Report for

“Restoration of High Priority Riparian Areas in the Muskegon River Watershed”

Great Lakes Basin Fish Habitat Partnership
(F15AC01093)

Final Report through September 8, 2017

Submitted by

Chad Hipshier, Muskegon Conservation District and
Julie Chamberlain, Muskegon River Watershed Assembly
The goals of this project were to reforest 100 acres of riparian land and stabilize 6,000 linear feet of streambank with native vegetation. The goal was to reduce annual pollutant loads by 25 tons of sediment, 138 pounds of phosphorous, and 565 pound of nitrogen to benefit the Muskegon River, Muskegon Lake Area of Concern and Lake Michigan. Overall, nutrient load reductions estimated using STEPL show that this project has the following reductions: 19.5 tons/year Sediment, 170.7 lb. /year Phosphorus, 631.7 lb. /year Nitrogen and 124.9 lb. /year BOD.

The Muskegon Conservation District (MCD) worked with nine landowners reforesting a total of 105 acres and stabilized 6,050 linear feet of stream bank. A total of 37,100 native tree seedlings were planted including a mixture of 14 species of shrubs, conifers, and hardwoods. Reforestation took place in four HUC 12 watersheds including Little Muskegon River Watershed (40601020802), Handy Creek-Little Muskegon River Watershed (40601020810), Quigley Creek- Little Muskegon River Watershed (40601020808), and Brackway Creek-Little Muskegon River Watershed (40601020803). Overall, nutrient load reductions estimated using STEPL are shown below:

The primary role of the Muskegon Conservation District (MCD) was to perform field related project management services for the restoration of high priority riparian areas in the Little Muskegon River Sub - watershed in Newaygo, Mecosta and Montcalm Counties. MCD proposed to reforest 100 acres of riparian land and stabilize 6,000 linear feet of stream bank using native vegetation. During the two-year project, MCD worked with nine landowners reforesting a total of 105 acres and stabilized 6,050 linear feet of stream bank.

To enlist landowners, MCD utilized mailed letters to qualifying landowners, phone calls, and periodic site visits. During this project, 75 letters were sent out to various landowners seeking involvement in the project. Of these landowners, follow up contact was made with eleven landowners and nine landowners eventually signed up for reforestation. Agreements were set up with nine landowners totaling 105 acres of reforestation and 6,050 linear feet of riparian land. In total, 37,100 native tree seedlings were planted including a mixture of 14 species of shrubs, conifers, and hardwoods. Reforestation took place in four HUC 12 watersheds including Little Muskegon River Watershed (40601020802), Handy Creek-Little Muskegon River Watershed (40601020810), Quigley Creek- Little Muskegon River Watershed (40601020808), and Brackway Creek-Little Muskegon River Watershed (40601020803).

An additional activity included an outreach/education component in the local community. The Muskegon River Watershed Assembly provided education to 156, sixth grade students at a field day in which the planted trees and were instructed in the importance
of trees to protect waters. This information and updates were published on MRWA social media and in newsletters. Examples are shown in this report along with detailed information regarding tree planting and streambank stabilization work.

This project has been completed and exceeded by planting an additional five acres of trees and stabilizing 50 additional feet of streambank. Goal reductions for nitrogen and phosphorous were greater than expected by 66.8 lb. /yr. and 32.7 lb. /yr., respectively. The goal of sedimentation reduction of 25 tons vs 19.5 tons actual reduction is due to the types of soil having less movement than expected. There was slight change in BOD. The project had no significant impact on basin wide or cumulative BOD.

<table>
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<tr>
<th>STEPL</th>
<th>N Load (no BMP)</th>
<th>N Load (with BMP)</th>
<th>Difference in N Reduction</th>
<th>%N Reduction</th>
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<td>lb./year</td>
<td>lb./year</td>
<td>%</td>
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<td></td>
<td>631.7</td>
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## Phosphorous

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<td></td>
<td>lb./year</td>
<td>lb./year</td>
<td>lb./year</td>
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<tr>
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**Total**                       |                 |                   | **170.7**            |             |

## Sediment

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<td>tons/year</td>
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<td>1584.2</td>
<td>0.3</td>
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**Total**                       |                       |                         | **19.5**                    |             |

Additional pertinent information including site plans and photos are located in the body of this report.
The Muskegon River Watershed Assembly provided field education in which 156, 6th grade students from six Chippewa Hills Intermediate School classes participated in June 2017. They each learned about the connection between trees and water quality in the river. They planted one gallon sized native trees and participated in several stations including: the Food Web, Oh Salmon, soil education, making a pot out of newspaper and planting a pine tree to take home and an aquatic invasive species boat washing demonstration. Volunteers from the local fire department were on hand to water all of the trees after planting. See photo below.

6th grade students helped plant trees at an educational field day and create newspaper post in which they also planted a pine tree seedling to take home.

This project was recognized on the MRWA website, face book and in newsletters in the fall of 2016 and summer and fall 2017.
Project Summary

As part of an eight-year investigation to evaluate the Muskegon River Watershed, researchers developed a multi-model risk assessment tool called the Muskegon River Ecological Modeling System (MREMS). MREMS simulations included several problem areas including land use changes (urbanization / development), erosion and sedimentation, fisheries, effects of dams on the river system, as well as climate change. In fact, MREMS is the first to address the influence of future climate change as a driver for change in local hydrology and land use/cover. Using the results of this model, MREMS researchers provided recommendations to protect the ecological integrity of the Muskegon River Watershed.

The Restoration of High Priority Riparian Areas in the Muskegon River Watershed project focused on one principal concept gathered from MREMS, which is that the impacts of climate change will likely be significant and will be most evident as a dramatic change in local hydrology. MREMS researchers recommended that the most effective way to ensure long-term hydrologic stability is to invest in the permanent conservation of riparian lands as well as reforestation and installation of vegetative BMPs along riparian corridors in high priority sub-basins. To reduce the impacts of climate change, the Muskegon River Watershed Assembly in partnership with the Muskegon Conservation District implemented a riparian reforestation strategy and streambank vegetative stabilization program in high priority sub-watersheds and stream corridors of the Muskegon River System.

Methodologies Used to Achieve Results

MCD used the following methods to achieve reforestation accomplishments detailed above:

1. Used aerial photography to identify priority properties to target reforestation / buffer establishment efforts.
2. Developed mailing list for priority properties using County Equalization Property Mapping Application.
3. Distributed landowner letters to determine interest in reforestation efforts on their property.
4. Held meetings with interested landowners (meetings included site visit of proposed reforestation site, signed cooperator agreement to move forward with reforestation efforts, and maintenance agreement).
5. Developed reforestation site plan / map of property. Calculated necessary reforestation quantities of desirable and appropriate tree
species, and placed order with tree nursery.
6. Completed reforestation activities on properties.

Next Steps

As a result of this project, numerous contacts were developed with landowners who participated in the program as well as landowners who did not qualify. For the landowners who participated in the project, MCD has planned to follow-up with the landowners to gauge the success of the tree planting efforts on their property. MCD will continue to seek additional funding sources for properties, if applicable, where mortality rates are higher than anticipated and will not achieve reforestation targets. MCD will also continue to seek funding to continue reforestation and streambank stabilization efforts in high priority sub-basins identified by MREMS as well as the Muskegon River Watershed Management Plan.

Products Produced

MCD produced the following items as part of the Restoration of Riparian Areas in the Muskegon River Watershed Project and are included in this report:

- Landowner Recruitment Letter
- Available Tree List
- Bauman Cooperator Agreement*, Maintenance Plan, Topo, Site Plan and Pictures
- Buchner Cooperator Agreement, Maintenance Plan, Topo, Site Plan and Pictures
- Garnett Cooperator Agreement, Maintenance Plan, Topo, Site Plan and Pictures
- Lucas Cooperator Agreement, Maintenance Plan, Topo, Site Plan and Pictures
- Muskegon County Road Commission Cooperator Agreement, Maintenance Plan, Topo, Site Plan and Pictures
- Sellars Cooperator Agreement, Maintenance Plan, Topo, Site Plan and Pictures
- Swain Cooperator Agreement, Maintenance Plan, Topo, Site Plan and Pictures
- Wheeler Cooperator Agreement, Maintenance Plan, Topo, Site Plan and Pictures
- Willett Cooperator Agreement, Maintenance Plan, Topo, Site Plan and Pictures

*Cooperator agreements are on file with MRWA and not included in this report.
Landowner recruitment letter

Date

Name
Address

Dear Name,

The Muskegon Conservation District (MCD) is partnering with the Muskegon River Watershed Assembly to preserve, protect, and restore high-priority areas within the Little Muskegon River Watershed. This project, funded through Great Lakes Basin Fish Habitat Partnership, will provide landowners the opportunity to reforest open riparian areas on their property at no cost.

The goal of this project is to reforest an additional 100 acres within the Little Muskegon River Watershed in Newaygo, Mecosta, and Montcalm Counties. This project will further the work completed in 2014 and 2015 that reforested over 480 acres within priority sub-basins in the greater Muskegon River Watershed including Penoyer Creek, Four Mile Creek, Minnie Creek, Cedar Creek, Tamarack Creek, the Little Muskegon and Muskegon Lake.

You are receiving this letter because your property has been identified, via aerial image, to fall within one of our high-priority sub-basins for this part of the project and meet grant guidelines. With your cooperation, MCD will work with you to provide the purchasing and installation of tree seedlings for reforestation efforts at NO COST to you. The first step is to contact MCD at our office via phone or e-mail. Once contact has been made, MCD will work with you to develop a reforestation strategy for the areas of your property you are interested in planting. Priority areas for tree planting include tracts of land larger than one acre and areas close to or adjacent to stream habitats. If you are interested in the project or would like more information, please contact Alex Wieten at (231) 828-5097 as soon as possible. Grant funding is limited to 100 acres and landowners will be put on a waiting list once current funding is used up. Thank you in advance for your consideration in helping restore/protect the Muskegon River Watershed.

Sincerely,

Alex Wieten
Project Manager
Muskegon Conservation District
Alex.wieten@macd.org
P 231.828.5097

4735 Holton Rd. ☐ Twin Lake, MI 49457 ☐ P 231.828.5097 ☐ muskegoncd.org
### Available Tree List

#### Deciduous
- Red Maple
- Sugar Maple
- Black Cherry
- Quaking Aspen
- Red Oak
- White Oak
- Black Walnut

#### Small Trees/Shrubs
- Arrowwood
- Choke Cherry
- Black Chokeberry
- Highbush Cranberry
- Gray Dogwood
- Redosier Dogwood
- Silky Dogwood
- American Hazelnut
- American Mountain Ash
- Nannyberry
- Ninebark
- American Plum
- Redbud
- Serviceberry

#### Conifers
- White Spruce
- White Pine
- White Cedar
- Red Cedar
- Tamarack
- Red Pine
- Black Spruce

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*Other trees may be available based on nursery stock, please feel free to contact the District with special requests.*

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940 N. Van Eyck St.  ■  Muskegon, MI 49442  ■  P 231.773.0008  ■  muskegoncd.org
Muskegon Conservation District Cooperator Agreement

Name (Last, First): ___________________________ Township & Section: ___________________________

Mailing Address: ___________________________ City: __________________ State: ____ Zip: ______

Home Phone: (____)______________ Work Phone: (____)______________ Email: _____________

☐ I do not wish to receive newsletters or other mailed materials related to District projects or programs.

I would like to help preserve the natural resources of the Muskegon River Watershed. I would like the District’s assistance in providing the opportunity to reforest areas on my property. I understand that such help will be dependant on the services available by the District; and may require a maintenance agreement. This cooperator agreement will stay in effect until either I or the District cancels it in writing, or until my ownership of the property ends. To facilitate implementation of conservation practices the District may view and maintain a copy of my USDA-NRCS program contracts.

I am interested in cooperating with the Muskegon Conservation District in their effort to restore high priority riparian areas within the Muskegon River Watershed:

________________________________________________________________________

Cooperator Signature ___________________________ Date _____________

The Muskegon Conservation District agrees to provide assistance for these projects.

________________________________________________________________________

Project Coordinator ___________________________ Date _____________

4735 Holton Rd. Twin Lake, MI 49457 P 231.828.5097 muskegoncd.org
Riparian Reforestation Maintenance Plan

The purpose of this plan is to provide maintenance recommendations to ensure that the installed best management practices meet the intended purposes and the expected benefits will be realized. The riparian forest buffer (plantings within 100’ of the stream edge) should be inspected periodically and protected from adverse impacts such as excessive vehicular and pedestrian traffic, pest infestations, concentrated flows, pesticides, livestock or wildlife damage and fire.

Recommended Maintenance Specifications:

A. Watering specifications:
   - The seedlings should be irrigated when rainfall does not provide 1” of water per week.
   - Plantings shall be monitored and if signs of stress appear, shall be deeply watered.

B. Fertilization
   - Fertilizers should not be used due to the planting areas being adjacent to the stream.

C. Pruning and Staking:
   - Trees shall be pruned as needed to remove weak, diseased or damaged limbs/branches in
     order to avoid the need for pesticide applications and to maintain proper form.
   - Stakes shall only be used if after the first year trees cannot remain upright.

D. Seeding requirement:
   - Eroded or damaged seeding areas shall be repaired as appropriate. They shall be
     overseeded or replanted, as necessary with seed appropriate for location and function.

We agree to accept responsibility of the installed best management practices and will maintain native seeding areas and/or tree seedling plantings to the best of our abilities. This maintenance plan will remain in effect for 10 years to ensure the establishment of the riparian forest buffer. I am the owner of the property for which I received the trees listed below (please print):

Property Owner’s: (Print Name)________________________ (Signature)________________________

Address of Proposed Trees:__________________________________________________________

Home Address:____________________________________________________________________

Telephone: (H)__________________ (W)__________________ Email:________________________

# of Trees/Species:_______________________________________________________________

4735 Holton Rd. Twin Lake, MI 49457 P 231.828.5097 muskegoncd.org
Alvin Garnett 2886
130th Ave.
Morley, MI 49336
Sec 23 T13N R9W

Photo: Alvin Garnett property
Map: Planting area Alvin Garnett property
Aerial view: Alvin Garnett Property

Species Planted
- White Pine
- Red Maple
- Quaking Aspen

Species Planted
- Red Oak
- White Oak
- Red Pine

Quantities
Area Planted: 4 Acres
Linear Feet: 650 Feet

Legend
- Property Line
- Planting Area Outline
William Willett Plan
6794 Cypress Ave.
Newaygo, MI 48337

SEC 15 T12N R11W

Photo: William Willett planting
Species Planted
White Pine Highbush Cranberry
White Spruce Silky Dogwood

Quantities
Area Planted: 2 Acres
Linear Feet: 300

Legend
- Property Line
- Planting Area Outline

Aerial View: William Willette Planting area
Map: Cliff Buchner Property
Aerial View: Cliff Buchner Property

**Species Planted**
- White Pine
- White Spruce
- Highbush Cranberry
- Silky Dogwood

**Quantities**
- Area Planted: 4 Acres
- Linear Feet: 4,000

**Legend**
- Red: Property Line
- Yellow: Planting Area Outline
John Lucas Property
10700 5 Mile Rd
Aetna Township, MI

Photo: Planting John Lucas Property

SEC 05 T13N R08W
Map: John Lucas Property
Aerial View: John Lucas Property

**Species Planted**
- Red Oak
- White Oak
- White Pine
- Black Cherry
- Red Pine
- White Spruce
- Red Maple

**Quantities**
- Area Planted: 5 Acres
- Linear Feet: 300

**Legend**
- Property Line
- Planting Area Outline
Mark Baumann Property
20001 Washington Rd.
Morley, MI
SEC 34 T13N R10W

Photos: Mark Baumann Property
### Species Planted
- White Spruce
- Ninebark
- Highbush Cranberry
- Serviceberry

### Quantities
- Area Planted: 4 Acres
- Linear Feet: 300

### Legend
- Property Line
- Planting Area Outline
Mecosta Road Commission Property

75th and Garfield

Mecosta MI

Sec 35 T15N R08W

Photos: Mecosta Road Commission Property
Aerial View: Mecosta Road Commission Property

**Species Planted**
- White Pine
- Black Cherry
- Red Pine
- Red Oak

**Quantities**
- Area Planted: 40 Acres

**Legend**
- Property Line
- Planting Area Outline

31
Richard Wheeler
6152 Hayes St.
Stanwood, MI 49346
SEC 12 T14N R8W

Photo: Richard Wheeler Property
Map: Richard Wheeler Property
Marilyn Sellars Property
Jefferson Rd. Morley, MI
SEC 22 T13N R10W

Photo: Marilyn Sellars Property
Species Planted

Chokecherry, Silky Dogwood
Area planted: 25 Acres

Legend

Red Maple, Black Walnut
Linear Feet: 300

Property Line
Planting Area Outline
Steve Swain
17024 Jefferson Rd.
Morley, MI 49336
SEC 30 R13N R9W

Photos: Steve Swain Property
Map: Steve Swain Property
Aerial View: Steve Swain Property

**Species Planted**
- Quaking Aspen
- Red Oak
- Red Pine
- Silky Dogwood
- Black Walnut
- White Pine
- Serviceberry

**Quantities**
- Linear Feet: 200
- Area Planted: 16 Acres

**Legend**
- Yellow: Planting Area Outline
- Red: Property Line