San Juan-Pagosa Springs (PSPC2)
San Juan-Pagosa Springs (PSPC2)

- Upper (11000-12644)
- Middle (8500-11000)
- Lower (7198-8500)
Calibrations/Simulations - inputs

• In reality the 3 areas (upper, middle and lower) are represented (simulated) by only 3 points.

• The inputs our model needs for calibrations and operations (at these 3 points) are:
  • precipitation
  • temperature
  • freezing level
For San Juan River at Pagosa Springs (PSPC2)

- **PSPC2 upper area**
  - Elevation = 11437
  - Area = 60nm

- **PSPC2 middle area**
  - Elevation = 9774
  - Area = 152nm

- **PSPC2 lower area**
  - Elevation = 7844
  - Area = 88nm
Calibrations/Simulations - Precipitation

• Each area (upper, middle and lower) MAP is built using precipitation stations that (hopefully) have similar characteristics to that area
• For the PSPC2
  • Upper area – Upper San Juan.4, Lily Pond.35, Middle Creek.36
  • Middle area - Upper San Juan.31, Lily Pond.31, Middle Creek.32
  • Lower area - Pagosa Springs 1.06
• These weights were chosen to guarantee water balance in each area. The water balance in each area was calculated using the PRISM sets
San Juan-Pagosa Springs (PSPC2)

- mdlc2
- usjc2
- lpdc2
- pagc2
Calibrations/Simulations - Temperature

• Nearby stations (whose climatology is known) area used to calculate the temperature at the mid-point elevation of the area (whose climatologies are calculated using the climatology of the nearby stations)
• Temperature is calculated by using the difference in station and area climatology
Calibrations/Simulations
- Inputs

• Precipitation and temperature are calculated every six hours at each area within the basin
  • 30 years
  • Used to calibrate hydrologic models
• Operationally done in a similar way
  • Ensures our forecasts will have similar quality/characteristics to 30 years of calibration
• For the San Juan at Pagosa Springs this is done for the upper, middle and lower areas
Calibrations/Simulations - Models

• A snow model (accumulates/ablates snow) is run for each area in the basin
• A soil moisture model (controls amount of water from the snow model which is retained in the soil/evaporates or ends up in the stream) is run for each area
  • Evaporation is a calibrated amount:
    • $E = P - Q$
SNOW ACCUMULATION AND ABLATION MODEL (SNOW-17)
Calibrations/Simulations
- Results
Calibrations/Simulations

- 456 basins
- 1130 areas (2-3 per basin)
- 85 reservoirs
Calibrations/Simulations
- Reservoirs

- Reservoir modeling is difficult as they are not physically based. However, we calibrate the reservoir models assuming two different modes:
  - Irrigation (use average releases)
  - Spillway/passflow

- Operationally we do the following:
  - Assume the current release
  - Input a schedule
  - Allow the spill/passflow rules
Adjustments to Flow

• Unregulated flow =
  Observed flow + Diversions (measured) + Storage
• Natural flow =
  Unregulated flow + Consumptive Use
• Consumptive use (in basin irrigation) can only be estimated
• In our simulations we simulate natural flow but subtract out the consumptive use so the output is always unregulated flow
• So:
  • We simulate “natural flow”
  • We remove the in-basin irrigation (consumptive use)
  • This is the simulated unregulated flow. It simulates the actual flow plus the measured diversions (adjusted flow)
• Operational considerations
  • Observed flow = Unregulated flow - Diversions - Storage