

ELK COUNTY FRESHWATER ASSOCIATION

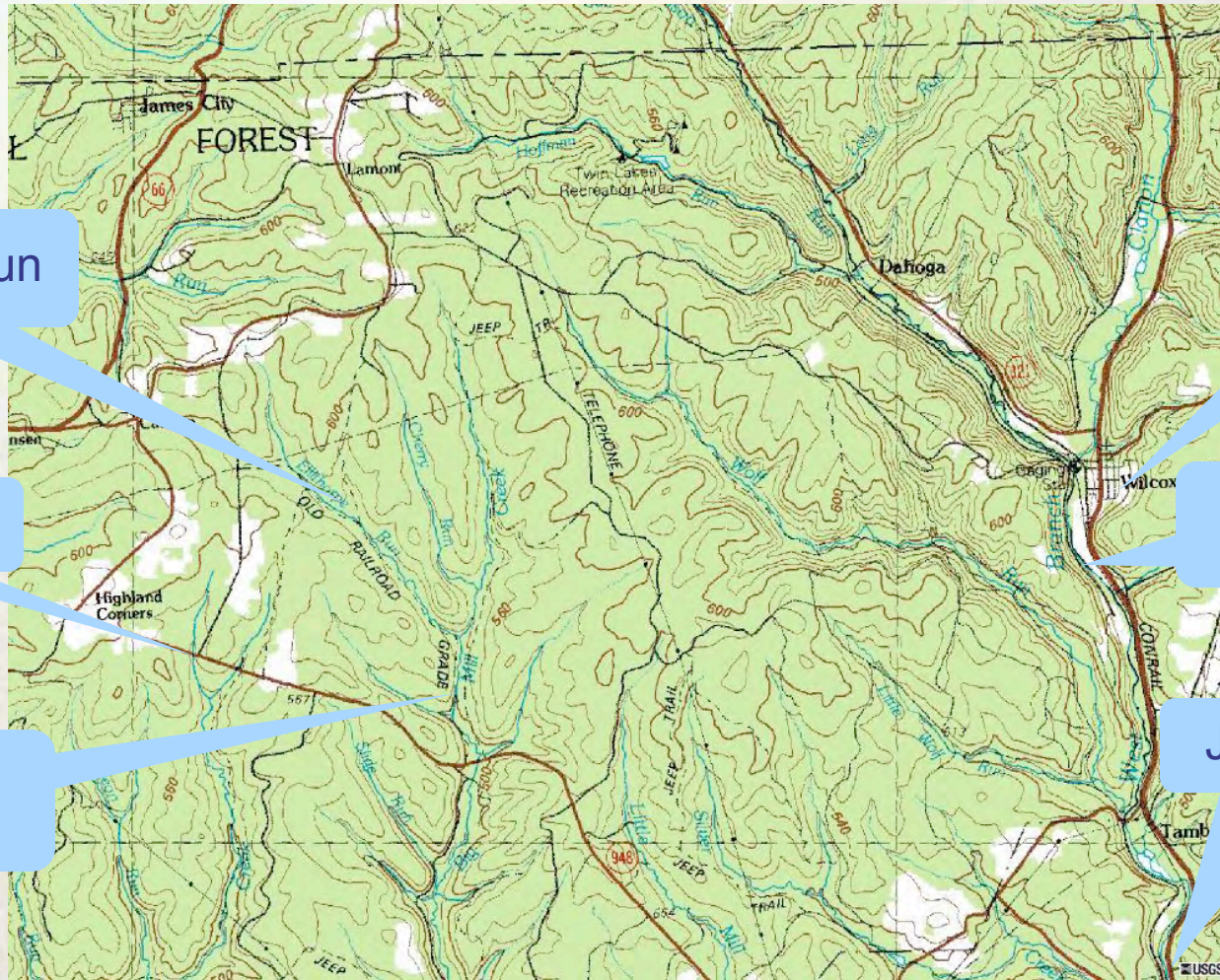


ECFA Objectives

- Restore streams in Elk County
- Educate the public about local watershed
- Improve fishing locations in Elk County
- First project
 - Big Mill Creek Restoration



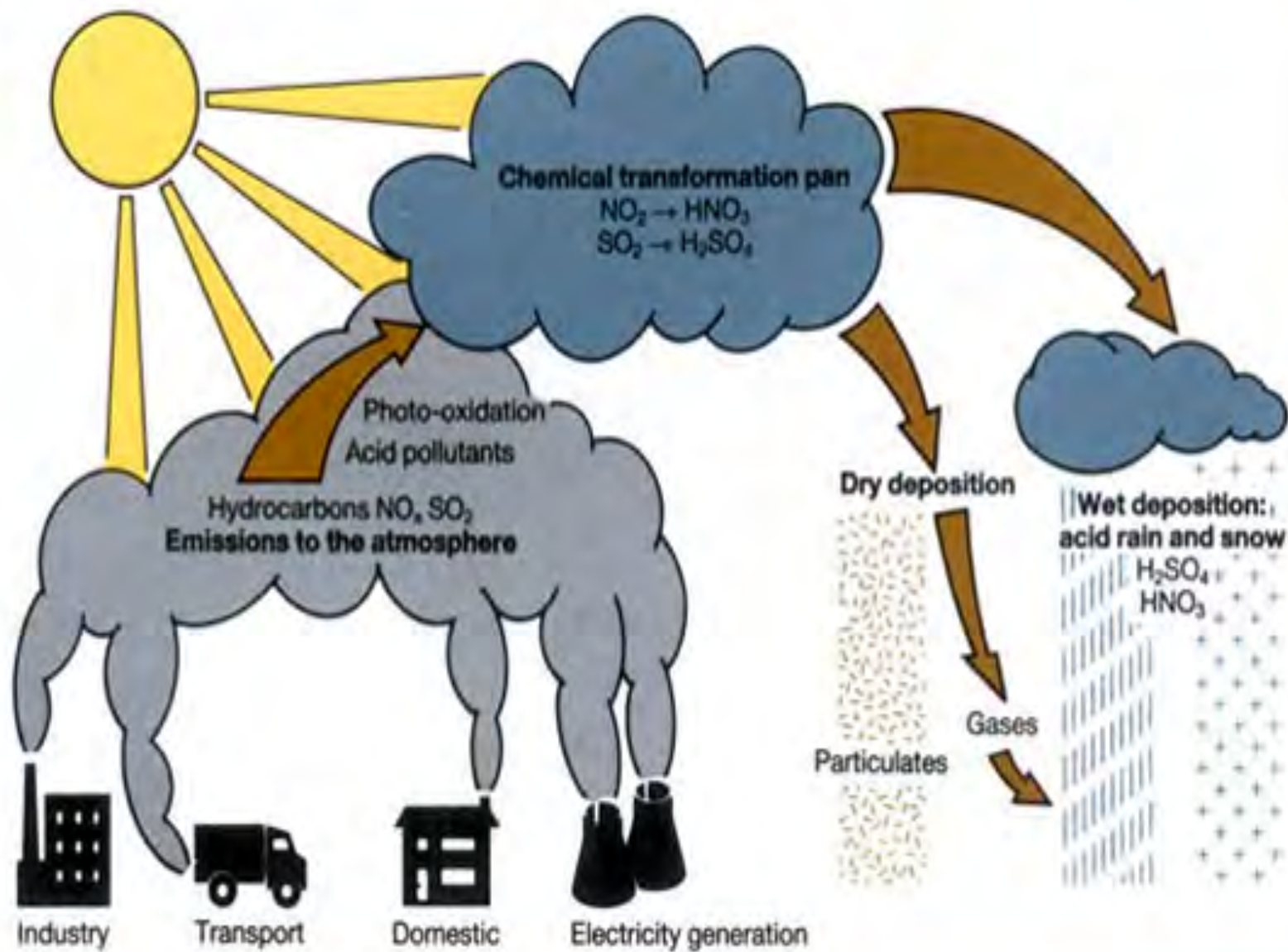
Big Mill Creek – Location



Big Mill Creek – What's Wrong?

- Acid Rain
 - **SO_x & NO_x Loading from Fossil Fuel Emissions**
 - **Depletion of Soil and Shallow Groundwater Buffering**
 - **Decrease in Soil pH & Increase in Soluble Aluminum**
 - **Decrease in Headwater Alkalinity & pH**
 - Chronic Acidification
 - Episodic Acidification
 - **Downstream Migration of Acidification**
 - Episodic & Chronic

How acid rain is formed



Impacts of Acid Rain & Episodic Events

- Fish cannot live in low pH water
- Invertebrates cannot live
- No natural reproduction of fish or their food
- Early life stages of water species will not develop



pH Tolerances of Species

- **pH 6.5**
Trout, Bass,
Frogs
Mayflies, Clams,
Sunfish, Snails,
Salamanders,
Crayfish
- **pH 6.0**
Trout, Bass,
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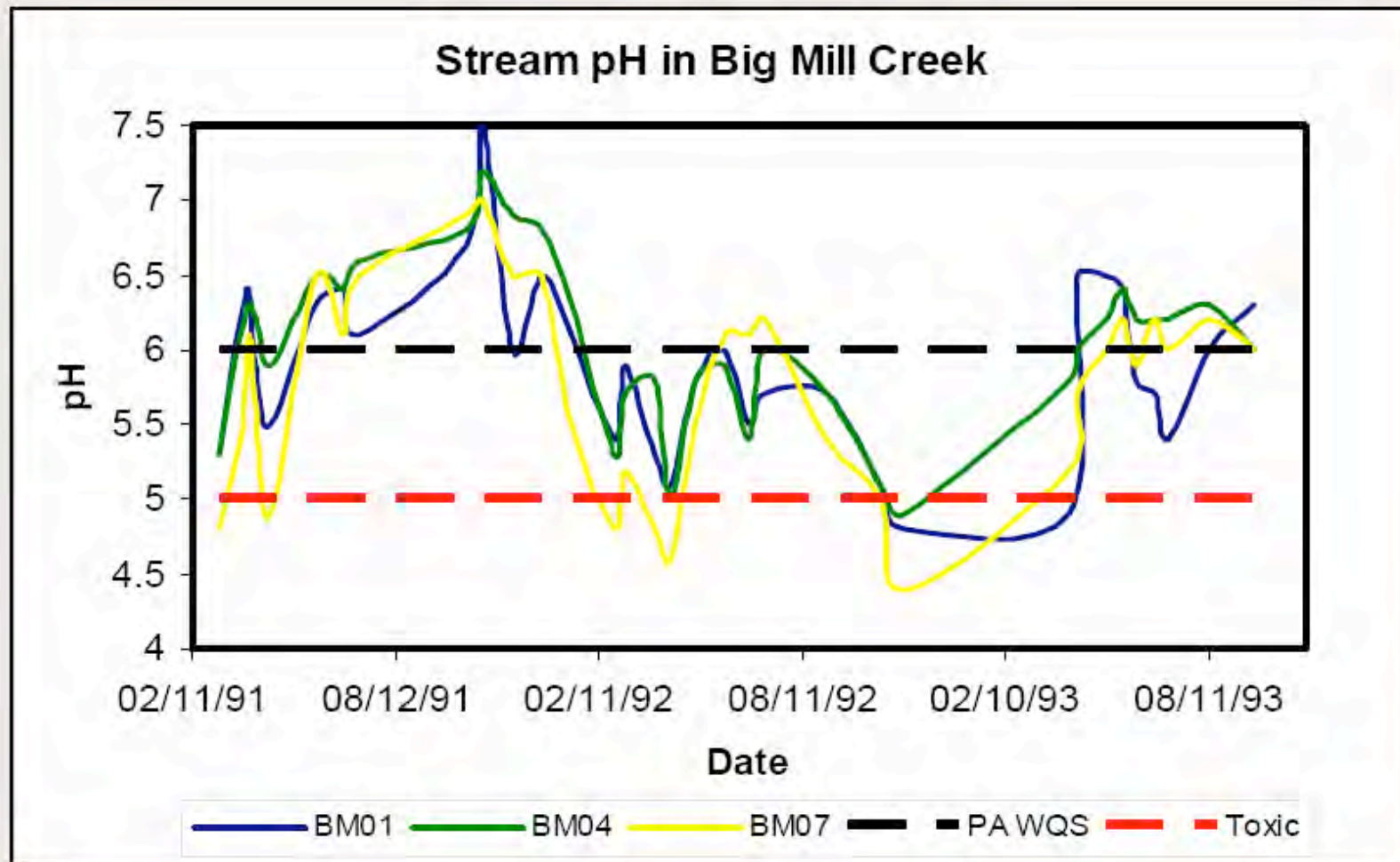


- **pH 5.5**
Frogs,
Sunfish,
Salamander

- **pH 5.0**
Frogs

Historical Water Quality in Big Mill Creek

Data Source: U.S. Forest Service



How We Are Testing

- Taking pH and conductivity measurements during different flows



What We Can Do

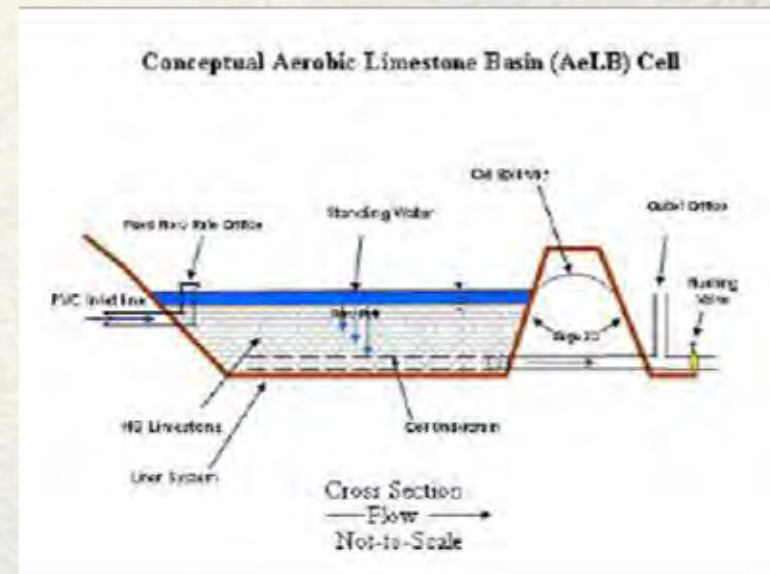
- Stop Acid Rain
 - Global issue that is being solved by reduction in fossil fuel emissions
- Put in treatment facilities
 - Active limestone treatments
 - Passive limestone treatments
 - Both increase the buffering capacity
 - Demonstration

2 Types of Passive Treatments

- Anaerobic Vertical Flow Wetlands (AVFW)
- Limestone Basin

Aerobic Limestone Basin

- **Advantages**
 - Simple Design
 - Removes iron & aluminum
 - Removes acidity
 - Produces alkalinity
 - May remove manganese
- **Disadvantages**
 - Effected by coating
 - Potential clogging
 - No high metals (Fe & Al)
 - Uncertain alkalinity generation
- **Sizing Guidance**
 - 4-40 hours detention time



Anaerobic Vertical Flow Wetlands (AVFW)

- **Advantages**

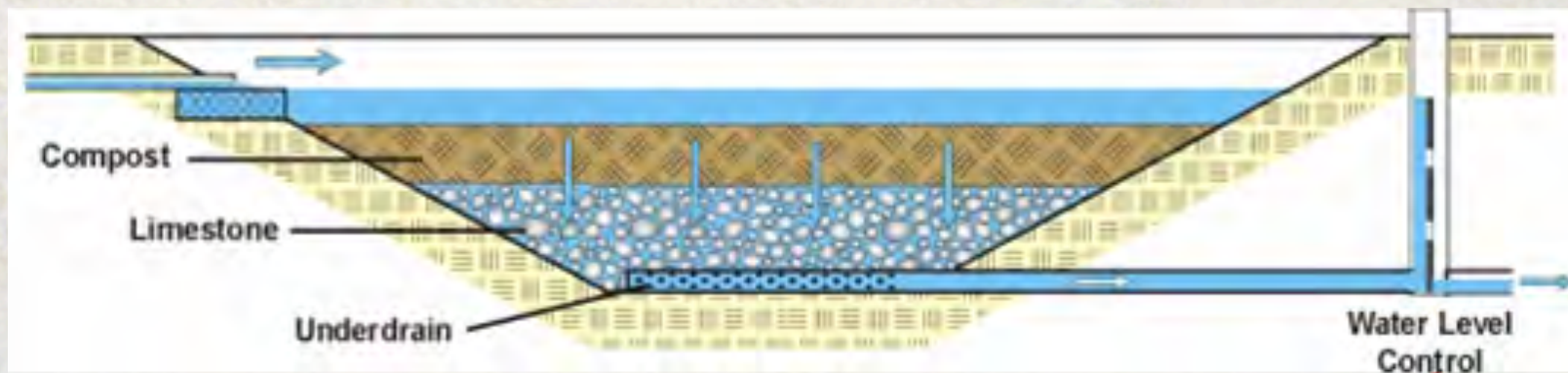
- Accepts toxic waters
- Can treat high acidity
- Not effected by aluminum
- Produces excess alkalinity

- **Disadvantages**

- Effected by high iron loading
- Poor manganese removal
- Complex design
- High capitol cost

- **Sizing Guidance**

- 20-50 GDM acidity removal
- 8-16 hours detention time
(limestone layer only)

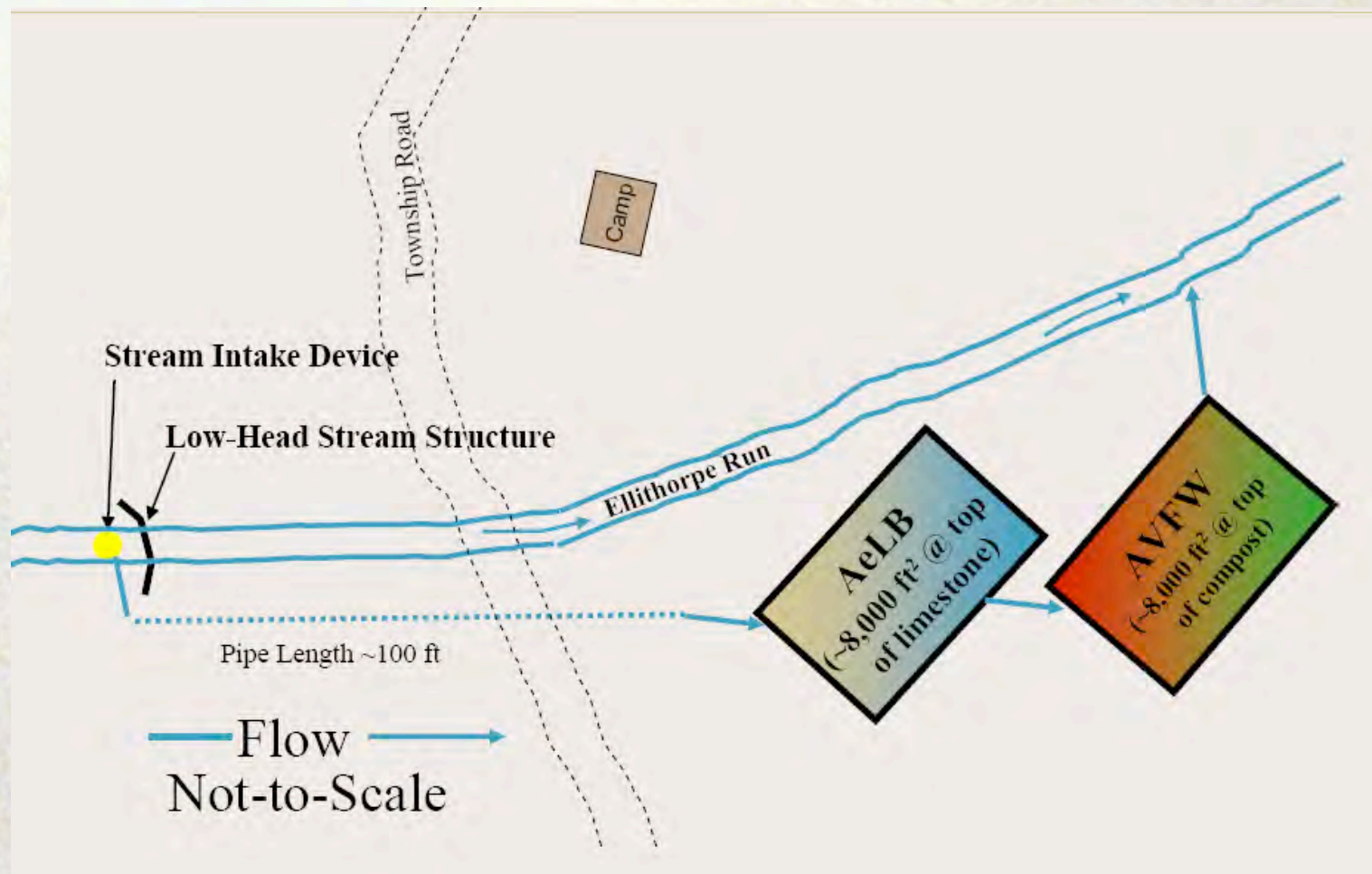


What They Look Like



The Sommerville VFW

Putting It All Together

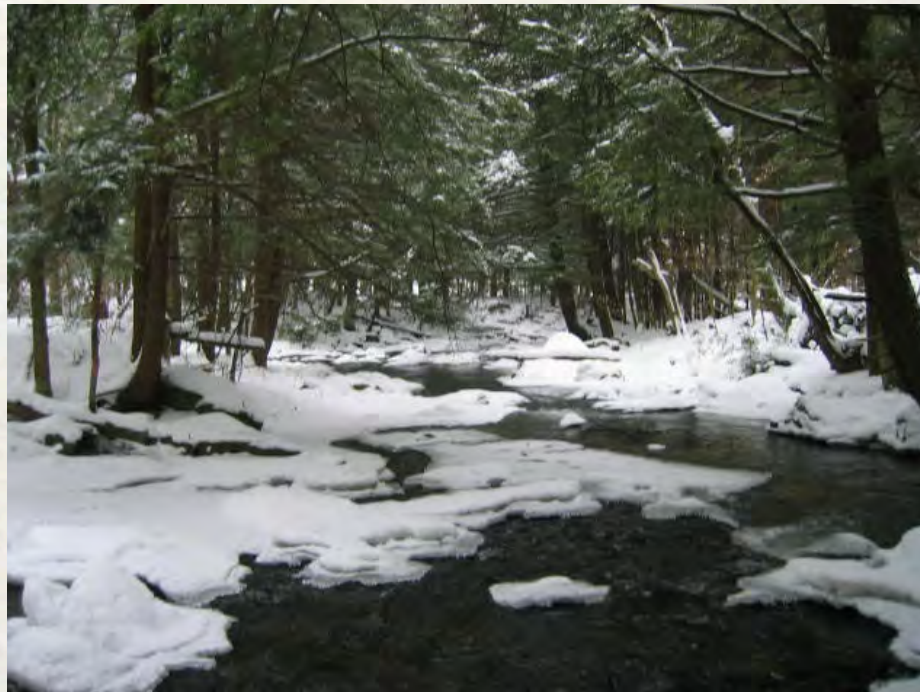


Benefits Of Improvements

- Improve water quality of Ridgway Reservoir
- Relieve fishing pressure from other streams because Big Mill Creek will be taken off stocking schedule if nothing is done
- Ensure future generations of Elk County anglers will have premium trout streams

Future Improvements

- Easily accessible areas
- Reintroduction of native species
- Other stream habitat improvements



Wrap-up

- Improve water quality of Big Mill Creek by installing passive limestone systems to tributaries
- Improve fishing and fish habitat of Elk County streams



- Provide a model for future groups to combat the effects of acid rain
- Educate people of what is going on with our local streams



Contact Information

Elk County Freshwater Association

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St. Mary's, Pa 15857
(814) 834 3701

We would be happy to do a presentation for your group
or school



Donations Accepted