



COLORADO

Division of Water Resources

Department of Natural Resources

Board of Examiners of Water Well Construction
and Pump Installation Contractors

May 3, 2021

Policy 2021-2

WELLS CONSTRUCTED IN THE ALLUVIAL, OGALLALA, AND WHITE RIVER AQUIFERS INSIDE THE NORTHERN HIGH PLAINS DESIGNATED BASIN

Background

The term "alluvium" is used to describe the sediments deposited by modern streams during relatively recent time. The same processes that transport and deposit sediments in Colorado's stream valleys today have deposited "alluvial" sediments for millions of years and have been a primary means for basin filling since the uplift of the Rocky Mountains some 65 million years ago. Much of the older sedimentary rock deposited prior to that time is associated with deposition in shallow seas (marine sediments).

Thus, fluvial (river/stream) processes have resulted in the deposition of thousands of feet of clay, silt, sand, and gravel (alluvial sediments) in the intermontane and foreland basins of Colorado. Because the sediments were transported and deposited by streams, they are all considered to be "alluvial" deposits. With time and depending on conditions in the subsurface, alluvial deposits become consolidated to semi-consolidated (lithified - cemented by chemical processes, or simply compacted). The lithification process is evident in the conglomerates, sandstones, siltstones, and claystones that comprise the Arapahoe, Denver, and Dawson aquifers of the foreland Denver Basin, the Troublesome and North Park formations of the North and Middle Park intermontane basins, and the White River Formation of the eastern plains. These deposits are considered to be "bedrock", based on their relative age, not their degree of induration or lithification. Likewise, the Ogallala Formation, which is compacted but may be unconsolidated in many locations, is a fluvial deposit of ancient alluvium, but is considered bedrock. It is this difference of the clastic materials of the Ogallala Formation from modern river depositional systems that places it in the Type II aquifer category.

The treatment of the Ogallala Formation as a Type II aquifer by the Board of Examiners is not new with this policy. It is discussed within [BOE Policy 2003-3](#), *Construction Standards for Wells in the Unconfined Sediments of the Alamosa Formation in the San Luis Valley*, that the Ogallala of eastern Colorado should be treated as a Type II aquifer, not a Type III aquifer. This policy reiterates this standard in a separate policy specifically for the Northern High Plains.

In the Rules and Regulations for the Management and Control of Designated Groundwater (Designated Basin Rules) (2 CCR 410-1, 1/14/2020), designated groundwater in the Northern High Plains Designated Groundwater Basin (Figure 1) includes the Ogallala and White River bedrock aquifers together. The Division of Water Resources (DWR) will henceforth label the Ogallala and



White River aquifers together as the “High Plains Aquifer” within the Northern High Plains Designated Basin. Historical aquifer names will not be changed in the DWR databases, but High Plains Aquifer will be used on well permits and well construction reports moving forward.

Era	System		Series	Stratigraphic unit		Hydrogeologic unit	Physical characteristics
Cenozoic	Quaternary		Holocene and Pleistocene	Alluvial deposits, valley-fill deposits and dune sand		Type 3	Gravel, sand, silt, and clay
	Tertiary	Upper	Miocene	Ogallala Formation		High Plains aquifer	Unconsolidated, poorly sorted gravel, sand, silt, and clay
				Arikaree Formation			Sandstone, fine to very fine. Local beds of volcanic ash, siltstone, claystone, and marl
	Lower	Oligocene	Brule Formation	White River Group	Siltstone with sandstone as beds and channel deposits		
			Chadron Formation		Confining unit	Clay and silt	

Modified from Gutentag and others, 1984

Aquifer Types in Northern High Plains Designated Groundwater Basin

Rule 10.4.6 in the Well Construction Rules (Rules) (2 CCR 402-2, 9/1/2016) requires wells completed in a Type II aquifer (unconfined bedrock aquifer) to have at least 40 feet of solid casing and 30 feet of continuous grout, with the uppermost 20 feet of casing being steel.

Rule 10.4.6.3 provides that in the event the unconfined bedrock aquifer (Type II) is overlain by an unconsolidated aquifer (Type III), the unconsolidated aquifer must be fully isolated with grout or driven steel casing. In the Northern High Plains, wells constructed into the High Plains Aquifer can also produce water from the overlying alluvium because the Alluvial, Ogallala, and White River aquifers are administered as a single hydrogeologic unit, so Rule 10.4.6.3 is not applicable.

Wells constructed to solely produce from the modern alluvial aquifer (Type III wells) must be constructed pursuant to Rule 10.4.7.

Policy

In order to provide consistency and adequacy in the construction of water wells within the High Plains Aquifer of the Northern High Plains Designated Groundwater Basin, and to acknowledge that these wells may produce water from the Alluvial, Ogallala and White River aquifers which are administered as a single hydrogeologic unit, the Board hereby adopts the following policy:

Water wells constructed within the High Plains Aquifer of the Northern High Plains Designated Groundwater Basin must be constructed in accordance with the construction standards for Type II aquifers (unconfined bedrock) found in Rule 10.4.6. This policy does not supersede any construction requirements specified in the conditions of approval of a valid well permit. Any deviation from the requirements of Rules 10.4.6, 10.4.6.1, or 10.4.6.2 or other applicable standards of the Water Well Construction Rules must comply with the requirements of Rule 18, Variances.

Approval

This policy may only be modified or revoked in writing by the Board of Examiners of Water Well Construction and Pump Installation Contractors.

Approved May 3, 2021



Keith Branstetter, Chairperson
Board of Examiners of Water Well Construction
and Pump Installation Contractors

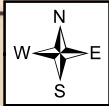
Map Key



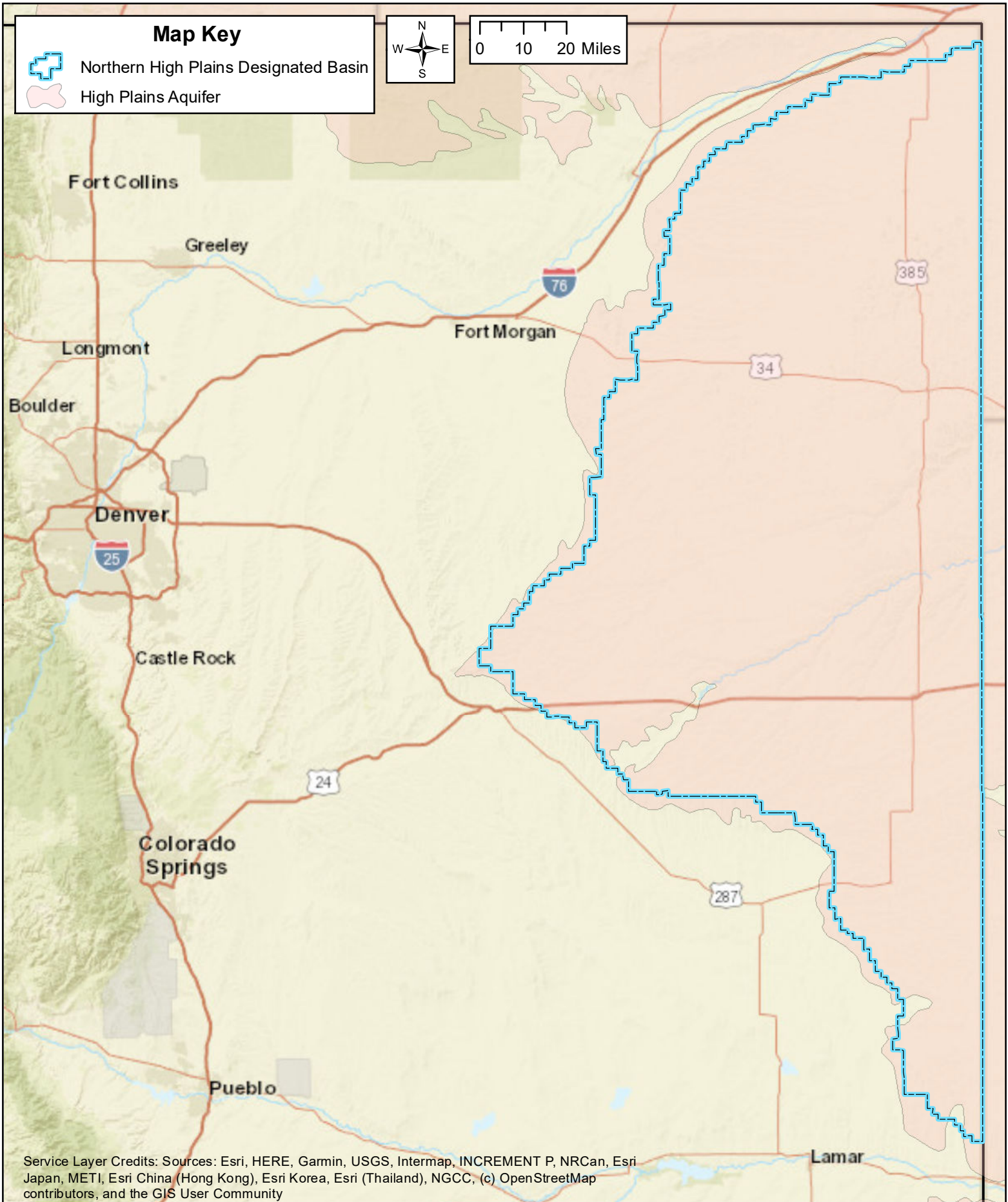
Northern High Plains Designated Basin



High Plains Aquifer



0 10 20 Miles



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Northern High Plains Designated Groundwater Basin

**Figure
1**