

Transboundary Salinity Management and Water Supply Impacts Scarcity and Salt: Colorado River & Central Asia

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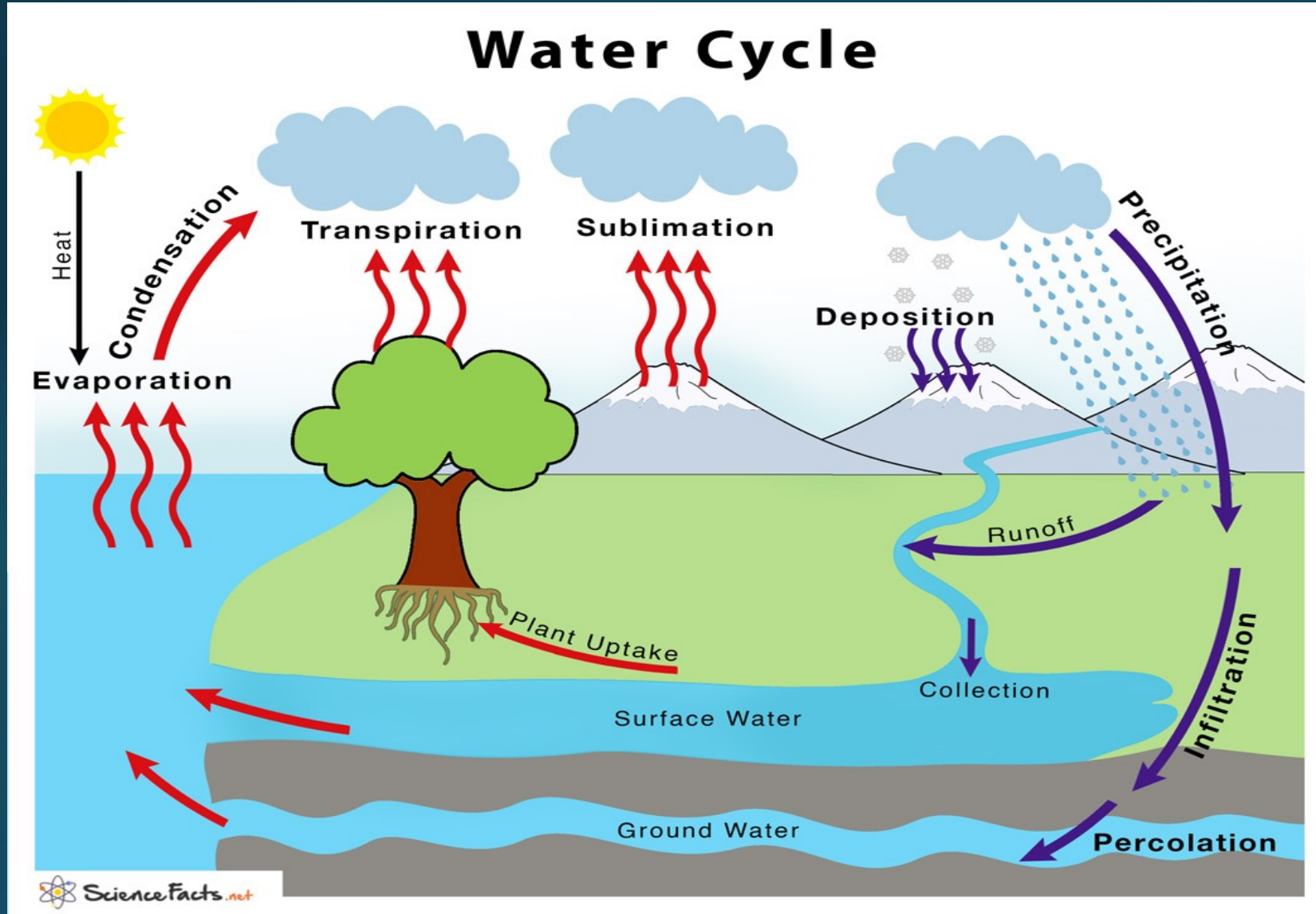
Upper Colorado River Commission

- An interstate water administrative agency established by the 1948 Compact to ensure appropriate allocation of water to the Upper Division States.
- Serves to ensure commitments under 1922 Compact are met at Lee Ferry and regarding Mexico.
- Seeks to promote interstate comity and to remove causes of present and future controversies.
- Comprised of one representative appointed by the Governor of each Upper Division State and one member appointed by the President.

Caveat – opinions expressed today do not reflect nor are endorsed by the Commission or Upper Division States



The Real Hydrologic World



Evaporation concentrates salt!

Especially in arid regions....

Such as the Colorado River Basin

& Central Asia

For Most of the 100 Years of Colorado Basin Development – Salinity Issues were addressed by DILUTION

1. Construction of major storage – particularly Lake Powell changed the game

- Closure of Glen Canyon Dam triggered the salinity issues between the US and Mexico along with the completion of the Welton Mohawk Outlet Drain

2. Minute 242 Proposed the Definitive and Permanent Solution to the Salinity Problem

- Use desalination technology to recycle agricultural drainage water for delivery to Mexico conserve more than 100 kaf/yr



US & Lower Basin Response to Minute 242

- Build Yuma Desalting Plant
 - Operate for 90 days in 1992 – damaged by flood flows on Gila River
 - Operate for 90 days in 2007 – pilot run
 - Operate for 365 days in 2010-2011 demonstrating water savings at 1/3 capacity
- Account for delivery of water in the bypass conveyance system “as if” treated and recycled to Mexico so no water supply impact to Arizona/CAP – Drain Lake Mead by ~120 – 150 kaf/yr
- Impacts to Lake Mead
 - Additional depletion in Lake Mead due to no recycling of ag drainage water but accounting for return flows “as if”
- Impacts to Lake Powell
 - Additional releases under “balancing” conditions – Mead is lower so requires “more help” from Lake Powell
- Mexico uses bypass flows for environmental purposes in Cienega de Santa Clara

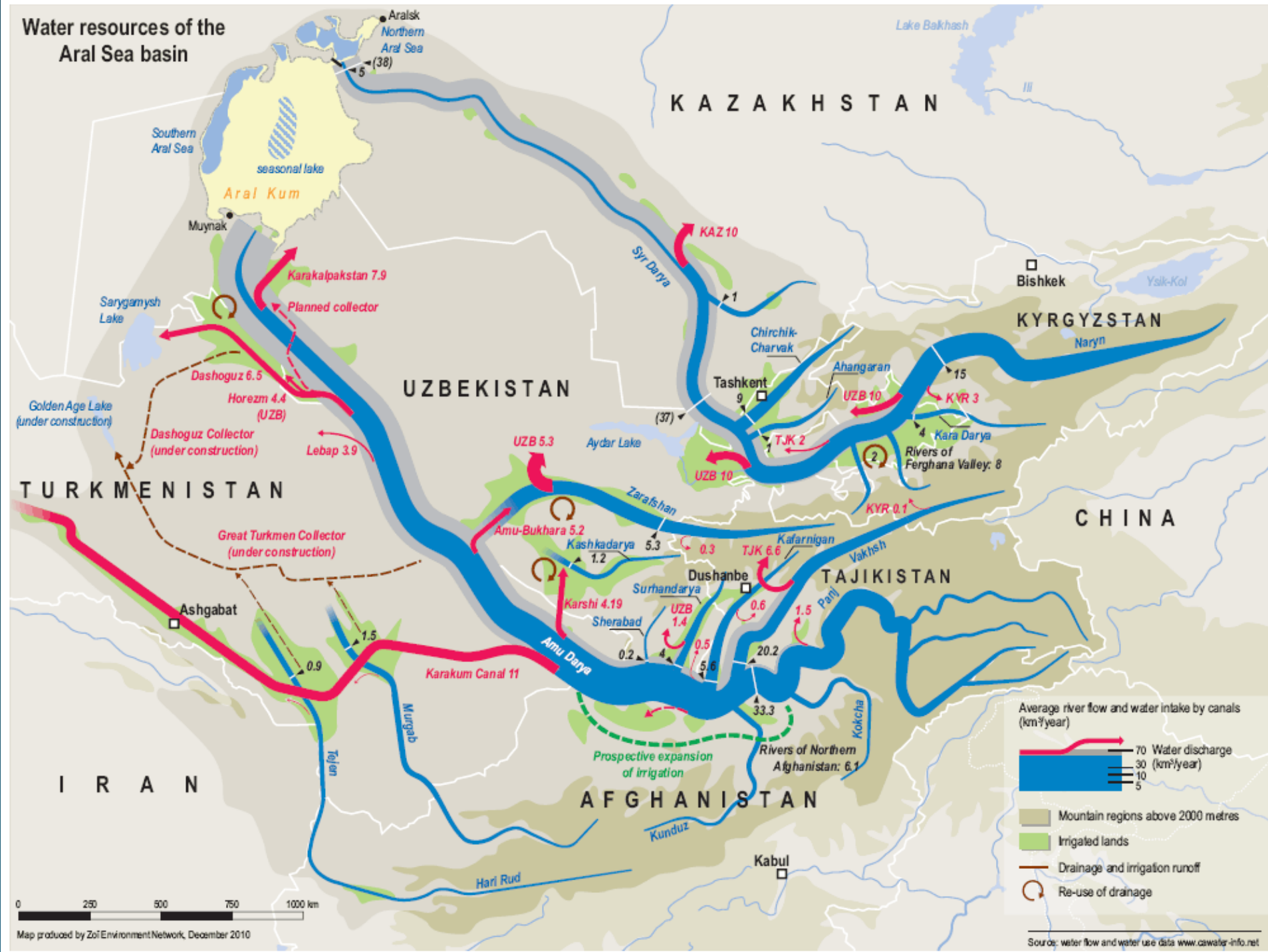
Meanwhile – ½ a world away in Central Asia



Meanwhile – 1/2
a world away in
Central Asia

Impact of
Irrigated
Agriculture and
Trans-basin
Diversions On
Aral Sea

Driver for
irrigation
depletions is
salt
management



Impact of Depletions and Trans-basin Diversions On Aral Sea

Aral Sea important fishery and resource Uzbekistan & Kazakhstan

1. Construction of trans-basin conveyance system and expansion of cotton changed the game

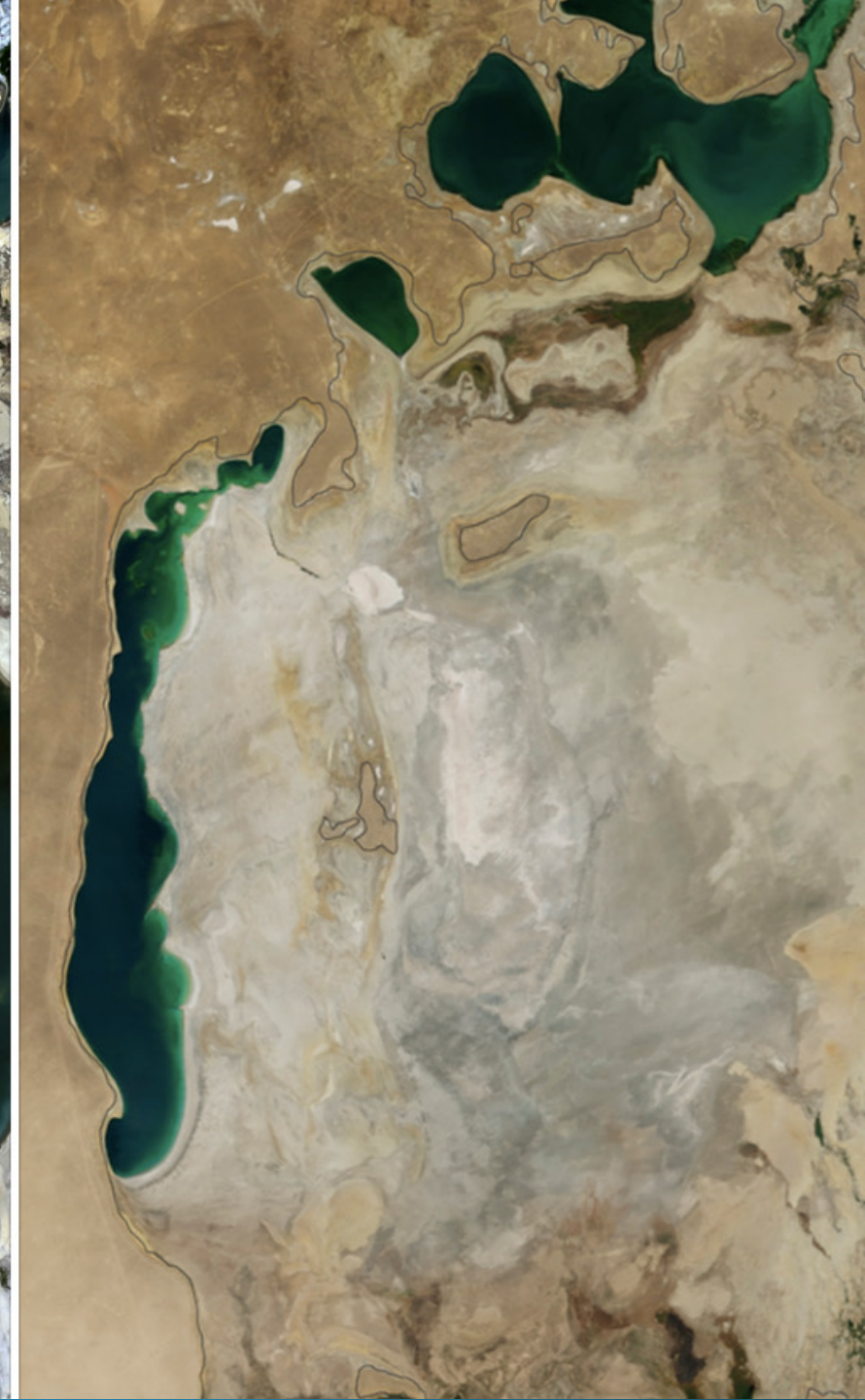
- Karakum Canal on the Amu Darya (Uzbekistan to Turkmenistan) 745 miles – to serve 1,000,000 acres of Cotton in Turkmenistan, ~19,000 cfs, ~50% efficiency, salt leach fraction,
- Cotton major hard currency crop for Uzbek and Turkmen economies (forced labor)

2. Depletes Aral Sea



Impact of Irrigated Agriculture and Trans-basin Diversions On Aral Sea

- Uzbekistan did nothing (Amu Darya)
- Turkmenistan did nothing (Amu Darya)
- Kazakhstan invested in infrastructure and efficiency to “save” northern Sea (Syr Darya)



Lessons Learned

Salinity management impacts water supplies
"Evaporation is real!"

Costly and Painful Tradeoffs Are Necessary

All Actors and Sectors must play a role

Hydrology will dictate more than policy
"Mass balance don't care"

The Alternative to Inaction is Brutal and Obvious

