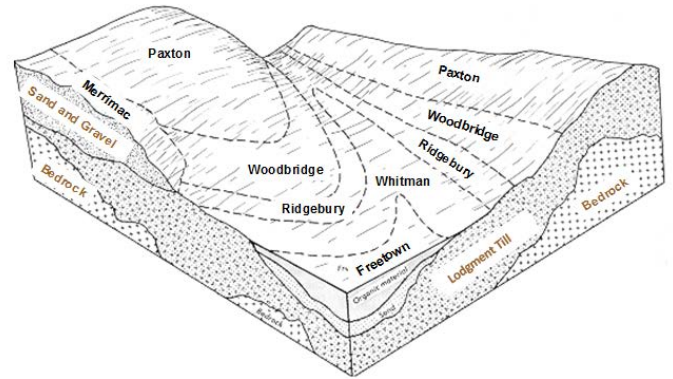


SOIL DRAINAGE CATENAS OF MASSACHUSETTS

The soil catena concept is a useful guide to understand the complex nature of soils that cover the landscape. A soil catena is a sequence of soil types, or series, that are developed from similar parent material and extend across landscape positions. Related soils of about the same age, derived from similar parent material, and occurring under similar climatic conditions can be arranged into a sequence of increasing wetness. The diagram to the right shows a block diagram of a drainage catena on glacial till parent materials.



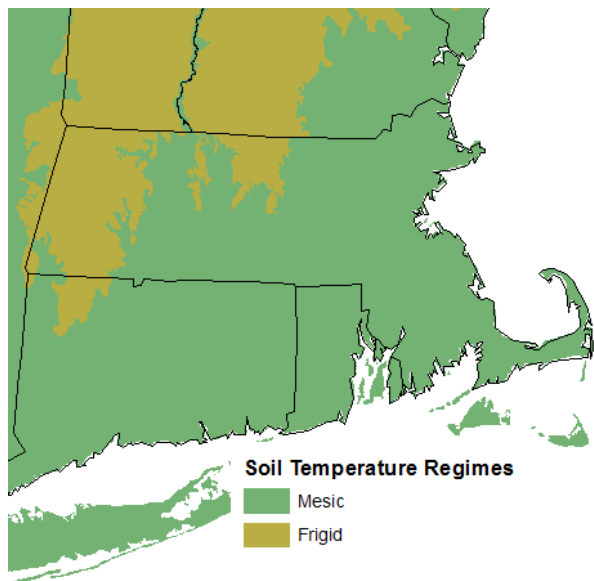
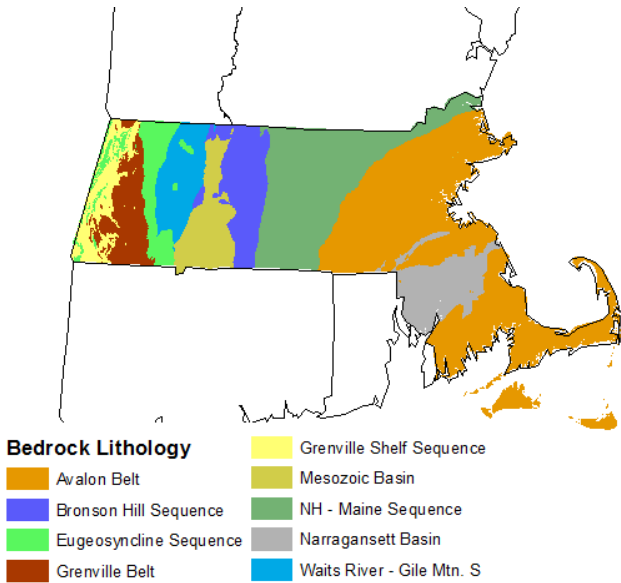
GEOLOGY AND CLIMATE

Drainage catenas in Massachusetts are formed in soils with similar climate and similar parent materials. Massachusetts consists of a variety of geologic parent materials including the sedimentary Narragansett Basin in the Southeast, the granitic upland of the north and central parts of the state, and the Mesozoic basin sedimentary material in the Connecticut River Valley.

Massachusetts also consists of two different temperature regimes: the colder, or frigid, temperature regime of the western highlands, and the more moderate, or mesic, areas in the remainder of the state.

PARENT MATERIALS

All of the Massachusetts was covered with up to a mile thick of ice during the latest Wisconsinan glaciation. Glacial ice extended to Long Island, Nantucket, and Martha's Vineyard approximately 19,000 years ago. This glacial advance and retreat is the major forming factor in the parent materials of the soils found in Massachusetts today. Glacial tills and glaciofluvial deposits are the two most common parent material types in Massachusetts. Till can be either subglacial lodgment till (packed down beneath the glacier) or supraglacial ablation till (materials left as the ice melted away). Lodgment till is very dense and often impedes water movement through the soil. Ablation till is generally more friable and allows water to move through the soil. Glaciofluvial (outwash) deposits were left by glacial meltwater, consist of stratified sands and gravels, and allow for rapid water movement though the soil. Glacial lakes were formed in many parts of the state during and after glaciation. These lakes later drained away, but left behind fine layers of silt and clay in the abandoned lakebeds. Other soil parent materials in Massachusetts consist of alluvium from river floodwaters, organic material, beach deposits, and human transported material.



The key that follows uses the catena concept by matching geology, parent material, and drainage class for each soil series mapped in Massachusetts. This is helpful in identifying the relationship of one soil series to others. It is intended to be used only as a guide; the Official Series Description should be used to identify a soil being evaluated.

Visit: <http://www.ma.nrcs.usda.gov/soils.html> for more information.

Visit <https://www.soils.org/publications/soils-glossary/> for a searchable glossary of soil science terms

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Deposit	Parent Materials / Lithology	Textural Group and Special Features	Excessively Drained	Somewhat Excessively Drained	Well Drained	Moderately Well Drained	Poorly Drained	Very Poorly Drained	
Glacial Till Unstratified Sand, Silt and Rock	carboniferous - phyllite and shale	loamy		Kearsarge*	Newport+ Bernardston+ Dutchess Cardigan*	Pittstown+	Stissing+		
		loamy and gravelly		Taconic*	Lanesboro+ Dummerston Macomber*	Fullam+	Brayton+		
	acidic crystalline rocks (granite, gneiss and schist)	loamy			Hollis* Chatfield*	Charlton	Sutton	Leicester	
		loamy over sandy and gravelly			Colrain ^P Woodstock* Millsite*	Paxton+ Henniker+ Becket ^{P+} Marlow ^{P+}	Woodbridge+ Metacommet+ Skerry ^{P+} Peru ^{P+}	Ridgebury+ Cabot+	Whitman+
		sandy mantled over loamy			Gloucester	Canton Montauk+ Annisquam+ Monadnock ^P Chichester	Newfields Scituate+	Lyme	
		sandy				Poquonock+	Birchwood+	Mattapoissett ^{P+}	
		silt-mantled loamy over loamy				Essex+		Norwell+	Brockton+
		silt-mantled over sandy and gravelly					Broadbrook+ Narragansett Barnstable	Rainbow +	(loess over till)
	schist and impure limestone	loamy							
		loamy			Westminster*	Shelburne	Ashfield		
	mica schist	loamy			Lyman*	Berkshire Tunbridge* ^P	Dixfield+		
		loamy			Brimfield*	Brookfield			
	reddish sandstone, shale, conglomerate, basalt	loamy				Wethersfield+ Yalesville* Holyoke* Meckesville Cheshire	Ludlow+	Wilbraham+	
		loamy				Pittsfield Nellis+	Amenia+	Kendaia	Lyons
calcareous limestone	loamy								
	loamy, dense substratum			Farmington*	Stockbridge				
thrustured coastal plain till	fine-loamy				Nantucket+ Chilmark	Moshup	(eolian over coastal plain)		
	carboniferous - phyllite and shale	sandy and gravelly with high percentage of dark channers	Quonset	Warwick	Hoosic				
Glaciofluvial / Outwash	acidic crystalline rocks (granite, gneiss, shist)	sandy		Windsor Adams		Deerfield Croghan	Wareham Naumburg	Scarboro Searsport	

Deposit	Parent Materials / Lithology	Textural Group and Special Features	Excessively Drained	Somewhat Excessively Drained	Well Drained	Moderately Well Drained	Poorly Drained	Very Poorly Drained
Glaciofluvial / Outwash	acidic crystalline rocks (granite, gneiss and shist)	sandy and gravelly		Hinckley	Merrimac Katama Riverhead	Sudbury Pompton	Walpole Pipestone ^p	Berryland ^p
		loamy over sandy and gravelly		Colton	Agawam Allagash	Sheepscot Ninigret		
		loamy over sandy and gravelly; loess mantle			Enfield	Tisbury	Raypol	
	siliceous rocks	sandy	Carver Evesboro	Eastchop	Haven	Klej	Saugatuck Massasoit ^p Mashpee ^p	Rainberry ^p
	limestone, shist, glaciofluvial over glaciolacustrine	Calcareous, sandy and gravelly	Groton		Copake Pollux	Hero Amostown	Fredon Squamscott	Halsey
Glaciolacustrine and Glaciomarine		loamy and silty				Belgrade	Raynham	Birdsall
		silty			Unadilla	Scio		
		silty, thin solum			Poocham			
		clayey			Suffield	Boxford	Scitico	Maybid
		sandy over loamy		Wapanucket	Hinesburg	Eldridge	Enosburg	
Alluvial		loamy over clayey			Melrose	Elmridge Elmwood	Shaker Swanton	Whately
		clayey					Buxton	Scantic
		silty			Hadley	Winooski	Limerick	Saco
		loamy				Occum	Pootatuck	Lim Rippowam
		sandy	Suncook			Ondawa	Lovewell Podunk	Charles Rumney
Human Altered	excavated	sandy	Udipsammments		Udorthents		Tihonet	
Coastal Deposits	sandy eolian or overwash deposits on dunes and back		Oakville	Hooksan		Succotash		Sandyhook
Organic Deposits	freshwater/inland organics	16-50" of organics	over sandy material					Swansea
			over gravelly outwash					Chocorua
	>50" of organics		over loamy material					Palms
			dysic					Wonsqueak
		euic					Freetown	
							Greenwood	
							Lupton	
							Bucksport	
Organic Deposits	salt and brackish (tidal) organics	> 50" of organics in tidal areas						Ipswich
		loamy	16-50" of organics					Westbrook
			0-8" of organics					Sandyhook
		sandy	8-16" of organics					Matunuck
			16-50" of organics				Pawcatuck	

orange/italic: frigid temperature regime
green: mesic temperature regime

+ soils underlain by dense till within 60 inches

^p spodic horizon

* bedrock contact within 40 inches of soil surface