

Improvements to the Cheat River Watershed's Fisheries in Response to Reductions in Acid Mine Drainage Pollution

WV MINE DRAINAGE TASK FORCE SYMPOSIUM
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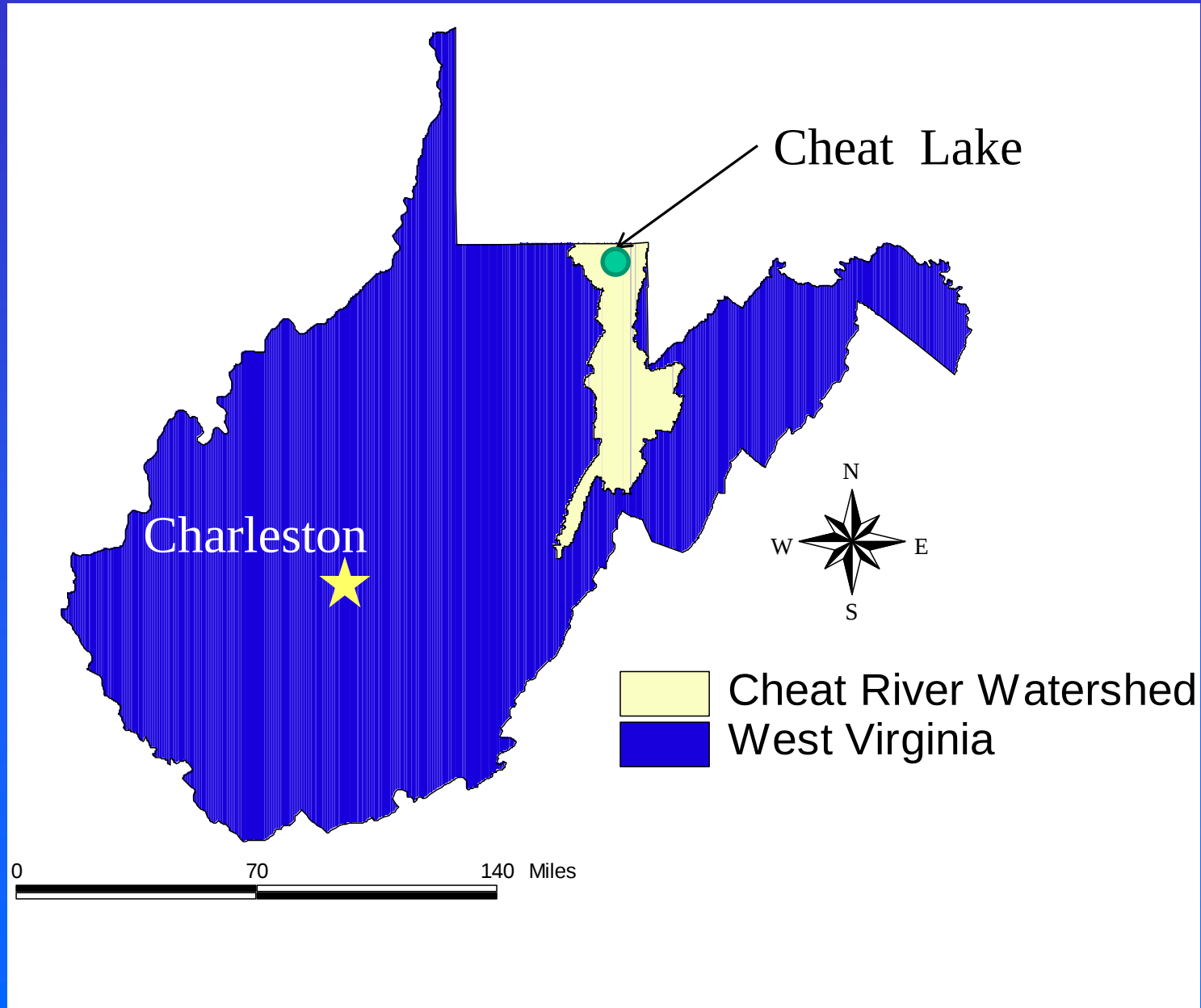


Purpose

Document improvements to the water quality and fisheries in Cheat Lake and Cheat River resulting from acid mine drainage (AMD) remediation projects funded through the Abandoned Mine Lands (AML), the WV Special Reclamation programs, and other participating partners.

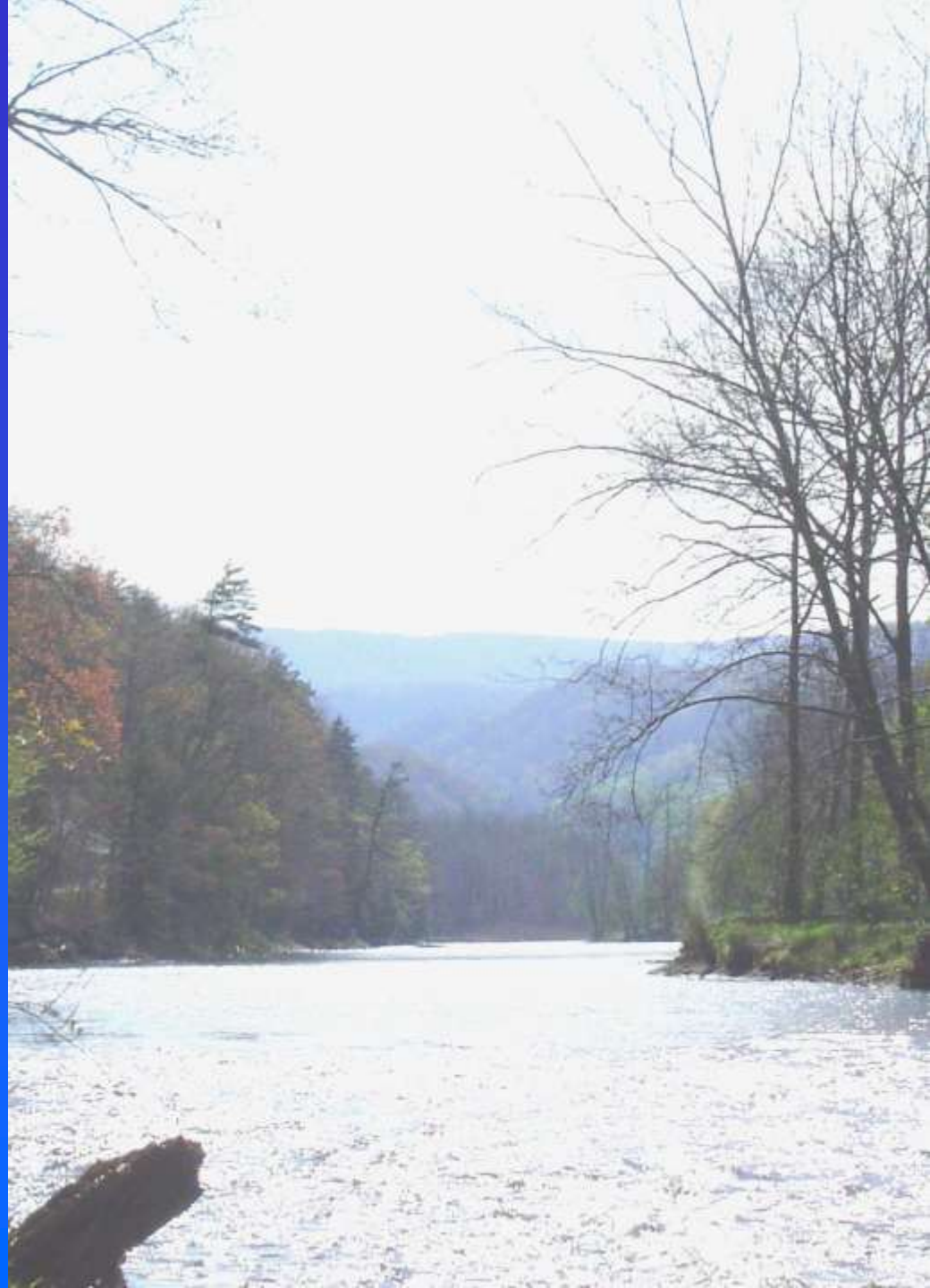
Cheat River Watershed

- 1,424 mi² drainage area
- Elevations range from 800 ft to 4,500 ft
- Coal high in sulfur and other metals



Cheat River

- Formed by Black Fork and Shavers Fork at Parsons, WV
- Mainstem flows 75 miles north to state line.
- 2nd largest Monongahela River tributary
- Average annual flow of 2,300 cfs
- November 4, 1985 flood: 200,000 cfs



Cheat Lake

- Located at base of the Cheat watershed
- 1,730 acres: 13 miles long
- Maximum depth 106 feet
- Operated for hydropower, not for flood control
- High angling and boating use



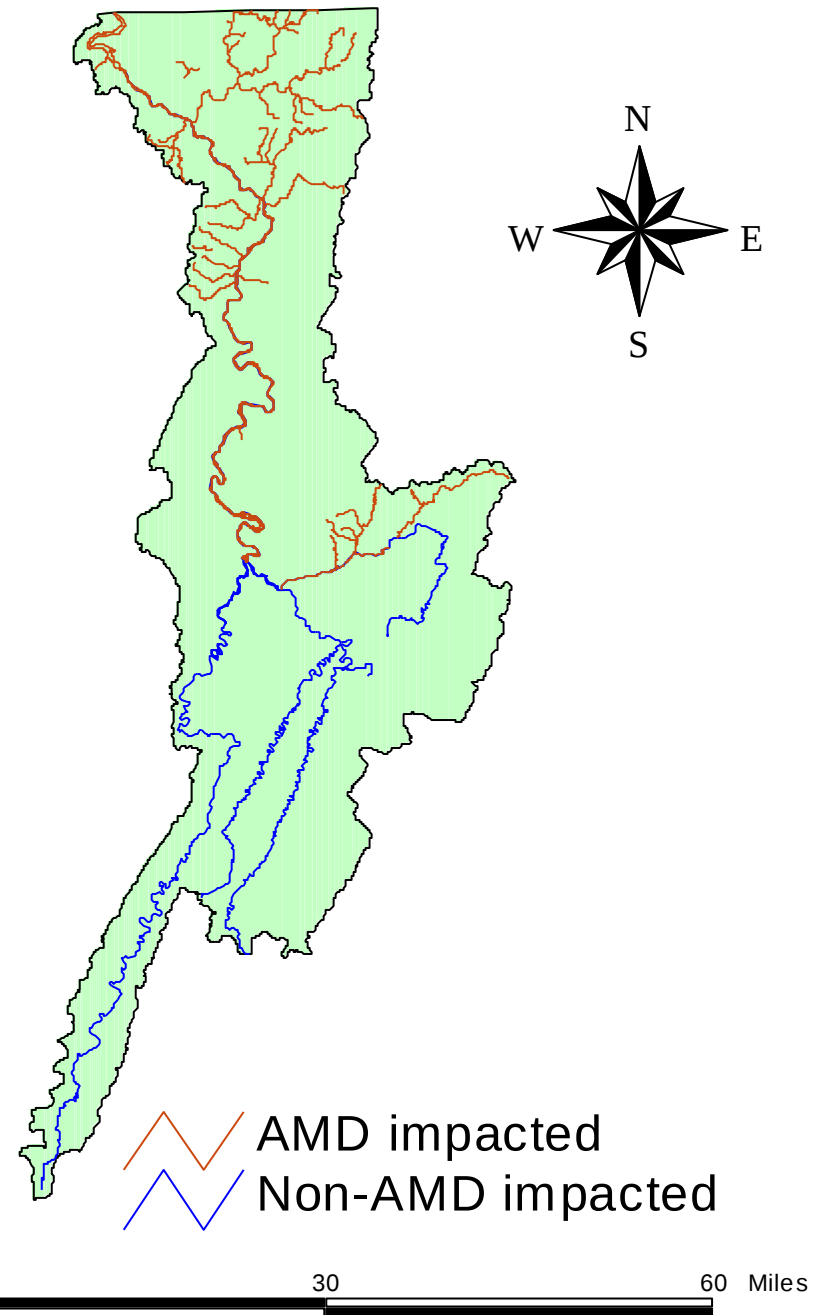
Coal Mining in the Cheat Watershed

Many deep mines were developed beginning in the 1920's and ranged in size from small family owned mines to mines large enough to support company towns.



Subsequent strip mining has occurred on about 1% of the watershed area (U.S. Geological Survey, 1992).

AMD impacts 69 miles of
Cheat mainstem and 53
streams listed on state
303D list



Surface Mining Control and Reclamation Act (SMCRA)

Two major programs: before and after 1977.

1. Regulation of active coal mines after 1977 (bond forfeitures). Special Reclamation Program.
2. AML Program - reclamation of mine sites prior to 1977. Priorities of public safety and health, not necessarily AMD.



U.S. Department of the Interior's Office of Surface Mining distributes federal money to states by SMCRA guidelines.

Special Reclamation Sites

Active chemical treatment methods often used at bond forfeited sites.

Alkaline materials introduced into water for neutralization.

64 complete projects

~\$30 million



AML Sites

Passive treatment*
methods often used at
AML sites. Natural
chemical and biological
reactions used for
neutralization.

66 sites reclaimed
~\$16 million

173 unreclaimed



* longevity / maintenance ?

1994 Cheat River Deep Mine Blowout

T & T mine
\$ 30,000 month

No fish kill

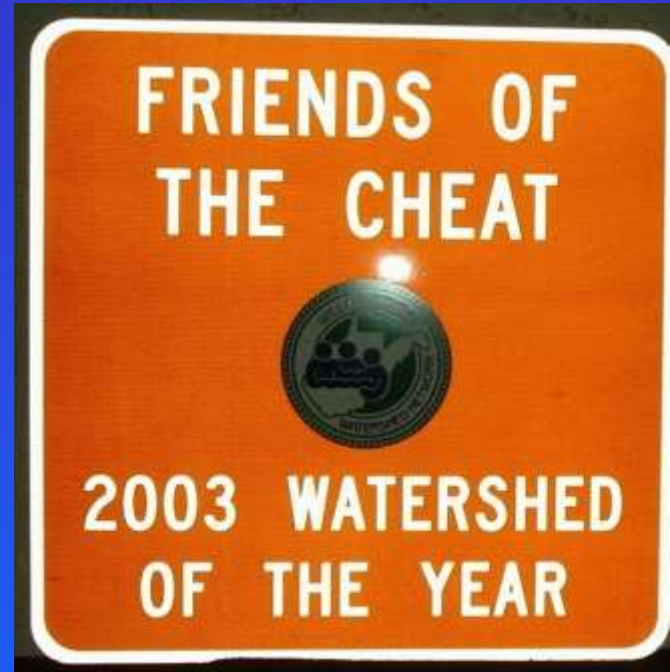


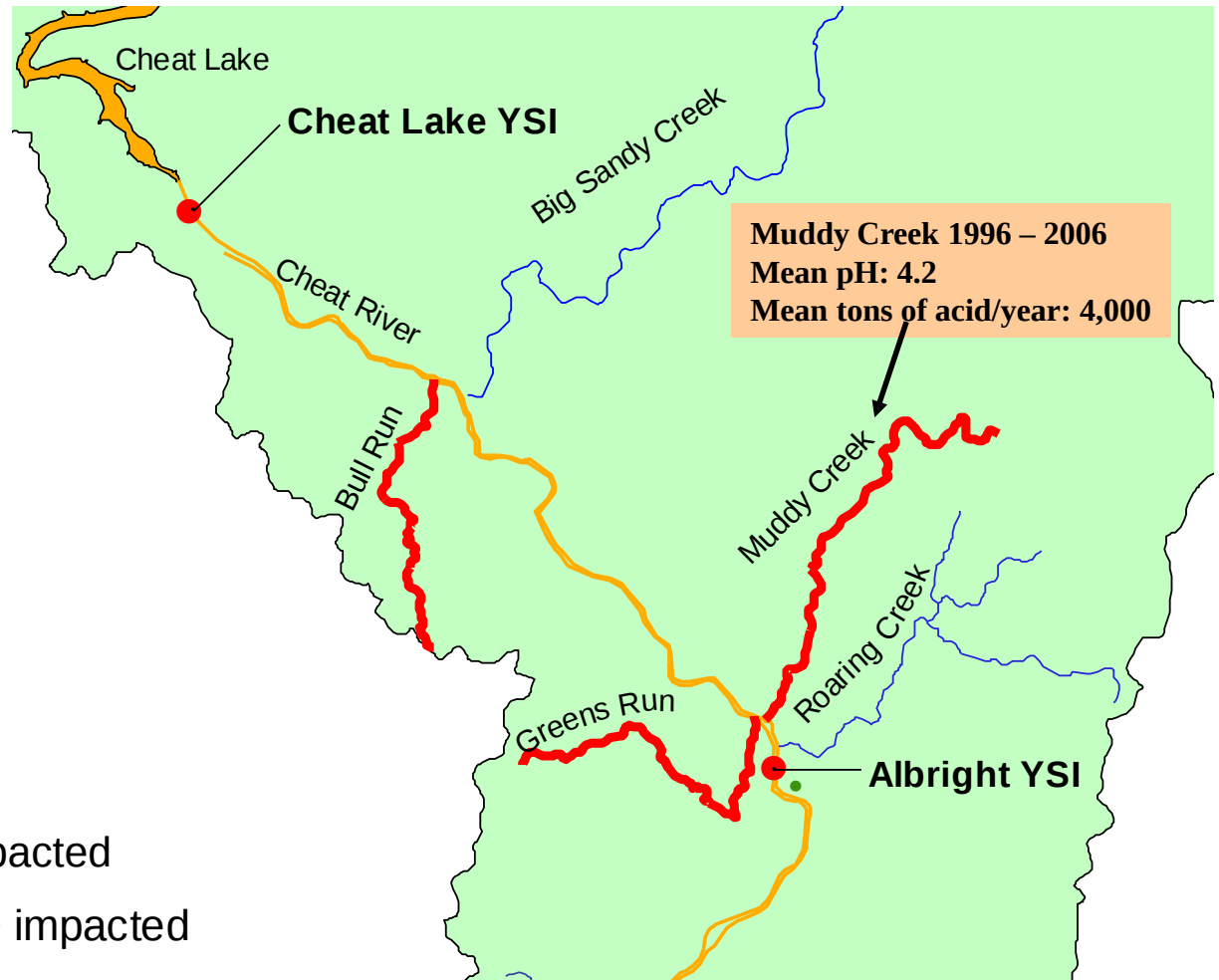
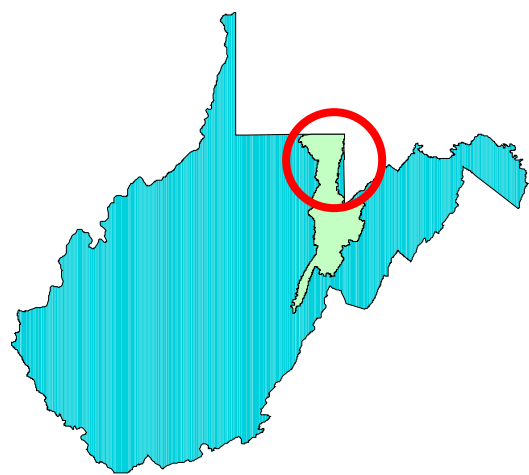
Cheat Watershed Groups

Friends of Cheat organized in 1995 to restore and promote the Cheat watershed. Cultivated a wide range of support from watershed stakeholders.

Organized River of Promise in 1995 to reduce AMD and restore sport fisheries.

Signatories include state and federal agencies, industry, and conservation groups.





- Heavily AMD Impacted
- Moderately AMD impacted
- No AMD
- YSI Locations

0 7 14 Miles

Continuous Water Quality Monitoring



Is AMD treatment positively impacting
Cheat River water quality???

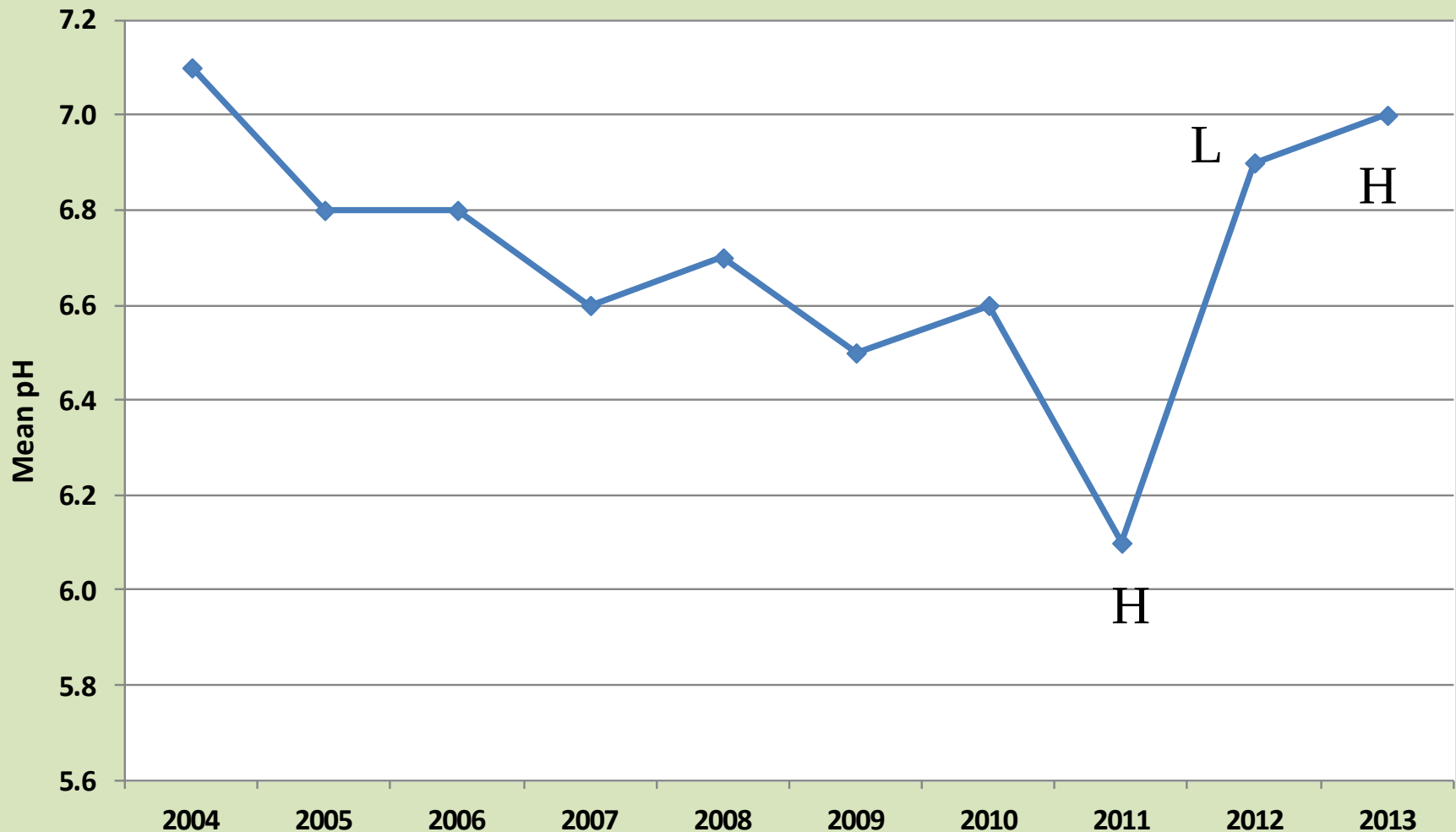
Start in 2004

Continuous Water Quality Monitoring



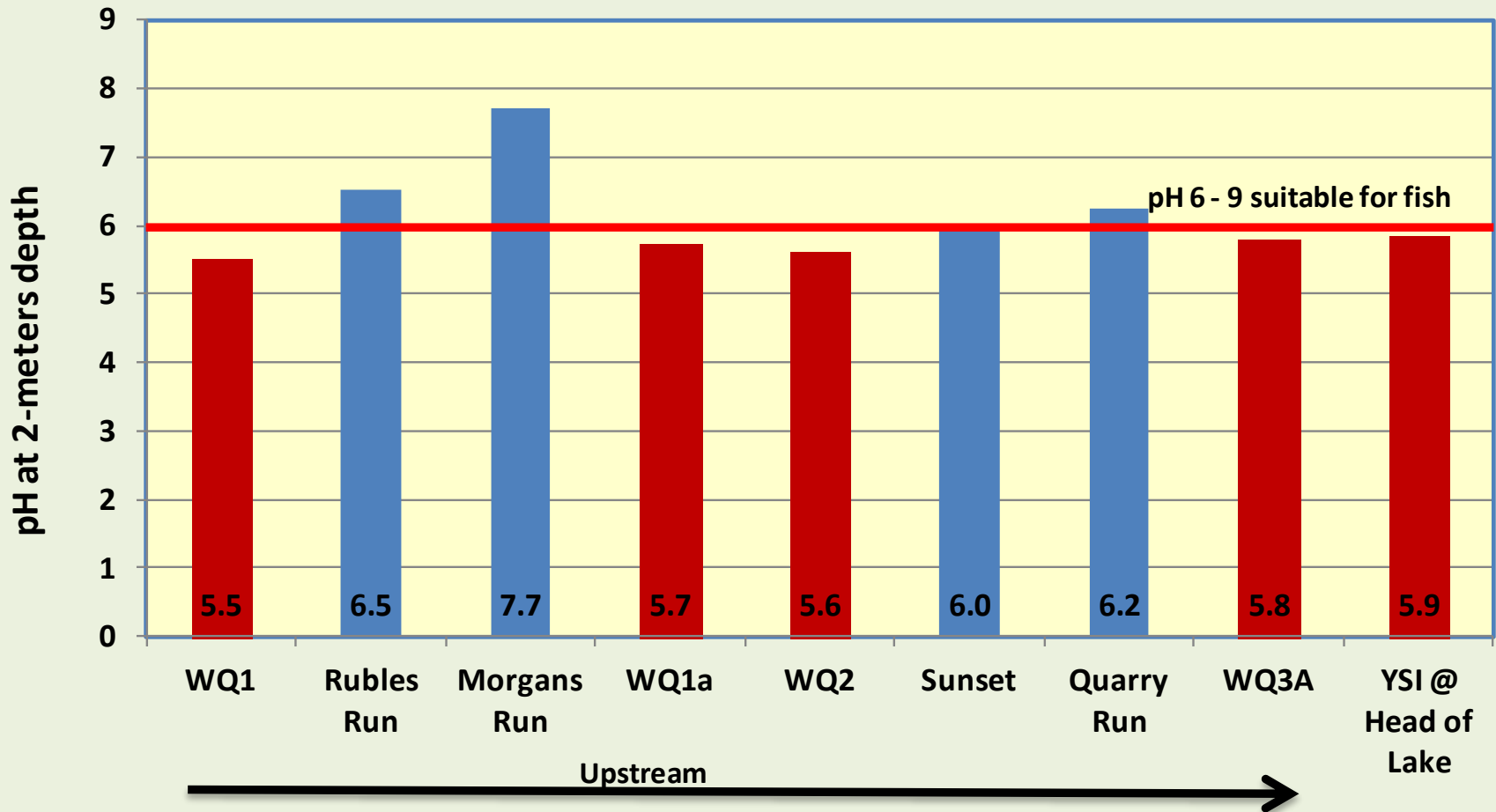
Head of Cheat Lake

Mean Annual pH, 2006 - 2013

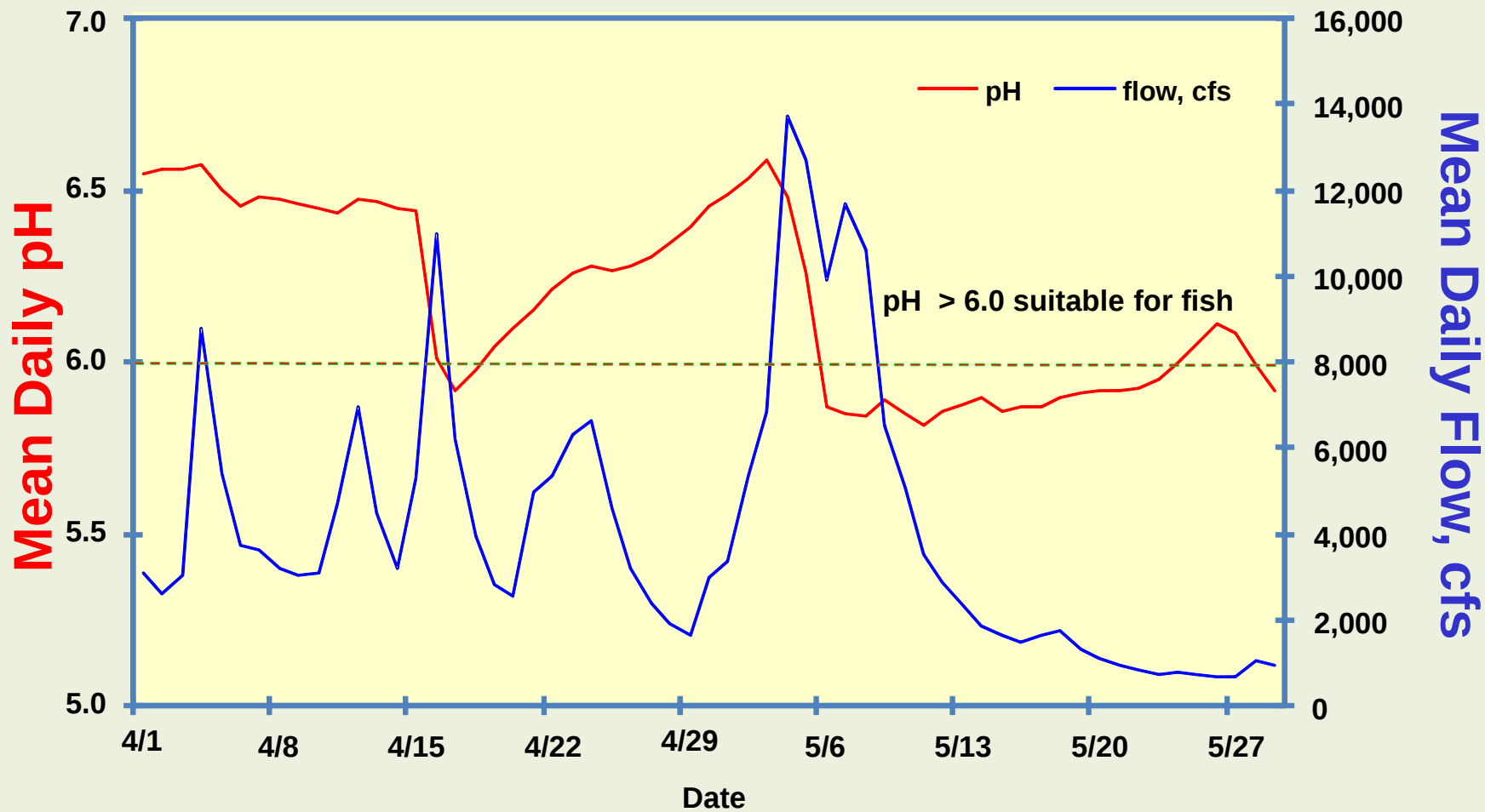


pH Depression

Cheat Lake pH - May 7, 2009

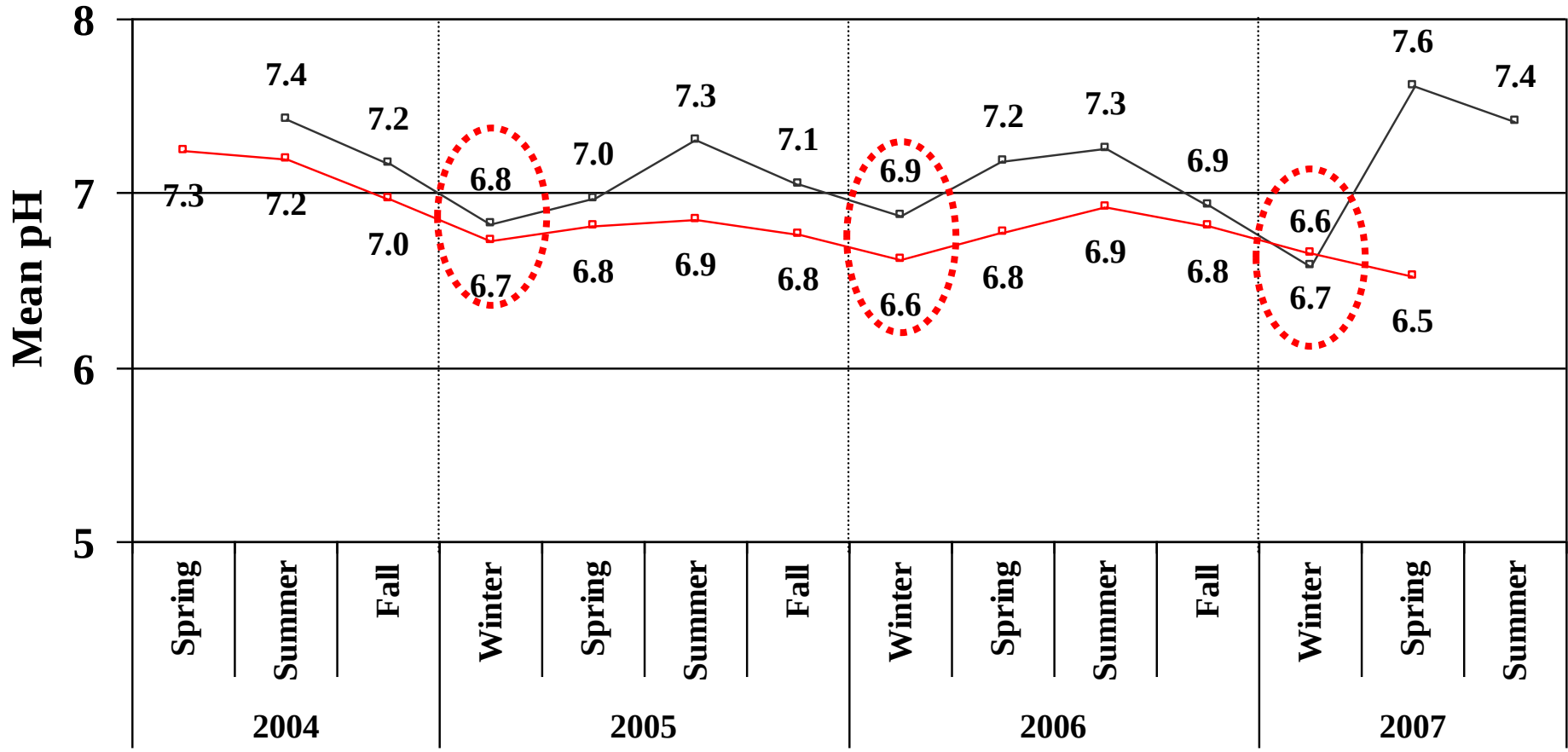


Mean Daily pH vs Flow for Cheat River

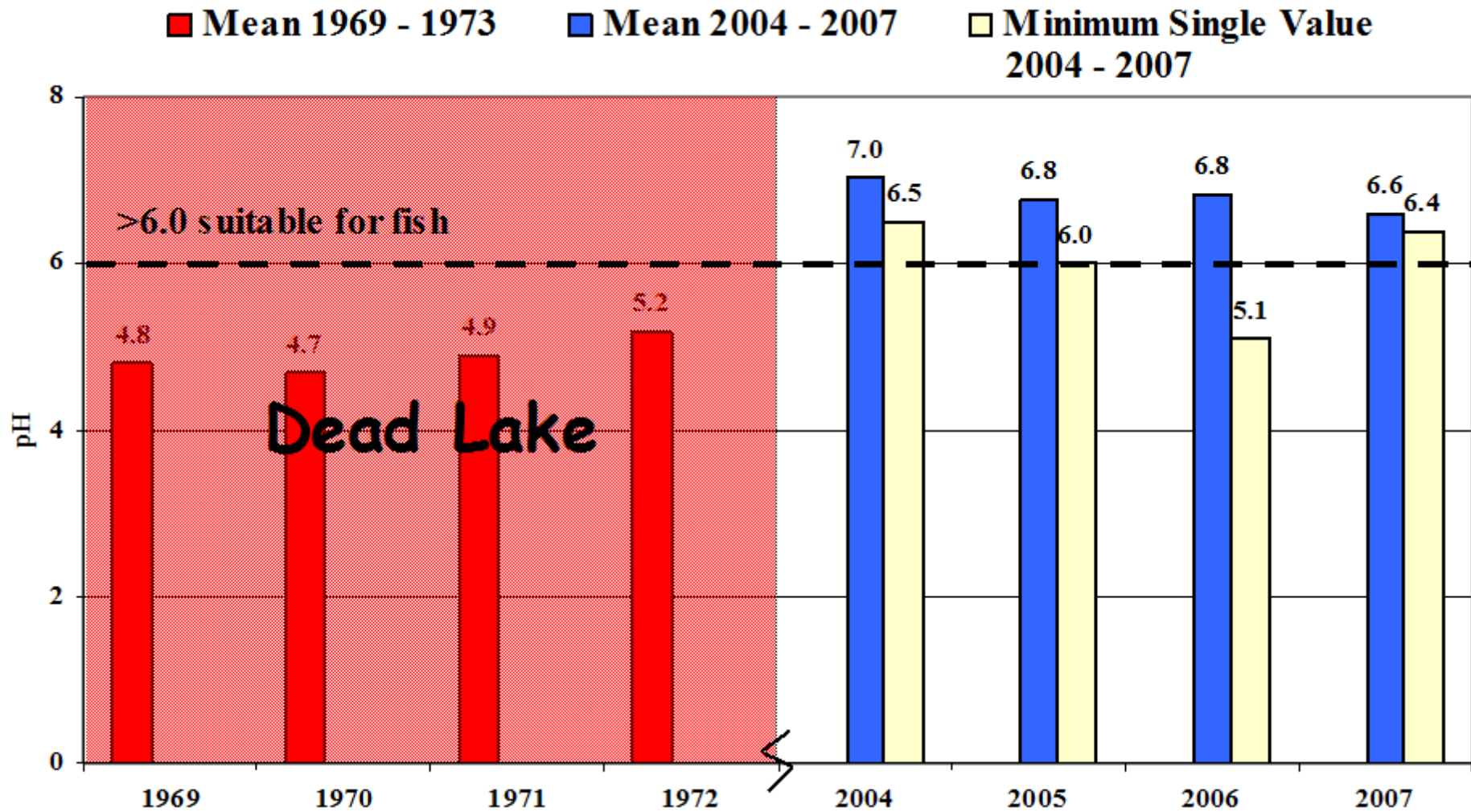


Mean Seasonal pH

—□— Albright —□— Cheat Lake



Cheat Lake pH



Cheat Lake's Fish Community

48 species collected

1 atherinids

4 catostomids

10 centrarchids

1 clupid

11 cyprinids

2 esocids

4 ictalurids

2 moronidae

9 percids

1 percithyids

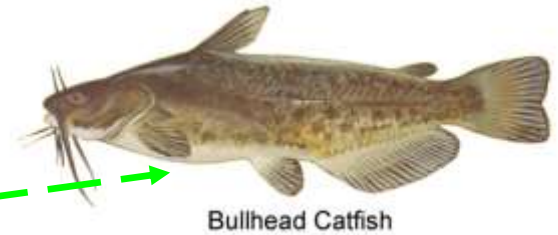
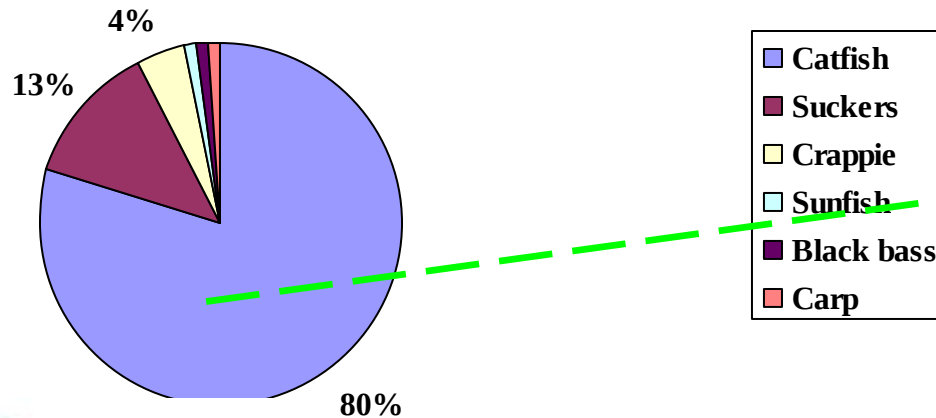
1 sciaenid

2 salmonids

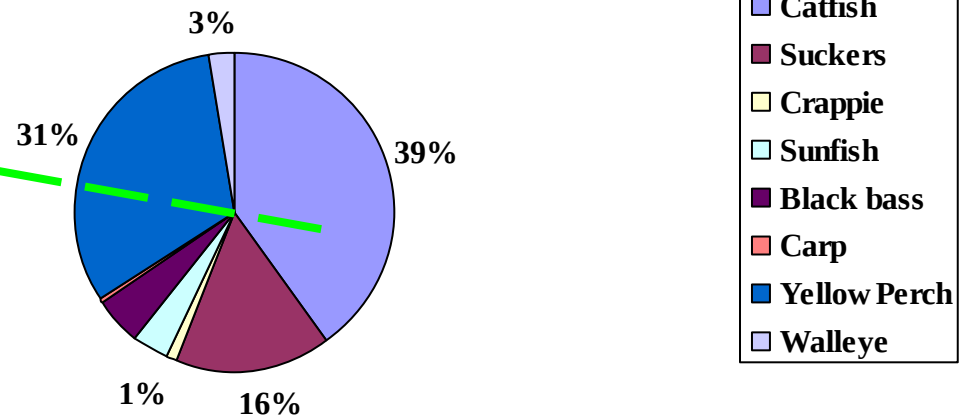


Cheat Lake's Fishery

1955 Cheat Lake Gill and Trap Net Survey



2006 Cheat Lake Gill Net Surveys by WVDNR



Core 1959: “yellow perch and walleye became extinct by 1940 from the watershed”



Best yellow perch fishery in WV 2005



15 per day limit in 2006

Walleye Stocking

Walleye	Stocking Year										Total
	1999	2000	2004	2005	2006	2007	2009	2010	2012	2013	
Fry	1,700,00	1,000,000	.	.	.	.	.	.	.	.	2,700,000
Fingerling	.	.	50,000	44,000	46,000	25,000	6,800	87,712	31,775	.	291,287



Spring pH fluctuations affect walleye spawning success ??

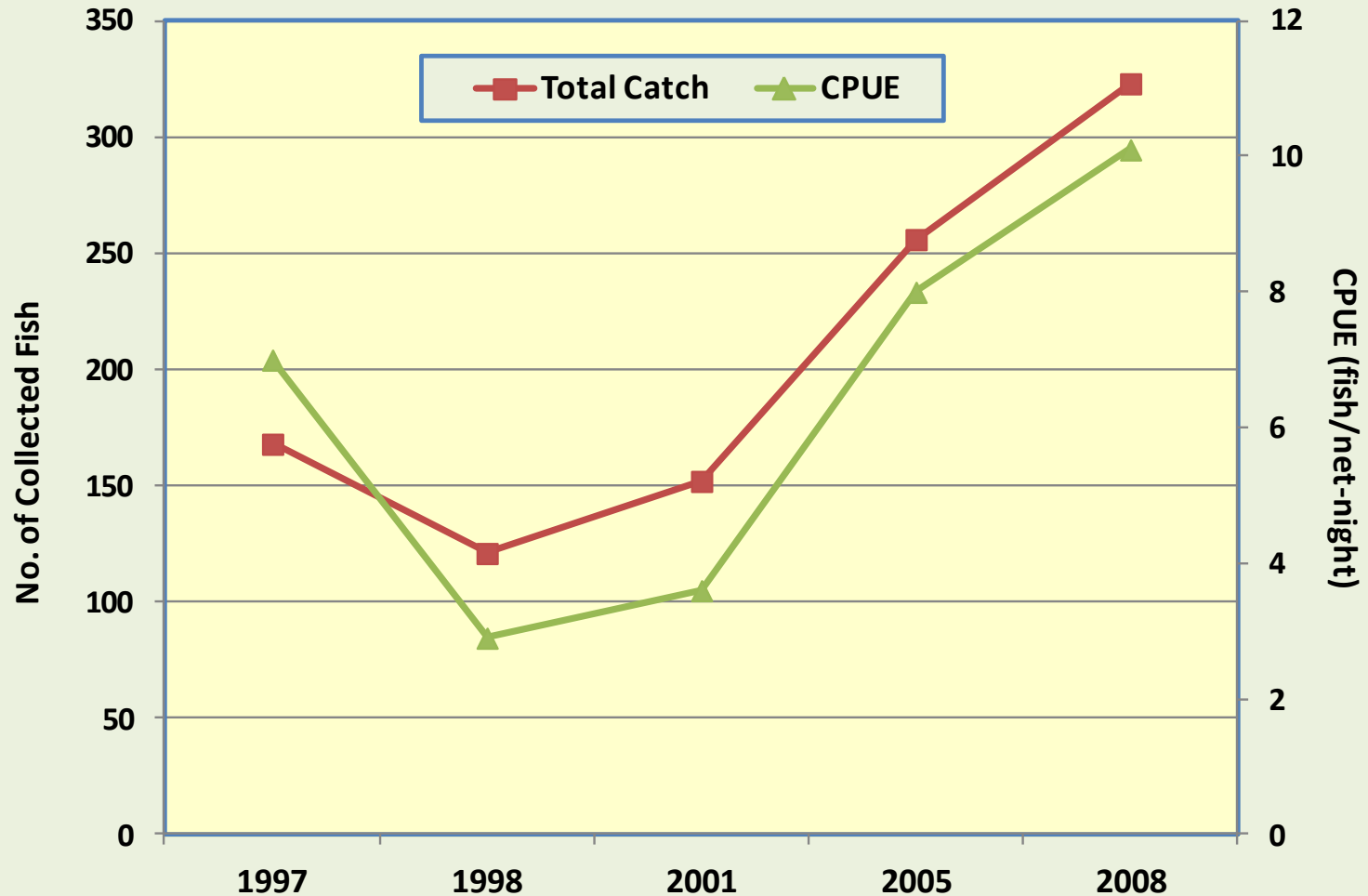
Telemetry study



29-inch Walleye

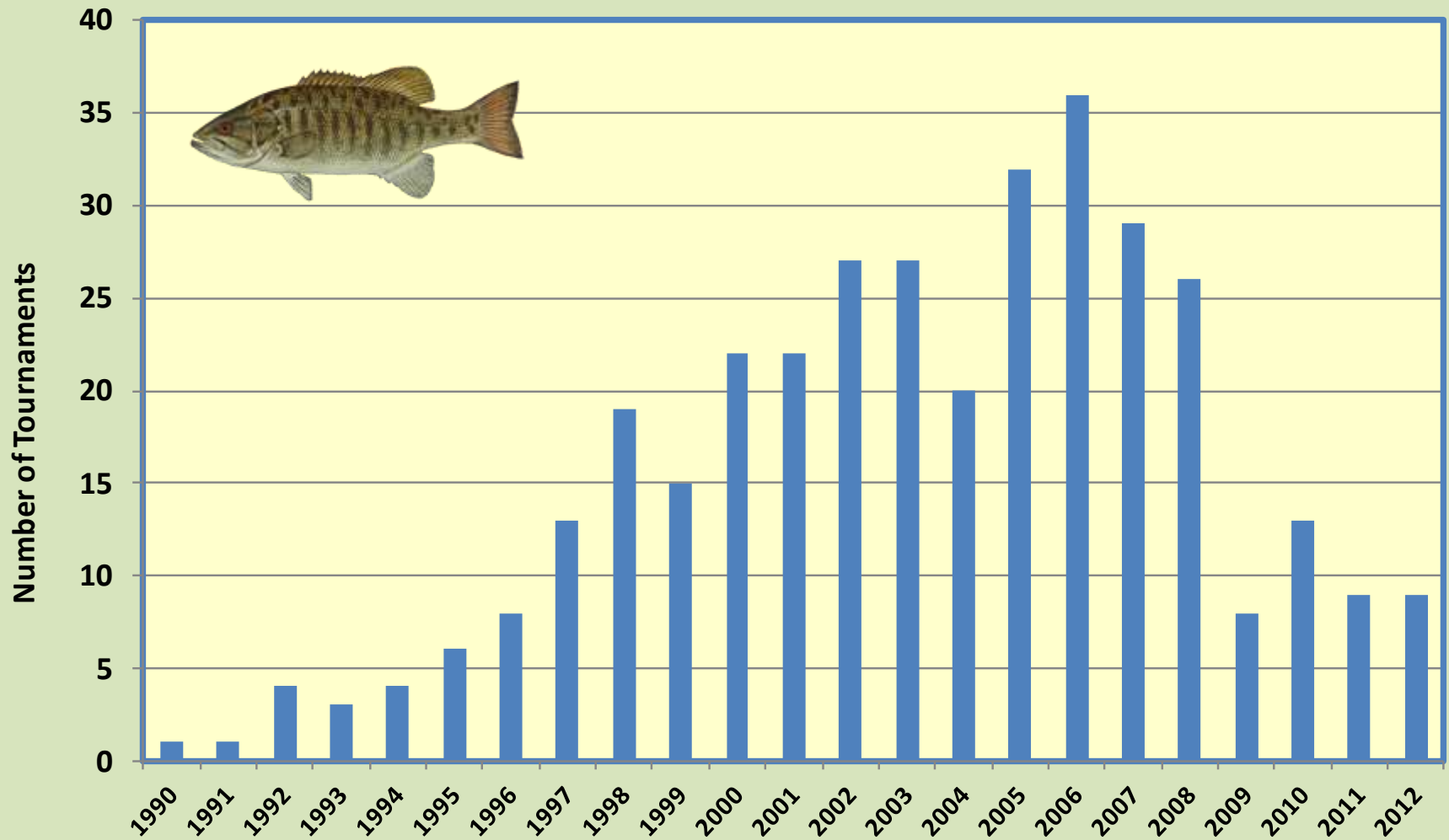
Cheat Lake Fish Monitoring

1997 - 2008 Cheat Lake Gill Nets



Cheat Lake Bass Tournaments

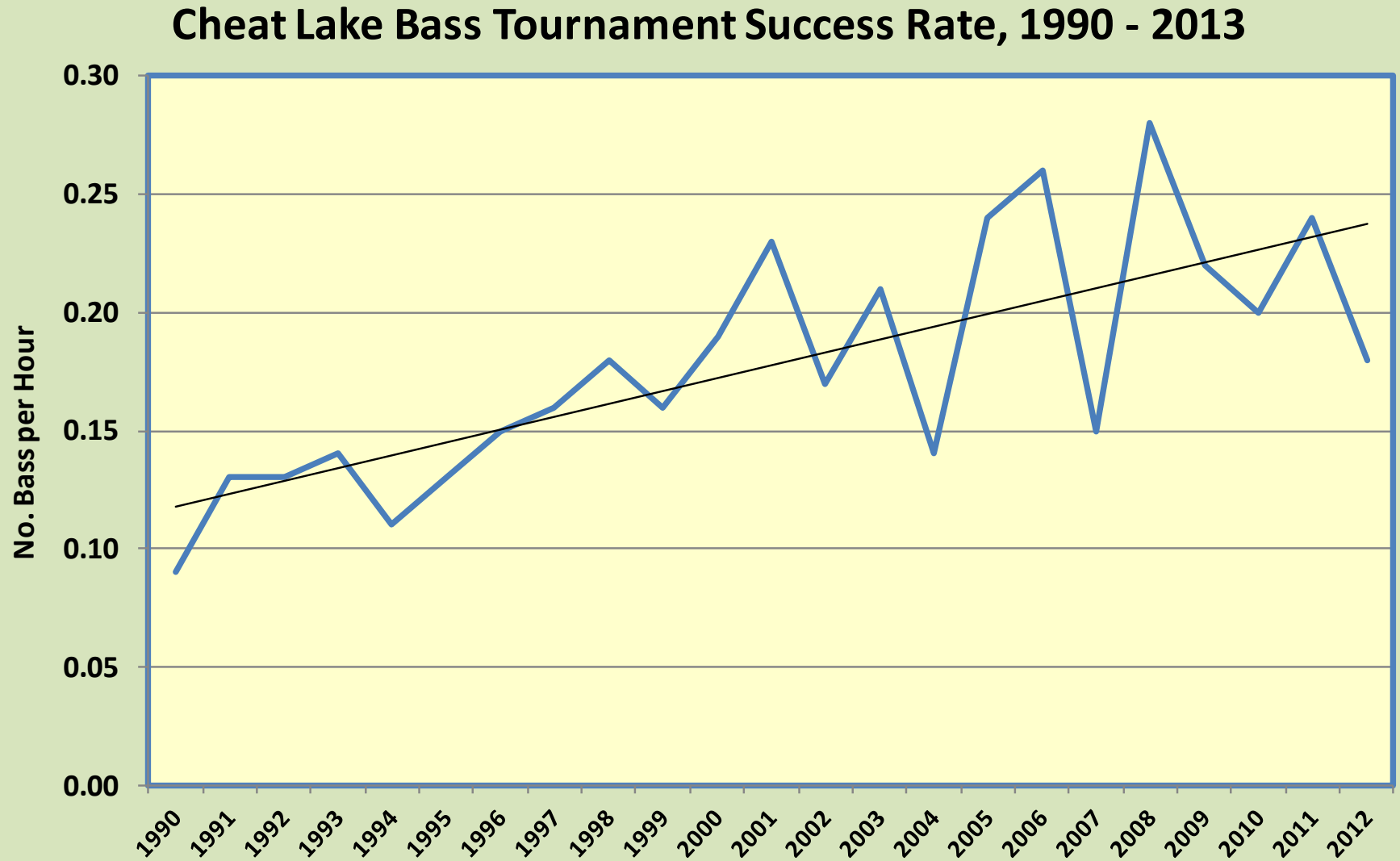
Cheat Lake Bass Tournaments, 1990 - 2013



Cheat Lake Bass Tournaments

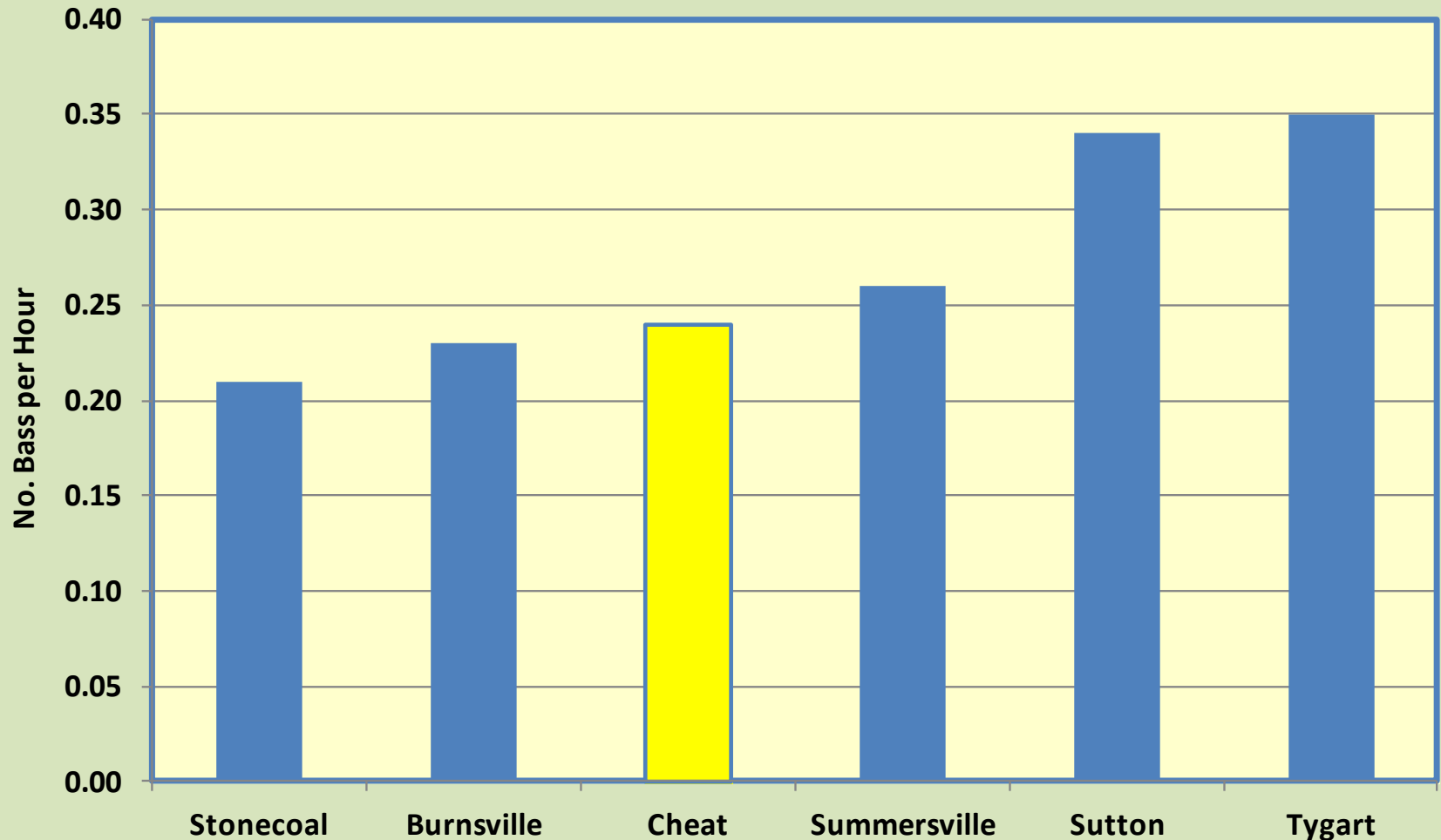


Cheat Lake Bass Tournaments

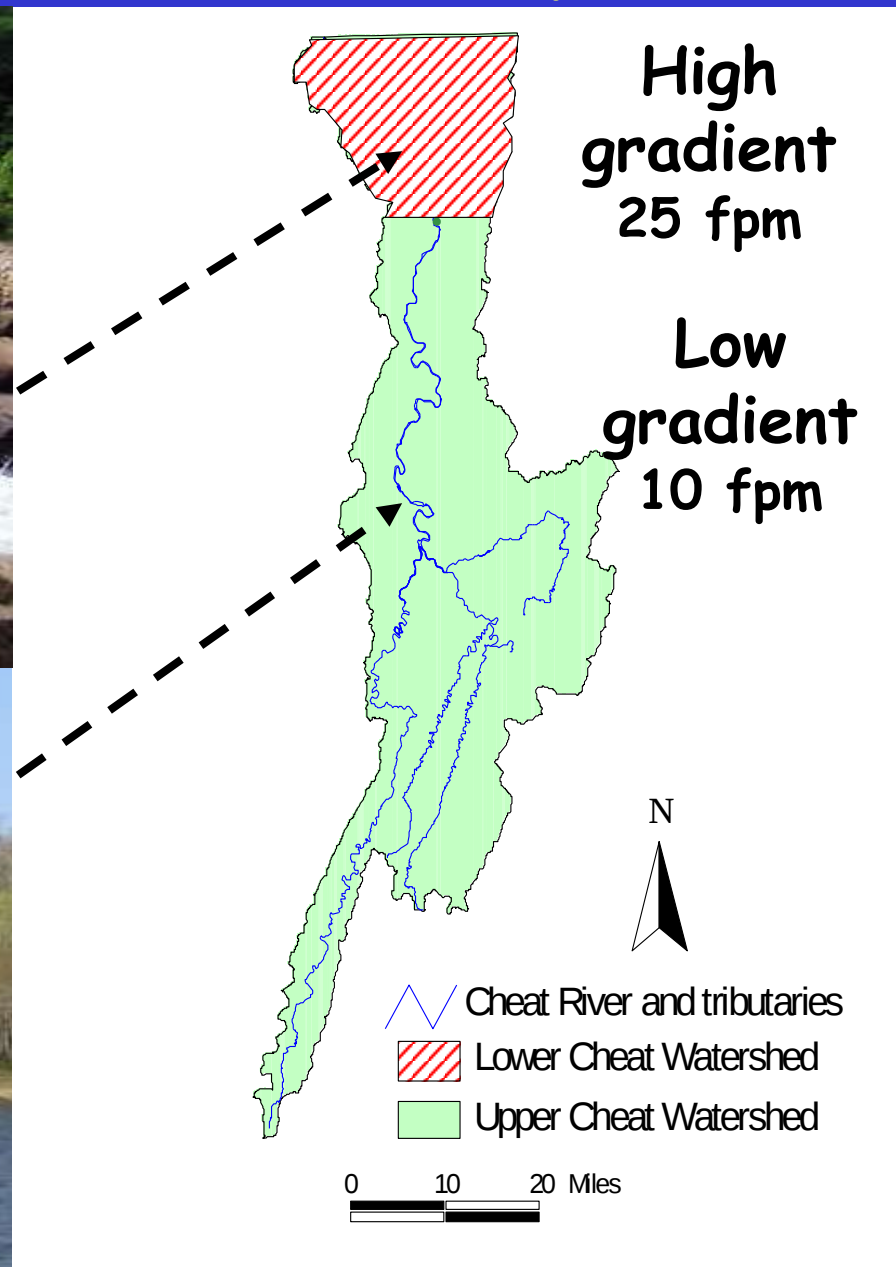


Cheat Lake Bass Tournaments

Bass Tournament Success Rates, 2012

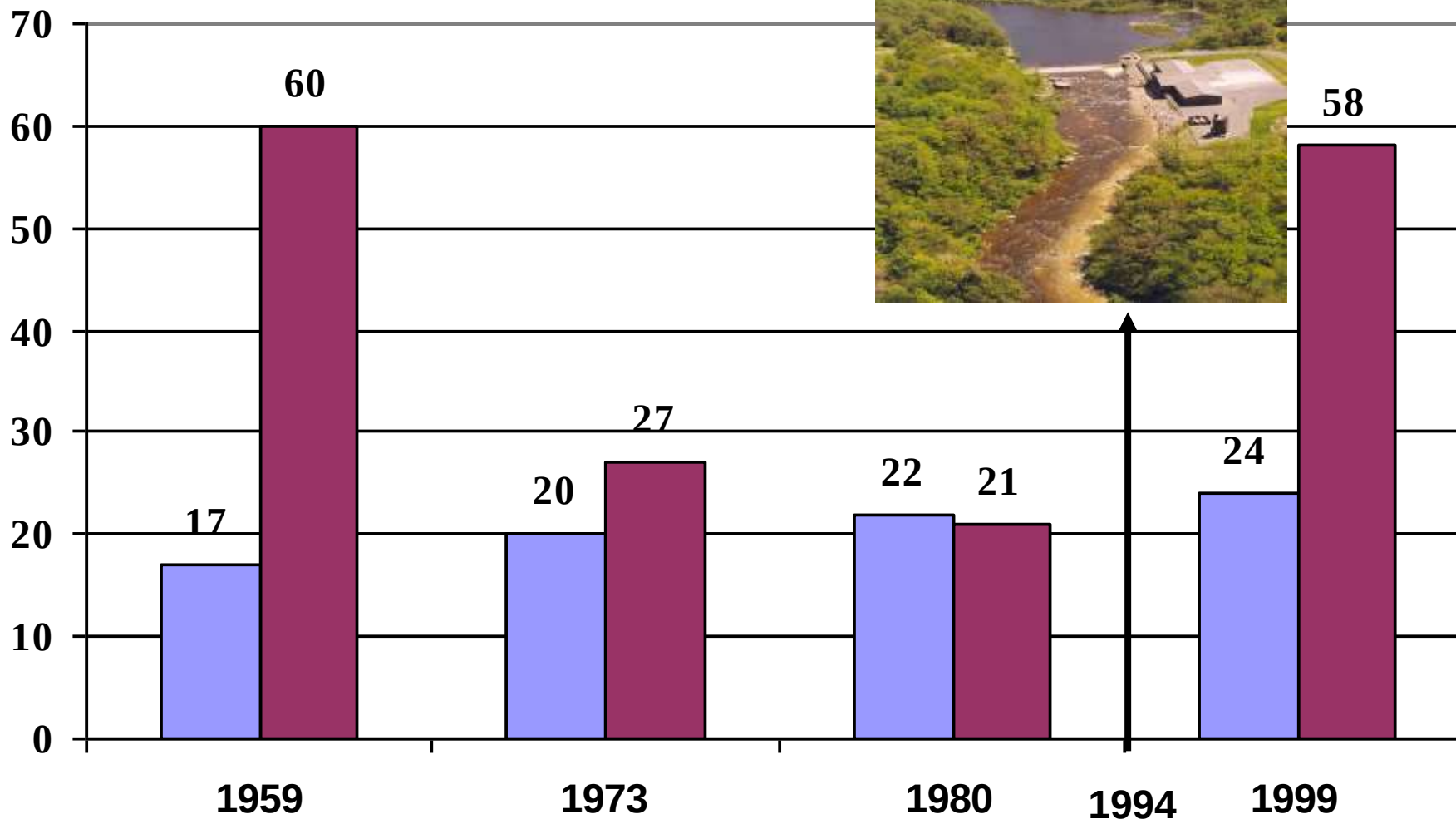


Cheat River Fish Surveys



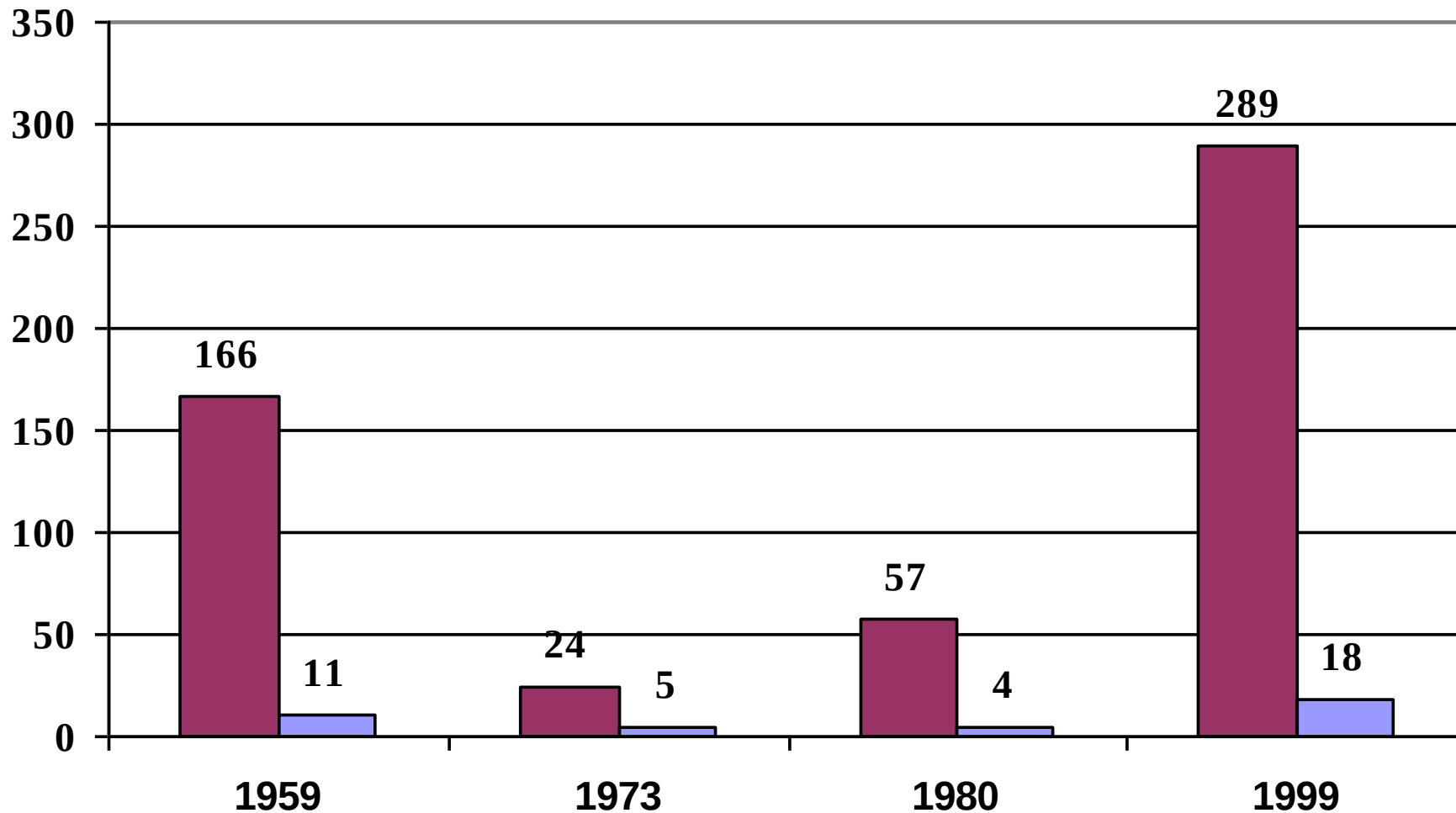
Upper Cheat River

■ No of Species ■ lbs of fish per acre



Upper Cheat River

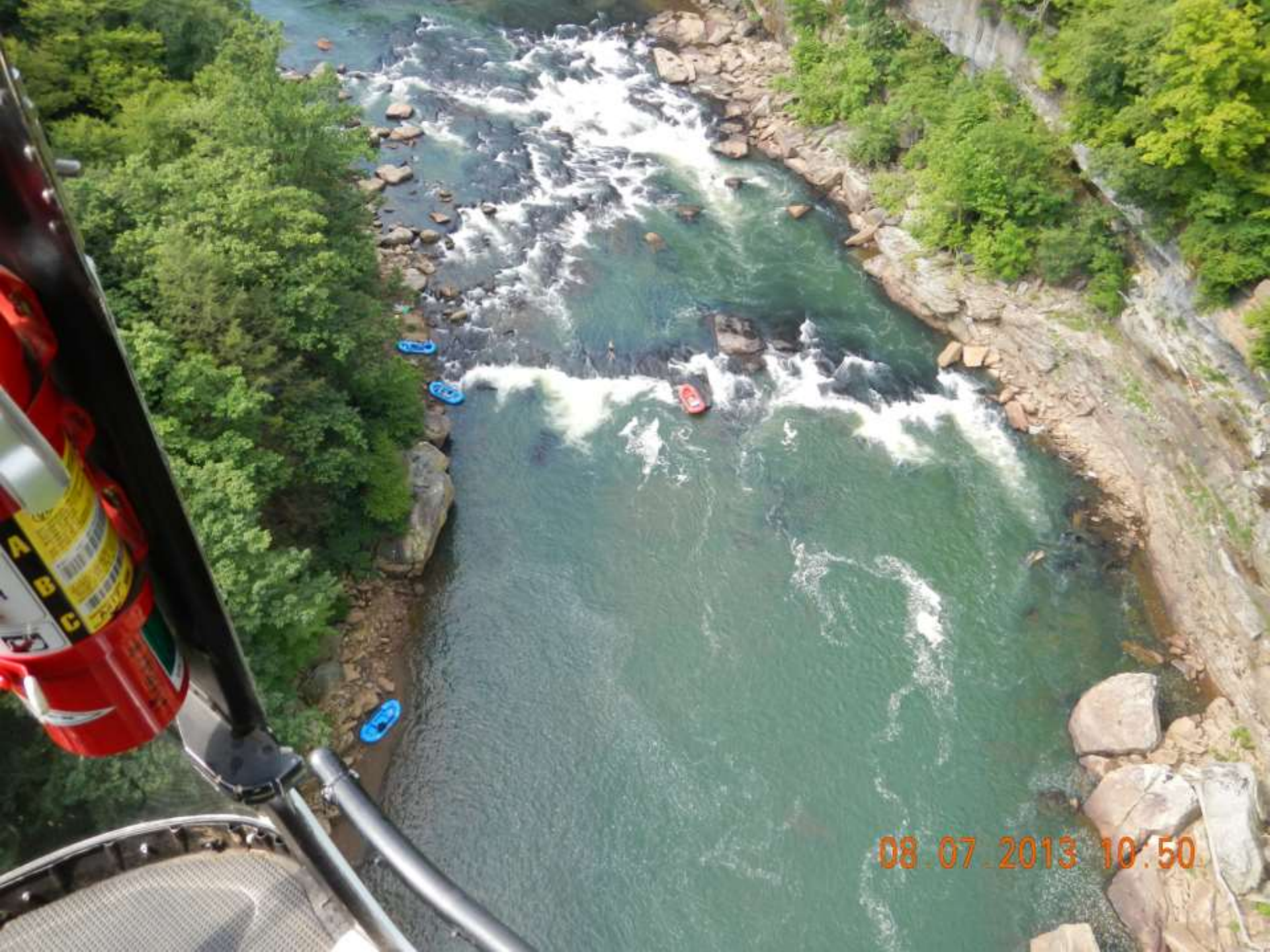
■ No. of Smallmouth Bass ■ lbs of Smallmouth Bass per acre





Lower Cheat
500 cfs

08.07.2013 11:00



08.07.2013 10:50

Lower Cheat River

All Species			Smallmouth Bass		
Year	Number Species	Number Individuals	Number Individuals	CPUE (fish/hour)	Size Range, inches
1997	1	1	0	0	-
2005	7	123	100	4	6 - 14

The best way to sample fish ?

Conclusions

1. Seasonal mean pH values did not approach threshold criteria of 6.0;
2. pH is lowest during periods of high flow, specifically during the winter season. **Could affect egg and fry development in April or May;**
3. Increase in both sport and forage fishes have occurred in Cheat Lake and Cheat River;
4. Cheat Lake has become a fishing destination for recreational and tournament anglers.

Take Home Message

The continuation of the Cheat Lake and Cheat River fisheries are dependent upon:

1. Maintenance of existing AMD remedial projects; and
2. Continual efforts to address sources of acid discharging from the multitude of remaining abandoned coal mines in the watershed.
3. **Must maintain future funding !!**

Muddy Creek—
still a problem !!!

August 2013

08.07.2013 11:08



Questions ?



Questions??



08.07.2013 10:53

Cheat Lake Fish Monitoring

1997 - 2008 Cheat Lake Electrofishing

