

Shenandoah River Fish Kills 2004-2006

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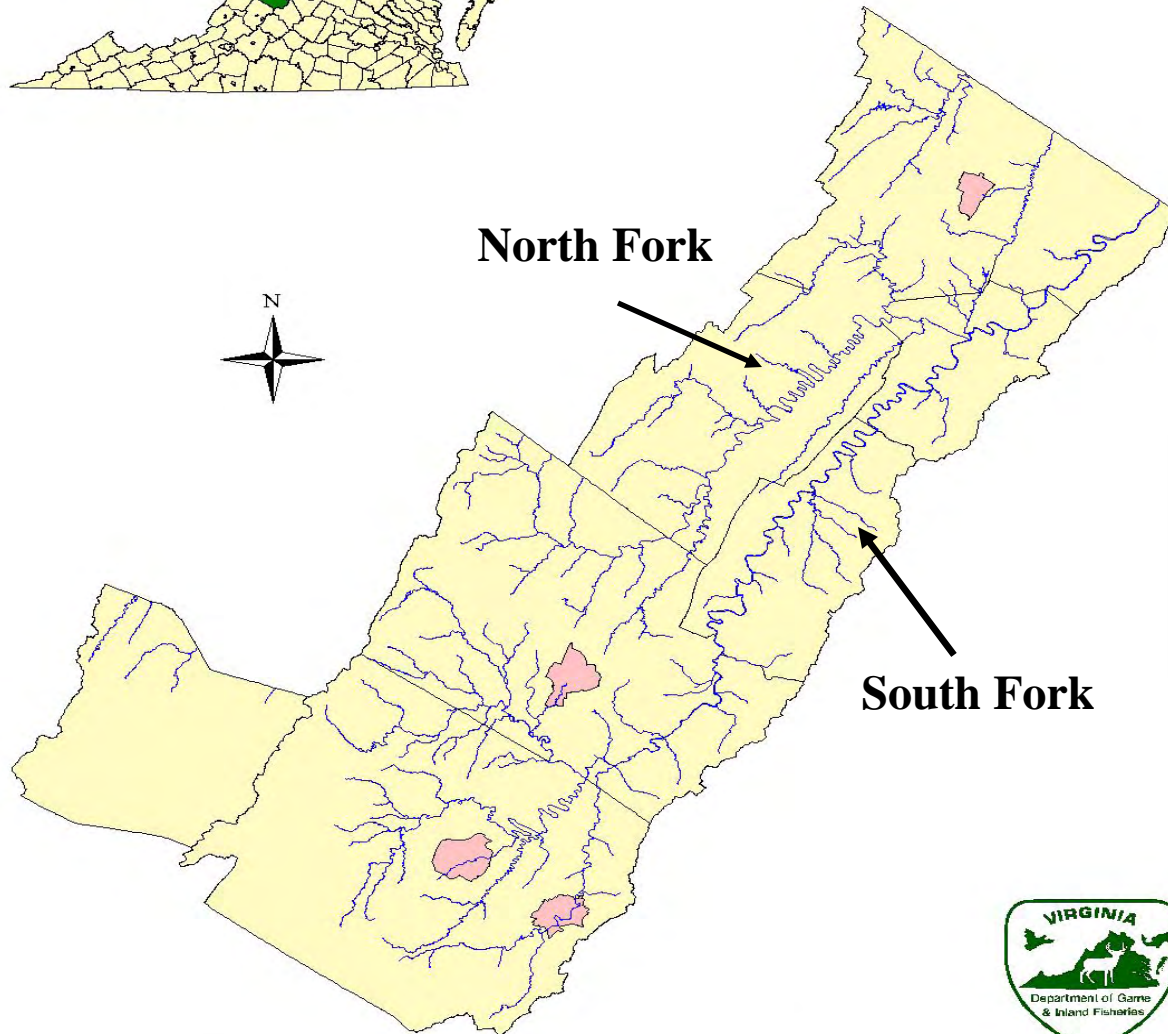


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DED FISH

www.purewaterforum.org

Help Solve the
Shenandoah Fish Kill
visit www.purewaterforum.org

Shenandoah River Watershed



Sources:
Water - USGS
Counties - DGIF

www.dgif.state.va.us



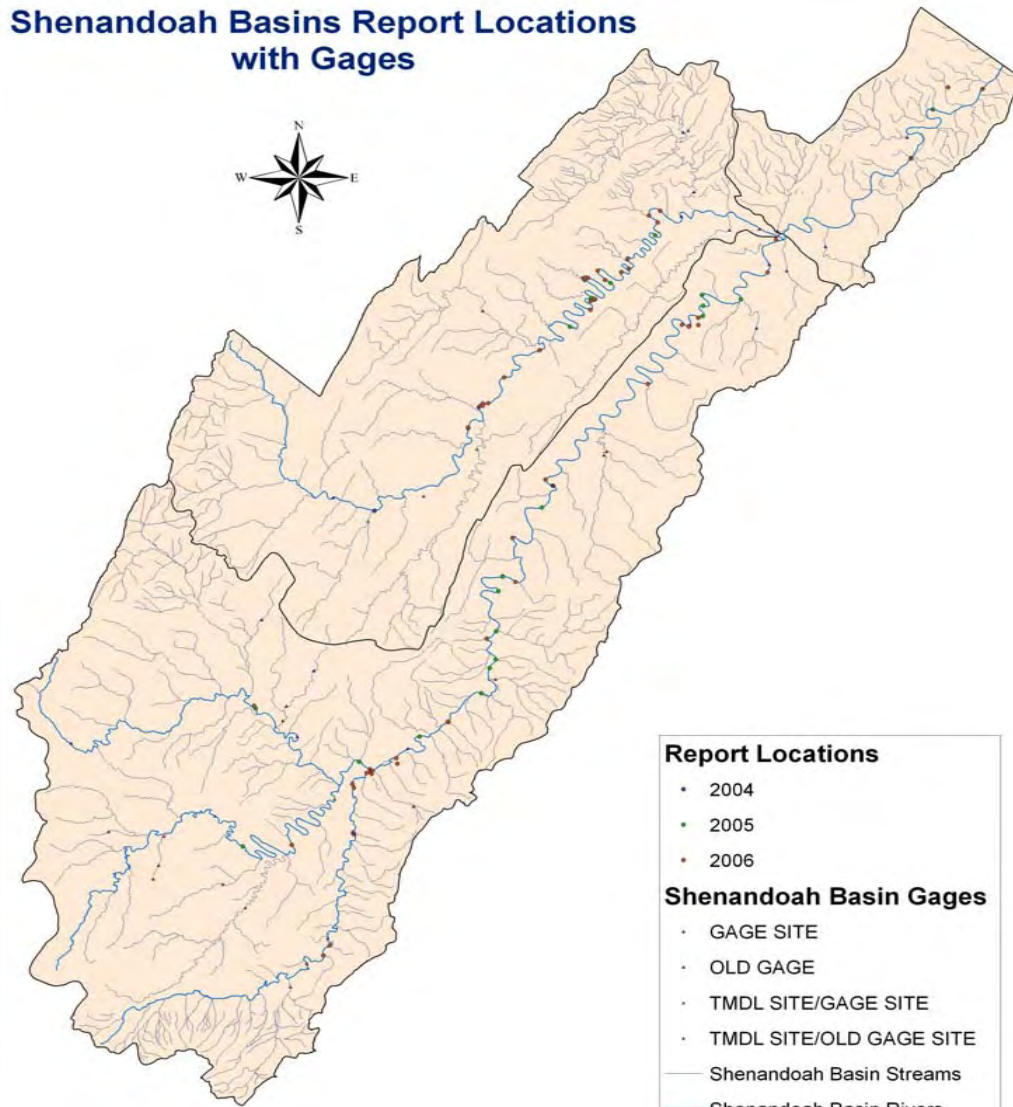
Shenandoah River Fish Kills

North Fork Shenandoah River 2004

South Fork Shenandoah River 2005

**South River ; North Fork Shenandoah &
Mainstem Shenandoah River 2006**

Shenandoah Basins Report Locations with Gages



Report Locations

- 2004
- 2005
- 2006

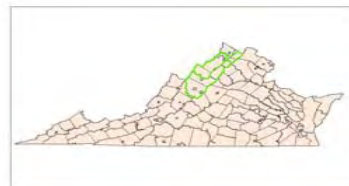
Shenandoah Basin Gages

- GAGE SITE
- OLD GAGE
- TMDL SITE/GAGE SITE
- TMDL SITE/OLD GAGE SITE

— Shenandoah Basin Streams

— Shenandoah Basin Rivers

■ Shenandoah Basins



Sources:
Virginia Department of Environmental Quality
United States Geological Survey

2004 & 2005 Fish Kills

April

Increased Flow due to precipitation

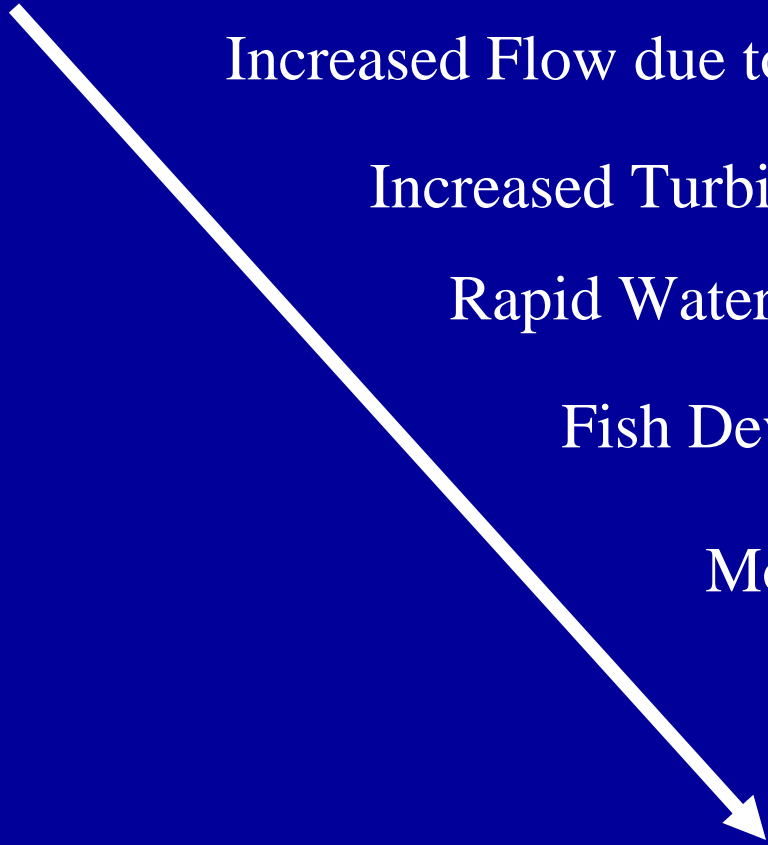
Increased Turbidity

Rapid Water Temperature Fluctuations

Fish Develop Lesions

Mortality

July



2006 Fish Kills

March

Extreme low flow conditions

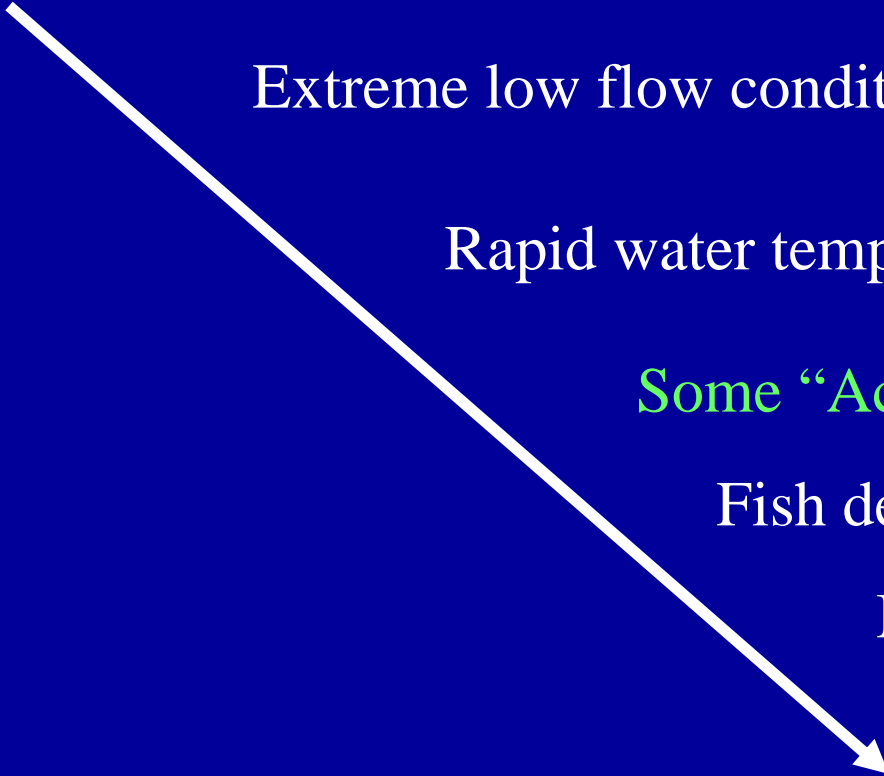
Rapid water temperature fluctuations

Some "Acute" Mortality?

Fish developed lesions

Mortality

July













JUL 18 2005



Estimated 80% loss of the adult smallmouth bass and redbreast sunfish

- 75+ miles of NF Shenandoah (2004)
- 100+ miles of SF Shenandoah (2005).
- 30+ miles of NF Shenandoah (2006)



Mortality of Multiple Species in 2006

- 5+ miles of South River
- 10+ miles of Main stem Shenandoah River
- Lower North Fork Shenandoah River





OCT 18 2005

North Fork Shenandoah 2006



Smallmouth Bass



Redbreast Sunfish





JUN 24 2005



















JR3-26



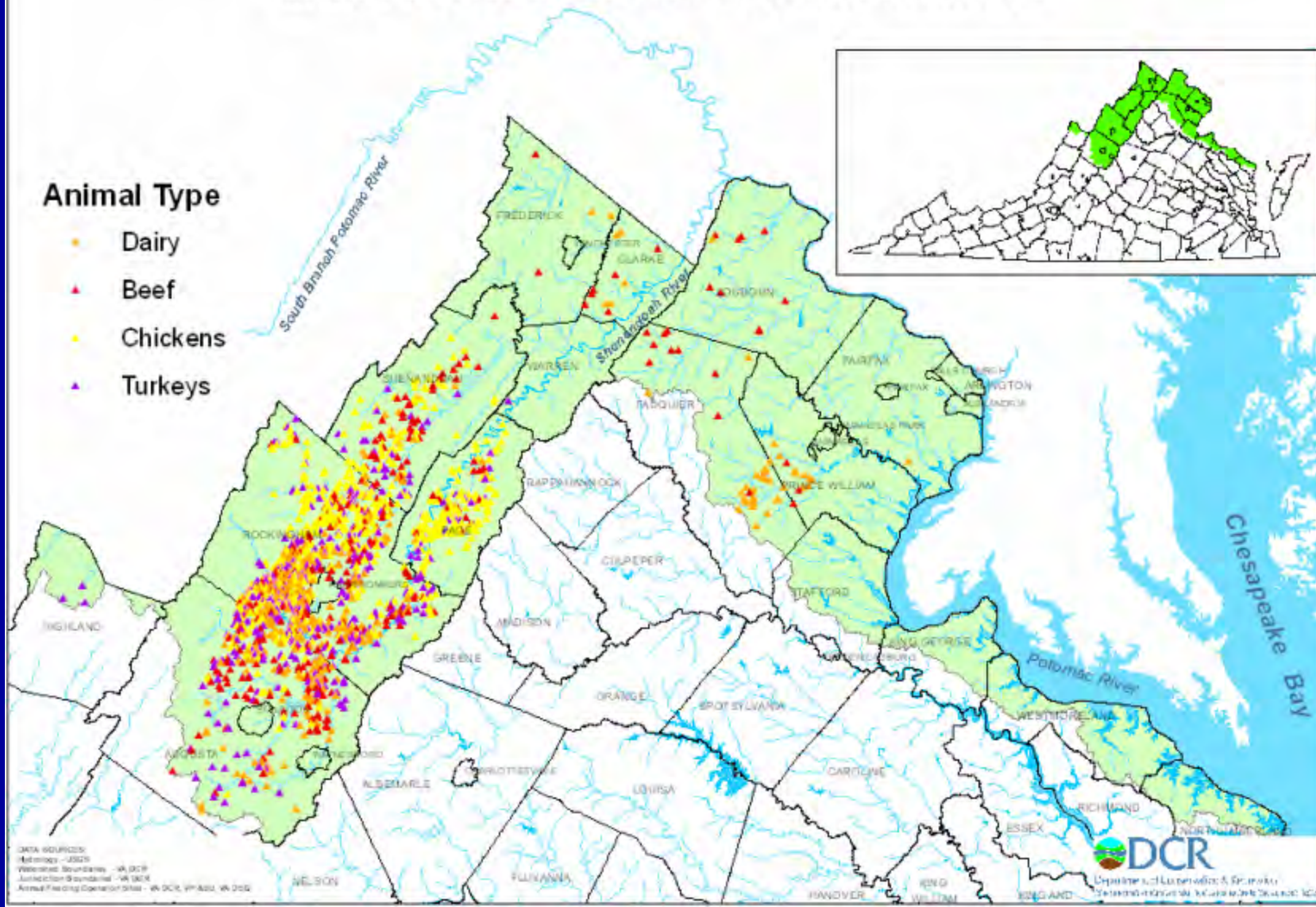




Cattle and Poultry Animal Feeding Operations in the Potomac & Shenandoah Rivers Watershed

Animal Type

- Dairy
- ▲ Beef
- Chickens
- ▲ Turkeys

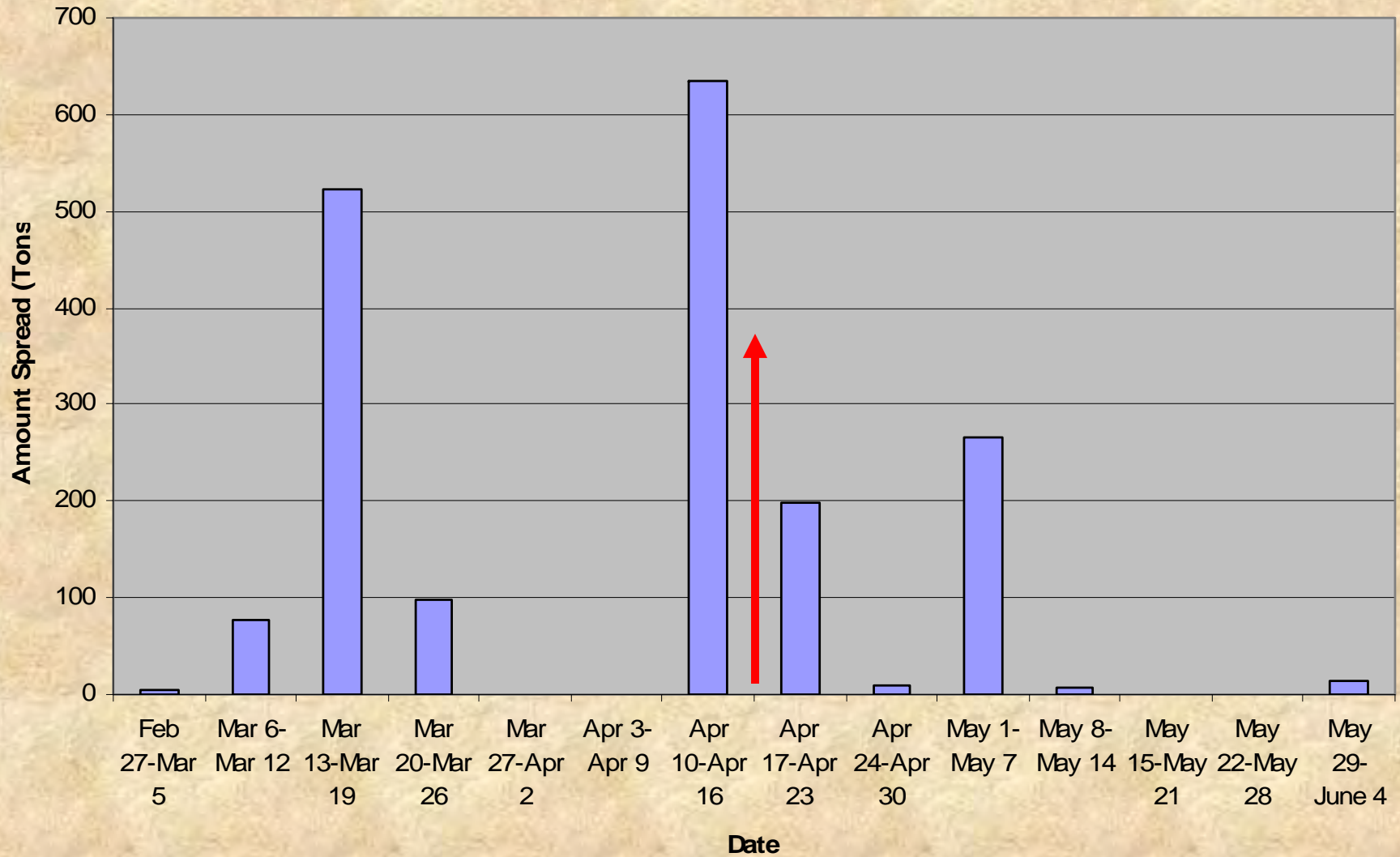


DATA SOURCES:
 Watershed - USGS
 Watershed Boundaries - VA DCR
 Jurisdiction Boundaries - VA DCR
 Animal Feeding Operations Data - VA DCR, VPI&SU, VA DOD

DCR
 Department of Conservation & Forestry
 2215 North 29th Street, Suite 200
 Charlottesville, VA 22904-4132

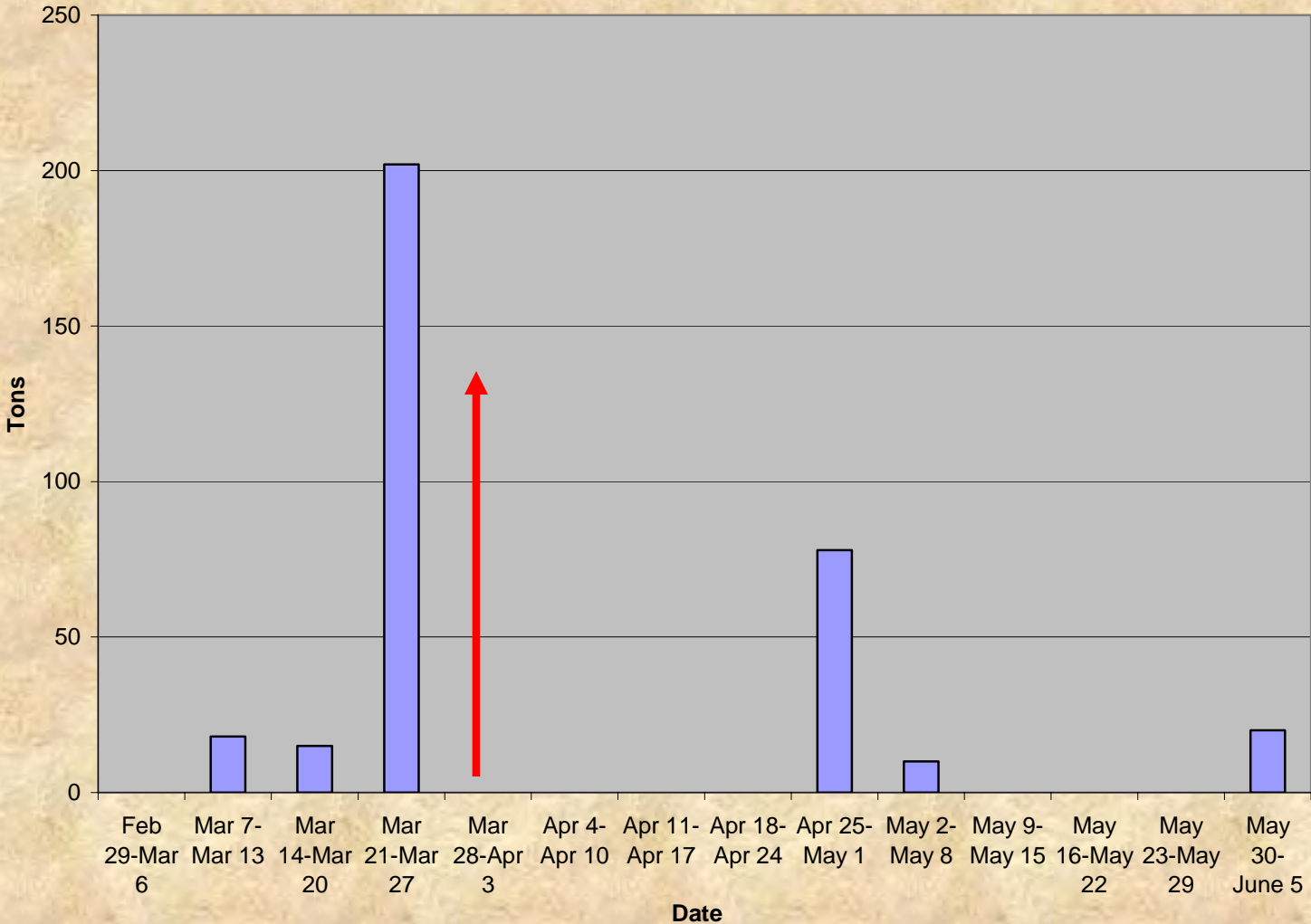
Poultry Litter Spread

2005



Poultry Litter Spread 2004

2004



North Fork Shenandoah March 2006

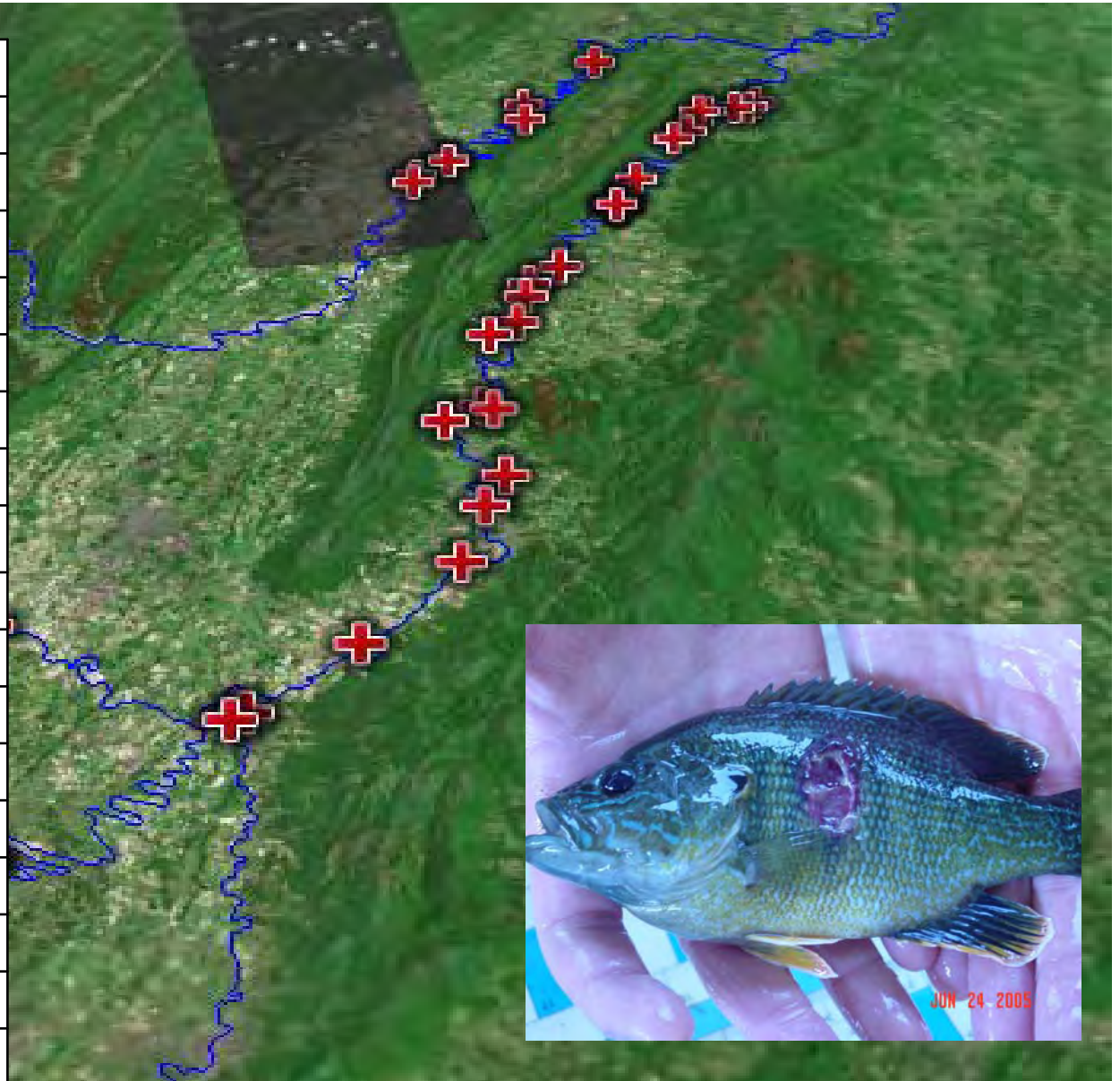


Shenandoah River Fish Kill Task Force

- State - **DEQ, DGIF**, DCR
- Federal - USGS, USFWS, USDA
- Citizens - Riparian Landowners
 - Citizen Monitoring Groups: FOSR, FONF
 - Anglers / Fishing Guides
- Chesapeake Bay Foundation
- Shenandoah Pure Water 2000 Forum
- Canaan Valley Institute
- Potomac Conservancy
- University Researchers (VA Tech, JMU, VCU)
- Agriculture Reps

The Shenandoah River Fish Kill Task Force

Algae
Bacteria
Ammonia
Sediment Contaminants
Aquatic Macrophytes
Pathogens
Parasites
Water Temperature
Agricultural Chemicals
Agricultural Density
Manure Applications
Biosolids
Immune Suppression
Chronic Stressors
Body Burden
Fish Health
Population Density
Meth Labs





Complex

Chronic

**Compounding of
Stressors?**

**Across the entire
Watershed**

**What has changed in these
watersheds in recent years?**

**What is similar within these
watersheds?**

**Have we reached an
ecological threshold?**

OCT 18 2005