

History of Filamentous Algae in the Buffalo National River

Tate Wentz
Ecologist Coordinator
Office of Water Quality
Water Quality Planning Branch



ARKANSAS DEPARTMENT OF
ENVIRONMENTAL QUALITY

1974-1975 Buffalo River Water Quality Study

FINAL REPORT

BUFFALO NATIONAL RIVER ECOSYSTEMS

1 APRIL 1974 - 31 MARCH 1975

Submitted by:

Project Director: R. E. Babcock

Project Coordinator: H. C. MacDonald

on Behalf of

Water Resources Research Center

University of Arkansas

Fayetteville, Arkansas 72701

for the Office of Natural Sciences,

Southwest Region, National Park

Service, Santa Fe, New Mexico

under Contract Number NPS 700040182.

Laura L. Rippy and Richard L. Meyer

Spatial and Temporal Distribution of
Algae and Associated Parameters

Objective: determine distribution of
periphyton community. Pool vs. riffle
association collected along length of river.

1975 Rippy and Meyer

Major findings:

- Late spring and early summer composed of *Spirogyra* and *Oedogonium*.
- *Spirogyra* most dominate in July and August.
- *Oedogonium* was present in almost every sample period.

1975 Rippy and Meyer

Major findings:

- No great algal blooms developed in autumn as typically occurs in lakes.
- Visually evidenced as extensive expanses of clean gravel.
- One year of study suggested some change from upper to lower Buffalo.

1978 Water Quality and Phycological Studies

Richard Meyer and Neil Woomeer

Major findings:

- No significant deviations from previously reported patterns of periphyton growth were observed.
- 28 additional taxa were added.

1978 Meyer and Woomer

Major findings:

- September, *Chara* beds completely overgrown with thick extensive coating of filamentous blue-green, *Anabena unispora*.
- Copious blooms of *Spirogyra* are associated with deep pools with large rocks and a sand-silt base.

1978 Meyer and Woomer

Major findings:

- Cattle access at Tyler Bend appears to be directly related to localized and extremely heavy *Spirogyra* bloom.

1991 Survey of Mill Creek

Martin Maner and David Mott...

“Dissolved oxygen in the Buffalo varied from 7.2 mg/l (88.9% saturation) upstream to 9.5 mg/l (120.3% saturation) downstream. The extreme value downstream was apparently caused by photosynthesis from numerous algal clumps on the bottom of the pool and other forms of periphyton at this point. These clumps were up to a foot or more in diameter.”

1997 BNR Ten Years of Water Quality Monitoring

BUFFALO NATIONAL RIVER,
ARKANSAS
TEN YEARS OF WATER QUALITY MONITORING

David N. Mott¹

May, 1997

¹Hydrologist, U.S. Department of the Interior, National Park Service,
Buffalo National River, Harrison, Arkansas



United States Department of the Interior
National Park Service

Figure 19 represents an attempt to remove the effects of higher turbidity in the spring and to highlight the relative degree of turbidity at each station caused by algae by focusing only on those samples collected during the summer months. During the summer growth season, the correlation between higher nutrients and higher turbidities is especially pronounced at Hasty (R4). Summer base-flow turbidity is typically related to phytoplankton and algal growth, which in the case of R4 may result from the nutrient loading from Mill Creek and Little Buffalo River which confluence above Hasty.



Fig. 19. Average summer turbidity values at nine Buffalo River sampling sites.

2004 BNR Water Resource Management Plan

WATER RESOURCES MANAGEMENT PLAN

BUFFALO NATIONAL RIVER ARKANSAS

February 2004

David N. Mott
Buffalo National River
Harrison, AR 72601

Jessica Laurans
Buffalo National River
Harrison, AR 72601

United States Department of the Interior
National Park Service

Approved by: *Jan Mica* 2/2/04
Superintendent, Buffalo National River Date

David Mott and Jessica Larson

“There has been limited research on the algae community along the Buffalo River. This is an area that needs more attention...”

2004 Mott and Larson

- “Filamentous algae blooms have posed problems on the Buffalo, algal blooms in late summer are extensive enough to warrant complaints by visitors.”
- “*Spirogyra* sp. is the most common, occurring in dense, floating masses in pools along the middle and lower river.”
- “It was found in 60 percent of the macro algae samples taken from sites along the Buffalo River (Petersen and Femmer, 2002).”

What do we know now?

2016

First reported September 15, 2016

~20 miles long

Primarily *Oedogonium*



2017

First reported August 7, 2017

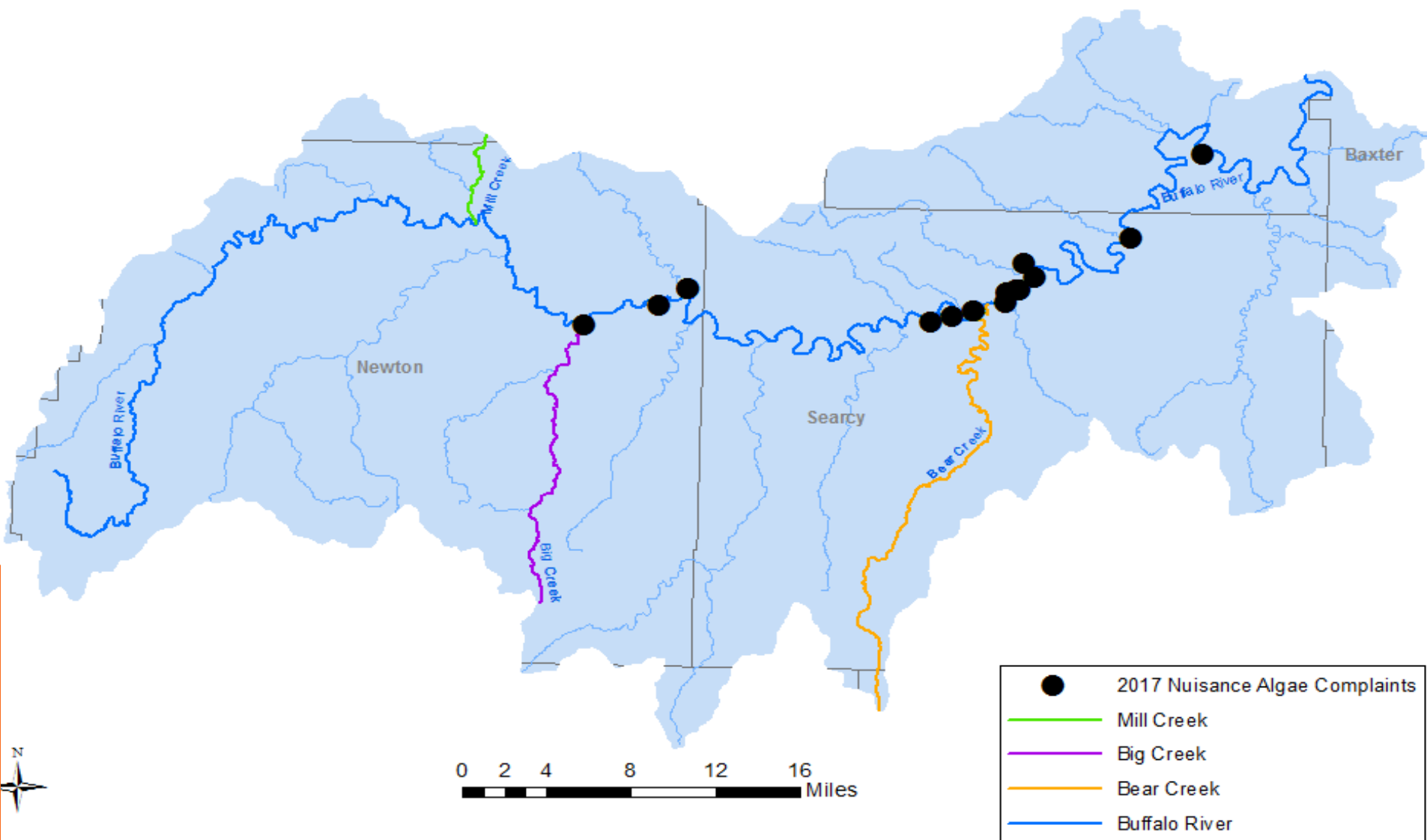
Lasted approximately four months

~70 miles long

Primarily *Spirogyra* and *Oedogonium*



Buffalo River Watershed



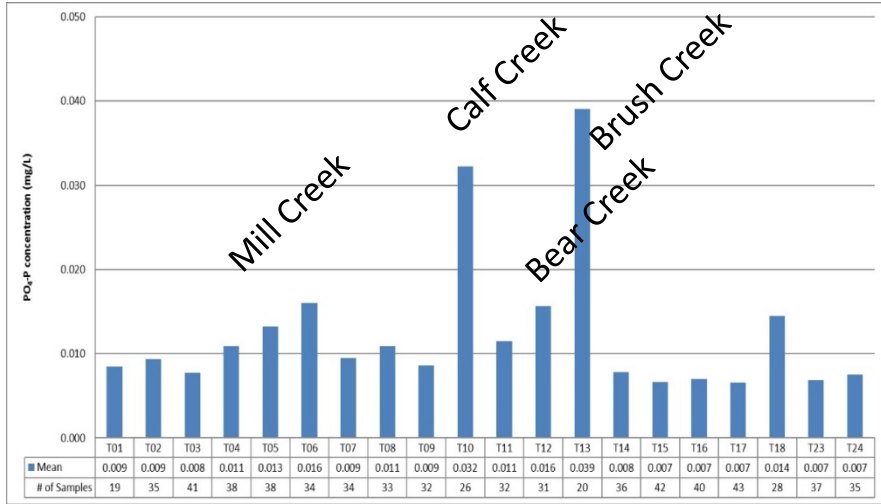


Figure 4.4.3 Mean PO₄-P concentrations for Buffalo River tributary sites sampled between 1998 and 2011 during base-flow conditions.

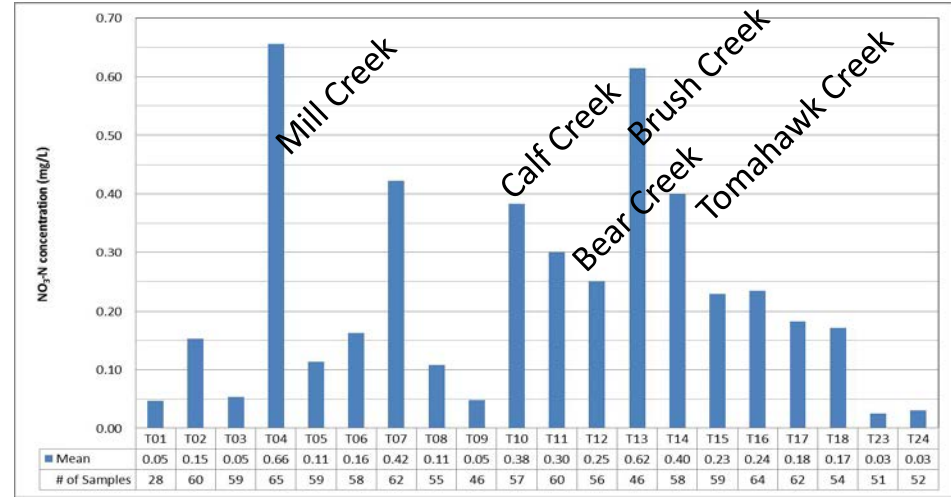
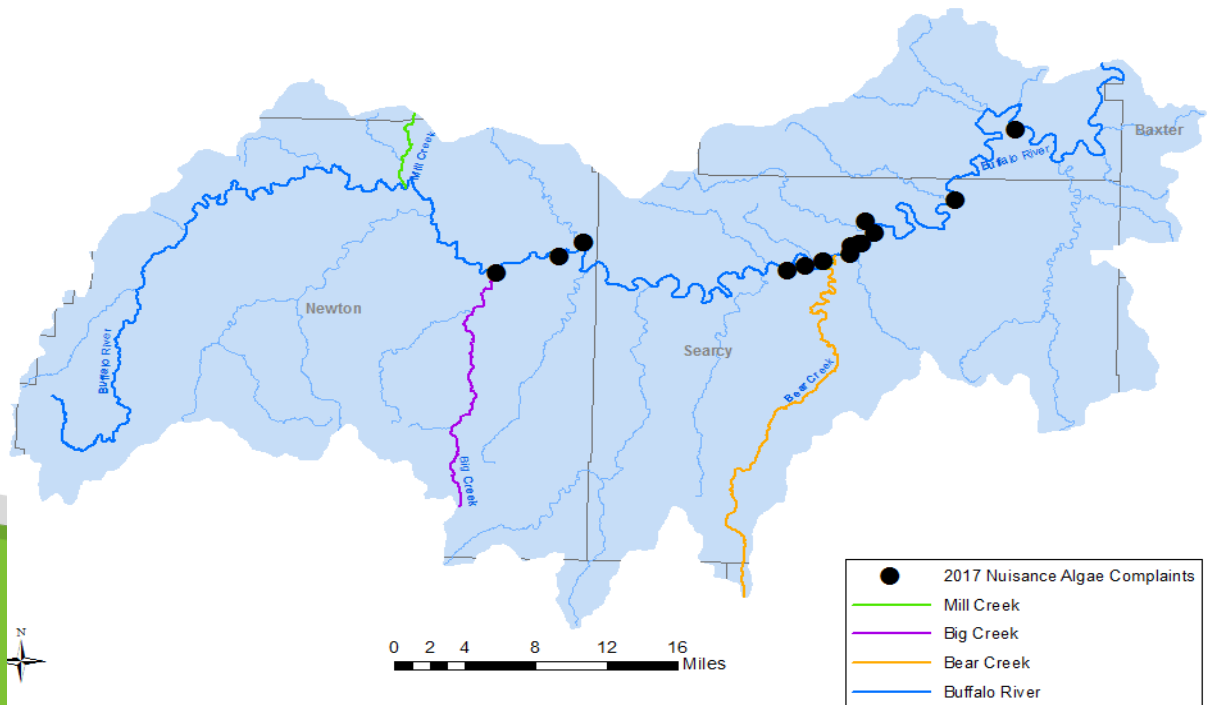


Figure 4.3.5 Mean NO₃-N concentrations for Buffalo River tributary sites between 1995 and 2011 during base-flow conditions.

WCRC, 2017

Buffalo River Watershed



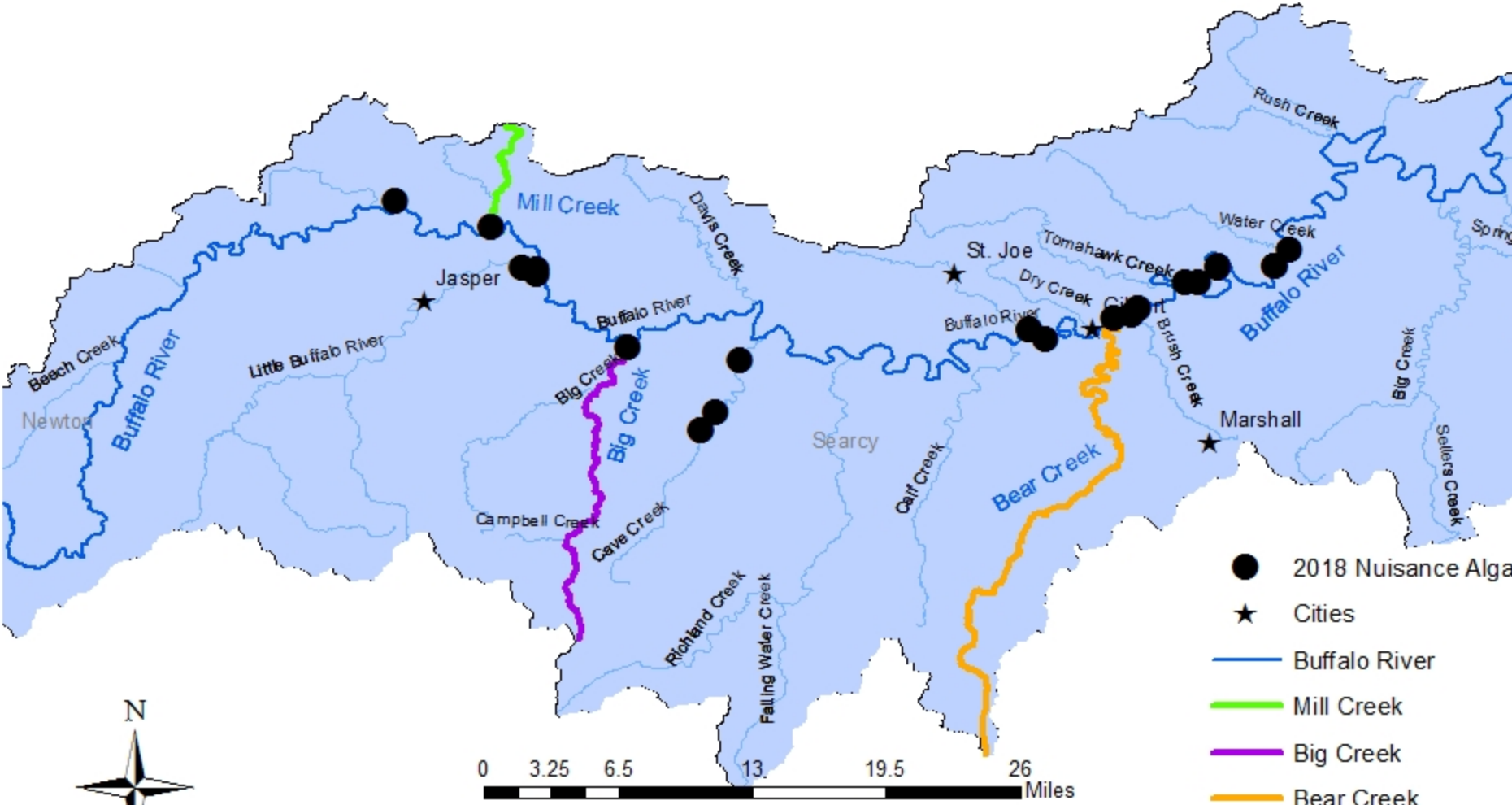
2018

First reported May 15, 2018

26 tracking submissions to date



Buffalo River Watershed



ADEQ Monitoring Efforts

- Current stream and river field efforts geared toward evaluating response of multiple stressors, including nutrients for nuisance algae
- Lake monitoring efforts for HABs being developed
- Web based complaint submissions
- Develop real time tracking tools
Interactive maps

ADEQ's Mobile App - Pollution Complaints
Get our app and start sending complaints from your phone.



Online Complaint Reporting Forms

Select a link below to report a pollution problem.



Pollution Complaints

Complaint Reporting Forms

- [Submit Air Pollution Complaint](#)
- [Submit Asbestos Complaint](#)
- [Submit Hazardous Waste Complaint](#)
- [Submit Mining Complaint](#)
- [Submit Petroleum Product Spills and Leaks Complaint](#)
- [Submit Solid Waste / Illegal Dumps Complaint](#)
- [Submit Water Pollution Complaint](#)

Submit Nuisance Algae Bloom Complaint

- [Submit Harmful Algae Bloom Complaint](#)
- [Tire Accountability Program Complaint](#)

Complaints, Incidents, & Inspections Searchable Data Forms

- [Search ADEQ Complaints and Inspections Data](#)
- [Search Regional Solid Waste Management Districts Complaints & Inspections Data](#)
- [Search Solid Waste/Illegal Dumps Complaints and Inspections Data](#)

Nuisance Algae Bloom Complaint Form

The information you submit will be forwarded to ADEQ environmental enforcement personnel. If you send a complaint to the wrong division, it will be referred to appropriate staff.

ADEQ's Mobile App - Pollution Complaints

Get our app and start sending complaints from your phone.



Online Nuisance Algae Bloom Complaint Reporting Form


** Asterisk indicates item is mandatory; all others are optional*

Owner/Location Information

Instructions

Property Owner (if known):

* County (if known):

Select County (or Unknown) 

* Location/Driving Directions:

Provide the exact address, including street, city, and zip and/or location/driving directions.

Description of Problem

Instructions

Public Access:

Yes

After-Hours Emergencies

If you are reporting a spill/leak of petroleum products or hazardous materials or gases requiring an immediate emergency response, call the:

**Arkansas Department of
Emergency Management
800-322-4012**

Please also call:

**ADEQ
501-682-0716**

Leave a message and your call will be returned.

File a complaint with ADEQ

ONLINE
Online Complaint Reporting Form
← fill in the online complaint form

8:00 am - 4:30 pm
Monday - Friday

Contact
Water Division
Inspection Branch
501-682-0634
FAX: 501-682-0880

Or
[Contact the Water Division](#)

Future Work

- AGFC/USGS/ADEQ/NPS Joint Algae Study
- Citizen Science



ADEQ

ARKANSAS
Department of Environmental Quality

"To protect, enhance, and restore the natural environment for the well-being of all Arkansans."