



RAPPAHANNOCK AND YORK RIVER BASIN TMDL DEVELOPMENT

Virginia Department of Environmental Quality
Rappahannock-Rapidan Regional Commission
Engineering Concepts, Inc.

TECHNICAL ADVISORY COMMITTEE (TAC)
July 8, 2004



TMDL DEVELOPMENT TEAM

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- Watershed Residents

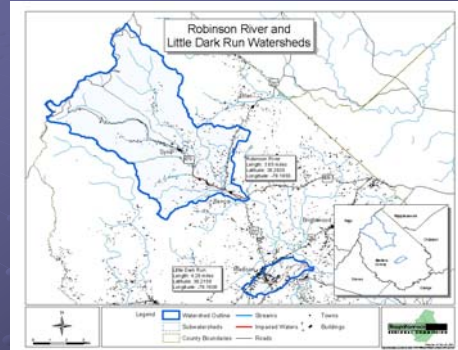


TMDL PROCESS

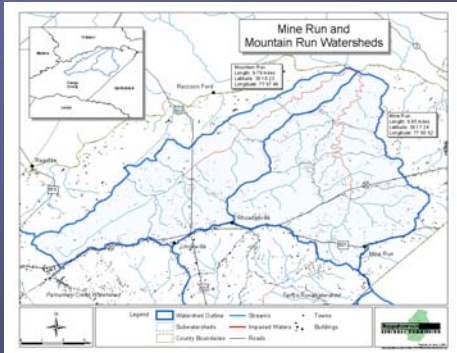
- Characterize watershed and identify critical contamination conditions
- Identify and quantify pollutant sources
- Link pollutant sources to stream water quality – modeling
 - Inputs (soils, land use, climate, pollutant)
 - Model processes (hydrology, pollutant fate/transport)
 - Outputs (runoff, pollutant)
- Develop and evaluate allocation scenarios



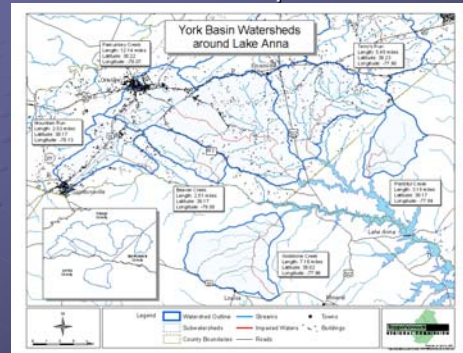
Robinson River and Little Dark Run

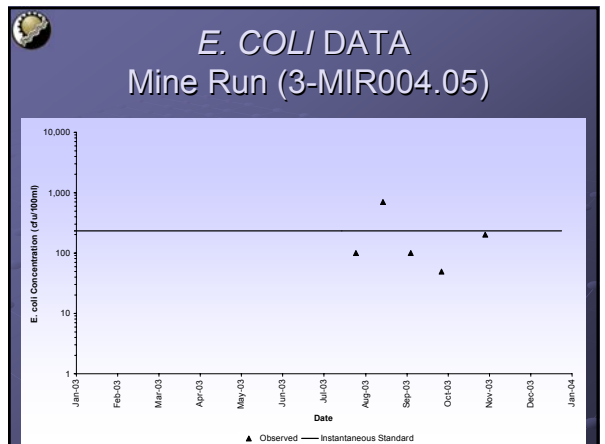
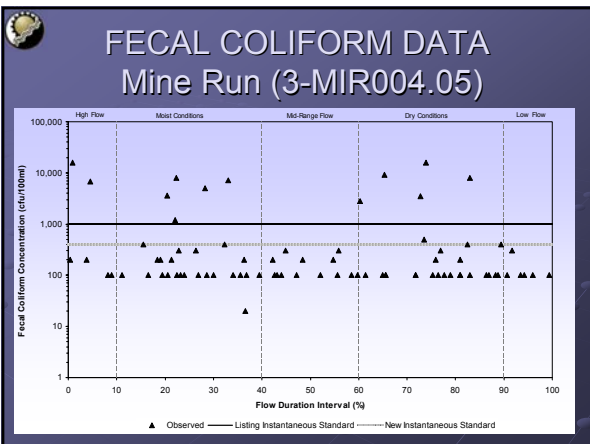
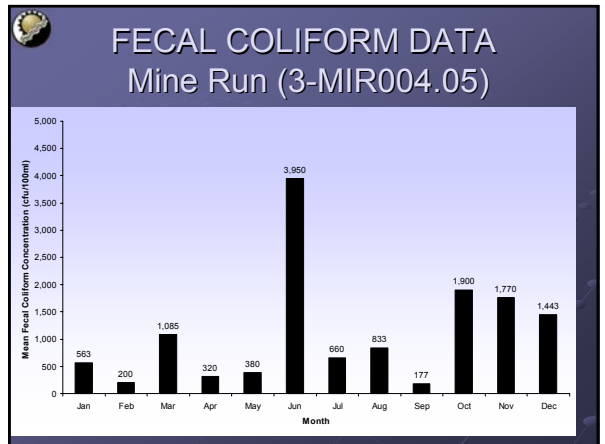
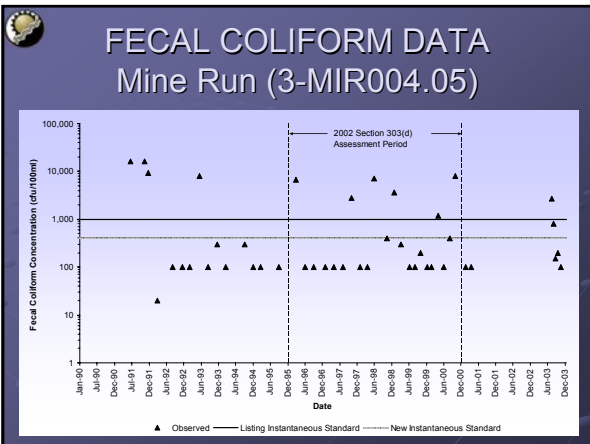
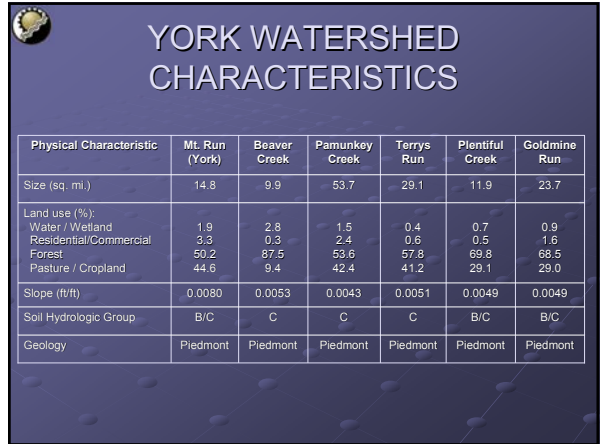
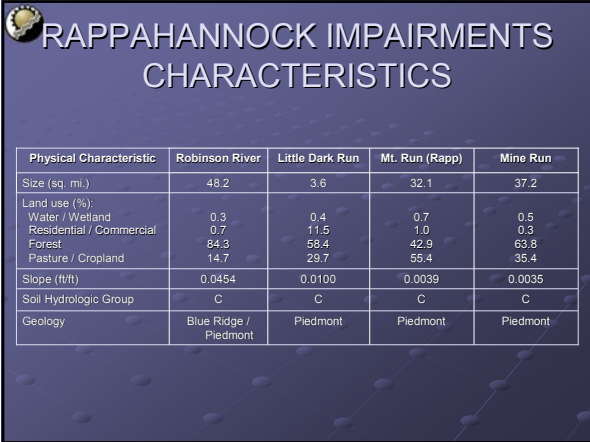


Mine Run and Mountain Run



York River Impairments







HYDROLOGIC MODELING COMPONENTS

- Land use
- Climatic data
- Topography
- Soils
- Stream channel characteristics
- Point source discharge / withdrawal
- Flow data



WATER QUALITY MODELING COMPONENTS

- Sources
 - Fecal production
 - Fecal coliform densities
 - Fecal coliform distribution
- Delivery mechanisms
 - Direct
 - Land-applied
- Temporal variation



PERMITTED DISCHARGES

- VPDES permits provided by VADEQ
- Historical average (from DMR) for calibration period
- Design and permitted values for allocation
- Direct application



HUMAN SOURCES

- Population, housing units, onsite treatment systems based on U.S. Census
- Septic systems
 - Failure to soil surface throughout year
 - Lateral movement continuously to stream
- Straight pipes
 - Direct continuous input to stream



HUMAN SOURCES

- Sanitary sewer
 - Loading rates (overflows, exfiltration)
 - Land-applied / direct deposition
- Biosolids
 - Land-applied



PET SOURCES

- American Veterinary Medical Association (AVMA) estimates 0.53 dogs and 0.60 cats per household
- Updated through veterinarians, animal control, and treasurer
- Population = population density * housing unit
- Land-applied

HUMAN AND PET SOURCES

Impairment	Human Population (#)	Housing Unit (#)	Dogs (#)	Cats (#)
Robinson River	863	415	220	249
Little Dark Run	480	202	107	121
Mt. Run (Rapp)	1,171	480	254	288
Mine Run	1,575	619	328	372
Mt. Run (York)	1,319	547	290	328
Beaver Creek	453	190	101	114
Pamunkey Creek	3,177	1,325	702	795
Terrys Run	1,395	574	304	344
Plentiful Creek	647	269	142	161
Goldmine Run	1,194	539	286	323

LIVESTOCK SOURCES

- Population
 - Virginia Agricultural Statistics
 - Consultation with SWCD, VADCR, VCE, NRCS, producers
- Distribution of waste
 - Confined: waste collected and spread
 - Pastured: land-applied
 - Livestock access: direct deposition to stream
 - Imported sources
- Seasonal varying applications

LIVESTOCK SOURCES

Impairment	Beef (#)	Dairy (#)	Horse (#)
Robinson River	1,545	227	136
Little Dark Run	236	35	21
Mt. Run (Rapp)	3,522	341	227
Mine Run	2,612	253	169
Mt. Run (York)	1,310	127	85
Beaver Creek	184	18	12
Pamunkey Creek	4,519	437	292
Terrys Run	2,380	230	154
Plentiful Creek	288	44	66
Goldmine Run	1,012	88	88

WILDLIFE SOURCES

- Populations based on habitat and population densities provided by VDGIF biologists
- Distribution of waste based on habitat
 - Land-applied
 - Direct deposition to stream
- Seasonal variations based on migration patterns and food sources

WILDLIFE SOURCES

Impairment	Deer (#)	Raccoon (#)	Muskrat (#)	Beaver (#)	Geese (#)	Duck (#)	Turkey (#)
Robinson River	1,114	898	1,995	106	657	89	172
Little Dark Run	75	86	195	9	50	7	9
Mt. Run (Rapp)	708	821	2,310	92	123	43	51
Mine Run	827	1,023	1,461	117	143	50	88
Mt. Run (York)	319	395	1,193	44	57	20	28
Beaver Creek	220	241	93	27	38	13	32
Pamunkey Creek	1,165	1,251	2,732	135	206	72	107
Terrys Run	646	734	1,350	82	112	39	62
Plentiful Creek	145	302	240	34	46	16	14
Goldmine Run	314	564	921	62	91	32	76

FOR INFORMATION, CONTACT:

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