

Colorado Ground Water Commission

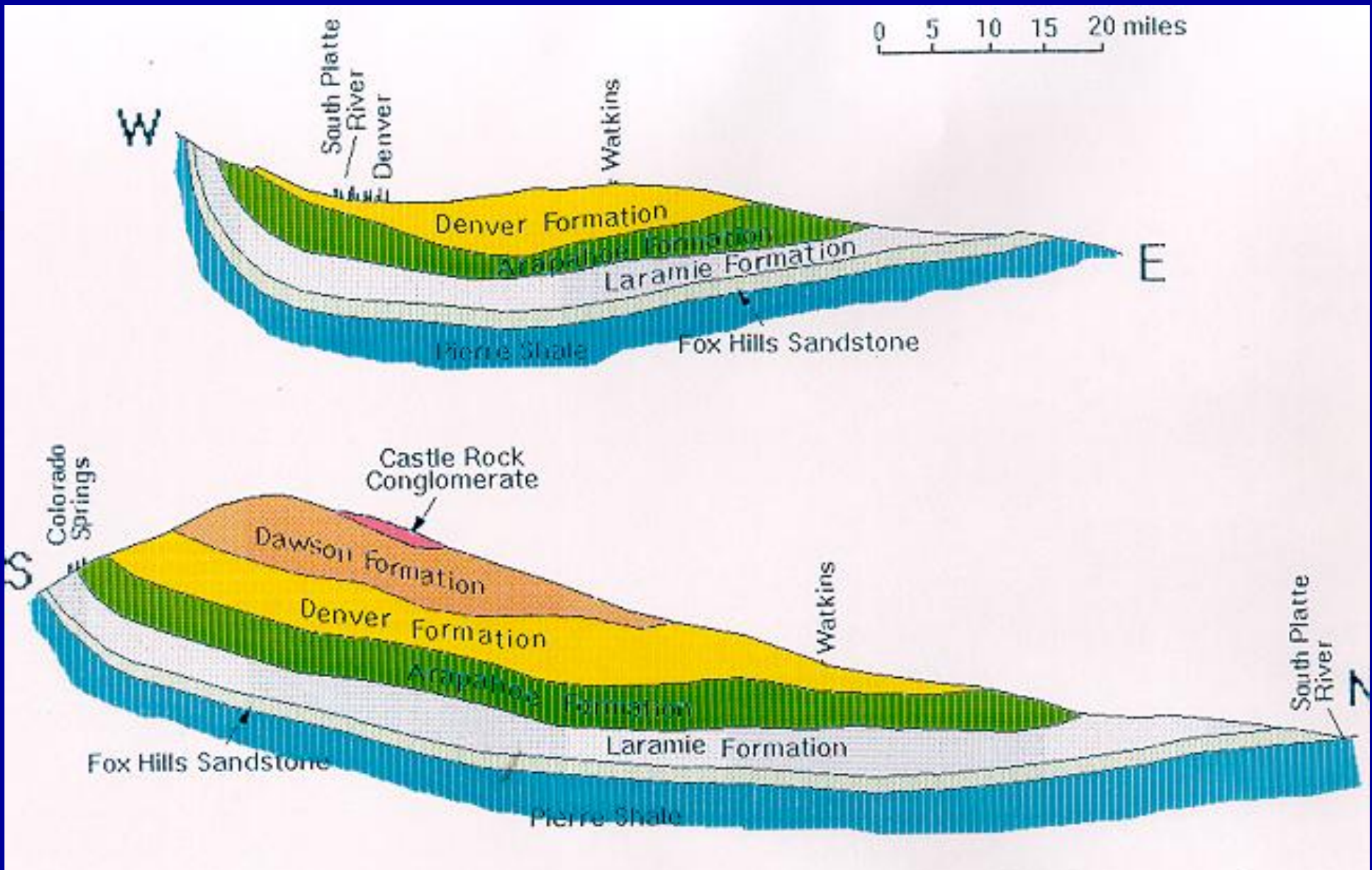
**Denver Basin Bedrock Aquifers
Determinations of Water Rights
November 19, 2010**

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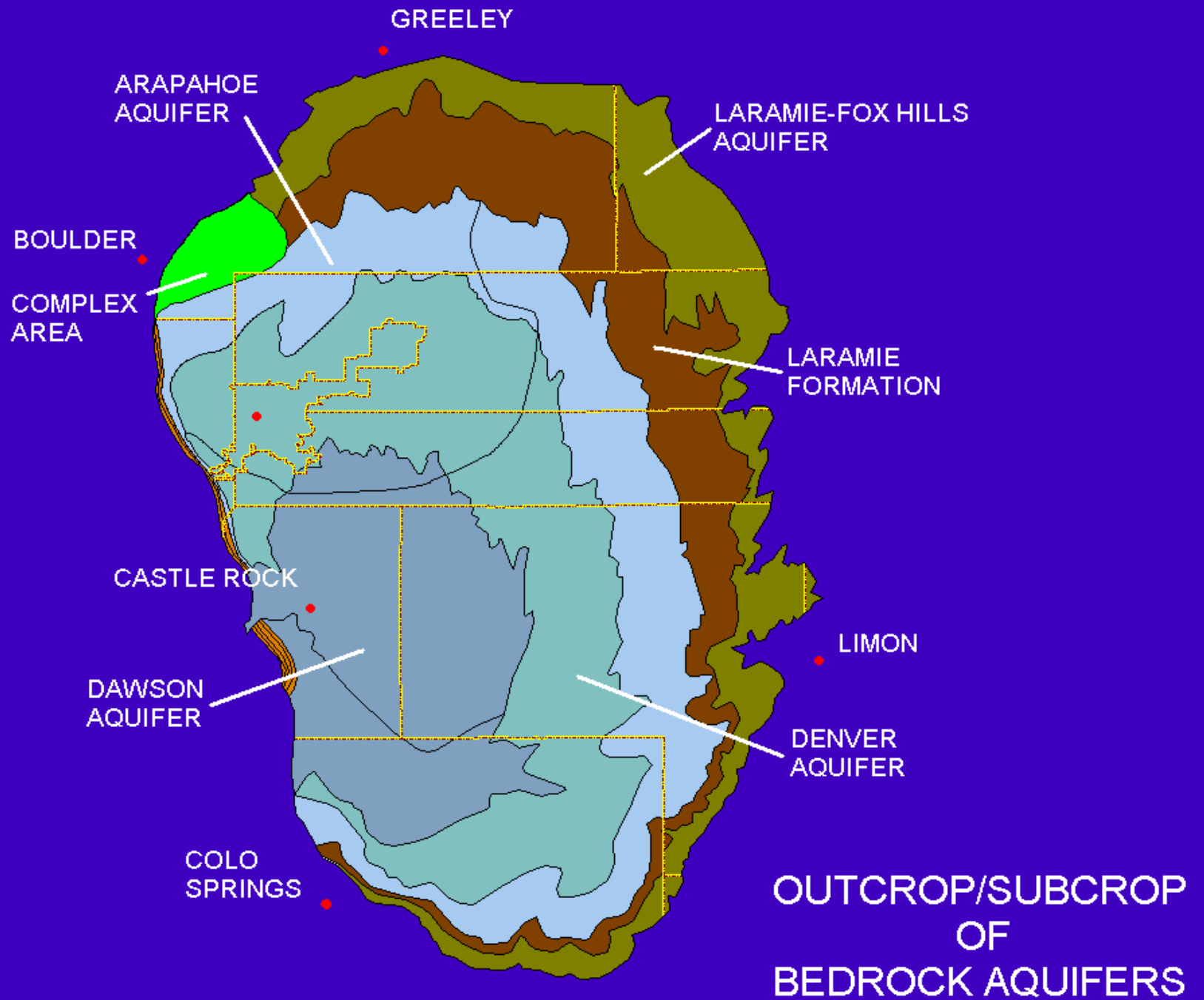
Denver Basin Bedrock Aquifers

- Four aquifers

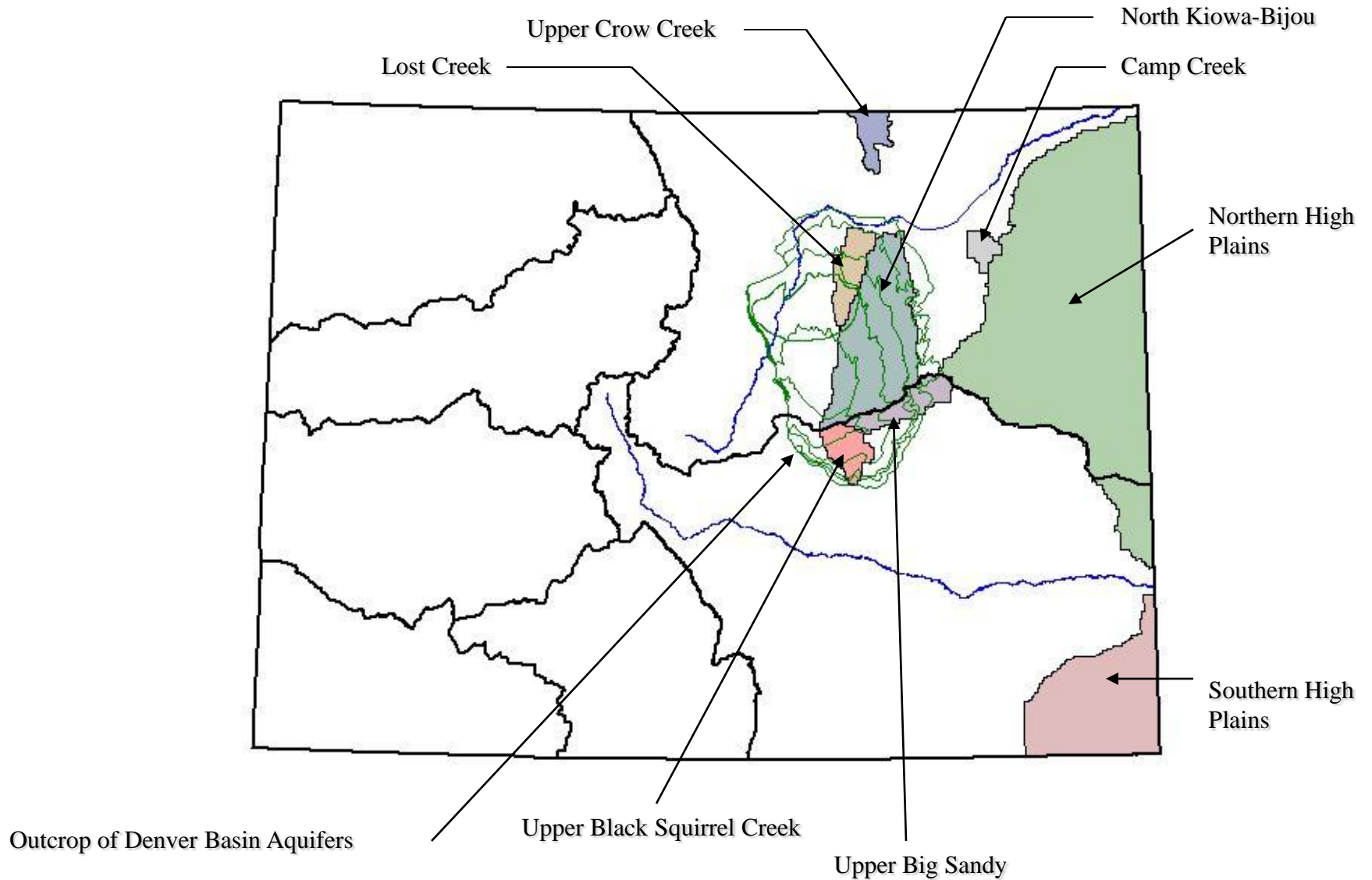
- Dawson (Upper and Lower) aquifer
- Denver aquifer
- Arapahoe (Upper and Lower) aquifer
- Laramie-Fox Hills aquifer



GENERALIZED GEOLOGIC SECTIONS THROUGH THE DENVER BASIN



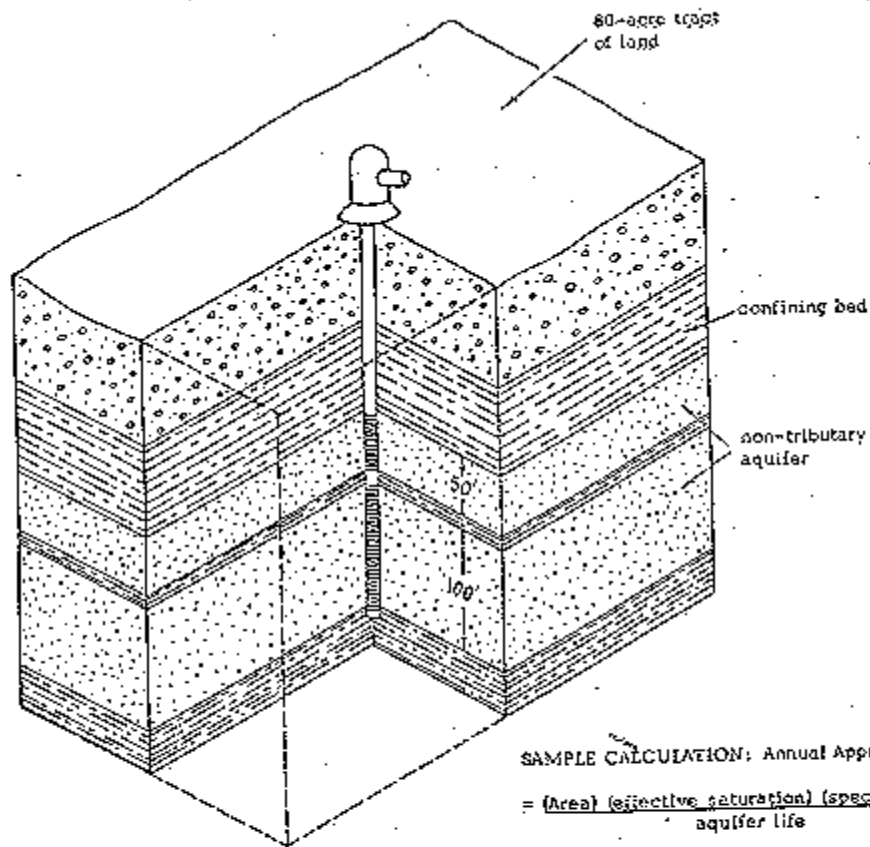
Denver Basin and Designated Ground Water Basins



Denver Basin Bedrock Aquifers

Administration

- Senate Bill 213 (1973)
 - Allocation based on overlying land area
 - 100-year aquifer life
- Senate Bill 5 (1985)
 - Defined "nontributary"
 - Identified "not-nontributary"
- Designated Basin
 - Statutes [37-90-111(5) in 1988 and 37-90-107(7) in 1998] and Ground Water Commission Policy (1973-1992) & Rules (1992-Current) have generally followed Statutes and concepts outside of Basins
 - Determinations of Water Right is required before a well permit may be issued



SAMPLE CALCULATION: Annual Appropriation

$$= \frac{\text{Area} \text{ (effective saturation)} \text{ (specific yield)}}{\text{aquifer life}}$$

$$= \frac{80 \text{ acres} \text{ (150 feet)} \text{ (.20)}}{100 \text{ years}}$$

$$= 24 \text{ acre-feet} \text{ / year}$$

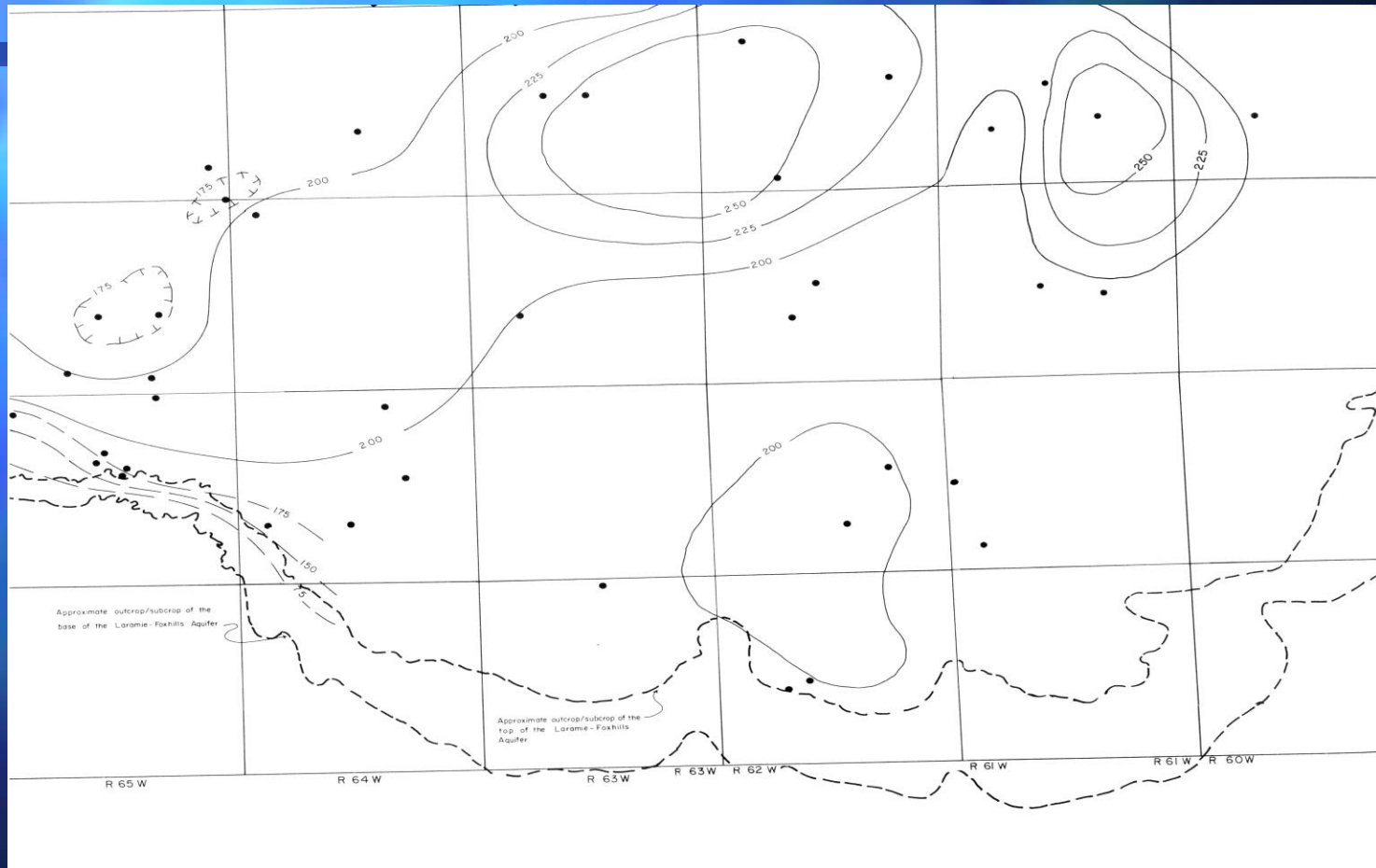
DETERMINATION OF APPROPRIATION
IN NON-TRIBUTARY AQUIFERS

Quantification Per Rule 5.3

Acre-Feet in Storage =
(Overlying Acres)
x (Sandstone thickness)
x (Specific Yield)

100-year aquifer life
Allowed Average Annual
Amount of Withdrawal =
(AF in Storage)
/ (100 Years)

Denver Basin Bedrock Aquifers



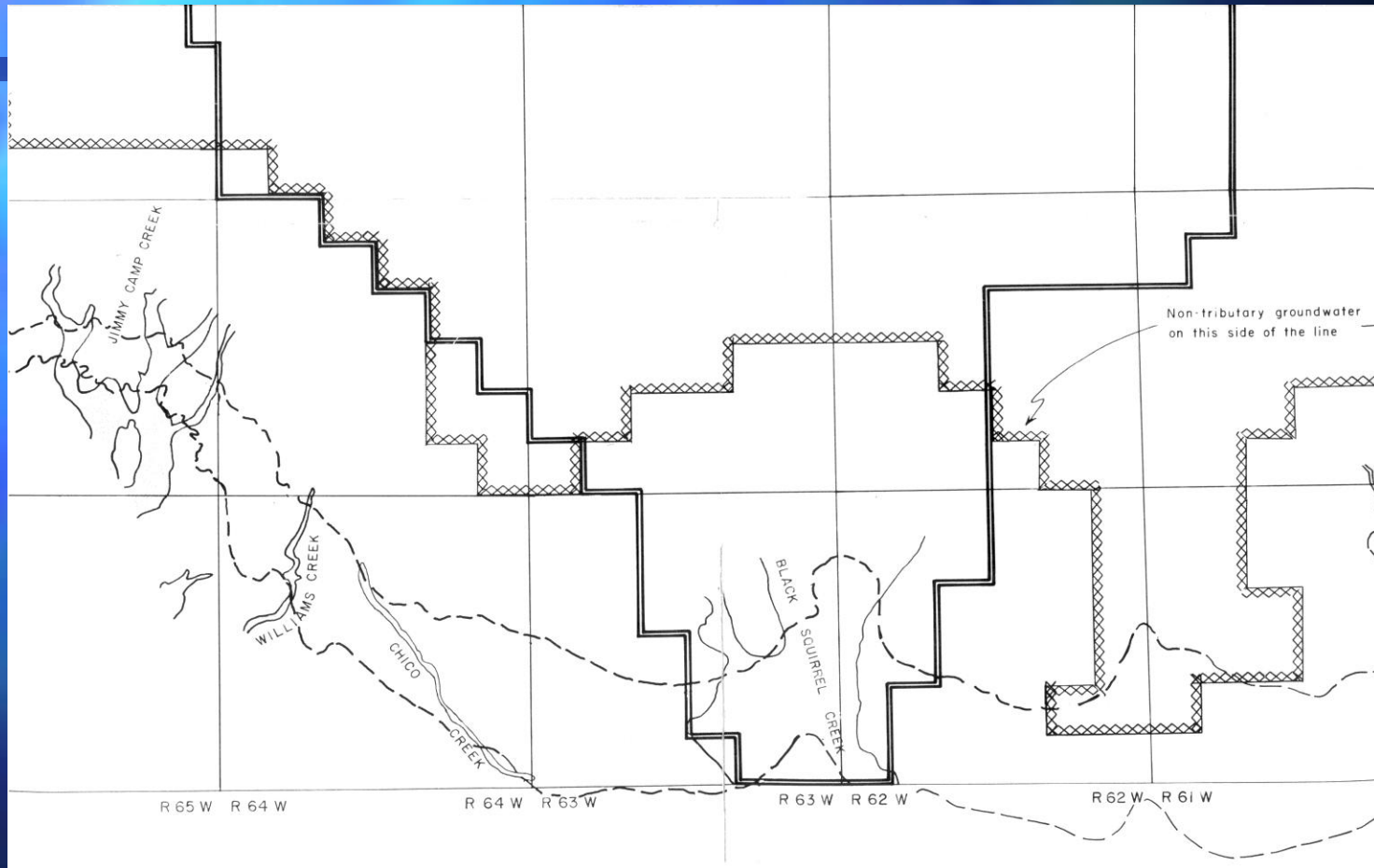
Laramie-Fox Hills Aquifer (Saturated Sandstone)

Denver Basin Bedrock Aquifers

Types of Water

- Nontributary
 - Area defined by Rules Maps
 - 98% limit on consumption
- Not-Nontributary - 4%
 - Areas in Denver, Arapahoe, Laramie-Fox Hills aquifers more than 1 mile from contact with the alluvium. Use Rules Maps.
 - 4% replacement requirement
- Not-Nontributary - Actual
 - All areas in Dawson Aquifer that do not qualify as Nontributary
 - Areas in Denver, Arapahoe, Laramie-Fox Hills aquifers within 1-mile of an aquifer contact with the alluvium. Use Rules Maps.
 - Requires a replacement plan that replaces actual alluvial depletions prior to issuing a well permit. Depletions are estimated using ground water modeling.

Denver Basin Bedrock Aquifers



Laramie-Fox Hills Aquifer (NT and NNT areas)

Questions?