Basin 17 Tactical Basin Plan 2017 report card.

 Since the 2017 Lake Memphremagog Tomifobia and Coaticook Tactical basin plan (TBP) was published a network of local partners has worked closely with the Vermont Department of Environmental Conservation (VDEC) to implement or initiated work on over 80% of the 66 strategies in the plan. These same local partners and VDEC have provided updates to these strategies in the draft report card below which will help to guide the development of strategies for the 2022 plan update. These strategies are broken down into those that have a status of:

* Completed – where the strategy has largely been completed
* In progress – where significant progress has been made on the strategy
* Awaiting Action - where there has not been significant progress
* Discontinued – where there has not been progress on the strategy but the strategy is not considered to be relevant or a priority

**Figure 1. Status of strategies from the Basin 17 2017 TBP**

Table 1. Status of the implementation actions for the Basin 17 Tactical basin plan

| **Action from 2017 TBP** | **Stressor Addressed** | **Partners**  | **Funding**  | **2021 Status** | **2021 Updates** |
| --- | --- | --- | --- | --- | --- |
| Strategies to address runoff from Developed Lands. Priority Sub-basins include high phosphorus export watersheds in the Lake Memphremagog Basin (Figure 2) Tributary to Stearns Brook, lake watersheds with elevated nutrient levels or increasing trends. |
| 1. Map parcels that will come under the 3-acre stormwater permit in the basin and do outreach to landowners that will be required to seek permit coverage.
 | land erosion, channel erosion, encroachment | VDEC, NVDA, Towns |  | **Completed** | See: <https://dec.vermont.gov/watershed/stormwater/9050/3-acre-properties> |
| 1. Complete 100% design for City of Newport stormwater retrofit, and full feasibility analysis for Derby stormwater retrofit.
 | land erosion, channel erosion, encroachment | MWA, City of Newport, Town of Derby, OCNRCD | CWI, ERP | **Completed** | Final design for Newport Marina subsurface infiltration chambers developed by WCA under contract with MWA. MWA submitted was awarded implementation block grant funding for construction, Oct 2021. Town of Derby infiltration chambers project is stalled due to buried fill materials in proposed site; soil conditions need further profiling to determine feasibility for stormwater treatment. Debry is open to alternatives.  |
| 1. Develop 30% design for Newport elementary school stormwater retrofit and Northpoint auto dealership drainage at the head of the mass failure along the Clyde River.
 | land erosion, channel erosion, encroachment | MWA, Northpoint Auto  | CWI, ERP | **Awaiting action; Completed** | Newport elementary school illicit discharge from elementary bathroom remedied through plumbing retrofit. Gravel wetland and GSI projects awaiting action; outreach to Elaine Collins (Principal) indicated recent series of zoning meetings for increased parking lot & other improvements; emailed Liam Gannon & Christina Malanga (teachers) who may be interested in leading applied enviro projects (e.g. small GSI). Northpoint auto dealership landowner stabilized eroding slope to reduce and prevent mass wasting. No underground chambers installed yet. Neighboring Dollar Store currently treating 100-yr storm using pervious pavement and infiltration, reducing nearby stormwater runoff that might flow to Northpoint Auto. |
| 1. Create the Memphremagog Stormwater Collaborative to implement a stormwater outreach effort to make landowners aware of stormwater BMPs to support implementation of town GSI practices, and to create local expertise in implementing GSI practices in the basin that can be shared with partners. Support coordinated funding of stormwater implementation.
 | Nutrients, land erosion, channel erosion, encroachment | MWA, OCNRCD, VDEC, NVDA, Towns, Lake Associations | CWI, ERP | **Completed** | SWC meetings up to April 2019 included discussions focused on Prouty Beach, Road Erosion Inventories, Rain barrel workshops, Town Planning workshops, IJC Water Quality Reference, and Natural & Developed Lands Recommendations.March 2021 meeting facilitated by MWA and included representatives from City of Newport, Town of Morgan, VDEC, NWSC, VHCB, and Seymour Lake Assoc. Discussions focused on tracking recent stormwater project updates, selecting additional projects to develop, and transitioning to the Basin Water Quality Council. Through these discussions, identified Barton Village and Town of Glover stormwater projects for 2021 development efforts. MWA funded to facilitate SWC meetings/transition to BWQC thru FY22 TBP support grant. |
| 1. Complete City of Newport small GSI practices and Glover town office rain garden projects along with other small scale GSI practices. Engage volunteers in installing practices and host GSI tours to expand understanding of techniques.
 | Nutrients, land erosion, | MWA, City of Newport, Town of Glover, OCNRCD | CWI, ERP | **Awaiting action; In progress** | City of Newport small GSI projects on hold while larger projects seek implementation funding. MWA performing project development work in coordination with town selectboard; screening for feasibility and natural resource compliance.  |
| 1. Address two potentially failed septic systems in Derby identified by IDDE assessment.
 | Pathogens, nutrients | VDEC, Derby | Septic system funding.. | **Completed** | Reached out to Derby Town Clerk to find person with relevant information. Bob Kelley (Administrator) not aware of this issue. Follow up site visits after the [IDDE assessments](https://dec.vermont.gov/sites/dec/files/wsm/erp/docs/IDDE/erp_report_LMB.pdf) were not able to show that the systems had 'failed', but suggested that the systems could benefit from upgrades. New funding for septic system repairs may encourage upgrdes to these facilities. |
| 1. Support brownfields restoration efforts that mitigate surface water pollution generated from these sites.
 | Toxics | NVDA, Towns, MWA,  | EPA | **In progress** | NVDA acquired VCDP grant for improvements and Phase I and II Environmental Assessment at Gardner Park with additional EPA grant funds to support the required additional assessment work. EPA Region 1 chose the project for a Targeted Brownfields Assessment (TBA) award to cover additional assessment work, cleanup planning, and remediation work. The next step is an Evaluation of Corrective Action Alternatives, to be followed by a Corrective Action Plan, which will be coordinated with the planned park improvements. |
| Strategies to address runoff from Lakeshore Developed Lands. Priority sub-basins include lakes with increasing nutrients trends or elevated levels (Eligo, Little and Great Averill, Holland, Long, Parker, Norton, Salem, Seymour, Shadow, Willoughby) and lake watersheds elevated nutrient levels including Lake Memphremagog, Walker Pond and Mud Pond. |
| 1. Complete annual Lake Wise trainings to develop capacity for local partners to evaluate properties for Lake Wise Assessments.
 | Nutrients, land erosion, encroachment | VDEC, Local Lake Wise Partners |  | **Complete/ In progress** | MWA received Lake Wise training and performed assessments for private lakeshore properties on Shadow Lake (7), Echo Lake (2), Salem Lake (2), and Lake Memphremagog (2). Recent turnover of trained personnel prevented ability to delegate FY21 Lakewise assessments, suggesting need for new point-person for basin.(3) OCNRCD has staff working on Lakewise in Orleans County but ouitside of the watershed. OCNRCD intends to have staff capacity in the future. |
| 1. Complete Lake Wise Masterplans for Willoughby, Seymour, and Shadow Lakes or as other stressed lakes where there is local support to identify and implement priority projects.
 | Nutrients, land erosion, encroachment | NorthWoods, OCNRCD, MWA, VDEC, FOVLAP, Lake and Watershed Associations.  | CWI, ERP | **Awaiting Action** | No Lake Wise Master Plans done – but Lake Watershed Action Plans being considered for Lake Willoughby. OCNRCD leading LWAP for select lakes in basin.NorthWoods Stewardship Center also interested in engagement with these in future years and may have some staff capacity. OCNRCD is involved in this work outside of the watershed and intended to provide staff capacity to support state priorities and lake associations.(shadow lake recently reached out to us to start discussing this) |
| 1. Use Memphremagog Stormwater Collaborative to initiate Lake Wise Mentoring to share Lake Wise expertise between Lake Associations, and to support shared technical resources and coordinated grant funding for BMP implementation.
 | Nutrients, land erosion, encroachment | NorthWoods, OCNRCD, MWA, VDEC, FOVLAP, Lake and Watershed Associations.  | CWI, ERP | **In progress** | SWC may morph into BWQC fall 2021. In meantime, NWSC and MWA working to determine roles for Lake Wise efforts and coordinating with Lake Associations for stormwater BMP implementation. All three partners have capacity for this work so this should be a priority action for next TBP and this will require strategizing and coordination between partners.  |
| 1. Implement priority projects identified in Lake Wise master plans.
 | Nutrients, land erosion, encroachment | NorthWoods, OCNRCD, MWA, VDEC, FOVLAP, Lake and Watershed Associations. | CWI, ERP |  **In progress** | Lake Wise Master Plans dropped. Lake Watershed Action Plans have not yet been developed. There has been a large number of Lake Wise practices implemented on lakes across the watershed. |
| 1. Complete Lake Wise practices at Brighton State Park, Shadow Lake Beach, Lake Willoughby (north end), Coutts Moriarty Camp on Lake Salem to increase the visibility of BMP practices and Lake Wise program.
 | Nutrients, land erosion, encroachment | NorthWoods, OCNRCD, MWA, VDEC, Lake and Watershed Associations, VFPR, Towns. | CWI, ERP | **Complete; In progress** | All complete except for Lake Willoughby north end. Shadow Lake Beach received rain gardens, woody plantings, and stabilization improvements. On Lake Salem, Coutts Moriarty Camp improvements included plantings, fencing, and 350 feet of shoreline stabilization. Several BMPs were implemented at Brighton State Park.  |
| 1. Develop and evaluate the new lake watershed assessment process to identify and address shoreland and lake sources of nutrients to upland lakes.
 | Nutrients, land erosion, encroachment | NorthWoods, OCNRCD, MWA, VDEC, towns, Lake and Watershed Associations | CWI, Watershed grants | **In Progress** | Lake Watershed Action Plan process has been developed by VDEC and OCNRCD is looking to apply for funding to support LWAPs in the Lake Memphremagog watershed. |
| Strategies to address runoff from Municipal Roads. Priority areas shown in Figure 8 and Table 12. |
| 1. Complete outreach to towns and communities about new MRGP regulations through workshops and individual meetings with selectboards.
 | land erosion, channel erosion, encroachment | NVDA, VTrans, OCNRCD, MWA, VDEC, FOVLAP, Vermont Local Roads, NorthWoods | CWI, ERP | **Complete** | NEK Rivers and Roads workgroup members have held several workshops and NVDA has supported road foreman’s meetings where outreach has been provided along with many individual meetings.  |
| 1. Develop regional collaboration for completing assessments to meet municipal Road General Permit requirements and help towns prioritize implementation of projects that address road segments with significant water quality impacts.
 | land erosion, channel erosion, encroachment | NVDA, VTrans, OCNRCD, MWA, VDEC, FOVLAP, Vermont Local Roads, NorthWoods | CWI, ERP | **Complete** | NEK Rivers and Roads workgroup has met several times per year to coordinate efforts to work with towns to complete REI’s and to prioritize projects.  |
| 1. Update regional road erosion inventory template to incorporate MRGP requirements and to better highlight projects with largest water quality benefits along with town transportation needs.
 | Nutrients, land erosion, channel erosion, encroachment | OCNRCD, MWA, VDEC, Lake and Watershed Associations, ANR, Towns. | CWI, ERP | **Completed** | Partners and towns have been focused on getting road erosion inventories in place and have not had capacity to develop a new template. The template that we were working on at the time of this TBP was written has been finalized by VDEC MRGP program and includes a section for project prioritization.  |
| 1. Develop capacity through Memphremagog Stormwater Collaborative or private consultants to support towns in completing at least 5 Road erosion inventories and capital budgets per year.
 | Nutrients, land erosion, channel erosion, encroachment | NorthWoods, OCNRCD MWA, VDEC, NVDA, VTrans | CWI, ERP, BBR | **Complete** | Road Erosion Inventories for all towns within Basin 17 were completed as of October 2021 through the work of partners that make up the NEK Rivers and Roads workgroup |
| 1. Through the Memphremagog Stormwater Collaborative and NEKRR group, provide ongoing support for towns in implementing road projects with the most significant water quality benefits through Better Roads grants and other funding sources.
 | Nutrients, land erosion, channel erosion, encroachment | NorthWoods, OCNRCD, MWA, VDEC, VTrans, Lake and Watershed Associations, Towns. | CWI, ERP, BBR | **In progress** | Partners in the NEK Rivers and Roads workgroup have been providing support to many towns in the basin to implement priority projects. It total 22 miles of miles of municipal road drainage and erosion control improvements were made since 2017. |
| 1. Complete ANR Bridge and culvert surveys in the Tomifobia and Coaticook watersheds and work with towns to replace structures identified in these and earlier assessments as barriers to AOP and or that are geomorphically incompatible.
 | Channel erosion, encroachment | VFW, VDEC, Towns, MWA, NorthWoods, Consultants | VBR, CWI, ERP, (for geomorphically incompatible structures) | **Complete** | A Bridge and culvert survey has been completed in the Tomifobia and Coaticook watersheds. Sever priority structures have addressed AOP and geomorphic compatibility issues including the VAST culvert on the Oswagatchie Brook in Brighton. Vtrans has replaced an undersized culvert on Route 14 on Brighton Brook.  |
| Strategies to address runoff from State Transportation Infrastructure Priority Sub-basins include high phosphorus export watersheds in the Lake Memphremagog Basin in Figure 2 with a focus of the Airport Tributary. |
| 1. Implement six minimum control measures required in the State TS4 permit.
 | land erosion, channel erosion, encroachment | VTrans,  | VTrans | **In progress** | VTrans has started implementing and documenting repairs of erosion locations, replacing failing/critical culverts and reviewing facilities for Stormwater pollution prevention plans (SWPPP). VTran has been adding treatment and green infrastructure to the garages where we have completed SWPPPs. In addition to that we have completed swale/ditch inventory the watershed (2020) and have gained a new stormwater permit along 191 (2021). |
| 1. Complete assessments necessary to support the development of a phosphorus control plan for the Lake Memphremagog Basin early in the next TS4 permit cycle.
 | land erosion, channel erosion, encroachment | VTrans | VTrans | **In progress** | The current TS4 permit doesn’t have specific requirements for the implementation of the Lake Memphremagog TMDL for Magog but will be included in the next permit. Once it is closer to the start of the next TS4 permit cycle, basin specific requirements will become clearer. This will likely be similar to with the process that was used for the Lake Champlain phosphorus control plan.   |
| 1. Identify funding to complete final designs for Newport State Airport gully stabilization and Orleans Park and ride stormwater treatment practices.
 | Channel erosion, encroachment | VTrans, MWA  | VTrans, ERP | **Awaiting action**  | Recent airport upgrades took priority over gully remediation. Not currently planning stabilization project.  |
| 1. Scope potential treatment practices on Willoughby State Forest to treat runoff from Route 5A before this enters Lake Willoughby.
 | Nutrients, land erosion | VTrans, VFPR, MWA,  | VTrans, ERP, Northern Borders Regional Commission | **In progress** | VTrans assisted in erosion stabilization where cars have been parking along the road. The restoration plan continues to look at opportunities for additional stabilization and treatment along Route 5a.  |
| Strategies to address runoff from Agricultural lands. Priority sub-basins include high phosphorus export watersheds shown in Figure 2, Impaired Tributary to Stearns Brook, Roaring Branch, Lake watersheds with increasing nutrient trends including Willoughby, Seymour, Shadow, Parker, Salem.  |
| 1. Create Memphremagog farmer workgroup to support the implementation of RAPs, BMPs, and effective workshops and outreach efforts.
 | Nutrients, land erosion, channel erosion | OCNRCD, AAFM, NRCS, VDEC, UVM ext. | ACWIP | **Discontinued** | A standalone farmer workgroup has not been created but the Orleans NRCD board and associate members include several active farmers and so serve much of the purpose that had been envisioned for a farmer workgroup. |
| 1. Host annual workshops on improving soil health and new RAPs.
 | Land erosion, nutrients, channel erosion | OCNRCD, Sterling College, AAFM, NRCS, UVM ext., NOFA | RCPP, USDA, ERP, ACWIP | **Completed** | There have been annual workshops except for 2020 and 2021 when Covid complicated such events. |
| 1. Create tracking system for certified small farms that need NMPs or that have up-to-date NMPs, schedule to keep these up-to-date.
 | Land erosion, nutrients, channel erosion | OCNRCD, AAFM, NRCS, UVM ext. | RCPP, ERP, ACWIP | **Completed** | AAFM had maintained lists of certified small farms who report they do not have a current NMP and OCNRCD has worked to refine this list and contact and work with farmers to get NMP’s in place. OCNRCD has tracking system for NMPs in Orleans County. |
| 1. Support 8 farmers per year in developing Nutrient Management Plans (NMPs) through UVM Extension’s Digging In course and the development of NMPs for all certified farms through NRCS CAPS funding.
 | Land erosion, nutrients, channel erosion | OCNRCD, AAFM, NRCS, UVM ext. | RCPP, EQIP | **Completed** | RCPP has supported this. Nineteen farmers took the UVM NMP course and have a certified 590 plan. |
| 1. Support the development of NMPs for certified farms that are not interested in Digging in Course through NRCS CAPS funding.
 | Land erosion, nutrients, channel erosion | OCNRCD, AAFM, NRCS | RCPP, EQIP, ACWIP | **Completed** | Many farms have gotten NMP’s in place though this funding source. We have provided support to farms who couldn’t take the class to sign up for NRCS NMP CAP funds. |
| 1. Generate funding so that VACD, OCNRCD staff, and partners can continue to work with priority farms on implementing NMPs once these have been completed to installing practices to address issues identified in NMP and LTPs.
 | Land erosion, nutrients, channel erosion | OCNRCD, AAFM, NRCS, VDEC, UVM Extension, NOFA | RCPP, USDA, ERP, ACWIP, AAFM BMP | **Completed** | MEMPH RCPP has provided support to update NMPs and provide follow up resources which has been critical to maintaining relationships, implementing and tracking the NMP and natural resource project development. |
| 1. Include local dairy nutritionist in the Memphremagog agricultural workgroup and to support partners in make the bridge from NMP to feed & forage management.
 | nutrients, | OCNRCD, NRCS, UVM Extension, NOFA | RCPP, ACWIP,  | **Completed** | Mike Thersher from Morrisons feed attends Memphremagog Ag workgroup meetings |
| 1. Evaluate additional BMPs that could be used on hay land to reduce loading from this land use. Options to evaluate include injection, timing of application, or use of Aerway. Provide outreach to farmers to support effective BMPs that are identified.
 | Land erosion, nutrients, | OCNRCD, AAFM, NRCS, VDEC, UVM ext, NOFA | RCPP, USDA, ERP, ACWIP, AAFM BMP | **In progress** |  We have been working to support farmers interested in Manure injection including a hosting a manure injection workshop. |
| 1. Work with farmers to do demonstrations and trials on different cover crops, rotations and manure management scenarios such as rotation of annual Italian grass.
 | Land erosion, nutrients, | UVM ext., OCNRCD, NRCS, VDEC, NOFA, seed companies | RCPP, USDA, ERP, ACWIP | **In Progress** | UVM NWCS team has been working with one RCPP cooperator farm on interseeding cover crop trail and UVM is now working with OCNRCD to implement a shorter day corn trial program. We will continue to do this work.  |
| 1. Develop a practical farm stormwater BMPs for farms and provide technical and financial support for farms to implement these to address stormwater runoff from impervious surfaces in farm production areas.
 | Land erosion, nutrients, channel erosion | OCNRCD, AAFM, NRCS, VDEC, UVM ext., NOFA, MWA, NorthWoods | ACWIP, EQIP, RCPP, AAFM BMP, ERP | **Awaiting Action** | Funding to support this work hasn’t been easy to get because of the potential regulatory connections to stormwater runoff from farmstead areas.  |
| 1. Increase the availability of equipment available for rental or through custom operators to allow farmers to follow NMPs including equipment to measure crop yields, manure application rates, take soil samples, and to implement practices such as no till drills, manure injectors, tine weeder air seeders.
 | Land erosion, nutrients, channel erosion | OCNRCD, AAFM, NRCS, VDEC, UVM ext., NOFA | ACWIP, AAFM BMP | **Completed** | OCNRCD purchased scales which are available for rental by farmers. VTAAFM CEAP program that has supported many farms to get no till drills and manure injection equipment.VHCB funding has also supported the purchase of equipment?? Sarah may check in on details. |
| 1. Promote existing programs (Commonwealth Grant) and develop additional programs to reduce financial match requirements for farmers to implement priority water quality improvement practices in coordination with Farm Viability Program.
 | Land erosion, nutrients, channel erosion | OCNRCD, AAFM, NRCS, VDEC,  | ERP, ACWIP, Northern Borders Regional Commission, Commonwealth Grant | **In Progress** | Since 2016 OCNRCD has made 116 referrals to other programs. (116 applications to other programs were filled out and submitted) Several programs are being developed including new RCPP funding, and the Pay for Phosphorus program that may reduce the out of pocket costs for farmers implementing practices.  |
| 1. Develop equine specific programing including support for installing horse manure compost bins and making pasture improvements.
 | Land erosion, nutrients,  | OCNRCD, AAFM, NRCS,  | ACWIP, EQIP, RCPP, AAFM BMP | **Awaiting Action**  | There has not been capacity to do targeted outreach to the equine program but it is possible that funding though formula grants may support this work if phosphorus reductions can be tied to these practices. |
| 1. Complete targeted water quality sampling on 5-10 farms to help identify source areas and evaluate nutrient reductions achieved through BMP implementation.
 | Land erosion, nutrients, channel erosion | VDEC, OCNRCD, Beck Pond LLC, MWA | ERP, ACWIP | **In progress** | VDEC and OCNRCD sampling for phosphorus in 16 tributaries.  |
| 1. Publish success stories where farmers have installed BMP practices and seen improved farm operations and improved water quality conditions.
 | Land erosion, nutrients, channel erosion | VDEC, OCNRCD, NRCS, AAFM, MWA, NOFA VT | ERP | **Complete** | 2 stories have been published  |
| 1. Increase the participation of Dairy Farms in the basin in the Caring Dairy Program, as well as new AAFM Vermont Environmental Stewardship program to highlight farms with good water quality practices.
 | Land erosion, nutrients, channel erosion | OCNRCD, AAFM | Caring Dairy, Northern Borders Regional Commission | **Awaiting Action**  | A few years ago the caring dairy program stopped bringing new farms into the program. Farms in the basin have not yet signed up to participate in the Vermont Environmental Stewardship program. |
| 1. Increase the participation of Farm Viability in working with farms that are the focus of BMP implementation efforts in target watersheds to complete a cash flow analysis or develop a full business plan.
 | Land erosion, nutrients, channel erosion | Farm Viability, OCNRCD, AAFM, NRCS, NOFA VT | Northern Borders Regional Commission, |  **In progress** |  OCNRCD referred many farmers to the farm viability program.  |
| 1. Develop Farm Conservation Corp program to support implementation of BMP practices which can be done efficiently by hand labor.
 | Land erosion, nutrients, channel erosion | OCNRCD, AAFM, NRCS, VDEC, UVM ext, NOFA, NorthWoods | ERP, ACWIP | **Awaiting Action**  | NorthWoods and OCNRCD have started to discuss this concept but haven’t made progress in developing such a program. A decision needs to be made as to if this is feasible and a priority to include in the 2022 plan. CWSP funding for small farm practices may provide a funding alternative for this. |
| Strategies to address runoff from Forest Lands. |
| 1. Support local land trusts and conservation organizations in conserving forest blocks that are important for protecting water quality in headwater streams.
 | land erosion, channel erosion, encroachment | Lake and Watershed Associations, Northern Rivers Land Trust, ANR., TNC, VLT, Staying Connected  | CWI, ERP, VHCB,  | **Awaiting Action** |  |
| 1. Coordinate workshops on minimizing water quality impacts of maple sugaring operations.
 | land erosion, channel erosion, | VT Woodlands Association, VT Coverts, VFPR | CWI | **Awaiting Action** |  |
| 1. Host workshops on the new AMPs, as well as resources available for addressing logging road issues which could be held at local lumberyards
 | land erosion, channel erosion, | VT Woodlands Association, VT Coverts, VFPR | CWI | **Awaiting Action** | Not aware of any workshops that have been held on the AMPs in the basin or logging road issues. NorthWoods Stewardship Center held a Strategic Wood Addition training. |
| 1. Use Lidar data when available to identify gullies that may have been caused by historical logging operations to evaluate restoration potential.
 | Land Erosion, Channel erosion | VFPR, ONCRCD, NorthWoods,  | CWI, ERP | **In Progress** | MWA leading GIS and preliminary field screening of erosive gullies thru FY 22 TBP support grant. This was an action that OCNRCD highlighted. If MWA looks at gullies on any farmlands or adjacent unmanaged lands OCNRCD would be happy to work on this.  |
| 1. Continue to support local skidder bridge rental program and increase usage of bridges.
 | Channel erosion, land erosion | OCNRCD, NorthWoods, VFPR | CWI, ERP | **In Progress** | Skidder bridge support has shifted from the rental program to support for purchase of skidder bridges by loggers to reach a wider audience. |
| Strategies to address unstable stream channels and improve aquatic habitat. Priority Sub-Basins include Middle and lower Barton River. |
| 1. Complete Phase 2 SGA for identified reaches in the Memphremagog watershed.
 | Channel erosion, encroachment | VDEC, OCNRCD, MWA, NorthWoods, Towns.. | CWI, ERP | **In Progress** | MWA performing basin-wide Phase 2 SGA review and initiate planning for identified reaches in coordination with VDEC thru FY22 TBP support grant. |
| 1. Complete a field visit along the Stearns Brook watershed to evaluate the status of sediment stressed condition and the contribution of stream channel erosion to this condition as well as town interest in river corridor zoning. Complete Phase 2 assessment if justified based on this evaluation.
 | Channel erosion, encroachment | VDEC, OCNRCD, MWA, NorthWoods, Towns | CWI, ERP | **In Progress** | MWA performing Stearns Brook sediment evaluation and river corridor planning outreach to town of Holland in coordination with VDEC thru FY22 TBP support grant. |
| 1. Complete preliminary engineering for projects identified in existing and new SGA assessments and culvert inventories. Complete project datasheets with preliminary project descriptions and constraints for high priority projects.
 | Channel erosion, encroachment | VDEC, OCNRCD, MWA, NorthWoods, Towns | CWI, ERP | **Awaiting Action** |  |
| 1. Complete priority river corridor easement projects along the Baron River including coordination with VFW where one rod ownerships could be expanded through river corridor easements or purchase of these lands.
 | Channel erosion, encroachment | VDEC, VFW, OCNRCD, MWA, NorthWoods, Towns, VRC | CWI, ERP | **In progress** | NWSC, OCNRCD and MWA working with VFWD on the Riparian Lands Team to identify acquisition or buffer restoration opportunities on the Willoughby, Barton, Black, and Johns rivers. GIS mapping and landowner outreach through 2023. OCNRCD has an agreement with PFW and will conducting landowner outreach  |
| 1. Continue buffer plantings along rivers in priority locations through CREP, Trees for Streams program, Elm restoration, and VFWD buffer planting efforts
 | Channel erosion, encroachment, land erosion, nutrients, | VDEC, VFW, OCNRCD, MWA, TNC, NorthWoods, Towns | CWI, ERP, CREP | **In progress** | NWSC, OCNRCD, MWA leading tree planting efforts on riverfront parcels identified through the Riparian Lands Team efforts.  |
| 1. Continue VFWD experimentation, and if found practical, implementation of novel methods to encourage faster and more efficient means to reclaim cleared lands to floodplain forest.
 | Channel erosion, encroachment, land erosion, nutrients, | VFWD, VDEC, Beck Pond LLC | ERP, State Wildlife Grants, Dingell-Johnson funds | **In progress** | VFWD leading novel revegetation experiments utilizing soil prep and hydroseeding for rapid plantings. |
| 1. Coordinate outreach to basin towns on adopting River Corridor Zoning.
 | Channel erosion, encroachment | NorthWoods, OCNRCD, MWA, VDEC, Lake and Watershed Associations, Towns | CWI, MPG, HMF | **In progress** | MWA performing outreach to town of Holland for river corridor planning following Stearns Brook sediment evaluation. |
| Strategies to support wetland restoration and protection |
| 1. Continue outreach to landowners of wetlands identified as priority restoration sites – with a focus on lands with new landowners, actively being conserved or where landowners are making changes in land management
 | Channel erosion, encroachment | OCNRCD, NRCS, MWA, NorthWoods, Beck Pond LLC | CRP, GLFC/Riparian Lands | **In progress** | MWA leading wetland restoration screening and realtor/landowner outreach through Project Development Block Grant through 2021. Outreach to Riparian Lands adjacent landowners with significant habitat for conservation easements, acquisition, and restoration projects. |
| 1. Flag wetland restoration opportunities when landowners contact wetland ecologists looking to buy or sell a property that really can’t be built on to promote wetland restoration programs.
 | Channel erosion, encroachment | OCNRCD, NRCS, MWA, NorthWoods, Beck Pond LLC | CRP | **In progress** | MWA connecting with wetland ecologist, Sea Grant, and Orleans realtors for workshop to increase wetland conservation awareness and identify wetland restoration opportunities on private parcels. Supported by Project Development Block Grant. |
| Strategies to address runoff from WWTF |
| 1. Finalize the wasteload allocation for facilities in the Lake Memphremagog watershed and issue permits that meet these new phosphorus limits.
 | Nutrients | Brighton, VDEC, NVDA | WW funding, Northern Borders Commission funding. | **In progress** | The wasteload allocation for facilities in the Lake Memphremagog was completed in 2017. The Barton and Orleans WWTF permits were issued in 2019. The Brighton WWTF permit is currently being drafted and Newport City is on the plan for later in FY22. |
| 1. Support Barton, Orleans, Brighton and the City of Newport in optimizing WWTF facilities to minimize loading in the Lake Memphremagog watershed and to maintain WLA to allow for future growth.
 | Nutrients | Barton, Orleans, City of Newport, VDEC, NVDA | Town and City funds | **In progress** | Barton and Orleans have submitted phosphorus optimization plans. The Vermont Rural Water Association is working with all facilities under TMDLs in VT to support nutrient removal optimization. Hoyle Tanner & Associates in the middle of a 3-year project to optimize P removal at facilities in the Lake Champlain Basin. Facilities in the Memphremagog Basin will benefit from the guidance that comes out of this project.  |
| Strategies to address flow altered waters. Norton Lake, Great Averill Pond and Little Averill Lake and the streams below these waterbodies. |
| 1. ANR will advocate before the PSB the modification of these dams to function with a crest control to restore more natural water level fluctuations on these waterbodies and natural flows in the streams below the dams.
 | Flow Alteration | ANR, PSB, Hydro Coaticook, Camp owners and groups |  | **In progress** | Efforts to address flow and water level issues on Great and Little Averill are ongoing with discussion of lowering the spillway and allowing this to control flows.  |
| 1. Review status of other flow-altered waterbodies and, where necessary, take steps toward restoring more natural water level fluctuations and downstream flows.
 | Flow Alteration | VDEC, VDFW, Lake and Watershed Groups, Towns |  | **In progress** | The town of Glover had reduced the winter draw down from 2 boards to 1 and may have stopped water level adjustments altogether at this time. There are discussions of dam modifications to widen the spill way and address erosion around the dam which could solve the problem if funding is found to support this work. |
| Strategies to address Aquatic Invasive Species |
| 1. 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.
 | Aquatic Invasive Species | VDEC, Lake and Watershed Groups, FOVLAP |  | **In progress** | VIP programs active at: Shadow, Willoughby, Echo, Seymour, Salem and Memphremagog. Two VIP trainings were provided by VDEC for our watershed. One was in person at Lake Lamoille and the other was virtual.  |
| 1. Support new and existing greeter programs for lakes and ponds including greeter programs on waters with invasive species to provide information to recreational users to encourage actions to prevent waterbody to waterbody transport.
 | Aquatic Invasive Species | VDEC, Lake and Watershed Groups | ANC Grant-in-Aid, | **In progress** | Greeter programs active at: Shadow, Crystal, Willoughby, Island Pond, Echo, Seymour, Salem Memphremagog. |
| 1. Support the purchase and use of decontamination equipment by greeter programs to increase the effectiveness of spread prevention programs including the use of VDEC portable decontamination unit in the basin when available to target large fishing events along with other spread prevention priorities.
 | Aquatic Invasive Species | VDEC, Lake and Watershed Groups | ANC Grant-in-Aid, | **In progress** | Decontamination equipment in use at Shadow and Seymour lakes. Both programs are very active, operating 7 days a week for at least 10 hours a day.The City of Newport has not been using decontamination equipment because it is broken. |
| 1. Continue to refine starry stonewort spread prevention strategy including broader Lake Memphremagog greeter program with decontamination unit, public education campaign and signage, as well as policy options to increase use of decontamination unit to prevent spread out of Lake Memphremagog.
 | Aquatic Invasive Species | Lake and Watershed Groups Towns, VDEC  | ANC Grant-in-Aid, Watershed Grants | **In progress**  | The Memphremagog greeter program has limited hours and there were not any efforts to engage in any additional public education campaign. For the second year Starry Stonewort Signage was posted at beach area and Scott’s Cove by MWA using signage approved by VT ANS program. |
| 1. Keep abreast of Starry Stonewort research in other states and encourage research on spread prevention and control options as well as impacts of starry stonewort on the lake including fish communities through Department of Fish and Wildlife assessments.
 | Aquatic Invasive Species | VDEC, Lake and Watershed Groups, Communities | ANC Grant-in-Aid, Watershed Grants | **unknown** |  |
| 1. Sample for zebra mussels, quagga mussels, and spiny waterflea in lakes in the watershed.
 | Aquatic Invasive Species | VDEC, Lake and Watershed Groups, Communities | ANC Grant-in-Aid, Watershed Grants | **In progress** | Found in Lake Memphremagog in Quebec and monitoring is ongoing to track migration south along with veliger survey’s. MWA participating in MCI-led lay monitoring program for private docks using PCV samplers. |
| 1. Support active invasive species control programs with priorities going to those which have the greatest chance of keeping an invasive species population under control.
 | Aquatic Invasive Species | Colleges and Universities, VFWD, VDEC, watershed groups | ANC Grant-in-Aid, | **In progress** | Diver operated suction harvesting occurring on Hosmer, Willoughby, and Derby Pond. Hand pulling on Crystal and Shadow Lake. The City of Newport has installed limited # of BBs at City dock this year on Lake Memphremagog and received approval and permits for DASH (Diver Assisted Suction Harvesting). This is being done by Newport Town at Whipple Point and at Newport Marina in City |

# List of Acronyms

AAFM Agency of Agriculture, Food, and Markets

AAPs Accepted Agricultural Practices

ACWIP Agricultural Clean Water Initiative Grant Program

AIS Aquatic Invasive Species

AMPs Acceptable Management Practices (for logging)

ANR Agency of Natural Resources

AOP Aquatic Organism Passage

BBR Better Backroads program

BMP Best Management Practices

CREP Conservation Reserve Enhancement Program

CWI Clean Water Initiative Grant Funding

CWIP Clean Water Initiative Program

CWSRF Clean Water State Revolving Fund

DWSRF Drinking Water State Revolving Fund

EQIP Environmental Quality Incentive Program

ERP Ecosystem Restoration Program

FOVLAP Federation of Vermont Lakes and Ponds

GIS Geographic Information System

GSI Green Stormwater Infrastructure

HMG High Meadows Fund

IDDE Illicit Discharge Detection (and) Elimination

LTP Land Treatment Plan

MPG Municipal Planning Grant

MRGP Municipal Roads General Permit

MWA Memphremagog Watershed Association

NEKRR Northeast Kingdom Rivers & Roads Workgroup

NMP Nutrient Management Plan

NOFA Northeast Organic Farming Association of Vermont

NRCD Natural Resource Conservation District

NRCS Natural Resources Conservation Service

NVDA Northeast Vermont Development Association

PFW Partners for Fish and Wildlife

RAP Required Agricultural Practices

RCPP Regional Conservation Partnership Program

RMP River Management Program

RPC Regional Planning Commission

SFO Small Farm Operation

SGA Stream Geomorphic Assessment

SWG State Wildlife Grants

SWMP Stormwater master plans

TBP Tactical Basin Plan

TMDL Total Maximum Daily Load

TNC The Nature Conservancy

TS4 Transportation Separate Storm Sewer System General Permit

TU Trout Unlimited

USDA United States Department of Agriculture

USEPA United States Environmental Protection Agency

USFWS United States Fish and Wildlife Service

USFS United States Forest Service

USGS United States Geological Survey

UVM ext. University of Vermont Extension

VANR Vermont Agency of Natural Resources

VDEC Vermont Department of Environmental Conservation

VDFPR Vermont Department of Forests, 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

VLRP Vermont Local Roads Program

VLT Vermont Land Trust

VTrans Vermont Agency of Transportation

VRC Vermont River Conservancy