

Basin 17 Water Quality Management Plan Implementation Table - April 2016

Objective: Restore Crystal and Stearns Brooks to meet water quality standards.

Action	Lead/Key Players	Cost/ Funding	Target Date/Status (N, I, C)
1. Monitor Crystal Brook to confirm that this stream has been restored and can be removed from the list of impaired waters.	VDEC / OCNRCD	VDEC Funds	2011/ 2009 and 2010 results suggest this water now meets VWQS. Removed from list of impaired waters- (completed)
2. Complete a watershed assessment of the tributary to Stearns Brook to identify potential projects to reduce runoff to this waterbody	OCNRCD / VDEC, NRCS	Ag resource specialist funding	2011- - (completed)
3. Biologically assess the Stearns Brook tributary site to determine if recent efforts have addressed impairment and if the tributary to Stearns Brook is still impaired consider water sampling to constrain nutrient sources and work with landowners to identify and address pollution sources.	OCNRCD / VDEC, NRCS, VAAFM	319, EQIP, CREP, VT BMP programs	2012 – Biological sampling done and stream does not meet water quality standards. Nutrient sampling started in 2014 and projects implemented to address some identified sources (more work to to) (Initiated)

Objective: Develop a TMDL and refine the Basin 17 Water Quality Management Plan to address the phosphorus impairment of Lake Memphremagog.

Action	Lead/Key Players	Cost/ Funding	Target Date/Status
4. Coordinate monitoring of phosphorus and chloride loading from major tributaries and in Lake Memphremagog to allow for the development of a Bath Tub model for Lake Memphremagog.	VDEC / MCI, MDDEP, MRC, MWA, COGESAF,	VDEC operational funds, Watershed grant, ERP	2010-2012/ Joint monitoring was done 2010 through 2012. (completed)
5. Refine the watershed phosphorus export model for the Lake Memphremagog watershed.	VDEC / MDDEP, MRC	Staff time	2010-2012/ updated with 2006 nlcd in 2011. (Initiated)
6. Complete targeted tributary sampling program to identify target watersheds for phosphorus reduction.	MWA / VDEC, ONRDC, Beck Pond LLC	\$10,000 year/ ERP, Watershed grant, LaRosa, 604(b)	2011-2012/ Targeted sampling 2011 - 2014. Reports on priority phosphorus reduction projects produced using all past sampling (Initiated)
7. Develop a Bath Tub model for Lake Memphremagog or another method to model the necessary reductions in phosphorus load from the Vermont portions of the watershed to meet Vermont Water Quality Standards	VDEC / MDDEP, MRC	Staff time	2011-2012 Bath tub modeling nearly finished with support from Eric Smeltzer (Initiated)
8. Develop a TMDL to address the phosphorus impairment of Lake Memphremagog.	VDEC / EPA	Staff time	2012 (revised target date winter 2016) (Initiated)
9. Update action plan based on the TMDL phosphorus reduction targets and watershed loading model targeting the most efficient projects and locations to reduce phosphorus loading across contributing land uses.	VDEC / MWA, OCNRCD, NRCS, Towns, watershed groups and partners	Staff time	2013 (revised target 2016)

10. /Develop a sustainable long term water sampling program to monitor changes in phosphorus load for the Vermont portions of the Lake Memphremagog Watershed and changes in in-lake phosphorus concentration to evaluate success of TMDL implementation efforts.	VDEC / MWA, City of Newport (LMP), Beck Pond LLC	Staff time and Department Laboratory resources	2012-2015
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Objective: Ensure the flow altered waters in the Coaticook River watershed meet Vermont Water Quality Standards.

Action	Lead/Key Players	Cost/Funding	Target Date/Status
11. The Agency of Natural Resources will work with Hydro Coaticook, the PSB, and local residents to identify and address the water resource concerns associated with water level fluctuations at Norton and Great and Little Averill ponds so these waters will meet the Vermont Water Quality Standards.	VDEC / VFWD, HydroCoaticook, PSB, Averill lakes association,	Staff time	2014/ Plan developed to monitor water levels of lakes and ponds and flows below from 2013-2014. (Initiated)
12. An agreement should be made to establish more formal conservation flows for each of the dams, to determine what height of gate opening would equate to these flows, and if not already existing, make modifications to the dams to ensure these minimum flows are met at all times.	VDEC / VFWD, Hydro Coaticook, PSB, Averill lakes association	Staff time	2014 PSB petition has been submitted by residents and DEC is working to aid in developing conservation flows (Initiated)

GOAL: REDUCE PHOSPHORUS LOADING IN THE BASIN TO ALLOW LAKE MEMPHREMAGOG TO MEET WATER QUALITY STANDARDS AND REDUCE AND/OR PREVENT INCREASES IN PHOSPHORUS LEVELS IN OTHER NUTRIENT SENSITIVE LAKES IN THE BASIN.

Objective: Reduce the impacts from stormwater runoff from developed lands.

Action	Lead/Key Players	Cost/Funding	Target Date/Status
13. Complete stormwater system mapping and illicit discharge detection for the City of Newport, Village of Derby, Village of Orleans and Village of Barton.	VDEC / cities and towns, ONRCD	\$40,000/ ERP, 319, SEP	2012-2014 mapping done in 2014 and grant to complete IDDE in 2015 (completed)
14. Increase awareness of stormwater runoff issues and available solutions through newspaper articles and outreach materials.	MWA / NVDA, Local newspapers, VDEC, OCNRCD	Watershed grant	Ongoing - (Initiated)
15. Complete demonstration projects addressing stormwater issues in the basin, such as rain barrels or rain gardens, to show how these practices can be used and increase awareness of these methods. Target priority areas identified through stormwater mapping.	Lake and watershed organizations / OCNRCD	Watershed grant, ERP, 319 program	2012/ Workshop held in 2010 to discuss rain barrels and to distribute them. MWA sold barrels at famers market and installed rain garden master planning grant 2015 (Initiated)
16. Work with a local developer to complete a low impact development project in the basin and publicize this to increase awareness of the social, economic and environmental benefits of using low impact development techniques.	local developer/ Lake and watershed groups, NVDA, Towns		2013

Action	Lead/Key Players	Cost/Funding	Target Date/Status
17. Increase awareness of landscaping techniques to minimize nutrient, herbicide and other pollutant runoff from lawns. Techniques include: aerating, increasing organic content, maximizing natural vegetative cover, and using less and only phosphorus free fertilizers except where soil testing show low soil phosphorus levels.	Lake and watershed organizations / master gardener program, VDEC	Watershed grants, 319 grant program	Ongoing Workshops held with master gardeners in 2015, landscaper workshops planned for 2015 (completed)

Objective: Reduce impacts from roads and other transportation infrastructure on aquatic resources.

Action	Lead/Key Players	Cost/Funding	Target Date/Status
18. Organize a road review committee to identify roads, ditches and stream crossings in the basin that are having an impact on water resources, focusing initially on towns which have not yet participated in the Better Backroads Program including Irasburg, Coventry, Albany and Craftsbury.	Road commissioners and foreman / watershed groups, landowners, environmental consultants, conservation and planning commissions. Better Backroads tech.	Group could be ad hoc w/o funding or could apply for Better Backroads grants.	2012/ MWA has meet with local towns and developed a Better Backroads project with Newport Town. Better backroads road assessment grant for Morgan in 2014. Possible stormwater master planning grant in 2014 could address backroads. Orleans County Roads and rivers group created in 2015 (completed)
19. Work with all towns in the basin to apply for at least one Better Backroads Grant to address one of the major water quality issues identified by the road review committee. Initially, the following towns which are in areas characterized by low watershed phosphorus retention will be targeted: Derby, Irasburg, Coventry, Albany, Craftsbury and Newport town Newport City.	VDEC/ road commissioners and foreman, conservation commissions, private landowners	\$5,000-10,000 per town/ ERP, Better Back Roads	2013/ Grants received for: Charleston, Morgan, Westmore roads. (Initiated)
20. Host and advertise local workshops for road crews and commissioners on the best management practices to address road/water quality issues. Include a workshop in the Roads Scholar program on minimizing impacts from roads on surface waters.	Local Roads Program, road commissioners and foreman, watershed associations, VANR, landowners, conservation and planning commissions.	Northern VT RC&D Council, VT Better Backroads Program	2012- Road resiliency workshop held in the fall of 2012 with good attendance from local road crews. (completed)
21. Identify and promote funding sources for towns to address road/water quality issues, and work to increase funding sources that are targeted for this purpose.	Vtrans/ watershed groups, local, state and national elected officials	Better Backroads	Ongoing Better back roads program strengthened through use of ERP funds. Backroad grant amounts increased (completed)
22. Educate towns on the advantages of following locally adopted road and bridge standards in order to increase compliance with these standards in the basin. Submit articles on reducing the impact of roads on water quality in the <i>Vermont Local Road News</i> that goes to town staffs.	Vtrans/ watershed groups, landowners, conservation commissions, road commissioners and foreman, VANR	Watershed grants, 319 grant program	Ongoing/ 2010 Act 110 included updates to the standards effective for 2012 and required towns to annually certify compliance. Incentives for towns to adopt standards have been increased and stormwater permit for town roads being discussed. (Initiated)

Action	Lead/Key Players	Cost/Funding	Target Date/Status
23. Provide VANR bridge and culvert assessment results to towns in the basin so this information can be used to help towns in prioritizing stream crossing replacement.	VANR/ road commissioners and foreman, conservation commissions.	604(b), ERP	Ongoing / Coventry survey finished. (Initiated)
24. Encourage towns in planning for land use changes and resulting changes in hydrology on stream crossings, encouraging proper stream crossing sizing and rock aprons at outlets.	VDEC/ NVDA, Towns	604(b)	Ongoing (Initiated)

Objective: Maintain the coverage of forested lands while reducing sediment and phosphorus runoff occasionally associated with forestland management.

Action	Lead/Key Players	Cost/Funding	Target Date/Status
25. Increase educational opportunities and outreach to the general public, landowners, and loggers on good forestry practices and the mechanics of logging.	NorthWoods Stewardship Center/ VDFPR, OCNRCD, VT Coverts	Watershed grant	ongoing
26. Work with logging equipment distributors to provide information pamphlets on logging practices and contacts when specific equipment is sold for private logging use.	OCNRCD, VDFPR,	Watershed grant	2013
27. Organize and publicize a field tour of a logging operation on state lands to demonstrate BMPs, paired with tour of a problem site if possible.	VDFPR, OCNRCD, ECNRCD, NorthWoods Stewardship Center		2013- grant proposal put in by VDFPR to complete such a project and outreach in this or nearby basin. (Initiated)
28. Organize a welcome kit with information for new landowners on managing forested lands as well considerations for hiring a forester and logger.	OCNRCD, NorthWoods Stewardship Center		2013
29. Maintain extensive forested lands in the basin due to the water quality and habitat benefits through the current use program, Forest Legacy Easements and the creation of new or expansion of existing town forests.	VDFPR/ VLT, towns, private landowners, environmental consultants	VHCB, forest legacy	2013
30. Initiate a portable skidder bridge project in the basin to provide bridges for lease to local loggers and outreach on their use.	OCNRCD/ VDFPR, loggers, LandVest,	\$4,000 - \$20,000 depending on scale / ERP, SEP, 319	2011/ Portable skidder bridge program initiated in the basin. (completed)

Objective: Establish an agricultural water quality group that will represent the interest of the Memphremagog region and to leverage the positive attention of the legislature, the press, and the watershed community and to promote the best use of government cost share dollars.

Action	Lead/Key Players	Cost/Funding	Target Date/Status
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31. Create a Steering Committee to look at the different models for such a water quality group and provide overall direction	OCNRCD	ERP	2011/ Held three meetings of a steering committee in 2013/2014 (completed)
32. Assemble a membership from the various agricultural groups, and create an agenda for targeted funding and technical assistance based on goals below Key players continued: Grain and Feed Dealers, Farm Equipment Sales, Local Work Group, Watershed Association, local legislators	OCNRCD/ Farm Bureau, NOFA, Grange, VT Fruit and Vegetable Growers Assoc, Milk haulers, Large Animal Vets...	In-kind from members	2011/ Decided to convene this group when TMDL development gets into high gear 2015.(OCNRCD applied for watershed grant to support in 2015) (Initiated)
33. Refine phosphorus reduction estimates for practices funded and prioritize those with highest potential for positive impacts	NRCS/ VAAFM	319, ERP	2012 Developed Basin specific BMP scenario tool to evaluate load reductions and evaluated use in two target watersheds (Initiated)

Objective: Minimize the acreage and number of days of fields in bare soil.

Action	Lead/Key Players	Cost/Funding	Target Date/Status
34. Conduct a vulnerability analysis to identify specific areas (based on soil types, land use, agronomic practices, etc) and prioritize technical assistance and funding to these	OCNRCD/ NRCS, Agency of Ag, UVM Coop Ext	Watershed grants, Partners	2011/ initiated targeted assessments on ag lands in 2011 based on water sampling results. Priority Phosphorus Reduction Area study done in 2013 and being expanded upon in 2014. Erosion risk analysis done in 2015 (Completed)
35. Conduct extensive outreach of existing programs that provide financial incentives for cover crop, conservation cropping, no-till etc. to all farms	NRCS/ Agency of Ag, OCNRC	VACD	on-going/ RCPP grant will support technical assistance to farmers to implement practices (Initiated)
36. Use Local Work Group to provide priority points to NRCS projects that address bare soil.	OCNRCD/ NRCS	NA	on-going (Initiated)
37. Conduct research trials on grasses best suited for cover crops for this region and shorter season corn varieties that preserve yields.	UVM Coop Ext/ OCNRC	SARE grants	2011

Objective: Reduce opportunities for grazing animals to be in streams and break down stream bank vegetation.

Action	Lead/Key Players	Cost/Funding	Target Date/Status
38. Make direct contact with producers to promote existing programs such as the Conservation Reserve Enhancement Program (CREP) that provide incentives for fencing, watering tanks, and stream crossings.	VACD/ OCNRC, NRCS, VAAFM	NRCS, VAAFM	ongoing / 2011 ARS started targeted CREP outreach to farmers to promote this program with increased signups. BMP project funding has been secured through ERP grants and projects have been done. (completed)

Action	Lead/Key Players	Cost/Funding	Target Date/Status
39. Encourage use of rotational or planned grazing plans.	NRCS/ VOFA, UVM, SARE, Holistic Management Practitioners	NRCS, VAAFAM	Ongoing One grazing plan has been done in target high phosphorus watershed. Grazing plans focus of NOFA support to RCPP grant (Initiated)
40. Promote preservation and restoration of riparian and wetland areas for their other benefits such as thermal cooling, nutrient retention, and habitat enhancement.	OCNRCD/ VACD, NRCS, VAAFAM, VFWD, USFWS, Beck Ponds LLC, NorthWoods Stewardship Center	USDA, VAAFAM, VFWD, US Fish and Wildlife Services	ongoing / 2010 - 2016 grants included trees for streams project and wetland assessment and proj. development for WRP program. MWA wetlands focus for events in 2013. (completed)

Objective: Reduce the number of acres of agricultural land that transition to commercial and residential development which would increase nutrient loading and stormwater runoff.

Action	Lead/Key Players	Cost/Funding	Target Date/Status
41. Continue to conserve prime agricultural lands to prevent the change in landuse to developed lands	VLT/ VAAFAM, NRCS, VACD	VHCB,	Ongoing – Some conservation projects done (Initiated)
42. Inventory idle farm land in the basin and connect farmers who are interested in CREP or other programs and have a limited land base to these landowners to increase the ability of farmers to participate in these programs.	VAAFAM / ONRCD, Environmental Consultants	VAAFAM	2012

Objective: Improve nutrient management and soil health on vegetable and small farms

Action	Lead/Key Players	Cost/Funding	Target Date/Status
43. Conduct nutrient management planning workshops for small and hobby farms	VACD, NERC, UVM Ext	VAAFAM, UVM Ext, SARE, VACD,	2011 on/ workshops planned for 2014. NMP courses held in 2016 RCPP grant would fund NMP for farms in the basin 2016 and 2017. (Initiated)
44. Provide outreach on efficient use of Nitrogen and Phosphorus fertilizers for vegetable operations	VACD, UVM Ext, VT Fruit &Vegetable Growers Assoc.	VACD, UVM Ext, VT Fruit & Vegetable Growers Assoc.	2011
45. Promote soil testing and manure analysis to determine nutrient requirements for individual fields for small farms.	VACD, UVM Ext	NA	Ongoing. (Initiated)
46. Promote workshops, programs, and materials specific to equine operations	VACD, VT Pasture Network, UVM Ext, Vermont Horse Association	VAAFAM	ongoing

Action	Lead/Key Players	Cost/Funding	Target Date/Status
47. Create programs to improve infiltration and water holding capacity of soils through addition of organic material, avoiding compaction	NRCS, VAAFM, UVM Coop Ext, Highfields Center for Composting	NRCS, VT VAAFM, UVM, VACD, SARE	2011

Objective: Protect and restore the equilibrium conditions of streams and rivers.

Action	Lead/Key Players	Cost/Funding	Target Date/Status
48. Complete Phase 1 Stream Geomorphic Assessments (SGA) of all major streams in the Lake Memphremagog Watershed where this has not been done and targeted smaller streams as identified in Figure 8.	NorthWoods Stewardship Center , VDEC, towns, environmental consultants	Ecosystem Restoration Grants	2011/ Largely finished. Barton, Black, Clyde, Johns Rivers finished. Some small tributaries have not been done. (Initiated)
49. Complete Phase 2 SGA for all stream reaches in the basin that were rated as in fair or poor condition in the Phase 1 assessment, stream reaches that towns would like to include in FEH zoning, or stream reaches that are of concern to local residents as shown in Figure 8.	NorthWoods Stewardship Center/ VDEC, towns, environmental consultants	Ecosystem Restoration Grants	2013/ Majority of Barton, Clyde, Johns Rivers finished. Black River in progress. Some small tributaries have not been done. (Initiated)
50. Work with towns to include protection for floodplains, FEH zones and buffer zones in local zoning.	NorthWoods Stewardship Center/ VDEC, MWA, NVDA towns	Town planning grants	2014- increased collaboration between NVDA and VDEC to work with towns. (Initiated)
51. Promote BMPs for development adjacent to river corridors to protect river functions, such as maintaining setbacks and buffer strips, LID techniques.	NorthWoods Stewardship Center/ VDEC, OCNRCD, watershed groups	ERP	Ongoing (Initiated)
52. Provide education programs to increase awareness of fluvial geomorphic principles and the many benefits of managing rivers for their equilibrium condition. Examples include demonstrating the flume at Derby days, the fisherman's breakfast or other events in the basin, involving volunteers in geomorphic assessments, and holding workshops.	NorthWoods Stewardship Center/ VDEC, towns, OCNRCD, watershed groups	Watershed Grants	2013 (Initiated)
53. Protect riparian lands in Basin 17 which are identified as essential to maintaining stream equilibrium conditions (shown in Figure 10.)	NorthWoods Stewardship Center/ VDEC, Towns, Land Trust, OCNRCD, Environmental Consultants	ERP, VHCB,	2014 VFW has purchased some priority lands along Lower Barton River (Initiated)

Action	Lead/Key Players	Cost/Funding	Target Date/Status
54. Establish a Trees for Streams Program in Basin 17 to increase natural vegetated buffers along streams.	OCNRCD/ VDFPR, Consulting Foresters, Lake Associations	\$10,000 per year / 319 program, ERP	2014 / OCNCRD began trees for streams program in 2010 and continued through 2016 (Completed)
55. Increase buffers on state lands including fish and wildlife access areas, riparian land ownership and South Bay and Willoughby Falls WMAs.	VANR/ NorthWoods Stewardship Center,	Lands Stewardship funds	2012 / Buffer plantings along a 3+ miles of river 2009 -2015. Dunn property accepted by USFWD will have 100ft buffers. (Initiated)

GOAL: PREVENT THE SPREAD OF NON-NATIVE INVASIVE PLANTS AND ANIMALS TO WATERBODIES AND RIPARIAN LANDS IN THE BASIN AND TO CONTROL EXISTING POPULATIONS WHERE PRACTICAL TO SUPPORT RECREATION AND NATIVE BIOLOGICAL COMMUNITIES IN THE BASIN.

Action	Lead/Key Players	Cost/Funding	Target Date/Status
56. Hold an annual Vermont Invasive Patrollers (VIP) training in the basin to support the establishment of VIP programs for lakes and ponds in the basin.	VDEC/ Lake and Watershed Groups	NA	Yearly/ workshops held in 2008, 2009, 2012 and 2014. (Initiated)
57. Support new and existing greeter programs for lakes and ponds. Encourage greeter programs on waters with invasives (e.g. Eurasian watermilfoil) to provide information to recreational users to encourage actions to prevent waterbody to waterbody transport	VDEC/ Lake and Watershed Groups Communities	ANC Grant-in-Aid, Watershed Grants	2011 (Initiated)
58. Support participation in the Federation of Vermont Lakes and Ponds forum for lake and pond residents to discuss issues associated with aquatic invasive species spread prevention and control in addition to other lake and pond topics.	Federation of Vermont Lakes and Ponds/ Lake and Watershed Groups, VDEC	NA	Ongoing/ (Initiated)
59. Support active invasive species control programs with priorities going to those which have the greatest chance of keeping an invasive species population in check.	VDEC/ Watershed Groups, Towns	ANS grants, Town funds, Local support	Ongoing (Initiated)
60. Strengthen the enforcement of existing laws in regards to the transport of aquatic non-native invasive species.	Enforcement programs/ Legislature, VDEC, Watershed Groups	NA	Law passed to make transport of all aquatic plants illegal in 2010 (Completed)

GOAL: IMPROVE AQUATIC HABITAT CONDITIONS IN THE BASIN TO SUPPORT FISHERIES, AND AQUATIC, RIPARIAN AND WETLAND COMMUNITIES.

Objective: Protect and restore habitat and water quality of lakes and lakeshores.

Action	Lead/Key Players	Cost/Funding	Target Date/Status
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Action	Lead/Key Players	Cost/Funding	Target Date/Status
61. Hold a public meeting to discuss the importance of undeveloped lakeshore parcels and priorities for their protection.	VDEC/ UVM, Lake and Watershed Groups		2011
62. Working closely with local land trusts, lake associations, and towns, contact landowners of the highest priority undeveloped lakeshore parcels to determine interest in conservation and conserve at least one of the top priority parcels.	VLT/ NorthWoods Stewardship Center, VANR, Towns, Environmental Consultants	VHCB, Private funds	2013 / Dunn property accepted by US Fish and Wildlife with support from VANR. Bluff estates protected through VLT project in 2015. (Completed) .
63. Coordinate lake association comments on any lakeshore buffer legislation at the state level to increase the likelihood that any such an effort will be effective in protecting lakes in the basin.	Federation of Vermont Lakes and Ponds/ Lake and Watershed Groups	NA	Ongoing –Act 138 report included public input on options for increasing buffer protections. MWA hosted public comment section on buffer bill (Completed)
64. Contact all towns in the basin without existing buffer language for lakes in town zoning to offer support for the development of regulations such as those included in the VLCT <i>Model Lake Shoreland Protection District Bylaw</i> .	VDEC/ VLCT, NVDA, Watershed Groups, Conservation, zoning and planning commissions	Municipal planning grants, 604(b)	Ongoing- Increased coordination with NVDA on town buffer language has been done. NVDA has done a review of town planning and zoning with a 604(b) grant for this purpose (Initiated)
65. Hold annual shoreland walks or paddles in the basin to discuss good shoreland practices and advertise these to all basin lake and watershed groups.	NorthWoods Stewardship Center, VDEC, OCNRCD, MWA, Watershed Groups	Watershed Grant	2013/ Walks have been held in Newport and Morgan. (Initiated)
66. Continue to develop materials on good and poor lakeshore practices for distribution to lakeshore residents. Establish a program for getting these materials to new shoreland landowners in the basin and to the press.	MWA/ VDEC, Watershed Groups	Watershed Grant,	2012/ MWA developed materials for folder and has distributed around Memphremagog and to other lake associations. New Lakewise program has new materials. Fovlap ERP grant to support this work (Completed)
67. Establish lakeshore buffer planting programs that continue through the early summer when lakeshore residents are in town.	OCNRCD/,VDEC, Watershed/ Lake groups	\$10,000 yr/ 319 program, ERP, Watershed grant	2012/ Northeast Kingdom Lakeshore Buffering program established and extending season along with new Federation of lakes and ponds grant. (Completed)
68. Hold a training for landscapers on landscaping to protect the lakeshore environment. Contact local nurseries to encourage them to provide local native trees and shrubs for shoreland plantings at reasonable prices.	NorthWoods Stewardship Center/ VDEC, OCNRCD, Watershed/lake Groups, Master Gardeners	Watershed Grant	Ongoing Contractor training held in 2015 (Completed)
69. Host and do outreach to promote project WET training workshops for teachers in the Memphremagog watershed customized to address water-related topics including, wetlands, watersheds, lake ecosystems, water quality monitoring, and phosphorus.	VDEC/ Local Schools and teachers, Watershed and lake groups		Ongoing MWA supported watershed focused boat rides on the lake in 2014 and 2015 targeting many of these topics. (initiated)

Objective: Protect the functions and values of existing wetlands and selectively restore human-altered wetlands.

Action	Lead/Key Players	Cost/Funding	Target Date/Status
70. Increase opportunities for watershed residents to learn about the important functions and values of wetlands, and changes in the wetland rules that allow all significant wetlands, regardless of mapping, to be protected and considered class II, through events, public displays and the distribution of outreach materials.	NorthWoods Stewardship Center , VDEC, Lake and Watershed Groups, Beck Pond LLC	Watershed Grant	2012 MWA organized a series of wetland events in 2013 and continuing outreach on this topic in 2014. (completed)
71. Complete wetlands surveys for towns in the basin to identify wetlands not included on the Vermont Significant Wetlands Inventory maps and wetlands with exceptional functions and values that may be deserving of additional protections thorough conservation efforts, town zoning, or reclassification.	Conservation Commissions/ NorthWoods Stewardship Center, VDEC, Towns, environmental consultants, Beck Pond LLC	\$5,000-\$10,000 per town / 604(b), Watershed grant.	2013/ Northwoods has done a wetland survey of upper Clyde River wetlands. (Initiated)
72. Develop specific wetland conservation priorities for high value wetlands in the basin for both habitat and phosphorus retention and use the priorities to focus the wetland conservation and restoration work of the many different partners involved in such work in the basin.	VDEC/ NVDA , Watershed Groups, NRCS, OCNRCD, VLT, Northern Rivers land trust, Beck Pond LLC	604(b), Watershed Grant	Ongoing/ Ecosystem System restoration grant received in 2011 and 2012, 2015 to identify target wetlands for restoration. (Initiated)
73. Work with individual landowners to conserve wetlands with exceptional functions and values in the basin.	VANR/ Watershed Groups, OCNRCD, NorthWoods Stewardship Center, NRCS, Landowners, VLT, NRLT, Beck Pond LLC	VHCB, Private funds and donations, Ducks unlimited	Ongoing/ Dunn property accepted by US Fish and Wildlife with support from VANR and VLT. (Completed)
74. Identify and prioritize sites of prior converted agricultural wetlands and wetland buffers in the basin for wildlife and phosphorus retention potential. Contact landowners to encourage enrollment in the Wetlands Reserve Program or CREP program to restore wetland functions and values.	OCNRCD/ VDEC, Lake and Watershed Groups, NRCS, Private landowners, Beck Pond LLC	WRP, WHIP, CREP, ERP, Partners for Fish and Wildlife	2012/ Ecosystem System restoration grant received in 2010, 2011, 2012, 2015 to identify lands appropriate for WRP program. One conservation project finished (Initiated)
75. Provide information to watershed residents about changes in the Current Use Program that allow for the enrollment of ecologically sensitive lands such as wetlands	NorthWoods Stewardship Center/ VANR, Consulting foresters		2013
76. Provide information to watershed residents on the benefits of beavers including their importance for creating wetland and wildlife habitat and for protecting water resources. Increase the awareness of programs available in some situations to assist landowners in dealing with human beaver conflicts while maintaining the benefits of beavers.	VFWD/ VDEC, Watershed groups	USFWS funding	Ongoing- part of 2015 MWA watershed workshop (completed)
77. Increase protection for the Upper Clyde River / Pherrins Wetlands Complex, including, but not limited to, having these wetlands designated a Class One Wetland under the Vermont Wetlands Rules.	NorthWoods Stewardship Center/ Towns, VANR, Watershed	Watershed Grant	2012/ Upper Clyde River wetlands study done by NorthWoods Stewardship Center in 2012. Identified by wetlands

Action	Lead/Key Players	Cost/Funding	Target Date/Status
	groups, private landowners		program as possible Class 1 wetland (Initiated)

Objective: Assess barriers to aquatic species passage and replace or retrofit priority structures in the basin to increase stream continuity

Action	Lead/Key Players	Cost/Funding	Target Date/Status
78. Complete bridge and culvert assessments using ANR protocols on streams in the basin targeting in the following order of priority: a. Black, Barton, Johns rivers and minor tributaries to Lake Memphremagog, and the Clyde River below Charleston Dam. b. Tributaries to Willoughby, Crystal, Salem, Echo, and Seymour lakes, Norton, Island and Great and Little Averill ponds. c. The rest of the watershed used by brook trout and other native species	VDEC/ VDFW, OCNRCD, Vtrans	\$5,000-\$10,000 / 604(b), Ecosystem Restoration	2014/ Assessments have been done for the town of Coventry, and portions of the Black and Johns Rivers and Phase 2 assessment reaches. (Initiated)
79. Work with partners in the basin to replace stream crossings blocking aquatic species passage including those targeted in Table 3 as well as any identified through additional bridge and culvert assessments.	VDEC/ VDFW, OCNRCD, Vtrans, Towns, NRCS, VAST	WHIP, ERP, Partners for fish and wildlife, Eastern brook trout joint venture	2014

Acronyms

319 Federal section 319 grants for NPS pollution abatement
604(b) Federal section 604b funds for regional planning commissions
AAP Acceptable Agricultural Practices
Agency Vermont Agency of Natural Resources
AMP Acceptable Management Practices
ANS Aquatic Nuisance Species Program
AOP Aquatic Organism Passage
ARS Agricultural Resources Specialist
BMP Best Management Practices
CREP Conservation Reserve Enhancement Program
EQIP Environmental Quality Incentives Program
ERP Ecosystem Restoration Program
FEH Fluvial Erosion Hazard
FEMA Federal Emergency Management Agency
LaRosa LaRosa Analytical Partnership Program
LEAP Logger Education to Advance Professionalism

LMP Lay Monitoring Program
MWA Memphremagog Watershed Association
NFIP National Flood Insurance Program
NMP Nutrient Management Plan
NOFA Northeast Organic Farming Association of Vermont
NPS Nonpoint Source Pollution
NRCS Natural Resource Conservation Service
NVDA Northeastern Vermont Development Association
OCNRCD - Orleans County Natural Resources Conservation District
ORW Outstanding Resource Water
PSB Public Service Board
RMP River Management Program (Agency of Natural Resources)
SARE Sustainable Agriculture Research and Education
SEP Supplemental Environmental Project
TMDL Total Maximum Daily Load
USEPA United States Environmental Protection Agency
USFWS United States Fish and Wildlife Service
UVM Ext - University of Vermont Extension

UVM WAgN - University of Vermont Women's Agricultural Network
 VAAFM Vermont Agency of Agriculture, Food and Markets
 VACD Vermont Association of Conservation Districts
 VANR Vermont Agency of Natural Resources
 VAST Vermont Association of Snow Travelers
 VCGI Vermont Center for Geographic Information
 VDEC Vermont Department of Environmental Conservation
 VDFPR Vermont Department of Forest Parks and Recreation
 VFWD Vermont Fish and Wildlife Department
 VHCB Vermont Housing and Conservation Board

VIP Vermont Invasive Patrollers
 VLCT Vermont League of Cities and Towns
 VLT Vermont Land Trust
 VSJF Vermont Sustainable Jobs Fund
 VTrans Vermont Agency of Transportation
 VRC Vermont River Conservancy
 VWQS Vermont Water Quality Standards
 VYCC Vermont Youth Conservation Corps
 WHIP Wildlife Habitat Enhancement Program
 WWTP Waste Water Treatment Plant

	Actions Not initiated		Actions Initiated		Actions Completed		Total
	Number	Percent	Number	Percent	Number	Percent	Number
Restore impaired waters	2	17%	7	58%	3	25%	12
Goal 1- reduce phosphorus load	8	19%	24	56%	11	26%	43
Goal 2- Aquatic invasive species	0	0%	4	80%	1	20%	5
Goal 3 – Improve aquatic habitat	3	16%	8	42%	8	42%	19
Total April 2016	13	16%	43	54%	23	29%	79
Total in May 2013	21	27%	41	52%	17	22%	79
Total in August 2013	24	30%	42	53%	13	16%	79
Total in November 2012	28	35%	41	52%	10	13%	79
Total in Feb 2012	35	44%	38	48%	6	8%	79

