Supplemental Figures/Tables

	(a) Recycling	(b) Land Precip. Recycling	(c) Norm. Recycling	(d) Norm. Land Precip. Recycling
PNW	1.04	33.94	0.93	30.3
SWC	1.29	39.17	1.2	36.36
SWW	2.53	29.98	2.07	24.53
UPR	0.86	14.89	0.73	12.55
SCP	4.11	27.77	3.36	22.69
ICP	2.31	13.2	2.17	12.38
INP	0.87	8.32	0.8	7.7
NMW	2.0	13.72	1.85	12.7
RMW	1.44	8.56	1.35	8.03
OHV	2.6	15.25	2.3	13.46
SSE	3.16	30.54	2.77	26.71
NEE	1.37	10.53	1.24	9.52
NCA	0.56	15.53	0.1	2.87
PFC	0.71	26.46	0.62	23.11
WIP	1.07	19.97	0.93	17.39
EIP	1.15	15.05	1.0	13.11
WON	0.96	9.09	0.9	8.53
EON	2.0	11.99	1.86	11.11
ALC	1.19	11.19	0.86	8.09
NMM	3.02	24.85	2.79	22.93
СММ	4.81	33.68	4.22	29.58
SMM	6.43	61.5	5.67	54.22

Winter Recycling Percentages per Region

Supplemental Table 1. (a) The percent contribution of local recycling to total winter (DJF) precipitation for each defined land region, (b) the percent contribution of local recycling to total winter (DJF) land-based precipitation for each defined land region, (c) the same as (a) but scaled by the normalized land area of each region, and (d) the same as (b) but scaled by the normalized land area of each region.

Spring Recycling Percentages per Region

			5 1 5	
	(a) Recycling	(b) Land Precip. Recycling	(c) Norm. Recycling	(d) Norm. Land Precip. Recycling
PNW	5.67	41.13	5.06	36.72
SWC	5.53	48.09	5.13	44.64
SWW	11.67	33.81	9.55	27.67
UPR	11.04	26.45	9.3	22.29
SCP	8.82	34.17	7.2	27.91
ICP	7.12	16.14	6.68	15.13
INP	6.89	13.91	6.37	12.88
NMW	4.89	10.77	4.52	9.97
RMW	4.73	13.49	4.44	12.65
OHV	5.08	13.98	4.49	12.34
SSE	8.31	37.87	7.27	33.12
NEE	4.76	13.89	4.3	12.55
NCA	13.76	40.43	2.55	7.48
PFC	5.19	31.21	4.54	27.26
WIP	10.76	24.21	9.37	21.09
EIP	10.3	19.89	8.97	17.33
WON	5.38	10.54	5.05	9.89
EON	4.73	10.02	4.38	9.28
ALC	6.98	18.56	5.04	13.42
NMM	7.6	24.17	7.01	22.3
СММ	12.47	41.6	10.95	36.54
SMM	14.74	64.38	12.99	56.76

Supplemental Table 2. (a) The percent contribution of local recycling to total spring (MAM) precipitation for each defined land region, (b) the percent contribution of local recycling to total spring (MAM) land-based precipitation for each defined land region, (c) the same as (a) but scaled by the normalized land area of each region, and (d) the same as (b) but scaled by the normalized land area of each region.

Summer Recycling Percentages per Region

	(a) Recycling	(b) Land Precip. Recycling	(c) Norm. Recycling	(d) Norm. Land Precip. Recycling
PNW	17.45	40.02	15.58	35.72
SWC	18.53	39.57	17.2	36.73
SWW	21.65	42.56	17.71	34.83
UPR	26.6	38.39	22.41	32.35
SCP	11.91	40.38	9.73	32.99
ICP	13.91	25.25	13.05	23.68
INP	16.58	24.23	15.35	22.42
NMW	12.17	18.8	11.26	17.4
RMW	12.32	24.83	11.55	23.29
OHV	12.69	22.55	11.2	19.9
SSE	15.37	46.11	13.44	40.33
NEE	11.96	20.16	10.81	18.21
NCA	26.52	43.17	4.9	7.98
PFC	12.55	29.58	10.96	25.84
WIP	20.7	29.73	18.03	25.9
EIP	18.31	25.07	15.95	21.84
WON	9.37	12.99	8.79	12.19
EON	9.25	13.02	8.57	12.06
ALC	13.35	19.53	9.65	14.11
NMM	10.69	30.68	9.87	28.31
СММ	12.08	42.23	10.61	37.09
SMM	12.03	49.94	10.6	44.03

Supplemental Table 3. (a) The percent contribution of local recycling to total summer (JJA) precipitation for each defined land region, (b) the percent contribution of local recycling to total summer (JJA) land-based precipitation for each defined land region, (c) the same as (a) but scaled by the normalized land area of each region, and (d) the same as (b) but scaled by the normalized land area of each region.

Fall Recycling Percentages per Region

	(a) Recycling	(b) Land Precip. Recycling	(c) Norm. Recycling	(d) Norm. Land Precip. Recycling
PNW	2.2	30.06	1.97	26.84
SWC	1.88	26.87	1.74	24.95
SWW	8.05	29.4	6.59	24.05
UPR	5.61	23.43	4.72	19.74
SCP	6.36	31.03	5.19	25.35
ICP	3.76	11.69	3.52	10.96
INP	3.63	10.45	3.36	9.67
NMW	5.51	14.62	5.1	13.53
RMW	3.52	11.85	3.3	11.11
OHV	5.75	17.73	5.08	15.65
SSE	6.77	40.82	5.92	35.7
NEE	4.59	16.55	4.15	14.96
NCA	8.26	31.56	1.53	5.84
PFC	2.12	19.92	1.85	17.4
WIP	5.89	23.23	5.13	20.23
EIP	8.16	22.58	7.11	19.67
WON	4.27	10.72	4.0	10.06
EON	4.54	11.14	4.21	10.32
ALC	5.4	15.87	3.9	11.47
NMM	6.89	25.68	6.36	23.69
СММ	8.48	39.7	7.45	34.87
SMM	8.94	48.37	7.89	42.64

Supplemental Table 4. (a) The percent contribution of local recycling to total fall (SON) precipitation for each defined land region, (b) the percent contribution of local recycling to total fall (SON) land-based precipitation for each defined land region, (c) the same as (a) but scaled by the normalized land area of each region, and (d) the same as (b) but scaled by the normalized land area of each region.

Winter Recycled	Precip .: 1	FEI Split	per Region
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Г	(a) Transpiration	(b) Canopy Evap.	(c) Ground Evap.
PNW	12.54	39.94	47.52
SWC	24.46	22.83	52.7
SWW	21.18	22.66	56.15
UPR	5.81	25.83	68.36
SCP	25.94	25.91	48.15
ICP	14.76	24.07	61.17
INP	6.11	25.48	68.41
NMW	3.0	20.72	76.29
RMW	13.63	26.37	59.99
OHV	5.23	16.62	78.15
SSE	36.98	33.71	29.31
NEE	9.4	26.11	64.49
NCA	5.79	40.92	53.29
PFC	10.93	64.14	24.94
WIP	7.28	65.26	27.46
EIP	4,13	53.62	42.25
WON	4.37	56.61	39.01
EON	2,94	31.49	65.57
ALC	4.71	54.36	40.93
NMM	14.24	27.08	58.68
CMM	32.14	23.27	44.59
SMM	42.38	32.6	25.02

Supplemental Table 5. (a) The percent contribution of transpiration to total recycled precipitation for each defined land region, (b) the percent contribution of canopy evaporation to total recycled precipitation for each defined land region, and (c) the percent contribution of ground evaporation to total recycled precipitation for each defined land region during the winter season (DJF).

Spring Recycled Precip.: TEI Split per Region

Γ	(a) Transpiration	(b) Canopy Evap.	(c) Ground Evap.
PNW	27.56	27.89	44.55
SWC	39.57	18.52	41.91
SWW	36.15	22.61	41.24
UPR	30.67	19.24	50.09
SCP	43.13	25.67	31.2
ICP	48,38	21,17	30.45
INP	39,32	13.4	47.28
NMW	30,61	17,97	51.42
RMW	42,33	20,4	37,27
OHV	34.8	17.95	47.25
SSE	49.68	29.96	20.36
NEE	38.46	21.2	40.34
NCA	16.35	15.9	67.76
PFC	38.79	44.13	17.08
WIP	40.05	27.86	32.09
EIP	33.37	18.96	47.67
WON	29.03	25.15	45.83
EON	27.51	24.55	47.94
ALC	24.6	24.29	51.12
NMM	25.11	29.25	45.64
CMM	38.89	24.09	37.01
SMM	46.42	30.61	22.98

Supplemental Table 6. (a) The percent contribution of transpiration to total recycled precipitation for each defined land region, (b) the percent contribution of canopy evaporation to total recycled precipitation for each defined land region, and (c) the percent contribution of ground evaporation to total recycled precipitation for each defined land region during the spring season (MAM).

Summer	[.] Recycled	Precip.: T	EI Split	per Re	egior
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	(a) Transpiration	(b) Canopy Evap.	(c) Ground Evap.
PNW	35.15	20.92	43.92
SWC	38.95	12.1	48.96
SWW	31.13	25,15	43.72
UPR	48.14	24.11	27.75
SCP	39.02	30.66	30.32
ICP	53.11	29.26	17.63
INP	63.04	23.94	13.02
NMW	54.51	23,55	21,94
RMW	56.54	28.02	15,44
OHV	52,67	23.6	23.74
SSE	45.94	37.3	16.76
NEE	57.27	27.69	15.04
NCA	44.9	25.75	29.34
PFC	51.48	33.84	14.67
WIP	62.21	27.65	10.14
EIP	54.62	23,45	21.93
WON	43.72	29.43	26.84
EON	46.93	28.42	24.65
ALC	44.01	24.06	31.94
NMM	21.49	29.96	48.55
СММ	30.58	28.37	41.05
SMM	37.81	35.26	26.93

Supplemental Table 7. (a) The percent contribution of transpiration to total recycled precipitation for each defined land region, (b) the percent contribution of canopy evaporation to total recycled precipitation for each defined land region, and (c) the percent contribution of ground evaporation to total recycled precipitation for each defined land region during the summer season (JJA).

Fall Recycled Precip.: TEI Split per Region

	(a) Transpiration	(b) Canopy Evap.	(c) Ground Evap.
PNW	19.45	37.31	43.23
SWC	9.87	22.88	67.25
SWW	21.7	27.38	50.92
UPR	24.85	29.11	46.04
SCP	24.37	30.3	45.34
ICP	16.49	29.77	53.74
INP	20,44	26.54	53.01
NMW	25,15	20.6	54,25
RMW	26,93	28.15	44.92
OHV	26,58	19.39	54.03
SSE	41,65	35.19	23.16
NEE	41,87	27.61	30,53
NCA	26.25	36.64	37.11
PFC	26.59	52.27	21.14
WIP	34.87	39.13	26.0
EIP	25.79	28.02	46.19
WON	27.98	35.56	36.46
EON	28.53	33.32	38.16
ALC	29.58	33.53	36.89
NMM	20,18	30.33	49.5
CMM	28,15	26.7	45.15
SMM	35.49	34,52	30.0

Supplemental Table 8. (a) The percent contribution of transpiration to total recycled precipitation for each defined land region, (b) the percent contribution of canopy evaporation to total recycled precipitation for each defined land region, and (c) the percent contribution of ground evaporation to total recycled precipitation for each defined land region during the fall season (SON).

Winter Imported	d Precip.:	TEI Split	per Region
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	(a) Transpiration	(b) Canopy Evap.	(c) Ground Evap.
PNW	38,18	19.36	42,46
SWC	42,3	20,19	37,51
SWW	34,31	19.59	46.1
UPR	26.67	24.35	48.98
SCP	40.13	18.45	41.42
ICP	30.22	19.08	50.7
INP	21.91	25.57	52.52
NMW	24.77	21.72	53.51
RMW	34.39	17.45	48.17
OHV	31.67	18.92	49.41
SSE	40.45	19.62	39.93
NEE	31.25	19.5	49.25
NCA	26.77	27.54	45.69
PFC	35.46	21.71	42.82
WIP	22.43	36.12	41.44
EIP	19.24	35.03	45.73
WON	16.92	29.9	53.19
EON	19.06	21.49	59.45
ALC	23,92	21.04	55.03
NMM	38.57	20.08	41.35
CMM	41.76	22.82	35,42
SMM	39,96	23.38	36,66

Supplemental Table 9. (a) The percent contribution of transpiration to total imported precipitation for each defined land region, (b) the percent contribution of canopy evaporation to total imported precipitation for each defined land region, and (c) the percent contribution of ground evaporation to total imported precipitation for each defined land region during the winter season (DJF).

Spring	Imported	Precip.:	TEI S	plit	per l	Region

	(a) Transpiration	(b) Canopy Evap.	(c) Ground Evap.	
PNW	39.15	15.61	45.24	
SWC	38.04	15.86	46.1	
SWW	42.21	15.79	42.0	
UPR	39.37	14.43	46.2	
SCP	46.81	18.47	34.72	
ICP	45.53	15.86	38.61	
INP	43.14	13.86	42.99	
NMW	43.93	13.64	42.43	
RMW	46.38	15.79	37.83	
OHV	46.59	15.3	38,11	
SSE	46.52	17.18	36,31	
NEE	45.81	14.95	39.24	
NCA	35,11	14.52	50.37	
PFC	36,26	15.7	48.03	
WIP	38.61	16.51	44.88	
EIP	38,93	13.26	47.81	
WON	38,38	12,61	49.01	
EON	39.93	12.98	47.09	
ALC	39.73	13.08	47.19	
NMM	46.14	19.33	34.54	
СММ	48.34	21.26	30.4	
SMM	45.74	26.45	27.8	

Supplemental Table 10. (a) The percent contribution of transpiration to total imported precipitation for each defined land region, (b) the percent contribution of canopy evaporation to total imported precipitation for each defined land region, and (c) the percent contribution of ground evaporation to total imported precipitation for each defined land region during the spring season (MAM).

Summer	Imported	Precip.:	TEI S	plit	per	Regior
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	(a) Transpiration	(b) Canopy Evap.	(c) Ground Evap.
PNW	51.67	18.24	30.09
SWC	41.69	16.37	41.94
SWW	43.01	19.78	37,21
UPR	49.22	17.0	33.78
SCP	47.44	23,22	29.34
ICP	48.31	20,77	30,92
INP	53.16	18,39	28,45
NMW	54.47	17,96	27.57
RMW	49.92	20.9	29,18
OHV	53.1	19.65	27.25
SSE	49.79	20.34	29.86
NEE	53.9	18.63	27.47
NCA	54.51	17.04	28.44
PFC	54.52	20.39	25.09
WIP	54.59	18.97	26.43
EIP	54.51	17.63	27.86
WON	53.19	17.13	29.68
EON	52.98	16.32	30.7
ALC	52.86	16.12	31.03
NMM	41.42	23,25	35.33
СММ	43.18	25.91	30.91
SMM	46.19	24.5	29.31

Supplemental Table 11. (a) The percent contribution of transpiration to total imported precipitation for each defined land region, (b) the percent contribution of canopy evaporation to total imported precipitation for each defined land region, and (c) the percent contribution of ground evaporation to total imported precipitation for each defined land region during the summer season (JJA).

Fall Imported Precip.: TEI Split per Region

	(a) Transpiration	(b) Canopy Evap.	(c) Ground Evap.
PNW	40.0	21.75	38.25
SWC	37.86	19.65	42.49
SWW	34.52	21.08	44.4
UPR	32.35	22.47	45.18
SCP	39.19	22.2	38.61
ICP	34.18	20,86	44.96
INP	32.88	21,39	45.73
NMW	33.61	20,11	46,28
RMW	35.89	20.3	43.81
OHV	36.73	20.35	42.91
SSE	38.72	21.45	39.82
NEE	37.5	19.89	42.61
NCA	43.62	22.56	33.82
PFC	43.74	23.97	32.29
WIP	36.77	27.66	35.56
EIP	35.06	24.23	40.71
WON	33.34	21.27	45.39
EON	33.48	19.08	47.44
ALC	37.95	18.6	43.45
NMM	36.59	22.96	40.46
CMM	39.71	25.6	34.69
SMM	42.04	24.96	33.0

Supplemental Table 12. (a) The percent contribution of transpiration to total imported precipitation for each defined land region, (b) the percent contribution of canopy evaporation to total imported precipitation for each defined land region, and (c) the percent contribution of ground evaporation to total imported precipitation for each defined land region during the fall season (SON).



Supplemental Figure 1. A comparison of the North American T from iCESM and GLEAM for (a) winter (DJF), (b) spring (MAM), (c) summer (JJA), and (d) fall (SON). Note: black cells indicate missing observational data. Units are in mm day^-1.



Supplemental Figure 2. A comparison of the North American C from iCESM and GLEAM for (a) winter (DJF), (b) spring (MAM), (c) summer (JJA), and (d) fall (SON). Note: black cells indicate missing observational data. Units are in mm day^-1.



Supplemental Figure 3. A comparison of the North American E from iCESM and GLEAM for (a) winter (DJF), (b) spring (MAM), (c) summer (JJA), and (d) fall (SON). Note: black cells indicate missing observational data. Units are in mm day^-1.



Supplemental Figure 4. CESM simulated North American land-based precipitation for (a) winter (DJF), (b) spring (MAM), (c) summer (JJA), and (d) fall (SON). Units are in mm season^-1.



Supplemental Figure 5. Predicted North American land-based precipitation using the matrix formulation described in Section 2.2 for (a) winter (DJF), (b) spring (MAM), (c) summer (JJA), and (d) fall (SON). Units are normalized units of length per m^-1.



Supplemental Figure 6. CESM simulated North American T-based precipitation for (a) winter (DJF), (b) spring (MAM), (c) summer (JJA), and (d) fall (SON). Units are in mm season^-1.



Supplemental Figure 7. Predicted North American T-based precipitation using the matrix formulation described in Section 2.2/3.8 for (a) winter (DJF), (b) spring (MAM), (c) summer (JJA), and (d) fall (SON). Units are normalized units of length per m^-1.



Supplemental Figure 8. CESM simulated North American C-based precipitation for (a) winter (DJF), (b) spring (MAM), (c) summer (JJA), and (d) fall (SON). Units are in mm season^-1.



Supplemental Figure 9. Predicted North American C-based precipitation using the matrix formulation described in Section 2.2/3.8 for (a) winter (DJF), (b) spring (MAM), (c) summer (JJA), and (d) fall (SON). Units are normalized units of length per m^-1.



Supplemental Figure 10. CESM simulated North American G-based precipitation for (a) winter (DJF), (b) spring (MAM), (c) summer (JJA), and (d) fall (SON). Units are in mm season^-1.



Supplemental Figure 11. Predicted North American G-based precipitation using the matrix formulation described in Section 2.2/3.8 for (a) winter (DJF), (b) spring (MAM), (c) summer (JJA), and (d) fall (SON). Units are normalized units of length per m^-1.