservoir volume	m^3	14 750 000
Reservoir area	km^2	1.238
Maximum reservoir depth	m	22.50
Mean reservoir depth	m	9.800
Inundated area fractions	-	0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.5, 0.44, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.02, 0.0, 0.0, 0.0, 0.0, 0.02, 0.0, 0.0, 0.02, 0.0, 0.0
Soil carbon in inundated area	kgC m^{-2}	9.267
Mean monthly horizontal radiance	kWh m^{-2} d^{-1}	2.700
Mean monthly horizontal radiance: May - Sept	kWh m^{-2} d^{-1}	4.308
Mean monthly horizontal radiance: Nov - Mar	kWh m^{-2} d^{-1}	1.126
Mean monthly wind speed	m s^{-1}	5.210
Water intake depth below surface	m	N/A

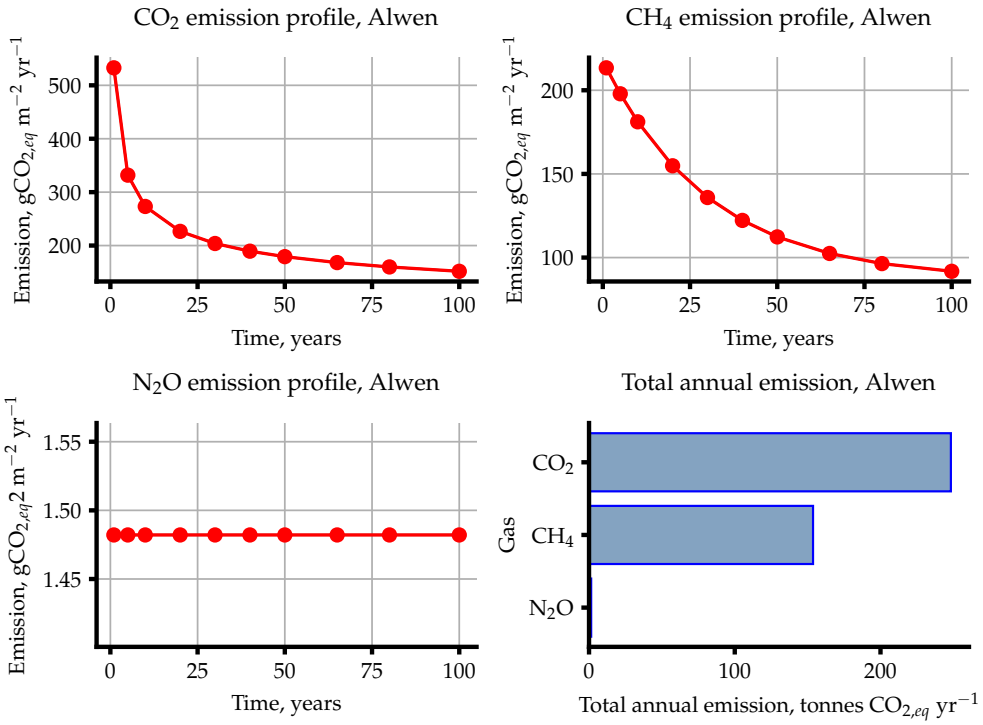




7.2 Outputs

Name	Unit	Value
CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	155.5
Nonanthropogenic CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	106.7
Preimpoundment CO_2 emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−151.8
CO_2 emission minus non-anthropogenic	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	48.77
Net CO_2 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	200.6
Total CO_2 emission per year	$tCO_{2,eq}\ yr^{-1}$	248.3
Total CO_2 emission per lifetime	$ktCO_{2,eq}$	24.83
CH_4 emission via diffusion	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	34.83
CH_4 emission via ebullition	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	86.82
CH_4 emission via degassing	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	2.522
Pre-impounment CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.0
Net CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	124.2
Total CH_4 emission per year	$tCO_{2,eq}\ yr^{-1}$	153.7
Total CH_4 emission per lifetime	$ktCO_{2,eq}$	15.37
Net N_2O emission, method A	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	1.482
Net N_2O emission, method B	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.9011
Net N_2O emission, mean value	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	1.192
Total N_2O emission per year	$tCO_{2,eq}\ yr^{-1}$	1.835
Total N_2O emission per lifetime	$ktCO_{2,eq}$	0.1835
CO_2+CH_4 net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	324.7
CO_2+CH_4+N_2O net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	325.9

7.3 Emission plots



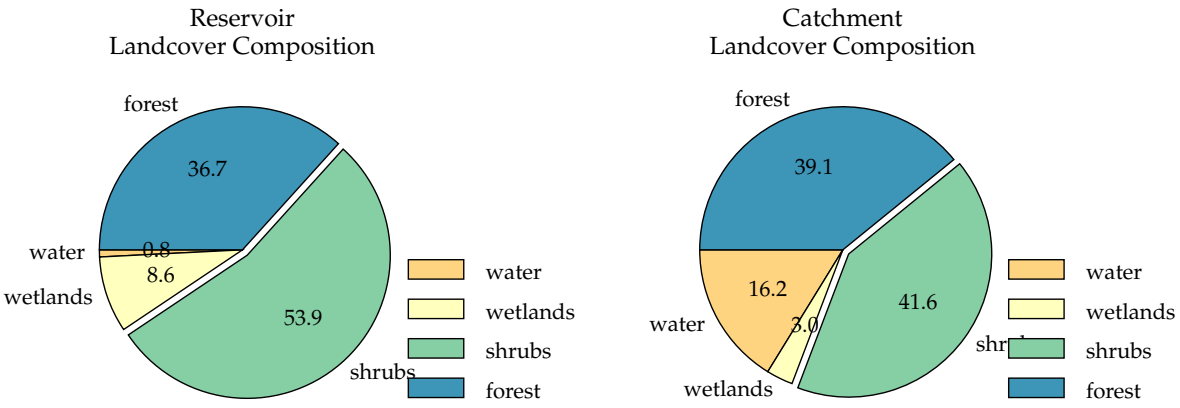
7.4 Intermediate variables

Name	Unit	Value
Influent total P concentration	μg L^{-1}	22.62
Retention coefficient	-	0.3393
Influent total N concentration	μg L^{-1}	52.83
Reservoir TN concentration	μg L^{-1}	34.91
Reservoir TP concentration	μg L^{-1}	15.14
Percentage of reservoir's surface area that is littoral	%	16.93
Mean radiance at the reservoir	kWh m^{-2} d^{-1}	4.308
Cumulative global horizontal radiance at the reservoir	kWh m^{-2} d^{-1}	51.70
Bottom (hypolimnion) temperature in the reservoir	^{o}C	12.41
Water density at the bottom of the reservoir	kg m^{-3}	999.5
Surface (epilimnion) temperature in the reservoir	^{o}C	12.50
Water density at the surface of the reservoir	kg m^{-3}	999.5
Thermocline depth	m	4.497
Influent total N load	kgN yr^{-1}	1216
Influent total P load	kgP yr^{-1}	520.5
Downstream TN concentration	mg L^{-1}	0.050 83

8 Brenig

8.1 Inputs

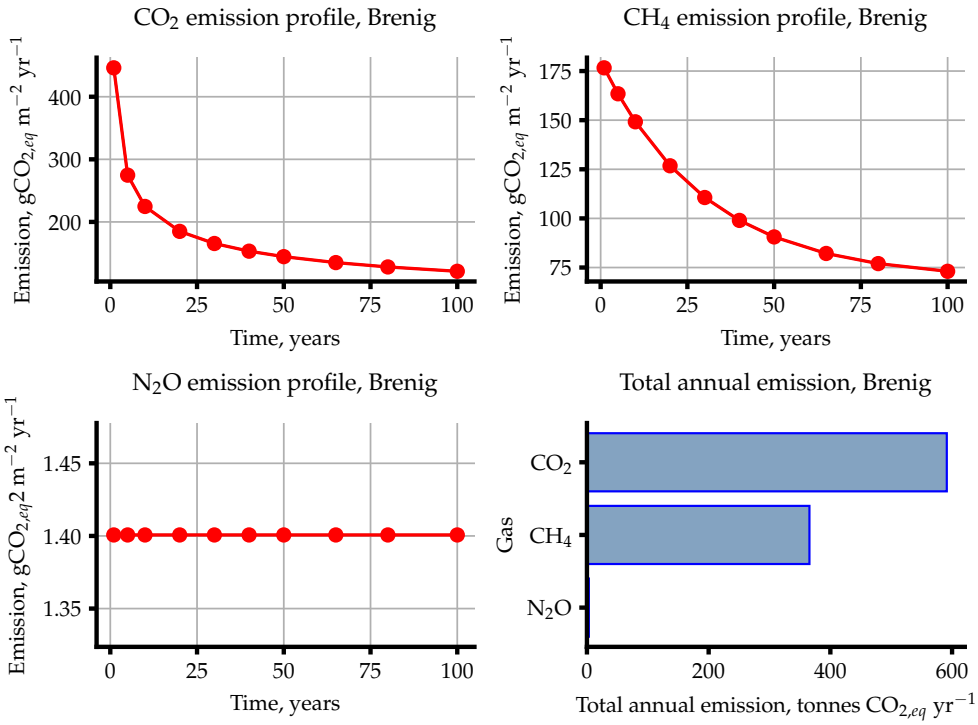
Input Name	Unit	Value(s)
Reservoir ID		19
Reservoir type		potable
Reservoir coordinates (lat/lon)	^{o}	LAT: 53.0751805026, LON: -3.5311817483
Monthly Temperatures	^{o}C	2.9, 2.6, 4.0, 5.7, 8.8, 11.5, 13.6, 13.4, 11.2, 8.4, 5.4, 3.8
Year vector for emission profiles	yr	1, 5, 10, 20, 30, 40, 50, 65, 80, 100
Calculated gas emissions	-	CO_2, CH_4, N_2O
Biogenic factors		
Biome	-	temperate broadleaf and mixed
Climate	-	temperate
Soil Type	-	mineral
Treatment Factor	-	secondary biological treatment
Landuse Intensity	-	low intensity
Inputs for catchment-level process calculations		
Annual runoff	mm/year	970.0
Catchment area	km^2	22.43
Length of inundated river	km	2.835
Population	capita	177.0
Area fractions	-	0.0, 0.0, 0.0, 0.162, 0.03, 0.0, 0.416, 0.391, 0.0
Mean catchment slope	%	8.000
Mean annual precipitation	mm/year	1468
Mean annual evapotranspiration	mm/year	518.0
Soil wetness	mm over profile	63.00
Soil Olsen P content	kgP ha^{-1}	37.64
Inputs for reservoir-level process calculations		
Reservoir volume	m^3	54 270 000
Reservoir area	km^2	3.634
Maximum reservoir depth	m	45.00
Mean reservoir depth	m	15.00
Inundated area fractions	-	0.0, 0.0, 0.0, 0.0, 0.078, 0.0, 0.453, 0.367, 0.0, 0.0, 0.0, 0.0, 0.0, 0.008, 0.0, 0.086, 0.0, 0.0, 0.0, 0.0, 0.0, 0.008, 0.0, 0.0, 0.0, 0.0, 0.0
Soil carbon in inundated area	kgC m^{-2}	9.145
Mean monthly horizontal radiance	kWh m^{-2} d^{-1}	2.700
Mean monthly horizontal radiance: May - Sept	kWh m^{-2} d^{-1}	4.308
Mean monthly horizontal radiance: Nov - Mar	kWh m^{-2} d^{-1}	1.126
Mean monthly wind speed	m s^{-1}	5.380
Water intake depth below surface	m	N/A



8.2 Outputs

Name	Unit	Value
CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	132.6
Nonanthropogenic CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	91.03
Preimpoundment CO_2 emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−121.1
CO_2 emission minus non-anthropogenic	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	41.62
Net CO_2 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	162.7
Total CO_2 emission per year	$tCO_{2,eq}\ yr^{-1}$	591.3
Total CO_2 emission per lifetime	$ktCO_{2,eq}$	59.13
CH_4 emission via diffusion	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	30.53
CH_4 emission via ebullition	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	68.84
CH_4 emission via degassing	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	1.247
Pre-impounment CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.0
Net CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	100.6
Total CH_4 emission per year	$tCO_{2,eq}\ yr^{-1}$	365.6
Total CH_4 emission per lifetime	$ktCO_{2,eq}$	36.56
Net N_2O emission, method A	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	1.401
Net N_2O emission, method B	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.3424
Net N_2O emission, mean value	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.8715
Total N_2O emission per year	$tCO_{2,eq}\ yr^{-1}$	5.090
Total N_2O emission per lifetime	$ktCO_{2,eq}$	0.5090
CO_2+CH_4 net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	263.3
CO_2+CH_4+N_2O net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	264.2

8.3 Emission plots



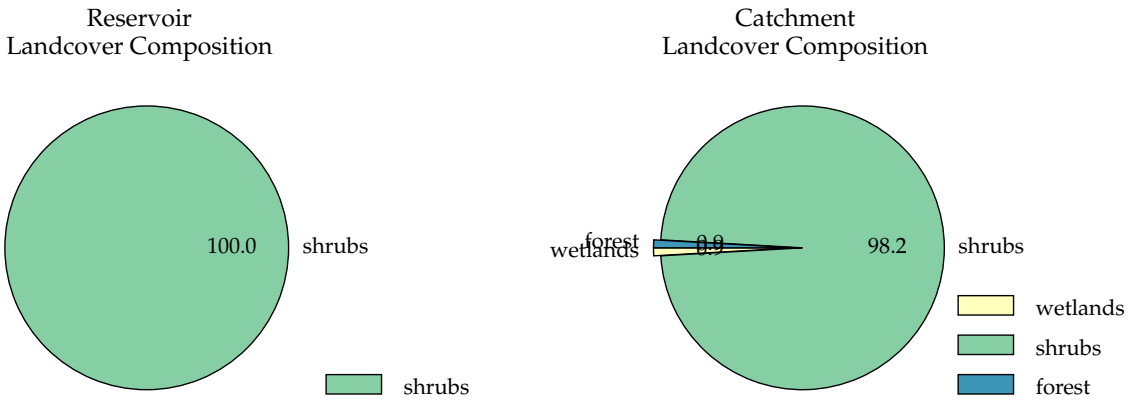
8.4 Intermediate variables

Name	Unit	Value
Influent total P concentration	μg L^{-1}	16.45
Retention coefficient	-	0.6665
Influent total N concentration	μg L^{-1}	53.64
Reservoir TN concentration	μg L^{-1}	17.89
Reservoir TP concentration	μg L^{-1}	5.367
Percentage of reservoir's surface area that is littoral	%	12.89
Mean radiance at the reservoir	kWh m^{-2} d^{-1}	4.308
Cumulative global horizontal radiance at the reservoir	kWh m^{-2} d^{-1}	51.70
Bottom (hypolimnion) temperature in the reservoir	^{o}C	12.41
Water density at the bottom of the reservoir	kg m^{-3}	999.5
Surface (epilimnion) temperature in the reservoir	^{o}C	12.43
Water density at the surface of the reservoir	kg m^{-3}	999.5
Thermocline depth	m	13.81
Influent total N load	kgN yr^{-1}	1167
Influent total P load	kgP yr^{-1}	357.9
Downstream TN concentration	mg L^{-1}	0.014 00

9 Dindinnie

9.1 Inputs

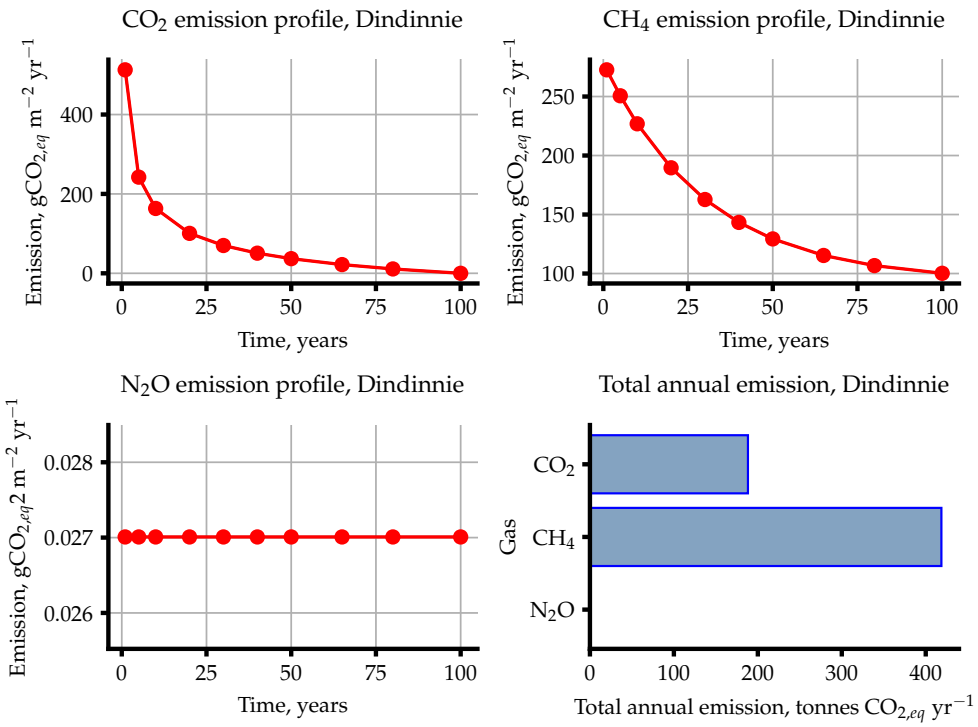
Input Name	Unit	Value(s)
Reservoir ID		4
Reservoir type		potable
Reservoir coordinates (lat/lon)	^{o}	LAT: 54.9018705397, LON: -5.0871080473
Monthly Temperatures	^{o}C	3.6, 3.5, 5.0, 7.0, 9.9, 12.5, 14.2, 14.0, 11.8, 9.2, 6.0, 4.4
Year vector for emission profiles	yr	1, 5, 10, 20, 30, 40, 50, 65, 80, 100
Calculated gas emissions	-	CO_2, CH_4, N_2O
Biogenic factors		
Biome	-	temperate broadleaf and mixed
Climate	-	temperate
Soil Type	-	mineral
Treatment Factor	-	secondary biological treatment
Landuse Intensity	-	low intensity
Inputs for catchment-level process calculations		
Annual runoff	mm/year	702.0
Catchment area	km^2	6.047
Length of inundated river	km	0.9370
Population	capita	21.00
Area fractions	-	0.0, 0.0, 0.0, 0.0, 0.009, 0.0, 0.983, 0.009, 0.0
Mean catchment slope	%	5.000
Mean annual precipitation	mm/year	1280
Mean annual evapotranspiration	mm/year	610.0
Soil wetness	mm over profile	42.00
Soil Olsen P content	kgP ha^{-1}	48.34
Inputs for reservoir-level process calculations		
Reservoir volume	m^3	343 000
Reservoir area	km^2	2.868
Maximum reservoir depth	m	10.87
Mean reservoir depth	m	4.600
Inundated area fractions	-	0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.772, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.228, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0
Soil carbon in inundated area	kgC m^{-2}	8.604
Mean monthly horizontal radiance	kWh m^{-2} d^{-1}	2.470
Mean monthly horizontal radiance: May - Sept	kWh m^{-2} d^{-1}	3.916
Mean monthly horizontal radiance: Nov - Mar	kWh m^{-2} d^{-1}	1.046
Mean monthly wind speed	m s^{-1}	6.440
Water intake depth below surface	m	N/A



9.2 Outputs

Name	Unit	Value
CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	209.2
Nonanthropogenic CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	143.6
Preimpoundment CO_2 emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.0
CO_2 emission minus non-anthropogenic	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	65.63
Net CO_2 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	65.63
Total CO_2 emission per year	$tCO_{2,eq}\ yr^{-1}$	188.2
Total CO_2 emission per lifetime	$ktCO_{2,eq}$	18.82
CH_4 emission via diffusion	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	52.65
CH_4 emission via ebullition	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	93.13
CH_4 emission via degassing	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.1955
Pre-impounment CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.0
Net CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	146.0
Total CH_4 emission per year	$tCO_{2,eq}\ yr^{-1}$	418.7
Total CH_4 emission per lifetime	$ktCO_{2,eq}$	41.87
Net N_2O emission, method A	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.027 01
Net N_2O emission, method B	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.022 23
Net N_2O emission, mean value	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.024 62
Total N_2O emission per year	$tCO_{2,eq}\ yr^{-1}$	0.077 46
Total N_2O emission per lifetime	$ktCO_{2,eq}$	0.007 746
CO_2+CH_4 net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	211.6
CO_2+CH_4+N_2O net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	211.6

9.3 Emission plots



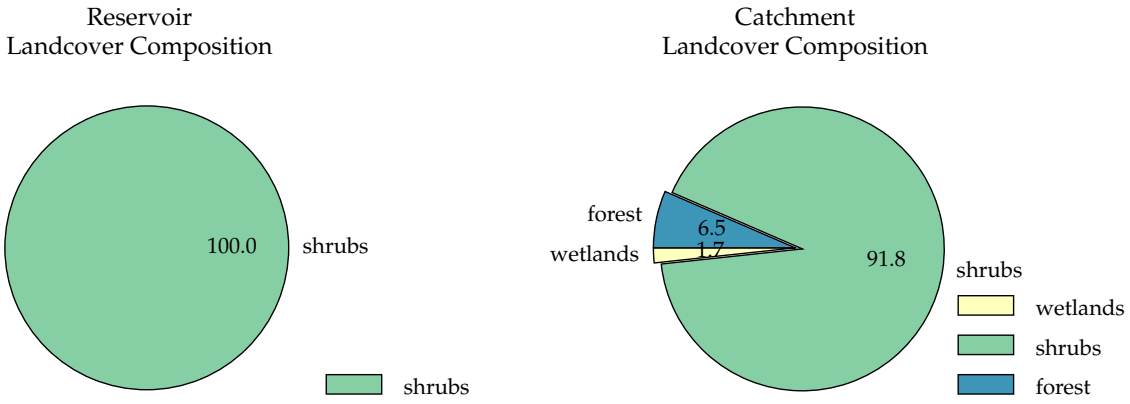
9.4 Intermediate variables

Name	Unit	Value
Influent total P concentration	μg L^{-1}	37.73
Retention coefficient	-	0.060 78
Influent total N concentration	μg L^{-1}	95.36
Reservoir TN concentration	μg L^{-1}	89.56
Reservoir TP concentration	μg L^{-1}	36.02
Percentage of reservoir's surface area that is littoral	%	35.61
Mean radiance at the reservoir	kWh m^{-2} d^{-1}	3.916
Cumulative global horizontal radiance at the reservoir	kWh m^{-2} d^{-1}	46.99
Bottom (hypolimnion) temperature in the reservoir	^{o}C	13.00
Water density at the bottom of the reservoir	kg m^{-3}	999.4
Surface (epilimnion) temperature in the reservoir	^{o}C	13.13
Water density at the surface of the reservoir	kg m^{-3}	999.4
Thermocline depth	m	5.682
Influent total N load	kgN yr^{-1}	404.8
Influent total P load	kgP yr^{-1}	160.2
Downstream TN concentration	mg L^{-1}	0.1232

10 Waltersmuir

10.1 Inputs

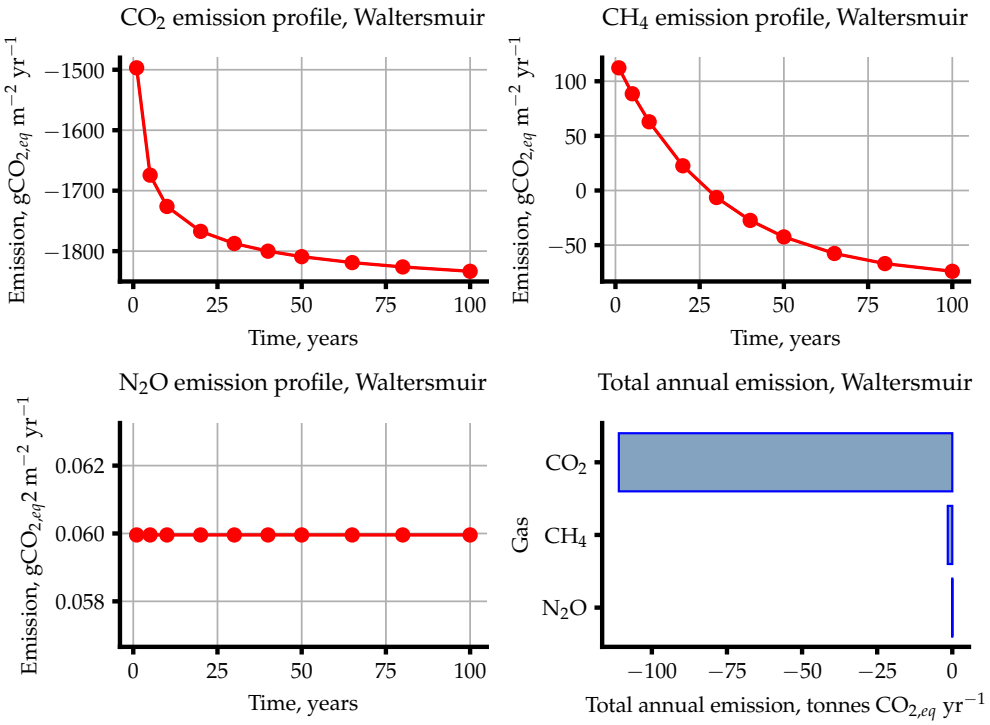
Input Name	Unit	Value(s)
Reservoir ID		14
Reservoir type		potable
Reservoir coordinates (lat/lon)	^{o}	LAT: 56.1812592875, LON: -3.9198441706
Monthly Temperatures	^{o}C	2.7, 2.9, 4.4, 6.4, 9.4, 12.0, 13.9, 13.5, 11.2, 8.2, 5.0, 3.2
Year vector for emission profiles	yr	1, 5, 10, 20, 30, 40, 50, 65, 80, 100
Calculated gas emissions	-	CO_2, CH_4, N_2O
Biogenic factors		
Biome	-	temperate broadleaf and mixed
Climate	-	temperate
Soil Type	-	organic
Treatment Factor	-	secondary biological treatment
Landuse Intensity	-	low intensity
Inputs for catchment-level process calculations		
Annual runoff	mm/year	986.0
Catchment area	km^2	12.30
Length of inundated river	km	0.2890
Population	capita	49.00
Area fractions	-	0.0, 0.0, 0.0, 0.0, 0.017, 0.0, 0.918, 0.065, 0.0
Mean catchment slope	%	13.00
Mean annual precipitation	mm/year	1563
Mean annual evapotranspiration	mm/year	609.0
Soil wetness	mm over profile	34.00
Soil Olsen P content	kgP ha^{-1}	31.18
Inputs for reservoir-level process calculations		
Reservoir volume	m^3	123 900
Reservoir area	km^2	0.062 00
Maximum reservoir depth	m	10.32
Mean reservoir depth	m	4.400
Inundated area fractions	-	0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 1.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0
Soil carbon in inundated area	kgC m^{-2}	10.33
Mean monthly horizontal radiance	kWh m^{-2} d^{-1}	2.410
Mean monthly horizontal radiance: May - Sept	kWh m^{-2} d^{-1}	3.908
Mean monthly horizontal radiance: Nov - Mar	kWh m^{-2} d^{-1}	0.9520
Mean monthly wind speed	m s^{-1}	5.000
Water intake depth below surface	m	N/A



10.2 Outputs

Name	Unit	Value
CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	137.3
Nonanthropogenic CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	94.24
Preimpoundment CO_2 emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	1833
CO_2 emission minus non-anthropogenic	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	43.08
Net CO_2 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−1790
Total CO_2 emission per year	$tCO_{2,eq}\ yr^{-1}$	−111.0
Total CO_2 emission per lifetime	$ktCO_{2,eq}$	−11.1
CH_4 emission via diffusion	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	50.65
CH_4 emission via ebullition	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	95.13
CH_4 emission via degassing	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	6.640
Pre-impounment CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	176.7
Net CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−24.30
Total CH_4 emission per year	$tCO_{2,eq}\ yr^{-1}$	−1.507
Total CH_4 emission per lifetime	$ktCO_{2,eq}$	−0.1507
Net N_2O emission, method A	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.059 96
Net N_2O emission, method B	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.066 65
Net N_2O emission, mean value	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.063 30
Total N_2O emission per year	$tCO_{2,eq}\ yr^{-1}$	0.003 717
Total N_2O emission per lifetime	$ktCO_{2,eq}$	0.000 371 7
CO_2+CH_4 net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−1815
CO_2+CH_4+N_2O net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−1814

10.3 Emission plots



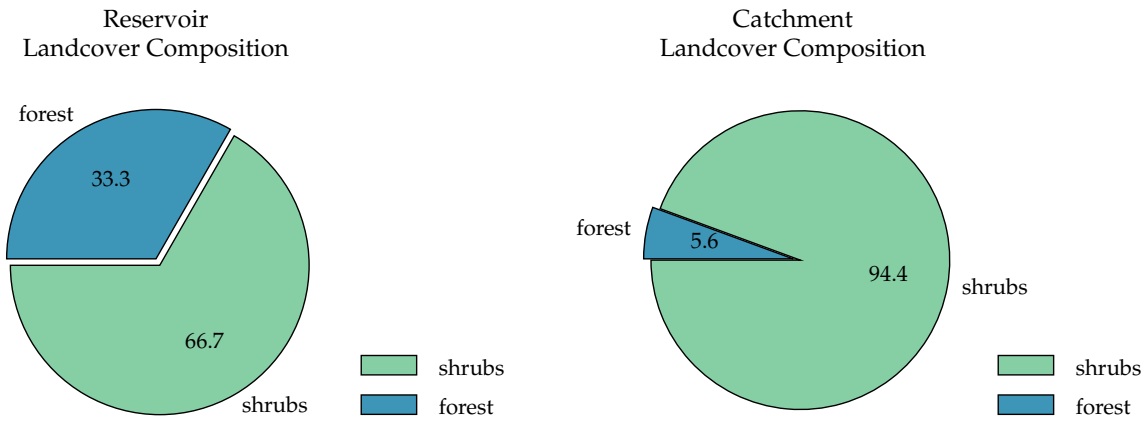
10.4 Intermediate variables

Name	Unit	Value
Influent total P concentration	μg L^{-1}	25.81
Retention coefficient	-	0.008 118
Influent total N concentration	μg L^{-1}	17.00
Reservoir TN concentration	μg L^{-1}	16.86
Reservoir TP concentration	μg L^{-1}	25.59
Percentage of reservoir's surface area that is littoral	%	37.00
Mean radiance at the reservoir	kWh m^{-2} d^{-1}	3.908
Cumulative global horizontal radiance at the reservoir	kWh m^{-2} d^{-1}	46.90
Bottom (hypolimnion) temperature in the reservoir	^{o}C	12.47
Water density at the bottom of the reservoir	kg m^{-3}	999.5
Surface (epilimnion) temperature in the reservoir	^{o}C	12.65
Water density at the surface of the reservoir	kg m^{-3}	999.4
Thermocline depth	m	1.470
Influent total N load	kgN yr^{-1}	206.2
Influent total P load	kgP yr^{-1}	313.0
Downstream TN concentration	mg L^{-1}	0.016 92

11 Lochenkit

11.1 Inputs

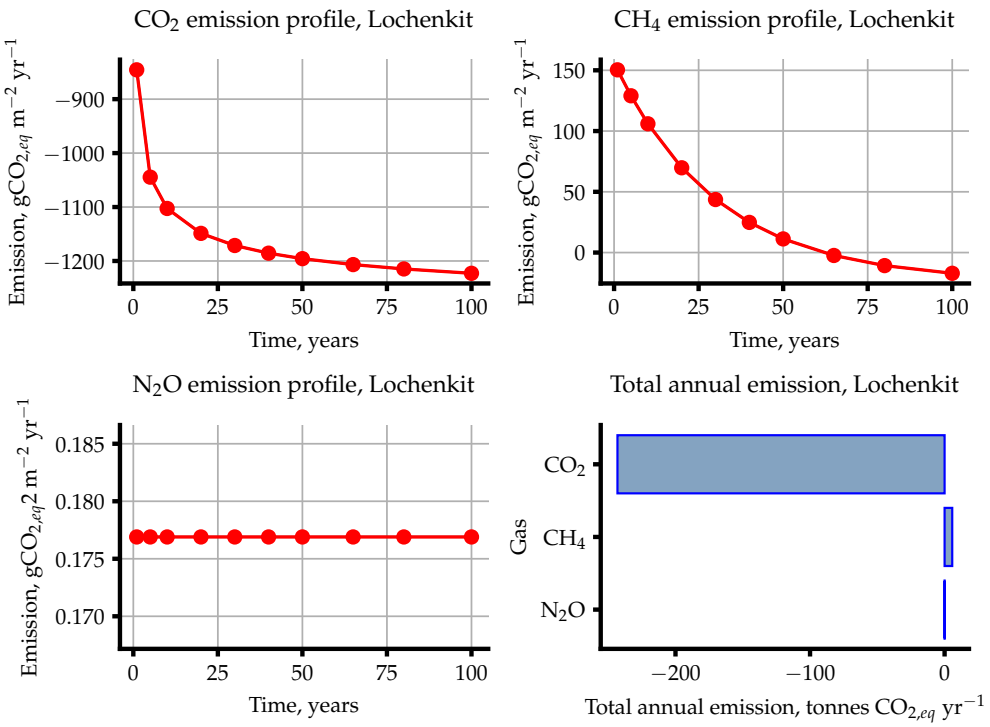
Input Name	Unit	Value(s)
Reservoir ID		8
Reservoir type		potable
Reservoir coordinates (lat/lon)	^{o}	LAT: 55.0608911246, LON: -3.8827037278
Monthly Temperatures	^{o}C	2.8, 3.0, 4.4, 6.4, 9.4, 12.0, 13.9, 13.4, 11.1, 8.3, 5.0, 3.2
Year vector for emission profiles	yr	1, 5, 10, 20, 30, 40, 50, 65, 80, 100
Calculated gas emissions	-	CO_2, CH_4, N_2O
Biogenic factors		
Biome	-	temperate broadleaf and mixed
Climate	-	temperate
Soil Type	-	organic
Treatment Factor	-	secondary biological treatment
Landuse Intensity	-	low intensity
Inputs for catchment-level process calculations		
Annual runoff	mm/year	1003
Catchment area	km^2	3.073
Length of inundated river	km	0.0
Population	capita	5.000
Area fractions	-	0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.944, 0.056, 0.0
Mean catchment slope	%	9.000
Mean annual precipitation	mm/year	1551
Mean annual evapotranspiration	mm/year	575.0
Soil wetness	mm over profile	39.00
Soil Olsen P content	kgP ha^{-1}	23.41
Inputs for reservoir-level process calculations		
Reservoir volume	m^3	412 400
Reservoir area	km^2	0.2070
Maximum reservoir depth	m	11.11
Mean reservoir depth	m	4.700
Inundated area fractions	-	0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.667, 0.333, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0
Soil carbon in inundated area	kgC m^{-2}	9.714
Mean monthly horizontal radiance	kWh m^{-2} d^{-1}	2.470
Mean monthly horizontal radiance: May - Sept	kWh m^{-2} d^{-1}	3.934
Mean monthly horizontal radiance: Nov - Mar	kWh m^{-2} d^{-1}	1.044
Mean monthly wind speed	m s^{-1}	5.000
Water intake depth below surface	m	N/A



11.2 Outputs

Name	Unit	Value
CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	153.9
Nonanthropogenic CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	105.6
Preimpoundment CO_2 emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	1223
CO_2 emission minus non-anthropogenic	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	48.28
Net CO_2 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−1175
Total CO_2 emission per year	$tCO_{2,eq}\ yr^{-1}$	−243.1
Total CO_2 emission per lifetime	$ktCO_{2,eq}$	−24.31
CH_4 emission via diffusion	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	49.21
CH_4 emission via ebullition	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	93.94
CH_4 emission via degassing	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	2.181
Pre-impounment CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	117.9
Net CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	27.46
Total CH_4 emission per year	$tCO_{2,eq}\ yr^{-1}$	5.684
Total CH_4 emission per lifetime	$ktCO_{2,eq}$	0.5684
Net N_2O emission, method A	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.1769
Net N_2O emission, method B	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.1415
Net N_2O emission, mean value	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.1592
Total N_2O emission per year	$tCO_{2,eq}\ yr^{-1}$	0.036 62
Total N_2O emission per lifetime	$ktCO_{2,eq}$	0.003 662
CO_2+CH_4 net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−1147
CO_2+CH_4+N_2O net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−1147

11.3 Emission plots



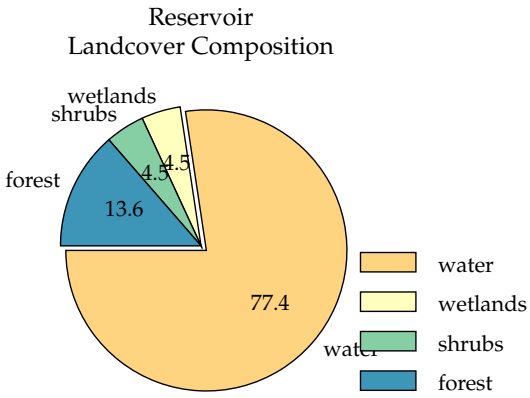
11.4 Intermediate variables

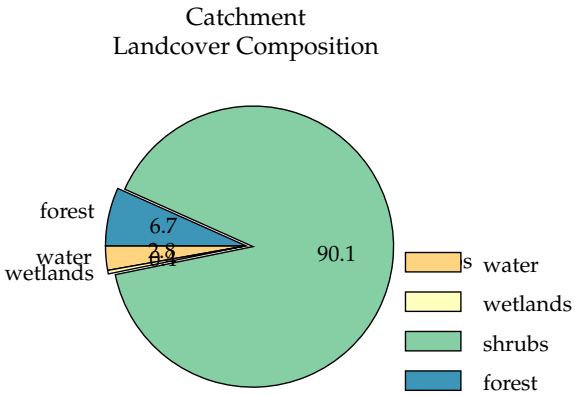
Name	Unit	Value
Influent total P concentration	μg L^{-1}	25.30
Retention coefficient	-	0.096 80
Influent total N concentration	μg L^{-1}	36.78
Reservoir TN concentration	μg L^{-1}	33.22
Reservoir TP concentration	μg L^{-1}	23.19
Percentage of reservoir's surface area that is littoral	%	34.90
Mean radiance at the reservoir	kWh m^{-2} d^{-1}	3.934
Cumulative global horizontal radiance at the reservoir	kWh m^{-2} d^{-1}	47.21
Bottom (hypolimnion) temperature in the reservoir	^{o}C	12.54
Water density at the bottom of the reservoir	kg m^{-3}	999.5
Surface (epilimnion) temperature in the reservoir	^{o}C	12.60
Water density at the surface of the reservoir	kg m^{-3}	999.5
Thermocline depth	m	3.366
Influent total N load	kgN yr^{-1}	113.4
Influent total P load	kgP yr^{-1}	77.97
Downstream TN concentration	mg L^{-1}	0.047 18

12 Finglas

12.1 Inputs

Input Name	Unit	Value(s)
Reservoir ID		5
Reservoir type		potable
Reservoir coordinates (lat/lon)	^{o}	LAT: 56.2406223294, LON: -4.3731219035
Monthly Temperatures	^{o}C	2.4, 2.7, 4.0, 6.1, 9.0, 11.4, 13.1, 13.1, 11.0, 8.1, 4.9, 3.1
Year vector for emission profiles	yr	1, 5, 10, 20, 30, 40, 50, 65, 80, 100
Calculated gas emissions	-	CO_2, CH_4, N_2O
Biogenic factors		
Biome	-	temperate broadleaf and mixed
Climate	-	temperate
Soil Type	-	organic
Treatment Factor	-	secondary biological treatment
Landuse Intensity	-	low intensity
Inputs for catchment-level process calculations		
Annual runoff	mm/year	1681
Catchment area	km^2	37.90
Length of inundated river	km	2.979
Population	capita	75.00
Area fractions	-	0.0, 0.0, 0.0, 0.028, 0.004, 0.0, 0.901, 0.067, 0.0
Mean catchment slope	%	26.00
Mean annual precipitation	mm/year	2182
Mean annual evapotranspiration	mm/year	516.0
Soil wetness	mm over profile	24.00
Soil Olsen P content	kgP ha^{-1}	17.53
Inputs for reservoir-level process calculations		
Reservoir volume	m^3	9 043 000
Reservoir area	km^2	1.326
Maximum reservoir depth	m	14.00
Mean reservoir depth	m	6.500
Inundated area fractions	-	0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.455, 0.045, 0.0, 0.045, 0.136, 0.0, 0.0, 0.0, 0.0, 0.318, 0.0, 0.0, 0.0, 0.0, 0.0
Soil carbon in inundated area	kgC m^{-2}	10.19
Mean monthly horizontal radiance	kWh m^{-2} d^{-1}	2.350
Mean monthly horizontal radiance: May - Sept	kWh m^{-2} d^{-1}	3.840
Mean monthly horizontal radiance: Nov - Mar	kWh m^{-2} d^{-1}	0.8940
Mean monthly wind speed	m s^{-1}	4.610
Water intake depth below surface	m	N/A

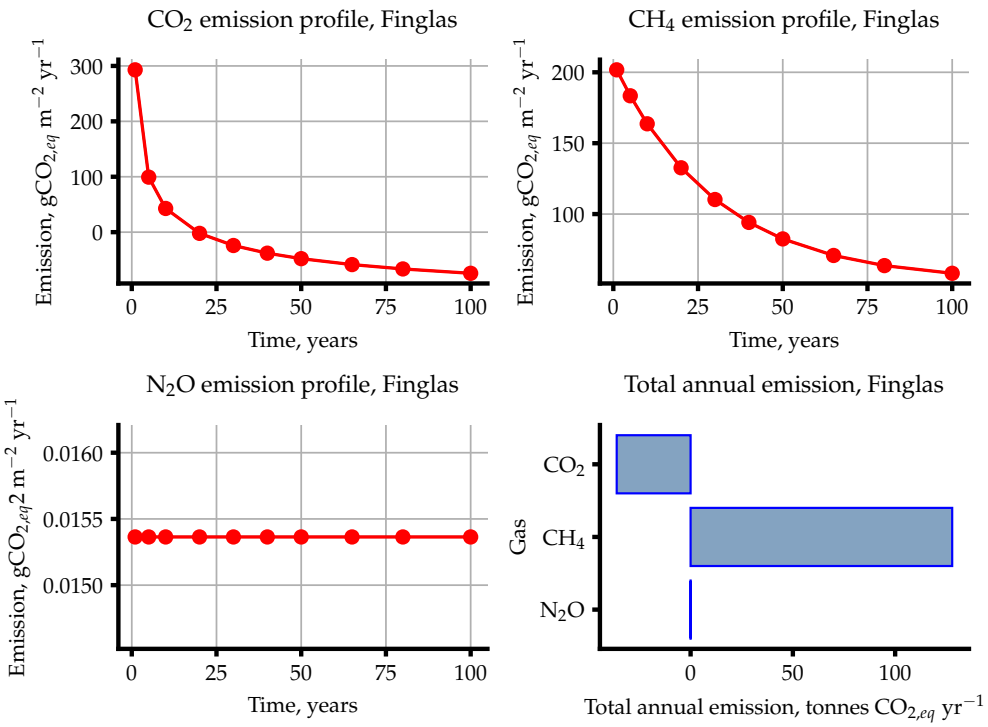




12.2 Outputs

Name	Unit	Value
CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	149.8
Nonanthropogenic CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	102.8
Preimpoundment CO_2 emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	74.25
CO_2 emission minus non-anthropogenic	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	47.01
Net CO_2 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−27.24
Total CO_2 emission per year	$tCO_{2,eq}\ yr^{-1}$	−36.12
Total CO_2 emission per lifetime	$ktCO_{2,eq}$	−3.612
CH_4 emission via diffusion	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	40.12
CH_4 emission via ebullition	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	60.29
CH_4 emission via degassing	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	3.993
Pre-impounment CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	7.952
Net CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	96.45
Total CH_4 emission per year	$tCO_{2,eq}\ yr^{-1}$	127.9
Total CH_4 emission per lifetime	$ktCO_{2,eq}$	12.79
Net N_2O emission, method A	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.015 36
Net N_2O emission, method B	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.012 25
Net N_2O emission, mean value	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.013 81
Total N_2O emission per year	$tCO_{2,eq}\ yr^{-1}$	0.020 37
Total N_2O emission per lifetime	$ktCO_{2,eq}$	0.002 037
CO_2+CH_4 net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	69.21
CO_2+CH_4+N_2O net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	69.22

12.3 Emission plots



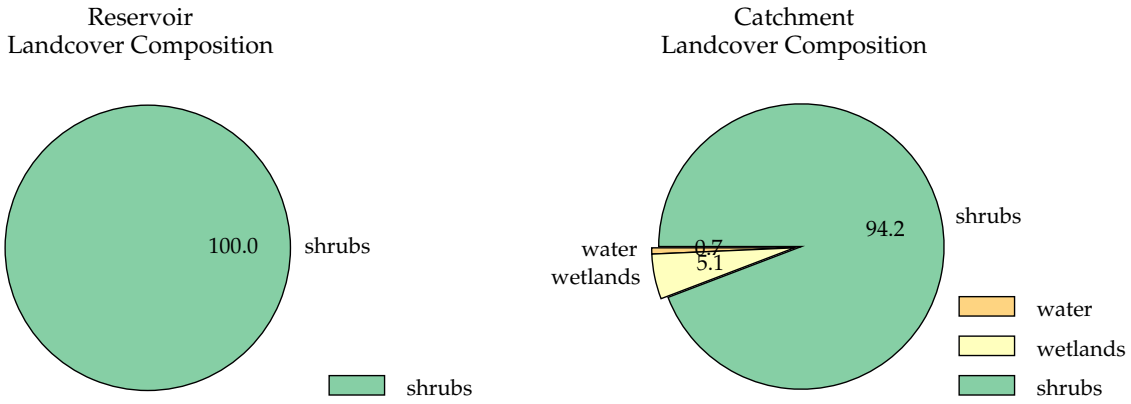
12.4 Intermediate variables

Name	Unit	Value
Influent total P concentration	μg L^{-1}	14.54
Retention coefficient	-	0.1021
Influent total N concentration	μg L^{-1}	0.9322
Reservoir TN concentration	μg L^{-1}	0.8371
Reservoir TP concentration	μg L^{-1}	13.48
Percentage of reservoir's surface area that is littoral	%	24.29
Mean radiance at the reservoir	kWh m^{-2} d^{-1}	3.840
Cumulative global horizontal radiance at the reservoir	kWh m^{-2} d^{-1}	46.08
Bottom (hypolimnion) temperature in the reservoir	^{o}C	12.28
Water density at the bottom of the reservoir	kg m^{-3}	999.5
Surface (epilimnion) temperature in the reservoir	^{o}C	12.15
Water density at the surface of the reservoir	kg m^{-3}	999.5
Thermocline depth	m	7.322
Influent total N load	kgN yr^{-1}	59.40
Influent total P load	kgP yr^{-1}	926.4
Downstream TN concentration	mg L^{-1}	0.001 192

13 Aled Isaf

13.1 Inputs

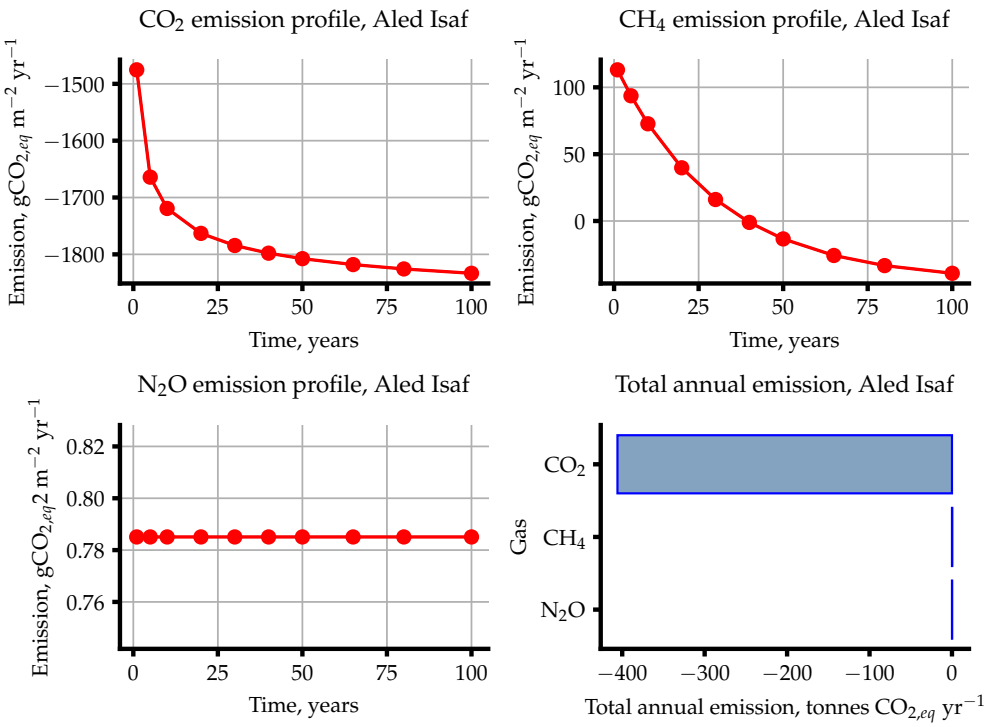
Input Name	Unit	Value(s)
Reservoir ID		170
Reservoir type		potable
Reservoir coordinates (lat/lon)	^{o}	LAT: 53.1246185422, LON: -3.623111707
Monthly Temperatures	^{o}C	2.9, 2.6, 4.0, 5.7, 8.9, 11.6, 13.7, 13.4, 11.2, 8.4, 5.3, 3.7
Year vector for emission profiles	yr	1, 5, 10, 20, 30, 40, 50, 65, 80, 100
Calculated gas emissions	-	CO_2, CH_4, N_2O
Biogenic factors		
Biome	-	temperate broadleaf and mixed
Climate	-	temperate
Soil Type	-	organic
Treatment Factor	-	secondary biological treatment
Landuse Intensity	-	low intensity
Inputs for catchment-level process calculations		
Annual runoff	mm/year	995.0
Catchment area	km^2	7.859
Length of inundated river	km	0.9350
Population	capita	50.00
Area fractions	-	0.0, 0.0, 0.0, 0.007, 0.051, 0.0, 0.942, 0.0, 0.0
Mean catchment slope	%	6.000
Mean annual precipitation	mm/year	1488
Mean annual evapotranspiration	mm/year	515.0
Soil wetness	mm over profile	61.00
Soil Olsen P content	kgP ha^{-1}	46.38
Inputs for reservoir-level process calculations		
Reservoir volume	m^3	982 600
Reservoir area	km^2	0.2270
Maximum reservoir depth	m	5.000
Mean reservoir depth	m	3.700
Inundated area fractions	-	0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.6, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.4, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0
Soil carbon in inundated area	kgC m^{-2}	9.464
Mean monthly horizontal radiance	kWh m^{-2} d^{-1}	2.700
Mean monthly horizontal radiance: May - Sept	kWh m^{-2} d^{-1}	4.308
Mean monthly horizontal radiance: Nov - Mar	kWh m^{-2} d^{-1}	1.126
Mean monthly wind speed	m s^{-1}	5.570
Water intake depth below surface	m	N/A



13.2 Outputs

Name	Unit	Value
CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	146.1
Nonanthropogenic CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	100.3
Preimpoundment CO_2 emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	1833
CO_2 emission minus non-anthropogenic	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	45.83
Net CO_2 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−1788
Total CO_2 emission per year	$tCO_{2,eq}\ yr^{-1}$	−405.8
Total CO_2 emission per lifetime	$ktCO_{2,eq}$	−40.58
CH_4 emission via diffusion	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	43.40
CH_4 emission via ebullition	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	131.3
CH_4 emission via degassing	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	3.356
Pre-impounment CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	176.7
Net CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	1.389
Total CH_4 emission per year	$tCO_{2,eq}\ yr^{-1}$	0.3153
Total CH_4 emission per lifetime	$ktCO_{2,eq}$	0.031 53
Net N_2O emission, method A	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.7851
Net N_2O emission, method B	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.6320
Net N_2O emission, mean value	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.7086
Total N_2O emission per year	$tCO_{2,eq}\ yr^{-1}$	0.1782
Total N_2O emission per lifetime	$ktCO_{2,eq}$	0.017 82
CO_2+CH_4 net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−1786
CO_2+CH_4+N_2O net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−1785

13.3 Emission plots



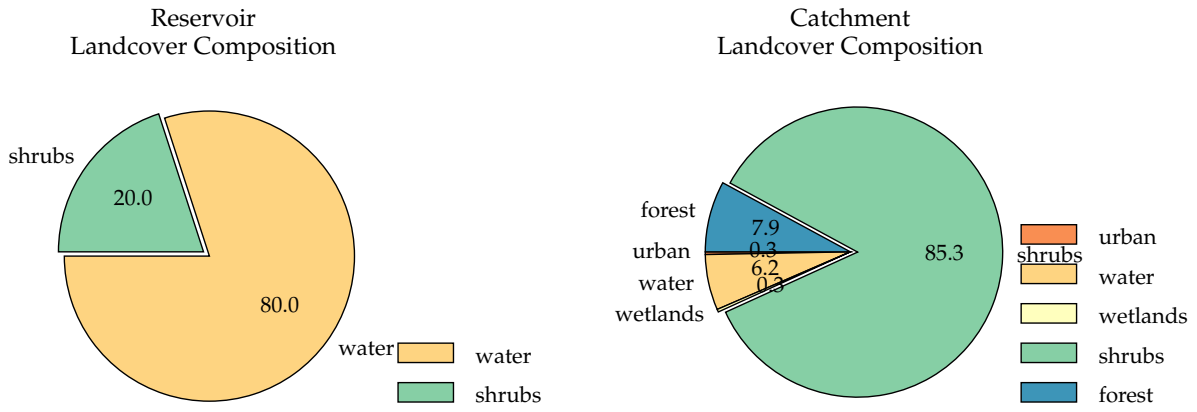
13.4 Intermediate variables

Name	Unit	Value
Influent total P concentration	μg L^{-1}	26.53
Retention coefficient	-	0.091 45
Influent total N concentration	μg L^{-1}	75.49
Reservoir TN concentration	μg L^{-1}	68.59
Reservoir TP concentration	μg L^{-1}	24.11
Percentage of reservoir's surface area that is littoral	%	27.53
Mean radiance at the reservoir	kWh m^{-2} d^{-1}	4.308
Cumulative global horizontal radiance at the reservoir	kWh m^{-2} d^{-1}	51.70
Bottom (hypolimnion) temperature in the reservoir	^{o}C	12.41
Water density at the bottom of the reservoir	kg m^{-3}	999.5
Surface (epilimnion) temperature in the reservoir	^{o}C	12.48
Water density at the surface of the reservoir	kg m^{-3}	999.5
Thermocline depth	m	3.681
Influent total N load	kgN yr^{-1}	590.3
Influent total P load	kgP yr^{-1}	207.4
Downstream TN concentration	mg L^{-1}	0.096 76

14 Cwellyn

14.1 Inputs

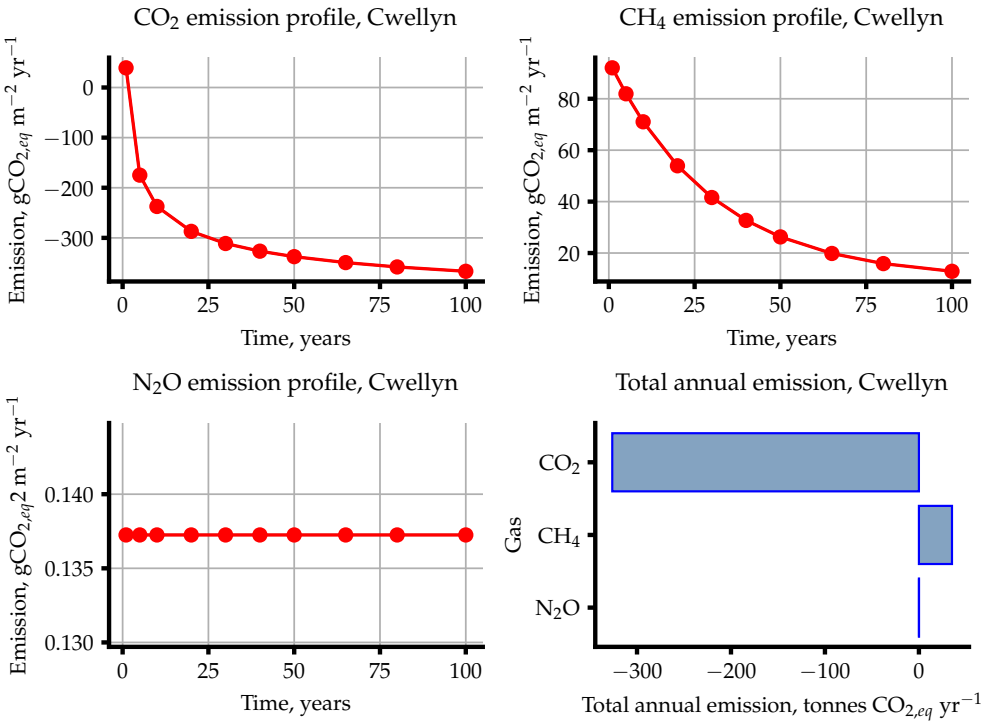
Input Name	Unit	Value(s)
Reservoir ID		21
Reservoir type		potable
Reservoir coordinates (lat/lon)	^{o}	LAT: 53.0780252035, LON: -4.1619399968
Monthly Temperatures	^{o}C	4.2, 4.2, 5.7, 7.5, 10.6, 13.0, 14.9, 14.9, 12.8, 10.2, 6.9, 5.1
Year vector for emission profiles	yr	1, 5, 10, 20, 30, 40, 50, 65, 80, 100
Calculated gas emissions	-	CO_2, CH_4, N_2O
Biogenic factors		
Biome	-	temperate broadleaf and mixed
Climate	-	temperate
Soil Type	-	organic
Treatment Factor	-	secondary biological treatment
Landuse Intensity	-	low intensity
Inputs for catchment-level process calculations		
Annual runoff	mm/year	1064
Catchment area	km^2	20.51
Length of inundated river	km	2.245
Population	capita	181.0
Area fractions	-	0.0, 0.0, 0.003, 0.062, 0.003, 0.0, 0.853, 0.079, 0.0
Mean catchment slope	%	23.00
Mean annual precipitation	mm/year	1562
Mean annual evapotranspiration	mm/year	519.0
Soil wetness	mm over profile	55.00
Soil Olsen P content	kgP ha^{-1}	31.54
Inputs for reservoir-level process calculations		
Reservoir volume	m^3	20 360 000
Reservoir area	km^2	1.037
Maximum reservoir depth	m	36.00
Mean reservoir depth	m	22.60
Inundated area fractions	-	0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.05, 0.0, 0.0, 0.0, 0.0, 0.0, 0.8, 0.0, 0.0, 0.1, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.05, 0.0, 0.0
Soil carbon in inundated area	kgC m^{-2}	9.492
Mean monthly horizontal radiance	kWh m^{-2} d^{-1}	2.880
Mean monthly horizontal radiance: May - Sept	kWh m^{-2} d^{-1}	4.570
Mean monthly horizontal radiance: Nov - Mar	kWh m^{-2} d^{-1}	1.208
Mean monthly wind speed	m s^{-1}	5.430
Water intake depth below surface	m	N/A



14.2 Outputs

Name	Unit	Value
CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	165.6
Nonanthropogenic CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	113.7
Preimpoundment CO_2 emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	366.7
CO_2 emission minus non-anthropogenic	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	51.96
Net CO_2 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−314.7
Total CO_2 emission per year	$tCO_{2,eq}\ yr^{-1}$	−326.3
Total CO_2 emission per lifetime	$ktCO_{2,eq}$	−32.63
CH_4 emission via diffusion	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	23.21
CH_4 emission via ebullition	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	44.99
CH_4 emission via degassing	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	1.080
Pre-impounment CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	35.34
Net CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	33.94
Total CH_4 emission per year	$tCO_{2,eq}\ yr^{-1}$	35.19
Total CH_4 emission per lifetime	$ktCO_{2,eq}$	3.519
Net N_2O emission, method A	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.1373
Net N_2O emission, method B	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.066 05
Net N_2O emission, mean value	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.1016
Total N_2O emission per year	$tCO_{2,eq}\ yr^{-1}$	0.1423
Total N_2O emission per lifetime	$ktCO_{2,eq}$	0.014 23
CO_2+CH_4 net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−280.8
CO_2+CH_4+N_2O net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−280.7

14.3 Emission plots



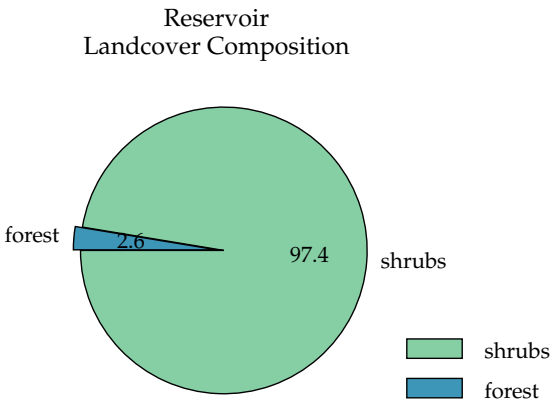
14.4 Intermediate variables

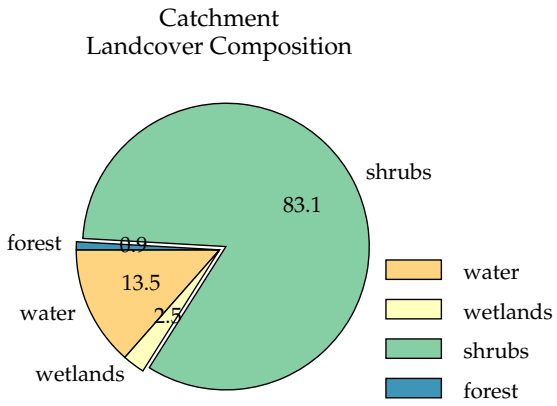
Name	Unit	Value
Influent total P concentration	μg L^{-1}	24.07
Retention coefficient	-	0.4277
Influent total N concentration	μg L^{-1}	3.039
Reservoir TN concentration	μg L^{-1}	1.739
Reservoir TP concentration	μg L^{-1}	14.36
Percentage of reservoir's surface area that is littoral	%	5.028
Mean radiance at the reservoir	kWh m^{-2} d^{-1}	4.570
Cumulative global horizontal radiance at the reservoir	kWh m^{-2} d^{-1}	54.84
Bottom (hypolimnion) temperature in the reservoir	^{o}C	13.46
Water density at the bottom of the reservoir	kg m^{-3}	999.3
Surface (epilimnion) temperature in the reservoir	^{o}C	13.90
Water density at the surface of the reservoir	kg m^{-3}	999.3
Thermocline depth	m	1.933
Influent total N load	kgN yr^{-1}	66.32
Influent total P load	kgP yr^{-1}	525.3
Downstream TN concentration	mg L^{-1}	0.002 430

15 Arklet

15.1 Inputs

Input Name	Unit	Value(s)
Reservoir ID		1
Reservoir type		potable
Reservoir coordinates (lat/lon)	^{o}	LAT: 56.2480871704, LON: -4.6499323188
Monthly Temperatures	^{o}C	2.8, 3.1, 4.2, 6.4, 9.3, 11.6, 13.4, 13.3, 11.2, 8.4, 5.2, 3.5
Year vector for emission profiles	yr	1, 5, 10, 20, 30, 40, 50, 65, 80, 100
Calculated gas emissions	-	CO_2, CH_4, N_2O
Biogenic factors		
Biome	-	temperate broadleaf and mixed
Climate	-	temperate
Soil Type	-	organic
Treatment Factor	-	secondary biological treatment
Landuse Intensity	-	low intensity
Inputs for catchment-level process calculations		
Annual runoff	mm/year	1672
Catchment area	km^2	17.29
Length of inundated river	km	1.517
Population	capita	17.00
Area fractions	-	0.0, 0.0, 0.0, 0.135, 0.025, 0.0, 0.83, 0.009, 0.0
Mean catchment slope	%	25.00
Mean annual precipitation	mm/year	2193
Mean annual evapotranspiration	mm/year	534.0
Soil wetness	mm over profile	21.00
Soil Olsen P content	kgP ha^{-1}	15.07
Inputs for reservoir-level process calculations		
Reservoir volume	m^3	16 290 000
Reservoir area	km^2	2.574
Maximum reservoir depth	m	20.40
Mean reservoir depth	m	7.400
Inundated area fractions	-	0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.973, 0.013, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.013, 0.0
Soil carbon in inundated area	kgC m^{-2}	10.43
Mean monthly horizontal radiance	kWh m^{-2} d^{-1}	2.350
Mean monthly horizontal radiance: May - Sept	kWh m^{-2} d^{-1}	3.840
Mean monthly horizontal radiance: Nov - Mar	kWh m^{-2} d^{-1}	0.8940
Mean monthly wind speed	m s^{-1}	5.670
Water intake depth below surface	m	N/A

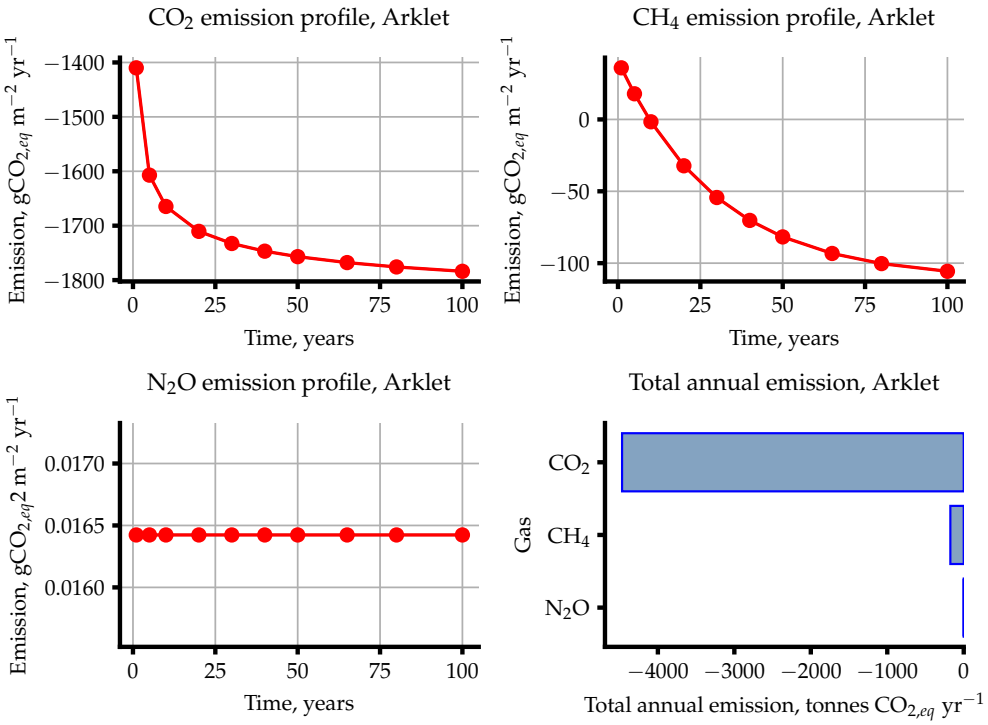




15.2 Outputs

Name	Unit	Value
CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	152.6
Nonanthropogenic CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	104.7
Preimpoundment CO_2 emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	1784
CO_2 emission minus non-anthropogenic	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	47.87
Net CO_2 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−1736
Total CO_2 emission per year	$tCO_{2,eq}\ yr^{-1}$	−4468
Total CO_2 emission per lifetime	$ktCO_{2,eq}$	−446.8
CH_4 emission via diffusion	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	41.15
CH_4 emission via ebullition	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	60.48
CH_4 emission via degassing	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	2.306
Pre-impounment CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	171.9
Net CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−68.01
Total CH_4 emission per year	$tCO_{2,eq}\ yr^{-1}$	−175.1
Total CH_4 emission per lifetime	$ktCO_{2,eq}$	−17.51
Net N_2O emission, method A	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.016 42
Net N_2O emission, method B	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.010 55
Net N_2O emission, mean value	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.013 49
Total N_2O emission per year	$tCO_{2,eq}\ yr^{-1}$	0.042 27
Total N_2O emission per lifetime	$ktCO_{2,eq}$	0.004 227
CO_2+CH_4 net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−1804
CO_2+CH_4+N_2O net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−1804

15.3 Emission plots



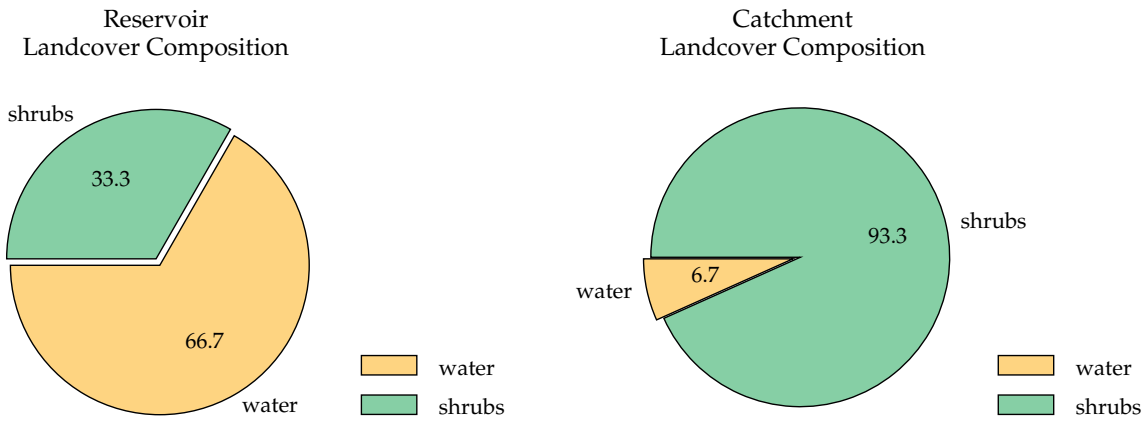
15.4 Intermediate variables

Name	Unit	Value
Influent total P concentration	μg L^{-1}	13.23
Retention coefficient	-	0.3109
Influent total N concentration	μg L^{-1}	1.093
Reservoir TN concentration	μg L^{-1}	0.7532
Reservoir TP concentration	μg L^{-1}	8.872
Percentage of reservoir's surface area that is littoral	%	24.38
Mean radiance at the reservoir	kWh m^{-2} d^{-1}	3.840
Cumulative global horizontal radiance at the reservoir	kWh m^{-2} d^{-1}	46.08
Bottom (hypolimnion) temperature in the reservoir	^{o}C	12.54
Water density at the bottom of the reservoir	kg m^{-3}	999.5
Surface (epilimnion) temperature in the reservoir	^{o}C	12.38
Water density at the surface of the reservoir	kg m^{-3}	999.5
Thermocline depth	m	8.278
Influent total N load	kgN yr^{-1}	31.60
Influent total P load	kgP yr^{-1}	382.5
Downstream TN concentration	mg L^{-1}	0.001 106

16 Cwm Ystradllyn

16.1 Inputs

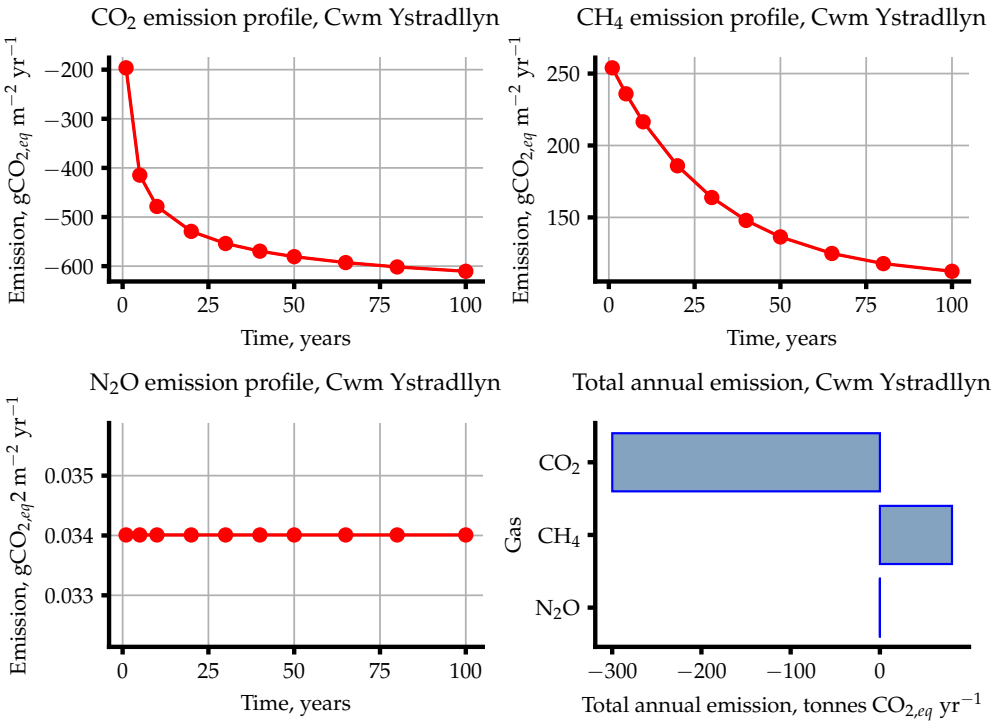
Input Name	Unit	Value(s)
Reservoir ID		23
Reservoir type		potable
Reservoir coordinates (lat/lon)	^{o}	LAT: 52.975057908, LON: -4.1460507792
Monthly Temperatures	^{o}C	4.2, 4.3, 5.6, 7.4, 10.4, 12.8, 14.7, 14.6, 12.6, 10.1, 7.0, 5.1
Year vector for emission profiles	yr	1, 5, 10, 20, 30, 40, 50, 65, 80, 100
Calculated gas emissions	-	CO_2, CH_4, N_2O
Biogenic factors		
Biome	-	temperate broadleaf and mixed
Climate	-	temperate
Soil Type	-	organic
Treatment Factor	-	secondary biological treatment
Landuse Intensity	-	low intensity
Inputs for catchment-level process calculations		
Annual runoff	mm/year	967.0
Catchment area	km^2	6.204
Length of inundated river	km	0.3020
Population	capita	85.00
Area fractions	-	0.0, 0.0, 0.0, 0.067, 0.0, 0.0, 0.933, 0.0, 0.0
Mean catchment slope	%	24.00
Mean annual precipitation	mm/year	1503
Mean annual evapotranspiration	mm/year	560.0
Soil wetness	mm over profile	55.00
Soil Olsen P content	kgP ha^{-1}	34.93
Inputs for reservoir-level process calculations		
Reservoir volume	m^3	2 902 000
Reservoir area	km^2	0.5380
Maximum reservoir depth	m	21.04
Mean reservoir depth	m	9.100
Inundated area fractions	-	0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.333, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.667, 0.0, 0.0, 0.0, 0.0, 0.0
Soil carbon in inundated area	kgC m^{-2}	8.454
Mean monthly horizontal radiance	kWh m^{-2} d^{-1}	2.980
Mean monthly horizontal radiance: May - Sept	kWh m^{-2} d^{-1}	4.712
Mean monthly horizontal radiance: Nov - Mar	kWh m^{-2} d^{-1}	1.262
Mean monthly wind speed	m s^{-1}	6.160
Water intake depth below surface	m	N/A



16.2 Outputs

Name	Unit	Value
CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	169.0
Nonanthropogenic CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	116.0
Preimpoundment CO_2 emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	610.5
CO_2 emission minus non-anthropogenic	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	53.03
Net CO_2 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−557.5
Total CO_2 emission per year	$tCO_{2,eq}\ yr^{-1}$	−299.9
Total CO_2 emission per lifetime	$ktCO_{2,eq}$	−29.99
CH_4 emission via diffusion	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	41.31
CH_4 emission via ebullition	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	165.6
CH_4 emission via degassing	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	2.112
Pre-impounment CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	58.85
Net CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	150.2
Total CH_4 emission per year	$tCO_{2,eq}\ yr^{-1}$	80.78
Total CH_4 emission per lifetime	$ktCO_{2,eq}$	8.078
Net N_2O emission, method A	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.034 01
Net N_2O emission, method B	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.0231
Net N_2O emission, mean value	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.028 55
Total N_2O emission per year	$tCO_{2,eq}\ yr^{-1}$	0.018 30
Total N_2O emission per lifetime	$ktCO_{2,eq}$	0.001 830
CO_2+CH_4 net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−407.3
CO_2+CH_4+N_2O net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−407.3

16.3 Emission plots



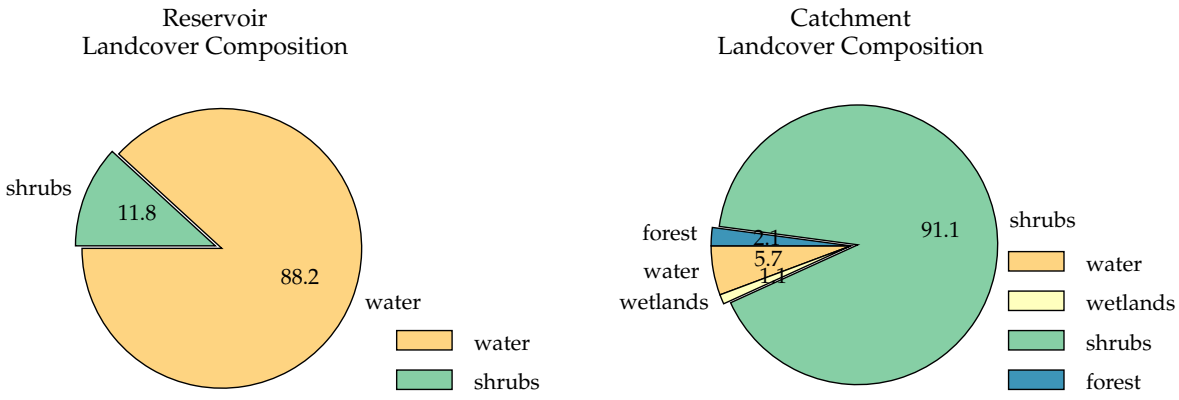
16.4 Intermediate variables

Name	Unit	Value
Influent total P concentration	μg L^{-1}	28.19
Retention coefficient	-	0.2793
Influent total N concentration	μg L^{-1}	2.642
Reservoir TN concentration	μg L^{-1}	1.904
Reservoir TP concentration	μg L^{-1}	21.63
Percentage of reservoir's surface area that is littoral	%	18.28
Mean radiance at the reservoir	kWh m^{-2} d^{-1}	4.712
Cumulative global horizontal radiance at the reservoir	kWh m^{-2} d^{-1}	56.54
Bottom (hypolimnion) temperature in the reservoir	^{o}C	13.46
Water density at the bottom of the reservoir	kg m^{-3}	999.3
Surface (epilimnion) temperature in the reservoir	^{o}C	13.67
Water density at the surface of the reservoir	kg m^{-3}	999.3
Thermocline depth	m	2.668
Influent total N load	kgN yr^{-1}	15.85
Influent total P load	kgP yr^{-1}	169.1
Downstream TN concentration	mg L^{-1}	0.002 803

17 Megget

17.1 Inputs

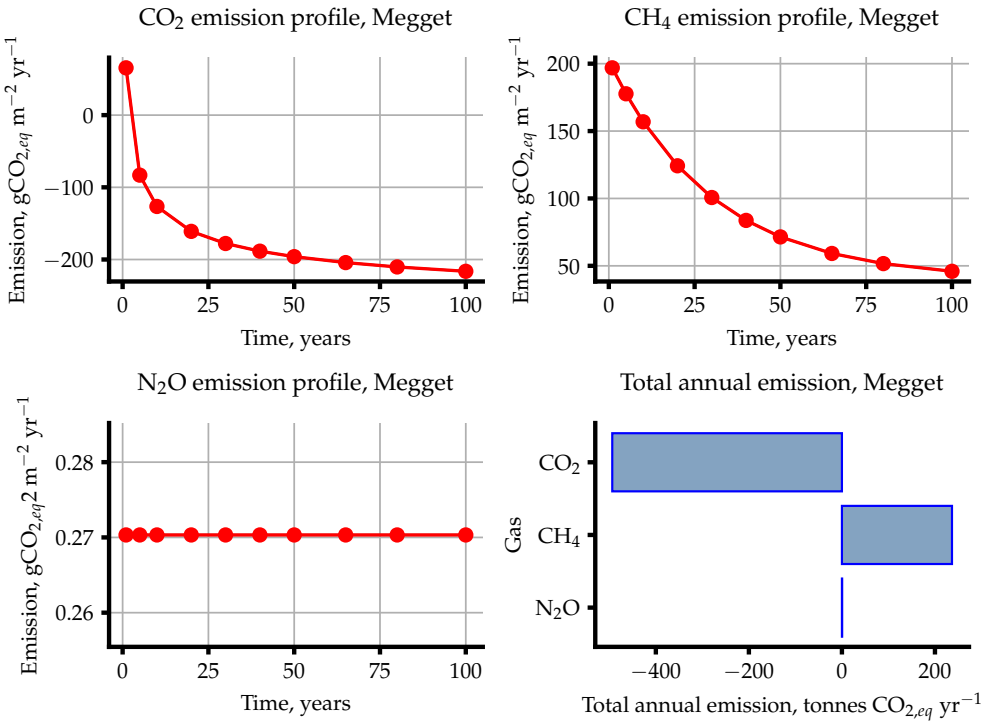
Input Name	Unit	Value(s)
Reservoir ID		9
Reservoir type		potable
Reservoir coordinates (lat/lon)	^{o}	LAT: 55.4938674031, LON: -3.251964499
Monthly Temperatures	^{o}C	1.4, 1.6, 3.1, 5.1, 8.2, 11.0, 13.0, 12.6, 10.2, 7.2, 3.8, 2.3
Year vector for emission profiles	yr	1, 5, 10, 20, 30, 40, 50, 65, 80, 100
Calculated gas emissions	-	CO_2, CH_4, N_2O
Biogenic factors		
Biome	-	temperate broadleaf and mixed
Climate	-	temperate
Soil Type	-	organic
Treatment Factor	-	secondary biological treatment
Landuse Intensity	-	low intensity
Inputs for catchment-level process calculations		
Annual runoff	mm/year	1295
Catchment area	km^2	45.13
Length of inundated river	km	4.626
Population	capita	30.00
Area fractions	-	0.0, 0.0, 0.0, 0.057, 0.011, 0.0, 0.911, 0.021, 0.0
Mean catchment slope	%	23.00
Mean annual precipitation	mm/year	1839
Mean annual evapotranspiration	mm/year	561.0
Soil wetness	mm over profile	53.00
Soil Olsen P content	kgP ha^{-1}	26.23
Inputs for reservoir-level process calculations		
Reservoir volume	m^3	319 500 000
Reservoir area	km^2	2.739
Maximum reservoir depth	m	18.70
Mean reservoir depth	m	8.000
Inundated area fractions	-	0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.725, 0.0, 0.0, 0.118, 0.0, 0.0, 0.0, 0.0, 0.0, 0.157, 0.0, 0.0, 0.0, 0.0, 0.0
Soil carbon in inundated area	kgC m^{-2}	10.17
Mean monthly horizontal radiance	kWh m^{-2} d^{-1}	2.470
Mean monthly horizontal radiance: May - Sept	kWh m^{-2} d^{-1}	3.934
Mean monthly horizontal radiance: Nov - Mar	kWh m^{-2} d^{-1}	1.044
Mean monthly wind speed	m s^{-1}	5.540
Water intake depth below surface	m	N/A



17.2 Outputs

Name	Unit	Value
CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	115.0
Nonanthropogenic CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	78.93
Preimpoundment CO_2 emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	216.3
CO_2 emission minus non-anthropogenic	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	36.08
Net CO_2 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−180.3
Total CO_2 emission per year	$tCO_{2,eq}\ yr^{-1}$	−493.7
Total CO_2 emission per lifetime	$ktCO_{2,eq}$	−49.37
CH_4 emission via diffusion	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	35.50
CH_4 emission via ebullition	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	60.61
CH_4 emission via degassing	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	11.13
Pre-impounment CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	20.85
Net CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	86.38
Total CH_4 emission per year	$tCO_{2,eq}\ yr^{-1}$	236.6
Total CH_4 emission per lifetime	$ktCO_{2,eq}$	23.66
Net N_2O emission, method A	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.2703
Net N_2O emission, method B	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.055 69
Net N_2O emission, mean value	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.1630
Total N_2O emission per year	$tCO_{2,eq}\ yr^{-1}$	0.7404
Total N_2O emission per lifetime	$ktCO_{2,eq}$	0.074 04
CO_2+CH_4 net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−93.87
CO_2+CH_4+N_2O net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−93.71

17.3 Emission plots



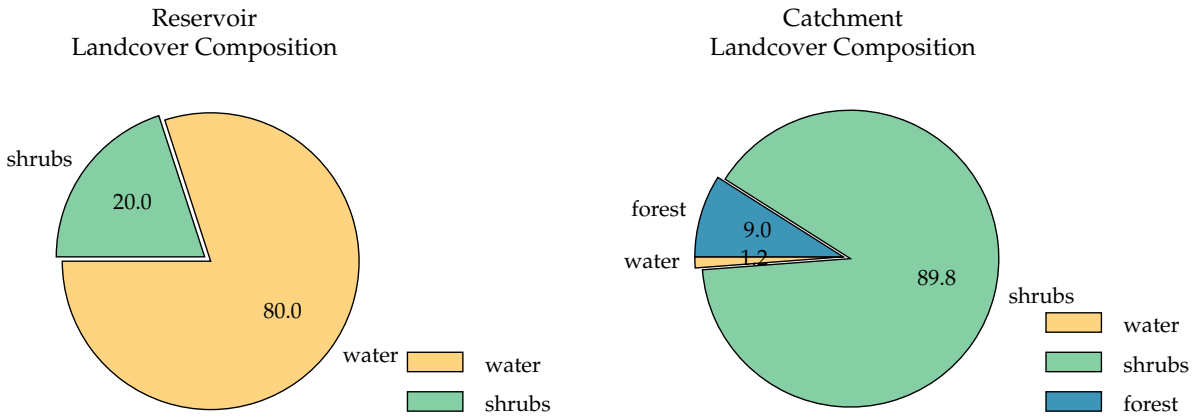
17.4 Intermediate variables

Name	Unit	Value
Influent total P concentration	μg L^{-1}	18.62
Retention coefficient	-	0.8141
Influent total N concentration	μg L^{-1}	2.448
Reservoir TN concentration	μg L^{-1}	0.4550
Reservoir TP concentration	μg L^{-1}	3.657
Percentage of reservoir's surface area that is littoral	%	20.86
Mean radiance at the reservoir	kWh m^{-2} d^{-1}	3.934
Cumulative global horizontal radiance at the reservoir	kWh m^{-2} d^{-1}	47.21
Bottom (hypolimnion) temperature in the reservoir	^{o}C	10.44
Water density at the bottom of the reservoir	kg m^{-3}	999.7
Surface (epilimnion) temperature in the reservoir	^{o}C	11.70
Water density at the surface of the reservoir	kg m^{-3}	999.6
Thermocline depth	m	1.719
Influent total N load	kgN yr^{-1}	143.1
Influent total P load	kgP yr^{-1}	1088
Downstream TN concentration	mg L^{-1}	0.000 359 0

18 Glenkiln

18.1 Inputs

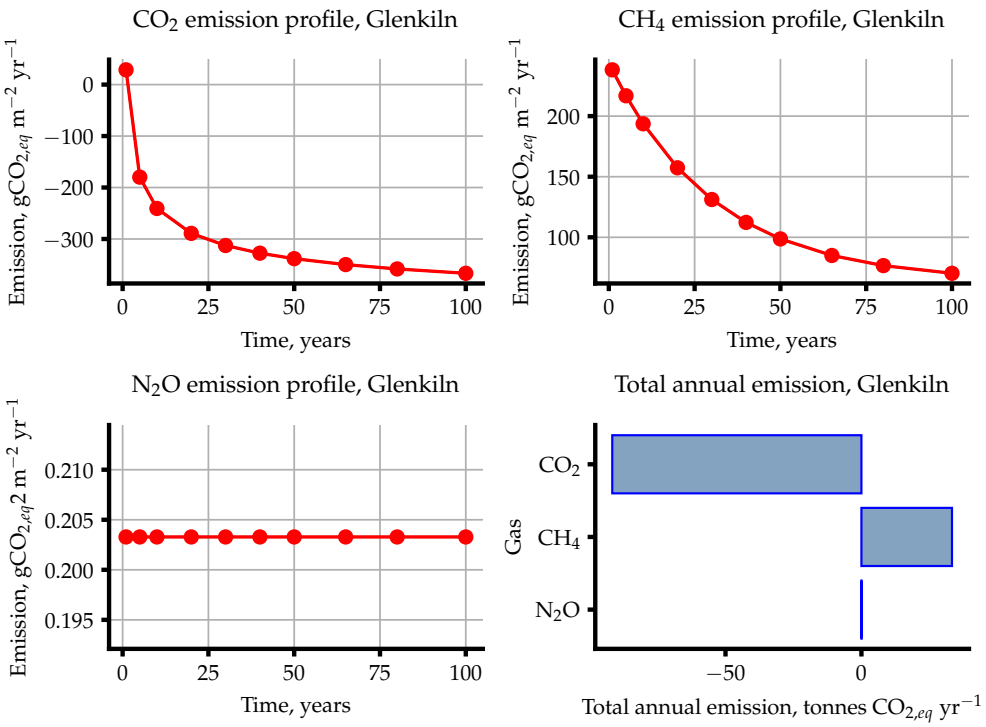
Input Name	Unit	Value(s)
Reservoir ID		6
Reservoir type		potable
Reservoir coordinates (lat/lon)	^{o}	LAT: 55.0807903009, LON: -3.8056330289
Monthly Temperatures	^{o}C	2.9, 3.2, 4.6, 6.6, 9.6, 12.1, 14.0, 13.7, 11.3, 8.5, 5.2, 3.5
Year vector for emission profiles	yr	1, 5, 10, 20, 30, 40, 50, 65, 80, 100
Calculated gas emissions	-	CO_2, CH_4, N_2O
Biogenic factors		
Biome	-	temperate broadleaf and mixed
Climate	-	temperate
Soil Type	-	organic
Treatment Factor	-	secondary biological treatment
Landuse Intensity	-	low intensity
Inputs for catchment-level process calculations		
Annual runoff	mm/year	984.0
Catchment area	km^2	18.31
Length of inundated river	km	0.3000
Population	capita	111.0
Area fractions	-	0.0, 0.0, 0.0, 0.012, 0.0, 0.0, 0.899, 0.09, 0.0
Mean catchment slope	%	12.00
Mean annual precipitation	mm/year	1528
Mean annual evapotranspiration	mm/year	572.0
Soil wetness	mm over profile	39.00
Soil Olsen P content	kgP ha^{-1}	21.54
Inputs for reservoir-level process calculations		
Reservoir volume	m^3	1 189 000
Reservoir area	km^2	0.2900
Maximum reservoir depth	m	11.10
Mean reservoir depth	m	4.500
Inundated area fractions	-	0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.2, 0.0, 0.0, 0.0, 0.0, 0.0, 0.8, 0.0, 0.0, 0.0, 0.0, 0.0
Soil carbon in inundated area	kgC m^{-2}	9.933
Mean monthly horizontal radiance	kWh m^{-2} d^{-1}	2.470
Mean monthly horizontal radiance: May - Sept	kWh m^{-2} d^{-1}	3.934
Mean monthly horizontal radiance: Nov - Mar	kWh m^{-2} d^{-1}	1.044
Mean monthly wind speed	m s^{-1}	4.730
Water intake depth below surface	m	N/A



18.2 Outputs

Name	Unit	Value
CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	161.3
Nonanthropogenic CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	110.7
Preimpoundment CO_2 emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	366.7
CO_2 emission minus non-anthropogenic	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	50.61
Net CO_2 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−316.1
Total CO_2 emission per year	$tCO_{2,eq}\ yr^{-1}$	−91.66
Total CO_2 emission per lifetime	$ktCO_{2,eq}$	−9.166
CH_4 emission via diffusion	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	51.45
CH_4 emission via ebullition	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	98.76
CH_4 emission via degassing	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.0
Pre-impounment CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	35.34
Net CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	114.9
Total CH_4 emission per year	$tCO_{2,eq}\ yr^{-1}$	33.31
Total CH_4 emission per lifetime	$ktCO_{2,eq}$	3.331
Net N_2O emission, method A	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.2033
Net N_2O emission, method B	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.1726
Net N_2O emission, mean value	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.1879
Total N_2O emission per year	$tCO_{2,eq}\ yr^{-1}$	0.058 95
Total N_2O emission per lifetime	$ktCO_{2,eq}$	0.005 895
CO_2+CH_4 net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−201.2
CO_2+CH_4+N_2O net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−201.0

18.3 Emission plots



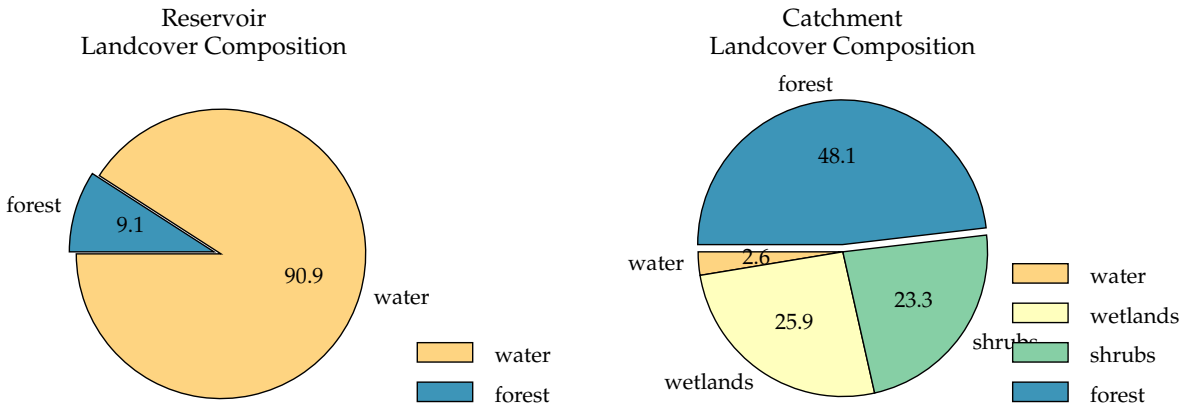
18.4 Intermediate variables

Name	Unit	Value
Influent total P concentration	μg L^{-1}	25.85
Retention coefficient	-	0.050 21
Influent total N concentration	μg L^{-1}	21.55
Reservoir TN concentration	μg L^{-1}	20.47
Reservoir TP concentration	μg L^{-1}	24.87
Percentage of reservoir's surface area that is littoral	%	37.01
Mean radiance at the reservoir	kWh m^{-2} d^{-1}	3.934
Cumulative global horizontal radiance at the reservoir	kWh m^{-2} d^{-1}	47.21
Bottom (hypolimnion) temperature in the reservoir	^{o}C	12.60
Water density at the bottom of the reservoir	kg m^{-3}	999.5
Surface (epilimnion) temperature in the reservoir	^{o}C	12.77
Water density at the surface of the reservoir	kg m^{-3}	999.4
Thermocline depth	m	18.24
Influent total N load	kgN yr^{-1}	388.3
Influent total P load	kgP yr^{-1}	465.6
Downstream TN concentration	mg L^{-1}	0.027 24

19 Penwhirn

19.1 Inputs

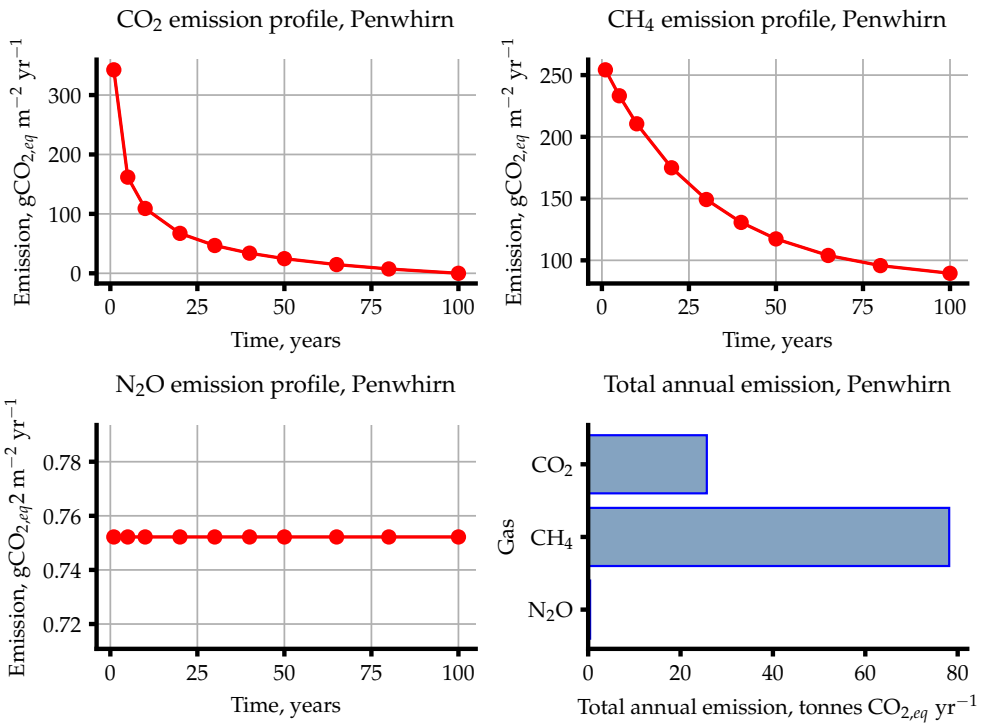
Input Name	Unit	Value(s)
Reservoir ID		10
Reservoir type		potable
Reservoir coordinates (lat/lon)	^{o}	LAT: 54.9853223911, LON: -4.9255739829
Monthly Temperatures	^{o}C	3.3, 2.9, 4.2, 6.2, 9.2, 11.7, 13.5, 13.3, 11.1, 8.6, 5.8, 4.2
Year vector for emission profiles	yr	1, 5, 10, 20, 30, 40, 50, 65, 80, 100
Calculated gas emissions	-	CO_2, CH_4, N_2O
Biogenic factors		
Biome	-	temperate broadleaf and mixed
Climate	-	temperate
Soil Type	-	organic
Treatment Factor	-	secondary biological treatment
Landuse Intensity	-	low intensity
Inputs for catchment-level process calculations		
Annual runoff	mm/year	1046
Catchment area	km^2	20.44
Length of inundated river	km	1.042
Population	capita	18.00
Area fractions	-	0.0, 0.0, 0.0, 0.026, 0.259, 0.0, 0.233, 0.481, 0.0
Mean catchment slope	%	5.000
Mean annual precipitation	mm/year	1622
Mean annual evapotranspiration	mm/year	595.0
Soil wetness	mm over profile	42.00
Soil Olsen P content	kgP ha^{-1}	27.81
Inputs for reservoir-level process calculations		
Reservoir volume	m^3	2 825 000
Reservoir area	km^2	0.5860
Maximum reservoir depth	m	13.87
Mean reservoir depth	m	5.500
Inundated area fractions	-	0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.091, 0.0, 0.0, 0.0, 0.0, 0.909, 0.0, 0.0, 0.0, 0.0, 0.0
Soil carbon in inundated area	kgC m^{-2}	10.20
Mean monthly horizontal radiance	kWh m^{-2} d^{-1}	2.470
Mean monthly horizontal radiance: May - Sept	kWh m^{-2} d^{-1}	3.916
Mean monthly horizontal radiance: Nov - Mar	kWh m^{-2} d^{-1}	1.046
Mean monthly wind speed	m s^{-1}	6.480
Water intake depth below surface	m	N/A



19.2 Outputs

Name	Unit	Value
CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	139.7
Nonanthropogenic CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	95.90
Preimpoundment CO_2 emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.0
CO_2 emission minus non-anthropogenic	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	43.84
Net CO_2 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	43.84
Total CO_2 emission per year	$tCO_{2,eq}\ yr^{-1}$	25.69
Total CO_2 emission per lifetime	$ktCO_{2,eq}$	2.569
CH_4 emission via diffusion	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	46.22
CH_4 emission via ebullition	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	82.75
CH_4 emission via degassing	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	4.411
Pre-impounment CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.0
Net CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	133.4
Total CH_4 emission per year	$tCO_{2,eq}\ yr^{-1}$	78.16
Total CH_4 emission per lifetime	$ktCO_{2,eq}$	7.816
Net N_2O emission, method A	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.7522
Net N_2O emission, method B	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.6888
Net N_2O emission, mean value	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.7205
Total N_2O emission per year	$tCO_{2,eq}\ yr^{-1}$	0.4408
Total N_2O emission per lifetime	$ktCO_{2,eq}$	0.044 08
CO_2+CH_4 net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	177.2
CO_2+CH_4+N_2O net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	177.9

19.3 Emission plots



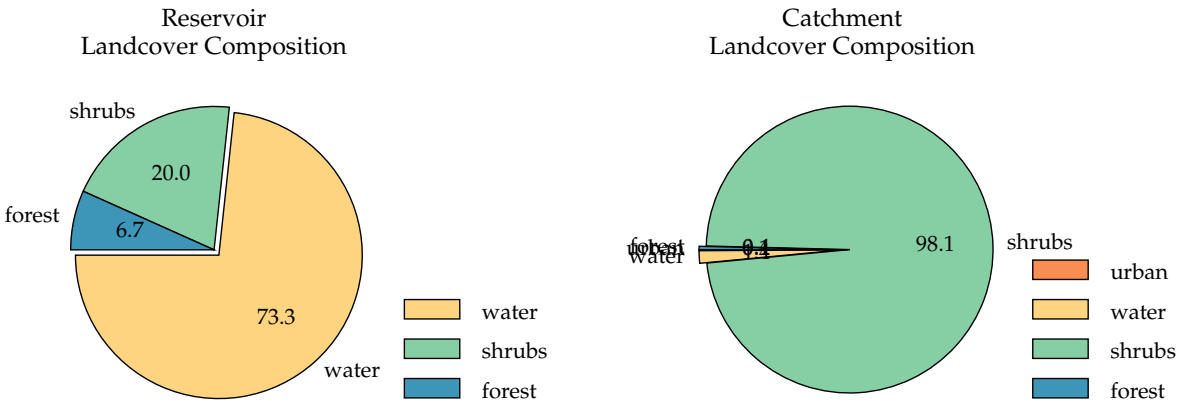
19.4 Intermediate variables

Name	Unit	Value
Influent total P concentration	μg L^{-1}	12.11
Retention coefficient	-	0.095 71
Influent total N concentration	μg L^{-1}	73.99
Reservoir TN concentration	μg L^{-1}	66.91
Reservoir TP concentration	μg L^{-1}	11.25
Percentage of reservoir's surface area that is littoral	%	30.99
Mean radiance at the reservoir	kWh m^{-2} d^{-1}	3.916
Cumulative global horizontal radiance at the reservoir	kWh m^{-2} d^{-1}	46.99
Bottom (hypolimnion) temperature in the reservoir	^{o}C	12.60
Water density at the bottom of the reservoir	kg m^{-3}	999.5
Surface (epilimnion) temperature in the reservoir	^{o}C	12.40
Water density at the surface of the reservoir	kg m^{-3}	999.5
Thermocline depth	m	6.296
Influent total N load	kgN yr^{-1}	1582
Influent total P load	kgP yr^{-1}	258.8
Downstream TN concentration	mg L^{-1}	0.082 99

20 Cefni

20.1 Inputs

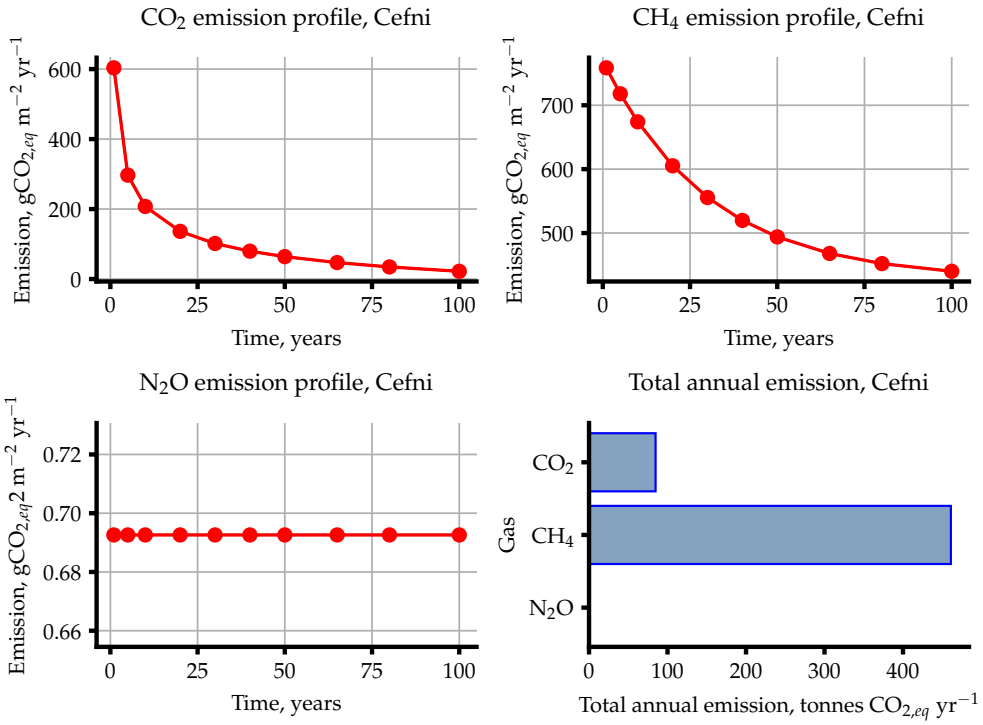
Input Name	Unit	Value(s)
Reservoir ID		20
Reservoir type		potable
Reservoir coordinates (lat/lon)	^{o}	LAT: 53.2686611432, LON: -4.3312701691
Monthly Temperatures	^{o}C	5.3, 5.2, 6.7, 8.3, 11.2, 13.6, 15.7, 15.6, 13.6, 11.2, 8.1, 6.2
Year vector for emission profiles	yr	1, 5, 10, 20, 30, 40, 50, 65, 80, 100
Calculated gas emissions	-	CO_2, CH_4, N_2O
Biogenic factors		
Biome	-	temperate broadleaf and mixed
Climate	-	temperate
Soil Type	-	mineral
Treatment Factor	-	secondary biological treatment
Landuse Intensity	-	low intensity
Inputs for catchment-level process calculations		
Annual runoff	mm/year	446.0
Catchment area	km^2	46.06
Length of inundated river	km	1.437
Population	capita	1954
Area fractions	-	0.0, 0.0, 0.001, 0.014, 0.0, 0.0, 0.982, 0.004, 0.0
Mean catchment slope	%	3.000
Mean annual precipitation	mm/year	1013
Mean annual evapotranspiration	mm/year	646.0
Soil wetness	mm over profile	45.00
Soil Olsen P content	kgP ha^{-1}	37.50
Inputs for reservoir-level process calculations		
Reservoir volume	m^3	1 520 000
Reservoir area	km^2	0.8780
Maximum reservoir depth	m	7.265
Mean reservoir depth	m	2.200
Inundated area fractions	-	0.0, 0.0, 0.0, 0.6, 0.0, 0.0, 0.2, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.133, 0.0, 0.0, 0.0, 0.067, 0.0
Soil carbon in inundated area	kgC m^{-2}	7.604
Mean monthly horizontal radiance	kWh m^{-2} d^{-1}	2.880
Mean monthly horizontal radiance: May - Sept	kWh m^{-2} d^{-1}	4.570
Mean monthly horizontal radiance: Nov - Mar	kWh m^{-2} d^{-1}	1.208
Mean monthly wind speed	m s^{-1}	5.100
Water intake depth below surface	m	N/A



20.2 Outputs

Name	Unit	Value
CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	237.3
Nonanthropogenic CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	162.8
Preimpoundment CO_2 emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−22.11
CO_2 emission minus non-anthropogenic	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	74.44
Net CO_2 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	96.55
Total CO_2 emission per year	$tCO_{2,eq}\ yr^{-1}$	84.77
Total CO_2 emission per lifetime	$ktCO_{2,eq}$	8.477
CH_4 emission via diffusion	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	85.68
CH_4 emission via ebullition	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	427.0
CH_4 emission via degassing	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	12.32
Pre-impounment CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.0
Net CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	525.0
Total CH_4 emission per year	$tCO_{2,eq}\ yr^{-1}$	461.0
Total CH_4 emission per lifetime	$ktCO_{2,eq}$	46.1
Net N_2O emission, method A	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.6926
Net N_2O emission, method B	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.5765
Net N_2O emission, mean value	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.6346
Total N_2O emission per year	$tCO_{2,eq}\ yr^{-1}$	0.6081
Total N_2O emission per lifetime	$ktCO_{2,eq}$	0.060 81
CO_2+CH_4 net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	621.6
CO_2+CH_4+N_2O net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	622.2

20.3 Emission plots



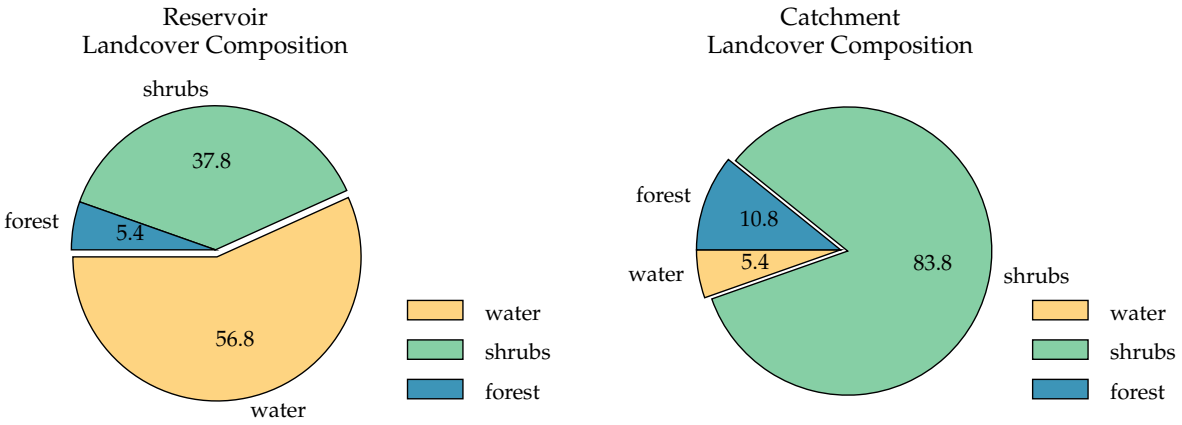
20.4 Intermediate variables

Name	Unit	Value
Influent total P concentration	μg L^{-1}	78.78
Retention coefficient	-	0.055 94
Influent total N concentration	μg L^{-1}	170.7
Reservoir TN concentration	μg L^{-1}	161.1
Reservoir TP concentration	μg L^{-1}	75.59
Percentage of reservoir's surface area that is littoral	%	70.66
Mean radiance at the reservoir	kWh m^{-2} d^{-1}	4.570
Cumulative global horizontal radiance at the reservoir	kWh m^{-2} d^{-1}	54.84
Bottom (hypolimnion) temperature in the reservoir	^{o}C	14.11
Water density at the bottom of the reservoir	kg m^{-3}	999.3
Surface (epilimnion) temperature in the reservoir	^{o}C	14.63
Water density at the surface of the reservoir	kg m^{-3}	999.2
Thermocline depth	m	1.570
Influent total N load	kgN yr^{-1}	3506
Influent total P load	kgP yr^{-1}	1618
Downstream TN concentration	mg L^{-1}	0.2189

21 Talla

21.1 Inputs

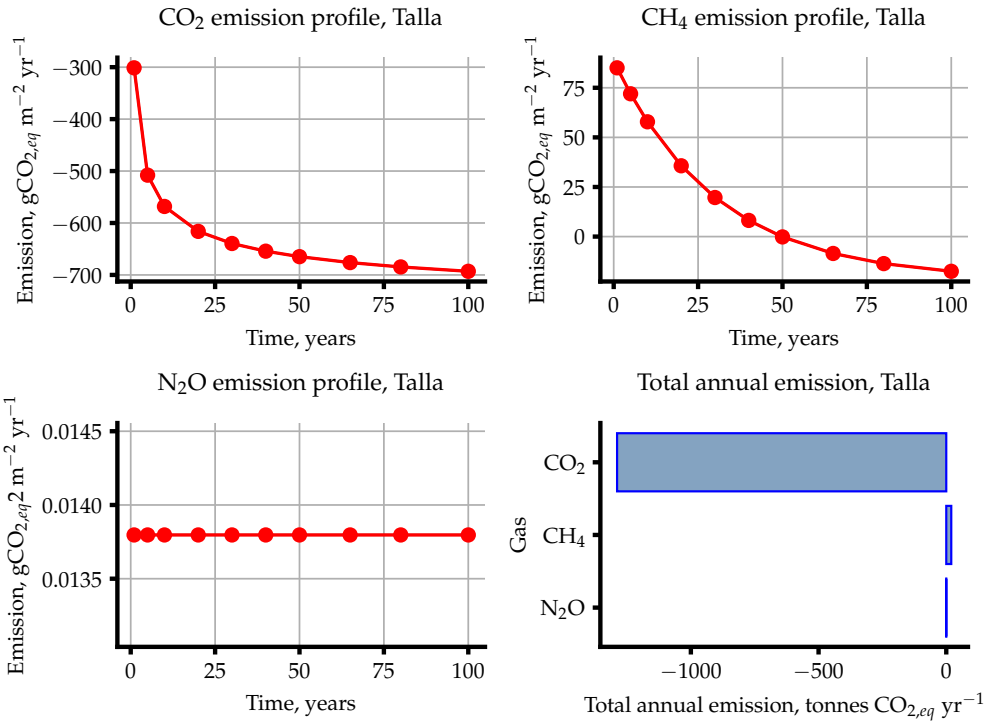
Input Name	Unit	Value(s)
Reservoir ID		12
Reservoir type		potable
Reservoir coordinates (lat/lon)	^{o}	LAT: 55.4911513127, LON: -3.4165641832
Monthly Temperatures	^{o}C	1.6, 1.8, 3.2, 5.2, 8.4, 11.0, 13.0, 12.6, 10.2, 7.4, 4.0, 2.4
Year vector for emission profiles	yr	1, 5, 10, 20, 30, 40, 50, 65, 80, 100
Calculated gas emissions	-	CO_2, CH_4, N_2O
Biogenic factors		
Biome	-	temperate broadleaf and mixed
Climate	-	temperate
Soil Type	-	organic
Treatment Factor	-	secondary biological treatment
Landuse Intensity	-	low intensity
Inputs for catchment-level process calculations		
Annual runoff	mm/year	1382
Catchment area	km^2	22.27
Length of inundated river	km	4.399
Population	capita	19.00
Area fractions	-	0.0, 0.0, 0.0, 0.054, 0.0, 0.0, 0.839, 0.108, 0.0
Mean catchment slope	%	28.00
Mean annual precipitation	mm/year	1912
Mean annual evapotranspiration	mm/year	546.0
Soil wetness	mm over profile	52.00
Soil Olsen P content	kgP ha^{-1}	22.06
Inputs for reservoir-level process calculations		
Reservoir volume	m^3	12 550 000
Reservoir area	km^2	2.005
Maximum reservoir depth	m	22.30
Mean reservoir depth	m	10.60
Inundated area fractions	-	0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.459, 0.0, 0.0, 0.378, 0.027, 0.0, 0.0, 0.0, 0.0, 0.108, 0.0, 0.0, 0.0, 0.027, 0.0
Soil carbon in inundated area	kgC m^{-2}	11.93
Mean monthly horizontal radiance	kWh m^{-2} d^{-1}	2.470
Mean monthly horizontal radiance: May - Sept	kWh m^{-2} d^{-1}	3.934
Mean monthly horizontal radiance: Nov - Mar	kWh m^{-2} d^{-1}	1.044
Mean monthly wind speed	m s^{-1}	5.560
Water intake depth below surface	m	N/A



21.2 Outputs

Name	Unit	Value
CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	159.9
Nonanthropogenic CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	109.7
Preimpoundment CO_2 emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	693.0
CO_2 emission minus non-anthropogenic	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	50.15
Net CO_2 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−642.9
Total CO_2 emission per year	$tCO_{2,eq}\ yr^{-1}$	−1289
Total CO_2 emission per lifetime	$ktCO_{2,eq}$	−128.9
CH_4 emission via diffusion	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	30.40
CH_4 emission via ebullition	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	45.10
CH_4 emission via degassing	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	1.062
Pre-impounment CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	66.80
Net CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	9.763
Total CH_4 emission per year	$tCO_{2,eq}\ yr^{-1}$	19.58
Total CH_4 emission per lifetime	$ktCO_{2,eq}$	1.958
Net N_2O emission, method A	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.013 80
Net N_2O emission, method B	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.009 830
Net N_2O emission, mean value	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.011 81
Total N_2O emission per year	$tCO_{2,eq}\ yr^{-1}$	0.027 66
Total N_2O emission per lifetime	$ktCO_{2,eq}$	0.002 766
CO_2+CH_4 net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−633.1
CO_2+CH_4+N_2O net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−633.1

21.3 Emission plots



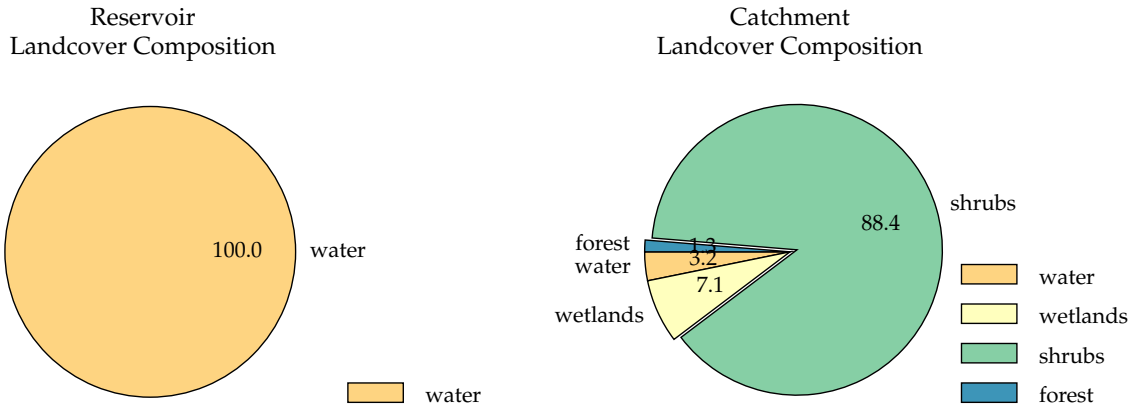
21.4 Intermediate variables

Name	Unit	Value
Influent total P concentration	μg L^{-1}	16.55
Retention coefficient	-	0.2462
Influent total N concentration	μg L^{-1}	0.9199
Reservoir TN concentration	μg L^{-1}	0.6934
Reservoir TP concentration	μg L^{-1}	13.16
Percentage of reservoir's surface area that is littoral	%	14.74
Mean radiance at the reservoir	kWh m^{-2} d^{-1}	3.934
Cumulative global horizontal radiance at the reservoir	kWh m^{-2} d^{-1}	47.21
Bottom (hypolimnion) temperature in the reservoir	^{o}C	11.75
Water density at the bottom of the reservoir	kg m^{-3}	999.6
Surface (epilimnion) temperature in the reservoir	^{o}C	11.70
Water density at the surface of the reservoir	kg m^{-3}	999.6
Thermocline depth	m	7.905
Influent total N load	kgN yr^{-1}	28.32
Influent total P load	kgP yr^{-1}	509.5
Downstream TN concentration	mg L^{-1}	0.001 020

22 Baddinsgill

22.1 Inputs

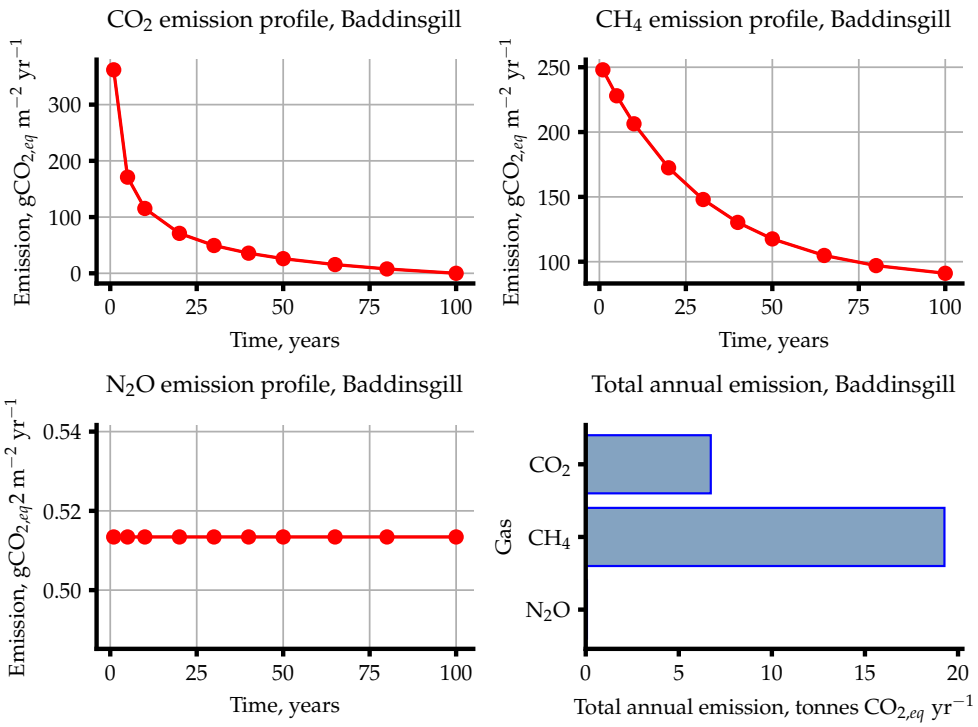
Input Name	Unit	Value(s)
Reservoir ID		2
Reservoir type		potable
Reservoir coordinates (lat/lon)	^{o}	LAT: 55.7850595914, LON: -3.3917119991
Monthly Temperatures	^{o}C	1.7, 1.7, 3.1, 5.2, 8.4, 11.1, 13.0, 12.7, 10.2, 7.4, 4.0, 2.5
Year vector for emission profiles	yr	1, 5, 10, 20, 30, 40, 50, 65, 80, 100
Calculated gas emissions	-	CO_2, CH_4, N_2O
Biogenic factors		
Biome	-	temperate broadleaf and mixed
Climate	-	temperate
Soil Type	-	organic
Treatment Factor	-	secondary biological treatment
Landuse Intensity	-	low intensity
Inputs for catchment-level process calculations		
Annual runoff	mm/year	716.0
Catchment area	km^2	8.445
Length of inundated river	km	0.0
Population	capita	47.00
Area fractions	-	0.0, 0.0, 0.0, 0.032, 0.071, 0.0, 0.885, 0.013, 0.0
Mean catchment slope	%	13.00
Mean annual precipitation	mm/year	1258
Mean annual evapotranspiration	mm/year	576.0
Soil wetness	mm over profile	50.00
Soil Olsen P content	kgP ha^{-1}	35.13
Inputs for reservoir-level process calculations		
Reservoir volume	m^3	1 326 000
Reservoir area	km^2	0.1450
Maximum reservoir depth	m	12.99
Mean reservoir depth	m	5.400
Inundated area fractions	-	0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 1.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0
Soil carbon in inundated area	kgC m^{-2}	9.252
Mean monthly horizontal radiance	kWh m^{-2} d^{-1}	2.470
Mean monthly horizontal radiance: May - Sept	kWh m^{-2} d^{-1}	3.934
Mean monthly horizontal radiance: Nov - Mar	kWh m^{-2} d^{-1}	1.044
Mean monthly wind speed	m s^{-1}	5.670
Water intake depth below surface	m	N/A



22.2 Outputs

Name	Unit	Value
CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	147.7
Nonanthropogenic CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	101.3
Preimpoundment CO_2 emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.0
CO_2 emission minus non-anthropogenic	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	46.33
Net CO_2 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	46.33
Total CO_2 emission per year	$tCO_{2,eq}\ yr^{-1}$	6.717
Total CO_2 emission per lifetime	$ktCO_{2,eq}$	0.6717
CH_4 emission via diffusion	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	42.81
CH_4 emission via ebullition	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	84.63
CH_4 emission via degassing	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	5.455
Pre-impounment CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.0
Net CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	132.9
Total CH_4 emission per year	$tCO_{2,eq}\ yr^{-1}$	19.27
Total CH_4 emission per lifetime	$ktCO_{2,eq}$	1.927
Net N_2O emission, method A	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.5134
Net N_2O emission, method B	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.4003
Net N_2O emission, mean value	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.4569
Total N_2O emission per year	$tCO_{2,eq}\ yr^{-1}$	0.074 45
Total N_2O emission per lifetime	$ktCO_{2,eq}$	0.007 445
CO_2+CH_4 net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	179.2
CO_2+CH_4+N_2O net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	179.7

22.3 Emission plots



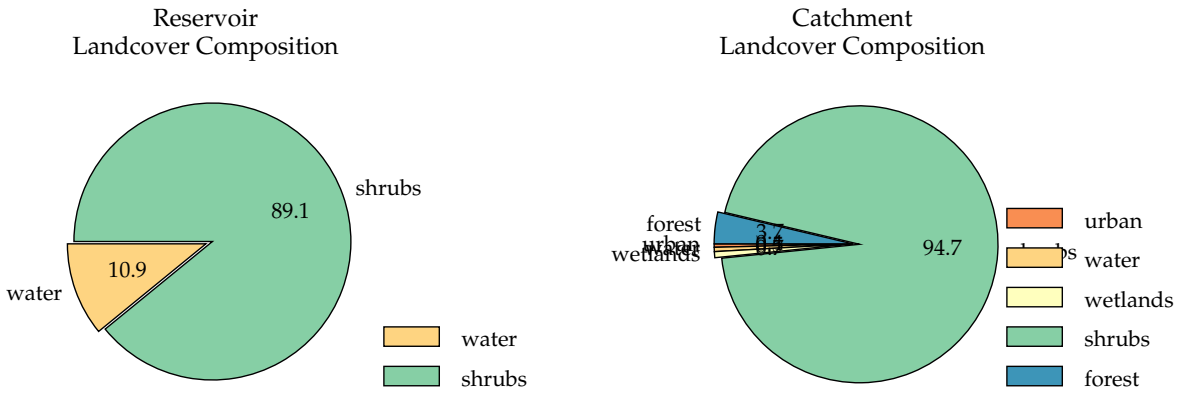
22.4 Intermediate variables

Name	Unit	Value
Influent total P concentration	μg L^{-1}	34.99
Retention coefficient	-	0.1494
Influent total N concentration	μg L^{-1}	23.28
Reservoir TN concentration	μg L^{-1}	19.80
Reservoir TP concentration	μg L^{-1}	30.28
Percentage of reservoir's surface area that is littoral	%	30.87
Mean radiance at the reservoir	kWh m^{-2} d^{-1}	3.934
Cumulative global horizontal radiance at the reservoir	kWh m^{-2} d^{-1}	47.21
Bottom (hypolimnion) temperature in the reservoir	^{o}C	11.82
Water density at the bottom of the reservoir	kg m^{-3}	999.5
Surface (epilimnion) temperature in the reservoir	^{o}C	11.75
Water density at the surface of the reservoir	kg m^{-3}	999.6
Thermocline depth	m	4.862
Influent total N load	kgN yr^{-1}	140.8
Influent total P load	kgP yr^{-1}	211.5
Downstream TN concentration	mg L^{-1}	0.028 60

23 lLandegfedd

23.1 Inputs

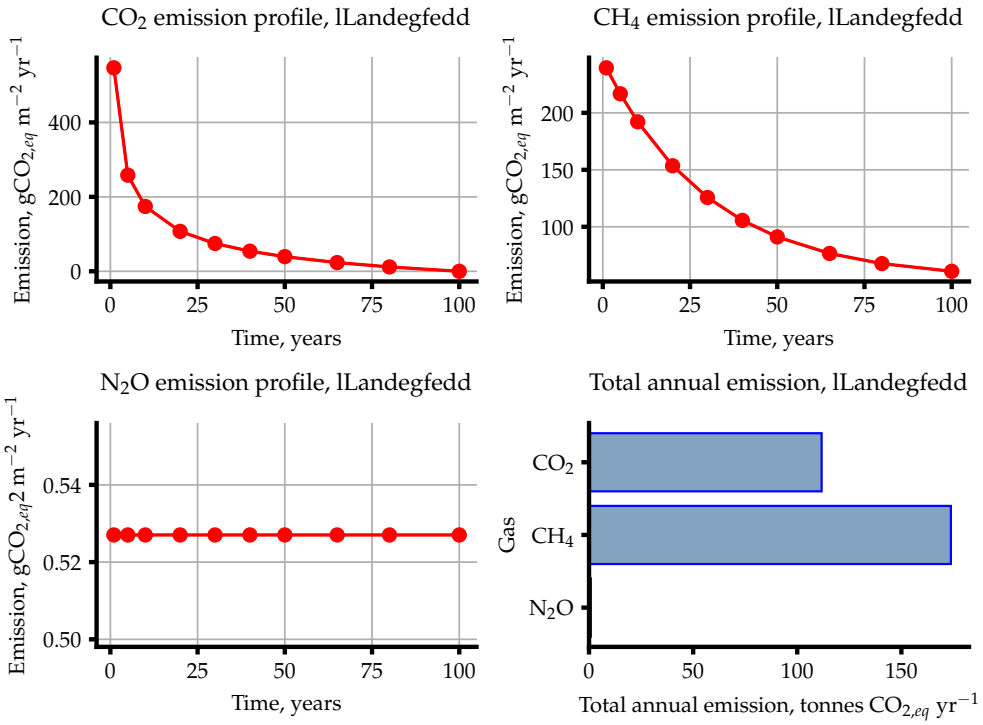
Input Name	Unit	Value(s)
Reservoir ID		32
Reservoir type		potable
Reservoir coordinates (lat/lon)	^{o}	LAT: 51.6816453336, LON: -2.9767157251
Monthly Temperatures	^{o}C	4.7, 4.4, 6.2, 8.0, 11.3, 14.1, 16.4, 16.1, 13.7, 10.7, 7.3, 5.6
Year vector for emission profiles	yr	1, 5, 10, 20, 30, 40, 50, 65, 80, 100
Calculated gas emissions	-	CO_2, CH_4, N_2O
Biogenic factors		
Biome	-	temperate broadleaf and mixed
Climate	-	temperate
Soil Type	-	mineral
Treatment Factor	-	secondary biological treatment
Landuse Intensity	-	low intensity
Inputs for catchment-level process calculations		
Annual runoff	mm/year	842.0
Catchment area	km^2	1092
Length of inundated river	km	0.7790
Population	capita	59 500
Area fractions	-	0.0, 0.0, 0.004, 0.005, 0.007, 0.0, 0.947, 0.037, 0.0
Mean catchment slope	%	14.00
Mean annual precipitation	mm/year	1355
Mean annual evapotranspiration	mm/year	560.0
Soil wetness	mm over profile	64.00
Soil Olsen P content	kgP ha^{-1}	27.96
Inputs for reservoir-level process calculations		
Reservoir volume	m^3	24 490 000
Reservoir area	km^2	1.596
Maximum reservoir depth	m	34.61
Mean reservoir depth	m	13.90
Inundated area fractions	-	0.0, 0.0, 0.0, 0.087, 0.0, 0.0, 0.891, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.022, 0.0, 0.0, 0.0, 0.0, 0.0
Soil carbon in inundated area	kgC m^{-2}	7.679
Mean monthly horizontal radiance	kWh m^{-2} d^{-1}	2.640
Mean monthly horizontal radiance: May - Sept	kWh m^{-2} d^{-1}	4.146
Mean monthly horizontal radiance: Nov - Mar	kWh m^{-2} d^{-1}	1.166
Mean monthly wind speed	m s^{-1}	3.760
Water intake depth below surface	m	N/A



23.2 Outputs

Name	Unit	Value
CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	223.1
Nonanthropogenic CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	153.1
Preimpoundment CO_2 emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.0
CO_2 emission minus non-anthropogenic	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	69.99
Net CO_2 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	69.99
Total CO_2 emission per year	$tCO_{2,eq}\ yr^{-1}$	111.7
Total CO_2 emission per lifetime	$ktCO_{2,eq}$	11.17
CH_4 emission via diffusion	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	39.07
CH_4 emission via ebullition	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	53.63
CH_4 emission via degassing	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	16.18
Pre-impounment CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.0
Net CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	108.9
Total CH_4 emission per year	$tCO_{2,eq}\ yr^{-1}$	173.8
Total CH_4 emission per lifetime	$ktCO_{2,eq}$	17.38
Net N_2O emission, method A	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.5270
Net N_2O emission, method B	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.5856
Net N_2O emission, mean value	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.5563
Total N_2O emission per year	$tCO_{2,eq}\ yr^{-1}$	0.8411
Total N_2O emission per lifetime	$ktCO_{2,eq}$	0.084 11
CO_2+CH_4 net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	178.9
CO_2+CH_4+N_2O net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	179.4

23.3 Emission plots



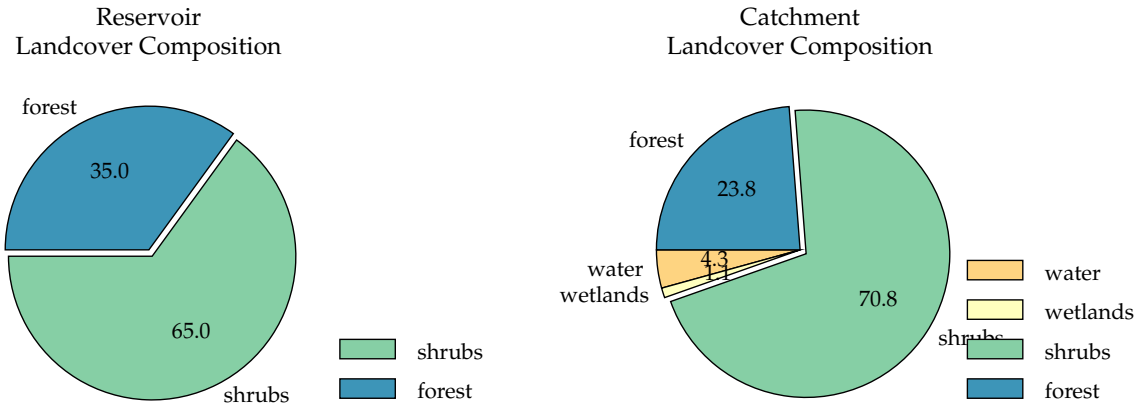
23.4 Intermediate variables

Name	Unit	Value
Influent total P concentration	μg L^{-1}	45.15
Retention coefficient	-	0.020 89
Influent total N concentration	μg L^{-1}	19.47
Reservoir TN concentration	μg L^{-1}	19.06
Reservoir TP concentration	μg L^{-1}	44.23
Percentage of reservoir's surface area that is littoral	%	12.64
Mean radiance at the reservoir	kWh m^{-2} d^{-1}	4.146
Cumulative global horizontal radiance at the reservoir	kWh m^{-2} d^{-1}	49.75
Bottom (hypolimnion) temperature in the reservoir	^{o}C	13.59
Water density at the bottom of the reservoir	kg m^{-3}	999.3
Surface (epilimnion) temperature in the reservoir	^{o}C	15.08
Water density at the surface of the reservoir	kg m^{-3}	999.1
Thermocline depth	m	6.957
Influent total N load	kgN yr^{-1}	17 910
Influent total P load	kgP yr^{-1}	41 530
Downstream TN concentration	mg L^{-1}	0.019 22

24 Pontsticilll

24.1 Inputs

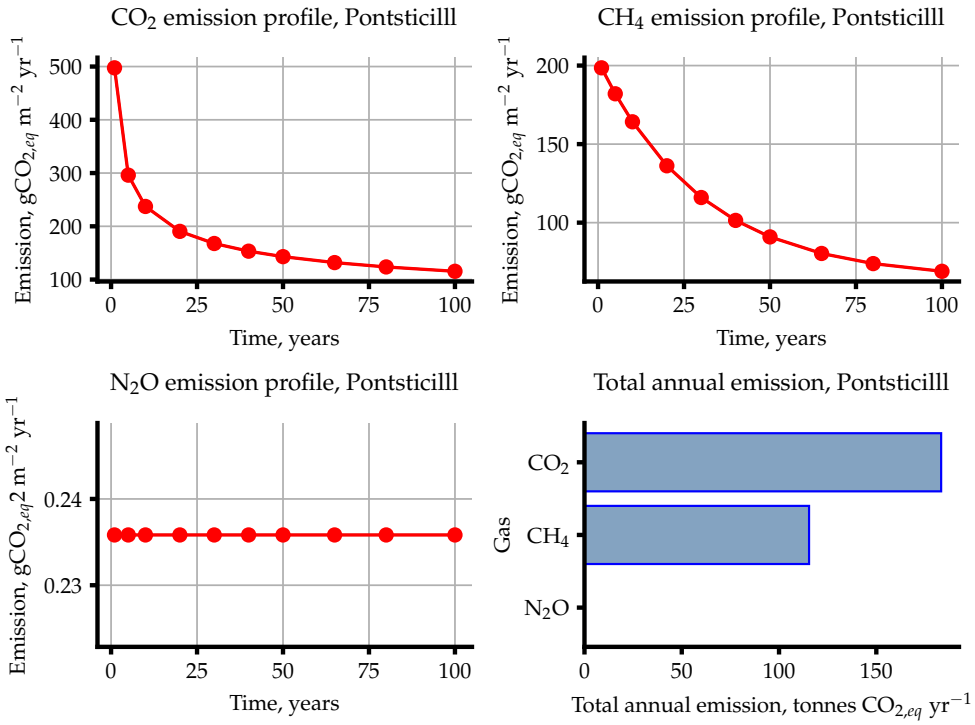
Input Name	Unit	Value(s)
Reservoir ID		31
Reservoir type		potable
Reservoir coordinates (lat/lon)	^{o}	LAT: 51.797785923, LON: -3.3646012941
Monthly Temperatures	^{o}C	3.0, 2.8, 4.6, 6.5, 9.8, 12.5, 14.7, 14.6, 12.2, 9.2, 6.0, 4.2
Year vector for emission profiles	yr	1, 5, 10, 20, 30, 40, 50, 65, 80, 100
Calculated gas emissions	-	CO_2, CH_4, N_2O
Biogenic factors		
Biome	-	temperate broadleaf and mixed
Climate	-	temperate
Soil Type	-	mineral
Treatment Factor	-	secondary biological treatment
Landuse Intensity	-	low intensity
Inputs for catchment-level process calculations		
Annual runoff	mm/year	1225
Catchment area	km^2	33.16
Length of inundated river	km	2.677
Population	capita	327.0
Area fractions	-	0.0, 0.0, 0.0, 0.043, 0.011, 0.0, 0.709, 0.238, 0.0
Mean catchment slope	%	16.00
Mean annual precipitation	mm/year	1733
Mean annual evapotranspiration	mm/year	528.0
Soil wetness	mm over profile	64.00
Soil Olsen P content	kgP ha^{-1}	24.38
Inputs for reservoir-level process calculations		
Reservoir volume	m^3	10 720 000
Reservoir area	km^2	1.115
Maximum reservoir depth	m	26.84
Mean reservoir depth	m	11.10
Inundated area fractions	-	0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.65, 0.35, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0
Soil carbon in inundated area	kgC m^{-2}	8.762
Mean monthly horizontal radiance	kWh m^{-2} d^{-1}	2.640
Mean monthly horizontal radiance: May - Sept	kWh m^{-2} d^{-1}	4.146
Mean monthly horizontal radiance: Nov - Mar	kWh m^{-2} d^{-1}	1.166
Mean monthly wind speed	m s^{-1}	3.920
Water intake depth below surface	m	N/A



24.2 Outputs

Name	Unit	Value
CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	155.9
Nonanthropogenic CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	107.0
Preimpoundment CO_2 emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−115.5
CO_2 emission minus non-anthropogenic	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	48.91
Net CO_2 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	164.4
Total CO_2 emission per year	$tCO_{2,eq}\ yr^{-1}$	183.3
Total CO_2 emission per lifetime	$ktCO_{2,eq}$	18.33
CH_4 emission via diffusion	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	36.48
CH_4 emission via ebullition	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	63.73
CH_4 emission via degassing	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	3.322
Pre-impounment CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.0
Net CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	103.5
Total CH_4 emission per year	$tCO_{2,eq}\ yr^{-1}$	115.4
Total CH_4 emission per lifetime	$ktCO_{2,eq}$	11.54
Net N_2O emission, method A	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.2358
Net N_2O emission, method B	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.1808
Net N_2O emission, mean value	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.2083
Total N_2O emission per year	$tCO_{2,eq}\ yr^{-1}$	0.2629
Total N_2O emission per lifetime	$ktCO_{2,eq}$	0.026 29
CO_2+CH_4 net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	267.9
CO_2+CH_4+N_2O net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	268.2

24.3 Emission plots



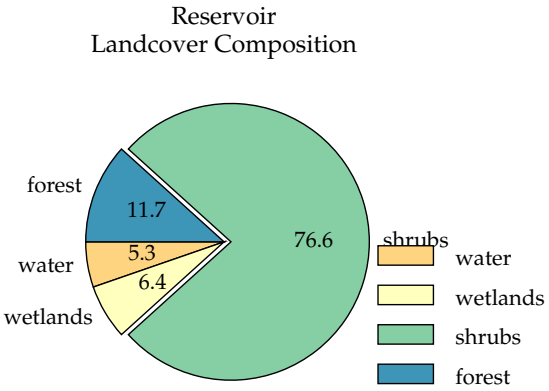
24.4 Intermediate variables

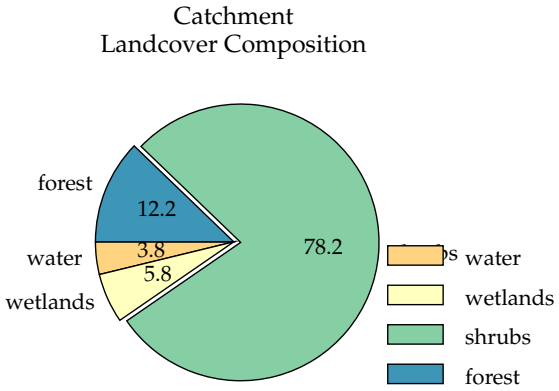
Name	Unit	Value
Influent total P concentration	μg L^{-1}	18.45
Retention coefficient	-	0.1745
Influent total N concentration	μg L^{-1}	10.18
Reservoir TN concentration	μg L^{-1}	8.408
Reservoir TP concentration	μg L^{-1}	15.30
Percentage of reservoir's surface area that is littoral	%	15.47
Mean radiance at the reservoir	kWh m^{-2} d^{-1}	4.146
Cumulative global horizontal radiance at the reservoir	kWh m^{-2} d^{-1}	49.75
Bottom (hypolimnion) temperature in the reservoir	^{o}C	12.54
Water density at the bottom of the reservoir	kg m^{-3}	999.5
Surface (epilimnion) temperature in the reservoir	^{o}C	13.50
Water density at the surface of the reservoir	kg m^{-3}	999.3
Thermocline depth	m	8.772
Influent total N load	kgN yr^{-1}	413.7
Influent total P load	kgP yr^{-1}	749.5
Downstream TN concentration	mg L^{-1}	0.012 22

25 NantyMoch

25.1 Inputs

Input Name	Unit	Value(s)
Reservoir ID		46
Reservoir type		potable
Reservoir coordinates (lat/lon)	^{o}	LAT: 52.4598536126, LON: -3.8346536395
Monthly Temperatures	^{o}C	3.1, 2.7, 4.2, 5.9, 9.1, 11.7, 13.6, 13.5, 11.3, 8.7, 5.6, 3.9
Year vector for emission profiles	yr	1, 5, 10, 20, 30, 40, 50, 65, 80, 100
Calculated gas emissions	-	CO_2, CH_4, N_2O
Biogenic factors		
Biome	-	temperate broadleaf and mixed
Climate	-	temperate
Soil Type	-	organic
Treatment Factor	-	secondary biological treatment
Landuse Intensity	-	low intensity
Inputs for catchment-level process calculations		
Annual runoff	mm/year	1452
Catchment area	km^2	55.42
Length of inundated river	km	2.170
Population	capita	255.0
Area fractions	-	0.0, 0.0, 0.0, 0.038, 0.058, 0.0, 0.782, 0.122, 0.0
Mean catchment slope	%	16.00
Mean annual precipitation	mm/year	1939
Mean annual evapotranspiration	mm/year	501.0
Soil wetness	mm over profile	46.00
Soil Olsen P content	kgP ha^{-1}	24.60
Inputs for reservoir-level process calculations		
Reservoir volume	m^3	26 290 000
Reservoir area	km^2	2.039
Maximum reservoir depth	m	32.30
Mean reservoir depth	m	12.40
Inundated area fractions	-	0.0, 0.0, 0.0, 0.032, 0.021, 0.0, 0.426, 0.064, 0.0, 0.0, 0.0, 0.0, 0.0, 0.043, 0.0, 0.34, 0.053, 0.0, 0.0, 0.0, 0.0, 0.021, 0.0, 0.0, 0.0, 0.0, 0.0
Soil carbon in inundated area	kgC m^{-2}	9.210
Mean monthly horizontal radiance	kWh m^{-2} d^{-1}	2.540
Mean monthly horizontal radiance: May - Sept	kWh m^{-2} d^{-1}	4.010
Mean monthly horizontal radiance: Nov - Mar	kWh m^{-2} d^{-1}	1.100
Mean monthly wind speed	m s^{-1}	5.360
Water intake depth below surface	m	N/A

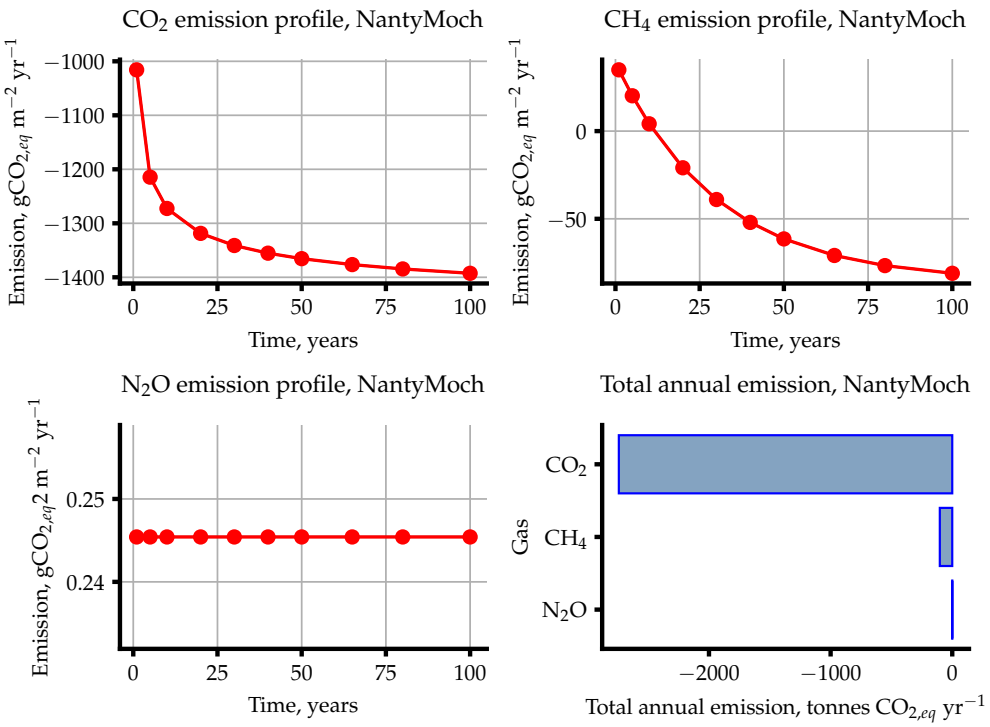




25.2 Outputs

Name	Unit	Value
CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	153.8
Nonanthropogenic CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	105.5
Preimpoundment CO_2 emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	1393
CO_2 emission minus non-anthropogenic	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	48.24
Net CO_2 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−1344
Total CO_2 emission per year	$tCO_{2,eq}\ yr^{-1}$	−2741
Total CO_2 emission per lifetime	$ktCO_{2,eq}$	−274.1
CH_4 emission via diffusion	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	32.68
CH_4 emission via ebullition	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	49.55
CH_4 emission via degassing	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	2.959
Pre-impounment CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	135.4
Net CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−50.17
Total CH_4 emission per year	$tCO_{2,eq}\ yr^{-1}$	−102.3
Total CH_4 emission per lifetime	$ktCO_{2,eq}$	−10.23
Net N_2O emission, method A	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.2454
Net N_2O emission, method B	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.1828
Net N_2O emission, mean value	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.2141
Total N_2O emission per year	$tCO_{2,eq}\ yr^{-1}$	0.5004
Total N_2O emission per lifetime	$ktCO_{2,eq}$	0.050 04
CO_2+CH_4 net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−1395
CO_2+CH_4+N_2O net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−1394

25.3 Emission plots



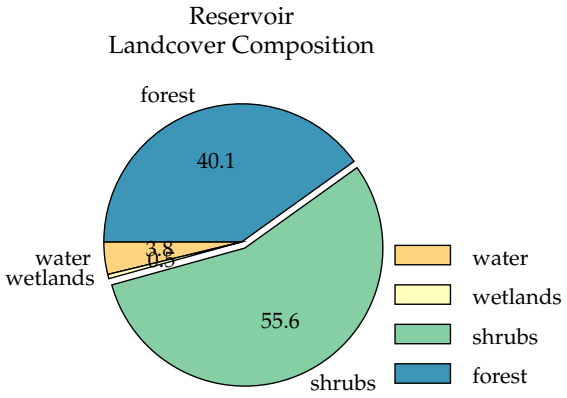
25.4 Intermediate variables

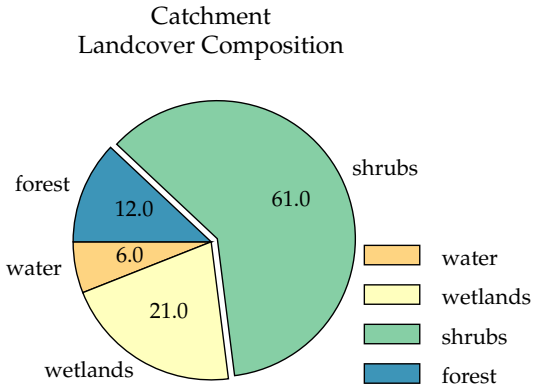
Name	Unit	Value
Influent total P concentration	μg L^{-1}	15.77
Retention coefficient	-	0.2074
Influent total N concentration	μg L^{-1}	7.917
Reservoir TN concentration	μg L^{-1}	6.275
Reservoir TP concentration	μg L^{-1}	12.53
Percentage of reservoir's surface area that is littoral	%	14.48
Mean radiance at the reservoir	kWh m^{-2} d^{-1}	4.010
Cumulative global horizontal radiance at the reservoir	kWh m^{-2} d^{-1}	48.12
Bottom (hypolimnion) temperature in the reservoir	^{o}C	12.47
Water density at the bottom of the reservoir	kg m^{-3}	999.5
Surface (epilimnion) temperature in the reservoir	^{o}C	12.52
Water density at the surface of the reservoir	kg m^{-3}	999.5
Thermocline depth	m	6.966
Influent total N load	kgN yr^{-1}	637.1
Influent total P load	kgP yr^{-1}	1269
Downstream TN concentration	mg L^{-1}	0.009 182

26 Vyrnwy

26.1 Inputs

Input Name	Unit	Value(s)
Reservoir ID		36
Reservoir type		potable
Reservoir coordinates (lat/lon)	^{o}	LAT: 52.7645810597, LON: -3.4558235209
Monthly Temperatures	^{o}C	3.0, 2.7, 4.4, 6.1, 9.3, 12.0, 14.2, 13.9, 11.6, 8.7, 5.6, 4.0
Year vector for emission profiles	yr	1, 5, 10, 20, 30, 40, 50, 65, 80, 100
Calculated gas emissions	-	CO_2, CH_4, N_2O
Biogenic factors		
Biome	-	temperate broadleaf and mixed
Climate	-	temperate
Soil Type	-	organic
Treatment Factor	-	secondary biological treatment
Landuse Intensity	-	low intensity
Inputs for catchment-level process calculations		
Annual runoff	mm/year	1138
Catchment area	km^2	73.20
Length of inundated river	km	0.0
Population	capita	206.0
Area fractions	-	0.0, 0.0, 0.0, 0.06, 0.21, 0.0, 0.61, 0.12, 0.0
Mean catchment slope	%	16.00
Mean annual precipitation	mm/year	1624
Mean annual evapotranspiration	mm/year	505.0
Soil wetness	mm over profile	65.00
Soil Olsen P content	kgP ha^{-1}	35.43
Inputs for reservoir-level process calculations		
Reservoir volume	m^3	59 850 000
Reservoir area	km^2	4.361
Maximum reservoir depth	m	20.00
Mean reservoir depth	m	13.20
Inundated area fractions	-	0.0, 0.0, 0.0, 0.019, 0.0, 0.0, 0.469, 0.324, 0.0, 0.0, 0.0, 0.0, 0.0, 0.005, 0.0, 0.087, 0.077, 0.0, 0.0, 0.0, 0.0, 0.019, 0.0, 0.0, 0.0, 0.0, 0.0
Soil carbon in inundated area	kgC m^{-2}	8.989
Mean monthly horizontal radiance	kWh m^{-2} d^{-1}	2.540
Mean monthly horizontal radiance: May - Sept	kWh m^{-2} d^{-1}	4.010
Mean monthly horizontal radiance: Nov - Mar	kWh m^{-2} d^{-1}	1.100
Mean monthly wind speed	m s^{-1}	4.110
Water intake depth below surface	m	N/A

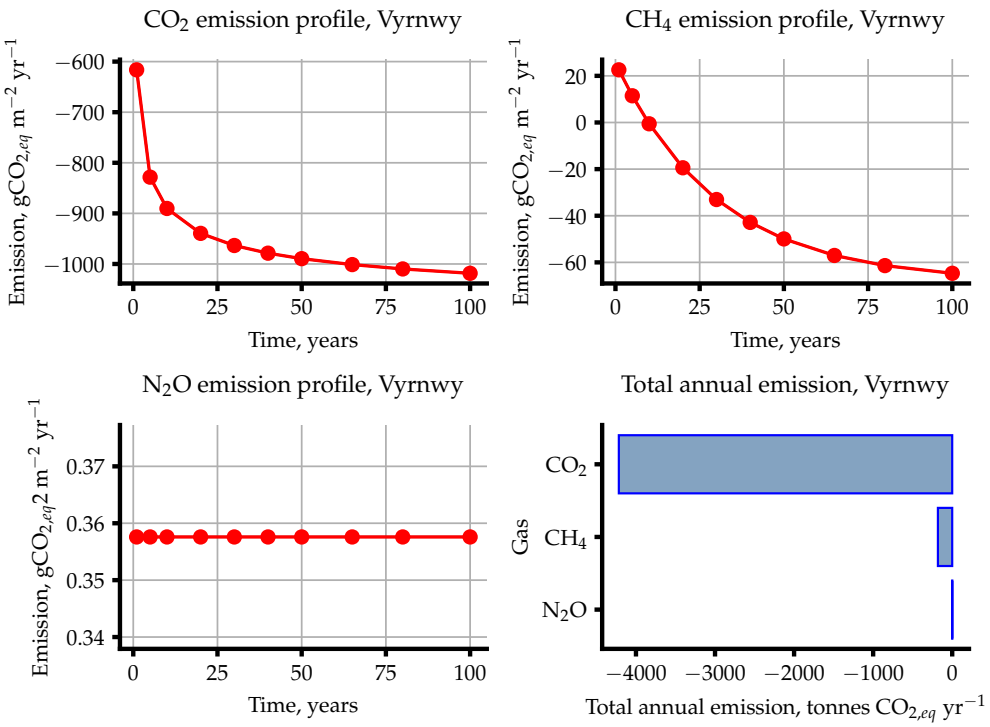




26.2 Outputs

Name	Unit	Value
CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	164.1
Nonanthropogenic CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	112.6
Preimpoundment CO_2 emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	1018
CO_2 emission minus non-anthropogenic	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	51.48
Net CO_2 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−966.9
Total CO_2 emission per year	$tCO_{2,eq}\ yr^{-1}$	−4217
Total CO_2 emission per lifetime	$ktCO_{2,eq}$	−421.7
CH_4 emission via diffusion	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	25.65
CH_4 emission via ebullition	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	29.99
CH_4 emission via degassing	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	1.126
Pre-impounment CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	98.25
Net CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−41.48
Total CH_4 emission per year	$tCO_{2,eq}\ yr^{-1}$	−180.9
Total CH_4 emission per lifetime	$ktCO_{2,eq}$	−18.09
Net N_2O emission, method A	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.3576
Net N_2O emission, method B	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.2041
Net N_2O emission, mean value	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.2808
Total N_2O emission per year	$tCO_{2,eq}\ yr^{-1}$	1.559
Total N_2O emission per lifetime	$ktCO_{2,eq}$	0.1559
CO_2+CH_4 net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−1008
CO_2+CH_4+N_2O net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−1008

26.3 Emission plots



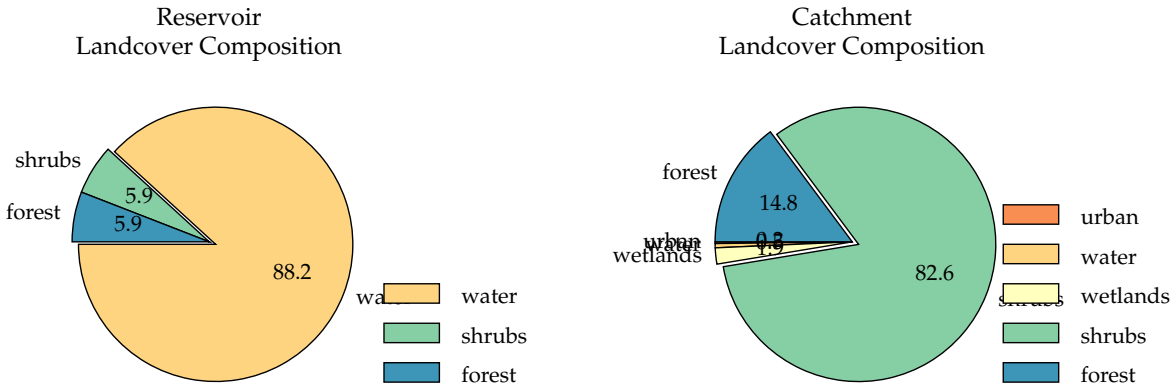
26.4 Intermediate variables

Name	Unit	Value
Influent total P concentration	μg L^{-1}	17.16
Retention coefficient	-	0.3653
Influent total N concentration	μg L^{-1}	11.10
Reservoir TN concentration	μg L^{-1}	7.047
Reservoir TP concentration	μg L^{-1}	10.96
Percentage of reservoir's surface area that is littoral	%	8.031
Mean radiance at the reservoir	kWh m^{-2} d^{-1}	4.010
Cumulative global horizontal radiance at the reservoir	kWh m^{-2} d^{-1}	48.12
Bottom (hypolimnion) temperature in the reservoir	^{o}C	12.47
Water density at the bottom of the reservoir	kg m^{-3}	999.5
Surface (epilimnion) temperature in the reservoir	^{o}C	12.93
Water density at the surface of the reservoir	kg m^{-3}	999.4
Thermocline depth	m	19.18
Influent total N load	kgN yr^{-1}	924.9
Influent total P load	kgP yr^{-1}	1430
Downstream TN concentration	mg L^{-1}	0.010 21

27 Cowlyd

27.1 Inputs

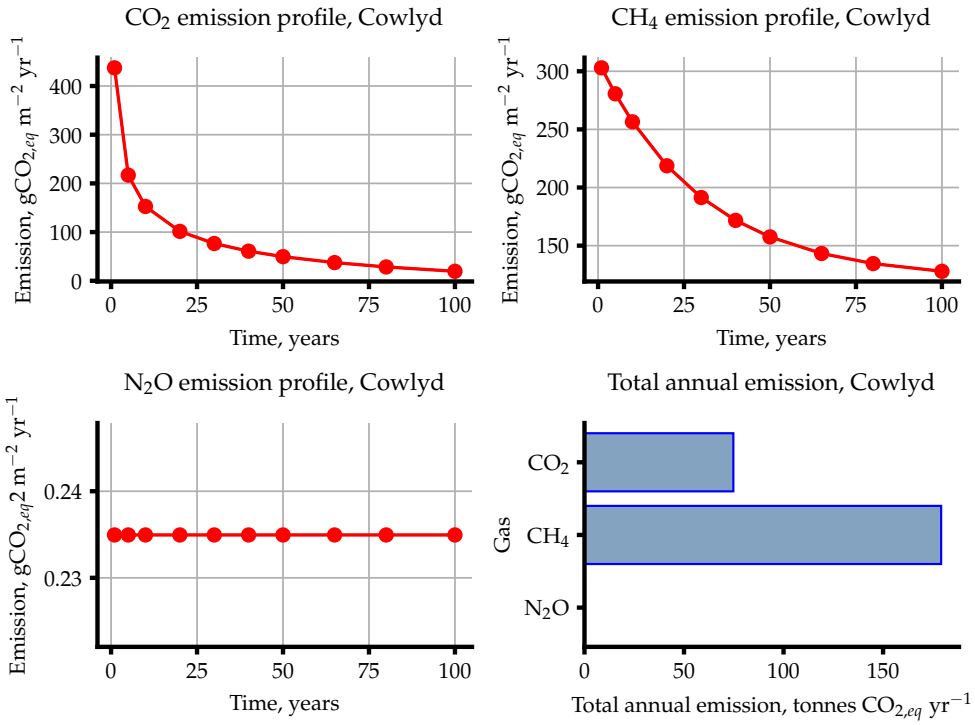
Input Name	Unit	Value(s)
Reservoir ID		35
Reservoir type		potable
Reservoir coordinates (lat/lon)	^{o}	LAT: 53.15217, LON: -3.88909
Monthly Temperatures	^{o}C	3.1, 2.8, 4.2, 5.9, 9.1, 11.6, 13.6, 13.4, 11.3, 8.5, 5.5, 3.8
Year vector for emission profiles	yr	1, 5, 10, 20, 30, 40, 50, 65, 80, 100
Calculated gas emissions	-	CO_2, CH_4, N_2O
Biogenic factors		
Biome	-	temperate broadleaf and mixed
Climate	-	temperate
Soil Type	-	mineral
Treatment Factor	-	secondary biological treatment
Landuse Intensity	-	low intensity
Inputs for catchment-level process calculations		
Annual runoff	mm/year	967.0
Catchment area	km^2	407.6
Length of inundated river	km	1.686
Population	capita	7614
Area fractions	-	0.0, 0.0, 0.002, 0.005, 0.019, 0.0, 0.825, 0.148, 0.0
Mean catchment slope	%	15.00
Mean annual precipitation	mm/year	1455
Mean annual evapotranspiration	mm/year	513.0
Soil wetness	mm over profile	57.00
Soil Olsen P content	kgP ha^{-1}	35.69
Inputs for reservoir-level process calculations		
Reservoir volume	m^3	9 432 000
Reservoir area	km^2	1.025
Maximum reservoir depth	m	60.00
Mean reservoir depth	m	9.100
Inundated area fractions	-	0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.235, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.647, 0.0, 0.0, 0.059, 0.059, 0.0
Soil carbon in inundated area	kgC m^{-2}	9.956
Mean monthly horizontal radiance	kWh m^{-2} d^{-1}	2.700
Mean monthly horizontal radiance: May - Sept	kWh m^{-2} d^{-1}	4.308
Mean monthly horizontal radiance: Nov - Mar	kWh m^{-2} d^{-1}	1.126
Mean monthly wind speed	m s^{-1}	6.390
Water intake depth below surface	m	N/A



27.2 Outputs

Name	Unit	Value
CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	170.5
Nonanthropogenic CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	117.0
Preimpoundment CO_2 emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−19.47
CO_2 emission minus non-anthropogenic	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	53.49
Net CO_2 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	72.96
Total CO_2 emission per year	$tCO_{2,eq}\ yr^{-1}$	74.79
Total CO_2 emission per lifetime	$ktCO_{2,eq}$	7.479
CH_4 emission via diffusion	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	41.73
CH_4 emission via ebullition	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	120.8
CH_4 emission via degassing	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	12.30
Pre-impounment CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.0
Net CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	174.8
Total CH_4 emission per year	$tCO_{2,eq}\ yr^{-1}$	179.2
Total CH_4 emission per lifetime	$ktCO_{2,eq}$	17.92
Net N_2O emission, method A	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.2350
Net N_2O emission, method B	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.2611
Net N_2O emission, mean value	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.2480
Total N_2O emission per year	$tCO_{2,eq}\ yr^{-1}$	0.2408
Total N_2O emission per lifetime	$ktCO_{2,eq}$	0.024 08
CO_2+CH_4 net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	247.8
CO_2+CH_4+N_2O net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	248.0

27.3 Emission plots



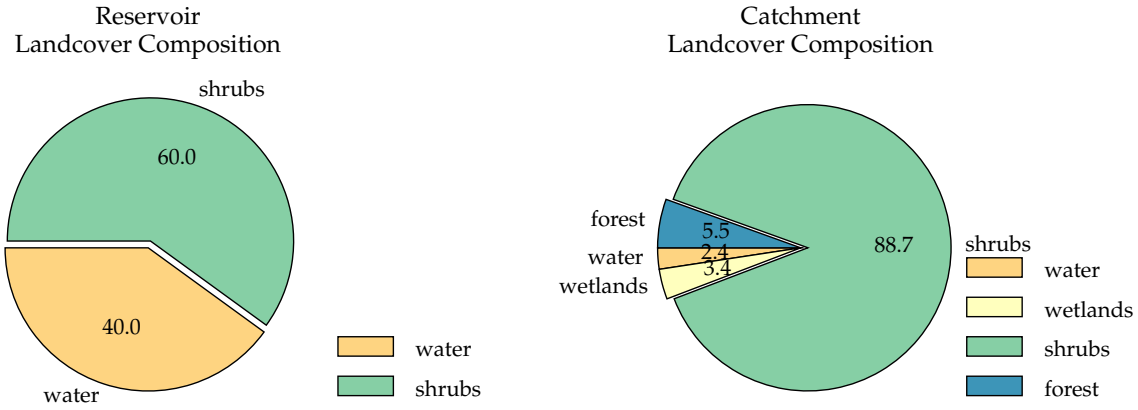
27.4 Intermediate variables

Name	Unit	Value
Influent total P concentration	μg L^{-1}	28.37
Retention coefficient	-	0.018 81
Influent total N concentration	μg L^{-1}	14.47
Reservoir TN concentration	μg L^{-1}	14.20
Reservoir TP concentration	μg L^{-1}	27.90
Percentage of reservoir's surface area that is littoral	%	24.94
Mean radiance at the reservoir	kWh m^{-2} d^{-1}	4.308
Cumulative global horizontal radiance at the reservoir	kWh m^{-2} d^{-1}	51.70
Bottom (hypolimnion) temperature in the reservoir	^{o}C	12.54
Water density at the bottom of the reservoir	kg m^{-3}	999.5
Surface (epilimnion) temperature in the reservoir	^{o}C	12.48
Water density at the surface of the reservoir	kg m^{-3}	999.5
Thermocline depth	m	6.982
Influent total N load	kgN yr^{-1}	5705
Influent total P load	kgP yr^{-1}	11 180
Downstream TN concentration	mg L^{-1}	0.014 31

28 Cantref

28.1 Inputs

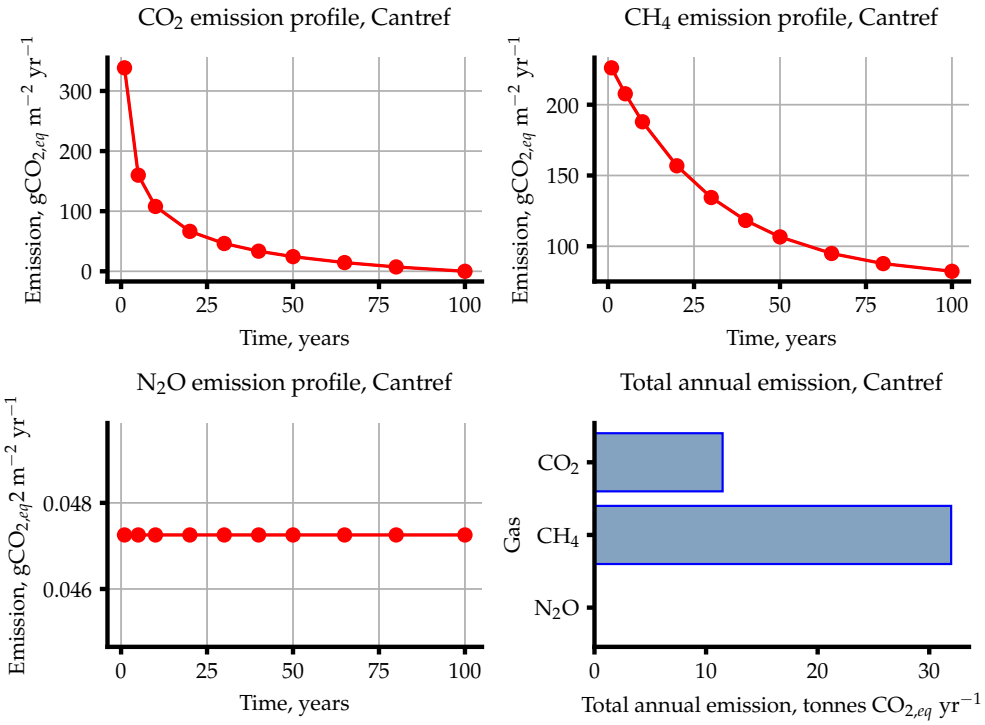
Input Name	Unit	Value(s)
Reservoir ID		34
Reservoir type		potable
Reservoir coordinates (lat/lon)	^{o}	LAT: 51.8282920904, LON: -3.4574211518
Monthly Temperatures	^{o}C	2.9, 2.7, 4.5, 6.4, 9.7, 12.4, 14.6, 14.5, 12.2, 9.1, 5.9, 4.1
Year vector for emission profiles	yr	1, 5, 10, 20, 30, 40, 50, 65, 80, 100
Calculated gas emissions	-	CO_2, CH_4, N_2O
Biogenic factors		
Biome	-	temperate broadleaf and mixed
Climate	-	temperate
Soil Type	-	mineral
Treatment Factor	-	secondary biological treatment
Landuse Intensity	-	low intensity
Inputs for catchment-level process calculations		
Annual runoff	mm/year	1308
Catchment area	km^2	17.10
Length of inundated river	km	1.425
Population	capita	112.0
Area fractions	-	0.0, 0.0, 0.0, 0.024, 0.034, 0.0, 0.887, 0.055, 0.0
Mean catchment slope	%	21.00
Mean annual precipitation	mm/year	1813
Mean annual evapotranspiration	mm/year	523.0
Soil wetness	mm over profile	61.00
Soil Olsen P content	kgP ha^{-1}	22.15
Inputs for reservoir-level process calculations		
Reservoir volume	m^3	1 450 000
Reservoir area	km^2	0.2650
Maximum reservoir depth	m	19.62
Mean reservoir depth	m	8.600
Inundated area fractions	-	0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.4, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.4, 0.0, 0.0, 0.2, 0.0, 0.0
Soil carbon in inundated area	kgC m^{-2}	8.607
Mean monthly horizontal radiance	kWh m^{-2} d^{-1}	2.640
Mean monthly horizontal radiance: May - Sept	kWh m^{-2} d^{-1}	4.146
Mean monthly horizontal radiance: Nov - Mar	kWh m^{-2} d^{-1}	1.166
Mean monthly wind speed	m s^{-1}	3.900
Water intake depth below surface	m	N/A



28.2 Outputs

Name	Unit	Value
CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	138.1
Nonanthropogenic CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	94.79
Preimpoundment CO_2 emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.0
CO_2 emission minus non-anthropogenic	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	43.33
Net CO_2 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	43.33
Total CO_2 emission per year	$tCO_{2,eq}\ yr^{-1}$	11.48
Total CO_2 emission per lifetime	$ktCO_{2,eq}$	1.148
CH_4 emission via diffusion	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	39.88
CH_4 emission via ebullition	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	76.42
CH_4 emission via degassing	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	4.304
Pre-impounment CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.0
Net CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	120.6
Total CH_4 emission per year	$tCO_{2,eq}\ yr^{-1}$	31.96
Total CH_4 emission per lifetime	$ktCO_{2,eq}$	3.196
Net N_2O emission, method A	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.047 26
Net N_2O emission, method B	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.040 27
Net N_2O emission, mean value	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.043 76
Total N_2O emission per year	$tCO_{2,eq}\ yr^{-1}$	0.012 52
Total N_2O emission per lifetime	$ktCO_{2,eq}$	0.001 252
CO_2+CH_4 net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	163.9
CO_2+CH_4+N_2O net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	164.0

28.3 Emission plots



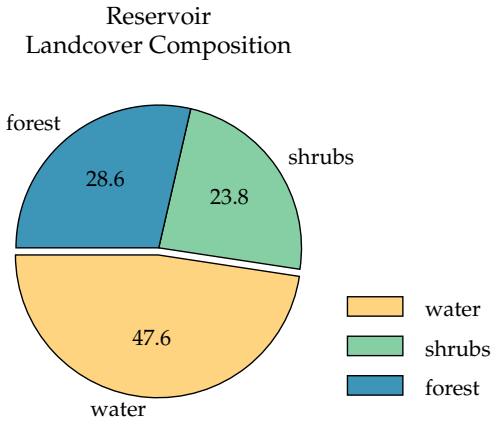
28.4 Intermediate variables

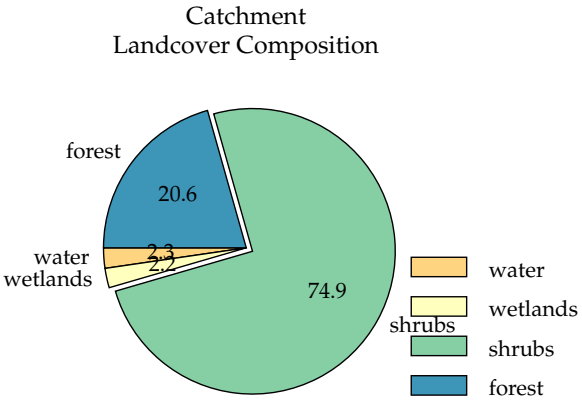
Name	Unit	Value
Influent total P concentration	μg L^{-1}	19.33
Retention coefficient	-	0.049 37
Influent total N concentration	μg L^{-1}	3.766
Reservoir TN concentration	μg L^{-1}	3.580
Reservoir TP concentration	μg L^{-1}	18.49
Percentage of reservoir's surface area that is littoral	%	19.15
Mean radiance at the reservoir	kWh m^{-2} d^{-1}	4.146
Cumulative global horizontal radiance at the reservoir	kWh m^{-2} d^{-1}	49.75
Bottom (hypolimnion) temperature in the reservoir	^{o}C	12.47
Water density at the bottom of the reservoir	kg m^{-3}	999.5
Surface (epilimnion) temperature in the reservoir	^{o}C	13.43
Water density at the surface of the reservoir	kg m^{-3}	999.4
Thermocline depth	m	6.145
Influent total N load	kgN yr^{-1}	84.25
Influent total P load	kgP yr^{-1}	432.5
Downstream TN concentration	mg L^{-1}	0.004 744

29 LlwynOn

29.1 Inputs

Input Name	Unit	Value(s)
Reservoir ID		33
Reservoir type		potable
Reservoir coordinates (lat/lon)	^{o}	LAT: 51.7928043356, LON: -3.4345461779
Monthly Temperatures	^{o}C	3.4, 3.1, 5.0, 6.8, 10.1, 12.8, 14.9, 14.8, 12.5, 9.5, 6.3, 4.5
Year vector for emission profiles	yr	1, 5, 10, 20, 30, 40, 50, 65, 80, 100
Calculated gas emissions	-	CO_2, CH_4, N_2O
Biogenic factors		
Biome	-	temperate broadleaf and mixed
Climate	-	temperate
Soil Type	-	mineral
Treatment Factor	-	secondary biological treatment
Landuse Intensity	-	low intensity
Inputs for catchment-level process calculations		
Annual runoff	mm/year	1203
Catchment area	km^2	43.11
Length of inundated river	km	2.338
Population	capita	316.0
Area fractions	-	0.0, 0.0, 0.0, 0.023, 0.022, 0.0, 0.748, 0.206, 0.0
Mean catchment slope	%	16.00
Mean annual precipitation	mm/year	1707
Mean annual evapotranspiration	mm/year	525.0
Soil wetness	mm over profile	61.00
Soil Olsen P content	kgP ha^{-1}	24.14
Inputs for reservoir-level process calculations		
Reservoir volume	m^3	5 066 000
Reservoir area	km^2	1.073
Maximum reservoir depth	m	22.00
Mean reservoir depth	m	9.400
Inundated area fractions	-	0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.238, 0.286, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.476, 0.0, 0.0, 0.0, 0.0, 0.0
Soil carbon in inundated area	kgC m^{-2}	8.986
Mean monthly horizontal radiance	kWh m^{-2} d^{-1}	2.640
Mean monthly horizontal radiance: May - Sept	kWh m^{-2} d^{-1}	4.146
Mean monthly horizontal radiance: Nov - Mar	kWh m^{-2} d^{-1}	1.166
Mean monthly wind speed	m s^{-1}	3.610
Water intake depth below surface	m	N/A

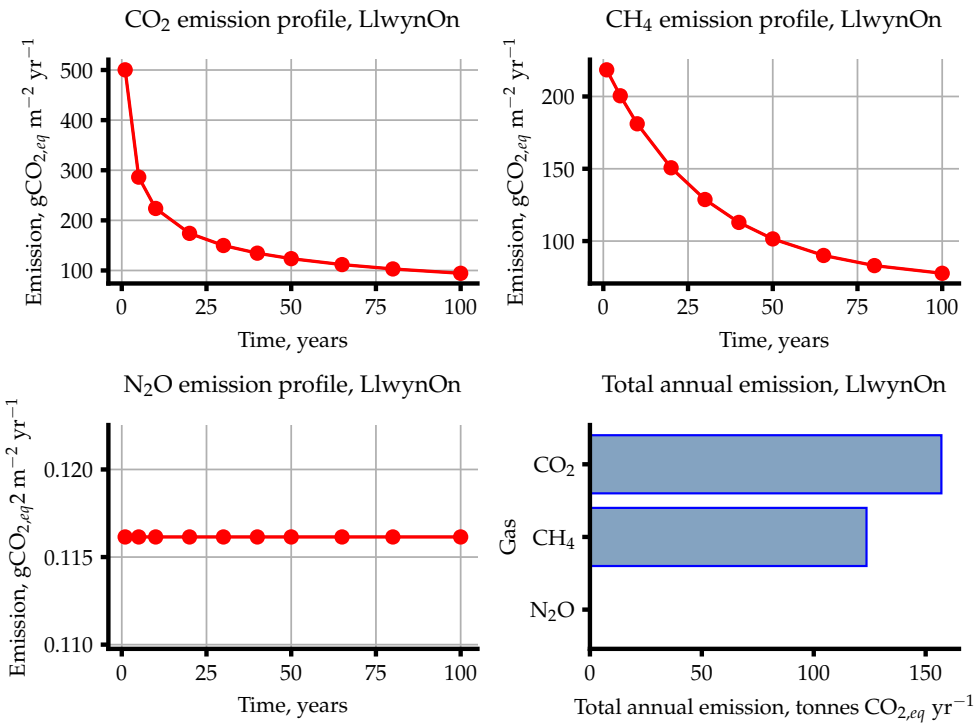




29.2 Outputs

Name	Unit	Value
CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	165.7
Nonanthropogenic CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	113.7
Preimpoundment CO_2 emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−94.38
CO_2 emission minus non-anthropogenic	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	51.97
Net CO_2 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	146.4
Total CO_2 emission per year	$tCO_{2,eq}\ yr^{-1}$	157.0
Total CO_2 emission per lifetime	$ktCO_{2,eq}$	15.70
CH_4 emission via diffusion	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	40.04
CH_4 emission via ebullition	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	71.94
CH_4 emission via degassing	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	3.189
Pre-impounment CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.0
Net CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	115.2
Total CH_4 emission per year	$tCO_{2,eq}\ yr^{-1}$	123.6
Total CH_4 emission per lifetime	$ktCO_{2,eq}$	12.36
Net N_2O emission, method A	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.1161
Net N_2O emission, method B	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.093 77
Net N_2O emission, mean value	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.1050
Total N_2O emission per year	$tCO_{2,eq}\ yr^{-1}$	0.1246
Total N_2O emission per lifetime	$ktCO_{2,eq}$	0.012 46
CO_2+CH_4 net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	261.5
CO_2+CH_4+N_2O net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	261.6

29.3 Emission plots



29.4 Intermediate variables

Name	Unit	Value
Influent total P concentration	μg L^{-1}	19.05
Retention coefficient	-	0.072 57
Influent total N concentration	μg L^{-1}	10.21
Reservoir TN concentration	μg L^{-1}	9.472
Reservoir TP concentration	μg L^{-1}	17.95
Percentage of reservoir's surface area that is littoral	%	17.84
Mean radiance at the reservoir	kWh m^{-2} d^{-1}	4.146
Cumulative global horizontal radiance at the reservoir	kWh m^{-2} d^{-1}	49.75
Bottom (hypolimnion) temperature in the reservoir	^{o}C	12.74
Water density at the bottom of the reservoir	kg m^{-3}	999.4
Surface (epilimnion) temperature in the reservoir	^{o}C	13.75
Water density at the surface of the reservoir	kg m^{-3}	999.3
Thermocline depth	m	7.702
Influent total N load	kgN yr^{-1}	529.7
Influent total P load	kgP yr^{-1}	987.8
Downstream TN concentration	mg L^{-1}	0.013 30

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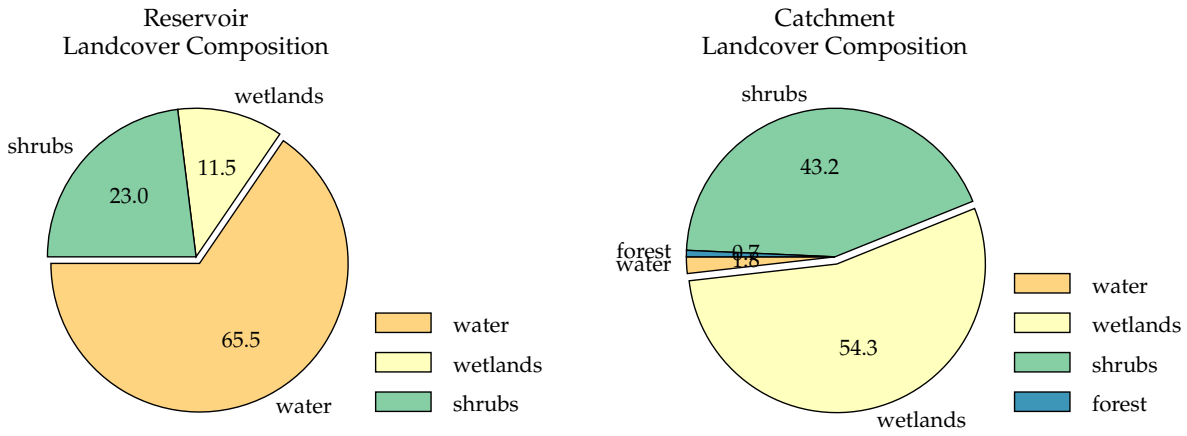
30.1 Inputs

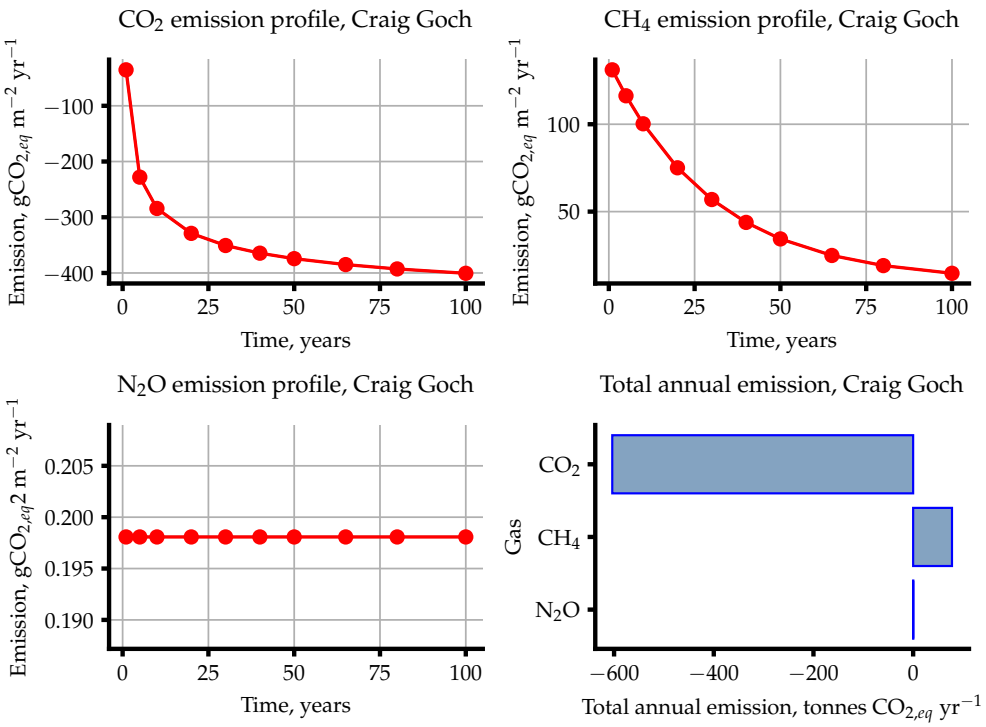
Input Name	Unit	Value(s)
Reservoir ID		39
Reservoir type		potable
Reservoir coordinates (lat/lon)	^{o}	LAT: 52.3060412817, LON: -3.622776145
Monthly Temperatures	^{o}C	3.0, 2.5, 4.2, 6.1, 9.4, 12.0, 14.0, 13.7, 11.4, 8.7, 5.5, 3.8
Year vector for emission profiles	yr	1, 5, 10, 20, 30, 40, 50, 65, 80, 100
Calculated gas emissions	-	CO_2, CH_4, N_2O
Biogenic factors		
Biome	-	temperate broadleaf and mixed
Climate	-	temperate
Soil Type	-	organic
Treatment Factor	-	secondary biological treatment
Landuse Intensity	-	low intensity
Inputs for catchment-level process calculations		
Annual runoff	mm/year	1444
Catchment area	km^2	54.04
Length of inundated river	km	2.873
Population	capita	115.0
Area fractions	-	0.0, 0.0, 0.0, 0.018, 0.543, 0.0, 0.432, 0.007, 0.0
Mean catchment slope	%	13.00
Mean annual precipitation	mm/year	1924
Mean annual evapotranspiration	mm/year	495.0
Soil wetness	mm over profile	55.00
Soil Olsen P content	kgP ha^{-1}	20.80
Inputs for reservoir-level process calculations		
Reservoir volume	m^3	9 583 000
Reservoir area	km^2	1.706
Maximum reservoir depth	m	22.00
Mean reservoir depth	m	10.50
Inundated area fractions	-	0.0, 0.0, 0.0, 0.654, 0.077, 0.0, 0.192, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.038, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.038, 0.0, 0.0, 0.0, 0.0
Soil carbon in inundated area	kgC m^{-2}	9.542
Mean monthly horizontal radiance	kWh m^{-2} d^{-1}	2.540
Mean monthly horizontal radiance: May - Sept	kWh m^{-2} d^{-1}	4.010
Mean monthly horizontal radiance: Nov - Mar	kWh m^{-2} d^{-1}	1.100
Mean monthly wind speed	m s^{-1}	3.930
Water intake depth below surface	m	N/A



30.2 Outputs

Name	Unit	Value
CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	149.0
Nonanthropogenic CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	102.3
Preimpoundment CO_2 emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	400.6
CO_2 emission minus non-anthropogenic	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	46.74
Net CO_2 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−353.8
Total CO_2 emission per year	$tCO_{2,eq}\ yr^{-1}$	−603.7
Total CO_2 emission per lifetime	$ktCO_{2,eq}$	−60.37
CH_4 emission via diffusion	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	33.67
CH_4 emission via ebullition	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	50.57
CH_4 emission via degassing	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	2.079
Pre-impounment CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	40.64
Net CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	45.68
Total CH_4 emission per year	$tCO_{2,eq}\ yr^{-1}$	77.93
Total CH_4 emission per lifetime	$ktCO_{2,eq}$	7.793
Net N_2O emission, method A	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.1981
Net N_2O emission, method B	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.1587
Net N_2O emission, mean value	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.1784
Total N_2O emission per year	$tCO_{2,eq}\ yr^{-1}$	0.3379
Total N_2O emission per lifetime	$ktCO_{2,eq}$	0.033 79
CO_2+CH_4 net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−308.2
CO_2+CH_4+N_2O net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−308.0

30.3 Emission plots



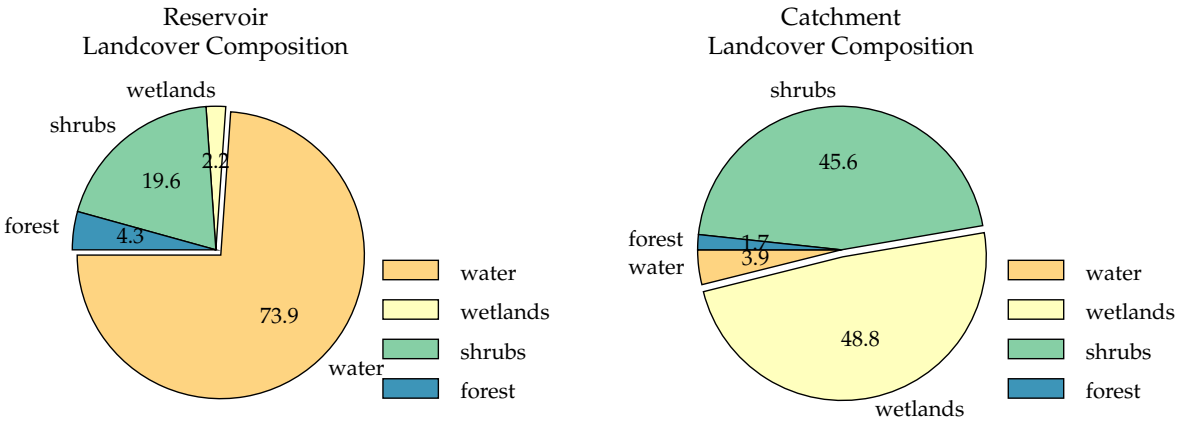
30.4 Intermediate variables

Name	Unit	Value
Influent total P concentration	μg L^{-1}	11.90
Retention coefficient	-	0.089 55
Influent total N concentration	μg L^{-1}	14.60
Reservoir TN concentration	μg L^{-1}	13.29
Reservoir TP concentration	μg L^{-1}	11.04
Percentage of reservoir's surface area that is littoral	%	14.83
Mean radiance at the reservoir	kWh m^{-2} d^{-1}	4.010
Cumulative global horizontal radiance at the reservoir	kWh m^{-2} d^{-1}	48.12
Bottom (hypolimnion) temperature in the reservoir	^{o}C	12.34
Water density at the bottom of the reservoir	kg m^{-3}	999.5
Surface (epilimnion) temperature in the reservoir	^{o}C	12.78
Water density at the surface of the reservoir	kg m^{-3}	999.4
Thermocline depth	m	14.92
Influent total N load	kgN yr^{-1}	1139
Influent total P load	kgP yr^{-1}	928.8
Downstream TN concentration	mg L^{-1}	0.018 84

31 Caban Coch

31.1 Inputs

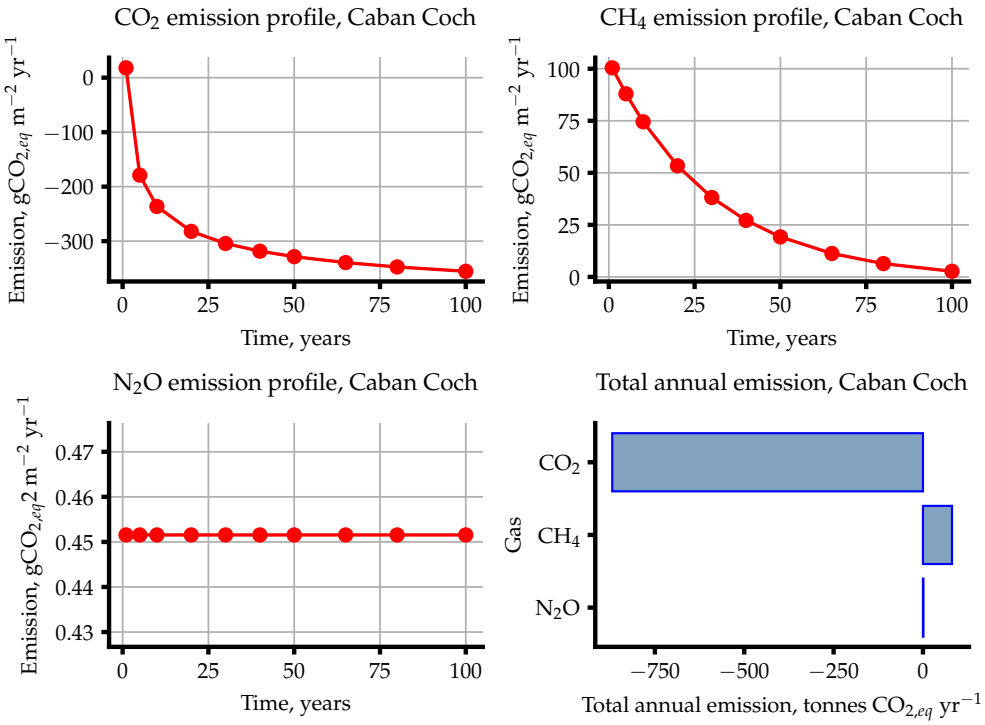
Input Name	Unit	Value(s)
Reservoir ID		37
Reservoir type		potable
Reservoir coordinates (lat/lon)	^{o}	LAT: 52.268139977, LON: -3.5776253113
Monthly Temperatures	^{o}C	3.2, 2.7, 4.4, 6.3, 9.6, 12.2, 14.2, 14.0, 11.7, 8.9, 5.8, 4.1
Year vector for emission profiles	yr	1, 5, 10, 20, 30, 40, 50, 65, 80, 100
Calculated gas emissions	-	CO_2, CH_4, N_2O
Biogenic factors		
Biome	-	temperate broadleaf and mixed
Climate	-	temperate
Soil Type	-	organic
Treatment Factor	-	secondary biological treatment
Landuse Intensity	-	low intensity
Inputs for catchment-level process calculations		
Annual runoff	mm/year	1458
Catchment area	km^2	177.7
Length of inundated river	km	5.122
Population	capita	436.0
Area fractions	-	0.0, 0.0, 0.0, 0.039, 0.488, 0.0, 0.456, 0.017, 0.0
Mean catchment slope	%	13.00
Mean annual precipitation	mm/year	1941
Mean annual evapotranspiration	mm/year	498.0
Soil wetness	mm over profile	54.00
Soil Olsen P content	kgP ha^{-1}	19.89
Inputs for reservoir-level process calculations		
Reservoir volume	m^3	36 870 000
Reservoir area	km^2	2.827
Maximum reservoir depth	m	38.00
Mean reservoir depth	m	17.60
Inundated area fractions	-	0.0, 0.0, 0.0, 0.739, 0.0, 0.0, 0.065, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.022, 0.0, 0.109, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.022, 0.043, 0.0
Soil carbon in inundated area	kgC m^{-2}	9.312
Mean monthly horizontal radiance	kWh m^{-2} d^{-1}	2.540
Mean monthly horizontal radiance: May - Sept	kWh m^{-2} d^{-1}	4.010
Mean monthly horizontal radiance: Nov - Mar	kWh m^{-2} d^{-1}	1.100
Mean monthly wind speed	m s^{-1}	3.770
Water intake depth below surface	m	N/A



31.2 Outputs

Name	Unit	Value
CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	152.4
Nonanthropogenic CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	104.6
Preimpoundment CO_2 emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	355.3
CO_2 emission minus non-anthropogenic	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	47.80
Net CO_2 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−307.5
Total CO_2 emission per year	$tCO_{2,eq}\ yr^{-1}$	−869.3
Total CO_2 emission per lifetime	$ktCO_{2,eq}$	−86.93
CH_4 emission via diffusion	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	27.52
CH_4 emission via ebullition	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	33.33
CH_4 emission via degassing	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	2.509
Pre-impounment CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	34.64
Net CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	28.73
Total CH_4 emission per year	$tCO_{2,eq}\ yr^{-1}$	81.21
Total CH_4 emission per lifetime	$ktCO_{2,eq}$	8.121
Net N_2O emission, method A	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.4515
Net N_2O emission, method B	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.3602
Net N_2O emission, mean value	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.4059
Total N_2O emission per year	$tCO_{2,eq}\ yr^{-1}$	1.277
Total N_2O emission per lifetime	$ktCO_{2,eq}$	0.1277
CO_2+CH_4 net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−278.8
CO_2+CH_4+N_2O net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−278.4

31.3 Emission plots



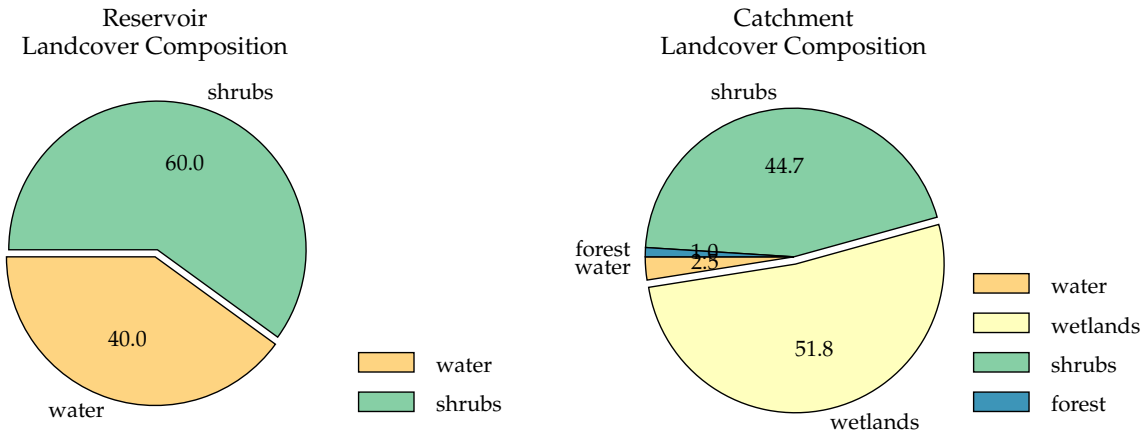
31.4 Intermediate variables

Name	Unit	Value
Influent total P concentration	μg L^{-1}	11.94
Retention coefficient	-	0.1023
Influent total N concentration	μg L^{-1}	14.34
Reservoir TN concentration	μg L^{-1}	12.87
Reservoir TP concentration	μg L^{-1}	10.84
Percentage of reservoir's surface area that is littoral	%	9.092
Mean radiance at the reservoir	kWh m^{-2} d^{-1}	4.010
Cumulative global horizontal radiance at the reservoir	kWh m^{-2} d^{-1}	48.12
Bottom (hypolimnion) temperature in the reservoir	^{o}C	12.47
Water density at the bottom of the reservoir	kg m^{-3}	999.5
Surface (epilimnion) temperature in the reservoir	^{o}C	13.02
Water density at the surface of the reservoir	kg m^{-3}	999.4
Thermocline depth	m	14.25
Influent total N load	kgN yr^{-1}	3714
Influent total P load	kgP yr^{-1}	3093
Downstream TN concentration	mg L^{-1}	0.018 32

32 Penygarreg

32.1 Inputs

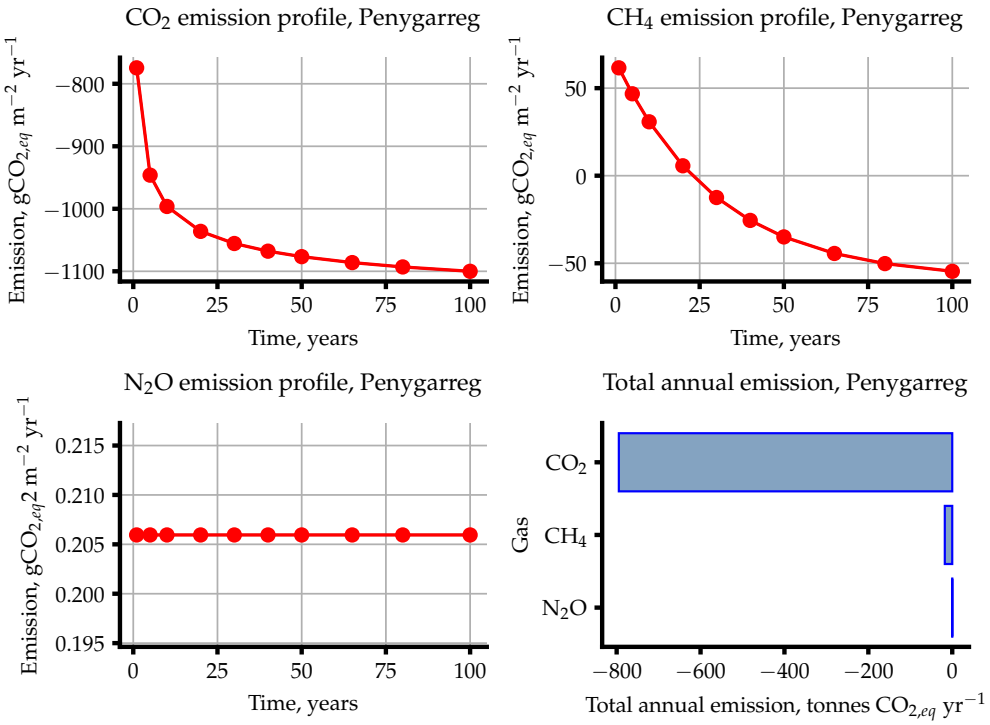
Input Name	Unit	Value(s)
Reservoir ID		38
Reservoir type		potable
Reservoir coordinates (lat/lon)	^{o}	LAT: 52.2946823109, LON: -3.5975560655
Monthly Temperatures	^{o}C	3.0, 2.5, 4.2, 6.1, 9.5, 12.1, 14.1, 13.8, 11.5, 8.7, 5.6, 3.9
Year vector for emission profiles	yr	1, 5, 10, 20, 30, 40, 50, 65, 80, 100
Calculated gas emissions	-	CO_2, CH_4, N_2O
Biogenic factors		
Biome	-	temperate broadleaf and mixed
Climate	-	temperate
Soil Type	-	organic
Treatment Factor	-	secondary biological treatment
Landuse Intensity	-	low intensity
Inputs for catchment-level process calculations		
Annual runoff	mm/year	1433
Catchment area	km^2	61.92
Length of inundated river	km	2.137
Population	capita	134.0
Area fractions	-	0.0, 0.0, 0.0, 0.025, 0.518, 0.0, 0.447, 0.01, 0.0
Mean catchment slope	%	14.00
Mean annual precipitation	mm/year	1914
Mean annual evapotranspiration	mm/year	497.0
Soil wetness	mm over profile	55.00
Soil Olsen P content	kgP ha^{-1}	20.63
Inputs for reservoir-level process calculations		
Reservoir volume	m^3	5 558 000
Reservoir area	km^2	0.7510
Maximum reservoir depth	m	27.00
Mean reservoir depth	m	12.10
Inundated area fractions	-	0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.6, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.4, 0.0, 0.0, 0.0, 0.0, 0.0
Soil carbon in inundated area	kgC m^{-2}	8.536
Mean monthly horizontal radiance	kWh m^{-2} d^{-1}	2.540
Mean monthly horizontal radiance: May - Sept	kWh m^{-2} d^{-1}	4.010
Mean monthly horizontal radiance: Nov - Mar	kWh m^{-2} d^{-1}	1.100
Mean monthly wind speed	m s^{-1}	3.930
Water intake depth below surface	m	N/A



32.2 Outputs

Name	Unit	Value
CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	132.8
Nonanthropogenic CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	91.16
Preimpoundment CO_2 emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	1100
CO_2 emission minus non-anthropogenic	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	41.67
Net CO_2 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−1058
Total CO_2 emission per year	$tCO_{2,eq}\ yr^{-1}$	−794.8
Total CO_2 emission per lifetime	$ktCO_{2,eq}$	−79.48
CH_4 emission via diffusion	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	32.49
CH_4 emission via ebullition	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	46.68
CH_4 emission via degassing	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	3.222
Pre-impounment CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	106.0
Net CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−23.64
Total CH_4 emission per year	$tCO_{2,eq}\ yr^{-1}$	−17.75
Total CH_4 emission per lifetime	$ktCO_{2,eq}$	−1.775
Net N_2O emission, method A	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.2059
Net N_2O emission, method B	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.1770
Net N_2O emission, mean value	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.1915
Total N_2O emission per year	$tCO_{2,eq}\ yr^{-1}$	0.1547
Total N_2O emission per lifetime	$ktCO_{2,eq}$	0.015 47
CO_2+CH_4 net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−1082
CO_2+CH_4+N_2O net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−1082

32.3 Emission plots



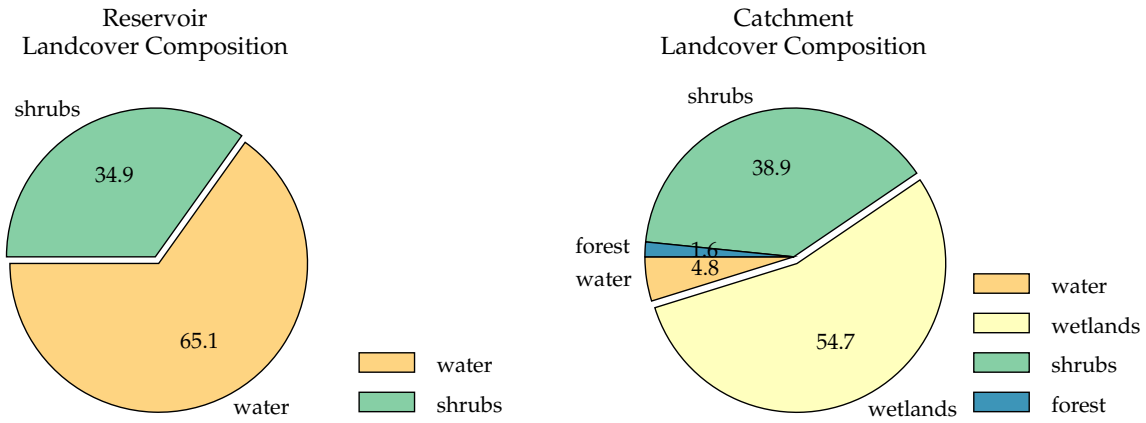
32.4 Intermediate variables

Name	Unit	Value
Influent total P concentration	μg L^{-1}	12.11
Retention coefficient	-	0.047 78
Influent total N concentration	μg L^{-1}	12.24
Reservoir TN concentration	μg L^{-1}	11.66
Reservoir TP concentration	μg L^{-1}	11.55
Percentage of reservoir's surface area that is littoral	%	13.50
Mean radiance at the reservoir	kWh m^{-2} d^{-1}	4.010
Cumulative global horizontal radiance at the reservoir	kWh m^{-2} d^{-1}	48.12
Bottom (hypolimnion) temperature in the reservoir	^{o}C	12.34
Water density at the bottom of the reservoir	kg m^{-3}	999.5
Surface (epilimnion) temperature in the reservoir	^{o}C	12.88
Water density at the surface of the reservoir	kg m^{-3}	999.4
Thermocline depth	m	10.93
Influent total N load	kgN yr^{-1}	1086
Influent total P load	kgP yr^{-1}	1075
Downstream TN concentration	mg L^{-1}	0.015 31

33 Claerwen

33.1 Inputs

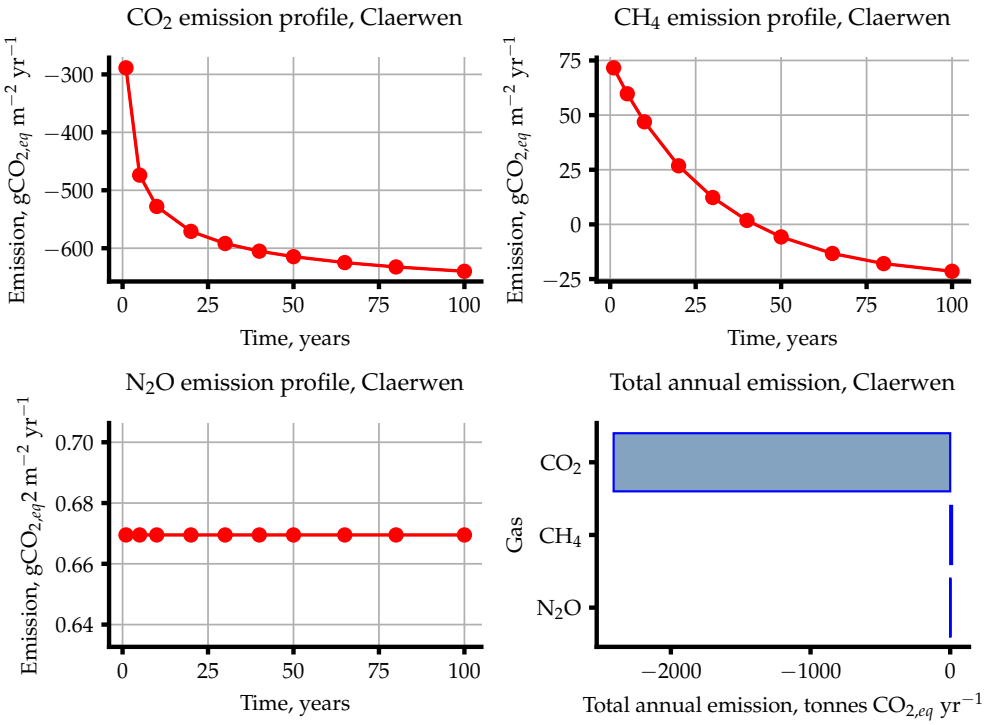
Input Name	Unit	Value(s)
Reservoir ID		40
Reservoir type		potable
Reservoir coordinates (lat/lon)	^{o}	LAT: 52.2590727268, LON: -3.6590312522
Monthly Temperatures	^{o}C	2.7, 2.2, 3.8, 5.6, 8.9, 11.6, 13.6, 13.3, 11.1, 8.4, 5.3, 3.7
Year vector for emission profiles	yr	1, 5, 10, 20, 30, 40, 50, 65, 80, 100
Calculated gas emissions	-	CO_2, CH_4, N_2O
Biogenic factors		
Biome	-	temperate broadleaf and mixed
Climate	-	temperate
Soil Type	-	organic
Treatment Factor	-	secondary biological treatment
Landuse Intensity	-	low intensity
Inputs for catchment-level process calculations		
Annual runoff	mm/year	1528
Catchment area	km^2	63.03
Length of inundated river	km	7.156
Population	capita	169.0
Area fractions	-	0.0, 0.0, 0.0, 0.048, 0.547, 0.0, 0.389, 0.016, 0.0
Mean catchment slope	%	10.00
Mean annual precipitation	mm/year	2007
Mean annual evapotranspiration	mm/year	493.0
Soil wetness	mm over profile	52.00
Soil Olsen P content	kgP ha^{-1}	19.16
Inputs for reservoir-level process calculations		
Reservoir volume	m^3	48 690 000
Reservoir area	km^2	4.051
Maximum reservoir depth	m	50.00
Mean reservoir depth	m	18.40
Inundated area fractions	-	0.0, 0.0, 0.0, 0.197, 0.0, 0.0, 0.288, 0.0, 0.0, 0.0, 0.0, 0.0, 0.455, 0.0, 0.0, 0.061, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0
Soil carbon in inundated area	kgC m^{-2}	9.480
Mean monthly horizontal radiance	kWh m^{-2} d^{-1}	2.540
Mean monthly horizontal radiance: May - Sept	kWh m^{-2} d^{-1}	4.010
Mean monthly horizontal radiance: Nov - Mar	kWh m^{-2} d^{-1}	1.100
Mean monthly wind speed	m s^{-1}	4.170
Water intake depth below surface	m	N/A



33.2 Outputs

Name	Unit	Value
CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	143.3
Nonanthropogenic CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	98.34
Preimpoundment CO_2 emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	639.8
CO_2 emission minus non-anthropogenic	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	44.95
Net CO_2 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−594.9
Total CO_2 emission per year	$tCO_{2,eq}\ yr^{-1}$	−2410
Total CO_2 emission per lifetime	$ktCO_{2,eq}$	−241.0
CH_4 emission via diffusion	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	27.22
CH_4 emission via ebullition	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	36.40
CH_4 emission via degassing	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	1.351
Pre-impounment CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	61.67
Net CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	3.295
Total CH_4 emission per year	$tCO_{2,eq}\ yr^{-1}$	13.35
Total CH_4 emission per lifetime	$ktCO_{2,eq}$	1.335
Net N_2O emission, method A	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.6695
Net N_2O emission, method B	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.4493
Net N_2O emission, mean value	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.5594
Total N_2O emission per year	$tCO_{2,eq}\ yr^{-1}$	2.712
Total N_2O emission per lifetime	$ktCO_{2,eq}$	0.2712
CO_2+CH_4 net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−591.6
CO_2+CH_4+N_2O net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−591.0

33.3 Emission plots



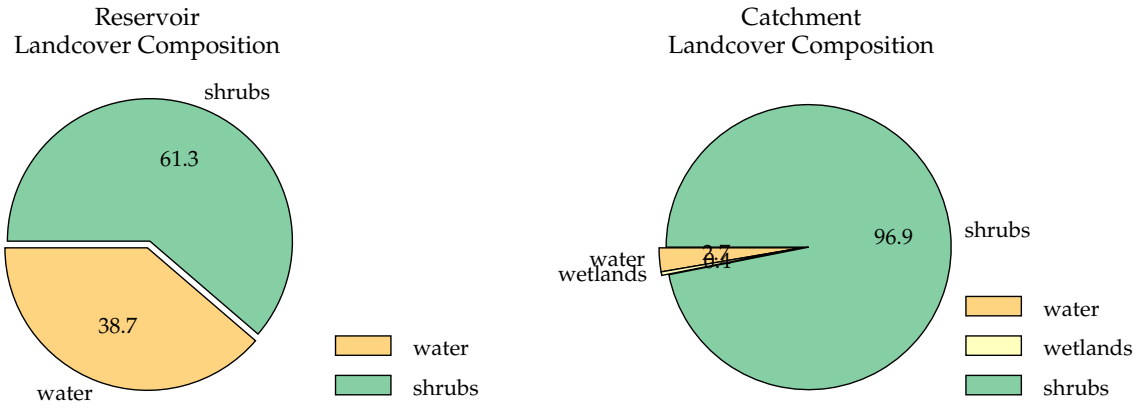
33.4 Intermediate variables

Name	Unit	Value
Influent total P concentration	μg L^{-1}	10.67
Retention coefficient	-	0.2882
Influent total N concentration	μg L^{-1}	23.44
Reservoir TN concentration	μg L^{-1}	16.68
Reservoir TP concentration	μg L^{-1}	7.826
Percentage of reservoir's surface area that is littoral	%	10.08
Mean radiance at the reservoir	kWh m^{-2} d^{-1}	4.010
Cumulative global horizontal radiance at the reservoir	kWh m^{-2} d^{-1}	48.12
Bottom (hypolimnion) temperature in the reservoir	^{o}C	12.14
Water density at the bottom of the reservoir	kg m^{-3}	999.5
Surface (epilimnion) temperature in the reservoir	^{o}C	12.40
Water density at the surface of the reservoir	kg m^{-3}	999.5
Thermocline depth	m	26.01
Influent total N load	kgN yr^{-1}	2258
Influent total P load	kgP yr^{-1}	1028
Downstream TN concentration	mg L^{-1}	0.024 49

34 Llys-y-fran

34.1 Inputs

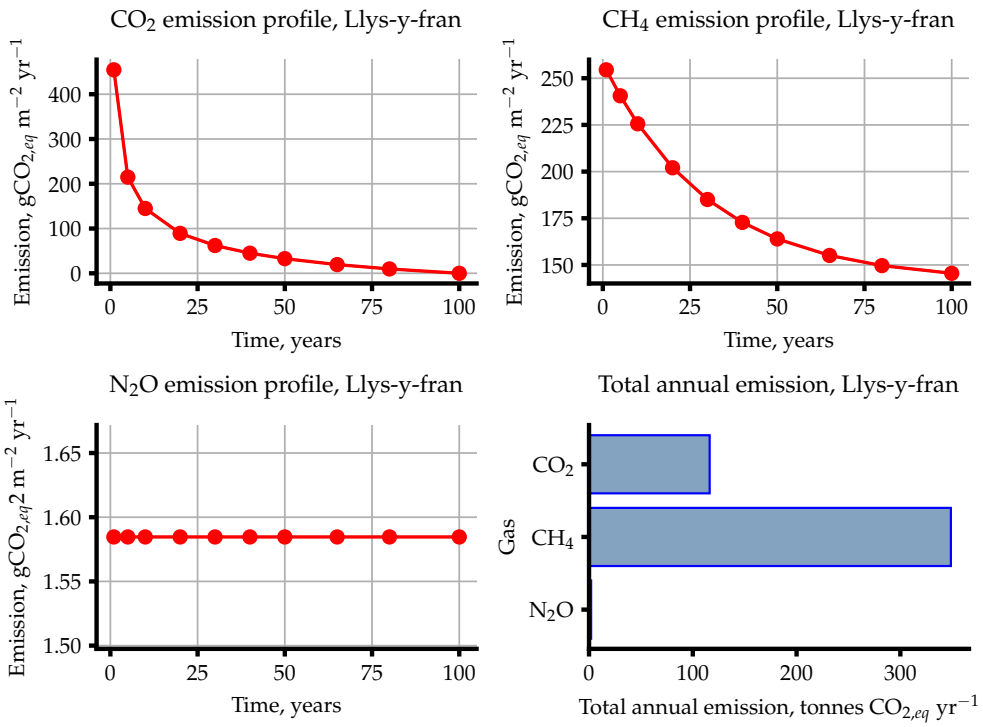
Input Name	Unit	Value(s)
Reservoir ID		43
Reservoir type		potable
Reservoir coordinates (lat/lon)	^{o}	LAT: 51.8825773382, LON: -4.8531612192
Monthly Temperatures	^{o}C	5.6, 5.3, 6.5, 8.0, 10.8, 13.2, 15.4, 15.5, 13.7, 11.2, 8.3, 6.6
Year vector for emission profiles	yr	1, 5, 10, 20, 30, 40, 50, 65, 80, 100
Calculated gas emissions	-	CO_2, CH_4, N_2O
Biogenic factors		
Biome	-	temperate broadleaf and mixed
Climate	-	temperate
Soil Type	-	mineral
Treatment Factor	-	secondary biological treatment
Landuse Intensity	-	low intensity
Inputs for catchment-level process calculations		
Annual runoff	mm/year	692.0
Catchment area	km^2	29.40
Length of inundated river	km	3.231
Population	capita	465.0
Area fractions	-	0.0, 0.0, 0.0, 0.027, 0.004, 0.0, 0.969, 0.0, 0.0
Mean catchment slope	%	10.00
Mean annual precipitation	mm/year	1261
Mean annual evapotranspiration	mm/year	606.0
Soil wetness	mm over profile	53.00
Soil Olsen P content	kgP ha^{-1}	43.78
Inputs for reservoir-level process calculations		
Reservoir volume	m^3	38 940 000
Reservoir area	km^2	1.998
Maximum reservoir depth	m	42.00
Mean reservoir depth	m	19.50
Inundated area fractions	-	0.0, 0.0, 0.0, 0.387, 0.0, 0.0, 0.613, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0
Soil carbon in inundated area	kgC m^{-2}	8.441
Mean monthly horizontal radiance	kWh m^{-2} d^{-1}	3.210
Mean monthly horizontal radiance: May - Sept	kWh m^{-2} d^{-1}	5.076
Mean monthly horizontal radiance: Nov - Mar	kWh m^{-2} d^{-1}	1.364
Mean monthly wind speed	m s^{-1}	5.600
Water intake depth below surface	m	N/A



34.2 Outputs

Name	Unit	Value
CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	185.5
Nonanthropogenic CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	127.3
Preimpoundment CO_2 emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.0
CO_2 emission minus non-anthropogenic	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	58.19
Net CO_2 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	58.19
Total CO_2 emission per year	$tCO_{2,eq}\ yr^{-1}$	116.3
Total CO_2 emission per lifetime	$ktCO_{2,eq}$	11.63
CH_4 emission via diffusion	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	31.48
CH_4 emission via ebullition	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	141.1
CH_4 emission via degassing	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	1.980
Pre-impounment CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.0
Net CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	174.5
Total CH_4 emission per year	$tCO_{2,eq}\ yr^{-1}$	348.7
Total CH_4 emission per lifetime	$ktCO_{2,eq}$	34.87
Net N_2O emission, method A	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	1.585
Net N_2O emission, method B	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.4449
Net N_2O emission, mean value	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	1.015
Total N_2O emission per year	$tCO_{2,eq}\ yr^{-1}$	3.166
Total N_2O emission per lifetime	$ktCO_{2,eq}$	0.3166
CO_2+CH_4 net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	232.7
CO_2+CH_4+N_2O net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	233.7

34.3 Emission plots



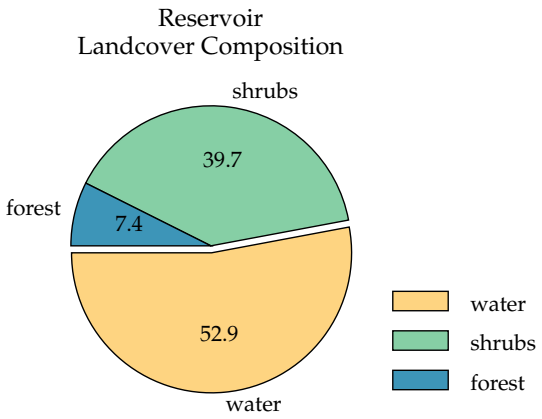
34.4 Intermediate variables

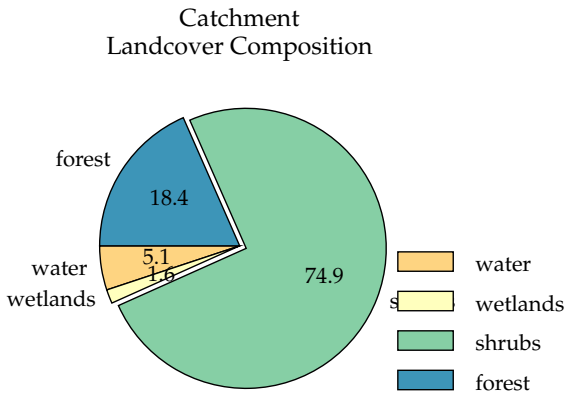
Name	Unit	Value
Influent total P concentration	μg L^{-1}	41.48
Retention coefficient	-	0.6053
Influent total N concentration	μg L^{-1}	40.99
Reservoir TN concentration	μg L^{-1}	16.18
Reservoir TP concentration	μg L^{-1}	16.90
Percentage of reservoir's surface area that is littoral	%	8.196
Mean radiance at the reservoir	kWh m^{-2} d^{-1}	5.076
Cumulative global horizontal radiance at the reservoir	kWh m^{-2} d^{-1}	60.91
Bottom (hypolimnion) temperature in the reservoir	^{o}C	14.18
Water density at the bottom of the reservoir	kg m^{-3}	999.2
Surface (epilimnion) temperature in the reservoir	^{o}C	14.45
Water density at the surface of the reservoir	kg m^{-3}	999.2
Thermocline depth	m	2.919
Influent total N load	kgN yr^{-1}	833.7
Influent total P load	kgP yr^{-1}	843.7
Downstream TN concentration	mg L^{-1}	0.016 08

35 Clywedog

35.1 Inputs

Input Name	Unit	Value(s)
Reservoir ID		44
Reservoir type		potable
Reservoir coordinates (lat/lon)	^{o}	LAT: 52.4710508943, LON: -3.6022804342
Monthly Temperatures	^{o}C	3.3, 2.8, 4.5, 6.2, 9.4, 12.0, 14.2, 13.9, 11.5, 8.8, 5.8, 4.1
Year vector for emission profiles	yr	1, 5, 10, 20, 30, 40, 50, 65, 80, 100
Calculated gas emissions	-	CO_2, CH_4, N_2O
Biogenic factors		
Biome	-	temperate broadleaf and mixed
Climate	-	temperate
Soil Type	-	mineral
Treatment Factor	-	secondary biological treatment
Landuse Intensity	-	low intensity
Inputs for catchment-level process calculations		
Annual runoff	mm/year	1278
Catchment area	km^2	47.17
Length of inundated river	km	7.174
Population	capita	286.0
Area fractions	-	0.0, 0.0, 0.0, 0.051, 0.016, 0.0, 0.749, 0.184, 0.0
Mean catchment slope	%	14.00
Mean annual precipitation	mm/year	1768
Mean annual evapotranspiration	mm/year	508.0
Soil wetness	mm over profile	53.00
Soil Olsen P content	kgP ha^{-1}	24.67
Inputs for reservoir-level process calculations		
Reservoir volume	m^3	48 830 000
Reservoir area	km^2	4.031
Maximum reservoir depth	m	62.00
Mean reservoir depth	m	20.10
Inundated area fractions	-	0.0, 0.0, 0.0, 0.515, 0.0, 0.0, 0.397, 0.074, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.015, 0.0, 0.0, 0.0, 0.0, 0.0
Soil carbon in inundated area	kgC m^{-2}	8.844
Mean monthly horizontal radiance	kWh m^{-2} d^{-1}	2.540
Mean monthly horizontal radiance: May - Sept	kWh m^{-2} d^{-1}	4.010
Mean monthly horizontal radiance: Nov - Mar	kWh m^{-2} d^{-1}	1.100
Mean monthly wind speed	m s^{-1}	4.060
Water intake depth below surface	m	N/A

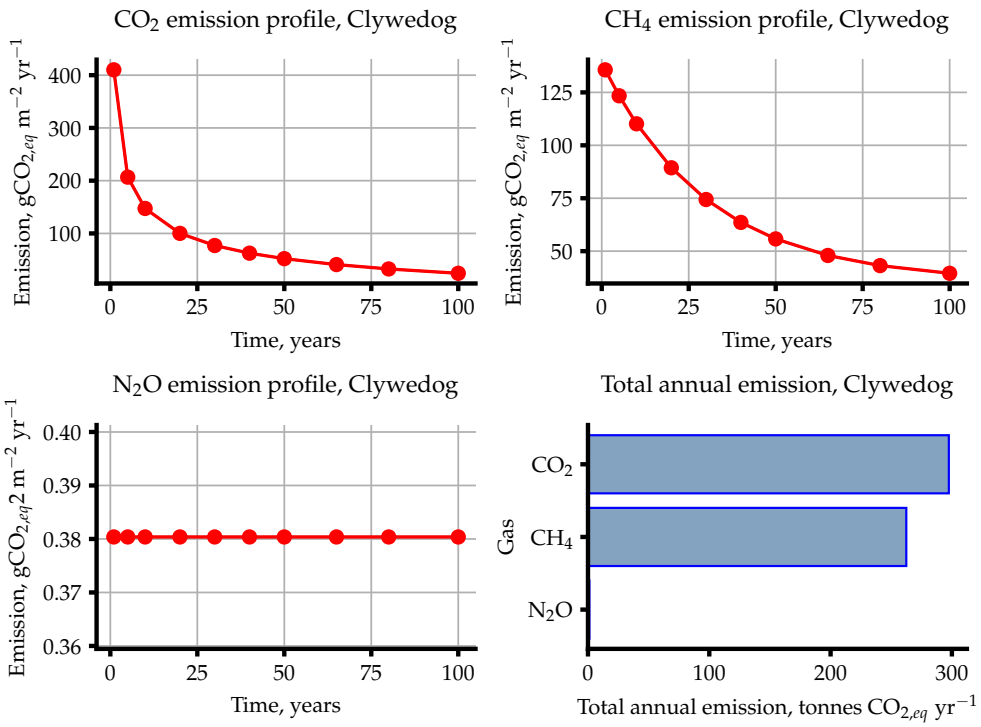




35.2 Outputs

Name	Unit	Value
CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	157.4
Nonanthropogenic CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	108.0
Preimpoundment CO_2 emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−24.42
CO_2 emission minus non-anthropogenic	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	49.38
Net CO_2 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	73.80
Total CO_2 emission per year	$tCO_{2,eq}\ yr^{-1}$	297.5
Total CO_2 emission per lifetime	$ktCO_{2,eq}$	29.75
CH_4 emission via diffusion	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	28.24
CH_4 emission via ebullition	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	35.60
CH_4 emission via degassing	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	1.258
Pre-impounment CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.0
Net CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	65.1
Total CH_4 emission per year	$tCO_{2,eq}\ yr^{-1}$	262.4
Total CH_4 emission per lifetime	$ktCO_{2,eq}$	26.24
Net N_2O emission, method A	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.3804
Net N_2O emission, method B	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.2018
Net N_2O emission, mean value	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.2911
Total N_2O emission per year	$tCO_{2,eq}\ yr^{-1}$	1.533
Total N_2O emission per lifetime	$ktCO_{2,eq}$	0.1533
CO_2+CH_4 net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	138.9
CO_2+CH_4+N_2O net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	139.2

35.3 Emission plots



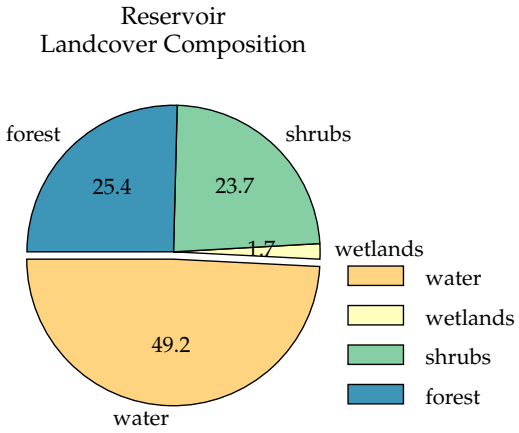
35.4 Intermediate variables

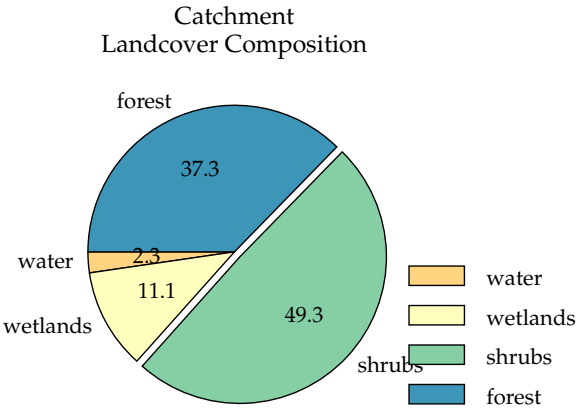
Name	Unit	Value
Influent total P concentration	μg L^{-1}	17.55
Retention coefficient	-	0.3935
Influent total N concentration	μg L^{-1}	13.49
Reservoir TN concentration	μg L^{-1}	8.182
Reservoir TP concentration	μg L^{-1}	11.15
Percentage of reservoir's surface area that is littoral	%	9.822
Mean radiance at the reservoir	kWh m^{-2} d^{-1}	4.010
Cumulative global horizontal radiance at the reservoir	kWh m^{-2} d^{-1}	48.12
Bottom (hypolimnion) temperature in the reservoir	^{o}C	12.54
Water density at the bottom of the reservoir	kg m^{-3}	999.5
Surface (epilimnion) temperature in the reservoir	^{o}C	12.90
Water density at the surface of the reservoir	kg m^{-3}	999.4
Thermocline depth	m	20.75
Influent total N load	kgN yr^{-1}	813.3
Influent total P load	kgP yr^{-1}	1058
Downstream TN concentration	mg L^{-1}	0.011 70

36 Llyn-Brianne

36.1 Inputs

Input Name	Unit	Value(s)
Reservoir ID		41
Reservoir type		potable
Reservoir coordinates (lat/lon)	^{o}	LAT: 52.1220011263, LON: -3.7656258759
Monthly Temperatures	^{o}C	3.3, 2.9, 4.4, 6.2, 9.4, 12.0, 14.1, 13.8, 11.6, 8.9, 5.8, 4.2
Year vector for emission profiles	yr	1, 5, 10, 20, 30, 40, 50, 65, 80, 100
Calculated gas emissions	-	CO_2, CH_4, N_2O
Biogenic factors		
Biome	-	temperate broadleaf and mixed
Climate	-	temperate
Soil Type	-	mineral
Treatment Factor	-	secondary biological treatment
Landuse Intensity	-	low intensity
Inputs for catchment-level process calculations		
Annual runoff	mm/year	1466
Catchment area	km^2	84.35
Length of inundated river	km	7.804
Population	capita	296.0
Area fractions	-	0.0, 0.0, 0.0, 0.023, 0.111, 0.0, 0.493, 0.373, 0.0
Mean catchment slope	%	15.00
Mean annual precipitation	mm/year	1952
Mean annual evapotranspiration	mm/year	501.0
Soil wetness	mm over profile	49.00
Soil Olsen P content	kgP ha^{-1}	18.53
Inputs for reservoir-level process calculations		
Reservoir volume	m^3	32 880 000
Reservoir area	km^2	3.283
Maximum reservoir depth	m	60.00
Mean reservoir depth	m	16.20
Inundated area fractions	-	0.0, 0.0, 0.0, 0.492, 0.017, 0.0, 0.237, 0.254, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0
Soil carbon in inundated area	kgC m^{-2}	9.007
Mean monthly horizontal radiance	kWh m^{-2} d^{-1}	2.540
Mean monthly horizontal radiance: May - Sept	kWh m^{-2} d^{-1}	4.010
Mean monthly horizontal radiance: Nov - Mar	kWh m^{-2} d^{-1}	1.100
Mean monthly wind speed	m s^{-1}	3.810
Water intake depth below surface	m	N/A

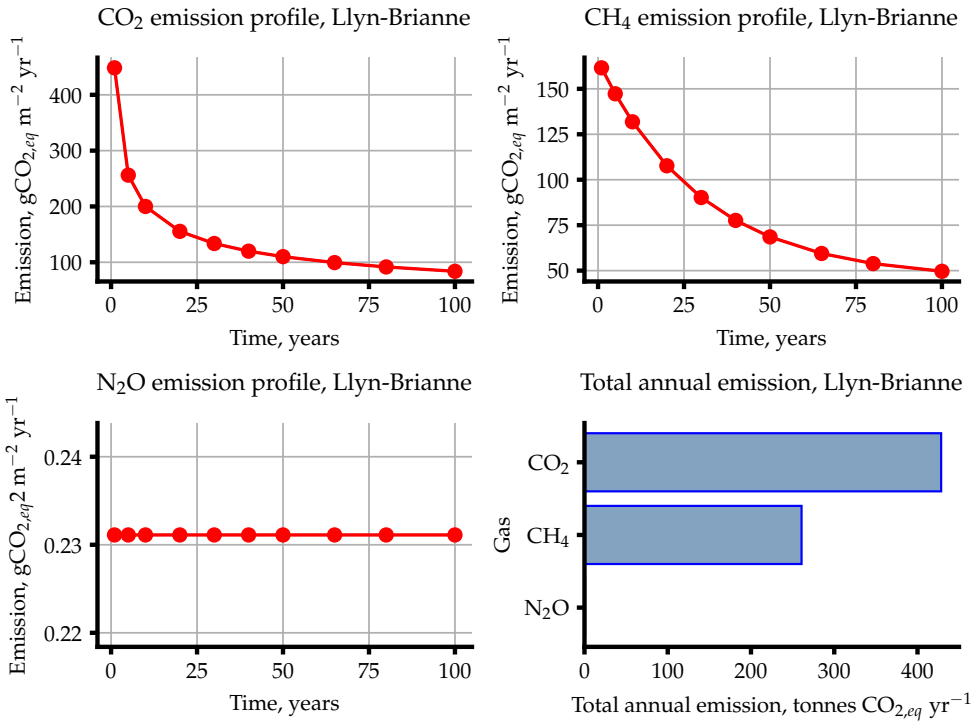




36.2 Outputs

Name	Unit	Value
CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	148.8
Nonanthropogenic CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	102.1
Preimpoundment CO_2 emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−83.82
CO_2 emission minus non-anthropogenic	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	46.67
Net CO_2 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	130.5
Total CO_2 emission per year	$tCO_{2,eq}\ yr^{-1}$	428.4
Total CO_2 emission per lifetime	$ktCO_{2,eq}$	42.84
CH_4 emission via diffusion	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	32.02
CH_4 emission via ebullition	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	45.05
CH_4 emission via degassing	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	2.349
Pre-impounment CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.0
Net CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	79.42
Total CH_4 emission per year	$tCO_{2,eq}\ yr^{-1}$	260.7
Total CH_4 emission per lifetime	$ktCO_{2,eq}$	26.07
Net N_2O emission, method A	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.2311
Net N_2O emission, method B	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.1770
Net N_2O emission, mean value	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.2041
Total N_2O emission per year	$tCO_{2,eq}\ yr^{-1}$	0.7588
Total N_2O emission per lifetime	$ktCO_{2,eq}$	0.075 88
CO_2+CH_4 net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	209.9
CO_2+CH_4+N_2O net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	210.1

36.3 Emission plots



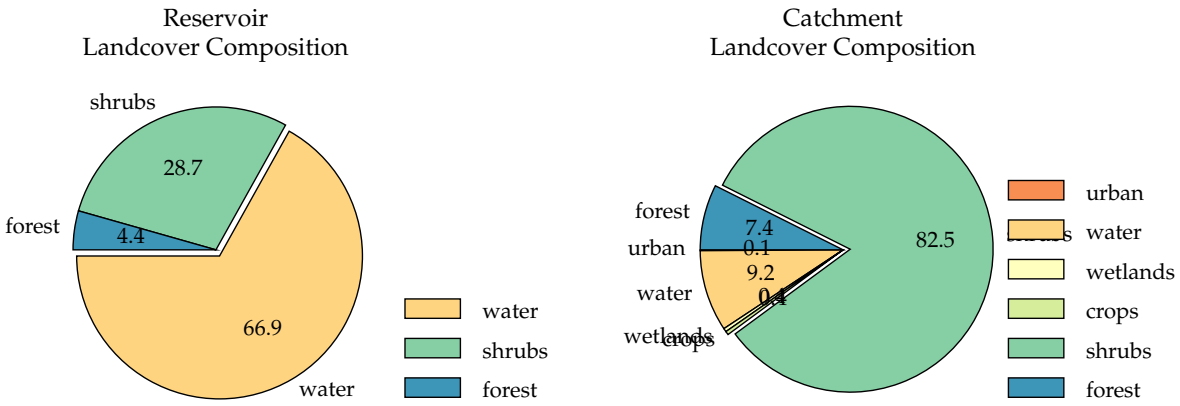
36.4 Intermediate variables

Name	Unit	Value
Influent total P concentration	μg L^{-1}	12.01
Retention coefficient	-	0.1756
Influent total N concentration	μg L^{-1}	9.580
Reservoir TN concentration	μg L^{-1}	7.898
Reservoir TP concentration	μg L^{-1}	10.12
Percentage of reservoir's surface area that is littoral	%	12.95
Mean radiance at the reservoir	kWh m^{-2} d^{-1}	4.010
Cumulative global horizontal radiance at the reservoir	kWh m^{-2} d^{-1}	48.12
Bottom (hypolimnion) temperature in the reservoir	^{o}C	12.60
Water density at the bottom of the reservoir	kg m^{-3}	999.5
Surface (epilimnion) temperature in the reservoir	^{o}C	12.88
Water density at the surface of the reservoir	kg m^{-3}	999.4
Thermocline depth	m	21.35
Influent total N load	kgN yr^{-1}	1185
Influent total P load	kgP yr^{-1}	1486
Downstream TN concentration	mg L^{-1}	0.011 48

37 Traffswynydd

37.1 Inputs

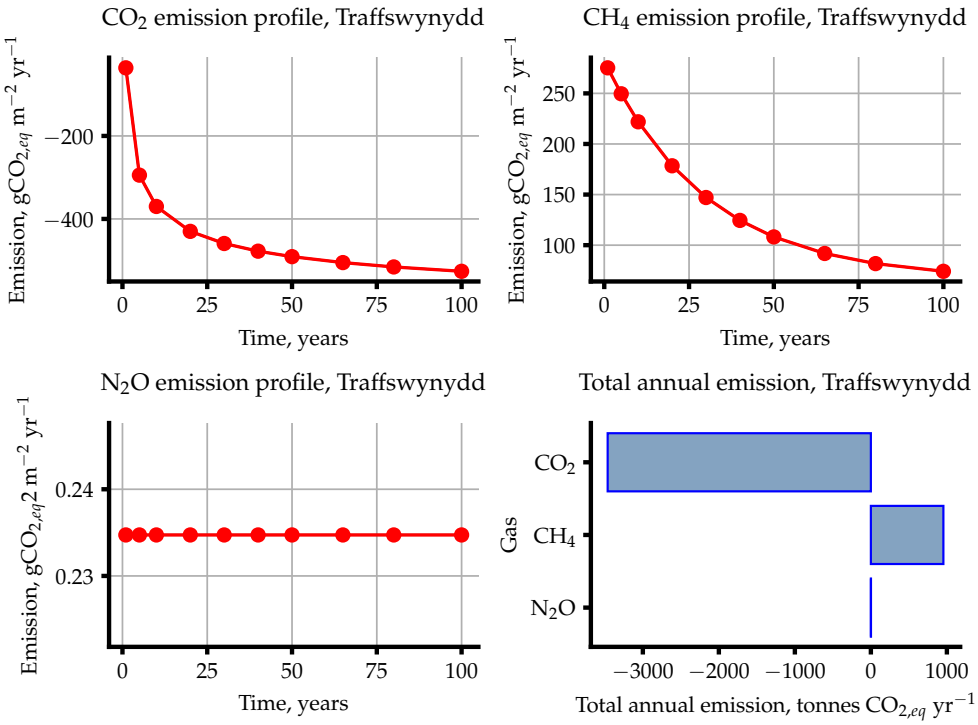
Input Name	Unit	Value(s)
Reservoir ID		47
Reservoir type		potable
Reservoir coordinates (lat/lon)	^{o}	LAT: 52.9192887615, LON: -3.9697958304
Monthly Temperatures	^{o}C	4.0, 3.9, 5.3, 7.1, 10.2, 12.7, 14.7, 14.6, 12.4, 9.8, 6.7, 4.9
Year vector for emission profiles	yr	1, 5, 10, 20, 30, 40, 50, 65, 80, 100
Calculated gas emissions	-	CO_2, CH_4, N_2O
Biogenic factors		
Biome	-	temperate broadleaf and mixed
Climate	-	temperate
Soil Type	-	organic
Treatment Factor	-	secondary biological treatment
Landuse Intensity	-	low intensity
Inputs for catchment-level process calculations		
Annual runoff	mm/year	1043
Catchment area	km^2	57.21
Length of inundated river	km	4.971
Population	capita	568.0
Area fractions	-	0.0, 0.0, 0.001, 0.092, 0.004, 0.004, 0.825, 0.074, 0.0
Mean catchment slope	%	11.00
Mean annual precipitation	mm/year	1535
Mean annual evapotranspiration	mm/year	513.0
Soil wetness	mm over profile	54.00
Soil Olsen P content	kgP ha^{-1}	33.75
Inputs for reservoir-level process calculations		
Reservoir volume	m^3	26 110 000
Reservoir area	km^2	7.473
Maximum reservoir depth	m	36.00
Mean reservoir depth	m	5.300
Inundated area fractions	-	0.0, 0.0, 0.0, 0.669, 0.0, 0.0, 0.287, 0.044, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0
Soil carbon in inundated area	kgC m^{-2}	8.523
Mean monthly horizontal radiance	kWh m^{-2} d^{-1}	2.540
Mean monthly horizontal radiance: May - Sept	kWh m^{-2} d^{-1}	4.010
Mean monthly horizontal radiance: Nov - Mar	kWh m^{-2} d^{-1}	1.100
Mean monthly wind speed	m s^{-1}	4.840
Water intake depth below surface	m	N/A



37.2 Outputs

Name	Unit	Value
CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	200.1
Nonanthropogenic CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	137.3
Preimpoundment CO_2 emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	526.2
CO_2 emission minus non-anthropogenic	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	62.76
Net CO_2 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−463.4
Total CO_2 emission per year	$tCO_{2,eq}\ yr^{-1}$	−3463
Total CO_2 emission per lifetime	$ktCO_{2,eq}$	−346.3
CH_4 emission via diffusion	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	57.88
CH_4 emission via ebullition	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	116.7
CH_4 emission via degassing	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	3.853
Pre-impounment CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	50.72
Net CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	127.7
Total CH_4 emission per year	$tCO_{2,eq}\ yr^{-1}$	954.2
Total CH_4 emission per lifetime	$ktCO_{2,eq}$	95.42
Net N_2O emission, method A	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.2347
Net N_2O emission, method B	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.1644
Net N_2O emission, mean value	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.1995
Total N_2O emission per year	$tCO_{2,eq}\ yr^{-1}$	1.754
Total N_2O emission per lifetime	$ktCO_{2,eq}$	0.1754
CO_2+CH_4 net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−335.7
CO_2+CH_4+N_2O net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−335.5

37.3 Emission plots



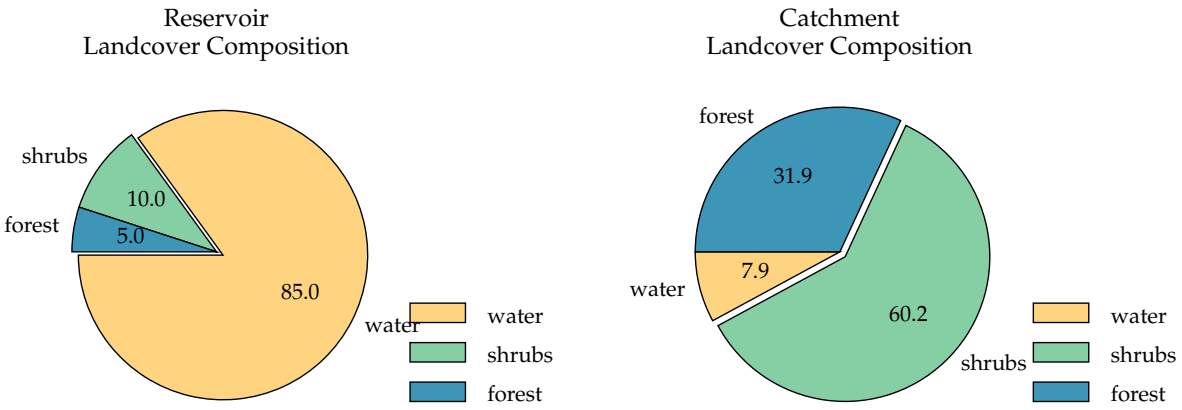
37.4 Intermediate variables

Name	Unit	Value
Influent total P concentration	μg L^{-1}	23.88
Retention coefficient	-	0.2595
Influent total N concentration	μg L^{-1}	28.10
Reservoir TN concentration	μg L^{-1}	20.82
Reservoir TP concentration	μg L^{-1}	19.50
Percentage of reservoir's surface area that is littoral	%	39.59
Mean radiance at the reservoir	kWh m^{-2} d^{-1}	4.010
Cumulative global horizontal radiance at the reservoir	kWh m^{-2} d^{-1}	48.12
Bottom (hypolimnion) temperature in the reservoir	^{o}C	13.26
Water density at the bottom of the reservoir	kg m^{-3}	999.4
Surface (epilimnion) temperature in the reservoir	^{o}C	13.60
Water density at the surface of the reservoir	kg m^{-3}	999.3
Thermocline depth	m	28.75
Influent total N load	kgN yr^{-1}	1677
Influent total P load	kgP yr^{-1}	1425
Downstream TN concentration	mg L^{-1}	0.030 61

38 Usk

38.1 Inputs

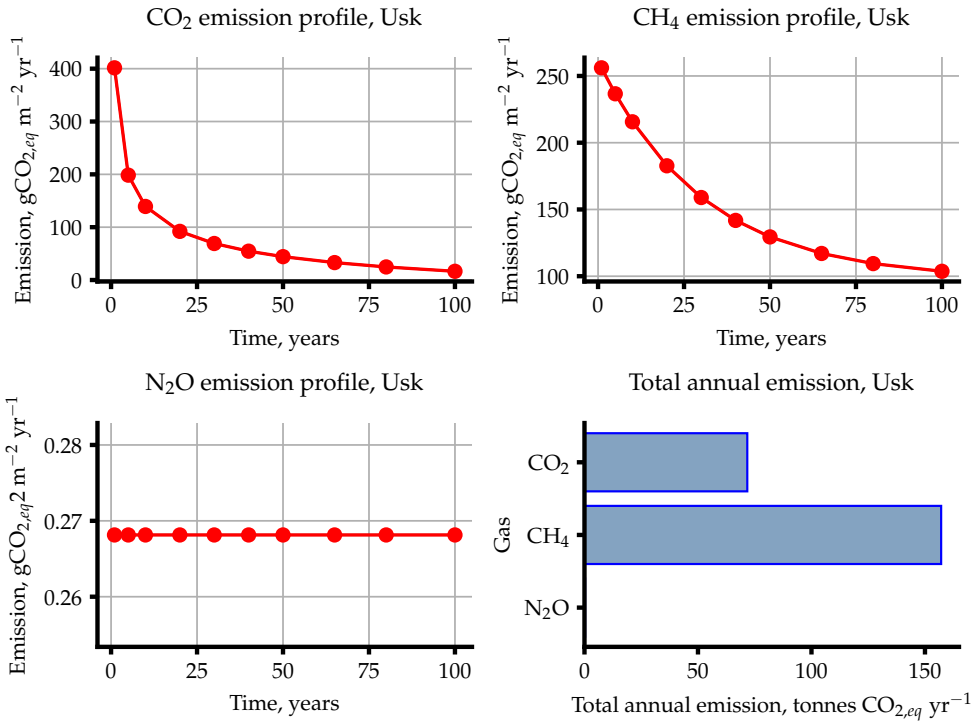
Input Name	Unit	Value(s)
Reservoir ID		42
Reservoir type		potable
Reservoir coordinates (lat/lon)	^{o}	LAT: 51.9458676294, LON: -3.7001956253
Monthly Temperatures	^{o}C	3.5, 3.1, 4.8, 6.7, 9.9, 12.5, 14.8, 14.8, 12.4, 9.6, 6.3, 4.5
Year vector for emission profiles	yr	1, 5, 10, 20, 30, 40, 50, 65, 80, 100
Calculated gas emissions	-	CO_2, CH_4, N_2O
Biogenic factors		
Biome	-	temperate broadleaf and mixed
Climate	-	temperate
Soil Type	-	mineral
Treatment Factor	-	secondary biological treatment
Landuse Intensity	-	low intensity
Inputs for catchment-level process calculations		
Annual runoff	mm/year	1227
Catchment area	km^2	12.71
Length of inundated river	km	1.723
Population	capita	57.00
Area fractions	-	0.0, 0.0, 0.0, 0.079, 0.0, 0.0, 0.602, 0.319, 0.0
Mean catchment slope	%	9.000
Mean annual precipitation	mm/year	1738
Mean annual evapotranspiration	mm/year	532.0
Soil wetness	mm over profile	50.00
Soil Olsen P content	kgP ha^{-1}	23.57
Inputs for reservoir-level process calculations		
Reservoir volume	m^3	3 572 000
Reservoir area	km^2	1.090
Maximum reservoir depth	m	4.000
Mean reservoir depth	m	3.300
Inundated area fractions	-	0.0, 0.0, 0.0, 0.45, 0.0, 0.0, 0.1, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.4, 0.0, 0.0, 0.0, 0.05, 0.0
Soil carbon in inundated area	kgC m^{-2}	8.481
Mean monthly horizontal radiance	kWh m^{-2} d^{-1}	2.640
Mean monthly horizontal radiance: May - Sept	kWh m^{-2} d^{-1}	4.146
Mean monthly horizontal radiance: Nov - Mar	kWh m^{-2} d^{-1}	1.166
Mean monthly wind speed	m s^{-1}	3.720
Water intake depth below surface	m	N/A



38.2 Outputs

Name	Unit	Value
CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	157.1
Nonanthropogenic CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	107.8
Preimpoundment CO_2 emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−16.50
CO_2 emission minus non-anthropogenic	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	49.30
Net CO_2 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	65.80
Total CO_2 emission per year	$tCO_{2,eq}\ yr^{-1}$	71.72
Total CO_2 emission per lifetime	$ktCO_{2,eq}$	7.172
CH_4 emission via diffusion	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	46.70
CH_4 emission via ebullition	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	97.44
CH_4 emission via degassing	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.0
Pre-impounment CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.0
Net CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	144.1
Total CH_4 emission per year	$tCO_{2,eq}\ yr^{-1}$	157.1
Total CH_4 emission per lifetime	$ktCO_{2,eq}$	15.71
Net N_2O emission, method A	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.2681
Net N_2O emission, method B	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.2089
Net N_2O emission, mean value	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.2385
Total N_2O emission per year	$tCO_{2,eq}\ yr^{-1}$	0.2923
Total N_2O emission per lifetime	$ktCO_{2,eq}$	0.029 23
CO_2+CH_4 net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	209.9
CO_2+CH_4+N_2O net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	210.2

38.3 Emission plots



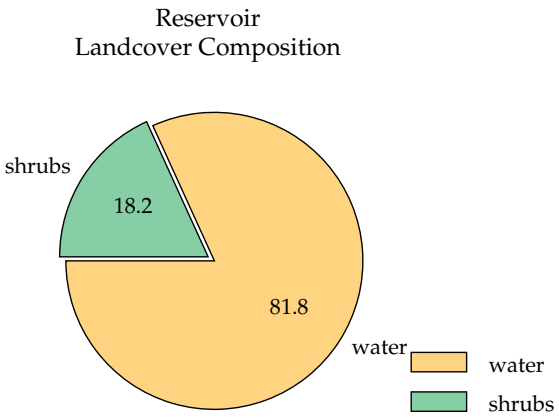
38.4 Intermediate variables

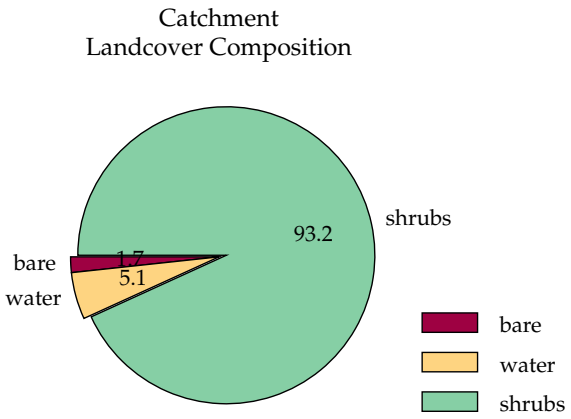
Name	Unit	Value
Influent total P concentration	μg L^{-1}	15.65
Retention coefficient	-	0.1551
Influent total N concentration	μg L^{-1}	34.01
Reservoir TN concentration	μg L^{-1}	28.74
Reservoir TP concentration	μg L^{-1}	14.27
Percentage of reservoir's surface area that is littoral	%	25.48
Mean radiance at the reservoir	kWh m^{-2} d^{-1}	4.146
Cumulative global horizontal radiance at the reservoir	kWh m^{-2} d^{-1}	49.75
Bottom (hypolimnion) temperature in the reservoir	^{o}C	12.74
Water density at the bottom of the reservoir	kg m^{-3}	999.4
Surface (epilimnion) temperature in the reservoir	^{o}C	13.63
Water density at the surface of the reservoir	kg m^{-3}	999.3
Thermocline depth	m	8.537
Influent total N load	kgN yr^{-1}	530.3
Influent total P load	kgP yr^{-1}	244.0
Downstream TN concentration	mg L^{-1}	0.041 47

39 Ogwen

39.1 Inputs

Input Name	Unit	Value(s)
Reservoir ID		48
Reservoir type		potable
Reservoir coordinates (lat/lon)	^{o}	LAT: 53.122994764, LON: -4.0149817151
Monthly Temperatures	^{o}C	2.9, 2.8, 4.2, 6.1, 9.2, 11.8, 13.8, 13.5, 11.4, 8.6, 5.4, 3.6
Year vector for emission profiles	yr	1, 5, 10, 20, 30, 40, 50, 65, 80, 100
Calculated gas emissions	-	CO_2, CH_4, N_2O
Biogenic factors		
Biome	-	temperate broadleaf and mixed
Climate	-	temperate
Soil Type	-	organic
Treatment Factor	-	secondary biological treatment
Landuse Intensity	-	low intensity
Inputs for catchment-level process calculations		
Annual runoff	mm/year	1410
Catchment area	km^2	10.95
Length of inundated river	km	1.657
Population	capita	31.00
Area fractions	-	0.017, 0.0, 0.0, 0.051, 0.0, 0.0, 0.931, 0.0, 0.0
Mean catchment slope	%	34.00
Mean annual precipitation	mm/year	1896
Mean annual evapotranspiration	mm/year	500.0
Soil wetness	mm over profile	55.00
Soil Olsen P content	kgP ha^{-1}	28.63
Inputs for reservoir-level process calculations		
Reservoir volume	m^3	770 500
Reservoir area	km^2	0.6130
Maximum reservoir depth	m	2.700
Mean reservoir depth	m	2.000
Inundated area fractions	-	0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.091, 0.0, 0.0, 0.182, 0.0, 0.0, 0.0, 0.0, 0.0, 0.727, 0.0, 0.0, 0.0, 0.0, 0.0
Soil carbon in inundated area	kgC m^{-2}	9.126
Mean monthly horizontal radiance	kWh m^{-2} d^{-1}	2.790
Mean monthly horizontal radiance: May - Sept	kWh m^{-2} d^{-1}	4.439
Mean monthly horizontal radiance: Nov - Mar	kWh m^{-2} d^{-1}	1.167
Mean monthly wind speed	m s^{-1}	8.080
Water intake depth below surface	m	N/A

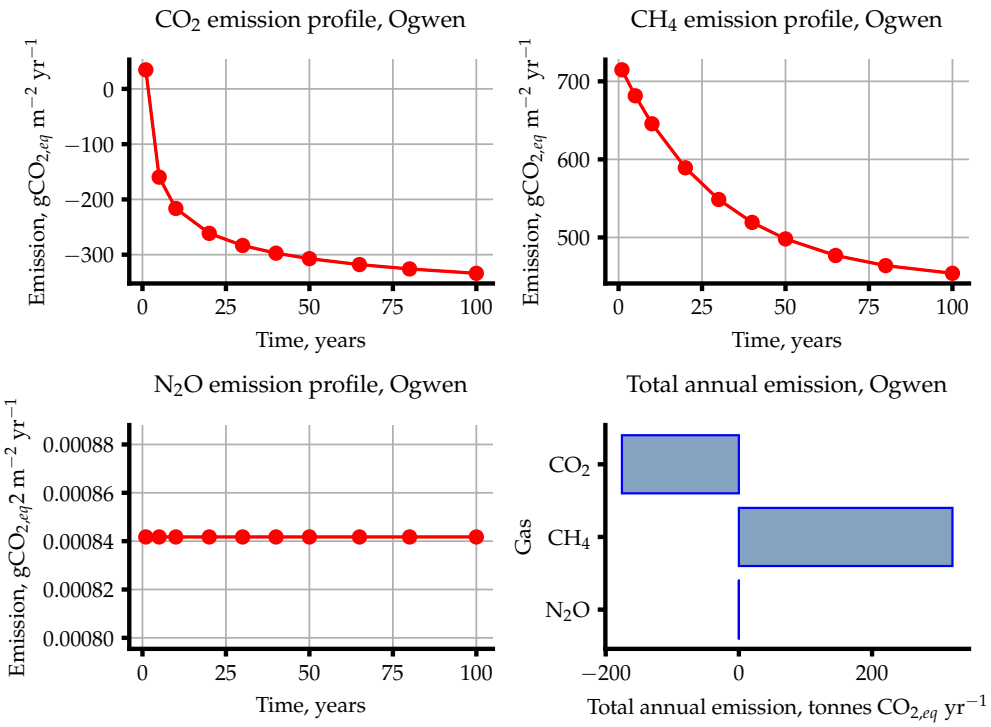




39.2 Outputs

Name	Unit	Value
CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	150.2
Nonanthropogenic CO_2 diffusion flux	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	103.1
Preimpoundment CO_2 emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	333.7
CO_2 emission minus non-anthropogenic	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	47.13
Net CO_2 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	−286.5
Total CO_2 emission per year	$tCO_{2,eq}\ yr^{-1}$	−175.6
Total CO_2 emission per lifetime	$ktCO_{2,eq}$	−17.56
CH_4 emission via diffusion	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	79.89
CH_4 emission via ebullition	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	475.5
CH_4 emission via degassing	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.0
Pre-impounment CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	32.16
Net CH_4 emission	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	523.3
Total CH_4 emission per year	$tCO_{2,eq}\ yr^{-1}$	320.8
Total CH_4 emission per lifetime	$ktCO_{2,eq}$	32.08
Net N_2O emission, method A	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.000 841 7
Net N_2O emission, method B	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.000 772 6
Net N_2O emission, mean value	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	0.000 807 2
Total N_2O emission per year	$tCO_{2,eq}\ yr^{-1}$	0.000 516 0
Total N_2O emission per lifetime	$ktCO_{2,eq}$	5.160×10^{-5}
CO_2+CH_4 net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	236.7
CO_2+CH_4+N_2O net emissions	$gCO_{2,eq}\ m^{-2}\ yr^{-1}$	236.7

39.3 Emission plots



39.4 Intermediate variables

Name	Unit	Value
Influent total P concentration	μg L^{-1}	17.98
Retention coefficient	-	0.038 44
Influent total N concentration	μg L^{-1}	0.3141
Reservoir TN concentration	μg L^{-1}	0.3021
Reservoir TP concentration	μg L^{-1}	18.12
Percentage of reservoir's surface area that is littoral	%	100.0
Mean radiance at the reservoir	kWh m^{-2} d^{-1}	4.439
Cumulative global horizontal radiance at the reservoir	kWh m^{-2} d^{-1}	53.27
Bottom (hypolimnion) temperature in the reservoir	^{o}C	12.54
Water density at the bottom of the reservoir	kg m^{-3}	999.5
Surface (epilimnion) temperature in the reservoir	^{o}C	12.63
Water density at the surface of the reservoir	kg m^{-3}	999.5
Thermocline depth	m	6.017
Influent total N load	kgN yr^{-1}	4.849
Influent total P load	kgP yr^{-1}	277.6
Downstream TN concentration	mg L^{-1}	0.000 370 7