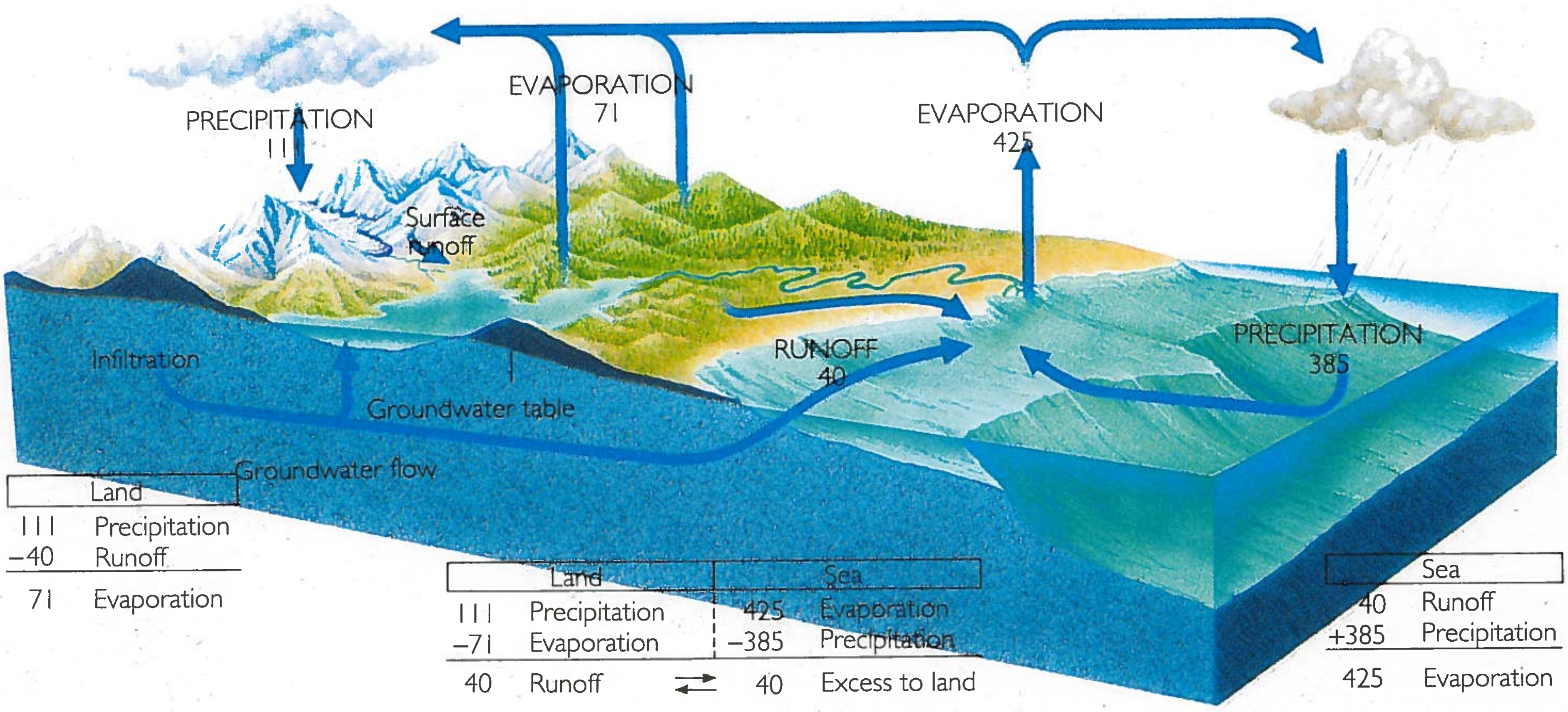

units of flux (rate) = 10^{15} Kg/yr

Figure 12.2

Press and Siever: ***Understanding Earth***

OHT 60

Overlay for #60

Press and Siever: ***Understanding Earth***

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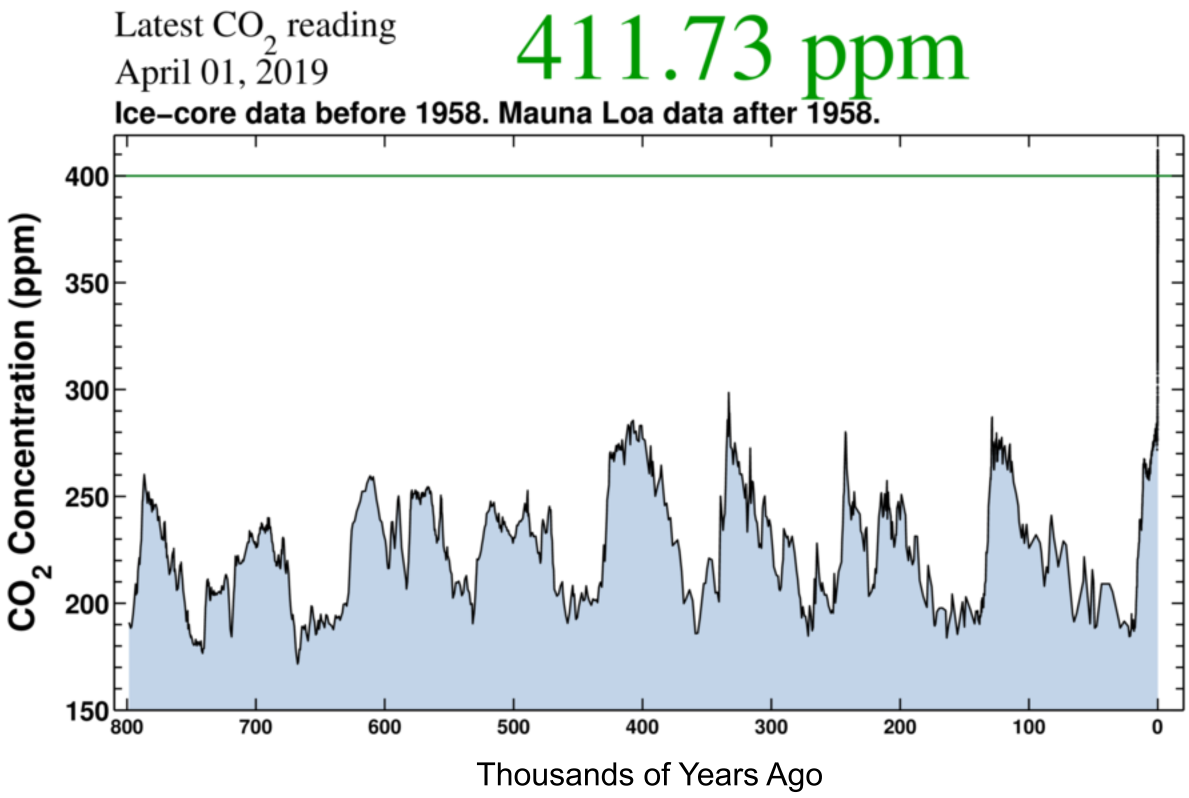
OHT 61

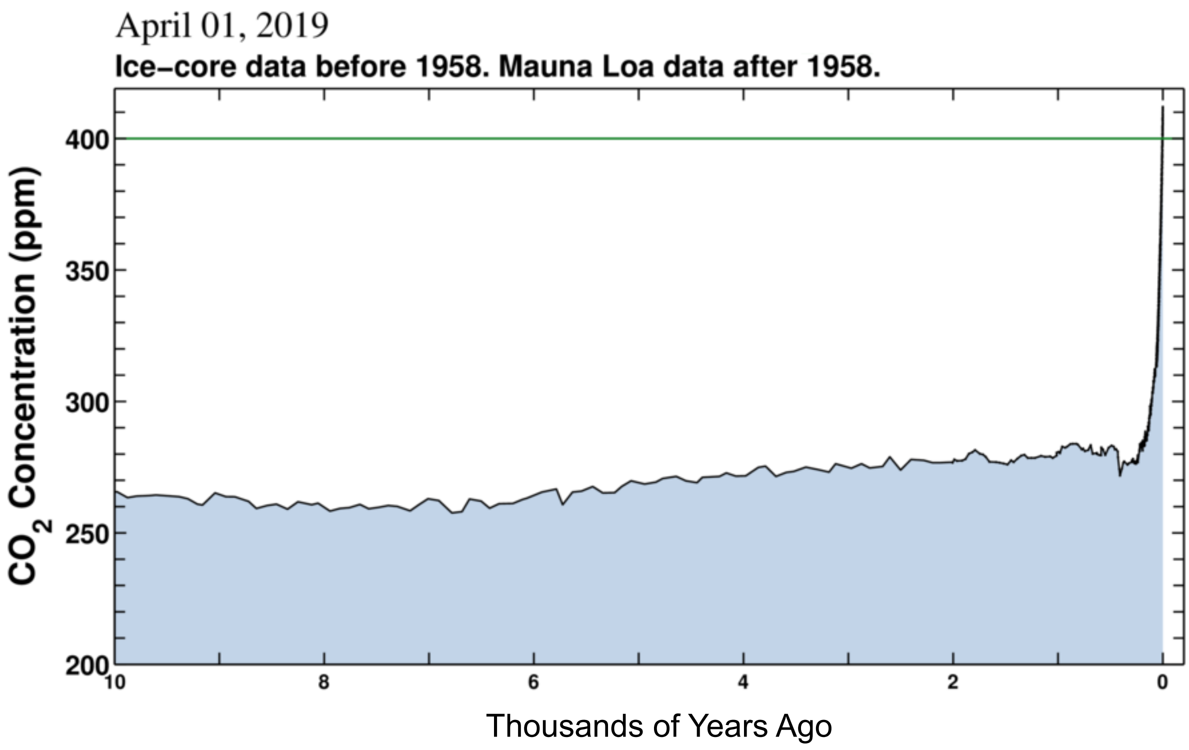
The Keeling Curve (https://scripps.ucsd.edu/programs/keelingcurve/)



Latest CO_2 reading
April 01, 2019

411.73 ppm

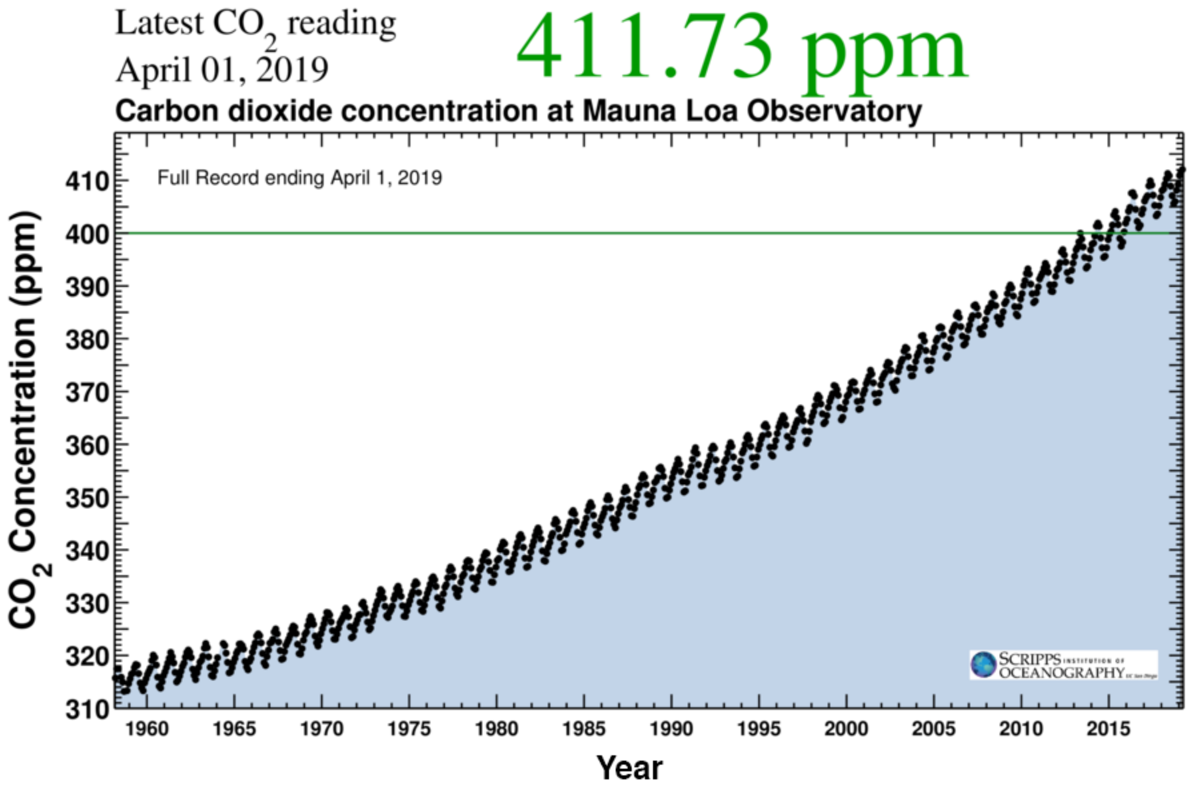
Ice-core data before 1958. Mauna Loa data after 1958.



April 01, 2019

Ice-core data before 1958. Mauna Loa data after 1958.

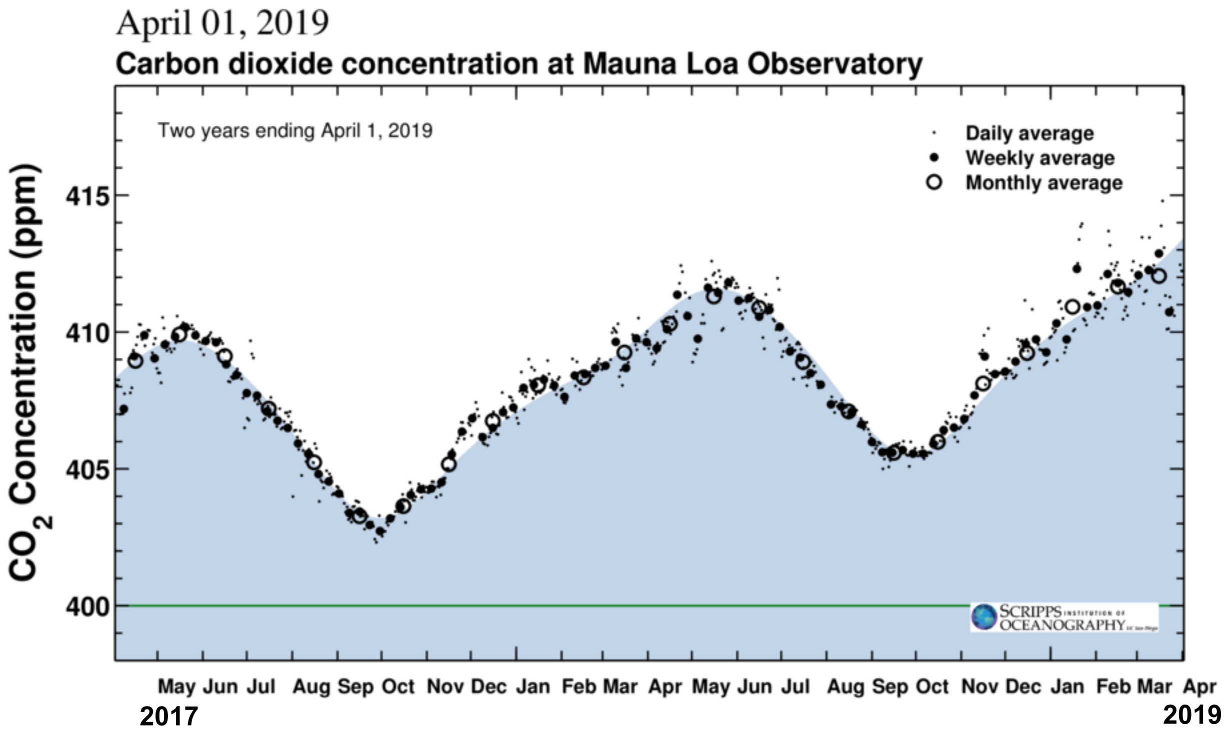
The Keeling Curve (https://scripps.ucsd.edu/programs/keelingcurve/)



Latest CO_2 reading
April 01, 2019

411.73 ppm

Carbon dioxide concentration at Mauna Loa Observatory



April 01, 2019

Carbon dioxide concentration at Mauna Loa Observatory

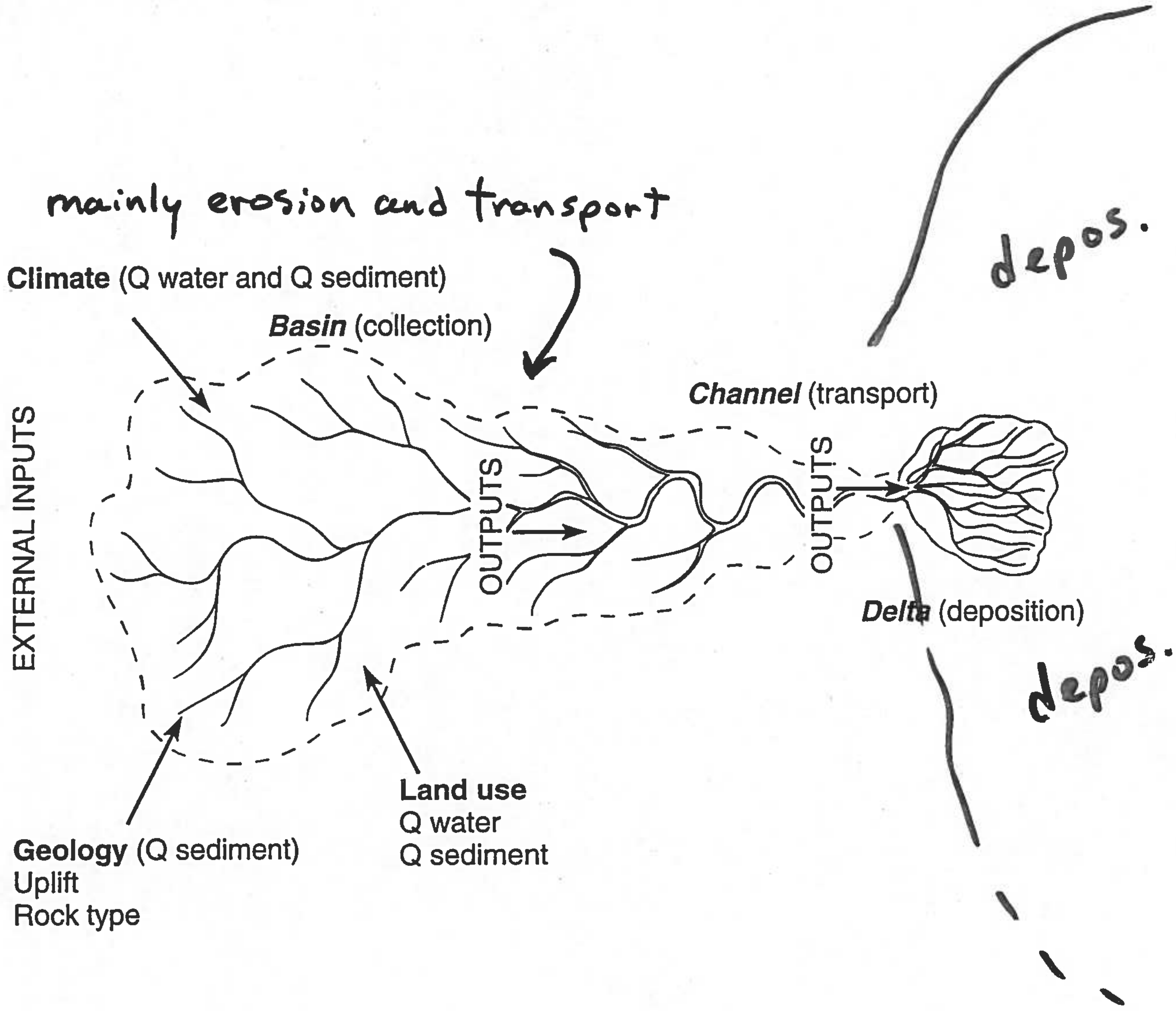


FIGURE 5.1

Schematic surface components of the fluvial system. The tributaries provide links between lithology and climate and are adjusted to both. Channel characteristics vary in response to the external variables of sediment and water discharge (Q), which are influenced naturally from climate, tectonic, and lithologic factors. Human influence also modifies these variables through land use alterations.

CHARACTERISTICS OF COLUMBIA RIVER SEDIMENT AND SEDIMENT TRANSPORT[1,2]

JOHN T. WHETTEN, JAMES C. KELLEY, AND LARRY G. HANSON

JOURNAL OF SEDIMENTARY PETROLOGY, VOL. 39, NO. 3, P. 1149–1166
FIGS. 1–10, SEPTEMBER, 1969

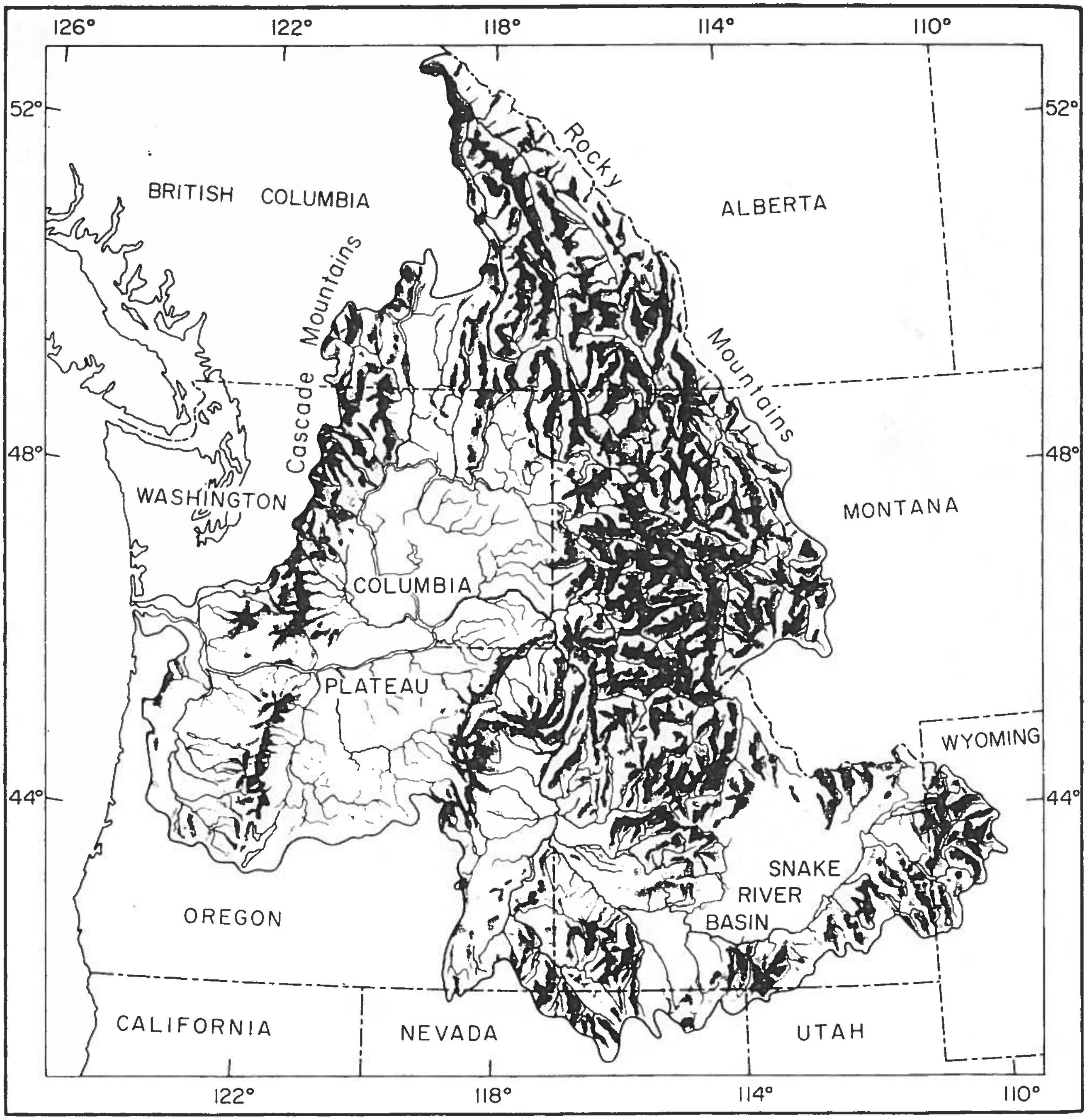


FIG. 3.—Shaded relief map of the Columbia River drainage basin.

Columbia River (#s from Milliman + Meade, 1983):

Water Discharge = $250\ km^3/yr$
Drainage area = $.67 \times 10^6\ km^2 = .67 \times 10^{12}\ m^2$
Average Susp. Sed Concentration = $0.13\ g/L$

(1) First consider Suspended Load Sed Discharge,
what is the susp. sediment concentration? (g/L) ?
can calculate:

$$250\ \frac{\cancel{km^3}}{yr} \times \frac{10^9\ \cancel{m^3}}{\cancel{km^3}} \times \frac{.13 g}{L} \times \frac{1\ \cancel{L}}{.001\ m^3} = 3.25 \times 10^{13}\ g/yr$$

= susp. sed discharge

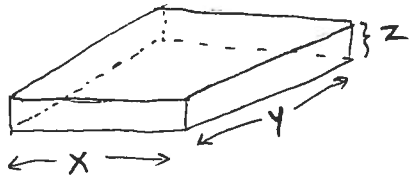
(2) Calculate Total Sed Discharge:
if bedload = ~25% of total load, then susp load = 75%, and

$3.25 \times 10^{13}\ g/y = .75\ X$, and: $X\ (\text{total}) = \underline{4.33 \times 10^{13}\ g/yr}$
$= 4.33 \times 10^{10}\ kg/yr$
(= total annual sedim. discharge, mass)

(3) Convert to Volume:

$$4.3 \times 10^{10}\ \frac{\cancel{kg}}{yr} \times \frac{m^3}{2700\ kg} = 1.6 \times 10^7\ m^3/yr$$

(4) Convert to vertical denudation rate: we know: $\boxed{\frac{volume}{yr}}$ and $\boxed{area}$...



volume = x · y · z (known)
area = x · y (known)

solve for $z = \frac{vol/yr}{area}$ =

$$1.6 \times 10^7\ \frac{m^3}{yr} \div .67 \times 10^{12}\ m^2 = 2.4 \times 10^{-5}\ \frac{m}{yr} = 2.4 \times 10^{-2}\ \frac{mm}{yr}$$

$\boxed{= .024\ \frac{mm}{yr}}$ denud. rate