VERMONT WATERSHED GRANT PROGRAM PROJECT: "LAKE RAPONDA WATERSHED ASSESSMENT"
Report Compiled By: Lake Raponda Association (LRA) Watershed Steering Committee and Cory Ross, DEC Watershed Division Coordinator
Funding Agency: Vermont Agency of Natural Resources, Department of Environmental Conservation (DEC), Watershed Management Division
Project Applicant: Windham County Natural Resources Conservation District (WCNRCD)
Grant Advisors: Marie Caduto, DEC Watershed Division Coordinator; Margo Ghia and Cory Ross, District Managers WCNRCD
Total Amount Awarded: $3,150
Project Summary (from grant application). This proposal's primary goal is to work with the Lake Raponda Association (LRA) in conducting a Lake Raponda watershed assessment of current conditions to identify priority projects and create a lake management plan. Doing so will help guide LRA, landowners and the Town of Wilmington in addressing lake quality. The lake assessment will follow the guidelines outlined in VT DEC's "Elements of a Lake Watershed Assessment and Management Plan," and incorporate Lake Wise program information.

Lake Assessment Grant Project Activities. Recommended by grant advisors

1. Organization & Orientation to the Goals & Objectives of the LR Watershed Grant.
2. Public Survey of the Lake Raponda Watershed.
3. iNaturalist Training with Local Citizen Scientist Identification of Aquatic and Terrestrial Fauna and Flora within the Lake Raponda Watershed.
4. Watershed aquatic invasive plants survey and lake paddle
5. Stream Walks & Culvert Survey for Assessing Storm Water Runoff
6. Lake paddle for waterside study of culverts, drainage pipes and run-off deltas
7. Lake Wise Program Activities.
8. Greeter Program at Town Beach

1) ORGANIZATION & ORIENTATION TO THE GOALS & OBJECTIVES OF THE LR WATERSHED GRANT

Activity Leaders. Margo Ghia, District Manager WCNRCD; Scott Tucker, Wilmington Town Manager; Marie Caduto DEC Watershed Division Coordinator; Will Melton, President LRA, Jack Widness, Chair, Watershed Assessment Steering Committee; 24 attendees;
Objectives.

1. Organization of volunteer team from LRA, appointment of Steering Committee
2. Set priorities for assessment activities by developing watershed survey instrument
3. Identify specific assessment activities to be undertaken
4. Recruit volunteers to carry out assessment activities
5. Develop overall plan for compiling and submitting results

Results.

1. **Assessment Organizational Meeting**: Saturday, May 24, 2019; Location: Home of Mike & Jack Widness; Marie Caduto gave an interactive PPT presentation entitled, "Lake Raponda Watershed Assessment," that was attended by 20 LRA members, Scott Tucker, John LeBron (Vice-Chair, Wilmington Planning Committee), and Margo Ghia.

2. **Established SignUpGenius** as an effective communication tool for event and volunteer coordination. way to communicate about the LR Watershed with LRA members. Leadership: Beth Brody, LRA Social Chair.
3. **Developed website tools** for submitting assessment data (Raponda.org) and for progress reports to members. Leadership: Alan Baker, LRA webmaster.
4. **Organized public event to highlight watershed assessment**. August wildlife presentation promoted as "kid-friendly" and attracted 22 attendees. Speaker Mike Clough, Managing Director, Southern Vermont Natural History Museum, introduced a snapping turtle and hawk on the beach along with a talk, "What is a Watershed, How Does It Function, and Why is It Important?"

Future Plans.

1. Extend culvert survey to include 12 culverts on West Lake Road. These are at considerable distance from the lake but still important to analyze.
2. Use outcomes and data to inform Tactical Basin Plan introduced in December 2019.
3. Draft conservation priorities for discussion with LRA membership.
4. Write and present boating guidelines for LRA members in hopes of broad support for strategies to minimize wake-related shoreline erosion and other boating impacts upon the Lake.
5. Develop advocacy plan for consideration of designation of Lake Raponda as a Vermont ANR Outstanding Resource Waters.

2) Public Survey of the Lake Raponda Watershed

Activity Leaders. Will Melton, President LRA, Mike Widness, LRA Treasurer, & Jack Widness, LRA member.

Objectives. To seek input on a brief 2-question survey about key watershed and volunteer issues from those using Lake Raponda watershed including the following user groups:

- Lake Raponda Association members
- Mountain View Association members
- Members of the public visiting Lake Raponda Green Mountain Beach
- Members of the public using Lake Raponda's State Boat Launch

1. To utilize the survey results for formulating plans for maintaining and improving the watershed's water quality;
2. Description of Survey Methodology: With advice from the Grant Advisors, two attitudinal questions were formulated: a. What are the one or two things that you treasure the most about Lake Raponda? b. What do you consider the greatest threat to the lake's well-being?
3. Two other questions were added to elicit volunteers for the various assessment programs and for LRA's "Greeter Program" at the boat launch. Ten additional volunteers were identified.
4. The responses obtained from these two open-ended questions were grouped by categories created by two members of the LR Association who agreed on categorization in tables below. Prior to surveying Green Mountain Beach and Boat Launch Users,

advice was sought from the Town of Wilmington officials on the questions asked and the timing of performing the survey.

Results of Survey (arranged left to right from highest to lowest % selecting for ALL GROUPS):

1. What are the one or two things that you treasure the most about Lake Raponda?

	Serenity/ Quiet/ Peace-fulness	Natural Beauty	Water Quality	Recreat-ional Activities	Wildlife	Protection/ Lack of Develp-ment	Social Lake Com-munity	Prox-imity/ Access-ibility
Lake Raponda Assoc Members (n=34)								
Number selecting	16	14	16	7	10	4	2	3
% Selecting	47.1%	41.2%	47.1%	20.6%	29.4%	11.8%	5.9%	8.8%
Mountain View Assoc Members (n=3)								
Number selecting	2	2	2	2	1	0	0	0
% Selecting	66.7%	66.7%	66.7%	66.7%	33.3%	0.0%	0.0%	0.0%
Green Mountain Beach Users (n=24)								
Number selecting	9	9	10	11	1	1	4	2
% Selecting	37.5%	37.5%	41.7%	45.8%	4.2%	4.2%	16.7%	8.3%
Boat Launch Users (n=4)								
Number selecting	3	3	0	0	0	1	0	0
% Selecting	75.0%	75.0%	0.0%	0.0%	0.0%	25.0%	0.0%	0.0%
ALL GROUPS (n=65)								
Number selecting	30	28	28	20	12	6	6	5
% Selecting	46.2%	43.1%	43.1%	30.8%	18.5%	9.2%	9.2%	7.7%

2. What do you consider the greatest threat to the lake's well-being?

	Motor-boats / Swim-ming	Milfoil/ Aquatic Invasives / Algae	Water Pol-lution	Erosion/ Silting/ Runoff	Green MTN Beach	Over develop-ment	Septic System/ Bacteria	Light Pol-lution	Human Impacts	Insufficient Volunteer Help
LRA MEMBER Number of N=34 total:										
Number selecting	21	20	8	10	3	5	2	6	2	1
% Selecting	61.8%	58.8%	23.5%	29.4%	8.8%	14.7%	5.9%	17.6%	5.9%	2.9%
Mountain View Assoc Members (n=3)										
Number selecting	2	2	0	2	0	0	0	0	0	0
% Selecting	66.7%	66.7%	0.0%	66.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Green Mountain Beach Users (n=24)										
Number selecting	4	4	7	2	11	3	6	0	1	0
% Selecting	16.7%	16.7%	29.2%	8.3%	45.8%	12.5%	25.0%	0.0%	4.2%	0.0%
Boat Launch Users (n=4)										
Number selecting	2	1	0	0	0	4	0	0	0	0
% Selecting	50.0%	25.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
ALL GROUPS (n=65)										
Number selecting	29	27	15	14	14	12	8	6	3	1
% Selecting	44.6%	41.5%	23.1%	21.5%	21.5%	18.5%	12.3%	9.2%	4.6%	1.5%

Future Plans.

- To expand survey's scope by sharing the study's results with non-member property owners within the Lake Raponda Watershed.
- Restructure and expand membership criteria to incorporate all watershed residents as candidates for LRA membership.
- Share data with other interested groups and individuals for a prioritized list of future watershed improvement projects that is likely to be led by the LRA and the Town of Wilmington.
- Participate in the public hearings of the draft of 5-year Tactical Basin Plan for our region (Basin 12).
- Develop priorities as a lake association to seek support for further enhancements of Lake Raponda's water quality and natural setting.

3) iNaturalist Training Followed By Local Citizen Scientist Identification of Aquatic and Terrestrial Fauna and Flora Within the Lake Raponda Watershed

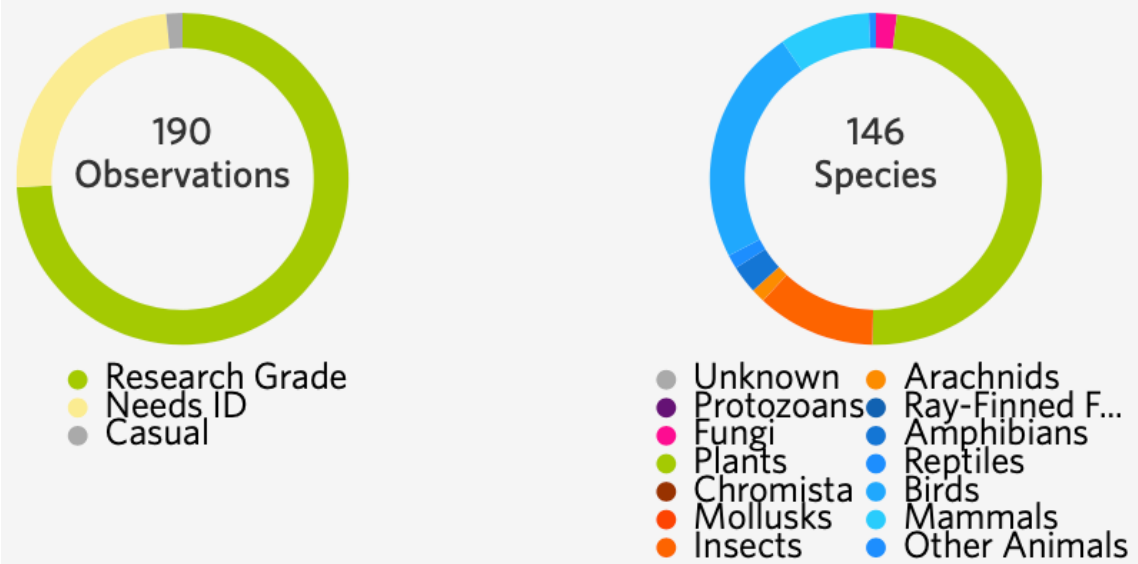
Activity Leaders. Will Melton, Will Melton, President LRA, Alan Baker LRA Webmaster & Jack Widness, LRA member.

Objectives.

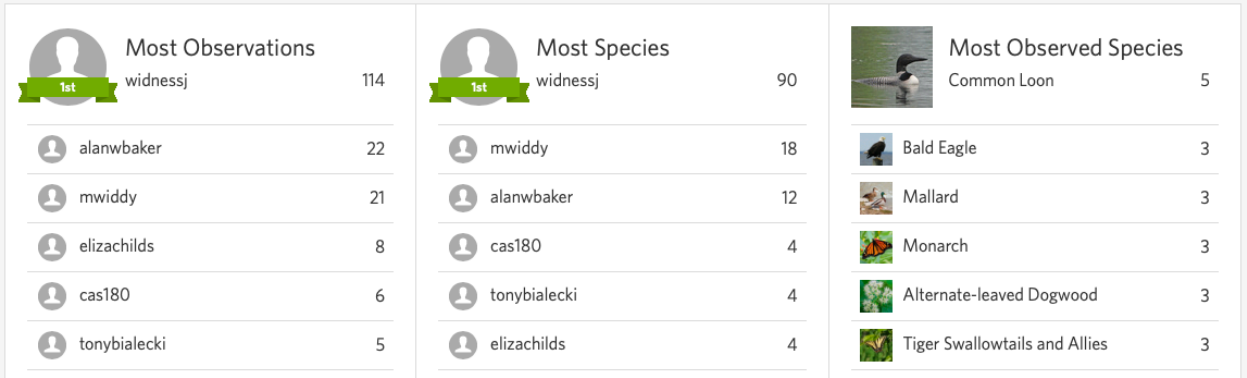
To utilize iNaturalist (one of the world's most popular nature apps for gathering and sharing research quality data to better understand and protect nature) for inventorying Lake Raponda Watershed's fauna and flora. This includes birds, mammals, insects, plants, and fungi that can then contribute to future projects to protect, maintain and improve the LR watershed, e.g., by seeking its designation as one of Vermont's Outstanding Resource Waters

Results.

- On Friday, July 26, 2019 there were 26 local attendees at an iNaturalist workshop at the home of Marti & Gordon Watson. The leader was Abby Winrich, this past summer's VT Eco-Americorp staff member working as Marie Caduto's assistant.
- Established permanent iNaturalist "Lake Raponda Watershed Project" site.
- In learning to use iNaturalist, we discovered how to make direct contact with naturalists who were experts who could help confirm, refine, or reject our LR Watershed so that more of our observations achieved "Research Grade" designation (see top left figure below). These experts include: Nathanial Sharp, Data Technician, Vermont Center for Ecostudies; Charlie Hohn, Wetlands Ecologist, Department of Environmental Conservation; Cherrie Corey, a local naturalist, environmental educator, and photographer; and Charlotte Bill, a semi-retired educator;
- Summary results gathered by 13 observers (of which 9 are LRA members) within the LR Watershed Project iNaturalist site on Dec 20, 2019 are as follows:



- For the LR Watershed Project, the six top observers of the number of species identified and most observed species are all LRA members as follows:



Future Plans.

1. To encourage interested individuals to continue to submit observations to iNaturalist.
2. To continue to offer individualized follow-up training help for those interested (offered by Jack Widness).
3. Through the LRA and other local sources, to promote an iNaturalist workshop at the Southern Vermont Natural History Museum on Sunday, May 3. Activity Leader: Emily Anderson, Citizen Science Outreach Naturalist, Vermont Center for Ecostudies.
4. To encourage and highlight discoveries of invasive aquatic and terrestrial species.
5. To assist in removal of invasives using best practices, and to spread news of the successful results to encourage residents and other lake users to follow.
6. To foster educational sessions to build awareness of desirable wildlife (e.g. loons) and undesirable invasive species, e.g., zebra mussels, purple loosestrife, and Eurasian water milfoil.
7. Follow-up on invitation from Charlie Hohn, Wetlands Ecologist, Vermont DEC, to visit LR next spring to do an in-person assessment of the LR Watershed maps he has constructed of possible LR wetlands with the object of learning what areas and what plant species need protection.

4) WATERSHED AQUATIC INVASIVE SPECIES (AIS) SURVEY AND LAKE PADDLE

Activity Leaders. Laurie Callahan, Southeastern Vermont Aquatic Invasive Species (AIS) Project Coordinator & Jack Widness, LRA member

Description: 3-hour session on August 30, surveying 20% of the lake surface's littoral zone

Objectives.

1. On-the-water volunteer training in the identification of AIS by Group Leader Laurie Callahan
2. Detailed search for AIS by trained volunteers, under direction of Laurie Callahan, of the high-risk area in and around the Vermont State Boat Launch area of Lake Raponda.
3. Laurie's supervision of LRA volunteers in booking observations in iNaturalist of native, non-AIS water plants found and identified.

Participants: 9 LRA members

Outcome: No AIS were found.

Documents completed as part of activity

By Activity Leader.

1. "Vermont Invasive Patroller Survey Data Sheet," a standardized form with Laurie Callahan's results available upon request;
2. "2019 Connecticut River Watershed Aquatic Invasive Plants Survey," a standardized form with Laurie Callahan's results available upon request;
3. Map of Lake Raponda showing lake depths and the area surveyed

By Attendees.

1. Public informational report posted on iNaturalist (by Jack Widness): https://www.inaturalist.org/projects/lake-raponda-watershed-survey/journal

Future Plans.

4. Request submitted to Kim Jensen, Department of Environmental Conservation, Aquatic Invasive Species Management Division Specialist, for the LRA to co-host in Wilmington (with Sadawga Lake Association) a 2020 Vermont Invasive Patrollers (VIPs) workshop training session (https://dec.vermont.gov/watershed/lakes-ponds/aquatic-invasives/monitoring/vips) Result: decision pending.
5. Add additional VIP-certified LRA members (only two are currently certified)

5) STREAM WALKS & CULVERT SURVEY FOR ASSESSING STORM WATER RUNOFF Activity Leaders. Will Melton, President LRA, & Bob Bois, Vice-President LRA, Carol Bois, LRA Past-President and Board member, and Alan Baker, LRA Webmaster.

Objectives.

1. Develop member awareness of location, extent, and condition of the lake's 60 major culverts
2. To identify the most problematic flow points for run-off
3. Encourage the town to extend its program of culvert improvements and to help improve the design used for future construction of culverts to slow run-off, and minimize siltation, as well as reduce traffic problems caused by wet road surfaces.

Results.

1. Marie Caduto from VT ANR trained six volunteers in culvert and stream assessment.

2. 48 culverts on Lake Raponda's east side were surveyed, from the dam to Ware Road, and up Stearns Ave. to its end. At least 20 of these culverts have been updated with concrete facings by the Town of Wilmington in recent years, which are significant improvements. Perhaps 10 more are highly problematic, as detailed in the reports we filed at https://raponda.org/culverts/.

Future Plans.

1. There are secondary culverts on tangential roads that are yet to be reviewed.
2. A dozen more culverts remain to be surveyed on West Lake Road.
3. Resubmittal of an unfunded grant request for state funding to extend stream and culvert work to problematic Stearns Ave. culverts and steam bed.

6. LAKE PADDLE FOR WATERSIDE STUDY OF CULVERTS, DRAINAGE PIPES AND RUN-OFF DELTAS.

Activity Leaders: Bob Bois, LRA vice president and John Meyer, LRA trustee
Objectives: To assess from the Lake's surface the evidence of run-off
Results: Nine volunteers in two teams paddled the peripheral circumference of the lakeshore, examining major water inflow points. This proved to be a valuable educational exercise to raise awareness among LRA members and other volunteers about the Lake's well-being and protection, providing visual evidence of lakeshore erosion and lake-bottom infill. It led to useful conversations about what can be done to mitigate run-off problems that result from property owner practices and shoreline erosion caused by careless boating activity.
Future Plans: A committee of LRA members has been formed to draft boating guidelines to build understanding and cooperation about responsible boating practices with particular attention to reducing boat wake erosion.

7. LAKE WISE PROGRAM ACTIVITIES

Activity Leader: Jack Widness, Watershed Assessment Chair
Objective: Continue Lake Wise Outreach assessments with this program to see if more properties can be approved and to encourage all shoreline landowners to apply established Lakeshore Best Management Practices.
Results.

1. This past summer there were 8 lakeshore properties evaluated (or re-evaluated) with 3 receiving designation as a VT DEC "Lake Wise Awardee." All were performed by Sarah Drew, Amy Picotte's summer assistant.
2. This brings the total Lake Wise assessments to 17 performed by Amy Picotte and her team (since 2016 when the first of these was performed). As of this year, we have a total of 9 Lake Wise Awardees among the 79 (11%) total lakeshore properties on Lake Raponda.

Future Plans.

1. Continue to organize Lake Wise Outreach assessments with Amy Picotte, with an eventual goal of becoming a Gold Lake Wise Award. For this, 15% properties need to have received a VT DEC Lake Wise Award.
2. As suggested by Amy Picotte, we are planning an "Open Shore Party" next summer with 5 shore land owners hosting visitors to tour successful Lake Wise awardee properties to

demonstrate the shore land practices they are using and inspire others to implement similar practices
3. Recruit other lakeside property owners to request evaluations for Lake Wise status.
4. Plans call for two LRA member seminars in 2020 that will inspire Lake Wise candidates to step forward: a) "Loon Behavior" to build enthusiasm for encouraging wildlife habitation in and around the lake; and b) "Lakeside Gardening" to increase awareness of ways to reduce chemical run-off from homes and gardens, and to encourage selection of native plant species for gardens.

8. GREETER PROGRAM.

History: 2019 was the third year of a staffed boat launch, funded by a State of Vermont grant with matching funds from the Town of Wilmington and the Lake Raponda Association
Activity Leaders: Bob Bois, LRA vice president, Bob Brody, LRA trustee
Objectives: To staff LRA's boat launch area for inspecting boats entering the lake. Greeters are trained to be friendly and welcoming educators that alert boaters to the threat of aquatic invasives. Each boat is inspected and, if imported plant material is present, to ask boaters to have their boat and trailer steam cleaned to prevent importing threatening biological material.
Results:
1. The boat launch was staffed during half of prime boating hours.
2. Most boating visitors welcome the training and cooperate with the inspections.

Future Plans:
1. Collaborate with the Town of Wilmington in submitting a 2019 final Lake Raponda Greeter report.
2. Seek funding to expand the program's staffing hours for 2020.

WATERSHED ASSESSMENT ACCOMPLISHMENTS, CONCLUSIONS, AND PRIORITIES:

The grant attracted 31 volunteers during the summer who contributed more than 225 recorded hours of service toward its objectives.

The current underlying mission of LRA is to "preserve and enhance the natural resources and environmental health of Lake Raponda and the surrounding area for the benefit of current and future generations." The LRA's president will present to members the following first draft of conservation priorities and encourage members to adopt these priorities in response to the findings from last summer's watershed assessment grant:

1. **Aquatic invasive plants and animals.** With nearby lakes plagued by Eurasian water milfoil, curly pondweed, and zebra mussels, this represents the lake's most serious threat. **Priority:** Seek continuing grant support for LRA's successful Greeter Program.
2. **Sediment and pollutant run-off from roads in the Lake Raponda watershed**. As a tightly contained watershed, Raponda's water is largely protected from upstream threats, but it is ringed by automobile roads that have been built up with gravel (eight feet over 25 years in some sections) and (by some accounts) treated with road-management chemicals. **Priority:** Building consensus to limit further fill-in of the lake and declining water clarity.
3. **Wetland impacts due to sediment runoff from roads.** There is a demonstrated problem with road runoff into the south side wetlands. As a seepage lake, these are the

primary water source for Lake Raponda and are concentrated on the lake's south end. Road sediment run-off lessens the protective values of our wetlands as water filters for Raponda. P**riority**: More aggressive wetland identification, impact analysis and mitigation.

4. **Non-native terrestrials.** The potential proliferation of land-based invasives that are moving ever closer to, but are not yet in, the Lake Raponda watershed (e.g., Japanese knotweed) is a growing threat to the lake's water/land transition zones. **Priority:** To encourage awareness and offer training in identification and removal techniques.
5. **New boating technologies**. The introduction of wake boats into shallow lakes like Lake Raponda (with an average depth of 12 feet) increases the impact of wave-shore erosion and the use of multiple large floats at high speeds is creating wave action not anticipated when powerboating was first introduced to Raponda. **Priority:** Develop and promote local, voluntary boating guidelines.
6. **Mercury levels.** According to our region's Tactical basin plan (TBP), mercury readings in Lake Raponda are elevated, but the likely sources are not suggested. This is more than a human threat, it puts all wildlife dependent on the Lake at risk. LRA would welcome a comparison to earlier data sets, if available. Is the problem stable or growing? **Priority:** No mitigation options are available.
7. **Lake water acidity.** The TBP also cites Raponda as demonstrating elevated acid in its pH readings. Although the lake has benefited from more than 25 years of e-coli testing, thanks to the unflagging efforts of long-time LRA officer and member Cindy Meyer. However, this data point was not part of her writ. Like the mercury issue, LRA would welcome VT ANR sharing any comparative data it has assembled over the years. Is the problem stable or growing? **Priority:** No mitigation options are available.
8. **Fish stocking practices.** Lake Raponda depth typically averages 12 feet. Loading a shallow, warm water lake with cold water fish (e.g., rainbow trout) as is currently managed means that in July's hot weather there is too little oxygen and floating dead fish proliferate about the lake. **Priority:** Alter species selection or size of stocking formula.