Cumulative Impact Analysis of Water Quantity

Mike Roberts, Surface Water Hydrologist, Montana DNRC

I. DNRC Approach to Analysis of Water Quantity Impacts
   (1) Review of permit and change applications
      (a) Environmental Assessment (EA)
      (b) Adverse effect assessment
   (2) Review of permit and change applications (Comprehensive EA)
      (a) Smith River EA (2003)
   (3) Basin Hydrologic Studies
      (a) Smith R, Flint Cr, NF Blackfoot, Shields R, Beaverhead R, etc.
   (4) Water Availability Analyses
      (a) Example - Upper Missouri
   (5) Exempt wells – no analysis

II. Smith River Environmental Assessment (2003)
   (1) Triggered by:
      (a) MEPA
      (b) Number of applications
      (c) Concerned stakeholders
      (d) Hydrologic Study
   (2) Detailed Approach
      (a) Baseline monitoring (hydrologic study)
         - gage and piezometer installation
         - bi-monthly sampling
         - irrigated acres evaluation
      (b) Existing environment and Environmental Consequences
      (c) Modelling
         - Ground water – MODFLOW
         - Surface Water – Spreadsheet irrigation budget
      (d) Results
         – Ground water: depletion caused by the proposed new wells was interpreted to occur by interception of ground water discharge rather than direct infiltration of streamflow
         - Surface water: ~~early season increases in flow (more efficient~~ spnnkiersj, ~~late~~ season decrease of 10 to 25% (decreased return flow, expansion of full service irrigation)
   (3) Level of Effort (EA only)
      (a) DNRC employees: 6
      (b) Time: 3-4 weeks
      (c) Scoping and public meetings