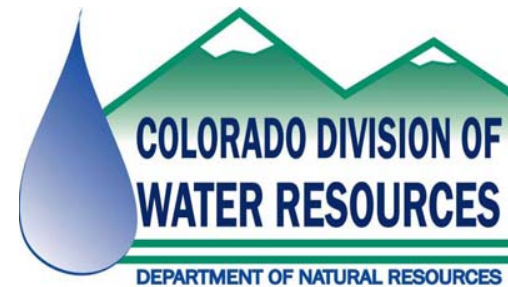


Water Use Efficiency Concerns in the Arkansas Basin

SEO Water Forum
September 6, 2006
Steven J. Witte
Division Engineer, Division 2



Article IV D

Arkansas River Compact

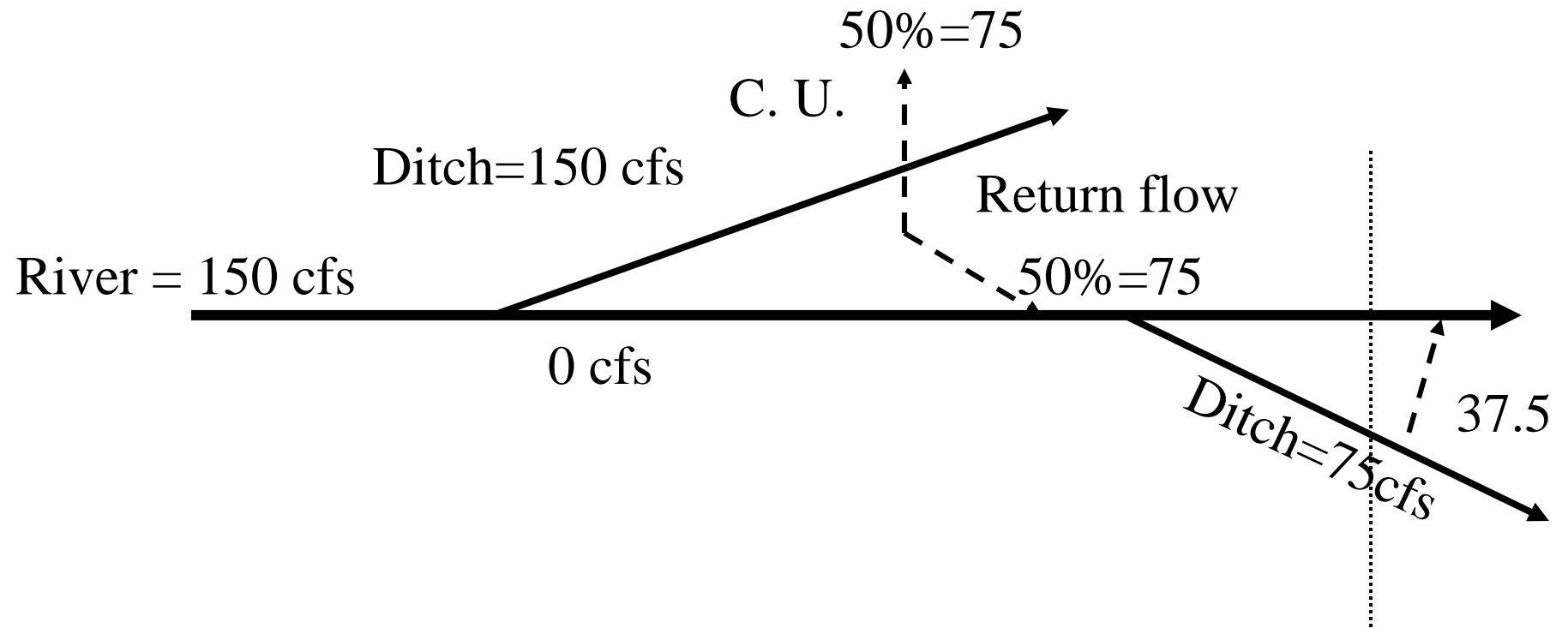
CRS 37-69-101

- This compact is not intended to prevent development of the Arkansas river in Colorado, which may involve improved or prolonged functioning of existing works: Provided, the waters of the river shall not be depleted in usable quantity or availability to the water users in Colorado and Kansas...

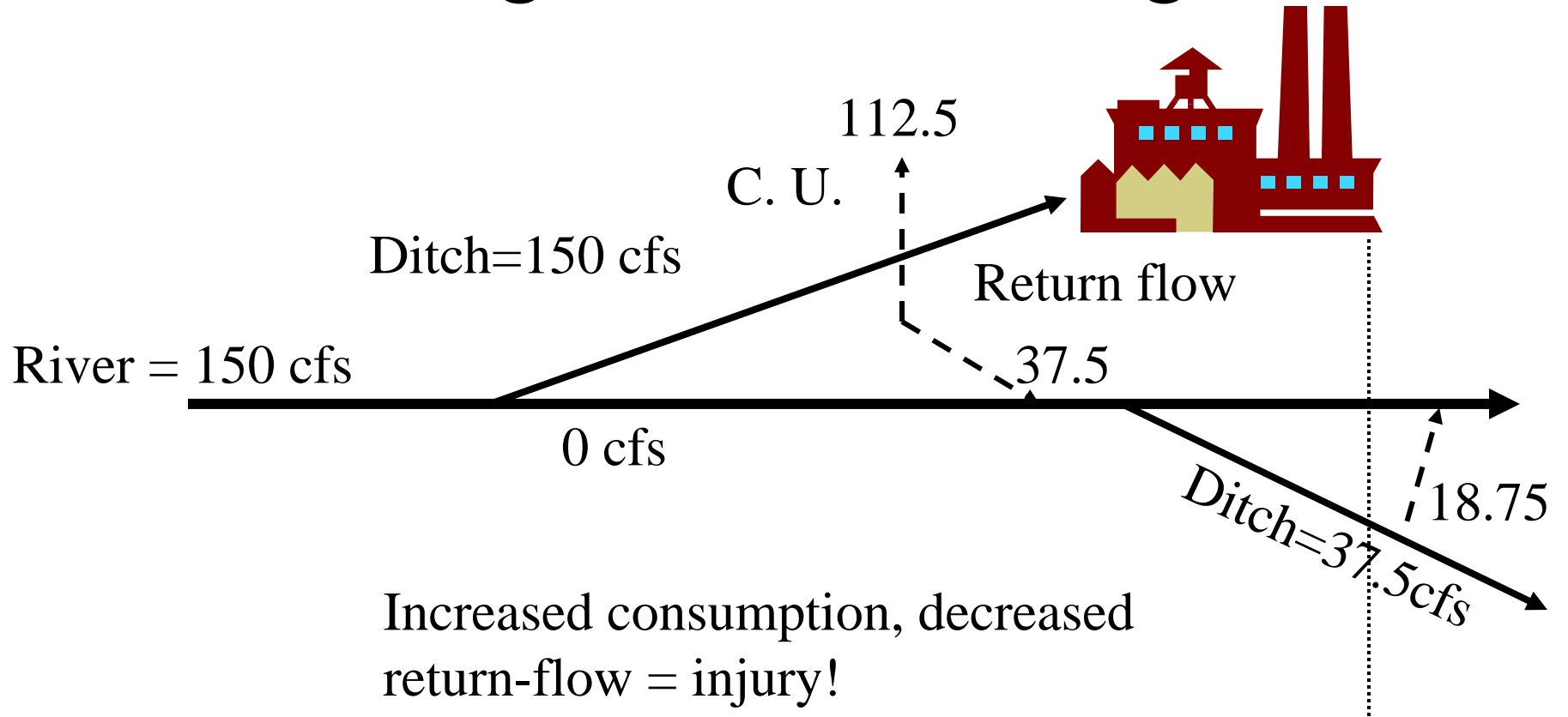
Changes of Water Rights

- One of the elements of property ownership is the ability to use, sell, move, change, or otherwise dispose of the article.
- Such changes are to be allowed subject to the rights of others not being injured

In the Beginning



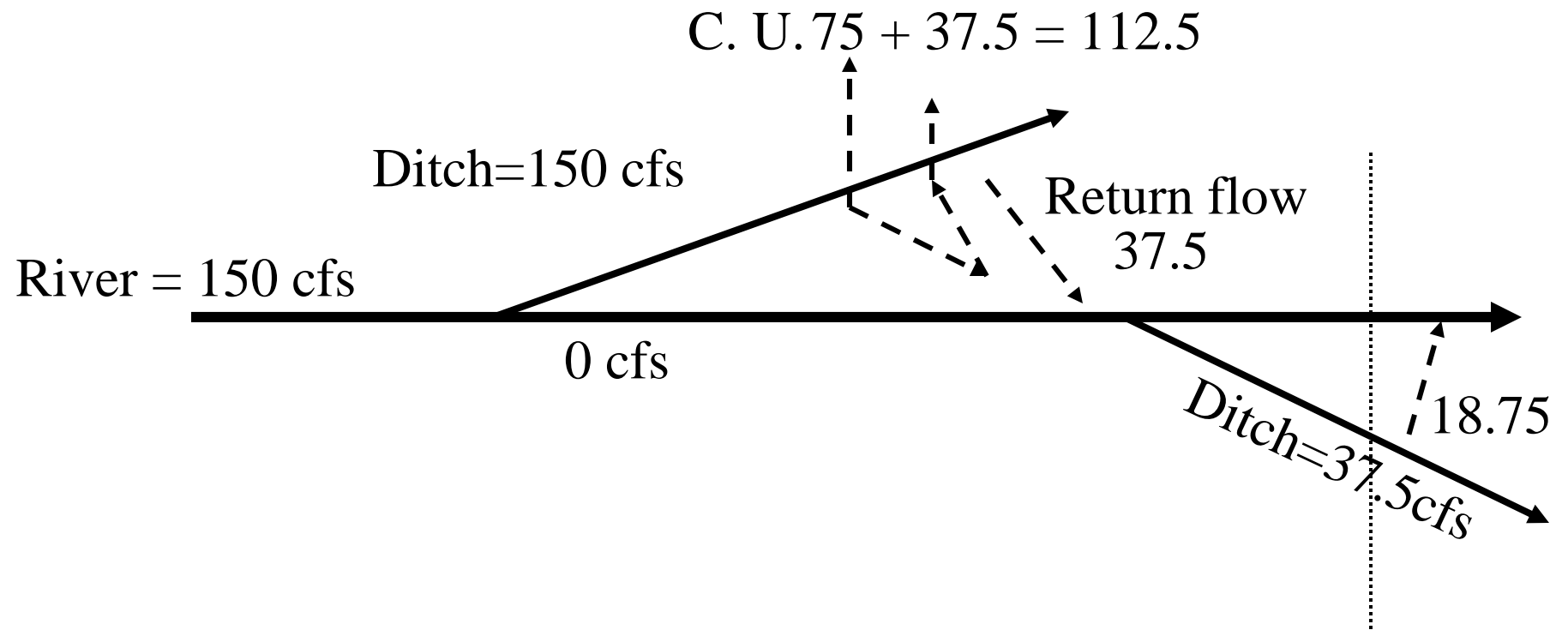
Change of Water Right



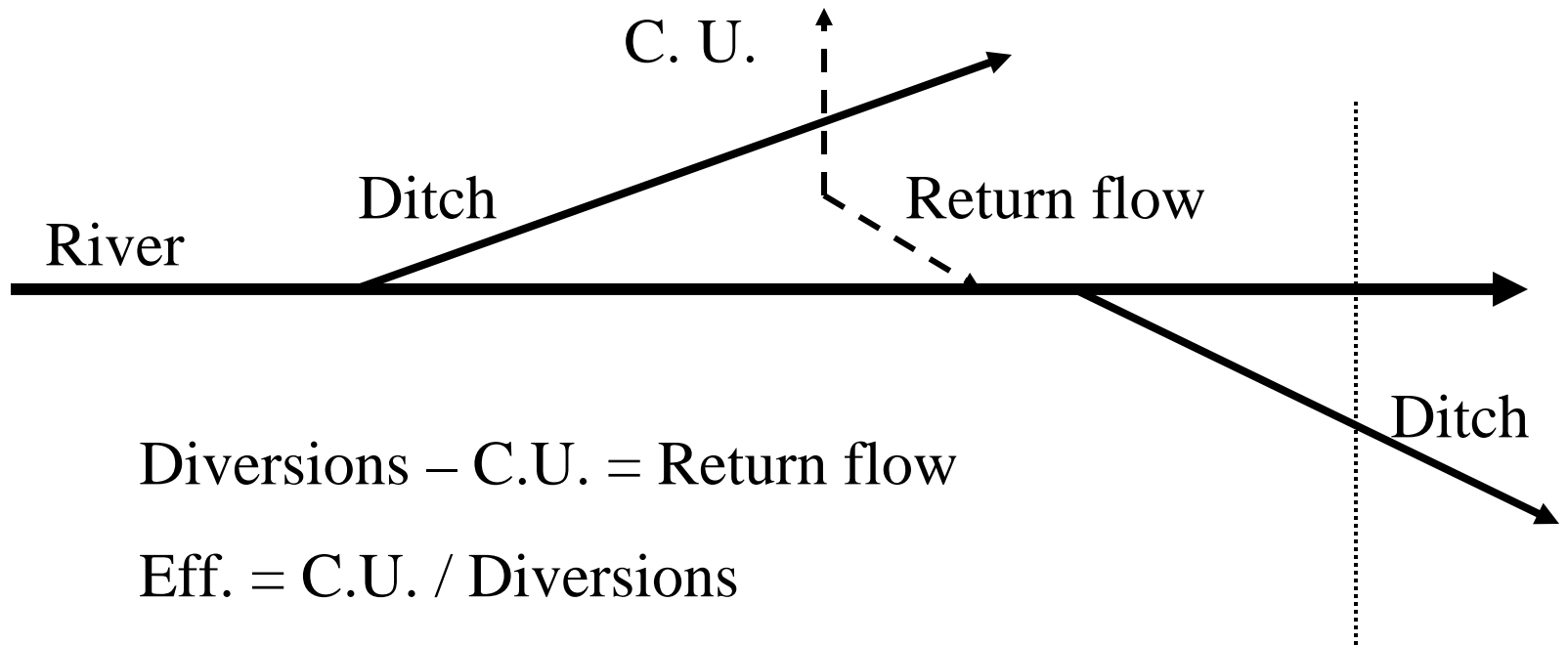
Increased consumption, decreased
return-flow = injury!

Without terms and conditions to prevent injury, this change of type of use cannot be allowed.

With Reuse



Efficiency Facts of Life



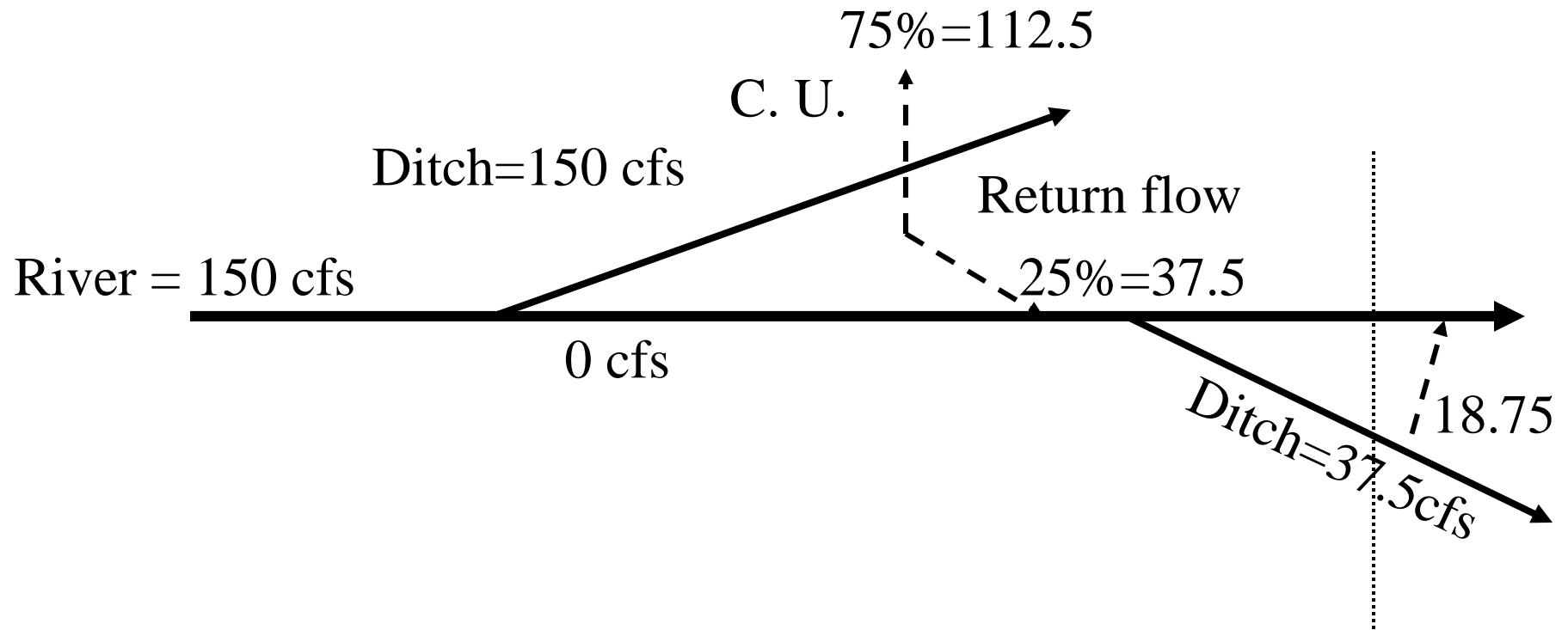
$$\text{Diversions} - \text{C.U.} = \text{Return flow}$$

$$\text{Eff.} = \text{C.U.} / \text{Diversions}$$

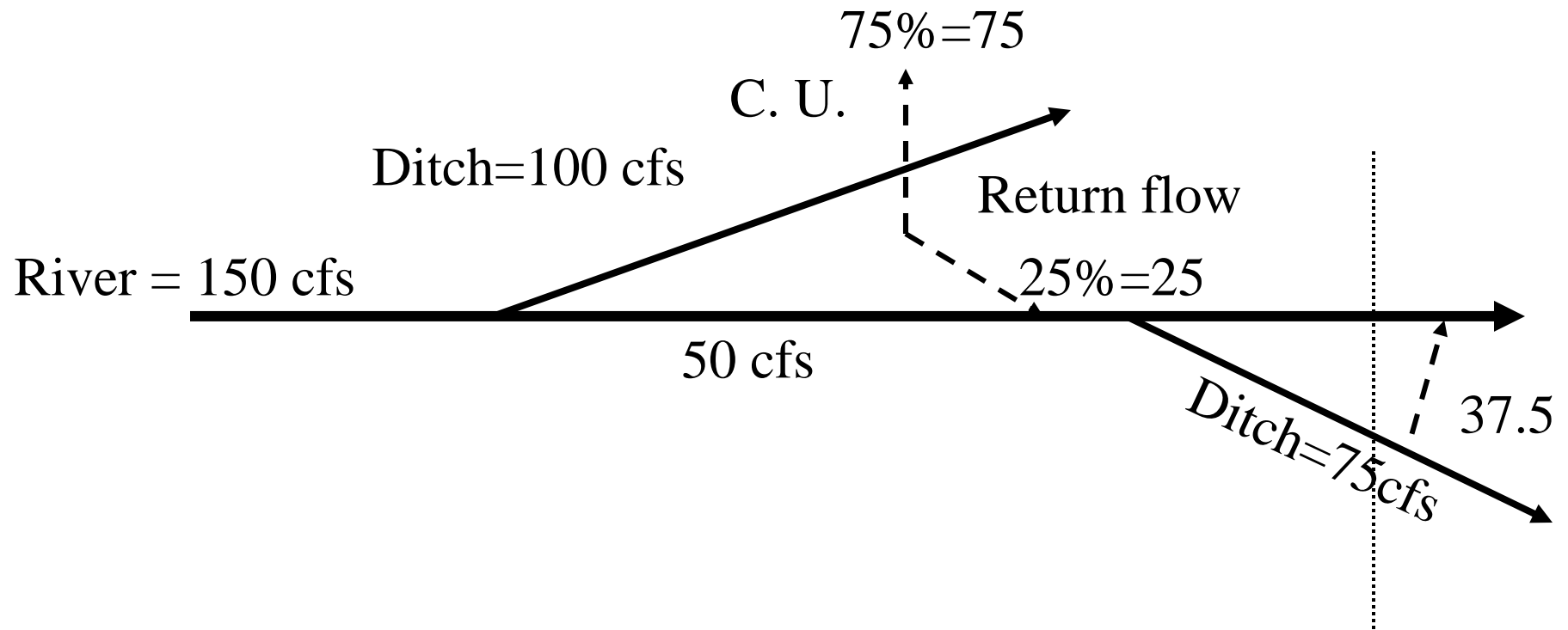
$$\text{Eff.} = \text{C.U.} / \text{Diversions}$$

$$\text{Diversions} - \text{C.U.} = \text{Return flow} = \text{Trouble!}$$

With Improved Efficiency Only



With Improved Efficiency and Bypass



The diagram illustrates a river and ditch system with the following components and processes:

- River:** Represented by a horizontal black line with an arrow pointing right.
- Ditch:** Two ditches are shown. The first ditch branches off the river and runs diagonally upwards to the right. The second ditch branches off the river and runs diagonally downwards to the right.
- Evap:** Indicated by a vertical dashed arrow pointing upwards from the first ditch.
- CU_{nb}:** Two vertical dashed arrows pointing upwards from the first ditch, labeled CU_{nb}.
- CU_b:** A vertical dashed arrow pointing upwards from the river, labeled CU_b.
- Return flow:** Indicated by a dashed arrow pointing from the first ditch back to the river.
- Seep:** Indicated by a dashed arrow pointing from the river up to the first ditch.
- Another Ditch:** A third ditch branches off the river further to the right and runs diagonally downwards.
- Vertical Dotted Line:** A vertical dotted line is positioned between the two ditches on the right.
- Another Return flow:** A dashed arrow points from the third ditch back to the river.

Field losses include Return flow (tail water and deep percolation), *phreatophyte ET, evaporation and spray losses*

Is the State really opposed to
improving irrigation efficiencies
in the Arkansas basin?

No!...provided that return flow is maintained.

So, where do we go from here?

- Continue research and monitoring
- Coordinate with NRCS
- Arkansas River Compact Rules
- Legislation

End

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Southeastern Colo. Water Conservancy Dist. v. Shelton Farms, Inc., 187 Colo. 181, 529 P.2d 1321 (1974)

Water Supply and Storage Co. v. Curtis, 733 P.2d 680 (Colo. 1987)