Agenda Item G – Informational Report

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DEPARTMENT

Discussion on Groundwater Allocation

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December 3, 2021

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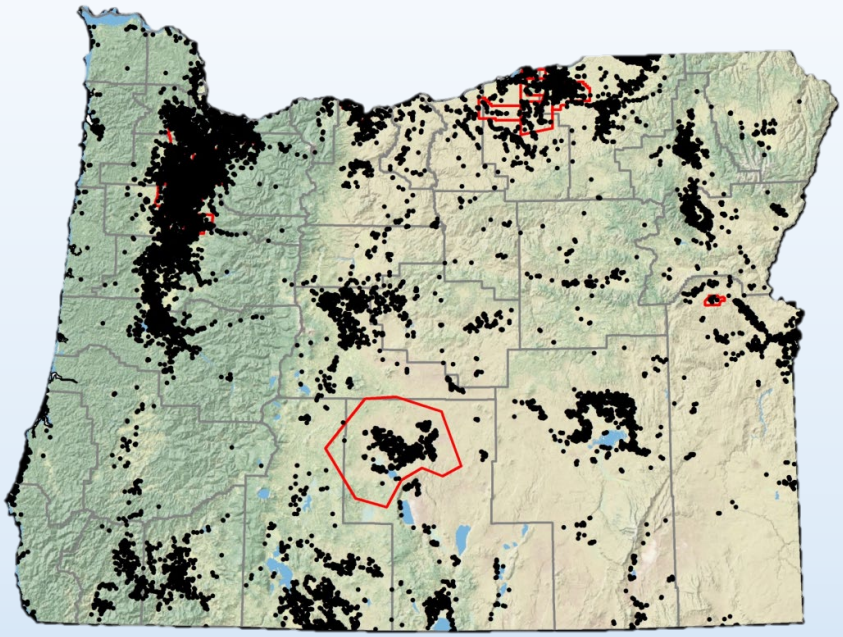
Discussion

- Why we are here today
- Groundwater concepts
- Some GW review history
- GW review alternatives
- Commission discussion

Photo Source: OWRD

Why we are here today



Previous WRC discussions:

- More than 70% of GW applications result in a permit
- Approx. 80% of applications in “Areas of Concern” receive permits
- The GW review cannot always determine whether the aquifer is over appropriated

Figure Source: OWRD, Location of approximately 25,000 water right wells as of 2016

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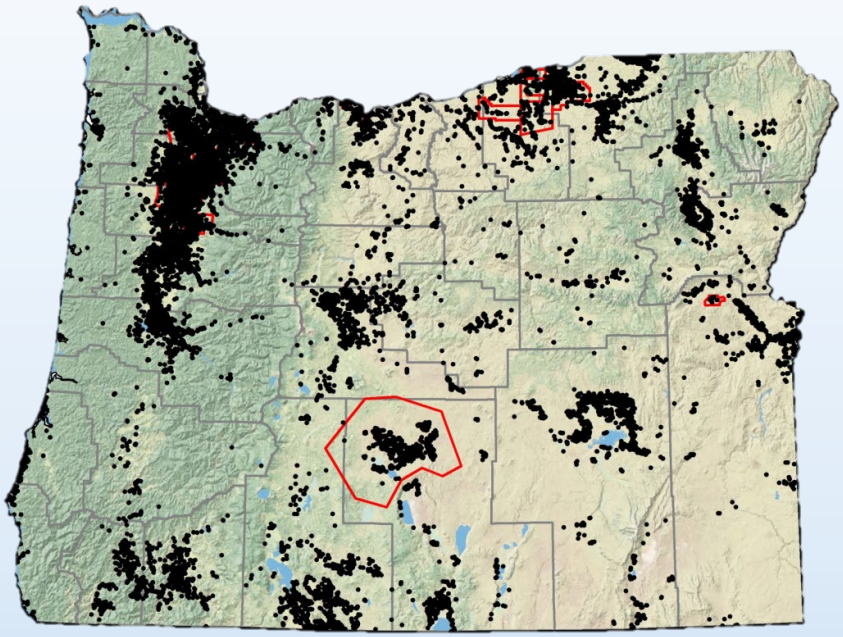
Why so many permits?



Short answer:

GW statute, rules, and policies are structured to prevent new uses that would have short-term, acute impacts, while allowing less significant short-term impacts to occur for the beneficial use of groundwater.

Figure Source: OWRD, Location of approximately 25,000 water right wells as of 2016

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Groundwater Concerns

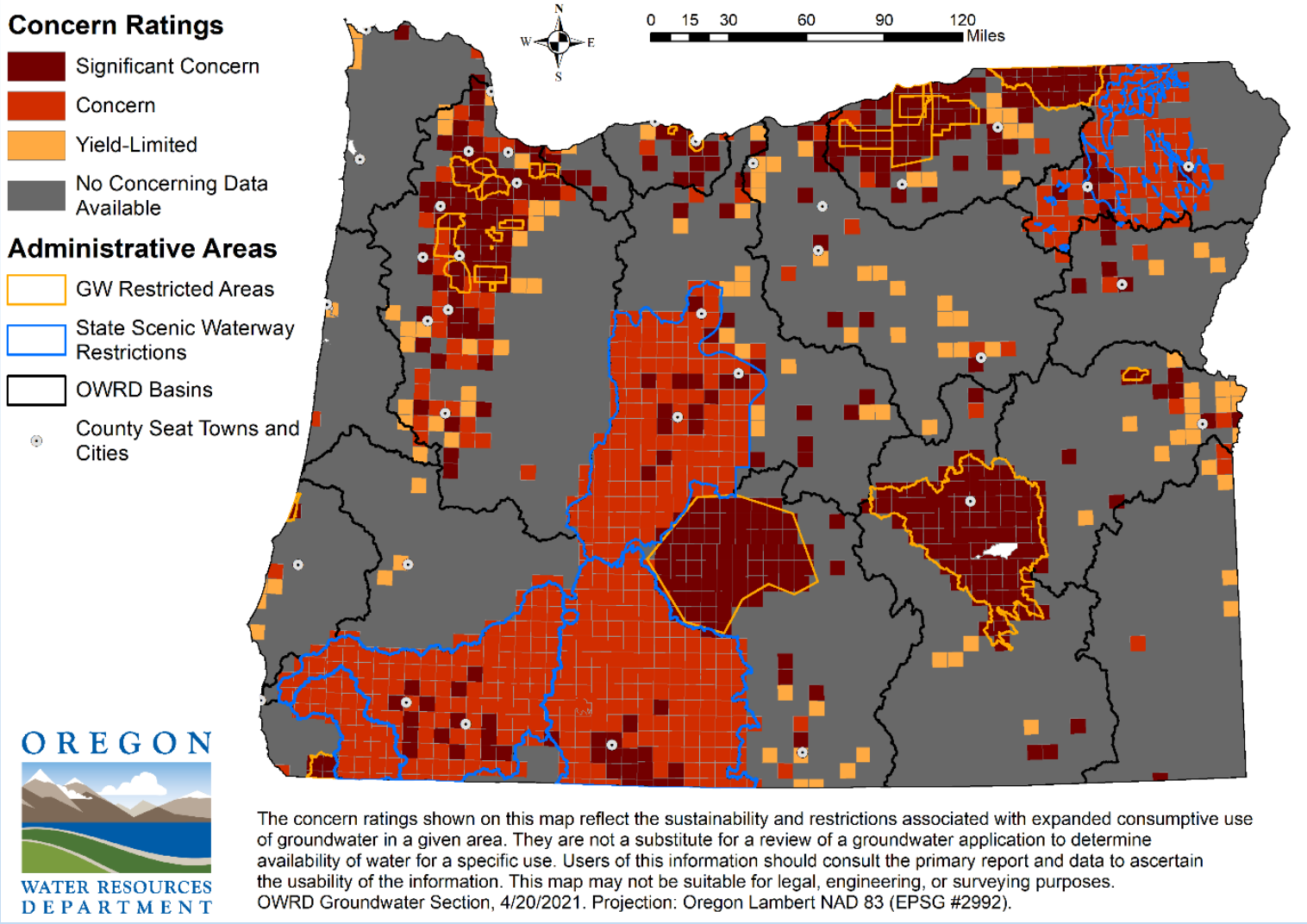

Figure Source: OWRD, June 2021 Commission staff report presents details.

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Surface water availability

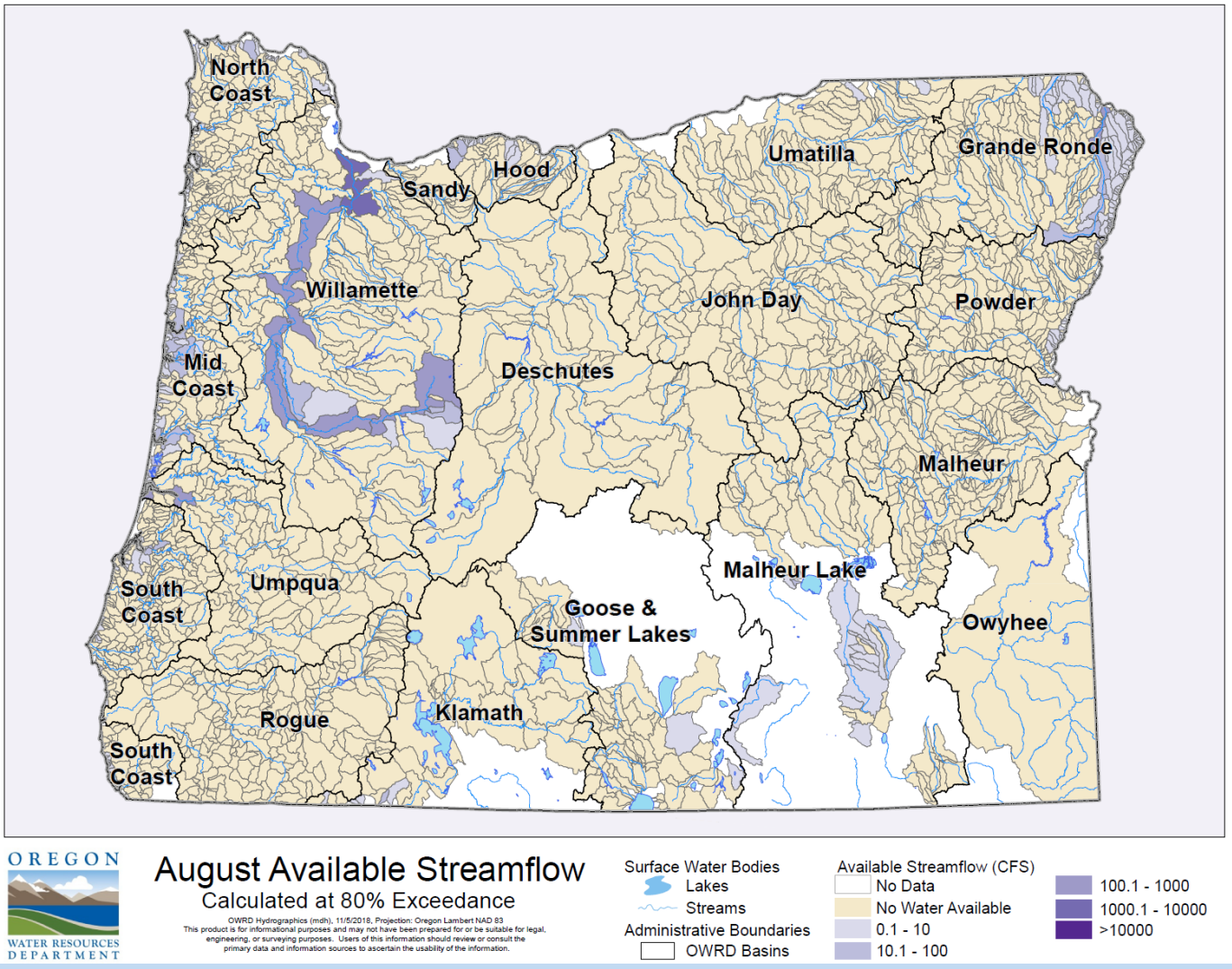

Figure Source: OWRD

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First... some fundamental groundwater principles

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Groundwater Appropriation

C. V. Theis, 1940: The Source of Water Derived From Wells

"From the standpoint of groundwater conservation and statutory or other regulation, the following point should be emphasized: All water discharged by wells is balanced by a loss of water somewhere."

Figure Source: Barlow, P.M., and Leake, S.A., 2012, Streamflow depletion by wells—Understanding and managing the effects of groundwater pumping on streamflow: U.S. Geological Survey Circular 1376, 84 p. (Also available at *http://pubs.usgs.gov/circ/1376/*.)

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Groundwater Appropriation

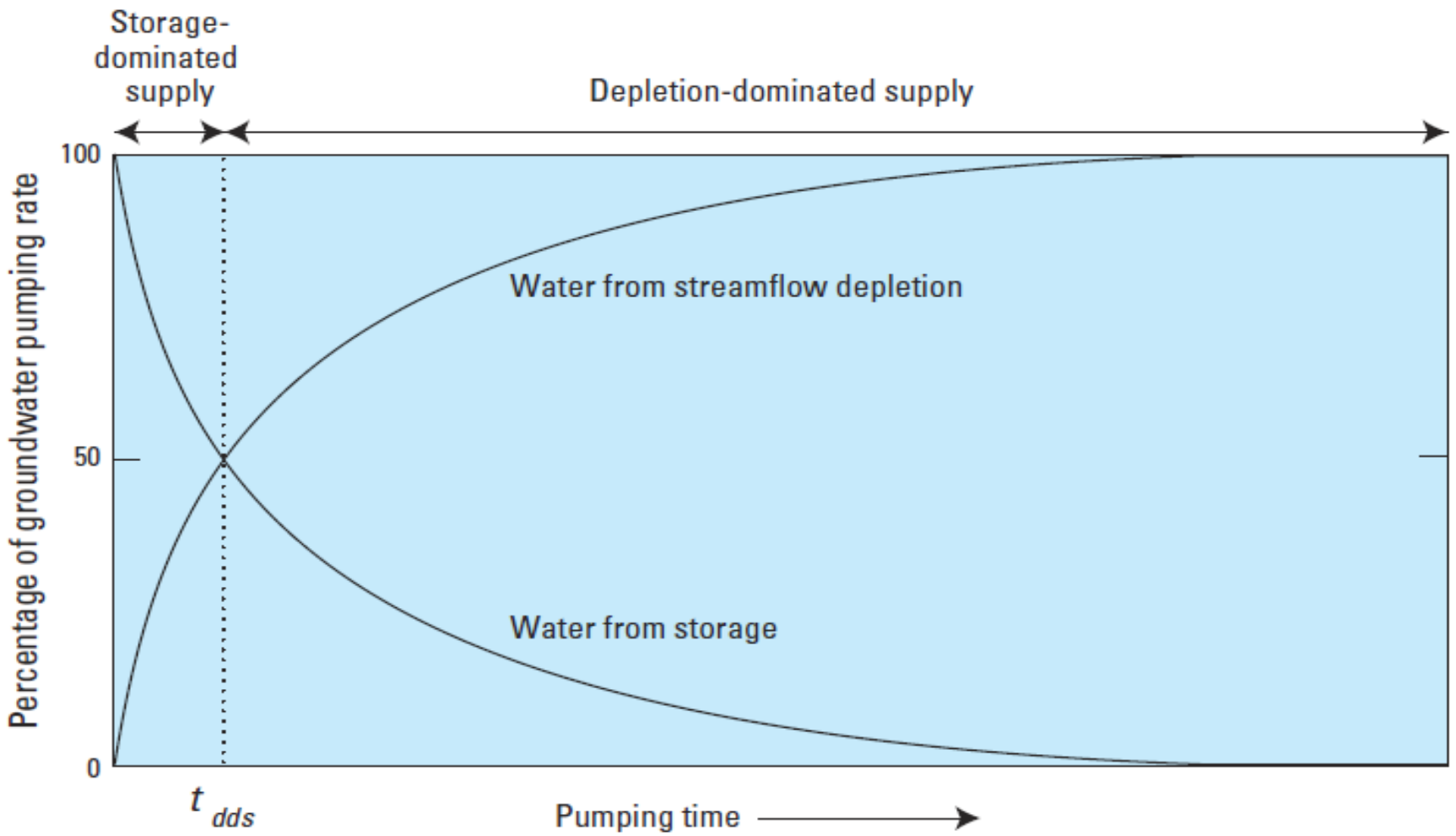

Figure Source: Barlow, P.M., and Leake, S.A., 2012, Streamflow depletion by wells—Understanding and managing the effects of groundwater pumping on streamflow: U.S. Geological Survey Circular 1376, 84 p. (Also available at *http://pubs.usgs.gov/circ/1376/*.)

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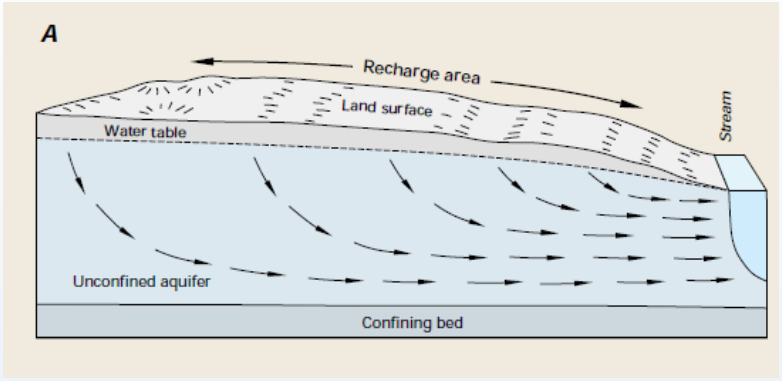
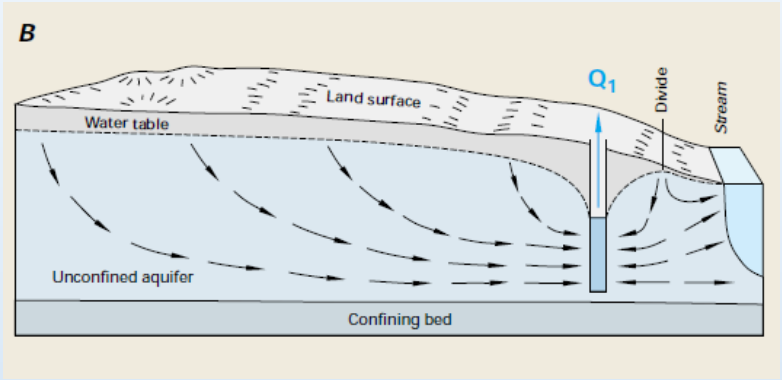
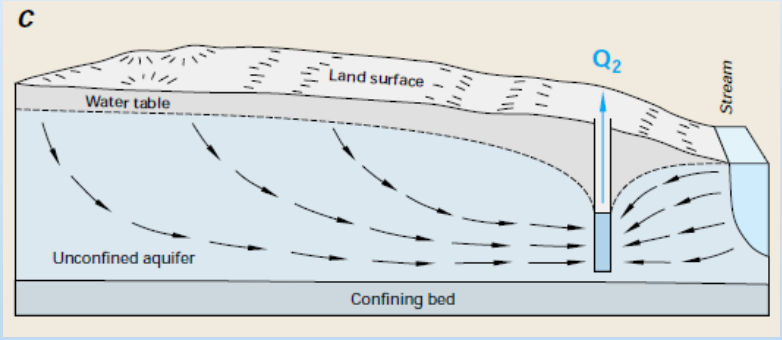
Groundwater Appropriation



Undeveloped aquifer



Add a well…
Groundwater storage capture



With continued pumping…
Streamflow capture

USGS Circular 1139, Groundwater and Surface Water: A Single Resource

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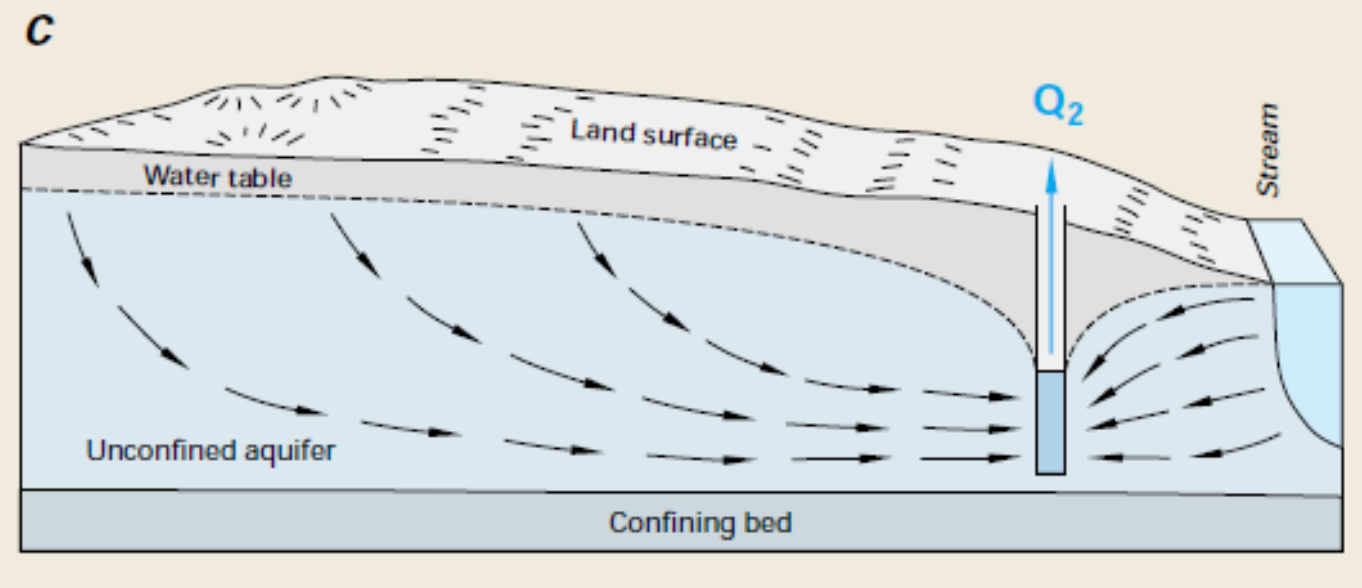
Groundwater Appropriation



USGS Circular 1139, Groundwater and Surface Water: A Single Resource

Groundwater review history

- 1955 Ground Water Act
  - Permit required to appropriate GW
  - Allowed for domestic and livestock water
- Late 1950s
  - Over appropriation of GW recognized
  - First critical groundwater areas established
- Early to mid-1980s
  - GW apps reviewed for impacts to nearby “closed” streams

Groundwater review history

- 1987
  - Legislature expands CGWA statute to include interference with SW
  - Internal policy: All GW apps within ¼ mi of a stream with a senior appropriator shall be reviewed for interference
    - Apps where interference deemed “insignificant” shall be issued a permit with a condition to control the use if interference is later observed

Groundwater review history

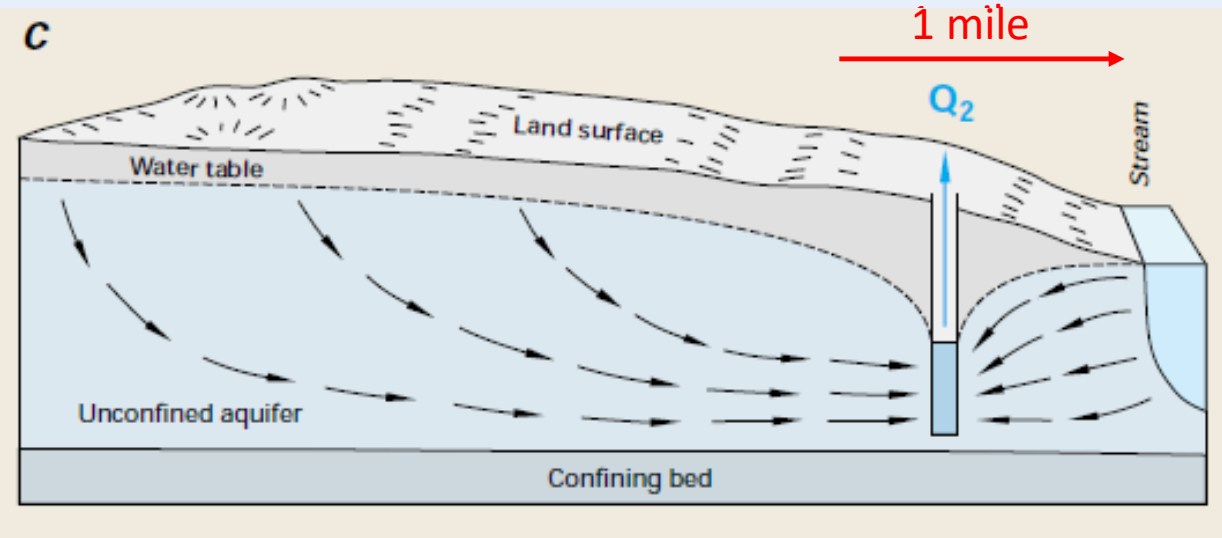
- October 1988
  - Administrative rule 690-09 (Div 09) is adopted
    - Adopts concept in rule of "potential for substantial interference"
      - Thresholds established for potential for substantial (i.e. short-term) interference
    - Section 040 extends GW reviews out to 1 mile
    - Rule intended to be superseded by GW allocation strategy in future basin plans

Groundwater review history

- 1992
  - State Water Resources Policy (OAR 690-400) is expanded to define Over-Appropriation
    - For groundwater:
      - Appropriations of all GW rights exceed average annual recharge to the GW source
      - OR results in further depletion of over-appropriated SW

Groundwater review history

- 2003
  - Internal policy: Div 09 reviews only apply to:
    - Wells within 1 mile of a stream
    - Impacts that occur within 1 year

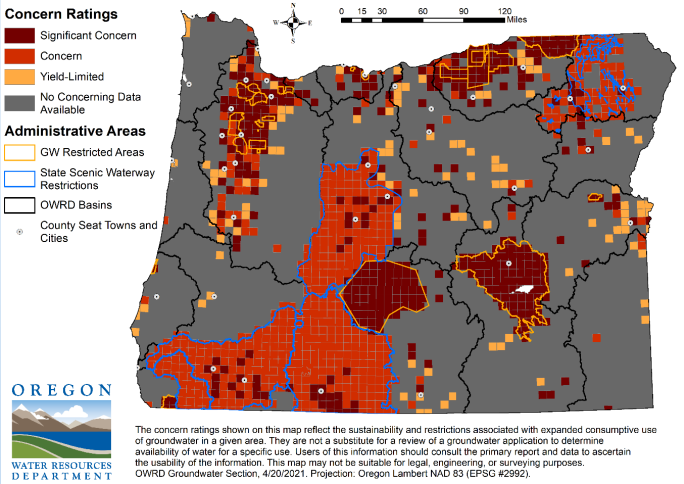


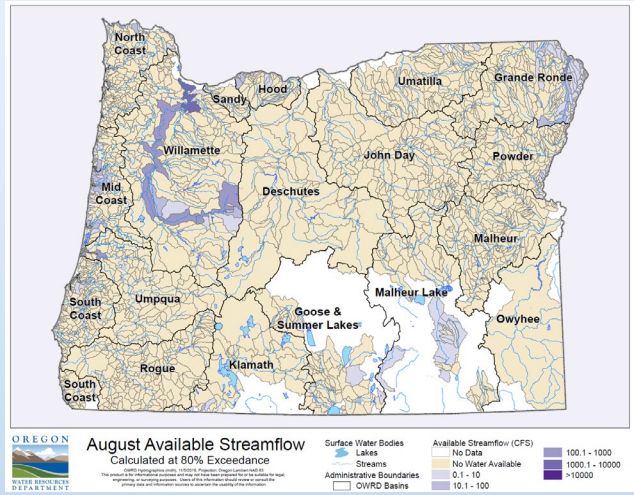
Groundwater review summary

- Groundwater reviews have evolved over time
- They are structured to prevent those uses with the potential to create “substantial" impacts in the short-term
- Applications that are not calculated to exhibit short-term impacts or are not in areas deemed over-appropriated are issued permits

Groundwater review summary

- Long term impacts and cumulative impacts are not assessed as part of the GW review process.
- The result of this over the past 50+ years is areas of GW level declines and reduced SW flows, both at the expense of senior users of GW and SW.





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Groundwater Allocation

- Alternatives to the current GW allocation process should be explored
  - Address inconsistencies in rules
  - Address long-term and cumulative impacts to surface and groundwater resources
- Priority
  - Groundwater declines & reduced streamflows
  - Protection of senior water right holders

Some potential alternatives

Basin classification rules

- Classify uses
- Limit new allocations by other measures, such as water availability

Groundwater review rule changes

- Division 09
  - Ex: hydraulic connection vs. potential for substantial interference
- Division 400 (Over-appropriation)

Internal policy changes

Groundwater review process changes

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Commission Discussion


Thank you.

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Surface water availability

Figure Source: OWRD

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Groundwater Appropriation

Understanding the location and timing of impacts from groundwater development is complicated by variable geology across the state.

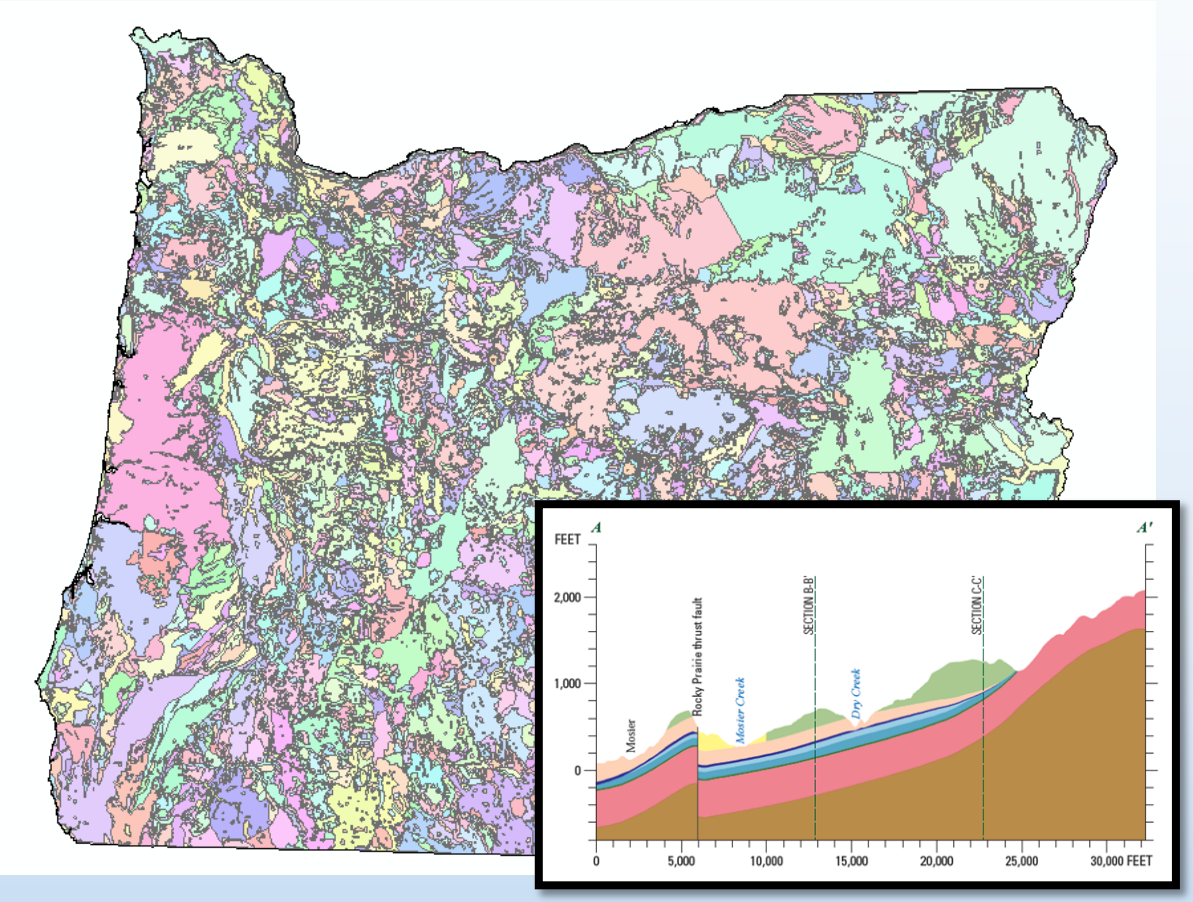

Figure Source: DOGAMI and OWRD

Application Review Process

- Public interest assessment: availability, injury, basin program, other rules
- Presume the public interest exists (or not?, 537.621(2) is unclear to me)
- Aug 2017 staff report has details

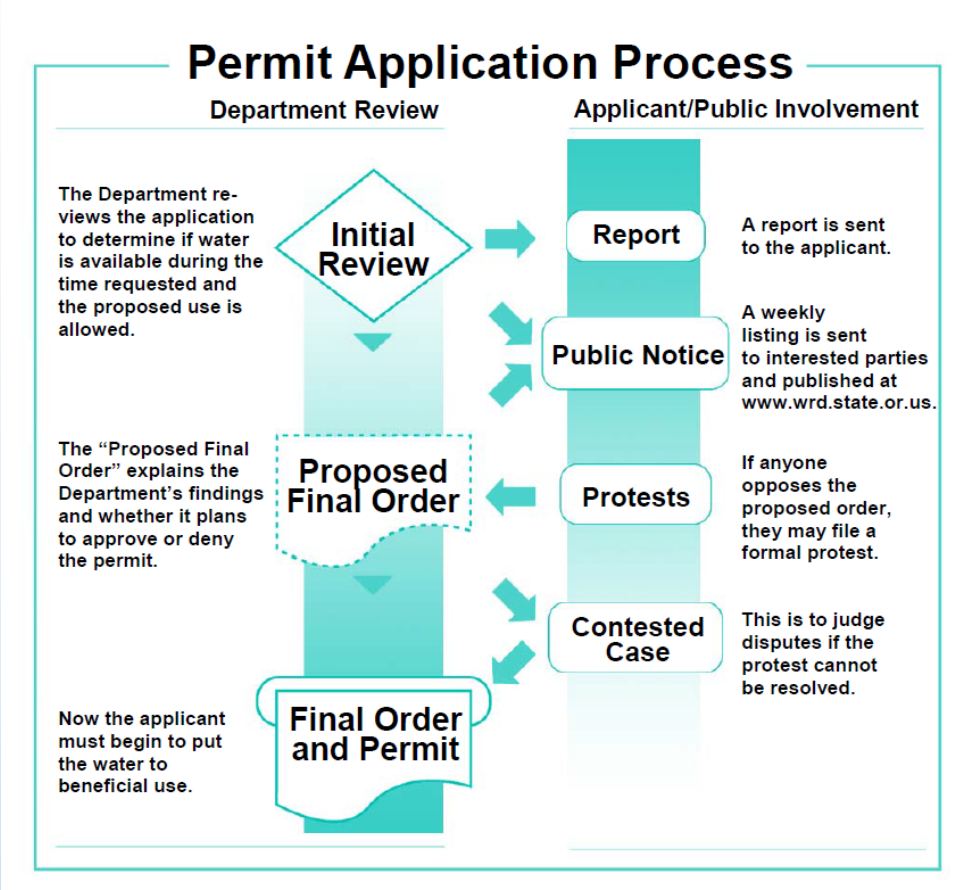

Figure Source: OWRD

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Cumulative Effects

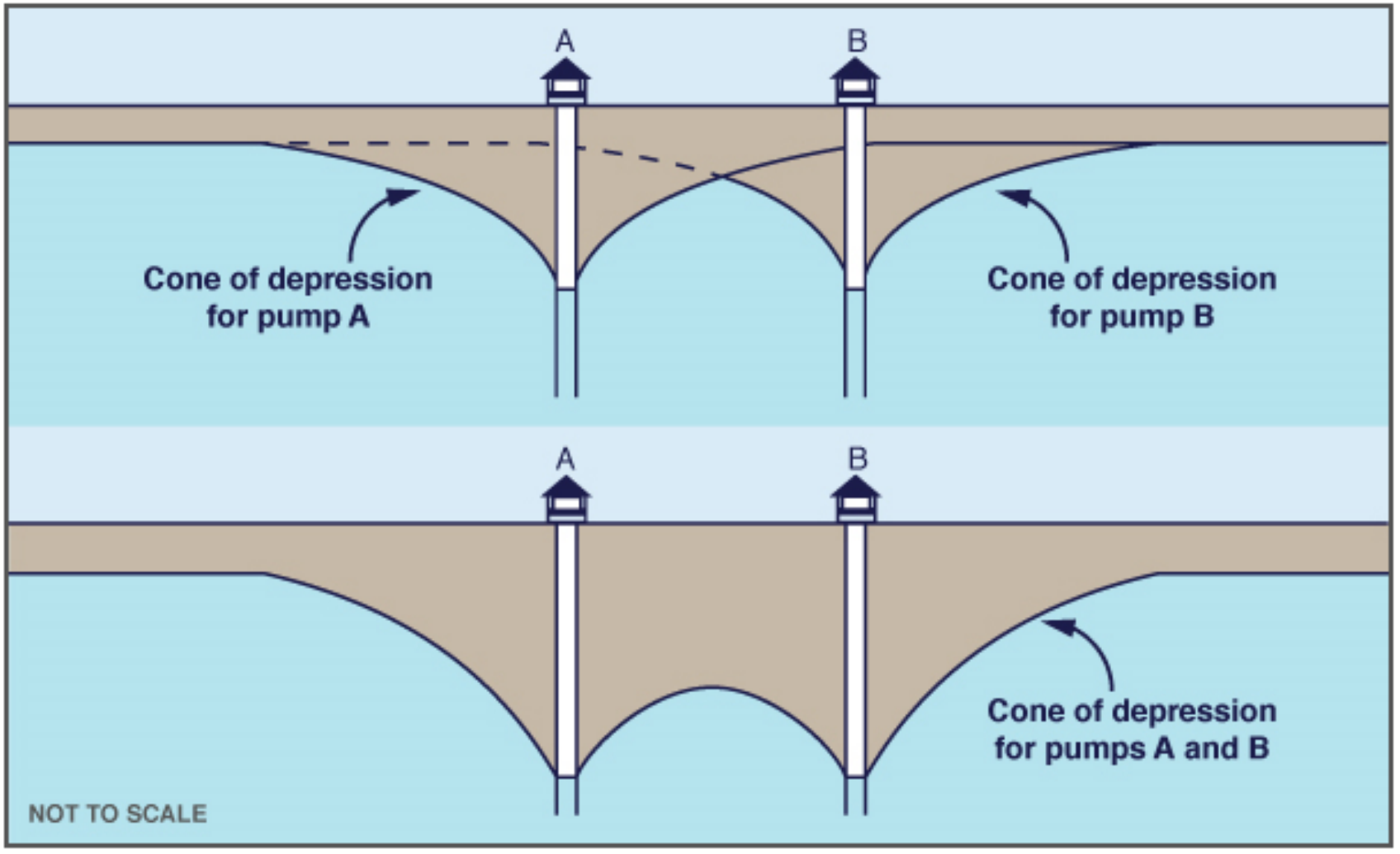

Figure Source: USGS (via http://ponce.sdsu.edu/effect_of_groundwater_pumping.html)

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Cumulative Effects

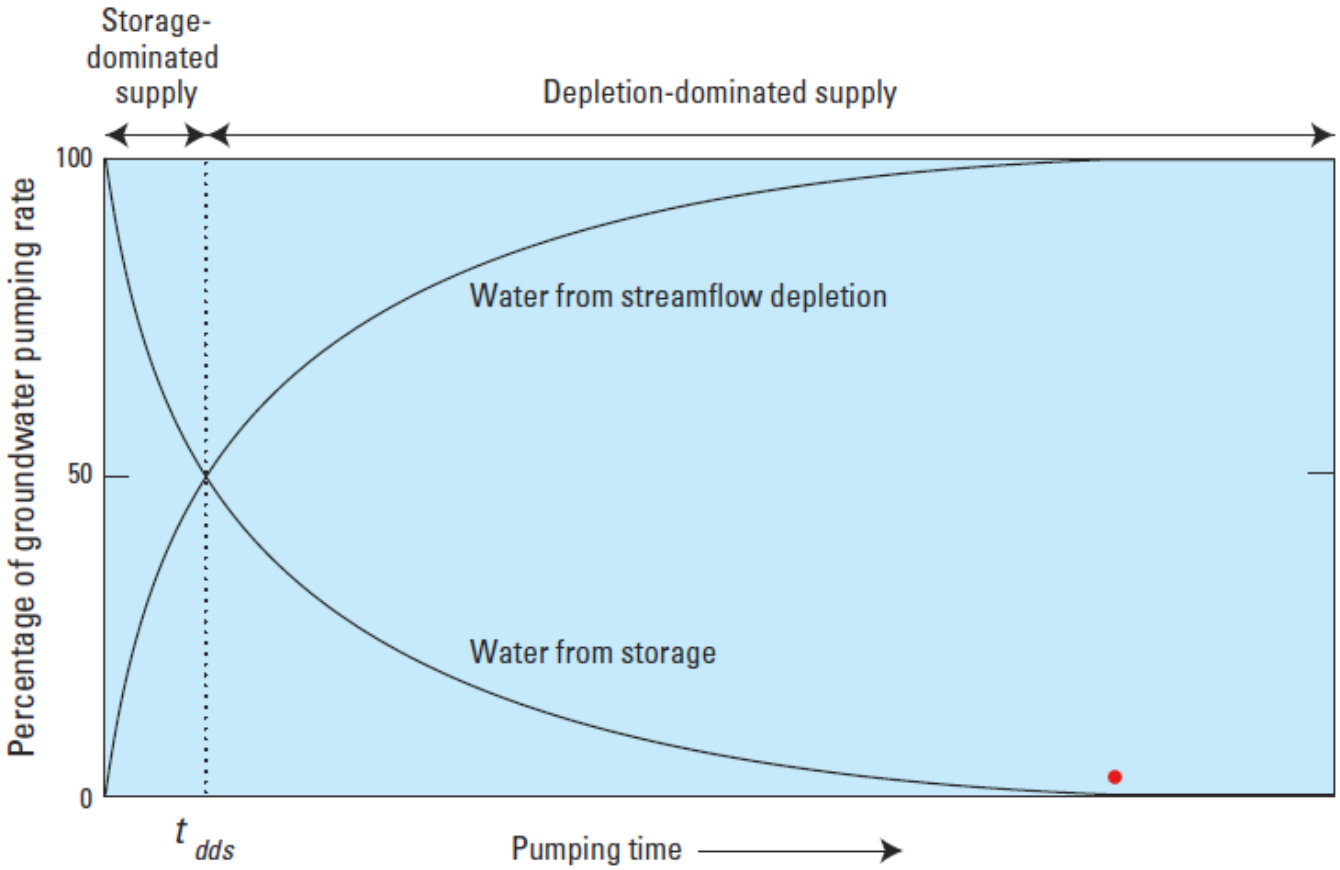

Figure 9. Relation of storage change and streamflow depletion as sources of pumped groundwater through time for a hypothetical well. Initially, the source of water (or supply) to the well is dominated by reductions in aquifer storage. At later times, streamflow depletion is the dominant source of supply. The condition of more than half of the pumping rate coming from streamflow depletion is designated as depletion-dominated supply, and variable t_{dds} is the time to reach the condition of depletion-dominated supply for a particular pumping location.

Figure Source: Barlow, P.M., and Leake, S.A., 2012, Streamflow depletion by wells—Understanding and managing the effects of groundwater pumping on streamflow: U.S. Geological Survey Circular 1376, 84 p. (Also available at *http://pubs.usgs.gov/circ/1376/*.)

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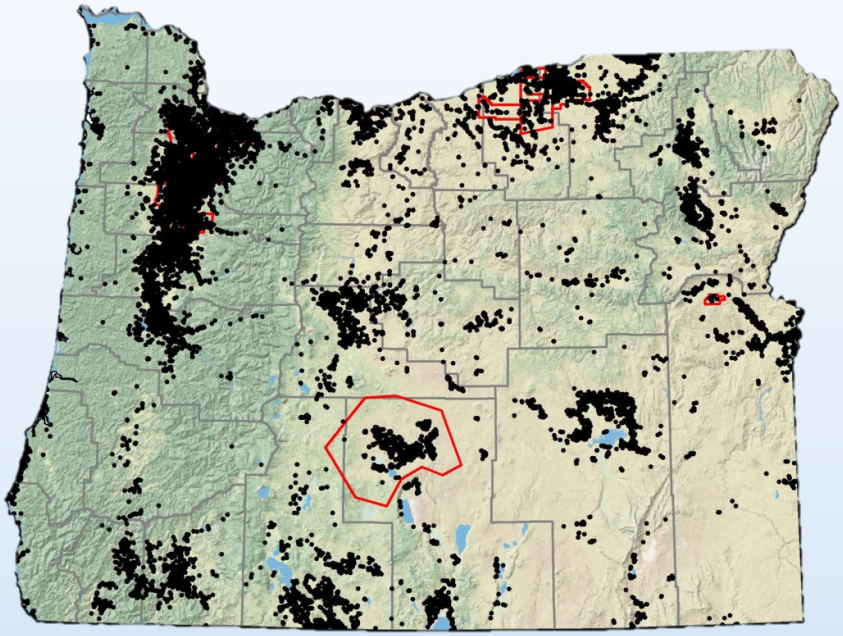
Question posed:



Does the Commission recommend the Department evaluate alternatives to the current GW allocation process?

Figure Source: OWRD, Location of approximately 25,000 water right wells as of 2016