

Millbrook Quarry Zebra Mussel Eradication



Rapid Response in the Real World

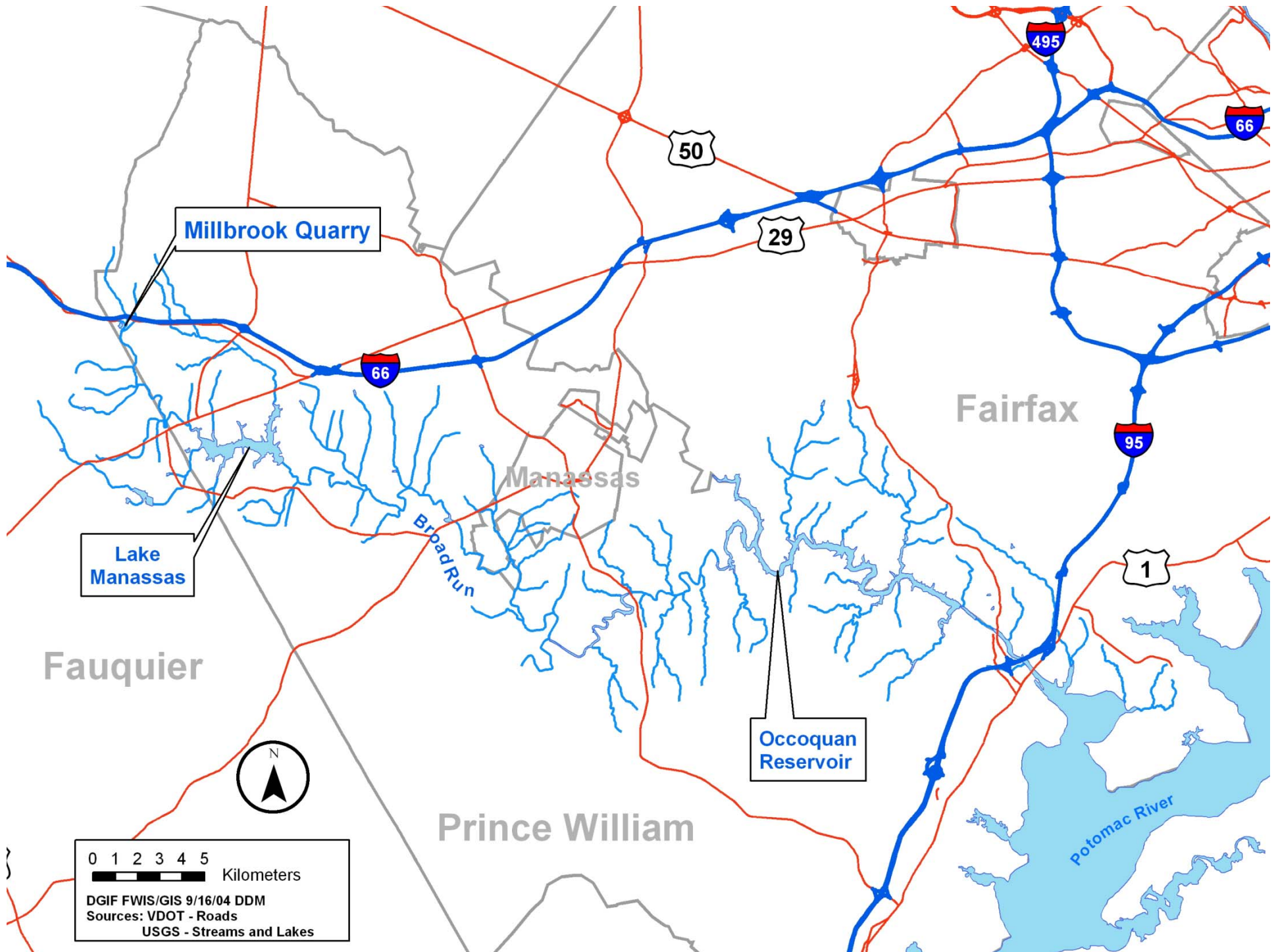
Raymond T. Fernald and Brian T. Watson
Virginia Department of Game & Inland Fisheries











1. Recognition and Reality Check

- Establish contact with The Dive Shop, and to confirm the infestation
- Inform Secretary of Natural Resources, and confirm DGIF authority to address problem
- Designated in-house leads for project management, technical fieldwork & analysis, and dissemination of public information
- Survey Broad Run, Lake Manassas, and other dive sites to confirm isolation of infestation

1 month; Sep 30, 2002



2. Understanding and Access

- Established interagency workgroup of state agencies, local governments, and other experts and stakeholders
- Compile and evaluate existing information on Millbrook Quarry, zebra mussel ecology, and 7 eradication/control alternatives
- Determine project constraints, additional information needs, agency assignments, and fieldwork protocols
- Secure legal access to quarry for fieldwork



HB 2752

Nonindigenous Aquatic Nuisance Species Act

- *Establishes NANS list, and authorizes DGIF to designate additional species as NANS via regulation*
- *Gives DGIF authority to conduct operations and measures to suppress, control, eradicate, prevent or retard the spread of any NANS*
- *DGIF may obtain warrants to inspect any property in VA to determine if NANS are present and to seize and eradicate any NANS found*
- *Violations can result in a maximum fine of \$25,000 and liability for the costs of investigation, control, and eradication measures incurred by any state agency, local government, political subdivision, or authority*

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5 months; Mar 14, 2003



3. Data Collection and Analysis

- Granted access to property on 3/14/03
- Coordination meeting on 3/27/03 to review the participating agencies/groups roles and responsibilities, and decontamination protocol
 - *DGIF – bathymetry and infestation status*
 - *DMME – geochemical & hydrologic analyses*
 - *OWML – water chemistry*
- Initial fieldwork conducted from 4/21-23/03



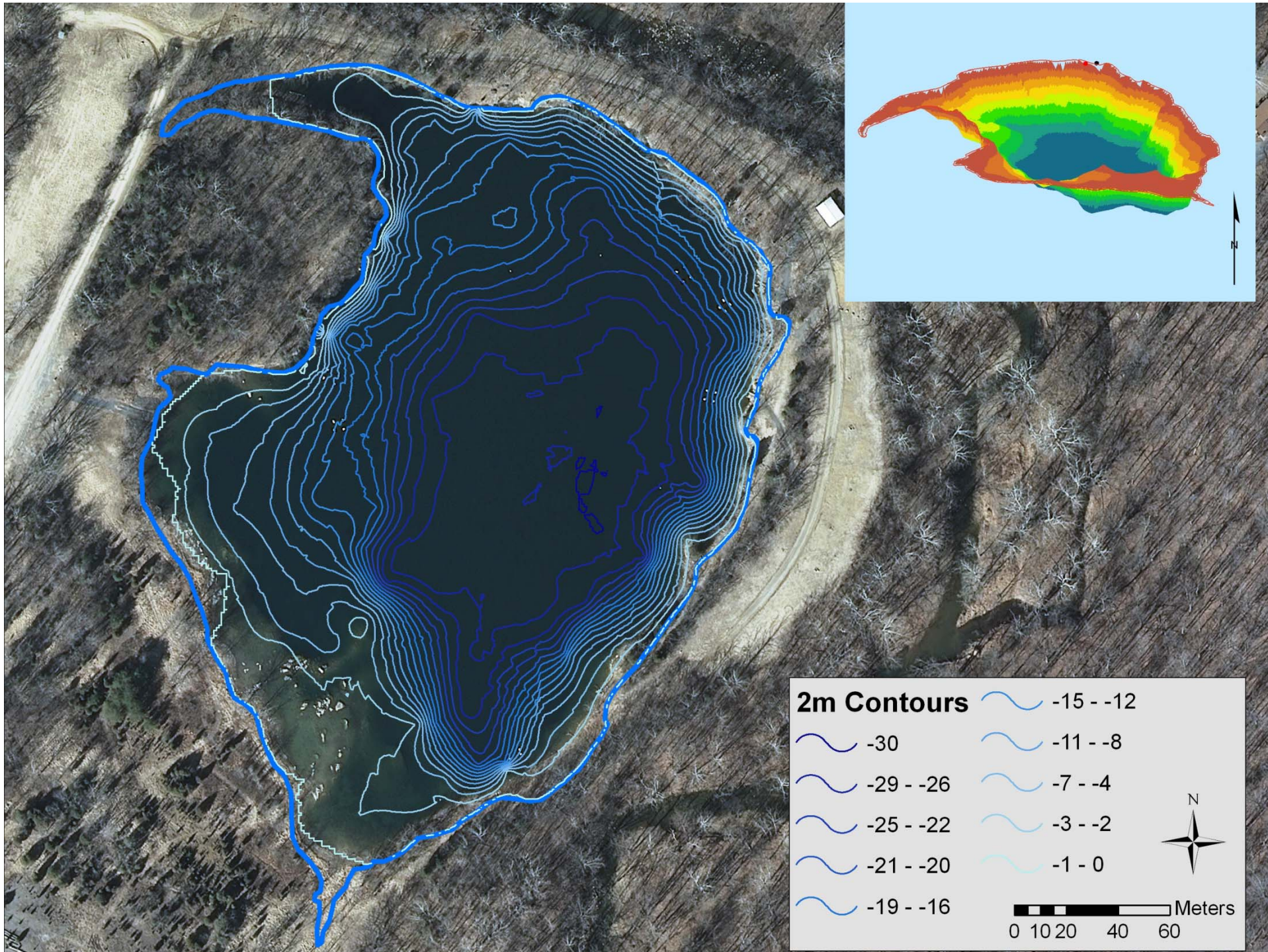


Millbrook Quarry Volume Estimation

- Trimble GeoExplorer3 GPS point collections and Hummingbird depth finder depths (feet) from a hull-mounted transducer on a johnboat.
- Trimble 3-d Real Time Correction using Trimble Beacon-on-a-Belt.
- 775 positions were read for the day with a total of 127 features created, each with a depth measurement.
- Trimble unit was set to record a position every 5 seconds and 6 positions were recorded for each feature. Accuracy was about 1 meter for all features. Depths were recorded in positive feet and were converted to negative meters.
- Features were transferred from the Trimble to an ArcView shapefile (UTM18 NAD83) using PathFinder Office software in Richmond
- A grid was interpolated from the features using kriging in ArcScene (ESRI).

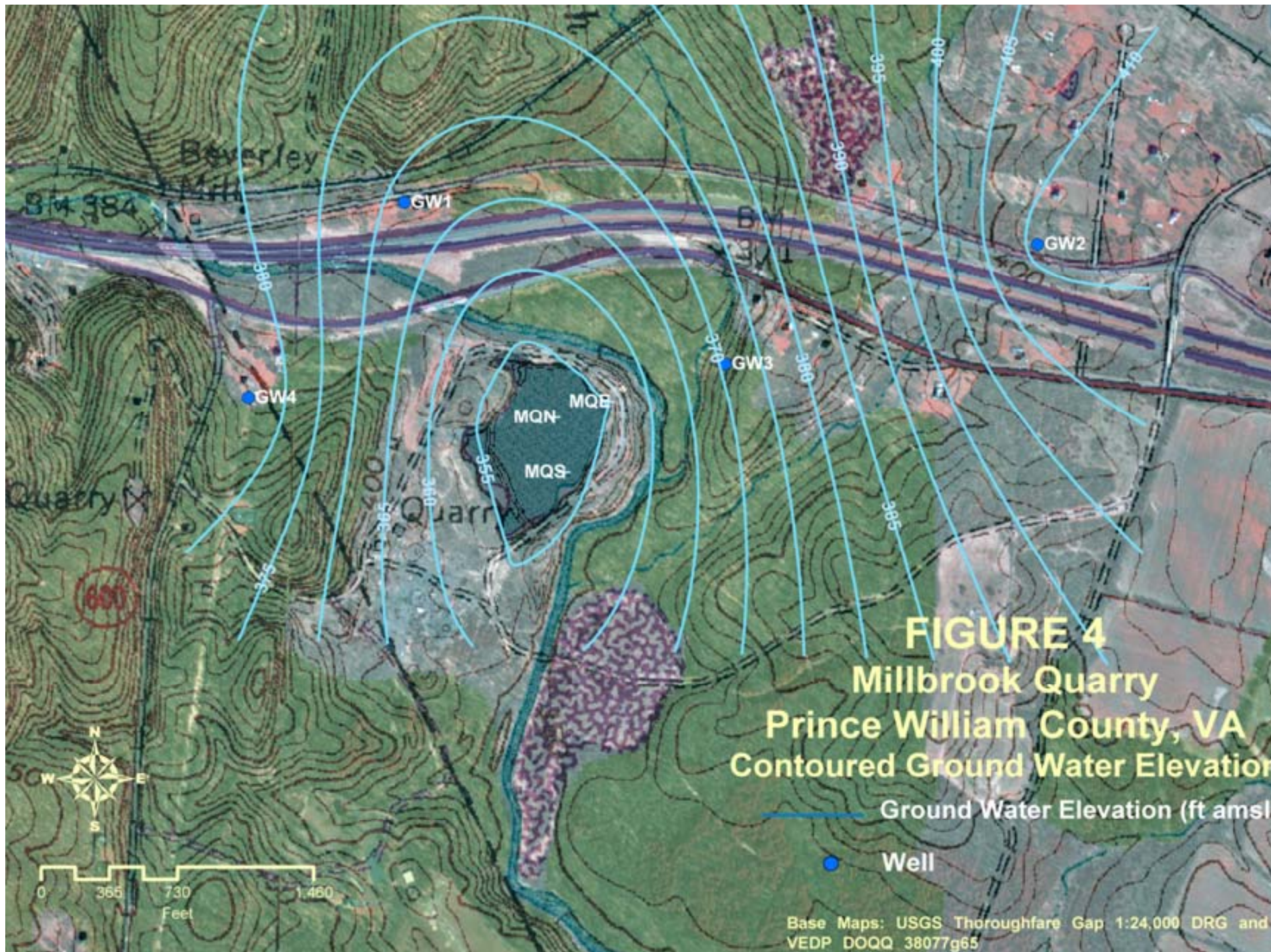
ArcScene – kriging quarry characteristic estimates

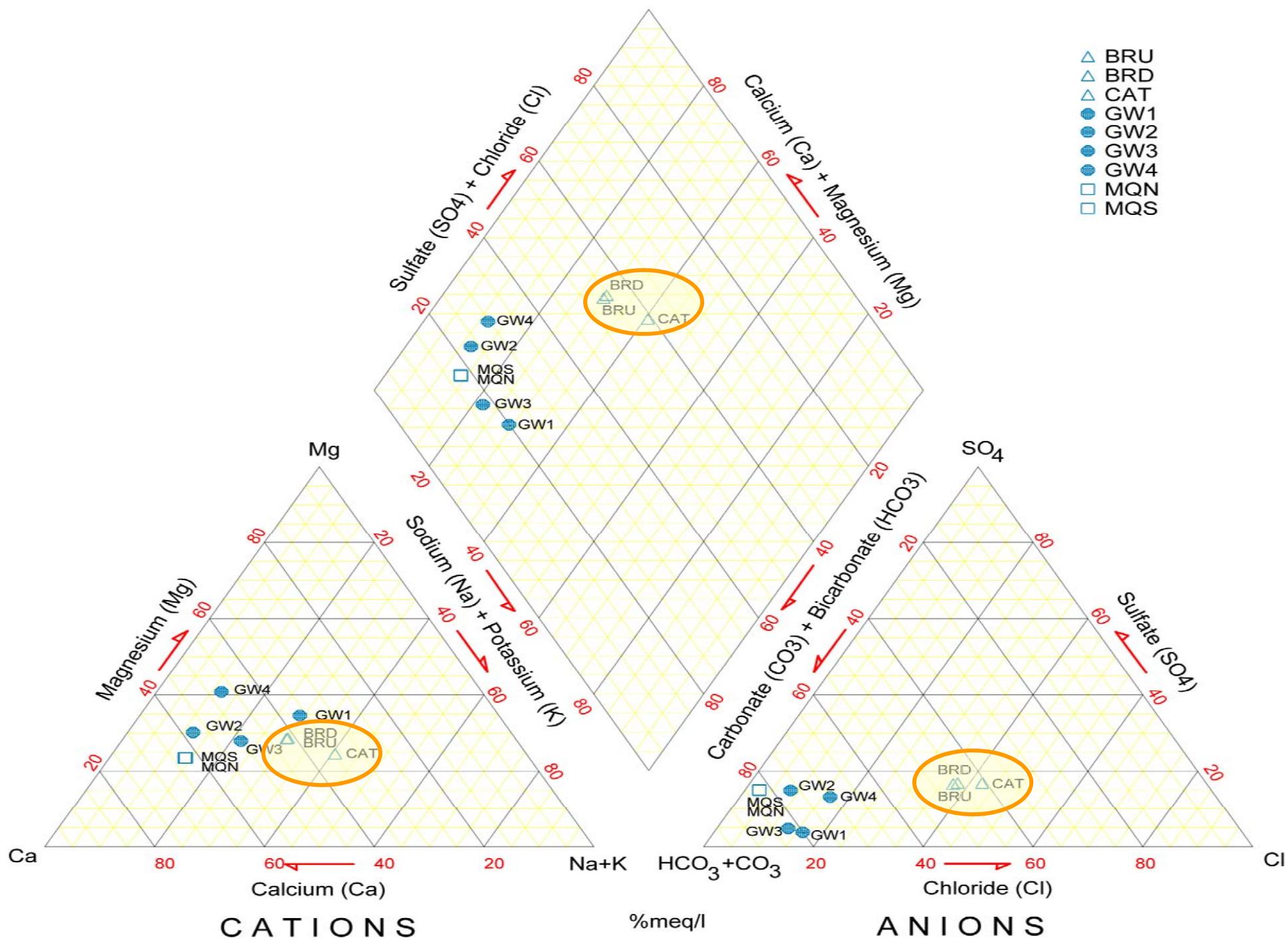
- **2D area:** 47,789 m² **3D Surface Area:** 54,259 m² **Volume:**
679,030 m³
- 679,030 cubic meters = 23,979,718 cubic feet = 179,380,749 gal



Hydrogeochemical Studies (DMME & OWML)

- *Determination of Millbrook Quarry surface drainage and watershed*
- *Assessment of regional groundwater elevations, geochemistry, and flow from existing data and investigations of local wells*
- *Review of past geological surveys, quarry records, and studies of the Millbrook Formation and associated faults*
- *Survey of surface water elevations in Millbrook Quarry, Broad Run, and Catletts Branch*
- *Analysis of base and event-related surface flows and elevations in Millbrook Quarry, Broad Run, and Catletts Branch*
- *Analysis of base and event-related water chemistry of Broad Run, Catletts Branch, Millbrook Quarry, and 5 local wells, including stable isotope analyses*





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- Initial fieldwork conducted from 4/21-23/03
- Meeting on 7/07/03 among DGIF, DMME, and OWML to review and discuss the data

4 months; Jul 7, 2003



4. Emergency Procurement

- Emergency procurement solicitation of proposals issued August 2003
- Emergency procurement solicitation of proposals cancelled October 2003 due to lack of funding to finalize purchase
- Directive to halt review of alternatives or project feasibility until funding secured

3 1/2 months; Oct 30, 2003



5. Funding: Scaling the Wall

- Letter from Secretary of Natural Resources soliciting contributions (\$800,000 goal)
- Funding contributed or pledged
 - \$300,000 grant from USDA/NRCS - WHIP
 - \$100,000 grant from USFWS – SWG
 - \$200,000 contribution from Fairfax Water
 - \$163,000 pledge from Fairfax Water
 - \$37,000 from corporations / local governments

11 months; Sep 30, 2004



6. Procurement Options

- Emergency Procurement
- Competitive Sealed Bidding
 - *Award based solely on lowest bid*
 - *Project requirements not definable (this instance)*
- Competitive Negotiation (Request for Proposals)
 - *RFP provides flexibility in describing the purchase, the criteria to be used to evaluate proposals, and qualifications required of potential vendors*
 - *Opportunity, through negotiation, to change all aspects of the project, including scope of work and price*
 - *Facilitates use of Evaluation Panel*

2 months; Nov 30, 2004



7. Competitive Negotiation

- Selection of RFP Evaluation Panel
 - *Technical expertise (DGIF, DMME, OWML)*
 - *Environmental & human health (DEQ, VDH)*
 - *Academic & research institutional (CFWRU)*
 - *Local government stakeholder (FW)*
- Develop & Issue Request For Proposals
- Evaluation of Proposals
- Negotiation with Selected Vendors
- Issuance of Award (Contract)

9 months; Aug 24, 2005



8. Environmental Review

- NEPA Documentation and Approval
- Virginia Environmental Impact Review
- Federal and State Endangered Species Acts
- Coastal Zone Resources Management Program
- FIFRA
 - *Landowner notification and assistance*
 - *Public Notice and meeting*

5 months; Jan 20, 2006

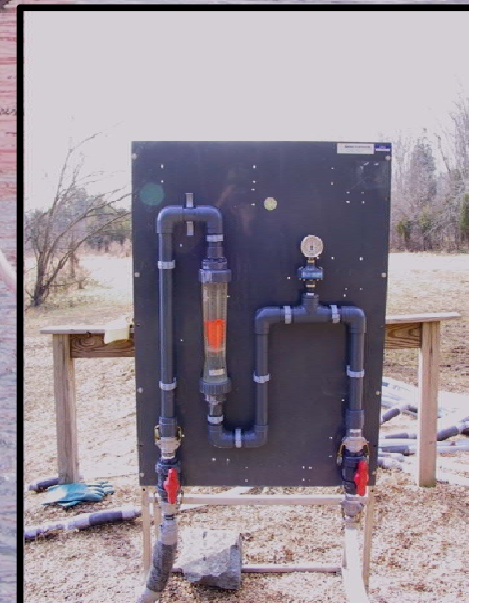


9. Onsite at Last

- Mobilization and staging of equipment
- Review and confirmation of operational protocol and schedule, emergency procedures, and project oversight
- Treatment and weekly monitoring of potassium concentration throughout quarry









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- Treatment and weekly monitoring of potassium concentration throughout quarry
- Demobilization and cleanup of site

1 month; Feb 21, 2006



10. Confirmation of Success

- Examination of over 1,000 zebra mussels
- Post-treatment survey of quarry by DGIF divers
- Video documentation of quarry by ROV





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- 80 bioassays of zebra mussels placed into quarry



3 mos; May 15, 2006

11. Post-Project Monitoring

- Water chemistry in quarry
 - *dissolved oxygen, temperature, pH, conductivity, oxidation/reduction, chemical oxygen demand, turbidity, total nitrogen, ammonia nitrogen, oxidized nitrogen, chlorophyll a, total organic carbon, total phosphorus, orthophosphate phosphorus, potassium, chloride*
- Microbenthos of the quarry sediments
- Potassium levels in Broad Run
- Potassium and chloride levels in local wells

2 years through January 2008



Synopsis

- Nearly ideal site and circumstances for success
- Firm decision to pursue eradication
- Interagency Workgroup
- Effective enabling legislation
- Interagency RFP Evaluation Panel
- Competitive Negotiation (criterion-based decision)
- Maintenance of interagency and public support

But . . .

obstacles to overcome . . .

- Lack of clearly defined agency authority and responsibility to address invasive species issues in state law and agency regulations, and in agency strategic and operational plans
- Lack of invasive species management strategies and rapid response plans that provide guidelines and protocols for interagency decision making and agency actions
- Complex and resource-intensive procurement and environmental documentation and compliance requirements
- Lack of invasive species program funding/staff



Jamie Hedges; Harold Post; Rick Browder; Brian Watson; Khizar Wasti; William Lassetter, Jr.; Richard Neves; Mark Miller; Karee Miller; John Wall; Pete Swinzow; Tayloe Murphy; Preston Bryant; Roger Chaffe; W. Gerald Massengill; Ed Walsh; John Odenkirk; Steve Owens; Scott Harman; David Whitehurst; Becky Gwynn; Stefanie Huffer; Mike Pinder; Dave Morton; Kevin Gooss; Julia Dixon; Ron Messina; Mel White; Lee Walker; Mike Bise; Dee Watts; Randy Grauer; Bruce Lemmert; Phil Townley; Mike Hull; David Dodson; John Hopkins; Scott Renalds; Rex Hill; Jim Croft; Hank Garner; Ron Henry; John Myers; Denise Dozier; Ken Carter; Bob Sobeck; Palmer Sweet; John Fisher; Bryant Thomas; Greg Brown; Charles Williamson; Marshall Trammel; Douglas Edwards; Susan Douglas; Asghar Pariroo; Marcus Haynes; Adil Godrej; Tom Grizzard; George Underwood; Phil Spellerberg; Tim Hayes; Stuart Raphael; Tom Bonacquisti; Charlie Crowder; Charles Murray; Jack Hartigan; Harry Day; Alex Vanegas; Gay Zigler; Michael Moon; Jim Johnston; Leslie Griffith; Ewe Kirste; Pete Paulin; Robert Wilson; Julie Thompson; Lisa Moss; John Organ; Vaughn Douglass; Bill Bolin; Eva Hardy; Lenée Pennington; Andrew Ertman; Bill Gross; Jim Jones; Ron Klauda; Bob McMahon; Jerrie Nichols; Chuck O'Neill; Don Schloesser; John Christmas; Charles Hores; Dan Butts; SO2; SO4; Amy Martin . . .