Fitzgerald Environmental Associates, LLC.

Applied Watershed Science & Ecology

MEMORANDUM

To: Lake Dunmore and Fern Lake Association
From: Evelyn Boardman, Frank Piasecki, and Evan P. Fitzgerald, CPESC/CFM
Re: Lake Dunmore and Fern Lake Watershed Action Plan
Project Identification and Prioritization
Date: April 6, 2021

Fitzgerald Environmental Associates (FEA) is developing a Watershed Action Plan for Lake Dunmore and Fern Lake, focusing on assessing priority areas for stormwater, erosion, and flood hazards. FEA has conducted a total of six (6) field tours of the project area including a lakeshore assessment for each lake, stream walks on selected tributaries to the lakes, and assessments of public and private roads and other impervious surfaces. This memo describes the problem area identification and prioritization process.

Identification of Problem Areas

The initial round of problem area identification began by identifying priority areas for field assessments with a desktop exercise scanning the watersheds with aerial imagery, NRCS soils data, LiDAR contour data, road erosion inventory data, and culvert data in a GIS. Potential project areas were identified and mapped for review during site visits.

The stream walk assessment focused on four (4) blue-line tributaries to Lake Dunmore and one (1) tributary to Fern Lake. The stream walks were a pared down version of the stream geomorphic assessment focusing on evaluating:

- Erosion of channel and embankments (bank erosion, mass failures, and headcuts)
- Additional linear features of interest (buffers < 25')
- Point features of interest (stormwater inputs, beaver impoundments, debris jams)
- Stream crossings
- Channel characteristics (dominant bed and bank material, basic cross-section, bar features)

Field tours of the priority areas identified and assessed 55 problem areas. The problem areas are shown on the map included in Appendix A. We grouped the problem areas into four (4) project categories described below.

- **Stormwater, Including:**
    - **Green Stormwater Infrastructure (GSI) BMP Installation/Retrofit**– Opportunity to reduce nutrient and sediment loads through the installation of a new stormwater best management practice (BMP). Sites where nutrient and sediment reductions could be improved through the retrofit of existing stormwater BMPs.

- **Road, Driveway, and Trail Drainage Improvement/Stabilization, Including:**
    - **Road, Driveway, and Trail Drainage Improvement/Stabilization –** Areas of high sediment and nutrient loading due to driveway, trail/campsite, road, embankment, and ditch erosion. Includes areas of erosion at road cross-culverts.
    - **Gully Stabilization –** Areas of severe erosion from concentrated stormwater runoff.
- **Stream, Including:**
    - **Stream Culvert –** Locations of undersized culverts and culverts with active erosion.
    - **Stream or Wetland Restoration** – Problem areas where stream bank erosion is a significant nutrient and sediment source, or where improved stream/wetland function could reduce sediment and nutrient loads to receiving waters.
- **Lakeshore –** Problem areas where lakeshore erosion or stormwater inputs are a significant nutrient and sediment source, or where improved lakeshore natural communities could reduce sediment and nutrient loads to receiving waters.

Evaluation and Prioritization of Problem Areas Approach

<u>GIS-Based Site Screening</u>

Using the field data points collected with sub-meter GPS during our watershed tours, we evaluated key characteristics for each site indicating the potential for increased stormwater runoff and pollutant loading, among several other factors described below. These GIS-based observations, along with field-based observations of site characteristics, are summarized in the project prioritization tables.

The following geospatial data were reviewed and evaluated as part of the GIS-based screening:

- **Subwatershed Mapping –** The contributing drainage area to each problem area was mapped based on field observations and 2-foot contours derived from the 0.7 2017 LiDAR elevation surface.
- **Aerial Photography** – We used the 0.3 m imagery collected for Addison County in 2018 to review the site land cover characteristics (i.e., forest, grass, impervious).
- **Impervious Surfaces Data** – We used the 2016 statewide high-resolution impervious surfaces data layer developed by the UVM Spatial Analysis Lab.
- **Stormwater Infrastructure** – We used the bridge and culvert data collected by the Addison County Regional Planning Commission between 2018 and 2020 for Town Roads and VTrans structure data for state highways.
- **NRCS Soils** – We used the Addison County Soils data to evaluate the inherent runoff and erosion potential of native soil types (i.e., hydrologic soil group, erodible land class). For project sites with potential for green stormwater infrastructure (GSI), we assessed the general runoff characteristics of the drainage area based on hydrologic soil group (HSG).
- **Parcel Data** – We used the parcel data available through VCGI to scope the limits of potential projects based on approximate parcel boundaries and road right-of-way.

- **VTDEC Hydrologically Collected Road Segment Data and Road Erosion Inventories –** We used a statewide inventory of road erosion risk and hydrologic connectivity of road segments and the road erosion inventories for Salisbury and Leicester to prioritize areas of potential sediment loading to visit for field surveys.

Unified Matrix Evaluation and Prioritization of Problem Areas

The 35 projects that could be assessed for a GSI treatment volume or erosion volume are described in the Unified Prioritization Project Table (Appendix B). These projects were prioritized based on the potential for each project to improve water quality, reduce environmental impact, project feasibility, and co-benefits. Estimated project cost and the phosphorus removal efficiency ($/lb of P) were included. We followed the Unified Scoring Prioritization for Stormwater Master Plans document developed by VTDEC, with an adjustment to the phosphorus loading and phosphorus reduction criteria (VTDEC, 2018). This method includes a total of 19 criteria divided into 3 categories. The final score is expressed as a percent of the total score, with slightly different criteria applied to road drainage projects.

<u>Phosphorus Loads from Sediment</u>

Land cover-based phosphorus loading estimates account for generalized assumptions of sediment mobilization; however, we believe that phosphorus loading from active erosion areas may be underestimated for some of the stormwater problem areas. Other project types such as stream bank restoration or gully stabilization do not fit into the VTDEC Unified Scoring framework. We followed the VTDEC Standard Operating Procedure (SOP) for tracking and accounting of phosphorus associated with the Municipal Roads General Permit (MRGP) to estimate phosphorus loading and reduction associated with road improvements and erosion stabilization (VTDEC 2020).

For grader berm removal, crown improvement, and drainage (ditch) improvement projects on Town roads, we used the linear loading rates from the VTDEC SOP to estimate phosphorus loading. Phosphorus reduction is estimated as a 40% reduction for upgrading a segment from partially meeting the MRGP standards to fully meeting the MRGP standards. Phosphorus reduction is estimated as an 80% reduction for upgrading a segment from not meeting the MRGP standards to fully meeting the MRGP standards.

For grader berm removal, crown improvement, and drainage (ditch) improvement projects private roads, we approximated the private road width is approximately half that of a Town road. Therefore, we halved the linear loading rates from the VTDEC SOP to estimate phosphorus loading from private roads. We estimated a 40% phosphorus reduction for projects to upgrade the roads, as space and budget constraints will likely prevent the private roads from meeting the standards and maintenance schedule prescribed for municipal roads.

For estimating the overall phosphorus loading and phosphorus reduction associated with excess sediment mobilization and stabilization, we used methods and loading rates established for the stabilization of roadside gully erosion in the VTDEC SOP. We estimate annual soil loss (in cubic feet) based on our best professional estimate of the age and volume of erosion features. We apply a 43.38

kg/ft^3 sediment bulk density to volume of erosion and 0.000396 kg (P)/ kg sediment (TSS), the equivalent of an annual loading rate of 0.017 kg (P)/ft^3 and 0.037 kg (P)/ft^3 (VTDEC 2020).

BMP Unit Costs and Adjustment Factors

BMP unit costs (2016 $) and adjustment factors were derived from recent stormwater master plans completed by Watershed Consulting Associates (2018). These numbers were primarily based on research completed by the Charles River Watershed Association and the Center for Watershed Protection (EPA, 2016), as well as updates based on actual construction costs in Vermont (Table 1). The unit cost estimates include an 8% total inflation adjustment for 2017-2020 based on the Consumer Price Indicator Inflation Calculator. Unit construction costs for road drainage projects were based on the estimates provided in the Road Erosion Site Prioritization and Remediation Project Summary (Fitzgerald Environmental Associates and Milone and MacBroom, Inc., 2017). Additional multipliers for site type (Table 2) and level of permitting and engineering required (Table 3) are also shown below.

Table 1: BMP Unit Costs

BMP Type	Cost/ft^3 Treatment Volume
Constructed Wetland	9.49
Dry Pond	4.87
Grass Conveyance Swale	4.32
Rain Garden (no underdrain)	16.72
Rain Garden (with underdrain)	16.72
Subsurface Infiltration	6.76
Surface Infiltration	6.75
Wet Pond	7.35

Table 2: Site Type Cost Adjustment

Site Type	**Cost Multiplier**
Existing BMP retrofit	0.25
New BMP in undeveloped area	1.00
New BMP in partially developed area	1.50
New BMP in developed area	2.00

Table 3: Permitting and Engineer (P&E) Cost Adjustment

Level of P&E Required	**Cost Multiplier**
None	1.00
Low	1.20
Moderate	1.25
High	1.35

Non-Unified Evaluation and Prioritization of Problem Areas

Areas identified during field tours of the study area where the primary project recommendation was not stormwater treatment infrastructure (e.g., road erosion stabilization, gully stabilization, and undersized culvert replacements) were assigned several numerical scoring metrics that are weighted to assist in prioritizing each project based on water quality benefits, project feasibility, maintenance requirements, costs, and any additional benefits. The maximum possible score is 30 and the individual site scores ranged from 7 to 19. Each category is described below and includes a description of the scoring for each criterion. Final evaluation criteria summarized in the Non-Unified Prioritization Project Table (Appendix B) are described below:

- **Water Quality Benefits (15 points total)**
  - **Nutrient Reduction Effectiveness (4 points)** – Degree of nutrient removal potential with project implementation, this accounts for both the existing nutrient loads and the removal efficiency and capacity of the proposed treatment. Nutrient loading was quantified based on the watershed size, the land cover types, and percent impervious surfaces, and the effectiveness was based on the treatment efficacy of the potential mitigation options appropriate for the space and location of the treatment area.
    - 0 points – No nutrient source and/or no increased treatment
    - 1 point – Minor nutrient source and/or minor increase in treatment
    - 2 points – Moderate nutrient source with some increase in treatment
    - 3 points – Moderate nutrient source with significant increase in treatment
    - 4 points – Major nutrient source with significant increase in treatment
  - **Sediment Reduction Effectiveness (4 points)** – Degree of sediment removal potential with project implementation, this accounts for both the existing sediment loads and the removal efficiency and capacity of the proposed treatment. Sediment loading was quantified based on the watershed size, the land cover types, and percent impervious surfaces, and the effectiveness was based on the treatment efficacy of the potential mitigation options appropriate for the space and location of the treatment area.
    - 0 points – No sediment source and/or no increased treatment
    - 1 point – Minor sediment source and/or minor increase in treatment
    - 2 points – Moderate sediment source with some increase in treatment
    - 3 points – Moderate sediment source with significant increase in treatment
    - 4 points – Major sediment source with significant increase in treatment
  - **Drainage Area (1 point)** – Approximate drainage area to site is greater than 2 acres
  - **Impervious Drainage (3 points)**– Approximate area of impervious surfaces draining to the site.
    - 0 points – Area of impervious surfaces is less than 0.25 acres
    - 1 point – Area of impervious surfaces is 0.25-0.5 acres
    - 2 points – Area of impervious surfaces is 0.5-1.0 acres
    - 3 points – Area of impervious surfaces is >1.0 acres

- **Connectivity to Surface Waters (3 points)**
  - 0 points – All stormwater infiltrates on site
  - 1 point – Stormwater receives some treatment before reaching receiving waters
  - 2 points – Stormwater drains into drainage infrastructure that directly outlets to receiving waters (assumes no erosion or additional pollutant loading to discharge point)
  - 3 points – Stormwater drains directly into receiving waters (typically stormwater draining directly into a large wetland is assigned 2 points)

- **Landowner Support (2 points)**
  - 0 points – Project is located on private property, no contact with landowner
  - 1 point – Project is on Town or State property with no contact
  - 2 points – Project has been discussed and is supported by landowner
- **Operation and Maintenance Requirements (2 points)**
  - 0 points – Project will require significant increased maintenance effort
  - 1 point – Project will require some increased maintenance effort
  - 2 points – Project will require no additional maintenance effort
- **Cost and Constructability (6 points) –** This score is based on the overall project cost (low score for high cost) and accounts for additional design, permitting requirements, and implementation considerations, such as site constraints and utilities, prior to project implementation.

- **Additional Benefits (5 points total) –** Description of other project benefits, total score is roughly a count of the number of additional benefits. Additional benefits considered in the prioritization are as follows:
  - **(1) Chronic Problem Area** – The site requires frequent maintenance and/or is an ongoing problem affecting water quality
  - **(2) Seasonal Flooding** – The site is affected by or contributes to seasonal flooding
  - **(3) Educational** – The site provides an opportunity to educate the public about stormwater treatment practices
  - **(4) High Visibility** – The site is highly visible and will benefit from aesthetically designed treatment practices
  - **(5) Infrastructure Conflicts** – The stormwater problem area is increasing erosion or inundation vulnerability of adjacent infrastructure (i.e. roads, buildings, etc.)
  - **(6) Drains to Connected Stormwater Infrastructure** – The site drains into a larger stormwater conveyance system that is less likely to receive downstream treatment
  - **(7) Reduces Thermal Pollution** – Project implementation will reduce the risk of thermal loading from runoff to receiving surface waters
  - **(8) Improves BMP Performance** – Project implementation will improve the performance of existing stormwater treatment practices that receive runoff from the site
  - **(9) Peak Flow Reduction** – Project implementation will significantly reduce stormwater peak flows leaving the site
  - **(10) Enhances Lakeshore Natural Communities** – Project implementation will promote a native vegetated lakeshore buffer and/or provide wildlife habitat along the lakeshore

Problem Area Summary Sheets

Problem area summary sheets were developed for 35 of the high and moderate priority project sites, and are provided in Appendix C. These sites were selected based on the prioritization categories shown in the Problem Area Table in Appendix B. Problem areas and prioritization strategies will be discussed and refined with input from representatives of the Lake Dunmore and Fern Lake Association during upcoming meetings. The one-page summary sheets found in Appendix C include a site map and description, site photographs, and prioritization categories.

List of Appendices

Appendix A: Stormwater Problem Area Location Maps (17”x17”)

Appendix B: Project Prioritization Summary Tables – Unified and Non-Unified (11”x17”)

Appendix C: Problem Area Summary Sheets (8½”x11”)

Literature Cited

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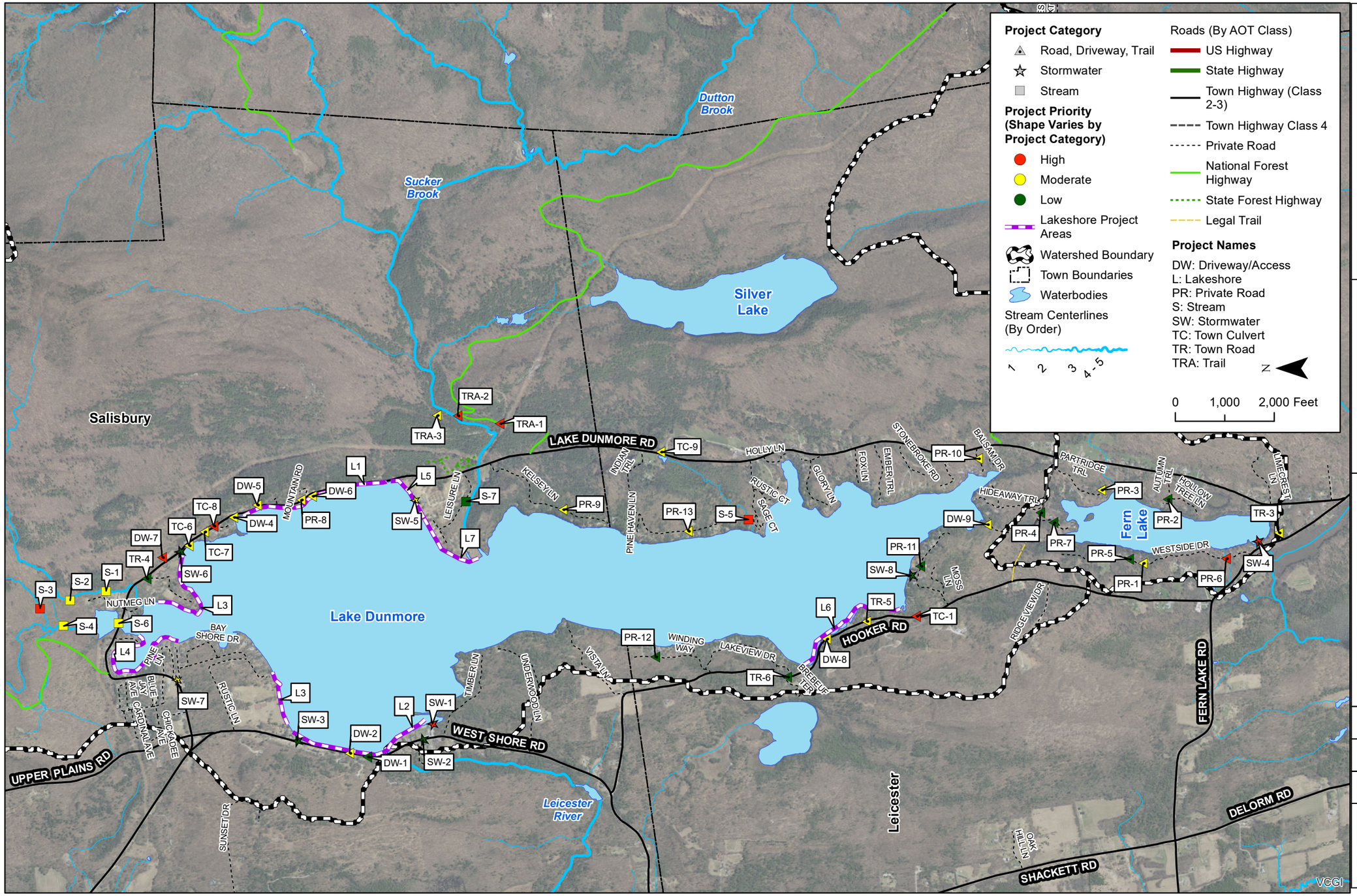

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Notes:
VCGI imagery is from 2018.

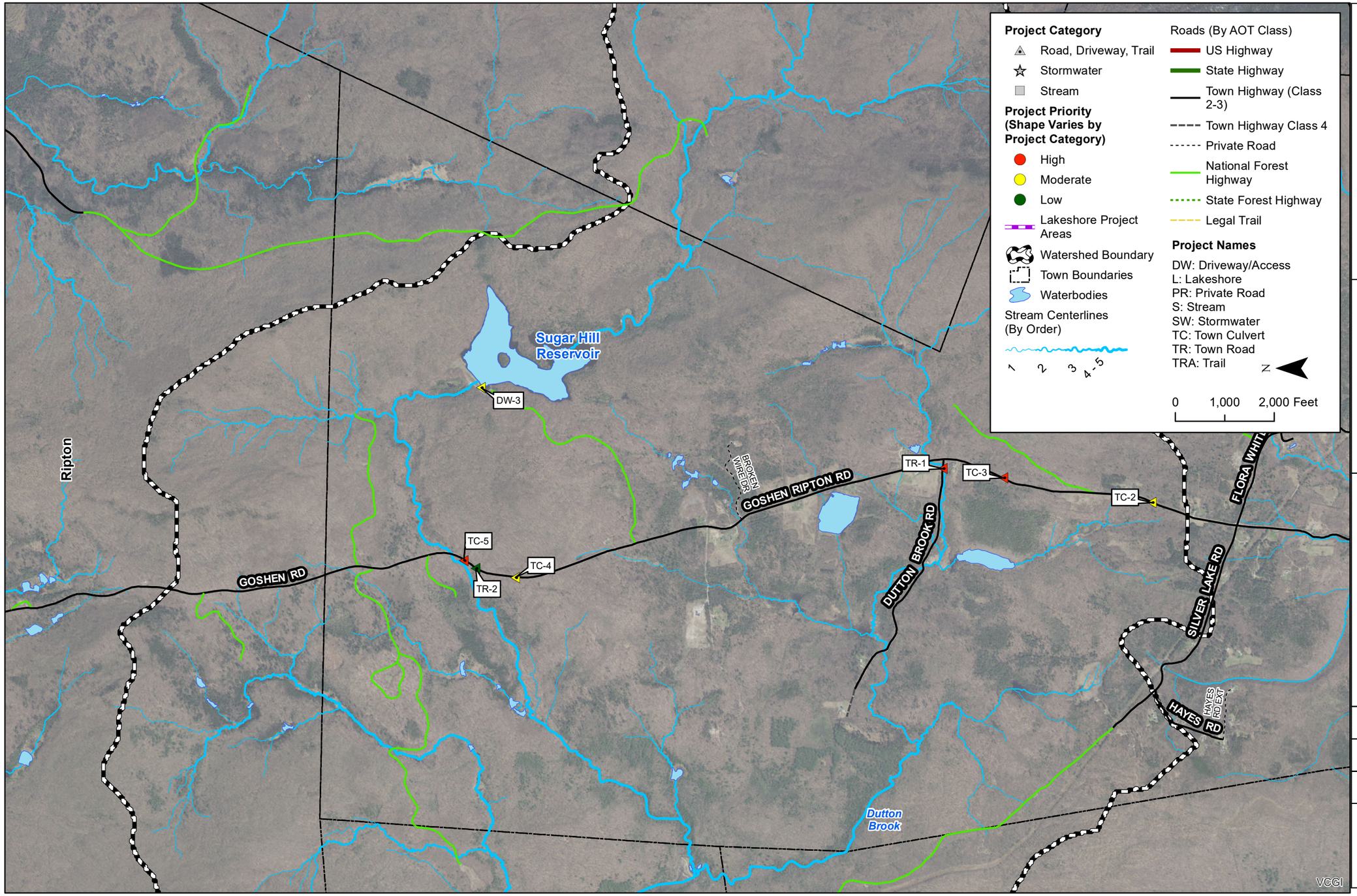
Draft Watershed Problem and Opportunity Areas
Lake Dunmore and Fern Lake Watershed Action Plan

EHB	EPF
Map By	Checked By

1" = 2,000'
Scale

May 17, 2021
Date

Sheet 1 of 2
SHEET NO.



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Sheet 2 of 2
SHEET NO.

Lake Dunmore & Fern Lake Watershed Action Plan
Project Prioritization List (Unified and Non-Unififed Prioritization Projects)
May 17, 2021

Project/ Photo ID	Project Type	Watershed	Location	Observer	Description	Preliminary Recommendations	Priority
DW-1	Driveway/ Access	Lake Dunmore	West Shore Road	EHB, FCP	Gravel parking area between road shoulder and lake shore is eroded (sheet/rill erosion).	Stabilize parking area. Consider installing geogrid to hold gravel in place.	Low
DW-2	Driveway/ Access	Lake Dunmore	West Shore Road	EHB, FCP	Erosion down shoulder of steep paved driveway is depositing material in roadside ditch. Scour over 4" pipe along driveway.	Stabilize driveway shoulder with stone as needed. Stabilize culvert header with stone.	Moderate
DW-3	Driveway/ Access	Lake Dunmore	Goshen Dam Road	EHB	Upper watershed. Construction underway with erosion down embankment to Sugar Hill Reservoir.	Divert runoff upslope of embankment to reduce erosion down the embankment and gravel washed into reservoir. Consider extending silt fence along edge of water and installing geogrid at the top of the embankment to hold gravel in place.	Moderate
DW-4	Driveway/ Access	Lake Dunmore	Lake Dunmore Road	EHB, EPF, FCP	Catch basin in gravel driveway. Minor sediment deposition at outlet. No space at outlet so treatment would have to be at the inlet. Connected to another inlet uphill.	Stabilize driveway and parking to the extent possible. Consider installing geogrid in the parking area around the catch basin to hold gravel in place.	Moderate
DW-5	Driveway/ Access	Lake Dunmore	Lake Dunmore Road	EHB, EPF, FCP	Steep gravel driveway with rill erosion down the travelled surface. No space for a ditch. Gravel washes across Lake Dunmore Road and is deposited along the lakeshore.	Stabilize driveway. Consider adding rubber belt water bars to divert runoff off of the driveway.	Moderate
DW-6	Driveway/ Access	Lake Dunmore	Lake Dunmore Road	EHB, EPF, FCP	Runoff from Lake Dunmore Road is eroding the gravel parking area and ramp down to lake.	Consider installing a stabilized parking area and ramp for lake access. Options include geogrid to hold gravel in place or steps down to the lake.	Moderate
DW-7	Driveway/ Access	Lake Dunmore	Lake Dunmore Road near Keewaydin	EHB, FCP, EPF	Eroding channel from headcut to culvert inlet (30' x 2' x 4'). Could not locate outlet on Keewaydin property.	Install stone armor to stabilize the headcut and channel erosion.	High
DW-8	Driveway/ Access	Lake Dunmore	Hooker Road	EHB	Rill erosion down steep gravel driveway. May wash across Hooker Road to lake.	Stabilize driveway to the extent possible. Evaluate opportunities to divert upslope runoff away from steep section of driveway.	Moderate
DW-9	Town Road	Lake Dunmore	Isthmus Drive	FCP	Erosion along access drive leading straight down into the lake.	Add stone fill to build the driveway up so water will sheet flow into the woods on either side of the access. Add water bars to direct water away from lake.	Moderate
PR-1	Private Road	Fern Lake	Westside Drive	JHB, FCP	18” cross culvert with minor erosion at outlet. Partially filled in.	Stabilize erosion and clear culvert of sediment.	Moderate
PR-2	Private Road	Fern Lake	Autumn Trail	JHB, FCP	Rill erosion at corner of Autumn Trail and Hollow Tree. No ditches currently present. Water does not seem to make it to the lake.	Regrade road to estabish distributed conveyance of runoff from the roadside and add ditches.	Low
PR-3	Private Road	Fern Lake	Partridge Trail	JHB, FCP	Minor erosion at steep section.	Regrade road to estabish distributed conveyance of runoff from the roadside.	Moderate
PR-4	Private Road	Fern Lake	Isthmus Drive	FCP	Erosion on road surface in ROW. No ditches present. Section does not appear to be hydrologically connected to the lake.	Install ditches along eroded section of road with stable turnouts to the forested area and grade to direct runoff into the ditches.	Low
PR-5	Private Road	Fern Lake	Westside Drive	FCP, JHB	Steep section of road to cross culvert. Minor erosion on steep flow path to lake	Clean out south side of culvert and add a sediment trap. Line ditch with stone.	Low
PR-6	Private Road	Fern Lake	Westside Drive	JHB, FCP	Steep section of road north of the culvert with no ditch and a high sediment load. Room for a sediment trap before cross culvert. Erosion at culvert outlet.	Install a sediment trap before the cross culvert and stabilize outlet erosion.	High
PR-7	Private Road	Fern Lake	Northend Point	FCP, JHB	Moderate to severe road erosion but all drains to a low point with no connection to lake	Regrade road to estabish distributed conveyance of runoff from the roadside.	Low

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PR-8	Private Road	Lake Dunmore	Mountain Road	EHB, EPF	Runoff down a steep section of Mountain Road is causing erosion of the gravel surface to the intersection with Lake Dunmore Road.	Install a sediment trap on the east side of the pull off at the base of the road.	Moderate
PR-9	Private Road	Lake Dunmore	Kelsey Lane	EHB	Kelsey Lane generally could use crown improvements. Potholes have developed along the roadway. Steep driveways at 430 and 480 approach the lake with some filtering through grass/vegetation.	Improve road crown along 1,500 foot section of road parallel to lake. Add material as needed to allow water to sheet flow off of the roadway.	Moderate
PR-10	Private Road	Lake Dunmore	Catamount Drive	EHB	High shoulder with trees along Catamount Drive in steep sections coming down from Route 53. These steep sections look relatively stable though and have a darker material on them (recycled asphalt?)	Install a ditch along the inslope side of the steep sections of road if space allows. Grade road to send water into ditch. Approximately 775 feet of road work.	Moderate
PR-11	Private Road	Lake Dunmore	Mountainview Drive	EHB	Mountainview Drive has some areas of high shoulder and areas needing crown improvements. A few steep driveways extend toward the lake with some filtering through grass/vegetation.	Improve road crown and lower high shoulder to allow water to sheet flow off of the roadway. Approximately 1,060 feet of road work along section of road parallel to lake. Flow could be diverted off driveways or treatment could be enhanced.	Low
PR-12	Private Road	Lake Dunmore	Winding Way	EHB	Winding Way has a flat crown, but appears generally stable. Multiple driveways slope toward the lake and appear generally stable with some filtration through grass/vegetation.	Improve road crown, adding material as needed, along 990 foot section of road parallel to lake. Flow could be diverted off driveways or treatment could be enhanced.	Low
PR-13	Private Road	Lake Dunmore	Indian Trail	EHB	Indian trail has a flat crown with some areas of high shoulder. Some driveways slope toward the lake before filtering through grass/vegetation.	Improve road crown and sheet flow off of the road shoulder along the 2,300 foot section of road parallel to the lake. Flow could be diverted off driveways or treatment could be enhanced.	Moderate
S-1	Stream	Lake Dunmore	N Pond Road	JHB, FCP	Some erosion from corner of parking. Half of roof drains to the parking area. Runoff flows directly into intermittent stream with no buffer	Install sediment trap and/or stormwater treatment basin. Establish a vegetated buffer along channel	Moderate
S-2	Stream	Lake Dunmore	North Pond Road	FCP, JHB	Transition to an incised channel, still buried in cobbles and gravel	Monitor channel condition. Could raise channel grade with rock or wood structures to reduce incision and provide some sediment storage.	Moderate
S-3	Stream	Lake Dunmore	Keewaydin North	JHB, FCP	Steep intermittent stream partially avulsed during recent high flow event, flowing down hiking trail (blue hashes) causing extensive erosion.	Install water bars downgradient to direct flow back to stream.	High
S-4	Stream	Lake Dunmore	NFR 106	FCP, JHB	There are active large scour holes at each bend.	Monitor channel condition. Could raise channel grade with rock or wood structures to reduce incision and provide some sediment storage.	Moderate
S-5	Stream	Lake Dunmore	Indian Trail	JHB, FCP	36” culvert is slightly undersized. Minor erosion at inlet and outlet headwall and minor erosion at culvert outlet. Sediment deposits in flat channel down from culvert	Stabilize erosion at the culvert outlet and inlet and outlet headwalls.	High
S-6	Stream	Lake Dunmore	Lake Dunmore Road between Dunmore and North Pond	FCP, JHB	Minor erosion is present at the culvert headwall.	Stabilize erosion with stone.	Moderate
S-7	Stream	Lake Dunmore	Leisure Lane	EHB	Berm along Leisure Lane transitions to concrete wall with some recent stone armor work. Wall may have failed in a flood as there is concrete debris from wall in channel.	Monitor channel condition. Consider soft armor or habitat enhancement opportunities if walls are rebuilt.	Low
SW-1	Stormwater	Lake Dunmore	West Shore Road, Lake Dunmore Boat Launch	EHB, FCP, EPF	VT F&W boat launch. Large gravel parking lot drains straight to lake via boat ramp. Small stone lined channel runs along north edge of parking area.	Enlarge channel, consider trench drain at interface between concrete ramp and gravel parking. May be space for small treatment practices in green spaces.	High

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SW-2	Stormwater	Lake Dunmore	West Shore Road near Waterhouse Dr.	EHB, FCP, EPF	Opportunity for stormwater treatment of lawn and impervious surfaces in green space on east or west side of road at the Waterhouses Store/Suites.	May be space for a small treatment practice capturing runoff from the road and lawn.	Low
SW-3	Stormwater	Lake Dunmore	West Shore Road	EHB, FCP, EPF	Opportunity for stormwater treatment of lawn and impervious surfaces in green space at cabin association.	Consider widening the existing ditch and/or installing a small filtering BMP to capture the most road runoff for treatment. Power upslope could conflict with slope grading.	Low
SW-4	Stormwater	Fern Lake	Fern Lake Boat Launch, Fern Lake Road	EHB, FCP, EPF	Gravel parking area slopes toward the lake via the boat launch. Shoreline erosion along the beach. Opportunity to stabilize scour and divert stormwater runoff.	Install Geogrid or similar product to stabilize the boat ramp. Divert upslope runoff to the wooded area north of the parking lot. Improve grass cover and consider plantings along shoreline	High
SW-5	Stormwater	Lake Dunmore	Branbury State Park Beach	EHB, FCP, EPF	Potential opportunity for a stormwater treatment feature in green space. Shallow groundwater is likely. Erosion along shoreline at dog access area.	Potential access via infiltration steps. Consider coir shoreline stabilization and installation of a constructed wetland or bioswale for stormwater treatment and demonstration purposes.	Moderate
SW-6	Stormwater	Lake Dunmore	Lake Dunmore Road near Keewaydin	EHB, FCP, EPF	Edge of camp property with bare ground near the lake edge. Space for bioswale or revegetation project. Educational value on the grounds of a summer camp. May have been for utility clearing. Low priority.	Install native plantings and implement "no mow" zones. Consider installing bioswale for stormwater treatment.	Low
SW-7	Stormwater	Lake Dunmore	Kampersville Deli (Lake Dunmore Road)	EHB, EPF	Stormwater pools in the Kampersville Deli parking lot. Large impervious contribution to drainage area. Appears to infiltrate (low water quality impact).	Consider lowering the berm between the parking area and green space at the deli. Install a dry well in the deli's green space or a cross culvert to send water to the green space across the street.	Moderate
SW-8	Stormwater	Lake Dunmore	Mountainview Drive	EHB, EPF	Opportunity for stormwater treatment and lakewise on Mountainview Road common land green space. Evidence of shallow bedrock in some areas. Some undermining behind concrete wall along lakeshore.	Install native plantings and implement "no mow" zones. Consider installing a small rain garden for stormwater treatment and demonstration purposes.	Low
TC-1	Town Culvert	Lake Dunmore	Hooker Road	EHB	There is erosion at the culvert outlet near 1185 Hooker Road.	Install a splash bowl at the culvert outlet and stabilize the channel with stone as needed. Consider adding check dams in the ditch upstream to attenuate flow.	High
TC-2	Town Culvert	Lake Dunmore	Goshen Ripton Road	EHB	Upper watershed. Headwall is slightly collapsed with some scour at the outlet.	Stabilize header and outlet with stone.	Moderate
TC-3	Town Culvert	Lake Dunmore	Goshen Ripton Road	EHB	Upper watershed. Significant gully erosion at 12" culvert outlet (4'x3'x50').	Gully stabilization with stone check dams.	High
TC-4	Town Culvert	Lake Dunmore	Goshen Ripton Road	EHB	Upper watershed. Erosion at outlet 3-6" deep for approximately 50'. Some eroded shoulder material moving through culvert and depositing in the channel.	Stabilize erosion with stone check dams/ level spreader.	Moderate
TC-5	Town Culvert	Lake Dunmore	Goshen Ripton Road	EHB	Upper watershed. Gully erosion along a steep embankment down to stream (3'x6'x100'). Erosion looks older and not very active.	Monitor for active erosion. Potential to anchor wood to steep slope.	High
TC-6	Town Culvert	Lake Dunmore	Lake Dunmore Rd.	EHB, FCP, EPF	There is scour at the triple culvert outlet. The gravel lake access next to the culverts is eroding. Some runoff from Lake Dunmore Road drains to the ramp.	Install armor at the culvert outlet. Stabilize the lake access with infiltration steps or a stabilized ramp.	Moderate
TC-7	Town Culvert	Lake Dunmore	Lake Dunmore Rd.	EHB, FCP, EPF	Cross culvert mostly filled in. Channel of erosion at outlet going down to the lake: 6"x2'x200'. Some sediment deposition in the flow path.	Potential for swale enhancement or regenerative stormwater features. Alternately, stabilize erosion and provide level spreader to disperse runoff.	Moderate

Lake Dunmore & Fern Lake Watershed Action Plan
Project Prioritization List (Unified and Non-Unififed Prioritization Projects)
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Project/ Photo ID	Project Type	Watershed	Location	Observer	Description	Preliminary Recommendations	Priority
TC-8	Town Culvert	Lake Dunmore	Lake Dunmore Road near Misty Lane	EHB, FCP, EPF	4'x4' square concrete culvert with significant erosion at inlet and outlet. Likely an intermittent or ephemeral stream. Approx. erosion dimensions 40' x 2' x' 5' erosion upstream of Rte 53, 30' x 2' x 5' between Rte 53 and driveway culvert. Some erosion in channel (120' x 5' x 0.5-1') downstream of 18" driveway culvert with some areas of stone.	Stabilize erosion with stone. Install check dams to trap sediment. Consider reaching out to landowner about regenerative stormwater features.	High
TC-9	Town Culvert	Lake Dunmore	Lake Dunmore Road	EHB	Minor erosion at cross culvert outlet.	Stabilize erosion with stone.	Moderate
TR-1	Town Road	Lake Dunmore	Dutton Brook Road	EHB	Upper watershed. A secondary ditch is forming along Dutton Brook Road from the intersection to slightly beyond the stream crossing. Most bypasses the crossing and does not directly flow to the stream.	Lower shoulder to allow sheet flow off of the roadway. Install stable turnout before the stream crossing.	High
TR-2	Town Road	Lake Dunmore	Goshen Ripton Road	EHB	Upper watershed. A secondary ditch is forming along the Goshen Ripton Road near the cross culvert. Gravel makes its way into the ditch and culvert outlet channel, increasing conveyance.	Lower shoulder to allow sheet flow off of the roadway.	Low
TR-3	Town Road	Fern Lake	Fernville Road	EHB, FCP	The shoulder of Fernville Road is eroding. Rill erosion is present along the high shoulder of the paved road. Most drains away from lake to wetland across Fern Lake Road. **Segment fully meets MRGP standards**	Install a ditch and grade road to direct water into ditch. Install turnout or cross culvert.	Moderate
TR-4	Town Road	Lake Dunmore	Lake Dunmore and Keewaydin Road Intersection	EHB, EPF, FCP	Gravel eroding along side of Keewaydin entrance to small wetland. Not much space for an improvement but educational benefit from the spot. There is a large gravel pile area across the road with no cross culvert draining to the downhill side. Potential source for a lot of sediment, but doesn't look to be moving at all.	Improve shoulder grading and Keewaydin Road crown to encourage sheet flow off of road.	Low
TR-5	Town Road	Lake Dunmore	Hooker Road	EHB	As noted in the road erosion inventory, the inslope side of the road lacks a ditch. The inslope side of the road is eroding due to concentrated flow over the road surface.	Install a ditch on the inslope side of the road. Install cross culvert with splash bowl at outlet if space allows.	Moderate
TR-6	Town Road	Lake Dunmore	Hooker Road	EHB	Opportunity to add check dams in steep ditch along Hooker Road from Brebeuf Terrace to cross culvert.	Install check dams in steep ditch. Consider lining with stone.	Low
TRA-1	Trails	Lake Dunmore	Silver Lake Road Trail	EHB, FCP	The trail is eroding from the main access trail down the steep Falls of Lana access. Erosion continues to Sucker Brook.	Stabilize trail access. Consider diverting water off of the main trail before the junction and installing stable steps down the access path.	High
TRA-2	Trails	Lake Dunmore	Silver Lake Road Trail	EHB, FCP	Water from the trails converges at the junction and flows across main trail and down steep embankment to sucker brook with moderate erosion.	Direct water into the woods to infiltrate with ditches, a cross culvert, or water bars. Stabilize the embankment as needed.	High
TRA-3	Trails	Lake Dunmore	Branbury State Park Campsite	FCP, JHB	There is erosion down the embankment from unofficial footpath from campsite to Sucker Brook.	Stabilize erosion. If access to stream is desired, install stone steps.	Moderate
L1	Lakeshore	Lake Dunmore	Lake Dunmore Road	EHB, EPF	Multiple opportunities for shoreline assessment and improvements including mowed lawns and hard armor along the lakeshore.	Potential opportunity for shoreline assessment and Lake Wise implementation, such as planting native trees and shrubs along the lakeshore.	Moderate
L2	Lakeshore	Lake Dunmore	West Shore Road	EHB, EPF	Multiple opportunities for shoreline assessment and improvements including mowed lawns and hard armor along the lakeshore.	Potential opportunity for shoreline assessment and Lake Wise implementation, such as planting native trees and shrubs along the lakeshore.	Moderate

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Project/ Photo ID	Project Type	Watershed	Location	Observer	Description	Preliminary Recommendations	Priority
L3	Lakeshore	Lake Dunmore	Keewaydin Camps	EHB, EPF	Multiple opportunities for shoreline assessment and improvements including mowed lawn along the lakeshore.	Potential opportunity for shoreline assessment and Lake Wise implementation, such as designating no-mow areas planting native trees and shrubs along the lakeshore.	High
L4	Lakeshore	Lake Dunmore	North Bay of Lake	EHB, EPF	Multiple opportunities for shoreline assessment and improvements including mowed lawns and hard armor along the lakeshore.	Potential opportunity for shoreline assessment and Lake Wise implementation, such as planting native trees and shrubs along the lakeshore.	High
L5	Lakeshore	Lake Dunmore	Branbury State Park	EHB, EPF	Multiple opportunities for shoreline assessment and improvements including mowed lawn along the lakeshore.	Potential opportunity for shoreline assessment and Lake Wise implementation, such as designating no-mow areas planting native trees and shrubs along the lakeshore.	High
L6	Lakeshore	Lake Dunmore	Hooker Road	EHB, EPF	Multiple opportunities for shoreline assessment and improvements including mowed lawns and hard armor along the lakeshore.	Potential opportunity for shoreline assessment and Lake Wise implementation, such as planting native trees and shrubs along the lakeshore.	Moderate
L7	Lakeshore	Lake Dunmore	Liesure Lane Area	EHB, EPF	Multiple opportunities for shoreline assessment and improvements including mowed lawn along the lakeshore.	Potential opportunity for shoreline assessment and Lake Wise implementation, such as designating no-mow areas planting native trees and shrubs along the lakeshore.	High

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Project/ Photo ID	Project Type	Watershed	Location	Observer	Description	Preliminary Recommendations	Total Acreage	Impervious Acreage	% Impervious	BMP P Reduction (lb/yr)	Erosion Volume (cf/yr)	Erosion P Reduction (lb/yr)	Total Cost	Project Efficiency $/lb	Final Score %	Priority
DW-7	Driveway/ Access	Lake Dunmore	Lake Dunmore Road near Keewaydin	EHB, FCP, EPF	Eroding channel from headcut to culvert inlet (30' x 2' x 4'). Could not locate outlet on Keewaydin property.	Install stone armor to stabilize the headcut and channel erosion.	10.06	0.00	0%	N/A	24	0.91	$ 4,800	$ 5,281	59%	High
PR-1	Private Road	Fern Lake	Westside Drive	JHB, FCP	18" cross culvert with minor erosion at outlet. Partially filled in.	Stabilize erosion and clear culvert of sediment.	1.6	0.018	1%	N/A	5	0.19	$ 2,000	$ 10,562	43%	Moderate
PR-2	Private Road	Fern Lake	Autumn Trail	JHB, FCP	Rill erosion at corner of Autumn Trail and Hollow Tree. No ditches currently present. Water does not seem to make it to the lake.	Regrade road to estabish distributed conveyance of runoff from the roadside and add ditches.	N/A	N/A	100%	N/A	Adapted MRGP VT DEC P Method	0.07	$ 6,000	$ 87,539	25%	Low
PR-3	Private Road	Fern Lake	Partridge Trail	JHB, FCP	Minor erosion at steep section.	Regrade road to estabish distributed conveyance of runoff from the roadside.	N/A	N/A	100%	N/A	Adapted MRGP VT DEC P Method	0.15	$ 2,000	$ 13,483	43%	Moderate
PR-6	Private Road	Fern Lake	Westside Drive	JHB, FCP	Steep section of road north of the culvert with no ditch and a high sediment load. Room for a sediment trap before cross culvert. Erosion at culvert outlet.	Install a sediment trap before the cross culvert and stabilize outlet erosion.	10.21	0.72	7%	0.55	81	3.07	$ 3,000	$ 829	68%	High
PR-9	Private Road	Lake Dunmore	Kelsey Lane	EHB	Kelsey Lane generally could use crown improvements. Potholes have developed along the roadway. Steep driveways at 430 and 480 approach the lake with some filtering through grass/vegetation.	Improve road crown along 1,500 foot section of road parallel to lake. Add material as needed to allow water to sheet flow off of the roadway.	N/A	N/A	N/A	N/A	Adapted MRGP VT DEC P Method	0.51	$ 10,000	$ 19,453	43%	Moderate
PR-10	Private Road	Lake Dunmore	Catamount Drive	EHB	High shoulder with trees along Catamount Drive in steep sections coming down from Route 53. These steep sections look relatively stable though and have a darker material on them (recycled asphalt?)	Install a ditch along the inslope side of the steep sections of road if space allows. Grade road to send water into ditch. Approximately 775 feet of road work.	N/A	N/A	100%	N/A	Adapted MRGP VT DEC P Method	1.55	$ 30,000	$ 19,396	50%	Moderate
PR-11	Private Road	Lake Dunmore	Mountainview Drive	EHB	Mountainview Drive has some areas of high shoulder and areas needing crown improvements. A few steep driveways extend toward the lake with some filtering through grass/vegetation.	Improve road crown and lower high shoulder to allow water to sheet flow off of the roadway. Approximately 1,060 feet of road work along section of road parallel to lake. Flow could be diverted off driveways or treatment could be enhanced.	N/A	N/A	100%	N/A	Adapted MRGP VT DEC P Method	0.36	$ 15,000	$ 41,292	32%	Low
PR-12	Private Road	Lake Dunmore	Winding Way	EHB	Winding Way has a flat crown, but appears generally stable. Multiple driveways slope toward the lake and appear generally stable with some filtration through grass/vegetation.	Improve road crown, adding material as needed, along 990 foot section of road parallel to lake. Flow could be diverted off driveways or treatment could be enhanced.	N/A	N/A	100%	N/A	Adapted MRGP VT DEC P Method	0.34	$ 10,000	$ 29,474	39%	Low
PR-13	Private Road	Lake Dunmore	Indian Trail	EHB	Indian trail has a flat crown with some areas of high shoulder. Some driveways slope toward the lake before filtering through grass/vegetation.	Improve road crown and sheet flow off of the road shoulder along the 2,300 foot section of road parallel to the lake. Flow could be diverted off driveways or treatment could be enhanced.	N/A	N/A	100%	N/A	Adapted MRGP VT DEC P Method	0.79	$ 20,000	$ 25,374	43%	Moderate
S-1	Stream	Lake Dunmore	N Pond Road	JHB, FCP	Some erosion from corner of parking. Half of roof drains to the parking area. Runoff flows directly into intermittent stream with no buffer	Install sediment trap and/or stormwater treatment basin. Establish a vegetated buffer along channel	0.13	0.11	85%	0.11	10	0.38	$ 5,200	$ 10,640	46%	Moderate
S-3	Stream	Lake Dunmore	Keewaydin North	JHB, FCP	Steep intermittent stream partially avulsed during recent high flow event, flowing down hiking trail (blue hashes) causing extensive erosion.	Install water bars downgradient to direct flow back to stream.	111.35	1.65	1%	N/A	27	1.02	$ 6,300	$ 6,161	55%	High
S-5	Stream	Lake Dunmore	Indian Trail	JHB, FCP	36" culvert is slightly undersized. Minor erosion at inlet and outlet headwall and minor erosion at culvert outlet. Sediment deposits in flat channel down from culvert	Stabilize erosion at the culvert outlet and inlet and outlet headwalls.	52.46	1.40	3%	N/A	27	1.02	$ 3,000	$ 2,934	59%	High
SW-1	Stormwater	Lake Dunmore	West Shore Road, Lake Dunmore Boat Launch	EHB, FCP, EPF	VT F&W boat launch. Large gravel parking lot drains straight to lake via boat ramp. Small stone lined channel runs along north edge of parking area.	Enlarge channel, consider trench drain at interface between concrete ramp and gravel parking. May be space for small treatment practices in green spaces.	0.25	0.24	96%	0.18	10	0.38	$ 16,200	$ 29,204	52%	High

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Project/ Photo ID	Project Type	Watershed	Location	Observer	Description	Preliminary Recommendations	Total Acreage	Impervious Acreage	% Impervious	BMP P Reduction (lb/yr)	Erosion Volume (cf/yr)	Erosion P Reduction (lb/yr)	Total Cost	Project Efficiency $/lb	Final Score %	Priority
SW-2	Stormwater	Lake Dunmore	West Shore Road near Waterhouse Dr.	EHB, FCP, EPF	Opportunity for stormwater treatment of lawn and impervious surfaces in green space on east or west side of road at the Waterhouses Store/Suites.	May be space for a small treatment practice capturing runoff from the road and lawn.	1.71	0.67	39%	0.81	0	0.00	$ 47,400	$ 58,231	28%	Low
SW-3	Stormwater	Lake Dunmore	West Shore Road	EHB, FCP, EPF	Opportunity for stormwater treatment of lawn and impervious surfaces in green space at cabin association.	Consider widening the existing ditch and/or installing a small filtering BMP to capture the most road runoff for treatment. Power upslope could conflict with slope grading.	41.12	1.65	4%	0.81	0	0.00	$ 15,700	$ 19,287	36%	Low
SW-4	Stormwater	Fern Lake	Fern Lake Boat Launch, Fern Lake Road	EHB, FCP, EPF	Gravel parking area slopes toward the lake via the boat launch. Shoreline erosion along the beach. Opportunity to stabilize scour and divert stormwater runoff.	Install Geogrid or similar product to stabilize the boat ramp. Divert upslope runoff to the wooded area north of the parking lot. Improve grass cover and consider plantings along shoreline	0.33	0.15	45%	0.18	27	1.02	$ 14,200	$ 11,848	68%	High
SW-5	Stormwater	Lake Dunmore	Branbury State Park Beach	EHB, FCP, EPF	Potential opportunity for a stormwater treatment feature in green space. Shallow groundwater is likely. Erosion along shoreline at dog access area.	Potential access via infiltration steps. Consider coir shoreline stabilization and installation of a constructed wetland or bioswale for stormwater treatment and demonstration purposes.	2.33	0.43	18%	0.97	10	0.38	$ 44,600	$ 33,118	52%	Moderate
SW-6	Stormwater	Lake Dunmore	Lake Dunmore Road near Keewaydin	EHB, FCP, EPF	Edge of camp property with bare ground near the lake edge. Space for bioswale or revegetation project. Educational value on the grounds of a summer camp. May have been for utility clearing. Low priority.	Install native plantings and implement "no mow" zones. Consider installing bioswale for stormwater treatment.	0.50	0.07	14%	0.37	0	0.00	$ 15,300	$ 40,909	32%	Low
SW-7	Stormwater	Lake Dunmore	Kampersville Deli (Lake Dunmore Road)	EHB, EPF	Stormwater pools in the Kampersville Deli parking lot. Large impervious contribution to drainage area. Appears to infiltrate (low water quality impact).	Consider lowering the berm between the parking area and green space at the deli. Install a dry well in the deli's green space or a cross culvert to send water to the green space across the street.	0.48	0.34	71%	0.86	0	0.00	$ 25,400	$ 29,604	42%	Moderate
SW-8	Stormwater	Lake Dunmore	Mountainview Drive	EHB, EPF	Opportunity for stormwater treatment and lakewise on Mountainview Road common land green space. Evidence of shallow bedrock in some areas. Some undermining behind concrete wall along lakeshore.	Install native plantings and implement "no mow" zones. Consider installing a small rain garden for stormwater treatment and demonstration purposes.	2.29	0.27	12%	0.40	0	0.00	$ 13,500	$ 34,091	34%	Low
TC-1	Town Culvert	Lake Dunmore	Hooker Road	EHB	There is erosion at the culvert outlet near 1185 Hooker Road.	Install a splash bowl at the culvert outlet and stabilize the channel with stone as needed. Consider adding check dams in the ditch upstream to attenuate flow.	4.97	0.15	3%	N/A	7.5	0.28	$ 6,000	$ 21,124	55%	High
TC-2	Town Culvert	Lake Dunmore	Goshen Ripton Road	EHB	Upper watershed. Headwall is slightly collapsed with some scour at the outlet.	Stabilize header and outlet with stone.	19.19	0.15	1%	N/A	5	0.19	$ 2,000	$ 10,562	50%	Moderate
TC-3	Town Culvert	Lake Dunmore	Goshen Ripton Road	EHB	Upper watershed. Significant gully erosion at 12" culvert outlet (4'x3'x50').	Gully stabilization with stone check dams.	11.79	0.11	1%	N/A	30	1.14	$ 8,100	$ 7,129	70%	High
TC-4	Town Culvert	Lake Dunmore	Goshen Ripton Road	EHB	Upper watershed. Erosion at outlet 3-6" deep for approximately 50'. Some eroded shoulder material moving through culvert and depositing in the channel.	Stabilize erosion with stone check dams/ level spreader.	17.90	0.08	0%	N/A	8	0.28	$ 8,100	$ 28,517	45%	Moderate
TC-5	Town Culvert	Lake Dunmore	Goshen Ripton Road	EHB	Upper watershed. Gully erosion along a steep embankment down to stream (3'x6'x100'). Erosion looks older and not very active.	Monitor for active erosion. Potential to anchor wood to steep slope.	3.89	0.02	1%	N/A	60	2.27	$ 10,000	$ 4,401	68%	High
TC-6	Town Culvert	Lake Dunmore	Lake Dunmore Rd.	EHB, FCP, EPF	There is scour at the triple culvert outlet. The gravel lake access next to the culverts is eroding. Some runoff from Lake Dunmore Road drains to the ramp.	Install armor at the culvert outlet. Stabilize the lake access with infiltration steps or a stabilized ramp.	10.06	0.42	4%	N/A	8	0.31	$ 12,500	$ 40,748	41%	Moderate
TC-7	Town Culvert	Lake Dunmore	Lake Dunmore Rd.	EHB, FCP, EPF	Cross culvert mostly filled in. Channel of erosion at outlet going down to the lake: 6"x2'x200'. Some sediment deposition in the flow path.	Potential for swale enhancement or regenerative stormwater features. Alternately, stabilize erosion and provide level spreader to disperse runoff.	3.13	0.02	1%	0.42	10	0.38	$ 12,300	$ 15,438	52%	Moderate

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TC-8	Town Culvert	Lake Dunmore	Lake Dunmore Road near Misty Lane	EHB, FCP, EPF	4'x4' square concrete culvert with significant erosion at inlet and outlet. Likely an intermittent or ephemeral stream. Approx. erosion dimensions 40' x 2' x' 5' erosion upstream of Rte 53, 30' x 2' x 5' between Rte 53 and driveway culvert. Some erosion in channel (120' x 5' x 0.5-1') downstream of 18" driveway culvert with some areas of stone.	Stabilize erosion with stone. Install check dams to trap sediment. Consider reaching out to landowner about regenerative stormwater features.	334.20	0.02	0%	2.77	50	1.89	$ 15,000	$ 3,215	75%	High
TC-9	Town Culvert	Lake Dunmore	Lake Dunmore Road	EHB	Minor erosion at cross culvert outlet.	Stabilize erosion with stone.	4.17	0.13	3%	N/A	5	0.19	2,000.00	$ 10,562	50%	Moderate
TR-1	Town Road	Lake Dunmore	Dutton Brook Road	EHB	Upper watershed. A secondary ditch is forming along Dutton Brook Road from the intersection to slightly beyond the stream crossing. Most bypasses the crossing and does not directly flow to the stream.	Lower shoulder to allow sheet flow off of the roadway. Install stable turnout before the stream crossing.	N/A	N/A	100%	N/A	MRGP VT DEC P Method	0.64	$ 3,000	$ 4,697	59%	High
TR-2	Town Road	Lake Dunmore	Goshen Ripton Road	EHB	Upper watershed. A secondary ditch is forming along the Goshen Ripton Road near the cross culvert. Gravel makes its way into the ditch and culvert outlet channel, increasing conveyance.	Lower shoulder to allow sheet flow off of the roadway.	N/A	N/A	100%	N/A	MRGP VT DEC P Method	0.03	$ 2,000	$ 70,576	32%	Low
TR-3	Town Road	Fern Lake	Fernville Road	EHB, FCP	The shoulder of Fernville Road is eroding. Rill erosion is present along the high shoulder of the paved road. Most drains away from lake to wetland across Fern Lake Road. **Segment fully meets MRGP standards**	Install a ditch and grade road to direct water into ditch. Install turnout or cross culvert.	N/A	N/A	100%	N/A	6	0.24	$ 5,400	$ 22,814	48%	Moderate
TR-5	Town Road	Lake Dunmore	Hooker Road	EHB	As noted in the road erosion inventory, the inslope side of the road lacks a ditch. The inslope side of the road is eroding due to concentrated flow over the road surface.	Install a ditch on the inslope side of the road. Install cross culvert with splash bowl at outlet if space allows.	N/A	N/A	100%	N/A	MRGP VT DEC P Method	0.38	$ 10,000	$ 26,465	52%	Moderate
TR-6	Town Road	Lake Dunmore	Hooker Road	EHB	Opportunity to add check dams in steep ditch along Hooker Road from Brebeuf Terrace to cross culvert.	Install check dams in steep ditch. Consider lining with stone.	6.31	0.35	6%	0.04	0	0.00	$ 3,600	$ 81,818	30%	Low

Lake Dunmore & Fern Lake Watershed Action Plan
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Additional Benefits Codes	CPA	SF	E	IC	SW	BMP	HV	TH	PF	L
	Chronic Problem Area	Seasonal Flooding	Educational	Infrastructure Conflicts	Drains to Connected Stormwater Infrastructure	Improves Existing BMP Performance	High Visibility	Reduces Thermal Pollution	Peak Flow Reduction	Enhance Lakeshore Natural Communities

							Water Quality Benefits											
Project ID	**Project Type**	**Watershed**	**Location**	**Observer**	**Description**	**Preliminary Recommendations**	**Nutrient Reduction**	**Sediment Reduction**	**Drainage Area**	**Impervious Drainage**	**Connectivity to Surface Waters**	**Landowner Support**	**O&M Requirements**	**Cost and Constructability**	**Additional Benefits**	**Additional Benefits Score**	**Total Score**	**Cost Estimate**	**Priority**
							4	4	1	3	3	2	2	6		5	30		
DW-1	Driveway/ Access	Lake Dunmore	West Shore Road	EHB, FCP	Gravel parking area between road shoulder and lake shore is eroded (sheet/rill erosion).	Stabilize parking area. Consider installing geogrid to hold gravel in place.	1	2	0	1	2	0	1	3		0	10	5-10k	Low
DW-2	Driveway/ Access	Lake Dunmore	West Shore Road	EHB, FCP	Erosion down shoulder of steep paved driveway is depositing material in roadside ditch. Scour over 4" pipe along driveway.	Stabilize driveway shoulder with stone as needed. Stabilize culvert header with stone.	1	2	0	1	2	0	2	4		0	12	1-5k	Moderate
DW-3	Driveway/ Access	Lake Dunmore	Goshen Dam Road	EHB	Upper watershed. Construction underway with erosion down embankment to Sugar Hill Reservoir.	Divert runoff upslope of embankment to reduce erosion down the embankment and gravel washed into reservoir. Consider extending silt fence along edge of water and installing geogrid at the top of the embankment to hold gravel in place.	1	2	0	1	3	1	1	3	E, HV	2	14	5-10k	Moderate
DW-4	Driveway/ Access	Lake Dunmore	Lake Dunmore Road	EHB, EPF, FCP	Catch basin in gravel driveway. Minor sediment deposition at outlet. No space at outlet so treatment would have to be at the inlet. Connected to another inlet uphill.	Stabilize driveway and parking to the extent possible. Consider installing geogrid in the parking area around the catch basin to hold gravel in place.	1	3	0	1	2	0	1	3	SW, CPA	2	13	10-20k	Moderate
DW-5	Driveway/ Access	Lake Dunmore	Lake Dunmore Road	EHB, EPF, FCP	Steep gravel driveway with rill erosion down the travelled surface. No space for a ditch. Gravel washes across Lake Dunmore Road and is deposited along the lakeshore.	Stabilize driveway. Consider adding rubber belt water bars to divert runoff off of the driveway.	1	2	0	1	2	0	1	3	CPA	1	11	5-10k	Moderate
DW-6	Driveway/ Access	Lake Dunmore	Lake Dunmore Road	EHB, EPF, FCP	Runoff from Lake Dunmore Road is eroding the gravel parking area and ramp down to lake.	Consider installing a stabilized parking area and ramp for lake access. Options include geogrid to hold gravel in place or steps down to the lake.	1	2	0	0	3	0	1	3	CPA	1	11	5-10k	Moderate
DW-8	Driveway/ Access	Lake Dunmore	Hooker Road	EHB	Rill erosion down steep gravel driveway. May wash across Hooker Road to lake.	Stabilize driveway to the extent possible. Evaluate opportunities to divert upslope runoff away from steep section of driveway.	1	2	0	0	3	0	1	4	CPA	1	12	1-5k	Moderate
DW-9	Town Road	Lake Dunmore	Isthmus Drive	FCP	Erosion along access drive leading straight down into the lake.	Add stone fill to build the driveway up so water will sheet flow into the woods on either side of the access. Add water bars to direct water away from lake.	2	3	1	0	3	0	1	3		0	13	5-10k	Moderate
L1	Lakeshore	Lake Dunmore	Lake Dunmore Road	EHB, EPF	Multiple opportunities for shoreline assessment and improvements including mowed lawns and hard armor along the lakeshore.	Potential opportunity for shoreline assessment and Lake Wise implementation, such as planting native trees and shrubs along the lakeshore.	2	1	0	0	3	0	1	5	L, TH	2	14	Varies with Extent	Moderate
L2	Lakeshore	Lake Dunmore	West Shore Road	EHB, EPF	Multiple opportunities for shoreline assessment and improvements including mowed lawns and hard armor along the lakeshore.	Potential opportunity for shoreline assessment and Lake Wise implementation, such as planting native trees and shrubs along the lakeshore.	2	1	0	0	3	0	1	5	L, TH	2	14	Varies with Extent	Moderate
L3	Lakeshore	Lake Dunmore	Keewaydin Camps	EHB, EPF	Multiple opportunities for shoreline assessment and improvements including mowed lawn along the lakeshore.	Potential opportunity for shoreline assessment and Lake Wise implementation, such as designating no-mow areas planting native trees and shrubs along the lakeshore.	2	1	0	0	3	0	1	5	E, L, TH	3	15	Varies with Extent	High
L4	Lakeshore	Lake Dunmore	North Bay of Lake	EHB, EPF	Multiple opportunities for shoreline assessment and improvements including mowed lawns and hard armor along the lakeshore.	Potential opportunity for shoreline assessment and Lake Wise implementation, such as planting native trees and shrubs along the lakeshore.	2	1	0	0	3	0	1	5	HV, L, TH	3	15	Varies with Extent	High
L5	Lakeshore	Lake Dunmore	Branbury State Park	EHB, EPF	Multiple opportunities for shoreline assessment and improvements including mowed lawn along the lakeshore.	Potential opportunity for shoreline assessment and Lake Wise implementation, such as designating no-mow areas planting native trees and shrubs along the lakeshore.	2	1	0	0	3	0	1	5	E, HV, L, TH	4	16	Varies with Extent	High
L6	Lakeshore	Lake Dunmore	Hooker Road	EHB, EPF	Multiple opportunities for shoreline assessment and improvements including mowed lawns and hard armor along the lakeshore.	Potential opportunity for shoreline assessment and Lake Wise implementation, such as planting native trees and shrubs along the lakeshore.	2	1	0	0	3	0	1	5	L, TH	2	14	Varies with Extent	Moderate
L7	Lakeshore	Lake Dunmore	Liesure Lane Area	EHB, EPF	Multiple opportunities for shoreline assessment and improvements including mowed lawn along the lakeshore.	Potential opportunity for shoreline assessment and Lake Wise implementation, such as designating no-mow areas planting native trees and shrubs along the lakeshore.	2	1	0	0	3	0	1	5	HV, L, TH	3	15	Varies with Extent	High
PR-4	Private Road	Fern Lake	Isthmus Drive	FCP, JHB	Erosion on road surface in ROW. No ditches present. Section does not appear to be hydrologically connected to the lake.	Install ditches along eroded section of road with stable turnouts to the forested area and grade to direct runoff into the ditches.	1	2	0	0	1	0	1	3		0	8	5-10k	Low
PR-5	Private Road	Fern Lake	Westside Drive	FCP, JHB	Steep section of road to cross culvert. Minor erosion on steep flow path to lake	Clean out south side of culvert and add a sediment trap. Line ditch with stone.	2	2	0	0	2	0	1	3		0	10	5-10k	Low
PR-7	Private Road	Fern Lake	Northend Point	FCP, JHB	Moderate to severe road erosion but all drains to a low point with no connection to lake	Fix road grade to improve drainage.	1	1	0	0	0	0	1	4		0	7	1-5k	Low
PR-8	Private Road	Lake Dunmore	Mountain Road	EHB, EPF	Runoff down a steep section of Mountain Road is causing erosion of the gravel surface to the intersection with Lake Dunmore Road.	Install a sediment trap on the east side of the pull off at the base of the road.	1	2	0	0	2	0	1	4	CPA	1	11	1-5k	Moderate

Lake Dunmore & Fern Lake Watershed Action Plan
Project Prioritization (Non-Unified Prioritization Matrix)
May 17, 2021

Additional Benefits Codes	CPA	SF	E	IC	SW	BMP	HV	TH	PF	L
	Chronic Problem Area	Seasonal Flooding	Educational	Infrastructure Conflicts	Drains to Connected Stormwater Infrastructure	Improves Existing BMP Performance	High Visibility	Reduces Thermal Pollution	Peak Flow Reduction	Enhance Lakeshore Natural Communities

							Water Quality Benefits												
Project ID	**Project Type**	**Watershed**	**Location**	**Observer**	**Description**	**Preliminary Recommendations**	**Nutrient Reduction**	**Sediment Reduction**	**Drainage Area**	**Impervious Drainage**	**Connectivity to Surface Waters**	**Landowner Support**	**O&M Requirements**	**Cost and Constructability**	**Additional Benefits**	**Additional Benefits Score**	**Total Score**	**Cost Estimate**	**Priority**
							4	4	1	3	3	2	2	6		5	30		
S-2	Stream	Lake Dunmore	North Pond Road	FCP, JHB	Transition to an incised channel, still buried in cobbles and gravel	Monitor channel condition. Could raise channel grade with rock or wood structures to reduce incision and provide some sediment storage.	2	2	1	0	3	0	1	3		0	12	5-10k	Moderate
S-4	Stream	Lake Dunmore	NFR 106	FCP, JHB	There are active large scour holes at each bend.	Monitor channel condition. Could raise channel grade with rock or wood structures to reduce incision and provide some sediment storage.	3	3	1	0	3	0	1	3		0	14	5-10k	Moderate
S-6	Stream	Lake Dunmore	Lake Dunmore Road between Dunmore and North Pond	FCP, JHB	Minor erosion is present at the culvert headwall.	Stabilize erosion with stone.	0	1	0	0	3	1	2	5		0	12	<1k	Moderate
S-7	Stream	Lake Dunmore	Leisure Lane	EHB	Berm along Leisure Lane transitions to concrete wall with some recent stone armor work. Wall may have failed in a flood as there is concrete debris from wall in channel.	Monitor channel condition. Consider soft armor or habitat enhancement opportunities if walls are rebuilt.	0	0	1	1	3	0	1	2		0	8	20k+, Varies with Extent	Low
TR-4	Town Road	Lake Dunmore	Lake Dunmore and Keewaydin Road Intersection	EHB, EPF, FCP	Gravel eroding along side of Keewaydin entrance to small wetland. Not much space for an improvement but educational benefit from the spot. There is a large gravel pile area across the road with no cross culvert draining to the downhill side. Potential source for a lot of sediment, but doesn't look to be moving at all.	Improve shoulder grading and Keewaydin Road crown to encourage sheet flow off of road.	0	1	0	0	0	0	2	4	E, HV	2	9	1-5k	Low
TRA-1	Trails	Lake Dunmore	Silver Lake Road Trail	EHB, FCP	The trail is eroding from the main access trail down the steep Falls of Lana access. Erosion continues to Sucker Brook.	Stabilize trail access. Consider diverting water off of the main trail before the junction and installing stable steps down the access path.	2	3	0	1	2	1	2	2	E, HV, CPA, IC	4	17	5-10k	High
TRA-2	Trails	Lake Dunmore	Silver Lake Road Trail	EHB, FCP	Water from the trails converges at the junction and flows across main trail and down steep embankment to sucker brook with moderate erosion.	Direct water into the woods to infiltrate with ditches, a cross culvert, or water bars. Stabilize the embankment as needed.	3	3	1	1	3	1	1	2	E, HV, CPA, IC	4	19	5-10k	High
TRA-3	Trails	Lake Dunmore	Branbury State Park Campsite	FCP, JHB	There is erosion down the embankment from unofficial footpath from campsite to Sucker Brook.	Stabilize erosion. If access to stream is desired, install stone steps.	2	2	0	0	3	1	1	3	CPA	1	13	1-5k	Moderate

Projects: DW-5		**Problem Area Summary**
Lake Watershed	Lake Dunmore	
Location:	Lake Dunmore Road	
Land Ownership:	Private Lake Access	

Site Description: Steep gravel driveway upslope (east) of Lake Dunmore Road with rill erosion down the travelled surface. No space to install a ditch. Gravel washes across Lake Dunmore Road and is deposited along the lakeshore.

Photo 1: Steep driveway with rill erosion.

Photo 2: Gravel deposits on the west side of Lake Dunmore Road

BMP Description: Stabilize driveway. Consider adding rubber belt water bars to divert runoff off of the driveway.

WQ Benefits	Landowner Support and O&M	Cost and Constructability	Additional Benefits	Total Score (Priority)
6	1	3	1	11 **(Moderate)**

Additional Project Benefits Description: The project presents an opportunity to address a chronic problem area for erosion.

Project Comments: The project is assigned a moderate priority due to the water quality benefits of reducing the erosion and the moderate cost of implementation. **We estimate that total project costs may be in the range of $5,000 - $10,000.**

Projects: DW-6		**Problem Area Summary**
Lake Watershed	Lake Dunmore	
Location:	Lake Dunmore Road	
Land Ownership:	Private Lake Access	

Site Description: Runoff from Lake Dunmore Road is eroding the gravel parking area and ramp down to lake.

Photo 1: Erosion down gravel access ramp to Lake Dunmore

BMP Description: Consider installing a stabilized parking area and ramp for lake access. Options include geogrid to hold gravel in place or a stabilized parking area with steps down to the lake.

WQ Benefits	Landowner Support and O&M	Cost and Constructability	Additional Benefits	Total Score (Priority)
6	1	3	1	11 **(Moderate)**

Additional Project Benefits Description: The project presents an opportunity to address a chronic problem area for erosion.

Project Comments: The project is assigned a moderate priority due to the water quality benefits of reducing the erosion and the moderate cost of implementation. **We estimate that total project costs may be in the range of $5,000 - $10,000.**

Project: DW-7		**Problem Area Summary**
Lake Watershed	Lake Dunmore	
Location	Keewaydin Camp at Lake Dunmore Road	
Land Ownership	Private Land and Town ROW	
BMP Type	Erosion Stabilization	
Drainage Area/Impervious	10.1 / 0.0 acres	
% Impervious	0	
Estimated Project Cost	$ 4,800	
P Efficiency ($/lb removed)	$ 5,281	
Project Priority	High	

Site Description: The channel is eroded from the headcut upstream of Lake Dunmore Road to the culvert inlet (30' x 2' x 4'). The channel is on Keewaydin property northeast of Lake Dunmore Road. The culvert outlet could not be located on Keewaydin property to the southwest.

Photo 1: Erosion in the channel upstream of the cross-culvert.

Photo 2: Cross-culvert inlet.

BMP Description: Install stone armor to stabilize the headcut and channel erosion.

BMP Volume (cf)	P Load (lbs)	P Reduction (lbs)	Sed Reduction	%WQv/CPv	Erosion	Maintenance
N/A	0.91*	0.91	High	N/A	Gully	Moderate

Feasibility Comments: The project is located on private land. No utility conflicts are anticipated.

Other Considerations/Benefits: Drains via infrastructure directly to receiving water with no additional pollutant loading

*P load (annual) is estimated from land cover values for each lake segment. Estimates include additional P loading from erosion or other sources.

Projects: DW-9		**Problem Area Summary**
Lake Watershed	Lake Dunmore	
Location:	Isthmus Drive	
Land Ownership:	Private Lake Access	

Site Description: Erosion is present along access drive. Sediment is deposited in Lake Dunmore.

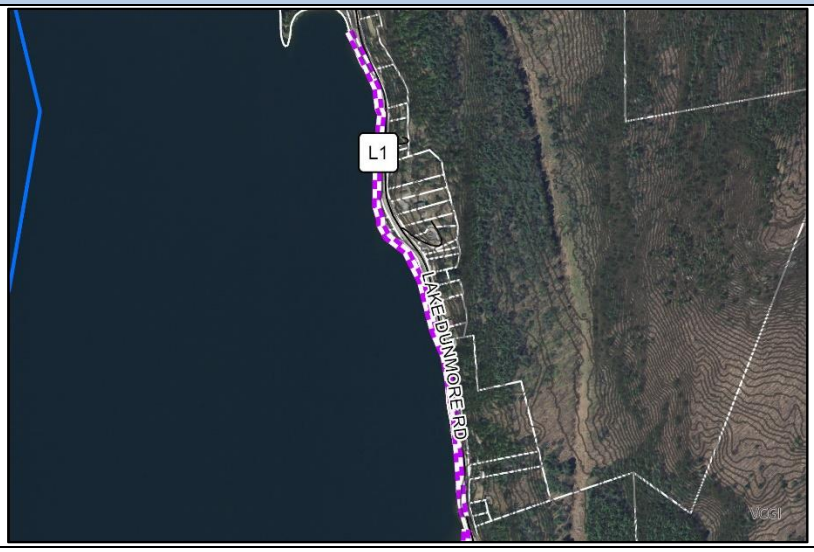
Photo 1: Erosion down access ramp to Lake Dunmore

BMP Description: Add stone fill to build the driveway up so water will sheet flow into the woods on either side of the access. Add water bars to direct water away from lake.

WQ Benefits	Landowner Support and O&M	Cost and Constructability	Additional Benefits	Total Score (Priority)
9	1	3	0	13 **(Moderate)**

Additional Project Benefits Description:

Project Comments: The project is assigned a moderate priority due to the water quality benefits of reducing the erosion and the moderate cost of implementation. **We estimate that total project costs may be in the range of $5,000 - $10,000.**

Projects: L-1		**Problem Area Summary**
Lake Watershed	Lake Dunmore	
Location:	Lake Dunmore Road	
Land Ownership:	Private and Town ROW	

Site Description: Multiple opportunities for shoreline assessment and improvements including mowed lawns and hard armor along the lakeshore.

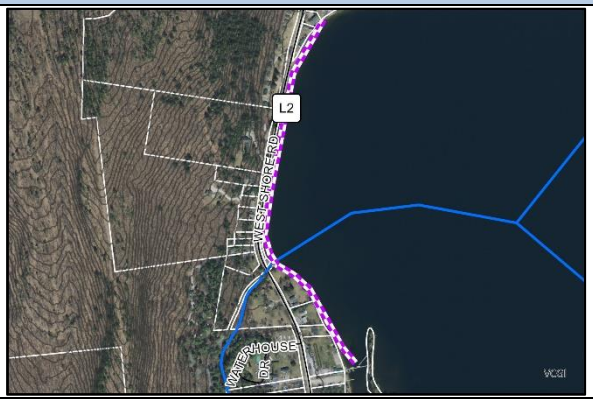
Photo 1: Example of the shoreline along a portion of Lake Dunmore Road.

BMP Description: Potential opportunity for shoreline assessment and Lake Wise practice implementation. Suggested practices include implementing no-mow areas, planting native trees and shrubs along the lakeshore, and improving lake access points to minimize erosion.

WQ Benefits	Landowner Support and O&M	Cost and Constructability	Additional Benefits	Total Score (Priority)
6	1	5	2	14 **(Moderate)**

Additional Project Benefits Description: The projects present opportunities to enhance lakeshore natural communities by establishing native vegetation and by providing shade along the lakeshore.

Project Comments: The project is assigned a moderate priority due to the water quality and habitat benefits of enhancing lakeshore natural communities and the low cost of implementation. **We estimate that total cost of native plantings may be in the range of $500 - $1,000 per parcel.**

Projects: L-2		**Problem Area Summary**
Lake Watershed	Lake Dunmore	
Location:	West Shore Road	
Land Ownership:	Private and Town ROW	

Site Description: Multiple opportunities for shoreline assessment and improvements including mowed lawns and hard armor along the lakeshore.

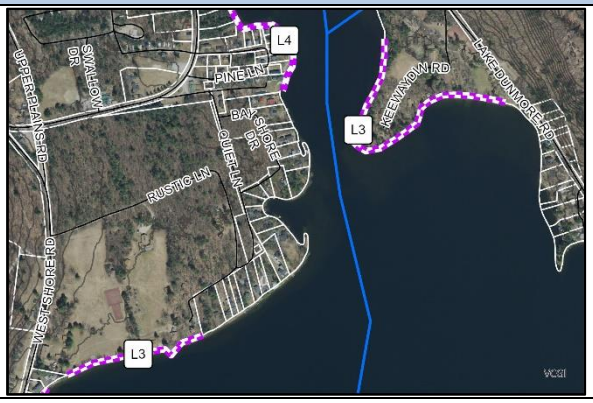
Photos 1-2: Examples of the shoreline along a portion of West Shore Road.

BMP Description: Potential opportunity for shoreline assessment and Lake Wise practice implementation. Suggested practices include implementing no-mow areas and planting native trees and shrubs along the lakeshore.

WQ Benefits	Landowner Support and O&M	Cost and Constructability	Additional Benefits	Total Score (Priority)
6	1	5	2	14 **(Moderate)**

Additional Project Benefits Description: The projects present opportunities to enhance lakeshore natural communities by establishing native vegetation and by providing shade along the lakeshore.

Project Comments: The project is assigned a moderate priority due to the water quality and habitat benefits of enhancing lakeshore natural communities and the low cost of implementation. **We estimate that total cost of native plantings may be in the range of $500 - $1,000 per parcel.**

Projects: L-3		**Problem Area Summary**
Lake Watershed	Lake Dunmore	
Location:	Keewaydin Camps	
Land Ownership:	Private	

Site Description: Multiple opportunities for shoreline assessment and improvements including mowed lawns along the lakeshore.

Photos 1-2: Examples of the shoreline at the Keewaydin Camps.

BMP Description: Potential opportunity for shoreline assessment and Lake Wise practice implementation. Suggested practices include implementing no-mow areas and planting native trees and shrubs along the lakeshore.

WQ Benefits	Landowner Support and O&M	Cost and Constructability	Additional Benefits	Total Score (Priority)
6	1	5	3	15 **(High)**

Additional Project Benefits Description: The projects present educational opportunities and opportunities to enhance lakeshore natural communities by establishing native vegetation and by providing shade along the lakeshore.

Project Comments: The project is assigned a high priority due to the water quality and habitat benefits of enhancing lakeshore natural communities and the low cost of implementation. **We estimate that total cost of native plantings may start in the range of $500 - $1,000 per parcel.**

Projects: L-4			**Problem Area Summary**
Lake Watershed	Lake Dunmore		
Location:	North Bay		
Land Ownership:	Private		

Site Description: Multiple opportunities for shoreline assessment and improvements including mowed lawns and hard armor along the lakeshore.

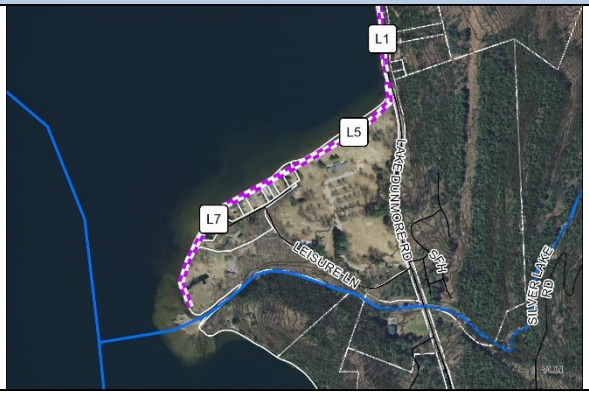
Photos 1-2: Examples of the shoreline in the north bay of Lake Dunmore.

BMP Description: Potential opportunity for shoreline assessment and Lake Wise practice implementation. Suggested practices include implementing no-mow areas and planting native trees and shrubs along the lakeshore.

WQ Benefits	Landowner Support and O&M	Cost and Constructability	Additional Benefits	Total Score (Priority)
6	1	5	3	15 **(High)**

Additional Project Benefits Description: The projects present opportunities to enhance lakeshore natural communities by establishing native vegetation in a high visibility area.

Project Comments: The project is assigned a high priority due to the water quality and habitat benefits of enhancing lakeshore natural communities and the low cost of implementation. **We estimate that total cost of native plantings may be in the range of $500 - $1,000 per parcel.**

Projects: L-5			**Problem Area Summary**
Lake Watershed	Lake Dunmore		
Location:	Branbury State Park		
Land Ownership:	State Park		

Site Description: Multiple opportunities for shoreline assessment and improvements including mowed lawns and hard armor along the lakeshore.

Photos 1: Example of the shoreline at Branbury State Park.

BMP Description: Potential opportunity for shoreline assessment and Lake Wise practice implementation. Suggested practices include implementing no-mow areas and planting native trees and shrubs along the lakeshore. See project SW-5 for stormwater treatment and erosion control recommendations.

WQ Benefits	Landowner Support and O&M	Cost and Constructability	Additional Benefits	Total Score (Priority)
6	1	5	4	16 **(High)**

Additional Project Benefits Description: The projects present educational opportunities and opportunities to enhance lakeshore natural communities by establishing native vegetation in a high visibility area.

Project Comments: The project is assigned a moderate priority due to the water quality and habitat benefits of enhancing lakeshore natural communities and the low cost of implementation. **We estimate that total cost of native plantings may start in the range of $500 - $1,000 per parcel.**

Projects: L-6			**Problem Area Summary**
Lake Watershed	Lake Dunmore		
Location:	Hooker Road		
Land Ownership:	Town ROW and Private		

Site Description: Multiple opportunities for shoreline assessment and improvements including mowed lawns and hard armor along the lakeshore.

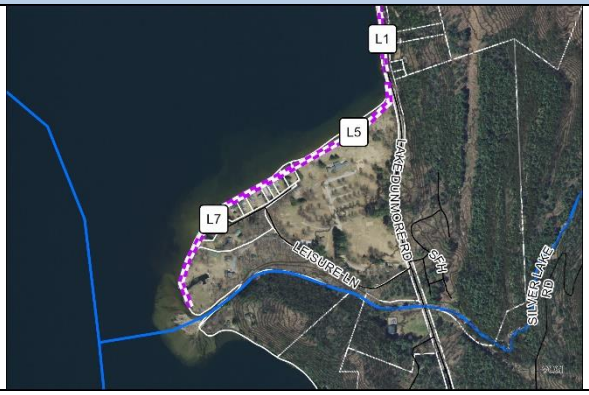
Photos 1-2: Examples of the shoreline along Hooker Road.

BMP Description: Potential opportunity for shoreline assessment and Lake Wise practice implementation. Suggested practices include implementing no-mow areas and planting native trees and shrubs along the lakeshore.

WQ Benefits	Landowner Support and O&M	Cost and Constructability	Additional Benefits	Total Score (Priority)
6	1	5	2	14 **(Moderate)**

Additional Project Benefits Description: The projects present educational opportunities and opportunities to enhance lakeshore natural communities by establishing native vegetation and by providing shade along the lakeshore.

Project Comments: The project is assigned a moderate priority due to the water quality and habitat benefits of enhancing lakeshore natural communities and the low cost of implementation. **We estimate that total cost of native plantings may start in the range of $500 - $1,000 per parcel.**

Projects: L-7			**Problem Area Summary**
Lake Watershed	Lake Dunmore		
Location:	Leisure Lane		
Land Ownership:	Private		

Site Description: Multiple opportunities for shoreline assessment and improvements including mowed lawns and hard armor along the lakeshore.

Photo 1: Example of the shoreline along Leisure Lane.

BMP Description: Potential opportunity for shoreline assessment and Lake Wise practice implementation. Suggested practices include implementing no-mow areas and planting native trees and shrubs along the lakeshore.

WQ Benefits	Landowner Support and O&M	Cost and Constructability	Additional Benefits	Total Score (Priority)
6	1	5	3	15 **(High)**

Additional Project Benefits Description: The projects present opportunities to enhance lakeshore natural communities by establishing native vegetation in a high visibility area.

Project Comments: The project is assigned a high priority due to the water quality and habitat benefits of enhancing lakeshore natural communities and the low cost of implementation. **We estimate that total cost of native plantings may be in the range of $500 - $1,000 per parcel.**

Project: PR-6	**Problem Area Summary**
Lake Watershed	Fern Lake
Location	Westside Drive
Land Ownership	Private Road
BMP Type	Erosion Stabilization
Drainage Area/Impervious	10.2 / 0.72 acres
% Impervious	7
Estimated Project Cost	$ 3,000
P Efficiency ($/lb removed)	$ 829
Project Priority	High

Site Description: Runoff is concentrated along a steep section of road north of the culvert with no ditch and a high sediment load. There does not appear to be room to install a ditch along the steep section of road. Erosion is also present at the cross-culvert outlet.

Photo 1: Location for turnout, currently filled with loose sediment from winter plowing and road grading

Photo 2: Cross-culvert outlet.

BMP Description: Install a sediment trap near the existing turnout to trap sediment before it reaches the channel. Stabilize outlet erosion at the cross-culvert.

BMP Volume (cf)	P Load (lbs)	P Reduction (lbs)	Sed Reduction	%WQv/CPv	Erosion	Maintenance
50	10.99*	3.62	High	N/A	Gully, Sheet	Moderate

Feasibility Comments: The project is located on private land. No utility conflicts are anticipated.

Other Considerations/Benefits: Stabilization of erosion from an unstable cross culvert outlet, provides some treatment before reaching receiving water

*P load (annual) is estimated from land cover values for each lake segment. Estimates include additional P loading from erosion or other sources.

Projects: PR-8		**Problem Area Summary**
Lake Watershed	Lake Dunmore	
Location:	Mountain Road	
Land Ownership:	Private Road	

Site Description: Runoff down a steep section of Mountain Road is causing erosion of the gravel surface to the intersection with Lake Dunmore Road

Photo 1: Space for a sediment trap at the base of Mountain Road.

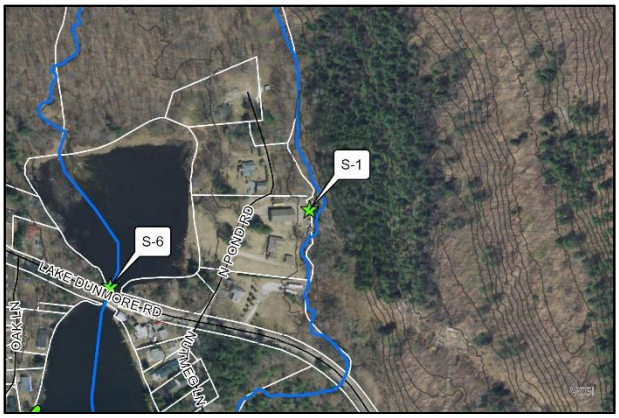
BMP Description: Install a sediment trap on the east side of the pull off at the base of the road. Grade road as needed to direct water into sediment trap

WQ Benefits	Landowner Support and O&M	Cost and Constructability	Additional Benefits	Total Score (Priority)
5	1	4	1	11 **(Moderate)**

Additional Project Benefits Description: The project presents an opportunity to trap sediment from a chronic problem area for erosion.

Project Comments: The project is assigned a moderate priority due to the water quality benefits of trapping eroded sediment and the low cost of implementation. **We estimate that total project costs may be in the range of $1,000 - $5,000.**

Project: S-1		**Problem Area Summary**
Lake Watershed	Lake Dunmore	
Location	North Pond Road	
Land Ownership	Private Land	
BMP Type	Sediment Trap / Stormwater Treatment	
Drainage Area/Impervious	0.13 / 0.11 acres	
% Impervious	85	
Estimated Project Cost	$ 5,200	
P Efficiency ($/lb removed)	$ 10,640	
Project Priority	Moderate	



Site Description: There is some erosion extending from the corner of parking to the stream. Half of roof drains to the parking area. Runoff flows directly into intermittent stream with no buffer

Photo 1: Erosion along the corner of the parking area. Exposed sediment extending to intermittent channel

Photo 2: Narrow buffer with some grass cover along intermittent channel

BMP Description: Install sediment trap and/or stormwater treatment basin to receive runoff from the parking area. Establish a vegetated buffer along channel.

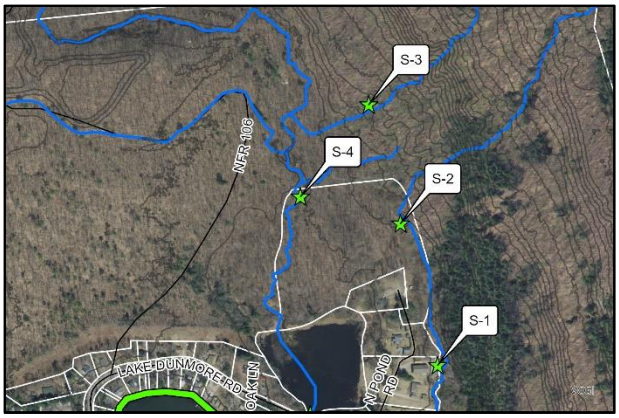
BMP Volume (cf)	P Load (lbs)	P Reduction (lbs)	Sed Reduction	%WQv/CPv	Erosion	Maintenance
50	0.67*	0.49	Moderate	Low	Sheet, Rill	High

Feasibility Comments: The project is located on private land. No utility conflicts are anticipated. Stream permitting or notice may be required.

Other Considerations/Benefits: Provides some treatment before reaching receiving water, riparian buffer habitat improvement

*P load (annual) is estimated from land cover values for each lake segment. Estimates include additional P loading from erosion or other sources.

Project: S-3		**Problem Area Summary**
Lake Watershed	Lake Dunmore	
Location	Keewaydin Camp Property North of Lake	
Land Ownership	Private Land	
BMP Type	Water Bars / Erosion Prevention	
Drainage Area/Impervious	111.4 /1.7 acres	
% Impervious	1	
Estimated Project Cost	$ 6,300	
P Efficiency ($/lb removed)	$ 6,161	
Project Priority	High	



Site Description: The steep intermittent stream partially avulsed during recent high flow event, flowing down hiking trail (blue hashes) causing extensive erosion.

Photo 1: Start of channel avulsion looking upslope towards channel from eroded trail

Photo 2: Erosion along hiking trail from channel avulsion

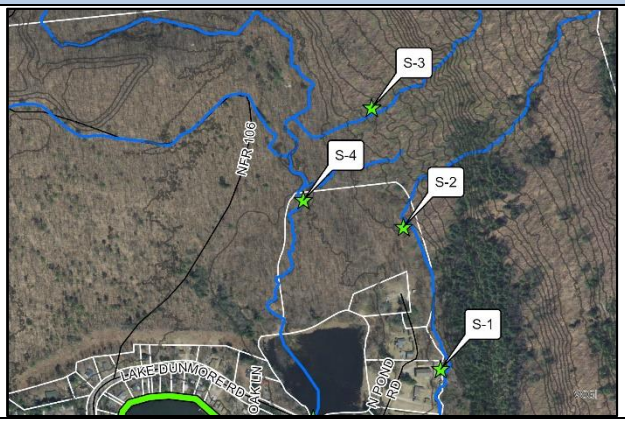
BMP Description: Install water bars downgradient to direct flow back to stream in order to prevent continued erosion of the trail.

BMP Volume (cf)	P Load (lbs)	P Reduction (lbs)	Sed Reduction	%WQv/CPv	Erosion	Maintenance
N/A	75.58*	1.02	High	N/A	Gully	Moderate

Feasibility Comments: The project is located on private land. No utility conflicts are anticipated.

Other Considerations/Benefits: Mitigation of future flood damage to trail

*P load (annual) is estimated from land cover values for each lake segment. Estimates include additional P loading from erosion or other sources.

Projects: S-4		**Problem Area Summary**
Lake Watershed	Lake Dunmore	
Location:	North Tributary to Lake Dunmore	
Land Ownership:	Private	

Site Description: There are active large scour holes at each bend in the intermittent channel.

Photo 1: Scour along the channel banks. Channel was dry at the time of assessment.

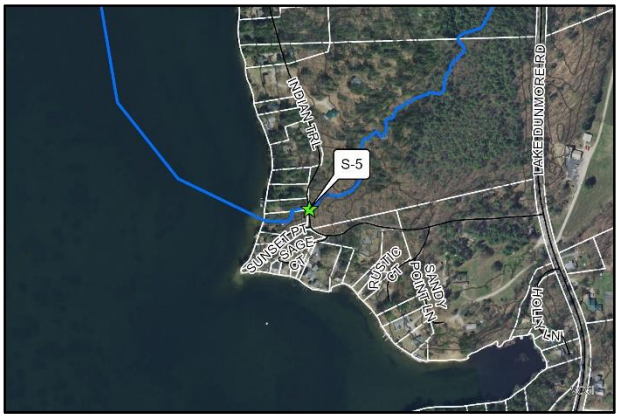
Photo 2: Scour along the channel banks. Channel was dry at the time of assessment.

BMP Description: Monitor channel condition for bank erosion and headcuts in the channel. The channel grade could be raised with rock or wood structures to reduce incision, improve floodplain access, and provide some sediment storage.

WQ Benefits	Landowner Support and O&M	Cost and Constructability	Additional Benefits	Total Score (Priority)
10	1	3	0	14 **(Moderate)**

Additional Project Benefits Description:

Project Comments: The project is assigned a high priority due to the water quality benefits of reducing erosion and trapping sediment. **We estimate that total project costs may be in the range of $5,000 - $10,000.**

Project: S-5		**Problem Area Summary**
Lake Watershed	Lake Dunmore	
Location	Indian Trail	
Land Ownership	Private Road	
BMP Type	Erosion Stabilization	
Drainage Area/Impervious	52.5 / 1.4 acres	
% Impervious	1	
Estimated Project Cost	$ 3,000	
P Efficiency ($/lb removed)	$ 2,934	
Project Priority	High	

Site Description: 36" culvert is slightly undersized. There is minor erosion at inlet and outlet headwall and minor erosion at culvert outlet. Sediment deposits are present in the low slope channel downstream of the culvert.

Photo 1: Minor erosion at culvert inlet headwall

Photo 2: Minor sediment accumulation in channel

BMP Description: Stabilize erosion at the culvert outlet and inlet and outlet headwalls.

BMP Volume (cf)	P Load (lbs)	P Reduction (lbs)	Sed Reduction	%WQv/CPv	Erosion	Maintenance
N/A	37.32*	1.02	High	N/A	Rill, Sheet	Moderate

Feasibility Comments: The project is located on private land. No utility conflicts are anticipated.

Other Considerations/Benefits: Road infrastructure improvement, drains directly to receiving water

*P load (annual) is estimated from land cover values for each lake segment. Estimates include additional P loading from erosion or other sources.

Project: SW-1		**Problem Area Summary**
Lake Watershed	Lake Dunmore	
Location	VT Fish and Wildlife Boat Launch on West Shore Road	
Land Ownership	State of Vermont	
BMP Type	Trench Drain and Rain Garden	
Drainage Area/Impervious	0.25 / 0.24 acres	
% Impervious	96	
Estimated Project Cost	$ 16,200	
P Efficiency ($/lb removed)	$ 29,204	
Project Priority	High	

Site Description: The VT F&W boat launch has a large parking area that drains directly to the lake via the boat ramp. A small stone lined channel runs along north edge of parking area. There are two small grassed areas on either side of the boat ramp.

Photo 1: Boat ramp and dock.

Photo 2: Gravel parking lot sloping toward the lake.

BMP Description: The channel on the north side of the ramp could be enlarged to provide a stable stormwater conveyance and trap eroded gravel. Consider installing a trench drain at interface between concrete ramp and gravel parking. There may be space for a small treatment practice (e.g., rain garden) in the grassed areas.

BMP Volume (cf)	P Load (lbs)	P Reduction (lbs)	Sed Reduction	%WQv/CPv	Erosion	Maintenance
200	1.00*	0.55	Moderate	Low	Sheet	High

Feasibility Comments: The project is located on State property. No utility conflicts are anticipated, but space for stormwater treatment is limited. Wetlands may be present along the southern edge of the parking area Lakeshore permitting or notice may be required.

Other Considerations/Benefits: Educational opportunity, provides some treatment before reaching receiving water

*P load (annual) is estimated from land cover values for each lake segment. Estimates include additional P loading from erosion or other sources.

Project: SW-2		**Problem Area Summary**
Lake Watershed	Lake Dunmore	
Location	Waterhouses at West Shore Road	
Land Ownership	Private Commercial	
BMP Type	Underdrained Bioretention/ Rain Garden or Gravel Wetland	
Drainage Area/Impervious	1.7 / 0.67 acres	
% Impervious	39	
Estimated Project Cost	$ 47,400	
P Efficiency ($/lb removed)	$ 58,231	
Project Priority	Low	

Site Description: Opportunity for stormwater treatment of lawn and impervious surfaces in green space on east or west side of road at the Waterhouses Store/Suites.

Photo 1: Small green space between road and parking on east side of West Shore Road.

Photo 2: Green space on the west side of West Shore Road.

BMP Description: A treatment practice capturing runoff from the road and lawn could be installed in the green space on either side of West Shore Road. The treatment volume specified may be scaled back depending on space availability and implementation budget.

BMP Volume (cf)	P Load (lbs)	P Reduction (lbs)	Sed Reduction	%WQv/CPv	Erosion	Maintenance
1,000	2.35*	0.81	Low	Moderate	None	High

Feasibility Comments: The project is located on private property and along the Town ROW. Potential utility conflicts should be evaluated during design.

Other Considerations/Benefits: Provides some treatment before reaching receiving water

*P load (annual) is estimated from land cover values for each lake segment. Estimates include additional P loading from erosion or other sources.

Project: SW-3		**Problem Area Summary**
Lake Watershed	Lake Dunmore	
Location	Cabins at West Shore Road	
Land Ownership	Private Property	
BMP Type	Stormwater Treatment (e.g., Regenerative Stormwater Conveyance)	
Drainage Area/Impervious	41.1 / 1.7 acres	
% Impervious	4	
Estimated Project Cost	$ 15,700	
P Efficiency ($/lb removed)	$ 19,287	
Project Priority	Low	

Site Description: Opportunity for stormwater treatment of lawn and impervious surfaces in green space at cabin association.

Photo 1: Existing ditch on the west side of West Shore Road.

Photo 2: Existing ditch on the west side of West Shore road with adjacent power boxes.

BMP Description: Consider widening the existing ditch and/or installing a small filtering BMP to capture the most road runoff for treatment. Power upslope could conflict with slope grading.

BMP Volume (cf)	P Load (lbs)	P Reduction (lbs)	Sed Reduction	%WQv/CPv	Erosion	Maintenance
150	29.50*	0.81	Low	Low	None	High

Feasibility Comments: Potential educational opportunity. The project is located on private property and along the Town ROW. Potential utility conflicts should be evaluated during design.

Other Considerations/Benefits: Provides some treatment before reaching receiving water

*P load (annual) is estimated from land cover values for each lake segment. Estimates include additional P loading from erosion or other sources.

Project: SW-4	**Problem Area Summary**
Lake Watershed	Fern Lake
Location	Fern Lake Boat Launch
Land Ownership	Town of Leicester
BMP Type	Erosion Stabilization and Sediment Trap
Drainage Area/Impervious	0.33 / 0.15 acres
% Impervious	45
Estimated Project Cost	$ 14,200
P Efficiency ($/lb removed)	$ 11,848
Project Priority	High

Site Description: The gravel parking area at the Town park slopes toward the lake via the boat launch. There is shoreline erosion present along the grassed area.

Photo 1: Gravel boat ramp.

Photo 2: Shoreline erosion at the beach area.

BMP Description: Install Geogrid or similar product to stabilize the boat ramp. Divert upslope runoff to the wooded area north of the parking lot. Improve grass cover and consider plantings along shoreline.

BMP Volume (cf)	P Load (lbs)	P Reduction (lbs)	Sed Reduction	%WQv/CPv	Erosion	Maintenance
50	1.50*	1.20	High	Low	Shore, Rill	High

Feasibility Comments: The project is located on Town property. No utility conflicts are anticipated, but the design should ensure continued access to the dry hydrant. Lakeshore permitting or notice may be required.

Other Considerations/Benefits: Educational opportunity, lakeshore habitat improvement, Town park infrastructure improvement, provides some treatment before reaching receiving water

*P load (annual) is estimated from land cover values for each lake segment. Estimates include additional P loading from erosion or other sources.

Project: SW-5		**Problem Area Summary**
Lake Watershed	Lake Dunmore	
Location	Branbury State Park Beach	
Land Ownership	State of Vermont	
BMP Type	Erosion Stabilization, Improved Lake Access, Gravel Wetland/ Constructed Wetland	
Drainage Area/Impervious	2.3 / 0.43 acres	
% Impervious	18	
Estimated Project Cost	$ 44,600	
P Efficiency ($/lb removed)	$ 33,118	
Project Priority	Moderate	

Site Description: Potential opportunity for a stormwater treatment feature in green space. Shallow groundwater is likely given low relief between the lake and park. Erosion is present along shoreline at the dog access area.

Photo 1: Facilities and lawn area upslope of the beach.

Photo 2: Shoreline erosion at the dog access area.

BMP Description: Soft shoreline stabilization practices (e.g., sloping back the area and planting or installing coir stabilization) could be implemented along the eroded dog access area, with a path to the lake designated. A constructed wetland or bioswale could be installed to treat stormwater from the facilities roof top and some of the lawn as well as provide lakeshore habitat improvements. See project L-5 for further lakeshore practices.

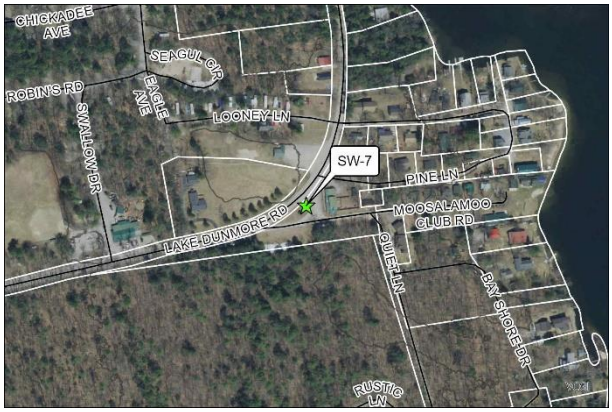
BMP Volume (cf)	P Load (lbs)	P Reduction (lbs)	Sed Reduction	%WQv/CPv	Erosion	Maintenance
1,000	2.69*	1.35	Moderate	Moderate	Shore	High

Feasibility Comments: The project is located along the Town ROW and treats runoff from Branbury State Park. No utility conflicts are anticipated. Lakeshore permitting or notice may be required.

Other Considerations/Benefits: Educational opportunity, lakeshore habitat improvement, provides some treatment before reaching receiving water, addresses local concern

*P load (annual) is estimated from land cover values for each lake segment. Estimates include additional P loading from erosion or other sources.

Project: SW-7		**Problem Area Summary**
Lake Watershed	Lake Dunmore	
Location	Kampersville Deli	
Land Ownership	Private Commercial	
BMP Type	Dry Well/ Infiltration Chamber	
Drainage Area/Impervious	0.48 / 0.34 acres	
% Impervious	71	
Estimated Project Cost	$ 25,400	
P Efficiency ($/lb removed)	$ 29,604	
Project Priority	Moderate	



Site Description: Stormwater pools in the Kampersville Deli parking lot. There is a large impervious contribution to drainage area. The water appears to eventually infiltrate on site (low water quality impact).

Photo 1: Pooled stormwater in the Kampersville Deli parking lot.

BMP Description: Consider lowering the berm between the parking area and green space at the deli. Install a dry well in the deli's green space to infiltrate the stormwater underground while preserving picnic seating. Alternatively, a cross culvert could be installed to send water to the green space across the street to infiltrate.

BMP Volume (cf)	P Load (lbs)	P Reduction (lbs)	Sed Reduction	%WQv/CPv	Erosion	Maintenance
800	0.95*	0.86	Low	Moderate	None	High

Feasibility Comments: The project is located on private property. Potential utility conflicts should be evaluated during design.

Other Considerations/Benefits: All runoff infiltrates on site

*P load (annual) is estimated from land cover values for each lake segment. Estimates include additional P loading from erosion or other sources.

Project: SW-8		**Problem Area Summary**
Lake Watershed	Lake Dunmore	
Location	Mountainview Drive Common Land	
Land Ownership	Private Common Land	
BMP Type	Lakeshore Improvements, Rain Garden	
Drainage Area/Impervious	2.3 / 0.27 acres	
% Impervious	12	
Estimated Project Cost	$ 13,500	
P Efficiency ($/lb removed)	$ 34,091	
Project Priority	Low	

Site Description: Opportunity for stormwater treatment and lakeshore improvements on Mountainview Road common land green space. Evidence of shallow bedrock in some areas. Some undermining behind concrete wall along lakeshore.

Photo 1: Mountainview common land green space.

Photo 2: Hard armor along the Mountainview common land green space.

BMP Description: Install native plantings and implement "no mow" zones. Consider installing a small rain garden for stormwater treatment and demonstration purposes.

BMP Volume (cf)	P Load (lbs)	P Reduction (lbs)	Sed Reduction	%WQv/CPv	Erosion	Maintenance
200	1.98*	0.40	Low	Low	None	High

Feasibility Comments: The project is located on private property. Potential infrastructure conflicts should be evaluated during design, specifically whether any onsite wastewater treatment is occurring on the parcel and the purpose/location of the PVC pipes accessible near the top of the slope. Lakeshore permitting or notice may be required.

Other Considerations/Benefits: Educational opportunity, lakeshore habitat improvement, provides some treatment before reaching receiving water

*P load (annual) is estimated from land cover values for each lake segment. Estimates include additional P loading from erosion or other sources.

Project: TC-1		**Problem Area Summary**
Lake Watershed	Lake Dunmore	
Location	Hooker Road	
Land Ownership	Town ROW and Private Property	
BMP Type	Erosion Stabilization	
Drainage Area/Impervious	5.0 / 0.15 acres	
% Impervious	3	
Estimated Project Cost	$ 6,000	
P Efficiency ($/lb removed)	$ 21,124	
Project Priority	High	

Site Description: An eroded channel has formed downstream of the cross-culvert outlet near 1185 Hooker Road.

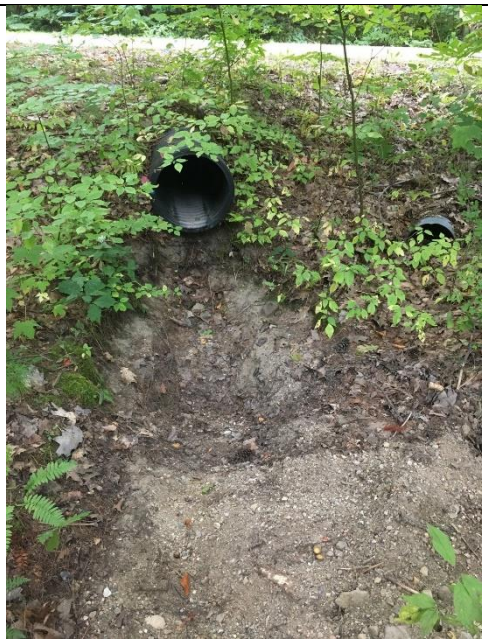


Photo 1: Cross-culvert outlet.

Photo 2: Erosion at the cross-culvert outlet.

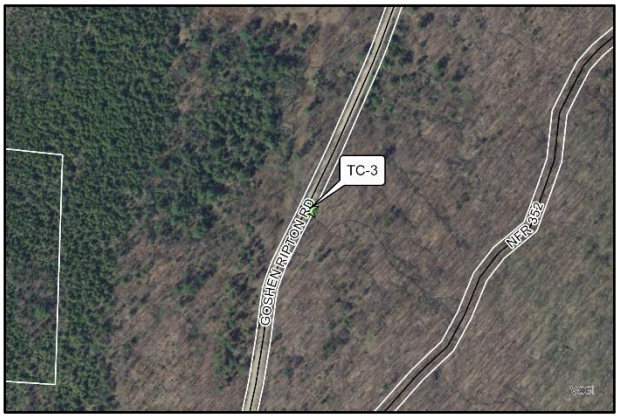
BMP Description: Install a splash bowl at the culvert outlet and stabilize the channel with stone as needed. Consider adding check dams in the ditch upstream to attenuate flow.

BMP Volume (cf)	P Load (lbs)	P Reduction (lbs)	Sed Reduction	%WQv/CPv	Erosion	Maintenance
N/A	3.76*	0.28	Moderate	N/A	Gully	Moderate

Feasibility Comments: The project is located along the Town ROW. Stabilization work may extend onto private land. No utility conflicts are anticipated.

Other Considerations/Benefits: Stabilization of erosion from an unstable cross culvert outlet, provides some treatment before reaching receiving water, addresses local concern

*P load (annual) is estimated from land cover values for each lake segment. Estimates include additional P loading from erosion or other sources.

Project: TC-3		**Problem Area Summary**
Lake Watershed	Lake Dunmore	
Location	Goshen Ripton Road	
Land Ownership	Town ROW and National Forest	
BMP Type	Erosion Stabilization	
Drainage Area/Impervious	11.8 / 0.11 acres	
% Impervious	1	
Estimated Project Cost	$ 8,100	
P Efficiency ($/lb removed)	$ 7,129	
Project Priority	High	

Site Description: This is a gully located in the upper Lake Dunmore watershed. Active gully erosion is present at 12" culvert outlet (4'x3'x50').

Photo 1: Cross-culvert outlet viewed from the road.

Photo 2: Erosion at the cross-culvert outlet.

BMP Description: Stabilize the gully with stone lining and check dams in the outlet channel. Install a level spreader to disperse runoff into the forest.

BMP Volume (cf)	P Load (lbs)	P Reduction (lbs)	Sed Reduction	%WQv/CPv	Erosion	Maintenance
N/A	8.91*	1.14	High	N/A	Gully	Moderate

Feasibility Comments: The project is located along the Town ROW and addresses runoff from the Green Mountain National Forest. No utility conflicts are anticipated.

Other Considerations/Benefits: Stabilization of erosion from an unstable cross culvert outlet, provides some treatment before reaching receiving water

*P load (annual) is estimated from land cover values for each lake segment. Estimates include additional P loading from erosion or other sources.

Project: TC-5		**Problem Area Summary**
Lake Watershed	Lake Dunmore	
Location	Goshen Ripton Road	
Land Ownership	Town ROW and National Forest	
BMP Type	Erosion Stabilization	
Drainage Area/Impervious	3.9 / 0.02 acres	
% Impervious	1	
Estimated Project Cost	$ 10,000	
P Efficiency ($/lb removed)	$ 4,401	
Project Priority	High	

Site Description: This is a gully located in the upper Lake Dunmore watershed. Gully erosion is present along a steep embankment down to stream (3'x6'x100'). Historic erosion was significant, but at present does not look very active.

Photo 1: Steep embankment between road and stream.

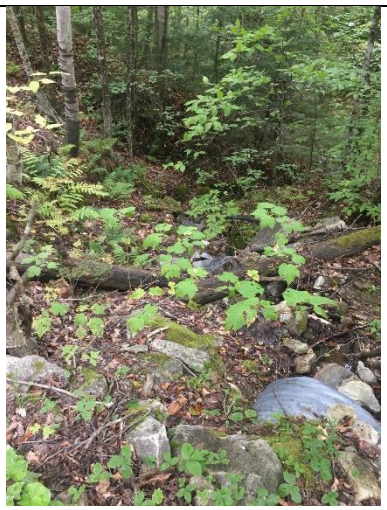


Photo 2: Erosion at the cross-culvert outlet.

BMP Description: Monitor for active erosion. Potential to anchor wood to steep slope to stabilize the gully and prevent future erosion.

BMP Volume (cf)	P Load (lbs)	P Reduction (lbs)	Sed Reduction	%WQv/CPv	Erosion	Maintenance
N/A	4.80*	2.27	High	N/A	Gully	Moderate

Feasibility Comments: The project is located along the Town ROW and addresses runoff from the Green Mountain National Forest. No utility conflicts are anticipated.

Other Considerations/Benefits: Stabilization of erosion from an unstable cross culvert outlet, drains via conveyance to receiving water

*P load (annual) is estimated from land cover values for each lake segment. Estimates include additional P loading from erosion or other sources.

Project: TC-6		**Problem Area Summary**
Lake Watershed	Lake Dunmore	
Location	Lake Dunmore Road	
Land Ownership	Town ROW and Private Lake Access	
BMP Type	Erosion Stabilization and Improved Lake Access	
Drainage Area/Impervious	10.1 / 0.42 acres	
% Impervious	4	
Estimated Project Cost	$ 12,500	
P Efficiency ($/lb removed)	$ 40,748	
Project Priority	Moderate	

Site Description: There is scour at the triple culvert outlet. The lake access next to the culverts is eroding. Some runoff from Lake Dunmore Road drains to the access ramp.

Photo 1: Erosion at the culvert outlet.

Photo 2: Erosion at the adjacent lake access.

BMP Description: Install armor at the culvert outlet. Stabilize the lake access with infiltration steps or a stabilized ramp.

BMP Volume (cf)	P Load (lbs)	P Reduction (lbs)	Sed Reduction	%WQv/CPv	Erosion	Maintenance
N/A	7.55*	0.31	Moderate	N/A	Rill	Moderate

Feasibility Comments: The project is located along the Town ROW and a private lake access. No utility conflicts are anticipated. Lakeshore permitting or notice may be required.

Other Considerations/Benefits: Stabilization of erosion from an unstable cross culvert outlet, drains directly to receiving water

*P load (annual) is estimated from land cover values for each lake segment. Estimates include additional P loading from erosion or other sources.

Project: TC-7		**Problem Area Summary**
Lake Watershed	Lake Dunmore	
Location	Lade Dunmore Road	
Land Ownership	Town ROW and Private Property	
BMP Type	Erosion Stabilization	
Drainage Area/Impervious	3.2 / 0.02 acres	
% Impervious	1	
Estimated Project Cost	$ 12,300	
P Efficiency ($/lb removed)	$ 15,438	
Project Priority	Moderate	

Site Description: The cross-culvert inlet is clogged with sediment. The channel from the outlet to the lake is eroded (6"x2'x200'). Some sediment is deposited in the existing channel.

Photo 1: Clogged culvert inlet.

Photo 2: Erosion at the culvert outlet.

BMP Description: Monitor for active erosion. Potential to anchor wood to steep slope to stabilize the gully and prevent future erosion.

BMP Volume (cf)	P Load (lbs)	P Reduction (lbs)	Sed Reduction	%WQv/CPv	Erosion	Maintenance
100	2.43*	0.80	Moderate	Low	Gully	High

Feasibility Comments: The project is located along the Town ROW but the work could stretch onto private land if deemed feasible. No utility conflicts are anticipated.

Other Considerations/Benefits: Stabilization of erosion from an unstable cross culvert outlet, provides some treatment before reaching receiving water

*P load (annual) is estimated from land cover values for each lake segment. Estimates include additional P loading from erosion or other sources.

Project: TC-8		**Problem Area Summary**
Lake Watershed	Lake Dunmore	
Location	Lake Dunmore Road near Misty Lane	
Land Ownership	Town ROW and Private Land	
BMP Type	Erosion Stabilization, Regenerative Stormwater Conveyance	
Drainage Area/Impervious	334.2 / 0.02 acres	
% Impervious	0	
Estimated Project Cost	$ 15,000	
P Efficiency ($/lb removed)	$ 3,215	
Project Priority	High	

Site Description: There is significant erosion at the inlet and outlet of the 4'x4' concrete box culvert under Lake Dunmore Road. The drainage is likely an intermittent or ephemeral stream. There is approximately 1,000 cubic feet total of erosion in the channel upstream of Lake Dunmore Road, between the road and the downstream driveway culvert, and downstream of the 18" driveway culvert.

Photo 1: Concrete box culvert outlet.

Photo 2: Erosion between box and driveway culverts.

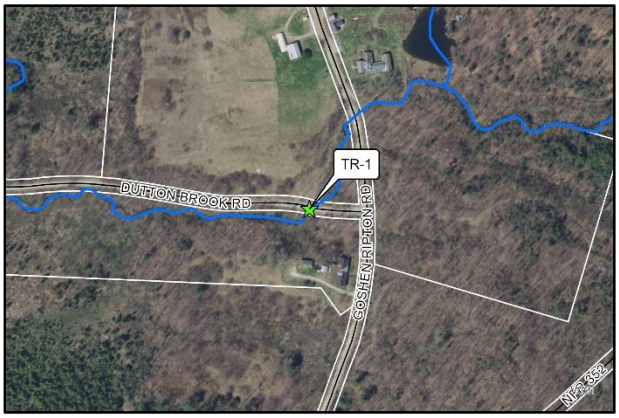
BMP Description: Stabilize erosion with stone. Install check dams to trap sediment. Consider reaching out to landowner about upgrading the driveway culvert and regenerative stormwater features.

BMP Volume (cf)	P Load (lbs)	P Reduction (lbs)	Sed Reduction	%WQv/CPv	Erosion	Maintenance
100	175.91*	4.67	High	N/A	Gully	High

Feasibility Comments: The project is located along the Town ROW but the work could stretch onto private land if deemed feasible. No utility conflicts are anticipated.

Other Considerations/Benefits: Infrastructure improvement, provides some treatment before reaching receiving water

*P load (annual) is estimated from land cover values for each lake segment. Estimates include additional P loading from erosion or other sources.

Project: TR-1		**Problem Area Summary**
Lake Watershed	Lake Dunmore	
Location	Dutton Brook Road	
Land Ownership	Town ROW and National Forest	
BMP Type	Erosion Stabilization	
Road Work Length	160 feet	
Road Slope	> 10%	
Estimated Project Cost	$ 3,000	
P Efficiency ($/lb removed)	$ 4,697	
Project Priority	High	

Site Description: Upper watershed. A secondary ditch is forming along Dutton Brook Road from the intersection to slightly beyond the stream crossing. Most of the runoff bypasses the crossing and does not directly flow to the stream.

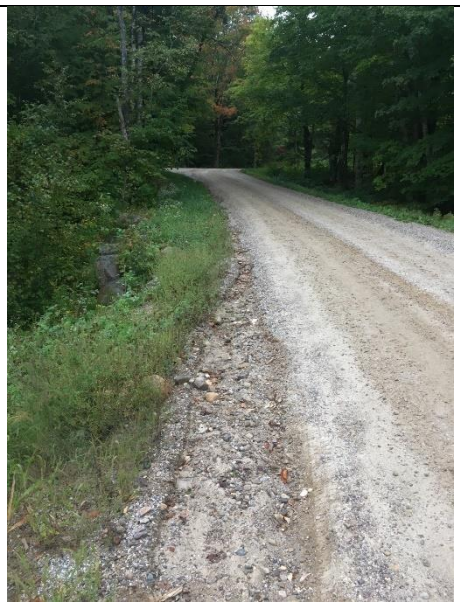


Photo 1: Erosion along the road shoulder from the intersection to the stream crossing.

Photo 2: Dutton Brook stream crossing culvert outlet.

BMP Description: Lower shoulder to allow sheet flow off of the roadway. Install stable turnout before the stream crossing.

BMP Volume (cf)	P Load (lbs)	P Reduction (lbs)	Sed Reduction	%WQv/CPv	Erosion	Maintenance
N/A	1.60*	0.64	Moderate	N/A	Rill	Moderate

Feasibility Comments: The project is located along the Town ROW. No utility conflicts are anticipated.

Other Considerations/Benefits: Stabilizes direct conveyance to receiving water

*P load (annual) is estimated from land cover values for each lake segment. Estimates include additional P loading from erosion or other sources.

Project: TR-5		**Problem Area Summary**
Lake Watershed	Lake Dunmore	
Location	Hooker Road	
Land Ownership	Town ROW	
BMP Type	MRGP Road Upgrades	
Road Work Length	330 feet	
Road Slope	<5%	
Estimated Project Cost	$	
P Efficiency ($/lb removed)	$ 26,465	
Project Priority	Moderate	

Site Description: As noted in the road erosion inventory, the inslope side of the road lacks a ditch. The inslope side of the road is eroding due to concentrated flow over the road surface.

Photo 1: Section of Hooker Road lacking a ditch.

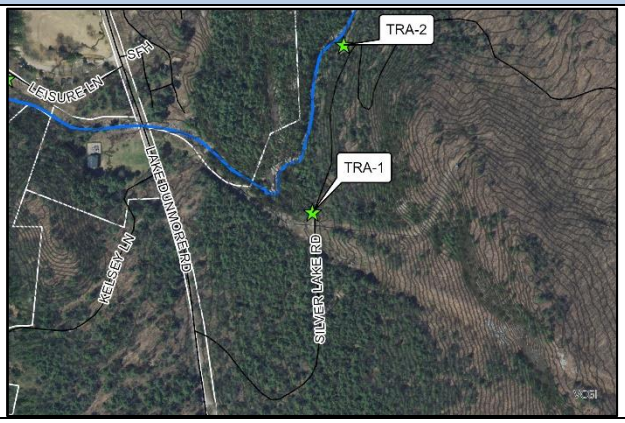
BMP Description: Install a ditch on the inslope side of the road. Install cross culvert with splash bowl at outlet if space allows. Given the low road slope, the ditch may be grass lined.

BMP Volume (cf)	P Load (lbs)	P Reduction (lbs)	Sed Reduction	%WQv/CPv	Erosion	Maintenance
N/A	0.94*	0.38	Moderate	N/A	Rill	Moderate

Feasibility Comments: The project is located along the Town ROW. No utility conflicts are anticipated.

Other Considerations/Benefits: Infrastructure improvement to reduce ongoing road maintenance

*P load (annual) is estimated from land cover values for each lake segment. Estimates include additional P loading from erosion or other sources.

Projects: TRA-1		**Problem Area Summary**
Lake Watershed	Lake Dunmore	
Location:	Silver Lake Road Trail	
Land Ownership:	Branbury State Park	

Site Description: The trail is eroding from the main access trail down the steep Falls of Lana access trail. Erosion continues to Sucker Brook.

Photo 1: Erosion down the Falls of Lana access trail.

BMP Description: Stabilize the access trail. Consider diverting water off of the main trail before the junction and installing stable steps down the access path.

WQ Benefits	Landowner Support and O&M	Cost and Constructability	Additional Benefits	Total Score (Priority)
8	3	2	4	17 **(High)**

Additional Project Benefits Description: The project presents and educational opportunity in a high visibility area as well as the opportunity to improve trail infrastructure by addressing a chronic problem area.

Project Comments: The project is assigned a high priority due to the water quality benefits of stabilizing the erosion and the educational nature of implementing the project along a highly visited trail. **We estimate that total project costs may be in the range of $5,000 - $10,000.**

Projects: TRA-2		**Problem Area Summary**
Lake Watershed	Lake Dunmore	
Location:	Silver Lake Road Trail	
Land Ownership:	Branbury State Park	

Site Description: Water from the trails converges at the junction and flows across main trail and down steep embankment to sucker brook with moderate erosion.

Photo 1: Erosion down the road embankment to Sucker Brook.

Photo 2: Erosion down the road embankment to Sucker Brook.

BMP Description: Direct water into the woods to infiltrate with ditches, a cross culvert, or water bars. Stabilize the embankment as needed.

WQ Benefits	Landowner Support and O&M	Cost and Constructability	Additional Benefits	Total Score (Priority)
11	2	2	4	19 **(High)**

Additional Project Benefits Description: The project presents and educational opportunity in a high visibility area as well as the opportunity to improve trail infrastructure by addressing a chronic problem area.

Project Comments: The project is assigned a high priority due to the water quality benefits of stabilizing the erosion and the educational nature of implementing the project along a highly visited trail. **We estimate that total project costs may be in the range of $5,000 - $10,000.**

Projects: TRA-3		**Problem Area Summary**
Lake Watershed	Lake Dunmore	
Location:	State Park Campsite	
Land Ownership:	Branbury State Park	

Site Description: There is erosion down the embankment from unofficial footpath from campsite to Sucker Brook.

Photo 1: Erosion along the Sucker Brook bank at the campsite.

BMP Description: Stabilize erosion. If access to stream is desired, install stone steps. Potentially a good project for VYCC partnership.

WQ Benefits	Landowner Support and O&M	Cost and Constructability	Additional Benefits	Total Score (Priority)
7	2	3	1	13 **(Moderate)**

Additional Project Benefits Description: The project presents and opportunity to address a chronic problem area for erosion due to continued access.

Project Comments: The project is assigned a moderate priority due to the water quality benefits of stabilizing the erosion. **We estimate that total project costs may be in the range of $1,000 - $5,000.**