Growing natives in clay soil

What is clay soil?

- Very small particle sizes, lots of tiny pores, but generally fertile.
- Slow water infiltration and percolation. When wet, tiny pores are saturated, plant roots are starved for air. Can be difficult to saturate but once wet, dries slowly.
- Some clay soils crack due to expansion when wet and contraction when dry.
- Undisturbed clay soil can have good structure (aggregates and holes) providing plants with accessible nutrients, water, and air.

How do I know if I have clay soil?

- Water runs off rather than penetrating. It is hard to dig when dry (non-friable). It takes a long time for it to dry out after a long, soaking rain.
- Soil percolation test indicates poor drainage. To perform test, dig a hole, saturate soil in and around the hole, refill it with water, and observe how long it takes to drain. It can take many hours for water to drain from a hole in clay soil. Test your soil in several locations since soil type can vary in a garden.
- Soil has tactile properties of clay that can be sensed by forming and handling a half-inch ball of moistened soil. Clayey soil feels slippery, if lightly squeezed it resists molding and holds together, and it can be rolled into a 2-3 inch long ribbon.

How amending soil goes wrong

- If you add less than 50% by volume of coarse sand, you are likely to create concrete. Fine sand makes the problem even worse.
- “Soil conditioners” like lime or gypsum are only helpful for calcium-deficient or sodic soils. Lime is often used to raise pH in acidic soil, however, western soils tend to be basic, making it inappropriate. Gypsum can help to reduce high sodium levels in sodic soils (as determined by a soil test).
- Drainage and barrier problems can develop between native and amended soils.
- Rototilling clay soil destroys whatever structure the soil has and usually over time causes more problems than it solves.

What to do

- Do a soil test if there is little growing in the soil to determine and correct the specific problems.
- Select appropriate plants (see list of native plants for clay soil). Avoid plants that require good or excellent drainage. To increase variety in your garden, grow some plants in containers or raised beds (at least two feet deep, and prepared so water does not accumulate at interface) where you can easily modify soil conditions.
- Only garden when soil is slightly moist. Working dry or saturated clay soil destroys soil structure which can take a long time to recover. Do not walk or drive vehicles on wet, clay soil.
- Apply a 2-4 inch layer of mulch to protect soil from compaction, increase water penetration, reduce runoff, and improve structure over time.
- When planting, dig hole wider but not deeper than rootball. Roughen sides of the planting hole. Backfill with native soil, do not add amendment to the planting hole.
- If supplemental water is needed, apply slowly to allow it to penetrate with no runoff. On/off cycling allows time for deeper water infiltratration. Do not water again until soil is moderately dry. Check for moisture several inches below the surface.
- Try growing some durable wildflowers like California poppies to begin the process of developing good soil structure. A layer of coarse gravel mulch may help the seedlings germinate and penetrate the soil.

Be patient

- As plants start to grow in clay soil, root growth and other biological activity gradually improve soil structure.
- Soil structure will slowly improve as long as there is minimal disturbance and cultivation of the soil.