

Estimating Sediment Accumulation in Reservoirs

The attached form IL-ENG-10 may be used to estimate sediment accumulation in reservoirs.

1. Type Erosion - Rotation used in soil loss equation to estimate Tons/Ac soil lost.
2. Acres - Estimate acres at each different soil loss rate.
3. Soil Loss - Fill in estimated soil loss in Tons/Acre using the soil loss equation for expected land treatment and rotation.
4. Total - Multiply Acres X Tons and total "Total" column.
5. Estimate Delivery Rate - Use 0.50 for normal watershed and increase to 0.75 for gullied fan-shaped watershed. Multiply Delivery Rate X Total Tons to get Tons Delivered.
6. Complete calculation of Tons Delivered X Trap efficiency X Design Years of structure to get Total Tons accumulated in reservoir.
7. Estimate lb/ft^3 and multiply Sediment Storage in Tons X AcFt/Ton taken from Conversion Table to get Total Acre Feet accumulated in pond. Use 50 or 55 lb/ft^3 for most soils in Illinois and higher weights for sands and gravels.
8. Fill in sketch map.

This amount of sediment should be added to other needs to determine total storage needed. Estimated volume of the reservoir may be obtained by the formula $V = 0.4 AD$ where V is volume in acre-feet, A is the surface area in acres and D is maximum depth. A topographic map should be used if available.

This procedure is optional but should be used on larger drainage areas and on high sediment producing drainage areas. This method is limited to 250 acres drainage area but may be used in preliminary work on larger drainage areas with detailed estimates made by the geologist for final design.

ESTIMATING SEDIMENT ACCUMULATION IN RESERVOIRS

Location Sample Site No. Any

Date Now Computed By I. C. U.

Total Acres 100 County All
(Limited to 250 acres)

Present or Future Conditions (Check one)

TYPE EROSION		(ACRES)	SOIL LOSS (TONS/AC.)	TOTAL (TONS)
Cropland	<u>3-1-1</u>	<u>20</u>	<u>3.5</u>	<u>70</u>
	<u>1-1-4</u>	<u>40</u>	<u>2.0</u>	<u>80</u>
Pasture or Woods		<u>40</u>	<u>1.0</u>	<u>40</u>
Other				
Total				<u>190</u>

Total

Delivery Rate 0.50 x
(Use 0.50 to 0.75)

95 Tons Delivered

$$\text{Tons Delivered } \underline{95} \times 0.90 = \underline{85.5} \text{ Tons} \times \frac{(25)}{\text{(Design Years)}} = \underline{2140} \text{ Tons}$$

(Trap Efficiency)

$$\text{Sediment Storage } \underline{2140} \text{ Tons} \times \underline{0.0008} \text{ Ac. Ft./Ton} = \underline{1.8} \text{ Acre Feet.}$$

Conversion Table

1 b/ft ³	AcFt/Ton
50	0.00092
55	0.00084
60	0.00077
65	0.00071
70	0.00066

← Most Soils

← Sand or Gravel

