



MISSOURI
DEPARTMENT OF
NATURAL RESOURCES

Engineering Workshop

Welcome and Introduction

Refaat Mefrakis, P.E.

Chief of Engineering Section

November 13, 28, and December 11, 2012



Overview

1

- Centralization of Construction Permitting

2

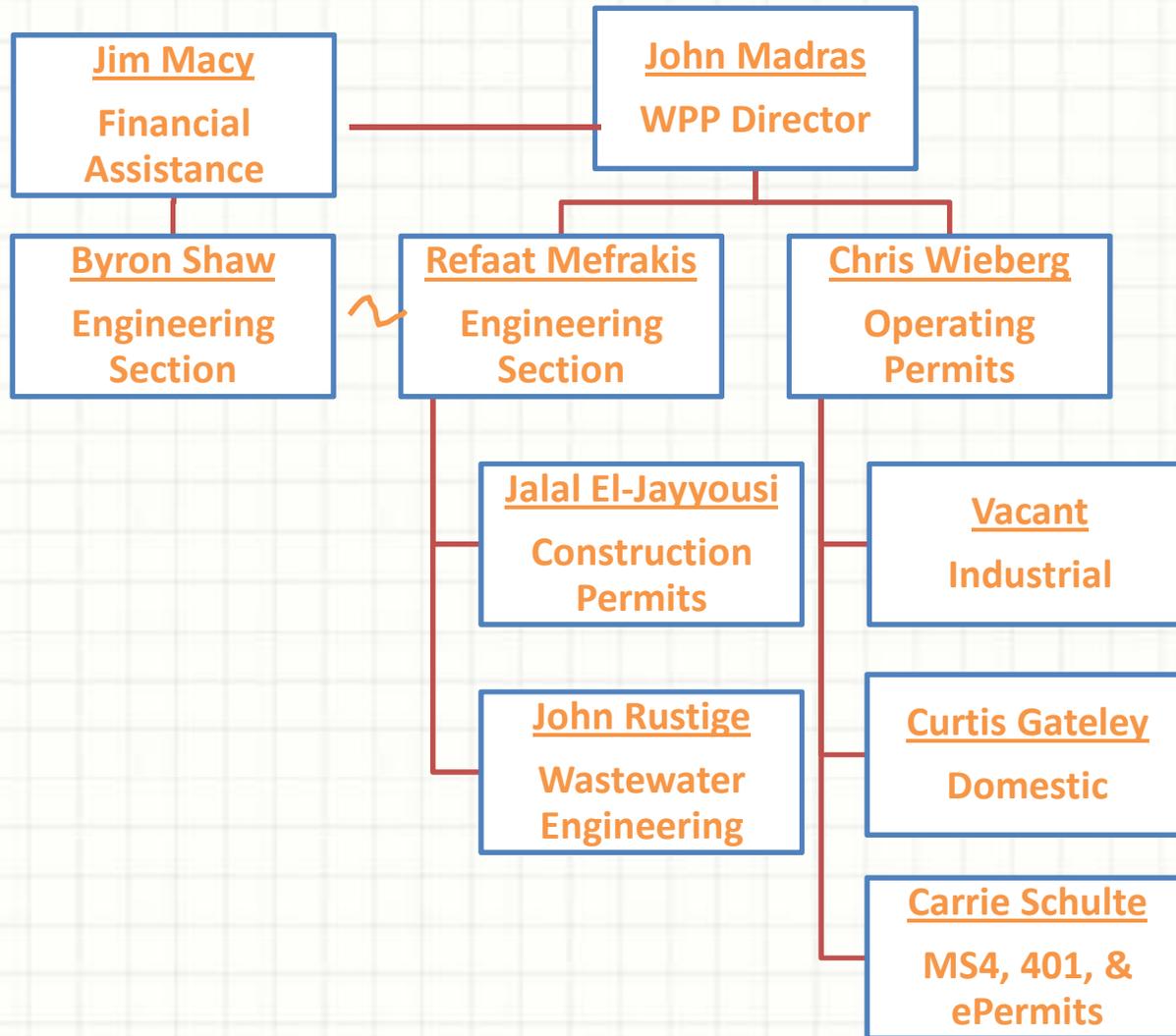
- Application Process

3

- Construction Rule Revision



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Who's Who Engineering Supervisors

Lead

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Why Centralization?

- Consolidate Activities
- Consolidate Staffing
- Consistent Policies
- Efficiency
 - Workload Management
 - Workproduct Consistency



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CP Application Process Option 1

Applicant Submittal

Antidegradation

Facility Plan

**Construction/Operating
Permit Application**

**Statement of Work
Completed**



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CP Application Process Option 2

Preferred Submittal Option

Antidegradation

**Facility Plan/ Operating
Permit Application**

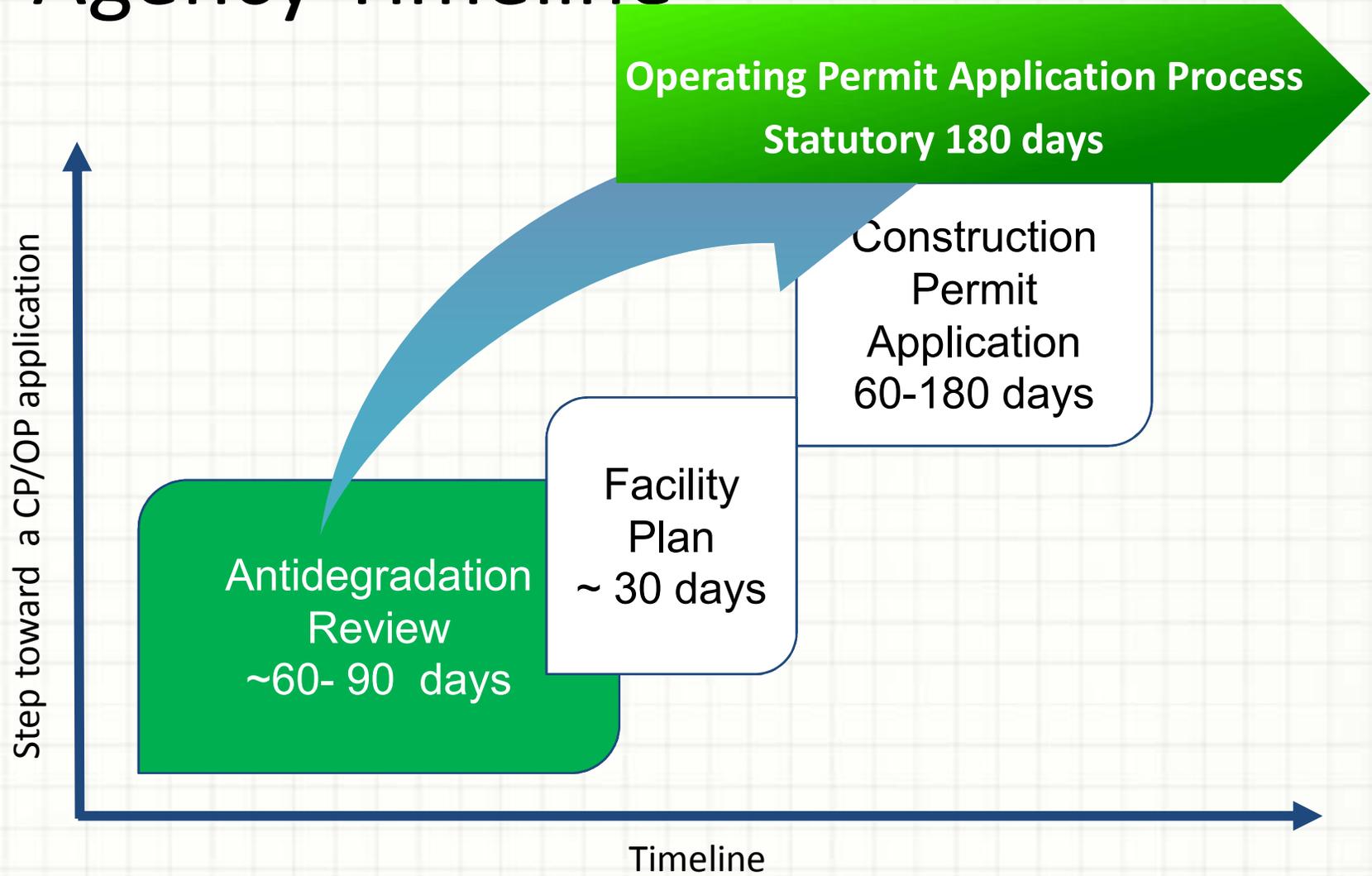
**Construction Permit
Application**

**Statement of Work
Completed**



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Agency Timeline





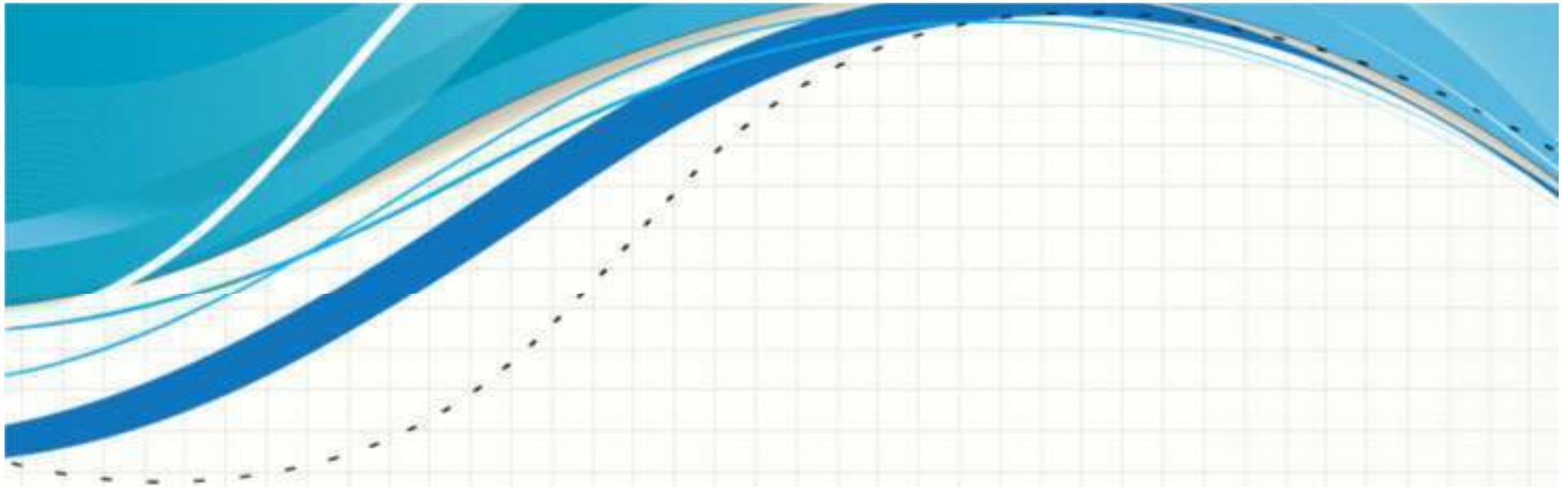
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Upcoming Chapter 6 Updates

- 10 CSR 20-6.010
 - Construction/ Operating Permits
 - Continuing Authority
 - Rule Applicability and Exemptions
- Stakeholder Subcommittee Meeting

<http://dnr.mo.gov/env/wpp/cwforum/ca-group.htm>

December 4, 2012 – Jefferson City



QUESTIONS?



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ANTIDEGRADATION
&
FACILITY PLAN

John Rustige, P.E. Wastewater Engineering Unit

Antidegradation History

- Statute and Rules: 25 Years
- Oct. 7, 2003 Missouri Coalition for the Environment vs. Leavitt (Case No.03-4217-CV-C-NKL W.D. Mo.)
- AIP effective August 30, 2008
- Minor Revision May 2, 2012



Missouri Department of Natural Resources

Division of Environmental Quality

Forms and Permits Publications News and Public Notices State Parks Calendar Search

Enforcement Laws and Regulations MO Environmental News Monitoring Other Sites Remediation

Water Protection Program

- About Us
- Commissions and Boards
- Information and Education
- Laws and Regulations
- Map Gallery
- Public Notices
- Related Links
- Report an Environmental Problem
- Rules in Development
- Services and Contacts
- Public Drinking Water Branch
- Water Pollution Control Branch
- Water Protection Financial Assistance Center

Antidegradation Implementation

Starting Aug. 30, 2008, all permit applications for new or expanded discharges will be required to follow the new *Missouri Antidegradation Rule and Implementation Procedure*. The Antidegradation Review process will be initiated by requests for water quality based effluent limits.

[Antidegradation Rule and Implementation Procedure PDF](#) **Final**
Approved April 20, 2007 and revised on May 7, 2008.

Antidegradation Review Request Form and Process Diagram

- [Water Quality Review Assistance/ Antidegradation Review Request, Form--MO 780-1893 Adobe PDF / Fill-in MS Word DOC](#)
- [Antidegradation Review Summary - Tier Determination and Effluent Limit Summary, Form--MO 780-2025 Adobe PDF / Fill-in MS Word DOC](#)
- [Antidegradation Review Summary - Attachment A: Tier 2 - Significant Degradation, Form--MO 780-2021 Adobe PDF / Fill-in MS Word DOC](#)
- [Antidegradation Review Summary - Attachment B: Tier 2 - Minimal Degradation, Form--MO 780-2022 Adobe PDF / Fill-in MS Word DOC](#)
- [Antidegradation Review Summary - Attachment C: Temporary Degradation, Form--MO 780-2023 Adobe PDF / Fill-in MS Word DOC](#)
- [Antidegradation Review Summary - Attachment D: Tier 1 Review, Form--MO 780-2024 Adobe PDF / Fill-in MS Word DOC](#)
- [No Degradation Evaluation - Conclusion of Antidegradation Review, Form--MO 780-2026 Adobe PDF / Fill-in MS Word DOC](#)

- State Operating Permits & Construction Permit applications for discharges that are



New or Expanded!

Tiers of Water Quality

- **Tier 1**: Water is At, Near, or Violating the WQS – Must meet WQS.
- **Tier 2**: Water Quality is Better than WQS, and Degradation *May* be allowed if justified.
- **Tier 3**: Outstanding National & State Resource Waters – No degradation.

TIER 2 Options

- 1) Non-Degrading: Demonstrate that expanded loading will be maintained or decreased.
- 2) Minimally Degrading: Demonstrate that the loading will consume less than 10 percent of the assimilative capacity.
- 3) Significantly Degrading: Demonstrate or assume degradation with **alternative analysis**.

Alternatives Analysis

- Nondegrading
 - Regionalization / Connection
 - Land Application
 - Drip Irrigation
 - Reuse - Recycle
- Base Case
- Less Degrading
 - Typically requires a minimum of two options beyond the base case

Alternatives Analysis

- Practicability
 - Good “fit”
 - Technically feasible
- Economic Efficiency
 - Cost does not exceed 120% of the least expensive technology that meets WQS (rule of thumb)
- Affordability
 - Apply EPA’s nonbinding Guidance: “Interim Economic Guidance for Water Quality Standards,” EPA-823-B-95-002 (1995)

Economic Efficiency (Costs)

- Compare alternatives based on annualized costs
- Time horizon should be consistent for comparisons
- Projects can be economically efficient yet not affordable

Water Quality / Antidegradation Review

- Applicant draft review period – 1 week.
- Once finalized -- 30 days for applicant appeal.
- Public notice process typically with Operating Permit.

Tips to Move Your Review Forward

- Make a Realistic Schedule
- Involve Internal and External Experts
- Pre-consultation Meetings with the Department
- Identify the Type of Antidegradation Review
- Make a Complete Submittal
- Make Sure it is Well Organized
- Respond Promptly to Request

- **Examples**

- Case 1: Nondegrading (No net increase in pollutants)
- Dissolved Oxygen Example
- Case 2: Minimally Degrading (Net increase will consume less than 10% of the Assimilative Capacity)

- **Facility Plan**

- Components of the Plan
- Opportunities



**WASTEWATER ENGINEERING
REVIEW**

C **CONSTRUCTION PERMIT**

November 13, 2012

John Rustige, P.E

Wastewater Engineering Unit

Missouri Department of

Natural Resources

Effluent Limit Development for Antidegradation Reviews

**WASTEWATER ENGINEERING REVIEW PROCESS
OF CONSTRUCTION PERMIT APPLICATIONS
WORKSHOP**

**Todd Blanc
2012**



**MISSOURI
DEPARTMENT OF
NATURAL RESOURCES**

Overview:

- Demonstration Scenarios
- Tools – DO Modeling
- Determining Effluent Limits

New or expanded discharge must either:

1) Demonstrate that expanded loading will be maintained or decreased,

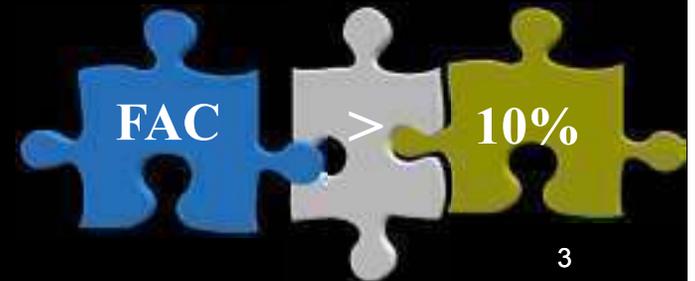
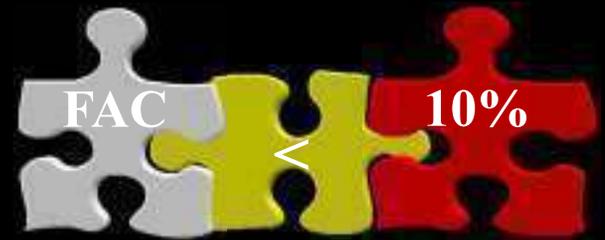
2) Demonstrate that the loading is below allowed facility assimilative

capacity (FAC) and *segment*

assimilative capacity, or

3) Demonstrate or assume degradation with alternative analysis and SEI

analysis.



Demonstrate No Net Increase

AIP, Section II A

Scenario #1: Maintain Loading

- Section II A. – No net increase in ambient water quality concentration of POC (s) in the receiving water.

Provide:

1) expanded loading $<$ or $=$ current loading,
and

2) concentration of POCs in waterbody before
and after proposed discharge.

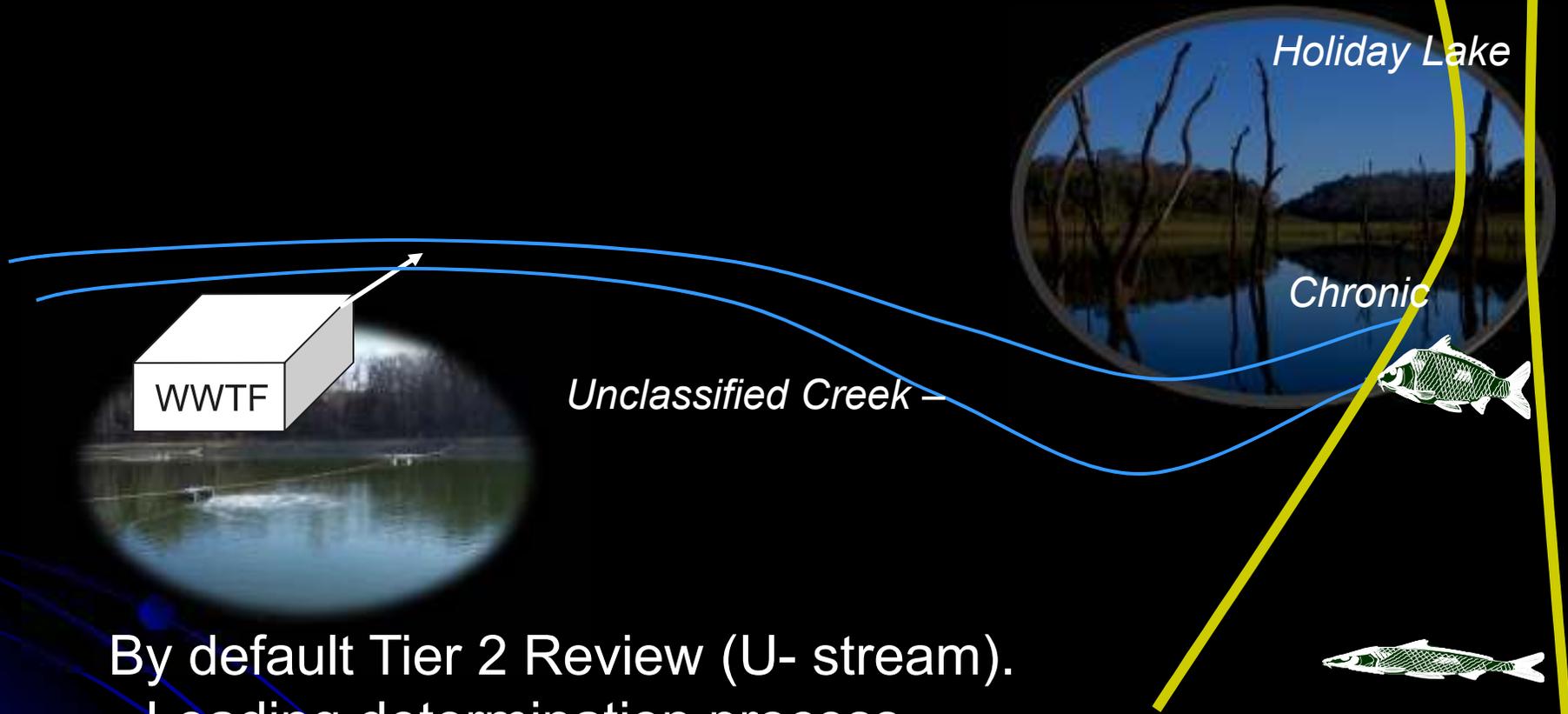
- Evaluation of the POC in the next segment.

Scenario # 1: Maintain Loading

- Expanded discharge of BOD5 and NH4 to a Unclassified stream
 - Segment #1: Upstream DO and NH4 is unknown for Unclassified Creek. **No flow.**
 - Segment #2: In Holiday Lake is classified. Address chronic NH4 and DO.

Scenario #1

Scenario#1



By default Tier 2 Review (U- stream).

--Loading determination process.

--WLA for BOD5 and NH4-protect beneficial uses in Holiday Lake.

Lastly, DO modeling for BOD5.

Scenario #1: Variables

C_c = water quality criterion (mg/L) = chronic ammonia, DO criteria

Q_s = stream flow (7Q10, 30Q10 --cfs) = **0 cfs**

Q_{d1} = current average daily design flow of discharge (cfs) = **3.1 cfs or 2 MGD**

Q_{d2} = proposed average daily design flow of discharge (cfs) = **5.3 cfs or 3.4 MGD**

C_{d1} = BOD5 maximum daily limit – 45 mg/L

C_{d1} = NH4 limit or monitoring not available

EWQ = existing water quality = unknown

CF = conversion factor to POC mass loading:

$$\underline{(\text{mg/L}) * (\text{cfs}) * 5.4 = (\text{lbs/day})}$$

Scenario #1: BOD5

Step 1-Calculate the Loadings :

a) Stream load = $EWQ \cdot Q_s \cdot CF = 0 \text{ lbs/day}$

Current load (*also now total*) =

$$Q_{d1} \cdot C_{d1} \cdot CF = 3.1 \cdot 45 \cdot 5.4 = 753.3 \text{ lbs/day}$$

b) New load = Current load (**solve for Cd2**)

$$Q_{d2} \cdot C_{d2} \cdot CF = 5.3 \cdot C_{d2} \cdot 5.4 = 753.3 \text{ lbs/day}$$

Net increase: $753.3 \text{ lbs/day} - 753.3 \text{ lbs/day} = 0$

Therefore, with no increase in loading

c) **Cd2 is 26.3 mg/L BOD5**. Note: Cd2 is maximum daily limit (MDL).

Scenario #1: Ammonia



$$Q_{d1} C_{d1} + Q_s EWQ = (Q_{d1} + Q_s) C_c$$

Solution:

$$C_{d1} \text{ winter} = 3.1 \text{ mg/L}$$

$$C_{d1} \text{ summer} = 1.5 \text{ mg/L}$$

Scenario #1: Conclusions

NH₄ concentration reduced to:

- 1.8 mg/L winter
- 0.9 mg/L summer

BOD₅ concentration reduced from:

45 mg/L to 26.3 mg/L

For BOD₅ and NH₄, Tier 2 Review not required by demonstration of insignificance (Section II. A).

DO Modeling

Water Quality Requirement

Biochemical Oxygen Demand (WQRA Request Form)

Scenario#1

GENERAL INSTRUCTIONS

1. Please attach:
 - A. A list of pollutants expected to be discharged.
 - B. The location of each outfall clearly shown on map(s). A U.S. Geological Survey topographic map is available at www.dnr.mo.gov/internetmapviewer/.
2. Discharge(s) to all gaining streams: Applicant must submit dissolved oxygen analysis (i.e., using Missouri Department of Natural Resources approved models such as Streeter Phelps (www.ecy.wa.gov/programs/eap/pwspread/pwspread.html) or Qual2K/Qual2E (Q2K/Q2E) stream water quality study (www.epa.gov/athens/wwqtsc/index.html)) indicating that the preferred alternative's BOD₅ effluent limitations from the alternative analysis or the technology-based/regulatory BOD₅ effluent limits are protective of Missouri's water quality standard for dissolved oxygen. **Note:** If Q2K/Q2E is used, wasteload allocation for ammonia must be assumed. All Q2K/Q2E studies must have department approved Quality Assurance Project Plans. *Recommended modeling procedures from the department (may differ with discharge) for this analysis are available upon request.*

Scenario #1: Streeter Phelps BOD5

INPUT

1. EFFLUENT CHARACTERISTICS

Discharge (cfs):	5.3
CBOD5 (mg/L):	21.3
NBOD (mg/L):	5
Dissolved Oxygen (mg/L):	2.4
Temperature (deg C):	26

2. RECEIVING WATER CHARACTERISTICS

Upstream Discharge (cfs):	0.01
Upstream CBOD5 (mg/L):	0.0
Upstream NBOD (mg/L):	0
Upstream Dissolved Oxygen (mg/L):	0
Upstream Temperature (deg C):	26
Elevation (ft NGVD):	630
Downstream Average Channel Slope (ft/ft):	0.0066
Downstream Average Channel Depth (ft):	1
Downstream Average Channel Velocity (fps):	1.4

Based on a 4 foot wide effluent dominated stream

Scenario #1: Streeter Phelps BOD5 (cont'd)

3. REAERATION RATE (Base e) AT 20 deg C (day⁻¹): 63.00

Reference	Applic. Vel (fps)	Applic. Dep (ft)	Suggested Values
Churchill	1.5 - 6	2 - 50	16.07
O'Connor and Dobbins	.1 - 1.5	2 - 50	15.33
Owens	.1 - 6	1 - 2	27.06
Tsivoglou-Wallace	.1 - 6	.1 - 2	63.82

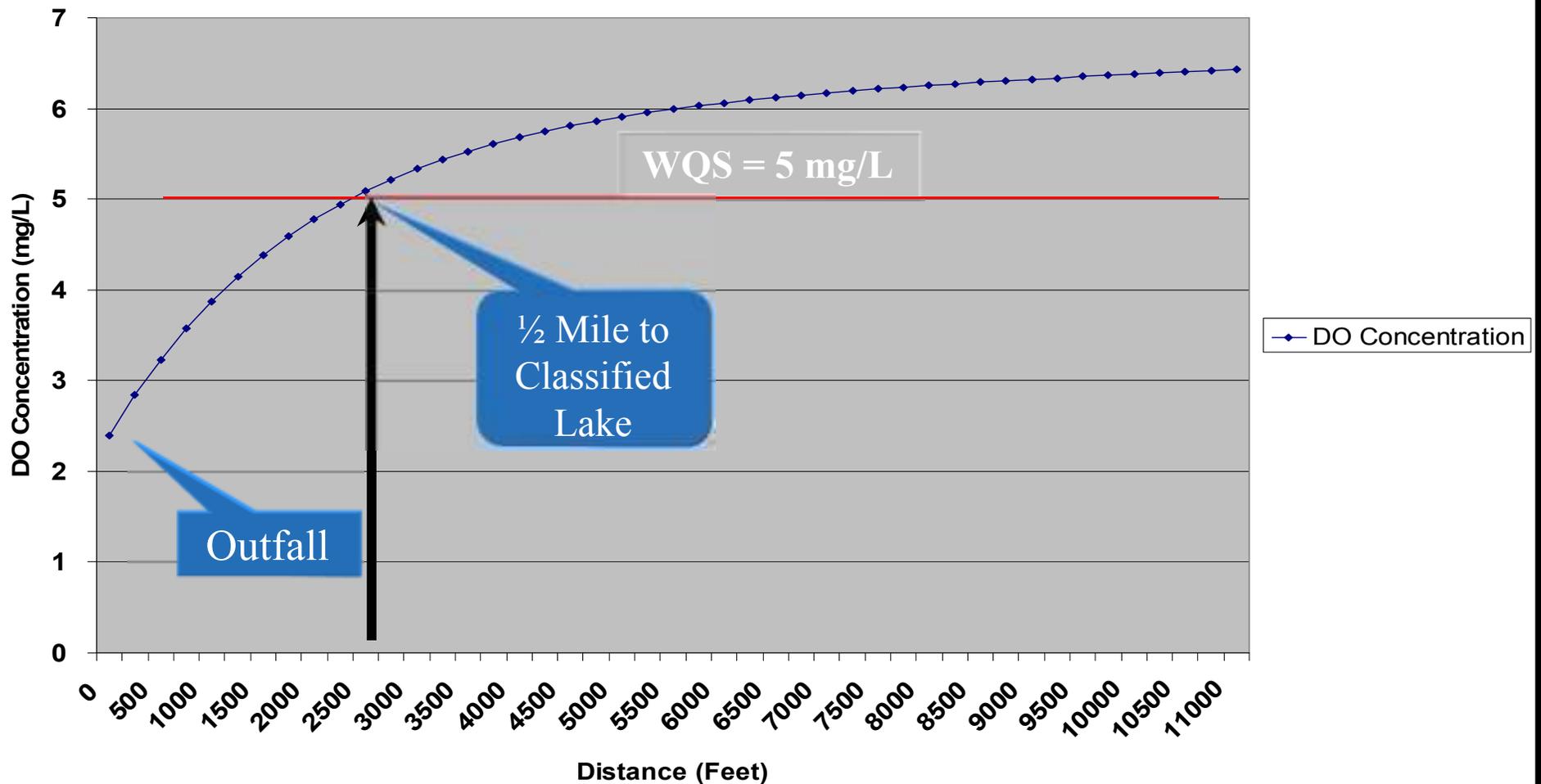
4. BOD DECAY RATE (Base e) AT 20 deg C (day⁻¹): 3.33

Reference	Suggested Value
Wright and McDonnell, 1979	3.33

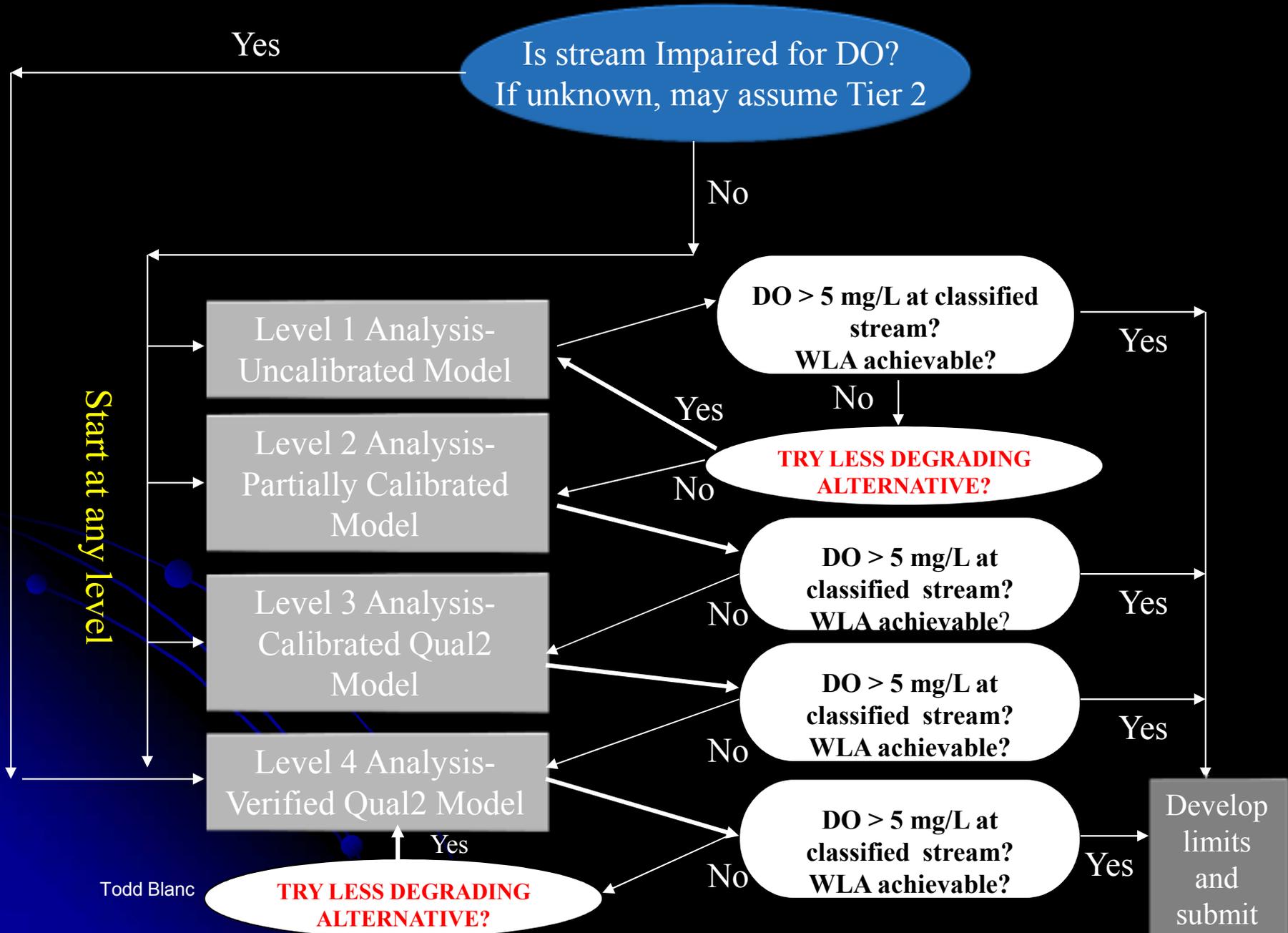


Scenario #1: DO Model Results

Dissolved Oxygen Sag Curve for WWTF Expansion



Modeling Level Decision Diagram



WLA Documents

- *Water Quality Monitoring in Support of Missouri's Antidegradation Rule*
- *Template Quality Assurance Project Plan for EWQ Collection.*
- DO Modeling & BOD Effluent Limit Development Administrative Guidance for the Purpose of Conducting Water Quality Assistance Reviews

<http://www.dnr.mo.gov/env/wpp/permits/antideg-guidance.htm>

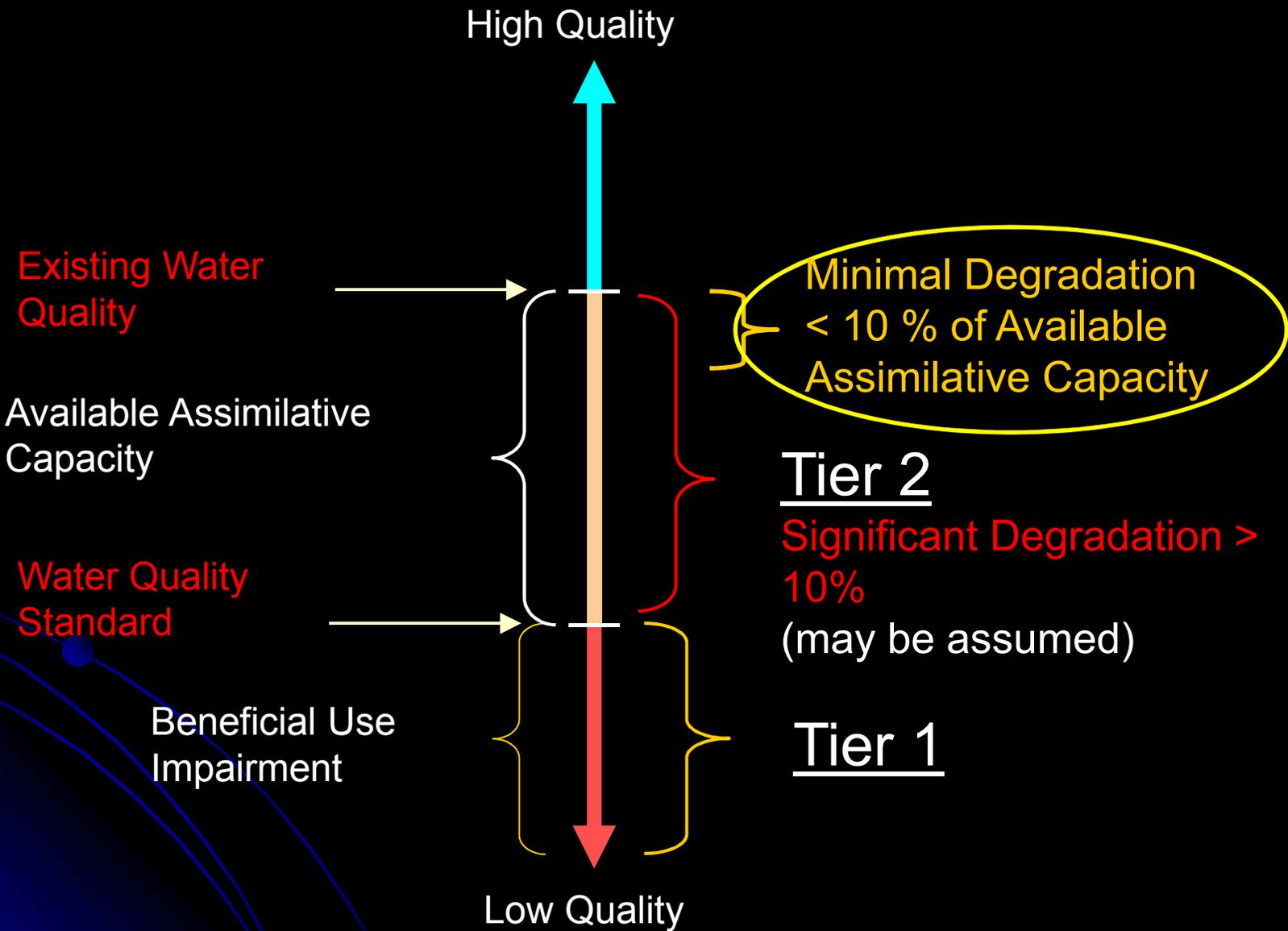
**Demonstrate Insignificance
< 10% FAC**

AIP, Section II A

Scenario #2: < 10% FAC

- Ammonia is Tier 2 – Assigned Tier 2 Review.
- Goal: Demonstrate ammonia loading to a P Stream < 10% facility assimilative capacity (FAC).

Water Quality, Assimilative Capacity, and Degradation



Scenario #2: Steps

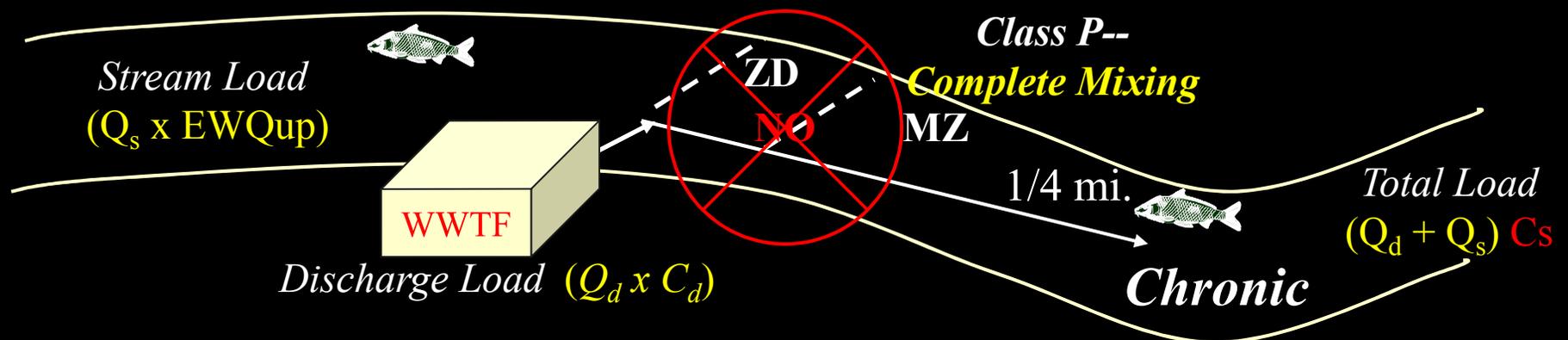
- Step 1-Establish existing water quality (EWQ upstream)
 - EWQ is water quality as of 08/30/2008
- Step 2- For **existing** discharges calculate Cs
 - Downstream of discharge after complete mixing
 - EWQup = data from Step 1

$$Cs = (EWQup \cdot Qs + Cd \cdot Qd) / (Qs + Qd)$$

(variables defined in AIP, Appendix 3, P. 42.)

- Step 3-Calculate new load or net loading increase
net increase = (new load – current load)
- Step 4-Calculate FAC—New discharge and Existing discharge
 - *Equations in Appendix 3, new use EWQ rather than Cs*
 - *FAC = Available stream load – current stream load*
 - $[(WQC \cdot (Qs + Qd2)) - (Cs \cdot (Qs + Qd1))] \cdot CF$
 - $\% \text{ FAC} = (\text{Net increase} / \text{FAC})$

Scenario #2: Step 2



$$Q_d C_d + Q_s EWQ_{up} = (Q_d + Q_s) C_s$$

$$C_s = (EWQ * Q_s + C_d * Q_d) / (Q_s + Q_d)$$

Final Answer: FAC < 10% (summer/winter)

Scenario #2: Conclusions

- Discharge does not result in significant degradation, therefore no necessity or SEI required.
- Tier 2 Review not required by demonstration of insignificance (Section II. A).

Effluent Limits

To demonstrate how limits may be determined.

How Effluent Limits Are Determined

- **Technology-Based Limits (TBELs)**
 - *Effluent Limitations Regulations (10 CSR 20-7.015) & Federal Regulations (ELGs, secondary treatment limits)*
 - *Alternative Analysis Technology-based*
- **Water Quality-Based Limits (WQBELs)**
 - *Mass balance equation*
 - *“Technical Support Document for Water Quality-based Toxics Control”, EPA/505/2-90-001*
 - *Guidance: “Guidance for Water Quality and Antidegradation Review Assistance”*
- **Minimally Degrading Effluent Limits (MDELs)**
 - *Guidelines: “Guidance for Water Quality and Antidegradation Review Assistance”*

Effluent Limits: TBEL

For Alternative Analysis Technology-based:

1) WLA of the preferred alternative is the average monthly limit (AML)

• 2) Maximum daily limit (MDL) = $AML * 1.5$

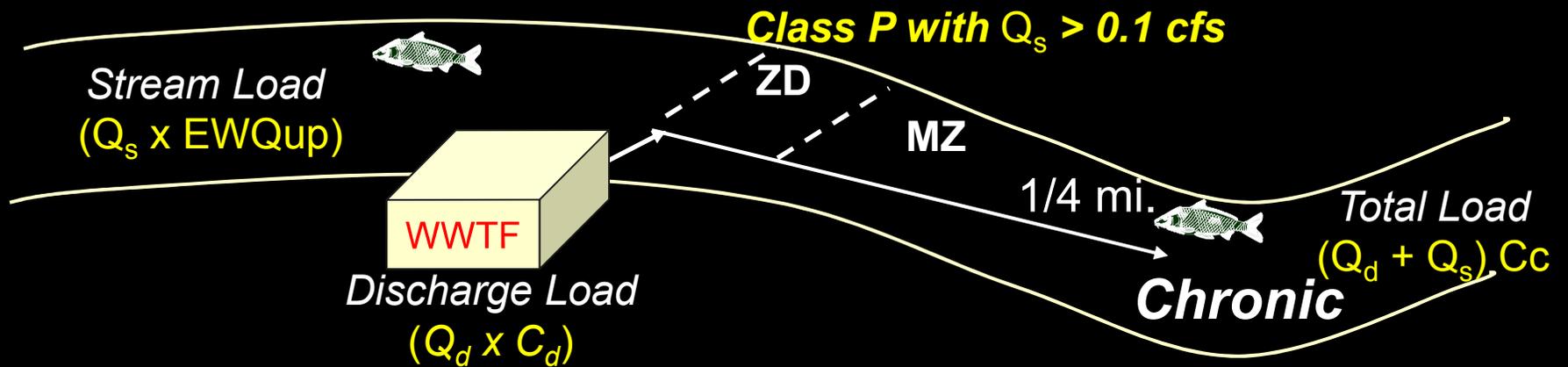
Guidelines: "Guidance for Water Quality and Antidegradation Review Assistance"

Establishing Effluent Limitations

Basis:	<u>Technology</u>	<u>Water Quality</u>
Goal:	“Zero Discharge of Pollutants”	“Fishable/Swimmable”
Reg. Cite:	40 CFR 122.44 (a) 40 CFR 122.44 (e) 40 CFR 125.3	40 CFR 122.44(d)

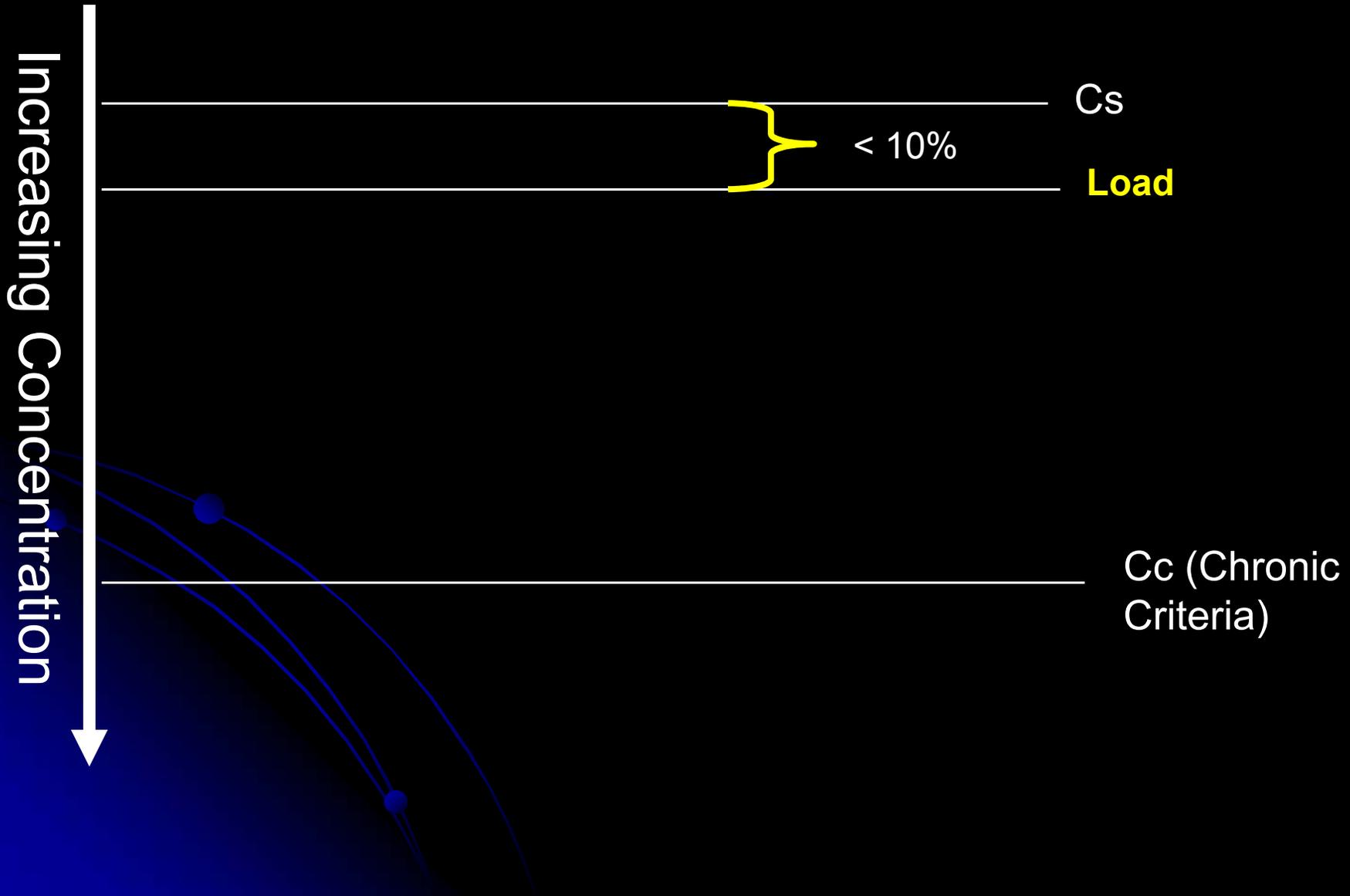
Relationship: Technology-based effluent limits are developed for all applicable pollutants of concern. If these limits are not adequate to protect water quality, then water quality-based effluent limits must be developed.

Effluent Limits: WQBEL



$$Q_d C_d + Q_s EWQup = (Q_d + Q_s) C_c$$

Effluent Limits: MDEL Concept



Calculating the MDEL

- Step 1 - establish existing water quality (EWQ upstream)
 - EWQ = water quality as of 08/30/2008
- Step 2 - calculate $C_s = (EWQ_{up} * Q_s + C_d * Q_d) / (Q_s + Q_d)$
(variables defined in AIP, Appendix 3, P. 42.)
 - EWQ_{up} = data from Step 1
- Step 3 - calculate net loading increase (existing) or new load (new discharge)
Net Increase = (new load – current load)
- Step 4- calculate FAC*0.1, then set equal to net loading increase and solve for proposed WLA_c, **C_d**
 - **C_c** -- (chronic water quality standard –unless acute criteria required)
- Step 5 - perform reasonable potential analysis and compare to proposed WLA_c: WLA = MDL
- Step 6 - final step is to compare MDEL to WQBEL.

Preliminary WQAR

- Providing comment period--5 days.
- Once finalized--30 days for applicant appeal.

Additional information:

http://www.dnr.mo.gov/env/wpp/permits/anti_deg-implementation.htm

Missouri Department of
Natural Resources

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Engineering Reports and Facility Plans

Cindy LePage, P.E.



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Missouri Department of

Natural Resources

Engineering Reports and Facility Plans

CWC approved - June 2011

Regulation
10 CSR 20-8.110(4)

Missouri Department of

Natural Resources

Engineering Reports and Facility Plans

Must be Signed & Sealed
by a Missouri
Registered Professional Engineer

Missouri Department of

Natural Resources

Engineering Reports and Facility Plans

Cover Letter

Engineering Reports

- Gravity Sewers (except 8" gravity sewer extension)
- Pressure Sewers
- Force Mains
- Wastewater Pumping Stations

Facility Plans

- Wastewater Treatment Projects

Engineering Report Guidance

<http://dnr.mo.gov/pubs/PUB2415.pdf>

Engineering Report

- Define the Problem
- Project Description
- Site Information
- Drawings
- Flow and Loading
- Impact of project on existing facilities
- Technical Information and Design Criteria
- Chapter 8 Deviations and Justifications

Engineering Report (continued)

Required Flow Data

- Existing Average Annual Daily Flow
- Existing Peak Annual Flow
- Design Annual Average Daily Flow

Use **ACTUAL FLOW DATA** to the extent possible.

Seasonal facilities use flow during seasonal period.

Engineering Report (continued)

Flow For New Systems

Use:

- Average Daily Flow based on 100 gallons per day per capita
10 CSR 20-8.120(5)(A)

- Peak Flows:

- $Q = \frac{(18 + \sqrt{P})}{(4 + \sqrt{P})}$

Q = flow in gallons per day

P = population in thousands

Engineering Report (continued)

Organic Loading For New Systems

Use:

- Design BOD range = 0.17 - 0.22 lbs/person/day
- Design TSS range = 0.20 – 0.25 lbs/person/day

Engineering Report Submittal

- Receiving WWTF $< 22,500$ gpd
 - Submit with CP Application
- Receiving WWTF $\geq 22,500$ gpd
 - Approved **BEFORE** submitting CP Application

Facility Plan Guidance

<http://www.dnr.mo.gov/pubs/PUB2416.pdf>

Facility Plan

- Title Page
- Table of Contents
- Introduction/Define the Problem
- Existing Facilities
- Proposed Project
- Project Development
- Recommended Project

Facility Plan (continued)

Existing Facility

- Detailed description of existing treatment facility along with an estimate of capacities of each process
- Brief inventory of collection system
- Evaluations of the system during wet weather flows

Facility Plan (continued)

Existing Facility

- Define the Problem
- Planning area, existing, and potential future service areas (sketches)
- Present and predicted population based on 20 YEAR planning period

Facility Plan (continued)

Hydraulic and Organic Loading

“Projections shall be made from

ACTUAL FLOW DATA

to the extent possible”



Facility Plan (continued)

Required Flow Data

For Existing Systems

- Use ≥ 1 year of flow data to determine:
 - Annual Average Daily Flow
 - Maximum Daily Flow
 - Wet Weather Peak Hourly Flow
 - Wet Weather Peak Instantaneous flow

Facility Plan (continued)

Required Flow Data

Design Average Flow:

- Average Daily Flow for a continuous 12 month period

Design Maximum Day Flow:

- Largest Flow during a continuous 24 hour period

Seasonal facilities based on flow during seasonal period.

Facility Plan (continued)

Required Flow Data

Design Peak Hourly Flow:

- Largest Flow in a one hour period

Design Peak Instantaneous Flow:

- Largest Instantaneous Flow

Seasonal facilities based on flow during seasonal period.

Facility Plan (continued)

Existing Organic Loading

- Sufficient samples of influent wastewater should be taken to characterize the organic strength
- Recommended that peak month and peak day loading rates also be determined

Facility Plan (continued)

Flow For Proposed Project

Use:

- Average Daily Flow based on 100 gallons per day per capita
10 CSR 20-8.120(5)(A)

- Peak Flows:

- $Q = \frac{(18 + \sqrt{P})}{(4 + \sqrt{P})}$

Q = flow in gallons per day

P = population in thousands

Facility Plan (continued)

Organic Loading For Proposed Project

Use:

- Design BOD range = 0.17 - 0.22 lbs/person/day
- Design TSS range = 0.20 – 0.25 lbs/person/day

Facility Plan (continued)

Project Development

- WQRA*
- Alternatives*

These are covered in the Antidegradation process if applicable.

Facility Plan (continued)

Project Development

- Site Evaluation
 - Geological, Groundwater, Flood Considerations,...
- Engineering Design Criteria
- Design Capacity

Facility Plan (continued)

Project Development

- Biosolids Treatment
- O & M Requirements
- Cost Estimate
- Environmental Review
- Chapter 8 Deviations and Justifications

Facility Plan (continued)

Project Alternatives

- Evaluate \geq Two Alternatives
- Feasibility of Regionalization
 - 10 CSR 20-6.010(3)(C)
- Feasibility No-Discharge
 - 10 CSR 20-6.010(3)(D)1.

Facility Plan (continued)

Project Alternatives

- For Each Alternative, Include:
 - Advantages and Disadvantages
 - Operation & Maintenance
 - Financial Considerations

Facility Plan (continued)

Recommended Project

- Selected Alternative
- Financial Considerations
- Technical Information
- Process Diagram
- Design Criteria
- Chapter 8 Deviations and Justifications

Facility Plan Submittal

- WWTF <22,500 gpd
 - Submit with CP Application
- WWTF \geq 22,500 gpd
 - Approved **BEFORE** submitting CP Application

Engineering Reports and Facility Plans

- Required by Regulation
- Guidance at
 - www.dnr.mo.gov; Publications; Water Pollution Control
 - www.dnr.mo.gov; Programs; Water Pollution Control Branch; Wastewater Construction Permitting; Publications

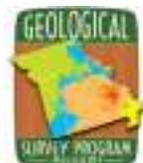
- Geohydrologic Evaluations - Environmental Assistance Unit

Sherry Stoner, R.G.
Missouri Geological Survey Program

Wastewater Engineering Review Process of Construction Permit Applications Workshop
November and December 2012



Missouri Department of Natural Resources
Division of Geology and Land Survey



What is a Geohydrologic Evaluation?

- The objective of a geohydrologic evaluation is to examine site-specific geologic and hydrologic conditions.
- Determine the potential of the facility to impact groundwater.

When do I Need to Have a Geohydrologic Evaluation Performed?

- In accordance with 10 CSR 20-7.010 through 10 CSR 20-7.031

And

- 10 CSR 20-8.010 through 10 CSR 20-8.500, these evaluations are required for:

When do I Need to Have a Geohydrologic Evaluation Performed?

- Both new and modified earthen lagoons, with or without discharge
- Mechanical treatment plants
- Recirculating filter beds
- Land application sites
- Other types of wastewater treatment facilities

When do I Need to Have a
Geohydrologic Evaluation Performed?

At the beginning stages of
the permitting process.

Where Can I Get the Request for a Geohydrologic Evaluation??

- Missouri Department of Natural Resources website at <http://dnr.mo.gov>
 - Forms and Permits tab
 - Search the Geology Category
 - Geological Survey
 - » Request for Geohydrologic Evaluation of Liquid-Waste Treatment Facility/Site



MISSOURI DEPARTMENT OF NATURAL RESOURCES
GEOLOGICAL SURVEY PROGRAM
REQUEST FOR GEOHYDROLOGIC EVALUATION OF
LIQUID-WASTE TREATMENT FACILITY/SITE

FOR OFFICE USE ONLY

PROJECT NUMBER

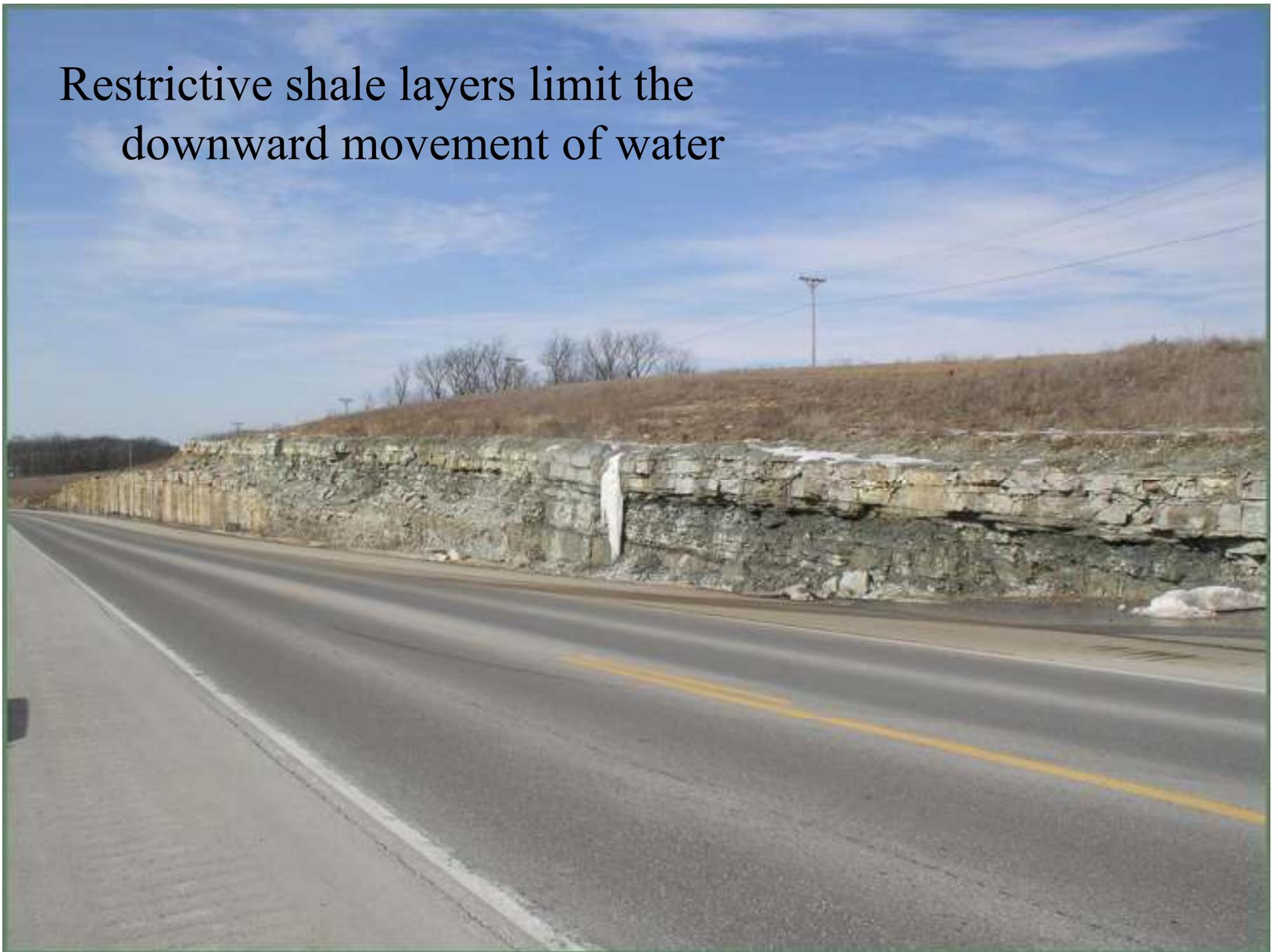
DATE RECEIVED

FACILITY OR PROJECT LOCATION					
FACILITY OR PROJECT NAME			PREVIOUS NAME OF FACILITY (IF APPLICABLE)		
00 SECTION	00 SECTION	00 SECTION	SECTION	TOWNSHIP	RANGE
				NORTH	<input type="checkbox"/> East <input type="checkbox"/> West
QUAD/NEEVE NAME					
WRITER LOCATION IF LEGAL DESCRIPTION IS UNAVAILABLE (USE COMMENTS AREA IF NECESSARY)					
COUNTY			COORDINATE LOCATION		
			LATITUDE	LONGITUDE	
OWNER INFORMATION					
OWNER'S NAME				TELEPHONE	
ADDRESS			CITY	STATE	ZIP CODE
FACILITY ADDRESS IF DIFFERENT FROM OWNER'S			CITY	STATE	ZIP CODE
EVALUATION REQUESTED BY					
NAME AND COMPANY OF REQUESTOR				TELEPHONE	
ADDRESS			CITY	STATE	ZIP CODE
FACILITY INFORMATION					
TYPE OF FACILITY		UNDER CONSTRUCTION MATERIALS		DISCHARGE	
<input type="checkbox"/> LAGOON <input type="checkbox"/> STORAGE BASIN <input type="checkbox"/> REGULATORY FILTER BED <input type="checkbox"/> LAND APPLICATION <input type="checkbox"/> MECHANICAL TREATMENT PLANT <input type="checkbox"/> SUBSURFACE SOL ABSORPTION SYSTEM <input type="checkbox"/> OTHER _____		<input type="checkbox"/> EXISTING SOILS <input type="checkbox"/> REINFORCED CONCRETE <input type="checkbox"/> OTHER _____		<input type="checkbox"/> FACILITY WILL DISCHARGE TO WATERS OF THE STATE <input type="checkbox"/> WILL NOT DISCHARGE (NO-DISCHARGE SYSTEM)	
TYPE OF WASTE					
<input type="checkbox"/> HUMAN <input type="checkbox"/> MINERAL <input type="checkbox"/> LEACHATE <input type="checkbox"/> PROCESS/INDUSTRIAL <input type="checkbox"/> OTHER _____					
THIS PORTION APPLIES TO LAGOONS AND STORAGE BASINS ONLY					
_____ EXISTING _____ PROPOSED _____ UNDER CONSTRUCTION		TOTAL ESTIMATED SIZE OF STORAGE BASIN/LAGOON		MAXIMUM OPERATING DEPTH OF LIQUIDS	
		<input type="checkbox"/> < 1 ACRE <input type="checkbox"/> > 1 ACRE AND < 2 ACRES <input type="checkbox"/> > 2 ACRES AND < 3 ACRES <input type="checkbox"/> > 3 ACRES AND < 4 ACRES <input type="checkbox"/> > 4 ACRES		<input type="checkbox"/> < 5 FEET <input type="checkbox"/> > 5 FEET AND < 10 FEET <input type="checkbox"/> > 10 FEET AND < 15 FEET <input type="checkbox"/> > 15 FEET AND < 20 FEET <input type="checkbox"/> > 20 FEET	
				MAXIMUM DEPTH OF PROPOSED EXCAVATION IN FEET	
				<input type="checkbox"/> < 5 FEET <input type="checkbox"/> > 5 FEET AND < 10 FEET <input type="checkbox"/> > 10 FEET AND < 15 FEET <input type="checkbox"/> > 15 FEET AND < 20 FEET <input type="checkbox"/> > 20 FEET	
NUMBER OF ACRES TO BE LAND APPLIED				WILL OWNER APPLY FOR STATE REVOLVING FUND?	
_____ ACRES				<input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> MAYBE	
				IF YES, WILL A NPDES PERMIT BE REQUIRED?	
				<input type="checkbox"/> YES (POINT SOURCE) <input type="checkbox"/> NO (NON-POINT SOURCE)	
SKETCH OR MAP MUST BE SUBMITTED WITH REQUEST					
Attach sketch or a topographic map showing all known wells, springs, sinkholes, caves, and mines within 1/4 mile of the facility. Show locations of existing test borings, test pits, or excavations which expose soil. If backhoe or other excavation has been done - send copy of results or, if planned, let us know of date. Show the proposed location of the facility, land application areas, and discharge point (if applicable). Please show north arrow on map or sketch.					
COMMENTS					
EMAIL ADDRESS: PLEASE PROVIDE AN E-MAIL ADDRESS IF YOU WISH TO RECEIVE CONFIRMATION MESSAGE OF RECEIPT OF THIS REQUEST.					
OWNER'S SIGNATURE (INDICATES PERMISSION TO ACCESS PROPERTY FOR EVALUATION)					DATE

Site Visit By a Geologist... What Are We Looking At?

- Bedrock - permeability

Restrictive shale layers limit the downward movement of water



Groundwater is only found in fractures





Christian County



Greene County



Site Visit By a Geologist... What Are We Looking At?

- Bedrock - permeability
- Surficial materials - permeability

Surficial materials are highly variable

Thick deposits

Wind-blown Loess (up to 50 feet)

Glacial Till (up to 200 feet)





Broad and flat alluvial plain





Camden County

Dallas County



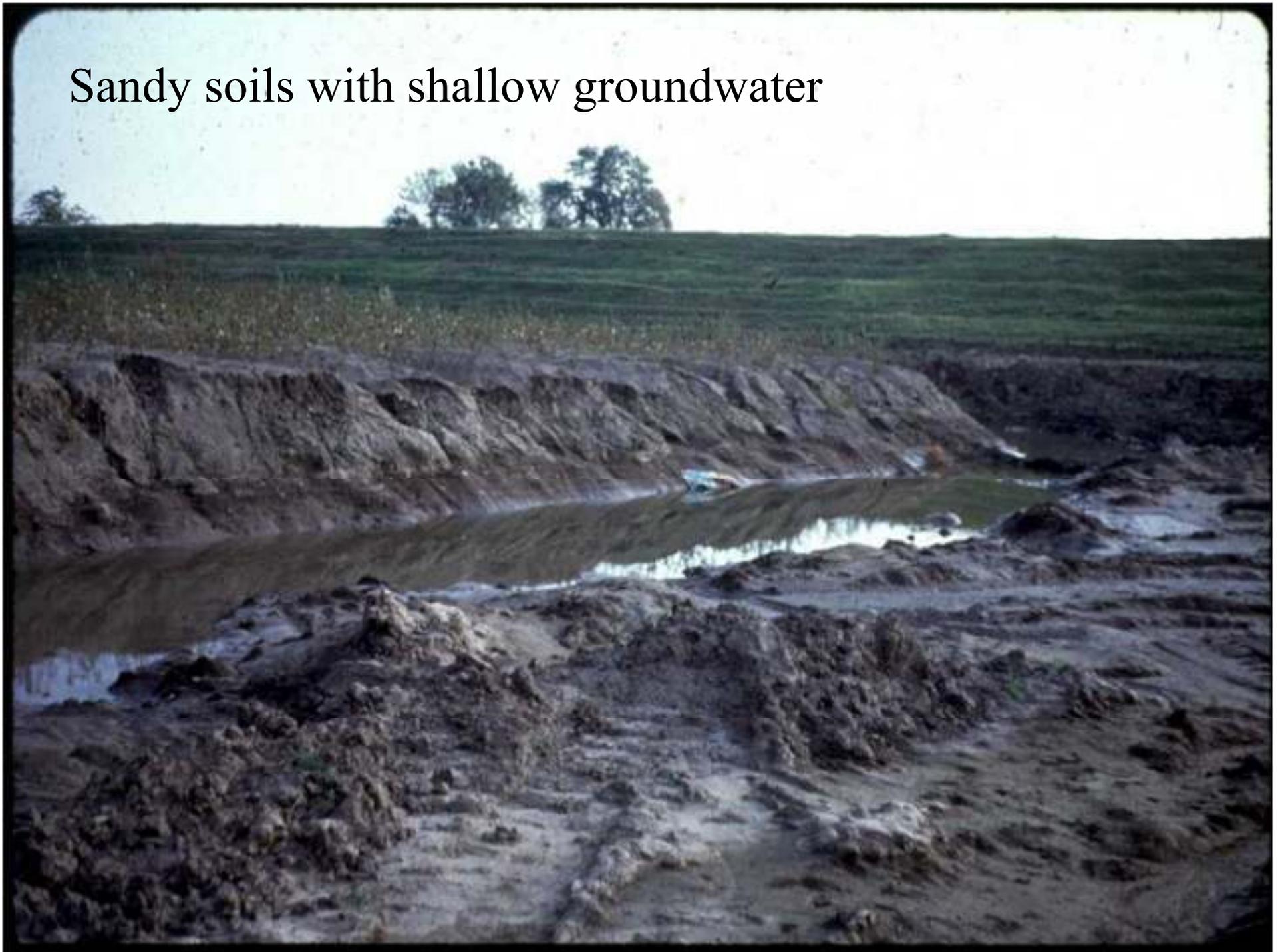
Greene County



Site Visit By a Geologist... What Are We Looking At?

- Bedrock - permeability
- Surficial materials - permeability
- Hydrology of the site

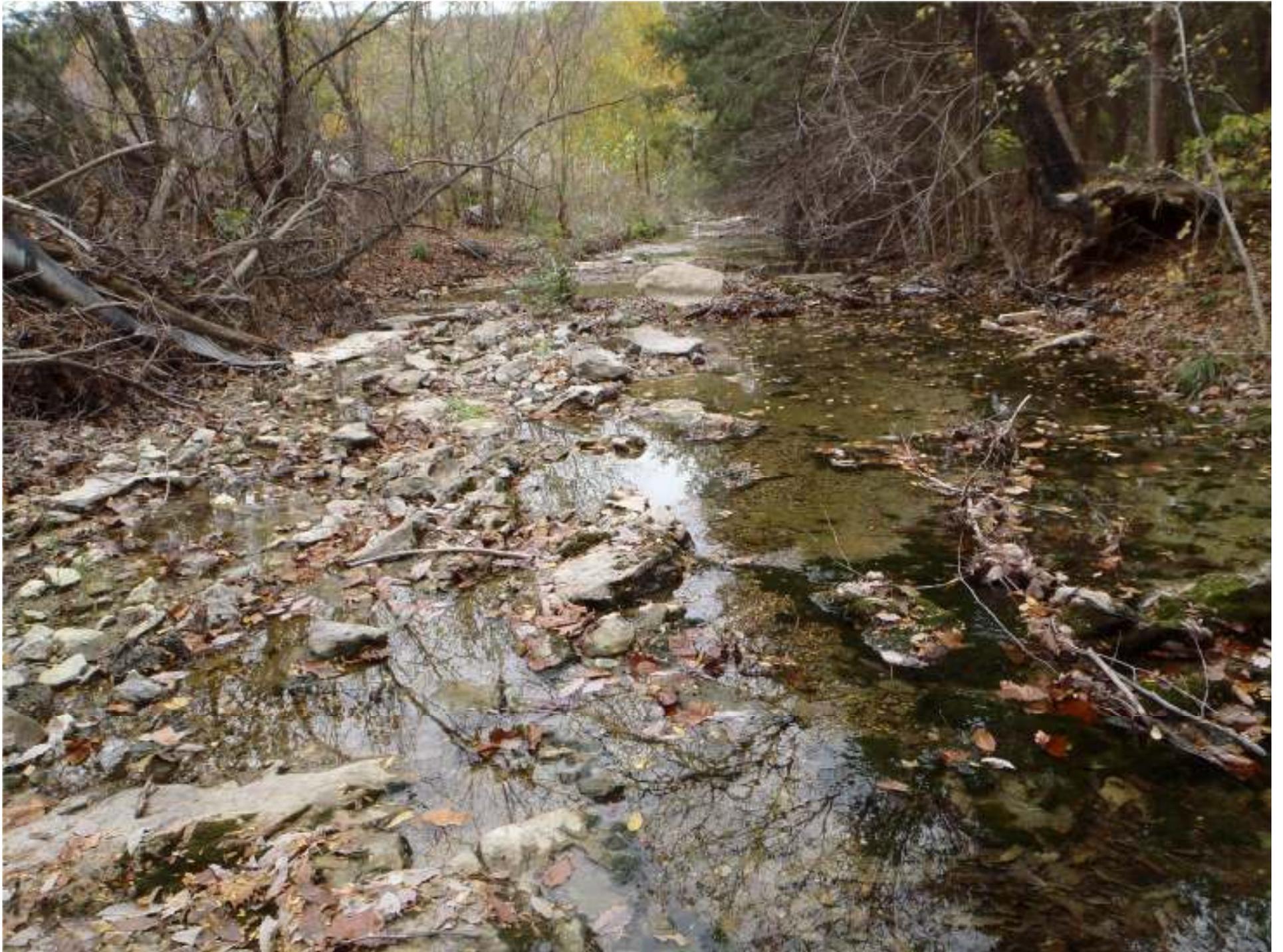
Sandy soils with shallow groundwater





Clear Creek Park Spring, Greene County





Geologic Stream Classification

Gaining

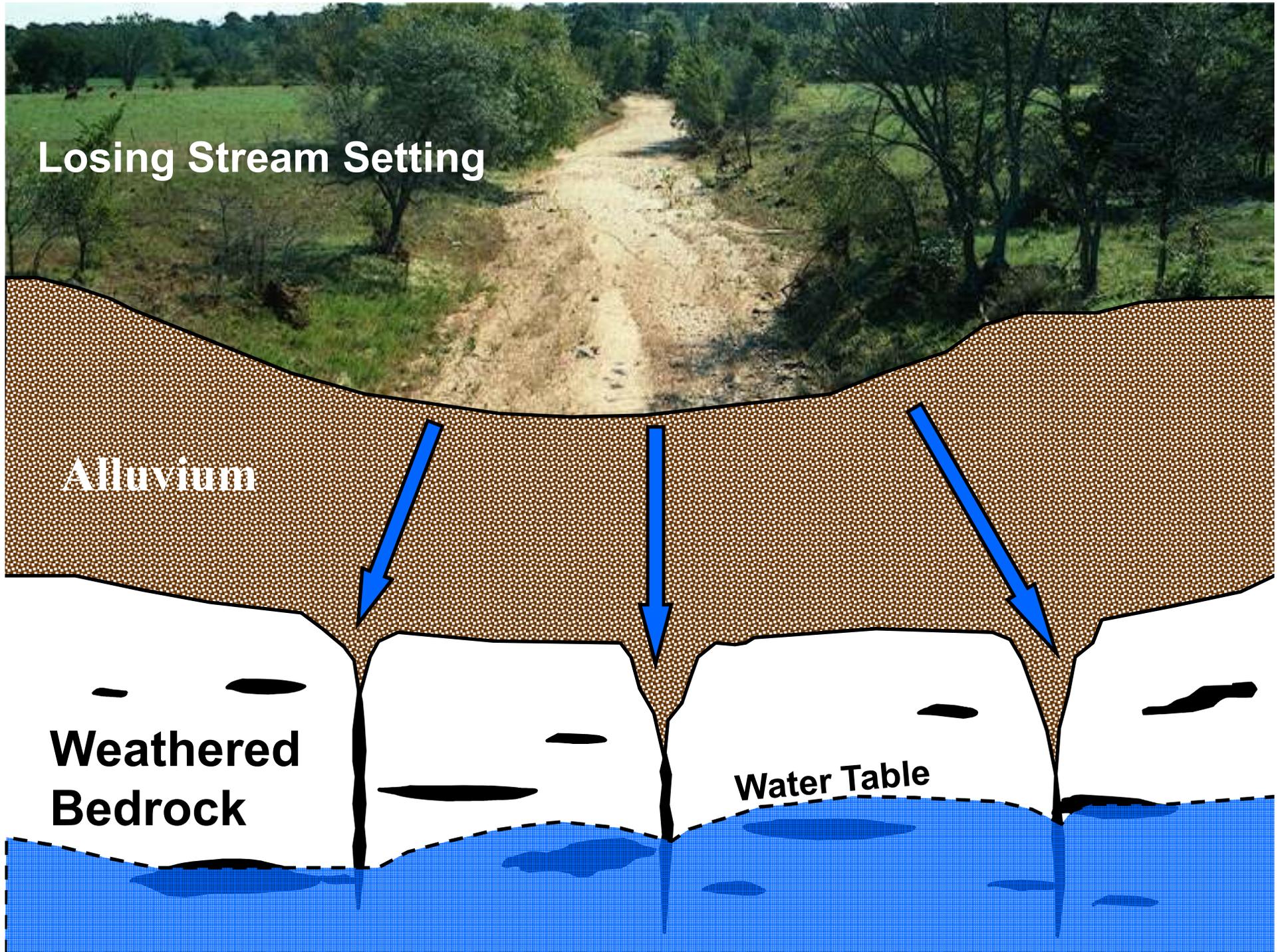
Losing

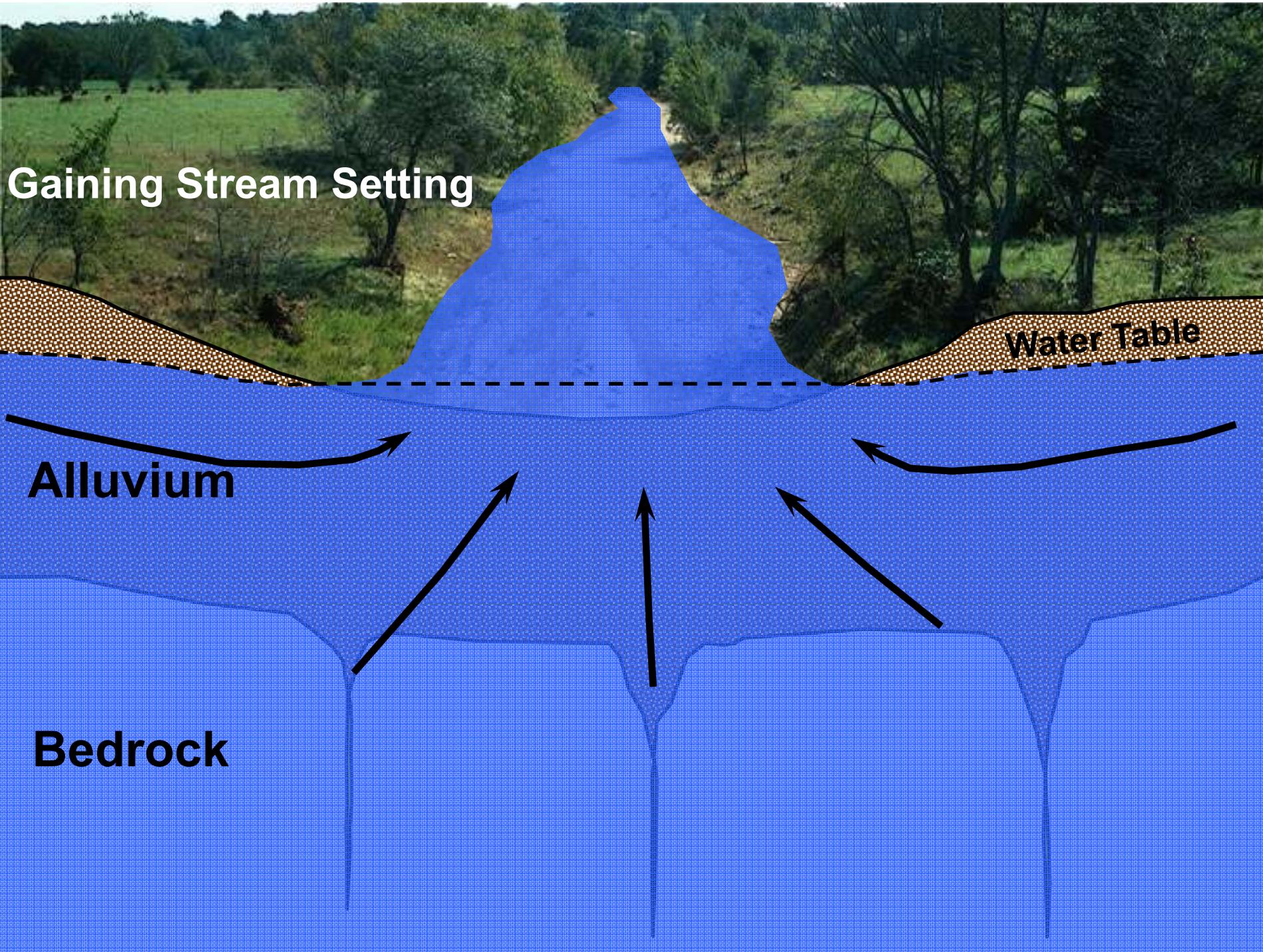
LOSING STREAM....

A stream that loses a significant part of its normal runoff into bedrock openings beneath the streambed.



Losing Stream Setting





Typical Losing Stream

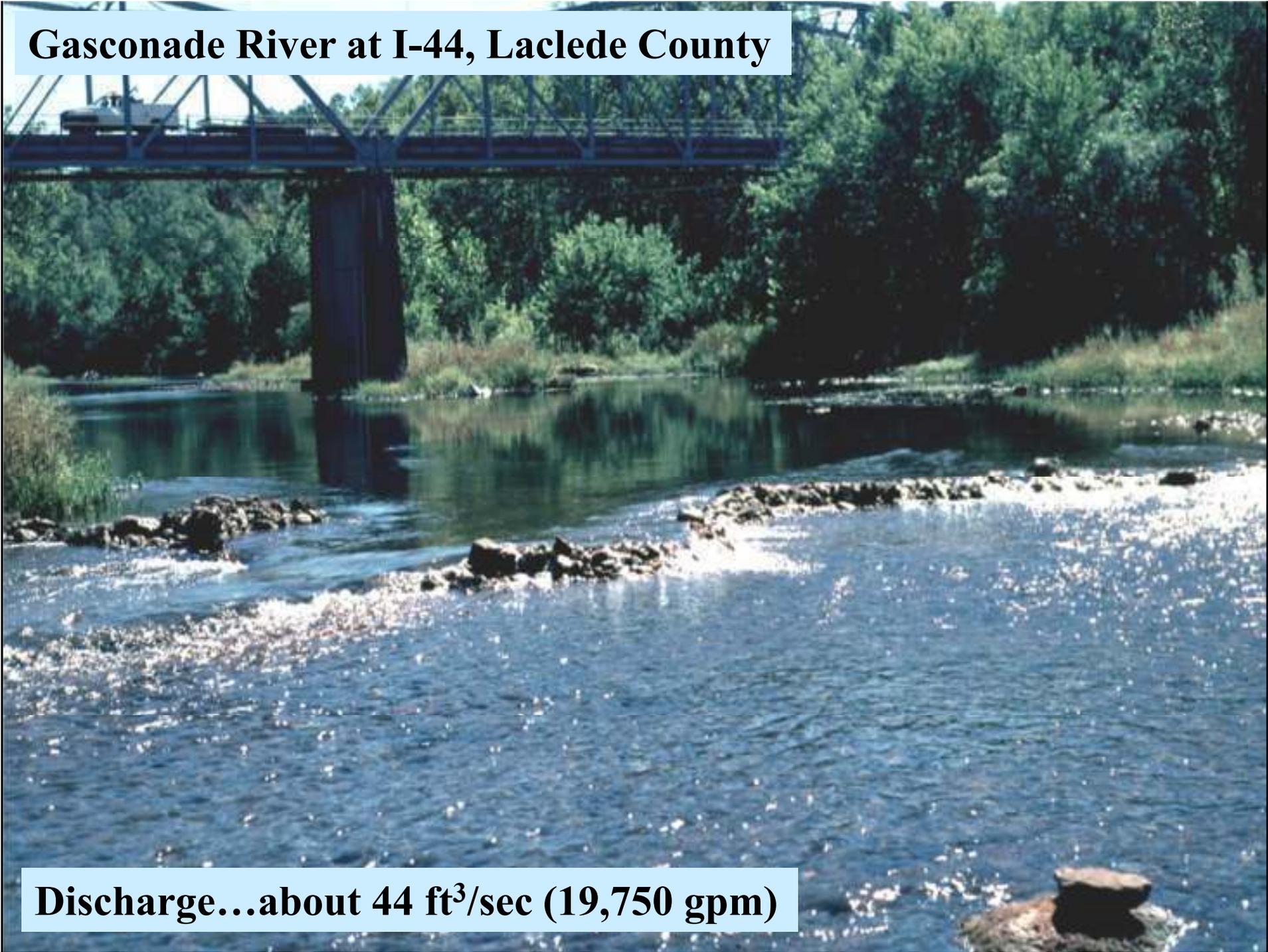


Laclede County

Typical Losing Stream

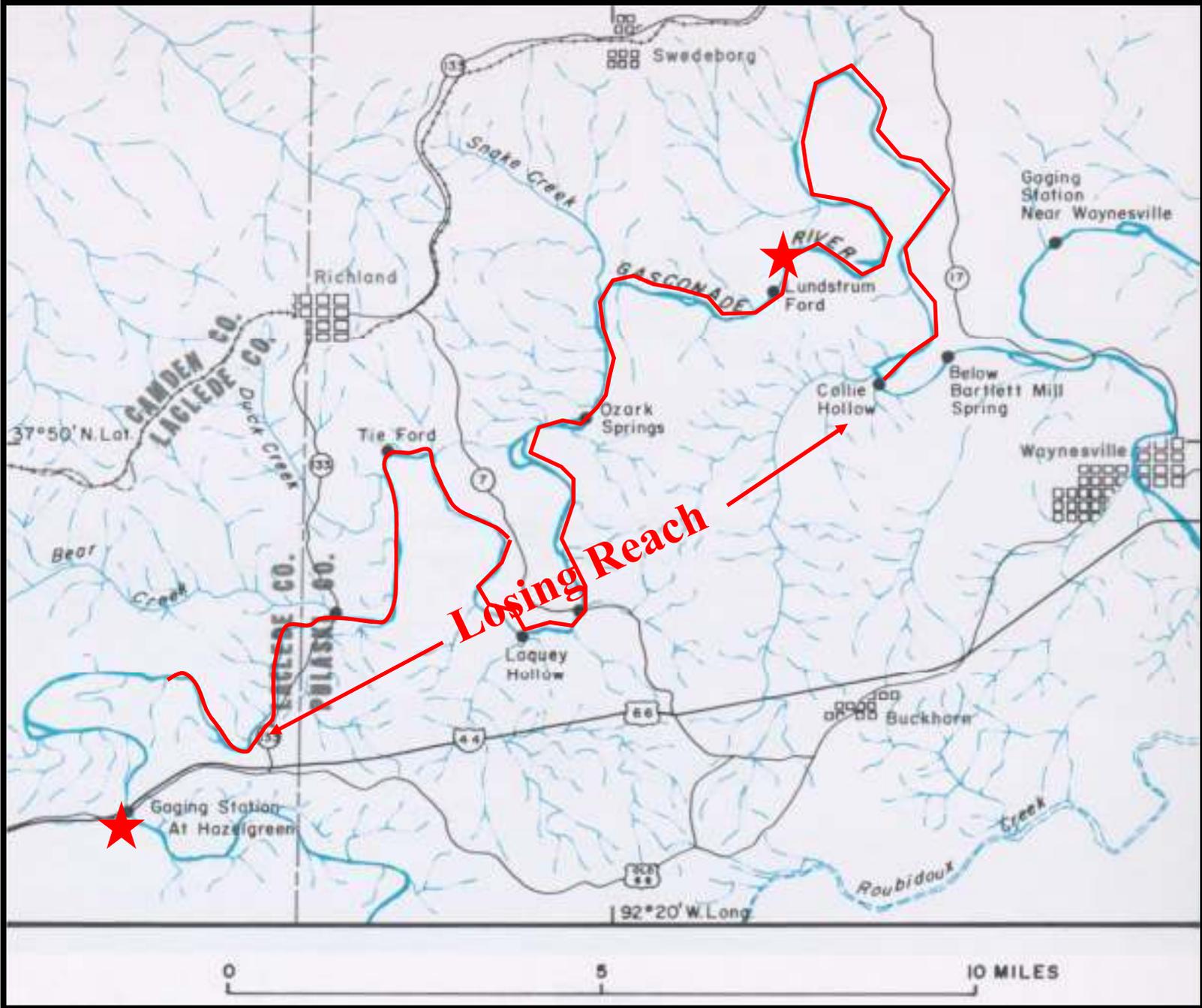


**North Cobb Creek
(Laclede County)**

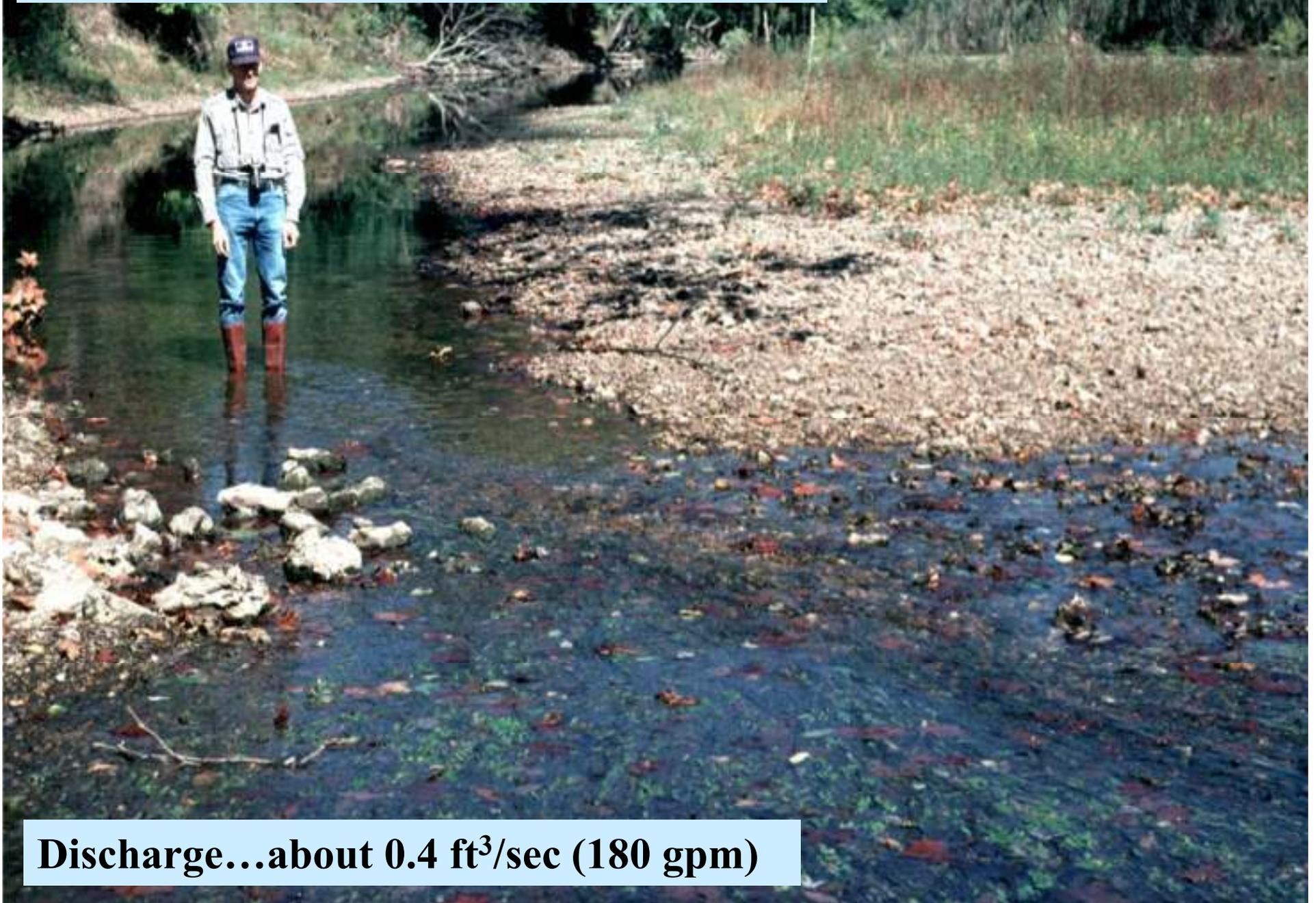
A photograph of the Gasconade River in Laclede County, Missouri. The river flows from the background towards the foreground, passing under a large steel truss bridge. The water is clear and blue, with white foam from rapids visible in the foreground. The banks are lined with dense green trees and vegetation. A white truck is visible on the bridge in the upper left. The sky is bright and clear.

Gasconade River at I-44, Laclede County

Discharge...about 44 ft³/sec (19,750 gpm)

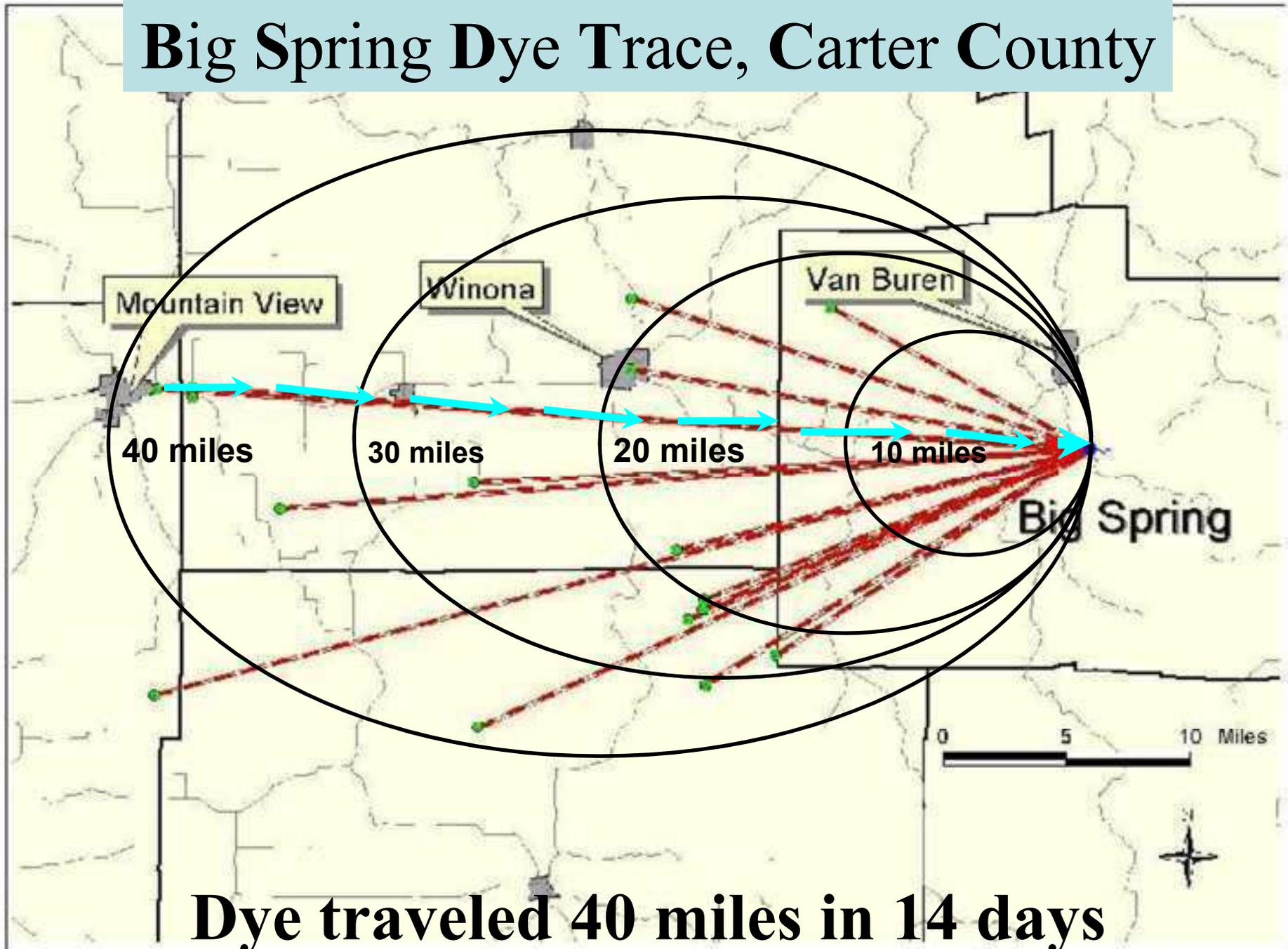


Gasconade River at Rt. T, Pulaski County



Discharge...about 0.4 ft³/sec (180 gpm)

Big Spring Dye Trace, Carter County



Dye traveled 40 miles in 14 days



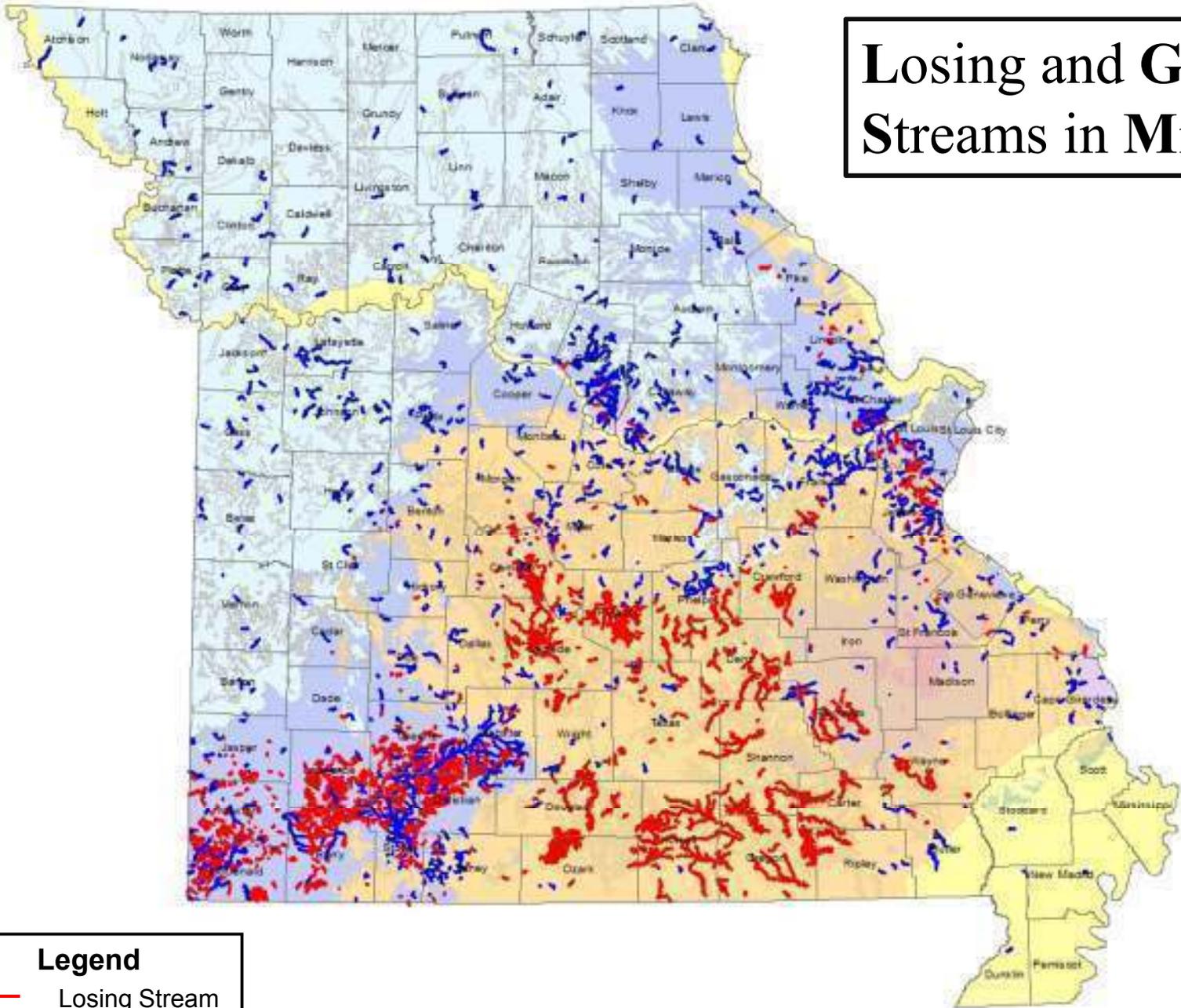
Schluersburg Karst Chasm

**July 2000
Completely filled with
coarse gravel**



**January 2000
237 feet long, 30 feet deep,
5 to 10 feet wide**

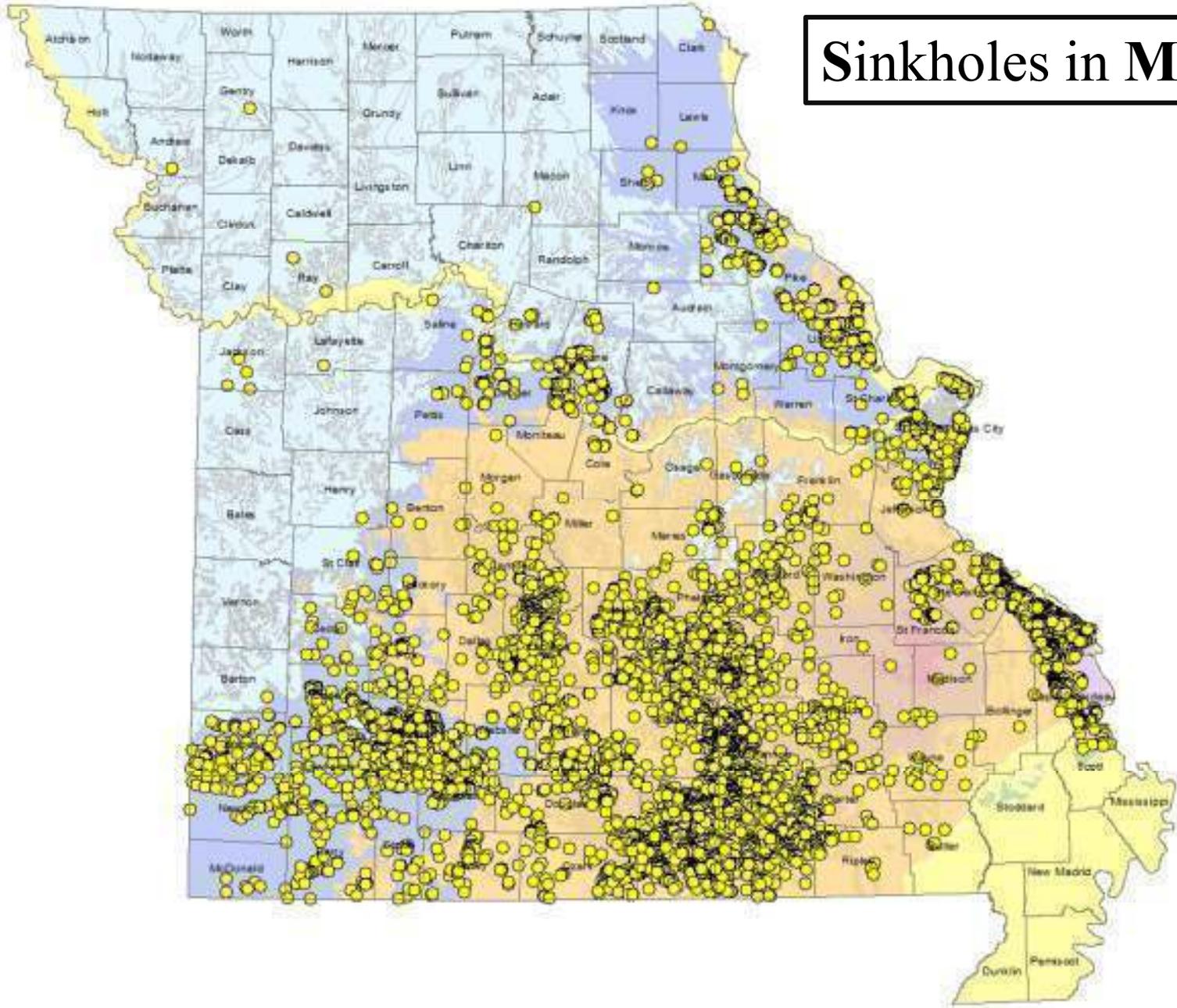
Losing and Gaining Streams in Missouri



Legend

- Red line — Losing Stream
- Blue line — Gaining Stream

Sinkholes in Missouri



Pike County



Jasper County





Lincoln County

103 7 21

2004 Berg Sinkhole Collapse, Barry County

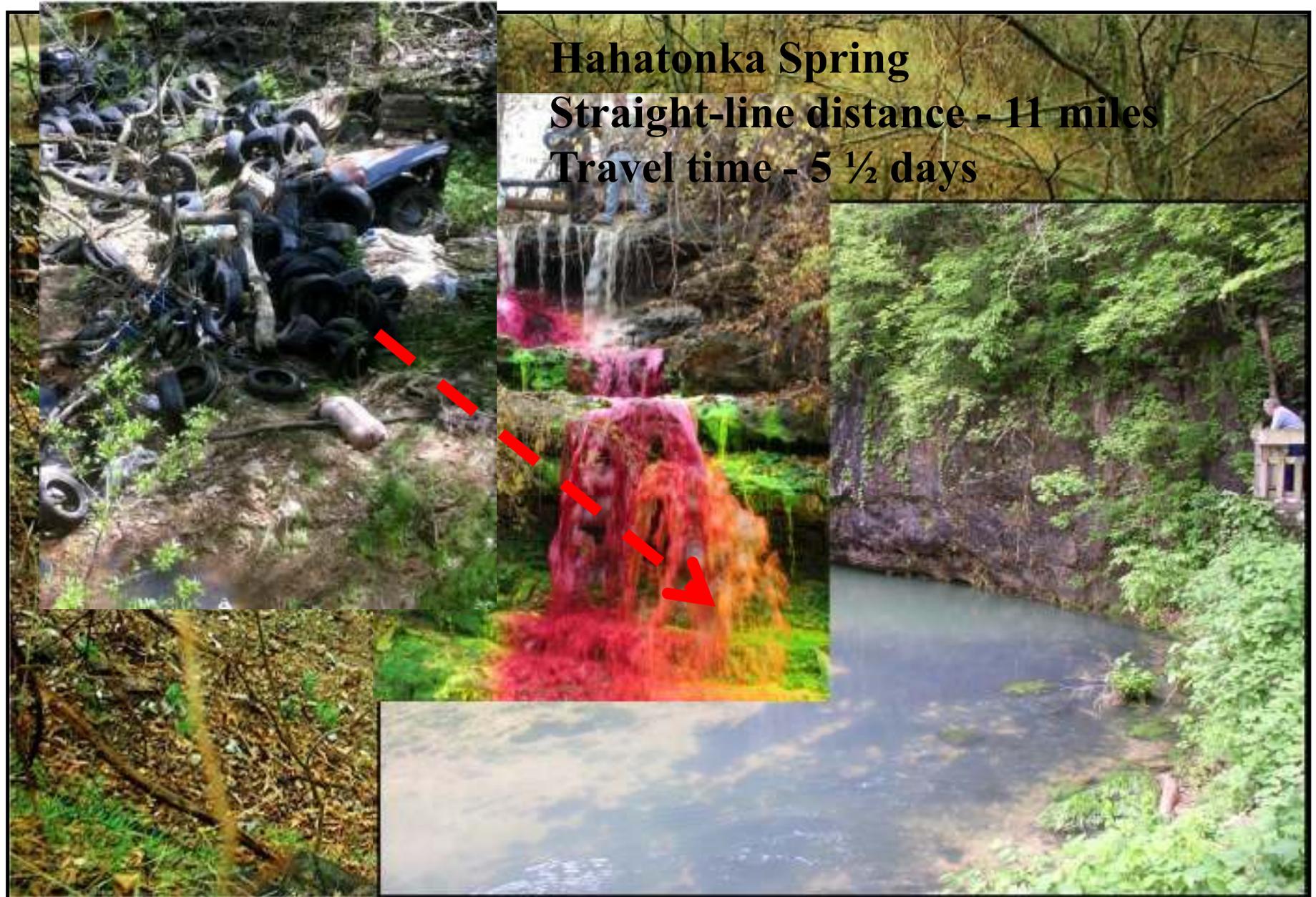


Karst areas are underlain by highly permeable bedrock and soils...

Groundwater aquifers are highly susceptible to contamination from the surface!!!

Just How Susceptible???

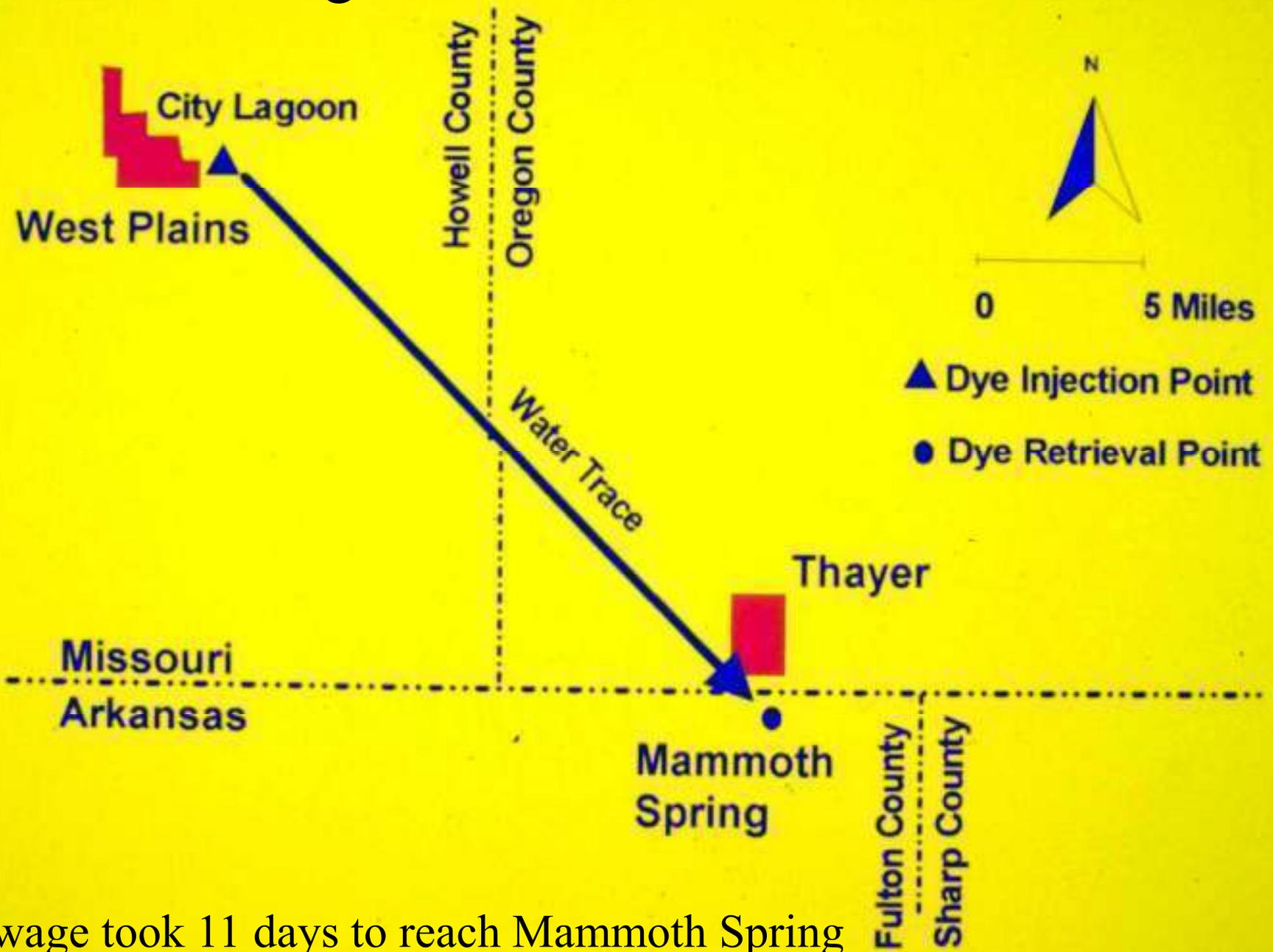
Lancaster Road Sinkhole Dump, Laclede County





West Plains Lagoon Sinkhole, Howell County

West Plains Lagoon Sinkhole



Sewage took 11 days to reach Mammoth Spring

Evaluation of Collapse Potential of Liquid-Waste Treatment Site

Required for new or modified
earthen lagoons/storage basins

Evaluation of Collapse Potential of Liquid-Waste Treatment Site

- Stream classification
- Depth to water table
- Bedrock
- Proximity of sinkholes and underground openings

Evaluation of Collapse Potential of Liquid-Waste Treatment Site

- Residuum thickness
- Surface area of facility
- Maximum operating depth

Evaluation of Collapse Potential of Liquid-Waste Treatment Site

Slight

Moderate

Severe

Geologic Limitations Rating

Slight

Moderate

Severe

Slight Geologic Limitations Rating

	Earthen Facilities	Mechanical Treatment Plant
Surficial Materials	Sufficient materials present on site which can be compacted to achieve low permeability	Not applicable
Bedrock	Low permeability below a weathered zone or a surficial material thickness and permeability which makes bedrock unimportant	Not applicable
Receiving Stream	Receiving stream must be gaining for 2 miles downstream of the discharge point for discharging facilities Streams may be losing if non-discharging facility	Receiving stream must be gaining for 2 miles downstream of the discharge point for all discharging facilities
Collapse Potential	Slight	Not applicable
Required Construction	Compacted clay liner Facility must meet gaining stream effluent quality standards	Must meet gaining stream effluent quality standards
Impact	Liner or treatment failure can affect local shallow groundwater in alluvium or other limited shallow groundwater supplies	Treatment failure can affect local shallow groundwater in alluvium or other limited shallow groundwater supplies

Moderate Geologic Limitations Rating

	Earthen Facility	Mechanical Treatment Plant
Surficial Materials	Surficial materials onsite or nearby which can be compacted or artificially sealed to achieve low permeability	<p>Note: Moderate geologic limitations do not apply to mechanical treatment plants</p>
Bedrock	Low to high permeability	
Receiving Stream	<p>Receiving stream must be gaining for 2 miles downstream of the discharge point for discharging facilities</p> <p>Streams may be losing if non-discharging facility</p>	
Collapse Potential	Slight or Moderate	
Required Construction	<p>Thickness of compacted clay liner determined by Division of Environmental Quality.</p> <p>May also require: artificial sealing, depth limits, subsurface diversion of water, and/or rock excavation</p> <p>Facility must meet gaining stream effluent quality standards</p>	
Impact	Liner or treatment failure can affect local, shallow and/or regional groundwater supplies	

Severe Geologic Limitations Rating

	Earthen Facility	Mechanical Treatment Plant
Surficial Materials	Highly permeable or an insufficient amount of surficial materials onsite or nearby. Surficial materials can not be remolded or sealed to achieve low permeability	Not applicable
Bedrock	High permeability	Not applicable
Receiving Stream	Losing within two miles downstream of the discharge point	Losing within two miles downstream of the discharge point
Collapse Potential	Moderate or severe. If a severe collapse potential rating is given then overall geologic limitations rating must also be severe.	Not applicable
Required Construction	Mechanical treatment plant, or reinforced concrete facility No earthen lagoon storage of waste is permitted.	Facility must meet losing stream effluent quality standards.
Impact	Treatment failure can affect regional groundwater supplies	Treatment failure can affect regional groundwater supplies.





**Sinkhole due
to soil piping
into 9-inch
fracture**



Cedar County

Why are Wastewater Systems Regulated.....

To protect our underground sources of current and potential drinking water resources from contamination.





Thank You

- Sherri Stoner, R.G.
- 573-368-2129
- sherri.stoner@dnr.mo.gov
- Department's website: <http://dnr.mo.gov>



Roadmap to a Successful Construction Permit Application Submittal

Byron Shaw, P.E.

SRF Engineering Unit

byron.shaw@dnr.mo.gov



Construction Permit Authority

- Revised Statutes of Missouri (RSMo)
 - 644.051 RSMo
- Code of State Regulations (CSR)
 - 10 CSR 20-6.010 Construction and Operating Permits

Keys to a Successful Submittal

- Anti-degradation Review (WWTPs)
- Geohydrologic Evaluation (WWTPs)
- Engineering Report or Facility Plan
- Construction Permit Application
- Construction Permit Fee
- Required Documentation
- Missouri Registered Professional Engineer's Seal, Signature, and Date

Construction Permit Applications

- Sewer Extension Application
 - Gravity Sewer Lines
 - Lift Stations
 - Force Mains
- Wastewater Treatment Plant Application
 - Discharge
 - No Discharge

Construction Permit Application Fees

- Sewer Extension
 - Gravity Sewer Lines
 - \$75 if less than 1,000 feet of pipe
 - \$300 if greater than or equal to 1,000 feet of pipe
 - Lift Stations - \$300
 - Force Mains - \$300

Construction Permit Application Fees

- Domestic Wastewater Treatment Plant
 - \$750 if Design Average Flow is less than 500,000 gallons per day (gpd)
 - \$2,200 if Design Average Flow is equal to or greater than 500,000 gpd

Required Documentation

- Sewer Extensions
 - Two copies of the engineering report
 - Projects limited to 8-inch gravity sewers are exempt from submitting an engineering report
 - Initially one copy of the plans and specifications is to be submitted. Three copies of the final P & S
 - For systems with a design flow $\geq 22,500$ gpd, the engineering report must be approved before submittal of P & S

Required Documentation (continued)

- Sewer Extensions
 - Summary of design
 - Letter from the continuing authority agreeing to accept the additional flow
 - Letter from the receiving wastewater treatment facility, if different than the continuing authority

Required Documentation (continued)

- Domestic Wastewater Treatment Plant
 - Anti-degradation Review
 - Two copies of the facility plan
 - Summary of design
 - Initially one copy of the plans and specifications is to be submitted. Three copies of the final P & S
 - For systems with a design flow $\geq 22,500$ gpd, the facility plan must be approved before submittal of P & S

Questions?

Review Process

Jalal El-Jayyousi, P.E.
Construction Permits Unit Chief



Review Process

- Completeness Check
- Technical Review
- Applicant Review
- Public Notice
- Construction Permit Issuance

Completeness Check

- Applicable form
- Original signature of appropriate designee
- Correct fee
- Antidegradation Report (if Applicable)
- Approved Facility Plan
- Summary of Design
- Plans and Specifications

Summary of Design

- A summary of design shall accompany the plans and specifications when applying for a construction permit.

10 CSR 20-8.110(5)

- [Summary of Design Guidance](#)

Summary of Design Contents

- Hydraulic and organic loadings
 - Average and peak flow
 - Average and peak BOD₅
 - Suspended solids
 - Impact from industrial sources
 - Verification that downstream components have adequate Capacity

Summary of Design Contents

- Process Units
 - Unit Dimensions
 - Flow rates, velocities, and detention times
 - Recycle rates
 - Controls
 - Flow metering
 - Performance assumptions
 - Pump and system curves

Summary of Design Contents

- Diagrams
- Design calculations
- Additional information
- Deviations

Incomplete Application

- Applicant notification
- Opportunity to correct deficiencies within set time frame
- Extension of time frame
- After two notification letters:
 - Application returned
 - Fee forfeited (10 CSR 20-6.010(4)(E))

Complete Application

- Assigned to Review Engineer
- Introduction letter
- Technical Review

Application Processing Time Frame

- 180 days (for WWTF)
- Clock starts – receipt of application
- Clock stops:
 - Incomplete application
 - Request for additional clarifying information
 - Pre-public notice review by applicant
 - Applicant requests extension of public notice

Technical Review

- [Technical Completeness Check](#)
- Conformance to design guide – Chapter 8
- Request for additional information
 - To applicant, copy engineer
 - Response within time frame
 - Time frame extension request
 - Two opportunities

Unresolved Technical Issues

- Contact the appropriate supervisory engineer to settle the conflict.
- Supervisory Professional Engineer Contacts:
 - Jalal El-Jayyousi, P.E.
 - Byron Shaw, P.E.
 - Refaat Mefrakis, P.E.

Draft Operating Permit

- Prior to issuance of construction permit
- Drafted by the review engineer
- Peer review
- Applicant review (15 days)
- Public Notice (30 days)

Exceptions – Public Notice

- Antidegradation review public notice
 - Existing schedule of compliance
 - Disinfection (implemented policy)
 - Ammonia (pending rulemaking)
- ➔
- Shorter processing time frame

Construction Permit Issuance

- After end of Public Notice
- Response to comments
- Management review
- Valid for one year
 - Exception: applicant request

Construction Permit Extension

- Written Request
- 30 days prior to expiration
- Justification + needed time to complete
- Can be extended only one time
- A new application and fee is required when a permit expires prior to construction completion.

Construction Completion

- Statement of Work Complete form
- As-builts – electronic format
- Applicable operating permit modification application form

Construction Permit Application

[New Form](#)

Draft

State Revolving Fund (SRF) Funding

Joe Blume, EIT
SRF Engineering Unit
conrad.blume@dnr.mo.gov



10 CSR 20-4 Grants and Loans

- Prior to the Construction Permit



- After the Construction Permit



SRF Funding Categories

- General Clean Water SRF Loan Program
 - 20% goes to Green Project Reserve
- Disadvantage Community Reserve
- Priority Watershed Reserve

Green Project Reserve

- Green Infrastructure
- Water Efficiency
- Energy Efficiency
- Environmentally Innovative

Green Infrastructure

- Includes a wide array of practices at multiple scales that manage wet weather and that maintain and restore natural hydrology by infiltrating, evapotranspiring and harvesting and using stormwater

Water Efficiency

- Use of improved technologies and practices to deliver equal or better services with less water. Water efficiency encompasses conservation and reuse efforts, as well as water loss reduction and prevention, to protect water resources for the future

Energy Efficiency

- Use of improved technologies and practices to reduce the energy consumption of water quality projects, use energy in a more efficient way, and/or produce/utilize renewable energy.

Environmentally Innovative

- Includes those that demonstrate new and/or innovative approaches to delivering services or managing water resources in a more sustainable way.

Disadvantage Community Reserve

- Population of 3,300 or less
- User rates at or above 2% of MHI
- MHI is at or below 75% of the state average MHI

Priority Watershed Reserve

- Part of the Our Missouri Water Initiative
- Three pilot watersheds
 - Big River
 - Lower Grand
 - Spring River



SRF Funding Application Requirements

- Project Summary
 - Need for the project
 - Project components
 - Cost Estimate
- Most Recent Financial Statement
- Proposed Project Schedule

SRF Funding Application

- Application must be post marked or received by the Department on or before **November 15th** prior to the fiscal year for which SRF assistance is requested
- Projects received after the November 15th deadline can be placed on the Intended Use Plan (IUP) by the Clean Water Commission

SRF Funding Application

- Projects may be considered for funding by the Clean Water Commission if the project is ready to proceed
 - Submitted complete facility plan for the purpose of financing
 - Has an acceptable debt instrument
- Unsuccessful applications for a given fiscal year shall be considered for funding the next fiscal year without having to reapply
 - If applicant is unsuccessful again they must reapply.

Facility Plan Requirements

- All the requirements for non funded projects
- The most reasonable environmentally sound and implementable alternatives must be evaluated
 - Evaluate 2 or more alternatives
 - Treatment plant alternatives must consider a no-discharge system and regionalization
- Estimate of the average user charge
 - Include documentation for the basis of the estimate
- <http://dnr.mo.gov/pubs/pub2418.pdf>

Facility Plan Requirements

- An assessment of the environmental conditions and the environmental impact of the proposed project
- The Department will use the assessment to make an environmental determination
- Projects that have started the permit process as a non funded project and then seeks funding from the Department will have to restart the permitting process.

Environmental Determination

- Categorical exclusion
- Finding of no significant impact/environmental assessment
- Environmental impact statement (rare)

Categorical Exclusion

- Granted for the following projects
 - Minor rehabilitation of existing facilities
 - Functional replacement of equipment
 - Construction of related facilities adjoining existing facilities
 - Cannot affect degree of treatment or the capacity of the facility.

Categorical Exclusion

- Granted for the following projects in communities of less than 10,000 population
 - Minor Expansions
 - Upgrading of existing treatment works
 - On-site disposal system

Categorical Exclusion

- Will not be granted for
 - Construction of new collection lines
 - New discharge or relocation of an existing discharge
 - Project designed for an increase of more than 30% in volume or loading
 - Projects designed for a future population that is 30% or more greater than the existing population
 - Projects known or expected to have an environmental impact
 - Project that is known or expected to be not cost effective
 - Project is known or expected to cause significant public controversy

Finding of No Significant Impact

- Most common environmental determination
- Prior to the finding of no significant impact being issued the community must hold the following meeting and hearings
 - Public meeting discussing the project alternatives
 - Public hearing to address proposed user rate changes
 - Public hearing to discuss any environmental impacts the project might have.
 - Public hearings shall be advertised at least 30 days in advance in a local newspaper

Finding of No Significant Impact

- The proposed alternatives must be provided to other local, state, and federal agencies that could be impacted by the proposed alternatives.
 - U.S. Army Corps of Engineers
 - United States Fish and Wildlife
 - Missouri Office of Administration – Federal Assistance Clearinghouse
 - Department of Conservation
 - DNR Office of Historical Preservation
 - DNR Division of Geology and Land Survey
 - DNR Division of State Parks

Finding of No Significant Impact

- The Department will place the finding of no significant impact on 30 day public notice prior to its issuance.
- Engineering Report/Facility Plan approved after public notice period ends and any comments have been addressed.

Plans and Specifications Requirements

- All the requirements for non funded projects
- Sole Source Restriction
- Experience Clause Restriction
- Domestic Products Procurement Law

Sole Source Restriction

- Specifications shall not require the use of the following known to be available from a sole source
 - Structures
 - Materials
 - Equipment
 - Processes
- The Department may allow sole sourcing if justification is made in writing by the engineer.
- Sole sourcing is best addressed during the facility planning stage.

Experience Clause Restriction

- Requiring manufacturers to have a record of operation for a specific period of time is not allowed
- Requiring manufacturers to have bonds or deposits to guarantee replacement in the event of a failure is not allowed
- The Department may allow an experience clause if justification is made in writing by the engineer

Domestic Products Procurement Law

- Bid documents shall require all manufactured goods or commodities used in the project to be manufactured, assembled, or produced in the United States
- Unless obtaining American-made products would increase the cost of the contract by more than 10%

Pre Construction Conference

- Meeting occurs after the concurrence of the contract award by the Department and contract execution.
- Attendees
 - Applicant
 - Consultant
 - Contractor
 - DNR Regional Office Engineer
 - DNR Project Coordinator
 - DNR Review Engineer (if necessary)
 - DNR Accountant (if necessary)

Quarterly or Interim Inspections

- Conducted by the Regional Office Engineer or Review Engineer if necessary
- Attendees
 - Consultant
 - Applicant
 - Contractor (if necessary)
 - DNR Regional Office Engineer
 - DNR Review Engineer (if necessary)
 - DNR Project Coordinator (if necessary)

Final Inspection

- Conducted once construction is complete
- Project could have more than one final inspection if there is leftover funds
- If issues are found during the final inspection. The inspection will be deemed a quarterly or interim inspection and a final inspection will still have to be conducted

Final Inspection

- **Attendees**
 - Applicant
 - Consultant
 - Contractor (if necessary)
 - DNR Regional Office Engineer
 - DNR Review Engineer
 - DNR Project Coordinator (if necessary)

Substantial Completion and Operable Wastewater Construction Form

- Submitted when the wastewater facilities are complete and operable, but the rest of the project is not complete
- Allows facility to receive operating permit and begin operating while completing the rest of the project
- <http://dnr.mo.gov/forms/780-2152-f.pdf>

Statement of Work Completed

- Submitted once the entire project is completed
 - Grass has taken hold
- Usually submitted after the final inspection has been conducted
- <http://dnr.mo.gov/forms/780-2155-f.pdf>

Engineering Assistance Grant

Byron Shaw

New and Unproven Technology

Byron Shaw, P.E.

SRF Engineering Unit

byron.shaw@dnr.mo.gov



MISSOURI
DEPARTMENT OF
NATURAL RESOURCES

New Methods and Equipment for the Treatment of Wastewater is Encouraged

- 10 CSR 20-8.020(11)(B)2
- 10 CSR 20-8.140(5)(B)
- See Publication 2453: New Technology Definitions and Requirements;
<http://dnr.mo.gov/pubs/pub2453.pdf>

Needed Information

- Operational reliability and effectiveness of the process by demonstration of a prototype unit operating at its design load conditions
- Monitoring observations, including test results and engineering evaluations, which demonstrate the efficiency of the process

Interim Definitions

- Proven Technology
- Developing Technology
- Unproven Technology

Interim Definitions (continued)

- Proven Technology
 - Existing technology not in the Code of State Regulations (10 CSR 20-8), but in use for many years, common throughout the U.S.

Treatment Technology

Recirculating Sand Filter
Sequencing Batch Reactor
Ultraviolet Disinfection

Effluent Parameter(s)

BOD5, TSS
BOD5, TSS, Ammonia
Bacteria such as E. coli

Interim Definitions (continued)

- **Developing Technology**
 - Newer technologies not covered in 10 CSR 20-8, but do have an established performance record, which includes three separate full-scale installations in the U.S. operating at a minimum of 75 percent of design average flow for three years, and having performed consistently as designed without major failure of the process, unit or equipment.

Interim Definitions (continued)

- **Developing Technology**

Treatment Technology

Membrane Bioreactor (MBR)
Recirculating Sand Filter

Effluent Parameter(s)

BOD5, TSS, Ammonia
Ammonia

Interim Definitions (continued)

- Unproven Technology
 - Emerging technologies not covered in 10 CSR 20-8. These are technologies undergoing pilot scale, or field application testing, or have already been applied in the field for full-scale application, but do not meet the criteria for developing technology.

Interim Definitions (continued)

- Unproven Technology

Treatment Technology

Moving Bed Bioreactor (MBBR)

Peracetic Acid

Effluent Parameter(s)

BOD5, TSS, Ammonia

Bacteria such as E. coli

Unproven Technology Review

- Approved under the following conditions
 - The operational reliability and effectiveness of the process or device shall have been demonstrated with a suitably sized prototype unit operating at its design load conditions for a minimum of one year with samples collected once per week and meeting the 90th percentile criteria (using the Microsoft[®] Excel[®] equation). Each permit parameter will be reviewed and approvals are parameter specific.

Is My Proposal Considered a New Technology?

- This determination needs to be completed prior to the submittal of the Anti-degradation review.
- Please contact the department for assistance.
- The department's New Technology Review Workgroup will assist.

What if my Process/Equipment is Completely New or Does Not Meet the Definitions Listed Above?

- A Pilot Study can be conducted for up to a year and renewed for a second year with approval of the department.
 - Required information will be determined when a proposal is submitted.

Questions?