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**Supplementary Materials**

**Spatial and Agronomic Assessment of Water Erosion on Inland Pacific Northwest Cereal Grain Cropland**

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# S1. Soil Files (Whitman County)

Table S1. Deep Soil (Palouse Silt Loam).

|  |  |  |  |
| --- | --- | --- | --- |
| Description | Value | | |
| Number of layers | 3 | | |
| Albedo | 0.16 | | |
| Initial saturation | 0.4 | | |
| Interill erodibility (kg\*s m-4) | 1E+07 | | |
| Rill erodibility (s m-1) | 0.018 | | |
| Critical shear (pa) | 0.35 | | |
| Surface hydraulic conductivity (mm hr-1) | 1.91 | | |
| Bedrock depth (mm) | 10000 | | |
| Restrictive layer Hyd. Cond. (mm hr-1) | 0.01 | | |
|  | Soil Depth (mm) | | |
|  | 0 to 200 | 200 to 600 | 600 to 1800 |
| Bulk density (gm cc-1) | 1.2 | 1.33 | 1.33 |
| Layer Hyd. Cond. (mm hr-1) | 1.91 | 1.4 | 1.4 |
| Anisotropy ratio | 1 | 1 | 5 |
| Field capacity (m m-1) | 0.286 | 0.292 | 0.292 |
| Wilting point (m m-1) | 0.134 | 0.142 | 0.142 |
| Sand (%) | 11.3 | 9.1 | 9.1 |
| Clay (%) | 21 | 25 | 25 |
| Organic (%) | 3 | 0.75 | 0.75 |
| CEC (meq/100 g) | 15 | 20 | 20 |
| Rock (%) | 0 | 0 | 0 |

Table S2. Moderate Soil (Anders-Kuhl Complex).

|  |  |  |  |
| --- | --- | --- | --- |
| Description | Value | | |
| Number of layers | 3 | | |
| Albedo | 0.16 | | |
| Initial saturation | 0.3 | | |
| Interill erodibility (kg\*s m-4) | 9221160 | | |
| Rill erodibility (s m-1) | 0.0148 | | |
| Critical shear (pa) | 0.30 | | |
| Surface hydraulic conductivity (mm hr-1) | 7.18 | | |
| Bedrock depth (mm) | 10000 | | |
| Restrictive layer hydraulic conductivity (mm hr-1) | 0.01 | | |
|  | Soil Depth (mm) | | |
|  | 0 to 200 | 200 to 600 | 600 to 871 |
| Bulk density (gm cc-1) | 1.25 | 1.35 | 1.4 |
| Layer Hyd. Cond. (mm hr-1) | 7.18 | 8.78 | 18.2 |
| Anisotropy ratio | 1 | 1 | 5 |
| Field capacity (m m-1) | 0.264 | 0.29 | 0.242 |
| Wilting point (m m-1) | 0.094 | 0.1 | 0.114 |
| Sand (%) | 30.4 | 30.4 | 66.8 |
| Clay (%) | 14 | 14 | 7 |
| Organic (%) | 1.5 | 0.75 | 0.75 |
| CEC (meq/100 g) | 5 | 3 | 11.3 |
| Rock (%) | 12.5 | 32.5 | 55.5 |

Table S3. Shallow Soil (Kuhl-Alpowa Complex).

|  |  |  |  |
| --- | --- | --- | --- |
| Description | Value | | |
| Number of layers | 3 | | |
| Albedo | 0.16 | | |
| Initial saturation | 0.3 | | |
| Interill erodibility (kg\*s m-4) | 9259580 | | |
| Rill erodibility (s m-1) | 0.0148 | | |
| Critical shear (pa) | 0.29 | | |
| Surface hydraulic conductivity (mm hr-1) | 28.1 | | |
| Bedrock depth (mm) | 10000 | | |
| Restrictive layer hydraulic conductivity (mm hr-1) | 0.01 | | |
|  | Soil Depth (mm) | | |
|  | 0 to 200 | 200 to 300 | 300 to 437 |
| Bulk density (gm/cc) | 1.25 | 1.33 | 1.4 |
| Layer Hyd. Cond. (mm hr-1) | 5.59 | 5.25 | 18.2 |
| Anisotropy ratio | 1 | 1 | 5 |
| Field capacity (m m-1) | 0.295 | 0.292 | 0.242 |
| Wilting point (m m-1) | 0.1 | 0.1 | 0.114 |
| Sand (%) | 30.9 | 30.4 | 66.8 |
| Clay (%) | 12.5 | 14 | 7 |
| Organic (%) | 1.5 | 0.5 | 0.5 |
| CEC (meq/100 g) | 12.5 | 15 | 11.3 |
| Rock (%) | 36.2 | 36.2 | 55.5 |

# S2. Calculated Hydraulic Conductivity

Table S4. Baseline Hydraulic Conductivity by Soil Depth

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| County |  | Deep | Moderate | Shallow |
|  |  | (mm hr−1) | | |
| Adams | Layer 1 | 4.45 | 4.45 | 18.2 |
|  | Layer 2 | 4.45 | 4.45 | 18.2 |
|  | Layer 3 | 4.45 | 18.2 | 18.2 |
| Asotin | Layer 1 | 5.25 | 2.42 | 4.08 |
|  | Layer 2 | 5.25 | 2.42 | 4.08 |
|  | Layer 3 | 9.84 | 2.42 | 4.08 |
| Benton | Layer 1 | 4.45 | 4.45 | 3.43 |
|  | Layer 2 | 4.45 | 4.45 | 3.43 |
|  | Layer 3 | 4.45 | 18.2 | 3.43 |
| Columbia | Layer 1 | 1.89 | 7.3 | 5.4 |
|  | Layer 2 | 1.44 | 6.21 | 3.67 |
|  | Layer 3 | 1.89 | 18.2 | 18.2 |
| Douglas | Layer 1 | 3.84 | 20.7 | 20.7 |
|  | Layer 2 | 3.78 | 20.9 | 20.2 |
|  | Layer 3 | 2.59 | 19.2 | 20 |
| Franklin | Layer 1 | 4.45 | 11.2 | 6.2 |
|  | Layer 2 | 4.45 | 7.79 | 6.2 |
|  | Layer 3 | 4.45 | 43 | 18.2 |
| Garfield | Layer 1 | 1.89 | 4.19 | 5.4 |
|  | Layer 2 | 1.44 | 4.28 | 2.73 |
|  | Layer 3 | 1.89 | 18.2 | 18.2 |
| Grant | Layer 1 | 4.45 | 4.14 | 3.84 |
|  | Layer 2 | 4.23 | 4.24 | 3.78 |
|  | Layer 3 | 4.04 | 4.24 | 2.59 |
| Lincoln | Layer 1 | 2.49 | 4.14 | 7.18 |
|  | Layer 2 | 2.04 | 4.24 | 8.78 |
|  | Layer 3 | 2.04 | 4.24 | 18.2 |
| Spokane | Layer 1 | 1.59 | 18.2 | 9.54 |
|  | Layer 2 | 1.23 | 2.17 | 9.65 |
|  | Layer 3 | 1.05 | 18.2 | 18.2 |
| Walla Walla | Layer 1 | 4.45 | 6.24 | 6.24 |
|  | Layer 2 | 4.45 | 2.72 | 2.72 |
|  | Layer 3 | 4.45 | 18.2 | 18.2 |
| Whitman | Layer 1 | 1.91 | 7.18 | 5.59 |
|  | Layer 2 | 1.4 | 8.78 | 5.25 |
|  | Layer 3 | 1.4 | 18.2 | 18.2 |

# S3. Management Information

## Rotations

## 1. WW-B-P: Winter Wheat-Barley-Pea

2. WW-B-F: Winter Wheat-Barley-Fallow  
3. WW-F: Winter Wheat-Fallow

S3.1 WW-B-P

Table S5. Intense tillage.

|  |  |  |  |
| --- | --- | --- | --- |
| Dates | Operation | Details | Remarks |
| 1/1/01 | Initial Conditions | After winter wheat seeding previous fall |  |
| 8/25/01 | Harvest - Annual | Wheat; Winter - Washington |  |
| 10/15/01 | Tillage | Tandem disk harrow | Depth: 4.00 in; Type: Sec |
| 4/15/02 | Tillage | Chisel plow, twisted points or shovels | Depth: 8.00 in; Type: Pri |
| 4/16/02 | Tillage | Harrow-spike tooth | Depth: 3.00 in; Type: Sec |
| 4/17/02 | Tillage | Harrow-spike tooth in opposite direction | Depth: 3.00 in; Type: Sec |
| 4/18/02 | Tillage | Drill, single disk opener (conventional) | Depth: 1.00 in; Type: Sec |
| 4/18/02 | Plant - Annual | Barley | Row Width: 7.00 in |
| 8/15/02 | Harvest - Annual | Barley |  |
| 10/15/02 | Tillage | Tandem disk harrow | Depth: 4.00 in; Type: Sec |
| 4/15/03 | Tillage | Chisel plow, twisted points or shovels | Depth: 8.00 in; Type: Pri |
| 4/24/03 | Tillage | Harrow-spike tooth | Depth: 3.00 in; Type: Sec |
| 4/25/03 | Tillage | Harrow-spike tooth in opposite direction | Depth: 3.00 in; Type: Sec |
| 4/26/03 | Tillage | Field cultivation for herbicide incorporation | Depth: 3.00 in; Type: Sec |
| 5/1/03 | Tillage | Drill, single disk opener (conventional) | Depth: 2.00 in; Type: Sec |
| 5/1/03 | Plant - Annual | Peas | Row Width: 7.00 in |
| 8/25/03 | Harvest - Annual | Peas |  |
| 9/3/03 | Tillage | Plow, Moldboard with uphill furrow (Pacific NW only) | Depth: 8.00 in; Type: Pri |
| 9/19/03 | Tillage | Tandem disk harrow | Depth: 4.00 in; Type: Sec |
| 9/20/03 | Tillage | Harrow-spike tooth | Depth: 3.00 in; Type: Sec |
| 9/21/03 | Tillage | Harrow-spike tooth in opposite direction | Depth: 3.00 in; Type: Sec |
| 9/28/03 | Tillage | Anhydrous applicator | Depth: 8.00 in; Type: Sec |
| 10/10/03 | Tillage | Drill with double disk opener | Depth: 1.00 in; Type: Sec |
| 10/10/03 | Plant - Annual | Wheat; Winter - Washington | Row Width: 7.00 in |

Table S6. Reduced tillage.

|  |  |  |  |
| --- | --- | --- | --- |
| Dates | Operation | Details | Remarks |
| 1/1/01 | Initial Conditions | After winter wheat seeding previous fall |  |
| 8/25/01 | Harvest - Annual | Wheat; Winter - Washington |  |
| 4/16/02 | Tillage | Chisel plow, straight with spike pts | Depth: 6.00 in; Type: Sec |
| 4/17/02 | Tillage | Harrow-spike tooth | Depth: 3.00 in; Type: Sec |
| 4/18/02 | Tillage | Drill, single disk opener (conventional) | Depth: 1.00 in; Type: Sec |
| 4/18/02 | Plant - Annual | Barley | Row Width: 7.00 in |
| 8/15/02 | Harvest - Annual | Barley |  |
| 4/14/03 | Tillage | Chisel plow, straight with spike pts | Depth: 6.00 in; Type: Sec |
| 4/15/03 | Tillage | Harrow-spike tooth | Depth: 3.00 in; Type: Sec |
| 4/26/03 | Tillage | Field cultivation for herbicide incorporation | Depth: 3.00 in; Type: Sec |
| 5/1/03 | Tillage | Drill, single disk opener (conventional) | Depth: 2.00 in; Type: Sec |
| 5/1/03 | Plant - Annual | Peas | Row Width: 7.00 in |
| 8/25/03 | Harvest - Annual | Peas |  |
| 9/20/03 | Tillage | Chisel plow, straight with spike pts | Depth: 6.00 in; Type: Sec |
| 9/20/03 | Tillage | Harrow-spike tooth | Depth: 3.00 in; Type: Sec |
| 9/28/03 | Tillage | Anhydrous applicator | Depth: 8.00 in; Type: Sec |
| 10/10/03 | Tillage | Drill with double disk opener | Depth: 1.00 in; Type: Sec |
| 10/10/03 | Plant - Annual | Wheat; Winter - Washington | Row Width: 7.00 in |

Table S7. No-till.

|  |  |  |  |
| --- | --- | --- | --- |
| Dates | Operation | Details | Remarks |
| 1/1/01 | Initial Conditions | After winter wheat seeding previous fall |  |
| 8/25/01 | Harvest - Annual | Wheat; Winter - Washington |  |
| 4/18/02 | Tillage | Drill, no-till in flat residues-ripple or bubble coult | Depth: 1.00 in; Type: Sec |
| 4/18/02 | Plant - Annual | Barley | Row Width: 7.00 in |
| 8/15/02 | Harvest - Annual | Barley |  |
| 4/26/03 | Herbicide application |  |  |
| 5/1/03 | Tillage | Drill, no-till in standing stubble-smooth coulters | Depth: 2 in; Type: Sec |
| 5/1/03 | Plant - Annual | Peas | Row Width: 7.00 in |
| 8/25/03 | Harvest - Annual | Peas |  |
| 9/28/03 | Tillage | Anhydrous applicator | Depth: 4.00 in; Type: Sec |
| 10/10/03 | Tillage | Drill, no-till in standing stubble-fluted coulters | Depth: 1 in; Type: Sec |
| 10/10/03 | Plant - Annual | Wheat; Winter - Washington | Row Width: 7.00 in |

S3.2 WW-B-F

Table S8. Intense tillage.

|  |  |  |  |
| --- | --- | --- | --- |
| Dates | Operation | Details | Remarks |
| 1/1/01 | Initial Conditions | After winter wheat seeding previous fall |  |
| 8/25/01 | Harvest - Annual | Wheat; Winter - Washington |  |
| 10/15/01 | Tillage | Tandem disk harrow | Depth: 4.00 in; Type: Sec |
| 4/15/02 | Tillage | Chisel plow, twisted points or shovels | Depth: 8.00 in; Type: Pri |
| 4/16/02 | Tillage | Harrow-spike tooth | Depth: 3.00 in; Type: Sec |
| 4/17/02 | Tillage | Harrow-spike tooth in opposite direction | Depth: 3.00 in; Type: Sec |
| 4/18/02 | Tillage | Drill, single disk opener (conventional) | Depth: 1.00 in; Type: Sec |
| 4/18/02 | Plant - Annual | Barley | Row Width: 12.00 in |
| 8/15/02 | Harvest - Annual | Barley |  |
| 10/15/02 | Tillage | Disk, offset-heavy plowing>10" spacing | Depth: 4.00 in; Type: Sec |
| 4/15/03 | Tillage | Rodweeder, plain rotary rod | Depth: 2 in; Type: Sec |
| 5/15/03 | Tillage | Rodweeder, plain rotary rod | Depth: 2 in; Type: Sec |
| 8/1/03 | Tillage | Rodweeder, plain rotary rod | Depth: 2 in; Type: Sec |
| 9/3/03 | Tillage | Plow, Moldboard with uphill furrow (Pacific NW only) | Depth: 8.00 in; Type: Pri |
| 9/15/03 | Tillage | Tandem disk harrow | Depth: 4.00 in; Type: Sec |
| 9/23/03 | Tillage | Harrow-spike tooth | Depth: 3.00 in; Type: Sec |
| 9/24/03 | Tillage | Harrow-spike tooth in opposite direction | Depth: 3.00 in; Type: Sec |
| 9/28/03 | Tillage | Anhydrous applicator | Depth: 8.00 in; Type: Sec |
| 10/10/03 | Tillage | Drill with double disk opener | Depth: 1.00 in; Type: Sec |
| 10/10/03 | Plant - Annual | Wheat; Winter - Washington | Row Width: 12.00 in |

Table S9. Reduced tillage.

|  |  |  |  |
| --- | --- | --- | --- |
| Dates | Operation | Details | Remarks |
| 1/1/01 | Initial Conditions | After winter wheat seeding previous fall |  |
| 8/25/01 | Harvest - Annual | Wheat; Winter - Washington |  |
| 4/15/02 | Tillage | Chisel plow, straight with spike pts | Depth: 6.00 in; Type: Pri |
| 4/17/02 | Tillage | Harrow-spike tooth | Depth: 3.00 in; Type: Sec |
| 4/18/02 | Tillage | Drill, single disk opener (conventional) | Depth: 1.00 in; Type: Sec |
| 4/18/02 | Plant - Annual | Barley | Row Width: 12.00 in |
| 8/15/02 | Harvest - Annual | Barley |  |
| 5/15/03 | Tillage | Rodweeder, plain rotary rod | Depth: 2 in; Type: Sec |
| 8/25/03 | Tillage | Chisel plow, straight with spike pts | Depth: 6.00 in; Type: Pri |
| 9/20/03 | Tillage | Harrow-spike tooth | Depth: 3.00 in; Type: Sec |
| 9/28/03 | Tillage | Anhydrous applicator | Depth: 8.00 in; Type: Sec |
| 10/10/03 | Tillage | Drill with double disk opener | Depth: 1.00 in; Type: Sec |
| 10/10/03 | Plant - Annual | Wheat; Winter - Washington | Row Width: 12.00 in |

Table S10. No-till.

|  |  |  |  |
| --- | --- | --- | --- |
| Dates | Operation | Details | Remarks |
| 1/1/01 | Initial Conditions | After winter wheat seeding previous fall |  |
| 8/25/01 | Harvest - Annual | Wheat; Winter - Washington |  |
| 4/18/02 | Tillage | Drill, no-till in flat residues-ripple or bubble coulters | Depth: 1.00 in; Type: Sec |
| 4/18/02 | Plant - Annual | Barley | Row Width: 12.00 in |
| 8/15/02 | Harvest - Annual | Barley |  |
| 9/28/03 | Tillage | Anhydrous applicator | Depth: 4.00 in; Type: Sec |
| 10/10/03 | Tillage | Drill, no-till in standing stubble-fluted coulters | Depth: 1.00 in; Type: Sec |

S3.3. WW-F

Table S11. Intense tillage.

|  |  |  |  |
| --- | --- | --- | --- |
| Dates | Operation | Details | Remarks |
| 1/1/01 | Initial Conditions | After winter wheat seeding previous fall |  |
| 7/25/01 | Harvest - Annual | Wheat; Winter - Washington |  |
| 8/20/01 | Tillage | Disk, offset-heavy plowing>10" spacing | Depth: 8.00 in; Type: Sec |
| 4/1/02 | Tillage | Rodweeder, plain rotary rod | Depth: 2 in; Type: Sec |
| 5/15/02 | Tillage | Rodweeder, plain rotary rod | Depth: 2 in; Type: Sec |
| 8/1/02 | Tillage | Rodweeder, plain rotary rod | Depth: 2 in; Type: Sec |
| 8/25/02 | Tillage | Plow, Moldboard with uphill furrow (Pacific NW only) | Depth: 8.00 in; Type: Pri |
| 9/6/02 | Tillage | Tandem disk harrow | Depth: 4.00 in; Type: Sec |
| 9/7/02 | Tillage | Harrow-spiketooth | Depth: 3.00 in; Type: Sec |
| 9/8/02 | Tillage | Harrow-spike tooth in opposite direction | Depth: 3.00 in; Type: Sec |
| 9/9/02 | Tillage | Anhydrous applicator | Depth: 8.00 in; Type: Sec |
| 9/14/02 | Tillage | Drill with double disk opener | Depth: 1.00 in; Type: Sec |
| 9/14/02 | Plant - Annual | Wheat; Winter - Washington | Row Width: 15.00 in |

Table S12. Reduced tillage.

|  |  |  |  |
| --- | --- | --- | --- |
| Dates | Operation | Details | Remarks |
| 1/1/01 | Initial Conditions | After winter wheat seeding previous fall |  |
| 7/25/01 | Harvest - Annual | Wheat; Winter - Washington |  |
| 5/15/02 | Tillage | Rodweeder, plain rotary rod | Depth:2 in; Type: Sec |
| 8/26/02 | Tillage | Chisel plow, straight with spike pts | Depth: 6.00 in; Type: Pri |
| 9/6/02 | Tillage | Harrow-spike tooth | Depth: 3.00 in; Type: Sec |
| 9/9/02 | Tillage | Anhydrous applicator | Depth: 8.00 in; Type: Sec |
| 9/14/02 | Tillage | Drill with double disk opener | Depth: 1.00 in; Type: Sec |
| 9/14/02 | Plant - Annual | Wheat; Winter - Washington | Row Width: 15.00 in |

Table S13. No-till.

|  |  |  |  |
| --- | --- | --- | --- |
| Dates | Operation | Details | Remarks |
| 1/1/01 | Initial Conditions | After winter wheat seeding previous fall |  |
| 7/25/01 | Harvest - Annual | Wheat; Winter - Washington |  |
| 9/9/02 | Tillage | Anhydrous applicator | Depth: 4.00 in; Type: Sec |
| 9/14/02 | Tillage | Drill, no-till in standing stubble-fluted coulters | Depth: 1.00 in; Type: Sec |
| 9/14/02 | Plant - Annual | Wheat; Winter - Washington | Row Width: 15.00 in |

# S4. Projected 30-yr Tillage Proportion

## Years with \* are the recorded years while the remaining years are estimated.

Table S14. Annual percentages of intense, reduced, and no-till tillage.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Adams County | | | Asotin County | | |
| Year | Intense | Reduced | No-till | Intense | Reduced | No-till |
| 2018 | 41.2 | 54.0 | 4.8 | 3.2 | 21.6 | 75.3 |
| 2017\* | 42.3 | 53.4 | 4.3 | 5.1 | 19.7 | 75.2 |
| 2016 | 43.3 | 52.8 | 3.8 | 7.0 | 17.8 | 75.2 |
| 2015 | 44.4 | 52.2 | 3.4 | 8.8 | 16.0 | 75.2 |
| 2014 | 45.5 | 51.6 | 2.9 | 10.7 | 14.1 | 75.2 |
| 2013 | 46.6 | 51.0 | 2.4 | 12.6 | 12.3 | 75.1 |
| 2012\* | 47.6 | 50.4 | 2.0 | 14.5 | 10.4 | 75.1 |
| 2011 | 48.7 | 49.8 | 1.5 | 16.4 | 8.6 | 75.1 |
| 2010 | 49.8 | 49.2 | 1.0 | 18.2 | 6.7 | 75.1 |
| 2009 | 50.9 | 48.6 | 0.6 | 20.1 | 4.8 | 75.0 |
| 2008 | 51.9 | 48.0 | 0.1 | 22.0 | 3.0 | 75.0 |
| 2007 | 52.6 | 47.4 | 0.0 | 23.9 | 1.1 | 75.0 |
| 2006 | 53.2 | 46.8 | 0.0 | 25.0 | 0.0 | 75.0 |
| 2005 | 53.8 | 46.2 | 0.0 | 25.1 | 0.0 | 74.9 |
| 2004 | 54.4 | 45.6 | 0.0 | 25.1 | 0.0 | 74.9 |
| 2003 | 55.0 | 45.0 | 0.0 | 25.1 | 0.0 | 74.9 |
| 2002 | 55.7 | 44.4 | 0.0 | 25.1 | 0.0 | 74.9 |
| 2001 | 56.3 | 43.7 | 0.0 | 25.2 | 0.0 | 74.8 |
| 2000 | 56.9 | 43.1 | 0.0 | 25.2 | 0.0 | 74.8 |
| 1999 | 57.5 | 42.5 | 0.0 | 25.2 | 0.0 | 74.8 |
| 1998 | 58.1 | 41.9 | 0.0 | 25.2 | 0.0 | 74.8 |
| 1997 | 58.7 | 41.3 | 0.0 | 25.3 | 0.0 | 74.8 |
| 1996 | 59.3 | 40.7 | 0.0 | 25.3 | 0.0 | 74.7 |
| 1995 | 59.9 | 40.1 | 0.0 | 25.3 | 0.0 | 74.7 |
| 1994 | 60.5 | 39.5 | 0.0 | 25.3 | 0.0 | 74.7 |
| 1993 | 61.1 | 38.9 | 0.0 | 25.3 | 0.0 | 74.7 |
| 1992 | 61.7 | 38.3 | 0.0 | 25.4 | 0.0 | 74.6 |
| 1991 | 62.3 | 37.7 | 0.0 | 25.4 | 0.0 | 74.6 |
| 1990 | 62.9 | 37.1 | 0.0 | 25.4 | 0.0 | 74.6 |
| 1989 | 63.5 | 36.5 | 0.0 | 25.4 | 0.0 | 74.6 |
| **30-yr average** | 53.9 | 45.3 | 0.9 | 20.6 | 4.5 | 74.9 |

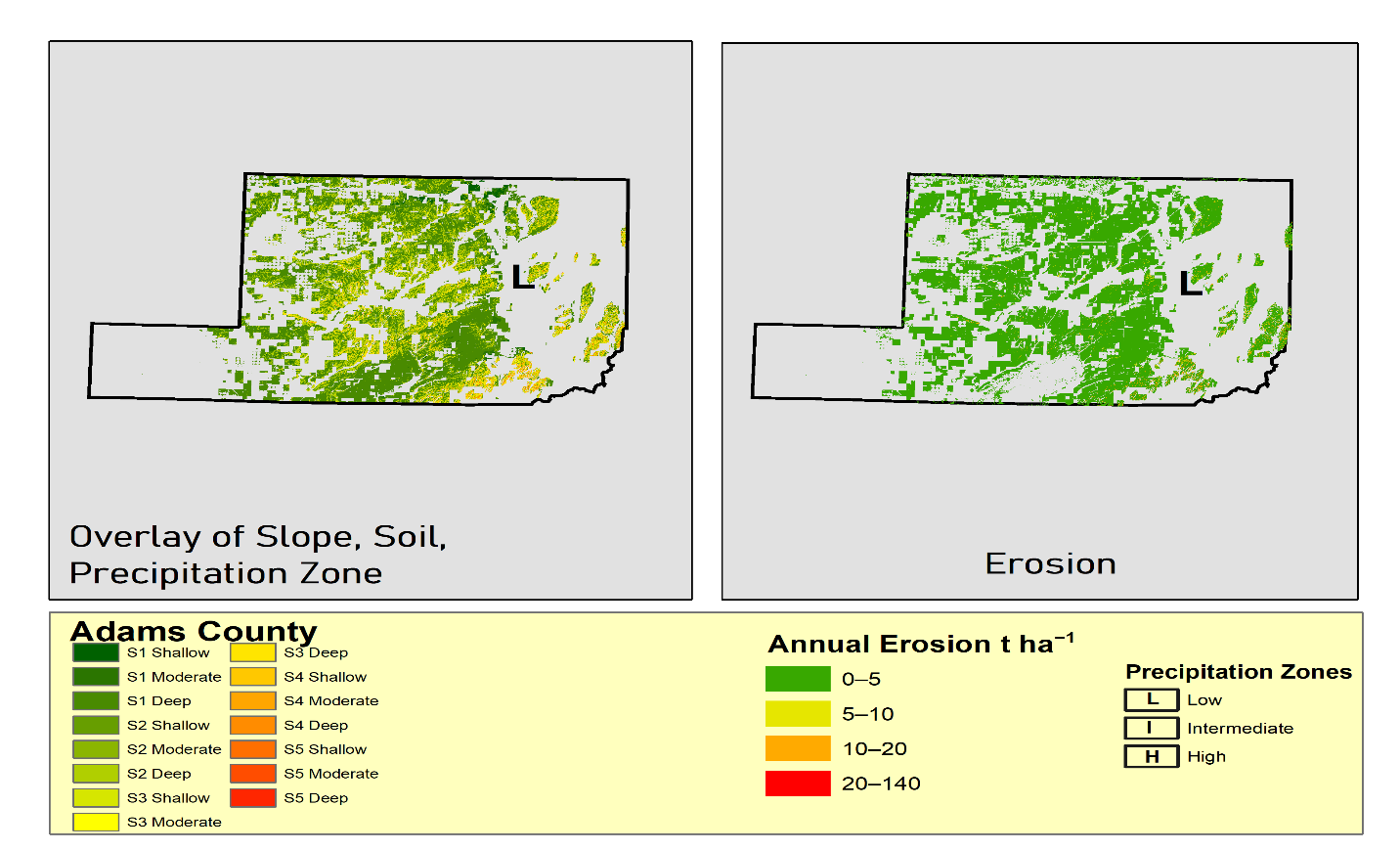
|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Benton County | | | Douglas County | | |
| Year | Intense | Reduced | No-till | Intense | Reduced | No-till |
| 2018 | 11.1 | 47.0 | 41.9 | 44.3 | 28.9 | 26.8 |
| 2017\* | 16.4 | 43.6 | 40.0 | 48.5 | 28.8 | 22.7 |
| 2016 | 21.8 | 40.2 | 38.1 | 52.7 | 28.7 | 18.6 |
| 2015 | 27.1 | 36.8 | 36.1 | 56.9 | 28.5 | 14.5 |
| 2014 | 32.4 | 33.4 | 34.2 | 61.1 | 28.4 | 10.5 |
| 2013 | 37.7 | 30.0 | 32.3 | 65.3 | 28.3 | 6.4 |
| 2012\* | 43.0 | 26.6 | 30.4 | 69.5 | 28.2 | 2.3 |
| 2011 | 48.3 | 23.2 | 28.5 | 71.9 | 28.1 | 0.0 |
| 2010 | 53.6 | 19.8 | 26.6 | 72.0 | 28.0 | 0.0 |
| 2009 | 58.9 | 16.5 | 24.7 | 72.1 | 27.9 | 0.0 |
| 2008 | 64.2 | 13.1 | 22.8 | 72.2 | 27.8 | 0.0 |
| 2007 | 69.5 | 9.7 | 20.9 | 72.3 | 27.7 | 0.0 |
| 2006 | 74.8 | 6.3 | 19.0 | 72.4 | 27.6 | 0.0 |
| 2005 | 80.1 | 2.9 | 17.0 | 72.5 | 27.5 | 0.0 |
| 2004 | 84.9 | 0.0 | 15.1 | 72.6 | 27.4 | 0.0 |
| 2003 | 86.8 | 0.0 | 13.2 | 72.7 | 27.3 | 0.0 |
| 2002 | 88.7 | 0.0 | 11.3 | 72.8 | 27.2 | 0.0 |
| 2001 | 90.6 | 0.0 | 9.4 | 72.9 | 27.1 | 0.0 |
| 2000 | 92.5 | 0.0 | 7.5 | 73.0 | 27.0 | 0.0 |
| 1999 | 94.4 | 0.0 | 5.6 | 73.1 | 26.9 | 0.0 |
| 1998 | 96.3 | 0.0 | 3.7 | 73.3 | 26.7 | 0.0 |
| 1997 | 98.2 | 0.0 | 1.8 | 73.4 | 26.6 | 0.0 |
| 1996 | 100.0 | 0.0 | 0.0 | 73.5 | 26.5 | 0.0 |
| 1995 | 100.0 | 0.0 | 0.0 | 73.6 | 26.4 | 0.0 |
| 1994 | 100.0 | 0.0 | 0.0 | 73.7 | 26.3 | 0.0 |
| 1993 | 100.0 | 0.0 | 0.0 | 73.8 | 26.2 | 0.0 |
| 1992 | 100.0 | 0.0 | 0.0 | 73.9 | 26.1 | 0.0 |
| 1991 | 100.0 | 0.0 | 0.0 | 74.0 | 26.0 | 0.0 |
| 1990 | 100.0 | 0.0 | 0.0 | 74.1 | 25.9 | 0.0 |
| 1989 | 100.0 | 0.0 | 0.0 | 74.2 | 25.8 | 0.0 |
| **30-yr average** | 72.4 | 11.6 | 16.0 | 69.3 | 27.3 | 3.4 |

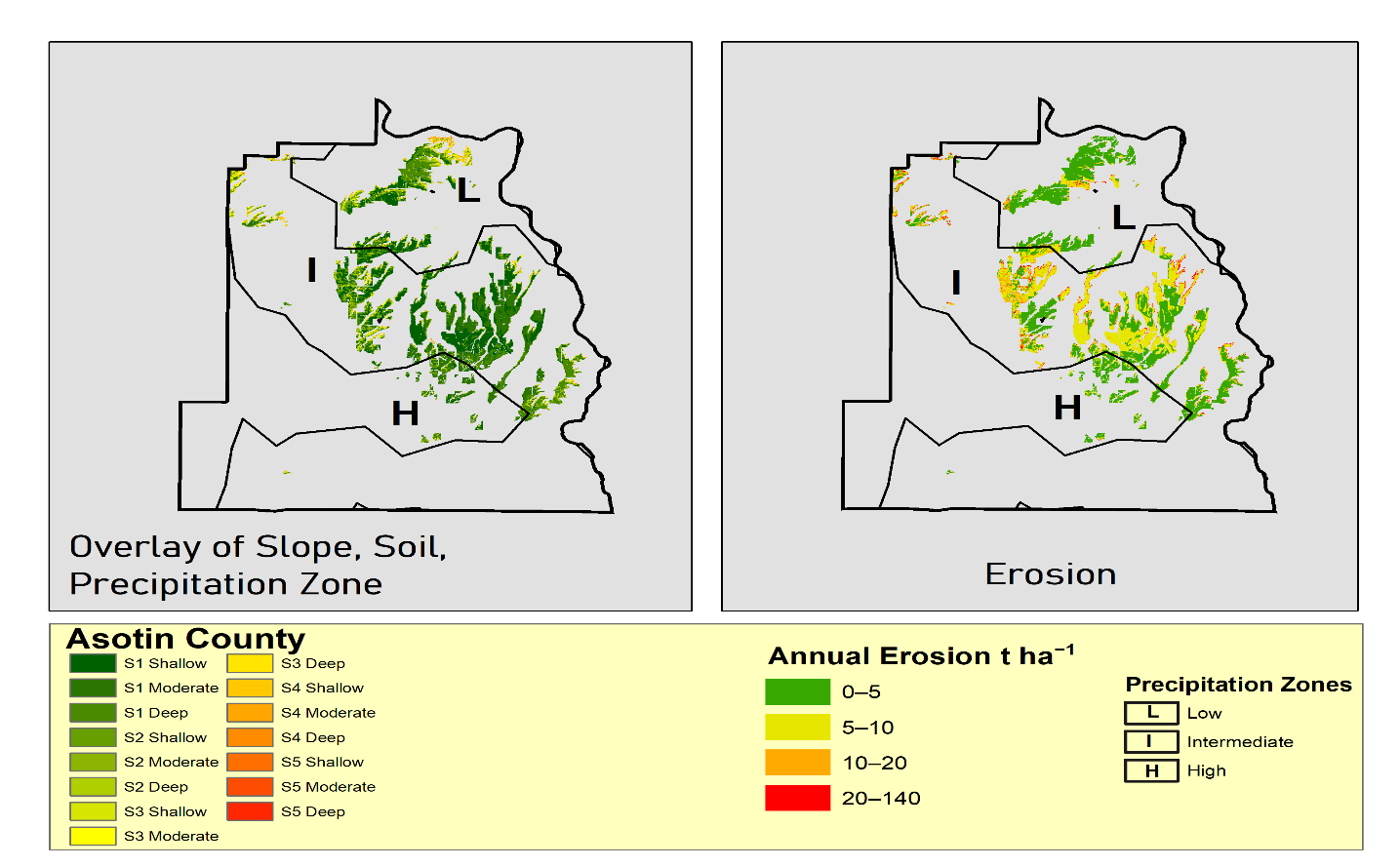
|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Grant County | | | Lincoln County | | |
| Year | Intense | Reduced | No-till | Intense | Reduced | No-till |
| 2018 | 59.0 | 33.1 | 7.9 | 25.2 | 48.1 | 26.7 |
| 2017\* | 61.2 | 31.6 | 7.2 | 28.0 | 45.5 | 26.6 |
| 2016 | 63.5 | 30.1 | 6.5 | 30.8 | 42.8 | 26.4 |
| 2015 | 65.7 | 28.6 | 5.8 | 33.6 | 40.1 | 26.2 |
| 2014 | 67.9 | 27.0 | 5.1 | 36.4 | 37.5 | 26.1 |
| 2013 | 70.1 | 25.5 | 4.4 | 39.2 | 34.8 | 25.9 |
| 2012\* | 72.3 | 24.0 | 3.7 | 42.1 | 32.2 | 25.8 |
| 2011 | 74.6 | 22.5 | 3.0 | 44.9 | 29.5 | 25.6 |
| 2010 | 76.8 | 21.0 | 2.3 | 47.7 | 26.8 | 25.5 |
| 2009 | 79.0 | 19.4 | 1.5 | 50.5 | 24.2 | 25.3 |
| 2008 | 81.2 | 17.9 | 0.8 | 53.3 | 21.5 | 25.2 |
| 2007 | 83.5 | 16.4 | 0.1 | 56.1 | 18.9 | 25.0 |
| 2006 | 85.1 | 14.9 | 0.0 | 58.9 | 16.2 | 24.9 |
| 2005 | 86.6 | 13.4 | 0.0 | 61.7 | 13.5 | 24.7 |
| 2004 | 88.1 | 11.9 | 0.0 | 64.6 | 10.9 | 24.6 |
| 2003 | 89.7 | 10.3 | 0.0 | 67.4 | 8.2 | 24.4 |
| 2002 | 91.2 | 8.8 | 0.0 | 70.2 | 5.6 | 24.3 |
| 2001 | 92.7 | 7.3 | 0.0 | 73.0 | 2.9 | 24.1 |
| 2000 | 94.2 | 5.8 | 0.0 | 75.8 | 0.2 | 24.0 |
| 1999 | 95.7 | 4.3 | 0.0 | 76.2 | 0.0 | 23.8 |
| 1998 | 97.3 | 2.7 | 0.0 | 76.3 | 0.0 | 23.7 |
| 1997 | 98.8 | 1.2 | 0.0 | 76.5 | 0.0 | 23.5 |
| 1996 | 100.0 | 0.0 | 0.0 | 76.6 | 0.0 | 23.4 |
| 1995 | 100.0 | 0.0 | 0.0 | 76.8 | 0.0 | 23.2 |
| 1994 | 100.0 | 0.0 | 0.0 | 76.9 | 0.0 | 23.1 |
| 1993 | 100.0 | 0.0 | 0.0 | 77.1 | 0.0 | 22.9 |
| 1992 | 100.0 | 0.0 | 0.0 | 77.3 | 0.0 | 22.8 |
| 1991 | 100.0 | 0.0 | 0.0 | 77.4 | 0.0 | 22.6 |
| 1990 | 100.0 | 0.0 | 0.0 | 77.6 | 0.0 | 22.4 |
| 1989 | 100.0 | 0.0 | 0.0 | 77.7 | 0.0 | 22.3 |
| **30-yr average** | 85.8 | 12.6 | 1.6 | 60.2 | 15.3 | 24.5 |

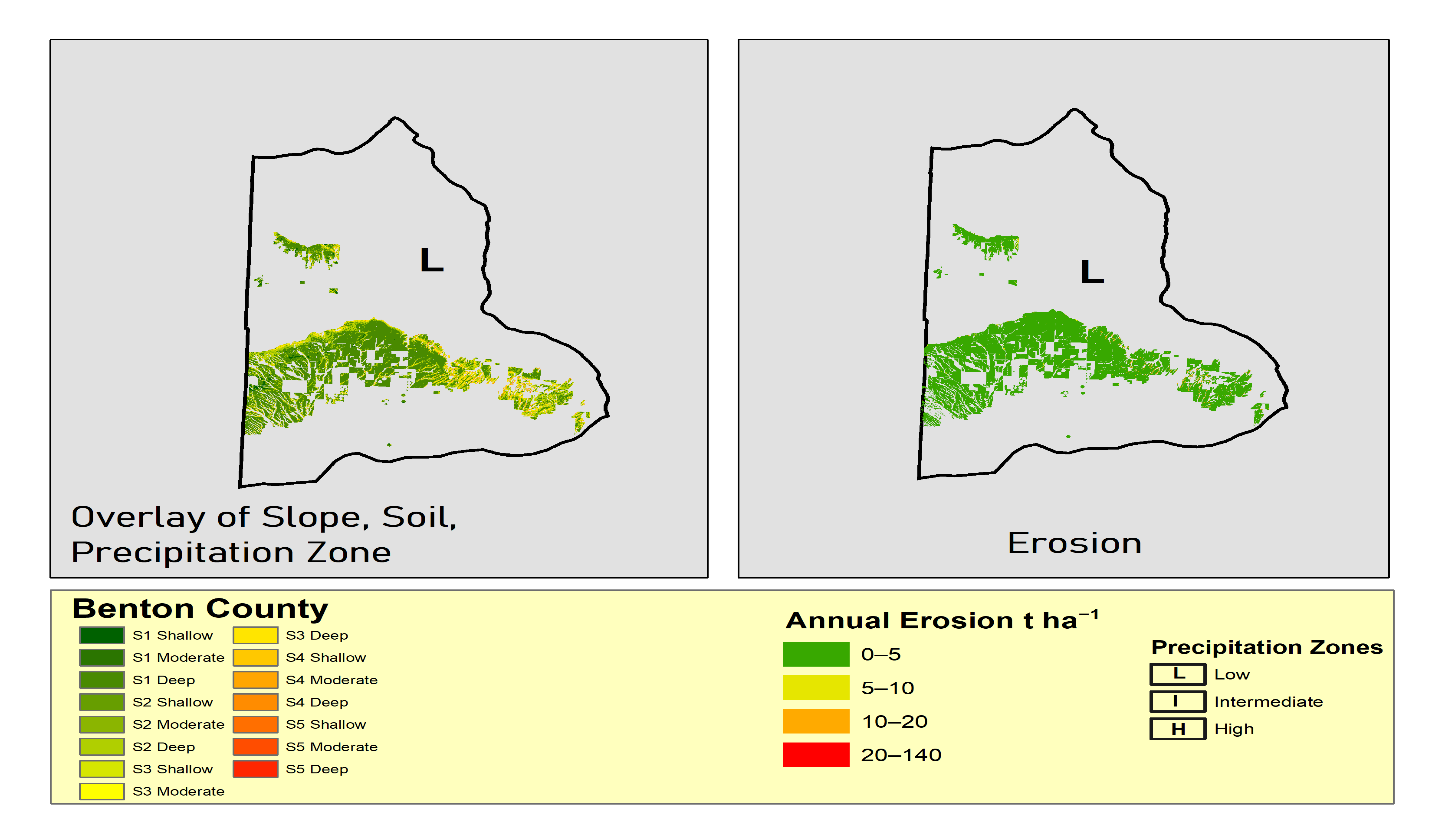
|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Franklin County | | | Spokane County | | |
| Year | Intense | Reduced | No-till | Intense | Reduced | No-till |
| 2018 | 38.9 | 51.6 | 9.5 | 15.8 | 38.6 | 45.5 |
| 2017\* | 42.6 | 48.7 | 8.7 | 17.3 | 38.7 | 44.0 |
| 2016 | 46.4 | 45.8 | 7.9 | 18.8 | 38.7 | 42.5 |
| 2015 | 50.1 | 42.8 | 7.1 | 20.3 | 38.7 | 41.0 |
| 2014 | 53.8 | 39.9 | 6.3 | 21.8 | 38.7 | 39.5 |
| 2013 | 57.5 | 37.0 | 5.5 | 23.4 | 38.7 | 38.0 |
| 2012\* | 61.3 | 34.1 | 4.7 | 24.9 | 38.7 | 36.5 |
| 2011 | 65.0 | 31.1 | 3.9 | 26.4 | 38.7 | 35.0 |
| 2010 | 68.7 | 28.2 | 3.1 | 27.9 | 38.7 | 33.4 |
| 2009 | 72.4 | 25.3 | 2.3 | 29.4 | 38.7 | 31.9 |
| 2008 | 76.2 | 22.3 | 1.5 | 30.9 | 38.7 | 30.4 |
| 2007 | 79.9 | 19.4 | 0.7 | 32.4 | 38.7 | 28.9 |
| 2006 | 83.5 | 16.5 | 0.0 | 33.9 | 38.7 | 27.4 |
| 2005 | 86.5 | 13.5 | 0.0 | 35.4 | 38.7 | 25.9 |
| 2004 | 89.4 | 10.6 | 0.0 | 36.9 | 38.7 | 24.4 |
| 2003 | 92.3 | 7.7 | 0.0 | 38.4 | 38.7 | 22.9 |
| 2002 | 95.3 | 4.7 | 0.0 | 39.9 | 38.7 | 21.4 |
| 2001 | 98.2 | 1.8 | 0.0 | 41.4 | 38.7 | 19.8 |
| 2000 | 100.0 | 0.0 | 0.0 | 43.0 | 38.7 | 18.3 |
| 1999 | 100.0 | 0.0 | 0.0 | 44.5 | 38.7 | 16.8 |
| 1998 | 100.0 | 0.0 | 0.0 | 46.0 | 38.7 | 15.3 |
| 1997 | 100.0 | 0.0 | 0.0 | 47.5 | 38.7 | 13.8 |
| 1996 | 100.0 | 0.0 | 0.0 | 49.0 | 38.7 | 12.3 |
| 1995 | 100.0 | 0.0 | 0.0 | 50.5 | 38.7 | 10.8 |
| 1994 | 100.0 | 0.0 | 0.0 | 52.0 | 38.7 | 9.3 |
| 1993 | 100.0 | 0.0 | 0.0 | 53.5 | 38.7 | 7.7 |
| 1992 | 100.0 | 0.0 | 0.0 | 55.0 | 38.8 | 6.2 |
| 1991 | 100.0 | 0.0 | 0.0 | 56.5 | 38.8 | 4.7 |
| 1990 | 100.0 | 0.0 | 0.0 | 58.0 | 38.8 | 3.2 |
| 1989 | 100.0 | 0.0 | 0.0 | 59.5 | 38.8 | 1.7 |
| **30-yr average** | 81.9 | 16.0 | 2.0 | 37.7 | 38.7 | 23.6 |

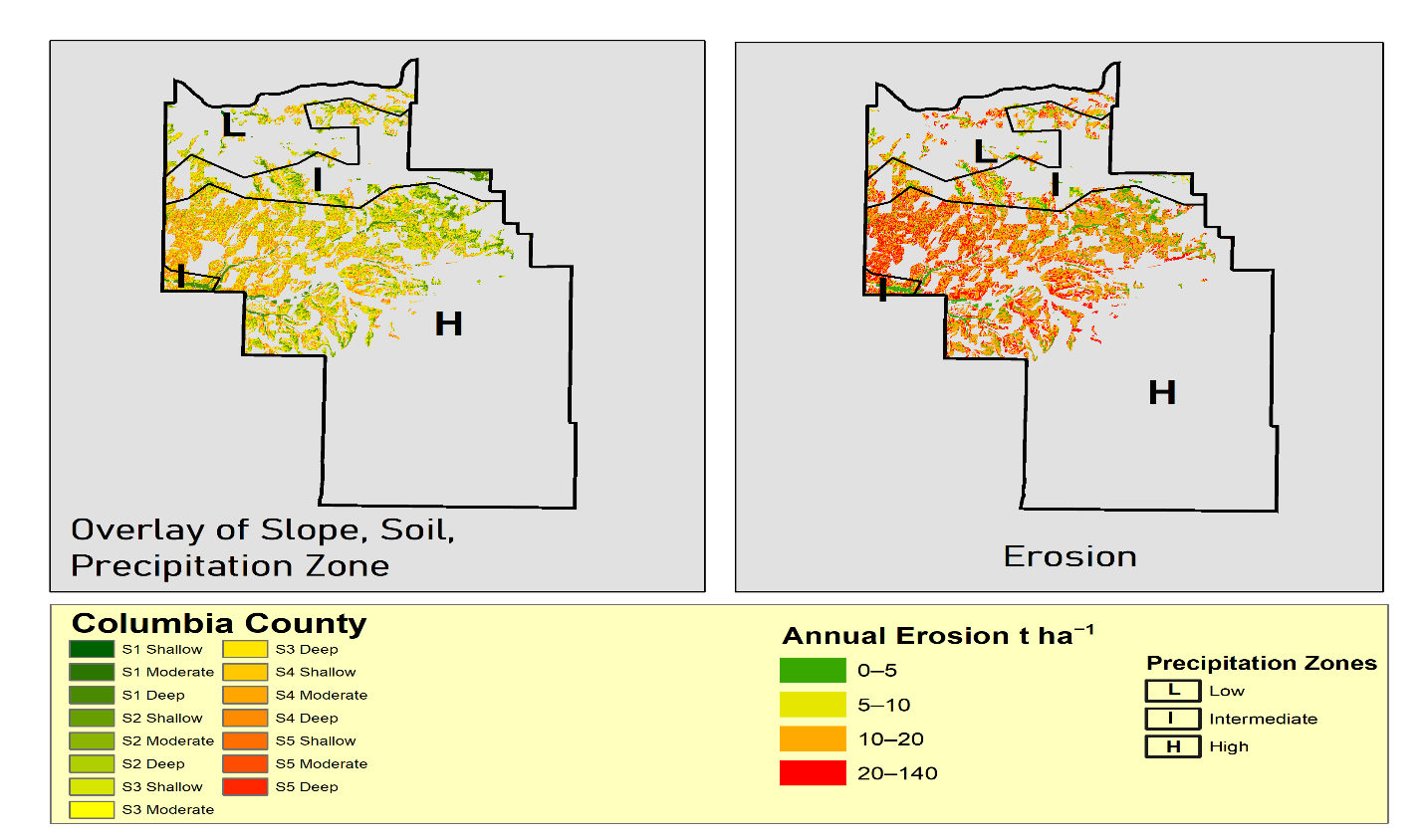
|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Columbia County | | | Walla Walla County | | |
| Year | Intense | Reduced | No-till | Intense | Reduced | No-till |
| 2018 | 0.0 | 55.6 | 44.6 | 13.9 | 41.2 | 44.9 |
| 2017\* | 4.1 | 53.4 | 42.6 | 15.9 | 40.6 | 43.5 |
| 2016 | 8.3 | 51.1 | 40.6 | 18.0 | 39.9 | 42.1 |
| 2015 | 12.6 | 48.8 | 38.5 | 20.0 | 39.3 | 40.7 |
| 2014 | 16.9 | 46.6 | 36.5 | 22.0 | 38.6 | 39.4 |
| 2013 | 21.1 | 44.3 | 34.5 | 24.0 | 38.0 | 38.0 |
| 2012\* | 25.4 | 42.1 | 32.5 | 26.1 | 37.4 | 36.6 |
| 2011 | 29.7 | 39.8 | 30.5 | 28.1 | 36.7 | 35.2 |
| 2010 | 33.9 | 37.6 | 28.5 | 30.1 | 36.1 | 33.8 |
| 2009 | 38.2 | 35.3 | 26.5 | 32.1 | 35.4 | 32.5 |
| 2008 | 42.4 | 33.1 | 24.5 | 34.1 | 34.8 | 31.1 |
| 2007 | 46.7 | 30.8 | 22.5 | 36.2 | 34.1 | 29.7 |
| 2006 | 51.0 | 28.6 | 20.5 | 38.2 | 33.5 | 28.3 |
| 2005 | 55.2 | 26.3 | 18.5 | 40.2 | 32.8 | 27.0 |
| 2004 | 59.5 | 24.0 | 16.5 | 42.2 | 32.2 | 25.6 |
| 2003 | 63.7 | 21.8 | 14.5 | 44.2 | 31.5 | 24.2 |
| 2002 | 68.0 | 19.5 | 12.5 | 46.3 | 30.9 | 22.8 |
| 2001 | 72.3 | 17.3 | 10.5 | 48.3 | 30.2 | 21.5 |
| 2000 | 76.5 | 15.0 | 8.5 | 50.3 | 29.6 | 20.1 |
| 1999 | 80.8 | 12.8 | 6.5 | 52.3 | 29.0 | 18.7 |
| 1998 | 85.0 | 10.5 | 4.4 | 54.4 | 28.3 | 17.3 |
| 1997 | 89.3 | 8.3 | 2.4 | 56.4 | 27.7 | 16.0 |
| 1996 | 93.6 | 6.0 | 0.4 | 58.4 | 27.0 | 14.6 |
| 1995 | 96.2 | 3.8 | 0.0 | 60.4 | 26.4 | 13.2 |
| 1994 | 98.5 | 1.5 | 0.0 | 62.4 | 25.7 | 11.8 |
| 1993 | 100.0 | 0.0 | 0.0 | 64.5 | 25.1 | 10.5 |
| 1992 | 100.0 | 0.0 | 0.0 | 66.5 | 24.4 | 9.1 |
| 1991 | 100.0 | 0.0 | 0.0 | 68.5 | 23.8 | 7.7 |
| 1990 | 100.0 | 0.0 | 0.0 | 70.5 | 23.1 | 6.3 |
| 1989 | 100.0 | 0.0 | 0.0 | 72.6 | 22.5 | 5.0 |
| **30-yr average** | 59.0 | 23.8 | 17.3 | 43.2 | 31.9 | 24.9 |

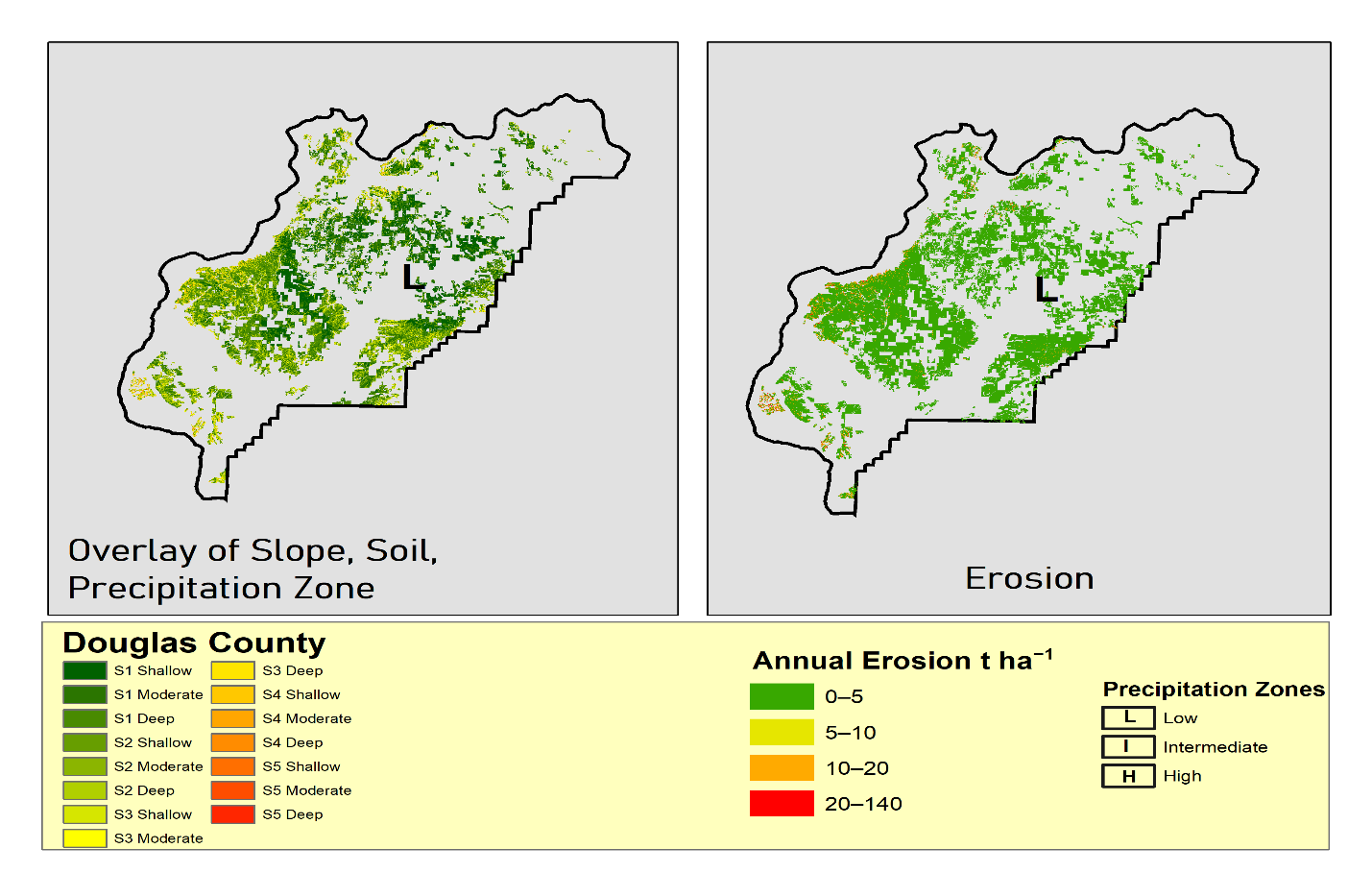
# S5. Erosion Maps

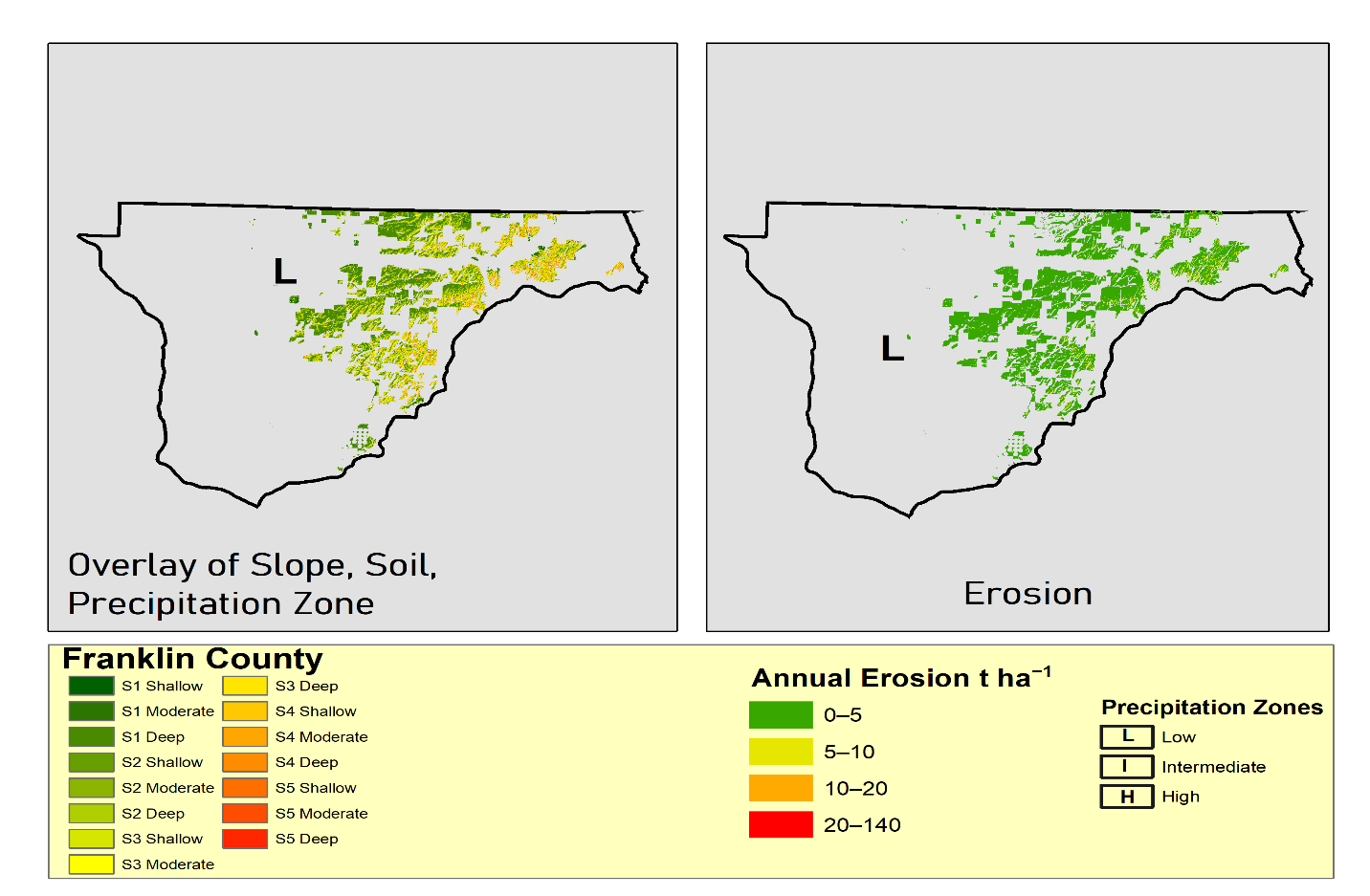


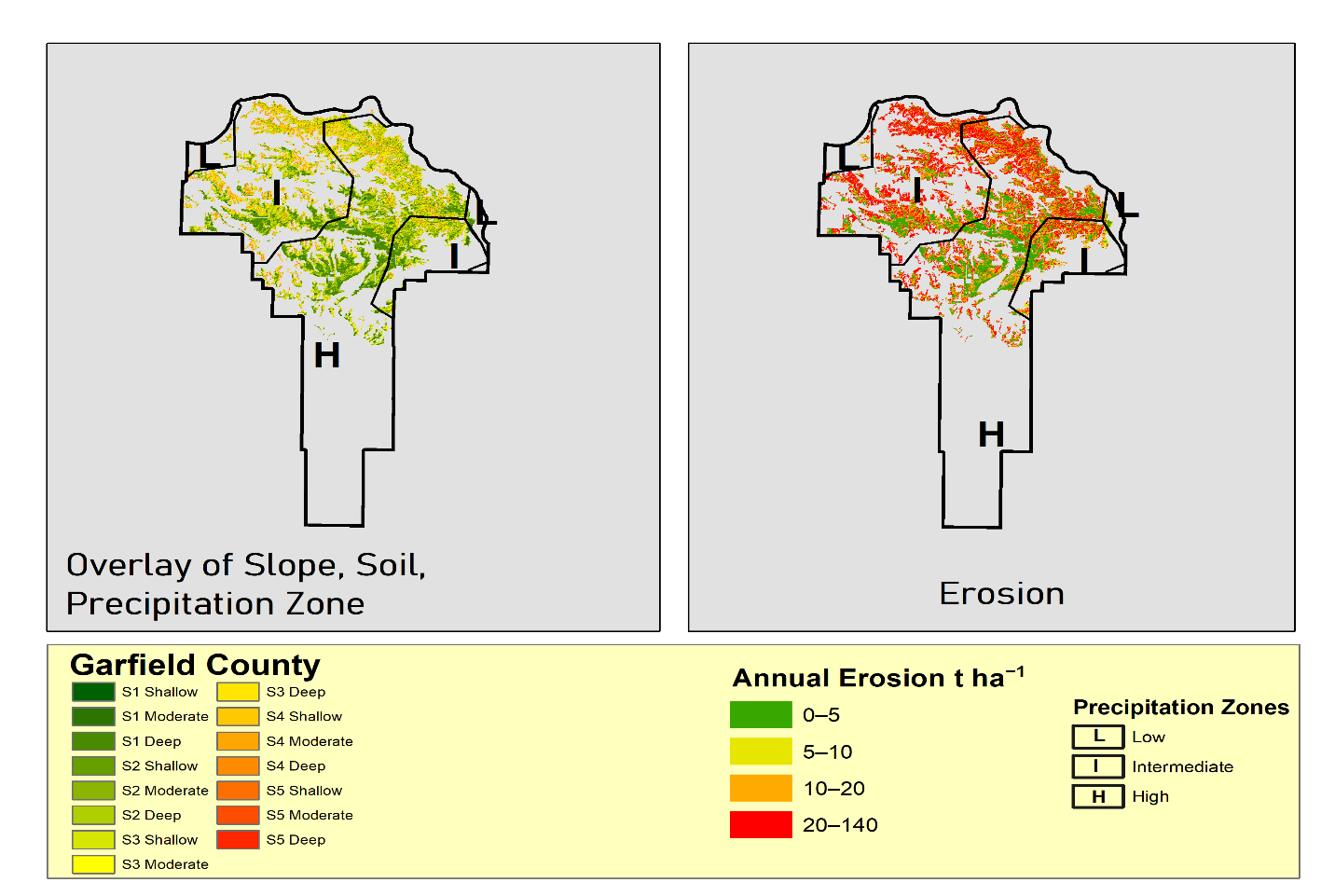


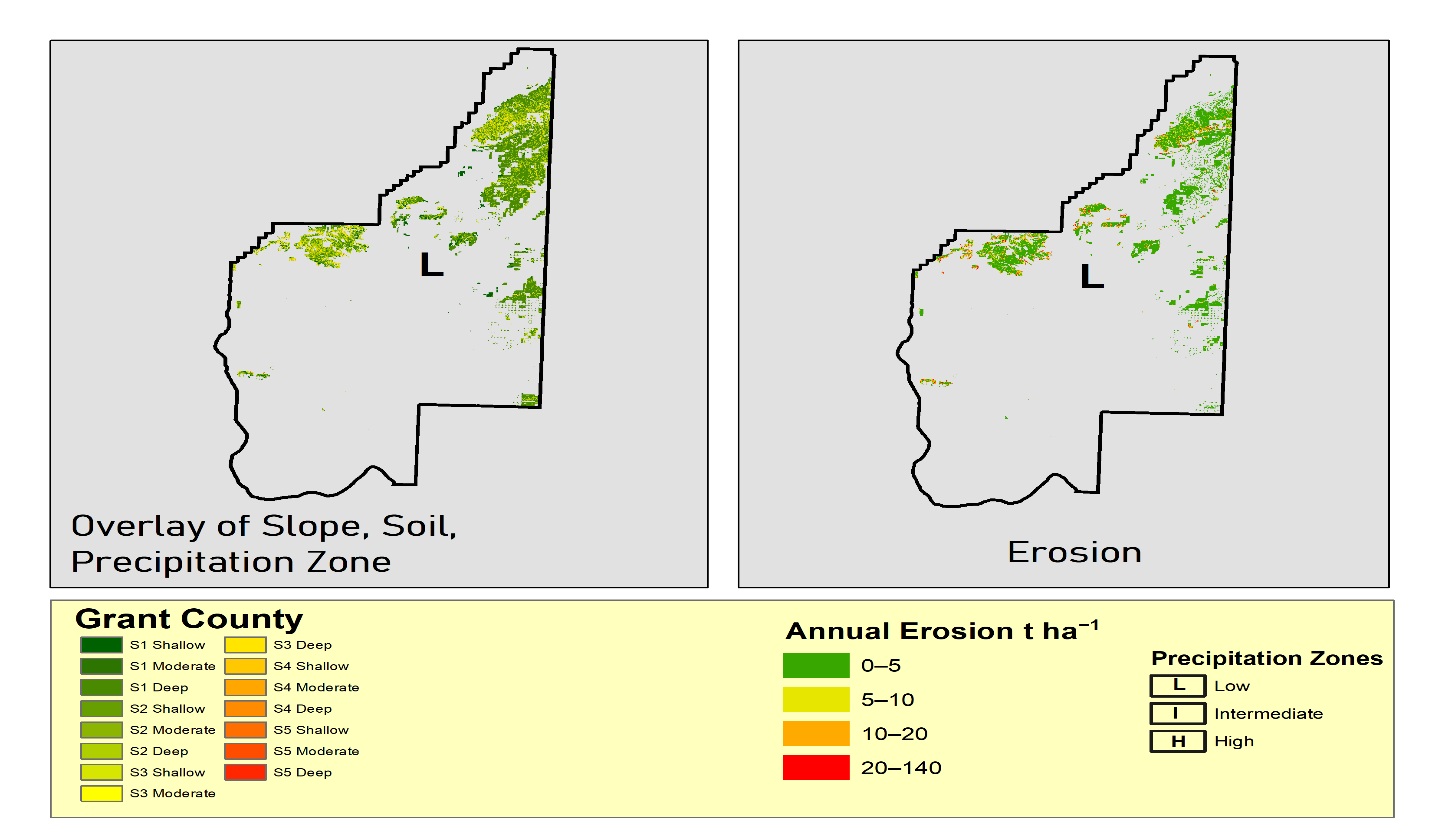


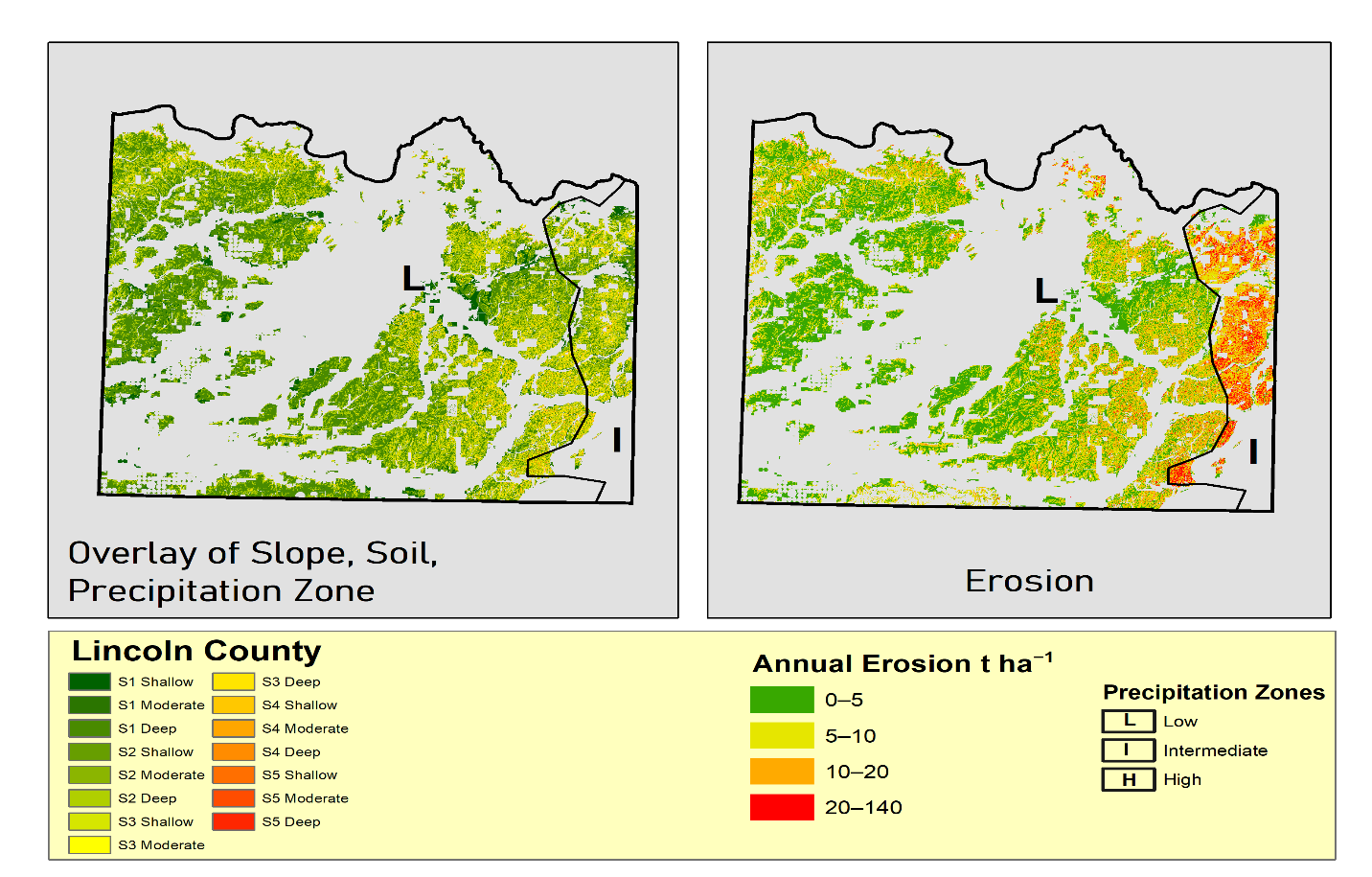


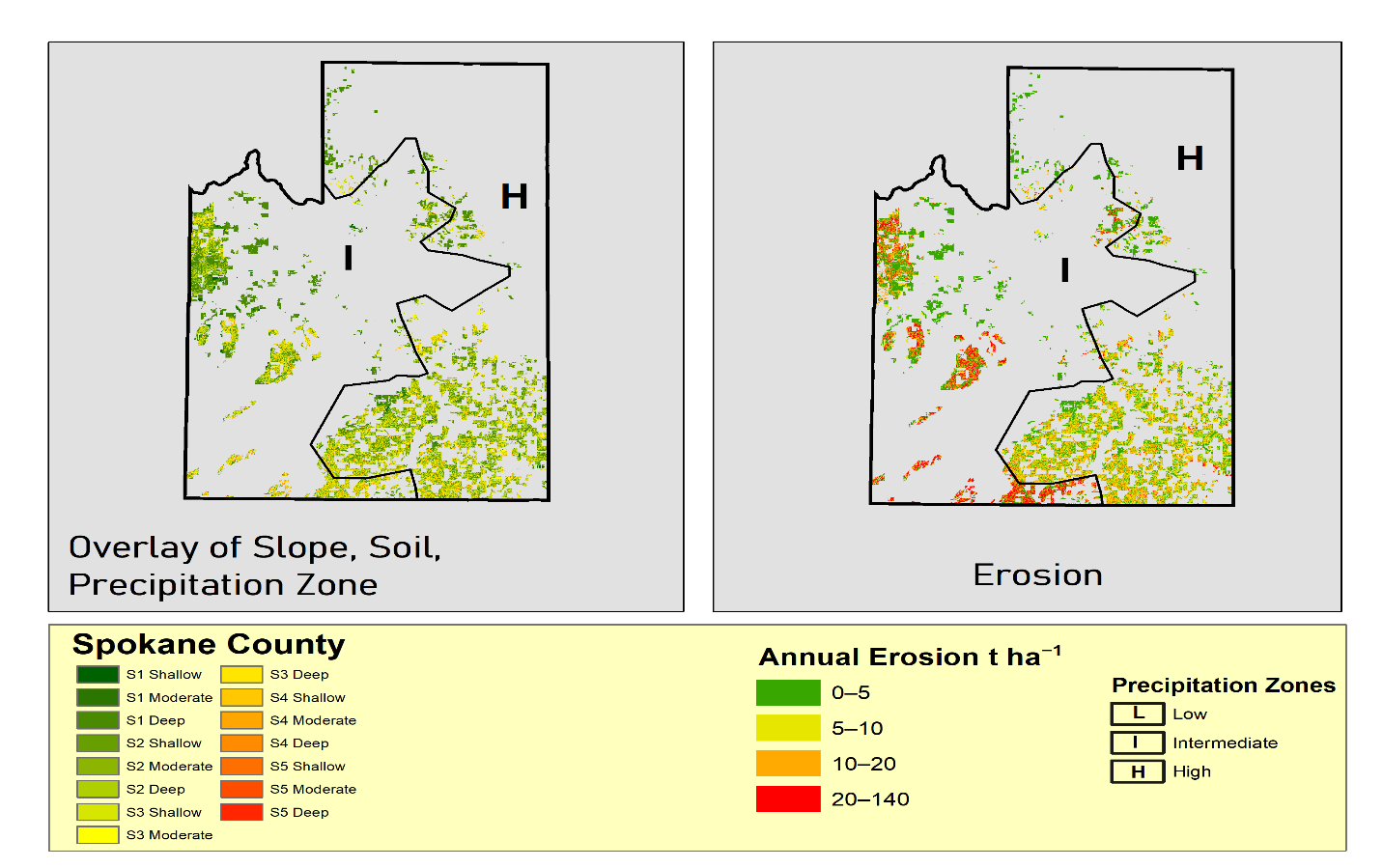


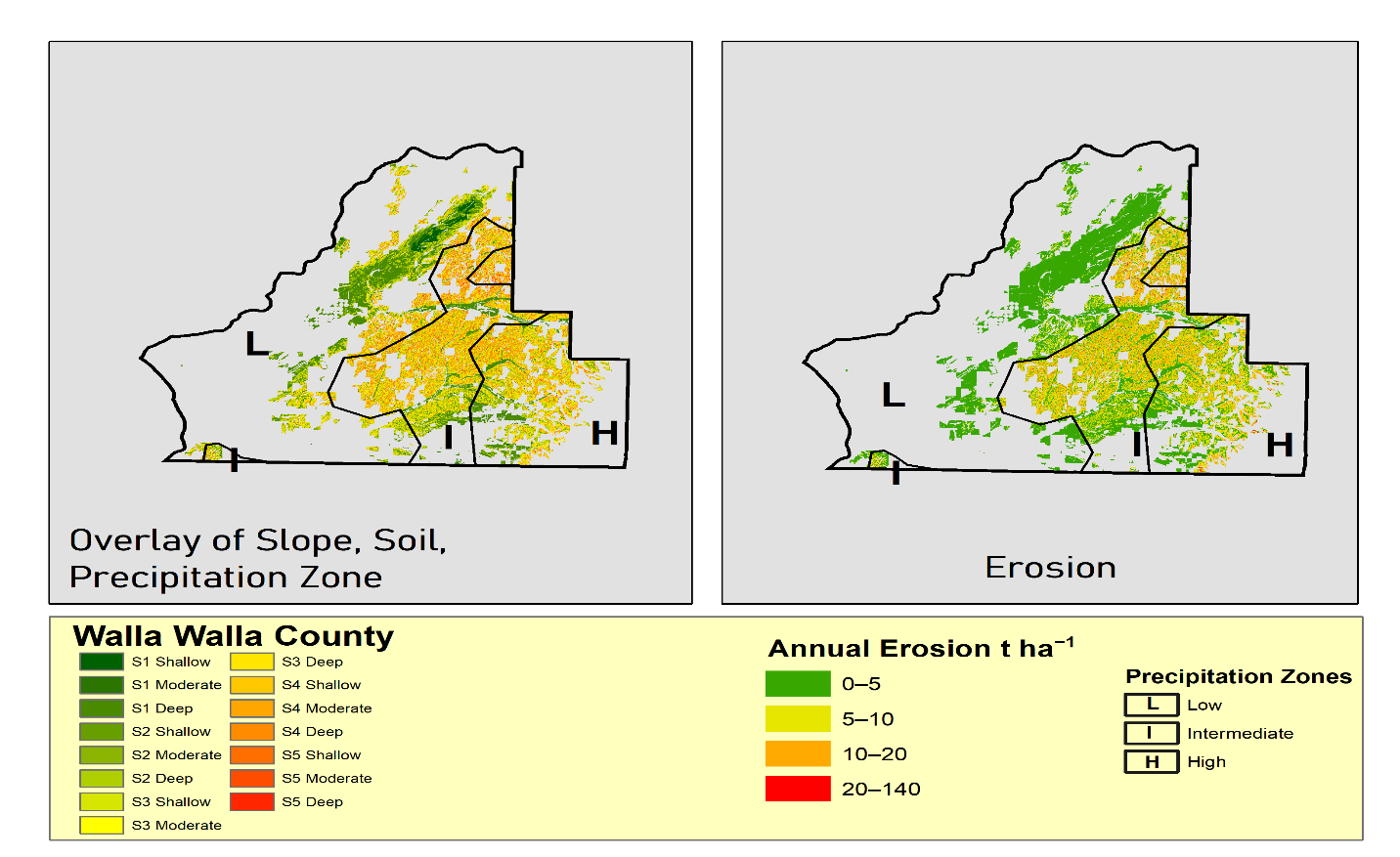












# S6. Temporal Variation of Erosion Rates

