

Table 1. Base PI values for the 12 soil orders

Soil Order	Base Productivity Index value	Justification
Histosols	14	Organic soils, highly fertile when drained
Mollisols	13	Highest organic matter contents of all mineral soils
Vertisols	12	Also very high in organic matter
Andisols	11	Minimally weathered and rich in short range-order minerals; many are rich in organic matter
Alfisols	10	Generally low in organic matter, but many are quite fertile
Inceptisols	9	Like Alfisols, but usually less fertile
Gelisols	8	Generally fertile soils, but severely compromised due to cold climate
Spodosols	7	Acid soils of minimal productivity, although some have notable amounts of organic matter
Entisols	6	Minimally developed soils, usually low in organic matter
Aridisols	5	Can be fertile but severely compromised by dry climate
Ultisols	4	Low activity clays limit productivity
Oxisols	3	Oxide and low activity clays greatly limit productivity

Table 2. Suborder PI modifiers¹

Suborder modifier name²	Change made to base PI value	Justification	Soil orders affected
And-	+2	Andic properties imply increased productivity	Inceptisols
Gel-	+2	Gelic properties imply increased organic matter	Spodosols and Inceptisols
Hist-	+2	Histic properties imply increased organic matter	Gelisols

Hum-	+2	Increased amounts of organic matter	Spodosols
Anthr-	+1	Manuring and other human influences likely increase the overall productivity	Inceptisols
Arg-	+1	Illuvial clay in B horizon probably increases CEC and water-holding ability	Aridisols
Calc-	+1	Calcium is an essential nutrient; these soils have an abundance	Aridisols
Fluv-	+1	Soils in floodplains frequently get influxes of fresh, humus-rich sediment	Entisols
Rend-	+1	High amounts of Ca, an essential nutrient; high pH levels in subsoil	Mollisols
Umb-	+1	Increased amounts of organic matter	Inceptisols
Vitr-	+1	Glassy mineral assemblage promotes nutrient storage and exchange	Andisols
Dur-	-1	Duripan restricts rooting depth	Aridisols
Psamm-	-2	Sandiness limits CEC and water-holding capacity	Entisols

1. Modifiers not shown here have no effect on the Base PI value.

2. Names in italics are obsolete terms used in versions of Soil Taxonomy that were published prior to 1999. We included them in our system so older soil names could also be fit to the PI.

Table 3. Great Group PI modifiers¹

Great Group modifier name ²	Change made to base PI value	Justification
And- Gel- Hist- Hum-	+2	See Table 2
Eutr-	+2	Definition implies high productivity and pH
Moll-	+2	Increased amounts of organic matter
Plagg-	+2	Implies long-continued manuring and mixing
Anthr- Arg- Calc- Calci- Fluv- <i>Umbr</i> - Vitr-	+1	See Table 2
Melan-	+1	Implies darker colors and increased amounts of organic matter
Somb-	+1	Implies subsoil organic matter accumulations
Verm-	+1	Worm activity is commonly associated with fertile soils of good tilth and high organic matter contents
Dur-	-1	See Table 2
Acr-	-1	Abnormally low CEC in Oxisols
Fragi- Fragloss-	-1	Fragipan restricts rooting depth and implies low pH
Hal-	-1	High amounts of sodium inhibit most types of plant growth
Kand- Kan-	-1	Kandic horizon is inherently low in productivity and CEC
Natr- Na-	-1	High amounts of sodium inhibit most types of plant growth
Pale-	-1	Implies old age and long-term weathering and pedogenesis
Petr-	-1	Petrocalcic horizon restrict rooting depth
Plac-	-1	Placic horizon implies acidic conditions and restricted rooting
Plinth-	-1	Plinthite is inherently infertile and often restricts rooting
Sal-	-1	High amounts of soluble salts inhibit most types of plant growth

Sphagn-	-1	Highly acidic Histosols
Sulf-	-1	Highly acidic materials within the solum
Dur- Psamm-	-2	See Table 2
Dystr-	-2	Definition implies low productivity and pH
Nadur-	-2	Combination of Natric (-1) and Duripan (-1)
Quartz-	-2	Quartz-rich sands are inherently infertile

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Table 4. Subgroup PI modifiers¹

Subgroup modifier name ²	Change made to base PI value	Justification
Andaqueptic Andeptic Andic Aquandic Haploxerandic Udandic Ustandic Ustivitrandic Vitrandic Vitric Vitritorrandic Vitrixerandic	+2	See Table 2 (Vitr-) and Table 3 (And-)
Aquollic Borollic Calcixerollic Hapludollic Haploxerollic (in Aridisols) Haplustollic Mollic Rendollic Udollic Ustollic Xerollic	+2	See Table 3 (Moll-) and Table 2 (Rend-)
Calciargidic Calcic Calcidic <i>Calciorthidic Haplocalcidic</i>	+2	See Table 2 (Calc- and Arg-)
Plagganthreptic	+2	See Table 3 (Plagg-)
Pachic	+2	Thick A horizon with more organic matter than is typical
Humic Humaqueptic	+2	Increased amounts of organic matter
Histic Ruptic-Histic	+2	Increased amounts of organic matter
Aquertic Ruptic-Vertic Udertic Ustertic Vertic	+2	Vertic characteristics indicate enhanced CEC and increased organic matter content
Alfic Aqualfic Argiaquic <i>Argic</i> <i>Argidic Boralfic Haplargidic</i> <i>Haploxeralfic</i> Ruptic-Alfic Ruptic-Argic <i>Udalfic</i> Ustalfic Xeralfic	+1	Illuvial clay in B horizon probably increases CEC and water-holding ability; see also Table 2 (Arg-)
Anthraquic Anthropic	+1	Increased amounts of organic matter and P
Cumulic	+1	Thicker A horizon and probably increased organic matter
Fluvaqueptic Fluventic Torrifluventic Udifluventic <i>Ustifluventic</i>	+1	See Table 2
Lamellic	+1	Lamellae enhance nutrient-holding capacities in sandy soils

Sombric	+1	See Table 3
Thapto-Histic	+1	Buried organic materials provide nutrients to growing plants
Umbric	+1	See Table 2
Vermic	+1	See Table 3
Durixerollic	-1	Combination of Duric (-1) and Mollic (+2).
Acraquoxic Acrudoxic Acrustoxic Albaquultic Aquultic <i>Orthoxic</i> Oxic Ruptic-Ultic Torroxic Udoxic Ultic Ustoxic	-1	Oxic/kandic mineralogy implies low CEC
Alic	-1	High amounts of aluminum reduce productivity
Arenic	-1	Sandy, generally infertile soils
Duric Duridic Durinodic Durorthidic Haploduridic Petronodic	-1	See Table 2
Fragiaquic Fragic	-1	See Table 3
Halic	-1	See Table 3
Kandic Kanhaplic	-1	See Table 3
Natric	-1	See Table 3
Placic	-1	See Table 3
Plinthaquic Plinthic	-1	See Table 3
Ruptic-Lithic Ruptic-Lithic-Entic <i>Ruptic-Lithic-Xerochreptic</i>	-1	Shallow bedrock limits rooting volume, but not as extreme as Lithic (-2) subgroups
Salic Salidic <i>Salorthidic</i>	-1	See Table 3
Sodic	-1	High amounts of sodium inhibit most types of plant growth
Sphagnic	-1	See Table 3
Sulfaqueptic Sulfic Sulfuric	-1	See Table 3
Dystric	-2	See Table 3
Grossarenic	-2	Thick sands at surface imply reduced productivity and low CEC

Lithic	-2	Shallow bedrock reduces rooting volume
Petrocalcic Petrocalcicidic	-2	Petrocalcic horizon is a rooting impediment, like bedrock
Petroferric	-2	Shallow iron pan reduces rooting volume
Petrogypsic	-2	Petrogypsic horizon is a rooting impediment, like bedrock
Psammentic Torripsammentic <i>Psammaquentic</i> <i>Quartzipsammentic</i>	-2	See Table 2

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