

What is a Watershed? (Answer Key)

LAND USE TYPE	NUMBER OF GRID CELLS	CALCULATION	AREA (ACRES)	CALCULATION	AREA RATIO OF WATERSHED
Urban	47	Multiply by 200 (acres)	9,400	Divide by 31,600 x 100	0.298
Agricultural	69		13,800		0.437
Conservation	42		8,400		0.266
TOTAL	158	n/a	31,600	n/a	1.00

LAND USE TYPE	RUNOFF RATIO	AREA RATIO OF WATERSHED	CALCULATION	PROPORTION OF RAIN AS RUNOFF	CALCULATION	VOLUME OF RUNOFF (42 GALLON BARRELS)
Urban	0.90	0.298	Multiply the two columns to the left	0.268	Multiply by 61,288,484 (barrels of rain from a 3 inch rain event)	16,547,891 16,408,246*
Agricultural	0.30	0.437		0.131		8,090,080 8,029,567*
Conservation	0.10	0.266		0.027		1,593,501 1,629,188
Total	n/a	1.00	n/a	n/a	n/a	26,231,472 26,067,001*

*without using rounded figures

Equations Used

Storm Water Volume : (Total Area x 43560 ft²) x (0.25 ft of Rain) x (0.1781 barrel/ft³)
 Proportion of Rain as Runoff: (Runoff Ratio) x (Land Use Type Area/Total Area)
 Volume of Runoff: (Proportion of Rain as Runoff) x (Storm Water Volume)
 Total Volume of Runoff : (Sum of Land Use Type Runoff)

Bonus:

If development was conducted within the Waialeale watershed, creating more green spaces within urban areas to mitigate storm water runoff and pollution, what information would you need to recalculate runoff?

The area of land being redeveloped and the runoff percentage for the new green spaces.

How could you evaluate the effectiveness of the new development at decreasing storm water runoff volume?

To evaluate effectiveness, subtract the total amount of runoff after greenspace development from the total amount of runoff before development to evaluate the reduction in storm water runoff volume.