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Groundwater Level Fluctuation Formulas

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List of 21 Groundwater Level Fluctuation Formulas

Groundwater Level Fluctuation

1) Base Flow when Possible Recharge is Considered

$$fx \quad B = R_G - R + I + I_s$$

Open Calculator 

$$ex \quad 5m^3/s = 45m^3/s - 70m^3/s + 12m^3/s + 18m^3/s$$

2) Catchment Area usually Watershed Area when Possible Recharge is Considered

$$fx \quad A = \frac{R + D_G}{h} \cdot S_Y$$

Open Calculator 

$$ex \quad 9.44m^2 = \frac{70m^3/s + 10m^3/s}{5m} \cdot 0.59$$

3) Equation for Base Flow into Stream from Area

$$fx \quad B = R_G - D_G + I_s + I - (h \cdot S_Y \cdot A)$$

Open Calculator 

$$ex \quad 6m^3/s = 45m^3/s - 10m^3/s + 18m^3/s + 12m^3/s - (5m \cdot 0.59 \cdot 20m^2)$$

4) Equation for Gross Recharge due to Rainfall and other Sources

$$fx \quad R_G = (h \cdot S_Y \cdot A) + D_G + B - I_s - I$$

Open Calculator 

$$ex \quad 45m^3/s = (5m \cdot 0.59 \cdot 20m^2) + 10m^3/s + 6m^3/s - 18m^3/s - 12m^3/s$$



5) Equation for Gross Water Draft 

$$fx \quad D_G = R_G - B + I_s + I - (h \cdot S_Y \cdot A)$$

[Open Calculator !\[\]\(cbe80b694ebd74fcfe136a095b608235_img.jpg\)](#)


$$ex \quad 10m^3/s = 45m^3/s - 6m^3/s + 18m^3/s + 12m^3/s - (5m \cdot 0.59 \cdot 20m^2)$$

6) Equation for Net Ground Water Flow into Area across Boundary 

$$fx \quad I = (h \cdot S_Y \cdot A) - R_G + D_G + B - I_s$$

[Open Calculator !\[\]\(3e2231b1ad3ca8da8658228c00dd08e0_img.jpg\)](#)

$$ex \quad 12m^3/s = (5m \cdot 0.59 \cdot 20m^2) - 45m^3/s + 10m^3/s + 6m^3/s - 18m^3/s$$

7) Equation for Recharge from Irrigation in Area 

$$fx \quad R_{gw} = R - R_{rf} - R_{wt} - R_t$$

[Open Calculator !\[\]\(0d5ec72f61334709c3fc9450209b754f_img.jpg\)](#)

$$ex \quad 19m^3/s = 70m^3/s - 16m^3/s - 21m^3/s - 14m^3/s$$

8) Equation for Recharge from Rainfall 

$$fx \quad R_{rf} = R - R_{gw} - R_{wt} - R_t$$

[Open Calculator !\[\]\(b64b40baaee5acddc1eab8538ba84754_img.jpg\)](#)

$$ex \quad 16m^3/s = 70m^3/s - 19m^3/s - 21m^3/s - 14m^3/s$$

9) Equation for Recharge from Stream into Ground Water Body 

$$fx \quad I_s = (h \cdot A \cdot S_Y) - R_G + D_G + B - I$$

[Open Calculator !\[\]\(aff7c69c44a5e015f18c35867ef3f5c3_img.jpg\)](#)

$$ex \quad 18m^3/s = (5m \cdot 20m^2 \cdot 0.59) - 45m^3/s + 10m^3/s + 6m^3/s - 12m^3/s$$



10) Equation for Recharge from Tanks and Ponds

$$fx \quad R_t = R - R_{rf} - R_{gw} - R_{wt}$$

[Open Calculator !\[\]\(e78f798d4ea5c530c9db49e7d26e6b95_img.jpg\)](#)

$$ex \quad 14m^3/s = 70m^3/s - 16m^3/s - 19m^3/s - 21m^3/s$$

11) Equation for Recharge from Water Conservation Structures

$$fx \quad R_{wt} = R - R_{rf} - R_{gw} - R_t$$

[Open Calculator !\[\]\(05be7c7a8995decd503647c99211f7c2_img.jpg\)](#)

$$ex \quad 21m^3/s = 70m^3/s - 16m^3/s - 19m^3/s - 14m^3/s$$

12) Equation for Recharge when Gross Water Draft is Considered

$$fx \quad R = (h \cdot S_Y \cdot A) - D_G$$

[Open Calculator !\[\]\(fe3aebe81acea8d45108cd2768939da7_img.jpg\)](#)

$$ex \quad 49m^3/s = (5m \cdot 0.59 \cdot 20m^2) - 10m^3/s$$

13) Equation for Specific Yield

$$fx \quad S_Y = \frac{R_G - D_G - B + I_s + I}{A \cdot h}$$

[Open Calculator !\[\]\(899d8b7697d64725bf017d3296cfcf1b_img.jpg\)](#)

$$ex \quad 0.59 = \frac{45m^3/s - 10m^3/s - 6m^3/s + 18m^3/s + 12m^3/s}{20m^2 \cdot 5m}$$



14) Equation for Water Level Fluctuation

$$fx \quad h = \frac{R_G - D_G - B + I_s + I}{A \cdot S_Y}$$

[Open Calculator !\[\]\(e2376d476d06eb31946dc01a69a4403a_img.jpg\)](#)

$$ex \quad 5m = \frac{45m^3/s - 10m^3/s - 6m^3/s + 18m^3/s + 12m^3/s}{20m^2 \cdot 0.59}$$

15) Equation for Watershed Area about Specific Yield and Water Level Fluctuation

$$fx \quad A = \frac{R_G - D_G - B + I_s + I}{S_Y \cdot h}$$

[Open Calculator !\[\]\(0b5e7e25e8775f7e7e80906ada4f0021_img.jpg\)](#)

$$ex \quad 20m^2 = \frac{45m^3/s - 10m^3/s - 6m^3/s + 18m^3/s + 12m^3/s}{0.59 \cdot 5m}$$

16) Net Ground Water Flow given Possible Recharge

$$fx \quad I = R - R_G + B - I_s$$

[Open Calculator !\[\]\(bd3b31712ad9bab5a241210fa6925cdd_img.jpg\)](#)

$$ex \quad 13m^3/s = 70m^3/s - 45m^3/s + 6m^3/s - 18m^3/s$$

17) Possible Recharge given Gross Recharge due to Rainfall

$$fx \quad R = R_G - B + I + I_s$$

[Open Calculator !\[\]\(7bc43b319a082987e20f7bf78f4bab80_img.jpg\)](#)

$$ex \quad 69m^3/s = 45m^3/s - 6m^3/s + 12m^3/s + 18m^3/s$$



18) Possible Recharge given other Recharge Factors

$$fx \quad R = R_{rf} + R_{gw} + R_{wt} + R_t$$

[Open Calculator !\[\]\(d3fb9f94af8b26d1c844efa9a98805b0_img.jpg\)](#)

$$ex \quad 70m^3/s = 16m^3/s + 19m^3/s + 21m^3/s + 14m^3/s$$

19) Recharge from Stream into Ground water Body given Possible Recharge

$$fx \quad I_s = R - R_G + B - I$$

[Open Calculator !\[\]\(e1d6102fe77919492c04879c8450f1f5_img.jpg\)](#)

$$ex \quad 19m^3/s = 70m^3/s - 45m^3/s + 6m^3/s - 12m^3/s$$

20) Specific Yield when Possible Recharge and Gross Water Draft is Considered

$$fx \quad S_Y = \frac{R + D_G}{h \cdot A}$$

[Open Calculator !\[\]\(ab4e2b3fc7e7887b7a72f548aa6f5e60_img.jpg\)](#)

$$ex \quad 0.8 = \frac{70m^3/s + 10m^3/s}{5m \cdot 20m^2}$$

21) Water Level Fluctuation when Possible Recharge and Gross Water Draft is Considered

$$fx \quad h = \frac{R + D_G}{S_Y \cdot A}$$

[Open Calculator !\[\]\(5abce1a84a655b073239ab33e1199487_img.jpg\)](#)

$$ex \quad 6.779661m = \frac{70m^3/s + 10m^3/s}{0.59 \cdot 20m^2}$$






Variables Used

- **A** Watershed Area (Square Meter)
- **B** Base Flow into the Stream from the Area (Cubic Meter per Second)
- **D_G** Gross Water Draft (Cubic Meter per Second)
- **h** Water Level Fluctuation (Meter)
- **I** Net Ground Water Flowing Outside Catchment (Cubic Meter per Second)
- **I_s** Recharge of Ground Water Body (Cubic Meter per Second)
- **R** Possible Recharge (Cubic Meter per Second)
- **R_G** Gross Recharge due to Rainfall (Cubic Meter per Second)
- **R_{gw}** Recharge from Irrigation (Cubic Meter per Second)
- **R_{rf}** Recharge from Rainfall (Cubic Meter per Second)
- **R_t** Recharge from Tanks and Ponds (Cubic Meter per Second)
- **R_{wt}** Recharge from Conservation Structures (Cubic Meter per Second)
- **S_Y** Specific Yield






Constants, Functions, Measurements used

- **Measurement: Length** in Meter (m)
Length Unit Conversion 
- **Measurement: Area** in Square Meter (m²)
Area Unit Conversion 
- **Measurement: Volumetric Flow Rate** in Cubic Meter per Second (m³/s)
Volumetric Flow Rate Unit Conversion 



Check other formula lists

- [Groundwater Level Fluctuation Formulas](#) 
- [Specific Yield Method Formulas](#) 
- [Rainfall Infiltration Method Formulas](#) 

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