

# *Session G – Lessons Learned*

What is a Lesson Learned?

# Lessons Learned

**A Lesson Learned is a change in behavior as a result of experience**

1. **Reflect on Experience**
2. **Identify Lesson**
3. **Analyze**
4. **Generalize**

**At this stage we have a Lesson Identified.**



[Knoco stories: What is a Lesson Learned?  
http://www.nickmilton.com/2009/05/what-is-lesson-learned.html#ixzz7VpZzZjxW](http://www.nickmilton.com/2009/05/what-is-lesson-learned.html#ixzz7VpZzZjxW)

# Lessons Learned

## What Makes a Lesson Learned?

- **Take Action**
  - Include in Training
  - Change Policy and Procedures
  - Revise Standards or Details
  - Include in QA/QC Reviews
- **If Nothing Is Changed, Nothing Has Been Learned, We Repeat Failure**



[Knoco stories: What is a Lesson Learned?  
http://www.nickmilton.com/2009/05/what-is-lesson-learned.html#ixzz7VpZzZjxW](http://www.nickmilton.com/2009/05/what-is-lesson-learned.html#ixzz7VpZzZjxW)

# Restoration Is Ancient History: Nothing You Do Is New

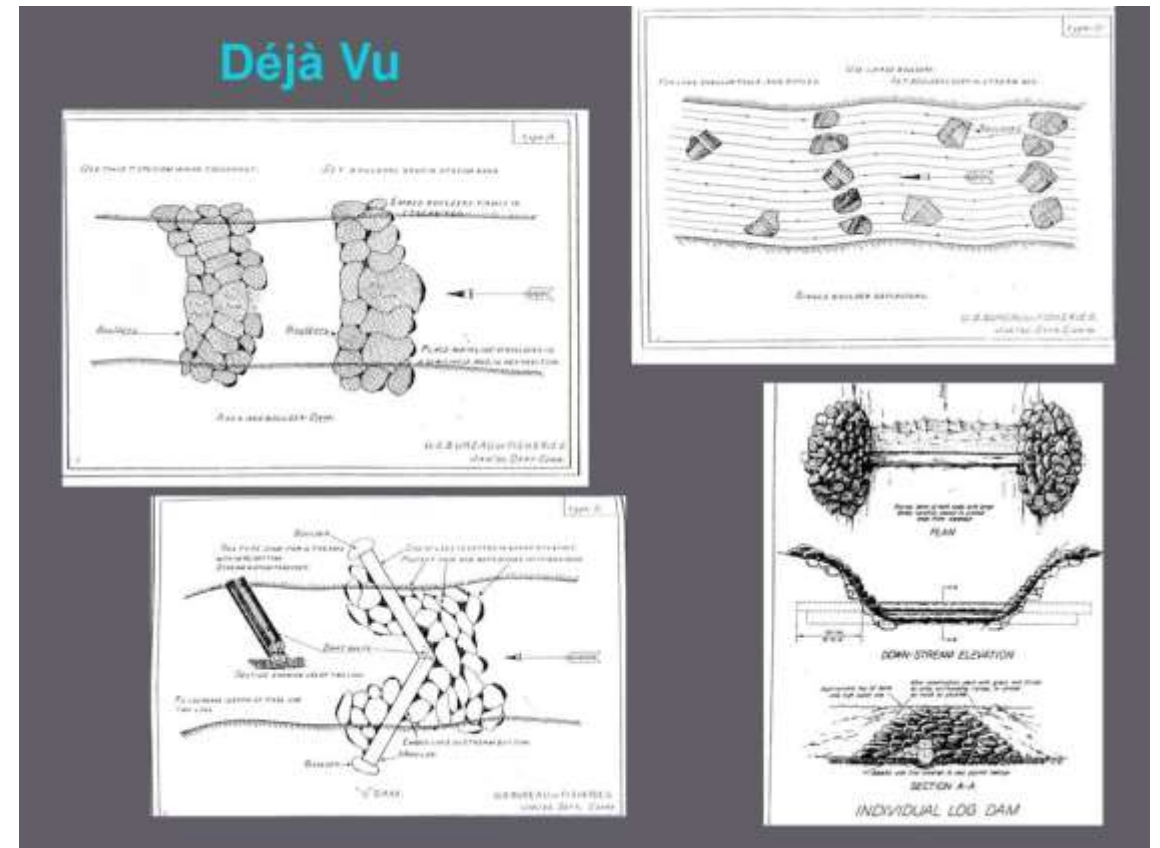
*Session G*

*Bob Siegfried*



# 1870- 1920s - Structures to Improve Fishing

- 1870s Fishing Clubs in Catskills build pools for trout
- 1870-1920 US Bureau of Fisheries, American Society of Fisheries
- Focus was on Fish Production, particularly for Recreation



1935 US Bureau of Fisheries

# 1930 - 'Low Tech' Stream Restoration

- CCC does Stream Restoration
- Used Boulders, Logs, Bioengineering
- In-Channel Improvements
- Mostly Hand Labor
- 31,000+ structures in 406 mountain streams
- 4,800 Miles of Streams

STREAMS ARE IMPROVED BY CCC. MONTANA.

F-292499



# Lessons Identified (Learned?)

*Géographie physique et Quaternaire*, 2002, vol. 56, n° 1, p. 45-60, 4 fig.

## THE DEVELOPMENT AND HISTORIC USE OF HABITAT STRUCTURES IN CHANNEL RESTORATION IN THE UNITED STATES: THE GRAND EXPERIMENT IN FISHERIES MANAGEMENT

Douglas M. THOMPSON\* and Gregory N. STULL, Department of Physics, Astronomy and Geophysics, Connecticut College, Campus Box 5585, 270 Mohegan Avenue, New London, Connecticut 06320, U.S.A.

- 1930s Science Started to Study Restoration Projects
- 100% of cover structures failed
- 95% cabled LWD failed
- Ehlers (1956) 18 year study of 41 CCC era structures – 76% failure
- Structures failed without maintenance

# 1940 - 1967 – WWII Command and Control

- Massive COE Water Projects  
Dam and Divert Rivers
  - 11,000 miles dredged by COE
  - 20,000+ miles by Soil Cons. Ser.
- Flood Control Leads to Concrete Channels





# Environmental Movement - Stream Restoration

- **1970s – Fishery Scientist Lead the Way (Again!)**

- Fish Habitat Enhancement
- 15-20 Years Of In-stream Structures – K Dams, Wing Deflectors, Log Check Dams
- Abruptly Altered Channel Bedform (Pool Frequency)
- No Channel Reconfiguration



# 1952 USFS Manual



Many mistakes were made in the earlier stages of the work, but much has been learned as a result. At first, considerable emphasis was placed on a large variety of stream improvement structures. Stream improvement was looked upon by some as a cure-all for the environmental ills of a trout stream. Experience showed that only a relatively few types of simply designed structures were necessary and that stream improvement fell far short of making a desirable stream habitat if destructive forces were at work in the watershed.

Unless stream improvements are carefully planned much damage may result. One of the first things learned in the earlier stream improvement work was that it could be easily overdone.

## SIMPLE Log Dam

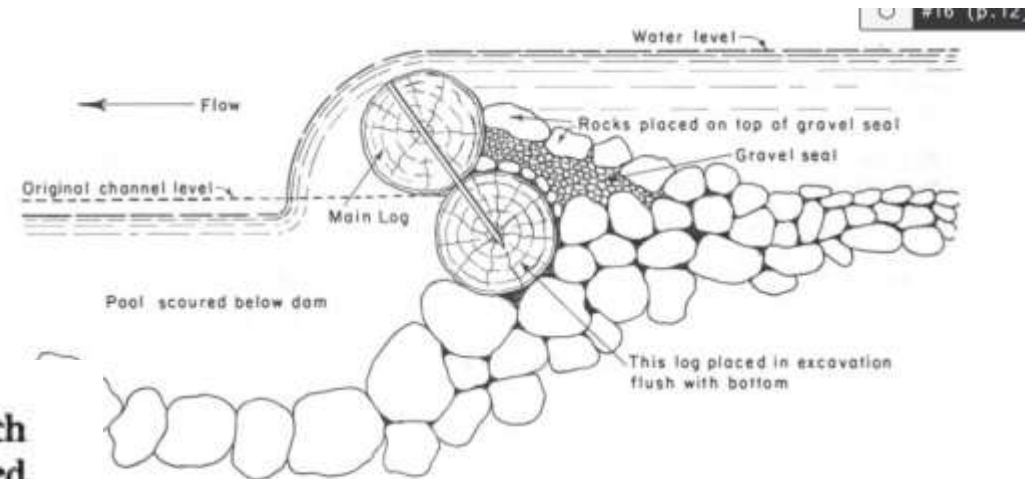
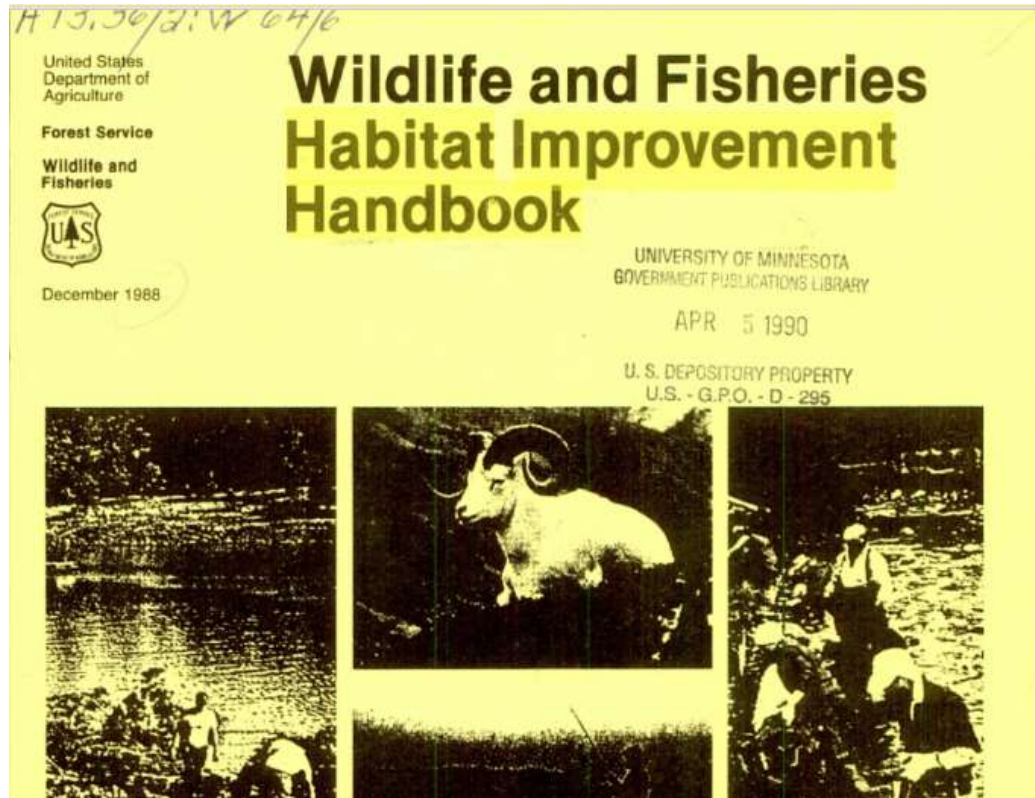


Plate III (B)

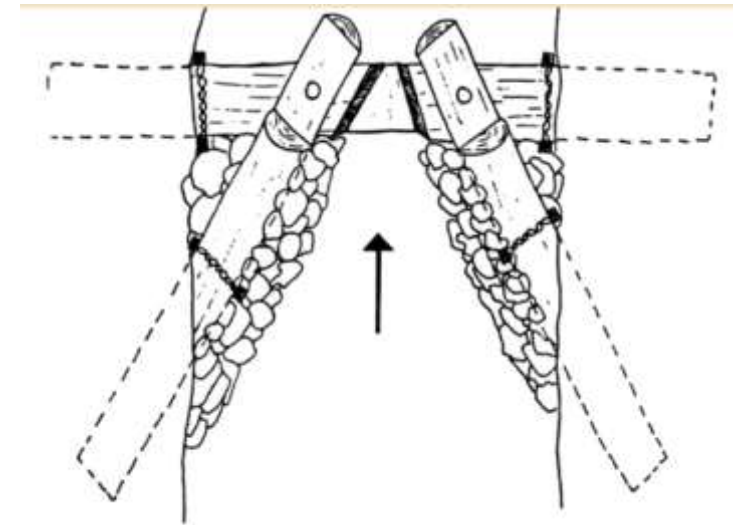
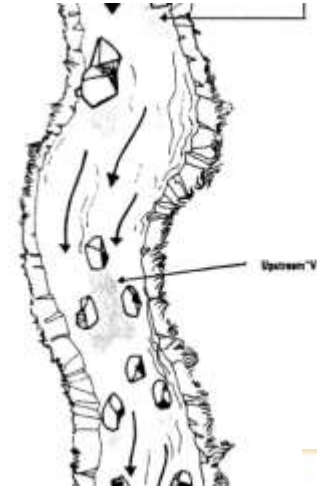
### SIMPLE LOG DAM

Cross-Section  
Should be used only where excessive  
undercutting beneath dam is not expected

# 1986 USFS Manual



## Simplified Details and Design Criteria



# USFS 1992

Attachment for  
Biology Tech. Note #48



United States  
Department of  
Agriculture  
Forest Service  
Southern Region

## Stream Habitat Improvement Handbook

Technical Publication RB-TP 16

June 1992



## Schematic Drawings

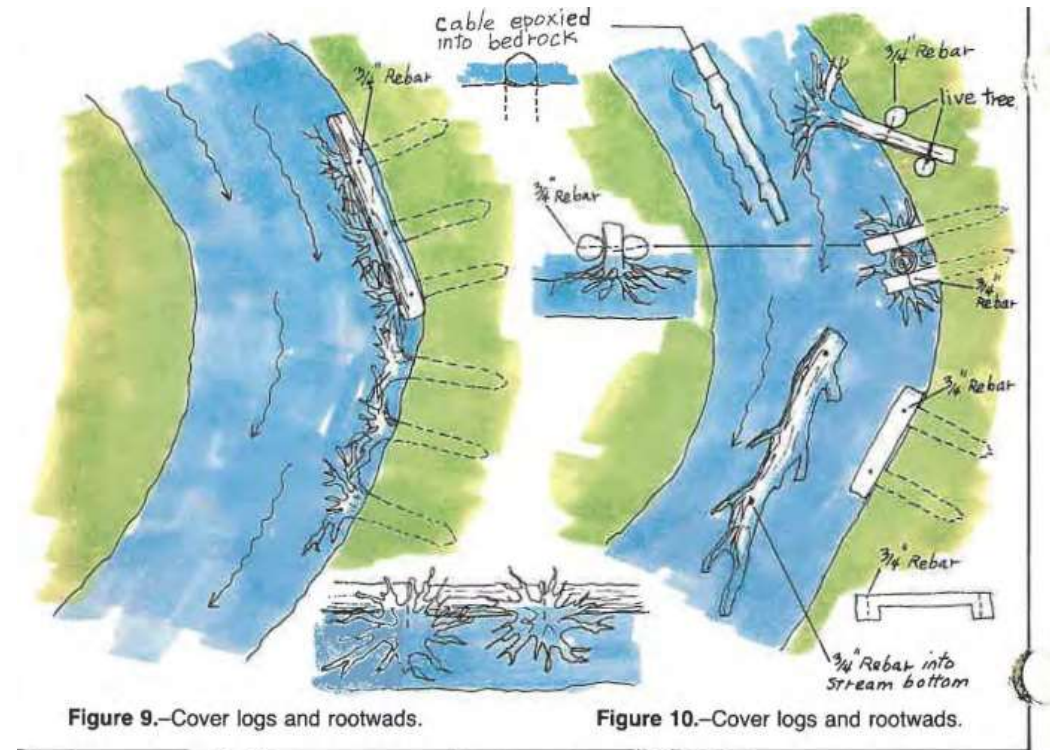
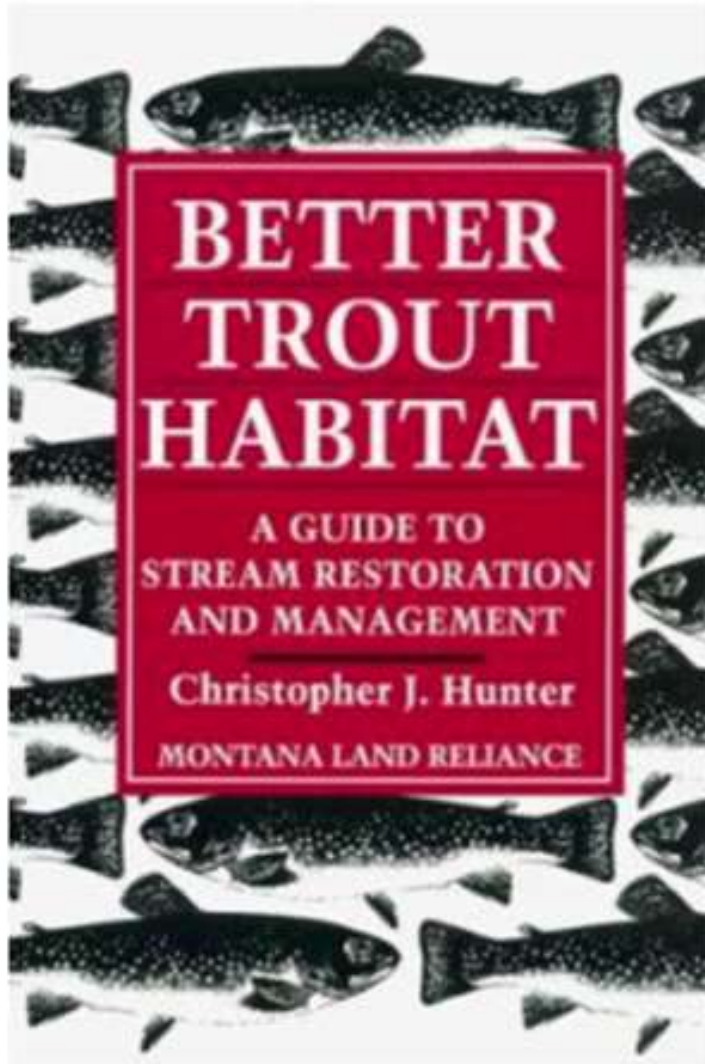


Figure 9.—Cover logs and rootwads.

Figure 10.—Cover logs and rootwads.

## 1991 – Better Trout Habitat



- Targeted to Public Groups
- TU / Watershed Groups
- Fish Habitat / Structures
- Less Details than earlier Manuals

# Modern History of Stream Restoration

## 1980-2010s

- 1980s Other Disciplines Arrive
- Hydraulic Geometry Relationships
- Stage Set For Full Scale Reconfiguration Of Rivers
- Stand Alone Use Of Instream Structures Fell Out Of Favor
- BUT Nearly All "Restored" Streams Include "Structures"
- Most Structures are a Point of Failure

## Failed J Hook



# 2004 Virginia Manual

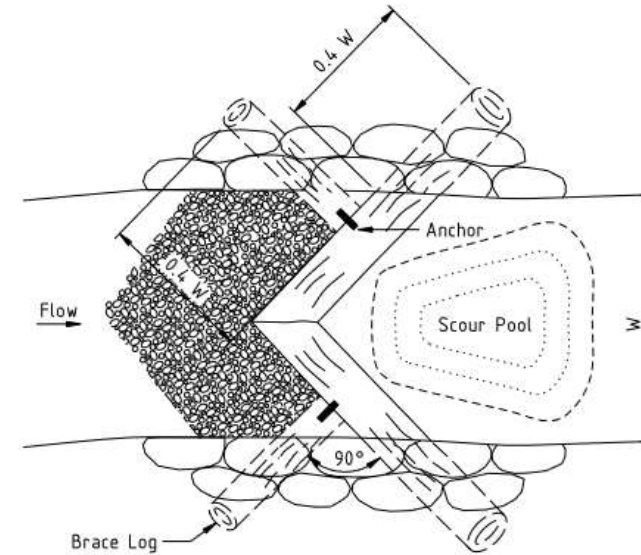
## The Virginia Stream Restoration & Stabilization Best Management Practices Guide



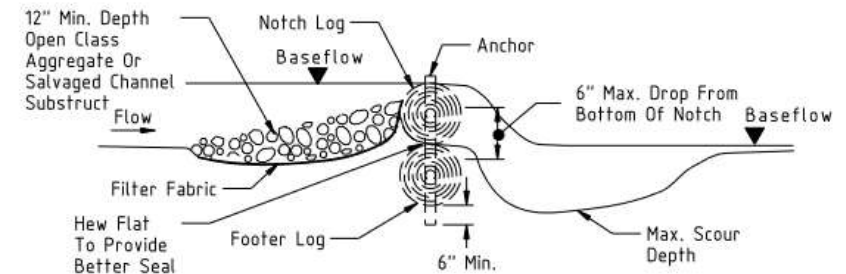
Department of Conservation and Recreation  
Division of Soil and Water Conservation  
203 Governor Street, Suite 206  
Richmond, Virginia 23219-2094  
Phone: 804-786-2064



### The Virginia Stream Restoration & Stabilization Best Management Practices Guide DETAIL 3.5(b): V LOG DROPS



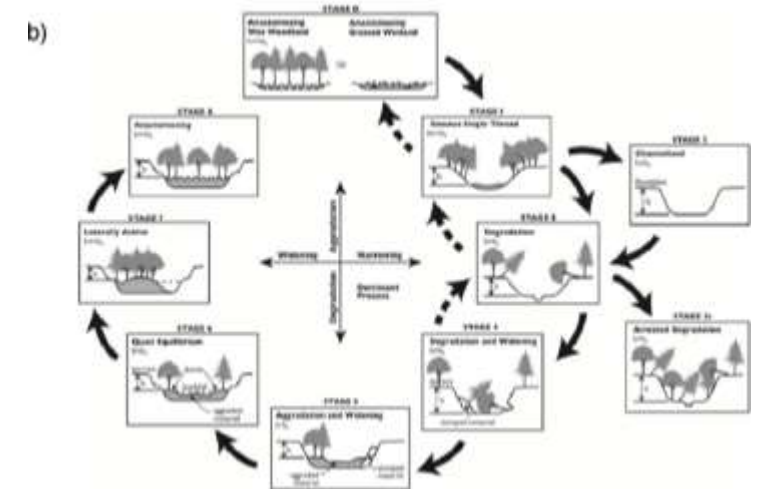
PLAN



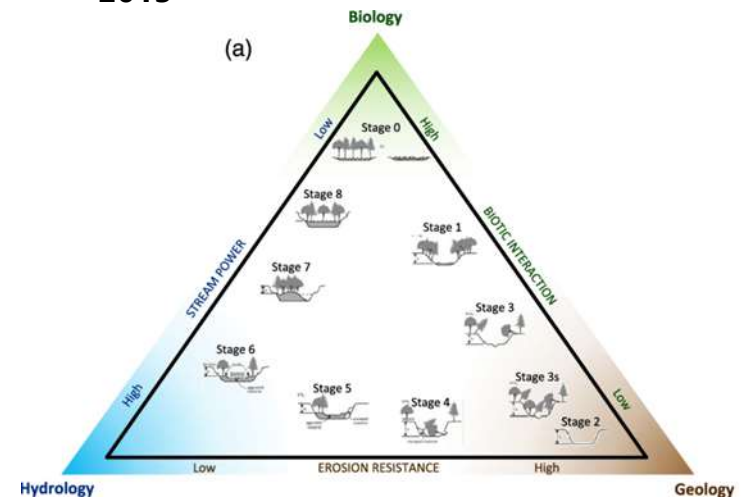
PROFILE

# Broadening the Concept of Restoration

- **2010s:**
  - Legacy Sediment Removal Design
  - Stage Zero Design
    - Incorporation of More Ecology
  - Beaver Analog Designs
    - Low Tech or Process Based
  - Messy River Design Concepts (Wohl)
    - Dynamic, Complex, Self Healing,
    - Floodplain Wetland/Stream Complexes



Stream Evolution Model (Cluer and Thorne 2013)



Stream Evolution Triangle (Castro & Thorne 2019)



# Lessons Learned from History of Beaver Analogs?

1870, 1930s, 1950s

Beaver Analog on 1930s Gully

### Low-tech Restoration Isn't New

**France 1870's**



**E**



**F**

**Sierras 1930's**

**Handbook of Erosion Control in Mountain Meadows**  
~ Published 1934



Whenever the flow along a gully has increased to a low high "flood" stage one is considered to be out over some of four feet.

There is less danger of such structures washing out in time or worse, and if they should wash out less damage will result. Further, the dams are more economical than high dams.

It is not unusual to stabilize a gully by stages, that is, to do it at one time or with one set of dams. The best method is to construct a series of low dams along the gully. When the embankment behind these dams has filled, another series of dams may be built on top of or just upstream from the original ones as illustrated in Figure 19. One or two years will ordinarily elapse before it is necessary to construct a new set of dams, although occasionally one big stone may be sufficient to fill the interstices.

Temporary rather than permanent dams have not usually proved. When a gully has been incised, and the stream properly located, the check dam serves no further purpose. In the case of temporary dams, consisting in part of cut other local material, are more effective in some localities than these. This has been shown to be a temporary nature, leaving permanent control of it to be obtained by proper vegetative methods, if that same soil can be effectively dug and well built.

**CA & ID 1950's**

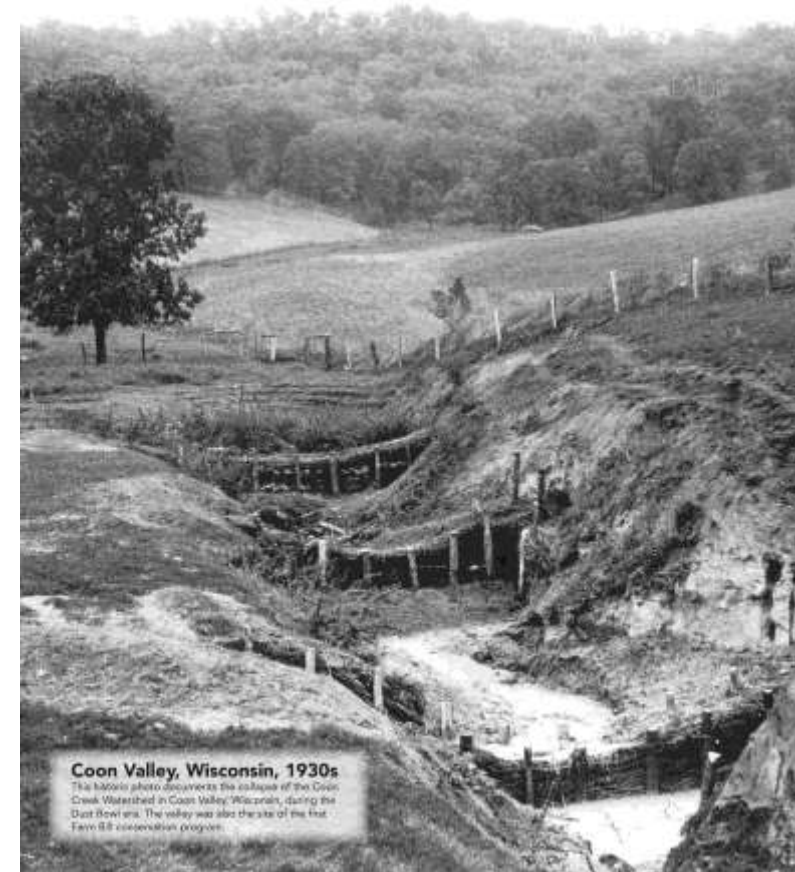


**SCS 1930's**



Figure 11  
Location of gully after flood has been over the dam. The grass has been cut, and the layer of litter has been removed.





**Coon Valley, Wisconsin, 1930s**  
The Moore photo documents the collapse of the Coon Creek Watershed in Coon Valley, Wisconsin, during the Dust Bowl era. The valley was also the site of the first Farm Bill conservation program.

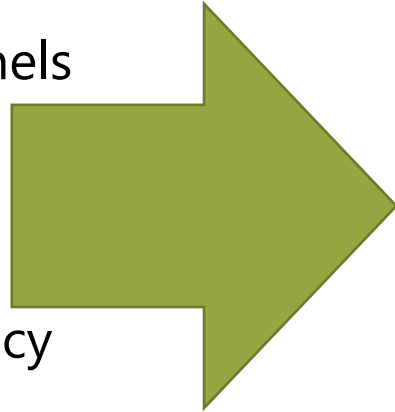
# Where are We Going ?

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## Moving Away From

- “Structures” in Channel
- Reconfiguring Single Channels
- Annual Floods
- Dynamic Stability
- Conveyance and Competency

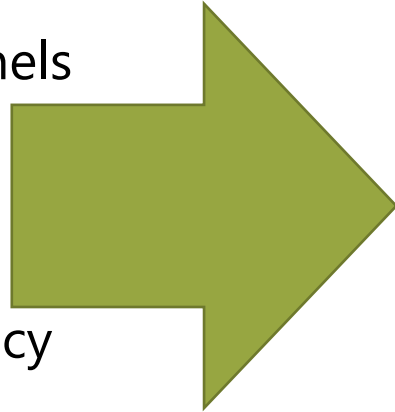
## Moving Toward



# Where are We Going ?

## Moving Away From

- “Structures” in Channel
- Reconfiguring Single Channels
- Annual Floods
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- Conveyance and Competency



## Moving Toward

- Let Channel Build Itself
- Multiple Channels
- Frequent Flooding
- Messy Rivers – Embracing Instability
- Aggradation/Retention/Avulsions




# Questions & Answers

*For more information:*

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[res.us](http://res.us)

Stop by booth #20

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