SWD --- Water Supply Storage Accounting

Introduction

- PURPOSE OF PRESENTATION ---

  Present background and options available for water supply storage accounting.

- PRESENTED BY – Southwestern Division, Corps of Engineers

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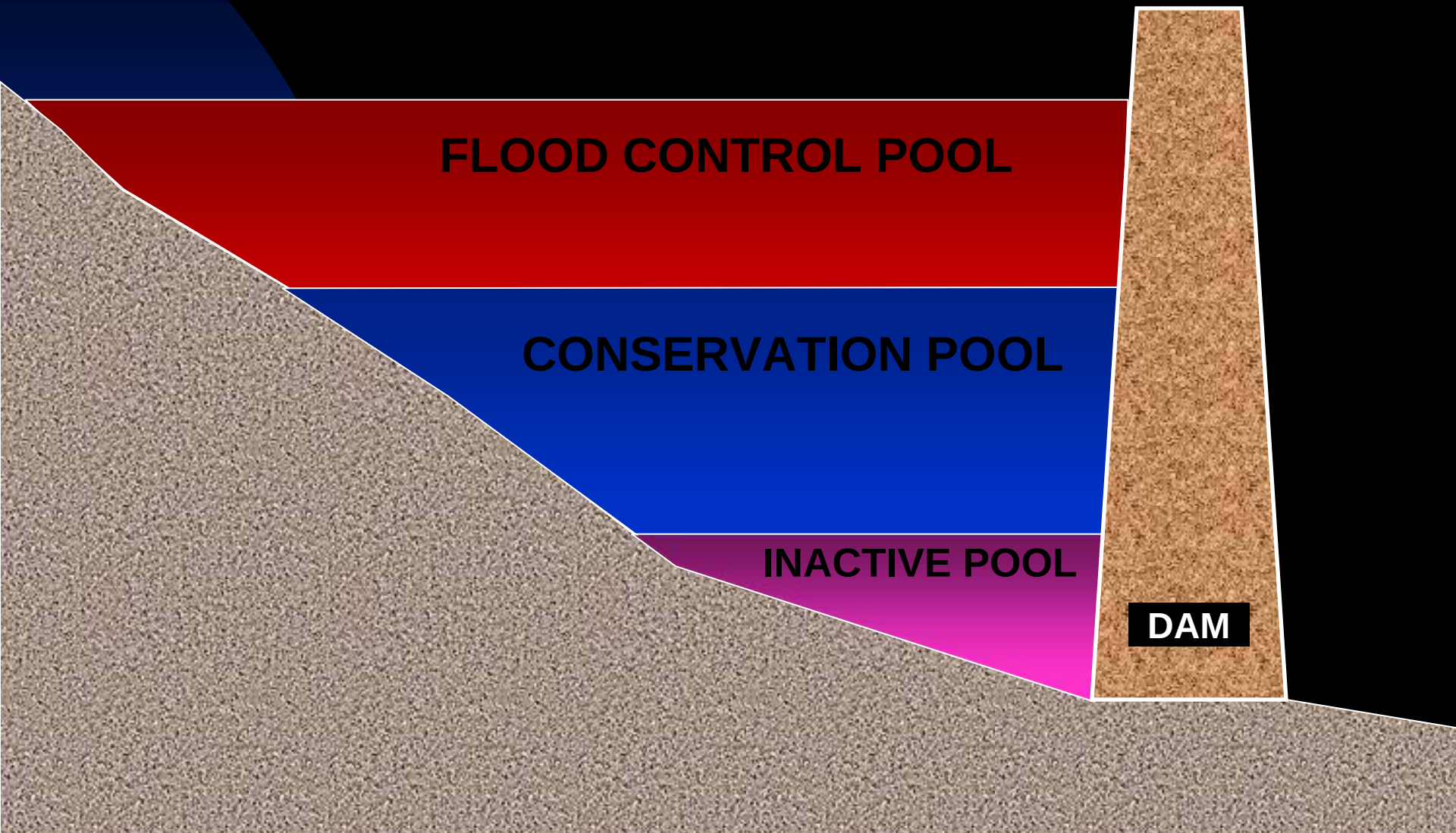
Topics of Discussion

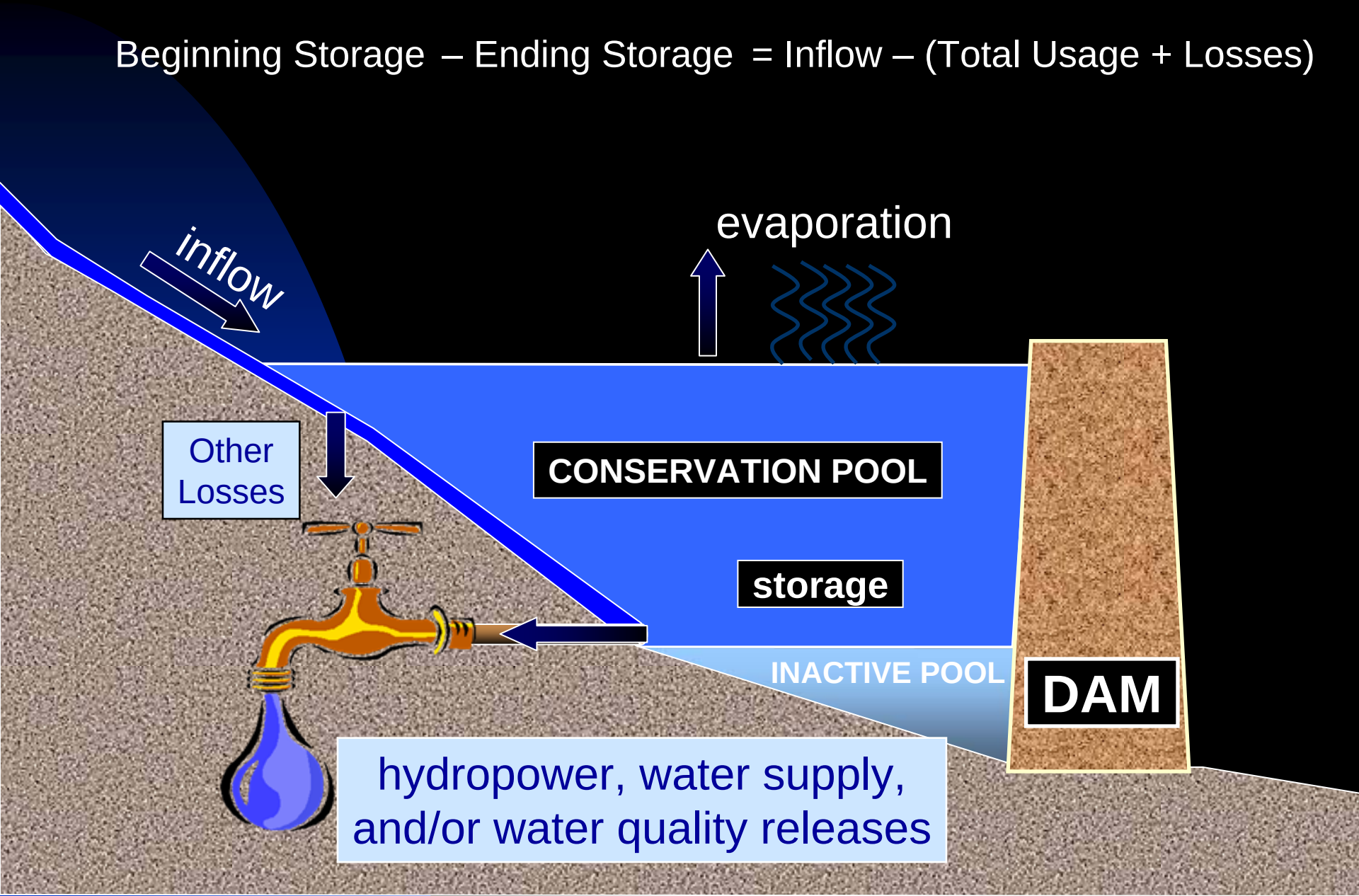
- Why Accounting is Done
- When Accounting is Done
- How Accounting is Done
- Examples (Greg Estep – SWT)

Storage Zones

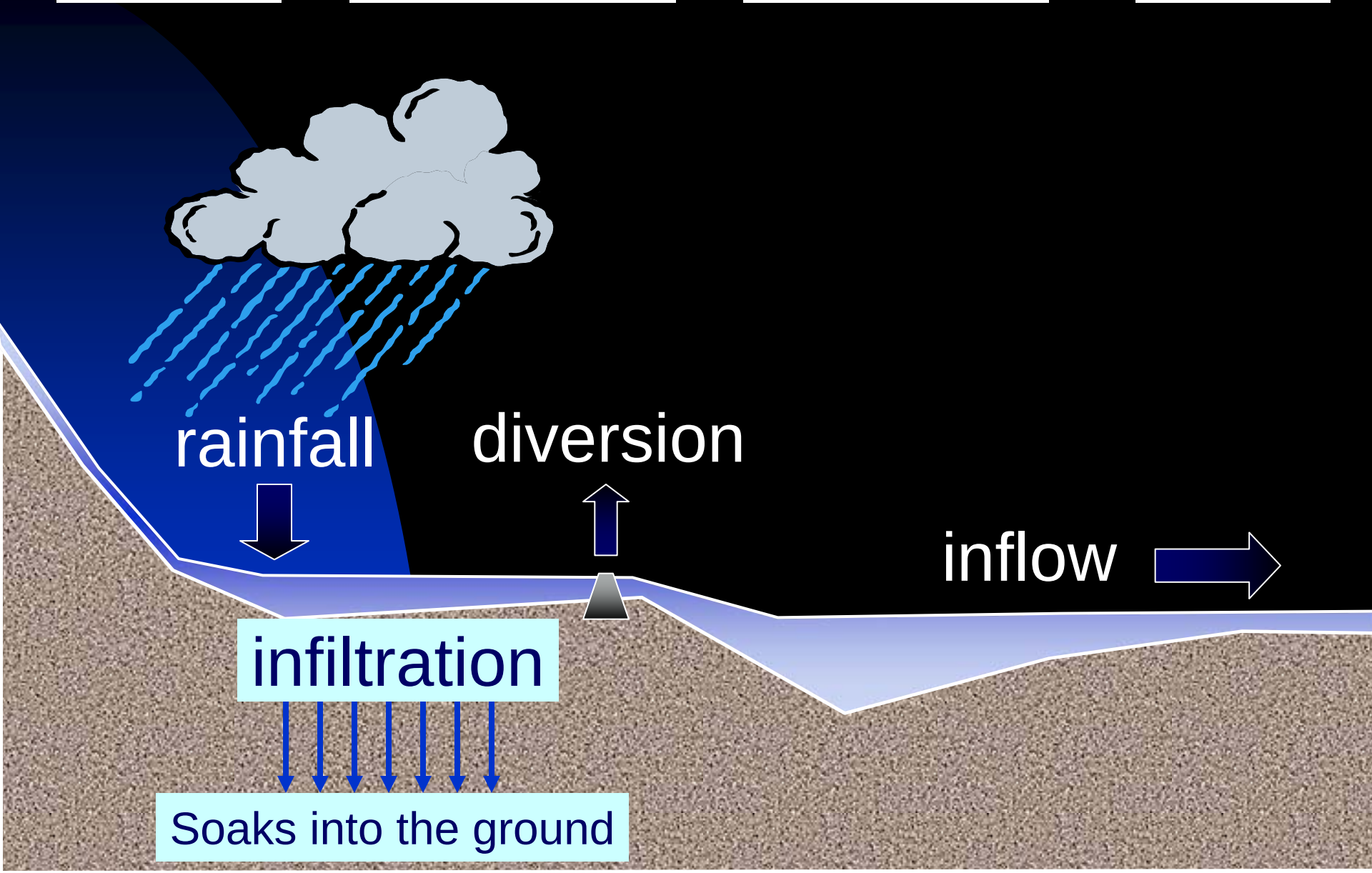


Water Storage Accounting

Beginning Storage – Ending Storage = Inflow – (Total Usage + Losses)



rainfall - infiltration - diversion = inflow



Why Accounting is Done

- To assure that one contracted water user is not encroaching on the rights of other contracted users.
- Especially critical during drought
- To notify users of the need for conservation measures or the need for additional water supply sources.

When Accounting is Started…

- Less than 75% conservation storage remaining (optional)
- Start accounting back to when the pool was last at 100% full

When Accounting is Stopped…

- When conservation storage recovers to 100% full.

How Accounting is Done - Philosophy

INFLOW VS LOSSES

- Start with all storages at 100% full
- End Storage = Beg Storage + inflow – losses – usage
- Inflows distributed by percentage of user contracted storage
- Losses distributed by loss equation
- Loss equation distributes losses based on users average remaining storage (particularly appropriate for evaporation losses)

How Accounting is Done – Formulas

INFLOWS VS LOSSES

- End Storage = Beg Storage + inflow share – loss share – user's usage
- User inflow share = Total inflow x percentage of user contract share.
- User loss share = ((2 x user beginning storage) – user withdrawals + user inflow share) x total losses*/(total beginning storage + total ending storage + total losses*))

* Total losses = Beginning storage – ending storage – total withdrawals/releases + total inflow

How Accounting is Done - Methods

- By hand calculations
- By water accounting program
- By spreadsheet

WS Storage Accounting Example (by hand)

- Total Lake storage = 100AF
- Pool Elev. = 100’

- User #1 storage = 80AF
- User #2 storage = 20AF

- 15 Aug 09: 100%
- 1 Sep 09: Elev. 80’ Storage = 70AF (70%)

- Begin Storage Accounting

WS Storage Accounting Example (by hand)

- Total inflow (15 Aug – 1 Sep) = 20AF
- Total losses (15 Aug – 1 Sep) = 30AF

- User #1 usage = 10AF
- User #2 usage = 10AF

- User #1 inflow share = 80/100X20AF = 16AF
- User #2 inflow share = 20/100X20AF = 4AF

WS Storage Accounting Example (by hand)

- User #1 loss share = ((2 X user #1 beg. Storage) – user #1 usage + user #1 inflow share) X total losses / (total beg. storage + total end. Storage + total losses)
- User #1 loss share = ((2 X 80) – 10 + 16) X 30 / (100 + 70 + 30)
- User #1 loss share = 166 X 30 / 200 = 24.9AF

WS Storage Accounting Example (by hand)

- User #2 loss share = ((2 X user #2 beg. Storage) – user #2 usage + user #2 inflow share) X total losses / (total beg. storage + total end. Storage + total losses)
- User #2 loss share = ((2 X 20) – 10 + 4) X 30 / (100 + 70 + 30)
- User #2 loss share = 34 X 30 / 200 = 5.1AF

WS Storage Accounting Example (by hand)

- User #1 storage (1 Sep) = user #1 storage (15 Aug) + user #1 inflow share – user #1 loss share – user #1 usage
- User #1 storage (1 Sep) = 80 + 16 – 24.9 – 10 = 96 -34.9 = 61.1AF (76.4%)
- User #2 storage (1 Sep) = 20 + 4 – 5.1 – 10 = 24 – 15.1 = 8.9AF (44.5%)

WS Storage Accounting Example (by hand)

- 1 Oct 09: Elev. 95’ Storage = 90AF
- Total inflow (1 Sep – 1 Oct) = 50AF
- Total losses (1 Sep – 1 Oct) = 20AF
- User #1 usage = 0AF
- User #2 usage = 10AF

WS Storage Accounting Example (by hand)

- User #1 inflow share = .80 X 50 = 40AF
- User #2 inflow share= .20 X 50 = 10AF
- User #1 loss share = ((2 X 61.1) – 0 + 40) X 20 / (70 + 90 + 20) = 162.2 X 20 / 180 = 18.0AF
- User #2 loss share = ((2 X 8.9) – 10 + 10) X 20 / 180 = 17.8 X 20 / 180 = 2.0AF

WS Storage Accounting Example (by hand)

- User #1 storage (1 Oct) = 61.1 + 40 – 18 -0 = 83.1AF
- User #1 is 100% full at 80AF, so 3.1AF of their inflow share is excess and can be given to the other user/users.
- User #2 storage (1 Oct) = 8.9 + 10 + 3.1 – 2 – 10 = 10AF (50% full).

WS Storage Accounting Example (by hand)

- 1 Nov.: Elev. = 100’ Storage = 100AF (100% full)
- All users are now 100% full and the storage accounting is complete.

How Accounting is Done - Methods

- By hand calculations
- By water accounting program
- By spreadsheet

Additional Information

- Copies of spreadsheet
- Handout (by Gene Morisani – SAM)
- Ron Bell, P.E. (469) 487-7096
- Greg Estep, P.E.(918) 669-7132

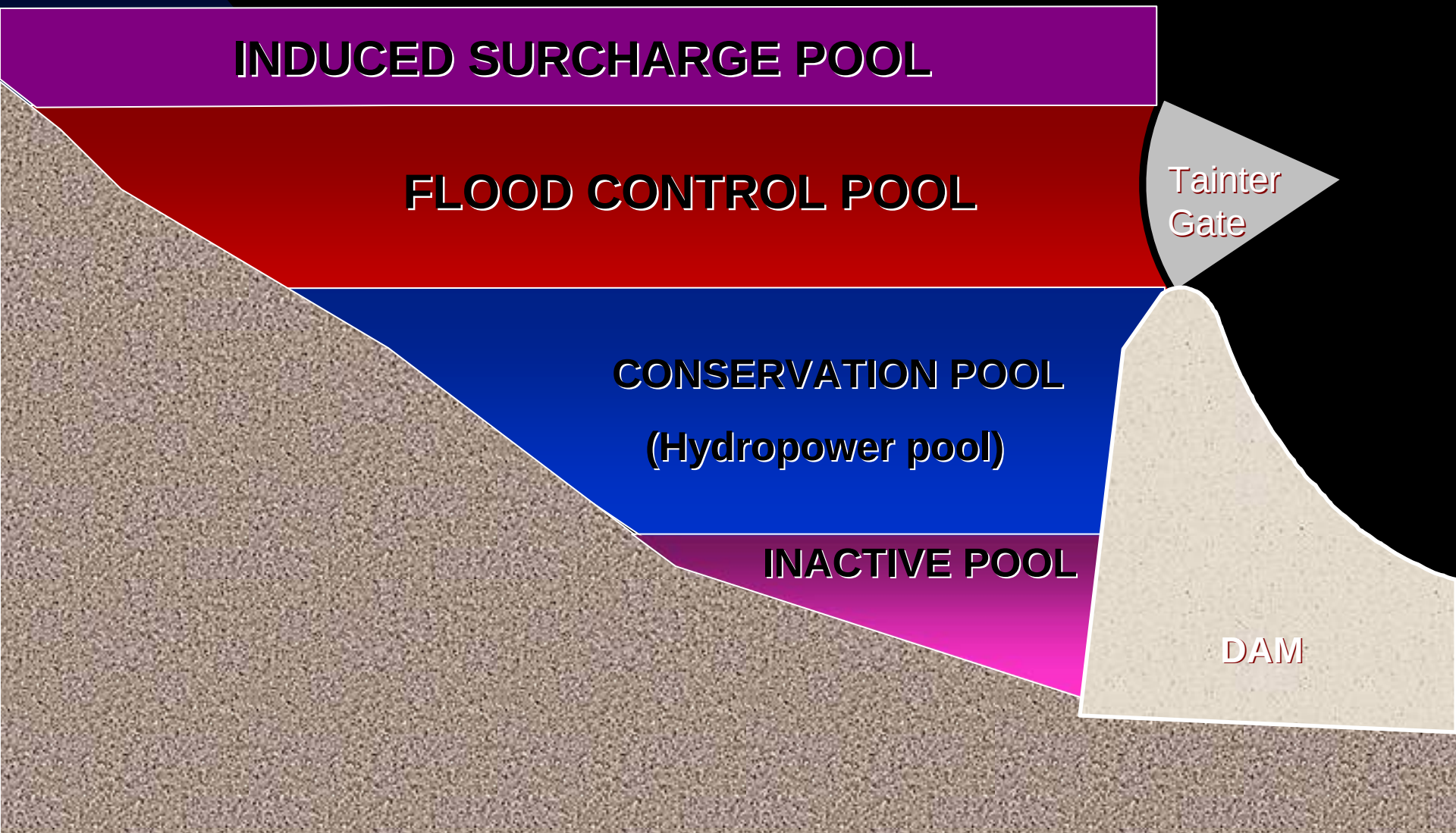
Water Supply Storage Accounting

Questions?/Comments!


7/21/2000 9:44am

Storage Zones

Flood Damage Risk Reduction Project with Surcharge



Storage Zones

Flood Damage Risk Reduction Project with Surcharge