



OHIO STREAM MANAGEMENT GUIDE

Biotechnical Projects in Ohio

Guide No. 10

This Ohio Stream Management Guide maps and briefly describes some of the many projects that have been constructed in Ohio using biotechnical practices. If you want to investigate using biotechnology to solve a stream problem or improve stream habitat on your property, you can locate sites close to you and contact the person listed to arrange for a visit. Installation dates are given so you can estimate the amount of change to the environment since the practices were installed. Names and phone numbers for the contacts are listed following the project descriptions. Additional Guides are or will be available that describe construction methods for several of these practices.

Biotechnical practices use vegetative or other natural materials to achieve stream management objectives, usually erosion control. One of the chief advantages of biotechnical practices is that they help restore natural stream features, like in-stream habitat and streambank vegetation. The materials used for biotechnical practices are generally less expensive than for more traditional approaches, but installation is more labor intensive and they may require more frequent maintenance.

BIOTECHNICAL PRACTICES

Biotechnical practices can be used alone or with other practices to accomplish management objectives. Installing biotechnical practices has been described as more art than science, that is, you may need to experiment with their use to get a feel for what will work in a given situation. When these practices are combined with surveying, engineering and horticultural sciences, their professional design and installation is called bioengineering.

Some site conditions and/or project objectives will require use of more traditional, structurally engineered solutions. This is particularly true where high stream flows can be expected. In other situations, a combination of structural

and biotechnical practices may provide both strength and habitat. See Guide No. 03, Natural Stream Processes for an overview of stream mechanics.

The following is a brief overview of the practices used in the projects listed below:

Willow posts - Large branches of willow or Red Osier Dogwood cut in four to six-foot lengths and installed in the dormant season (Nov. - Mar.). These plants quickly reestablish root structure on streambanks exposed to sunlight. Construction details are given in Guide No. 07, Restoring Streambanks with Vegetation.

Native hardwood tree plantings on top of the streambank supplements willow postings, eventually shading out the willows and establishing a wooded corridor.

Fascines - Thin branches of dormant willow or red osier dogwood bundled together into long bundles and laid in trenches dug parallel to the shoreline or streambank. The trenches capture runoff, enabling the willows to sprout roots and leaf.

Brush layering - Thin branches of dormant willows, etc., are placed side-by-side in alternate layers of soil and branches to fill in an eroded or excavated area of streambank. Each layer runs parallel to the water line. The top third of branches are exposed and leaf out while the bottom two-thirds establish roots. Also called Branch packing.

Evergreen revetments - Cedars, firs or Christmas trees anchored into an eroded bank to armor the bank by absorbing stream energy and trapping sediments. Usually used with willow posts to establish needed root structure.

Log revetment - hardwood logs anchored against the streambank to buffer stream energy. Brush is tied behind the log to prevent scour and capture sediments.

Tree kickers - Felled streambank trees or hardwood logs found in streams which are anchored to the bank at an angle to kick the stream flow away from an erosion point and back toward the center of the stream. Brush is tied in behind the log to prevent scour.

Lunker structure - A wooden, box-like frame placed into the streambank at or near channel bottom and covered with rock and soil fill. Lunkers provide shelter for fish from predators and strengthen the toe of the bank slope to prevent undercutting. Excavation of the bank is required.

Placed rocks - Stones or boulders are strategically placed in a stream channel which lacks natural structural features. They can create eddies and scour holes, which are important elements of fish habitat.

BIOTECHNICAL PROJECTS

1. **Swan Creek, Lucas County**, in Toledo's Swan Creek MetroPark. Evergreen revetment, fascines, willow posts, log revetments and native hardwood tree plantings; 200 linear feet (LF) installed 12/95 & 3/96 to train volunteers. Contact: Cherie Blevins.
2. **Black River, Lorain County**, in the Black River Reservation, Elyria. Fascines in swale area and evergreen revetment on streambank; 75 LF installed 3/96 to prevent gully erosion into the streambank and train volunteers. Contact: Linda Lagunzad.
3. **East Branch Black River, Lorain County**, LaGrange Twp. Evergreen revetment, willow posts, fascines, and hardwood tree plantings; 432 LF installed 12/95 to prevent bank erosion and train volunteers. Contact: Linda Lagunzad.
4. **Sagamore Creek, Cuyahoga County**, Valley View. Root wads, fascines, and brush mat; 200 LF installed 6/95

Location of Projects Listed in this Guide



to prevent meandering away from a bridge. Contact: Jim Storer.

5. **Tinkers Creek, Cuyahoga County**, Independence. Evergreen revetment; 102 LF installed 5/96 to protect base of a electric transmission tower and train volunteers. Contact: Kelvin Rogers.
6. **East Branch Chagrin River, Lake County**, Chardin Twp. Brush layering with rip-rap; 1,500 LF installed 1/96 to stabilized streambank. Contact: Cindy Paschke.
7. **Grand River, Trumbull County**, Farmington Twp. Lunker structure and evergreen revetment; 30 LF installed in 1992 to provide in-stream structure and shelter while stabiliz-

ing the streambank. Contact: John Golz.

8. **Flatrock Creek, Paulding County**. Tree kickers, log revetments, and willow plantings; 300 LF installed 7/ 94 to reestablish stable channel and control erosion. Contact: Tim Franklin.
9. **Black Fork of the Mohican River, Richland County**, Cass Twp. Emergency storm water bypass; 1,000 ft. installed 8/91 to improve stormwater discharge near a series of oxbows. Contact: John Hildreth.
10. **Black Fork of the Mohican River, Richland County**, Cass Twp. Fas-

cines and willow posts; 600 LF installed 4/95 to train local Vo-Ag students and stabilize bank. Contact: John Hildreth.

11. **Ashland County**, Milton Twp. Evergreen revetment and willow posting; 400 LF installed 12/93 to stabilize bank. Contact: Jim Bishop.
12. **Ashland County**, Village of Mifflin. Evergreen revetment; 350 LF installed 11/94 to stabilize a streambank. Contact: Jim Bishop.
13. **Ashland County**, Mohican Twp. Willow posting; 350 LF installed 3/93 to revegetate an eroded area. Contact: Jim Bishop.
14. **Clear Fork of the Mohican River, Richland County**, Washington Twp. Bankers Willow planting and top-of-bank tree planting; 400 LF installed 4/96 to stabilize bank and reestablish river corridor. Contact: John Hildreth.

15. **Richland County**, Monroe Twp. Evergreen revetment; 400 LF installed 5/93 to stabilize a streambank. Contact: Jim Bishop.
16. **Rocky Fork of the Mohican River, Richland County**, Monroe Twp. Evergreen revetment and willow posting; 300 LF installed 4/93 to stabilize bank and train staff. Contact: John Hildreth.
17. **Clear Fork of the Mohican River, Richland County**, Jefferson Twp. River corridor tree planting, including Buckeye and Black Walnut seedlings; 1,800 LF planted 4/96 to train Vo-Ag students. Contact: John Hildreth.
18. **Pusheta Creek, Auglaize County**, Clay Twp. Willow posts, evergreen revetment, river corridor tree plantings; 400 LF installed 1/96 to control field erosion. Contact: Randy Hoover.
19. **Logan County**, Richland Twp. Willow posts and dwarf willow plantings; 150 LF installed Spring, 1996, to control bank erosion. Contact: Richard Neff.
20. **Logan County**, Richland Twp. Branch packing, "biologs", tree kickers, willow wattles (fascines), willow posts, dwarf willow plantings, evergreen revetments; 580 LF installed Spring, 1996, to control streambank erosion. Contact: Richard Neff.
21. **Logan County**, Richland Twp. Evergreen revetment; 350 LF installed Summer, 1994 to control streambank erosion. Contact: Richard Neff.
22. **Logan County**, Richland Twp. Evergreen revetment, tree kickers, willow posting; 300 LF installed Summer, 1995 to control bank erosion. Contact: Elmer Heyob.
23. **New Richland tributary to S. Fork Great Miami, Logan County**, Richland Twp. Evergreen revetments, tree kickers, log revetments, large willow posts, river corridor tree plantings, livestock fencing; approximately (-) 400 LF installed 12/94 to control field erosion. Contact: Randy Hoover.
24. **Doughty Creek, Holmes County**, Berlin Twp. Evergreen revetment; 75 LF installed 4/93 to stabilize streambank. Contact: Darla DiFabio.
25. **Tuscarawas County**, Franklin Twp. Evergreen revetment, dormant posts; 800 LF installed 9/94 to stabilize streambank. Contact: Jim Bishop.
26. **Buxton Bay of Tappan Lake, Harrison County, Franklin Twp.** Lakeside forest buffer, wildlife structures, livestock exclusion, shoreline watering facilities; 2,500 LF installed 4/94 to prevent shoreline erosion. Contact: Jim Bishop.
27. **Clendening Lake, Harrison County**, Nottingham Twp. Fascines; 1,665 LF installed 12/95 to stabilize the shoreline. Contact: Cindy Coutts.
28. **Crabapple Creek, Belmont County**, Wheeling Twp. Willow posting; 1,600 LF installed 3/93 to revegetate a reconstructed mine land stream channel. Contact: Jim Bishop.
29. **Big Darby Creek, Union County**, Allen Twp. Evergreen revetment and willow posting; 400 LF installed 3/95 and 7/95. Contact: Kathy Smith.
30. **Mad River, Champaign County**, Mad River Twp. Tree Kickers, evergreen revetment, willow posts; - 800 LF installed 2/93 to curtail field erosion. Contact: Randy Hoover.
31. **Mad River, Champaign County**, Mad River Twp. Rocks placed for in-stream structure; 100 LF installed in Summer, 1994, for habitat improvement in a channelized stream. Contact: Elmer Heyob.
32. **Mad River, Champaign County**, Urbana Twp. Rocks placed for instream structure; - 100 LF installed in Summer, 1994, for habitat improvement in a channelized stream. Contact: Elmer Heyob.
33. **Treacle Creek, Champaign County**, Goshen Twp. Fascines, willow posts, tree kickers; 200 LF installed 3/95 to stabilize a bank and prevent field erosion. Contact: Kathy Smith.
34. **Little Darby Creek, Madison County**, Pike Twp. Willow posts and evergreen revetment; 800 LF installed 2/91 to demonstrate streambank erosion control. Contact: Kathy Smith.
35. **Spring Fork, Madison County**, Monroe Twp. Evergreen revetments; 350 LF (several sites) installed 4/96 to stabilize a streambank. Contact: Kathy Smith.
36. **Walnut Creek, Fairfield County**, Liberty Twp. Brush layering, fascines, willow posts, riprap toe protection, fascine toe protection, willow posts, seedlings and geo-textile materials; 1,000 LF installed 3/96 to demonstrate streambank stabilization techniques. Contact: Art Brate.
37. **Licking County**, Madison Twp. Tree kickers and willow posts; approx 500 LF installed 9/95 as an erosion control demonstration. Contact: Daniel Blatter.
38. **Little Miami River, Greene County**, Beaver Creek Twp. Tree kickers and willow posts; 400 ft. (in two locations) installed 3/91 to protect electric transmission towers. Contact: Doug Maloney.
39. **Paintey Run, Greene County**, Caesar Creek Twp. Evergreen revetments, river corridor hardwood tree plantings; - 200 LF installed Summer, 1995, to establish vegetation on a stream channel relocated due to bridge work (required as a special condition of a federal water quality permit). Contact: Randy Hoover.
40. **North Fork Massies Creek, Greene County**, Cedarville Twp. Willow posts, river corridor hardwood tree plantings; 12 sites along one-half mile installed 3/91 as a training demonstration to reduce bank erosion and improve habitat. Contact: Doug Maloney.
41. **Clark County**, Green Twp. Willow posts; 150 LF installed 2/92 to control streambank erosion and train volunteers. Contact: Kathy Smith.
42. **Big Darby Creek, Pickaway County**, Jackson Twp. Evergreen revetment, willow posts; 900 LF installed 2/94 and 6-7/96 to protect a newly constructed levee. Contact: Kathy Smith.
43. **Salt Creek, Hocking County**, Salt Creek Twp. Tree Kickers, willow posts, evergreen revetments, hardwood plantings and livestock fencing; - 700 LF installed 2/94 to control field erosion. Contact: Mike Greenlee.
44. **Clear Creek, Fairfield County**, Madison Twp. Brush layering, evergreen revetment, willow posting, fascines, hardwood plantings and other seedlings; - 1,000 LF installed 3-4/96 to demonstrate erosion control methods and improve habitat. Contact: Chad Hermandorfer.

- 45. **Hocking River, Athens County**, York Twp. Evergreen revetment, willow posts, hardwood plantings; - 650 LF installed 2/91 to demonstrate erosion control methods and improve habitat. Contact: Mike Greenlee.
- 46. **Morgan County**, Meigsville Twp. Evergreen revetment and willow posts; 2 sites, 250 and 100 LF, respectively, installed 3-4/96 to demonstrate erosion control methods. Contact: Lori Ryan-Griffin.
- 47. **Muskingum River, Washington County**, in a Marietta City Park. Tree kickers and willow posts; - one-quarter mile, installed 5/94 to stabilize a steep bank. Contact: Michael Mullens.
- 48. **Indian Creek, Butler County**, Reilly Twp. Log revetments; - 300 LF installed 7-8/95 to curtail erosion into a field and forest area. Contact: Dave Carter.
- 49. **Indian Creek, Butler County**, Reilly Twp. Evergreen revetment, tree kicker, willow posts; - 200 LF installed 6-7/95 to protect a park road from erosion. Contact: Dave Carter.

CONTACTS

- Jim Bishop, Watershed Forester, Ohio Department of Natural Resources (ODNR) Division of Forestry, 330/339- 2205.
- Daniel Blatter, District Engineer, Licking Soil & Water Conservation District (SWCD) , 614/349-6920.
- Cherie Blevins, Ohio Environmental Protection Agency (Ohio EPA), Coordinator for the Maumee River Remedial Action Plan (RAP), 419/373-3010.
- Art Brate, State Conservation Engineer, U.S.D.A. Natural Resource Conservation Service (NRCS), 614/469- 6942.
- Dave Carter, Program Administrator, Butler SWCD, 513/887-3720.
- Cindy Coutts, Muskingum Watershed Conservancy District, 330/343-6647.
- Darla DiFabio, District Technician, Holmes SWCD, 330/674-2811.
- Tim Franklin, District Technician, Paulding SWCD, 419/399-4771.
- John Golz, Aquatic Biologist, ODNR Division of Wildlife District 3, 216/644-2293.
- Mike Greenlee, Aquatic Biologist, ODNR Division of Wildlife District 4, 614/594-2211.
- Chad Hermendorfer, Engineer Technician, Fairfield SWCD, 614/653-8154.
- Elmer Heyob, Aquatic Biologist, ODNR Division of Wildlife District 1, 614/644- 3925.
- John Hildreth, Program Administrator, Richland SWCD, 419/589-2712.
- Randy Hoover, Aquatic Biologist, ODNR Division of Wildlife District 5, 513/372-9261.
- Linda Lagunzad, Ohio EPA, Black River RAP Coordinator, 216/963-1169.
- Doug Maloney, Fish Management Supervisor, ODNR Division of Wildlife District 5, 513/372-9261.
- Michael Mullen, Development Director, City of Marietta, 614/373-9354 .
- Richard Neff, NRCS Water Quality Coordinator, at the Logan SWCD, 513/ 593-2946.
- Cindy Paschke, HRZ Environmental Consultants, Inc., 216/357-1260.
- Kelvin Rogers, Ohio EPA, Cuyahoga River RAP Coordinator, 216/963-1117.
- Lori Ryan-Griffin, NRCS Soil Conservationist, at the Muskingum SWCD, 614/454-2767.
- Kathy Smith, Watershed Forester, ODNR Division of Forestry, 513/653-4106.
- Jim Storer, NRCS District Conservationist, at the Cuyahoga SWCD, 216/ 524-6580



This Guide was developed using information from a centralized file on biotechnical project sites in Ohio. To find out about other project sites or contribute information about projects you know about, please contact the Ohio department of Natural Resources, Division of Soil and Water Resources, at 614/265-6610 or by e-mail at: water@dnr.state.oh.us.

This Guide is one of a series of Ohio Stream Management Guides covering a variety of watershed and stream management issues and methods of addressing stream related problems. The overview Guides listed below, are intended to give the reader an understanding of the functions and values of streams. For more information about stream management programs, issues and methodologies, see Guide 05 Index of Titles. All Guides are available from the Ohio Department of Natural Resources. Single copies are available free of charge and may be reproduced.

The guides are also available online as web pages and PDF files so you may print high quality originals at your location. You will find the guides on-line at:

<http://www.ohiodnr.gov/soilandwater/>

Prepared by the Ohio Department of Natural Resources, Kim Baker, Division of Real Estate and Land Management, principal author. Input from staff of several ODNR divisions, state and federal agencies are used in the development of the Ohio Stream Management Guides.

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