Addressing Aquatic Life and Recreational Impairments in the Guadalupe Basin

Total Maximum Daily Load Program
Strategic Assessment Division
Texas Commission on Environmental Quality

Project Timeline

1999
303(d) Listing of Waterbodies within Basin Groups D&E

↓

2000
Invitation for Bids (4 projects)

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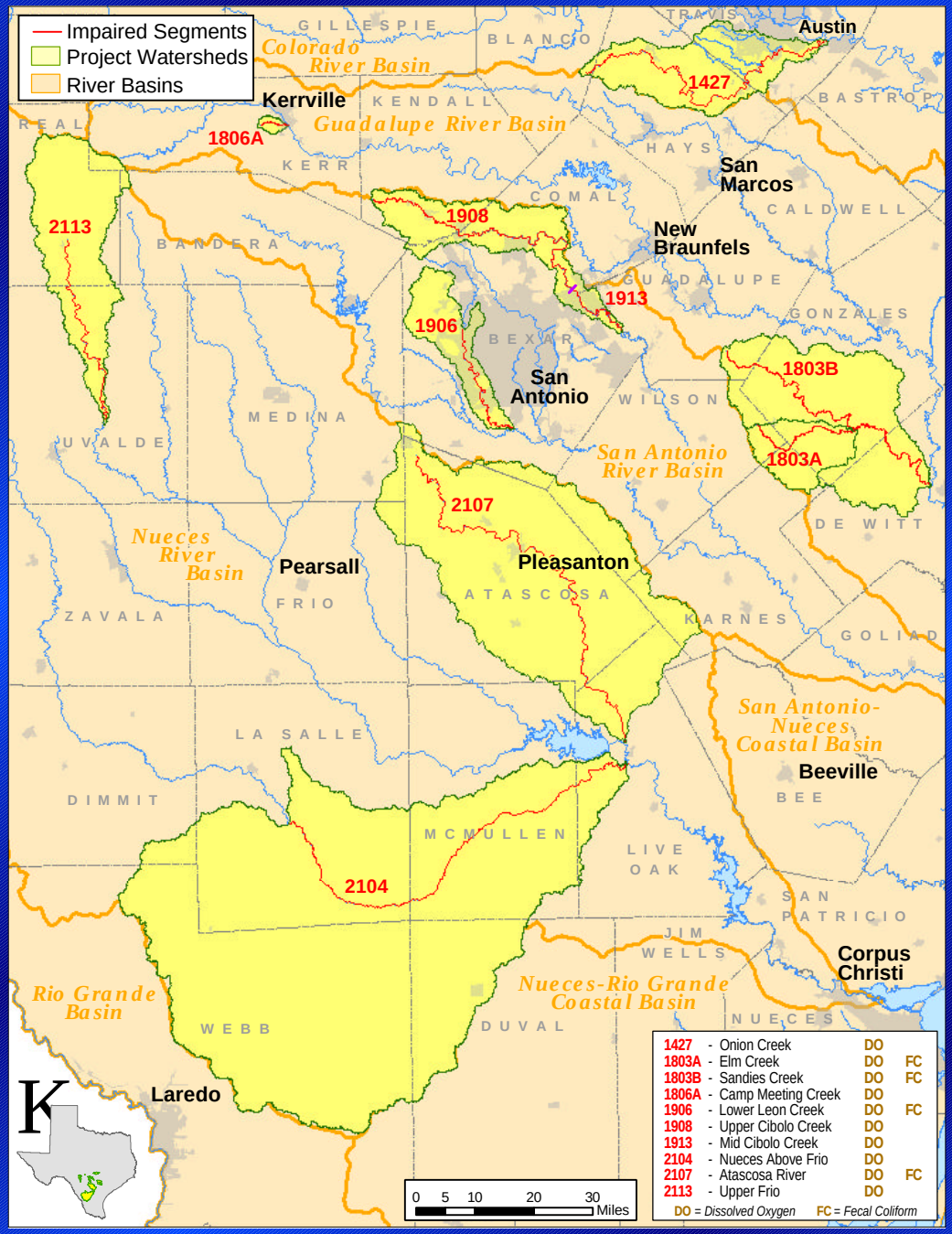
2001
Project Area 1 Awarded to Texas A&M Kingsville

↓

2002 - 2004
Impairment Verification Monitoring

South Central Texas Dissolved Oxygen and Bacteria Study



Water Quality Standards

Seg #	Segment Name	Aquatic Life Use	D.O. Criteria	FC Criteria Single Sample/ Geometric Mean	EC Criteria Single Sample/ Geometric Mean
1803A	Elm Creek	High	5.0 mg/L avg 3.0 mg/L min	400 cfu/100mL 200 cfu/100mL	394 cfu/100mL 126 cfu/100mL
1803B	Sandies Creek	High	5.0 mg/L avg 3.0 mg/L min	400 cfu/100mL 200 cfu/100mL	394 cfu/100mL 126 cfu/100mL
1806A	Camp Meeting Creek	High	5.0 mg/L avg 3.0 mg/L min	400 cfu/100mL 200 cfu/100mL	394 cfu/100mL 126 cfu/100mL
1815	Cypress Creek	Exceptional	6.0 mg/L avg 4.0 mg/L min	400 cfu/100mL 200 cfu/100mL	394 cfu/100mL 126 cfu/100mL

Identified Impairments

Seg #	Segment Name	Aquatic Life Use	Recreational Use
1803A	Elm Creek	✝	✝
1803B	Sandies Creek	✝	✝
1806A	Camp Meeting Creek	✝	
1815	Cypress Creek	✝	

Impairment Verification Monitoring

August 2002-August 2005

Field Parameters

Chemical Parameters

Biological Parameters

24-Hour Dissolved Oxygen
Temperature
Conductivity
pH
Flow

Impairment Verification Monitoring

August 2002-August 2005

Field Parameters

Chemical Parameters

Biological Parameters

Alkalinity
TSS
Sulfate
Chloride
Chlorophyll a
CBOD
Fecal coliform\E. coli

Impairment Verification Monitoring

August 2002-August 2005

Field Parameters

Chemical Parameters

Biological Parameters

- Nekton Assessments
- Benthic Assessments
- Habitat Assessments

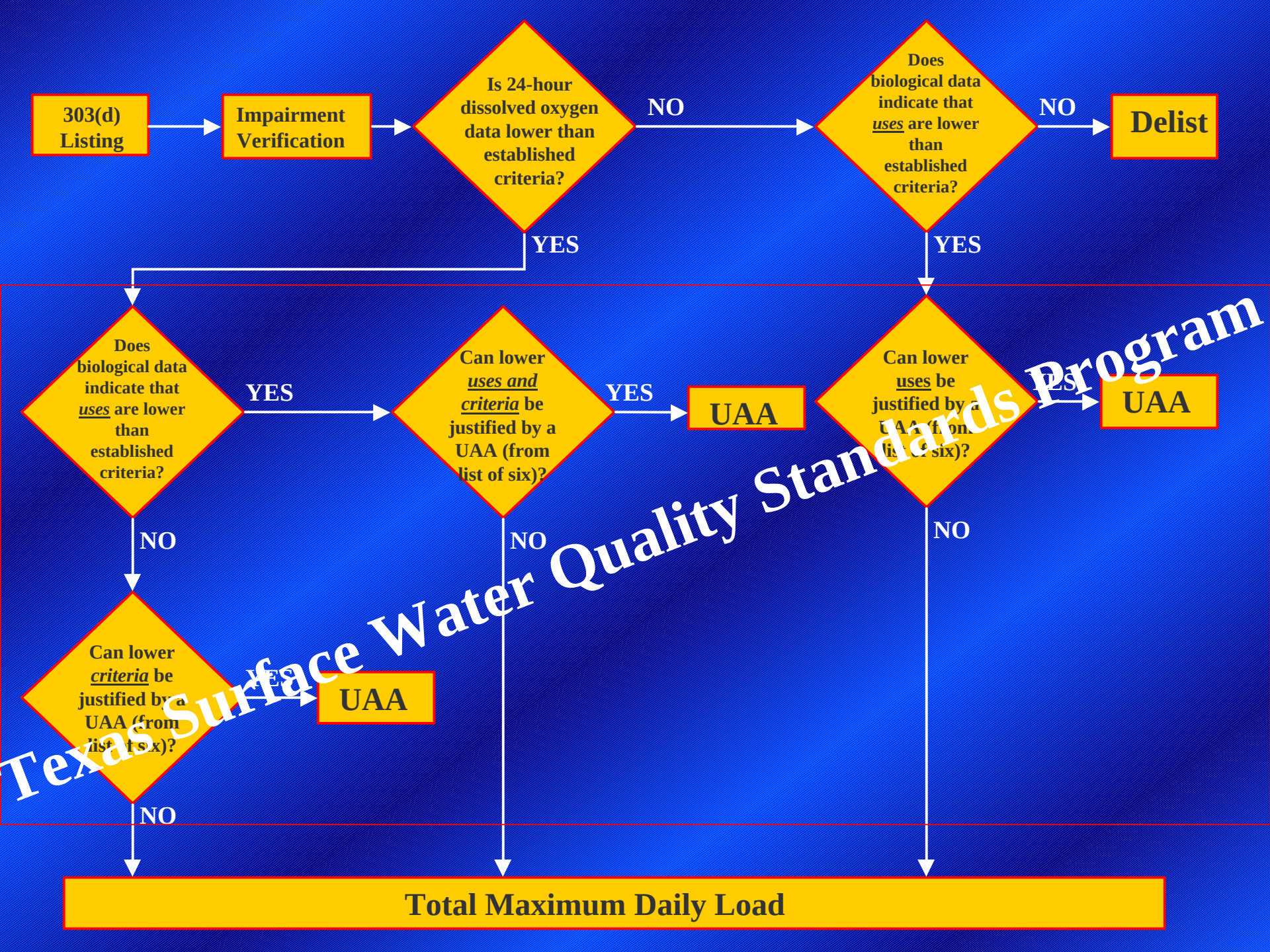
Impairment Verification Monitoring

Results

Three potential outcomes:

- Delisting
- Use Attainability Analysis
- Total Maximum Daily Load (TMDL)

Texas Surface Water Quality Standards Program



Use Attainability Analysis (UAA)

Is a multifaceted assessment of environmental and economic factors that affect the attainment of a use (in this case aquatic life use) for a specific body of water.

This assessment identifies and defines existing and current uses to determine whether state designated uses are appropriate. The process analyzes potential uses by examining physical, chemical, and biological characteristics of the body of water.

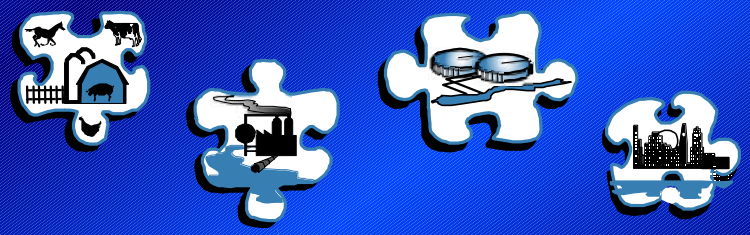
Use Attainability Analysis (UAA)

Justification for use\criteria adjustment

(1) Naturally-occurring pollutant concentrations prevent the attainment of the use
(2) Naturally-occurring low flow conditions
(3) Human influences which cannot be corrected
(4) Hydrologic modifications which cannot be reversed
(5) Physical conditions related to the natural features of the water body
(6) Restoring uses would result in substantial and widespread economic and social impact

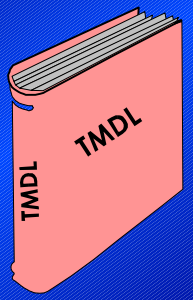
What Is a TMDL?

- A total maximum daily load (TMDL) is a scientific model that:
  - determines the maximum amount (or load) of a particular pollutant that a water body can receive and attain and maintain its standards
  - allocates this allowable load to point and nonpoint sources of pollution in the watershed



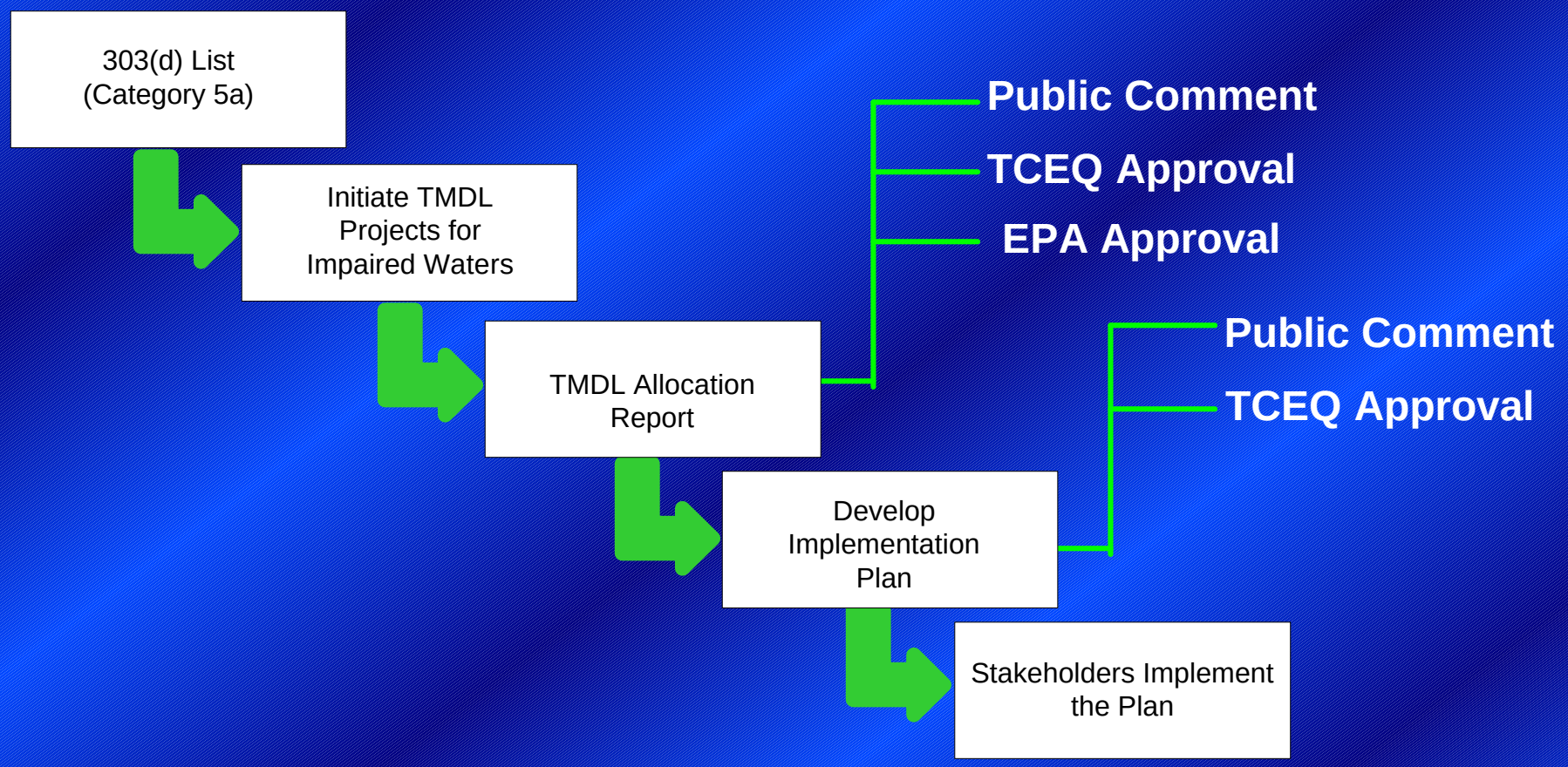
A TMDL Is Also A. . .

- **Technical term:** the amount of pollution a water body can receive and still meet standards for its use (a load allocation).
- **Technical document:** submitted to EPA for approval. Includes identification of pollutant, sources, and allocation of load to point and nonpoint sources



- **Process:** for restoring water quality

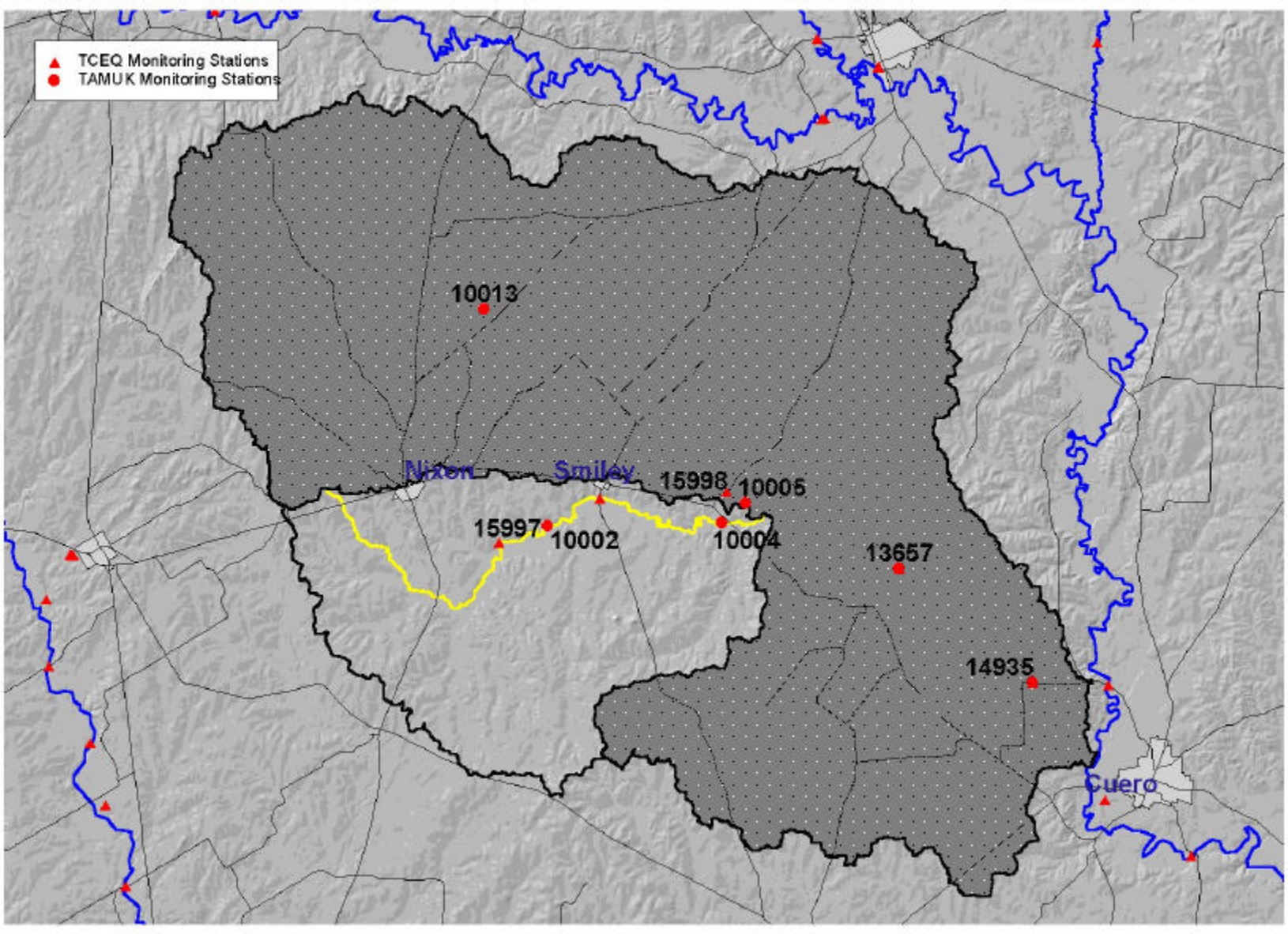
TMDL Development Process



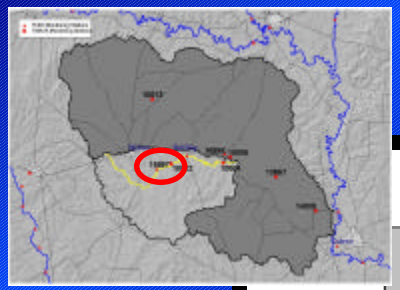
Data Analyses

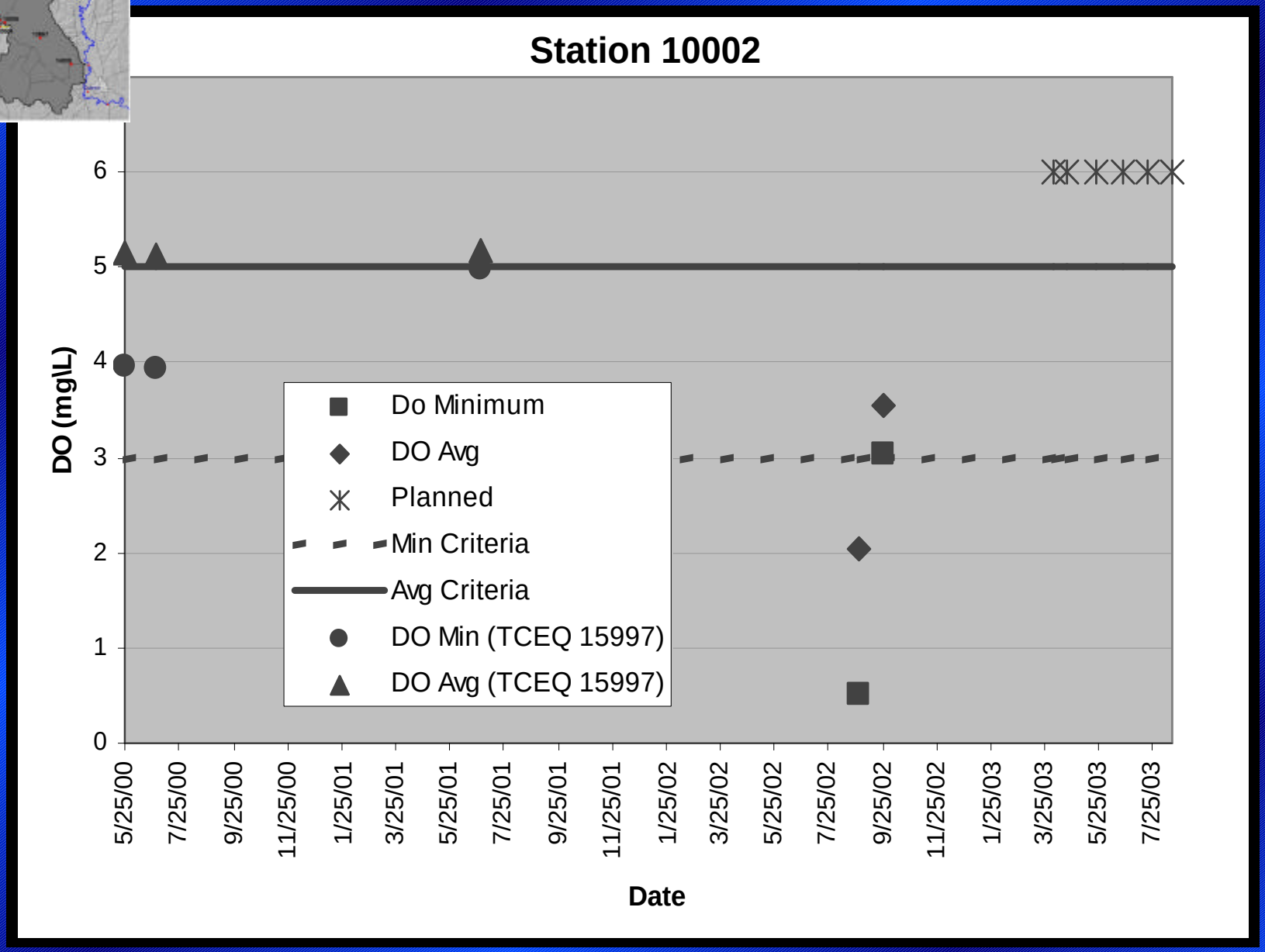
August-October 2002

Segment 1803A – Elm Creek



1803A Elm Creek – Dissolved Oxygen





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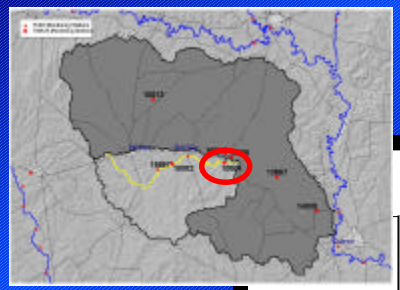
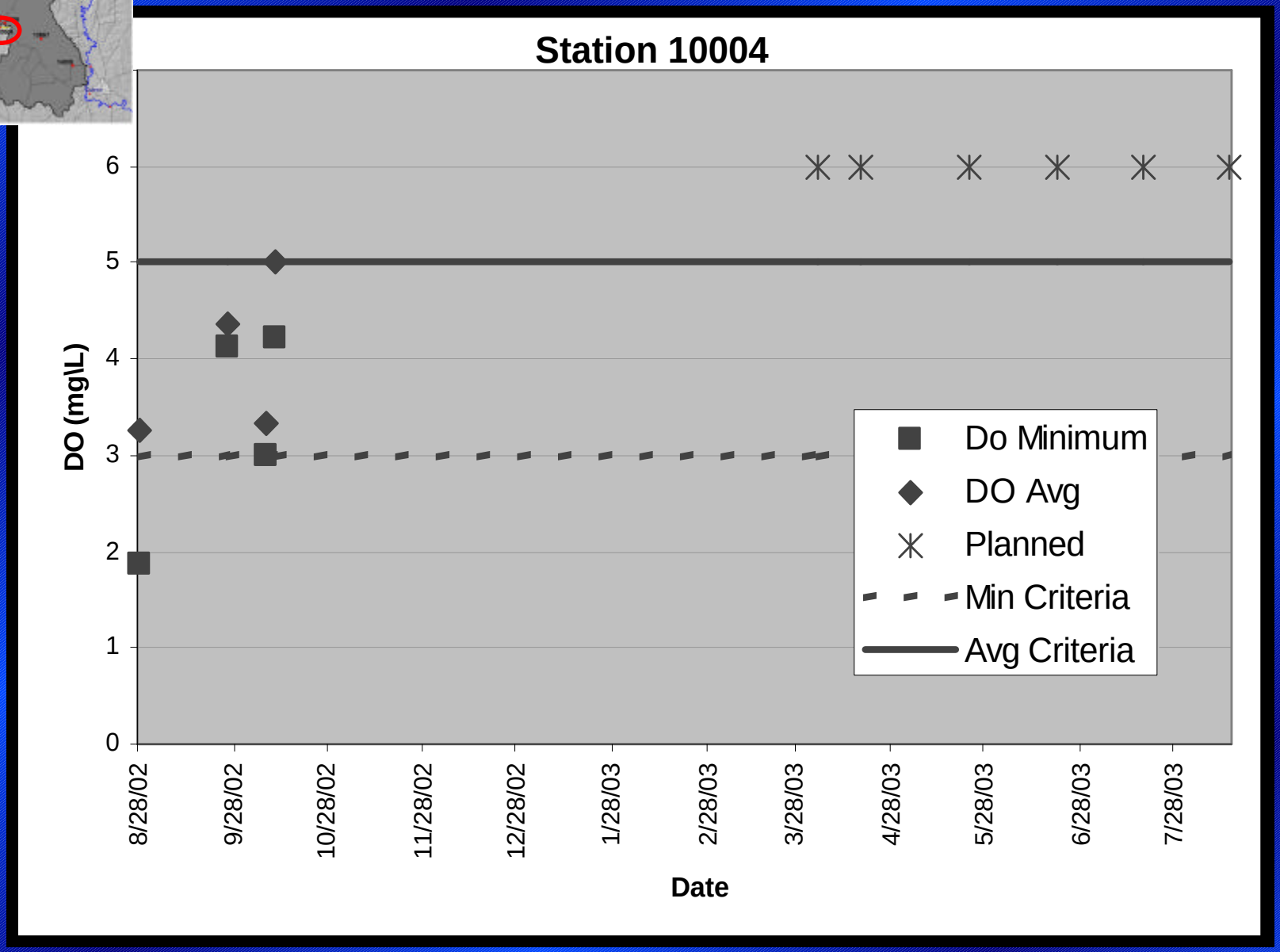
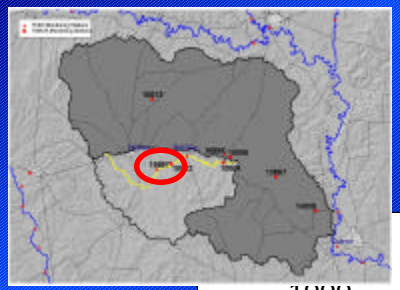
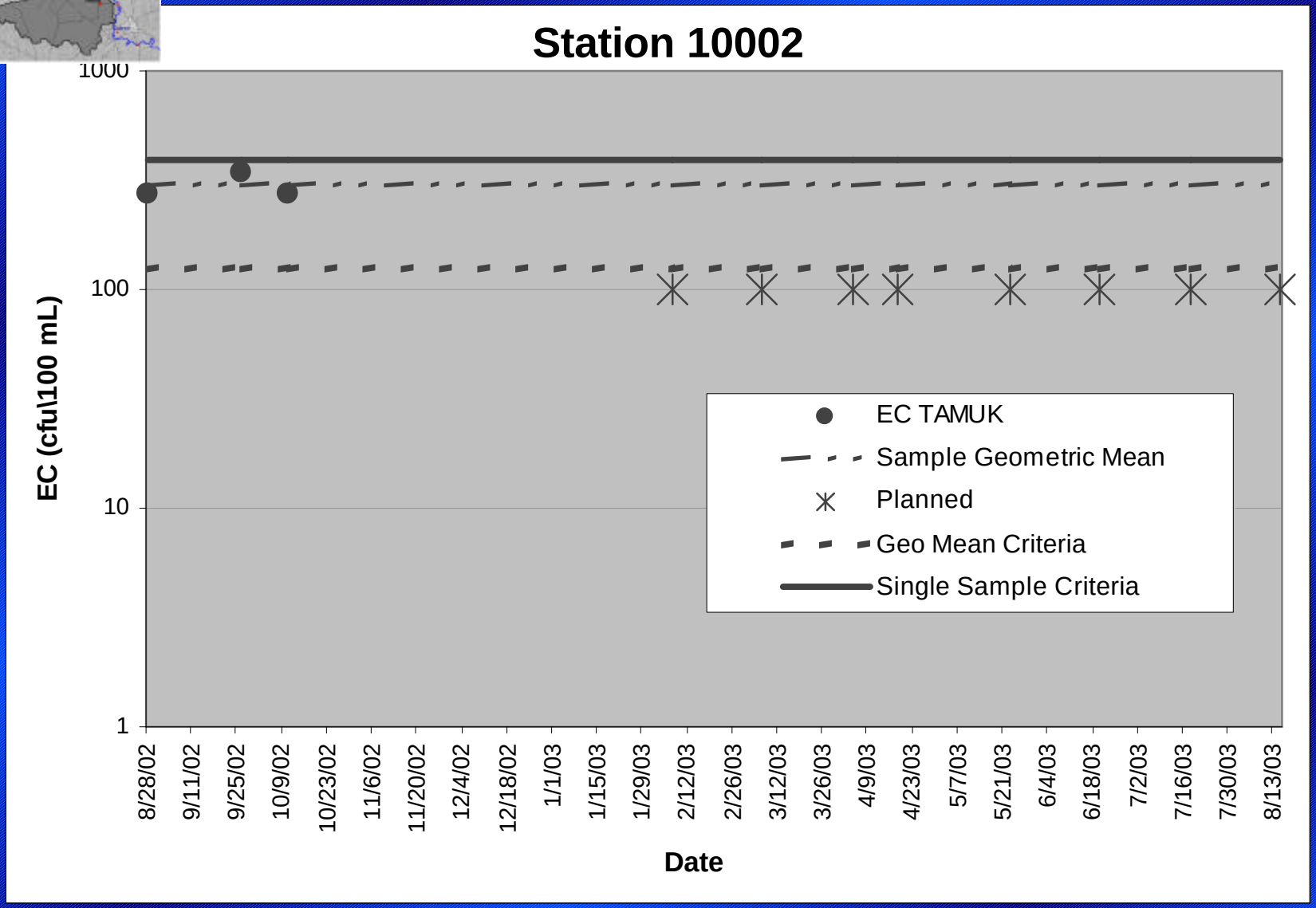




1803A Elm Creek – Bacteria





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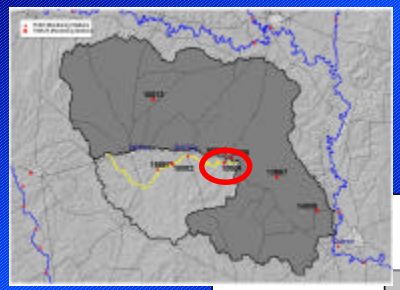
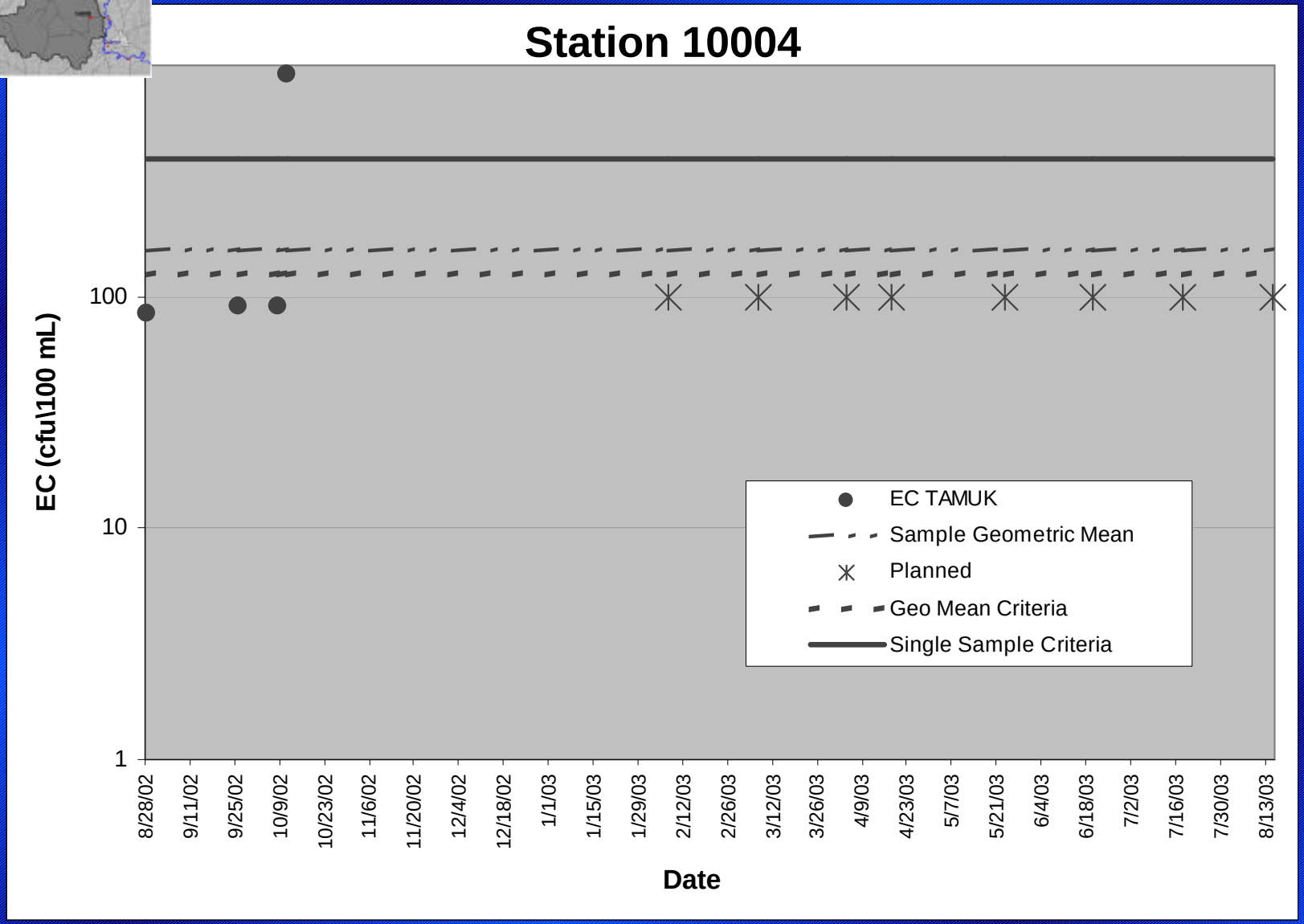
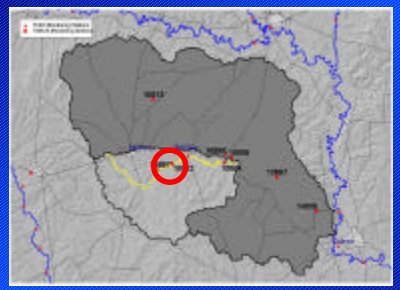


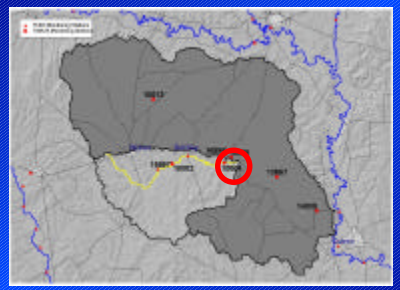


1803A Elm Creek – Biological



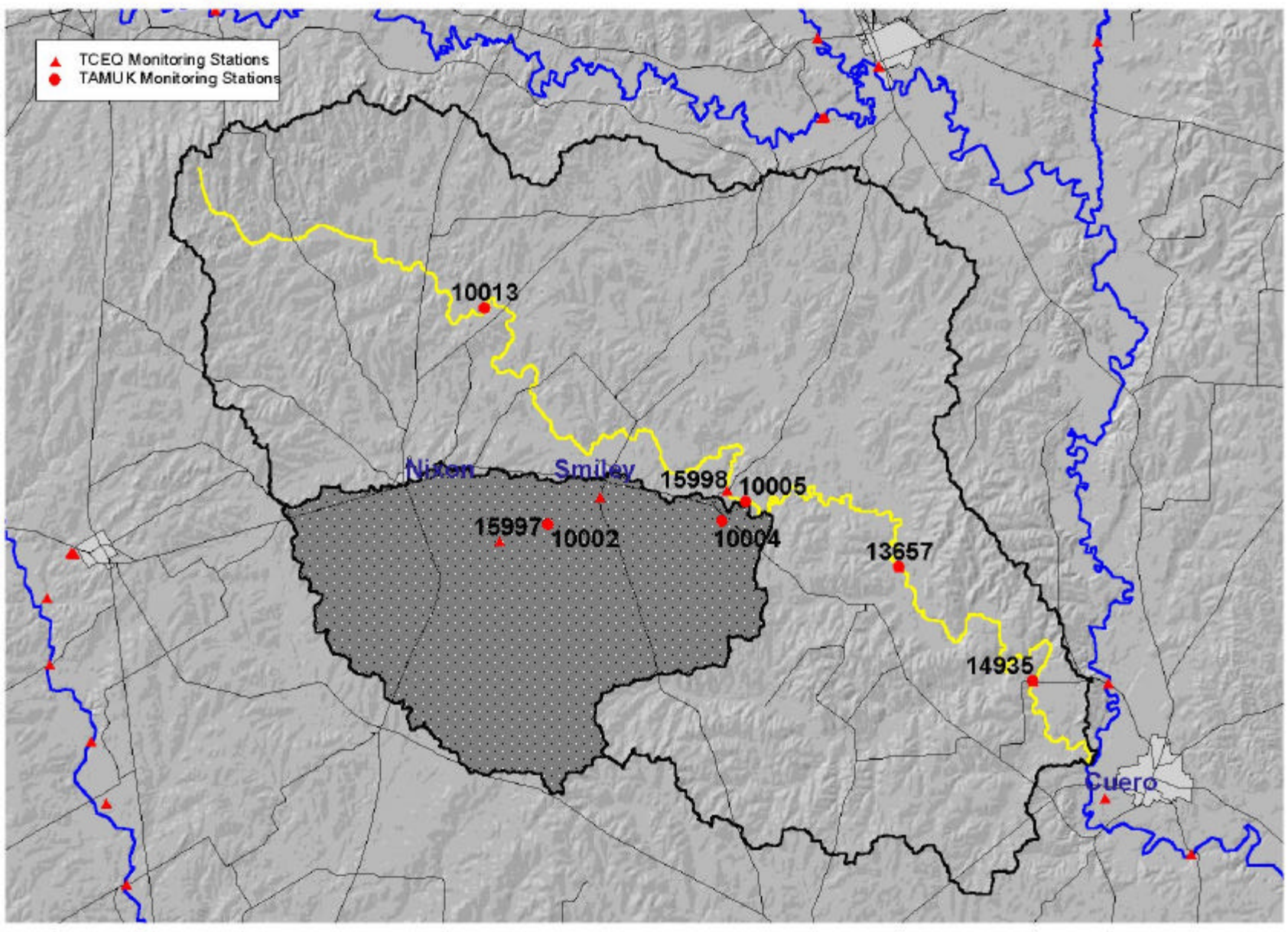
		Nekton	Benthic	Habitat
10002	August	High	Intermediate	Intermediate
	September	Limited/ Intermediate	Intermediate	Intermediate

1803A Elm Creek – Biological

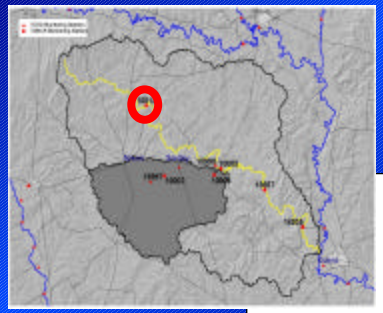


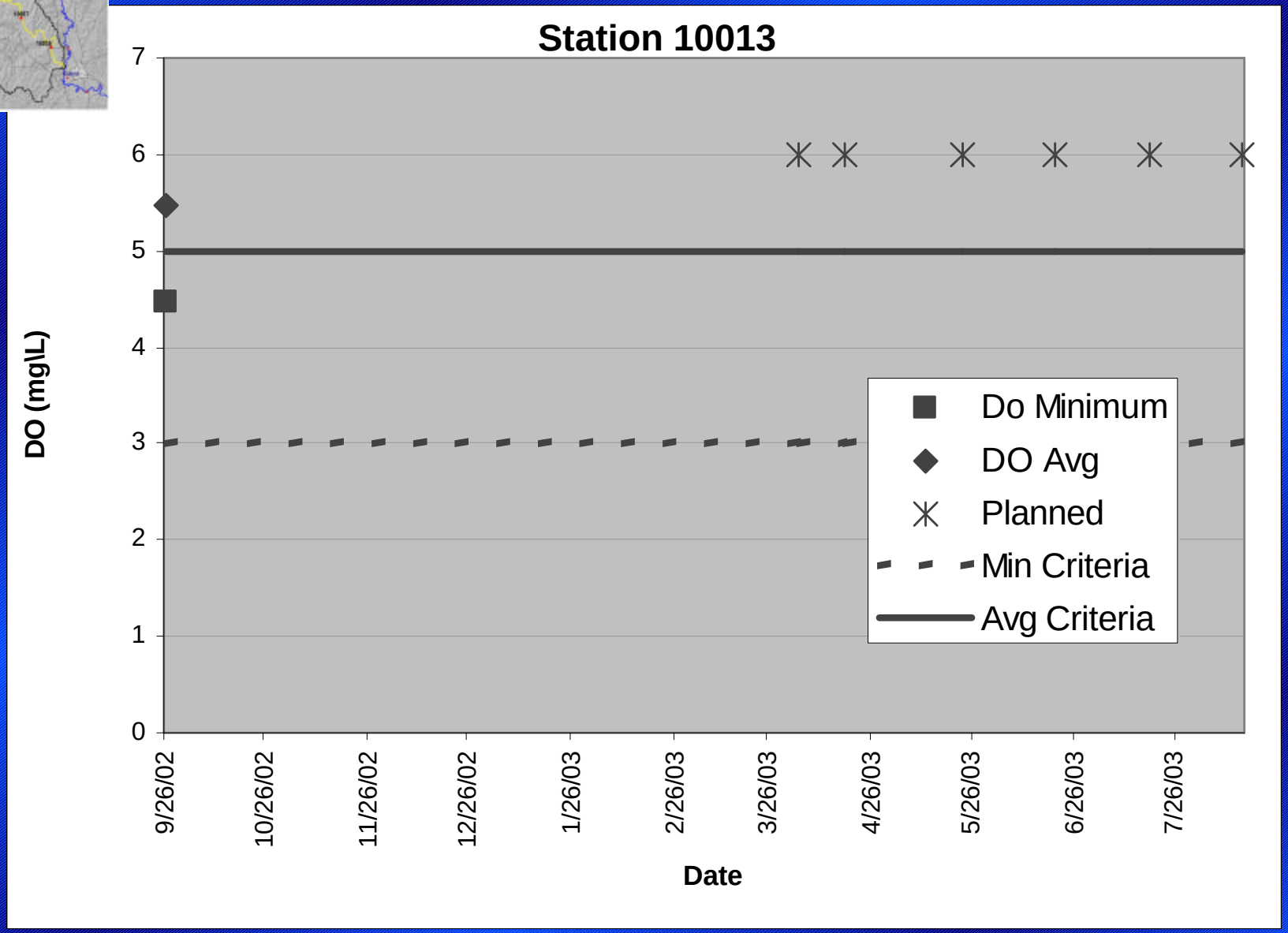
		Nekton	Benthic	Habitat
10002	August	High	Intermediate	Intermediate
	September	Limited/ Intermediate	Intermediate	Intermediate
10004	August	High	High	Intermediate
	September	High	High	Intermediate

Segment 1803B – Sandies Creek



1803B Sandies Creek – Dissolved Oxygen





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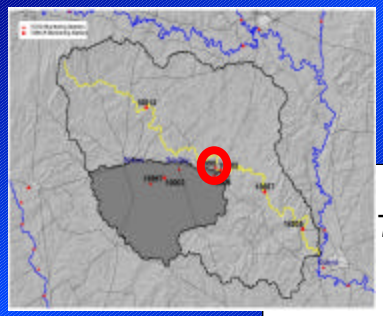

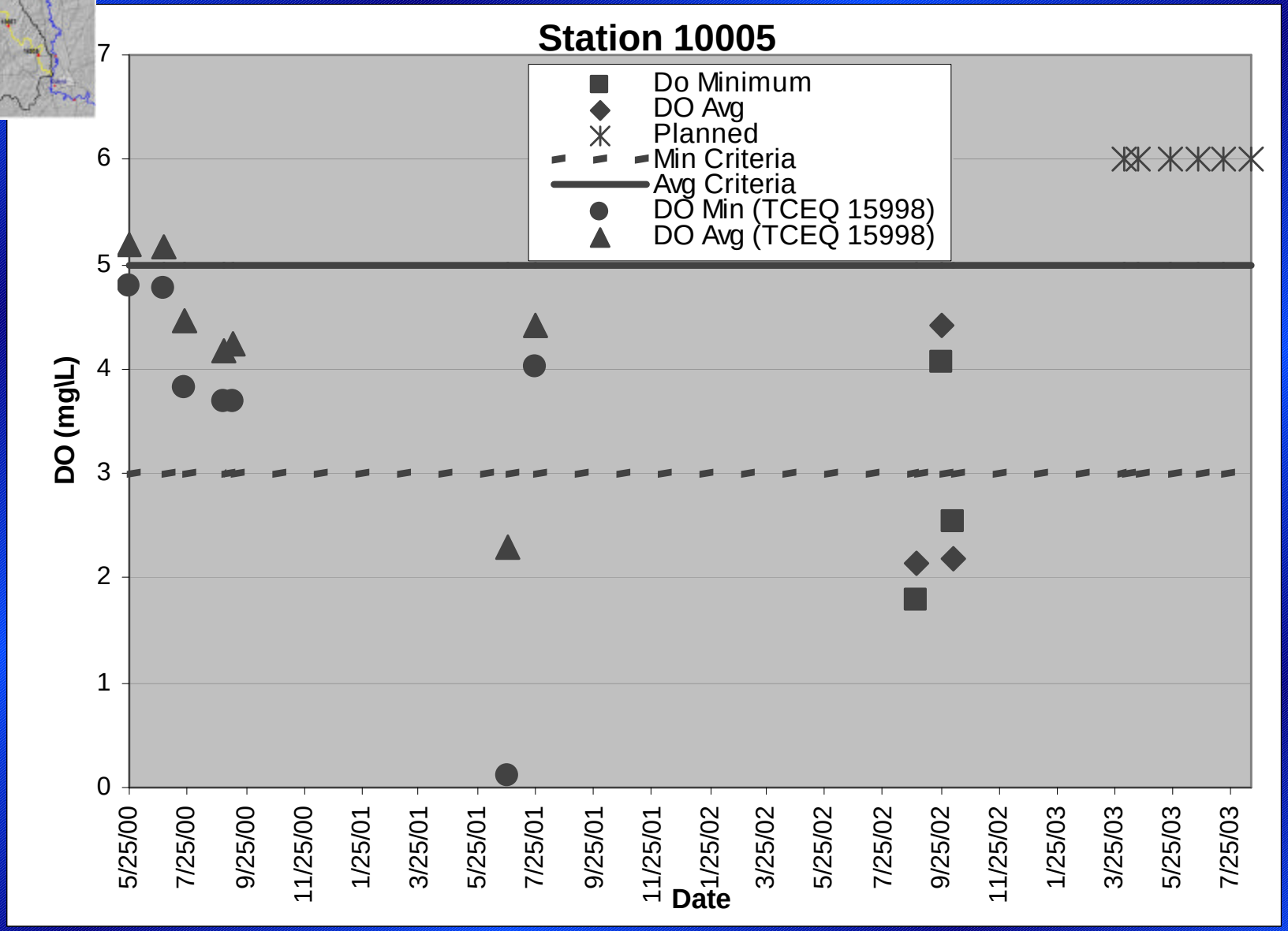

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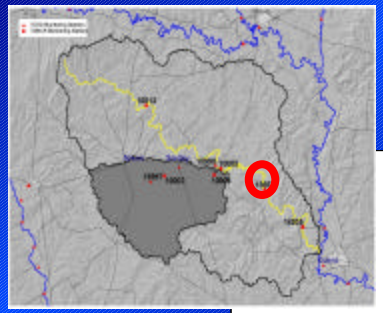

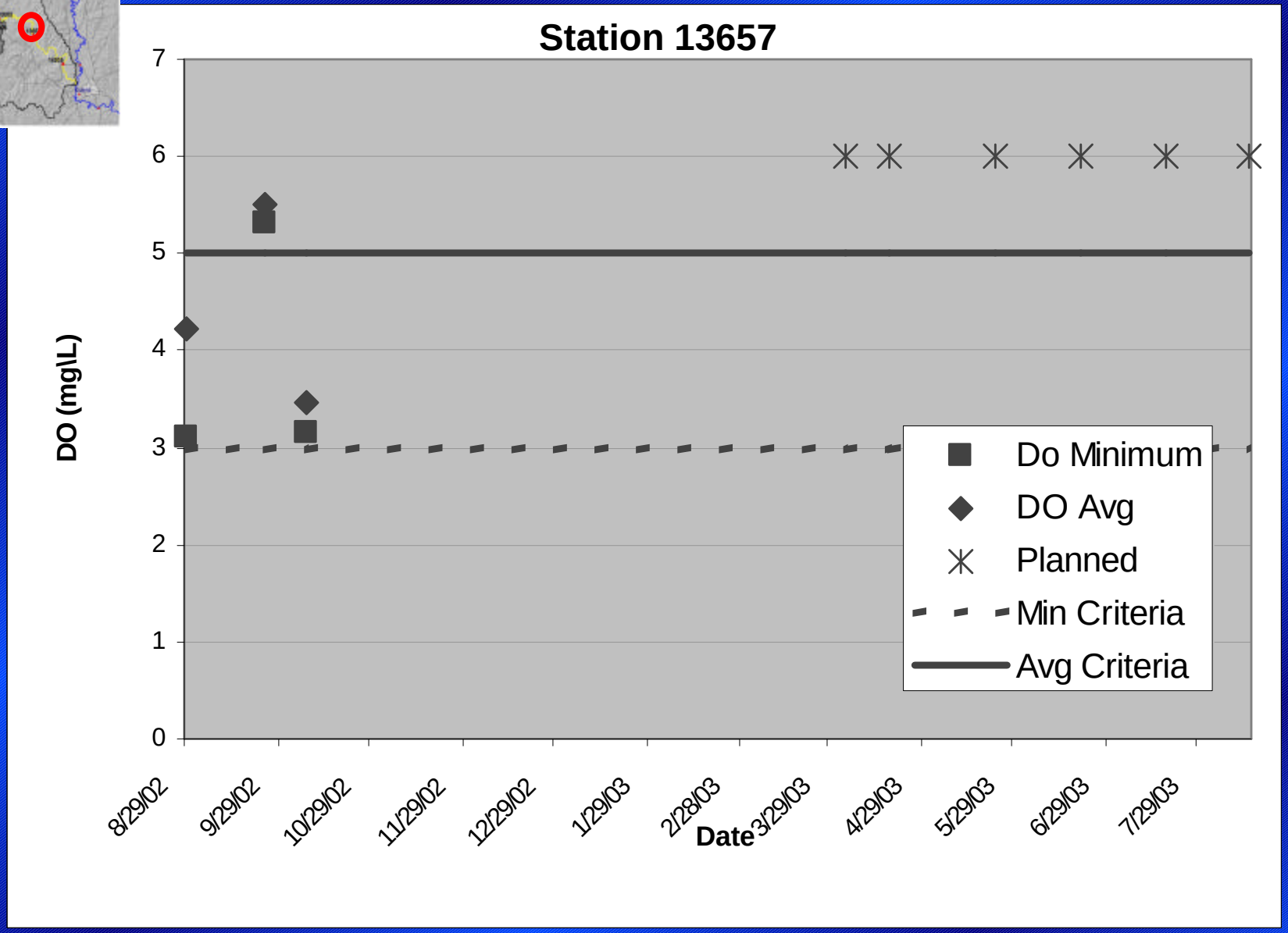

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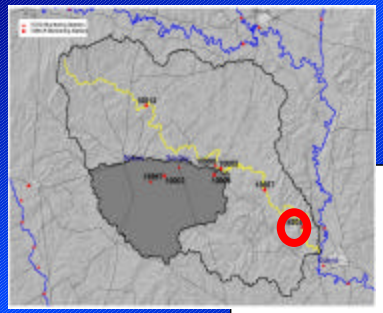
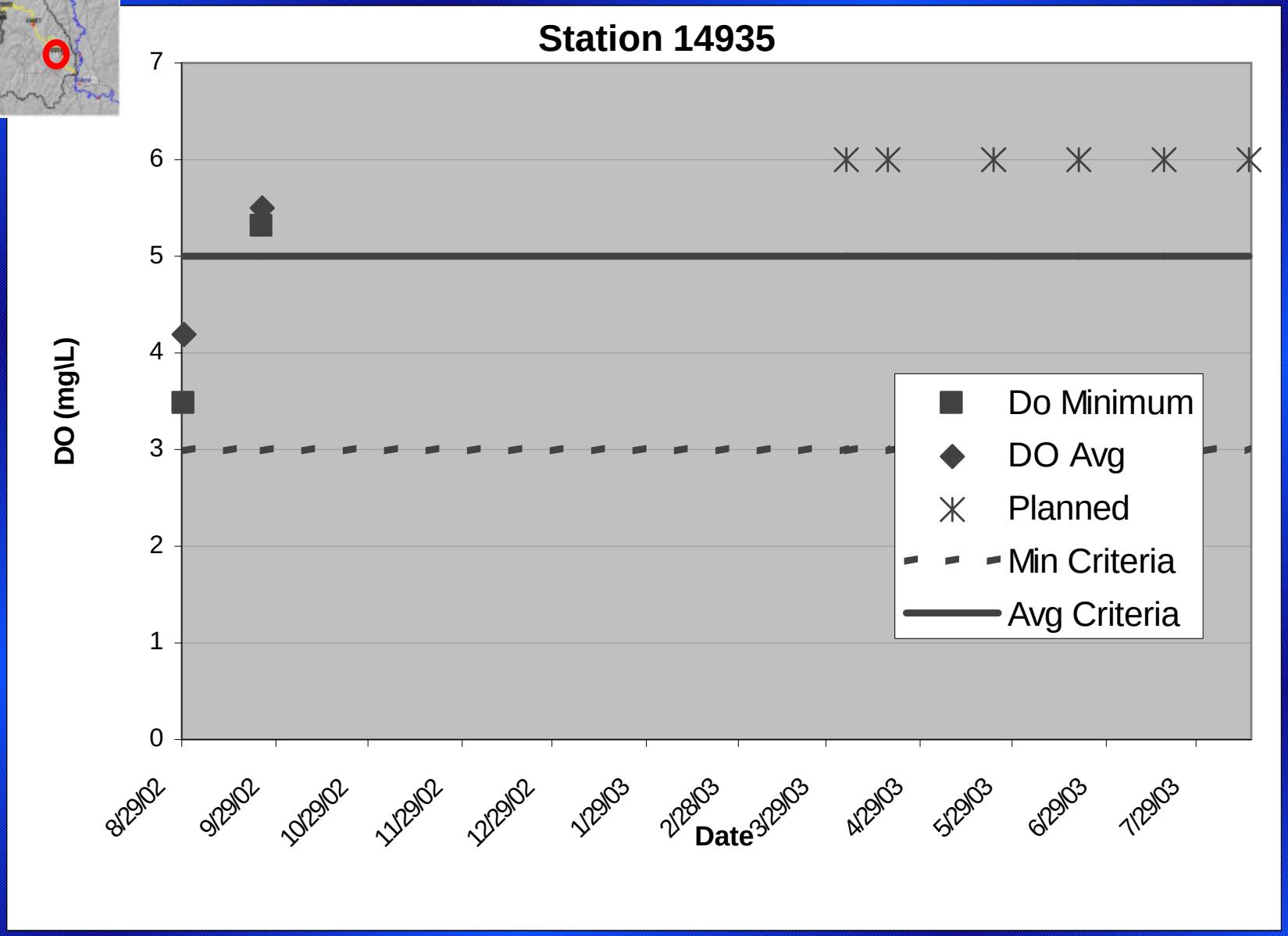
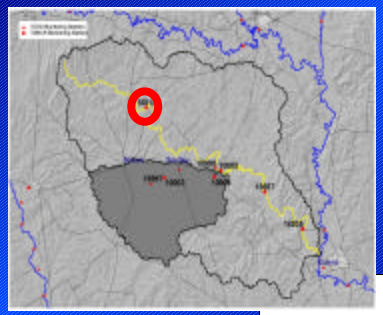
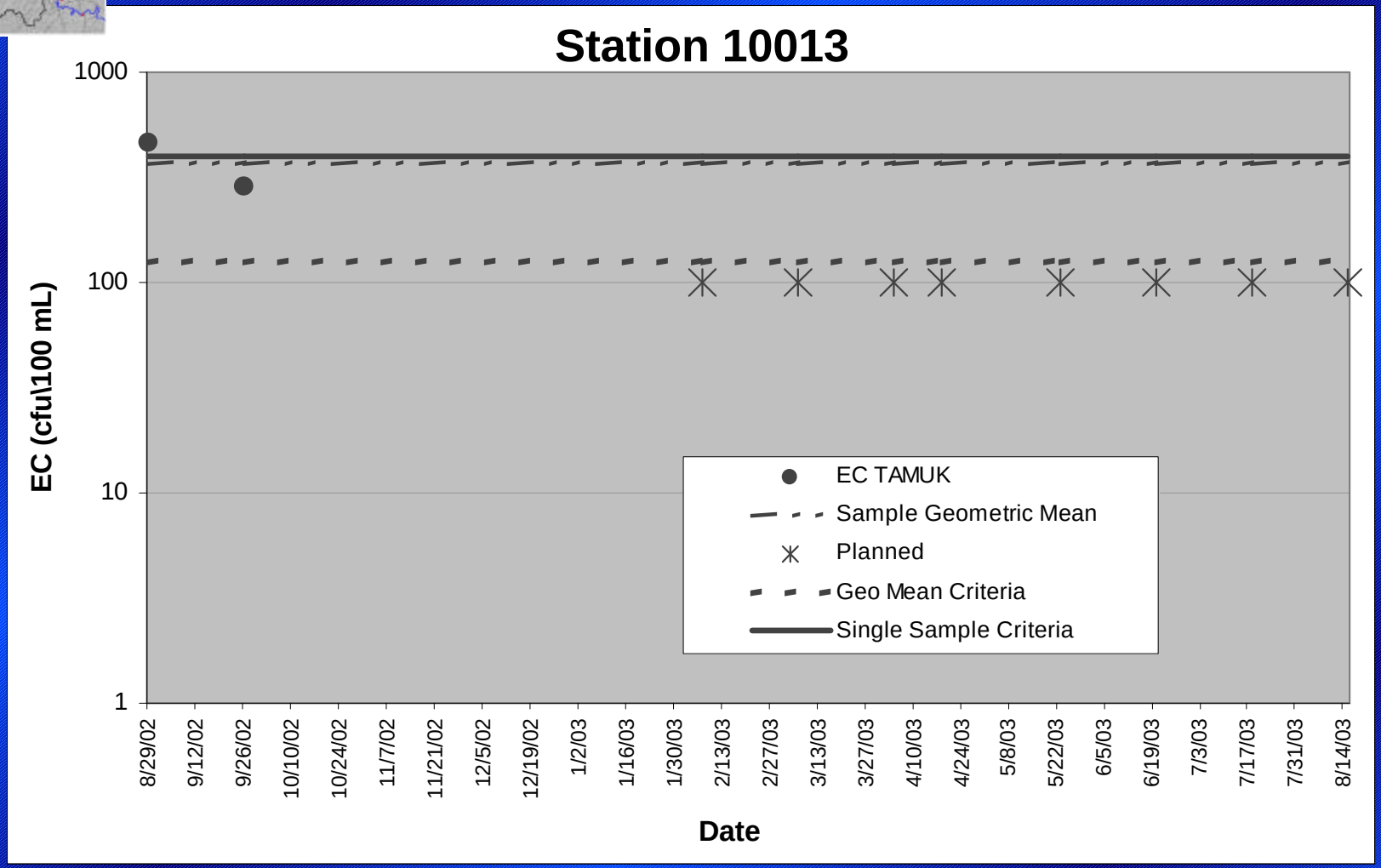


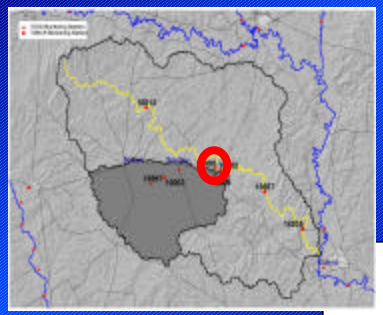


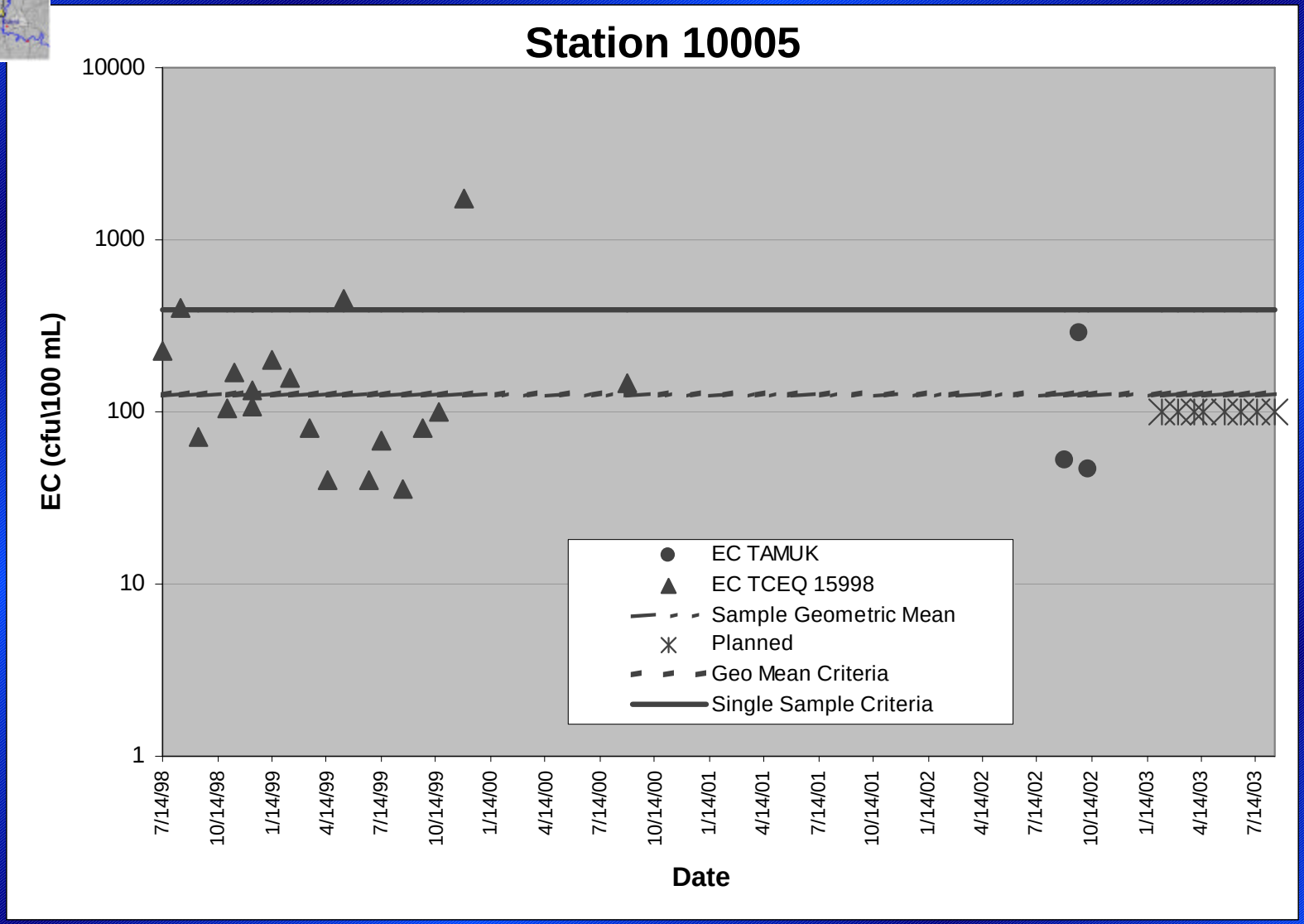
1803B Sandies Creek – Bacteria



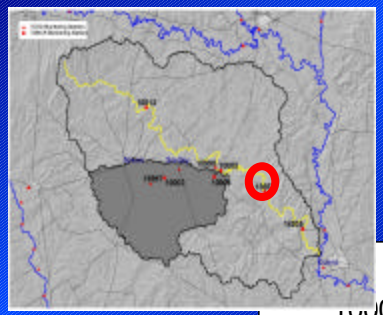


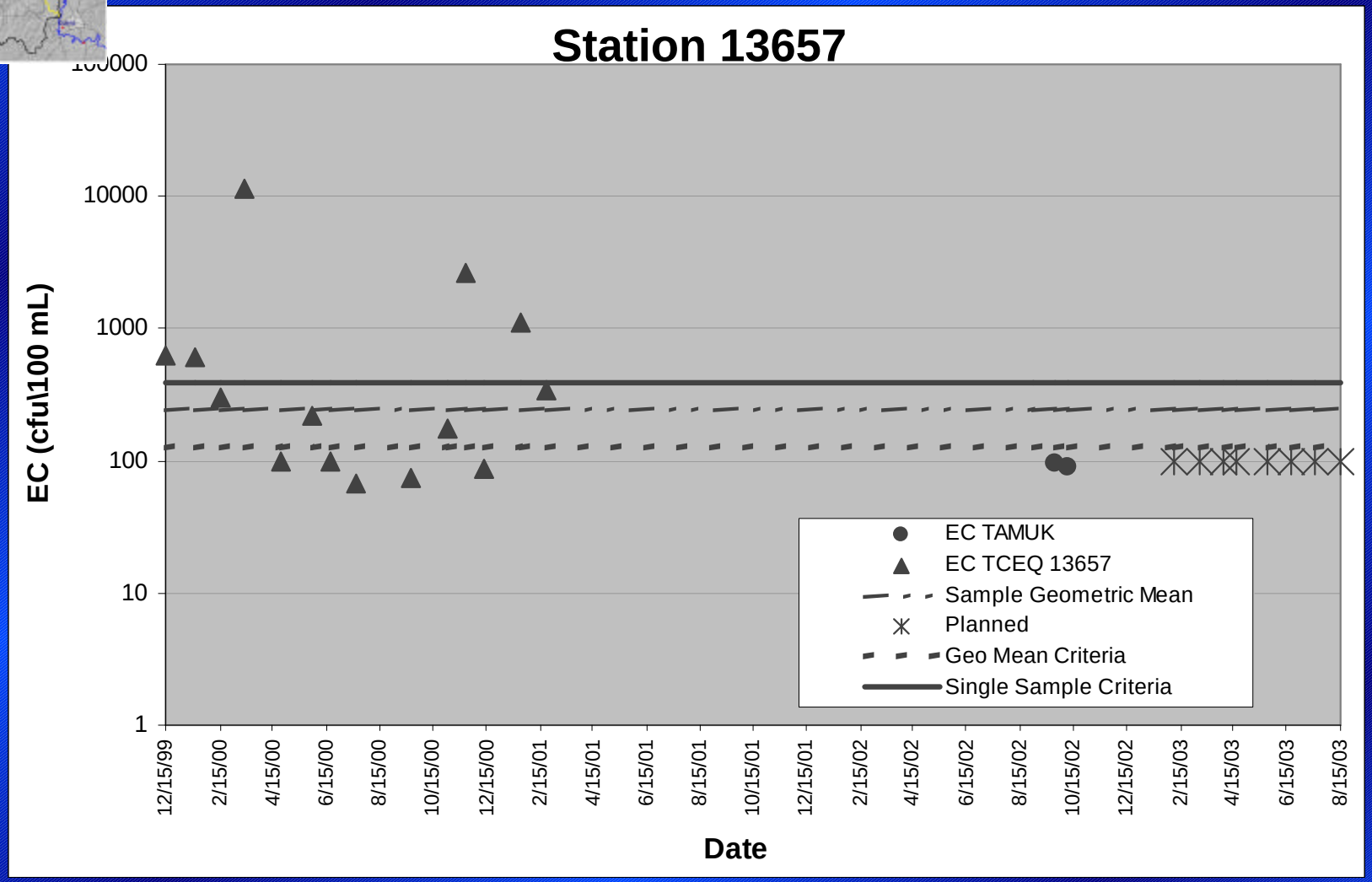
1803B Sandies Creek – Bacteria



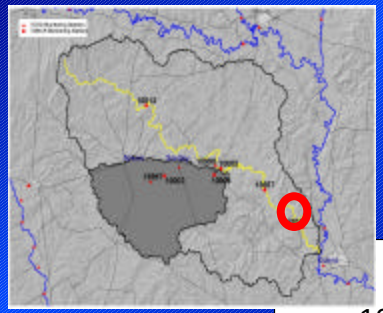


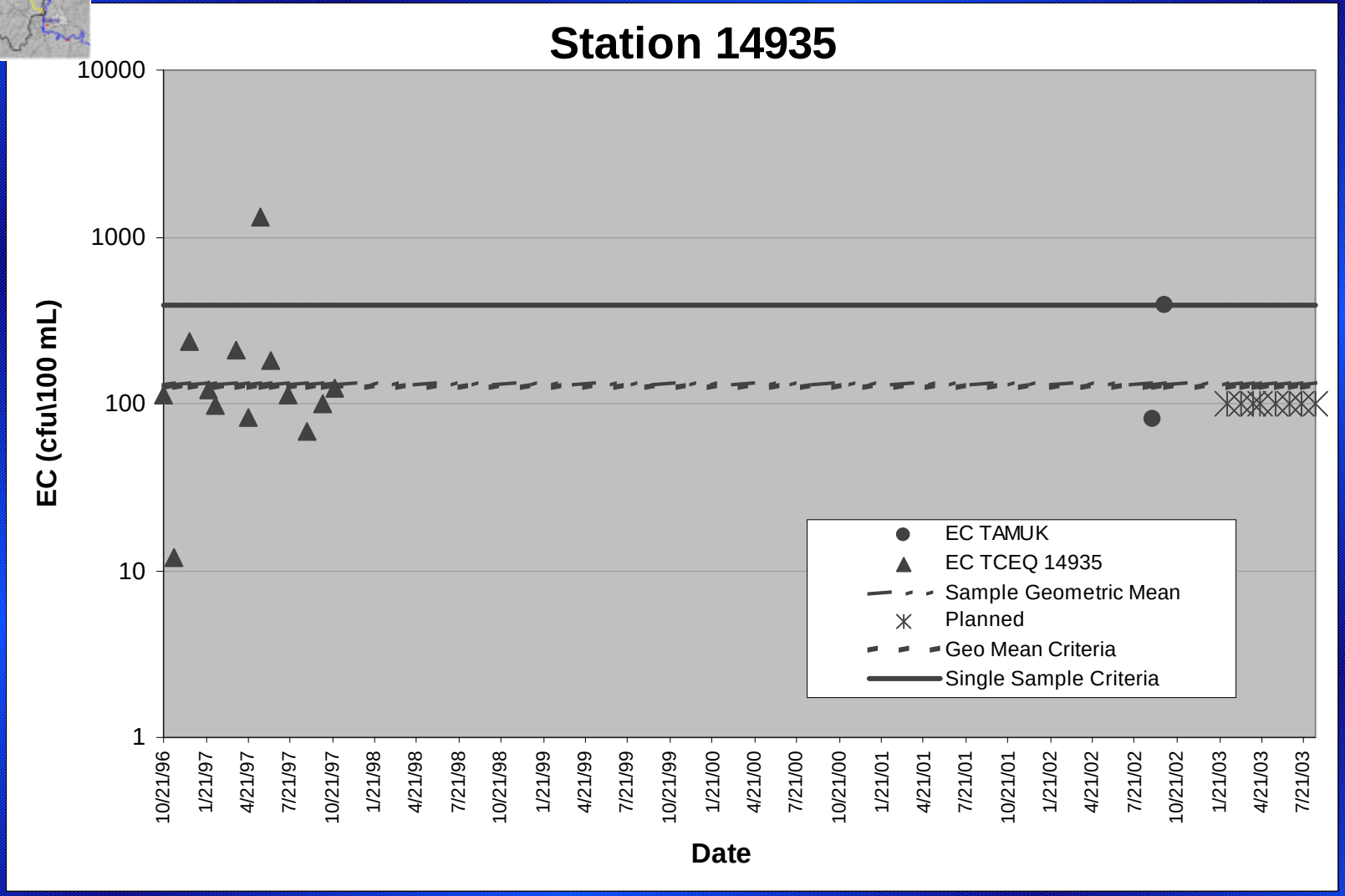
1803B Sandies Creek – Bacteria



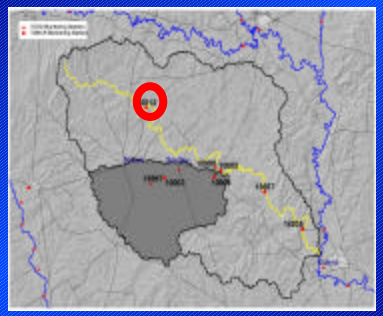


1803B Sandies Creek – Bacteria



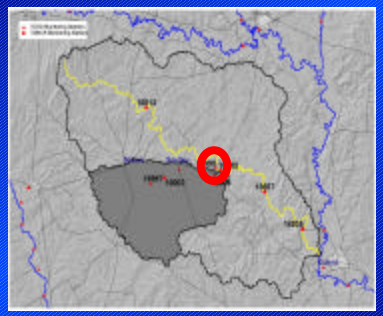


1803B Sandies Creek – Biological



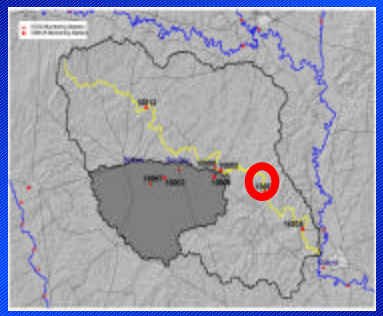
		Nekton	Benthic	Habitat
10013	August	High	High	Intermediate
	September	Intermediate	Intermediate	Intermediate

1803B Sandies Creek – Biological



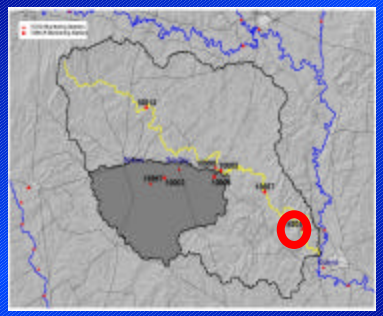
		Nekton	Benthic	Habitat
10013	August	High	High	Intermediate
	September	Intermediate	Intermediate	Intermediate
10005	August	Limited	High	Intermediate
	September	Limited	High	Intermediate

1803B Sandies Creek – Biological



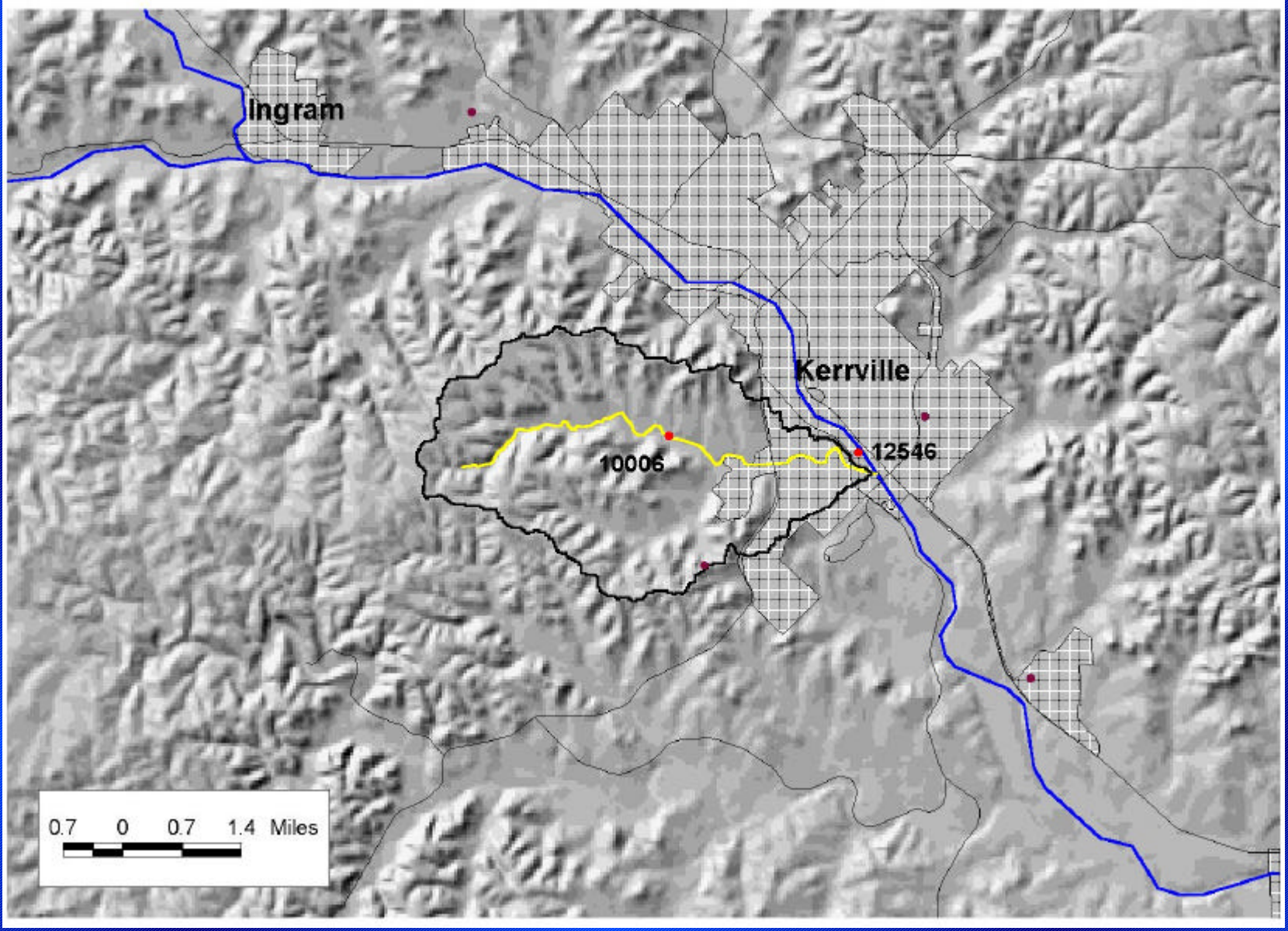
		Nekton	Benthic	Habitat
10013	August	High	High	Intermediate
	September	Intermediate	Intermediate	Intermediate
10005	August	Limited	High	Intermediate
	September	Limited	High	Intermediate
13657	August	Intermediate	Intermediate	Intermediate
	September	Intermediate	High	Intermediate

1803B Sandies Creek – Biological

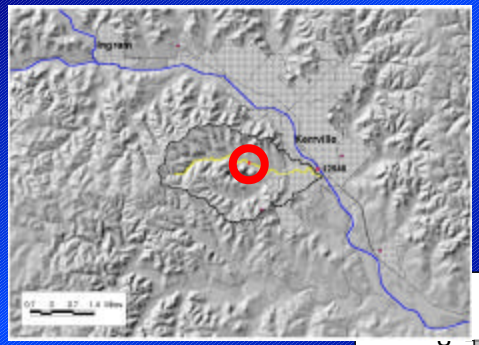


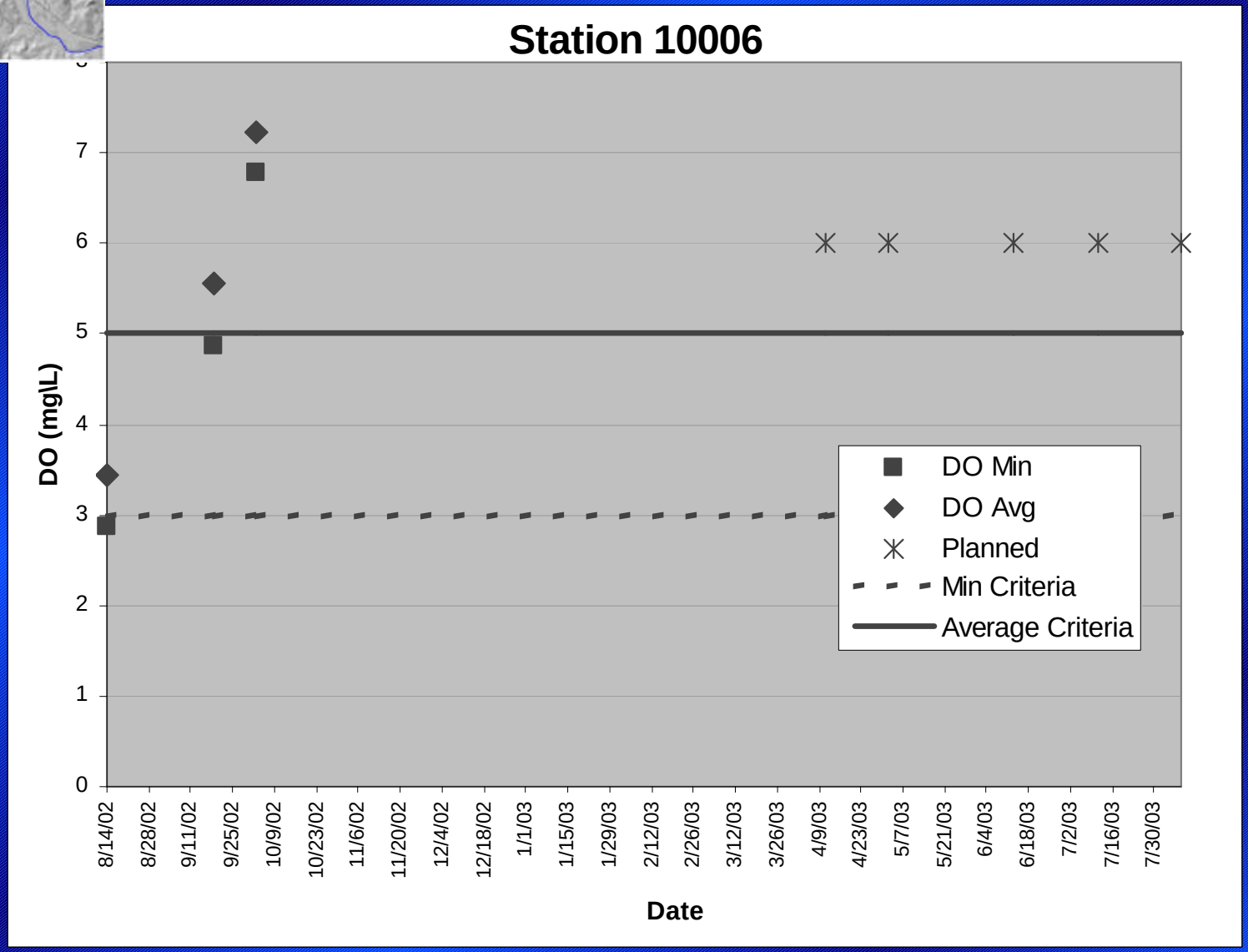
		Nekton	Benthic	Habitat
10013	August	High	High	Intermediate
	September	Intermediate	Intermediate	Intermediate
10005	August	Limited	High	Intermediate
	September	Limited	High	Intermediate
13657	August	Intermediate	Intermediate	Intermediate
	September	Intermediate	High	Intermediate
14935	August	Limited	High	Intermediate
	September	High	Intermediate	Intermediate

Segment 1806A – Camp Meeting Creek

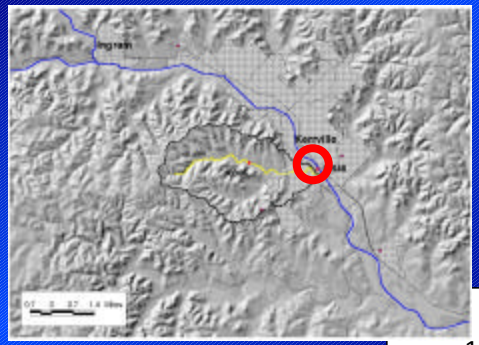


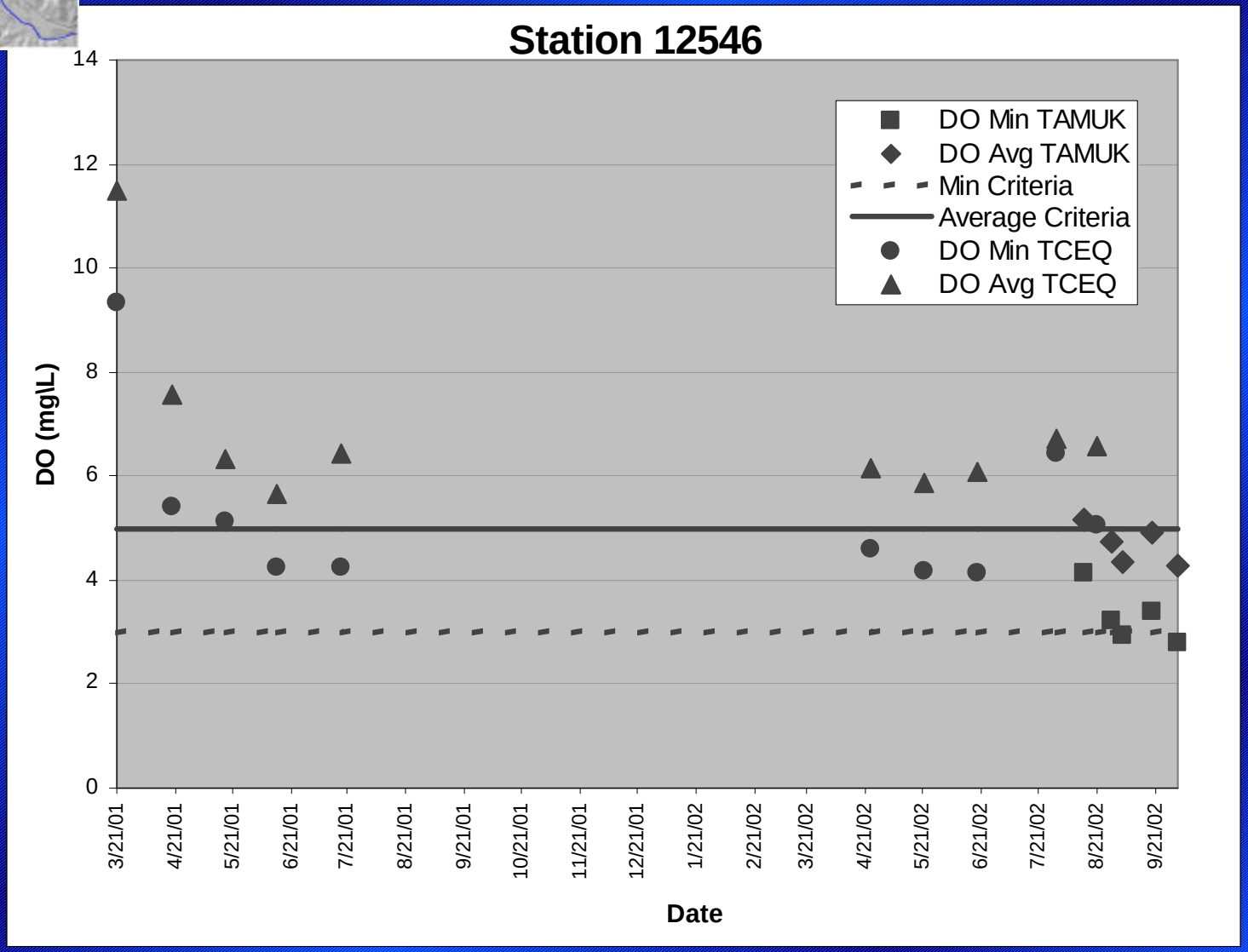
1806A Camp Meeting Creek – Dissolved Oxygen



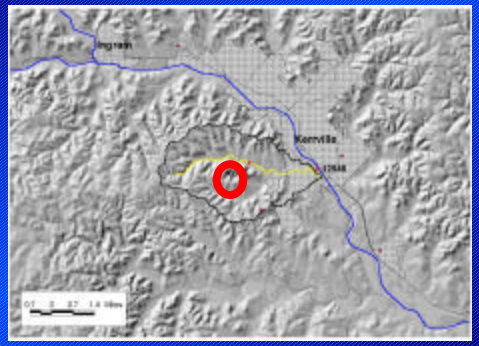


1806A Camp Meeting Creek – Dissolved Oxygen



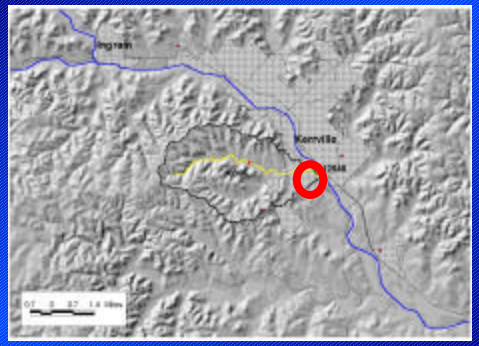


1806A Camp Meeting Creek – Biological



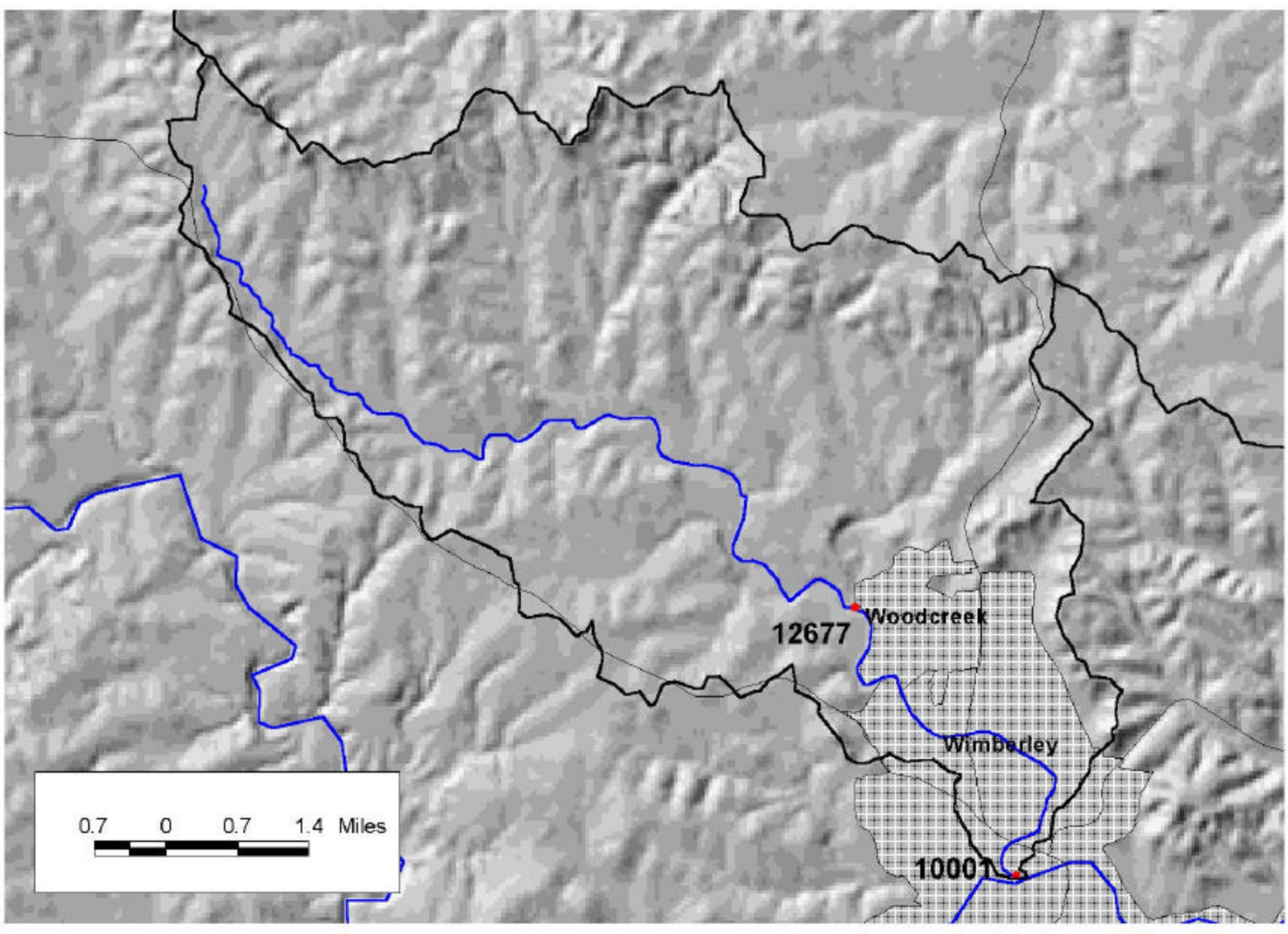
		Nekton	Benthic	Habitat
10006	September	Intermediate	High	High
	October	High	High	High

1806A Camp Meeting Creek – Biological



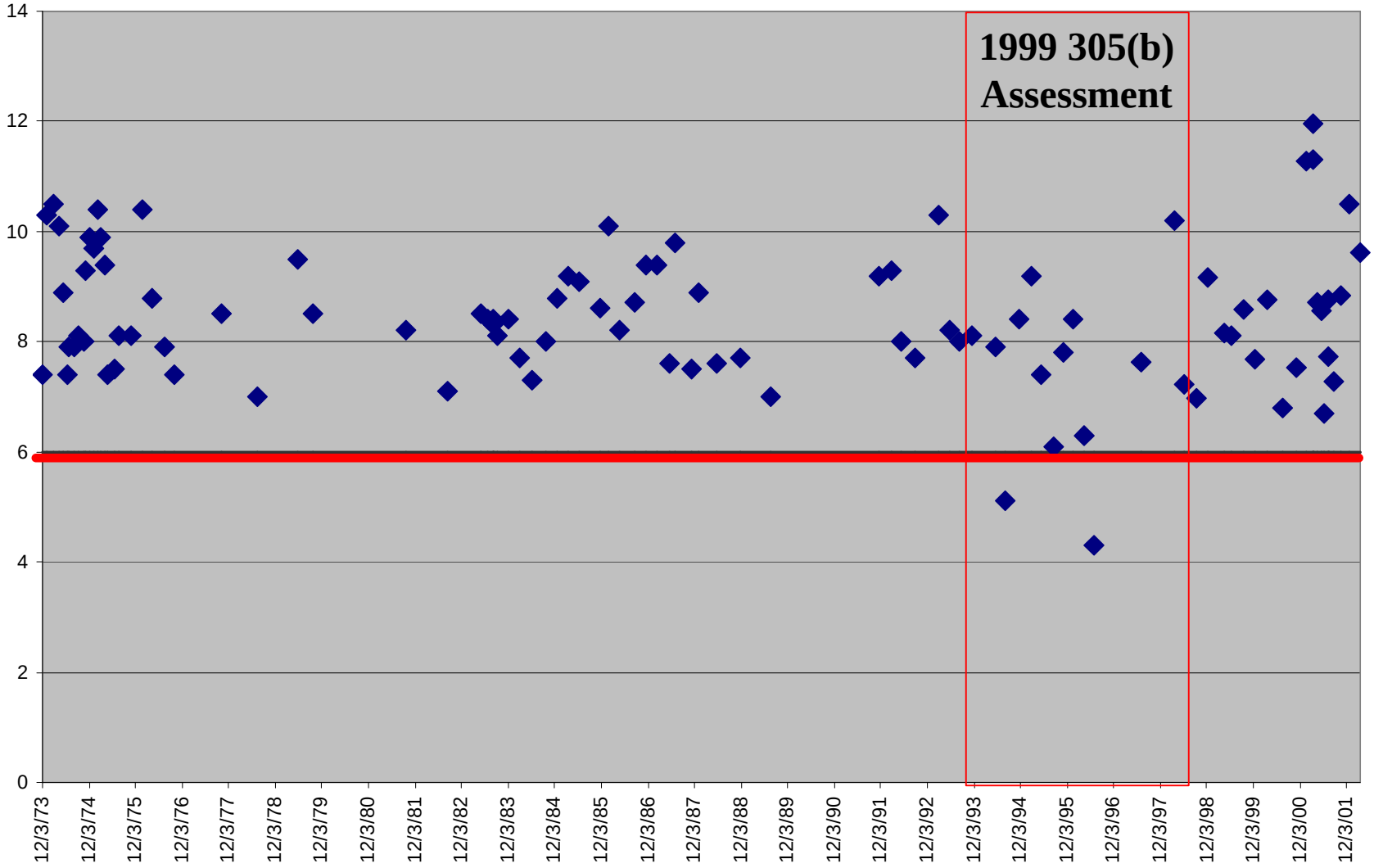
		Nekton	Benthic	Habitat
10006	September	Intermediate	High	High
	October	High	High	High
12546	September	High	Intermediate	Intermediate
	October	High	Intermediate	Intermediate

Segment 1815 – Cypress Creek



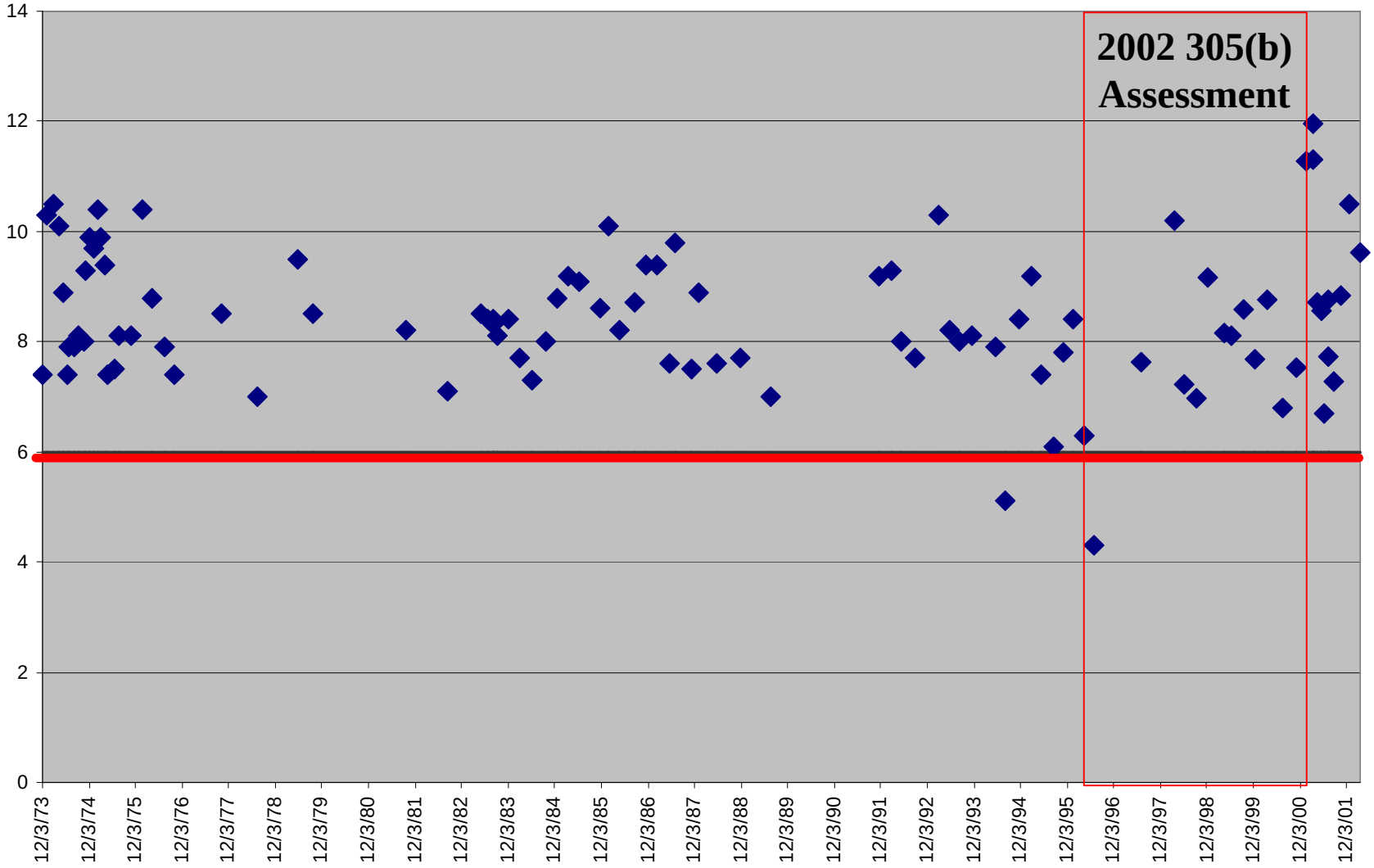
Segment 1815 – Cypress Creek

Dissolved Oxygen



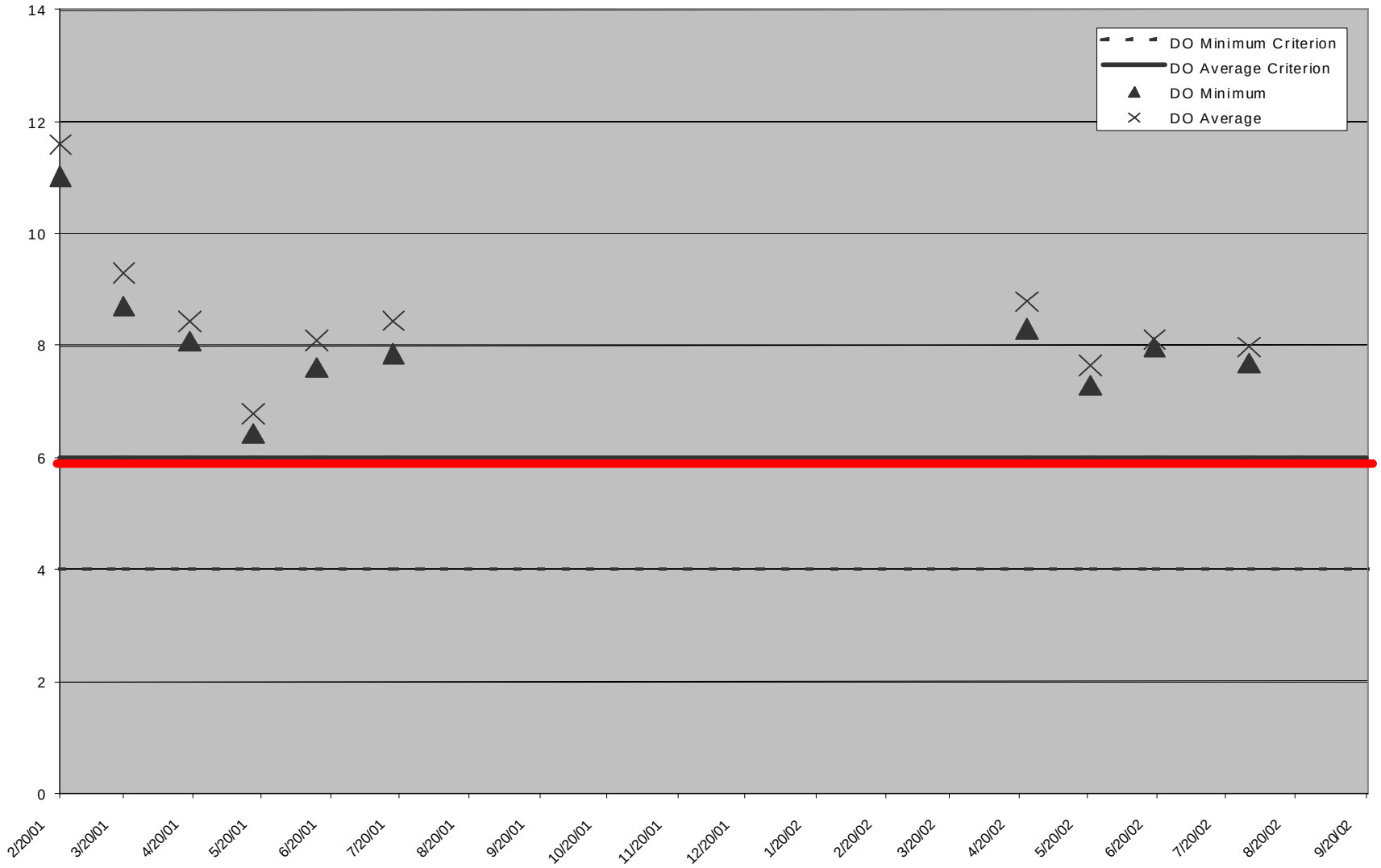
Segment 1815 – Cypress Creek

Dissolved Oxygen



Segment 1815 – Cypress Creek

24-hour Dissolved Oxygen



www.tceq.state.tx.us/water/quality/tmdl/

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