

EcoLogic Memorandum

TO: Chautauqua Lake and Watershed Management Alliance
FROM: Liz Moran and Michelle McGinnis, EcoLogic LLC
Mike Werth and Jim Rhea, Anchor QEA
RE: Multi-Criteria Analysis Tool- Review and Update
DATE: September 23, 2020

Overview

In May 2020, the Chautauqua Lake and Watershed Management Alliance (Alliance) Board of Directors reengaged EcoLogic and Anchor QEA (the Eco/AQ team) to review and update the Alliance's Multi-Criteria Analysis (MCA) Tool. This tool has been applied since its completion in May 2018 to review and score proposals for lake and watershed improvement measures. The Alliance requested review of the 2018 MCA tool in light of advances in Chautauqua Lake and watershed issues. Among these developments are the New York State Department of Environmental Conservation's (NYSDEC) Harmful Algal Bloom (HAB) Action Plan for Chautauqua Lake (2018), the Memorandum of Agreement among Chautauqua County and other stakeholders regarding aquatic herbicides and other lake management techniques (2019), the County's White Paper on Macrophyte Management (Ecology and Environment, Inc. 2019), advanced monitoring of lake hydrodynamics and phosphorus profiles, recent macrophyte surveys completed by multiple parties, and regulatory approval for application of a new aquatic herbicide (ProcellaCOR). The Alliance staff shared relevant documents prepared by county, municipal, or state agencies, and academic institutions with the Eco/AQ project team.

We approached this assignment as a series of tasks, described below.

1. Review the existing MCA tool and its guiding assumptions with Alliance leadership and staff. Examine scoring data from prior applications of the MCA tool.
2. Review recent data and information on Chautauqua Lake water quality and habitat conditions, and effectiveness of management interventions.
3. Work with the Alliance staff to prepare a stakeholder questionnaire for current members of the Alliance and local funding agencies.
4. Analyze responses to the questionnaire and consider the extent to which modified criteria and/or weighting factors are needed to capture new information and/or changes in community perception of values or risk tolerance.
5. Host remote consultations to explore issues with stakeholders. Stakeholders were divided into three groups: northern basin municipalities and organizations; southern basin municipalities and organizations; County agencies and funding partners.
6. Draft recommendations for modifications to the MCA tool, review with Alliance Board and staff, and modify as appropriate to respond to comments.
7. Host a final consultation open to the Alliance Board and staff and stakeholders from all groups to review draft revisions. Modify as appropriate to respond to comments.

8. Present final recommendations to the Alliance Board at their September 10, 2020 meeting. Once proposed modifications are accepted by the Board, re-code the MCA tool and prepare an instruction sheet to reflect new information and stakeholder input.

Findings

The questionnaires did not reveal a consensus opinion on the need to revise criteria and weighting factors in the MCA tool, with three exceptions. Criteria related to invasive species management and disclosure of costs were recommended to be assigned a higher weighting factor. In contrast, the criterion related to hydrologic resilience was recommended for a lower weighting factor. The questionnaire and responses are included as [Appendix A](#) to this memorandum.

Once the questionnaires were submitted and reviewed, the project team hosted three remote consultations using the videoconferencing platform Zoom. Each consultation opened with a description of the Eco/AQ team's assignment and approach, followed by PowerPoint slides displaying graphs of the questionnaire results. An open discussion, facilitated by the project team, followed to provide opportunities for participants to share their perspectives on the MCA tool and the status of various programs to manage Chautauqua Lake and its watershed.

Several themes emerged from the open discussions. Like our team's findings in 2018, stakeholders are concerned with human health impacts. The recurring cyanobacterial blooms and associated lake use advisories have reinforced this issue as a top priority. Also, the questionnaire responses and comments during the consultations acknowledged the importance of the fishery as an indicator of ecosystem health as well as an important regional economic driver. Respondents agreed with the need to manage Chautauqua Lake for its multiple uses and were generally supportive of the Macrophyte Management Strategy's approach to protecting critical fish and wildlife habitat while optimizing the lake for its human uses. New research initiatives and partnerships have engendered optimism that the resulting data and information will help guide effective lake and watershed management decisions.

The optimism we heard related to potential benefits from the current influx of research initiatives and partnerships was, however, tempered by a shared concern that the lake may be approaching a 'tipping point'. Transition from a macrophyte dominant system to an algal/cyanobacterial dominant system would represent a major threat to the lake ecosystem. While respondents differed in their preferred approaches to in-lake management and their perception of relative benefit of long-term (watershed) solutions, there was recognition of the negative consequences on health of the ecosystem, the public, and the regional economy that could ensue from degradation of the native plant and animal community.

Areas of disagreement among stakeholder groups remain. As described in the April 2018 report "5-Year Implementation Strategy for the Management of Chautauqua Lake and its Watershed",

there are competing local narratives related to the relative risks and effectiveness of in-lake macrophyte management approaches (i.e., herbicides and mechanical harvesting). Participants expressed frustration with continued rifts among stakeholders and the emergence of those referred to as “self-professed experts”. At the same time, most participants expressed their appreciation of the important role the Alliance plays in coordinating management efforts for the benefit of the lake’s multiple uses and users. The Macrophyte Management Strategy continues to be recognized as a foundational document guiding decisions related to macrophyte management. The central role of NYSDEC (Region 9) in permitting application of aquatic herbicides was acknowledged, as was the challenge for review teams with different technical backgrounds to assess ‘scientific consensus’ of risk of harm to human health and the environment.

Despite the lack of alignment between advocates for herbicides vs. mechanical harvesting, there is common recognition that the lake requires maintenance. Substantial investments have been made over decades in equipment, staffing, and training to perform mechanical harvesting and shoreline clean-up measures. More recently, substantial investments have also been directed toward planning, SEQR compliance and permitting, consultant procurement, and monitoring related to herbicide applications. Most proposals submitted to the Alliance since 2018 have been requests for funding to support lake maintenance activities. Stakeholders expressed a strong preference for a simpler process to prepare and score maintenance proposals.

Revisions to the MCA Tool

The Eco/AQ team modified the existing MCA tool to address the information gleaned from our reviews of documents, discussions with Alliance Board and staff, and the stakeholder questionnaires and consultations. These changes were made to reflect that lake maintenance is an ongoing commitment and to simplify the process of evaluating proposals that support ongoing maintenance activities. Other changes were made to acknowledge the central role of the regulatory agencies and make the review process for potential adverse human health and ecosystem impacts less subjective. Weighting factors for invasive species and cost disclosure were increased.

Major changes include:

- Create ‘Lake Maintenance’ as a third project category. Lake maintenance projects include herbicide treatment, mechanical harvesting, and shoreline cleanup activities.
- Define a focused set of criteria for scoring lake maintenance projects.
- Eliminate the category weighting factor (environmental, social, economic) for lake maintenance criteria, but retain the criteria weights, which sum to 100.
- Reference “regulatory documents and/or scientific literature” as sources for evaluating human and ecosystem health impacts for in-lake and lake maintenance projects.

Minor changes include:

- All projects: list relevant reference documents, cite “most recent version”
- Watershed projects: delete criterion related to streamflow return interval for stream projects (e.g., designed for a 50-year storm). Replace with more general language to increase scoring for projects designed to help mitigate impacts of climate change
- Increased weighting factor for management of invasive species
- Increased weighting factor for cost disclosure
- Inclusion of “nutrient inactivation” in the in-lake project criteria
- Clarified wording on project length for in-lake projects (under “Enhancement of Recreational Uses”)

The revised tool is summarized in Table 1 (watershed projects), Table 2 (in-lake projects), and Table 3 (maintenance projects).

Table 1. Watershed Project Criteria

| Category | Category Weight (%) | Criteria | Criteria Weight | Scoring Values |
|------------------|---------------------|---|-----------------|--|
| Watershed | | | | |
| Environmental | 50 | Reduction in external nutrient loading | 50 | <p>0: No impact on nutrient loading</p> <p>3: Plan addresses a source estimated to contribute <10% of total nonpoint phosphorus load per TMDL (septic, streambanks)</p> <p>6: Plan addresses a source estimated to contribute 10-25% of total nonpoint phosphorus load per TMDL (stormwater, forest practices)</p> <p>9: Plan addresses a source estimated to contribute >25% of total nonpoint phosphorus load per TMDL (agriculture)</p> |
| | | Consistency with existing plans and strategies, and/or consideration of emerging solutions ¹ | 40 | <p>0: Proposed action is not a specific recommendation in existing plans or strategies and is not consistent with the objectives of those plans</p> <p>3: Proposed action is not specifically recommended in existing plans or strategies but is consistent with objectives of those plans</p> <p>6: Proposed action is recommended as approvable for specific application in an existing plan or strategy, and/or has been demonstrated to hold promise as a newly emerging technology previously unidentified in guidance documents</p> <p>9: Proposed action is recommended as approvable for specific application in an existing plan or strategy, and/or has been demonstrated to hold promise as a newly emerging technology previously unidentified in guidance documents, and also includes a specific component that addresses climate resilience</p> |
| | | Plan to measure and report effectiveness | 40 | <p>0: No commitment to monitoring or communicating results of proposed action</p> <p>3: Monitoring by project applicant only</p> <p>6: Monitoring plan includes professionals not associated with project applicant (external)</p> <p>9: Commitment to external monitoring and assessment, and communication of findings</p> |
| | | Reduction in sediment loading | 30 | <p>0: No impact on sediment load</p> <p>3: Plan or BMP has an anticipated sediment reduction efficiency of <20%</p> <p>6: Plan or BMP has an anticipated sediment reduction efficiency of 20-40%</p> <p>9: Plan or BMP has an anticipated sediment reduction efficiency of >40%</p> |

| Category | Category Weight (%) | Criteria | Criteria Weight | Scoring Values |
|----------|---------------------|--|-----------------|--|
| Social | 30 | Commitment to stakeholder collaboration | 30 | 0: Only one organization involved 3: Multiple organizations involved; specific roles undefined 6: Multiple collaborators, with project role and inputs defined for each 9: Multiple collaborators, with expected project outputs (e.g., outreach products, data/information, nutrient reduction actions) defined for each |
| | | Outreach and education | 30 | 0: No outreach/education component 3: Targeted to existing organization's subscribed audiences 6: Conveys emerging knowledge regarding lake health to critical or broad audience 9: Promotes behavioral change to critical or new audiences |
| Economic | 20 | Potential for leveraging available funding | 20 | 0: None 3: Eligible for funds to match local contribution (up to 50%) 6: Eligible for funds to match local contribution (50% - 75%) 9: Eligible for funds to match local contribution (>75%) |
| | | Disclosure of costs | 20 | 0: Project costs and assumptions are not clearly defined 3: There are substantial gaps in cost estimates and assumptions 6: Most costs and assumptions are defined 9: Costs and assumptions are fully defined |
| | | Magnitude of costs | 10 | 0: Project costs not clearly defined 3: Approximate cost greater than \$1,000,000 6: Approximate cost between \$100,000 and \$1,000,000 9: Approximate cost less than \$100,000 |
| | | Spatial scale of project | 10 | 0: Unknown 3: Small (e.g., localized, e.g., individual landowners; <1,000 ft of stream segment) 6: Medium (scale between localized and subwatershed scale) 9: Large (e.g., subwatershed scale; >1 mile of stream segment) |

Note:

1. Plans include most recent versions of the Watershed Management Plan (Chautauqua County Planning 2010), Chautauqua Lake Local Waterfront Revitalization Plan (LWRP) (NYSDEC 2011), Macrophyte Management Strategy (Chautauqua County Planning 2017), NYS Invasive Species Comprehensive Management Plan (NYSDEC 2018), HABs Action Plan (NYSDEC 2018), Memorandum of Agreement (Chautauqua County et al. 2019), White Paper on Macrophyte Management (Ecology and Environment, Inc. 2019), Total Maximum Daily Load (TMDL) for Phosphorus in Chautauqua Lake (NYSDEC 2012), and other relevant documents prepared by county, municipal or state agencies, or academic institutions.

Table 2. In-Lake Project Criteria

| Category | Category Weight (%) | Criteria | Criteria Weight | Scoring Values |
|----------------|---------------------|---|-----------------|--|
| In-Lake | | | | |
| Environmental | 50 | Protective of human health | 50 | <p>0: Project includes component(s) precluded for use in NYS waters based on potential impacts to human health</p> <p>3: Project includes component(s) not previously applied at field scale in NYS – analysis of human health impacts not reported in scientific literature and/or regulatory documents</p> <p>6: Project may have been applied at field scale in NYS but may require extensive technical review (e.g., new SEIS) in advance of regulatory approval</p> <p>9: Project components previously approved and/or implemented in CL, with scientific evidence indicating minimal risk to human health</p> |
| | | Protective of ecosystem health | 50 | <p>0: Project includes component(s) that may potentially cause significant harm to native CL plant and animal species based on scientific literature and/or regulatory documents</p> <p>3: Project includes component(s) that may potentially cause significant harm to native CL plant and animal species; adverse impacts can be demonstrably mitigated through proper implementation</p> <p>6: No project component is anticipated to pose a significant risk to native CL plant and animal species based on scientific literature and/or regulatory documents, but management alternative has not been previously applied to CL</p> <p>9: Project components previously approved and/or implemented in CL, with scientific evidence indicating minimal risk of adverse impacts on native CL plant and animal species</p> |
| | | Reduction/inactivation of nutrients from lake ecosystem | 50 | <p>0: Does not remove/inactivate phosphorus from lake ecosystem</p> <p>3: Removes/inactivates phosphorus on localized scale (e.g., tributary mouth, embayment)</p> <p>6: Removes/inactivates P on a relatively larger (e.g., basin-wide) scale</p> <p>9: Removes/inactivates P on a relatively larger (e.g., basin-wide) scale, longevity more than 5 years</p> |

| Category | Category Weight (%) | Criteria | Criteria Weight | Scoring Values |
|----------|---------------------|---|-----------------|--|
| | | Plan to measure and report effectiveness | 40 | 0: No commitment to monitoring or communicating results of proposed action 3: Monitoring by project applicant only 6: Monitoring plan includes professionals not associated with project applicant (external) 9: Commitment to external monitoring and assessment, and communication of findings |
| | | Consistency with existing plans and strategies, and/or consideration of emerging solutions ¹ | 40 | 0: Proposed action is not recommended and is inconsistent with existing plans or strategies for managing the lake, including invasive species and cyanobacterial blooms 3: Proposed action is not recommended in plans or strategies, but is consistent with their objectives 6: Proposed action is recommended in an existing plan or strategy and/or has been demonstrated to hold promise as a newly emerging technology previously unidentified in guidance documents 9: Proposed action is recommended as approvable for specific application in an existing plan or strategy, and/or has been demonstrated to hold promise as a newly emerging technology previously unidentified in guidance documents; includes component(s) designed to meet environmental sustainability goals (e.g., reduced greenhouse gas emissions) |
| | | Management of invasive species (as defined in applicable NYSDEC/PRISM regulations/guidelines) | 40 | 0: No impact on invasive species 3: Targets established invasive species (e.g., Eurasian watermilfoil, Curly-leaf pondweed) 6: Targets new invasive species (e.g., Hydrilla, water chestnut) 9: Early detection of new invasive species |
| Social | 30 | Enhancement of recreational uses | 30 | 0: No impact 3: Affects <1mile of shoreline, >50% in front of privately owned land 6: Affects <1 mile of shoreline, >50% in front of publicly owned land 9: Affects >1 mile of shoreline |
| | | Commitment to stakeholder collaboration | 30 | 0: Only one organization involved 3: Multiple organizations involved; specific roles undefined 6: Multiple collaborators, with project role and inputs (e.g., staff time, equipment/materials) defined for each 9: Multiple collaborators, with expected project outputs (e.g., outreach products, data/information, nutrient reduction actions) defined for each |

| Category | Category Weight (%) | Criteria | Criteria Weight | Scoring Values |
|----------|---------------------|--|-----------------|--|
| | | Outreach and education | 20 | 0: No outreach/education component 3: Targeted to existing organization's subscribed audiences 6: Conveys emerging knowledge regarding lake health to critical or broad audience 9: Promotes behavioral change to critical or new audiences |
| Economic | 20 | Potential for leveraging available funding | 20 | 0: None 3: Eligible for outside funds (up to 50%) to match local contribution 6: Eligible for outside funds (50-75%) to match local contribution 9: Eligible for funds (<75%) to match local contribution |
| | | Disclosure of costs | 20 | 0: Project costs and assumptions are not clearly defined 3: There are substantial gaps in cost estimates and assumptions 6: Most costs and assumptions are defined 9: Costs and assumptions are fully defined |
| | | Magnitude of costs | 10 | 0: Project costs not clearly defined 3: Approximate cost greater than \$1,000,000 6: Approximate cost between \$100,000 and \$1,000,000 9: Approximate cost less than \$100,000 |
| | | Spatial scale of project | 10 | 0: Unknown 3: Small (e.g., localized embayment or smaller [<1% of lake surface area]) 6: Medium (1% - 10% of lake surface area) 9: Large (>10% of lake surface area) |

Note:

1. Plans include most recent versions of the Watershed Management Plan (Chautauqua County Planning 2010), Chautauqua Lake Local Waterfront Revitalization Plan (LWRP) (NYSDOS 2011), Macrophyte Management Strategy (Chautauqua County Planning 2017), NYS Invasive Species Comprehensive Management Plan (NYSDEC 2018), HABs Action Plan (NYSDEC 2018), Memorandum of Agreement (Chautauqua County et al. 2019), White Paper on Macrophyte Management (Ecology and Environment, Inc. 2019), Total Maximum Daily Load (TMDL) for Phosphorus in Chautauqua Lake (NYSDEC 2012), and other relevant documents prepared by county, municipal or state agencies, or academic institutions.

Table 3. In-Lake Maintenance Criteria (Harvesting, shoreline cleanup, herbicides)

| Criteria | Criteria Weight | Scoring Values |
|---|-----------------|---|
| Protective of human health | 30 | <p>0: Project includes component(s) precluded for use in NYS waters based on potential impacts to human health</p> <p>3: Project includes component(s) not previously applied at field scale in NYS – analysis of human health impacts not reported in scientific literature and/or regulatory documents</p> <p>6: Project may have been applied at field scale in NYS but may require extensive technical review (e.g., new SEIS) in advance of regulatory approval</p> <p>9: Project components previously approved and/or implemented in CL, with scientific evidence indicating minimal risk to human health</p> |
| Protective of ecosystem health | 25 | <p>0: Project includes component(s) that may potentially pose significant long-term harm to native CL plant and animal species based on scientific literature and/or regulatory documents</p> <p>3: Project includes component(s) documented to pose no significant risk of long-term harm, but may potentially cause significant short-term harm to native CL plant and animal species; adverse impacts can be demonstrably mitigated through proper implementation</p> <p>6: No project component is anticipated to pose a significant risk to native CL plant and animal species based on scientific literature and/or regulatory documents, but management alternative has not been previously applied to CL</p> <p>9: Project components previously approved and/or implemented in CL, with scientific evidence indicating minimal risk of adverse impacts on native CL plant and animal species</p> |
| Enhancement of recreational uses | 25 | <p>0: No impact</p> <p>3: Affects <1mile of shoreline, >50% in front of privately owned land</p> <p>6: Affects <1 mile of shoreline, >50% in front of publicly owned land</p> <p>9: Affects >1 mile of shoreline</p> |
| Consistency with existing plans and strategies, and/or consideration of emerging solutions ¹ | 10 | <p>0: Proposed action is not recommended and is inconsistent with existing plans or strategies for managing the lake’s littoral zone and shoreline, including invasive species and cyanobacterial blooms</p> <p>3: Proposed action is not recommended in plans or strategies, but is consistent with their objectives</p> <p>6: Proposed action is recommended in an existing plan or strategy and/or has been demonstrated to hold promise as a newly emerging technology previously unidentified in guidance documents</p> <p>9: Proposed action is recommended as approvable for specific application in an existing plan or strategy, and/or has been demonstrated to hold promise as a newly emerging technology previously unidentified in guidance documents, includes component(s) designed to meet environmental sustainability goals (e.g., renewable energy)</p> |

| Criteria | Criteria Weight | Scoring Values |
|--|-----------------|---|
| Disclosure of costs and effectiveness | 5 | 0: Project costs, assumptions, and projected effectiveness (longevity) are not clearly defined 3: There are substantial gaps in cost estimates, assumptions, and projections of effectiveness 6: Most costs, assumptions, and projections of effectiveness are defined 9: Costs, assumptions, and projections of effectiveness are fully defined |
| Opportunity to leverage existing investments | 5 | 0: No impact 3: Activity or equipment will improve efficiency of applicant's lake maintenance activities 6: Commitment to shared services with another entity to improve joint efficiency 9: Commitment to shared services with more than one entity to improve joint efficiency |

Note:

1. Plans include most recent versions of the Watershed Management Plan (Chautauqua County Planning 2010), Chautauqua Lake Local Waterfront Revitalization Plan (LWRP) (NYSDOS 2011), Macrophyte Management Strategy (Chautauqua County Planning 2017), NYS Invasive Species Comprehensive Management Plan (NYSDEC 2018), HABs Action Plan (NYSDEC 2018), Memorandum of Agreement (Chautauqua County et al. 2019), White Paper on Macrophyte Management (Ecology and Environment, Inc. 2019), Total Maximum Daily Load (TMDL) for Phosphorus in Chautauqua Lake (NYSDEC 2012), and other relevant documents prepared by county, municipal or state agencies, or academic institutions.

Appendix A

Questionnaire Responses

1 Questionnaire

The following is a copy of the Chautauqua Lake & Watershed Management Alliance Questionnaire for Stakeholders. The questionnaire was distributed to twenty-nine stakeholder groups who were asked to discuss the content internally and submit one response per group. The Alliance received fifteen questionnaire responses.

Chautauqua Lake & Watershed Management Alliance

Questionnaire for Stakeholders: Alliance MCA Tool Update Project

Background

The Chautauqua Lake & Watershed Management Alliance has re-engaged EcoLogic and Anchor QEA to review and update (as appropriate) the **Multi-criteria Analysis (MCA) tool**, a central element of the *Five-Year Implementation Strategy for the Management of Chautauqua Lake and its Watershed*. The team of scientists and engineers completed the MCA tool in 2018 to support local decision makers in their efforts to allocate funds among multiple proposed initiatives for restoring and protecting the lake. The MCA tool incorporated the most recent science of lake and watershed management and focused on key pollutants and sources affecting Chautauqua Lake. In addition, the MCA tool included the human dimension by weighting proposed actions with respect to their alignment with community's values and priorities.

Chautauqua Lake and watershed continue to change. Since developing the Strategy and MCA tool, additional data, information, and perspectives have emerged. Key developments include the NYSDEC HABs Action Plan, a Memorandum of Agreement with Chautauqua County and several shoreline communities governing herbicide treatments and other lake management actions, herbicide applications in 2018, 2019, and 2020, post-treatment monitoring, and annual macrophyte surveys and reports by Racine-Johnson Aquatic Ecologists. Research efforts, including installation of water quality sensors under a cooperative project with the Chautauqua Lake Partnership and Bowling Green State University, continue. The Chautauqua Lake Association and shoreline municipalities have increased their efforts to remove nuisance vegetation from the lake. Additional lands have been brought under protection of the Chautauqua Watershed Conservancy. Focused programs of community outreach have engaged homeowners to take action to reduce nonpoint source pollution from residential properties. Invasive species management programs focus on prevention, early detection, and rapid response. New partners from the university, industrial, and government sectors are joining the efforts to understand and manage the lake.

Findings of these recent initiatives have the potential to affect the criteria and weighting factors that underlie the MCA tool. The MCA tool was developed with the expectation of adaptive management; the criteria and weighting factors are transparent and subject to review and modification to reflect new information and evolving community priorities. Due to the dynamic nature of the lake and watershed, coupled with changes in funding opportunities, emerging technologies, and shifts in regulatory acceptance of remedial measures, priority projects will change over time. Knowledge gained from monitoring can also provide insights to define priorities. Finally, both individual landowners and municipal leaders may become more willing to participate with programs as outreach efforts expand. This 2020 effort asks the Chautauqua community to consider their priorities and the ecosystem services they value as part of the MCA tool update.

The Alliance is distributing this questionnaire on behalf of EcoLogic and Anchor QEA to check in with stakeholders regarding their thoughts on the criteria and weighting factors incorporated in the MCA tool. Please complete this questionnaire on behalf of your organization (one consensus response per organization). Our team will review the responses and schedule a representative of your group into one of several remote consultations using the Zoom videoconferencing platform. **We request that you confer with your peers and return this questionnaire to Randall Perry PerryR@co.chautauqua.ny.us within two weeks (no later than August 5, 2020).** The Zoom consultations will be scheduled during the week of August 10th.

Key Questions

1. Questionnaire represents the views of _____

If appropriate, expand on the stakeholders represented in this response (e.g., shoreline property owners, business owners, researchers, municipalities, advisory boards)

2. Use of Existing Plans and Strategies

| Chautauqua Lake Documents | Are you familiar with it? | What aspects do you find helpful? | Does your organization play a role in implementing recommendations? If so, how? |
|---|----------------------------------|--|--|
| <i>Watershed Management Plan</i> | Y/N | | |
| <i>Macrophyte Management Strategy</i> | Y/N | | |
| <i>Phosphorus TMDL Implementation Plan</i> | Y/N | | |
| <i>HABs Action Plan (NYSDEC 2018)</i> | Y/N | | |
| <i>Five-year Implementation Strategy for managing Chautauqua Lake</i> | Y/N | | |
| <i>Chautauqua County Memorandum of Agreement</i> | Y/N | | |
| <i>SOLitude Lake Management reports</i> | Y/N | | |
| <i>Princeton Hydro reports</i> | Y/N | | |
| <i>Racine-Johnson Aquatic Ecologists reports</i> | Y/N | | |
| <i>Other research or monitoring reports (please specify)</i> | Y/N | | |

3. Update to MCA Tool Criteria and Weighting Factors

Tables 1 and 2 summarize the criteria and weighting factors used in the 2018 MCA Tool.

http://www.chautauquaalliance.org/wpcontent/uploads/2018/07/ChautauquaLake5YearStrategy_Final_20180509.pdf Please review and indicate if you would alter the current weight (higher↑, lower↓, or the same ↔).

There is also an opportunity to expand on the criteria and rankings in Part 3a. Additional explanation of how the rankings are applied is found below the tables.

Table 1
Summary of Criteria and Weighting Factors for Watershed Projects

| Category | Category Weight (%) | Criteria | Individual Criteria Weight | Comments? (↑↓↔) |
|---------------|---------------------|--|----------------------------|-----------------|
| Environmental | 50 | Reduction in nutrient loading | 50 | |
| | | Plan to measure and report effectiveness | 40 | |
| | | Consistency with existing plans and strategies, and/or consideration of emerging solutions | 40 | |
| | | Reduction in sediment loading | 30 | |
| | | Hydrologic resilience | 20 | |
| Social | 30 | Commitment to stakeholder collaboration | 30 | |
| | | Outreach and education | 30 | |
| Economic | 20 | Potential for leveraging available non-local funding | 20 | |
| | | Disclosure of costs (up front and future maintenance) | 10 | |
| | | Magnitude of up-front project costs | 10 | |
| | | Spatial scale of project | 10 | |

Table 2
Summary of Criteria and Weighting Factors for In-lake Projects

| Category | Category Weight (%) | Criteria | Individual Criteria Weight | Comments? (↑↓↔) |
|---------------|---------------------|--|----------------------------|-----------------|
| Environmental | 50 | Protective of human health | 50 | |
| | | Reduction of nutrients from lake ecosystem | 50 | |
| | | Plan to measure and report effectiveness | 40 | |
| | | Consistency with existing plans and strategies, and/or consideration of emerging solutions | 40 | |
| | | Protective of ecosystem health | 40 | |
| | | Longevity of effectiveness | 40 | |
| | | Management of invasive species | 30 | |
| Social | 30 | Enhancement of recreational uses | 30 | |
| | | Commitment to stakeholder collaboration | 30 | |
| | | Outreach and education | 20 | |
| Economic | 20 | Potential for leveraging available non-local funding | 20 | |
| | | Disclosure of costs (up front and future maintenance) | 10 | |
| | | Magnitude of up-front project costs | 10 | |
| | | Spatial scale of project | 10 | |

MCA Tool Primer: *Each of the three criteria categories applied in the Tool was assigned a weight by allocating a percentage that reflects the importance of each category (i.e., the highest weight is assigned to the most important category), and such that the sum of the three categories is 100%. The environmental category was assigned a weight of 50%, followed by social (30%), and economic (20%). The individual criteria within each category were then assigned a weight, which can range from zero to a maximum value equal to the weight assigned to that category. The specific values and the range of numbers used do not matter; all that matters is the relationship between the various numbers. The individual criteria weights (i.e., the values in the fourth column of Tables 1 and 2 before the comment column) are the only weights used to calculate scores in the MCA. The fourth column indicates how the various criteria are weighted relative to one another.*

3 a. Please comment on the criteria and rankings summarized in Tables 1 and 2. What (if anything) would you add, delete, or change to update the MCA tool to 2020 conditions?

3 b. Please share your group’s rankings of the following criteria. Additional rows are included to provide an opportunity to expand on the list.

| Potential Criteria for Ranking | Not important | Slightly important | Moderately important | Very important | Extremely important |
|--|---------------|--------------------|----------------------|----------------|---------------------|
| Longevity of effectiveness (short-term vs. long-term) | | | | | |
| Scientific consensus of risk to human health | | | | | |
| Scientific consensus of risk to ecosystem health | | | | | |
| Cost-to-benefit ratio | | | | | |
| Scale of the projected improvement (lake-wide vs. localized) | | | | | |
| Regulatory acceptance/feasibility of permitting | | | | | |
| Impact on fish community | | | | | |
| Impact on cyanobacterial and/or Harmful Algal Blooms (HABs) | | | | | |
| Impact on recreational access | | | | | |
| Impact on sediment loading | | | | | |
| Impact on navigational access | | | | | |
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4. Stakeholder Concerns: How important are these issues to your organization?

| Issue | Not important | Slightly important | Moderately important | Very important | Extremely important | Do not know |
|---|---------------|--------------------|----------------------|----------------|---------------------|-------------|
| Lake aesthetics (color, odor, vegetation mats, etc.) | | | | | | |
| Boating safety and access | | | | | | |
| Swimming safety and access | | | | | | |
| Tourism | | | | | | |
| Lake shore property values | | | | | | |
| Ecosystem health | | | | | | |
| Fish community health | | | | | | |
| Rare/threatened/ endangered species | | | | | | |
| Human health | | | | | | |
| Preparing for a changing climate | | | | | | |
| Agricultural viability | | | | | | |
| Community engagement in lake management issues | | | | | | |
| Invasive species management | | | | | | |
| Sustainability of lake management actions | | | | | | |
| Protection of critical watershed areas | | | | | | |
| Investment in effective wastewater collection & treatment systems | | | | | | |
| Feasibility of project implementation in short-term | | | | | | |
| Please list and rank any other lake and watershed management issues that are of concern to your organization | | | | | | |
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5. Contact Information

The project team will be scheduling remote meetings to discuss your comments and ideas. Please indicate a contact person for your organization.

Name: _____

Email: _____

Thank you for participating!

2 Questionnaire Responses

The questionnaire was distributed to twenty-nine organizations; fifteen responded as listed below.

- Chautauqua Institution
- Chautauqua Lake Association
- Chautauqua Lake Partnership
- Chautauqua Watershed Conservancy
- NYSOPRHP - Allegany Region
- Roger Tory Peterson Institute of Natural History
- South & Center Chautauqua Lake Sewer Districts (SCCLSD)
- Village of Bemus Point
- Town of Busti
- Town of Chautauqua
- Town of Ellery
- Town of Ellicott
- Town of North Harmony
- Village of Lakewood
- Village of Mayville

2.1 Use of Existing Plans and Strategies

In Section 2 of the questionnaire, participants were asked to comment on their knowledge and use of existing plans and strategies relevant to Chautauqua Lake management. Responses are summarized in Table 3.

Table 3
Use of Existing Plans and Strategies Responses

| Chautauqua Lake Documents | What aspects do you find helpful? |
|---------------------------|---|
| Watershed Management Plan | <ul style="list-style-type: none"> • Collaboration and project implementation to get things done • CWC involvement • Good general guide • Too many opinions • Stormwater study to reduce sediment loading • 35 strategies and 8 organizations, very challenging to implement • Prioritization of permanents cons of forest & wetlands; BMPs • Comprehensive, top-level watershed goals and high degree of community involvement in developing these goals |

| Chautauqua Lake Documents | What aspects do you find helpful? |
|-------------------------------------|---|
| Macrophyte Management Strategy | <ul style="list-style-type: none"> • Comprehensive, thoughtful, scientific recommendations and collaborative effort • MMS zones • Notes sensitive lake factors • Need more DEC cooperation • Establishes the zone where herbicides can be applied • Lack of implementation plans, and detail related to the SEIS for herbicide application • Guidance on different tool use; maps of environmentally sensitive areas • Most comprehensive vegetation management plan |
| Phosphorus TMDL Implementation Plan | <ul style="list-style-type: none"> • Targets • Good guidelines • The need to reduce phosphorus loading • Useful for historical information related to external reduction of phosphorus loading within the lake. Since it only briefly mentions internal loading, which is the biggest contributor, some of the assumptions used are erroneous. In addition, both the GWLF and Bathtub modelling were over simplified. It ignored internal lake loading despite the results for internal lake loading being 55.1% of the south basin and 25.1% of the north basin total phosphorus. It assumed that reducing external loading would reduce internal loading. This poor assumption has led to a focus on implementing a strategy to reduce phosphorus loading in the lake by only executing projects which have less impact than including the major source (internal loading) as part of the plan. • Strategies and additional measures: public education, pollution prevention; natural area preservation, etc. • Detailed review of CHQ Lake Phosphorus – impairment and recommended management strategies |
| HABs Action Plan (NYSDEC 2018) | <ul style="list-style-type: none"> • Data/information and funding promises, spotlight on problem • Publicizes the problem • Chapter 11: lake management/water quality goals • Educating us about the emerging cyanobacterial blooms • Useful information included in the Action Plan related to external phosphorus loading. It used a lot of data from the 2012 phosphorus TMDL. It did include some additional information related to clarity and other measurements as well as details on past HABs in the lake by year. Actions focused on Education/outreach, Sewer and Septic Systems, purchasing additional CLA equipment, Roadside ditch programs, Agriculture, Riparian buffers and more sampling/studies. Nothing focused on internal lake loading as the data used to develop the action plan was the same as the Phosphorus TMDL. • A much needed re-assessment of the challenges posed by increasing harmful algal blooms in light of recent research not yet represented in other CHQ lake plans |

| Chautauqua Lake Documents | What aspects do you find helpful? |
|---|--|
| <p>Five-year Implementation Strategy for managing Chautauqua Lake</p> | <ul style="list-style-type: none"> • Good plan of attack developed collaboratively • Find the whole package great • Highlights programs • Herbicides, harvesting, shoreline clean-up • Prioritizes in lake and around the lake activities • The Strategy includes a decision-making tool, a multivariate process requiring specification of criteria, criteria weighting and, ultimately criteria scoring and summation to develop a priority seriatim of projects. We are concerned these criteria and weightings favor certain outcomes (e. g., numerous environmental criteria versus few socioeconomic criteria) and that the Strategy does not include “clear and concise, yet detailed, rationale for all findings and recommendations, including key assumptions and data gaps” for the included criteria and weightings as required in the Project Scope (3). • Increasing emphasis on prioritizing money for watershed projects • MCA tool & most up-to-date comprehensive evaluation of critical focal areas for in-lake and watershed efforts |
| <p>Chautauqua County Memorandum of Agreement</p> | <ul style="list-style-type: none"> • Collaborative, limits herbicide zones • Keeps herbicides out of the north basin • Furthers collaborations that already existed via the organizations’ Conservation Statement • Every member needs to comply • We all need to work together to improve the lake • MOA compliance is a disaster. Inconsistent enforcement of MOA tenets. 75% of the MOA requirements are not met after a year. Those which have been met are almost all associated with herbicides. • Emphasis on 3rd party science-based information; consideration of impact on algae of plant management practices; collaboration; 3rd party monitoring • The collaborative intent of this document is critical to a successful alignment of the stakeholders – hopefully, all stakeholders will eventually sign on |
| <p>SOLitude Lake Management reports</p> | <ul style="list-style-type: none"> • Very little, corporate self-interest directed. • Continue chemical treatment • Weed surveys • Survey data and report used as foundation for herbicide application program. Comprehensive of entire lake. • None. Conflict of interest, data not available for review, some data questionable |
| <p>Princeton Hydro reports</p> | <ul style="list-style-type: none"> • Somewhat informative • Post treatment testing • 3rd party monitoring of herbicide treatments. Reviewed and used as part of herbicide application program. Compared results to Solitude and Racine-Johnson reports. Comprehensive of herbicide treated areas. • Too limited in time frame and scope to be of much help. Should be required to be more expansive over time and sites to be more definitive |

| Chautauqua Lake Documents | What aspects do you find helpful? |
|---|---|
| Racine-Johnson Aquatic Ecologists reports | <ul style="list-style-type: none"> • Longevity of Chautauqua Lake knowledge/research, scientific authenticity • Very informative. Very relevant due to industry standards status • Long-term data source • Used as a comparison to other surveys. Information contained in report is subjective and not comprehensive of the lake. It is not utilized to determine herbicide application. Weed harvesting is not listed as a tool to use for lake management. Its inaccuracies and misrepresentation of data are too many to list. • Very valuable in high quality long term macrophyte & invertebrate herbivores and mussel monitoring; only consistent long term data set for the lake • Extremely detailed vegetation assessments based on long-term monitoring. The authoritative aquatic vegetation survey for CHQ Lake. |
| Other research or monitoring reports (please specify) | <ul style="list-style-type: none"> • CSLAP and HABs Monitoring, E&E White Paper • SEIS – Comprehensive, up to date, approved by DEC • Audubon IBA designation for CHQ Lake https://www.audubon.org/important-bird-areas/chautauqua-lake - CHQ Lake is an important stopover location for migrant birds, particularly waterfowl. At least 270 species have been documented. • Potential impact information for our immediate shoreline. Especially with herbicides |

2.2 Update to MCA Tool Criteria and Weighting Factors

In section 3 of the questionnaire, participants were asked to review and indicate how they would alter the 2018 weighting factors (higher, lower, or the same ↔). Figures 1 and 2 summarize the responses for both watershed and in-lake projects, respectively.

Figure 1
Responses to Weighting Factors of Watershed Projects

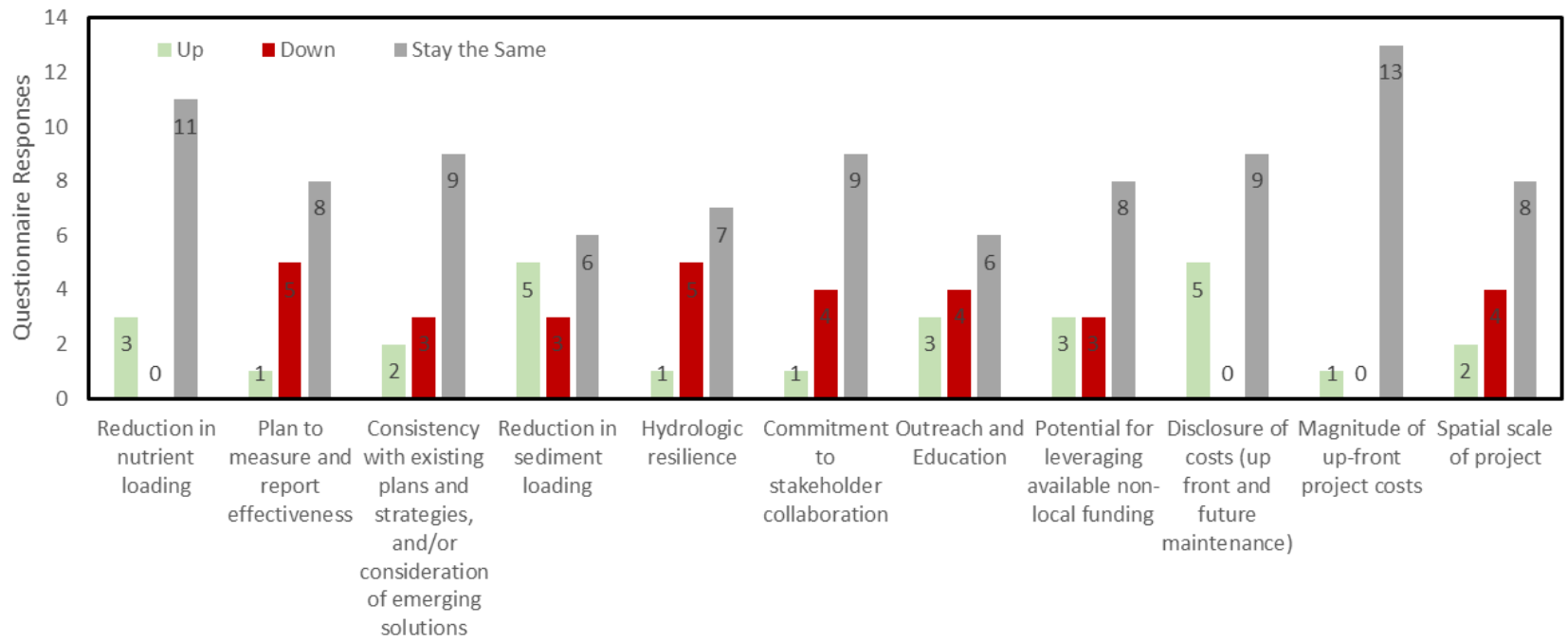
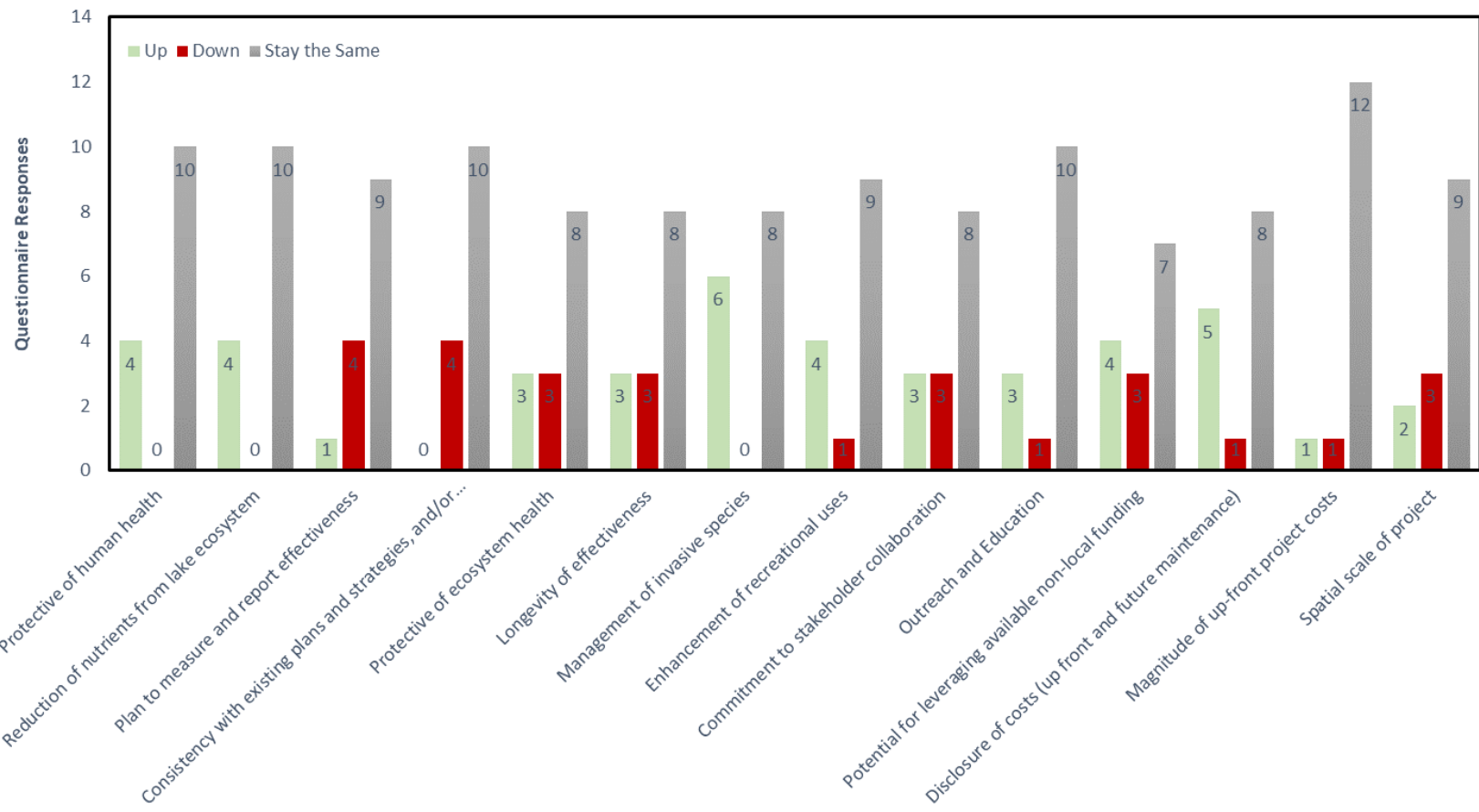


Figure 2
Responses to Weighting Factors of In-Lake Projects



2.3 Comments on Criteria and Weighting Factors

In section 3a of the questionnaire, participants were asked to comment on the criteria and weighting factors of the 2018 Multicriteria Analysis Tool and to indicate what, if anything, they would add, delete, or change to update the MCA tool to 2020 conditions?

Table 4
Summary of Criteria and Weighting Factors for In-Lake Projects

| Responses |
|--|
| <p>Focus on a responsible balance of projects that are weighted heavily toward long-term solutions with just enough short-term management strategies to address targeted, limited zones/areas. Need a much heavier weight on nutrient loading and harvesting with cleanup. Limit herbicide use to very small, non-sensitive areas that can't be addressed effectively by harvesting. Add and heavily weight risk to environment for in-lake projects. Add financial sustainability to in-lake projects. Add risk of not doing watershed projects to list. Add impact on algae to in-lake and watershed projects.</p> |
| <p>All should be left as is. No changes should be made at this point in time. The Tool has only been used twice. The Five-Year Strategy has not had time to unfold. An appropriate evaluation time has not passed. Although this survey's BACKGROUND opening remarks references current day activity, nothing in the BACKGROUND remarks justifies making changes to the tool. The activities already fit within the scope of the tool.</p> |
| <p>What needs to change is to stop the Alliance Board from varying from the Tool's rating scale when it makes funding recommendations (which have been so blatantly designed as to serve political purposes instead of proper lake and watershed management purposes). The Tool should not be redesigned to serve social-political interests due to the pressure that is being received from such interests and which has very obviously caused this premature revisiting of the criteria.</p> |

Responses

In order to maintain or enhance the water quality, plant conditions and ecological health of the lake over the long term, maintaining or increasing the overall percentage of forest and wetland coverage in the watershed is essential. Otherwise incremental loss of natural forest, wetlands and successional lands to urbanization or other uses will result in increased stormwater discharges, erosion and sediments and nutrients to tributaries and the lake itself, negating benefits of tertiary sewage treatment and other BMPs. In addition, climate change is driving more frequent severe runoff events leading potentially to increased erosion, runoff and nutrient and sediment loading to the lake. Stormwater capture & infiltration is essential to future successful lake management. Therefore:

1. Table 1 Additional criteria needed under Environment
 - a. Conservation/enhancement/restoration of forests, wetlands and successional natural lands for stormwater capture & infiltration (50), Conservation/enhancement of filtration ecosystem services (Forest & wetland conservation/riparian buffer conservation); reduction of forest fragmentation (50)
 - b. Climate change resilience (add weighting factor of 30)
2. In order for programs and projects of substantial scale and scope to be developed in the watershed, multi-year funding is needed for successful projects. Also, monitoring needs to be multi-year, as natural variations in weather and natural systems impact field conditions that can make detecting trends not possible.
3. Table – 2 Management of invasive species: break down into subcategories:
 1. Naturalized/well established non-native invasives (*Myriophyllum spicatum*, *potamogeton crispus*)
 2. Newly emerging non-native invasives (*Hydrilla*, *Trapa natans*, etc.)
4. Maintain or increase funding for watershed preventive projects and programs
5. Table 3b Regulatory acceptance – should be better defined: Just because an herbicide is EPA or NYSDEC approved doesn't mean it is appropriate for use on particular sites or species in Chautauqua Lake, as local conditions, sensitive non-target species and environmental sensitivities may make it not appropriate for the proposed locations.

Given the complexity and dynamic nature of the issues impacting CQ Lake and its watershed, we believe that outreach and education efforts will need to increase and will need to be assigned a higher weight in the MCA tool. Increased awareness of the lake's challenges, management goals, and project outcomes is critical to raise stakeholder support, as well as community and individual engagement. More effective, unified communication will positively impact other criteria in the environmental, social, and economic, social categories.

With more scientific data and new players and techniques entering our lake, the tool will need flexibility to address items such as how HABs are treated. As in the past some common sense will need to help guide us in some areas.

Responses

Overall comments: 5-year implementation strategy should be changed to reflect a new strategy inclusive of all lake management techniques and increased efforts towards HABs - both internal and external phosphorus loading. Flawed assumptions and inaccurate/incomplete reports/studies have led to a strategy that is not fully inclusive. The watershed management plan and MMS are not inclusive and are difficult to implement. The phosphorus TMDL and NYS HABs action plan are great examples of why internal lake loading needs to be considered higher than in the past. The focus has been on external loading. When major projects (i.e., WWTPs) are funded by the County, any tool that is used should only consider those activities that are not funded by the County and where grant money is needed to meet the overall implementation strategy. Projects need to be evaluated before, during and afterwards to see if they met objectives. If only the MCA tool is changed, then nothing will really be achieved. Flawed assumptions need to be addressed along with inaccurate/incomplete data in reports/studies.

The tool is focused on studies/reports and not on operational based projects such as herbicides, MobiTrac and shoreline cleanup, weed harvesting and surveys to support the in lake management of such. We suggest that the tables be changed completely. There needs to be a separate table for lake management inclusive of the items mentioned above. With the increased focus on HABs, a separate table for internal/external lake loading weighted more towards in lake (as reflected in the phosphorus TMDL and the HABs action plan for NYS) related projects is needed. Finally, a separate table or funding option for community outreach is needed. This shouldn't need a table and the Alliance Science committee could determine what/if any community outreach is needed for the upcoming year. If this sort of approach is taken, all the white noise and subjective weighting that is part of the current MCA table would go away. Lake Maintenance and Operations shouldn't be looked at as a project and judged in a tool that is made to evaluate projects.

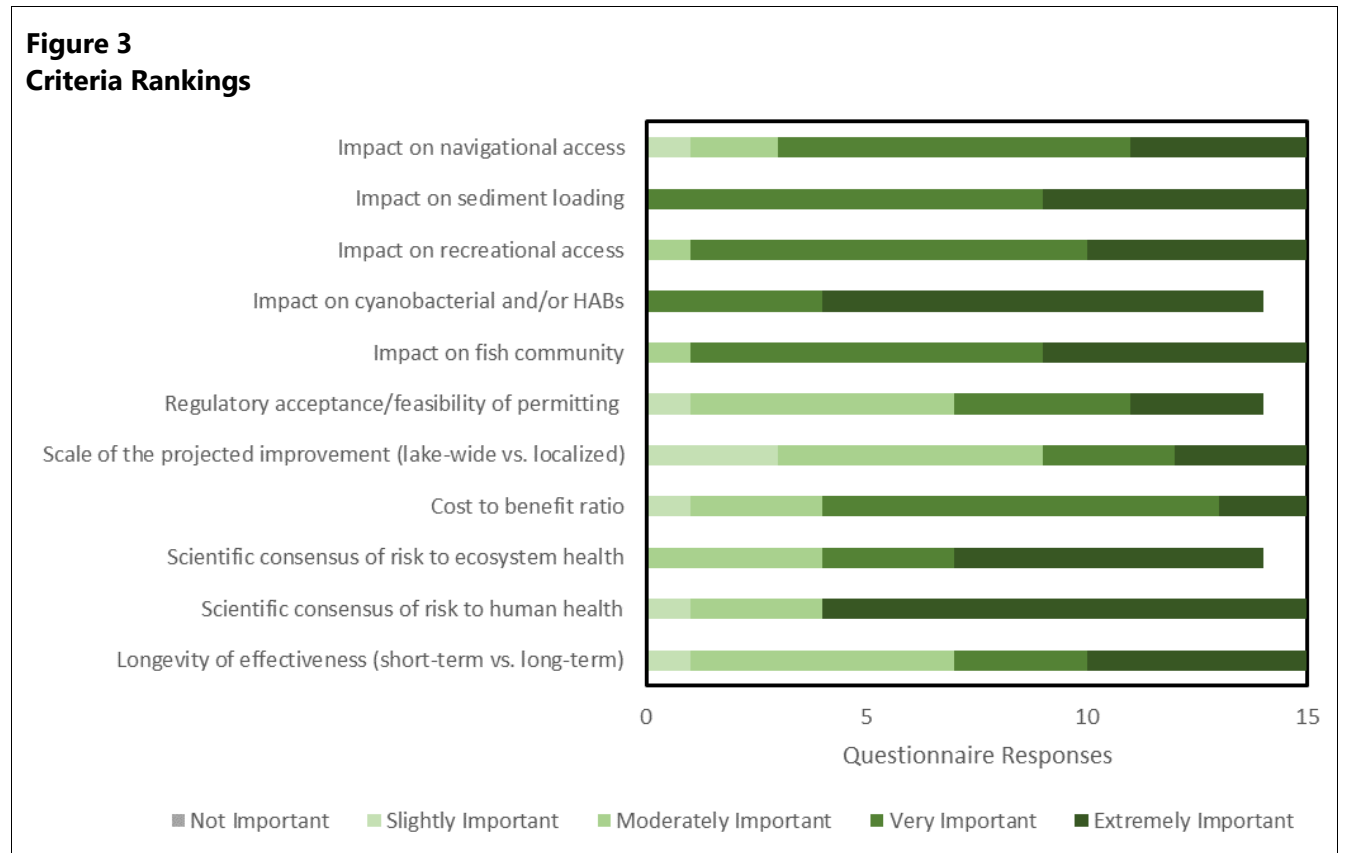
Table 1 and 2:

If the MCA tool is not changed then a complete rewrite of Table 1 and Table 2 is warranted. Here are a few of the items that should be changed at a minimum

Overall weight for each category should be changed. Environment should be less than the current rating; social should be more. Economic should be more of a check to see if the project should be funded by the Alliance with a yes or no question, and if its funded by grants or through the county. Also, commitment to stakeholder collaboration should be a yes or no question. If this is done, then Environmental and Social should have the same weights. Social should be given a few other areas for evaluation such as increases in property value, effect on tourism. The same Table should be used to evaluate all projects. Environmental should include reduction of nutrient loading. Consistency with existing plans shouldn't be a consideration if the project meets the requirements for the implementation strategy. Consideration for similar projects accomplishing the same thing need to be evaluated. The MCA tool favors studies and reports over actual work or improvements being completed.

2.4 Criteria Rankings

In section 3b of the questionnaire, participants were asked to share their group's rankings of particular criteria and indicate whether it is viewed as not important, slightly important, moderately important, very important, or extremely important. Results are displayed in Figure 3.



2.5 Stakeholder Concerns

In Section 4 of the questionnaire, stakeholders were asked to share their views on important issues within the Chautauqua Lake watershed and indicate its importance (not important, slightly, moderately, very, or extremely important). Figure 4 summarizes the responses.

Figure 4
Stakeholder Concerns

