

SWC-IGWA Term Sheet Implementation – Technical Workshop

Consumptive Use

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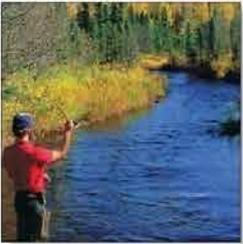
Date: 9/23/2015



Overview



- Groundwater diversion can include consumptive and non-consumptive water use.



- Consumptive groundwater use causes depletion of the ESPA.

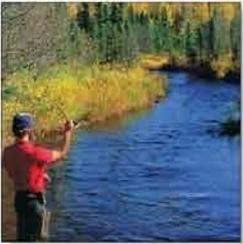


- Reducing diversions doesn't always reduce consumptive use.

- Multiple practices to reduce consumptive use.



Crop Irrigation Requirement

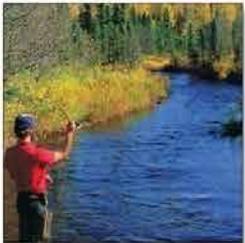


- **Crop Irrigation Requirement (CIR):** The amount of water, in addition to precipitation, that must be applied to meet irrigation consumptive use.

$$\text{CIR} = \text{Consumptive Use} - \text{Precipitation}$$

- Groundwater irrigators can only control consumptive use.

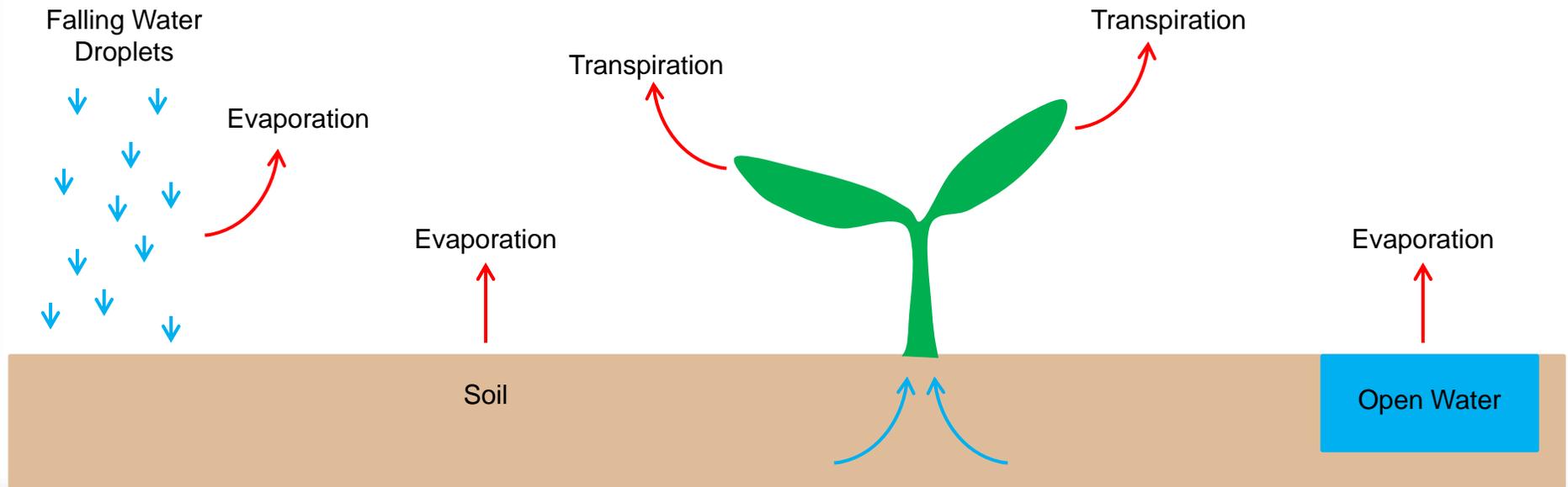
Consumptive Use to the Aquifer



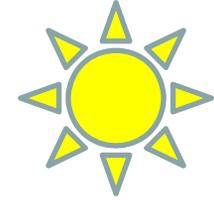
- **Consumptive Use:** The diverted groundwater that does not return to the aquifer and causes depletion of the aquifer. Consumptive use is entirely evapotranspiration (ET).
- **Non-Consumptive Use:** The diverted groundwater that goes back into the aquifer.

Evapotranspiration (ET) = Evaporation + Transpiration

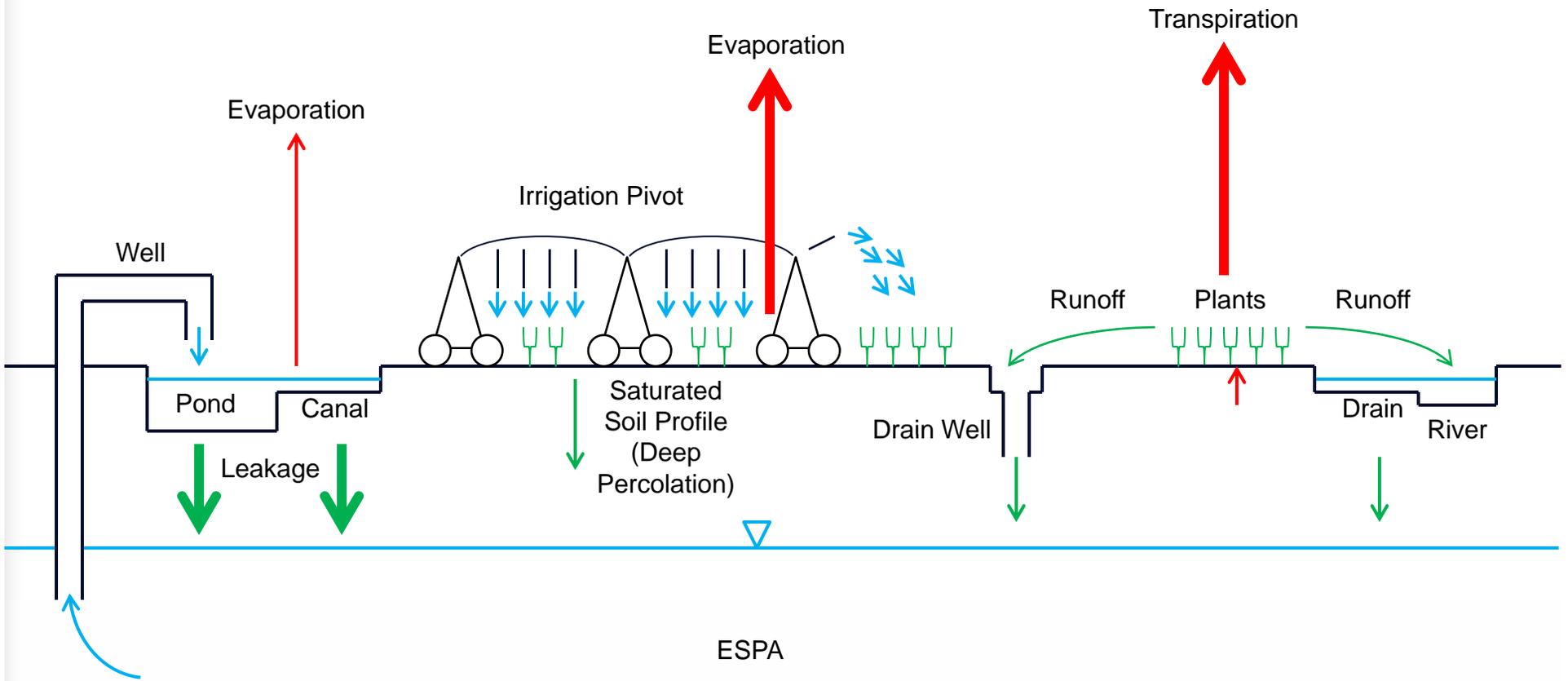
- The process of transferring moisture into the atmosphere by:
 - Evaporation from soil, open water, sprinkler irrigation, etc.
 - Transpiration from plants.
- ET is dependent on:
 - Moisture availability at the surface (vegetation, soil, etc.).
 - Water demand in the atmosphere (solar radiation, air temperature, humidity, wind speed).



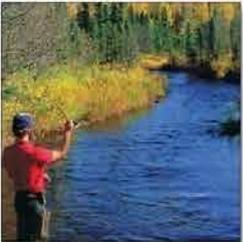
Hypothetical



- Consumptive Use
- Non-Consumptive Use

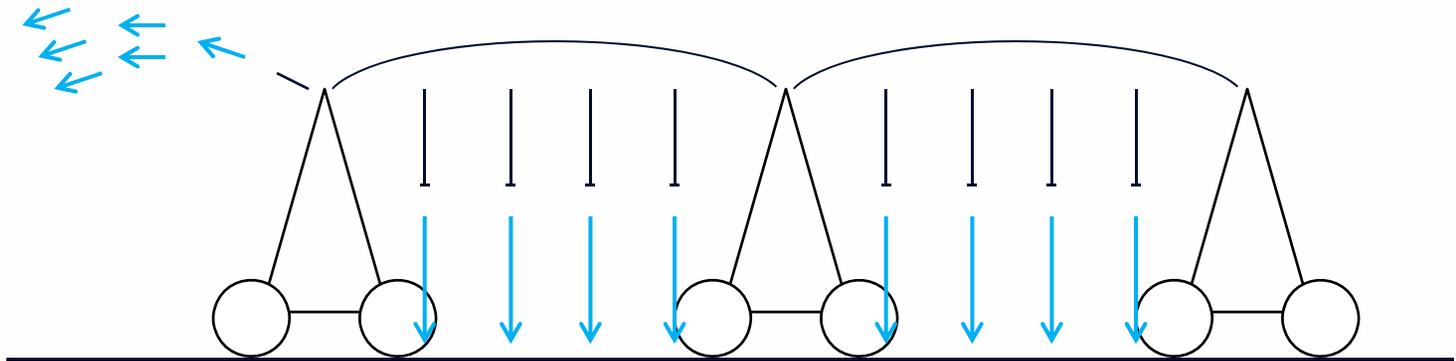


Reduce Consumptive Use - Evaporation

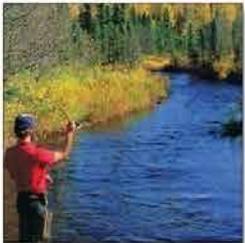


➤ During water application

- End guns
- Sprinkler drops
- Nozzles

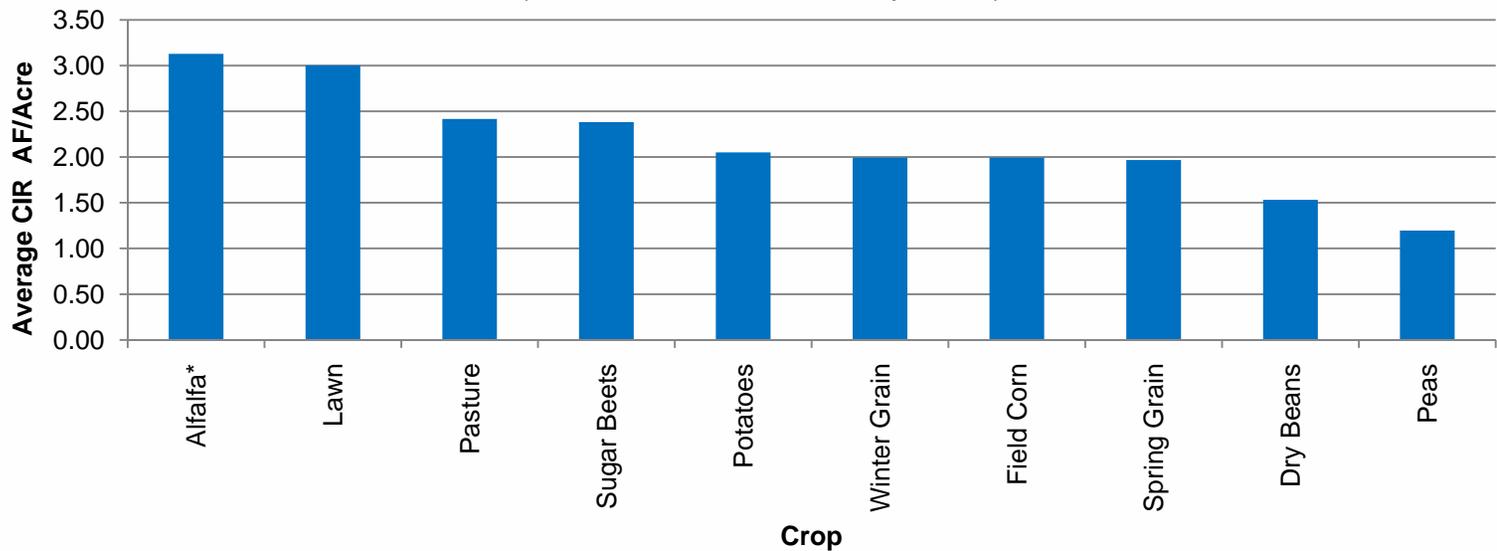


Reduce Consumptive Use - Transpiration



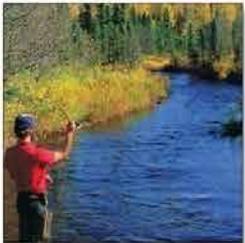
- Reduce crop acres (fallow)
- Adjust crop mix
- Change crop rotation
- Reduce double cropping
- Apply less irrigation water (↓ consumptive use)

Average Crop Irrigation Requirement (CIR) 2000-2014
Rupert AgriMet Station
(CIR = ET - Effective Precipitation)



* Values represent "average" daily use that takes seasonal cuttings into consideration.

Do groundwater diversions equal consumption use of the aquifer?



- A diversion is the total amount of water diverted from ESPA. It includes:

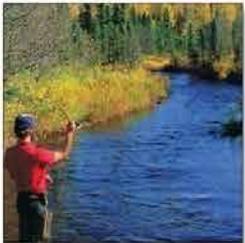
Consumptive Use

- Water consumed by crops
 - Transpiration
- Water not used consumed by crops that does not return to ESPA
 - Evaporation
 - Runoff

Non-Consumptive Use

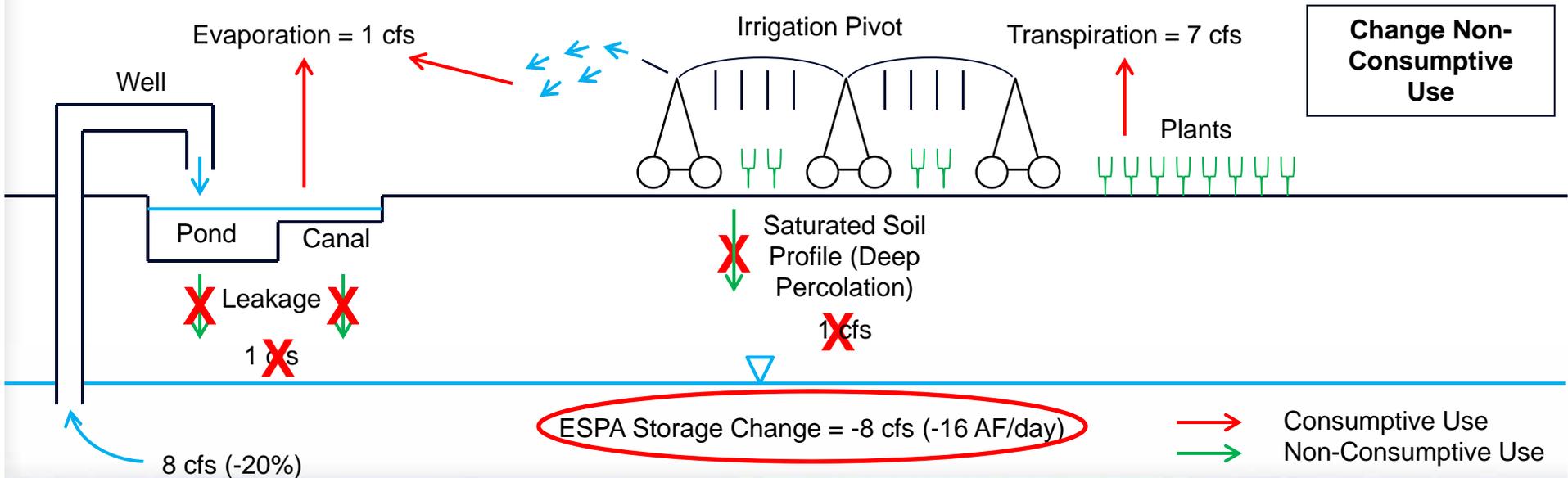
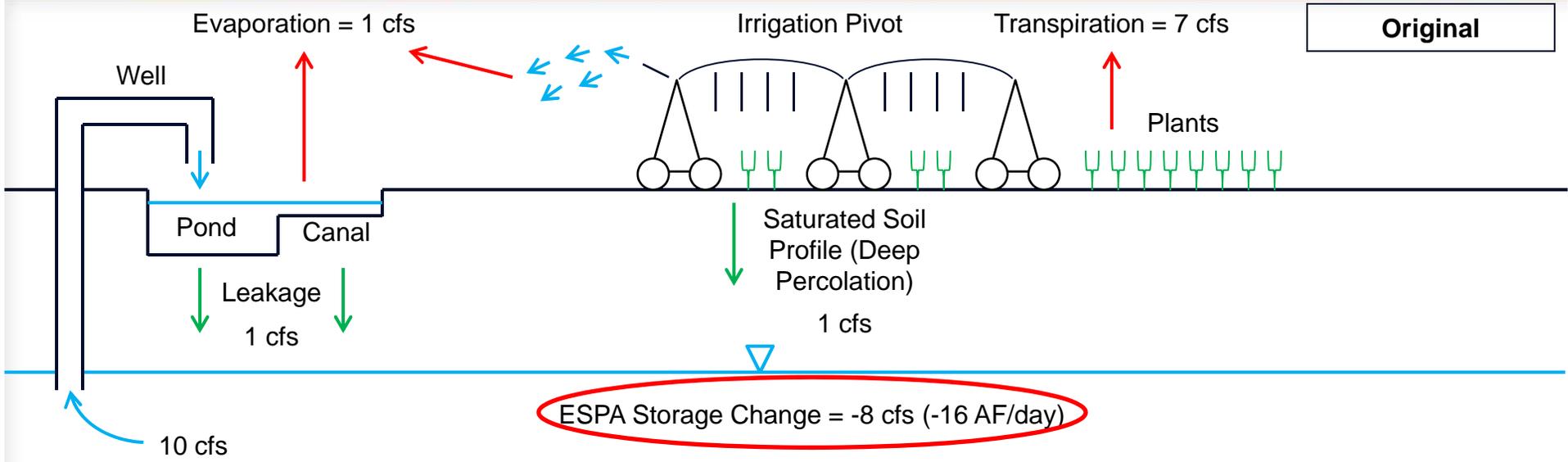
- Water not consumed by crops that returns to the ESPA
 - Pond/canal leakage
 - Saturated soil (deep percolation)
 - Runoff

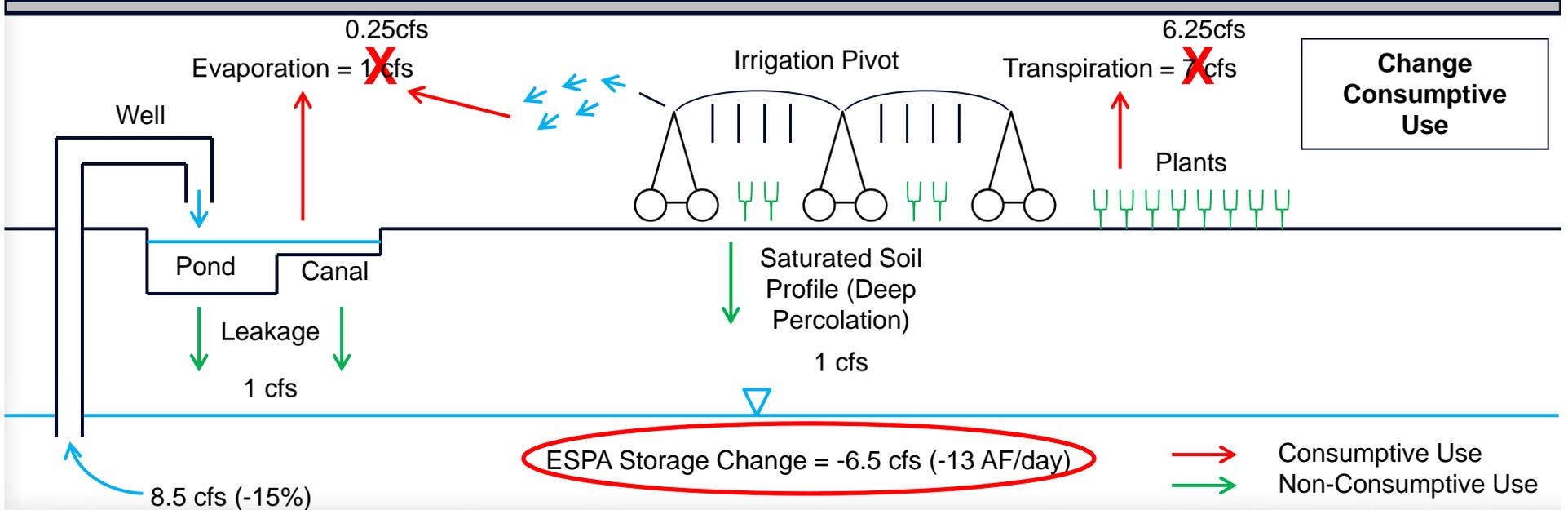
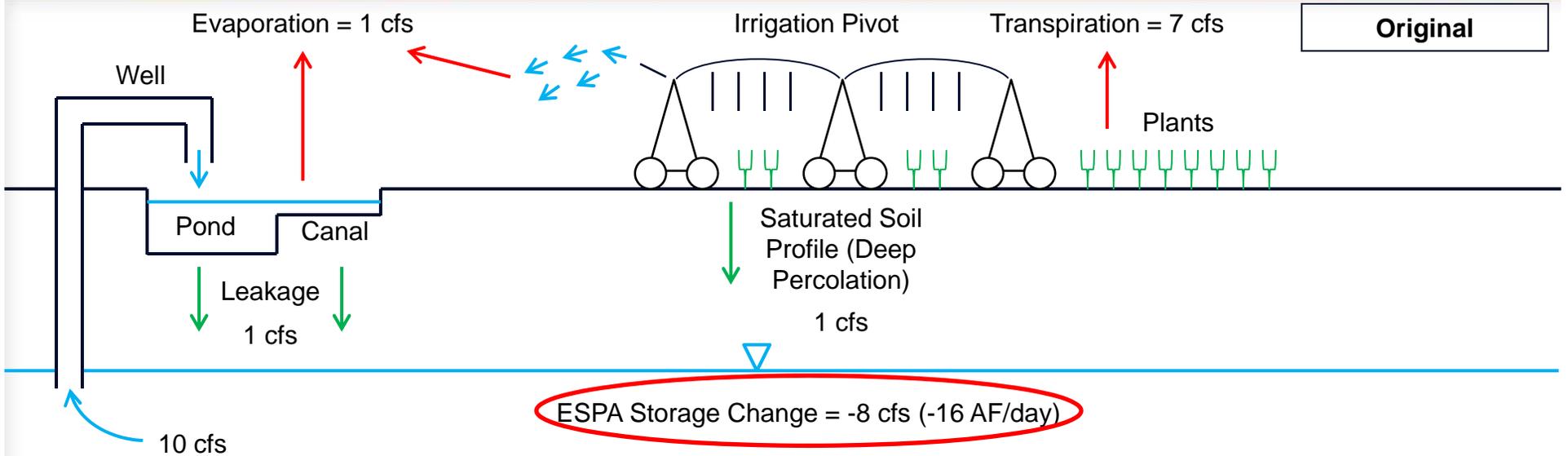
Does reducing a diversion reduce ESPA consumption?



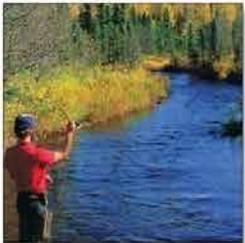
- **Yes:** If reduced diversion is achieved by reducing consumptive use.
 - Evaporation
 - Transpiration

- **No:** If reduced diversion is achieved by reducing non-consumptive use.
 - Converting from flood irrigation to sprinkler irrigation
 - Lining ponds & canals
 - Removing drain wells & runoff infiltration ponds





Stabilize the Aquifer



- Consumptive use is the portion of diverted groundwater that is not returned to the Eastern Snake Plain Aquifer.
- To stabilize the aquifer, reduce consumptive use:
 - Reduce evaporation
 - Reduce crop acres
 - Change crop rotation
 - Adjust crop mix
 - Apply less irrigation water
 - Combination of these

Questions?